LABORATORY TREATABILITY REPORT

UTILITY MANUFACTURING FACILITY
LONG ISLAND, NEW YORK

JANUARY 31, 2001

PREPARED FOR

ANSON ENVIRONMENTAL LTD.
771 NEW YORK AVENUE
HUNTINGTON, NY 11743

PREPARED BY

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ISOTEC CASE NO. 800271

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Section 1 Executive Summary

In-Situ Oxidative Technologies, Inc. (ISOTEC[SM]) was retained by Anson Environmental Ltd. (AEL) to conduct a laboratory treatability study (study) on soil and groundwater samples collected at the utility manufacturing site in Long Island, New York (the site). The purpose of the study was to determine the potential effectiveness of ISOTEC's *in situ* chemical oxidation process to oxidize site contaminants of concern in soil and groundwater at the site.

The ISOTEC process is based on Fenton's chemistry using a proprietary catalyst to produce hydroxyl radicals that oxidize chemical bonds. The target contaminants of concern for the study were chlorinated volatile organic compounds (CVOCs) including tetrachloroethene (PCE), trichloroethene (TCE), Cis-1,2-Dichloroethene (Cis-DCE), and 1,1,1-Trichloroethane (TCA). Experiments were conducted on samples of site groundwater and on a mixture of site groundwater and site soil (soil-slurry) that was prepared by ISOTEC at their facility. Results of the study indicated nearly 99% destruction of CVOCs in both the groundwater test (GW-test) and the soil-slurry test (SL-test). The study results can be used to design a pilot scale application of the ISOTEC process for the site from which the study samples were collected. A full-scale process can be designed for the site following successful completion of the pilot scale application.

Section 2 Study Objectives

The objectives of the study were as follows:

- For each ISOTEC catalyst under evaluation, determine the amount of catalyst/oxidant mix (reagent) required to oxidize the measured contaminants at the site (i.e, the site-specific stoichiometry per catalyst);
- Evaluate the effectiveness of ISOTEC's Fenton-based chemical oxidation on site groundwater samples;
- Evaluate the effectiveness of ISOTEC's Fenton-based chemical oxidation in the presence of site aquifer solids (i.e. soil); and
- Determine the most effective reagent for a potential pilot scale application at the site.

Section 3 Sample Collection

AEL collected soil and groundwater samples from the site then shipped the samples to the ISOTEC facility for the study. The soil was collected on October 9, 2000 and was identified as "MW-6 SOIL". This soil was used to generate the soil-slurry sample used during the study. The soil was stored at 4 degrees Celsius (°C) until mixed at the laboratory with the site groundwater sample to form the soil-slurry mix used during the study.

The groundwater was collected on October 11, 2000 in three unpreserved 1-liter glass containers, one 250-milliliter jar and two 40-milliliter (ml) vials preserved in hydrochloric acid (HCl), and was identified as "MW-6". ISOTEC used the unpreserved groundwater sample in a 250-ml jar for dissolved iron analysis. The preserved volumes were used to analyze the initial VOC content in the site groundwater. The groundwater was stored at 4°C until used during the study.

Section 4 Laboratory Treatability Study

The study consisted of the experimental setup, establishing initial conditions and experimental controls, conducting the experiments through application of various catalysts and oxidants, and then submitting the treated samples for chemical analysis.

4.1 Experimental Setup

Two sets of laboratory experiments were performed: one set on the groundwater sample and one set on a soil-slurry mix. The groundwater experiments are hereinafter referred to as Groundwater Test (GW-test) and consisted of the following:

- one experiment to determine the optimum catalyst/oxidant mix (reagent) and reagent volume, as evidenced by VOC oxidation in groundwater.

The soil-slurry experiments are hereinafter referred to as Soil-Slurry Test (SL-test) and consisted of the following:

- one experiment to determine the optimum reagent and reagent volume as evidenced by VOC oxidation in the soil-slurry; and

4.1.1 GW-test Experimental Setup

The GW-test consisted of the VOC experiment as described below.

4.1.1.1 VOC Experiment

The GW-test VOC experiment was performed in three pairs of 140 ml sealed batch reactors (reactors). Groundwater was introduced into each reactor, leaving enough headspace for predetermined reagent volumes to be injected. The reactors were sealed with aluminum caps fitted with Teflon®-lined rubber septa to facilitate reagent injections.

Each pair received either a different reagent, or a different volume of a particular reagent. One reactor of each pair served as the "treatment reactor" while the other served as the "monitoring reactor". Both reactors of each pair received identical reagent doses. The treatment reactor was not opened or sampled until the end of the experiment. The monitoring reactor was used to monitor the extent of the oxidation reaction of the pair, by periodically extracting small samples for hydrogen peroxide analysis. Additional reactors were set up for control purposes. Control reactors are discussed later in Section 4.3.

4.1.2 SL-test Experimental Setup

The SL-test consisted of the VOC experiment as described below.

4.1.2.1 VOC Experiment

The SL-test VOC experiment was performed in five pairs of 120 ml sealed batch reactors (reactors). The soil-slurry mix was prepared from a one to one ratio by weight (1:1 w/w) of soil and groundwater. The soil-slurry was introduced into each reactor, leaving enough headspace for predetermined reagent volumes to be injected. The reactors were sealed with screw-top caps fitted with Teflon®-lined rubber septa to facilitate reagent injections. One additional reactor was setup and stored at 4°C to represent initial conditions (Section 4.2).

Each pair received either a different reagent, or a different volume of a particular reagent, with one reactor serving as the "treatment reactor" and the other as the "monitoring reactor". Both reactors of each pair received identical reagent doses. The treatment reactor was not opened or sampled until the end of the experiment. The monitoring reactor was used to monitor the extent of the oxidation reaction of the pair, by periodically extracting small samples for hydrogen peroxide analysis. Additional reactors were set up for control purposes. Control reactors are discussed later in Section 4.3.

4.2 Initial Conditions

The initial conditions of each matrix (soil, groundwater and soil-slurry) were established prior to initiating the experiments.

Soil was analyzed for iron and manganese by EPA method 6010 and total organic carbon (TOC) by EPA method 9060.

Groundwater was analyzed for Iron and Manganese by EPA method 6010; and VOCs by EPA method 624 -10.

Soil-slurry was analyzed for Iron and Manganese by EPA method 6010; and VOCs by EPA method 8260B -10.

The results of the initial condition analyses are presented in Table 4-1. The analytical laboratory reports, including chains of custody, are presented in Appendix 1.

4.3 Experimental Control

Experimental control samples (Control) were set up during the study to document the following:

- reduction in contaminant concentrations due to sample dilution by reagent volumes injected, and
- reduction in contaminant concentrations due to volatilization caused by room temperature test conditions.

The control sample was set up in a treatment reactor but was injected with distilled water instead of catalyst and oxidant. The volume of distilled water injected was identical to the volumes of reagent injected into treatment reactors. The control sample remained at and was subject to the same conditions as the treatment and monitoring reactors.

Control samples were used during the following experiments:

- GW-test VOC experiment, and
- SL-test VOC experiment,

4.4 Application of Reagents

The study experiments were performed on each matrix. Where multiple pairs of reactors were prepared for a given matrix, a series of different reagents or different volumes of the same reagent were injected into each pair of reactors (treatment and monitoring). Each monitoring reactor received an identical dose as its paired treatment reactor. Samples were periodically withdrawn from the monitoring reactors for hydrogen peroxide analysis, the results of which may have led to additional treatment dosages of the reagent under study, for its paired treatment reactor. Distilled water was used to equalize the total volume of reagent used between reactor pair.

Following the last application of reagent, all reactors remained undisturbed at room temperature for a minimum of 24 hours or until the oxidizer was completely consumed as determined by Hach H_2O_2 testing equipment. The reaction was quenched using catalase, which is an organic enzyme catalyst naturally present in most soils that decomposes hydrogen peroxide directly to oxygen without generating hydroxyl radicals as shown below.

$$H_2O_2 \rightarrow H_2O + \tfrac{1}{2}\, O_2$$

After the resting period, excess catalase was injected into each reactor to decompose residual hydrogen peroxide and terminate the study. The use of catalase for quenching purposes is a standard practice in Fenton's chemistry and does not interfere with laboratory analysis. However, for control purposes, the exact volume of excess catalase injected into each treatment reactor was also injected into control reactors. The treatment effectiveness was evaluated by calculating the percent VOC reduction in each treatment reactor relative to the control reactors.

The type of catalyst tested, and the number of treatment dosages evaluated is discussed below.

4.4.1 ISOTEC Catalyst 4260

ISOTEC's patented Catalyst 4260 is a circum-neutral pH (e.g. 5-8) organometallic complex with high mobility within the subsurface. Based on historical contaminant levels noted at the site and previous experience with treatment of the compounds of concern, ISOTEC selected this catalyst for most of the experiments. The stoichiometric molar ratio of Catalyst 4260 to measured site contaminants was determined and then used to prepare the Catalyst 4260 reagent. One, two and three treatment dosages of the Catalyst 4260 reagent were evaluated on the soil-slurry matrix for VOC oxidation. One and two treatment dosages were evaluated on the groundwater matrix for VOC oxidation.

4.4.2 ISOTEC Catalyst 4460

ISOTEC's proprietary Catalyst 4460 is a concentrated organometallic complex that was also evaluated during this study. This catalyst is more concentrated than Catalyst 4260 and promotes a relatively aggressive reaction. The stoichiometric molar ratio of Catalyst 4460 to measured site contaminants was determined and then used to prepare the Catalyst 4460 reagent. One and two treatment dosages of the Catalyst 4460 reagent were evaluated on the soil-slurry matrix for VOC oxidation. One treatment dosage was evaluated on the groundwater matrix for VOC oxidation.

4.5 Sample Collection and Analysis

After the study was terminated by injecting excess catalase into the reactors, water from each of the GW-test VOC experiment treatment and control reactors was decanted into 40-ml glass vials preserved in HCl for VOC analysis by EPA method 624 + 10. Final values of pH were determined from the monitoring reactor. Likewise, a sample of slurry from each SL-test VOC experiment treatment and control reactor was homogenized in the 120-ml reactor vessels and analyzed for VOCs by EPA method 8260B + 10.

All study samples were submitted to a New Jersey certified analytical laboratory for analysis.

Table 4-1: Initial Conditions

Sample Matrix	UNITS	MW-6 Aqueous	MW-6 Soil	Slurry/Initial Soil
VO Compound				
1,1-Dichloroethane	µg/L or µg/Kg	0.652	NA	ND(<8.45)
Cis-1,2-Dichloroethene	µg/L or µg/Kg	10.5	NA	3.21 J
1,1,1-Trichloroethane	µg/L or µg/Kg	3.22	NA	ND(<8.45)
Trichloroethene	µg/L or µg/Kg	7.30	NA	1.96 J
Tetrachloroethene	µg/L or µg/Kg	93.2	NA	15
Total target VO's	µg/L or µg/Kg	144.87	NA	20.17
Total TIC's	µg/L or µg/Kg	ND	NA	ND
Additional Parameters				
Iron	mg/L or mg/Kg	ND<	1,107	NA
Manganese	mg/L or mg/Kg	0.533	14.1	NA
Total Organic Carbon	mg/L or mg/Kg	NA	570	NA

Note:

- "MW-6" and "MW-6 SOIL" are "Field" collected samples.
- Slurry/Initial is a "Laboratory" collected initial samples from SI.-test prepared in 1:1 ratio (w/w) of "MW-6 SOIL" and "MW-6" samples.
- J = Concentration detected at a value below the method detection limit.
- ND = Analyzed for but not detected at the method detection limit (MDL) indicated.
- NA = Parameter not analyzed for
- VO's = Volatile organic compounds
- TIC's = Tentatively Identified Compounds or non-target compounds
- mg/Kg = milligrams per kilogram; µg/Kg = micrograms per kilogram
- mg/L = milligrams per liter; µg/L = micrograms per liter

Section 5 Treatability Study Results

5.1 GW-Test

Results of the GW-test VOC experiments are discussed below, with analytical results tabulated in Table 5-1. Analytical data packages are provided in Appendix 1.

5.1.1 VOC Experiments

The results of the GW-test VOC experiments are presented in Table 5-1. The treated sample data when compared to control sample indicates a 98% destruction of the total targeted VOCs detected in the groundwater sample after only one treatment dosage of the Catalyst 4260 reagent. The percent VOC reduction increased to 99% following two treatment dosages of the Catalyst 4260 reagent. An increasing trend in percent VOC reduction may be noted as the treatment dosages increased from one dosage to two dosages. All contaminants except TCA have been treated to below the laboratory method detection limits. Trichloroethane (TCA) persisted because the rate of reaction of hydroxyl radicals with TCA is at least an order of magnitude lower than with PCE, TCE and Cis-DCE. However, as may be noted by the decreasing trend with increasing treatment dosages and also results of the SL-test (next section), additional treatments should gradually oxidize TCA to below regulatory criteria.

Catalyst 4460 was equally effective on the target contaminants, also achieving 97.8% reduction following one treatment dosage. As may be noted from the final pH values, the treatment occurred in the pH range 5.04-5.91, which is desirable for maintaining natural subsurface conditions.

5.2 SL-test

The results of the SL-test VOC experiments are discussed below, with analytical results tabulated in Table 5-2. Analytical data packages are presented in Appendix 1.

5.2.1 VOC Experiments

The data indicate greater than 99% reduction in total targeted VOCs after ISOTEC's minimal treatment (i.e. one treatment dosage) of ISOTEC Catalyst 4260 reagent.

The data also indicate over a 99% destruction of total targeted VOCs in soil-slurry samples treated with Catalyst 4460. These results were also achieved after only one treatment application of the catalyst 4460, and are identical to those achieved using one treatment application of Catalyst 4260.

The data further indicates that the oxidation occurred under circum-neutral pH conditions (i.e. pH = 5.76-6.41) for both the catalysts and is suitable for field application under natural subsurface conditions.

Table 5-1: Results of GW-Test VOC Experiment

	UNITS	Control	Treated #1	Treated #2	Treated #3
Catalyst Used **Oxidant Used** **No. of Treatments**		None None 0	Cat-4260 Stab. H_2O_2 1	Cat-4260 Stab. H_2O_2 2	Cat-4460 Stab. H_2O_2 1
VO Compound					
1,1-Dichloroethane	µg/L	ND(<0.6)	ND(<0.3)	ND(<0.3)	ND(<0.3)
Cis-1,2-Dichlorocthene	µg/L	6.64	ND(<0.25)	ND(<0.25)	ND(<0.25)
1,1,1-Trichloroethane	µg/L	2.56	1.64	0.862	1.84
Trichloroethene	µg/L	5.36	ND(<0.39)	ND(<0.39)	ND(<0.39)
Tetrachloroethene	µg/L	67.8	ND(<0.57)	ND(<0.57)	ND(<0.57)
Total target VO's	µg/L	**82.36**	**1.64**	**0.862**	**1.84**
Total TIC's	µg/L	ND	ND	4.2	ND
% Reduction (Total target VO's)	-	**0%**	**98%**	**99%**	**97.8%**
Final pH of GW	-	**5.19**	**5.54**	**5.91**	**5.04**

Note:

- J = Concentration detected at a value below the method detection limit.
- ND = Analyzed for but not detected at the method detection limit (MDL) indicated.
- NA = Parameter not analyzed for
- VO's = Volatile organic compounds
- TIC's = Tentatively Identified Compounds or non-target compounds
- D = Results from diluted analysis
- mg/L = milligrams per liter; µg/L = micrograms per liter

Table 5-2: Results of SL-Test VOC Experiment

Catalyst Used Oxidant Used No. of Treatments	UNITS	Control None None 0	Treated #1 Cat-4260 Stab. H_2O_2 1	Treated #1 Cat-4260 Stab. H_2O_2 2	Treated 3 Cat-4260 Stab. H_2O_2 3	Treated #4 Cat-4460' Stab. H_2O_2 1	Treated #5 Cat-4460' Stab. H_2O_2 2
VO Compound							
Cis-1,2-Dichloroethene	µg/Kg	2.43 J	ND(<9.65)	ND(<8.85)	ND(<8.4)	ND(<9.2)	ND(<5.8)
Tetrachloroethene	µg/Kg	10.6	ND(<9.65)	ND(<8.85)	ND(<8.4)	ND(<9.2)	ND(<5.8)
Total target VO's	µg/Kg	13.03	ND	ND	ND	ND	ND
Total TIC's		ND	ND	ND	ND	ND	ND
% Reduction (Total target VO's)	-	0%	99+%	99+%	99+%	99+%	99+%
Final pH of Slurry	-	6.27	6.05	6.41	6.35	5.95	5.76

Note:

- J = Concentration detected at a value below the method detection limit.
- ND = Analyzed for but not detected at the method detection limit (MDL) indicated.
- NA = Parameter not analyzed for
- VO's = Volatile organic compounds
- TIC's = Tentatively Identified Compounds or non-target compounds
- mg/Kg = milligrams per kilogram; µg/Kg= micrograms per kilogram
- ! = Cat-4460 is a concentrated experimental catalyst

Section 6 Conclusions

The laboratory study results indicate that the ISOTEC process is effective in significantly reducing the concentration of CVOC's in site soil and groundwater. The data indicate that both the catalysts tested (i.e. Catalysts 4260 and 4460) achieved maximum contaminant reduction under close to natural subsurface pH conditions, with one application indicating greater than 99% reduction in soil-slurry and nearly 98% reduction in groundwater. Trichloroethane (TCA) persisted even after two treatments because of its refractory nature and a lower rate of reaction with hydroxyl radicals. However, based upon decreasing concentration noted with increasing treatment dosages, this compound will be treated with additional treatment dosages.

A preliminary assessment of site-specific factors that could affect the ISOTEC process was performed on the content of iron, manganese and TOC in site soil. Iron was detected in site soil at 1,107 mg/Kg (Table 4-1). Much of this iron is bound to the soil matrix and unavailable to catalyze the Fenton reaction that occurs in the aqueous phase. Iron was not detected in the site groundwater. The soil manganese concentration of 14.1 mg/Kg is low to function as a natural catalyst for Fenton process. The aqueous concentration was also low at 0.533 mg/L. The concentration of TOC was measured to be 570 mg/Kg, which is low but may promote minor side reactions that compete for hydroxyl radicals. However, supplying additional reagent volumes will offset reagent losses due to such competition.

The ISOTEC study results suggest that a pilot application of the ISOTEC process should be completed at the site to gather additional data on the effectiveness of this remedial alternative on a large-scale basis. A pilot application would also serve as an initial step toward remediating the site; data obtained from the study indicate that the ISOTEC process could substantially reduce CVOC concentrations in the treated areas.

APPENDIX #1

LAB STUDY ANALYTICAL PACKAGE

Integrated Analytical Labs

Integrated Analytical Laboratories, LLC.

273 Franklin Road
Randolph, N.J. 07869

Phone: 973 361-4252
Fax: 973 989-5288

ANALYTICAL DATA REPORT

for
Isotec
51 Everett Drive
Suite A-10
West Windsor,NJ 08550

Project: ANSON/UTILITY MANUF. NY - 800271
Lab Case Number: E00-6513
Date Report Prepared: October 31, 2000

CLIENT SAMPLE ID	LABORATORY SAMPLE ID
MW-6 SOIL	6513-001
SL/ INITIAL	6513-002
SL/ CONTROL	6513-003
SL/T-A	6513-004
SL/T-B	6513-005
SL/T-C	6513-006
SL/T-D	6513-007
SL/T-E	6513-008
MW-6	6513-009
GW/ CONTROL	6513-010
GW/T-F	6513-011
GW/T-G	6513-012
GW/T-H	6513-013

All required protocols were followed during analyses. These data have been reviewed and accepted by

Michael H. Leftin, Ph.D.
Laboratory Director

The liability of Integrated Analytical Laboratories, LLC. is limited to the actual cost of the analyses performed.

INTEGRATED ANALYTICAL LABORATORIES, LLC.

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Subcontracted results from The Washington Group Laboratory

INTEGRATED ANALYTICAL LABORATORIES, LLC.

MATRIX QUALIFIERS

A - Indicates the sample is an Aqueous matrix.

O - Indicates the sample is an Oil matrix.

S - Indicates the sample is a Soil, Sludge or Sediment matrix.

X - Indicates the sample is an Other matrix as indicated by Client Chain of Custody.

DATA QUALIFIERS

B - Indicates the analyte was found in the Blank and in the sample. It indicates possible sample contamination and warns the data user to use caution when applying the results of the analyte.

C - Common Laboratory Contaminant.

D - The compound was reported from the Diluted analysis.

D.F. - Dilution Factor.

E - Estimated concentration, reported results are outside the calibrated range of the instrument.

J - Indicates an estimated value. The compound was detected at a value below the method detection limit but greater than zero. For GC/MS procedures, the mass spectral data meets the criteria required to identify the target compound.

MDL - Method Detection Limit.

MI - Indicates compound concentration could not be determined due to Matrix Interferences.

NA - Not Applicable.

ND - Indicates the compound was analyzed for but Not Detected at the MDL.

REPORT QUALIFIERS

All solid sample analyses are reported on a dry weight basis.

All solid sample values are corrected for original sample size and percent solids.

INTEGRATED ANALYTICAL LABORATORIES, LLC.

SUMMARY REPORT
Client: Isotec
Project: ANSON/UTILITY MANUF. NY - 800271
Lab Case No.: E00-6513

	Lab ID:	6513-001	6513-002		6513-003		6513-004	6513-005
	Client ID:	MW-6	SL/		SL/		SL/T-A	SL/T-B
	Client ID Cont.:	SOIL	INITIAL		CONTROL			
	Matrix:	Soil	Soil		Soil		Soil	Soil
	Sampled Date:	10/9/2000	10/12/2000		10/16/2000		10/16/2000	10/16/2000
PARAMETER(Units)								
Volatiles (ppb)								
(Including Cis1,2-DCE,MTBE & TBA)								
t-Butyl Alcohol(TBA)		-	ND		ND		ND	ND
Methyl-t-Butyl Ether(MTBE)		-	ND		ND		ND	ND
cis-1,2-Dichloroethene		-	3.21	J	2.43	J	ND	ND
Trichloroethene		-	1.96	J	ND		ND	ND
Tetrachloroethene		-	15		10.6		ND	ND
TOTAL VO's:		-	20.17	J	13.03	J	ND	ND
TOTAL TIC's:		-	ND		ND		ND	ND
TOTAL VO's & TIC's:		-	20.17	J	13.03	J	ND	ND
Metals (ppm)								
Iron		1107	-		-		-	-
Manganese		14.1	-		-		-	-
General Analytical								
*Total Organic Carbons (ppm)		570	-		-		-	-

- = Sample not analyzed for
ND = Analyzed for but Not Detected at the MDL
J = The concentration was detected at a value below the MDL
All qualifiers on individual Volatiles are carried down through summation.
*Subcontracted results from The Washington Group Laboratory

SUMMARY REPORT

Client: Isotec

Project: ANSON/UTILITY MANUF. NY - 800271

Lab Case No.: E00-6513

Lab ID:	6513-006	6513-007	6513-008	6513-009	6513-010
Client ID:	SL/T-C	SL/T-D	SL/T-E	MW-6	GW/ CONTROL
Client ID Cont.:					
Matrix:	Soil	Soil	Soil	Aqueous	Aqueous
Sampled Date:	10/16/2000	10/16/2000	10/16/2000	10/11/2000	10/16/2000
PARAMETER(Units)					
Volatiles (ppb)					
(Including Cis1,2-DCE,MTBE & TBA)					
t-Butyl Alcohol(TBA)	ND	ND	ND	ND	ND
Methyl-t-Butyl Ether(MTBE)	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	0.652	ND
cis-1,2-Dichloroethene	ND	ND	ND	10.5	6.64
1,1,1-Trichloroethane	ND	ND	ND	3.22	2.56
Trichloroethene	ND	ND	ND	7.3	5.36
Tetrachloroethene	ND	ND	ND	93.2	67.8
TOTAL VO's:	ND	ND	ND	114.872	82.36
TOTAL TIC's:	ND	ND	ND	ND	ND
TOTAL VO's & TIC's:	ND	ND	ND	114.872	82.36
Metals (ppm)					
Iron	-	-	-	ND	-
Manganese	-	-	-	0.533	-

Lab ID:	6513-011	6513-012	6513-013
Client ID:	GW/T-F	GW/T-G	GW/T-H
Matrix:	Aqueous	Aqueous	Aqueous
Sampled Date:	10/16/2000	10/16/2000	10/16/2000
PARAMETER(Units)			
Volatiles (ppb)			
(Including Cis1,2-DCE,MTBE & TBA)			
t-Butyl Alcohol(TBA)	ND	ND	ND
Methyl-t-Butyl Ether(MTBE)	ND	ND	ND
cis-1,2-Dichloroethene	ND	ND	ND
1,1,1-Trichloroethane	1.64	0.862	1.84
TOTAL VO's:	1.64	0.862	1.84
TOTAL TIC's:	ND	4.2	ND
TOTAL VO's & TIC's:	1.64	5.062	1.84

- = Sample not analyzed for

ND = Analyzed for but Not Detected at the MDL

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Client/Project: ISOTEC/ANSON

Lab ID: 6513-002
Client ID: SL/INITIAL
Date Received: 10/17/2000
Date Analyzed: 10/17/2000
Data file: I4491.D

GC/MS Column: DB-624
Sample wt/vol: 5.0g
Matrix-Units: Soil-µg/Kg (ppb)
Dilution Factor: 1
% Moisture: 40.7

Compound	Concentration	Q	MDL
Chloromethane	ND		8.45
Vinyl Chloride	ND		8.45
Bromomethane	ND		8.45
Chloroethane	ND		8.45
Trichlorofluoromethane	ND		8.45
Acrolein	ND		16.9
1,1-Dichloroethene	ND		8.45
Methylene Chloride	ND		8.45
Acrylonitrile	ND		16.9
t-Butyl Alcohol(TBA)	ND		16.9
trans-1,2-Dichloroethene	ND		8.45
Methyl-t-Butyl Ether(MTBE)	ND		8.45
1,1-Dichloroethane	ND		8.45
cis-1,2-Dichloroethene	3.21	J	8.45
Chloroform	ND		8.45
1,1,1-Trichloroethane	ND		8.45
Carbon Tetrachloride	ND		8.45
1,2-Dichloroethane(EDC)	ND		8.45
Benzene	ND		8.45
Trichloroethene	1.96	J	8.45
1,2-Dichloropropane	ND		8.45
Bromodichloromethane	ND		8.45
2-Chloroethylvinyl Ether	ND		8.45
cis-1,3-Dichloropropene	ND		8.45
Toluene	ND		8.45
trans-1,3-Dichloropropene	ND		8.45
1,1,2-Trichloroethane	ND		8.45
Tetrachloroethene	15		8.45
Dibromochloromethane	ND		8.45
Chlorobenzene	ND		8.45
Ethylbenzene	ND		8.45
Total Xylenes	ND		8.45
Bromoform	ND		8.45
1,1,2,2-Tetrachloroethane	ND		8.45
1,3-Dichlorobenzene	ND		8.45
1,4-Dichlorobenzene	ND		8.45
1,2-Dichlorobenzene	ND		8.45
Total Target Compounds:	20.17	J	

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS
Tentatively Identified Compounds

Client/Project: ISOTEC/ANSON

Lab ID: 6513-002
Client ID: SL/INITIAL
Date Received: 10/17/2000
Date Analyzed: 10/17/2000
Data file: I4491.D

GC/MS Column: DB-624
Sample wt/vol: 5.0g
Matrix-Units: Soil-μg/Kg (ppb)
Dilution Factor: 1
% Moisture: 40.7

CAS #	Compound	Estimated Concentration	Retention Time
	No peaks detected		

Total TICs = 0

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Client/Project: ISOTEC/ANSON

Lab ID: 6513-003
Client ID: SL/CONTROL
Date Received: 10/17/2000
Date Analyzed: 10/17/2000
Data file: I4492.D

GC/MS Column: DB-624
Sample wt/vol: 5.0g
Matrix-Units: Soil-µg/Kg (ppb)
Dilution Factor: 1
% Moisture: 42.4

Compound	Concentration	Q	MDL
Chloromethane	ND		8.7
Vinyl Chloride	ND		8.7
Bromomethane	ND		8.7
Chloroethane	ND		8.7
Trichlorofluoromethane	ND		8.7
Acrolein	ND		17.4
1,1-Dichloroethene	ND		8.7
Methylene Chloride	ND		8.7
Acrylonitrile	ND		17.4
t-Butyl Alcohol(TBA)	ND		17.4
trans-1,2-Dichloroethene	ND		8.7
Methyl-t-Butyl Ether(MTBE)	ND		8.7
1,1-Dichloroethane	ND		8.7
cis-1,2-Dichloroethene	2.43	J	8.7
Chloroform	ND		8.7
1,1,1-Trichloroethane	ND		8.7
Carbon Tetrachloride	ND		8.7
1,2-Dichloroethane(EDC)	ND		8.7
Benzene	ND		8.7
Trichloroethene	ND		8.7
1,2-Dichloropropane	ND		8.7
Bromodichloromethane	ND		8.7
2-Chloroethylvinyl Ether	ND		8.7
cis-1,3-Dichloropropene	ND		8.7
Toluene	ND		8.7
trans-1,3-Dichloropropene	ND		8.7
1,1,2-Trichloroethane	ND		8.7
Tetrachloroethene	10.6		8.7
Dibromochloromethane	ND		8.7
Chlorobenzene	ND		8.7
Ethylbenzene	ND		8.7
Total Xylenes	ND		8.7
Bromoform	ND		8.7
1,1,2,2-Tetrachloroethane	ND		8.7
1,3-Dichlorobenzene	ND		8.7
1,4-Dichlorobenzene	ND		8.7
1,2-Dichlorobenzene	ND		8.7
Total Target Compounds:	13.03	J	

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS
Tentatively Identified Compounds

Client/Project: ISOTEC/ANSON

Lab ID: 6513-003
Client ID: SL/CONTROL
Date Received: 10/17/2000
Date Analyzed: 10/17/2000
Data file: I4492.D

GC/MS Column: DB-624
Sample wt/vol: 5.0g
Matrix-Units: Soil-μg/Kg (ppb)
Dilution Factor: 1
% Moisture: 42.4

CAS #	Compound	Estimated Concentration	Retention Time
	No peaks detected		

Total TICs = 0

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Client/Project: ISOTEC/ANSON

Lab ID: 6513-004
Client ID: SL/T-A
Date Received: 10/17/2000
Date Analyzed: 10/17/2000
Data file: I4493.D

GC/MS Column: DB-624
Sample wt/vol: 5.0g
Matrix-Units: Soil-μg/Kg (ppb)
Dilution Factor: 1
% Moisture: 48.2

Compound	Concentration	Q	MDL
Chloromethane	ND		9.65
Vinyl Chloride	ND		9.65
Bromomethane	ND		9.65
Chloroethane	ND		9.65
Trichlorofluoromethane	ND		9.65
Acrolein	ND		19.3
1,1-Dichloroethene	ND		9.65
Methylene Chloride	ND		9.65
Acrylonitrile	ND		19.3
t-Butyl Alcohol(TBA)	ND		19.3
trans-1,2-Dichloroethene	ND		9.65
Methyl-t-Butyl Ether(MTBE)	ND		9.65
1,1-Dichloroethane	ND		9.65
cis-1,2-Dichloroethene	ND		9.65
Chloroform	ND		9.65
1,1,1-Trichloroethane	ND		9.65
Carbon Tetrachloride	ND		9.65
1,2-Dichloroethane(EDC)	ND		9.65
Benzene	ND		9.65
Trichloroethene	ND		9.65
1,2-Dichloropropane	ND		9.65
Bromodichloromethane	ND		9.65
2-Chloroethylvinyl Ether	ND		9.65
cis-1,3-Dichloropropene	ND		9.65
Toluene	ND		9.65
trans-1,3-Dichloropropene	ND		9.65
1,1,2-Trichloroethane	ND		9.65
Tetrachloroethene	ND		9.65
Dibromochloromethane	ND		9.65
Chlorobenzene	ND		9.65
Ethylbenzene	ND		9.65
Total Xylenes	ND		9.65
Bromoform	ND		9.65
1,1,2,2-Tetrachloroethane	ND		9.65
1,3-Dichlorobenzene	ND		9.65
1,4-Dichlorobenzene	ND		9.65
1,2-Dichlorobenzene	ND		9.65

Total Target Compounds: 0

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS
Tentatively Identified Compounds

Client/Project: ISOTEC/ANSON

Lab ID: 6513-004
Client ID: SL/T-A
Date Received: 10/17/2000
Date Analyzed: 10/17/2000
Data file: I4493.D

GC/MS Column: DB-624
Sample wt/vol: 5.0g
Matrix-Units: Soil-μg/Kg (ppb)
Dilution Factor: 1
% Moisture: 48.2

CAS #	Compound	Estimated Concentration	Retention Time
	No peaks detected		

Total TICs = 0

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Client/Project: ISOTEC/ANSON

Lab ID: 6513-005
Client ID: SL/T-B
Date Received: 10/17/2000
Date Analyzed: 10/17/2000
Data file: I4494.D

GC/MS Column: DB-624
Sample wt/vol: 5.0g
Matrix-Units: Soil-μg/Kg (ppb)
Dilution Factor: 1
% Moisture: 43.4

Compound	Concentration	Q	MDL
Chloromethane	ND		8.85
Vinyl Chloride	ND		8.85
Bromomethane	ND		8.85
Chloroethane	ND		8.85
Trichlorofluoromethane	ND		8.85
Acrolein	ND		17.7
1,1-Dichloroethene	ND		8.85
Methylene Chloride	ND		8.85
Acrylonitrile	ND		17.7
t-Butyl Alcohol(TBA)	ND		17.7
trans-1,2-Dichloroethene	ND		8.85
Methyl-t-Butyl Ether(MTBE)	ND		8.85
1,1-Dichloroethane	ND		8.85
cis-1,2-Dichloroethene	ND		8.85
Chloroform	ND		8.85
1,1,1-Trichloroethane	ND		8.85
Carbon Tetrachloride	ND		8.85
1,2-Dichloroethane(EDC)	ND		8.85
Benzene	ND		8.85
Trichloroethene	ND		8.85
1,2-Dichloropropane	ND		8.85
Bromodichloromethane	ND		8.85
2-Chloroethylvinyl Ether	ND		8.85
cis-1,3-Dichloropropene	ND		8.85
Toluene	ND		8.85
trans-1,3-Dichloropropene	ND		8.85
1,1,2-Trichloroethane	ND		8.85
Tetrachloroethene	ND		8.85
Dibromochloromethane	ND		8.85
Chlorobenzene	ND		8.85
Ethylbenzene	ND		8.85
Total Xylenes	ND		8.85
Bromoform	ND		8.85
1,1,2,2-Tetrachloroethane	ND		8.85
1,3-Dichlorobenzene	ND		8.85
1,4-Dichlorobenzene	ND		8.85
1,2-Dichlorobenzene	ND		8.85

Total Target Compounds: 0

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS
Tentatively Identified Compounds

Client/Project: ISOTEC/ANSON

Lab ID: 6513-005
Client ID: SL/T-B
Date Received: 10/17/2000
Date Analyzed: 10/17/2000
Data file: I4494.D

GC/MS Column: DB-624
Sample wt/vol: 5.0g
Matrix-Units: Soil-μg/Kg (ppb)
Dilution Factor: 1
% Moisture: 43.4

CAS #	Compound	Estimated Concentration	Retention Time
	No peaks detected		

Total TICs = 0

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Client/Project: ISOTEC/ANSON

Lab ID: 6513-006
Client ID: SL/T-C
Date Received: 10/17/2000
Date Analyzed: 10/17/2000
Data file: I4495.D

GC/MS Column: DB-624
Sample wt/vol: 5.0g
Matrix-Units: Soil-μg/Kg (ppb)
Dilution Factor: 1
% Moisture: 40.3

Compound	Concentration	Q	MDL
Chloromethane	ND		8.4
Vinyl Chloride	ND		8.4
Bromomethane	ND		8.4
Chloroethane	ND		8.4
Trichlorofluoromethane	ND		8.4
Acrolein	ND		16.8
1,1-Dichloroethene	ND		8.4
Methylene Chloride	ND		8.4
Acrylonitrile	ND		16.8
t-Butyl Alcohol(TBA)	ND		16.8
trans-1,2-Dichloroethene	ND		8.4
Methyl-t-Butyl Ether(MTBE)	ND		8.4
1,1-Dichloroethane	ND		8.4
cis-1,2-Dichloroethene	ND		8.4
Chloroform	ND		8.4
1,1,1-Trichloroethane	ND		8.4
Carbon Tetrachloride	ND		8.4
1,2-Dichloroethane(EDC)	ND		8.4
Benzene	ND		8.4
Trichloroethene	ND		8.4
1,2-Dichloropropane	ND		8.4
Bromodichloromethane	ND		8.4
2-Chloroethylvinyl Ether	ND		8.4
cis-1,3-Dichloropropene	ND		8.4
Toluene	ND		8.4
trans-1,3-Dichloropropene	ND		8.4
1,1,2-Trichloroethane	ND		8.4
Tetrachloroethene	ND		8.4
Dibromochloromethane	ND		8.4
Chlorobenzene	ND		8.4
Ethylbenzene	ND		8.4
Total Xylenes	ND		8.4
Bromoform	ND		8.4
1,1,2,2-Tetrachloroethane	ND		8.4
1,3-Dichlorobenzene	ND		8.4
1,4-Dichlorobenzene	ND		8.4
1,2-Dichlorobenzene	ND		8.4

Total Target Compounds: 0

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS
Tentatively Identified Compounds

Client/Project: ISOTEC/ANSON

Lab ID: 6513-006
Client ID: SL/T-C
Date Received: 10/17/2000
Date Analyzed: 10/17/2000
Data file: I4495.D

GC/MS Column: DB-624
Sample wt/vol: 5.0g
Matrix-Units: Soil-μg/Kg (ppb)
Dilution Factor: 1
% Moisture: 40.3

CAS #	Compound	Estimated Concentration	Retention Time
	No peaks detected		

Total TICs = 0

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Client/Project: ISOTEC/ANSON

Lab ID: 6513-007
Client ID: SL/T-D
Date Received: 10/17/2000
Date Analyzed: 10/17/2000
Data file: I4496.D

GC/MS Column: DB-624
Sample wt/vol: 5.0g
Matrix-Units: Soil-µg/Kg (ppb)
Dilution Factor: 1
% Moisture: 45.7

Compound	Concentration	Q	MDL
Chloromethane	ND		9.2
Vinyl Chloride	ND		9.2
Bromomethane	ND		9.2
Chloroethane	ND		9.2
Trichlorofluoromethane	ND		9.2
Acrolein	ND		18.4
1,1-Dichloroethene	ND		9.2
Methylene Chloride	ND		9.2
Acrylonitrile	ND		18.4
t-Butyl Alcohol(TBA)	ND		18.4
trans-1,2-Dichloroethene	ND		9.2
Methyl-t-Butyl Ether(MTBE)	ND		9.2
1,1-Dichloroethane	ND		9.2
cis-1,2-Dichloroethene	ND		9.2
Chloroform	ND		9.2
1,1,1-Trichloroethane	ND		9.2
Carbon Tetrachloride	ND		9.2
1,2-Dichloroethane(EDC)	ND		9.2
Benzene	ND		9.2
Trichloroethene	ND		9.2
1,2-Dichloropropane	ND		9.2
Bromodichloromethane	ND		9.2
2-Chloroethylvinyl Ether	ND		9.2
cis-1,3-Dichloropropene	ND		9.2
Toluene	ND		9.2
trans-1,3-Dichloropropene	ND		9.2
1,1,2-Trichloroethane	ND		9.2
Tetrachloroethene	ND		9.2
Dibromochloromethane	ND		9.2
Chlorobenzene	ND		9.2
Ethylbenzene	ND		9.2
Total Xylenes	ND		9.2
Bromoform	ND		9.2
1,1,2,2-Tetrachloroethane	ND		9.2
1,3-Dichlorobenzene	ND		9.2
1,4-Dichlorobenzene	ND		9.2
1,2-Dichlorobenzene	ND		9.2

Total Target Compounds: 0

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS
Tentatively Identified Compounds

Client/Project: ISOTEC/ANSON

Lab ID: 6513-007
Client ID: SL/T-D
Date Received: 10/17/2000
Date Analyzed: 10/17/2000
Data file: I4496.D

GC/MS Column: DB-624
Sample wt/vol: 5.0g
Matrix-Units: Soil-μg/Kg (ppb)
Dilution Factor: 1
% Moisture: 45.7

CAS #	Compound	Estimated Concentration	Retention Time
	No peaks detected		

Total TICs = 0

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Client/Project: ISOTEC/ANSON

Lab ID: 6513-008
Client ID: SL/T-E
Date Received: 10/17/2000
Date Analyzed: 10/17/2000
Data file: I4497.D

GC/MS Column: DB-624
Sample wt/vol: 5.0g
Matrix-Units: Soil-µg/Kg (ppb)
Dilution Factor: 1
% Moisture: 13.9

Compound	Concentration	Q	MDL
Chloromethane	ND		5.8
Vinyl Chloride	ND		5.8
Bromomethane	ND		5.8
Chloroethane	ND		5.8
Trichlorofluoromethane	ND		5.8
Acrolein	ND		11.6
1,1-Dichloroethene	ND		5.8
Methylene Chloride	ND		5.8
Acrylonitrile	ND		11.6
t-Butyl Alcohol(TBA)	ND		11.6
trans-1,2-Dichloroethene	ND		5.8
Methyl-t-Butyl Ether(MTBE)	ND		5.8
1,1-Dichloroethane	ND		5.8
cis-1,2-Dichloroethene	ND		5.8
Chloroform	ND		5.8
1,1,1-Trichloroethane	ND		5.8
Carbon Tetrachloride	ND		5.8
1,2-Dichloroethane(EDC)	ND		5.8
Benzene	ND		5.8
Trichloroethene	ND		5.8
1,2-Dichloropropane	ND		5.8
Bromodichloromethane	ND		5.8
2-Chloroethylvinyl Ether	ND		5.8
cis-1,3-Dichloropropene	ND		5.8
Toluene	ND		5.8
trans-1,3-Dichloropropene	ND		5.8
1,1,2-Trichloroethane	ND		5.8
Tetrachloroethene	ND		5.8
Dibromochloromethane	ND		5.8
Chlorobenzene	ND		5.8
Ethylbenzene	ND		5.8
Total Xylenes	ND		5.8
Bromoform	ND		5.8
1,1,2,2-Tetrachloroethane	ND		5.8
1,3-Dichlorobenzene	ND		5.8
1,4-Dichlorobenzene	ND		5.8
1,2-Dichlorobenzene	ND		5.8

Total Target Compounds: 0

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS
Tentatively Identified Compounds

Client/Project: ISOTEC/ANSON

Lab ID: 6513-008
Client ID: SL/T-E
Date Received: 10/17/2000
Date Analyzed: 10/17/2000
Data file: I4497.D

GC/MS Column: DB-624
Sample wt/vol: 5.0g
Matrix-Units: Soil-μg/Kg (ppb)
Dilution Factor: 1
% Moisture: 13.9

CAS #	Compound	Estimated Concentration	Retention Time
	No peaks detected		

Total TICs = 0

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Client/Project: ISOTEC/ANSON

Lab ID: 6513-009
Client ID: MW-6
Date Received: 10/17/2000
Date Analyzed: 10/19/2000
Data file: K0772.D

GC/MS Column: DB-624
Sample wt/vol: 2.5mL
Matrix-Units: Aqueous-µg/L (ppb)
Dilution Factor: 2
% Moisture: 100

Compound	Concentration	Q	MDL
Chloromethane	ND		2
Vinyl Chloride	ND		0.78
Bromomethane	ND		0.94
Chloroethane	ND		1.96
Trichlorofluoromethane	ND		1.72
Acrolein	ND		8.04
1,1-Dichloroethene	ND		0.8
Methylene Chloride	ND		3.88
Acrylonitrile	ND		4.98
t-Butyl Alcohol(TBA)	ND		7.88
trans-1,2-Dichloroethene	ND		0.72
Methyl-t-Butyl Ether(MTBE)	ND		2.72
1,1-Dichloroethane	0.652		0.6
cis-1,2-Dichloroethene	10.5		0.5
Chloroform	ND		0.5
1,1,1-Trichloroethane	3.22		0.5
Carbon Tetrachloride	ND		0.6
1,2-Dichloroethane(EDC)	ND		0.34
Benzene	ND		0.44
Trichloroethene	7.3		0.78
1,2-Dichloropropane	ND		0.44
Bromodichloromethane	ND		0.5
2-Chloroethylvinyl Ether	ND		1.06
cis-1,3-Dichloropropene	ND		0.44
Toluene	ND		0.44
trans-1,3-Dichloropropene	ND		0.5
1,1,2-Trichloroethane	ND		0.44
Tetrachloroethene	93.2		1.14
Dibromochloromethane	ND		0.44
Chlorobenzene	ND		0.48
Ethylbenzene	ND		0.6
Total Xylenes	ND		1.6
Bromoform	ND		0.5
1,1,2,2-Tetrachloroethane	ND		0.44
1,3-Dichlorobenzene	ND		0.48
1,4-Dichlorobenzene	ND		0.5
1,2-Dichlorobenzene	ND		0.44

Total Target Compounds: 114.872

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Tentatively Identified Compounds

Client/Project: ISOTEC/ANSON

Lab ID: 6513-009
Client ID: MW-6
Date Received: 10/17/2000
Date Analyzed: 10/19/2000
Date File: K0772.D

GC/MS Column: DB-624
Sample wt/vol: 2.5mL
Matrix-Units: Aqueous-μg/L (ppb)
Dilution Factor: 2
% Moisture: 100

CAS #	Compound	Estimated Concentration	Retention Time
	No peaks detected		

Total TICs = 0

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Client/Project: ISOTEC/ANSON

L) ID: 6513-011
Client ID: GW/T-F
D te Received: 10/17/2000
D e Analyzed: 10/19/2000
Data file: K0774.D

GC/MS Column: DB-624
Sample wt/vol: 5mL
Matrix-Units: Aqueous-µg/L (ppb)
Dilution Factor: 1
% Moisture: 100

Compound	Concentration	Q	MDL
Chloromethane	ND		1
V yl Chloride	ND		0.39
B momethane	ND		0.47
Chloroethane	ND		0.98
T chlorofluoromethane	ND		0.86
Acrolein	ND		4.02
1,1-Dichloroethene	ND		0.4
M thylene Chloride	ND		1.94
Acrylonitrile	ND		2.49
t-Butyl Alcohol(TBA)	ND		3.94
tr is-1,2-Dichloroethene	ND		0.36
Methyl-t-Butyl Ether(MTBE)	ND		1.36
1 -Dichloroethane	ND		0.3
ci 1,2-Dichloroethene	ND		0.25
Chloroform	ND		0.25
1 ,1-Trichloroethane	1.64		0.25
C bon Tetrachloride	ND		0.3
1,2-Dichloroethane(EDC)	ND		0.17
B zene	ND		0.22
T chloroethene	ND		0.39
1,2-Dichloropropane	ND		0.22
B modichloromethane	ND		0.25
2 hloroethylvinyl Ether	ND		0.53
cis-1,3-Dichloropropene	ND		0.22
T uene	ND		0.22
trans-1,3-Dichloropropene	ND		0.25
1,1,2-Trichloroethane	ND		0.22
T achloroethene	ND		0.57
Dibromochloromethane	ND		0.22
Chlorobenzene	ND		0.24
E ylbenzene	ND		0.3
Total Xylenes	ND		0.8
Bromoform	ND		0.25
1, 2,2-Tetrachloroethane	ND		0.22
1,3-Dichlorobenzene	ND		0.24
1, -Dichlorobenzene	ND		0.25
1, -Dichlorobenzene	ND		0.22

Total Target Compounds: 1.64

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Tentatively Identified Compounds

Client/Project: ISOTEC/ANSON

Lab ID: 6513-011
Client ID: GW/T-F
Date Received: 10/17/2000
Date Analyzed: 10/19/2000
Date File: K0774.D

GC/MS Column: DB-624
Sample wt/vol: 5mL
Matrix-Units: Aqueous-μg/L (ppb)
Dilution Factor: 1
% Moisture: 100

CAS #	Compound	Estimated Concentration	Retention Time
	No peaks detected		

Total TICs = 0

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Tentatively Identified Compounds

Client/Project: ISOTEC/ANSON

Lab ID: 6513-010
Client ID: GW/CONTROL
Date Received: 10/17/2000
Date Analyzed: 10/19/2000
Date File: K0773.D

GC/MS Column: DB-624
Sample wt/vol: 2.5mL
Matrix-Units: Aqueous-μg/L (ppb)
Dilution Factor: 2
% Moisture: 100

CAS #	Compound	Estimated Concentration	Retention Time
	No peaks detected		

Total TICs = 0

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Client/Project: ISOTEC/ANSON

Lab ID: 6513-010
Client ID: GW/CONTROL
Date Received: 10/17/2000
Date Analyzed: 10/19/2000
Data file: K0773.D

GC/MS Column: DB-624
Sample wt/vol: 2.5mL
Matrix-Units: Aqueous-µg/L (ppb)
Dilution Factor: 2
% Moisture: 100

Compound	Concentration	Q	MDL
Chloromethane	ND		2
Vinyl Chloride	ND		0.78
Bromomethane	ND		0.94
Chloroethane	ND		1.96
Trichlorofluoromethane	ND		1.72
Acrolein	ND		8.04
1,1-Dichloroethene	ND		0.8
Methylene Chloride	ND		3.88
Acrylonitrile	ND		4.98
t-Butyl Alcohol(TBA)	ND		7.88
trans-1,2-Dichloroethene	ND		0.72
Methyl-t-Butyl Ether(MTBE)	ND		2.72
1,1-Dichloroethane	ND		0.6
cis-1,2-Dichloroethene	6.64		0.5
Chloroform	ND		0.5
1,1,1-Trichloroethane	2.56		0.5
Carbon Tetrachloride	ND		0.6
1,2-Dichloroethane(EDC)	ND		0.34
Benzene	ND		0.44
Trichloroethene	5.36		0.78
1,2-Dichloropropane	ND		0.44
Bromodichloromethane	ND		0.5
2-Chloroethylvinyl Ether	ND		1.06
cis-1,3-Dichloropropene	ND		0.44
Toluene	ND		0.44
trans-1,3-Dichloropropene	ND		0.5
1,1,2-Trichloroethane	ND		0.44
Tetrachloroethene	67.8		1.14
Dibromochloromethane	ND		0.44
Chlorobenzene	ND		0.48
Ethylbenzene	ND		0.6
Total Xylenes	ND		1.6
Bromoform	ND		0.5
1,1,2,2-Tetrachloroethane	ND		0.44
1,3-Dichlorobenzene	ND		0.48
1,4-Dichlorobenzene	ND		0.5
1,2-Dichlorobenzene	ND		0.44

Total Target Compounds: 82.36

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

C ent/Project: ISOTEC/ANSON

I b ID: 6513-012
C ent ID: GW/T-G
Date Received: 10/17/2000
I te Analyzed: 10/19/2000
I ta file: K0775.D

GC/MS Column: DB-624
Sample wt/vol: 5mL
Matrix-Units: Aqueous-µg/L (ppb)
Dilution Factor: 1
% Moisture: 100

C mpound	Concentration	Q	MDL
Chloromethane	ND		1
Vinyl Chloride	ND		0.39
B omomethane	ND		0.47
Chloroethane	ND		0.98
Trichlorofluoromethane	ND		0.86
A rolein	ND		4.02
1,1-Dichloroethene	ND		0.4
Methylene Chloride	ND		1.94
A rylonitrile	ND		2.49
t-Butyl Alcohol(TBA)	ND		3.94
tr ns-1,2-Dichloroethene	ND		0.36
M thyl-t-Butyl Ether(MTBE)	ND		1.36
1,1-Dichloroethane	ND		0.3
c -1,2-Dichloroethene	ND		0.25
C loroform	ND		0.25
1,1,1-Trichloroethane	0.862		0.25
C bon Tetrachloride	ND		0.3
1,2-Dichloroethane(EDC)	ND		0.17
Benzene	ND		0.22
T chloroethene	ND		0.39
1,2-Dichloropropane	ND		0.22
Bromodichloromethane	ND		0.25
2 hloroethylvinyl Ether	ND		0.53
cis-1,3-Dichloropropene	ND		0.22
Toluene	ND		0.22
tr ns-1,3-Dichloropropene	ND		0.25
1,1,2-Trichloroethane	ND		0.22
Tetrachloroethene	ND		0.57
D romochloromethane	ND		0.22
Chlorobenzene	ND		0.24
E ylbenzene	ND		0.3
T al Xylenes	ND		0.8
Bromoform	ND		0.25
1, ,2,2-Tetrachloroethane	ND		0.22
1, -Dichlorobenzene	ND		0.24
1,4-Dichlorobenzene	ND		0.25
1, -Dichlorobenzene	ND		0.22

Total Target Compounds: 0.862

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS
Tentatively Identified Compounds

Client/Project: ISOTEC/ANSON

Lab ID: 6513-012
Client ID: GW/T-G
Date Received: 10/17/2000
Date Analyzed: 10/19/2000
Date File: K0775.D

GC/MS Column: DB-624
Sample wt/vol: 5mL
Matrix-Units: Aqueous-μg/L (ppb)
Dilution Factor: 1
% Moisture: 100

CAS #	Compound	Estimated Concentration	Retention Time
000075-52-5	Methane, nitro-	4.2	5.38

Total TICs = 4.2

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Client/Project: ISOTEC/ANSON

Lab ID: 6513-013
Client ID: GW/T-H
Date Received: 10/17/2000
Date Analyzed: 10/19/2000
Data file: K0776.D

GC/MS Column: DB-624
Sample wt/vol: 5mL
Matrix-Units: Aqueous-µg/L (ppb)
Dilution Factor: 1
% Moisture: 100

Compound	Concentration	Q	MDL
Chloromethane	ND		1
Vinyl Chloride	ND		0.39
Bromomethane	ND		0.47
Chloroethane	ND		0.98
Trichlorofluoromethane	ND		0.86
Acrolein	ND		4.02
1,1-Dichloroethene	ND		0.4
Methylene Chloride	ND		1.94
Acrylonitrile	ND		2.49
t-Butyl Alcohol(TBA)	ND		3.94
trans-1,2-Dichloroethene	ND		0.36
Methyl-t-Butyl Ether(MTBE)	ND		1.36
1,1-Dichloroethane	ND		0.3
cis-1,2-Dichloroethene	ND		0.25
Chloroform	ND		0.25
1,1,1-Trichloroethane	1.84		0.25
Carbon Tetrachloride	ND		0.3
1,2-Dichloroethane(EDC)	ND		0.17
Benzene	ND		0.22
Trichloroethene	ND		0.39
1,2-Dichloropropane	ND		0.22
Bromodichloromethane	ND		0.25
2-Chloroethylvinyl Ether	ND		0.53
cis-1,3-Dichloropropene	ND		0.22
Toluene	ND		0.22
trans-1,3-Dichloropropene	ND		0.25
1,1,2-Trichloroethane	ND		0.22
Tetrachloroethene	ND		0.57
Dibromochloromethane	ND		0.22
Chlorobenzene	ND		0.24
Ethylbenzene	ND		0.3
Total Xylenes	ND		0.8
Bromoform	ND		0.25
1,1,2,2-Tetrachloroethane	ND		0.22
1,3-Dichlorobenzene	ND		0.24
1,4-Dichlorobenzene	ND		0.25
1,2-Dichlorobenzene	ND		0.22

Total Target Compounds: 1.84

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS
Tentatively Identified Compounds

Client/Project: ISOTEC/ANSON

Lab ID: 6513-013
Client ID: GW/T-H
Date Received: 10/17/2000
Date Analyzed: 10/19/2000
Date File: K0776.D

GC/MS Column: DB-624
Sample wt/vol: 5mL
Matrix-Units: Aqueous-μg/L (ppb)
Dilution Factor: 1
% Moisture: 100

CAS #	Compound	Estimated Concentration	Retention Time
	No peaks detected		

Total TICs = 0

INTEGRATED ANALYTICAL LABORATORIES, LLC.

Iron

Client/Project: ISOTEC/ANSON

Date Received: 10/17/00
Date Analyzed: 10/23/00

Lab ID	Client ID	Result	Q	D.F.	Matrix-Units	MDL	% Moist
6513-001	MW-6 SOIL	1107		1	Soil -mg/Kg	3.71	19.1
6513-009	MW-6	ND		1	Aqueous - mg/L	0.100	100

INTEGRATED ANALYTICAL LABORATORIES, LLC.

Manganese

Client/Project: ISOTEC/ANSON

Date Received: 10/17/00
Date Analyzed: 10/23/00

Lab ID	Client ID	Result	Q	D.F.	Matrix-Units	MDL	% Moist
6513-001	MW-6 SOIL	14.1		1	Soil -mg/Kg	0.494	19.1
6513-009	MW-6	0.533		1	Aqueous - mg/L	0.010	100

INTEGRATED ANALYTICAL LABORATORIES, LLC.

*TOTAL ORGANIC CARBONS

ent/Project: ISOTEC/ANSON

te Received: 10/17/00

ab ID	Client ID	Result	Q	DF	Matrix-Units	MDL	Date Analyzed
13- 01	MW-6 SOIL	570		NA	Soil-mg/Kg	NA	10/24/00

bcontracted results from The Washington Group Laboratory

Fax # (973) 989-5288

CHAIN OF STODY

h, NJ 07869

CLIENT & PROJECT

Name:	ISOTEC
Address:	51 Everett Dr.
	West Windsor, NJ 08512
Telephone #:	609-275-8500
Fax #:	609-275-9608
Project Name:	Anson / Utility Haunt, NY
Project Manager:	Prasad Kakarla TP
Reference ID#:	80027 PO#: 1565

REPORTING

Fax to:	Prasad Kakarla
Fax #:	
Report to:	— Same —
Address:	
Invoice to:	
Address:	— Same —

Turnaround Time

Conditional / TPHC

24 hr* 48 hr 72 hr 1 wk NA Other:

Verbal/Fax

24 hr* 48 hr* 72 hr* 1 wk* (2 wk) Other:

Hard Copy

72 hr* 1 wk* 2 wk* (3 wk) Other:

*Prior to sample arrival, Lab notification is required.

Report Format

(Results Only)

Reduced

Regulatory

SRP Disk**: dbf or wk1

Other:

ANALYTICAL PARAMETERS / PRESERVATIVES

** Circle format required

Preservatives: 1. HCL 2. NaOH 3. HNO_3 4. H_2SO_4 5. MeOH 6. Other

COOLER TEMP. 4 °C

Sample ID	Sample Description	Sampling Date	Sampling Time	am	pm	Matrix	# of Containers	Lab ID	(VOTO)	Fe	Mn	TOC	Comments
MW-6 Soil	Field Soil	10/9	1430			S	2	01		X	X	X	
SL/Initial	Lab initial	10/12	1500			SL	1	02	X				
SL/Control	Lab Control	10/16	1000			SL	1	03					
SL/T-A	" Treated	|	|			SL	1	04					Slurry
SL/T-B	" "	|	|			SL	1	05					Under Pressure
SL/T-C	" "	|	|			SL	1	06					Exercise
SL/T-D	" "	|	|			SL	1	07					Caution
SL/T-E	" "	↓	↓			SL	1	08	↓				

SAMPLE MATRIX: W - Waste, SL - Sludge, A - Aqueous, O - Oil, X - Other, S - Soil, GW - Groundwater, SOL - Solid

SAMPLE INFORMATION

Please print legibly and fill out completely. Samples cannot be processed and the turnaround time will not start until any ambiguities have been resolved.

Concentrations Expected: LOW (MED) HIGH

Known Hazard: yes no

Describe:

CUSTODY LOG

	Signature	Date	Time	Signature
Relinquished by:	[signature]	10/16	1115	Received by: [signature]
Relinquished by:	[signature]	10/16/00	1840	Received by: [signature]
Relinquished by:	[signature]	10/17/00	830	Received by: [signature]
Relinquished by:				Received by:
Relinquished by:				Received by:

LAB COPIES - WHITE & YELLOW; CLIENT COPY - PINK

Comments: upto 2000 ppb PCE. Expect lower conc. in Treated samples. Use low MDL's for analysis. Shake slurry well before analysis.

Lab Case # 6513

Fax # (973) 989-5288

CHAIN OF STODY

h, NJ 07869

CLIENT & PROJECT

Name:	
Address:	See Page (1)
Telephone #:	
Fax #:	
Project Name:	
Project Manager:	TA
Reference ID#:	PO#:

REPORTING

Fax to:	
Fax #:	
Report to:	
Address:	See Page (1)
Invoice to:	
Address:	

Turnaround Time

Conditional / TPHC

24 hr* 48 hr 72 hr 1 wk NA Other:

Verbal/Fax

24 hr* 48 hr* 72 hr* 1 wk* 2 wk Other:

Hard Copy

72 hr* 1 wk* 2 wk* 3 wk Other:

*Prior to sample arrival, Lab notification is required.

Report Format

Results Only

Reduced

Regulatory

SRP Disk**: dbf or wk1

Other:

ANALYTICAL PARAMETERS / PRESERVATIVES

** Circle format required

1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	Preservatives
(VOTID)	Fe, dissolved	Mn, dissolved								1. HCL 3. HNO_3 2. NaOH 4. H_2SO_4 5. MeOH 6. Other

COOLER TEMP. 4 °C

SAMPLE INFORMATION

SAMPLE MATRIX
W - Waste SL - Sludge A - Aqueous
O - Oil X - Other S - Soil
GW - Groundwater SOL - Solid

Sample ID	Sample Description	Sampling Date	Sampling Time	am	pm	Matrix	# of Containers	Lab ID	Comments
MW-6	Field GW	10/4	?			A	3	09	
GW/Control	Lab Control	10/16	1000			A	2	10	
GW/T-F	" Treated	10/16	1000			A	2	11	
GW/T-G	" "	10/16	1000			A	2	12	
GW/T-H	" "	10/16	1000			A	2	13	

Please print legibly and fill out completely. Samples cannot be processed and the turnaround time will not start until any ambiguities have been resolved.

Concentrations Expected: LOW MED HIGH

Known Hazard: yes no

Describe:

CUSTODY LOG

	Signature	Date	Time	Signature
Relinquished by:	[signature]	10/16	1115	Received by: [signature]
Relinquished by:	[signature]	10/16/00	1840	Received by: IAC Fudge
Relinquished by:	IAC Fudge	10/17/00	830	Received by: [signature]
Relinquished by:				Received by:
Relinquished by:				Received by:

LAB COPIES - WHITE & YELLOW; CLIENT COPY - PINK

Comments: Same as Pg (1)

Filter for Fe & Mn dissolved before analysis.

Lab Case # 6513

PAGE: 2 OF 2

CHAIN OF CUSTODY

Case No.: E00-6513 P.O. #: 1565
Project : ANSON/UTILITY MANIF. NY - 800271
Client/Project: ISOTEC/ANSON

Client Address:
Isotec
51 Everett Drive
Suite A-10
West Windsor, NJ 08550

Billing Address:
Isotec
51 Everett Drive
Suite A-10
West Windsor, NJ 08550

Date Received: 10/17/00
Time Received: 08:30
Report Format: Standard

Verbal Due: Oct 31
Report Due: Nov 7

# of Containers	2	1	1	1	1	1
IAL ID #	6513-001	6513-002	6513-003	6513-004	6513-005	6513-006
Client ID #	MW-6 SOI	SL/INITI	SL/CONTR	SL/T-A	SL/T-B	SL/T-C
	L	AL	OL			
Matrix	Soil	Soil	Soil	Soil	Soil	Soil
Sample Date	10/09/00	10/12/00	10/16/00	10/16/00	10/16/00	10/16/00
Sample Time	14:30	15:00	10:00	10:00	10:00	10:00
MTBE + TBA		√	√	√	√	√
VO+10, PP LIST		√	√	√	√	√
Cis 1,2-DCE		√	√	√	√	√
Fe-Iron	√					
Mn-Manganese	√					
% Solids	√	√	√	√	√	√
TOC	√					

Comments: NOTE 1: AS PER COC, EXPECT PCE CONC. UP TO 2000 ppb IN SAMPLES #2, 3, 9 & 10. EXPECT LOWER CONCENTRATIONS IN REMAINING SAMPLES. PLEASE USE LOW DILUTIONS.

NOTE 2: SAMPLE #9 FOR DISSOLVED FE & MN TO BE FILTERED AT LAB.

CHAIN OF CUSTODY

Case No.: E00-6513 P.O. #: 1565
Project : ANSON/UTILITY MANIF. NY - 800271
Client/Project: ISOTEC/ANSON

Client Address:
Isotec
51 Everett Drive
Suite A-10
West Windsor, NJ 08550

Billing Address:
Isotec
51 Everett Drive
Suite A-10
West Windsor, NJ 08550

Date Received: 10/17/00
Time Received: 08:30
Report Format: Standard

Verbal Due: Oct 31
Report Due: Nov 7

# of Containers	1	1	3	2	2	2
IAL ID #	6513-007	6513-008	6513-009	6513-010	6513-011	6513-012
Client ID #	SL/T-D	SL/T-E	MW-6	GW/CONTR	GW/T-F	GW/T-G
				OL		
Matrix	Soil	Soil	Aqueous	Aqueous	Aqueous	Aqueous
Sample Date	10/16/00	10/16/00	10/11/00	10/16/00	10/16/00	10/16/00
Sample Time	10:00	10:00	:	10:00	10:00	10:00
MTBE + TBA	√	√	√	√	√	√
VO+10, PP LIST	√	√	√	√	√	√
Cis 1,2-DCE	√	√	√	√	√	√
Fe-Iron			√			
Mn-Manganese			√			
% Solids	√	√				
Spl Filtration			√			

Comments: NOTE 1: AS PER COC, EXPECT PCE CONC. UP TO 2000 ppb IN SAMPLES #2, 3, 9 & 10. EXPECT LOWER CONCENTRATIONS IN REMAINING SAMPLES. PLEASE USE LOW DILUTIONS.
NOTE 2: SAMPLE #9 FOR DISSOLVED FE & MN TO BE FILTERED AT LAB.

INTEGRATED ANALYTICAL LABORATORIES, LLC

SAMPLE RECEIPT VERIFICATION

CASE NO: № 6513 CLIENT: ISOTEC

COOLER TEMPERATURE: 2° - 6°C: ✓ (See Chain of Custody)

CHAIN OF CUSTODY: COMPLETE / INCOMPLETE Comments:

Sample Bottles Intact:	✓	Comments:
Sample Labels Intact/ Correct:	✓	
Sufficient Sample Volume:	✓	
Correct bottles/ preservative:	✓	
Samples received in holding time/ prep time:	✓	
Headspace/ bubbles in voa samples:	✓	
Samples to be subcontracted:	✓	
Preserved Sample pH checked: (Excluding voa samples)	✓	

KEY

✓ = YES
✗ = NO
(✓) = N/A

ADDITIONAL COMMENTS:

SAMPLE(S) VERIFIED BY: INITIAL [initials] DATE 10-17-00

CORRECTIVE ACTION REQUIRED: **YES** [ ] **NO** [✓]

CLIENT NOTIFIED: YES [ ] Date/ Time: NO [ ]

PROJECT CONTACT:

SUBCONTRACTED LAB:

DATE SHIPPED:

CORRECTIVE ACTION BY CLIENT:

CORRECTIVE ACTION TAKEN:

CONCLUSION:

Corrective Action taken by: INITIAL DATE

Integrated Analytical Laboratories, LLC.

Laboratory Custody Chronicle

Case No : E00-6513
Client : Isotec
Project : ANSON/UTILITY MANUF. NY - 800271

	GC/MS V		EXTRACT DATE	EXTRACT TIME	EXTRACT INITIAL	ANALYSIS DATE	ANALYSIS TIME	ANALYSIS INITIAL
MTBE + TBA	6513-002	S				10/17	9:00	DST/LP
	6513-003	S						
	6513-004	S						
	6513-005	S						
	6513-006	S						
	6513-007	S						
	6513-008	S						
	6513-009	A				10/17	— 10/19	DSD
	6513-010	A						
	6513-011	A						
	6513-012	A						
	6513-013	A						
VO+10, PP LIST	6513-002	S				10/17	9:00	LP
	6513-003	S						
	6513-004	S						
	6513-005	S						
	6513-006	S						
	6513-007	S						
	6513-008	S						
	6513-009	A				10/17 —	10/19/00	DSD
	6513-010	A						
	6513-011	A						
	6513-012	A						
	6513-013	A						
Cis 1,2-DCE	6513-002	S				10/17	9:00	LP
	6513-003	S						
	6513-004	S						
	6513-005	S						
	6513-006	S						
	6513-007	S						
	6513-008	S						
	6513-009	A				10/17 —	10/19/00	DSD
	6513-010	A						
	6513-011	A						
	6513-012	A						
	6513-013	A						
	METALS							
Fe-Iron	6513-001	S	10/19/00	2pm	[illegible]	10/23	00	
	6513-009	A	10/17/00	2pm	[illegible]	10/18	00	
Mn-Manganese	6513-001	S	10/19/00	2pm	[illegible]	10/23	00	
	6513-009	A	10/17/00	2pm	[illegible]	10/18	00	
	WETCHEM							
% Solids	6513-001	S	10/17	945	KC			
	6513-002	S						
	6513-003	S						

Integrated Analytical Laboratories, LLC.

Laboratory Custody Chronicle

Case No : E00-6513
Client : Isotec
Project : ANSON/UTILITY MANUF. NY - 800271

	WETCHEM		EXTRACT			ANALYSIS		
			DATE	TIME	INITIAL	DATE	TIME	INITIAL
% Solids	6513-004	S	10/17	945	KC			
	6513-005	S	↓					
	6513-006	S						
	6513-007	S						
	6513-008	S						
Spl Filtration	6513-009	A						
	SUB-CON							
TOC	6513-001	S	Wadsworth Group					

REVIEW & APPROVAL: MC Slatkevich

REMARKS :