



Golder Associates Inc.
CONSULTING ENGINEERS

*Industri-plex
G.H.
OUI*

INTERIM REPORT NO. 2



SDMS DocID 000230859

SDMS # 230859

BASELINE AIR SURVEY
PRE-DESIGN INVESTIGATION TASK A-1
INDUSTRI-PLEX SITE
WOBURN, MASSACHUSETTS

Prepared for:

Industri-Plex Site Remedial Trust
800 North Linbergh Boulevard
St. Louis, Missouri

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September 1990

Project No.: 893-6255





Golder Associates Inc.
CONSULTING ENGINEERS

September 14, 1990

Project No. 893-6255

United States Environmental Protection Agency
Waste Management Division
J.F.K. Federal Building, HRS-CAN-3
Boston, MA 02203-2211

Attn: Joseph DeCola
Remedial Project Manager

RE: INDUSTRI-PLEX SITE, BASELINE AIR SURVEY,
INTERIM REPORT NO. 2

Gentlemen:

On behalf of the Industri-Plex Site Remedial Trust, we are submitting the attached Interim Report No. 2 for Pre-Design Investigation Task A-1, Baseline Air Survey. These data, along with data from future sampling rounds, are intended to document the baseline air quality at the site prior to initiation of Remedial Action.

If you have any questions, please contact us.

Very truly yours,

GOLDER ASSOCIATES INC.

James W. Voss

James W. Voss
Principal

RMG/JWV/bjt
C:A-1CL

Attachments

cc: D.L. Baumgartner, ISRT (w/o attachments)
W.L. Smull, ISRT (w/o attachments)

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1.0 INTRODUCTION

1.1 Objectives

One of the requirements of the Consent Decree for the Industri-Plex Site Pre-Design Investigation, as stated in the Remedial Design/Action Plan (RDAP), is to conduct:

"a baseline investigation to establish an effective air monitoring program and to determine acceptable on-site and off-site air quality standards for hazardous volatile compounds and/or other odorous compounds and dust relative to planned grading, consolidation, excavation, dredging, groundwater treatment and capping activities."

A baseline air survey is being conducted under Pre-Design Investigation Task A-1 to document the baseline conditions relative to potential types of emissions expected during remedial action. Specifically, the air survey addresses Air Data Need No. 3 given on page 107 of the Pre-Design Work Plan. Target Compound List volatile organic compounds (TCL VOCs) constitute the hazardous volatile compounds, and reduced sulfur compounds (including hydrogen sulfide and methyl mercaptan) constitute the major odorous compounds. The concentration of dust (as well as the concentrations of arsenic, lead, and chromium in dust) will also be determined.

Four rounds of air sampling are planned. This interim report presents the methods and results for the second round of air sampling conducted in August 1990. An additional Interim Report will be prepared for the third quarter sampling results. Proposed air quality standards will be developed and presented with the results of all four sampling rounds in the Interim Final Report for Pre-Design Task A-1.

1.2 History and Source Areas

Pertinent site history regarding air quality and the results of previous investigations are given in Section 3.5.3.1 and Appendix A of the Pre-Design Work Plan. The Record of Decision (ROD) states that repeated complaints have been received from local citizens in the past, especially southeast of the site, with respect to offensive odors generated by the hide piles. These complaints have been associated with former site development activities and rain storms. Increased odors during storms are believed to be largely due to exposure of fresh areas of the hide piles to the atmosphere after slumping of the unstable slopes, and due to increased emissions as a result of pressure gradients induced by lower barometric pressure during storms events.

The hide piles are a source of odors at the site. The composition of the hide pile gas was determined during the Remedial Investigation, and the odorous areas and compounds at the site were identified by soil gas sampling/laboratory analysis and use of an odor panel. The East Hide Pile was determined to be the dominant odor source. The odorous compounds were determined to be mainly hydrogen sulfide, which occurred at concentrations of 5,600 to 21,000 ppm within the East Hide Pile. Hydrogen sulfide was not detectable above ground using portable monitoring equipment. Methyl mercaptan was detected in East Hide Pile gas at concentrations ranging up to 150 ppm. Other mercaptan compounds were also detected at individual concentrations of up to 180 ppm. Benzene and toluene were detected in East Hide Pile gas at 1 to 11 ppm. Additional compositional data for the East Hide Pile gas are being collected under Pre-Design Investigation Task A-2. The East Hide Pile remediation

will include a gas collection layer and a gas treatment plant.

Benzene and toluene could also potentially be emitted from the groundwater treatment plant which will be installed in order to remediate Hazardous Substances in groundwater. Dust, and metals in dust, might be introduced into the air during site grading and capping activities that will remediate Hazardous Substances in soil.

2.0. FIELD METHODS

Sampling locations were selected based upon the results of air dispersion modeling using regional meteorological data conducted during the Remedial Investigation/Feasibility Study (RI/FS) and the historical locations of odor complaints. Sample locations were given in Figure 47 of the Pre-Design Work Plan. Some of the sampling points were slightly relocated based upon a field inspection by Mr. Bob Glazier (Golder Associates Task Leader) and Mr. Arnie Ostrofsky (NUS Project Manager). The revised locations are given in Figure 1 of this report along with the location numbers used in the laboratory report. The field duplicate was designated location number 13. The trip blank for the dust filter cassettes was numbered 14, the spike cassette was numbered 15, and additional trip blanks for dust cassette filters were numbered 15 through 20. The trip blank and spiked Summa canisters were not assigned sample location numbers.

Air samples were collected in accordance with the procedures given in Section 5.1 and Attachment 1 of the Pre-Design Investigation Field Sampling Plan (FSP). An initial attempt to collect samples during a 24-hour period on July 16-17, 1990, failed because the sampler at location 12 was stolen and two of the Summa canisters had a vacuum reading of 0 inches of mercury after sampling (which renders the contained sample unusable). Therefore, the Summa canisters were shipped back to the laboratory to be cleaned and calibrated for resampling. Replacement samples were collected, along with replacement dust samples in new filter cassettes, during a 24-hour period on August 6-7, 1990.

The sampler inlets were positioned at least three feet above average grade by either placing them on top of large isolated boulders (locations 2, 6, 7, 8, and 12) or suspending them from low tree branches (locations 1, 3, 4, 5, and 11) such that other nearby branches did not obstruct the sampler inlet ports. The sampler at location 10 was suspended from the top of unused playground equipment in the middle of an open field. At location 9, the samplers were positioned on top of a overhang above the school doorway on the side of the school facing the Industri-Plex Site. The school principal indicated that classroom windows must be shut at times due to odors from the site.

All sampler inlets were facing into the wind at the start of sampling. A duplicate sample was collected for all analyses at location 5, and a trip blank canister and filter cassette accompanied the samplers on the round trip from lab to site and back to the lab. A Summa canister spiked with the reduced sulfur analytes (hydrogen sulfide, methylmercaptan, dimethylsulfide, and dimethyldisulfide) was shipped to the site on the first day of sampling and back to the laboratory with the samples the following day.

TCL VOCs, methane, and reduced sulfur compounds were collected in 15-liter Summa passivated canisters. The vacuum flow regulators were calibrated to approximately 8 milliliters per minute by the laboratory and the flow rate/vacuum pressure was recorded by the laboratory on the canister chain-of-custody record prior to shipping. The vacuum pressure was checked and recorded in the field prior to and after sampling. Upon receipt by the laboratory, the vacuum pressure and vacuum flow regulator calibration were checked and recorded. These checks are documented on the canister chain of custody forms (given

in the lab report in Appendix A) and in Table 1. Sampling was initiated by removing the inlet valve dust cover and opening the valve. The valve was closed and the inlet dust cover replaced approximately 24 hours later. Chain of custody documentation was completed and the samples were sealed in shipping containers and sent by overnight courier to Enseco's Air Toxics laboratory in El Monte, California.

Dust was collected on filter cassette cartridges using an SKC Model 224-PCXR7 programmable personal sampling pump. The pump was set to a flow rate of 2 liters per minute just prior to sampling using a rotameter which had been calibrated to a primary standard (1000-ml film type flowmeter). Correction of the flow rate to standard dry air conditions (760 mm Hg, 298 K [25 degrees Celcius], 0 percent relative humidity) results in a flow rate of 1982 ml/min using the time-weighted-average conditions given in Section 6 below. The pump was programmed to alternately pump for one minute then shut down for two minutes such that approximately 951 liters of air was sampled over a period of 24-hours. Two separate pumps were used to collect field duplicate dust samples at location 5. Twenty four hours after the start of sampling, the pumps shut down, the inlet caps were replaced on the cassettes, and they were shipped under chain of custody to Enseco-East in Somerset, New Jersey by overnight courier. The flow rate of each pump was checked after sampling. The flow checks for the dust sampling pumps are documented in Table 1 and Appendix B. The final flow rate of all dust sampling pumps was within 10 percent of the original flow rate (see Table 1 and Appendix B).

All samplers deployed on August 6, 1990, appeared to be intact and did not show evidence of tampering. The vacuum pressure of all Summa canisters were checked upon receipt at the laboratory and were within 1 inch mercury of the value recorded in the field, except for the canister at location 1, which was within 3 inches mercury of the reading at the end of sampling (see Table 1 and lab report in Appendix A). The flow rate of all vacuum flow regulators was within 9 percent of the original flow rate, except for the canister at location 8, which was within 15 percent. The dust pumps at locations 4 and 8 had prematurely ceased sampling after 665 and 543 minutes (out of a planned total of 1440 minutes).

3.0 LAB METHODS

Summa canister samples were received by Enseco on August 8, 1990. Dust cassette samples were received by Enseco-East on August 8, 1990. Samples were analyzed in accordance with the procedures and analytical methods given in the FSP and the QAPjP.

It was not possible to spike the Summa canisters with both sulfur containing compounds and TCL VOCs because they would react with each other. Therefore, because the odorous sulfur compounds are of greatest concern at the site, the canisters were only spiked with the sulfur compounds.

Laboratory Control Samples and Duplicate Control Samples were analyzed with each batch of samples from the site.

4.0 LAB RESULTS

The results of the analyses are presented in Appendix A and summarized in Tables 2 and 3. Methane and reduced sulfur compounds were not detected in any of the samples. The following TCL VOCs were detected (maximum concentrations detected in parentheses): trichlorofluoromethane (72 ppbv); 1,1,2-trichloro-1,2,2-trifluoroethane (32 ppbv); 2-butanone (56 ppbv); 1,1,1-trichloroethane (32 ppbv); and toluene (20 ppbv). None of the above compounds were detected in the trip blank. Total dust measurements range from 160 to 1500 micrograms per cubic meter. Data for analysis of arsenic, lead, and chromium in dust have not been completed by Enseco-East at this time and will be submitted in a supplemental report when they are received.

5.0 ASSESSMENT OF DATA USABILITY

There are no hold times for these analyses, but it was planned to analyze as many of the sensitive compounds as possible within 72 hours of receipt by the lab. Sensitive analyses include TCL VOCs and reduced sulfur compounds. Nine of the thirteen TCL VOC and six of the sulfur compound samples were analyzed within 72 hours of receipt by the lab. The four remaining TCL VOC samples were analyzed 6 days after receipt, and the 7 remaining reduced sulfur samples were analyzed 7 days after receipt by the lab. The sulfur compound stability study documented in the lab report indicates that sulfur compounds might have been slightly affected by storage. However, the sample storage effects were noted on spiked canisters stored for a period of seven days during the first round of sampling. Any corrections to the data will be assessed when all four rounds of spike sample stability data are available. There are no project-specific data to support such a conclusion for the TCL VOCs, but stability studies have been performed for select TCL VOCs, and these will be included with the final report.

The Laboratory Control Samples (LCS) and Duplicate Control Samples (DCS) for the TCL VOCs, reduced sulfur compounds, methane, and metals in dust were within the control limits, indicating that laboratory precision and accuracy were acceptable. Reproducibility of the field duplicates is acceptable. All analytes in the field duplicate pair were less than the method detection limit except for 2-butanone which was detected in one of the duplicate samples, but at less than two times the method detection limit.

As discussed above, spike recoveries were within control limits for dimethylsulfide and dimethyldisulfide, but spike recoveries for hydrogen sulfide (63 percent) and methylmercaptan (51 percent) were not within the specified control limits. As discussed above, any corrections to the data will be assessed when all four rounds of spike stability data are available.

The total dust measurement data are presented in Table 3. The data have been corrected for mass loss in the blank filters (by adding the mass loss in the blanks) and for the actual volume of air sampled, which varied slightly at each location.

Data were reported for all samples. However, a sample was not collected at location 12 due to repeated tampering and vandalism. The overall data set is considered to be complete. Data are reported in standard units and were determined using accepted procedures. Therefore, the data are considered to be precise, accurate, comparable, complete, and representative of the conditions at the time of sampling.

6.0 METEOROLOGICAL DATA

Meteorological data, including wind speed and direction, relative humidity, temperature, and barometric pressure were recorded by the site weather station during sampling. The data are presented in Appendix C. The performance of the meteorological system was audited by C.T. Main, Inc. prior to sampling. The audit report is given in Appendix D. The results of the audit indicate that all instruments were providing acceptable data. Previously reported problems with the relative humidity probe were resolved prior to sampling.

Conditions at the site during sampling were very hazy and humid. The average temperature, barometric pressure, and humidity during the sampling period were 22.07 degrees centigrade, 762.5 millibars, and 85.13 percent [vapor pressure of water=16.98 mm Hg], respectively. At the beginning of sampling (11:45), the dominant wind direction was from the south and the average wind speed was approximately 10 miles per hour (mph). Approximately 90 minutes later (13:15) the dominant wind direction was from the east-southeast and the average wind speed was 4 mph. The wind speed/direction remained relatively constant for the remainder of the sampling period. Because all of the samplers were not deployed by 13:15, the first half of the samplers to be deployed collected samples when the wind was from the south. The first sampler to be deployed contained the largest fraction of input from the southern component, and samplers deployed after 13:15 received no input from the southern component. Samplers were deployed in the following order prior to 13:15 (see Figure 1 for locations): 2, 5, 13, 1, 4, 10.

7.0 DATA REDUCTION

The concentration data for methane, reduced sulfur compounds, and TCL VOCs are reported by the laboratory in parts per million and parts per billion by volume (ppmv, ppbv) and therefore do not need to be corrected to standard pressure and temperature. Relative humidity corrections result in changes of less than 1 percent in the results and have not been applied to the data because the accepted precision of the method can cause results to differ by up to 20 percent. Data for dust have already been corrected to standard conditions by correcting the flow rate of the sampling pumps to standard conditions.

8.0 SUMMARY

The second round of air samples under Pre-Design Task A-1 were collected in accordance with the Pre-Design Work Plan and Field Sampling Plan. All samples were analyzed in accordance with the procedures given in the Field Sampling Plan. No reduced sulfur compounds or methane were detected at any of the sample locations. The only Target Compound List VOCs detected include trichlorofluoromethane (Freon 11); 1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113); 2-butanone (MEK); 1,1,1-trichloroethane; and toluene. None of these compounds were detected in the trip blank. The range in total dust concentrations was 160 to 1500 micrograms per cubic meter. Valid data were collected for all analytes at all locations except location 12, which was not sampled. Location 12 is not considered to be critical, and the data do not need to be replaced. The data at sample locations 4 and 8 do not represent a full 24-hour time weighted average because the sampling pumps shut down prematurely.

TABLE 1
SAMPLER CALIBRATION CHECKS

Sampler Type	Location	Flow Rate (ml/min)		Vacuum Pressure(a)	
		Initial	Final	Lab	Field
Summa	1	8.0	7.8	30/15	30/18
Canister	2	8.1	8.0	30/12	30/12
	3	8.0	7.4	30/14	30/15
	4	8.2	7.6	30/12	30/12
	5	8.0	8.0	30/15	30/16
	6	8.2	8.0	30/14	30/14
	7	7.9	7.2	30/08	30/08
	8	8.2	7.0	30/14	30/14
	9	8.2	8.6	30/15	30/16
	10	8.2	7.6	30/11	30/12
	11	8.1	7.4	30/09	30/10
	12	NA	NA	NA	NA
	13(b)	8.0	7.4	30/14	30/14
	14(c)	NA	NA	30/29	30/30
	Dust Pump(d)	1	56	52	NA
2		56	56	NA	NA
3		56	55	NA	NA
4		56	53	NA	NA
5		56	57	NA	NA
6		56	55	NA	NA
7		56	53	NA	NA
8		56	56	NA	NA
9		56	53	NA	NA
10		56	54	NA	NA
11		56	57	NA	NA
12		NA	NA	NA	NA
13(b)		56	54	NA	NA
14(c)		NA	NA	NA	NA

Notes:

- (a) Readings given in inches of mercury. Data include initial/final readings for each canister custodian (field and lab).
- (b) Field duplicate of location 5.
- (c) Trip blank.
- (d) Flow rate values for dust pumps are original rotameter readings and have not been converted to ml/min.

TABLE 2
SUMMARY OF VOLATILE TARGET COMPOUND
LIST ANALYTES DETECTED DURING AUGUST 6-7, 1990

Analyte	Location	Concentration (ppbv)	Detection Limit (ppbv)
Trichlorofluoromethane (Freon 11)	7	72	2
1,1,2-Trichloro-1,2,2-trifluoromethane (Freon 113)	2	2.5	2
	8	32	2
1,1,1-Trichloroethane	7	32	3
2-Butanone (MEK)	7	11	5
	10	56	3
	13	4.8	3
Toluene	7	6.7	5
	10	20	3

Note: See laboratory report in Appendix A for listing of compounds which were not detected and their respective detection limits.

TABLE 3
TOTAL DUST MEASUREMENTS DURING AUGUST 6-7, 1990(a)

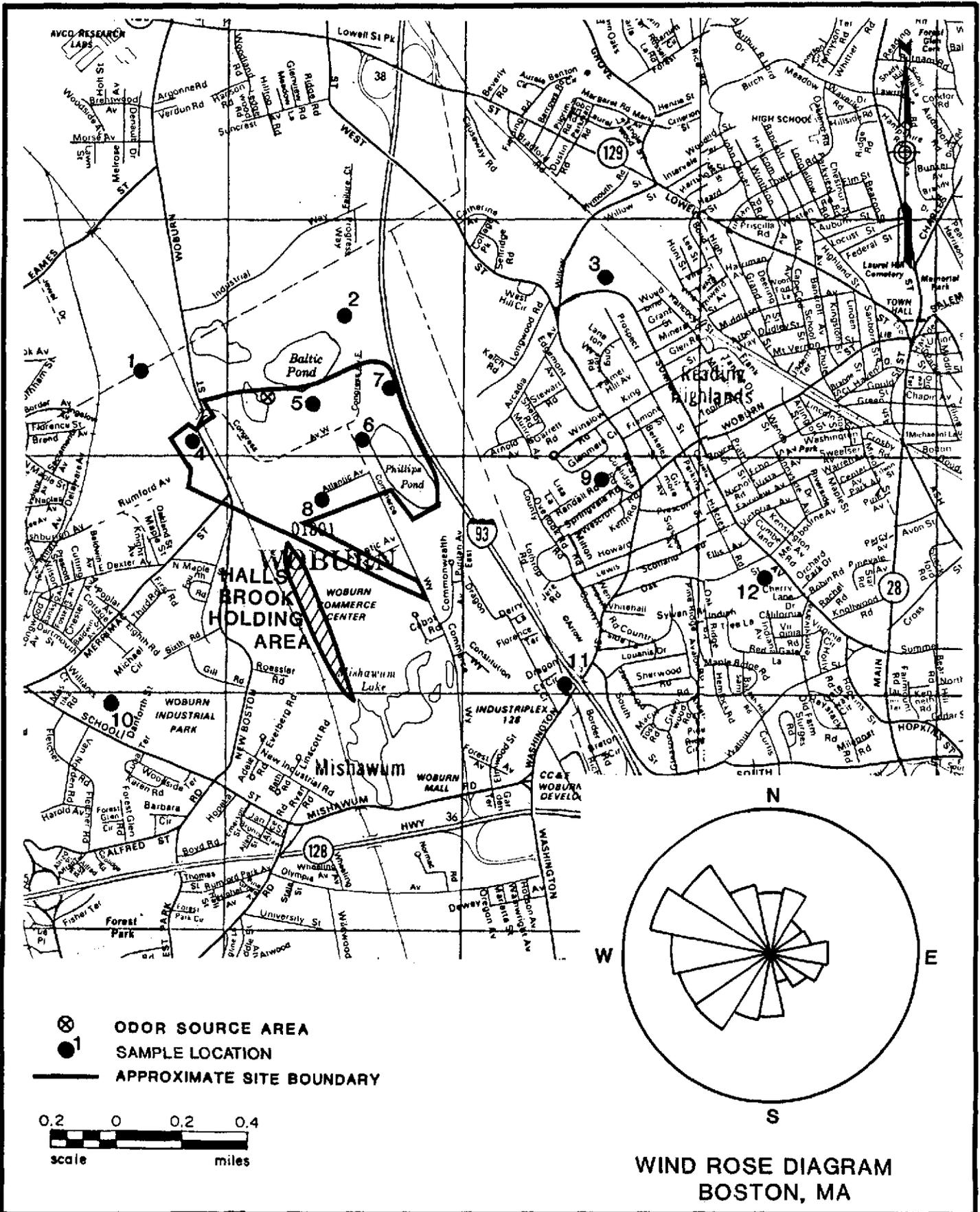
<u>Location</u>	<u>Uncorrected Total Dust (mg)</u>	<u>Corrected Total Dust (c) (mg)</u>	<u>Volume Sampled (m³)</u>	<u>Dust Concentration (ug/m³)</u>
1	0.57	0.88	0.945	930
2	0.34	0.65	0.949	680
3	0.34	0.65	0.943	690
4	0.35	0.66	0.438	1500
5	0.21	0.52	0.945	550
6	0.06	0.37	0.932	400
7	0.10	0.41	0.945	430
8	0.11	0.42	0.359	1200
9	-0.16	0.15	0.939	160
10	0.09	0.40	0.945	420
11	-0.05	0.26	0.936	280
13(b)	0.03	0.34	0.945	360
14(b)	-0.31	NA	0	NA
15(b)	-0.28	NA	0	NA
16(b)	-0.31	NA	0	NA
17(b)	-0.33	NA	0	NA
18(b)	-0.32	NA	0	NA
19(b)	-0.34	NA	0	NA
20(b)	-0.40	NA	0	NA

- (a) These are verbal results. The laboratory report will be forwarded when it becomes available along with the As, Pb, and Cr in dust data.
- (b) Location 13 is a field duplicate of location 5, location 15 is a matrix spike (for As, Pb, and Cr), locations 14 and 16 through 20 are trip blanks.
- (c) Corrected data based upon equation presented below (from NIOSH Method 500) and an average blank filter weight loss of 0.31 mg for location numbers 14 through 20.

$$c = \frac{(W2 - W1)}{V} + \frac{B}{1000} \text{ (in mg/m}^3\text{)}$$

where:

- W1 = tare weight of filter before sampling (mg)
- W2 = post-sampling weight of sample-containing filter (mg)
- B = mean decrease in field blank filter weights after sampling (mg)
- V = volume of air sampled (m³).



JOB NO.	893-6255	SCALE	AS SHOWN
DRAWN	LAS	DATE	07/06/90
CHECKED	RMG	DWG. NO.	MA01-096

AIR SAMPLE LOCATIONS

INDUSTRI-PLEX SITE REMEDIAL TRUST

FIGURE 1

APPENDIX A
LABORATORY REPORT

Enseco - Air Toxics Laboratory

9537 Telstar Avenue, Suite 118 • El Monte, CA 91731
(818) 442-8400 • FAX: (818) 442-3758

September 6, 1990

GOLDER ASSOCIATES
20000 Horizon Way, Ste. 500
Mt. Laurel, NJ 08054
ATTN: MR. BOB GLAZIER

ANALYSIS NO.: A9022002-001/015
ANALYSES: Sulfur Compounds (CARB 16),
Methane (SCAQMD Method 25.2), Volatile
Organics by GCMS - EPA T014
DATE SAMPLED: 24 hour composite
samples taken on 8/07/90
DATE SAMPLE REC'D: 8/08/90

PROJECT: INDUSTRIplex

Enclosed with this letter is the report on the chemical and physical analyses on the samples from ANALYSIS NO: A9022002-001/015 shown above.

The samples were received by ENSECO Air Toxics Laboratory, intact and with the chain-of-custody record attached.

Please note that ND means not detected at the detection limit expressed.


REVIEWED


APPROVED

Enseco - Air Toxics Laboratory

9537 Telstar Avenue, Suite 118 • El Monte, CA 91731
(818) 442-8400 • FAX: (818) 442-3758

LABORATORY REPORT

GOLDER ASSOCIATES
20000 Horizon Way, Ste. 500
Mt. Laurel, NJ 08054
ATTN: MR. BOB GLAZIER

ANALYSIS NO.: A9022002-005/009/010
ANALYSES: Methane (SCAQMD 25.2)
DATE SAMPLED: 8/07/90
DATE SAMPLE REC'D: 8/08/90
DATE ANALYZED: 8/08/90
SAMPLE TYPE: Air
QC BATCH NO.: GC101-9008081

METHANE

<u>SAMPLE IDENTIFICATION</u>	<u>SAMPLING TIME</u> <u>8/07/90 (Composite)</u>	<u>RESULTS</u> <u>ppm (vol/vol)</u>
1P/A-1/005/000/3/2/6 A-067 Location 5	1159	ND(8)
1P/A-1/009/000/3/2/6 A-075 Location 9	1400	ND(8)
1P/A-1/010/000/3/2/6 A-069 Location 10	1258	ND(8)

The Report Cover Letter is an integral part of this report.

Enseco - Air Toxics Laboratory

9537 Telstar Avenue, Suite 118 • El Monte, CA 91731
(818) 442-8400 • FAX: (818) 442-3758

LABORATORY REPORT

GOLDER ASSOCIATES
20000 Horizon Way, Ste. 500
Mt. Laurel, NJ 08054
ATTN: MR. BOB GLAZIER

ANALYSIS NO.: A9022002-001/004, 006/008
ANALYSES: Methane (SCAQMD 25.2)
DATE SAMPLED: 8/07/90
DATE SAMPLE REC'D: 8/08/90
DATE ANALYZED: 8/09/90
SAMPLE TYPE: Air
QC BATCH NO.: GC101-9008081

METHANE

<u>SAMPLE IDENTIFICATION</u>	<u>SAMPLING TIME</u> 8/07/90 (Composite)	<u>RESULTS</u> ppm (vol/vol)
1P/A-1/001/000/3/2/6 A-078 Location 1	1225	ND(8)
1P/A-1/002/000/3/2/6 A-071 Location 2	1140	ND(8)
1P/A-1/003/000/3/2/6 A-072 Location 3	1342	ND(8)
1P/A-1/004/000/3/2/6 A-095 Location 4	1236	ND(8)
1P/A-1/006/000/3/2/6 A-068 Location 6	1451	ND(8)
1P/A-1/007/000/3/2/6 A-096 Location 7	1502	ND(8)
1P/A-1/008/000/3/2/6 A-074 Location 8	1315	ND(8)

The Report Cover Letter is an integral part of this report.

Enseco - Air Toxics Laboratory

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(818) 442-8400 • FAX: (818) 442-3758

LABORATORY REPORT

GOLDER ASSOCIATES
20000 Horizon Way, Ste. 500
Mt. Laurel, NJ 08054
ATTN: MR. BOB GLAZIER

ANALYSIS NO.: A9022002-011/012/013
ANALYSES: Methane (SCAQMD 25.2)
DATE SAMPLED: 8/07/90
DATE SAMPLE REC'D: 8/08/90
DATE ANALYZED: 8/10/90
SAMPLE TYPE: Air
QC BATCH NO.: GC101-9008081

METHANE

<u>SAMPLE IDENTIFICATION</u>	<u>SAMPLING TIME</u>		<u>RESULTS</u> ppm (vol/vol)
	8/07/90 (Composite)		
1P/A-1/011/000/3/2/6 A-079 Location 11	1410		ND(8)
1P/A-1/012/000/3/2/6 A-070 Location 13	1159		ND(8)
1P/A-1/014/000/3/2/6 A-073 Trip Blank	1700		ND(8)

The Report Cover Letter is an integral part of this report.

This report pertains only to the samples investigated and does not necessarily apply to other apparently identical or similar materials. This report is submitted for the exclusive use of the client to whom it is addressed. Any reproduction of this report or use of this Laboratory's name for advertising or publicity purposes without authorization is prohibited.

Enseco - Air Toxics Laboratory

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LABORATORY REPORT

<p>GOLDER ASSOCIATES 20000 Horizon Way, Ste. 500 Mt. Laurel, NJ 08054 ATTN: MR. BOB GLAZIER</p>	<p>ANALYSIS NO.: A9022002 ANALYSES: Methane (SCAQMD 25.2) DATE SAMPLED: 8/07/90 DATE SAMPLE REC'D: 8/08/90 DATE ANALYZED: 8/08/90 SAMPLE TYPE: Air QC BATCH NO.: GC101-9008081</p>
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QC SUMMARY
Methane

<u>Compounds</u>	<u>Laboratory Control Sample % Recovery</u>	<u>Duplicate Control Sample % Recovery</u>	<u>RPD</u>
Methane	100	99	1
Limits	80 - 120	80 - 120	20

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LABORATORY REPORT

GOLDER ASSOCIATES
20000 Horizon Way, Ste. 500
Mt. Laurel, NJ 08054
ATTN: MR. BOB GLAZIER

ANALYSIS NO.: A9022002-002, 005, 006,
010, 012, 013
ANALYSES: Sulfur Compounds (CARB 16)
DATE SAMPLED: 8/07/90
DATE SAMPLE REC'D: 8/08/90
DATE ANALYZED: 8/08/90
SAMPLE TYPE: Air
QC BATCH NO.: GC401-9008081

Sulfur Compounds

Results
ppm (vol/vol)

<u>SAMPLE IDENTIFICATION</u>	<u>Hydrogen Sulfide</u>	<u>Methyl Mercaptan</u>	<u>Dimethyl Sulfide</u>	<u>Dimethyl Disulfide</u>
1P/A-1/002/000/3/2/6 A-071 Location 2	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)
1P/A-1/005/000/3/2/6 A-067 Location 5	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)
1P/A-1/006/000/3/2/6 A-068 Location 6	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)
1P/A-1/010/000/3/2/6 A-069 Location 10	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)
1P/A-1/013/000/3/2/6 A-070 Location 13	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)
1P/A-1/014/000/3/2/6 A-073 Trip Blank	ND(0.02)	ND(0.020)	ND(0.02)	ND(0.02)

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Enseco - Air Toxics Laboratory

9537 Telstar Avenue, Suite 118 • El Monte, CA 91731
(818) 442-8400 • FAX: (818) 442-3758

LABORATORY REPORT

GOLDER ASSOCIATES
2000 Horizon Way, Ste. 500
Mt. Laurel, NJ 08054
ATTN: MR. BOB GLAZIER

ANALYSIS NO.: A9022002-001, 003, 004,
007, 008, 009, 011
ANALYSES: Sulfur Compounds (CARB 16)
DATE SAMPLED: 8/07/90
DATE SAMPLE REC'D: 8/08/90
DATE ANALYZED: 8/14/90
SAMPLE TYPE: Air
QC BATCH NO.: GC401-9008141

Sulfur Compounds

Results
ppm (vol/vol)

<u>SAMPLE IDENTIFICATION</u>	<u>Hydrogen Sulfide</u>	<u>Methyl Mercaptan</u>	<u>Dimethyl Sulfide</u>	<u>Dimethyl Disulfide</u>
1P/A-1/001/000/3/2/6 A-078 Location 1	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)
1P/A-1/003/000/3/2/6 A-072 Location 3	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)
1P/A-1/004/000/3/2/6 A-095 Location 4	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)
1P/A-1/007/000/3/2/6 A-096 Location 7	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)
1P/A-1/008/000/3/2/6 A-074 Location 8	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)
1P/A-1/009/000/3/2/6 A-075 Location 9	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)
1P/A-1/011/000/3/2/6 A-079 Location 11	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)

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LABORATORY REPORT

GOLDER ASSOCIATES
2000 Horizon Way, Ste. 500
Mt. Laurel, NJ 08054
ATTN: MR. BOB GLAZIER

ANALYSIS NO.: A9022002
ANALYSES: Sulfur Compounds (CARB 16)
DATE SAMPLED: 8/07/90
DATE SAMPLE REC'D: 8/08/90
DATE ANALYZED: 8/08/90
SAMPLE TYPE: Air
QC BATCH NO.: GC401-9008081

QC SUMMARY
Sulfur Compounds

<u>Compounds</u>	<u>Laboratory Control Sample % Recovery</u>	<u>Duplicate Control Sample % Recovery</u>	<u>RPD</u>
Hydrogen Sulfide	88	98	11
Methyl Mercaptan	86	89	3
Dimethyl Sulfide	93	90	3
Limit	80 - 115	80 - 115	20

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LABORATORY REPORT

GOLDER ASSOCIATES
2000 Horizon Way, Ste. 500
Mt. Laurel, NJ 08054
ATTN: MR. BOB GLAZIER

ANALYSIS NO.: A9022002
ANALYSES: Sulfur Compounds (CARB 16)
DATE SAMPLED: 8/07/90
DATE SAMPLE REC'D: 8/08/90
DATE ANALYZED: 8/14/90
SAMPLE TYPE: Air
QC BATCH NO.: GC401-9008141

QC SUMMARY
Sulfur Compounds

<u>Compounds</u>	<u>Laboratory Control Sample % Recovery</u>	<u>Duplicate Control Sample % Recovery</u>	<u>RPD</u>
Hydrogen Sulfide	90	95	6
Methyl Mercaptan	84	87	4
Dimethyl Sulfide	95	95	0
Limit	80 - 115	80 - 115	20

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Sulfur Compound Stability Study

A 15L Summa passivated stainless steel canister was spiked with a measured volume of a standard gas mixture (Scott Specialty Gas) containing four sulfur compounds (H₂S, methyl mercaptan, dimethyl sulfide, and dimethyl disulfide). A known volume of hydrocarbon free air was added to the canister to simulate an ambient air matrix. The canister used for this study was identical to those used for the Industriplex project sampled 8/07/90 at 13 sample locations and identified by Enseco analysis #A9022002-001/013. (The canisters were manufactured by the same supplier and were from the same lot).

The spiked canister was analyzed on 8/06/90. The canister was sent to the Industriplex site on 8/06/90. The canister was sent back to the laboratory on 8/07/90 and received by Enseco Air Toxics Laboratory on 8/08/90. The spiked canister was analyzed on 8/08/90. The results are summarized below:

Date	Concentration (ppmv)			
	Hydrogen Sulfide	Methyl Mercaptan	Dimethyl Sulfide	Dimethyl Disulfide
* 8-06-90	1.1	1.2	1.1	1.1
8-06-90	1.3	1.3	1.2	1.1
8-08-90	0.69	0.61	1.2	1.4

* Preparation date and theoretical concentration of spiked canister.

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LABORATORY REPORT

GOLDER ASSOCIATES
 20000 Horizon Way, Ste. 500
 Mt. Laurel, NJ 08054
 ATTN: MR. BOB GLAZIER

ANALYSIS NO.: A9022002-001
ANALYSES: Volatile Organics by GCMS
 - EPA T014
DATE SAMPLED: 8/07/90
DATE SAMPLE REC'D: 8/08/90
DATE ANALYZED: 8/09/90
SAMPLE TYPE: Air
QC BATCH NO.: MS201-9008091

Sample ID: 1P/A-1/001/000/3/2/6
 A-078 Location 1

Volatile Organics by GCMS - EPA T014

<u>Parameter</u>	<u>Results</u>	<u>Detection</u>
	<u>ppb(v/v)</u>	<u>Limit</u>
Dichlorodifluoromethane-----Freon 12----	ND	2
Chloromethane	ND	2.5
1,2,-Dichloro-1,1,2,2-Tetrafluoroethane--Freon 114---	ND	2
Vinyl Chloride	ND	2.5
Bromomethane-----	ND	3
Chloroethane	ND	5
Trichlorofluoromethane-----Freon 11----	ND	1
cis-1,2-Dichloroethene	ND	2
Carbon Disulfide-----	ND	10
1,1,2-Trichloro-1,2,2-Trifluoroethane Freon 113	ND	2
Acetone-----	ND	10
Methylene Chloride	ND	4
trans-1,2-Dichloroethene-----	ND	4
1,1-Dichloroethane	ND	2.5
Vinyl Acetate-----	ND	2.5
1,1-Dichloroethene	ND	2
2-Butanone-----	ND	3
Chloroform	ND	2
1,1,1,-Trichloroethane-----	ND	2
Carbon Tetrachloride	ND	2
Benzene-----	ND	3
1,2-Dichloroethane	ND	2
Trichloroethene-----	ND	2.5
1,2-Dichloropropane	ND	8
Bromodichloromethane-----	ND	2
cis-1,3-Dichloropropene	ND	3
4-Methyl-2-Pentanone-----	ND	3

(cont...)

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LABORATORY REPORT

GOLDER ASSOCIATES
 20000 Horizon Way, Ste. 500
 Mt. Laurel, NJ 08054
 ATTN: MR. BOB GLAZIER

ANALYSIS NO.: A9022002-001
 ANALYSES: Volatile Organics by GCMS
 - EPA T014
 DATE SAMPLED: 8/07/90
 DATE SAMPLE REC'D: 8/08/90
 DATE ANALYZED: 8/09/90
 SAMPLE TYPE: Air
 QC BATCH NO.: MS201-9008091

Sample ID: 1P/A-1/001/000/3/2/6
 A-078 Location 1

Volatile Organics by GCMS - EPA T014

<u>Parameter</u>	<u>Results</u> <u>ppb(v/v)</u>	<u>Detection</u> <u>Limit</u>
Toluene-----	ND	3
trans-1,3-Dichloropropene	ND	3
1,1,2-Trichloroethane-----	ND	3
Tetrachloroethene	ND	3
2-Hexanone-----	ND	5
Dibromochloromethane	ND	3
1,2-Dibromoethane-----	ND	2
Chlorobenzene	ND	2.5
Ethylbenzene-----	ND	2.5
Total Xylenes	ND	5
Styrene-----	ND	7
Bromoform	ND	2
1,1,2,2-Tetrachloroethane-----	ND	4
Benzyl Chloride	ND	2
4-Ethyl Toluene-----	ND	4
1,3,5-Trimethylbenzene	ND	2.5
1,2,4-Trimethylbenzene-----	ND	3
1,3-Dichlorobenzene	ND	3
1,4-Dichlorobenzene-----	ND	4
1,2-Dichlorobenzene	ND	5
1,2,4-Trichlorobenzene-----	ND	7
Hexachlorobutadiene	ND	5

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LABORATORY REPORT

GOLDER ASSOCIATES
20000 Horizon Way, Ste. 500
Mt. Laurel, NJ 08054
ATTN: MR. BOB GLAZIER

ANALYSIS NO.: A9022002-002
ANALYSES: Volatile Organics by GCMS
- EPA T014
DATE SAMPLED: 8/07/90
DATE SAMPLE REC'D: 8/08/90
DATE ANALYZED: 8/09/90
SAMPLE TYPE: Air
QC BATCH NO.: MS201-9008091

Sample ID: 1P/A-1/002/000/3/2/6
A-071 Location 2

Volatile Organics by GCMS - EPA T014

<u>Parameter</u>	<u>Results</u>	<u>Detection</u>
	<u>ppb(v/v)</u>	<u>Limit</u>
Dichlorodifluoromethane-----Freon 12----	ND	2
Chloromethane	ND	2.5
1,2,-Dichloro-1,1,2,2-Tetrafluoroethane--Freon 114---	ND	2
Vinyl Chloride	ND	2.5
Bromomethane-----	ND	3
Chloroethane	ND	5
Trichlorofluoromethane-----Freon 11----	ND	1
cis-1,2-Dichloroethene	ND	2
Carbon Disulfide-----	ND	10
1,1,2-Trichloro-1,2,2-Trifluoroethane Freon 113	2.5	2
Acetone-----	ND	10
Methylene Chloride	ND	4
trans-1,2-Dichloroethene-----	ND	4
1,1-Dichloroethane	ND	2.5
Vinyl Acetate-----	ND	2.5
1,1-Dichloroethene	ND	2
2-Butanone-----	ND	3
Chloroform	ND	2
1,1,1,-Trichloroethane-----	ND	2
Carbon Tetrachloride	ND	2
Benzene-----	ND	3
1,2-Dichloroethane	ND	2
Trichloroethene-----	ND	2.5
1,2-Dichloropropane	ND	8
Bromodichloromethane-----	ND	2
cis-1,3-Dichloropropene	ND	3
4-Methyl-2-Pentanone-----	ND	3

(cont...)

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LABORATORY REPORT

GOLDER ASSOCIATES
20000 Horizon Way, Ste. 500
Mt. Laurel, NJ 08054
ATTN: MR. BOB GLAZIER

Sample ID: 1P/A-1/002/000/3/2/6
A-071 Location 2

ANALYSIS NO.: A9022002-002
ANALYSES: Volatile Organics by GCMS
- EPA T014
DATE SAMPLED: 8/07/90
DATE SAMPLE REC'D: 8/08/90
DATE ANALYZED: 8/09/90
SAMPLE TYPE: Air
QC BATCH NO.: MS201-9008091

Volatile Organics by GCMS - EPA T014

<u>Parameter</u>	<u>Results</u> ppb(v/v)	<u>Detection</u> <u>Limit</u>
Toluene-----	ND	3
trans-1,3-Dichloropropene	ND	3
1,1,2-Trichloroethane-----	ND	3
Tetrachloroethene	ND	3
2-Hexanone-----	ND	5
Dibromochloromethane	ND	3
1,2-Dibromoethane-----	ND	2
Chlorobenzene	ND	2.5
Ethylbenzene-----	ND	2.5
Total Xylenes	ND	5
Styrene-----	ND	7
Bromoform	ND	2
1,1,2,2-Tetrachloroethane-----	ND	4
Benzyl Chloride	ND	2
4-Ethyl Toluene-----	ND	4
1,3,5-Trimethylbenzene	ND	2.5
1,2,4-Trimethylbenzene-----	ND	3
1,3-Dichlorobenzene	ND	3
1,4-Dichlorobenzene-----	ND	4
1,2-Dichlorobenzene	ND	5
1,2,4-Trichlorobenzene-----	ND	7
Hexachlorobutadiene	ND	5

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LABORATORY REPORT

<p>GOLDER ASSOCIATES 20000 Horizon Way, Ste. 500 Mt. Laurel, NJ 08054 ATTN: MR. BOB GLAZIER</p> <p>Sample ID: 1P/A-1/003/000/3/2/6 A-072 Location 3</p>	<p>ANALYSIS NO.: A9022002-003 ANALYSES: Volatile Organics by GCMS - EPA T014 DATE SAMPLED: 8/07/90 DATE SAMPLE REC'D: 8/08/90 DATE ANALYZED: 8/09/90 SAMPLE TYPE: Air QC BATCH NO.: MS201-9008091</p>
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Volatile Organics by GCMS - EPA T014

<u>Parameter</u>	<u>Results</u>	<u>Detection</u>
	<u>ppb(v/v)</u>	<u>Limit</u>
Dichlorodifluoromethane-----Freon 12----	ND	2
Chloromethane	ND	2.5
1,2,-Dichloro-1,1,2,2-Tetrafluoroethane--Freon 114---	ND	2
Vinyl Chloride	ND	2.5
Bromomethane-----	ND	3
Chloroethane	ND	5
Trichlorofluoromethane-----Freon 11----	ND	1
cis-1,2-Dichloroethene	ND	2
Carbon Disulfide-----	ND	10
1,1,2-Trichloro-1,2,2-Trifluoroethane Freon 113	ND	2
Acetone-----	ND	10
Methylene Chloride	ND	4
trans-1,2-Dichloroethene-----	ND	4
1,1-Dichloroethane	ND	2.5
Vinyl Acetate-----	ND	2.5
1,1-Dichloroethene	ND	2
2-Butanone-----	ND	3
Chloroform	ND	2
1,1,1,-Trichloroethane-----	ND	2
Carbon Tetrachloride	ND	2
Benzene-----	ND	3
1,2-Dichloroethane	ND	2
Trichloroethene-----	ND	2.5
1,2-Dichloropropane	ND	8
Bromodichloromethane-----	ND	2
cis-1,3-Dichloropropene	ND	3
4-Methyl-2-Pentanone-----	ND	3

(cont...)

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LABORATORY REPORT

GOLDER ASSOCIATES
20000 Horizon Way, Ste. 500
Mt. Laurel, NJ 08054
ATTN: MR. BOB GLAZIER

Sample ID: 1P/A-1/003/000/3/2/6
A-072 Location 3

ANALYSIS NO.: A9022002-003
ANALYSES: Volatile Organics by GCMS
- EPA T014
DATE SAMPLED: 8/07/90
DATE SAMPLE REC'D: 8/08/90
DATE ANALYZED: 8/09/90
SAMPLE TYPE: Air
QC BATCH NO.: MS201-9008091

Volatile Organics by GCMS - EPA T014

<u>Parameter</u>	<u>Results</u> ppb(v/v)	<u>Detection</u> <u>Limit</u>
Toluene-----	ND	3
trans-1,3-Dichloropropene	ND	3
1,1,2-Trichloroethane-----	ND	3
Tetrachloroethene	ND	3
2-Hexanone-----	ND	5
Dibromochloromethane	ND	3
1,2-Dibromoethane-----	ND	2
Chlorobenzene	ND	2.5
Ethylbenzene-----	ND	2.5
Total Xylenes	ND	5
Styrene-----	ND	7
Bromoform	ND	2
1,1,2,2-Tetrachloroethane-----	ND	4
Benzyl Chloride	ND	2
4-Ethyl Toluene-----	ND	4
1,3,5-Trimethylbenzene	ND	2.5
1,2,4-Trimethylbenzene-----	ND	3
1,3-Dichlorobenzene	ND	3
1,4-Dichlorobenzene-----	ND	4
1,2-Dichlorobenzene	ND	5
1,2,4-Trichlorobenzene-----	ND	7
Hexachlorobutadiene	ND	5

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LABORATORY REPORT

GOLDER ASSOCIATES
20000 Horizon Way, Ste. 500
Mt. Laurel, NJ 08054
ATTN: MR. BOB GLAZIER

ANALYSIS NO.: A9022002-004
ANALYSES: Volatile Organics by GCMS
- EPA T014
DATE SAMPLED: 8/07/90
DATE SAMPLE REC'D: 8/08/90
DATE ANALYZED: 8/09/90
SAMPLE TYPE: Air
QC BATCH NO.: MS201-9008091

Sample ID: 1P/A-1/004/000/3/2/6
A-095 Location 4

Volatile Organics by GCMS - EPA T014

<u>Parameter</u>	<u>Results</u>	<u>Detection</u>
	<u>ppb(v/v)</u>	<u>Limit</u>
Dichlorodifluoromethane-----Freon 12----	ND	2
Chloromethane	ND	2.5
1,2,-Dichloro-1,1,2,2-Tetrafluoroethane--Freon 114---	ND	2
Vinyl Chloride	ND	2.5
Bromomethane-----	ND	3
Chloroethane	ND	5
Trichlorofluoromethane-----Freon 11----	ND	1
cis-1,2-Dichloroethene	ND	2
Carbon Disulfide-----	ND	10
1,1,2-Trichloro-1,2,2-Trifluoroethane Freon 113	ND	2
Acetone-----	ND	10
Methylene Chloride	ND	4
trans-1,2-Dichloroethene-----	ND	4
1,1-Dichloroethane	ND	2.5
Vinyl Acetate-----	ND	2.5
1,1-Dichloroethene	ND	2
2-Butanone-----	ND	3
Chloroform	ND	2
1,1,1,-Trichloroethane-----	ND	2
Carbon Tetrachloride	ND	2
Benzene-----	ND	3
1,2-Dichloroethane	ND	2
Trichloroethene-----	ND	2.5
1,2-Dichloropropane	ND	8
Bromodichloromethane-----	ND	2
cis-1,3-Dichloropropene	ND	3
4-Methyl-2-Pentanone-----	ND	3

(cont...)

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LABORATORY REPORT

GOLDER ASSOCIATES
20000 Horizon Way, Ste. 500
Mt. Laurel, NJ 08054
ATTN: MR. BOB GLAZIER

Sample ID: 1P/A-1/004/000/3/2/6
A-095 Location 4

ANALYSIS NO.: A9022002-004
ANALYSES: Volatile Organics by GCMS
- EPA T014
DATE SAMPLED: 8/07/90
DATE SAMPLE REC'D: 8/08/90
DATE ANALYZED: 8/09/90
SAMPLE TYPE: Air
QC BATCH NO.: MS201-9008091

Volatile Organics by GCMS - EPA T014

<u>Parameter</u>	<u>Results</u> ppb(v/v)	<u>Detection</u> <u>Limit</u>
Toluene-----	ND	3
trans-1,3-Dichloropropene	ND	3
1,1,2-Trichloroethane-----	ND	3
Tetrachloroethene	ND	3
2-Hexanone-----	ND	5
Dibromochloromethane	ND	3
1,2-Dibromoethane-----	ND	2
Chlorobenzene	ND	2.5
Ethylbenzene-----	ND	2.5
Total Xylenes	ND	5
Styrene-----	ND	7
Bromoform	ND	2
1,1,2,2-Tetrachloroethane-----	ND	4
Benzyl Chloride	ND	2
4-Ethyl Toluene-----	ND	4
1,3,5-Trimethylbenzene	ND	2.5
1,2,4-Trimethylbenzene-----	ND	3
1,3-Dichlorobenzene	ND	3
1,4-Dichlorobenzene-----	ND	4
1,2-Dichlorobenzene	ND	5
1,2,4-Trichlorobenzene-----	ND	7
Hexachlorobutadiene	ND	5

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LABORATORY REPORT

GOLDER ASSOCIATES
20000 Horizon Way, Ste. 500
Mt. Laurel, NJ 08054
ATTN: MR. BOB GLAZIER

ANALYSIS NO.: A9022002-005
ANALYSES: Volatile Organics by GCMS
- EPA T014
DATE SAMPLED: 8/07/90
DATE SAMPLE REC'D: 8/08/90
DATE ANALYZED: 8/09/90
SAMPLE TYPE: Air
QC BATCH NO.: MS201-9008091

Sample ID: 1P/A-1/005/000/3/2/6
A-067 Location 5

Volatile Organics by GCMS - EPA T014

<u>Parameter</u>	<u>Results</u>	<u>Detection</u>
	<u>ppb(v/v)</u>	<u>Limit</u>
Dichlorodifluoromethane-----Freon 12----	ND	2
Chloromethane	ND	2.5
1,2,-Dichloro-1,1,2,2-Tetrafluoroethane--Freon 114---	ND	2
Vinyl Chloride	ND	2.5
Bromomethane-----	ND	3
Chloroethane	ND	5
Trichlorofluoromethane-----Freon 11----	ND	1
cis-1,2-Dichloroethene	ND	2
Carbon Disulfide-----	ND	10
1,1,2-Trichloro-1,2,2-Trifluoroethane Freon 113	ND	2
Acetone-----	ND	10
Methylene Chloride	ND	4
trans-1,2-Dichloroethene-----	ND	4
1,1-Dichloroethane	ND	2.5
Vinyl Acetate-----	ND	2.5
1,1-Dichloroethene	ND	2
2-Butanone-----	ND	3
Chloroform	ND	2
1,1,1,-Trichloroethane-----	ND	2
Carbon Tetrachloride	ND	2
Benzene-----	ND	3
1,2-Dichloroethane	ND	2
Trichloroethene-----	ND	2.5
1,2-Dichloropropane	ND	8
Bromodichloromethane-----	ND	2
cis-1,3-Dichloropropene	ND	3
4-Methyl-2-Pentanone-----	ND	3

(cont...)

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LABORATORY REPORT

GOLDER ASSOCIATES
20000 Horizon Way, Ste. 500
Mt. Laurel, NJ 08054
ATTN: MR. BOB GLAZIER

Sample ID: 1P/A-1/005/000/3/2/6
A-067 Location 5

ANALYSIS NO.: A9022002-005
ANALYSES: Volatile Organics by GCMS
- EPA T014
DATE SAMPLED: 8/07/90
DATE SAMPLE REC'D: 8/08/90
DATE ANALYZED: 8/09/90
SAMPLE TYPE: Air
QC BATCH NO.: MS201-9008091

Volatile Organics by GCMS - EPA T014

<u>Parameter</u>	<u>Results ppb(v/v)</u>	<u>Detection Limit</u>
Toluene-----	ND	3
trans-1,3-Dichloropropene	ND	3
1,1,2-Trichloroethane-----	ND	3
Tetrachloroethene	ND	3
2-Hexanone-----	ND	5
Dibromochloromethane	ND	3
1,2-Dibromoethane-----	ND	2
Chlorobenzene	ND	2.5
Ethylbenzene-----	ND	2.5
Total Xylenes	ND	5
Styrene-----	ND	7
Bromoform	ND	2
1,1,2,2-Tetrachloroethane-----	ND	4
Benzyl Chloride	ND	2
4-Ethyl Toluene-----	ND	4
1,3,5-Trimethylbenzene	ND	2.5
1,2,4-Trimethylbenzene-----	ND	3
1,3-Dichlorobenzene	ND	3
1,4-Dichlorobenzene-----	ND	4
1,2-Dichlorobenzene	ND	5
1,2,4-Trichlorobenzene-----	ND	7
Hexachlorobutadiene	ND	5

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LABORATORY REPORT

GOLDER ASSOCIATES
20000 Horizon Way, Ste. 500
Mt. Laurel, NJ 08054
ATTN: MR. BOB GLAZIER

ANALYSIS NO.: A9022002-006
ANALYSES: Volatile Organics by GCMS
- EPA T014
DATE SAMPLED: 8/07/90
DATE SAMPLE REC'D: 8/08/90
DATE ANALYZED: 8/09/90
SAMPLE TYPE: Air
QC BATCH NO.: MS201-9008091

Sample ID: 1P/A-1/006/000/3/2/6
A-068 Location 6

Volatile Organics by GCMS - EPA T014

<u>Parameter</u>	<u>Results</u>	<u>Detection</u>
	<u>ppb(v/v)</u>	<u>Limit</u>
Dichlorodifluoromethane-----Freon 12----	ND	2
Chloromethane	ND	2.5
1,2,-Dichloro-1,1,2,2-Tetrafluoroethane--Freon 114---	ND	2
Vinyl Chloride	ND	2.5
Bromomethane-----	ND	3
Chloroethane	ND	5
Trichlorofluoromethane-----Freon 11----	ND	1
cis-1,2-Dichloroethene	ND	2
Carbon Disulfide-----	ND	10
1,1,2-Trichloro-1,2,2-Trifluoroethane Freon 113	ND	2
Acetone-----	ND	10
Methylene Chloride	ND	4
trans-1,2-Dichloroethene-----	ND	4
1,1-Dichloroethane	ND	2.5
Vinyl Acetate-----	ND	2.5
1,1-Dichloroethene	ND	2
2-Butanone-----	ND	3
Chloroform	ND	2
1,1,1,-Trichloroethane-----	ND	2
Carbon Tetrachloride	ND	2
Benzene-----	ND	3
1,2-Dichloroethane	ND	2
Trichloroethene-----	ND	2.5
1,2-Dichloropropane	ND	8
Bromodichloromethane-----	ND	2
cis-1,3-Dichloropropene	ND	3
4-Methyl-2-Pentanone-----	ND	3

(cont...)

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LABORATORY REPORT

GOLDER ASSOCIATES
 20000 Horizon Way, Ste. 500
 Mt. Laurel, NJ 08054
 ATTN: MR. BOB GLAZIER

Sample ID: 1P/A-1/006/000/3/2/6
 A-068 Location 6

ANALYSIS NO.: A9022002-006
 ANALYSES: Volatile Organics by GCMS
 - EPA T014
 DATE SAMPLED: 8/07/90
 DATE SAMPLE REC'D: 8/08/90
 DATE ANALYZED: 8/09/90
 SAMPLE TYPE: Air
 QC BATCH NO.: MS201-9008091

Volatile Organics by GCMS - EPA T014

<u>Parameter</u>	<u>Results</u> ppb(v/v)	<u>Detection</u> <u>Limit</u>
Toluene-----	ND	3
trans-1,3-Dichloropropene	ND	3
1,1,2-Trichloroethane-----	ND	3
Tetrachloroethene	ND	3
2-Hexanone-----	ND	5
Dibromochloromethane	ND	3
1,2-Dibromoethane-----	ND	2
Chlorobenzene	ND	2.5
Ethylbenzene-----	ND	2.5
Total Xylenes	ND	5
Styrene-----	ND	7
Bromoform	ND	2
1,1,2,2-Tetrachloroethane-----	ND	4
Benzyl Chloride	ND	2
4-Ethyl Toluene-----	ND	4
1,3,5-Trimethylbenzene	ND	2.5
1,2,4-Trimethylbenzene-----	ND	3
1,3-Dichlorobenzene	ND	3
1,4-Dichlorobenzene-----	ND	4
1,2-Dichlorobenzene	ND	5
1,2,4-Trichlorobenzene-----	ND	7
Hexachlorobutadiene	ND	5

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LABORATORY REPORT

GOLDER ASSOCIATES
20000 Horizon Way, Ste. 500
Mt. Laurel, NJ 08054
ATTN: MR. BOB GLAZIER

ANALYSIS NO.: A9022002-007
ANALYSES: Volatile Organics by GCMS
- EPA T014
DATE SAMPLED: 8/07/90
DATE SAMPLE REC'D: 8/08/90
DATE ANALYZED: 8/10/90
SAMPLE TYPE: Air
QC BATCH NO.: MS101-9008101

Sample ID: 1P/A-1/007/000/3/2/6
A-096 Location 7

Volatile Organics by GCMS - EPA T014

<u>Parameter</u>	<u>Results</u> ppb(v/v)	<u>Detection</u> <u>Limit</u>
Dichlorodifluoromethane-----Freon 12----	ND	3
Chloromethane	ND	4
1,2,-Dichloro-1,1,2,2-Tetrafluoroethane--Freon 114---	ND	3
Vinyl Chloride	ND	4
Bromomethane-----	ND	5
Chloroethane	ND	8
Trichlorofluoromethane-----Freon 11----	72	2
cis-1,2-Dichloroethene	ND	3
Carbon Disulfide-----	ND	15
1,1,2-Trichloro-1,2,2-Trifluoroethane Freon 113	ND	3
Acetone-----	ND	15
Methylene Chloride	ND	6
trans-1,2-Dichloroethene-----	ND	6
1,1-Dichloroethane	ND	4
Vinyl Acetate-----	ND	4
1,1-Dichloroethene	ND	3
2-Butanone-----	11	5
Chloroform	ND	3
1,1,1,-Trichloroethane-----	32	3
Carbon Tetrachloride	ND	3
Benzene-----	ND	5
1,2-Dichloroethane	ND	3
Trichloroethene-----	ND	4
1,2-Dichloropropane	ND	12
Bromodichloromethane-----	ND	3
cis-1,3-Dichloropropene	ND	5
4-Methyl-2-Pentanone-----	ND	5

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LABORATORY REPORT

<p>GOLDER ASSOCIATES 20000 Horizon Way, Ste. 500 Mt. Laurel, NJ 08054 ATTN: MR. BOB GLAZIER</p> <p>Sample ID: 1P/A-1/007/000/3/2/6 A-096 Location 7</p>	<p>ANALYSIS NO.: A9022002-007 ANALYSES: Volatile Organics by GCMS - EPA T014 DATE SAMPLED: 8/07/90 DATE SAMPLE REC'D: 8/08/90 DATE ANALYZED: 8/10/90 SAMPLE TYPE: Air QC BATCH NO.: MS101-9008101</p>
--	---

Volatile Organics by GCMS - EPA T014

<u>Parameter</u>	<u>Results</u> ppb(v/v)	<u>Detection</u> <u>Limit</u>
Toluene-----	6.7	5
trans-1,3-Dichloropropene	ND	5
1,1,2-Trichloroethane-----	ND	5
Tetrachloroethene	ND	5
2-Hexanone-----	ND	8
Dibromochloromethane	ND	5
1,2-Dibromoethane-----	ND	3
Chlorobenzene	ND	4
Ethylbenzene-----	ND	4
Total Xylenes	ND	8
Styrene-----	ND	11
Bromoform	ND	3
1,1,2,2-Tetrachloroethane-----	ND	6
Benzyl Chloride	ND	3
4-Ethyl Toluene-----	ND	6
1,3,5-Trimethylbenzene	ND	4
1,2,4-Trimethylbenzene-----	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene-----	ND	6
1,2-Dichlorobenzene	ND	8
1,2,4-Trichlorobenzene-----	ND	11
Hexachlorobutadiene	ND	8

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LABORATORY REPORT

GOLDER ASSOCIATES
20000 Horizon Way, Ste. 500
Mt. Laurel, NJ 08054
ATTN: MR. BOB GLAZIER

ANALYSIS NO.: A9022002-008
ANALYSES: Volatile Organics by GCMS
- EPA T014
DATE SAMPLED: 8/07/90
DATE SAMPLE REC'D: 8/08/90
DATE ANALYZED: 8/10/90
SAMPLE TYPE: Air
QC BATCH NO.: MS101-9008101

Sample ID: 1P/A-1/008/000/3/2/6
A-074 Location 8

Volatile Organics by GCMS - EPA T014

<u>Parameter</u>	<u>Results</u>	<u>Detection</u>
	<u>ppb(v/v)</u>	<u>Limit</u>
Dichlorodifluoromethane-----Freon 12----	ND	2
Chloromethane	ND	2.5
1,2,-Dichloro-1,1,2,2-Tetrafluoroethane--Freon 114---	ND	2
Vinyl Chloride	ND	2.5
Bromomethane-----	ND	3
Chloroethane	ND	5
Trichlorofluoromethane-----Freon 11----	ND	1
cis-1,2-Dichloroethene	ND	2
Carbon Disulfide-----	ND	10
1,1,2-Trichloro-1,2,2-Trifluoroethane Freon 113	32	2
Acetone-----	ND	10
Methylene Chloride	ND	4
trans-1,2-Dichloroethene-----	ND	4
1,1-Dichloroethane	ND	2.5
Vinyl Acetate-----	ND	2.5
1,1-Dichloroethene	ND	2
2-Butanone-----	ND	3
Chloroform	ND	2
1,1,1,-Trichloroethane-----	ND	2
Carbon Tetrachloride	ND	2
Benzene-----	ND	3
1,2-Dichloroethane	ND	2
Trichloroethene-----	ND	2.5
1,2-Dichloropropane	ND	8
Bromodichloromethane-----	ND	2
cis-1,3-Dichloropropene	ND	3
4-Methyl-2-Pentanone-----	ND	3

(cont...)

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LABORATORY REPORT

GOLDER ASSOCIATES
20000 Horizon Way, Ste. 500
Mt. Laurel, NJ 08054
ATTN: MR. BOB GLAZIER

Sample ID: 1P/A-1/008/000/3/2/6
A-074 Location 8

ANALYSIS NO.: A9022002-008
ANALYSES: Volatile Organics by GCMS
- EPA T014
DATE SAMPLED: 8/07/90
DATE SAMPLE REC'D: 8/08/90
DATE ANALYZED: 8/10/90
SAMPLE TYPE: Air
QC BATCH NO.: MS101-9008101

Volatile Organics by GCMS - EPA T014

<u>Parameter</u>	<u>Results</u> ppb(v/v)	<u>Detection</u> <u>Limit</u>
Toluene-----	ND	3
trans-1,3-Dichloropropene	ND	3
1,1,2-Trichloroethane-----	ND	3
Tetrachloroethene	ND	3
2-Hexanone-----	ND	5
Dibromochloromethane	ND	3
1,2-Dibromoethane-----	ND	2
Chlorobenzene	ND	2.5
Ethylbenzene-----	ND	2.5
Total Xylenes	ND	5
Styrene-----	ND	7
Bromoform	ND	2
1,1,2,2-Tetrachloroethane-----	ND	4
Benzyl Chloride	ND	2
4-Ethyl Toluene-----	ND	4
1,3,5-Trimethylbenzene	ND	2.5
1,2,4-Trimethylbenzene-----	ND	3
1,3-Dichlorobenzene	ND	3
1,4-Dichlorobenzene-----	ND	4
1,2-Dichlorobenzene	ND	5
1,2,4-Trichlorobenzene-----	ND	7
Hexachlorobutadiene	ND	5

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LABORATORY REPORT

<p>GOLDER ASSOCIATES 20000 Horizon Way, Ste. 500 Mt. Laurel, NJ 08054 ATTN: MR. BOB GLAZIER</p> <p>Sample ID: 1P/A-1/009/000/3/2/6 A-075 Location 9</p>	<p>ANALYSIS NO.: A9022002-009 ANALYSES: Volatile Organics by GCMS - EPA T014 DATE SAMPLED: 8/07/90 DATE SAMPLE REC'D: 8/08/90 DATE ANALYZED: 8/09/90 SAMPLE TYPE: Air QC BATCH NO.: MS201-9008091</p>
--	---

Volatile Organics by GCMS - EPA T014

<u>Parameter</u>	<u>Results</u>	<u>Detection</u>
	<u>ppb(v/v)</u>	<u>Limit</u>
Dichlorodifluoromethane-----Freon 12----	ND	2
Chloromethane	ND	2.5
1,2,-Dichloro-1,1,2,2-Tetrafluoroethane--Freon 114---	ND	2
Vinyl Chloride	ND	2.5
Bromomethane-----	ND	3
Chloroethane	ND	5
Trichlorofluoromethane-----Freon 11----	ND	1
cis-1,2-Dichloroethene	ND	2
Carbon Disulfide-----	ND	10
1,1,2-Trichloro-1,2,2-Trifluoroethane Freon 113	ND	2
Acetone-----	ND	10
Methylene Chloride	ND	4
trans-1,2-Dichloroethene-----	ND	4
1,1-Dichloroethane	ND	2.5
Vinyl Acetate-----	ND	2.5
1,1-Dichloroethene	ND	2
2-Butanone-----	ND	3
Chloroform	ND	2
1,1,1,-Trichloroethane-----	ND	2
Carbon Tetrachloride	ND	2
Benzene-----	ND	3
1,2-Dichloroethane	ND	2
Trichloroethene-----	ND	2.5
1,2-Dichloropropane	ND	8
Bromodichloromethane-----	ND	2
cis-1,3-Dichloropropene	ND	3
4-Methyl-2-Pentanone-----	ND	3

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LABORATORY REPORT

GOLDER ASSOCIATES
20000 Horizon Way, Ste. 500
Mt. Laurel, NJ 08054
ATTN: MR. BOB GLAZIER

Sample ID: 1P/A-1/009/000/3/2/6
A-075 Location 9

ANALYSIS NO.: A9022002-009
ANALYSES: Volatile Organics by GCMS
- EPA T014
DATE SAMPLED: 8/07/90
DATE SAMPLE REC'D: 8/08/90
DATE ANALYZED: 8/09/90
SAMPLE TYPE: Air
QC BATCH NO.: MS201-9008091

Volatile Organics by GCMS - EPA T014

<u>Parameter</u>	<u>Results</u> ppb(v/v)	<u>Detection</u> <u>Limit</u>
Toluene-----	ND	3
trans-1,3-Dichloropropene	ND	3
1,1,2-Trichloroethane-----	ND	3
Tetrachloroethene	ND	3
2-Hexanone-----	ND	5
Dibromochloromethane	ND	3
1,2-Dibromoethane-----	ND	2
Chlorobenzene	ND	2.5
Ethylbenzene-----	ND	2.5
Total Xylenes	ND	5
Styrene-----	ND	7
Bromoform	ND	2
1,1,2,2-Tetrachloroethane-----	ND	4
Benzyl Chloride	ND	2
4-Ethyl Toluene-----	ND	4
1,3,5-Trimethylbenzene	ND	2.5
1,2,4-Trimethylbenzene-----	ND	3
1,3-Dichlorobenzene	ND	3
1,4-Dichlorobenzene-----	ND	4
1,2-Dichlorobenzene	ND	5
1,2,4-Trichlorobenzene-----	ND	7
Hexachlorobutadiene	ND	5

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LABORATORY REPORT

GOLDER ASSOCIATES
20000 Horizon Way, Ste. 500
Mt. Laurel, NJ 08054
ATTN: MR. BOB GLAZIER

Sample ID: 1P/A-1/010/000/3/2/6
A-069 Location 10

ANALYSIS NO.: A9022002-010
ANALYSES: Volatile Organics by GCMS
- EPA T014
DATE SAMPLED: 8/07/90
DATE SAMPLE REC'D: 8/08/90
DATE ANALYZED: 8/13/90
SAMPLE TYPE: Air
QC BATCH NO.: MS201-9008131

Volatile Organics by GCMS - EPA T014

<u>Parameter</u>	<u>Results</u>	<u>Detection</u>
	<u>ppb(v/v)</u>	<u>Limit</u>
Dichlorodifluoromethane-----Freon 12----	ND	2
Chloromethane	ND	2.5
1,2,-Dichloro-1,1,2,2-Tetrafluoroethane--Freon 114---	ND	2
Vinyl Chloride	ND	2.5
Bromomethane-----	ND	3
Chloroethane	ND	5
Trichlorofluoromethane-----Freon 11----	ND	1
cis-1,2-Dichloroethene	ND	2
Carbon Disulfide-----	ND	10
1,1,2-Trichloro-1,2,2-Trifluoroethane Freon 113	ND	2
Acetone-----	ND	10
Methylene Chloride	ND	4
trans-1,2-Dichloroethene-----	ND	4
1,1-Dichloroethane	ND	2.5
Vinyl Acetate-----	ND	2.5
1,1-Dichloroethene	ND	2
2-Butanone-----	56	3
Chloroform	ND	2
1,1,1,-Trichloroethane-----	ND	2
Carbon Tetrachloride	ND	2
Benzene-----	ND	3
1,2-Dichloroethane	ND	2
Trichloroethene-----	ND	2.5
1,2-Dichloropropane	ND	8
Bromodichloromethane-----	ND	2
cis-1,3-Dichloropropene	ND	3
4-Methyl-2-Pentanone-----	ND	3

(cont...)

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LABORATORY REPORT

GOLDER ASSOCIATES
20000 Horizon Way, Ste. 500
Mt. Laurel, NJ 08054
ATTN: MR. BOB GLAZIER

Sample ID: 1P/A-1/010/000/3/2/6
A-069 Location 10

ANALYSIS NO.: A9022002-010
ANALYSES: Volatile Organics by GCMS
- EPA T014
DATE SAMPLED: 8/07/90
DATE SAMPLE REC'D: 8/08/90
DATE ANALYZED: 8/13/90
SAMPLE TYPE: Air
QC BATCH NO.: MS201-9008131

Volatile Organics by GCMS - EPA T014

<u>Parameter</u>	<u>Results</u> ppb(v/v)	<u>Detection</u> <u>Limit</u>
Toluene-----	20	3
trans-1,3-Dichloropropene	ND	3
1,1,2-Trichloroethane-----	ND	3
Tetrachloroethene	ND	3
2-Hexanone-----	ND	5
Dibromochloromethane	ND	3
1,2-Dibromoethane-----	ND	2
Chlorobenzene	ND	2.5
Ethylbenzene-----	ND	2.5
Total Xylenes	ND	5
Styrene-----	ND	7
Bromoform	ND	2
1,1,2,2-Tetrachloroethane-----	ND	4
Benzyl Chloride	ND	2
4-Ethyl Toluene-----	ND	4
1,3,5-Trimethylbenzene	ND	2.5
1,2,4-Trimethylbenzene-----	ND	3
1,3-Dichlorobenzene	ND	3
1,4-Dichlorobenzene-----	ND	4
1,2-Dichlorobenzene	ND	5
1,2,4-Trichlorobenzene-----	ND	7
Hexachlorobutadiene	ND	5

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Enseco - Air Toxics Laboratory

9537 Telstar Avenue, Suite 118 • El Monte, CA 91731
(818) 442-8400 • FAX: (818) 442-3758

LABORATORY REPORT

GOLDER ASSOCIATES
20000 Horizon Way, Ste. 500
Mt. Laurel, NJ 08054
ATTN: MR. BOB GLAZIER

ANALYSIS NO.: A9022002-011
ANALYSES: Volatile Organics by GCMS
- EPA T014
DATE SAMPLED: 8/07/90
DATE SAMPLE REC'D: 8/08/90
DATE ANALYZED: 8/13/90
SAMPLE TYPE: Air
QC BATCH NO.: MS201-9008131

Sample ID: 1P/A-1/011/000/3/2/6
A-079 Location 11

Volatile Organics by GCMS - EPA T014

<u>Parameter</u>	<u>Results</u>	<u>Detection</u>
	<u>ppb(v/v)</u>	<u>Limit</u>
Dichlorodifluoromethane-----Freon 12----	ND	2
Chloromethane	ND	2.5
1,2,-Dichloro-1,1,2,2-Tetrafluoroethane--Freon 114---	ND	2
Vinyl Chloride	ND	2.5
Bromomethane-----	ND	3
Chloroethane	ND	5
Trichlorofluoromethane-----Freon 11----	ND	1
cis-1,2-Dichloroethene	ND	2
Carbon Disulfide-----	ND	10
1,1,2-Trichloro-1,2,2-Trifluoroethane Freon 113	ND	2
Acetone-----	ND	10
Methylene Chloride	ND	4
trans-1,2-Dichloroethene-----	ND	4
1,1-Dichloroethane	ND	2.5
Vinyl Acetate-----	ND	2.5
1,1-Dichloroethene	ND	2
2-Butanone-----	ND	3
Chloroform	ND	2
1,1,1,-Trichloroethane-----	ND	2
Carbon Tetrachloride	ND	2
Benzene-----	ND	3
1,2-Dichloroethane	ND	2
Trichloroethene-----	ND	2.5
1,2-Dichloropropane	ND	8
Bromodichloromethane-----	ND	2
cis-1,3-Dichloropropene	ND	3
4-Methyl-2-Pentanone-----	ND	3

(cont...)

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LABORATORY REPORT

GOLDER ASSOCIATES
20000 Horizon Way, Ste. 500
Mt. Laurel, NJ 08054
ATTN: MR. BOB GLAZIER

Sample ID: 1P/A-1/011/000/3/2/6
A-079 Location 11

ANALYSIS NO.: A9022002-011
ANALYSES: Volatile Organics by GCMS
- EPA T014
DATE SAMPLED: 8/07/90
DATE SAMPLE REC'D: 8/08/90
DATE ANALYZED: 8/13/90
SAMPLE TYPE: Air
QC BATCH NO.: MS201-9008131

Volatile Organics by GCMS - EPA T014

<u>Parameter</u>	<u>Results</u> ppb(v/v)	<u>Detection</u> <u>Limit</u>
Toluene-----	ND	3
trans-1,3-Dichloropropene	ND	3
1,1,2-Trichloroethane-----	ND	3
Tetrachloroethene	ND	3
2-Hexanone-----	ND	5
Dibromochloromethane	ND	3
1,2-Dibromoethane-----	ND	2
Chlorobenzene	ND	2.5
Ethylbenzene-----	ND	2.5
Total Xylenes	ND	5
Styrene-----	ND	7
Bromoform	ND	2
1,1,2,2-Tetrachloroethane-----	ND	4
Benzyl Chloride	ND	2
4-Ethyl Toluene-----	ND	4
1,3,5-Trimethylbenzene	ND	2.5
1,2,4-Trimethylbenzene-----	ND	3
1,3-Dichlorobenzene	ND	3
1,4-Dichlorobenzene-----	ND	4
1,2-Dichlorobenzene	ND	5
1,2,4-Trichlorobenzene-----	ND	7
Hexachlorobutadiene	ND	5

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LABORATORY REPORT

GOLDER ASSOCIATES
20000 Horizon Way, Ste. 500
Mt. Laurel, NJ 08054
ATTN: MR. BOB GLAZIER

ANALYSIS NO.: A9022002-012
ANALYSES: Volatile Organics by GCMS
- EPA T014
DATE SAMPLED: 8/07/90
DATE SAMPLE REC'D: 8/08/90
DATE ANALYZED: 8/13/90
SAMPLE TYPE: Air
QC BATCH NO.: MS201-9008131

Sample ID: 1P/A-1/013/000/3/2/6
A-070 Location 13

Volatile Organics by GCMS - EPA T014

<u>Parameter</u>	<u>Results</u> ppb(v/v)	<u>Detection</u> <u>Limit</u>
Dichlorodifluoromethane-----Freon 12----	ND	2
Chloromethane	ND	2.5
1,2,-Dichloro-1,1,2,2-Tetrafluoroethane--Freon 114---	ND	2
Vinyl Chloride	ND	2.5
Bromomethane-----	ND	3
Chloroethane	ND	5
Trichlorofluoromethane-----Freon 11----	ND	1
cis-1,2-Dichloroethene	ND	2
Carbon Disulfide-----	ND	10
1,1,2-Trichloro-1,2,2-Trifluoroethane Freon 113	ND	2
Acetone-----	ND	10
Methylene Chloride	ND	4
trans-1,2-Dichloroethene-----	ND	4
1,1-Dichloroethane	ND	2.5
Vinyl Acetate-----	ND	2.5
1,1-Dichloroethene	ND	2
2-Butanone-----	4.8	3
Chloroform	ND	2
1,1,1,-Trichloroethane-----	ND	2
Carbon Tetrachloride	ND	2
Benzene-----	ND	3
1,2-Dichloroethane	ND	2
Trichloroethene-----	ND	2.5
1,2-Dichloropropane	ND	8
Bromodichloromethane-----	ND	2
cis-1,3-Dichloropropene	ND	3
4-Methyl-2-Pentanone-----	ND	3

(cont...)

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LABORATORY REPORT

GOLDER ASSOCIATES
20000 Horizon Way, Ste. 500
Mt. Laurel, NJ 08054
ATTN: MR. BOB GLAZIER

Sample ID: 1P/A-1/013/000/3/2/6
A-070 Location 13

ANALYSIS NO.: A9022002-012
ANALYSES: Volatile Organics by GCMS
- EPA T014
DATE SAMPLED: 8/07/90
DATE SAMPLE REC'D: 8/08/90
DATE ANALYZED: 8/13/90
SAMPLE TYPE: Air
QC BATCH NO.: MS201-9008131

Volatile Organics by GCMS - EPA T014

<u>Parameter</u>	<u>Results</u> ppb(v/v)	<u>Detection</u> <u>Limit</u>
Toluene-----	ND	3
trans-1,3-Dichloropropene	ND	3
1,1,2-Trichloroethane-----	ND	3
Tetrachloroethene	ND	3
2-Hexanone-----	ND	5
Dibromochloromethane	ND	3
1,2-Dibromoethane-----	ND	2
Chlorobenzene	ND	2.5
Ethylbenzene-----	ND	2.5
Total Xylenes	ND	5
Styrene-----	ND	7
Bromoform	ND	2
1,1,2,2-Tetrachloroethane-----	ND	4
Benzyl Chloride	ND	2
4-Ethyl Toluene-----	ND	4
1,3,5-Trimethylbenzene	ND	2.5
1,2,4-Trimethylbenzene-----	ND	3
1,3-Dichlorobenzene	ND	3
1,4-Dichlorobenzene-----	ND	4
1,2-Dichlorobenzene	ND	5
1,2,4-Trichlorobenzene-----	ND	7
Hexachlorobutadiene	ND	5

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Enseco - Air Toxics Laboratory

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LABORATORY REPORT

GOLDER ASSOCIATES
20000 Horizon Way, Ste. 500
Mt. Laurel, NJ 08054
ATTN: MR. BOB GLAZIER

ANALYSIS NO.: A9022002-013
ANALYSES: Volatile Organics by GCMS -
EPA T014
DATE SAMPLED: 8/07/90
DATE SAMPLE REC'D: 8/08/90
DATE ANALYZED: 8/13/90
SAMPLE TYPE: Air
QC BATCH NO.: MS201-9008131

Sample ID: 1P/A-1/014/000/3/2/6
Trip Blank A-073

Volatile Organics by GCMS - EPA T014

<u>Parameter</u>	<u>Results</u>	<u>Detection</u>
	<u>ppb(v/v)</u>	<u>Limit</u>
Dichlorodifluoromethane-----Freon 12----	ND	2
Chloromethane	ND	2.5
1,2,-Dichloro-1,1,2,2-Tetrafluoroethane--Freon 114---	ND	2
Vinyl Chloride	ND	2.5
Bromomethane-----	ND	3
Chloroethane	ND	5
Trichlorofluoromethane-----Freon 11----	ND	1
cis-1,2-Dichloroethene	ND	2
Carbon Disulfide-----	ND	10
1,1,2-Trichloro-1,2,2-Trifluoroethane Freon 113	ND	2
Acetone-----	ND	10
Methylene Chloride	ND	4
trans-1,2-Dichloroethene-----	ND	4
1,1-Dichloroethane	ND	2.5
Vinyl Acetate-----	ND	2.5
1,1-Dichloroethene	ND	2
2-Butanone-----	ND	3
Chloroform	ND	2
1,1,1,-Trichloroethane-----	ND	2
Carbon Tetrachloride	ND	2
Benzene-----	ND	3
1,2-Dichloroethane	ND	2
Trichloroethene-----	ND	2.5
1,2-Dichloropropane	ND	8
Bromodichloromethane-----	ND	2
cis-1,3-Dichloropropene	ND	3
4-Methyl-2-Pentanone-----	ND	3

(cont...)

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LABORATORY REPORT

GOLDER ASSOCIATES
20000 Horizon Way, Ste. 500
Mt. Laurel, NJ 08054
ATTN: MR. BOB GLAZIER

Sample ID: 1P/A-1/014/000/3/2/6
Trip Blank A-073

ANALYSIS NO.: A9022002-013
ANALYSES: Volatile Organics by GCMS -
EPA T014
DATE SAMPLED: 8/07/90
DATE SAMPLE REC'D: 8/08/90
DATE ANALYZED: 8/13/90
SAMPLE TYPE: Air
QC BATCH NO.: MS201-9008131

Volatile Organics by GCMS - EPA T014

<u>Parameter</u>	<u>Results</u> ppb(v/v)	<u>Detection</u> <u>Limit</u>
Toluene-----	ND	3
trans-1,3-Dichloropropene	ND	3
1,1,2-Trichloroethane-----	ND	3
Tetrachloroethene	ND	3
2-Hexanone-----	ND	5
Dibromochloromethane	ND	3
1,2-Dibromoethane-----	ND	2
Chlorobenzene	ND	2.5
Ethylbenzene-----	ND	2.5
Total Xylenes	ND	5
Styrene-----	ND	7
Bromoform	ND	2
1,1,2,2-Tetrachloroethane-----	ND	4
Benzyl Chloride	ND	2
4-Ethyl Toluene-----	ND	4
1,3,5-Trimethylbenzene	ND	2.5
1,2,4-Trimethylbenzene-----	ND	3
1,3-Dichlorobenzene	ND	3
1,4-Dichlorobenzene-----	ND	4
1,2-Dichlorobenzene	ND	5
1,2,4-Trichlorobenzene-----	ND	7
Hexachlorobutadiene	ND	5

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LABORATORY REPORT

GOLDER ASSOCIATES
20000 Horizon Way, Ste. 500
Mt. Laurel, NJ 08054
ATTN: MR. BOB GLAZIER

ANALYSIS NO.: A9022002
ANALYSES: Volatile Organics by GCMS
- EPA T014
DATE SAMPLED: 8/07/90
DATE SAMPLE REC'D: 8/08/90
DATE ANALYZED: 8/09/90
SAMPLE TYPE: Air
QC BATCH NO.: MS201-9008091

QC SUMMARY
Volatile Organics by GCMS

<u>Compounds</u>	<u>Laboratory Control Sample % Recovery</u>	<u>Duplicate Control Sample % Recovery</u>	<u>RPD</u>
Methylene Chloride	108	103	5
1,1 Dichloroethene	96	93	3
Trichloroethene	100	101	1
Toluene	91	95	4
1,1,2,2-Tetrachlorethane	99	100	2
Limits	80 - 115	80 - 115	20

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LABORATORY REPORT

GOLDER ASSOCIATES
20000 Horizon Way, Ste. 500
Mt. Laurel, NJ 08054
ATTN: MR. BOB GLAZIER

ANALYSIS NO.: A9022002
ANALYSES: Volatile Organics by GCMS
- EPA T014
DATE SAMPLED: 8/07/90
DATE SAMPLE REC'D: 8/08/90
DATE ANALYZED: 8/10/90
SAMPLE TYPE: Air
QC BATCH NO.: MS101-9008101

QC SUMMARY
Volatile Organics by GCMS

<u>Compounds</u>	<u>Laboratory Control Sample % Recovery</u>	<u>Duplicate Control Sample % Recovery</u>	<u>RPD</u>
Methylene Chloride	98	98	0
1,1 Dichloroethene	94	96	2
Trichloroethene	102	98	4
Toluene	95	92	3
1,1,2,2-Tetrachlorethane	94	95	1
Limits	80 - 115	80 - 115	20

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LABORATORY REPORT

GOLDER ASSOCIATES
20000 Horizon Way, Ste. 500
Mt. Laurel, NJ 08054
ATTN: MR. BOB GLAZIER

ANALYSIS NO.: A9022002
ANALYSES: Volatile Organics by GCMS
- EPA T014
DATE SAMPLED: 8/07/90
DATE SAMPLE REC'D: 8/08/90
DATE ANALYZED: 8/13/90
SAMPLE TYPE: Air
QC BATCH NO.: MS201-9008131

QC SUMMARY
Volatile Organics by GCMS

<u>Compounds</u>	<u>Laboratory Control Sample & Recovery</u>	<u>Duplicate Control Sample & Recovery</u>	<u>RPD</u>
Methylene Chloride	91	93	3
1,1 Dichloroethene	84	90	7
Trichloroethene	89	90	2
Toluene	83	83	0
1,1,2,2-Tetrachlorethane	81	87	7
Limits	80 - 115	80 - 115	20

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 2810 Bunsen Ave., Unit A Ventura, CA 93003, (805) 650-0546
 2325 Skyway Dr., Unit K, Santa Maria, CA 93455, (805) 922-2776
 9537 Telstar Ave., Unit 118, El Monte, CA 91731, (818) 442-8400
 Mobile Labs, (800) ENSECO-8

CHAIN OF CUSTODY RECORD

Date 8-7-90 Page 1 of 2

Lab Number A9022002-001
-01

CLIENT <u>Gold Associates</u>	PROJECT MANAGER <u>Bob Glazier</u>	ANALYSES Target Compound List V05 H2S, mercaptans Methane
ADDRESS <u>20,000 Horizon Way #500 Mt Laurel NJ 08054</u>	PHONE NUMBER <u>609-273-1110</u>	
PROJECT NAME <u>Industri-Plex</u>	SITE CONTACT <u>617-938-1553</u> <u>Bob Glazier</u>	
CONTRACT / PURCHASE ORDER / QUOTE #		

	Sample No. / Identification	Date	Time	Lab Sample Number	SAMPLE TYPE			No. of Containers	ANALYSES			Sample Condition/REMARKS
					LIQ.	AIR	SOLID		Target Compound List V05	H2S, mercaptans	Methane	
1	IP/A-1/001/000/3/2/6	8-7-90	1225			X		1	X	X	X	A-078 -001
2	IP/A-1/002/000/3/2/6		1140									A-071 -002
3	IP/A-1/003/000/3/2/6		1342									A-072 -003
4	IP/A-1/004/000/3/2/6		1236									A-095 -004
5	IP/A-1/005/000/3/2/6		1159									A-067 -005
6	IP/A-1/006/000/3/2/6		1451									A-068 -006
7	IP/A-1/007/000/3/2/6		1502									A-096 -007
8	IP/A-1/008/000/3/2/6		1315									A-074 -008
9	IP/A-1/009/000/3/2/6		1400									A-075 -009
10	IP/A-1/010/000/3/2/6		1258									A-069 -010

SAMPLERS: (Signature) <u>Robert M Glazier</u>	Received by: (Signature)	Date <u>8-7-90</u>	Time <u>1700</u>	The delivery of samples and the signature on this chain of custody form constitutes authorization to perform the analyses specified above under the Enseco Terms and Conditions, unless a contract or purchase order has been executed and is cited above.
Relinquished by: (Signature)	Received by: (Signature)	Date	Time	
Relinquished by: (Signature)	Date	Time	Received for Laboratory by: <u>James E Del</u>	
				Date RECEIVED <u>8/8/90</u> Time <u>9:30 am</u>
				Date ACCEPTED Time

Method of Shipment: <u>Federal Express, Airbill No. 4600577391</u>	SAMPLE DISPOSITION: 1. Storage time requested: _____ days (Samples will be stored for 30 days without additional charges; thereafter storage charges will be billed at the published rates.) 2. Sample to be returned to client: Y (N) (Enseco will dispose of unreturned samples at no extra charge. Disposal will be by incineration wherever possible; otherwise, as appropriate, according to legal requirements.)
Special Instructions: <u>Try to analyze by 8-10-90 please</u>	
<u>COC Seal No. 03482-03486</u>	



Incon vden C 926 898
 2810 Bunsen Ave., Unit A Ventura, CA 93003, (805) 650-0546
 2325 Skyway Dr., Unit K, Santa Maria, CA 93455, (805) 922-2776
 9537 Telstar Ave., Unit 118, El Monte, CA 91731, (818) 442-8400
 Mobile Labs, (800) ENSECO-8

IN Q UST RE D
Date 8-7-90 Page 2 of 2

Lab Number A9022002-001

CLIENT <u>Goldor Associates</u>	PROJECT MANAGER <u>Bob Glazier</u>	ANALYSES <i>Target Compound List VOC H2S, NOx, SO2, Methane</i>
ADDRESS <u>20,000 Horizon Way, #500 Mt Laurel NJ 08054</u>	PHONE NUMBER <u>609-273-1110</u>	
PROJECT NAME <u>Industri-Plex</u>	SITE CONTACT <u>Bob Glazier</u> <u>609-938-1553</u>	
CONTRACT / PURCHASE ORDER / QUOTE #		

	Sample No. / Identification	Date	Time	Lab Sample Number	SAMPLE TYPE			No. of Containers	ANALYSES				Sample Condition/ REMARKS
					LIQ.	AIR	SOLID						
11	IP/A-1/011/000/3/2/6	8-7-90	1410			X		1	X	X	X		A-079 -011
13	IP/A-1/013/000/3/2/6		1159										A-070 -012
14	IP/A-1/014/000/3/2/6 (trip blank)		1700										A-073 -013
15	not used			DO		NOT		ANALYZE					A-077 -015
16	IP/A-1/016/000/3/2/6 (spike)	8-6-90	-			X				X			A-076 -014

SAMPLERS: (Signature) <u>Robert M. Glazier</u>	Received by: (Signature)	Date 8-7-90	Time 1700	The delivery of samples and the signature on this chain of custody form constitutes authorization to perform the analyses specified above under the Enseco Terms and Conditions, unless a contract or purchase order has been executed and is cited above.
Relinquished by: (Signature)	Received by: (Signature)	Date	Time	

Relinquished by: (Signature)	Date	Time	Received for Laboratory by: <u>John E. DeL...</u>	Date RECEIVED 8/8/90	Time 9:30 a	Date ACCEPTED	Time
------------------------------	------	------	--	-------------------------	----------------	---------------	------

Method of Shipment: <u>Federal Express, Airbill No. 4600577391</u>	SAMPLE DISPOSITION: 1. Storage time requested: <u> </u> days (Samples will be stored for 30 days without additional charges; thereafter storage charges will be billed at the published rates.) 2. Sample to be returned to client: Y (N) <u>(N)</u> (Enseco will dispose of unreturned samples at no extra charge. Disposal will be by incineration wherever possible; otherwise, as appropriate, according to legal requirements.)
Special Instructions: <u>try to analyze by 8-10-90 please</u>	
<u>COC Seal No. 03482-63486</u>	

Location #1

Canister Chain of Custody and Field Data Record (Composite Samples)

Client Golden Associates

Page 8 of 14

Canister Serial # A-078 Date Cleaned 7/27/90 VFR Serial# HT-19

regulator pressure checked OK 8/1/90

Table with 6 rows of calibration and vacuum check data. Columns include description, units (ml/sec, inches of Hg), date, and initials. Includes calculations for flow rate and vacuum conversion.

Relinquished By: [Signatures: Steve Shi, Fed Ex, Robert M. Glosier, Red Ex]

Received by: [Signatures: Fed Ex, Robert M. Glosier, Red Ex, Joe E. De...]

Date / Time: [8/1/90 - 4:00pm, 8/6/90 0900, 8/7/90 1700, 8/8/90 9:30am]

Note: Numbers 1,2,5,6 are completed by Enseco Lab personnel

CFDR

Location # 2

Canister Chain of Custody and Field Data Record (Composite Samples)

Client Golden Associates

Page 9 of 14

Canister Serial # A-071 Date Cleaned 7/26/90 VFR Serial# HT-20

regulator pressure checked ok 8/1/90 *JH*

1) Initial Calibration of VFR (vacuum flow regulator)	<u>/</u> ml x <u>60</u> sec = <u>7.9</u> ml/min sec 1 min 7-31-90 = 8.1	Date <u>7-31-90</u> Initials <u>JJK</u>
2) Initial vacuum check of canister	<u>30</u> inches of Hg vacuum	Date <u>8/1/90</u> Initials <u>JH</u>
3) Field vacuum check before sampling	<u>30</u> inches of Hg vacuum	Date <u>8/6/90</u> Initials <u>RMG</u>
4) Final vacuum/pressure after sampling	<u>12</u> inches of Hg vacuum	Date <u>8/7/90</u> Initials <u>RMG</u>
5) Final vacuum/pressure after receipt by lab	<u>8.9 psia = 12</u> inches of Hg vacuum	Date <u>8-8-90</u> Initials <u>JJK</u>
6) Calibration check of VFR after receipt by lab	<u>/</u> ml x <u>60</u> sec = <u>8.0</u> ml/min sec 1 min	Date <u>8-17-90</u> Initials <u>JJK</u>

Relinquished By:

Steve Smith

Fed Ex

Robert M Blazier

Fed Ex

Received by:

Fed Ex

Robert M Blazier

Fed Ex

Ja C O J

Date / Time

8/1/90 - 4:00pm

8/6/90 1700

8/7/90 1700

8/8/90 9:30a

Note: Numbers 1,2,5,6 are completed by Enseco Lab personnel

CFDR

Location #3

Canister Chain of Custody and Field Data Record (Composite Samples)

Client Golden Associates

Page 11 of 14

Canister Serial # A-072 Date Cleaned 7/23/90 VFR Serial# HT-22

regulator pressure checked OK 8/1/90 JH

1) Initial Calibration of VFR (vacuum flow regulator)	<u> </u> ml x <u>60</u> sec = <u>8.2</u> ml/min sec 1 min 7-31-90 = 8.0	Date <u>7-31-90</u> Initials <u>JH</u>
2) Initial vacuum check of canister	<u>30</u> inches of Hg vacuum	Date <u>8/1/90</u> Initials <u>JH</u>
3) Field vacuum check before sampling	<u>30</u> inches of Hg vacuum	Date <u>8/6/90</u> Initials <u>RMG</u>
4) Final vacuum/pressure after sampling	<u>15</u> inches of Hg vacuum	Date <u>8/1/90</u> Initials <u>RMG</u>
5) Final vacuum/pressure after receipt by lab	<u>7.8psia = 14</u> inches of Hg vacuum	Date <u>8-8-90</u> Initials <u>JH</u>
6) Calibration check of VFR after receipt by lab	<u> </u> ml x <u>60</u> sec = <u>7.4</u> ml/min sec 1 min	Date <u>8-17-90</u> Initials <u> </u>

Relinquished By:

Steve Pan

Fed Ex

Robert M Blazier

Fed Ex

Received by:

Fed Ex

Robert M Blazier

Fed Ex

Jim Z Ouel

Date / Time

8/1/90 -4:00pm

8/6/90 0900

8/7/90 1700

8/8/90 9:30 a

Note: Numbers 1,2,5,6 are completed by Enseco Lab personnel

CFDR

Location # 7

Canister Chain of Custody and
Field Data Record
(Composite Samples)

Client Golden Associates

Page 4 of 14

Canister Serial # A-095 Date Cleaned 7/28/90 VFR Serial# HT-15

regulator pressure checked ok 8/1/90 JH

1) Initial Calibration of VFR (vacuum flow regulator)	<u> </u> ml / sec	x 60 sec / 1 min	=	<u>8.2</u> ml/min	Date <u>7-31-90</u>	Initials <u>JH</u>
2) Initial vacuum check of canister	<u>30</u>	inches of Hg vacuum			Date <u>8/1/90</u>	Initials <u>JH</u>
3) Field vacuum check before sampling	<u>30</u>	inches of Hg vacuum			Date <u>8/6/90</u>	Initials <u>RMB</u>
4) Final vacuum/pressure after sampling	<u>12</u>	inches of Hg vacuum			Date <u>8/7/90</u>	Initials <u>RMB</u>
5) Final vacuum/pressure after receipt by lab	<u>8.9 psi = 12</u>	inches of Hg vacuum			Date <u>8-8-90</u>	Initials <u>JH</u>
6) Calibration check of VFR after receipt by lab	<u> </u> ml / sec	x 60 sec / 1 min	=	<u>7.6</u> ml/min	Date <u>8-16-90</u>	Initials <u>JH</u>

Relinquished By:	Received by:	Date / Time
<u>Ken Thi</u>	<u>Fed Ex</u>	<u>8/1/90 - 4:00 pm</u>
<u>Fed Ex</u>	<u>Robert M. Blazier</u>	<u>8/6/90 0900</u>
<u>Robert M. Blazier</u>	<u>Fed Ex</u>	<u>8/7/90 1700</u>
<u>Fed EX</u>	<u>Jan E. De</u>	<u>8/8/90 9:30a</u>

Note: Numbers 1,2,5,6 are completed by Enseco Lab personnel

CFDR

Location #5

Canister Chain of Custody and Field Data Record (Composite Samples)

Client Golden Associates

Page 6 of 14

Canister Serial # A-067 Date Cleaned 7/28/90 VFR Serial# HT-17

regulator pressure checked OK 8/1/90

Table with 6 rows of calibration and vacuum check data. Columns include description, units (ml/sec, inches of Hg), date, and initials. Includes calculations like 'ml x 60 sec = 8.1 ml/min'.

Relinquished By:

Received by:

Date / Time

Handwritten signatures and names under 'Relinquished By' column.

Handwritten signatures and names under 'Received by' column.

Handwritten dates and times under 'Date / Time' column.

Note: Numbers 1,2,5,6 are completed by Enseco Lab personnel

CFDR

Location #6

Canister Chair. of Custody and
Field Data Record
(Composite Samples)

Client Golden Associates

Page 3 of 14

Canister Serial # A-068 Date Cleaned 7/27/90 VFR Serial# HT-14

regulator pressure checked OK 8/1/90 JH

1) Initial Calibration of VFR (vacuum flow regulator)	<u> </u> ml x <u>60</u> sec = <u>8.1</u> ml/min sec 1 min 7-31-90 = 8.2	Date <u>7-31-90</u> Initials <u>JH</u>
2) Initial vacuum check of canister	<u>30</u> inches of Hg vacuum	Date <u>8/1/90</u> Initials <u>JH</u>
3) Field vacuum check before sampling	<u>30</u> inches of Hg vacuum	Date <u>8/6/90</u> Initials <u>RMB</u>
4) Final vacuum/pressure after sampling	<u>14</u> inches of Hg vacuum	Date <u>8/7/90</u> Initials <u>RMB</u>
5) Final vacuum/pressure after receipt by lab	<u>2.0 psia = 14</u> inches of Hg vacuum	Date <u>8-8-90</u> Initials <u>JH</u>
6) Calibration check of VFR after receipt by lab	<u> </u> ml x <u>60</u> sec = <u>8.0</u> ml/min sec 1 min	Date <u>8-17-90</u> Initials <u>JH</u>

Relinquished By:

Fed Ex
Robert M Hazien
Fed Ex

Received by:
Fed Ex
Robert M Hazien
Fed Ex
Don E Del

Date / Time
8/1/90 - 4:00pm
8/6/90 0900
8/7/90 1700
8/8/90 9:30 a

Note: Numbers 1,2,5,6 are completed by Enseco Lab personnel

CFDR

Canister Chain of Custody and Field Data Record (Composite Samples)

Location #8#7

Client Golden Associates

Page 2 of 14

Canister Serial # A-096 Date Cleaned 7/23/90 VFR Serial# HT-13

regulator pressure checked OK 8/1/90

Table with 6 rows of calibration and vacuum check data. Columns include description, units (ml/sec, inches of Hg), date, and initials. Includes calculations like 'ml x 60 sec = 8.1 ml/min'.

Relinquished By: [Signatures and names: Stan Shi, Fed Ex, Robert M Alonzi, Fed Ex]

Received by: [Signatures and names: Fed Ex, Robert M Alonzi, Fed Ex, Jan E Del]

Date / Time: [Dates and times: 8/1/90-4:00pm, 8/6/90 0900, 8/7/90 1700, 8/8/90 9:30a]

Note: Numbers 1,2,5,6 are completed by Enseco Lab personnel

CFDR

Location #8

Canister Chain of Custody and Field Data Record (Composite Samples)

Client Golden Associates

Page 7 of 14

Canister Serial # A-074 Date Cleaned 7/26/90 VFR Serial# HT-18

regulator pressure checked OK 8/1/90 JK

1) Initial Calibration of VFR (vacuum flow regulator)	<u>/</u> ml x 60 sec = <u>8.2</u> ml/min sec 1 min 7-31-90 = 8.2 Date <u>7-31-90</u> Initials <u>JK</u>
2) Initial vacuum check of canister	<u>30</u> inches of Hg vacuum Date <u>8/1/90</u> Initials <u>JK</u>
3) Field vacuum check before sampling	<u>30</u> inches of Hg vacuum Date <u>8/6/90</u> Initials <u>RMB</u>
4) Final vacuum/pressure after sampling	<u>14</u> inches of Hg vacuum Date <u>8/7/90</u> Initials <u>RMB</u>
5) Final vacuum/pressure after receipt by lab	<u>8.0 psia = 14</u> inches of Hg vacuum Date <u>8-8-90</u> Initials <u>JK</u>
6) Calibration check of VFR after receipt by lab	<u>/</u> ml x 60 sec = <u>7.0</u> ml/min sec 1 min Date <u>8-17-90</u> Initials <u>JK</u>

Relinquished By:

Alan Harris

Fed Ex

Robert M Hazier

Fed Ex

Received by:

Fed Ex

Robert M Hazier

Fed Ex

Jan E Del

Date / Time

8/1/90 - 4:00pm

8/6/90 0900

8/7/90 1700

8/8/90 9:30a

Note: Numbers 1,2,5,6 are completed by Enseco Lab personnel

CFDR

Location #9

Canister Chain of Custody and Field Data Record (Composite Samples)

Client Golden Associates

Page 12 of 14

Canister Serial # A-075 Date Cleaned 7/23/90 VFR Serial# HT-23

regulator pressure checked OK 8/1/90 JH

Table with 6 rows of calibration and vacuum check data. Columns include description, units (ml/sec, inches of Hg), date, and initials. Includes calculations like 'ml x 60 sec = 8.2 ml/min'.

Relinquished By:

Received by:

Date / Time

Handwritten signature and date/time log. Includes entries for 'Steve J...', 'Fed Ex', and 'Robert M. Glezien' with dates like 8/1/90, 8/6/90, 8/7/90, and 8/8/90.

Note: Numbers 1,2,5,6 are completed by Enseco Lab personnel

CFDR

Location #10

Canister Chain of Custody and Field Data Record (Composite Samples)

Client Golden Associates

Page 1 of 14

Canister Serial # A-069 Date Cleaned 7/24/90 VFR Serial# HT-08

regulator pressure check OK 8/1/90 *RMG*

1) Initial Calibration of VFR (vacuum flow regulator)	_____ ml / sec	x 60 sec / 1 min	=	<u>8.2</u> ml/min	Date <u>7-31-90</u> Initials <u>JK</u>
2) Initial vacuum check of canister	<u>30</u>	inches of Hg vacuum			Date <u>8/1/90</u> Initials <u>JK</u>
3) Field vacuum check before sampling	<u>30</u>	inches of Hg vacuum			Date <u>8-6-90</u> Initials <u>RMG</u>
4) Final vacuum/pressure after sampling	<u>12</u>	inches of Hg vacuum			Date <u>8-7-90</u> Initials <u>RMG</u>
5) Final vacuum/pressure after receipt by lab	<u>9.2 psia = 11</u>	inches of Hg vacuum			Date <u>8-8-90</u> Initials <u>JK</u>
6) Calibration check of VFR after receipt by lab	_____ ml / sec	x 60 sec / 1 min	=	<u>7.6</u> ml/min	Date <u>8-16-90</u> Initials <u>JK</u>

Relinquished By:

[Signature]

Fed Ex

Robert M. Hoxier

Fed Ex

Received by:

Fed Ex

Robert M. Hoxier

Fed Ex

[Signature]

Date / Time

8/1/90 - 4:00pm

8/6/90 0900

8/7/90 1700

8/8/90 9:30am

Note: Numbers 1,2,5,6 are completed by Enseco Lab personnel

CFDR

Location #11

Canister Chain of Custody and
Field Data Record
(Composite Samples)

Client Golden Associates

Page 5 of 14

Canister Serial # A-079 Date Cleaned 7/27/90 VFR Serial# HT-16

regulator pressure checked OK 8/1/90 JH

1) Initial Calibration of VFR (vacuum flow regulator)	<u>/</u> ml x <u>60</u> sec = <u>8.1</u> ml/min sec 1 min 7-31-90 = 8.0	Date <u>7-31-90</u> Initials <u>JH</u>
2) Initial vacuum check of canister	<u>30</u> inches of Hg vacuum	Date <u>8/1/90</u> Initials <u>JH</u>
3) Field vacuum check before sampling	<u>30</u> inches of Hg vacuum	Date <u>8/6/90</u> Initials <u>RMG</u>
4) Final vacuum/pressure after sampling	<u>10</u> inches of Hg vacuum	Date <u>8/7/90</u> Initials <u>RMG</u>
5) Final vacuum/pressure after receipt by lab	<u>10.2 psia = 9</u> inches of Hg vacuum	Date <u>8-8-90</u> Initials <u>JH</u>
6) Calibration check of VFR after receipt by lab	<u>/</u> ml x <u>60</u> sec = <u>7.4</u> ml/min sec 1 min	Date <u>8-17-90</u> Initials <u>JH</u>

Relinquished By:	Received by:	Date / Time
<u>She Shi</u>	<u>Fed Ex</u>	<u>8/1/90 - 4:00pm</u>
<u>Fed Ex</u>	<u>Robert M Glazier</u>	<u>8/6/90 0900</u>
<u>Robert M Glazier</u>	<u>Fed Ex</u>	<u>8/7/90 1700</u>
<u>Fed Ex</u>	<u>Jan E Del</u>	<u>8/8/90 9:30a</u>

Note: Numbers 1,2,5,6 are completed by Enseco Lab personnel
CFDR

Location #13

Canister Chain of Custody and Field Data Record (Composite Samples)

Client Golden Associates

Page 10 of 14

Canister Serial # A-070 Date Cleaned 7/26/90 VFR Serial# HT-21

regulator pressure checked OK 8/1/90 JA

1) Initial Calibration of VFR (vacuum flow regulator)	<u>/</u> ml x <u>60</u> sec = <u>8.0</u> ml/min sec 1 min 7-31-90 = 8.0	Date <u>7-21-90</u> Initials <u>JX</u>
2) Initial vacuum check of canister	<u>30</u> inches of Hg vacuum	Date <u>8/1/90</u> Initials <u>JA</u>
3) Field vacuum check before sampling	<u>30</u> inches of Hg vacuum	Date <u>8/6/90</u> Initials <u>RMB</u>
4) Final vacuum/pressure after sampling	<u>14</u> inches of Hg vacuum	Date <u>8/7/90</u> Initials <u>RMB</u>
5) Final vacuum/pressure after receipt by lab	<u>8.0 psia = 14</u> inches of Hg vacuum	Date <u>8-8-90</u> Initials <u>JX</u>
6) Calibration check of VFR after receipt by lab	<u>/</u> ml x <u>60</u> sec = <u>7.4</u> ml/min sec 1 min	Date <u>8-17-90</u> Initials <u>JX</u>

Relinquished By:	Received by:	Date / Time
<u>Steve Han</u>	<u>Fed Ex</u>	<u>8/1/90 - 4:00pm</u>
<u>Fed Ex</u>	<u>Robert M Aluzier</u>	<u>8/6/90 0900</u>
<u>Robert M Aluzier</u>	<u>Fed Ex</u>	<u>8/7/90 1700</u>
<u>Fd EX</u>	<u>Jan C Oden</u>	<u>8/8/90 9:30am</u>

Note: Numbers 1,2,5,6 are completed by Enseco Lab personnel

CFDR

Canister Chain of Custody and
Field Data Record
(Grab Samples)

Tip Blank

Client Golden Associates

Page 14 of 14

Canister Serial # A-073

Date Cleaned 7/23/98

1) Initial vacuum check of canister	<u>30</u> inches of Hg vacuum	Date <u>8/11/90</u>	Initials <u>W</u>
2) Field vacuum check before sampling	<u>30</u> inches of Hg vacuum	Date <u>8/6/90</u>	Initials <u>RMB</u>
3) Final vacuum/pressure after sampling	<u>30</u> inches of Hg vacuum	Date <u>8/7/90</u>	Initials <u>RMB</u>
4) Final vacuum/pressure after receipt by lab	<u>80.3 psia = 29</u> inches of Hg vacuum <small>JK 8-8-90</small>	Date <u>8-8-90</u>	Initials <u>JK</u>

Relinquished By:

Received by:

Date / Time

Steve Jani
Fed Ex
Robert M Blazien
Fed Ex

Fed Ex
Robert M Blazien
Fed Ex
Jan E Dol

8/11/90 - 4:00pm
8/6/90 0900
8/7/90 1700
8/8/90 9:30a

Note: Numbers 1 & 4 are completed by Enseco Lab personnel

CDFR1

Canister Chain of Custody and Field Data Record (Grab Samples)

Client Golden Associates

Page 1 of 1

Canister Serial # A-076

Date Cleaned 7-2-90

1) Initial vacuum check of canister	<u>7 psia</u> inches of Hg vacuum	Date <u>8-6-90</u>	Initials <u>JAK</u>
2) Field vacuum check before sampling	_____ inches of Hg vacuum	Date _____	Initials _____
3) Final vacuum/pressure after sampling	_____ inches of Hg vacuum	Date _____	Initials _____
4) Final vacuum/pressure after receipt by lab	<u>6 psia</u> inches of Hg vacuum	Date <u>8-8-90</u>	Initials <u>JAK</u>

Relinquished By:

Received by:

Date / Time

Jan E Del

Fed - Ex

8-6-90 5pm

Fed - Ex

Fed - Ex

Jan E Del

8/8/90 9:30a

Note: Numbers 1 & 4 are completed by Enseco Lab personnel

CDFR1

Enseco, Inc. - Air Toxics Laboratory

9537 Telstar Avenue, Suite 118 • El Monte, CA 91731 (818) 442-8400 • FAX: (818) 442-3758

Not used
DO NOT ANALYZE

Canister Chain of Custody and
Field Data Record
(Composite Samples)

Client Golden Associates

Page 13 of 14

Canister Serial # A-077 Date Cleaned 7/24/90 VFR Serial# HT-24

regulator pressure checked OK 8/1/90 *JH*

1) Initial Calibration of VFR (vacuum flow regulator)	<u> </u> ml / sec	x	<u>60</u> sec	=	<u>8.0</u> ml/min	Date <u>7-31-90</u> Initials <u>JK</u>
2) Initial vacuum check of canister	<u>30</u>	inches of Hg vacuum	Date <u>8/1/90</u>	Initials <u>JH</u>		
3) Field vacuum check before sampling	<u>30</u>	inches of Hg vacuum	Date <u>8-6-90</u>	Initials <u>RMB</u>		
4) Final vacuum/pressure after sampling	<u>30</u>	inches of Hg vacuum	Date <u>8/7/90</u>	Initials <u>RMB</u>		
5) Final vacuum/pressure after receipt by lab	<u>30</u>	inches of Hg vacuum	Date <u>8-8-90</u>	Initials <u>JK</u>		
6) Calibration check of VFR after receipt by lab	<u> </u> ml / sec	x	<u>60</u> sec	=	<u> </u> ml/min	Date <u> </u> Initials <u> </u>

Relinquished By:	Received by:	Date / Time
<u><i>Ave Jhi</i></u>	<u><i>Fed Ex</i></u>	<u>8/1/90 - 4:00pm</u>
<u><i>Fed Ex</i></u>	<u><i>Robert M Blazier</i></u>	<u>8/6/90 0900</u>
<u><i>Robert M Blazier</i></u>	<u><i>Fed Ex</i></u>	<u>8/7/90 1700</u>
<u><i>Fed Ex</i></u>	<u><i>Jan E Dal</i></u>	<u>8/8/90 9:30a</u>

Note: Numbers 1,2,5,6 are completed by Enseco Lab personnel

CFDR

APPENDIX B

DUST PUMP FIELD CALIBRATION
AND SAMPLING DOCUMENTATION

PRE-DESIGN INVESTIGATION
INDUSTRI-PLEX SITE
WOBURN, MASSACHUSETTS

FLOW PUMP FIELD DATA FORM

PROJECT NO.: 893-6255

LOCATION NO.: 1

SAMPLER NAME: Bob Glazier

LOCATION DESCRIPTION [Address]: west of N. Eyland Resin & Pigment

DATE STARTED: 8-6-90

TIME STARTED: 1234

DATE COMPLETED: 8-7-90

TIME COMPLETED: 1225

PUMP SERIAL NO.: 516376

RECORDED TARE OF FILTER: —

INITIAL ROTAMETER READING: 75.57

FINAL ROTAMETER READING: 35.5

REQUIRED FLOW RATE (ml/min): 2000

INTERMITTENT PUMPING REQUIRED: X YES — NO

PUMP PROGRAMMING:

1. DELAYED START [Time started - min.]: 0
2. SAMPLE PERIOD [Total time - min.]: 1440
3. PUMP PERIOD [Total time - min.]: 480

WEATHER: cloudy, strong wind from south at beginning, heavy rain expected, high ~70°F light wind from east Oct 1500

OBSERVATIONS: moderate rain overnight. Light wind from south on 8-7-90. Humid. ~75°F

C: FPFDFORM

PRE-DESIGN INVESTIGATION
INDUSTRI-PLEX SITE
WOBURN, MASSACHUSETTS

FLOW PUMP FIELD DATA FORM

PROJECT NO.: 893-6255

LOCATION NO.: 2 SAMPLER NAME: Bob Glazier
LOCATION DESCRIPTION [Address]: between Presidential Way and East Hble Pile

DATE STARTED: 8-6-90 TIME STARTED: 1140
DATE COMPLETED: 8-7-90 TIME COMPLETED: ~~1132~~ 1137

PUMP SERIAL NO.: 516542 RECORDED TARE OF FILTER: —

INITIAL ROTAMETER READING: 57
FINAL ROTAMETER READING: 57

REQUIRED FLOW RATE (ml/min): ~~4~~ 2000

INTERMITTENT PUMPING REQUIRED: X YES — NO

PUMP PROGRAMMING:

- 1. DELAYED START [Time started - min.]: 0
- 2. SAMPLE PERIOD [Total time - min.]: 1440
- 3. PUMP PERIOD [Total time - min.]: 480

WEATHER: cloudy, high ~70°F, strong wind from south at beginning, heavy rain expected, light wind from east at 1500

OBSERVATIONS: noticeable H₂S odor, location is downwind of East hble pile. No odor on 8-7-90
moderate rain overnight. None on 8-7-90. Humid. Light wind from south, ~75°F

C: FPFDFORM

PRE-DESIGN INVESTIGATION
INDUSTRI-PLEX SITE
WOBURN, MASSACHUSETTS

FLOW PUMP FIELD DATA FORM

PROJECT NO.: 893-6255

LOCATION NO.: 3

SAMPLER NAME: Bob Glazier

LOCATION DESCRIPTION [Address]: across from Austin Prep school, Reading

DATE STARTED: 8-6-90

TIME STARTED: 1356

DATE COMPLETED: 8-7-90

TIME COMPLETED: 1342

PUMP SERIAL NO.: 516524

RECORDED TARE OF FILTER: —

INITIAL ROTAMETER READING: 57

FINAL ROTAMETER READING: 57

REQUIRED FLOW RATE (ml/min): 2000

INTERMITTENT PUMPING REQUIRED: YES NO

PUMP PROGRAMMING:

1. DELAYED START [Time started - min.]: ~~1440~~ 0
2. SAMPLE PERIOD [Total time - min.]: 1440
3. PUMP PERIOD [Total time - min.]: 480

WEATHER: cloudy, high ~ 70°F, strong wind from south at beginning, heavy rain expected, light wind from east at 1500.

OBSERVATIONS: Moderate rain overnight. 8-7-90: No rain, light wind from south, humid, ~ 75°F.

C: FPFDFORM

PRE-DESIGN INVESTIGATION
INDUSTRI-PLEX SITE
WOBURN, MASSACHUSETTS

FLOW PUMP FIELD DATA FORM

PROJECT NO.: 893-6255

LOCATION NO.: 4

SAMPLER NAME: Bob Grier

LOCATION DESCRIPTION (Address): NW corner of site (New Boston Rd)

DATE STARTED: 8-6-90

TIME STARTED: 1249

DATE COMPLETED: 8-7-90

TIME COMPLETED: 1236

PUMP SERIAL NO.: 516551

RECORDED TARE OF FILTER: -

INITIAL ROTAMETER READING: 57

FINAL ROTAMETER READING: 54

REQUIRED FLOW RATE (ml/min): 2000

INTERMITTENT PUMPING REQUIRED: YES NO

PUMP PROGRAMMING:

1. DELAYED START [Time started - min.]: 0
2. SAMPLE PERIOD [Total time - min.]: 1440
3. PUMP PERIOD [Total time - min.]: 480

WEATHER: cloudy, high ~ 70°F, strong wind from south at beginning, heavy rain expected, light wind from east at 1500.

OBSERVATIONS: At 1236 on 8-7-90, pump read "Hold, 0665" and did not sample after ~ 11 hrs
moderate rain overnight. 8-7-90: No rain, humid, ~75°F, light wind from south

C:FPFD FORM

PRE-DESIGN INVESTIGATION
INDUSTRI-PLEX SITE
WOBURN, MASSACHUSETTS

FLOW PUMP FIELD DATA FORM

PROJECT NO.: 893-6255

LOCATION NO.: 5 SAMPLER NAME: Bob Glazier

LOCATION DESCRIPTION [Address]: adjacent to East Hide Pile

DATE STARTED: 8-6-90 TIME STARTED: 1208

DATE COMPLETED: 8-7-90 TIME COMPLETED: 1159

PUMP SERIAL NO.: 516529 RECORDED TARE OF FILTER: —

INITIAL ROTAMETER READING: 57

FINAL ROTAMETER READING: 57

REQUIRED FLOW RATE (ml/min): 2000

INTERMITTENT PUMPING REQUIRED: X YES — NO

PUMP PROGRAMMING:

1. DELAYED START [Time started - min.]: 0
2. SAMPLE PERIOD [Total time - min.]: 1440
3. PUMP PERIOD [Total time - min.]: 480

WEATHER: cloudy, high ~70°F, strong wind from south at beginning, heavy rain expected, light wind from east at 1500. Moderate

OBSERVATIONS: no H2S odor

rain overnight. 8-7-90: no rain, humid, ~75°F, light wind from south

C: FPFDFORM

PRE-DESIGN INVESTIGATION
INDUSTRI-PLEX SITE
WOBURN, MASSACHUSETTS

FLOW PUMP FIELD DATA FORM

PROJECT NO.: 893-6255

LOCATION NO.: 6

SAMPLER NAME: Rel-10

LOCATION DESCRIPTION [Address]: NE corner of site

DATE STARTED: 8-6-90

TIME STARTED: 1523

DATE COMPLETED: 8-7-90

TIME COMPLETED: 1451

PUMP SERIAL NO.: 516³⁹⁵~~385~~

RECORDED TARE OF FILTER: —

INITIAL ROTAMETER READING: 57

FINAL ROTAMETER READING: 55

REQUIRED FLOW RATE (ml/min): 1000

INTERMITTENT PUMPING REQUIRED: X YES — NO

PUMP PROGRAMMING:

1. DELAYED START [Time started - min.]: NA
2. SAMPLE PERIOD [Total time - min.]: 1440
3. PUMP PERIOD [Total time - min.]: 480

WEATHER: cloudy, strong wind from south, heavy rain expected, light wind from east at 1500, high ~70°F

OBSERVATIONS: Moderate rain overnight. 8-7-90: no rain, humid, ~75°F, light wind from south

C: FPFDFORM

PRE-DESIGN INVESTIGATION
INDUSTRI-PLEX SITE
WOBURN, MASSACHUSETTS

FLOW PUMP FIELD DATA FORM

PROJECT NO.: 893-6255

LOCATION NO.: 87

SAMPLER NAME: Bob Glazier

LOCATION DESCRIPTION [Address]: north of ^{site} trailers at end of Commerce Way extension

DATE STARTED: 8-6-90

TIME STARTED: 1513

DATE COMPLETED: 8-7-90

TIME COMPLETED: 1502

PUMP SERIAL NO.: 516389
516388

RECORDED TARE OF FILTER: —

INITIAL ROTAMETER READING: 57

FINAL ROTAMETER READING: 53.5

REQUIRED FLOW RATE (ml/min): 2000

INTERMITTENT PUMPING REQUIRED: X YES — NO

PUMP PROGRAMMING:

1. DELAYED START [Time started - min.]: 0
2. SAMPLE PERIOD [Total time - min.]: 1440
3. PUMP PERIOD [Total time - min.]: 480

WEATHER: cloudy, high ~70°F, strong wind from south at beginning, heavy rain expected, light wind from east at 1500. Moderate

OBSERVATIONS: rain overnight. 8-7-90: no rain, humid, ~75°F, light wind from south

C: FPFDFORM

PRE-DESIGN INVESTIGATION
INDUSTRI-PLEX SITE
WOBURN, MASSACHUSETTS

FLOW PUMP FIELD DATA FORM

PROJECT NO.: 893-6255

LOCATION NO.: 8 SAMPLER NAME: Bob Glazier

LOCATION DESCRIPTION [Address]: end of Atlantic Ave

DATE STARTED: 8-6-90 TIME STARTED: 1322

DATE COMPLETED: 8-7-90 TIME COMPLETED: 1315

PUMP SERIAL NO.: 516388 RECORDED TARE OF FILTER: —

INITIAL ROTAMETER READING: 57

FINAL ROTAMETER READING: 56

REQUIRED FLOW RATE (ml/min): 2000

INTERMITTENT PUMPING REQUIRED: X YES — NO

PUMP PROGRAMMING:

1. DELAYED START [Time started - min.]: 0
2. SAMPLE PERIOD [Total time - min.]: 1440
3. PUMP PERIOD [Total time - min.]: 480

WEATHER: cloudy, high ~ 70°F, strong wind from south at beginning, heavy rain expected, light wind from east at 1500

OBSERVATIONS: Pump reads "Hold, 0543" on 8-7-90 at 1315.

There was some water in baggie around pump, it must have shut down because it got wet after pumping for 9 hrs, 45 minutes

C: FPFDFORM

Moderate rain overnight, 8-7-90: no rain, humid, ~75°F, light wind from south

PRE-DESIGN INVESTIGATION
INDUSTRI-PLEX SITE
WOBURN, MASSACHUSETTS

FLOW PUMP FIELD DATA FORM

PROJECT NO.: 893-6255

LOCATION NO.: 9 SAMPLER NAME: Bob Glezier

LOCATION DESCRIPTION [Address]: Mary Barrows School, Reading

DATE STARTED: 8-6-90 TIME STARTED: 1419

DATE COMPLETED: 8-7-90 TIME COMPLETED: 1400

PUMP SERIAL NO.: 516510 RECORDED TARE OF FILTER: —

INITIAL ROTAMETER READING: 57

FINAL ROTAMETER READING: 56

REQUIRED FLOW RATE (ml/min): 2000

INTERMITTENT PUMPING REQUIRED: X YES — NO

PUMP PROGRAMMING:

1. DELAYED START [Time started - min.]: 0
2. SAMPLE PERIOD [Total time - min.]: 1440
3. PUMP PERIOD [Total time - min.]: 480

WEATHER: cloudy, high ~70°F, strong wind from south at beginning,
heavy rain expected, light wind from east at 1500. Moderate

OBSERVATIONS: rain overnight. 8-7-90: no rain, humid, ~75°F,
light wind from south

C:FPDFORM

PRE-DESIGN INVESTIGATION
INDUSTRI-PLEX SITE
WOBURN, MASSACHUSETTS

FLOW PUMP FIELD DATA FORM

PROJECT NO.: 893-6255

LOCATION NO.: 10

SAMPLER NAME: Bob Glazier

LOCATION DESCRIPTION [Address]: Woburn Sr. Center, School St

DATE STARTED: 8-6-90

TIME STARTED: 1307

DATE COMPLETED: 8-7-90

TIME COMPLETED: 1258

PUMP SERIAL NO.: 516628

RECORDED TARE OF FILTER: —

INITIAL ROTAMETER READING: 57

FINAL ROTAMETER READING: 55

REQUIRED FLOW RATE (ml/min): 2000

INTERMITTENT PUMPING REQUIRED: YES NO

PUMP PROGRAMMING:

1. DELAYED START [Time started - min.]: 0
2. SAMPLE PERIOD [Total time - min.]: 1440
3. PUMP PERIOD [Total time - min.]: 480

WEATHER: cloudy, high ~70°F strong wind from south at beginning, heavy rain expected, light wind from east at 1500.

OBSERVATIONS: Moderate rain over night 8-7-90 = no rain, humid, ~75°F, light wind from south

C: FPFDFORM

PRE-DESIGN INVESTIGATION
INDUSTRI-PLEX SITE
WOBURN, MASSACHUSETTS

FLOW PUMP FIELD DATA FORM

PROJECT NO.: 893-6255

LOCATION NO.: 11 SAMPLER NAME: Bob Glazier

LOCATION DESCRIPTION [Address]: Woburn Post office

DATE STARTED: 8-6-90 TIME STARTED: 1435
~~235~~

DATE COMPLETED: 8-7-90 TIME COMPLETED: 1410

PUMP SERIAL NO.: 516³⁸⁵~~395~~ RECORDED TARE OF FILTER:

INITIAL ROTAMETER READING: 57

FINAL ROTAMETER READING: 57

REQUIRED FLOW RATE (ml/min): 2000

INTERMITTENT PUMPING REQUIRED: X YES NO

PUMP PROGRAMMING:

1. DELAYED START [Time started - min.]: 0
2. SAMPLE PERIOD [Total time - min.]: 1440
3. PUMP PERIOD [Total time - min.]: 480

WEATHER: cloudy, high ~70°F, strong wind from south at beginning,
heavy rain expected, light wind from east at 1500

OBSERVATIONS: Moderate rain overnight, 8-7-90: no rain, humid,
~75°F, light wind from south

C: FPFDFORM

PRE-DESIGN INVESTIGATION
INDUSTRI-PLEX SITE
WOBURN, MASSACHUSETTS

FLOW PUMP FIELD DATA FORM

PROJECT NO.: 893-6255

LOCATION NO.: 13 SAMPLER NAME: Bob Glover

LOCATION DESCRIPTION [Address]: East Hide Aie (duplicate)

DATE STARTED: 8-6-90 TIME STARTED: 1208

DATE COMPLETED: 8-7-90 TIME COMPLETED: 1159

PUMP SERIAL NO.: 516369 RECORDED TARE OF FILTER: —

INITIAL ROTAMETER READING: 57

FINAL ROTAMETER READING: 55

REQUIRED FLOW RATE (ml/min): 2000

INTERMITTENT PUMPING REQUIRED: YES NO

PUMP PROGRAMMING:

1. DELAYED START [Time started - min.]: 0
2. SAMPLE PERIOD [Total time - min.]: 1440
3. PUMP PERIOD [Total time - min.]: 480

WEATHER: cloudy, high ~70°F, strong wind from south at beginning, heavy rain expected, light wind from east at 1500

OBSERVATIONS: Dust pump is on when pump for #5 is off. Sampled some period but different specific minutes.

C: PPFDFORM

Moderate rain overnight. 8-7-90: no rain, humid, ~75°F, light wind from south

APPENDIX C
METEOROLOGICAL DATA

INDUSTRI-PLEX SITE WOBURN, MA
 WEATHER STATION DATA
 08/06/90 TIME 00:00 TO 08/08/90 TIME 00:00 (DAYS 218-220)

YEAR	DAY	TIME	AVG WIND SPEED (MPH)	AVG WIND DIR (DEG)	SIGMA WIND DIR (DEG)	AVG TEMP (DEG F)	AVG REL HUM (%)	AVG PRESS (IN/Hg)	BAT VOLT (VDC)
1990	218	0	7.47	177.9	13.17	73.7	74.7	30.06	14.12
1990	218	15	7.04	177	11.69	73.7	74.4	30.06	14.12
1990	218	30	8.09	170.4	10.23	73.5	74.5	30.06	14.12
1990	218	45	8.03	178.9	12.57	73.4	74.3	30.05	14.12
1990	218	100	7.48	178.4	11.54	73.4	74.2	30.05	14.12
1990	218	115	7.82	175.4	12.53	73.4	74.2	30.05	14.12
1990	218	130	8.88	175.4	12.2	73.4	74.1	30.05	14.12
1990	218	145	9.05	179	11.61	73.4	74.1	30.05	14.12
1990	218	200	8.62	180.6	12.48	73.3	74.2	30.05	14.12
1990	218	215	9.63	177.9	10.53	73.2	74.4	30.05	14.13
1990	218	230	8.65	182	11.18	73.1	74.8	30.04	14.13
1990	218	245	7.15	177.7	11.75	72.9	75.4	30.04	14.12
1990	218	300	7.69	181.7	14.66	72.8	75.9	30.05	14.12
1990	218	315	7.83	178.6	13.64	72.8	76.3	30.04	14.12
1990	218	330	9.06	173	10.8	72.7	76.6	30.04	14.12
1990	218	345	8.48	174.1	11.16	72.7	76.8	30.04	14.13
1990	218	400	7.82	170.6	12.01	72.6	77	30.04	14.13
1990	218	415	8.54	173.1	11.75	72.7	77	30.04	14.13
1990	218	430	7.65	170.8	11.53	72.7	76.9	30.04	14.13
1990	218	445	8.18	170.7	9.81	72.8	76.8	30.04	14.13
1990	218	500	8.05	175.6	11.21	72.8	76.7	30.03	14.13
1990	218	515	6.966	175.7	13	72.7	76.9	30.04	14.13
1990	218	530	7.51	170.1	11.15	72.5	77.2	30.03	14.13
1990	218	545	6.312	166.7	14.43	72.4	77.7	30.04	14.13
1990	218	600	5.428	159.2	16.21	72.1	78.4	30.04	14.13
1990	218	615	5.116	158.1	17.82	72.1	78.4	30.04	14.13
1990	218	630	5.859	167.9	11.88	72.2	78.3	30.04	14.13
1990	218	645	7.97	167.5	13.48	72.5	77.4	30.04	14.13
1990	218	700	7.82	170.9	10.47	72.6	76.8	30.04	14.13
1990	218	715	8.41	175	12.56	72.6	76.7	30.04	14.13
1990	218	730	7.31	171.5	13.08	72.8	76.7	30.04	14.13
1990	218	745	8.18	171.6	10.71	72.8	77	30.04	14.12
1990	218	800	9.75	174	11.43	73	77.3	30.04	14.13
1990	218	815	9.44	172.8	10.8	73.2	77.7	30.04	14.12
1990	218	830	10.14	171	13.05	73.5	78.1	30.04	14.12
1990	218	845	11.44	179.3	11.98	74.2	77.5	30.03	14.12
1990	218	900	12.51	173.3	11.4	74.6	76.3	30.03	14.12
1990	218	915	10.45	180.2	12.97	74.9	75.2	30.03	14.12
1990	218	930	11.53	180.6	11.93	75	74.2	30.03	14.12
1990	218	945	12.37	178.6	12.93	75.1	73.1	30.03	14.12
1990	218	1000	10.72	185.2	13.76	75.5	71.9	30.02	14.12
1990	218	1015	12.19	174.5	14.04	75.7	70.5	30.02	14.12

INDUSTRI-PLEX SITE WOBURN, MA
 WEATHER STATION DATA
 08/06/90 TIME 00:00 TO 08/08/90 TIME 00:00 (DAYS 218-220)

YEAR	DAY	TIME	AVG WIND SPEED (MPH)	AVG WIND DIR (DEG)	SIGMA WIND DIR (DEG)	AVG TEMP (DEG F)	AVG REL HUM (%)	AVG PRESS (IN/Hg)	BAT VOLT (VDC)
1990	218	1030	12.77	168.7	12.46	76.2	68.97	30.01	14.12
1990	218	1045	11.02	180.3	13.61	77	66.71	30.01	14.12
1990	218	1100	10.65	174.7	12.03	77.1	65.11	30.01	14.12
1990	218	1115	11.36	170.4	12.28	77.2	63.75	30	14.11
1990	218	1130	12.71	170.3	13.2	77.3	62	30.01	14.11
1990	218	1145	11.61	170.4	12.6	77.5	60.43	30.01	14.11
1990	218	1200	9.63	171.5	15.66	77.6	59.97	30	14.11
1990	218	1215	9.73	171.4	13.32	77.6	59.26	30	14.11
1990	218	1230	10.54	176.3	11.2	77.4	58.07	30	14.11
1990	218	1245	10.95	179.5	13.28	77.7	55.03	29.99	14.11
1990	218	1300	9.23	172.5	15.19	78	54.57	29.99	14.11
1990	218	1315	6.372	141.6	29.73	77.3	54.88	29.98	14.11
1990	218	1330	5.647	116.2	21.71	75.6	58.56	29.98	14.11
1990	218	1345	5.504	115.6	21.24	75.4	59.82	29.98	14.11
1990	218	1400	5.828	117.7	22.86	75	60.57	29.98	14.11
1990	218	1415	4.685	115.9	23.8	74.2	62.72	29.99	14.11
1990	218	1430	5.219	108.2	17.37	73.1	65.73	29.99	14.11
1990	218	1445	6.581	104.7	13.84	72.3	68.23	29.99	14.11
1990	218	1500	5.672	105.5	14.49	71.7	72.2	30	14.11
1990	218	1515	4.159	111.5	18.67	71.9	74	30.01	14.11
1990	218	1530	4.222	109.8	15.84	72	74.7	30.01	14.12
1990	218	1545	3.373	112.3	20.82	72.6	75	30	14.12
1990	218	1600	3.504	123.4	26.01	73.6	73.5	29.99	14.12
1990	218	1615	3.692	132.1	25.28	74	73.2	29.99	14.12
1990	218	1630	3.888	137	28.53	74.6	72	29.98	14.12
1990	218	1645	4.939	141.1	24.64	75	71.3	29.98	14.12
1990	218	1700	4.748	133.1	27.9	75.1	69.93	29.98	14.12
1990	218	1715	4.351	137	26.4	74.9	69.92	29.98	14.12
1990	218	1730	3.956	109.8	21.51	74.2	71	29.98	14.12
1990	218	1745	3.28	98.8	17.47	73.3	73.5	29.99	14.12
1990	218	1800	4.878	99.9	15.39	72.6	76.8	29.99	14.12
1990	218	1815	6.157	104	15.02	72.6	77	29.99	14.12
1990	218	1830	5.616	105.8	15.98	72.7	76.6	29.99	14.12
1990	218	1845	6.878	107.2	13.77	72.6	75.7	29.99	14.12
1990	218	1900	6.284	112.7	19.06	72.4	76.4	30	14.12
1990	218	1915	5.562	111.6	17.93	72.4	77.4	30	14.12
1990	218	1930	5.685	111.8	17.99	72.1	78.4	30	14.12
1990	218	1945	5.817	110.8	19.1	71.7	80	30.01	14.13
1990	218	2000	5.554	111	19.86	71.1	82.3	30.01	14.13
1990	218	2015	6.346	108.3	16.8	70.5	86.1	30.02	14.13
1990	218	2030	6.579	110.1	16.63	70	89.9	30.02	14.13
1990	218	2045	6.672	107.9	15.24	69.7	92.6	30.02	14.13

INDUSTRI-PLEX SITE WOBURN, MA
 WEATHER STATION DATA
 08/06/90 TIME 00:00 TO 08/08/90 TIME 00:00 (DAYS 218-220)

YEAR	DAY	TIME	AVG WIND SPEED (MPH)	AVG WIND DIR (DEG)	SIGMA WIND DIR (DEG)	AVG TEMP (DEG F)	AVG REL HUM (%)	AVG PRESS (IN/Hg)	BAT VOLT (VDC)
1990	218	2100	4.723	128.4	26.56	69.54	94.5	30.04	14.13
1990	218	2115	5.759	105.3	15.54	69.2	96	30.03	14.13
1990	218	2130	4.571	122.9	27.19	69.08	97.2	30.04	14.13
1990	218	2145	5.227	110.2	18.95	68.79	97.9	30.03	14.13
1990	218	2200	5.32	118	22.91	68.76	98.3	30.03	14.13
1990	218	2215	4.687	129	25.33	68.84	98.6	30.03	14.13
1990	218	2230	4.265	140.6	27.07	68.93	98.6	30.03	14.13
1990	218	2245	3.929	144.5	22.77	68.96	98.4	30.03	14.13
1990	218	2300	4.165	141.4	28.13	68.83	98.3	30.03	14.13
1990	218	2315	3.726	141.2	25	68.83	98.6	30.02	14.13
1990	218	2330	4.085	146	21.45	68.87	98.6	30.02	14.13
1990	218	2345	3.655	152	20.72	69.08	98.4	30.02	14.13
1990	219	0	3.537	125.6	25.55	68.92	97.2	30.02	14.13
1990	219	15	3.682	145.2	25.37	68.72	97.8	30.02	14.13
1990	219	30	4.095	157.7	14.91	68.89	98.7	30.03	14.13
1990	219	45	4.27	152.8	21.05	68.97	99	30.03	14.13
1990	219	100	8.34	163.3	12.97	69.32	94.6	30.02	14.13
1990	219	115	5.463	150.3	22.82	68.54	88.6	30.02	14.13
1990	219	130	4.202	132.3	27.37	68.07	89.9	30.02	14.13
1990	219	145	4.699	106.7	16.42	67.8	91	30.02	14.13
1990	219	200	4.753	102.1	17.83	67.32	88.9	30.02	14.13
1990	219	215	3.347	115.1	19.48	66.87	88.2	30.02	14.13
1990	219	230	3.101	109.8	18.82	66.43	88.6	30.02	14.13
1990	219	245	3.117	102.1	15.66	65.94	91	30.01	14.13
1990	219	300	3.078	99.3	15.61	65.85	94.3	30.01	14.13
1990	219	315	2.741	96	16.58	65.92	96.4	30.01	14.13
1990	219	330	3.169	98.1	13.74	66.29	98	30	14.13
1990	219	345	3.368	101.5	14.04	66.8	98.9	30	14.13
1990	219	400	2.848	122.6	25.34	68.16	99.6	30	14.13
1990	219	415	4.156	117.9	26.43	68.95	99.9	29.99	14.13
1990	219	430	5.102	116.6	21.38	69.16	99.7	29.99	14.13
1990	219	445	4.672	120.5	24.7	69.23	99.1	29.99	14.13
1990	219	500	3.858	137.9	28.04	69.27	98.7	29.99	14.13
1990	219	515	4.307	140.3	24.77	69.21	98.8	30	14.13
1990	219	530	4.507	126.5	25.52	69.2	99.2	30	14.13
1990	219	545	4.695	121	23.51	69.17	99.3	30	14.13
1990	219	600	4.635	132.1	27.99	69.07	99.7	30	14.14
1990	219	615	4.292	136.6	24	69.14	100	30	14.14
1990	219	630	4.694	127.4	27.04	69.19	100.1	30	14.13
1990	219	645	4.677	131.4	26.25	69.16	100	30	14.13
1990	219	700	3.87	137.3	27.35	69.3	99.9	30	14.13
1990	219	715	4.226	142.3	25.68	69.46	99.8	30	14.13

INDUSTRI-PLEX SITE WOBURN, MA
 WEATHER STATION DATA
 08/06/90 TIME 00:00 TO 08/08/90 TIME 00:00 (DAYS 218-220)

YEAR	DAY	TIME	AVG WIND SPEED (MPH)	AVG WIND DIR (DEG)	SIGMA WIND DIR (DEG)	AVG TEMP (DEG F)	AVG REL HUM (%)	AVG PRESS (IN/Hg)	BAT VOLT (VDC)
1990	219	730	3.839	140.3	25.5	69.66	99.6	30	14.13
1990	219	745	4.313	140.3	26.41	69.9	99.2	30	14.13
1990	219	800	4.758	133.6	27.63	70.1	98.7	30	14.13
1990	219	815	5.441	120.8	25.19	69.84	98.3	29.99	14.13
1990	219	830	4.459	130.2	27.87	69.94	98.1	29.99	14.13
1990	219	845	4.505	134.4	28.38	70.3	97.9	29.99	14.13
1990	219	900	5.221	127	25.13	70.6	97.2	29.99	14.13
1990	219	915	5.057	129.7	28.42	70.9	96.6	29.98	14.13
1990	219	930	6.699	127.5	25.35	70.7	96.1	29.98	14.13
1990	219	945	5.515	131.1	25.98	70.9	95.6	29.98	14.13
1990	219	1000	4.837	130.3	26.45	71.8	94.2	29.97	14.12
1990	219	1015	5.467	124.8	27.95	72.2	91.5	29.97	14.12
1990	219	1030	5.888	126.6	25.15	72	90.1	29.97	14.12
1990	219	1045	6.004	124.6	23.49	72.3	89.5	29.97	14.12
1990	219	1100	7.26	117.3	23	72.8	88.5	29.96	14.12
1990	219	1115	7.92	115.3	22.35	73.2	86.8	29.96	14.12
1990	219	1130	7.1	123.4	23.91	73.2	86.5	29.96	14.12
1990	219	1145	5.77	120.2	27.31	74.4	85	29.95	14.12
1990	219	1200	6.323	123.8	23.17	74.8	83	29.95	14.12
1990	219	1215	6.838	121.9	24.32	75	81.7	29.94	14.11
1990	219	1230	6.509	121.6	25.34	75	81.4	29.94	14.11
1990	219	1245	7.71	114	20	75.3	80.6	29.94	14.11
1990	219	1300	8.24	113.7	17.4	75.7	79.6	29.94	14.11
1990	219	1315	7.2	117.2	19.72	75.5	78.5	29.94	14.11
1990	219	1330	7	118.9	22.93	75.4	78.5	29.93	14.11
1990	219	1345	6.799	122.5	25.71	77	76.3	29.93	14.11
1990	219	1400	6.858	119.4	25.28	78.4	73.3	29.91	14.1
1990	219	1415	7.49	115	22.35	77.8	71.7	29.9	14.1
1990	219	1430	7.07	123.5	25.6	78.8	70.6	29.9	14.1
1990	219	1445	6.599	131.6	26.29	79.4	67.89	29.9	14.1
1990	219	1500	8.9	145.6	22.23	79.4	65.78	29.91	14.1
1990	219	1515	5.758	130.8	29.76	79.4	65.85	29.91	14.1
1990	219	1530	7.08	117.7	21.24	77.9	68.21	29.92	14.1
1990	219	1545	6.792	118.4	19.45	77.3	70.2	29.92	14.1
1990	219	1600	6.414	115.9	22.5	76.8	71.7	29.92	14.1
1990	219	1615	7.05	116.8	22.04	76.4	72.2	29.92	14.1
1990	219	1630	6.986	117.3	21.35	76.4	72.8	29.92	14.1
1990	219	1645	5.115	125.4	31.1	77.8	71.5	29.92	14.1
1990	219	1700	4.806	131.4	27.7	78	68.82	29.93	14.1
1990	219	1715	5.737	116.6	21.85	77.3	68.47	29.93	14.1
1990	219	1730	5.143	117.8	22.55	77.6	68.33	29.93	14.1
1990	219	1745	5.343	118.4	21.58	77.5	67.94	29.93	14.1

INDUSTRI-PLEX SITE WOBURN, MA
 WEATHER STATION DATA
 08/06/90 TIME 00:00 TO 08/08/90 TIME 00:00 (DAYS 218-220)

YEAR	DAY	TIME	AVG WIND SPEED (MPH)	AVG WIND DIR (DEG)	SIGMA WIND DIR (DEG)	AVG TEMP (DEG F)	AVG REL HUM (%)	AVG PRESS (IN/Hg)	BAT VOLT (VDC)
1990	219	1800	4.838	116.8	19.88	77.1	68.48	29.93	14.1
1990	219	1815	4.395	122.3	24.7	77.2	68.21	29.94	14.1
1990	219	1830	4.732	112.1	22.66	77	67.88	29.94	14.1
1990	219	1845	4.235	113.7	19.53	76.4	68.89	29.95	14.11
1990	219	1900	3.263	121.7	24.29	76.7	68.23	29.96	14.11
1990	219	1915	3.74	108.5	17.14	76.2	68.47	29.96	14.11
1990	219	1930	3.197	114.6	19.38	76	69.49	29.96	14.11
1990	219	1945	2.938	117.7	20.37	76	69.41	29.97	14.11
1990	219	2000	3.943	157.5	26.05	76.3	69.53	29.98	14.11
1990	219	2015	7.62	172.3	12.08	77.6	65.82	29.98	14.11
1990	219	2030	4.068	141.2	31.14	76.4	66.62	29.99	14.11
1990	219	2045	3.257	132.7	26.41	75.8	69.28	29.99	14.12
1990	219	2100	3.979	140.4	24.56	75.9	69.43	30	14.12
1990	219	2115	4.232	143.5	24.06	75.8	69.98	30.01	14.12
1990	219	2130	3.687	133.2	27.87	75.6	70.8	30.01	14.12
1990	219	2145	3.221	132.3	28.2	75.1	71.7	30.02	14.12
1990	219	2200	4.458	140.8	24.71	74.9	72.1	30.02	14.12
1990	219	2215	3.7	127	26	74.5	72.9	30.02	14.12
1990	219	2230	3.389	137.9	26.76	74.3	73.9	30.02	14.12
1990	219	2245	3.095	139.4	28.27	73.7	76.3	30.02	14.12
1990	219	2300	3.865	149	23.51	73.6	79.6	30.02	14.12
1990	219	2315	3.258	136.6	26.11	73.2	81.6	30.03	14.12
1990	219	2330	3.424	132.4	27.78	73	83.4	30.03	14.12
1990	219	2345	3.443	129.2	23.29	72.7	85.8	30.03	14.12
1990	220	0	3.915	131.5	25.46	72.6	87.5	30.03	14.13

APPENDIX D
METEOROLOGICAL STATION AUDIT REPORT



893-6255 / 74 309.1
CHAS. T. MAIN, INC.

PRUDENTIAL CENTER, BOSTON, MASSACHUSETTS 02199 • TELEPHONE 617 262 3200 • TELEX 4430035 • FAX 617 859 2575

August 14, 1990

4402-001-1000

Mr. Kenneth R. Moser
Golder Associates, Inc.
20000 Horizon Way
Suite 500
Mt. Laurel, NJ 08054

**SUBJECT: Industri-Plex Hazardous Waste Remediation Site
Meteorological Monitoring System Audit Results**

On Friday July 27, 1990 Chas. T. Main, Inc. (MAIN) conducted a performance audit the Industri-Plex hazardous waste remediation site meteorological monitoring system. The audit was performed by Messrs. Dewey Gile and Steven Coughlin of MAIN's Air Sciences Group. The audit was conducted following the installation of a new Climatronics relative humidity sensor on July 19, 1990. All audit procedures were conducted in accordance with the Quality Assurance Handbook for Air Pollution Measurement Systems - Volume IV - Meteorological Measurements; (EPA 600/4-82-600, August 1989), and the On-Site Meteorological Program Guidance for Regulatory Modeling Applications. (EPA 450/4 - 87-013, June 1987).

The audit procedures employed and the audit results are described and discussed in the following sections.

Wind Speed System

The wind speed system was tested by three different methods. First, a torque watch test was performed on the sensor bearings to determine the sensor starting threshold. Second, the sensor shaft was prevented from rotating, thereby simulating a zero wind speed; and third, a simulated upscale wind speed (29.3 mph) was introduced into the sensor via a synchronous motor.

The torque watch test reading of 0.12 gmcm indicated that the wind speed sensor bearings were in excellent condition and that the specified starting threshold of the sensor had not deteriorated.

The simulated zero wind speed test resulted in a system reading of 0.5 mph. This reading was expected because the system output is offset to account for the specified starting threshold of the sensor.

The simulated upscale wind speed test of 600 rpm (29.3 mph) resulted in a system reading of 29.4 mph. This reading is well within the ± 5 percent of actual wind speed (1.5 mph) acceptance criteria for wind speed measurement systems.

Wind Direction System

The wind direction system was tested by two different methods. First, a torque watch test was performed on the sensor bearings to determine the sensor starting threshold. A vane alignment to points of known azimuth was then performed to check the sensor alignment.

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The torque watch test reading of 8.0 gmcm indicated that the wind direction sensor bearings were in excellent condition and that the specified starting threshold of the sensor had not deteriorated.

The wind direction sensor vane was aligned to a tall stack to the west of the tower site. Azimuths from the tower to the stack were determined from a U.S. Geological Survey topographic map to be 275 degrees for the vane tip and 95 degrees for the vane tail.

The results of the vane tip and tail alignment checks were 278 and 98 degrees, respectively. This equates to an average vane alignment difference of +3 degrees. Quality assurance guidelines suggest an average difference of $\pm 3.0^\circ$. Since the average difference was right at the $\pm 3.0^\circ$ guideline limit, it was decided to re-align the crossarm. A post adjustment tip and tail alignment check was conducted, yielding results of 274 and 94 degrees respectively. This equates to an average vane alignment difference of 1 degree, which is well within the ± 3.0 degree quality assurance guideline.

Atmospheric Pressure

The atmospheric pressure sensory system was audited by comparing the system response to the response of a calibrated aneroid barometer.

At the time of the test, the system was reading 30.23 inches of mercury compared to the calibrated barometer reading of 30.30 inches of mercury, for a difference of -0.23 percent. This result is well within the ± 1.0 percent quality assurance guideline for atmospheric pressure measurement systems.

Temperature

The temperature system was audited by placing the sensor probe and an NBS traceable mercury thermometer in an ambient water bath and then in an ice water bath, and comparing the results.

For the ambient water bath test point, the reference thermometer reading was 66.0° and the corresponding sensor reading was 65.6°F. For the ice water bath test, the reference thermometer reading was 32.5°F and the corresponding sensor output reading was 32.3°F. The thermometer versus sensor temperature differences for the ambient and ice water baths were -0.4°F and -0.2°F respectively. These results are well within the $\pm 1.8^\circ\text{F}$ quality assurance guideline for temperature measurements.

Relative Humidity

The relative humidity sensor was audited by comparing the system output to the calculated relative humidity as determined by NBS traceable aspirated psychrometer readings.

Mr. Kenneth R. Moser
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At the time of the test, the system reading was 88.5% versus the aspirated psychrometer calculated relative humidity of 89.0%. This results in a difference of -0.5% and is well within the ± 5.0 percent quality assurance guideline for relative humidity measurements.

Conclusion

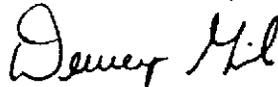
The Industri-Plex meteorological monitoring system, including the modified relative humidity sensor is producing accurate data which meets or exceeds quality assurance guidelines. Prior to the audit and relative humidity sensor exchange the relative humidity system had been outputting data which were low by 5 - 15 percent. The newly installed sensor is different from the previous sensor in that a new filter membrane is being used to protect the actual sensor. This modification was made by Climatronics, and the sensor is now outputting accurate data well within quality assurance guidelines.

The slight offset in the wind direction sensor alignment was likely the result of the high frequency of tower climbing during work performed during all of the earlier checks of the relative humidity sensors. Although the data was just at the ± 3 degree margin of acceptability, the adjustment to the wind direction sensor has corrected the variation to less than one degree.

This concludes the reporting of audit results for the July 27, 1990 audit. Copies of the relevant field audit test sheets are enclosed for your records. Please do not hesitate to call Steven Falzarano or myself if you have any questions.

Sincerely,

CHAS. T. MAIN, INC.



Dewey Gile
Project Meteorologist

DG/sh/D#1

cc: R. Glazier, Golder Assoc.
T. W. Fritts, MAIN
S. Falzarano, MAIN

Enclosures

AEROMETRIC MONITORING INSTRUMENTATION
GENERAL PURPOSE CALIBRATION CHECK FORM

CLIENT: Golder ASSO.

DATE: 7/27/90

PROJECT: 10-M Tower

TIME: 0815 EST

SITE: Woburn, MA

TECHNICIAN: DG/SC

PARAMETER	TEST INPUT	EXPECTED RESPONSE (mph)			OBSERVED RESPONSE (mph)		
		Voltage	Chart	DDAS	Voltage	Chart	DDAS
Parameter: 10M Wind S. Sensor M/N: 100108 S/N: 3152 Processor M/N: Cup: 905 S/N: Range: Location:	1. 0 RPM			0.5			0.5
	2. 600 RPM			29.3			29.4
	3.						
	4.						

PARAMETER	TEST INPUT	EXPECTED RESPONSE (inches)			OBSERVED RESPONSE (inches)		
		Voltage	Chart	DDAS	Voltage	Chart	DDAS
Atmospheric Parameter: Pressure Sensor M/N: S/N: Processor M/N: S/N: Range: Location:	1. 30.30"			30.30			30.23
	2.						
	3.						
	4.						

PARAMETER	TEST INPUT	EXPECTED RESPONSE			OBSERVED RESPONSE		
		Voltage	Chart	DDAS	Voltage	Chart	DDAS
Parameter: Sensor M/N: S/N: Processor M/N: S/N: Range: Location:	1.						
	2.						
	3.						
	4.						

COMMENTS: Started Audit at 0815 EST.

Wind Speed Torque = 0.12 gm cm⁻¹

FIELD ALIGNMENT /
CALIBRATION DATA SHEET

CLIENT: Golder Associates

DATE: 7/27/90

PROJECT: Remedial Industri-Plex Tower

TIME: 0845 EST

SITE: Woburn, MA

TECHNICIAN: DG/SC

LEVEL: SENSOR S/N OFF: PROCESSOR S/N OFF: VANE S/N OFF:
ON: ON: ON:

REFERENCE POINTS			SENSOR RESPONSES		
LANDMARKS	AZIMUTH ANGLE (DEGREES)	AZIMUTH ANGLE (VOLTS)	DVM VOLTS / DEGREES	DDAS VOLTS / DEGREES	CHART / DEGREES
1. <u>Smoke Stack</u> TIP: <u> </u> TAIL: <u> </u> T.P. <u>540°</u>	<u>274.5°</u> <u>94.5°</u> <u>454.5°</u>	<u>2.542</u> <u>0.875</u> <u>4.208</u>	<u>278</u> <u>98</u>	<u>274</u> <u>94</u>	
2. <u>Hancock Tower</u> TIP: <u> </u> TAIL: <u> </u> <u>540°</u>	<u> </u>	<u> </u>			
3. <u> </u> TIP: <u> </u> TAIL: <u> </u> <u>540°</u>	<u> </u>	<u> </u>			
4. <u> </u> TIP: <u> </u> TAIL: <u> </u> <u>540°</u>	<u> </u>	<u> </u>			

COMMENTS: ADJUSTED CROSS-ARM FOR WIND DIRECTION
TURBINE 10m WD = 8.0 g/m³

DEW POINT / RELATIVE HUMIDITY
FIELD CALIBRATION SHEET

CLIENT: Golder Associates
PROJECT: Remedial Site 10-M Tower
SITE: Woburn, MA

DATE: 7/27/90
TIME: 0910 EST
TECHNICIAN: Gile / Coughlin

TEST #	PARAMETER	SLING PSYCHROMETER	EXPECTED VOLTAGE	SENSOR		
				DVM	DEW POINT DAAS	CHART
1	DRY BULB	73°F	-	/	72.3°F	/
	WET BULB	70.5°F	-			
	W.B. DEP.	2.5°F	-			
	DEW POINT	69.4°F	-			
	REL. HUM.	89%	-		88.5%	
X	DRY BULB	SLING PSYCHROMETER	EXPECTED VOLTAGE	DVM	DEW POINT DAAS	CHART
2	DRY BULB					
	WET BULB					
	W.B. DEP.					
	DEW POINT					
	REL. HUM.					

DEW POINT SENSOR EXCHANGE						
INSTRUMENT / SERIAL NO.	LEVEL		LEVEL		LEVEL	
	REMOVED	INSTALLED	REMOVED	INSTALLED	REMOVED	INSTALLED
ASPIRATOR						
DEW POINT TRANSLATOR						
DEW POINT PROBE						

COMMENTS: Relative s/n # 20847
Humidity

CHAS. T. MAIN, INC.

PRUDENTIAL CENTER, BOSTON, MASSACHUSETTS 02199

TELEPHONE 617-262-3200

TEMPERATURE / DELTA-TEMPERATURE
FIELD CALIBRATION DATA SHEET

CLIENT: Golder Associates
PROJECT: Remedial Site 10-M Tower
SITE: Woburn, MA

DATE: 7/27/90
TIME: _____
TECHNICIAN: Gile/Coughlin

LEVEL	PROBE	REF. TEMP.	EXPECTED VOLTAGE
	TEMP	32.5	
	TEMP	66.0	
	ΔTEMP		

DEGREE F. (OR C.)		
DVM	DAAS	CHART
	32.2	
	65.6	

TEMPERATURE / DELTA TEMPERATURE SENSOR EXCHANGE						
INSTRUMENT / SERIAL NO.	_____ LEVEL		_____ LEVEL		_____ LEVEL	
	REMOVED	INSTALLED	REMOVED	INSTALLED	REMOVED	INSTALLED
TRANSLATOR						
ASPIRATOR SHIELD						
PROBE						

COMMENTS: Temp 4290 (Sensor S/N #)
RH 20847 (Sensor S/N #)