J. H. BAXTER & CO., a California Limited Partnership

J Baxter

28-E-1.1

April 2, 1998

Jeanne Tran
Department of Ecology
Northwest Regional Office
3190 160th Ave., S.E.
Bellevue, WA 98008-5442

RE: NPDES Permit No. WA-003142-9 - Dioxin/Furan Study

Dear Ms. Tran:

Enclosed please find the completed Dioxin/Furan study report for J.H. Baxter's Arlington, Washington facility. This report includes information and data from two sampling events, during which both storm water and pentachlorophenol treating solution samples were collected for analysis.

The submission of the NPDES permit renewal application will closely follow your receipt of this report. The final storm water analytical results have been received and the application will be completed and submitted next week.

In the interim, if you have any questions regarding this report, please do not hesitate to contact me at (650) 349-0201.

Sincerely,

Caroline Martin
Environmental and Safety Manager
J.H. Baxter & Co.

cc: Georgia Baxter, Thomas Orthmeyer

Enclosure

1700 So. El Camino Real P.O. Box 5902 San Mateo, CA 94402-0902 Phone 650 349 0201 Fax 650 570 6878

J. H. BAXTER & CO., a California Limited Partnership

DIOXIN/FURAN STUDY

J.H. Baxter & Co.
Arlington, Washington

Prepared in accordance with
NPDES Permit No. WA-003142-9

Prepared By:
Caroline Martin
Environmental and Safety Manager
J.H. Baxter & Co.
San Mateo, CA

Submitted: April 2, 1998

1700 So. El Camino Real P.O. Box 5902 San Mateo, CA 94402-0902 Phone 650 349 0201 Fax 650 570 6878

DIOXIN/FURAN STUDY

J.H. Baxter & Co.
Arlington, Washington

Table of Contents

1.0 Introduction:

In accordance with NPDES permit #WA-003142-9, J.H. Baxter conducted a Dioxin/Furan study of the storm water and pentachlorophenol (penta) treating solution at the Arlington, Washington facility. This report summarizes the collection procedures, analytical methods and laboratory results, as instructed on pages 17-19 of the permit (See the appendices of this report). The two sampling events were conducted on September 18, 1997 and January 8, 1998, and conformed to requirements set forth by the Department of Ecology.

Each sampling event consisted of sampling storm water from a significant storm event in the French drains located in the facility's treated wood storage area (drains13, 14, 23, 24, and 25). Samples from drains 13 and 14 were composited. A composite sample of the penta treating solution was also collected from the three on-site work tanks.

The remainder of this report is organized in the following manner. Section 2.0 of this report describes the magnitude and duration of the sampled storm events. Section 3.0 presents a description of the sampling procedures employed, along with the procedures for quality assurance and control. Section 4.0 contains information on how samples were transported and analyzed, and includes a summary table (Table 1) of the results. Supporting laboratory results are included in the appendix.

2.0 Magnitude and Duration of Storm Events:

The first storm event during which samples were collected took place on September 18, 1998. The magnitude of this storm event was 0.85 inches and lasted for 12 hours. The preceding significant storm event was a 0.55-inch storm that lasted 7.5 hours on September 16, 1997.

The second storm event that was sampled took place on January 8, 1998, and measured 0.20 inches and lasted for four hours. The preceding significant storm event was a 0.5 inch storm that lasted six hours on January 6, 1998.

3.0 Sample Collection and Quality Control:

Over the course of the four-year permit cycle, there has been a significant decrease in the natural permeability of site soil. This is due in large part to the quantities of silt have mobilized with the storm water and have sealed the top layer of the soil around the French drains. In order to prevent the silt from entering and clogging the French drains, filtration fabrics have been placed over each drain. These fabrics clog with silt rather quickly and create large puddles of standing water over the drains.

Ideally, storm water samples would be collected from the metal buckets that have been installed under the filter fabric of each drain. However, since these buckets are inaccessible, samples were collected by scooping the ponded water that stands above the entrance of the drain.

The five drains sampled as part of this study were 13, 14, 23, 24 and 25, all of which are located in the treated wood storage area (Parcel A). Samples from drains 13 and 14 were composited as allowed by the permit. A duplicate sample of this composite (labeled Drain #30) was collected and sent to the lab for quality control purposes.

Dedicated plastic one-quart measuring cups were used to extract the samples from the standing water above each drain. Prior to collection, all cups were decontaminated. The sampler on staff donned decontaminated rubber boots and new protective surgical gloves to prevent the possibility of cross-contamination. Samples were collected from the top of each drain, while taking care not to activate sediment. Sample bottles were filled directly from the plastic cup. The sampler's boots were decontaminated and surgical gloves replaced before proceeding to the next drain.

A composite sample of the pentachlorophenol treating solution was also collected. The components of the treating solution are base oil at approximately 95% by weight and pentachlorophenol at 5%. There are three solution tanks (or work tanks) used on-site, labeled Tanks 7, 8 and 13. Each tank is connected to the facility filter press. One half gallon of each solution was collected from each tank in new plastic jars, as the solution was transferred to the filter press. The staff sampler wore the appropriate personal protective equipment to avoid cross contamination and maintain safety from exposure. The sample volumes were combined in a separate, new plastic bucket to make up a total composite volume of approximately 1.5 gallons. Samples bottles were filled directly from the bucket.

Duplicate back-up samples were collected of each drain's storm water and the treating solution, and kept refrigerated on site, to be used in the event of bottle breakage or the laboratory's need for additional sample.

4.0 Sample Transport and Analysis

Once all samples were collected, the full bottles were placed in coolers with ice. The sealed coolers were shipped over night to Columbia Analytical Services in Kelso, Washington via Greyhound lines. Once received at Columbia, the bottles designated for dioxin and furan analysis were shipped to Ionics laboratory in Houston, Texas. Phenol and PAH testing were completed in Kelso.

The following analytical methods were employed:

- EPA methods 3580B/8151 Modified for the analysis of 2,4,6-Trichlorophenol, total Tetrachlorophenols and Pentachlorophenol.
- EPA methods 3580A/8310 for the analysis for PAHs.
- EPA Method 1613 for the dioxin and furan analysis.

Table A of this report summarizes the analytical results, while Table B, per the request of Ecology, lists the results of the dioxin and furan lab spike tests. It should be noted that the dioxin and furan results of the first-round composite sample from drains 13 and 14 were "Non-Detect" for every single constituent. These results did not coincide with those received for the duplicate of that sample (labeled Drain #30), which indicated detectable levels of several constituents. Consequently, the back-up duplicate sample from those drains, was submitted to confirm whether dioxin was present or absent. The back-up results matched those of the Drain #30 sample, and therefore, have been included on Table A.

Summary Tables

Table A: Dioxin/Furan Study on Stormwater and Treating Solution

J.H. Baxter & Co. - Arlington, WA

NPDES Permit #WA-0031429

Units: PPB for Stormwater, PPM for Treating Solution

Dioxins/Furans

	13&14				23		24		25		Treating Solution	
Date	18-Sep-97	Duplicate	8-Jan-98	Duplicate	18-Sep-97	8-Jan-98	18-Sep-97	8-Jan-98	18-Sep-97	8-Jan-98	18-Sep-97	8-Jan-98
Total TCDD	ND	0.0003	ND	ND	ND	ND	ND	0.0002	0.0002	ND	ND	ND
Total PeCDD	0.0028	0.0040	0.0018	0.0020	ND	0.0008	ND	0.0031	0.0027	0.0012	ND	0.0003
Total HxCDD	0.0604	0.0549	0.0789	0.0547	ND	0.0260	ND	0.0609	0.0362	0.0399	0.1250	0.1076
Total HpCDF	0.3607	0.2873	0.7461	0.6155	ND	0.1909	0.0025	0.3112	0.2150	0.1869	2.4613	20.0536
Total OCDD	1.1441	0.9859	4.0162	1.2925	ND	0.3944	0.0138	0.7494	0.6347	0.4786	0.6547	72.5483
Total TCDF	ND	0.0008	0.0003	0.0004	0.0005	ND	ND	ND	0.0005	0.0003	ND	ND
Total PeCDF	0.0087	0.0126	0.0122	0.0076	ND	0.0133	ND	0.0126	0.0087	0.0043	0.3540	0.0012
Total HxCDF	0.0982	0.0628	0.0994	0.0862	ND	0.0207	ND	0.0644	0.0376	0.0253	0.0306	1.4951
Total HpCDF	0.1680	0.1516	0.4199	0.3734	ND	0.0892	0.0009	0.1819	0.0861	0.0825	3.2488	23.7346
Total OCDD	0.1113	0.1202	0.5449	0.1848	ND	0.0678	0.0007	0.1132	0.0666	0.0646	0.1780	35.3426

Phenols

	13&14				23		24		25		Treating Solution	
Date	18-Sep-97	Duplicate	8-Jan-98	Duplicate	18-Sep-97	8-Jan-98	18-Sep-97	8-Jan-98	18-Sep-97	8-Jan-98	18-Sep-97	8-Jan-98
2,4,6-Trichlorophenol	ND	ND	ND	ND	<50	ND	<50	<5	<50	<5	<3000	<600
Total Tetrachlorophenols	2.30	2.50	4.00	5.10	<50	8.70	<50	10.00	<50	7.00	<6000	<600
Pentachlorophenol	74.00	88.00	130.00	140.00	720.00	250.00	780.00	550.00	340.00	180.00	<47000	<18000

No comparison to permit limits or fed. stds. - this needed also in columns to the right

Table A: Dioxin/Furan Study on Stormwater and Treating Solution

J.H. Baxter & Co. - Arlington, WA

NPDES Permit #WA-0031429

Units: PPB for Stormwater, PPM for Treating Solution

PAHs

	13&14				23		24		25		Treating Solution	
Date	18-Sep-97	Duplicate	8-Jan-98	Duplicate	18-Sep-97	8-Jan-98	18-Sep-97	8-Jan-98	18-Sep-97	8-Jan-98	18-Sep-97	8-Jan-98
Napthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<0.45	ND
Acenaphthylene	<3	ND	ND	ND	ND	ND	<11	ND	ND	ND	<0.1	ND
Acenaphthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<0.03	ND
Fluorene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.3	1.39
Phenanthrene	0.2	0.2	2	ND	<0.4	ND	<0.5	ND	ND	ND	3.4	ND
Anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<0.03	ND
Fluoranthene	0.3	0.3	5.1	3.3	ND	ND	ND	ND	ND	ND	<0.08	ND
Pyrene	0.5	0.4	6.8	ND	ND	ND	ND	ND	ND	ND	<1.3	ND
Benzo(a)anthracene	ND	ND	0.9	1.1	ND	ND	ND	ND	ND	ND	<0.01	ND
Chrysene	0.2	0.2	1.2	1.6	ND	ND	ND	0.3	ND	ND	<0.06	ND
Benzo(b)fluoranthene	0.6	0.3	1.4	1.9	ND	ND	ND	0.3	ND	ND	<0.02	ND
Benzo(k)fluoranthene	0.1	0.1	0.6	0.8	ND	ND	ND	0.1	ND	ND	<0.01	ND
Benzo(a)pyrene	0.1	0.1	1.3	1.6	ND	ND	ND	0.2	ND	ND	<0.01	ND
Dibenzo(a,h)anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<0.01	ND
Benzo(ghi)perylene	ND	ND	0.8	ND	ND	ND	ND	ND	ND	ND	<0.02	ND
Indeno(1,2,3-cd)pyrene	0.2	0.2	ND	1.2	ND	ND	ND	0.2	ND	ND	<0.01	ND

Table B: Dioxin/Furan Study on Stormwater and Treating Solution

J.H. Baxter & Co. - Arlington, WA

As Required by NPDES WA-0031429

Lab Spike Information

Coincident Sampling Date	9/18/97 (13&14 only)		9/18/97 (All others)		Date	
Labeled Compounds	Conc. (PPB)	% Rec.	Conc. (PPB)	% Rec.	Conc. (PPB)	% Rec.
13C12-2,3,7,8-TCDD	0.0022	110.4%	0.0014	69.8%	0.0018	88.8
13C12-1,2,3,7,8-PeCDD	0.0017	83.3%	0.0015	75.2%	0.0014	72.4
13C12-1,2,3,4,7,8-HxCDD	0.0026	127.9%	0.0024	118.1%	0.0023	116.9
13C12-1,2,3,6,7,8-HxCDD	0.0022	107.6%	0.0023	115.6%	0.0020	99.1
13C12-1,2,3,4,6,7,8-HpCD	0.0017	60.3%	0.0012	59.2%	0.0013	65.1
13C12-OCDD	0.0019	41.8%	0.0017	42.9%	0.0014	34.1
13C12-2,3,7,8-TCDF	0.0022	108.1%	0.0020	101.7%	0.0019	93.4
13C12-1,2,3,7,8-PeCDF	0.0020	99.7%	0.0022	110.5%	0.0019	94.4
13C12-2,3,4,7,8-PeCDF	0.0017	83.9%	0.0018	90.0%	0.0016	80
13C12-1,2,3,4,7,8-HxCDF	0.0024	121.1%	0.0022	111.6%	0.0022	111.7
13C12-1,2,3,6,7,8-HxCDF	0.0020	100.5%	0.0021	106.2%	0.0019	96.5
13C12-2,3,4,6,7,8-HxCDF	0.0019	95.4%	0.0020	101.0%	0.0019	96.8
13C12-1,2,3,7,8,9-HxCDF	0.0016	78.9%	0.0015	75.1%	0.0017	84
13C12-1,2,3,4,6,7,8-HpCD	0.0013	65.4%	0.0012	59.8%	0.0012	60.2
13C12-1,2,3,4,7,8,9-HpCD	0.0010	51.3%	0.0010	49.5%	0.0011	57.2

no L.S. on
% Recovery
w/in Q.C.
limits
(need another
column w/info)

Appendix A: NPDES instructions for the Dioxin/Furan report

S6. SOLID WASTE DISPOSAL: (continued)

B. Leachate

The Permittee shall not permit leachate from their solid waste material to enter state ground or surface waters without providing all known, available, and reasonable methods of treatment, nor allow such leachate to cause any adverse effect on state ground or surface waters. The Permittee shall apply for a permit or permit modification as may be required for such discharges.

C. Solid Waste Control Plan

The Permittee shall submit a Solid Waste Control Plan to the Department no later than 180 days from the effective date of this permit for review. This Plan shall include all solid wastes with the exception of those solid wastes regulated by Chapter 173-303 WAC (Dangerous Waste Regulations). The Plan shall include at a minimum a description of the source, generation rate, and disposal methods of these solid wastes. This Plan shall not be at variance with any approved local solid waste management plan.

The Permittee shall comply with the Plan as submitted to the Department. Any proposed revision or modification of the submitted Solid Waste Control Plan must be submitted to the Department for review. The Permittee shall comply with any Solid Waste Control Plan modifications. The Solid Waste Control Plan shall be deemed approved upon submission to the Department unless notified to the contrary by the Department. The Permittee shall submit an update of the Solid Waste Control Plan with the application for permit renewal 180 days prior to the expiration date of the permit.

S7. DIOXIN AND FURAN STUDY

A. Dioxin and Furan Analysis of Treating Solutions

In the fourth year of the permit, the Permittee shall conduct chemical analyses of representative samples of PCP treating solutions and treated product area storm water for french drains numbered 13, 14, 23, 24, and 25. Only samples collected from french drains numbered 13 and 14 may be composited.

The Permittee shall conduct chemical analyses in accordance with protocols, monitoring requirements, and QA/QC procedures specified in this section. PCP treating solutions and treated product storage area storm water samples shall be analyzed for:

Chlorophenol;
2,4,6-Trichlorophenol
2,3,4,6-Tetrachlorophenol
Pentachlorophenol

S7. DIOXIN AND FURAN STUDY (continued):

Polynuclear Aromatic Hydrocarbons;

Naphthalene	Acenaphthylene
Acenaphthene	Flourene
Phenanthrene	Anthracene
Fluoranthene	Pyrene
Benzo(a)anthracene	Chrysene
Benzo(b)fluoranthene	Benzo(k)fluoranthene
Benzo(a)pyrene	Dibenzo(a,h)anthracene
Benzo(ghi)perylene	Indeno(1,2,3-cd)pyrene

Dioxins and Furans;

2,3,7,8-Tetrachlorodibenzo-*p*-dioxin
Tetrachlorodibenzo-*p*-dioxins
Pentachlorodibenzo-*p*-dioxins
Hexachlorodibenzo-*p*-dioxins
Heptachlorodibenzo-*p*-dioxins
Octachlorodibenzo-*p*-dioxins
Tetrachlorodibenzofurans
Pentachlorodibenzofurans
Hexachlorodibenzofurans
Heptachlorodibenzofurans
Octachlorodibenzofurans

B. Monitoring Requirements

1. Two representative grab samples of PCP treating solutions shall be analyzed for the compounds in S5.A. above. Samples shall be representative in age and concentration of treating solutions in use at the facility.

   In the event that several different concentrations of PCP treating solutions are in use, a composite sample may be collected provided that it is representative of the average age of the solutions in use. The two samples shall be collected a minimum of two months apart. Sample collection, storage and analysis shall follow the protocols in S5.C. below.

2. Two grab samples of storm water runoff shall be collected from the treated wood storage yard from french drains numbered 13, 14, 23, 24, and 25. Only samples collected from french drains numbered 13 and 14 may be composited.

   One of the samples shall be from the first measurable storm event (greater than 0.1 inches of rainfall) of the season, beginning in the fourth year. The storm season (in the fourth year) is defined, for the purposes of this permit, as September through August.

S7. DIOXIN AND FURAN STUDY (continued):

In the event that the first storm event of the season does not produce sufficient runoff to sample, the first storm event of the season producing sufficient runoff shall be sampled.

The second storm water grab sample shall be collected during the months of December, January or February (in the fourth year of this permit) and shall be collected from a discharge resulting from a storm event that is greater than 0.1 inches in magnitude and that occurs at least 48 hours from the previously measurable (greater than 0.1 inch rainfall) storm event. Both storm water grab samples shall be taken during the first 60 minutes of discharge. Sample collection, storage and analysis shall follow the protocols in S5.C. below.

3. The results of the Dioxin and Furan Study shall be submitted to the Department with the permit renewal application. The report shall include: quality assurance and quality control procedures for sample collection; transport and analysis; for storm water samples the magnitude and duration of the storm event sampled, the time since the last storm event and the magnitude of the last storm event.

C. Protocols

1. Sampling for dioxins and furans shall be in accordance with appendix B of the USEPA/Paper Industry Cooperative Dioxin Screening Study (EPA 440/1-88-025, March 1988).

2. In accordance with 40 CFR 122.41(j)(4), dioxins and furans shall be analyzed using either:

EPA Method 1613: Tetra- through Octa- chlorinated Dioxins and Furans by Isotope Dilution; or

NCASI Procedures for the Preparation and Isomer Specific Analysis of Pulp and Paper Industry Samples for 2,3,7,8-TCDD and 2,3,7,8-TCDF: Technical Bulletin No 551;or

an equivalent method approved in advance by the Department.

S8. SPILL PLAN

Within six months after the effective date of this permit, the Permittee shall submit to the Department a Spill Control Plan for the prevention, containment, and control of spills or unplanned discharges of: 1) oil and petroleum products,

Appendix B: Original data from September 18, 1997 sampling

BINDER

FIVED NOV

Columbia Analytical Services, Inc.

October 30, 1997

Service Request No: K9706849

Caroline Martin
1700 El Camino Real
PO Box 5902
San Mateo, CA 94402-0902

Re: Drain Water

Dear Caroline:

Enclosed are the results of the sample(s) submitted to our laboratory on September 19, 1997. For your reference, these analyses have been assigned our service request number K9706849.

All analyses were performed according to our laboratory's quality assurance program. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the samples analyzed.

Please call if you have any questions. My extension is 220.

Respectfully submitted,

Columbia Analytical Services, Inc.

Teena Jones

Teena Jones
Project Chemist

TJ/bf

cc: Tom Orthmere (J.H. Baxter & Co.)

P.O. Box 479 Kelso, Washington 98626 Telephone 360/577-7222 Fax 360/636-1068

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
J	Estimated concentration. The value is less than the method reporting limit, but greater than the method detection limit.
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NAN	Not Analyzed
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected at or above the MRL
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	J.H.Baxter & Company	**Service Request No.:**	K9706849
Project:	Drain Water	**Date Received:**	19-Sept-97
Sample Matrix:	Water and Oil		

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for sample(s) designated for Tier I data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Due to matrix interference the phenol surrogate in samples Drain 23, Drain 24, Drain 25, and Treat Soln 1, the aromatic surrogate in Treat Soln 1 were diluted below detection limits.

All EPA recommended holding times have been met for analyses in this sample delivery group.

Samples were submitted to Ionics International for Dioxin and Furan analysis and those results are included in Appendix A.

Approved by T Jones **Date** 10/31/97

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: J.H. Baxter & Company
Project: Drain Water
Sample Matrix: Water

Service Request: K9706849
Date Collected: 9/18/97
Date Received: 9/19/97
Date Extracted: NA

Inorganic Parameters
Units: mg/L (ppm)

Analyte:	pH (units)	Solids, Total Suspended (TSS)
EPA Method:	150.1	160.2
Method Reporting Limit:	-	5
Date Analyzed:	9/18/97	9/25/97

Sample Name	Lab Code		
Drains 13/44	K9706849-001	7.97	1020
Drain 23	K9706849-002	6.94	113
Drain 24	K9706849-003	6.80	260
ıin 25	K9706849-004	7.06	260
ɔrain 30	K9706849-005	7.71	890
Drains 10-22	K9706849-006	7.09	640
Method Blank	K9706849-MB	-	ND

Approved By: _____ Date: 10/3/97

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: J.H. Baxter & Company
Project: Drain Water
Sample Matrix: Water

Service Request: K9706849
Date Collected: 9/18/97
Date Received: 9/19/97
Date Extracted: 10/3/97
Date Analyzed: 10/3/97

Oil and Grease
EPA Method 413.1
Units: mg/L (ppm)

Sample Name	Lab Code	MRL	Result
Drains 13/44	K9706849-001	5	ND
Drain 23	K9706849-002	5	ND
Drain 24	K9706849-003	5	ND
Drain 25	K9706849-004	5	ND
Drain 30	K9706849-005	5	ND
Drains 10-22	K9706849-006	5	10
Method Blank	K971003-MB	5	ND

Approved By: _____ Date: 10/6/97

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: J.H. Baxter & Company
Project: Drain Water
Sample Matrix: Water

Service Request: K9706849
Date Collected: 9/18/97
Date Received: 9/19/97
Date Extracted: 9/22/97

Polynuclear Aromatic Hydrocarbons
EPA Methods 3520B/610
Units: ug/L (ppb)

	Sample Name:	Drains 13/44	Drain 23	Drain 24
	Lab Code:	K9706849-001	K9706849-002	K9706849-003
	Date Analyzed:	10/2/97	10/3/97	10/3/97
Analyte	**MRL**			
Naphthalene	1	ND	ND	ND
Acenaphthylene	1	<3(B)	ND	<11(B)
Acenaphthene	1	ND	ND	ND
Fluorene	0.2	ND	ND	ND
enanthrene	0.1	0.2	<0.4(B)	<0.5(B)
nthracene	0.1	ND	ND	ND
Fluoranthene	0.2	0.3	ND	ND
Pyrene	0.2	0.5	0.2	ND
Benz(a)anthracene	0.1	ND	ND	ND
Chrysene	0.1	0.2	ND	ND
Benzo(b)fluoranthene	0.2	0.3	ND	ND
Benzo(k)fluoranthene	0.1	0.1	ND	ND
Benzo(a)pyrene	0.1	0.1	ND	ND
Dibenz(a,h)anthracene	0.1	ND	ND	ND
Benzo(g,h,i)perylene	0.2	ND	ND	ND
Indeno(1,2,3-cd)pyrene	0.1	0.2	ND	ND

B The MRL is elevated because of matrix interferences.

Approved By: _____ Date: 10/9/97

3S22/120594
06849SVG.JS1 - 1-3 10/8/97

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: J.H. Baxter & Company
Project: Drain Water
Sample Matrix: Water

Service Request: K9706849
Date Collected: 9/18/97
Date Received: 9/19/97
Date Extracted: 9/22/97

Polynuclear Aromatic Hydrocarbons
EPA Methods 3520B/610
Units: ug/L (ppb)

	Sample Name:	Drain 25	Drain 30	Drains 10-22
	Lab Code:	K9706849-004	K9706849-005	K9706849-006
	Date Analyzed:	10/3/97	10/3/97	10/3/97
Analyte	**MRL**			
Naphthalene	1	ND	ND	ND
Acenaphthylene	1	ND	ND	ND
Acenaphthene	1	ND	ND	ND
Fluorene	0.2	ND	ND	ND
Phenanthrene	0.1	ND	0.2	ND
Anthracene	0.1	ND	ND	ND
Fluoranthene	0.2	ND	0.3	ND
Pyrene	0.2	ND	0.4	ND
Benz(a)anthracene	0.1	ND	ND	ND
Chrysene	0.1	ND	0.2	ND
Benzo(b)fluoranthene	0.2	ND	0.3	ND
Benzo(k)fluoranthene	0.1	ND	0.1	ND
Benzo(a)pyrene	0.1	ND	0.1	ND
Dibenz(a,h)anthracene	0.1	ND	ND	ND
Benzo(g,h,i)perylene	0.2	ND	ND	ND
Indeno(1,2,3-cd)pyrene	0.1	ND	0.2	ND

Approved By: _____ Date: 10/9/97

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	J.H. Baxter & Company	**Service Request:**	K9706849
Project:	Drain Water	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
		Date Extracted:	9/22/97

Polynuclear Aromatic Hydrocarbons
EPA Methods 3520B/610
Units: ug/L (ppb)

Sample Name:	**Method Blank**
Lab Code:	K970922-WB
Date Analyzed:	10/2/97

Analyte	**MRL**	
Naphthalene	1	ND
Acenaphthylene	1	ND
Acenaphthene	1	ND
Fluorene	0.2	ND
Phenanthrene	0.1	ND
Anthracene	0.1	ND
Fluoranthene	0.2	ND
Pyrene	0.2	ND
Benz(a)anthracene	0.1	ND
Chrysene	0.1	ND
Benzo(b)fluoranthene	0.2	ND
Benzo(k)fluoranthene	0.1	ND
Benzo(a)pyrene	0.1	ND
Dibenz(a,h)anthracene	0.1	ND
Benzo(g,h,i)perylene	0.2	ND
Indeno(1,2,3-cd)pyrene	0.1	ND

Approved By: _____ Date: 10/9/97

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: J.H. Baxter & Company
Project: Drain Water
Sample Matrix: Oil

Service Request: K9706849
Date Collected: 9/18/97
Date Received: 9/19/97
Date Extracted: 10/1/97

Polynuclear Aromatic Hydrocarbons
EPA Methods 3580A/8310
Units: mg/Kg (ppm)

	Sample Name:	Treating Soln I	Method Blank
	Lab Code:	K9706849-007(C)	K971001-OB
	Date Analyzed:	10/3/97	10/3/97
Analyte	**MRL**		
Naphthalene	10	<450(D)	ND
Acenaphthylene	10	<100	ND
Acenaphthene	10	<30(D)	ND
Fluorene	2	1300	ND
Phenanthrene	1	3400	ND
Anthracene	1	<30(D)	ND
Fluoranthene	2	<80(D)	ND
Pyrene	2	<1300(D)	ND
Benz(a)anthracene	1	<10	ND
Chrysene	1	<60(D)	ND
Benzo(b)fluoranthene	2	<20	ND
Benzo(k)fluoranthene	1	<10	ND
Benzo(a)pyrene	1	<10	ND
Dibenz(a,h)anthracene	1	<10	ND
Benzo(g,h,i)perylene	2	<20	ND
Indeno(1,2,3-cd)pyrene	1	<10	ND

C The MRL is elevated because the sample required diluting.
D The MRL is elevated because of matrix interferences and because the sample required diluting.

Approved By: _____ Date: 10/9/97

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: J.H. Baxter & Company
Project: Drain Water
Sample Matrix: Water

Service Request: K9706849
Date Collected: 9/18/97
Date Received: 9/19/97
Date Extracted: 9/22/97
Date Analyzed: 10/2-3/97

Surrogate Recovery Summary
Polynuclear Aromatic Hydrocarbons
EPA Methods 3520B/610

Sample Name	Lab Code	Percent Recovery *p*-Terphenyl
Drains 13/44	K9706849-001	52
Drain 23	K9706849-002	53
Drain 24	K9706849-003	36
Drain 25	K9706849-004	36
Drain 30	K9706849-005	51
Drains 10-22	K9706849-006	58
Method Blank	K970922-WB	97

CAS Acceptance Limits: 35-110

Approved By: _____ Date: 10/9/97

SUR1/120594
06849SVG.JS1 - SUR1 10/8/97

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: J.H. Baxter & Company
Project: Drain Water
Sample Matrix: Oil

Service Request: K9706849
Date Collected: 9/18/97
Date Received: 9/19/97
Date Extracted: 10/1/97
Date Analyzed: 10/3/97

Surrogate Recovery Summary
Polynuclear Aromatic Hydrocarbons
EPA Methods 3580A/8310

Sample Name	Lab Code	Percent Recovery *p*-Terphenyl
Treating Soln I	K9706849-007	NA
Method Blank	K971001-OB	94

CAS Acceptance Limits: 35-110

NA Not Applicable; see case narrative.

Approved By: _____ Date: 10/9/97

SUR1/120594
06849SVG.JS2 - SUR1 10/9/97

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

...ent:	J.H. Baxter & Company	**Service Request:**	K9706849
Project:	Drain Water	**Date Collected:**	9/18/97
Sample Matrix:	Water	**Date Received:**	9/19/97
		Date Extracted:	9/25/97
		Date Analyzed:	9/26/97

Chlorinated Phenols
EPA Methods 8151 Modified
Units: µg/L (ppb)

Analyte:	2,4,6-Trichlorophenol	Total Tetrachlorophenols	Pentachlorophenol
Method Reporting Limit:	0.5	0.5	0.5
Sample Name	**Lab Code**		
Drains 13/44	K9706849-001	ND	2.3	74
Drain 23	K9706849-002	<50(C)	<50(C)	720
Drain 24	K9706849-003	<50(C)	<50(C)	780
Drain 25	K9706849-004	<50(C)	<50(C)	340
Drain 30	K9706849-005	ND	2.5	88
...ains 10-22	K9706849-006	ND	2.7	18
...thod Blank	K970925-WB	ND	ND	ND

C The MRL is elevated because the sample required diluting.

Approved By: _____ Date: 10/6/97

3A/1088849SVG.BT1 - p-t-tri 10/3/97

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	J.H. Baxter & Company	**Service Request:**	K9706849
Project:	Drain Water	**Date Collected:**	9/18/97
Sample Matrix:	Oil	**Date Received:**	9/19/97
		Date Extracted:	10/1/97
		Date Analyzed:	10/6/97

Chlorinated Phenols
EPA Methods 3580B/8151 Modified
Units: mg/Kg (ppm)

	Analyte:	2,4,6-Trichlorophenol	Total Tetrachlorophenols	Pentachlorophenol
	Method Reporting Limit:	0.005	0.005	0.005
Sample Name	**Lab Code**			
Treating Soln I	K9706849-007	<3000(C)	<6000(C)	47000
Method Blank	K971001-SB	ND	ND	ND

C The MRL is elevated because the sample required diluting.

Approved By: _____ Date: 10/21/97

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: J.H. Baxter & Company
Project: Drain Water
Sample Matrix: Water

Service Request: K9706849
Date Collected: 9/18/97
Date Received: 9/19/97
Date Extracted: 9/25/97
Date Analyzed: 9/26/97

Surrogate Recovery Summary
Chlorinated Phenols
EPA Methods 8151 Modified

Sample Name	Lab Code	Percent Recovery 4-Bromo-2,6-dichlorophenol
Drains 13/44	K9706849-001	88
Drain 23	K9706849-002	NA
Drain 24	K9706849-003	NA
Drain 25	K9706849-004	NA
Drain 30	K9706849-005	91
Drains 10-22	K9706849-006	88
Method Blank	K970925-WB	84

CAS Acceptance Limits: 42-122

Approved By: _____ Date: 10/6/97

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

.ent:	J.H. Baxter & Company	**Service Request:**	K9706849
Project:	Drain Water	**Date Collected:**	9/18/97
Sample Matrix:	Oil	**Date Received:**	9/19/97
		Date Extracted:	10/1/97
		Date Analyzed:	10/6/97

Surrogate Recovery Summary
Chlorinated Phenols
EPA Methods 3580B/8151 Modified

Sample Name	Lab Code	Percent Recovery 4-Bromo-2,6-dichlorophenol
Treating Soln I	K9706849-007	NA
Method Blank	K971001-SB	36

CAS Acceptance Limits: NA

Approved By: _____ Date: 10/21/97

SURI/111594
06849SVG.BT2 - sur 10/16/97

Appendix A

ionics INTERNATIONAL, INC.
10655 Richmond Avenue, Suite 150
Houston, Texas 77042
(713) 972-1037 Fax: (713) 784-1152
(800) 4-DIOXIN

October 20, 1997

treat sol.
~15 ppm
dioxin/furan

Ionics International Project 97-1037
CAS Project K97-6849
CAS P.O. 1885

This project consisted of five water samples and an oil sample.

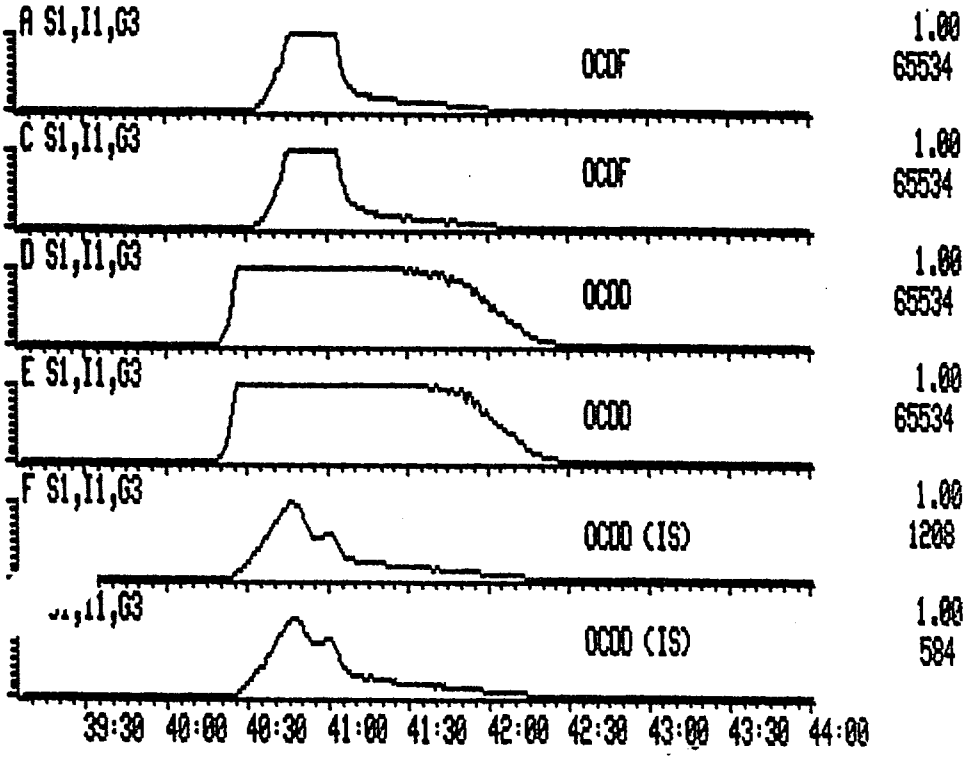
The oil sample was found to contain analytes at concentrations well above the upper end of the linear calibration range, some of them high enough to saturate the mass spectrometer preamplifier. The most abundant analyte was OCDD, and a set of chromatograms illustrating the effect is enclosed. In addition to saturating the preamplifier, the native OCDD made an isotopic contribution to OCDD internal standard channels (elevating the areas of the internal standard peaks). Thus, the reported values for OCDD and OCDF are low because (i) the upper portion of the peak could not be integrated, and (ii) the peak areas for the OCDD internal standards were elevated. We estimate that the total dioxin/furan concentration is in excess of 15 ppm, and suggest that dilution and reanalysis of the oil extract is unlikely to afford valid data.

Similarly, sample "Drain 25" had a total dioxin/furan content above 1 ppb and we do not recommend that dilution and reanalysis be performed.

The oil sample was batched with a Method Blank and a Lab Spike. The Method Blank was analyzed immediately before the oil sample, and the Lab Spike immediately after. There was some carry-over from the sample to the Lab Spike, so reported values for the analytes are elevated.

Please note that the concentrations of analytes in the oil sample are reported as ppt (even though the units for the blank and lab spike are ppq). This is not an error; some of the numbers expressed in ppq would not fit in our reporting spreadsheet cells.

27 17-OCT-97 15:09 70-250S (EI+) Sys:1613
A: 441.7428 B: 442.9728 C: 443.7399 D: 457.7377 E: 459.7348
:11-73-6



Columbia Analytical Services

PROJECT: 97-1073
FILE: A10671
LAB ID.: 11-73-1

PCDD/PCDF SUMMARY REPORT
PO: 1885
SAMPLE: Drains13/44

	SAMPLE DATA		QUALITY ASSURANCE DATA			
SPECIFIC ANALYTES	CONC (PPQ)	DL (PPQ)	BLANK (PPQ)	LS (PPQ)	LS (%)	QC Limits
2,3,7,8-TCDD	ND	2.4	ND	193.6	97%	50-150
1,2,3,7,8-PeCDD	ND	17.8	ND	964.0	96%	50-150
1,2,3,4,7,8-HxCDD	ND	21.3	ND	1107.2	111%	50-150
1,2,3,6,7,8-HxCDD	ND	18.0	ND	1043.4	104%	50-150
1,2,3,7,8,9-HxCDD	ND	20.0	ND	1021.7	102%	50-150
1,2,3,4,6,7,8-HpCDD	ND	29.2	ND	1236.9	124%	50-150
OCDD	ND	12.7	ND	1882.1	94%	50-150
2,3,7,8-TCDF	ND	7.4	ND	271.0	135%	50-150
1,2,3,7,8-PeCDF	ND	21.7	ND	1108.9	111%	50-150
2,3,4,7,8-PeCDF	ND	13.5	ND	1188.8	119%	50-150
1,2,3,4,7,8-HxCDF	ND	25.1	ND	1006.0	101%	50-150
1,2,3,6,7,8-HxCDF	ND	15.5	ND	1004.6	100%	50-150
2,3,4,6,7,8-HxCDF	ND	13.4	ND	1057.7	106%	50-150
1,2,3,7,8,9-HxCDF	ND	29.4	ND	978.1	98%	50-150
1,2,3,4,6,7,8-HpCDF	ND	13.3	ND	1181.6	118%	50-150
1,2,3,4,7,8,9-HpCDF	ND	21.2	ND	1100.8	110%	50-150
OCDF	ND	17.2	ND	1867.7	93%	50-150

TOTAL ANALYTES	CONC (PPQ)	DL (PPQ)
TOTAL TCDD	ND	2.4
TOTAL PeCDD	ND	17.8
TOTAL HxCDD	ND	21.3
TOTAL HpCDD	ND	29.2
TOTAL OCDD	ND	12.7
TOTAL TCDF	ND	7.4
TOTAL PeCDF	ND	21.7
TOTAL HxCDF	ND	29.4
TOTAL HpCDF	ND	21.2
TOTAL OCDF	ND	17.2

Definitions:

CONC — The concentration, given in parts per trillion (ppt) or parts per quadrillion (ppq).

DL — The detection limit, given in parts per trillion (ppt), parts per quadrillion (ppq), or in picograms (pg).

BLANK — The concentration of the blank.

MS (PPQ) — The concentration of Matrix Spike recovered.

MS (%) — The percent recovery of the Matrix Spike.

QC Limits — Ionics International, Inc. uses these advisory limits.

ND — (Non-Detect) The concentration of the analyte is less than the detection limit.

NR — (Not Reportable) The spike concentration is less than the concentration in the unspiked matrix sample.

TOTAL DIOXINS/FURANS: ND

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: ND

IONICS INTERNATIONAL, INC.

10655 Richmond Ave., Ste. 170
Houston, TX 77042

Phone: (713) 972-1037
Fax: (713) 784-1152

Columbia Analytical Services

PROJECT: 97-1073
FILE: A10671
LAB ID.: 11-73-1

PCDD/PCDF ANALYSIS REPORT
PO: 1885
SAMPLE: Drains13/44

PROJECT ID/P.O.:	1885	DATE COLLECTED:	9/18/97	ACCESSION NO:	11-73-1
SAMPLE ORIGIN:	N/A	DATE RECEIVED:	9/25/97	RETCHECK:	A10668
SAMPLE MATRIX:	Water	DATE EXTRACTED:	9/25/97	CONCAL:	A10669
SAMPLE SIZE:	1 L	DATE ANALYZED:	10/10/97	ICAL:	A050797
		DATE PROCESSED:	10/20/97	METHOD:	1613

SPECIFIC ANALYTES	CONC (PPQ)	DL (PPQ)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD	ND	2.4	-		U
1,2,3,7,8-PeCDD	ND	17.8	-		U
1,2,3,4,7,8-HxCDD	ND	21.3	-		U
1,2,3,6,7,8-HxCDD	ND	18.0	-		U
1,2,3,7,8,9-HxCDD	ND	20.0	-		U
1,2,3,4,6,7,8-HpCDD	ND	29.2	-		U
OCDD	ND	12.7	-		U
2,3,7,8-TCDF	ND	7.4	-		U
1,2,3,7,8-PeCDF	ND	21.7	-		U
2,3,4,7,8-PeCDF	ND	13.5	-		U
1,2,3,4,7,8-HxCDF	ND	25.1	-		U
1,2,3,6,7,8-HxCDF	ND	15.5	-		U
2,3,4,6,7,8-HxCDF	ND	13.4	-		U
1,2,3,7,8,9-HxCDF	ND	29.4	-		U
1,2,3,4,6,7,8-HpCDF	ND	13.3	-		U
1,2,3,4,7,8,9-HpCDF	ND	21.2	-		U
OCDF	ND	17.2	-		U

TOTAL ANALYTES	NO	CONC (PPQ)	DL (PPQ)	RT WINDOW (min)	FLAGS
TOTAL TCDD	0	ND	2.4	—	U
TOTAL PeCDD	0	ND	17.8	—	U
TOTAL HxCDD	0	ND	21.3	—	U
TOTAL HpCDD	0	ND	29.2	—	U
TOTAL TCDF	0	ND	7.4	—	U
TOTAL PeCDF	0	ND	21.7	—	U
TOTAL HxCDF	0	ND	29.4	—	U
TOTAL HpCDF	0	ND	21.2	—	U

DATA REVIEWER: AMA 10/20/97

IONICS INTERNATIONAL, INC.

10655 Richmond Ave., Ste. 170
Houston, TX 77042

Phone: (713) 972-1037
Fax: (713) 784-1152

Columbia Analytical Services

PROJECT: 97-1073
FILE: A10671
LAB ID.: 11-73-1

PCDD/PCDF QUALITY CONTROL REPORT

PO: 1885
SAMPLE: Drains13/44

PROJECT ID/P.O.:	1885	DATE COLLECTED:	9/18/97	ACCESSION NO:	11-73-1
SAMPLE ORIGIN:	N/A	DATE RECEIVED:	9/25/97	RETCHECK:	A10668
SAMPLE MATRIX:	Water	DATE EXTRACTED:	9/25/97	CONCAL:	A10669
SAMPLE SIZE:	1 L	DATE ANALYZED:	10/10/97	ICAL:	A050797
		DATE PROCESSED:	10/20/97	METHOD:	1613

LABELED COMPOUNDS	CONC (PPQ)	% REC.	RATIO	RT	FLAGS
13C12-2,3,7,8-TCDD	2168.9	108.4	0.76	22:29	-
13C12-1,2,3,7,8-PeCDD	1481.7	74.1	1.54	27:05	-
13C12-1,2,3,4,7,8-HxCDD	1673.3	83.7	1.35	31:36	-
13C12-1,2,3,6,7,8-HxCDD	1542.7	77.1	1.32	31:44	-
13C12-1,2,3,4,6,7,8-HpCDD	911.0	45.5	1.08	36:13	-
13C12-OCDD	733.8	18.3	0.82	40:43	Y
13C12-2,3,7,8-TCDF	2150.1	107.5	0.81	21:51	-
13C12-1,2,3,7,8-PeCDF	1975.1	98.8	1.64	25:52	-
13C12-2,3,4,7,8-PeCDF	1684.4	84.2	1.61	26:42	-
13C12-1,2,3,4,7,8-HxCDF	1680.8	84.0	0.53	30:33	-
13C12-1,2,3,6,7,8-HxCDF	1494.8	74.7	0.52	30:42	-
13C12-2,3,4,6,7,8-HxCDF	1403.4	70.2	0.52	31:28	-
13C12-1,2,3,7,8,9-HxCDF	1631.8	81.6	0.50	32:29	-
13C12-1,2,3,4,6,7,8-HpCDF	799.2	40.0	0.42	34:50	-
13C12-1,2,3,4,7,8,9-HpCDF	876.9	43.8	0.46	36:51	-

INTERNAL STANDARDS	RATIO	RT	FLAGS
13C12-1,2,3,4-TCDD	0.80	22:18	-
13C12-1,2,3,7,8,9-HxCDD	1.35	32:10	-

CLEANUP STANDARD	CONC (PPQ)	% REC.	RT	FLAGS
37Cl4-TCDD	1007.3	125.9	22:29	-

Flags:

U — The compound was analyzed for but not detected at or above the detection limit.

J — The analyte was detected at concentrations between the calibrated range and the detection limit.

E — The analyte was detected at concentrations greater than the calibrated range.

B — The analyte was found in the associated blank.

D — The analyte was identified in the analysis at a secondary dilution factor.

RO — Ions used for identification are out of ratio

S — The analyte in question is, in the opinion of the reviewer, a PCDD/PCDF, even though the fragment ion due to the loss of COCl did not meet the signal-to-noise ratio criterion of 2.5:1

X — An interferent peak or peaks were observed within the retention window that may obscure otherwise detectable peaks.

Y — The recovery of the indicated standard is outside of QC advisory limits.

Definitions:

CONC — The concentration, given in parts per quadrillio (ppq) or parts per trillion (ppt).

DL — The detection limit based on a 2.5:1 signal-to-noise criteria, given in parts per quadrillion (ppq), parts per trillion (ppt), or in picograms (pg).

RATIO — The ratio of the low- to high-mass ion areas for the confirmation and quantitation ions.

RT — The retention time of an analyte.

NO — The total number of peaks identified as analytes within the retention time window.

% REC — The percent recovery of the indicated standard.

IONICS INTERNATIONAL, INC.

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Houston, TX 77042

Phone: (713) 972-1037
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Columbia Analytical Services

PROJECT: 97-1073
FILE: A10671
LAB ID.: 11-73-1

PCDD/PCDF TOXICITY EQUIVALENCE REPORT

PO: 1885
SAMPLE: Drains13/44

PROJECT ID/P.O.:	1885	DATE COLLECTED:	9/18/97	ACCESSION NO:	11-73-1
SAMPLE ORIGIN:	N/A	DATE RECEIVED:	9/25/97	RETCHECK:	A10668
SAMPLE MATRIX:	Water	DATE EXTRACTED:	9/25/97	CONCAL:	A10669
SAMPLE SIZE:	1 L	DATE ANALYZED:	10/10/97	ICAL:	A050797
		DATE PROCESSED:	10/20/97	METHOD:	1613

SPECIFIC ANALYTES	CONC (PPQ)		TEF		TEF CONC (PPQ)
2,3,7,8-TCDD	ND	x	1	=	-
1,2,3,7,8-PeCDD	ND	x	0.5	=	-
1,2,3,4,7,8-HxCDD	ND	x	0.1	=	-
1,2,3,6,7,8-HxCDD	ND	x	0.1	=	-
1,2,3,7,8,9-HxCDD	ND	x	0.1	=	-
1,2,3,4,6,7,8-HpCDD	ND	x	0.01	=	-
OCDD	ND	x	0.001	=	-
2,3,7,8-TCDF	ND	x	0.1	=	-
1,2,3,7,8-PeCDF	ND	x	0.05	=	-
2,3,4,7,8-PeCDF	ND	x	0.5	=	-
1,2,3,4,7,8-HxCDF	ND	x	0.1	=	-
1,2,3,6,7,8-HxCDF	ND	x	0.1	=	-
2,3,4,6,7,8-HxCDF	ND	x	0.1	=	-
1,2,3,7,8,9-HxCDF	ND	x	0.1	=	-
1,2,3,4,6,7,8-HpCDF	ND	x	0.01	=	-
1,2,3,4,7,8,9-HpCDF	ND	x	0.01	=	-
OCDF	ND	x	0.001	=	-

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: ND

IONICS INTERNATIONAL, INC.

10655 Richmond Ave., Ste. 170
Houston, TX 77042

Phone: (713) 972-1037
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Columbia Analytical Services

PROJECT: 97-1073
FILE: A10674
LAB ID.: 11-73-2

PCDD/PCDF SUMMARY REPORT

PO: 1885
SAMPLE: Drain 23

	SAMPLE DATA		QUALITY ASSURANCE DATA			
SPECIFIC ANALYTES	CONC (PPQ)	DL (PPQ)	BLANK (PPQ)	LS (PPQ)	LS (%)	QC Limits
2,3,7,8-TCDD	ND	2.4	ND	193.6	97%	50-150
1,2,3,7,8-PeCDD	ND	17.8	ND	964.0	96%	50-150
1,2,3,4,7,8-HxCDD	ND	21.3	ND	1107.2	111%	50-150
1,2,3,6,7,8-HxCDD	ND	18.0	ND	1043.4	104%	50-150
1,2,3,7,8,9-HxCDD	ND	20.0	ND	1021.7	102%	50-150
1,2,3,4,6,7,8-HpCDD	ND	29.2	ND	1236.9	124%	50-150
OCDD	ND	12.7	ND	1882.1	94%	50-150
2,3,7,8-TCDF	256.2	7.4	ND	271.0	135%	50-150
1,2,3,7,8-PeCDF	ND	21.7	ND	1108.9	111%	50-150
2,3,4,7,8-PeCDF	ND	13.5	ND	1188.8	119%	50-150
1,2,3,4,7,8-HxCDF	ND	25.1	ND	1006.0	101%	50-150
1,2,3,6,7,8-HxCDF	ND	15.5	ND	1004.6	100%	50-150
2,3,4,6,7,8-HxCDF	ND	13.4	ND	1057.7	106%	50-150
1,2,3,7,8,9-HxCDF	ND	29.4	ND	978.1	98%	50-150
1,2,3,4,6,7,8-HpCDF	ND	13.3	ND	1181.6	118%	50-150
1,2,3,4,7,8,9-HpCDF	ND	21.2	ND	1100.8	110%	50-150
OCDF	ND	17.2	ND	1867.7	93%	50-150

TOTAL ANALYTES	CONC (PPQ)	DL (PPQ)
TOTAL TCDD	ND	2.4
TOTAL PeCDD	ND	17.8
TOTAL HxCDD	ND	21.3
TOTAL HpCDD	ND	29.2
TOTAL OCDD	ND	12.7
TOTAL TCDF	480.4	7.4
TOTAL PeCDF	ND	21.7
TOTAL HxCDF	ND	29.4
TOTAL HpCDF	ND	21.2
TOTAL OCDF	ND	17.2

Definitions:

- **CONC** — The concentration, given in parts per trillion (ppt) or parts per quadrillion (ppq).
- **DL** — The detection limit, given in parts per trillion (ppt), parts per quadrillion (ppq), or in picograms (pg).
- **BLANK** — The concentration of the blank.
- **MS (PPQ)** — The concentration of Matrix Spike recovered.
- **MS (%)** — The percent recovery of the Matrix Spike.
- **QC Limits** — Ionics International, Inc. uses these advisory limits.
- **ND** — (Non-Detect) The concentration of the analyte is less than the detection limit.
- **NR** — (Not Reportable) The spike concentration is less than the concentration in the unspiked matrix sample.

TOTAL DIOXINS/FURANS: 480.37 PPQ

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: 25.62 PPQ

IONICS INTERNATIONAL, INC.

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Columbia Analytical Services

PROJECT: 97-1073
FILE: A10674
LAB ID.: 11-73-2

PCDD/PCDF ANALYSIS REPORT
PO: 1885
SAMPLE: Drain 23

PROJECT ID/P.O.:	1885	DATE COLLECTED:	9/18/97	ACCESSION NO:	11-73-2
SAMPLE ORIGIN:	N/A	DATE RECEIVED:	9/25/97	RETCHECK:	A10668
SAMPLE MATRIX:	Water	DATE EXTRACTED:	9/25/97	CONCAL:	A10669
SAMPLE SIZE:	1 L	DATE ANALYZED:	10/10/97	ICAL:	A050797
		DATE PROCESSED:	10/20/97	METHOD:	1613

SPECIFIC ANALYTES	CONC (PPQ)	DL (PPQ)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD	ND	2.4	-		U
1,2,3,7,8-PeCDD	ND	17.8	-		U
1,2,3,4,7,8-HxCDD	ND	21.3	-		U
1,2,3,6,7,8-HxCDD	ND	18.0	-		U
1,2,3,7,8,9-HxCDD	ND	20.0	-		U
1,2,3,4,6,7,8-HpCDD	ND	29.2	-		U
OCDD	ND	12.7	-		U
2,3,7,8-TCDF	256.2	7.4	0.69	22:18	
1,2,3,7,8-PeCDF	ND	21.7	-		U
2,3,4,7,8-PeCDF	ND	13.5	-		U
1,2,3,4,7,8-HxCDF	ND	25.1	-		U
1,2,3,6,7,8-HxCDF	ND	15.5	-		U
2,3,4,6,7,8-HxCDF	ND	13.4	-		U
1,2,3,7,8,9-HxCDF	ND	29.4	-		U
1,2,3,4,6,7,8-HpCDF	ND	13.3	-		U
1,2,3,4,7,8,9-HpCDF	ND	21.2	-		U
OCDF	ND	17.2	-		U

TOTAL ANALYTES	NO	CONC (PPQ)	DL (PPQ)	RT WINDOW (min)	FLAGS
TOTAL TCDD	0	ND	2.4	—	U
TOTAL PeCDD	0	ND	17.8	—	U
TOTAL HxCDD	0	ND	21.3	—	U
TOTAL HpCDD	0	ND	29.2	—	U
TOTAL TCDF	5	480.4	7.4	—	
TOTAL PeCDF	0	ND	21.7	—	U
TOTAL HxCDF	0	ND	29.4	—	U
TOTAL HpCDF	0	ND	21.2	—	U

DATA REVIEWER: AMA 10/20/97

IONICS INTERNATIONAL, INC.

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Columbia Analytical Services

PROJECT: 97-1073
FILE: A10674
LAB ID.: 11-73-2

PCDD/PCDF QUALITY CONTROL REPORT

PO: 1885
SAMPLE: Drain 23

PROJECT ID/P.O.:	1885	DATE COLLECTED:	9/18/97	ACCESSION NO:	11-73-2
SAMPLE ORIGIN:	N/A	DATE RECEIVED:	9/25/97	RETCHECK:	A10668
SAMPLE MATRIX:	Water	DATE EXTRACTED:	9/25/97	CONCAL:	A10669
SAMPLE SIZE:	1 L	DATE ANALYZED:	10/10/97	ICAL:	A050797
		DATE PROCESSED:	10/20/97	METHOD:	1613

LABELED COMPOUNDS	CONC (PPQ)	% REC.	RATIO	RT	FLAGS
13C12-2,3,7,8-TCDD	1385.7	69.3	0.82	22:54	-
13C12-1,2,3,7,8-PeCDD	952.8	47.6	1.44	27:22	-
13C12-1,2,3,4,7,8-HxCDD	3767.1	188.4	1.15	31:56	Y
13C12-1,2,3,6,7,8-HxCDD	2829.3	141.5	1.36	32:03	-
13C12-1,2,3,4,6,7,8-HpCDD	1415.6	70.8	1.23	36:17	-
13C12-OCDD	1286.9	32.2	0.94	40:49	-
13C12-2,3,7,8-TCDF	1447.6	72.4	0.82	22:17	-
13C12-1,2,3,7,8-PeCDF	1167.2	58.4	1.57	26:12	-
13C12-2,3,4,7,8-PeCDF	854.0	42.7	1.67	26:59	-
13C12-1,2,3,4,7,8-HxCDF	4094.7	204.7	0.53	30:51	Y
13C12-1,2,3,6,7,8-HxCDF	3169.2	158.5	0.56	31:00	Y
13C12-2,3,4,6,7,8-HxCDF	2495.8	124.8	0.51	31:48	-
13C12-1,2,3,7,8,9-HxCDF	2735.8	136.8	0.48	32:43	-
13C12-1,2,3,4,6,7,8-HpCDF	1389.0	69.4	0.44	34:56	-
13C12-1,2,3,4,7,8,9-HpCDF	1442.1	72.1	0.42	36:54	-

INTERNAL STANDARDS	RATIO	RT	FLAGS
13C12-1,2,3,4-TCDD	0.84	22:35	-
13C12-1,2,3,7,8,9-HxCDD	1.31	32:27	-

CLEANUP STANDARD	CONC (PPQ)	% REC.	RT	FLAGS
37Cl4-TCDD	653.1	81.6	22:55	-

Flags:

U — The compound was analyzed for but not detected at or above the detection limit.

J — The analyte was detected at concentrations between the calibrated range and the detection limit.

E — The analyte was detected at concentrations greater than the calibrated range.

B — The analyte was found in the associated blank.

D — The analyte was identified in the analysis at a secondary dilution factor.

RO — Ions used for identification are out of ratio

S — The analyte in question is, in the opinion of the reviewer, a PCDD/PCDF, even though the fragment ion due to the loss of COCl did not meet the signal- to-noise ratio criterion of 2.5:1

X — An interferent peak or peaks were observed within the retention window that may obscure otherwise detectable peaks.

Y — The recovery of the indicated standard is outside of QC advisory limits.

Definitions:

CONC — The concentration, given in parts per quadrillio (ppq) or parts per trillion (ppt).

DL — The detection limit based on a 2.5:1 signal-to-noise criteria, given in parts per quadrillion (ppq), parts per trillion (ppt), or in picograms (pg).

RATIO — The ratio of the low- to high-mass ion areas for the confirmation and quantitation ions.

RT — The retention time of an analyte.

NO — The total number of peaks identified as analytes within the retention time window.

% REC — The percent recovery of the indicated standard.

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Columbia Analytical Services

PROJECT: 97-1073
FILE: A10674
LAB ID.: 11-73-2

PCDD/PCDF TOXICITY EQUIVALENCE REPORT

PO: 1885
SAMPLE: Drain 23

PROJECT ID/P.O.:	1885	DATE COLLECTED:	9/18/97	ACCESSION NO:	11-73-2
SAMPLE ORIGIN:	N/A	DATE RECEIVED:	9/25/97	RETCHECK:	A10668
SAMPLE MATRIX:	Water	DATE EXTRACTED:	9/25/97	CONCAL:	A10669
SAMPLE SIZE:	1 L	DATE ANALYZED:	10/10/97	ICAL:	A050797
		DATE PROCESSED:	10/20/97	METHOD:	1613

SPECIFIC ANALYTES	CONC (PPQ)		TEF		TEF CONC (PPQ)
2,3,7,8-TCDD	ND	x	1	=	-
1,2,3,7,8-PeCDD	ND	x	0.5	=	-
1,2,3,4,7,8-HxCDD	ND	x	0.1	=	-
1,2,3,6,7,8-HxCDD	ND	x	0.1	=	-
1,2,3,7,8,9-HxCDD	ND	x	0.1	=	-
1,2,3,4,6,7,8-HpCDD	ND	x	0.01	=	-
OCDD	ND	x	0.001	=	-
2,3,7,8-TCDF	256.2	x	0.1	=	25.62
1,2,3,7,8-PeCDF	ND	x	0.05	=	-
2,3,4,7,8-PeCDF	ND	x	0.5	=	-
1,2,3,4,7,8-HxCDF	ND	x	0.1	=	-
1,2,3,6,7,8-HxCDF	ND	x	0.1	=	-
2,3,4,6,7,8-HxCDF	ND	x	0.1	=	-
1,2,3,7,8,9-HxCDF	ND	x	0.1	=	-
1,2,3,4,6,7,8-HpCDF	ND	x	0.01	=	-
1,2,3,4,7,8,9-HpCDF	ND	x	0.01	=	-
OCDF	ND	x	0.001	=	-

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: 25.62 PPQ

IONICS INTERNATIONAL, INC.

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Columbia Analytical Services

PROJECT: 97-1073
FILE: A10675
LAB ID.: 11-73-3

PCDD/PCDF SUMMARY REPORT
PO: 1885
SAMPLE: Drain 24

	SAMPLE DATA		QUALITY ASSURANCE DATA			
SPECIFIC ANALYTES	CONC (PPQ)	DL (PPQ)	BLANK (PPQ)	LS (PPQ)	LS (%)	QC Limits
2,3,7,8-TCDD	ND	2.4	ND	193.6	97%	50-150
1,2,3,7,8-PeCDD	ND	17.8	ND	964.0	96%	50-150
1,2,3,4,7,8-HxCDD	ND	21.3	ND	1107.2	111%	50-150
1,2,3,6,7,8-HxCDD	ND	18.0	ND	1043.4	104%	50-150
1,2,3,7,8,9-HxCDD	ND	20.0	ND	1021.7	102%	50-150
1,2,3,4,6,7,8-HpCDD	1683.7	29.2	ND	1236.9	124%	50-150
OCDD	13814.0	12.7	ND	1882.1	94%	50-150
2,3,7,8-TCDF	ND	7.4	ND	271.0	135%	50-150
1,2,3,7,8-PeCDF	ND	21.7	ND	1108.9	111%	50-150
2,3,4,7,8-PeCDF	ND	13.5	ND	1188.8	119%	50-150
1,2,3,4,7,8-HxCDF	ND	25.1	ND	1006.0	101%	50-150
1,2,3,6,7,8-HxCDF	ND	15.5	ND	1004.6	100%	50-150
2,3,4,6,7,8-HxCDF	ND	13.4	ND	1057.7	106%	50-150
1,2,3,7,8,9-HxCDF	ND	29.4	ND	978.1	98%	50-150
1,2,3,4,6,7,8-HpCDF	202.0	13.3	ND	1181.6	118%	50-150
1,2,3,4,7,8,9-HpCDF	13.6	21.2	ND	1100.8	110%	50-150
OCDF	742.0	17.2	ND	1867.7	93%	50-150

TOTAL ANALYTES	CONC (PPQ)	DL (PPQ)
TOTAL TCDD	ND	2.4
TOTAL PeCDD	ND	17.8
TOTAL HxCDD	ND	21.3
TOTAL HpCDD	2526.3	29.2
TOTAL OCDD	13814.0	12.7
TOTAL TCDF	ND	7.4
TOTAL PeCDF	ND	21.7
TOTAL HxCDF	ND	29.4
TOTAL HpCDF	851.2	21.2
TOTAL OCDF	742.0	17.2

Definitions:

CONC — The concentration, given in parts per trillion (ppt) or parts per quadrillion (ppq).

DL — The detection limit, given in parts per trillion (ppt), parts per quadrillion (ppq), or in picograms (pg).

BLANK — The concentration of the blank.

MS (PPQ) — The concentration of Matrix Spike recovered.

MS (%) — The percent recovery of the Matrix Spike.

QC Limits — Ionics International, Inc. uses these advisory limits.

ND — (Non-Detect) The concentration of the analyte is less than the detection limit.

NR — (Not Reportable) The spike concentration is less than the concentration in the unspiked matrix sample.

TOTAL DIOXINS/FURANS: 17933.58 PPQ

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: 33.55 PPQ

IONICS INTERNATIONAL, INC.

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Columbia Analytical Services

PROJECT: 97-1073
FILE: A10675
LAB ID.: 11-73-3

PCDD/PCDF ANALYSIS REPORT
PO: 1885
SAMPLE: Drain 24

PROJECT ID/P.O.:	1885	DATE COLLECTED:	9/18/97	ACCESSION NO:	11-73-3
SAMPLE ORIGIN:	N/A	DATE RECEIVED:	9/25/97	RETCHECK:	A10668
SAMPLE MATRIX:	Water	DATE EXTRACTED:	9/25/97	CONCAL:	A10669
SAMPLE SIZE:	1 L	DATE ANALYZED:	10/10/97	ICAL:	A050797
		DATE PROCESSED:	10/20/97	METHOD:	1613

SPECIFIC ANALYTES	CONC (PPQ)	DL (PPQ)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD	ND	2.4	-		U
1,2,3,7,8-PeCDD	ND	17.8	-		U
1,2,3,4,7,8-HxCDD	ND	21.3	-		U
1,2,3,6,7,8-HxCDD	ND	18.0	-		U
1,2,3,7,8,9-HxCDD	ND	20.0	-		U
1,2,3,4,6,7,8-HpCDD	1683.7	29.2	1.06	36:05	
OCDD	13814.0	12.7	0.89	40:35	
2,3,7,8-TCDF	ND	7.4	-		U
1,2,3,7,8-PeCDF	ND	21.7	-		U
2,3,4,7,8-PeCDF	ND	13.5	-		U
1,2,3,4,7,8-HxCDF	ND	25.1	-		U
1,2,3,6,7,8-HxCDF	ND	15.5	-		U
2,3,4,6,7,8-HxCDF	ND	13.4	-		U
1,2,3,7,8,9-HxCDF	ND	29.4	-		U
1,2,3,4,6,7,8-HpCDF	202.0	13.3	0.96	34:38	
1,2,3,4,7,8,9-HpCDF	13.6	21.2	0.41	36:45	J
OCDF	742.0	17.2	0.88	40:47	

TOTAL ANALYTES	NO	CONC (PPQ)	DL (PPQ)	RT WINDOW (min)	FLAGS
TOTAL TCDD	0	ND	2.4	—	U
TOTAL PeCDD	0	ND	17.8	—	U
TOTAL HxCDD	0	ND	21.3	—	U
TOTAL HpCDD	2	2526.3	29.2	—	
TOTAL TCDF	0	ND	7.4	—	U
TOTAL PeCDF	0	ND	21.7	—	U
TOTAL HxCDF	0	ND	29.4	—	U
TOTAL HpCDF	3	851.2	21.2	—	

DATA REVIEWER: AMA 10/20/97

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Columbia Analytical Services

PROJECT: 97-1073
FILE: A10675
LAB ID.: 11-73-3

PCDD/PCDF QUALITY CONTROL REPORT

PO: 1885
SAMPLE: Drain 24

PROJECT ID/P.O.:	1885	DATE COLLECTED:	9/18/97	ACCESSION NO:	11-73-3
SAMPLE ORIGIN:	N/A	DATE RECEIVED:	9/25/97	RETCHECK:	A10668
SAMPLE MATRIX:	Water	DATE EXTRACTED:	9/25/97	CONCAL:	A10669
SAMPLE SIZE:	1 L	DATE ANALYZED:	10/10/97	ICAL:	A050797
		DATE PROCESSED:	10/20/97	METHOD:	1613

LABELED COMPOUNDS	CONC (PPQ)	% REC.	RATIO	RT	FLAGS
13C12-2,3,7,8-TCDD	1735.1	86.8	0.79	22:21	-
13C12-1,2,3,7,8-PeCDD	1388.6	69.4	1.68	26:57	-
13C12-1,2,3,4,7,8-HxCDD	1948.0	97.4	1.42	31:20	-
13C12-1,2,3,6,7,8-HxCDD	1380.2	69.0	1.17	31:27	-
13C12-1,2,3,4,6,7,8-HpCDD	941.3	47.1	1.04	36:04	-
13C12-OCDD	1266.3	31.7	0.93	40:33	-
13C12-2,3,7,8-TCDF	1893.5	94.7	0.79	21:44	-
13C12-1,2,3,7,8-PeCDF	1578.6	78.9	1.54	25:46	-
13C12-2,3,4,7,8-PeCDF	1517.7	75.9	1.69	26:33	-
13C12-1,2,3,4,7,8-HxCDF	1943.3	97.2	0.53	30:18	-
13C12-1,2,3,6,7,8-HxCDF	1545.8	77.3	0.53	30:27	-
13C12-2,3,4,6,7,8-HxCDF	1840.8	92.0	0.50	31:10	-
13C12-1,2,3,7,8,9-HxCDF	1539.8	77.0	0.56	32:16	-
13C12-1,2,3,4,6,7,8-HpCDF	905.2	45.3	0.46	34:37	-
13C12-1,2,3,4,7,8,9-HpCDF	888.9	44.4	0.48	36:42	-

INTERNAL STANDARDS	RATIO	RT	FLAGS
13C12-1,2,3,4-TCDD	0.79	22:11	-
13C12-1,2,3,7,8,9-HxCDD	1.34	31:54	-

CLEANUP STANDARD	CONC (PPQ)	% REC.	RT	FLAGS
37Cl4-TCDD	833.6	104.2	22:22	-

Flags:

U — The compound was analyzed for but not detected at or above the detection limit.

J — The analyte was detected at concentrations between the calibrated range and the detection limit.

E — The analyte was detected at concentrations greater than the calibrated range.

B — The analyte was found in the associated blank.

D — The analyte was identified in the analysis at a secondary dilution factor.

RO — Ions used for identification are out of ratio

S — The analyte in question is, in the opinion of the reviewer, a PCDD/PCDF, even though the fragment ion due to the loss of COCl did not meet the signal- to-noise ratio criterion of 2.5:1

X — An interferent peak or peaks were observed within the retention window that may obscure otherwise detectable peaks.

Y — The recovery of the indicated standard is outside of QC advisory limits.

Definitions:

CONC — The concentration, given in parts per quadrillio (ppq) or parts per trillion (ppt).

DL — The detection limit based on a 2.5:1 signal-to-noise criteria, given in parts per quadrillion (ppq), parts per trillion (ppt), or in picograms (pg).

RATIO — The ratio of the low- to high-mass ion areas for the confirmation and quantitation ions.

RT — The retention time of an analyte.

NO — The total number of peaks identified as analytes within the retention time window.

% REC — The percent recovery of the indicated standard.

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Columbia Analytical Services

PROJECT: 97-1073
FILE: A10675
LAB ID.: 11-73-3

PCDD/PCDF TOXICITY EQUIVALENCE REPORT

PO: 1885
SAMPLE: Drain 24

PROJECT ID/P.O.:	1885	DATE COLLECTED:	9/18/97	ACCESSION NO:	11-73-3
SAMPLE ORIGIN:	N/A	DATE RECEIVED:	9/25/97	RETCHECK:	A10668
SAMPLE MATRIX:	Water	DATE EXTRACTED:	9/25/97	CONCAL:	A10669
SAMPLE SIZE:	1 L	DATE ANALYZED:	10/10/97	ICAL:	A050797
		DATE PROCESSED:	10/20/97	METHOD:	1613

SPECIFIC ANALYTES	CONC (PPQ)		TEF		TEF CONC (PPQ)
2,3,7,8-TCDD	ND	x	1	=	-
1,2,3,7,8-PeCDD	ND	x	0.5	=	-
1,2,3,4,7,8-HxCDD	ND	x	0.1	=	-
1,2,3,6,7,8-HxCDD	ND	x	0.1	=	-
1,2,3,7,8,9-HxCDD	ND	x	0.1	=	-
1,2,3,4,6,7,8-HpCDD	1683.7	x	0.01	=	16.84
OCDD	13814.0	x	0.001	=	13.81
2,3,7,8-TCDF	ND	x	0.1	=	-
1,2,3,7,8-PeCDF	ND	x	0.05	=	-
2,3,4,7,8-PeCDF	ND	x	0.5	=	-
1,2,3,4,7,8-HxCDF	ND	x	0.1	=	-
1,2,3,6,7,8-HxCDF	ND	x	0.1	=	-
2,3,4,6,7,8-HxCDF	ND	x	0.1	=	-
1,2,3,7,8,9-HxCDF	ND	x	0.1	=	-
1,2,3,4,6,7,8-HpCDF	202.0	x	0.01	=	2.02
1,2,3,4,7,8,9-HpCDF	13.6	x	0.01	=	0.14
OCDF	742.0	x	0.001	=	0.74

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: 33.55 PPQ

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Columbia Analytical Services

PROJECT: 97-1073
FILE: A10676
LAB ID.: 11-73-4

PCDD/PCDF SUMMARY REPORT
PO: 1885
SAMPLE: Drain 25

	SAMPLE DATA		QUALITY ASSURANCE DATA			
SPECIFIC ANALYTES	CONC (PPQ)	DL (PPQ)	BLANK (PPQ)	LS (PPQ)	LS (%)	QC Limits
2,3,7,8-TCDD	46.1	2.4	ND	193.6	97%	50-150
1,2,3,7,8-PeCDD	870.4	17.8	ND	964.0	96%	50-150
1,2,3,4,7,8-HxCDD	2414.1	21.3	ND	1107.2	111%	50-150
1,2,3,6,7,8-HxCDD	5712.0	18.0	ND	1043.4	104%	50-150
1,2,3,7,8,9-HxCDD	5185.8	20.0	ND	1021.7	102%	50-150
1,2,3,4,6,7,8-HpCDD	115711.1	29.2	ND	1236.9	124%	50-150
OCDD	634659.3	12.7	ND	1882.1	94%	50-150
2,3,7,8-TCDF	50.4	7.4	ND	271.0	135%	50-150
1,2,3,7,8-PeCDF	74.8	21.7	ND	1108.9	111%	50-150
2,3,4,7,8-PeCDF	161.0	13.5	ND	1188.8	119%	50-150
1,2,3,4,7,8-HxCDF	867.5	25.1	ND	1006.0	101%	50-150
1,2,3,6,7,8-HxCDF	650.9	15.5	ND	1004.6	100%	50-150
2,3,4,6,7,8-HxCDF	1588.4	13.4	ND	1057.7	106%	50-150
1,2,3,7,8,9-HxCDF	ND	29.4	ND	978.1	98%	50-150
1,2,3,4,6,7,8-HpCDF	19466.1	13.3	ND	1181.6	118%	50-150
1,2,3,4,7,8,9-HpCDF	1631.6	21.2	ND	1100.8	110%	50-150
OCDF	66649.5	17.2	ND	1867.7	93%	50-150

TOTAL ANALYTES	CONC (PPQ)	DL (PPQ)
TOTAL TCDD	196.3	2.4
TOTAL PeCDD	2714.9	17.8
TOTAL HxCDD	36206.8	21.3
TOTAL HpCDD	214952.8	29.2
TOTAL OCDD	634659.3	12.7
TOTAL TCDF	457.5	7.4
TOTAL PeCDF	8676.0	21.7
TOTAL HxCDF	37607.8	29.4
TOTAL HpCDF	86145.4	21.2
TOTAL OCDF	66649.5	17.2

Definitions:

CONC — The concentration, given in parts per trillion (ppt) or parts per quadrillion (ppq).

DL — The detection limit, given in parts per trillion (ppt), parts per quadrillion (ppq), or in picograms (pg).

BLANK — The concentration of the blank.

MS (PPQ) — The concentration of Matrix Spike recovered.

MS (%) — The percent recovery of the Matrix Spike.

QC Limits — Ionics International, Inc. uses these advisory limits.

ND — (Non-Detect) The concentration of the analyte is less than the detection limit.

NR — (Not Reportable) The spike concentration is less than the concentration in the unspiked matrix sample.

TOTAL DIOXINS/FURANS: 1088266.34 PPQ

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: 4281.84 PPQ

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Columbia Analytical Services

PROJECT: 97-1073
FILE: A10676
LAB ID.: 11-73-4

PCDD/PCDF ANALYSIS REPORT
PO: 1885
SAMPLE: Drain 25

PROJECT ID/P.O.:	1885	DATE COLLECTED:	9/18/97	ACCESSION NO:	11-73-4
SAMPLE ORIGIN:	N/A	DATE RECEIVED:	9/25/97	RETCHECK:	A10668
SAMPLE MATRIX:	Water	DATE EXTRACTED:	9/25/97	CONCAL:	A10669
SAMPLE SIZE:	1 L	DATE ANALYZED:	10/10/97	ICAL:	A050797
		DATE PROCESSED:	10/20/97	METHOD:	1613

SPECIFIC ANALYTES	CONC (PPQ)	DL (PPQ)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD	46.1	2.4	0.74	22:25	
1,2,3,7,8-PeCDD	870.4	17.8	1.77	27:02	
1,2,3,4,7,8-HxCDD	2414.1	21.3	1.20	31:24	
1,2,3,6,7,8-HxCDD	5712.0	18.0	1.22	31:32	
1,2,3,7,8,9-HxCDD	5185.8	20.0	1.24	31:59	
1,2,3,4,6,7,8-HpCDD	115711.1	29.2	1.02	36:08	E
OCDD	634659.3	12.7	0.92	40:39	E
2,3,7,8-TCDF	50.4	7.4	0.86	21:49	
1,2,3,7,8-PeCDF	74.8	21.7	1.33	25:50	
2,3,4,7,8-PeCDF	161.0	13.5	1.89	26:38	
1,2,3,4,7,8-HxCDF	867.5	25.1	1.18	30:23	
1,2,3,6,7,8-HxCDF	650.9	15.5	1.08	30:32	
2,3,4,6,7,8-HxCDF	1588.4	13.4	1.10	31:13	
1,2,3,7,8,9-HxCDF	ND	29.4	-		U
1,2,3,4,6,7,8-HpCDF	19466.1	13.3	1.02	34:43	
1,2,3,4,7,8,9-HpCDF	1631.6	21.2	1.06	36:45	
OCDF	66649.5	17.2	0.89	40:50	E

TOTAL ANALYTES	NO	CONC (PPQ)	DL (PPQ)	RT WINDOW (min)	FLAGS
TOTAL TCDD	6	196.3	2.4	—	
TOTAL PeCDD	8	2714.9	17.8	—	
TOTAL HxCDD	6	36206.8	21.3	—	E
TOTAL HpCDD	2	214952.8	29.2	—	E
TOTAL TCDF	9	457.5	7.4	—	
TOTAL PeCDF	11	8676.0	21.7	—	
TOTAL HxCDF	9	37607.8	29.4	—	E
TOTAL HpCDF	4	86145.4	21.2	—	E

DATA REVIEWER: 10/20/97
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Columbia Analytical Services

PROJECT: 97-1073
FILE: A10676
LAB ID.: 11-73-4

PCDD/PCDF QUALITY CONTROL REPORT

PO: 1885
SAMPLE: Drain 25

PROJECT ID/P.O.:	1885	DATE COLLECTED:	9/18/97	ACCESSION NO:	11-73-4
SAMPLE ORIGIN:	N/A	DATE RECEIVED:	9/25/97	RETCHECK:	A10668
SAMPLE MATRIX:	Water	DATE EXTRACTED:	9/25/97	CONCAL:	A10669
SAMPLE SIZE:	1 L	DATE ANALYZED:	10/10/97	ICAL:	A050797
		DATE PROCESSED:	10/20/97	METHOD:	1613

LABELED COMPOUNDS	CONC (PPQ)	% REC.	RATIO	RT	FLAGS
13C12-2,3,7,8-TCDD	1747.2	87.4	0.80	22:24	-
13C12-1,2,3,7,8-PeCDD	1388.9	69.4	1.52	27:00	-
13C12-1,2,3,4,7,8-HxCDD	1977.9	98.9	1.33	31:23	-
13C12-1,2,3,6,7,8-HxCDD	1393.8	69.7	1.31	31:31	-
13C12-1,2,3,4,6,7,8-HpCDD	855.5	42.8	1.02	36:07	-
13C12-OCDD	1266.0	31.7	1.08	40:38	-
13C12-2,3,7,8-TCDF	1848.9	92.4	0.82	21:48	-
13C12-1,2,3,7,8-PeCDF	1633.1	81.7	1.59	25:48	-
13C12-2,3,4,7,8-PeCDF	1373.0	68.6	1.63	26:37	-
13C12-1,2,3,4,7,8-HxCDF	2220.1	111.0	0.52	30:23	-
13C12-1,2,3,6,7,8-HxCDF	1519.2	76.0	0.52	30:31	-
13C12-2,3,4,6,7,8-HxCDF	1639.6	82.0	0.52	31:15	-
13C12-1,2,3,7,8,9-HxCDF	1684.8	84.2	0.53	32:21	-
13C12-1,2,3,4,6,7,8-HpCDF	924.6	46.2	0.50	34:42	-
13C12-1,2,3,4,7,8,9-HpCDF	885.2	44.3	0.48	36:45	-

INTERNAL STANDARDS	RATIO	RT	FLAGS
13C12-1,2,3,4-TCDD	0.77	22:14	-
13C12-1,2,3,7,8,9-HxCDD	1.33	31:59	-

CLEANUP STANDARD	CONC (PPQ)	% REC.	RT	FLAGS
37Cl4-TCDD	804.2	100.5	22:25	-

Flags:

U — The compound was analyzed for but not detected at or above the detection limit.

J — The analyte was detected at concentrations between the calibrated range and the detection limit.

E — The analyte was detected at concentrations greater than the calibrated range.

B — The analyte was found in the associated blank.

D — The analyte was identified in the analysis at a secondary dilution factor.

RO — Ions used for identification are out of ratio

S — The analyte in question is, in the opinion of the reviewer, a PCDD/PCDF, even though the fragment ion due to the loss of COCl did not meet the signal- to-noise ratio criterion of 2.5:1

X — An interferent peak or peaks were observed within the retention window that may obscure otherwise detectable peaks.

Y — The recovery of the indicated standard is outside of QC advisory limits.

Definitions:

CONC — The concentration, given in parts per quadrillio (ppq) or parts per trillion (ppt).

DL — The detection limit based on a 2.5:1 signal-to-noise criteria, given in parts per quadrillion (ppq), parts per trillion (ppt), or in picograms (pg).

RATIO — The ratio of the low- to high-mass ion areas for the confirmation and quantitation ions.

RT — The retention time of an analyte.

NO — The total number of peaks identified as analytes within the retention time window.

% REC — The percent recovery of the indicated standard.

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Columbia Analytical Services

PROJECT: 97-1073
FILE: A10676
LAB ID.: 11-73-4

PCDD/PCDF TOXICITY EQUIVALENCE REPORT

PO: 1885
SAMPLE: Drain 25

PROJECT ID/P.O.:	1885	DATE COLLECTED:	9/18/97	ACCESSION NO:	11-73-4
SAMPLE ORIGIN:	N/A	DATE RECEIVED:	9/25/97	RETCHECK:	A10668
SAMPLE MATRIX:	Water	DATE EXTRACTED:	9/25/97	CONCAL:	A10669
SAMPLE SIZE:	1 L	DATE ANALYZED:	10/10/97	ICAL:	A050797
		DATE PROCESSED:	10/20/97	METHOD:	1613

SPECIFIC ANALYTES	CONC (PPQ)		TEF		TEF CONC (PPQ)
2,3,7,8-TCDD	46.1	x	1	=	46.09
1,2,3,7,8-PeCDD	870.4	x	0.5	=	435.2
1,2,3,4,7,8-HxCDD	2414.1	x	0.1	=	241.41
1,2,3,6,7,8-HxCDD	5712.0	x	0.1	=	571.2
1,2,3,7,8,9-HxCDD	5185.8	x	0.1	=	518.58
1,2,3,4,6,7,8-HpCDD	115711.1	x	0.01	=	1157.11
OCDD	634659.3	x	0.001	=	634.66
2,3,7,8-TCDF	50.4	x	0.1	=	5.04
1,2,3,7,8-PeCDF	74.8	x	0.05	=	3.74
2,3,4,7,8-PeCDF	161.0	x	0.5	=	80.5
1,2,3,4,7,8-HxCDF	867.5	x	0.1	=	86.75
1,2,3,6,7,8-HxCDF	650.9	x	0.1	=	65.09
2,3,4,6,7,8-HxCDF	1588.4	x	0.1	=	158.84
1,2,3,7,8,9-HxCDF	ND	x	0.1	=	-
1,2,3,4,6,7,8-HpCDF	19466.1	x	0.01	=	194.66
1,2,3,4,7,8,9-HpCDF	1631.6	x	0.01	=	16.32
OCDF	66649.5	x	0.001	=	66.65

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: 4281.84 PPQ

IONICS INTERNATIONAL, INC.

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Columbia Analytical Services

PROJECT: 97-1073
FILE: A10677
LAB ID.: 11-73-5

PCDD/PCDF SUMMARY REPORT
PO: 1885
SAMPLE: Drain 30

	SAMPLE DATA		QUALITY ASSURANCE DATA			
SPECIFIC ANALYTES	CONC (PPQ)	DL (PPQ)	BLANK (PPQ)	LS (PPQ)	LS (%)	QC Limits
2,3,7,8-TCDD	64.3	2.4	ND	193.6	97%	50-150
1,2,3,7,8-PeCDD	1417.1	17.8	ND	964.0	96%	50-150
1,2,3,4,7,8-HxCDD	3583.4	21.3	ND	1107.2	111%	50-150
1,2,3,6,7,8-HxCDD	8317.3	18.0	ND	1043.4	104%	50-150
1,2,3,7,8,9-HxCDD	9938.8	20.0	ND	1021.7	102%	50-150
1,2,3,4,6,7,8-HpCDD	154404.3	29.2	ND	1236.9	124%	50-150
OCDD	985885.0	12.7	ND	1882.1	94%	50-150
2,3,7,8-TCDF	50.7	7.4	ND	271.0	135%	50-150
1,2,3,7,8-PeCDF	72.7	21.7	ND	1108.9	111%	50-150
2,3,4,7,8-PeCDF	171.4	13.5	ND	1188.8	119%	50-150
1,2,3,4,7,8-HxCDF	1316.2	25.1	ND	1006.0	101%	50-150
1,2,3,6,7,8-HxCDF	1851.7	15.5	ND	1004.6	100%	50-150
2,3,4,6,7,8-HxCDF	2787.3	13.4	ND	1057.7	106%	50-150
1,2,3,7,8,9-HxCDF	ND	29.4	ND	978.1	98%	50-150
1,2,3,4,6,7,8-HpCDF	35497.9	13.3	ND	1181.6	118%	50-150
1,2,3,4,7,8,9-HpCDF	2902.1	21.2	ND	1100.8	110%	50-150
OCDF	120244.1	17.2	ND	1867.7	93%	50-150

TOTAL ANALYTES	CONC (PPQ)	DL (PPQ)
TOTAL TCDD	320.3	2.4
TOTAL PeCDD	3984.7	17.8
TOTAL HxCDD	54914.2	21.3
TOTAL HpCDD	287283.2	29.2
TOTAL OCDD	985885.0	12.7
TOTAL TCDF	775.7	7.4
TOTAL PeCDF	12565.3	21.7
TOTAL HxCDF	62807.4	29.4
TOTAL HpCDF	151552.9	21.2
TOTAL OCDF	120244.1	17.2

Definitions:

CONC — The concentration, given in parts per trillion (ppt) or parts per quadrillion (ppq).

DL — The detection limit, given in parts per trillion (ppt), parts per quadrillion (ppq), or in picograms (pg).

BLANK — The concentration of the blank.

MS (PPQ) — The concentration of Matrix Spike recovered.

MS (%) — The percent recovery of the Matrix Spike.

QC Limits — Ionics International, Inc. uses these advisory limits.

ND — (Non-Detect) The concentration of the analyte is less than the detection limit.

NR — (Not Reportable) The spike concentration is less than the concentration in the unspiked matrix sample.

TOTAL DIOXINS/FURANS: 1680332.82 PPQ

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: 6680.95 PPQ

Drain 30 1 ppm 3/E

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Columbia Analytical Services

PROJECT: 97-1073
FILE: A10677
LAB ID.: 11-73-5

PCDD/PCDF ANALYSIS REPORT
PO: 1885
SAMPLE: Drain 30

PROJECT ID/P.O.:	1885	DATE COLLECTED:	9/18/97	ACCESSION NO:	11-73-5
SAMPLE ORIGIN:	N/A	DATE RECEIVED:	9/25/97	RETCHECK:	A10668
SAMPLE MATRIX:	Water	DATE EXTRACTED:	9/25/97	CONCAL:	A10669
SAMPLE SIZE:	1 L	DATE ANALYZED:	10/10/97	ICAL:	A050797
		DATE PROCESSED:	10/20/97	METHOD:	1613

SPECIFIC ANALYTES	CONC (PPQ)	DL (PPQ)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD	64.3	2.4	0.86	22:30	
1,2,3,7,8-PeCDD	1417.1	17.8	1.76	27:05	
1,2,3,4,7,8-HxCDD	3583.4	21.3	1.34	31:33	
1,2,3,6,7,8-HxCDD	8317.3	18.0	1.26	31:40	
1,2,3,7,8,9-HxCDD	9938.8	20.0	1.26	32:06	
1,2,3,4,6,7,8-HpCDD	154404.3	29.2	1.02	36:11	E
OCDD	985885.0	12.7	0.89	40:43	E
2,3,7,8-TCDF	50.7	7.4	0.90	21:53	
1,2,3,7,8-PeCDF	72.7	21.7	1.66	25:52	
2,3,4,7,8-PeCDF	171.4	13.5	1.96	26:41	
1,2,3,4,7,8-HxCDF	1316.2	25.1	1.36	30:29	
1,2,3,6,7,8-HxCDF	1851.7	15.5	1.21	30:39	
2,3,4,6,7,8-HxCDF	2787.3	13.4	1.43	31:20	
1,2,3,7,8,9-HxCDF	ND	29.4	-		U
1,2,3,4,6,7,8-HpCDF	35497.9	13.3	1.09	34:46	E
1,2,3,4,7,8,9-HpCDF	2902.1	21.2	1.09	36:49	
OCDF	120244.1	17.2	0.90	40:54	E

TOTAL ANALYTES	NO	CONC (PPQ)	DL (PPQ)	RT WINDOW (min)	FLAGS
TOTAL TCDD	6	320.3	2.4	—	
TOTAL PeCDD	8	3984.7	17.8	—	
TOTAL HxCDD	8	54914.2	21.3	—	E
TOTAL HpCDD	2	287283.2	29.2	—	E
TOTAL TCDF	9	775.7	7.4	—	
TOTAL PeCDF	7	12565.3	21.7	—	
TOTAL HxCDF	8	62807.4	29.4	—	E
TOTAL HpCDF	4	151552.9	21.2	—	E

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IONICS INTERNATIONAL, INC.

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Columbia Analytical Services

PROJECT: 97-1073
FILE: A10677
LAB ID.: 11-73-5

PCDD/PCDF QUALITY CONTROL REPORT

PO: 1885
SAMPLE: Drain 30

PROJECT ID/P.O.:	1885	DATE COLLECTED:	9/18/97	ACCESSION NO:	11-73-5
SAMPLE ORIGIN:	N/A	DATE RECEIVED:	9/25/97	RETCHECK:	A10668
SAMPLE MATRIX:	Water	DATE EXTRACTED:	9/25/97	CONCAL:	A10669
SAMPLE SIZE:	1 L	DATE ANALYZED:	10/10/97	ICAL:	A050797
		DATE PROCESSED:	10/20/97	METHOD:	1613

LABELED COMPOUNDS	CONC (PPQ)	% REC.	RATIO	RT	FLAGS
13C12-2,3,7,8-TCDD	1811.9	90.6	0.82	22:29	-
13C12-1,2,3,7,8-PeCDD	1129.1	56.5	1.46	27:04	-
13C12-1,2,3,4,7,8-HxCDD	1540.1	77.0	1.32	31:32	-
13C12-1,2,3,6,7,8-HxCDD	1153.5	57.7	1.33	31:39	-
13C12-1,2,3,4,6,7,8-HpCDD	699.8	35.0	1.17	36:11	-
13C12-OCDD	1017.1	25.4	1.13	40:42	-
13C12-2,3,7,8-TCDF	1897.0	94.9	0.81	21:51	-
13C12-1,2,3,7,8-PeCDF	1357.6	67.9	1.54	25:51	-
13C12-2,3,4,7,8-PeCDF	1228.0	61.4	1.75	26:40	-
13C12-1,2,3,4,7,8-HxCDF	1652.6	82.6	0.53	30:29	-
13C12-1,2,3,6,7,8-HxCDF	1302.5	65.1	0.54	30:37	-
13C12-2,3,4,6,7,8-HxCDF	1267.9	63.4	0.53	31:23	-
13C12-1,2,3,7,8,9-HxCDF	1438.0	71.9	0.50	32:25	-
13C12-1,2,3,4,6,7,8-HpCDF	704.2	35.2	0.39	34:45	-
13C12-1,2,3,4,7,8,9-HpCDF	758.3	37.9	0.47	36:48	-

INTERNAL STANDARDS	RATIO	RT	FLAGS
13C12-1,2,3,4-TCDD	0.78	22:18	-
13C12-1,2,3,7,8,9-HxCDD	1.32	32:06	-

CLEANUP STANDARD	CONC (PPQ)	% REC.	RT	FLAGS
37Cl4-TCDD	847.8	106.0	22:30	-

Flags:

U — The compound was analyzed for but not detected at or above the detection limit.

J — The analyte was detected at concentrations between the calibrated range and the detection limit.

E — The analyte was detected at concentrations greater than the calibrated range.

B — The analyte was found in the associated blank.

D — The analyte was identified in the analysis at a secondary dilution factor.

RO — Ions used for identification are out of ratio

S — The analyte in question is, in the opinion of the reviewer, a PCDD/PCDF, even though the fragment ion due to the loss of COCl did not meet the signal- to-noise ratio criterion of 2.5:1

X — An interferent peak or peaks were observed within the retention window that may obscure otherwise detectable peaks.

Y — The recovery of the indicated standard is outside of QC advisory limits.

Definitions:

CONC — The concentration, given in parts per quadrillio (ppq) or parts per trillion (ppt).

DL — The detection limit based on a 2.5:1 signal-to-noise criteria, given in parts per quadrillion (ppq), parts per trillion (ppt), or in picograms (pg).

RATIO — The ratio of the low- to high-mass ion areas for the confirmation and quantitation ions.

RT — The retention time of an analyte.

NO — The total number of peaks identified as analytes within the retention time window.

% REC — The percent recovery of the indicated standard.

IONICS INTERNATIONAL, INC.

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Columbia Analytical Services

PROJECT: 97-1073
FILE: A10677
LAB ID.: 11-73-5

PCDD/PCDF TOXICITY EQUIVALENCE REPORT

PO: 1885
SAMPLE: Drain 30

PROJECT ID/P.O.:	1885	DATE COLLECTED:	9/18/97	ACCESSION NO:	11-73-5
SAMPLE ORIGIN:	N/A	DATE RECEIVED:	9/25/97	RETCHECK:	A10668
SAMPLE MATRIX:	Water	DATE EXTRACTED:	9/25/97	CONCAL:	A10669
SAMPLE SIZE:	1 L	DATE ANALYZED:	10/10/97	ICAL:	A050797
		DATE PROCESSED:	10/20/97	METHOD:	1613

SPECIFIC ANALYTES	CONC (PPQ)		TEF		TEF CONC (PPQ)
2,3,7,8-TCDD	64.3	x	1	=	64.34
1,2,3,7,8-PeCDD	1417.1	x	0.5	=	708.57
1,2,3,4,7,8-HxCDD	3583.4	x	0.1	=	358.34
1,2,3,6,7,8-HxCDD	8317.3	x	0.1	=	831.73
1,2,3,7,8,9-HxCDD	9938.8	x	0.1	=	993.88
1,2,3,4,6,7,8-HpCDD	154404.3	x	0.01	=	1544.04
OCDD	985885.0	x	0.001	=	985.89
2,3,7,8-TCDF	50.7	x	0.1	=	5.07
1,2,3,7,8-PeCDF	72.7	x	0.05	=	3.63
2,3,4,7,8-PeCDF	171.4	x	0.5	=	85.7
1,2,3,4,7,8-HxCDF	1316.2	x	0.1	=	131.62
1,2,3,6,7,8-HxCDF	1851.7	x	0.1	=	185.17
2,3,4,6,7,8-HxCDF	2787.3	x	0.1	=	278.73
1,2,3,7,8,9-HxCDF	ND	x	0.1	=	-
1,2,3,4,6,7,8-HpCDF	35497.9	x	0.01	=	354.98
1,2,3,4,7,8,9-HpCDF	2902.1	x	0.01	=	29.02
OCDF	120244.1	x	0.001	=	120.24

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: 6680.95 PPQ

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Columbia Analytical Services

PROJECT: 97-1073
FILE: A10727
LAB ID.: 11-73-6

PCDD/PCDF SUMMARY REPORT
PO: 1885
SAMPLE: Treating Soln. 1

	SAMPLE DATA		QUALITY ASSURANCE DATA			
SPECIFIC ANALYTES	CONC (PPT)	DL (PPT)	BLANK (PPT)	LS (PPQ)	LS (%)	QC Limits
2,3,7,8-TCDD	ND	0.5	ND			50-150
1,2,3,7,8-PeCDD	ND	0.5	ND			50-150
1,2,3,4,7,8-HxCDD	ND	1.1	ND			50-150
1,2,3,6,7,8-HxCDD	52317.4	1.2	ND			50-150
1,2,3,7,8,9-HxCDD	3631.6	1.0	ND			50-150
1,2,3,4,6,7,8-HpCDD	912299.3	0.7	ND			50-150
OCDD	654658.3	3.9	ND			50-150
2,3,7,8-TCDF	ND	0.4	ND			50-150
1,2,3,7,8-PeCDF	326358.9	1.0	ND			50-150
2,3,4,7,8-PeCDF	27627.3	0.7	ND			50-150
1,2,3,4,7,8-HxCDF	13073.5	0.7	ND			50-150
1,2,3,6,7,8-HxCDF	ND	0.7	ND			50-150
2,3,4,6,7,8-HxCDF	17494.2	1.2	ND			50-150
1,2,3,7,8,9-HxCDF	ND	2.4	ND			50-150
1,2,3,4,6,7,8-HpCDF	566689.2	4.5	ND			50-150
1,2,3,4,7,8,9-HpCDF	88726.9	1.5	ND			50-150
OCDF	178012.9	4.4	ND			50-150

TOTAL ANALYTES	CONC (PPT)	DL (PPT)
TOTAL TCDD	ND	0.5
TOTAL PeCDD	ND	0.5
TOTAL HxCDD	124951.7	1.2
TOTAL HpCDD	2561306.9	0.7
TOTAL OCDD	654658.3	3.9
TOTAL TCDF	ND	0.4
TOTAL PeCDF	353986.1	1.0
TOTAL HxCDF	30567.7	2.4
TOTAL HpCDF	3248820.5	4.5
TOTAL OCDF	178012.9	4.4

Definitions:

CONC — The concentration, given in parts per trillion (ppt) or parts per quadrillion (ppq).

DL — The detection limit, given in parts per trillion (ppt), parts per quadrillion (ppq), or in picograms (pg).

BLANK — The concentration of the blank.

MS (PPQ) — The concentration of Matrix Spike recovered.

MS (%) — The percent recovery of the Matrix Spike.

QC Limits — Ionics International, Inc. uses these advisory limits.

ND — (Non-Detect) The concentration of the analyte is less than the detection limit.

NR — (Not Reportable) The spike concentration is less than the concentration in the unspiked matrix sample.

TOTAL DIOXINS/FURANS: 7152304.17 PPT

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: 55293.06 PPT

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Columbia Analytical Services

PROJECT: 97-1073
FILE: A10727
LAB ID.: 11-73-6

PCDD/PCDF ANALYSIS REPORT
PO: 1885
SAMPLE: Treating Soln. 1

PROJECT ID/P.O.:	1885	DATE COLLECTED:	9/18/97	ACCESSION NO:	11-73-6
SAMPLE ORIGIN:	N/A	DATE RECEIVED:	9/25/97	RETCHECK:	A10721
SAMPLE MATRIX:	Oil	DATE EXTRACTED:	9/29/97	CONCAL:	A10722
SAMPLE SIZE:	1.08 g	DATE ANALYZED:	10/17/97	ICAL:	A050797
		DATE PROCESSED:	10/19/97	METHOD:	1613

SPECIFIC ANALYTES	CONC (PPT)	DL (PPT)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD	ND	0.5	-		U
1,2,3,7,8-PeCDD	ND	0.5	-		U
1,2,3,4,7,8-HxCDD	ND	1.1	-		U
1,2,3,6,7,8-HxCDD	52317.4	1.2	1.24	31:20	E
1,2,3,7,8,9-HxCDD	3631.6	1.0	1.28	31:48	
1,2,3,4,6,7,8-HpCDD	912299.3	0.7	0.99	35:58	E
OCDD	654658.3	3.9	0.95	40:30	E
2,3,7,8-TCDF	ND	0.4	-		U
1,2,3,7,8-PeCDF	326358.9	1.0	1.01	34:32	E
2,3,4,7,8-PeCDF	27627.3	0.7	0.99	36:38	E
1,2,3,4,7,8-HxCDF	13073.5	0.7	1.21	30:14	
1,2,3,6,7,8-HxCDF	ND	0.7	-		U
2,3,4,6,7,8-HxCDF	17494.2	1.2	1.17	31:02	
1,2,3,7,8,9-HxCDF	ND	2.4	-		U
1,2,3,4,6,7,8-HpCDF	566689.2	4.5	1.01	34:32	E
1,2,3,4,7,8,9-HpCDF	88726.9	1.5	0.99	36:38	E
OCDF	178012.9	4.4	0.92	40:48	E

TOTAL ANALYTES	NO	CONC (PPT)	DL (PPT)	RT WINDOW (min)	FLAGS
TOTAL TCDD	0	ND	0.5	—	U
TOTAL PeCDD	0	ND	0.5	—	U
TOTAL HxCDD	5	124951.7	1.2	—	E
TOTAL HpCDD	2	2561306.9	0.7	—	E
TOTAL TCDF	0	ND	0.4	—	U
TOTAL PeCDF	0	353986.1	1.0	—	E
TOTAL HxCDF	2	30567.7	2.4	—	E
TOTAL HpCDF	3	3248820.5	4.5	—	E

DATA REVIEWER: AMA 10/20/97

treat. sol.
5 PPM D/F

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Columbia Analytical Services

PROJECT: 97-1073
FILE: A10727
LAB ID.: 11-73-6

PCDD/PCDF QUALITY CONTROL REPORT

PO: 1885
SAMPLE: Treating Soln. 1

PROJECT ID/P.O.:	1885	DATE COLLECTED:	9/18/97	ACCESSION NO:	11-73-6
SAMPLE ORIGIN:	N/A	DATE RECEIVED:	9/25/97	RETCHECK:	A10721
SAMPLE MATRIX:	Oil	DATE EXTRACTED:	9/29/97	CONCAL:	A10722
SAMPLE SIZE:	1.08 g	DATE ANALYZED:	10/17/97	ICAL:	A050797
		DATE PROCESSED:	10/19/97	METHOD:	1613

LABELED COMPOUNDS	CONC (PPT)	% REC.	RATIO	RT	FLAGS
13C12-2,3,7,8-TCDD	391.7	21.2	0.79	22:26	Y
13C12-1,2,3,7,8-PeCDD	414.1	22.4	1.63	26:55	Y
13C12-1,2,3,4,7,8-HxCDD	761.4	41.1	1.37	31:12	-
13C12-1,2,3,6,7,8-HxCDD	699.4	37.8	1.34	31:19	-
13C12-1,2,3,4,6,7,8-HpCDD	1010.3	54.6	1.13	36:00	-
13C12-OCDD	31599.8	853.2	1.86	40:47	Y
13C12-2,3,7,8-TCDF	235.5	12.7	0.82	21:51	Y
13C12-1,2,3,7,8-PeCDF	502.4	27.1	1.45	25:46	-
13C12-2,3,4,7,8-PeCDF	307.6	16.6	1.52	26:32	Y
13C12-1,2,3,4,7,8-HxCDF	780.5	42.1	0.57	30:13	-
13C12-1,2,3,6,7,8-HxCDF	618.6	33.4	0.54	30:21	-
13C12-2,3,4,6,7,8-HxCDF	334.3	18.1	0.58	31:04	Y
13C12-1,2,3,7,8,9-HxCDF	472.5	25.5	0.55	32:10	-
13C12-1,2,3,4,6,7,8-HpCDF	747.0	40.3	1.16	34:32	-
13C12-1,2,3,4,7,8,9-HpCDF	313.4	16.9	0.61	36:38	Y

INTERNAL STANDARDS	RATIO	RT	FLAGS
13C12-1,2,3,4-TCDD	0.78	22:15	-
13C12-1,2,3,7,8,9-HxCDD	1.36	31:47	-

CLEANUP STANDARD	CONC (PPT)	% REC.	RT	FLAGS
37Cl4-TCDD	150.6	20.3	22:27	Y

Flags:

U — The compound was analyzed for but not detected at or above the detection limit.

J — The analyte was detected at concentrations between the calibrated range and the detection limit.

E — The analyte was detected at concentrations greater than the calibrated range.

B — The analyte was found in the associated blank.

D — The analyte was identified in the analysis at a secondary dilution factor.

RO — Ions used for identification are out of ratio

S — The analyte in question is, in the opinion of the reviewer, a PCDD/PCDF, even though the fragment ion due to the loss of COCl did not meet the signal- to-noise ratio criterion of 2.5:1

X — An interferent peak or peaks were observed within the retention window that may obscure otherwise detectable peaks.

Y — The recovery of the indicated standard is outside of QC advisory limits.

Definitions:

CONC — The concentration, given in parts per quadrillio (ppq) or parts per trillion (ppt).

DL — The detection limit based on a 2.5:1 signal-to-noise criteria, given in parts per quadrillion (ppq), parts per trillion (ppt), or in picograms (pg).

RATIO — The ratio of the low- to high-mass ion areas for the confirmation and quantitation ions.

RT — The retention time of an analyte.

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% REC — The percent recovery of the indicated standard.

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Columbia Analytical Services

PROJECT: 97-1073
FILE: A10727
LAB ID.: 11-73-6

PCDD/PCDF TOXICITY EQUIVALENCE REPORT

PO: 1885
SAMPLE: Treating Soln. 1

PROJECT ID/P.O.:	1885	DATE COLLECTED:	9/18/97	ACCESSION NO:	11-73-6
SAMPLE ORIGIN:	N/A	DATE RECEIVED:	9/25/97	RETCHECK:	A10721
SAMPLE MATRIX:	Oil	DATE EXTRACTED:	9/29/97	CONCAL:	A10722
SAMPLE SIZE:	1.08 g	DATE ANALYZED:	10/17/97	ICAL:	A050797
		DATE PROCESSED:	10/19/97	METHOD:	1613

SPECIFIC ANALYTES	CONC (PPT)		TEF		TEF CONC (PPT)
2,3,7,8-TCDD	ND	x	1	=	-
1,2,3,7,8-PeCDD	ND	x	0.5	=	-
1,2,3,4,7,8-HxCDD	ND	x	0.1	=	-
1,2,3,6,7,8-HxCDD	52317.4	x	0.1	=	5231.74
1,2,3,7,8,9-HxCDD	3631.6	x	0.1	=	363.16
1,2,3,4,6,7,8-HpCDD	912299.3	x	0.01	=	9122.99
OCDD	654658.3	x	0.001	=	654.66
2,3,7,8-TCDF	ND	x	0.1	=	-
1,2,3,7,8-PeCDF	326358.9	x	0.05	=	16317.94
2,3,4,7,8-PeCDF	27627.3	x	0.5	=	13813.63
1,2,3,4,7,8-HxCDF	13073.5	x	0.1	=	1307.35
1,2,3,6,7,8-HxCDF	ND	x	0.1	=	-
2,3,4,6,7,8-HxCDF	17494.2	x	0.1	=	1749.42
1,2,3,7,8,9-HxCDF	ND	x	0.1	=	-
1,2,3,4,6,7,8-HpCDF	566689.2	x	0.01	=	5666.89
1,2,3,4,7,8,9-HpCDF	88726.9	x	0.01	=	887.27
OCDF	178012.9	x	0.001	=	178.01

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: 55293.06 PPT

IONICS INTERNATIONAL, INC.

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Columbia Analytical Services

PROJECT: 97-1073
FILE: A10670
LAB ID.: DFBLK B3-104

PCDD/PCDF ANALYSIS REPORT
PO: 1885
SAMPLE: Method Blank

PROJECT ID/P.O.:	1885	DATE COLLECTED:	N/A	ACCESSION NO:	DFBLK B3-104
SAMPLE ORIGIN:	N/A	DATE RECEIVED:	N/A	RETCHECK:	A10668
SAMPLE MATRIX:	Water	DATE EXTRACTED:	9/25/97	CONCAL:	A10669
SAMPLE SIZE:	1 L	DATE ANALYZED:	10/10/97	ICAL:	A050797
		DATE PROCESSED:	10/20/97	METHOD:	1613

SPECIFIC ANALYTES	CONC (PPQ)	DL (PPQ)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD	ND	2.4	-		U
1,2,3,7,8-PeCDD	ND	17.8	-		U
1,2,3,4,7,8-HxCDD	ND	21.3	-		U
1,2,3,6,7,8-HxCDD	ND	18.0	-		U
1,2,3,7,8,9-HxCDD	ND	20.0	-		U
1,2,3,4,6,7,8-HpCDD	ND	29.2	-		U
OCDD	ND	12.7	-		U
2,3,7,8-TCDF	ND	7.4	-		U
1,2,3,7,8-PeCDF	ND	21.7	-		U
2,3,4,7,8-PeCDF	ND	13.5	-		U
1,2,3,4,7,8-HxCDF	ND	25.1	-		U
1,2,3,6,7,8-HxCDF	ND	15.5	-		U
2,3,4,6,7,8-HxCDF	ND	13.4	-		U
1,2,3,7,8,9-HxCDF	ND	29.4	-		U
1,2,3,4,6,7,8-HpCDF	ND	13.3	-		U
1,2,3,4,7,8,9-HpCDF	ND	21.2	-		U
OCDF	ND	17.2	-		U

TOTAL ANALYTES	NO	CONC (PPQ)	DL (PPQ)	RT WINDOW (min)	FLAGS
TOTAL TCDD	0	ND	2.4	—	U
TOTAL PeCDD	0	ND	17.8	—	U
TOTAL HxCDD	0	ND	21.3	—	U
TOTAL HpCDD	0	ND	29.2	—	U
TOTAL TCDF	0	ND	7.4	—	U
TOTAL PeCDF	0	ND	21.7	—	U
TOTAL HxCDF	0	ND	29.4	—	U
TOTAL HpCDF	0	ND	21.2	—	U

DATA REVIEWER: AMA 10/20/97

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Columbia Analytical Services

PROJECT: 97-1073 | ***PCDD/PCDF QUALITY CONTROL REPORT***
FILE: A10670 | **PO: 1885**
LAB ID.: DFBLK B3-104 | **SAMPLE: Method Blank**

PROJECT ID/P.O.:	1885	DATE COLLECTED:	N/A	ACCESSION NO:	DFBLK B3-104
SAMPLE ORIGIN:	N/A	DATE RECEIVED:	N/A	RETCHECK:	A10668
SAMPLE MATRIX:	Water	DATE EXTRACTED:	9/25/97	CONCAL:	A10669
SAMPLE SIZE:	1 L	DATE ANALYZED:	10/10/97	ICAL:	A050797
		DATE PROCESSED:	10/20/97	METHOD:	1613

LABELED COMPOUNDS	CONC (PPQ)	% REC.	RATIO	RT	FLAGS
13C12-2,3,7,8-TCDD	1506.6	75.3	0.79	22:21	-
13C12-1,2,3,7,8-PeCDD	1598.8	79.9	1.62	26:55	-
13C12-1,2,3,4,7,8-HxCDD	2022.8	101.1	1.32	31:17	-
13C12-1,2,3,6,7,8-HxCDD	2037.4	101.9	1.31	31:24	-
13C12-1,2,3,4,6,7,8-HpCDD	1324.6	66.2	1.18	36:01	-
13C12-OCDD	2801.1	70.0	0.89	40:30	-
13C12-2,3,7,8-TCDF	1981.4	99.1	0.79	21:45	-
13C12-1,2,3,7,8-PeCDF	1727.3	86.4	1.56	25:45	-
13C12-2,3,4,7,8-PeCDF	1656.6	82.8	1.55	26:32	-
13C12-1,2,3,4,7,8-HxCDF	1637.8	81.9	0.51	30:15	-
13C12-1,2,3,6,7,8-HxCDF	1817.2	90.9	0.52	30:24	-
13C12-2,3,4,6,7,8-HxCDF	2463.8	123.2	0.51	31:06	-
13C12-1,2,3,7,8,9-HxCDF	1460.1	73.0	0.50	32:15	-
13C12-1,2,3,4,6,7,8-HpCDF	1227.5	61.4	0.41	34:34	-
13C12-1,2,3,4,7,8,9-HpCDF	1101.4	55.1	0.44	36:39	-

INTERNAL STANDARDS	RATIO	RT	FLAGS
13C12-1,2,3,4-TCDD	0.79	22:11	-
13C12-1,2,3,7,8,9-HxCDD	1.28	31:52	-

CLEANUP STANDARD	CONC (PPQ)	% REC.	RT	FLAGS
37Cl4-TCDD	623.5	77.9	22:22	-

Flags:

U — The compound was analyzed for but not detected at or above the detection limit.

J — The analyte was detected at concentrations between the calibrated range and the detection limit.

E — The analyte was detected at concentrations greater than the calibrated range.

B — The analyte was found in the associated blank.

D — The analyte was identified in the analysis at a secondary dilution factor.

RO — Ions used for identification are out of ratio

S — The analyte in question is, in the opinion of the reviewer, a PCDD/PCDF, even though the fragment ion due to the loss of COCl did not meet the signal- to-noise ratio criterion of 2.5:1

X — An interferent peak or peaks were observed within the retention window that may obscure otherwise detectable peaks.

Y — The recovery of the indicated standard is outside of QC advisory limits.

Definitions:

CONC — The concentration, given in parts per quadrillio (ppq) or parts per trillion (ppt).

DL — The detection limit based on a 2.5:1 signal-to-noise criteria, given in parts per quadrillion (ppq), parts per trillion (ppt), or in picograms (pg).

RATIO — The ratio of the low- to high-mass ion areas for the confirmation and quantitation ions.

RT — The retention time of an analyte.

NO — The total number of peaks identified as analytes within the retention time window.

% REC — The percent recovery of the indicated standard.

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Columbia Analytical Services

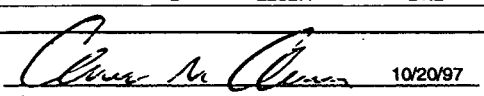
PROJECT: 97-1073
FILE: A10672
LAB ID.: LS B3-104

PCDD/PCDF ANALYSIS REPORT
PO: 1885
SAMPLE: Lab Spike

PROJECT ID/P.O.:	1885	DATE COLLECTED:	N/A	ACCESSION NO:	LS B3-104
SAMPLE ORIGIN:	N/A	DATE RECEIVED:	N/A	RETCHECK:	A10668
SAMPLE MATRIX:	Water	DATE EXTRACTED:	9/25/97	CONCAL:	A10669
SAMPLE SIZE:	1 L	DATE ANALYZED:	10/10/97	ICAL:	A050797
		DATE PROCESSED:	10/20/97	METHOD:	1613

SPECIFIC ANALYTES	CONC (PPQ)	DL (PPQ)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD	193.6	2.4	0.84	22:20	
1,2,3,7,8-PeCDD	964.0	17.8	1.66	26:56	
1,2,3,4,7,8-HxCDD	1107.2	21.3	1.29	31:18	
1,2,3,6,7,8-HxCDD	1043.4	18.0	1.05	31:25	
1,2,3,7,8,9-HxCDD	1021.7	20.0	1.39	31:53	
1,2,3,4,6,7,8-HpCDD	1236.9	29.2	1.03	36:03	
OCDD	1882.1	12.7	0.90	40:31	
2,3,7,8-TCDF	271.0	7.4	0.77	21:45	
1,2,3,7,8-PeCDF	1108.9	21.7	1.55	25:43	
2,3,4,7,8-PeCDF	1188.8	13.5	1.61	26:32	
1,2,3,4,7,8-HxCDF	1006.0	25.1	1.27	30:16	
1,2,3,6,7,8-HxCDF	1004.6	15.5	1.07	30:25	
2,3,4,6,7,8-HxCDF	1057.7	13.4	1.21	31:08	
1,2,3,7,8,9-HxCDF	978.1	29.4	1.17	32:16	
1,2,3,4,6,7,8-HpCDF	1181.6	13.3	1.04	34:36	
1,2,3,4,7,8,9-HpCDF	1100.8	21.2	1.07	36:41	
OCDF	1867.7	17.2	0.94	40:44	

TOTAL ANALYTES	NO	CONC (PPQ)	DL (PPQ)	RT WINDOW (min)	FLAGS
TOTAL TCDD	1	193.6	2.4	—	
TOTAL PeCDD	1	964.0	17.8	—	
TOTAL HxCDD	3	3172.4	21.3	—	
TOTAL HpCDD	1	1236.9	29.2	—	
TOTAL TCDF	1	271.0	7.4	—	
TOTAL PeCDF	2	2297.7	21.7	—	
TOTAL HxCDF	4	4046.4	29.4	—	
TOTAL HpCDF	2	2282.4	21.2	—	

DATA REVIEWER:  10/20/97
AMA

IONICS INTERNATIONAL, INC.

10655 Richmond Ave., Ste. 170
Houston, TX 77042

Phone: (713) 972-1037
Fax: (713) 784-1152

Columbia Analytical Services

PROJECT: 97-1073
FILE: A10672
LAB ID.: LS B3-104

PCDD/PCDF QUALITY CONTROL REPORT

PO: 1885
SAMPLE: Lab Spike

PROJECT ID/P.O.:	1885	DATE COLLECTED:	N/A	ACCESSION NO:	LS B3-104
SAMPLE ORIGIN:	N/A	DATE RECEIVED:	N/A	RETCHECK:	A10668
SAMPLE MATRIX:	Water	DATE EXTRACTED:	9/25/97	CONCAL:	A10669
SAMPLE SIZE:	1 L	DATE ANALYZED:	10/10/97	ICAL:	A050797
		DATE PROCESSED:	10/20/97	METHOD:	1613

LABELED COMPOUNDS	CONC (PPQ)	% REC.	RATIO	RT	FLAGS
13C12-2,3,7,8-TCDD	1459.2	73.0	0.79	22:20	-
13C12-1,2,3,7,8-PeCDD	1694.4	84.7	1.60	26:55	-
13C12-1,2,3,4,7,8-HxCDD	2621.0	131.1	1.22	31:17	-
13C12-1,2,3,6,7,8-HxCDD	2192.7	109.6	1.28	31:24	-
13C12-1,2,3,4,6,7,8-HpCDD	1580.3	79.0	1.23	36:02	-
13C12-OCDD	2174.2	54.4	0.94	40:31	-
13C12-2,3,7,8-TCDF	1907.8	95.4	0.80	21:44	-
13C12-1,2,3,7,8-PeCDF	1812.3	90.6	1.64	25:42	-
13C12-2,3,4,7,8-PeCDF	1763.3	88.2	1.59	26:31	-
13C12-1,2,3,4,7,8-HxCDF	2427.0	121.3	0.47	30:15	-
13C12-1,2,3,6,7,8-HxCDF	2092.4	104.6	0.58	30:24	-
13C12-2,3,4,6,7,8-HxCDF	2063.9	103.2	0.50	31:07	-
13C12-1,2,3,7,8,9-HxCDF	1717.6	85.9	0.55	32:15	-
13C12-1,2,3,4,6,7,8-HpCDF	1521.8	76.1	0.42	34:35	-
13C12-1,2,3,4,7,8,9-HpCDF	1477.7	73.9	0.40	36:40	-

INTERNAL STANDARDS	RATIO	RT	FLAGS
13C12-1,2,3,4-TCDD	0.80	22:10	-
13C12-1,2,3,7,8,9-HxCDD	1.19	31:52	-

CLEANUP STANDARD	CONC (PPQ)	% REC.	RT	FLAGS
37Cl4-TCDD	605.0	75.6	22:21	-

Flags:

U — The compound was analyzed for but not detected at or above the detection limit.

J — The analyte was detected at concentrations between the calibrated range and the detection limit.

E — The analyte was detected at concentrations greater than the calibrated range.

B — The analyte was found in the associated blank.

D — The analyte was identified in the analysis at a secondary dilution factor.

RO — Ions used for identification are out of ratio

S — The analyte in question is, in the opinion of the reviewer, a PCDD/PCDF, even though the fragment ion due to the loss of COCl did not meet the signal- to-noise ratio criterion of 2.5:1

X — An interferent peak or peaks were observed within the retention window that may obscure otherwise detectable peaks.

Y — The recovery of the indicated standard is outside of QC advisory limits.

Definitions:

CONC — The concentration, given in parts per quadrillio (ppq) or parts per trillion (ppt).

DL — The detection limit based on a 2.5:1 signal-to-noise criteria, given in parts per quadrillion (ppq), parts per trillion (ppt), or in picograms (pg).

RATIO — The ratio of the low- to high-mass ion areas for the confirmation and quantitation ions.

RT — The retention time of an analyte.

NO — The total number of peaks identified as analytes within the retention time window.

% REC — The percent recovery of the indicated standard.

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Columbia Analytical Services

PROJECT: 97-1073
FILE: A10726
LAB ID.: DFBLK B3-107

PCDD/PCDF ANALYSIS REPORT
PO: 1885
SAMPLE: Method Blank

PROJECT ID/P.O.:	1885	DATE COLLECTED:	N/A	ACCESSION NO:	DFBLK B3-107
SAMPLE ORIGIN:	N/A	DATE RECEIVED:	N/A	RETCHECK:	A10721
SAMPLE MATRIX:	Water	DATE EXTRACTED:	9/29/97	CONCAL:	A10722
SAMPLE SIZE:	1 L	DATE ANALYZED:	10/17/97	ICAL:	A050797
		DATE PROCESSED:	10/20/97	METHOD:	1613

SPECIFIC ANALYTES	CONC (PPQ)	DL (PPQ)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD	ND	0.5	-		U
1,2,3,7,8-PeCDD	ND	0.5	-		U
1,2,3,4,7,8-HxCDD	ND	1.1	-		U
1,2,3,6,7,8-HxCDD	ND	1.2	-		U
1,2,3,7,8,9-HxCDD	ND	1.0	-		U
1,2,3,4,6,7,8-HpCDD	ND	0.7	-		U
OCDD	ND	3.9	-		U
2,3,7,8-TCDF	ND	0.4	-		U
1,2,3,7,8-PeCDF	ND	1.0	-		U
2,3,4,7,8-PeCDF	ND	0.7	-		U
1,2,3,4,7,8-HxCDF	ND	0.7	-		U
1,2,3,6,7,8-HxCDF	ND	0.7	-		U
2,3,4,6,7,8-HxCDF	ND	1.2	-		U
1,2,3,7,8,9-HxCDF	ND	2.4	-		U
1,2,3,4,6,7,8-HpCDF	ND	4.5	-		U
1,2,3,4,7,8,9-HpCDF	ND	1.5	-		U
OCDF	ND	4.4	-		U

TOTAL ANALYTES	NO	CONC (PPQ)	DL (PPQ)	RT WINDOW (min)	FLAGS
TOTAL TCDD	0	ND	0.5	—	U
TOTAL PeCDD	0	ND	0.5	—	U
TOTAL HxCDD	0	ND	1.2	—	U
TOTAL HpCDD	0	ND	0.7	—	U
TOTAL TCDF	0	ND	0.4	—	U
TOTAL PeCDF	0	ND	1.0	—	U
TOTAL HxCDF	0	ND	2.4	—	U
TOTAL HpCDF	0	ND	4.5	—	U

DATA REVIEWER: AMA 10/20/97

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Columbia Analytical Services

PROJECT: 97-1073 — ***PCDD/PCDF QUALITY CONTROL REPORT***
FILE: A10726 — **PO: 1885**
LAB ID.: DFBLK B3-107 — **SAMPLE: Method Blank**

PROJECT ID/P.O.:	1885	DATE COLLECTED:	N/A	ACCESSION NO:	DFBLK B3-107
SAMPLE ORIGIN:	N/A	DATE RECEIVED:	N/A	RETCHECK:	A10721
SAMPLE MATRIX:	Water	DATE EXTRACTED:	9/29/97	CONCAL:	A10722
SAMPLE SIZE:	1 L	DATE ANALYZED:	10/17/97	ICAL:	A050797
		DATE PROCESSED:	10/20/97	METHOD:	1613

LABELED COMPOUNDS	CONC (PPQ)	% REC.	RATIO	RT	FLAGS
13C12-2,3,7,8-TCDD	1459.9	73.0	0.81	22:14	-
13C12-1,2,3,7,8-PeCDD	1520.9	76.0	1.61	26:49	-
13C12-1,2,3,4,7,8-HxCDD	2186.6	109.3	1.34	31:09	-
13C12-1,2,3,6,7,8-HxCDD	1986.9	99.3	1.33	31:16	-
13C12-1,2,3,4,6,7,8-HpCDD	1324.9	66.2	1.00	35:55	-
13C12-OCDD	1826.6	45.7	0.95	40:25	-
13C12-2,3,7,8-TCDF	1697.6	84.9	0.81	21:38	-
13C12-1,2,3,7,8-PeCDF	1992.1	99.6	1.56	25:36	-
13C12-2,3,4,7,8-PeCDF	1599.7	80.0	1.70	26:25	-
13C12-1,2,3,4,7,8-HxCDF	1988.1	99.4	0.52	30:08	-
13C12-1,2,3,6,7,8-HxCDF	2297.3	114.9	0.54	30:17	-
13C12-2,3,4,6,7,8-HxCDF	1892.7	94.6	0.50	30:59	-
13C12-1,2,3,7,8,9-HxCDF	1362.6	68.1	0.50	32:07	-
13C12-1,2,3,4,6,7,8-HpCDF	1348.1	67.4	0.45	34:28	-
13C12-1,2,3,4,7,8,9-HpCDF	1003.3	50.2	0.49	36:33	-

INTERNAL STANDARDS	RATIO	RT	FLAGS
13C12-1,2,3,4-TCDD	0.76	22:05	-
13C12-1,2,3,7,8,9-HxCDD	1.27	31:44	-

CLEANUP STANDARD	CONC (PPQ)	% REC.	RT	FLAGS
37Cl4-TCDD	603.0	75.4	22:15	-

Flags:

U — The compound was analyzed for but not detected at or above the detection limit.

J — The analyte was detected at concentrations between the calibrated range and the detection limit.

E — The analyte was detected at concentrations greater than the calibrated range.

B — The analyte was found in the associated blank.

D — The analyte was identified in the analysis at a secondary dilution factor.

RO — Ions used for identification are out of ratio

S — The analyte in question is, in the opinion of the reviewer, a PCDD/PCDF, even though the fragment ion due to the loss of COCl did not meet the signal- to-noise ratio criterion of 2.5:1

X — An interferent peak or peaks were observed within the retention window that may obscure otherwise detectable peaks.

Y — The recovery of the indicated standard is outside of QC advisory limits.

Definitions:

CONC — The concentration, given in parts per quadrillio (ppq) or parts per trillion (ppt).

DL — The detection limit based on a 2.5:1 signal-to-noise criteria, given in parts per quadrillion (ppq), parts per trillion (ppt), or in picograms (pg).

RATIO — The ratio of the low- to high-mass ion areas for the confirmation and quantitation ions.

RT — The retention time of an analyte.

NO — The total number of peaks identified as analytes within the retention time window.

% REC — The percent recovery of the indicated standard.

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Columbia Analytical Services

PROJECT: 97-1073
FILE: A10728
LAB ID.: LS B3-107

PCDD/PCDF ANALYSIS REPORT
PO: 1885
SAMPLE: Lab Spike

PROJECT ID/P.O.:	1885	DATE COLLECTED:	N/A	ACCESSION NO:	LS B3-107
SAMPLE ORIGIN:	N/A	DATE RECEIVED:	N/A	RETCHECK:	A10721
SAMPLE MATRIX:	Water	DATE EXTRACTED:	9/29/97	CONCAL:	A10722
SAMPLE SIZE:	1 L	DATE ANALYZED:	10/17/97	ICAL:	A050797
		DATE PROCESSED:	10/20/97	METHOD:	1613

SPECIFIC ANALYTES	CONC (PPQ)	DL (PPQ)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD	290.9	0.5	0.79	22:15	
1,2,3,7,8-PeCDD	1139.7	0.5	1.88	26:49	
1,2,3,4,7,8-HxCDD	1167.1	1.1	1.28	31:11	
1,2,3,6,7,8-HxCDD	1080.7	1.2	1.30	31:17	
1,2,3,7,8,9-HxCDD	1039.0	1.0	1.39	31:46	
1,2,3,4,6,7,8-HpCDD	4230.7	0.7	1.01	35:54	
OCDD	19259.1	3.9	0.91	40:27	
2,3,7,8-TCDF	282.4	0.4	0.74	21:39	
1,2,3,7,8-PeCDF	1120.9	1.0	1.68	25:37	
2,3,4,7,8-PeCDF	1170.7	0.7	1.60	26:26	
1,2,3,4,7,8-HxCDF	1069.3	0.7	1.25	30:09	
1,2,3,6,7,8-HxCDF	967.0	0.7	1.17	30:18	
2,3,4,6,7,8-HxCDF	1005.1	1.2	1.12	31:01	
1,2,3,7,8,9-HxCDF	1448.9	2.4	1.11	32:08	
1,2,3,4,6,7,8-HpCDF	2861.3	4.5	1.20	34:28	
1,2,3,4,7,8,9-HpCDF	1502.2	1.5	1.09	36:33	
OCDF	3349.9	4.4	0.92	40:39	

TOTAL ANALYTES	NO	CONC (PPQ)	DL (PPQ)	RT WINDOW (min)	FLAGS
TOTAL TCDD	1	ND	0.5	—	U
TOTAL PeCDD	1	ND	0.5	—	U
TOTAL HxCDD	3	ND	1.2	—	U
TOTAL HpCDD	1	ND	0.7	—	U
TOTAL TCDF	1	ND	0.4	—	U
TOTAL PeCDF	2	ND	1.0	—	U
TOTAL HxCDF	4	ND	2.4	—	U
TOTAL HpCDF	2	ND	4.5	—	U

DATA REVIEWER: AMA 10/20/97

IONICS INTERNATIONAL, INC.

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Columbia Analytical Services

PROJECT: 97-1073
FILE: A10728
LAB ID.: LS B3-107

PCDD/PCDF QUALITY CONTROL REPORT

PO: 1885
SAMPLE: Lab Spike

PROJECT ID/P.O.:	1885	DATE COLLECTED:	N/A	ACCESSION NO:	LS B3-107
SAMPLE ORIGIN:	N/A	DATE RECEIVED:	N/A	RETCHECK:	A10721
SAMPLE MATRIX:	Water	DATE EXTRACTED:	9/29/97	CONCAL:	A10722
SAMPLE SIZE:	1 L	DATE ANALYZED:	10/17/97	ICAL:	A050797
		DATE PROCESSED:	10/20/97	METHOD:	1613

LABELED COMPOUNDS	CONC (PPQ)	% REC.	RATIO	RT	FLAGS
13C12-2,3,7,8-TCDD	1395.3	69.8	0.80	22:14	-
13C12-1,2,3,7,8-PeCDD	1504.7	75.2	1.64	26:48	-
13C12-1,2,3,4,7,8-HxCDD	2362.5	118.1	1.29	31:10	-
13C12-1,2,3,6,7,8-HxCDD	2311.1	115.6	1.25	31:17	-
13C12-1,2,3,4,6,7,8-HpCDD	1183.8	59.2	1.05	35:55	-
13C12-OCDD	1714.4	42.9	0.92	40:27	-
13C12-2,3,7,8-TCDF	2034.8	101.7	0.82	21:38	-
13C12-1,2,3,7,8-PeCDF	2210.8	110.5	1.66	25:36	-
13C12-2,3,4,7,8-PeCDF	1800.9	90.0	1.66	26:25	-
13C12-1,2,3,4,7,8-HxCDF	2231.5	111.6	0.51	30:08	-
13C12-1,2,3,6,7,8-HxCDF	2124.8	106.2	0.51	30:17	-
13C12-2,3,4,6,7,8-HxCDF	2019.3	101.0	0.53	31:00	-
13C12-1,2,3,7,8,9-HxCDF	1501.1	75.1	0.51	32:07	-
13C12-1,2,3,4,6,7,8-HpCDF	1196.9	59.8	0.46	34:28	-
13C12-1,2,3,4,7,8,9-HpCDF	989.1	49.5	0.43	36:33	-

INTERNAL STANDARDS	RATIO	RT	FLAGS
13C12-1,2,3,4-TCDD	0.82	22:04	-
13C12-1,2,3,7,8,9-HxCDD	1.21	31:45	-

CLEANUP STANDARD	CONC (PPQ)	% REC.	RT	FLAGS
37Cl4-TCDD	633.7	79.2	22:15	-

Flags:

U — The compound was analyzed for but not detected at or above the detection limit.

J — The analyte was detected at concentrations between the calibrated range and the detection limit.

E — The analyte was detected at concentrations greater than the calibrated range.

B — The analyte was found in the associated blank.

D — The analyte was identified in the analysis at a secondary dilution factor.

RO — Ions used for identification are out of ratio

S — The analyte in question is, in the opinion of the reviewer, a PCDD/PCDF, even though the fragment ion due to the loss of COCl did not meet the signal- to-noise ratio criterion of 2.5:1

X — An interferent peak or peaks were observed within the retention window that may obscure otherwise detectable peaks.

Y — The recovery of the indicated standard is outside of QC advisory limits.

Definitions:

CONC — The concentration, given in parts per quadrillio (ppq) or parts per trillion (ppt).

DL — The detection limit based on a 2.5:1 signal-to-noise criteria, given in parts per quadrillion (ppq), parts per trillion (ppt), or in picograms (pg).

RATIO — The ratio of the low- to high-mass ion areas for the confirmation and quantitation ions.

RT — The retention time of an analyte.

NO — The total number of peaks identified as analytes within the retention time window.

% REC — The percent recovery of the indicated standard.

IONICS INTERNATIONAL, INC.

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1317 South 13th Ave. • Kelso, WA 98626 • (360) 577-7222 • (800) 695-[…] • FAX (360) 636-1068

CHAIN OF [C]USTODY/LABORATORY ANALYSIS REQUE[ST] FORM

DATE 9/18/97 PAGE 1 OF ____

PROJECT NAME JH BAXTER & Co. # DRAIN WATER

PROJECT MANAGER Tom Orthmere

COMPANY/ADDRESS JH BAXTER & CO.
6520 188TH ST. N.E.
ARLINGTON, WA.

PHONE 360-435-2146

SAMPLERS SIGNATURE Jim Clawson

ANALYSIS REQUESTED

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX	NUMBER OF CONTAINERS	Base/Neu/Acid Organics GC/MS 625/8270	Volatile Organics GC/MS 624/8240	Halogenated or Aromatic Volatiles 601/8010☐ 602/8020☐	Pesticides/PCBs 608/8080	Total Petroleum Hydrocarbons EPA/418.1☐ OR/418.1☐ WA/418.1☐	TPH/Gas/BTEX 5030/8015/8020 Gas☐ BTEX☐	TPH/8015 Modified Diesel☐ Hydrocarbon Scan☐	TPH/HCID WA/HCID☐ OR/HCID☐	TCLP Metals☐ VOA☐ Semi VOA☐ Pest/Herb☐	Metals (total or dissolved) List Below	~~Cyanide~~ oil + Grease	(pH) Cond, Cl, SO4, PO4, F, Br, NO2, NO3, (circle) (TSS)	NH3-N, COD, Total-P, TKN, TOC (circle)	Total Organic Halides (TOX) 9020 ☐ (AOX) 1650A☐	PCP-8150 M (1)	PAH-8310 (610)	DIOXINS + FURANS (2)	REMARKS
DRAIN 13 44	9/18/97	9:30A	1	WATER	5											X	X			X	X	X	
DRAIN 23	9/18/97	10:15A	2	↓	5											X	X			X	X	X	
DRAIN 24	9/18/97	10:45A	3	↓	5											X	X			X	X	X	
DRAIN 25	9/18/97	11:15A	4	↓	5											X	X			X	X	X	
DRAIN 30	9/18/97	8:30A	5	↓	5											X	X			X	X	X	
DRAIN 510-22	9/18/97	1:00p	6	↓	4											X	X			X	X	X	
Treating Soln	9/18/97	1:30p	7	oil Borne	3															X	X	X	

RELINQUISHED BY:
Signature: Jim Clawson
Printed Name: Jim Clawson
Firm: J.H. Baxter & Co
Date/Time: 9/18/97 2:30pm

RECEIVED BY:
Signature: [signature]
Printed Name: Lori K. Hawn
Firm: CAS
Date/Time: 091997 1600

TURNAROUND REQUIREMENTS
___ 24 hr ___ 48 hr. ___ 5 day
X Standard (10-15 working days)
___ Provide Verbal Preliminary Results
___ Provide FAX preliminary Results
Requested Report Date ____________

REPORT REQUIREMENTS
X I. Routine Report
___ II. Report (includes DUP.MS. MSD, as required, may be charged as samples)
___ III. Data Validation Report (includes All Raw Data)
___ IV. CLP Deliverable Report

INVOICE INFORMATION:
P.O.# ____________
Bill To: JH BAXTER & CO
P.O. Box 5902
San Mateo, CA. 94402
ATTN. CAROLIN MARTIN

SAMPLE RECEIPT:
Shipping VIA: ____________
Shipping #: ____________
Condition: ____________
Lab No: K97-6849

RELINQUISHED BY:
Signature ____________
Printed Name ____________
Firm ____________
Date/Time ____________

RECEIVED BY:
Signature ____________
Printed Name ____________
Firm ____________
Date/Time ____________

SPECIAL INSTRUCTIONS/COMMENTS: WATER OVERALL DRAINS

(1). Please Report MRL of 1.0 ppb — Analyze for 2,4,6, Trichlorophenol, 2,3,4,6, Tetrachlorophenol and pentachlorophenol.

(2). Please use EPA Method 1613: Tetra-Through Octachlorinated Dioxins and Furans By Isotope Dilution

NOTE: Treating Solution may have higher concentration of PCP, PAH and D/F than stormwater

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator

400-05

Appendix C: Revised data from September 18, 1997 sampling

→ 28-E-1.1
CF 3/13/98

Columbia Analytical Services, Inc.

March 10, 1998

Service Request No: K9708446

Caroline Martin
J.H. Baxter Company
1700 El Camino Real
P.O. Box 5902
San Mateo, CA 94402-0902

Re: J. H. Baxter & Co. Drain Water

Dear Caroline:

Enclosed are the results of the sample(s) submitted to our laboratory on November 13, 1997. For your reference, these analyses have been assigned our service request number K9708446.

This sample was a duplicate from CAS service request K9706849-001. The dioxin analysis was performed by Ionics Corporation and the results are included herein. We apologize for the delay.

Please call if you have any questions. My extension is 260.

Respectfully submitted,

Columbia Analytical Services, Inc.

Teena Jones
Project Chemist

TJ/sm

1317 South 13th Avenue • P.O. Box 479 • Kelso, Washington 98626 • Telephone 360/577-7222 • Fax 360/636-1068

Columbia Analytical Services, Inc.

PROJECT: 97-1144
FILE: J22545
LAB ID.: 12-44-1

PCDD/PCDF SUMMARY REPORT
REFERENCE: K978446
SAMPLE: Drains #13,14

	SAMPLE DATA		QUALITY ASSURANCE DATA			
SPECIFIC ANALYTES	CONC (PPQ)	MDL (PPQ)	BLANK (PPQ)	LS (PPQ)	LS (%)	QC Limits
2,3,7,8-TCDD	-	2.4	ND	168.7	84%	50-150
1,2,3,7,8-PeCDD	1376.9	17.8	ND	842.7	84%	50-150
1,2,3,4,7,8-HxCDD	4615.3	21.3	ND	866.2	87%	50-150
1,2,3,6,7,8-HxCDD	5717.9	18.0	ND	944.3	94%	50-150
1,2,3,7,8,9-HxCDD	7351.9	20.0	ND	911.3	91%	50-150
1,2,3,4,6,7,8-HpCDD	205823.2	29.2	ND	1081.4	108%	50-150
OCDD	1144070.5	12.7	ND	1926.4	96%	50-150
2,3,7,8-TCDF	-	7.4	ND	194.1	97%	50-150
1,2,3,7,8-PeCDF	118.9	21.7	ND	956.9	96%	50-150
2,3,4,7,8-PeCDF	132.3	13.5	ND	988.0	99%	50-150
1,2,3,4,7,8-HxCDF	1184.5	25.1	ND	935.8	94%	50-150
1,2,3,6,7,8-HxCDF	1298.2	15.5	ND	904.0	90%	50-150
2,3,4,6,7,8-HxCDF	1159.5	13.4	ND	929.0	93%	50-150
1,2,3,7,8,9-HxCDF	-	29.4	ND	940.0	94%	50-150
1,2,3,4,6,7,8-HpCDF	39733.9	13.3	ND	965.7	97%	50-150
1,2,3,4,7,8,9-HpCDF	3048.2	21.2	ND	1070.4	107%	50-150
OCDF	111305.2	17.2	ND	1771.1	89%	50-150

TOTAL ANALYTES	CONC (PPQ)	MDL (PPQ)
TOTAL TCDD	-	2.4
TOTAL PeCDD	2769.5	17.8
TOTAL HxCDD	60394.0	21.3
TOTAL HpCDD	360713.2	29.2
TOTAL OCDD	1144070.5	12.7
TOTAL TCDF	-	7.4
TOTAL PeCDF	8731.7	21.7
TOTAL HxCDF	98164.8	29.4
TOTAL HpCDF	168022.6	21.2
TOTAL OCDF	111305.2	17.2

Definitions:

CONC — The concentration, given in parts per trillion (ppt) or parts per quadrillion (ppq).
EDL — The estimated detection limit, given in parts per trillion (ppt), parts per quadrillion (ppq), or in picograms (pg).
BLANK — The concentration of the blank.
MS (PPQ) — The concentration of Matrix Spike recovered.
MS (%) — The percent recovery of the Matrix Spike.
QC Limits — Ionics International, Inc. uses these advisory limits.
ND — (Non-Detect) The concentration of the analyte is less than the detection limit.
NR — (Not Reportable) The spike concentration is less than the concentration in the unspiked matrix sample.

TOTAL DIOXINS/FURANS: 1954171.54 PPQ

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: 6634.68 PPQ

IONICS INTERNATIONAL, INC.
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Houston, TX 77042

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Fax: (713) 784-1152

Columbia Analytical Services, Inc.

PROJECT: 97-1144
FILE: J22545
LAB ID.: 12-44-1

PCDD/PCDF ANALYSIS REPORT
REFERENCE: K978446
SAMPLE: Drains #13,14

Project ID/P.O.:	K978446	Date collected:	N/A	Accession No.:	12-44-1
Sample origin:	CAS	Date received:	11/18/98	RTWin / Col Pfm:	J22537
Sample matrix:	WATER	Date extracted:	11/20/98	Beginning CCAL:	J22538
Sample size:	1 L	Date analyzed:	12/1/97	Ending CCAL:	J22547
		Date processed:	12/9/98	Initial CAL:	J082396

SPECIFIC ANALYTES	EMPC (PPQ)	CONC (PPQ)	MDL (PPQ)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD	-	-	2.4	-		U
1,2,3,7,8-PeCDD	-	1376.9	17.8	1.58	25:47	
1,2,3,4,7,8-HxCDD	-	4615.3	21.3	1.33	30:23	
1,2,3,6,7,8-HxCDD	-	5717.9	18.0	1.29	30:28	
1,2,3,7,8,9-HxCDD	-	7351.9	20.0	1.22	30:54	
1,2,3,4,6,7,8-HpCDD	-	205823.2	29.2	1.04	34:28	E
OCDD	-	1144070.5	12.7	0.89	38:42	E
2,3,7,8-TCDF	-	-	7.4	-		U
1,2,3,7,8-PeCDF	-	118.9	21.7	1.62	24:51	
2,3,4,7,8-PeCDF	-	132.3	13.5	1.56	25:29	
1,2,3,4,7,8-HxCDF	-	1184.5	25.1	1.43	29:13	
1,2,3,6,7,8-HxCDF	-	1298.2	15.5	1.12	29:13	
2,3,4,6,7,8-HxCDF	-	1159.5	13.4	1.37	30:17	
1,2,3,7,8,9-HxCDF	-	-	29.4	-		U
1,2,3,4,6,7,8-HpCDF	-	39733.9	13.3	1.06	33:13	E
1,2,3,4,7,8,9-HpCDF	-	3048.2	21.2	1.09	35:03	
OCDF	-	111305.2	17.2	0.91	38:53	

TOTAL ANALYTES	NO	CONC (PPQ)	MDL (PPQ)	RT WINDOW (min)	FLAGS
TOTAL TCDD	0	-	2.4	—	U
TOTAL PeCDD	4	2769.5	17.8	—	
TOTAL HxCDD	8	60394.0	21.3	—	E
TOTAL HpCDD	2	360713.2	29.2	—	E
TOTAL TCDF	0	-	7.4	—	U
TOTAL PeCDF	6	8731.7	21.7	—	
TOTAL HxCDF	10	98164.8	29.4	—	E
TOTAL HpCDF	3	168022.6	21.2	—	E

DATA REVIEWER: AMA 2/26/98

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Houston, TX 77042

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Columbia Analytical Services, Inc.

PROJECT: 97-1144
FILE: J22545
LAB ID.: 12-44-1

PCDD/PCDF QUALITY CONTROL REPORT
REFERENCE: K978446
SAMPLE: Drains #13,14

Project ID/P.O.:	K978446	Date collected:	N/A	Accession No.:	12-44-1
Sample origin:	CAS	Date received:	11/18/98	RTWin / Col Pfm:	J22537
Sample matrix:	WATER	Date extracted:	11/20/98	Beginning CCAL:	J22538
Sample size:	1 L	Date analyzed:	12/1/97	Ending CCAL:	J22547
		Date processed:	12/9/98	Initial CAL:	J082396

LABELED COMPOUNDS	CONC (PPQ)	% REC.	RATIO	RT	FLAGS
13C12-2,3,7,8-TCDD	819.2	41.0	0.69	21:33	-
13C12-1,2,3,7,8-PeCDD	1153.6	57.7	1.53	25:46	-
13C12-1,2,3,4,7,8-HxCDD	1782.1	89.1	1.09	30:21	-
13C12-1,2,3,6,7,8-HxCDD	1203.7	60.2	1.28	30:27	-
13C12-1,2,3,4,6,7,8-HpCDD	2309.6	115.5	1.06	34:27	-
13C12-OCDD	2116.8	52.9	0.77	38:41	-
13C12-2,3,7,8-TCDF	1228.5	61.4	0.79	20:56	-
13C12-1,2,3,7,8-PeCDF	1202.0	60.1	1.61	24:50	-
13C12-2,3,4,7,8-PeCDF	1117.7	55.9	1.64	25:27	-
13C12-1,2,3,4,7,8-HxCDF	1911.5	95.6	0.54	29:11	-
13C12-1,2,3,6,7,8-HxCDF	1558.2	77.9	0.52	29:13	-
13C12-2,3,4,6,7,8-HxCDF	1091.6	54.6	0.59	30:17	-
13C12-1,2,3,7,8,9-HxCDF	1723.3	86.2	0.52	31:10	-
13C12-1,2,3,4,6,7,8-HpCDF	2077.5	103.9	0.48	33:12	-
13C12-1,2,3,4,7,8,9-HpCDF	2431.1	121.6	0.49	35:02	-

INTERNAL STANDARDS	RATIO	RT	FLAGS
13C12-1,2,3,4-TCDD	0.79	21:12	-
13C12-1,2,3,7,8,9-HxCDD	1.17	30:53	-

CLEANUP STANDARD	CONC (PPQ)	% REC.	RT	FLAGS
37Cl4-TCDD	859.6	107.5	21:34	-

Flags:

U — The compound was analyzed for but not detected at or above the detection limit.

J — The analyte was detected at concentrations between the calibrated range and the detection limit.

E — The analyte was detected at concentrations greater than the calibrated range.

B — The analyte was found in the associated blank.

D — The analyte was identified in the analysis at a secondary dilution factor.

RO — Ions used for identification are out of ratio QC limits.

S — The analyte in question is, in the opinion of the reviewer, a PCDD/PCDF, even though the fragment ion due to the loss of COCl did not meet the signal- to-noise ratio criterion of 2.5:1

X — An interferent peak or peaks were observed within the retention window that may obscure otherwise detectable peaks.

Y — The recovery of the indicated standard is outside of QC advisory limits.

Definitions:

CONC — The concentration, given in parts per quadrillion (ppq) or parts per trillion (ppt).

EDL — Estimated detection limit based on a 2.5:1 signal-to-noise criteria, given in parts per quadrillion (ppq), parts per trillion (ppt), or in picograms (pg).

RATIO — The ratio of the low- to high-mass ion areas for the confirmation and quantitation ions.

RT — The retention time of an analyte.

NO — The total number of peaks identified as analytes within the retention time window.

% REC — The percent recovery of the indicated standard.

EMPC — Estimated Maximum Possible Concentration.

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Columbia Analytical Services, Inc.

PROJECT: 97-1144
FILE: J22545
LAB ID.: 12-44-1

PCDD/PCDF TOXICITY EQUIVALENCE REPORT
REFERENCE: K978446
SAMPLE: Drains #13,14

Project ID/P.O.:	K978446	Date collected:	N/A	Accession No.:	12-44-1
Sample origin:	CAS	Date received:	11/18/98	RTWin / Col Pfm:	J22537
Sample matrix:	WATER	Date extracted:	11/20/98	Beginning CCAL:	J22538
Sample size:	1 L	Date analyzed:	12/1/97	Ending CCAL:	J22547
		Date processed:	12/9/98	Initial CAL:	J082396

SPECIFIC ANALYTES	CONC (PPQ)		TEF		TEF CONC (PPQ)
2,3,7,8-TCDD	0.0	x	1	=	-
1,2,3,7,8-PeCDD	1376.9	x	0.5	=	688.45
1,2,3,4,7,8-HxCDD	4615.3	x	0.1	=	461.53
1,2,3,6,7,8-HxCDD	5717.9	x	0.1	=	571.79
1,2,3,7,8,9-HxCDD	7351.9	x	0.1	=	735.19
1,2,3,4,6,7,8-HpCDD	205823.2	x	0.01	=	2058.23
OCDD	1144070.5	x	0.001	=	1144.07
2,3,7,8-TCDF	0.0	x	0.1	=	-
1,2,3,7,8-PeCDF	118.9	x	0.05	=	5.94
2,3,4,7,8-PeCDF	132.3	x	0.5	=	66.13
1,2,3,4,7,8-HxCDF	1184.5	x	0.1	=	118.45
1,2,3,6,7,8-HxCDF	1298.2	x	0.1	=	129.82
2,3,4,6,7,8-HxCDF	1159.5	x	0.1	=	115.95
1,2,3,7,8,9-HxCDF	0.0	x	0.1	=	-
1,2,3,4,6,7,8-HpCDF	39733.9	x	0.01	=	397.34
1,2,3,4,7,8,9-HpCDF	3048.2	x	0.01	=	30.48
OCDF	111305.2	x	0.001	=	111.31

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: 6634.68 PPQ

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Columbia Analytical Services, Inc.

PROJECT: 97-1138
FILE: J22877
LAB ID.: DFBLK B3-147

PCDD/PCDF ANALYSIS REPORT
REFERENCE: K978446
SAMPLE: METHOD BLANK

Project ID/P.O.:	K978446	Date collected:	N/A	Accession No.:	DFBLK B3-147
Sample origin:	N/A	Date received:	N/A	RTWin / Col Pfm:	J22868
Sample matrix:	WATER	Date extracted:	11/20/97	Beginning CCAL:	J22869
Sample size:	1 L	Date analyzed:	1/19/98	Ending CCAL:	J22878
		Date processed:	1/23/98	Initial CAL:	J082396

SPECIFIC ANALYTES	EMPC (PPQ)	CONC (PPQ)	MDL (PPQ)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD	-	-	2.4	-		U
1,2,3,7,8-PeCDD	-	-	17.8	-		U
1,2,3,4,7,8-HxCDD	-	-	21.3	-		U
1,2,3,6,7,8-HxCDD	-	-	18.0	-		U
1,2,3,7,8,9-HxCDD	-	-	20.0	-		U
1,2,3,4,6,7,8-HpCDD	-	-	29.2	-		U
OCDD	-	-	12.7	-		U
2,3,7,8-TCDF	-	-	7.4	-		U
1,2,3,7,8-PeCDF	-	-	21.7	-		U
2,3,4,7,8-PeCDF	-	-	13.5	-		U
1,2,3,4,7,8-HxCDF	-	-	25.1	-		U
1,2,3,6,7,8-HxCDF	-	-	15.5	-		U
2,3,4,6,7,8-HxCDF	-	-	13.4	-		U
1,2,3,7,8,9-HxCDF	-	-	29.4	-		U
1,2,3,4,6,7,8-HpCDF	-	-	13.3	-		U
1,2,3,4,7,8,9-HpCDF	-	-	21.2	-		U
OCDF	-	-	17.2	-		U

TOTAL ANALYTES	NO	CONC (PPQ)	MDL (PPQ)	RT WINDOW (min)	FLAGS
TOTAL TCDD	0	-	2.4	—	U
TOTAL PeCDD	0	-	17.8	—	U
TOTAL HxCDD	0	-	21.3	—	U
TOTAL HpCDD	0	-	29.2	—	U
TOTAL TCDF	0	-	7.4	—	U
TOTAL PeCDF	0	-	21.7	—	U
TOTAL HxCDF	0	-	29.4	—	U
TOTAL HpCDF	0	-	21.2	—	U

DATA REVIEWER: AMA 2/26/98

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Columbia Analytical Services, Inc.

PROJECT: 97-1138
FILE: J22877
LAB ID.: DFBLK B3-147

PCDD/PCDF QUALITY CONTROL REPORT
REFERENCE: K978446
SAMPLE: METHOD BLANK

Project ID/P.O.:	K978446	Date collected:	N/A	Accession No.:	DFBLK B3-147
Sample origin:	N/A	Date received:	N/A	RTWin / Col Pfm:	J22868
Sample matrix:	WATER	Date extracted:	11/20/97	Beginning CCAL:	J22869
Sample size:	1 L	Date analyzed:	1/19/98	Ending CCAL:	J22878
		Date processed:	1/23/98	Initial CAL:	J082396

LABELED COMPOUNDS	CONC (PPQ)	% REC.	RATIO	RT	FLAGS
13C12-2,3,7,8-TCDD	1537.6	76.9	0.77	19:31	-
13C12-1,2,3,7,8-PeCDD	1628.0	81.4	1.73	23:53	-
13C12-1,2,3,4,7,8-HxCDD	2314.6	115.7	1.11	28:07	-
13C12-1,2,3,6,7,8-HxCDD	1644.7	82.2	1.30	28:14	-
13C12-1,2,3,4,6,7,8-HpCDD	1687.9	84.4	1.05	32:43	-
13C12-OCDD	3148.1	78.7	0.78	36:58	-
13C12-2,3,7,8-TCDF	1444.6	72.2	0.78	18:55	-
13C12-1,2,3,7,8-PeCDF	1795.2	89.8	1.67	22:42	-
13C12-2,3,4,7,8-PeCDF	1349.9	67.5	1.61	23:30	-
13C12-1,2,3,4,7,8-HxCDF	2450.0	122.5	0.50	27:07	-
13C12-1,2,3,6,7,8-HxCDF	1352.7	67.6	0.51	27:15	-
13C12-2,3,4,6,7,8-HxCDF	1656.8	82.8	0.50	27:57	-
13C12-1,2,3,7,8,9-HxCDF	1658.9	82.9	0.49	29:01	-
13C12-1,2,3,4,6,7,8-HpCDF	1405.6	70.3	0.42	31:19	-
13C12-1,2,3,4,7,8,9-HpCDF	1654.7	82.7	0.46	33:18	-

INTERNAL STANDARDS	RATIO	RT	FLAGS
13C12-1,2,3,4-TCDD	0.75	19:21	-
13C12-1,2,3,7,8,9-HxCDD	1.30	28:41	-

CLEANUP STANDARD	CONC (PPQ)	% REC.	RT	FLAGS
37Cl4-TCDD	694.2	86.8	19:31	-

Flags:

- **U** — The compound was analyzed for but not detected at or above the detection limit.
- **J** — The analyte was detected at concentrations between the calibrated range and the detection limit.
- **E** — The analyte was detected at concentrations greater than the calibrated range.
- **B** — The analyte was found in the associated blank.
- **D** — The analyte was identified in the analysis at a secondary dilution factor.
- **RO** — Ions used for identification are out of ratio QC limits.
- **S** — The analyte in question is, in the opinion of the reviewer, a PCDD/PCDF, evan though the fragment ion due to the loss of COCl did not meet the signal- to-noise ratio criterion of 2.5:1
- **X** — An interferent peak or peaks were observed within the retention window that may obscure otherwise detectable peaks.
- **Y** — The recovery of the indicated standard is outside of QC advisory limits.

Definitions:

- **CONC** — The concentration, given in parts per quadrillion (ppq) or parts per trillion (ppt).
- **EDL** — Estimated detection limit based on a 2.5:1 signal-to-noise criteria, given in parts per quadrillion (ppq), parts per trillion (ppt), or in picograms (pg).
- **RATIO** — The ratio of the low- to high-mass ion areas for the confirmation and quantitation ions.
- **RT** — The retention time of an analyte.
- **NO** — The total number of peaks identified as analytes within the retention time window.
- **% REC** — The percent recovery of the indicated standard.
- **EMPC** — Estimated Maximum Possible Concentration.

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Columbia Analytical Services, Inc.

PROJECT: 97-1138
FILE: J22858
LAB ID.: LS B3-147

PCDD/PCDF ANALYSIS REPORT
REFERENCE: K978446
SAMPLE: LAB SPIKE

Project ID/P.O.:	K978446	Date collected:	N/A	Accession No.:	LS B3-147
Sample origin:	N/A	Date received:	N/A	RTWin / Col Pfm:	J22854
Sample matrix:	WATER	Date extracted:	11/20/97	Beginning CCAL:	J22855
Sample size:	1 L	Date analyzed:	1/19/98	Ending CCAL:	J22859
		Date processed:	1/20/98	Initial CAL:	J082396

SPECIFIC ANALYTES	EMPC (PPQ)	CONC (PPQ)	MDL (PPQ)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD	-	168.7	2.4	0.77	20:59	
1,2,3,7,8-PeCDD	-	842.7	17.8	1.66	25:28	
1,2,3,4,7,8-HxCDD	-	866.2	21.3	1.33	29:46	
1,2,3,6,7,8-HxCDD	-	944.3	18.0	1.11	29:54	
1,2,3,7,8,9-HxCDD	-	911.3	20.0	1.41	30:20	
1,2,3,4,6,7,8-HpCDD	-	1081.4	29.2	0.92	34:27	
OCDD	-	1926.4	12.7	0.90	38:46	
2,3,7,8-TCDF	-	194.1	7.4	0.68	20:22	
1,2,3,7,8-PeCDF	-	956.9	21.7	1.72	24:15	
2,3,4,7,8-PeCDF	-	988.0	13.5	1.58	25:05	
1,2,3,4,7,8-HxCDF	-	935.8	25.1	1.23	28:46	
1,2,3,6,7,8-HxCDF	-	904.0	15.5	1.24	28:54	
2,3,4,6,7,8-HxCDF	-	929.0	13.4	1.22	29:37	
1,2,3,7,8,9-HxCDF	-	940.0	29.4	1.25	30:43	
1,2,3,4,6,7,8-HpCDF	-	965.7	13.3	0.98	33:02	
1,2,3,4,7,8,9-HpCDF	-	1070.4	21.2	1.01	35:04	
OCDF	-	1771.1	17.2	0.89	38:56	

TOTAL ANALYTES	NO	CONC (PPQ)	MDL (PPQ)	RT WINDOW (min)	FLAGS
TOTAL TCDD	1	168.7	2.4	—	
TOTAL PeCDD	1	842.7	17.8	—	
TOTAL HxCDD	3	2721.9	21.3	—	
TOTAL HpCDD	1	1081.4	29.2	—	
TOTAL TCDF	1	194.1	7.4	—	
TOTAL PeCDF	2	1945.0	21.7	—	
TOTAL HxCDF	4	3708.8	29.4	—	
TOTAL HpCDF	2	2036.0	21.2	—	

DATA REVIEWER: AMA 2/26/98

IONICS INTERNATIONAL, INC.
(800) 4-DIOXIN

10655 Richmond Ave., Ste. 150
Houston, TX 77042

Phone: (713) 972-1037
Fax: (713) 784-1152

Columbia Analytical Services, Inc.

PROJECT: 97-1138
FILE: J22858
LAB ID.: LS B3-147

PCDD/PCDF QUALITY CONTROL REPORT
REFERENCE: K978446
SAMPLE: LAB SPIKE

Project ID/P.O.:	K978446	Date collected:	N/A	Accession No.:	LS B3-147
Sample origin:	N/A	Date received:	N/A	RTWin / Col Pfm:	J22854
Sample matrix:	WATER	Date extracted:	11/20/97	Beginning CCAL:	J22855
Sample size:	1 L	Date analyzed:	1/19/98	Ending CCAL:	J22859
		Date processed:	1/20/98	Initial CAL:	J082396

LABELED COMPOUNDS	CONC (PPQ)	% REC.	RATIO	RT	FLAGS
13C12-2,3,7,8-TCDD	2208.4	110.4	0.78	20:56	-
13C12-1,2,3,7,8-PeCDD	1665.1	83.3	1.67	25:27	-
13C12-1,2,3,4,7,8-HxCDD	2557.4	127.9	1.31	29:46	-
13C12-1,2,3,6,7,8-HxCDD	2151.6	107.6	1.36	29:52	-
13C12-1,2,3,4,6,7,8-HpCDD	1206.7	60.3	0.97	34:26	-
13C12-OCDD	1672.8	41.8	0.87	38:44	-
13C12-2,3,7,8-TCDF	2162.4	108.1	0.79	20:21	-
13C12-1,2,3,7,8-PeCDF	1993.9	99.7	1.75	24:15	-
13C12-2,3,4,7,8-PeCDF	1677.0	83.9	1.71	25:04	-
13C12-1,2,3,4,7,8-HxCDF	2422.3	121.1	0.49	28:44	-
13C12-1,2,3,6,7,8-HxCDF	2009.8	100.5	0.47	28:53	-
13C12-2,3,4,6,7,8-HxCDF	1908.6	95.4	0.49	29:36	-
13C12-1,2,3,7,8,9-HxCDF	1578.3	78.9	0.52	30:42	-
13C12-1,2,3,4,6,7,8-HpCDF	1307.0	65.4	0.45	33:01	-
13C12-1,2,3,4,7,8,9-HpCDF	1025.3	51.3	0.47	35:03	-

INTERNAL STANDARDS	RATIO	RT	FLAGS
13C12-1,2,3,4-TCDD	0.79	20:46	-
13C12-1,2,3,7,8,9-HxCDD	1.35	30:20	-

CLEANUP STANDARD	CONC (PPQ)	% REC.	RT	FLAGS
37Cl4-TCDD	896.4	112.1	20:57	-

Flags:

- **U** — The compound was analyzed for but not detected at or above the detection limit.
- **J** — The analyte was detected at concentrations between the calibrated range and the detection limit.
- **E** — The analyte was detected at concentrations greater than the calibrated range.
- **B** — The analyte was found in the associated blank.
- **D** — The analyte was identified in the analysis at a secondary dilution factor.
- **RO** — Ions used for identification are out of ratio QC limits.
- **S** — The analyte in question is, in the opinion of the reviewer, a PCDD/PCDF, even though the fragment ion due to the loss of COCl did not meet the signal- to-noise ratio criterion of 2.5:1
- **X** — An interferent peak or peaks were observed within the retention window that may obscure otherwise detectable peaks.
- **Y** — The recovery of the indicated standard is outside of QC advisory limits.

Definitions:

- **CONC** — The concentration, given in parts per quadrillion (ppq) or parts per trillion (ppt).
- **EDL** — Estimated detection limit based on a 2.5:1 signal-to-noise criteria, given in parts per quadrillion (ppq), parts per trillion (ppt), or in picograms (pg).
- **RATIO** — The ratio of the low- to high-mass ion areas for the confirmation and quantitation ions.
- **RT** — The retention time of an analyte.
- **NO** — The total number of peaks identified as analytes within the retention time window.
- **% REC** — The percent recovery of the indicated standard.
- **EMPC** — Estimated Maximum Possible Concentration.

IONICS INTERNATIONAL, INC.
(800) 4-DIOXIN

10655 Richmond Ave., Ste. 150
Houston, TX 77042

Phone: (713) 972-1037
Fax: (713) 784-0052

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

Columbia Analytical Services inc. 1317 South 13th Ave. • Kelso, WA 98626 • (206) 577-7222 • (800) 695-7222 • FAX (206) 636-1068

DATE 11-12-97 PAGE 1 OF 1

PROJECT NAME J.H. BAXTER + CO. # DRAIN WATER

PROJECT MANAGER TOM ORTHMEYER

COMPANY/ADDRESS J.H. BAXTER + CO.

6520 188TH ST. N.E.

ARLINGTON, WA. 98223 PHONE 360 435-2146

SAMPLERS SIGNATURE Jim Clawson

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX	NUMBER OF CONTAINERS	Base/Neu/Acid Organics GC/MS 625/8270	Volatile Organics GC/MS 624/8240	Halogenated or Aromatic Volatiles 601/8010 ☐ 602/8020 ☐	Pesticides/PCBs 608/8080	Total Petroleum Hydrocarbons EPA/418.1 ☐ OR/418.1 ☐ WA/418.1 ☐	TPH/Gas/BTEX 5030/8015/8020 Gas ☐ BTEX ☐	TPH/8015 Modified Diesel ☐ Hydrocarbon Scan ☐	TPH/HCID ☐ OR/HCID ☐ WA/HCID ☐	TCLP Metals ☐ VOA ☐ Semi Pest/ VOA ☐ Herb ☐	Metals (total or dissolved) List Below	Cyanide	pH, Cond, Cl, SO_4, PO_4, F, Br NO_2, NO_3, (circle)	NH_3-N, COD, Total-P, TKN, TOC (circle)	Total Organic Halides (TOX) 9020 ☐ (AOX) 1650A ☐	DIOXINS / FURANS ☐	REMARKS
DRAINS #13 + #14	9/18/97	9:30A		WATER	1															X	

00010

RELINQUISHED BY:

Jim Clawson
Signature
JIM CLAWSON
Printed Name
J.H. BAXTER & CO.
Firm
11-12-97 2:30pm
Date/Time

RECEIVED BY:

Amy A. Gowan
Signature
Amy A. Gowan
Printed Name
CAS
Firm
11-14-97 10:30
Date/Time

TURNAROUND REQUIREMENTS

___ 24 hr ___ 48 hr. ___ 5 day

X Standard (10-15 working days)

___ Provide Verbal Preliminary Results

___ Provide FAX preliminary Results

Requested Report Date ___

REPORT REQUIREMENTS

X I. Routine Report

___ II. Report (includes DUP.MS. MSD, as required, may be charged as samples)

___ III. Data Validation Report (includes All Raw Data)

___ IV. CLP Deliverable Report

INVOICE INFORMATION:

P.O.# ___

Bill To J.H. BAXTER & CO.
P.O. BOX 5902
SAN MATEO CA.
94402
ATTN: CAROLINE MARTIN

SAMPLE RECEIPT:

Shipping VIA: ___

Shipping #: ___

Condition: ___

___

Lab No: 8446

RELINQUISHED BY:

Signature
Printed Name
Firm
Date/Time

RECEIVED BY:

Signature
Printed Name
Firm
Date/Time

SPECIAL INSTRUCTIONS/COMMENTS:

1). PLEASE USE EPA METHOD 1613: TETRA THROUGH OCTACHLORONATED DIOXINS AND FURANS BY ISOTOPE DILUTION.

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator

400-05

Appendix D: Original data from January 18, 1998 sampling

Columbia Analytical Services, Inc.

March 18, 1998

Service Request No: K9800155

Caroline Martin
J. H. Baxter
6520 188th Street NE
Arlington, WA 98223

Re: Drain Water Project

Dear Caroline:

Enclosed are the results of the sample(s) submitted to our laboratory on January 9, 1998. For your reference, these analyses have been assigned our service request number K9800155.

Dioxin analyses were performed at Ionics International and preliminary results may be found in Appendix A. A final report will follow under separate cover.

All analyses were performed according to our laboratory's quality assurance program. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the samples analyzed.

Please call if you have any questions. My extension is 260.

Respectfully submitted,

Columbia Analytical Services, Inc.

Teena Jones

Teena Jones
Project Chemist

TJ/sm

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
J	Estimated concentration. The value is less than the method reporting limit, but greater than the method detection limit.
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NAN	Not Analyzed
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected at or above the MRL
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

.ent:	J.H. Baxter & Company	**Service Request:**	K9800155
Project:	Drain Water	**Date Collected:**	1/8/98
Sample Matrix:	Water	**Date Received:**	1/9/98
		Date Extracted:	NA

Inorganic Parameters
Units: mg/L (ppm)

Analyte:	pH (units)	Solids, Total Suspended (TSS)
EPA Method:	150.1	160.2
Method Reporting Limit:	-	5
Date Analyzed:	1/9/98	1/15/98

Sample Name	Lab Code		
Drains #13 + 14	K9800155-001	7.69	676
Drain #23	K9800155-002	7.20	98
Drain #24	K9800155-003	7.30	282
Drain #25	K9800155-004	7.43	62
ain #30	K9800155-005	7.63	412
Drains #10-22	K9800155-006	7.61	6700
Method Blank	K9800155-MB	-	ND

Approved By: Michelle Ritola Date: 1/20/98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: J.H. Baxter & Company
Project: Drain Water
Sample Matrix: Water

Service Request: K9800155
Date Collected: 1/8/98
Date Received: 1/9/98
Date Extracted: 1/23/98
Date Analyzed: 1/23/98

Oil and Grease
EPA Method 413.1
Units: mg/L (ppm)

Sample Name	Lab Code	MRL	Result
Drains #13 + 14	K9800155-001	5	ND
Drain #23	K9800155-002	5	5
Drain #24	K9800155-003	5	5
Drain #25	K9800155-004	5	5
Drain #30	K9800155-005	5	5
Drains #10-22	K9800155-006	5	13
Method Blank	K980123-MB	5	ND

Approved By: _____ Date: 1/26/98

1AMRL/102594
00155PHC.BW1 - 413w 1/26/98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

:nt:	J.H. Baxter & Company	**Service Request:**	K9800155
Project:	Drain Water	**Date Collected:**	1/8/98
Sample Matrix:	Water	**Date Received:**	1/9/98
		Date Extracted:	1/13/98
		Date Analyzed:	1/24/98

Chlorinated Phenols
EPA Methods 8151 Modified
Units: µg/L (ppb)

Analyte:		2,4,6-Trichlorophenol	Total Tetrachlorophenols	Pentachlorophenol
Method Reporting Limit:		1.0	1.0	1.0
Sample Name	**Lab Code**			
Drains #13 + 14	K9800155-001	ND	4	130
Drain #23	K9800155-002	ND	8.7	250
Drain #24	K9800155-003	<5(D)	10	550
Drain #25	K9800155-004	<5(D)	7	180
Drain #30	K9800155-005	ND	5.1	140
Drains #10-22	K9800155-006	ND	1.9	27.7
'hod Blank	K980113-WB	ND	ND	ND

D The MRL is elevated because of matrix interferences and because the sample required diluting.

Approved By: MMauthe Date: 2/2/98

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

lient: J.H. Baxter & Company
Project: Drain Water
Sample Matrix: Water

Service Request: K9800155
Date Collected: 1/8/98
Date Received: 1/9/98
Date Extracted: 1/13/98
Date Analyzed: 1/24/98

Surrogate Recovery Summary
Chlorinated Phenols
EPA Methods 8151 Modified

Sample Name	Lab Code	Percent Recovery 4-Bromo-2,6-dichlorophenol
Drains #13 + 14	K9800155-001	76
Drain #23	K9800155-002	79
Drain #24	K9800155-003	70
Drain #25	K9800155-004	74
Drain #30	K9800155-005	89
Drains #10-22	K9800155-006	79
Method Blank	K980113-WB	59

CAS Acceptance Limits: 42-122

Approved By: MMarthe Date: 2/2/98

SUR1/111594
00155SVG.AY1 - sur 2/2/98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

.nt:	J. H. Baxter & Company	**Service Request:**	K9800155
Project:	Drain Water	**Date Collected:**	1/8/98
Sample Matrix:	Water	**Date Received:**	1/9/98

Polynuclear Aromatic Hydrocarbons

Sample Name:	Drains #13 + 14	Units:	ug/L (ppb)
Lab Code:	K9800155-001	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Naphthalene	EPA 3520B	610	1	1	1/14/98	1/23/98	ND	
Acenaphthylene	EPA 3520B	610	1	1	1/14/98	1/23/98	ND	
Acenaphthene	EPA 3520B	610	1	1	1/14/98	1/23/98	ND	
Fluorene	EPA 3520B	610	0.2	1	1/14/98	1/23/98	ND	
Phenanthrene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	2.0	
Anthracene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	ND	
Fluoranthene	EPA 3520B	610	0.2	1	1/14/98	1/23/98	5.1	
Pyrene	EPA 3520B	610	0.2	10	1/14/98	1/23/98	6.8	
Benz(a)anthracene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	0.9	
Chrysene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	1.2	
Benzo(b)fluoranthene	EPA 3520B	610	0.2	1	1/14/98	1/23/98	1.4	
Benzo(k)fluoranthene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	0.6	
Benzo(a)pyrene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	1.3	
Dibenz(a,h)anthracene	EPA 3520B	610	0.2	1	1/14/98	1/23/98	ND	B
Benzo(g,h,i)perylene	EPA 3520B	610	0.2	1	1/14/98	1/23/98	0.8	
Indeno(1,2,3-cd)pyrene	EPA 3520B	610	0.2	1	1/14/98	1/23/98	ND	B

B The MRL is elevated because of matrix interferences.

Approved By: _____ Date: 1/30/98

1S22/052595

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

.nt:	J. H. Baxter & Company	**Service Request:**	K9800155
Project:	Drain Water	**Date Collected:**	1/8/98
Sample Matrix:	Water	**Date Received:**	1/9/98

Polynuclear Aromatic Hydrocarbons

Sample Name:	Drain #23	Units:	ug/L (ppb)
Lab Code:	K9800155-002	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Naphthalene	EPA 3520B	610	1	1	1/14/98	1/23/98	ND	
Acenaphthylene	EPA 3520B	610	1	1	1/14/98	1/23/98	ND	
Acenaphthene	EPA 3520B	610	1	1	1/14/98	1/23/98	ND	
Fluorene	EPA 3520B	610	0.2	1	1/14/98	1/23/98	ND	
Phenanthrene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	ND	
Anthracene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	ND	
ranthene	EPA 3520B	610	0.2	1	1/14/98	1/23/98	ND	
ene	EPA 3520B	610	0.2	1	1/14/98	1/23/98	ND	
Benz(a)anthracene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	ND	
Chrysene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	ND	
Benzo(b)fluoranthene	EPA 3520B	610	0.2	1	1/14/98	1/23/98	ND	
Benzo(k)fluoranthene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	ND	
Benzo(a)pyrene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	ND	
Dibenz(a,h)anthracene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	ND	
Benzo(g,h,i)perylene	EPA 3520B	610	2	1	1/14/98	1/23/98	ND	B
Indeno(1,2,3-cd)pyrene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	ND	

B The MRL is elevated because of matrix interferences.

Approved By: _____ Date: 1/30/98

1S22/052595

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	J. H. Baxter & Company	**Service Request:**	K9800155
Project:	Drain Water	**Date Collected:**	1/8/98
Sample Matrix:	Water	**Date Received:**	1/9/98

Polynuclear Aromatic Hydrocarbons

Sample Name:	Drain #24	Units:	ug/L (ppb)
Lab Code:	K9800155-003	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Naphthalene	EPA 3520B	610	1	1	1/14/98	1/23/98	ND	
Acenaphthylene	EPA 3520B	610	1	1	1/14/98	1/23/98	ND	
Acenaphthene	EPA 3520B	610	1	1	1/14/98	1/23/98	ND	
Fluorene	EPA 3520B	610	0.2	1	1/14/98	1/23/98	ND	
Phenanthrene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	ND	
'hracene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	ND	
.oranthene	EPA 3520B	610	0.4	1	1/14/98	1/23/98	ND	B
Pyrene	EPA 3520B	610	0.5	1	1/14/98	1/23/98	ND	B
Benz(a)anthracene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	ND	
Chrysene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	0.3	
Benzo(b)fluoranthene	EPA 3520B	610	0.2	1	1/14/98	1/23/98	0.3	
Benzo(k)fluoranthene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	0.1	
Benzo(a)pyrene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	0.2	
Dibenz(a,h)anthracene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	ND	
Benzo(g,h,i)perylene	EPA 3520B	610	2	1	1/14/98	1/23/98	ND	B
Indeno(1,2,3-cd)pyrene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	0.2	

B The MRL is elevated because of matrix interferences.

Approved By: _____ Date: 2/23/98

1522/052595

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

..ent:	J. H. Baxter & Company	**Service Request:**	K9800155
Project:	Drain Water	**Date Collected:**	1/8/98
Sample Matrix:	Water	**Date Received:**	1/9/98

Polynuclear Aromatic Hydrocarbons

Sample Name:	Drain #25	Units:	ug/L (ppb)
Lab Code:	K9800155-004	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Naphthalene	EPA 3520B	610	1	1	1/14/98	1/23/98	ND	
Acenaphthylene	EPA 3520B	610	7	1	1/14/98	1/23/98	ND	B
Acenaphthene	EPA 3520B	610	1	1	1/14/98	1/23/98	ND	
Fluorene	EPA 3520B	610	0.2	1	1/14/98	1/23/98	ND	
Phenanthrene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	ND	
`nthracene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	ND	
ɔranthene	EPA 3520B	610	0.2	1	1/14/98	1/23/98	ND	
Pyrene	EPA 3520B	610	0.2	1	1/14/98	1/23/98	ND	
Benz(a)anthracene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	ND	
Chrysene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	ND	
Benzo(b)fluoranthene	EPA 3520B	610	0.2	1	1/14/98	1/23/98	ND	
Benzo(k)fluoranthene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	ND	
Benzo(a)pyrene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	ND	
Dibenz(a,h)anthracene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	ND	
Benzo(g,h,i)perylene	EPA 3520B	610	2	1	1/14/98	1/23/98	ND	B
Indeno(1,2,3-cd)pyrene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	ND	

B The MRL is elevated because of matrix interferences.

Approved By: _____ Date: 1/30/98

1S22/052595

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	J. H. Baxter & Company	**Service Request:**	K9800155
Project:	Drain Water	**Date Collected:**	1/8/98
Sample Matrix:	Water	**Date Received:**	1/9/98

Polynuclear Aromatic Hydrocarbons

Sample Name:	Drain #30	Units:	ug/L (ppb)
Lab Code:	K9800155-005	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Naphthalene	EPA 3520B	610	1	1	1/14/98	1/23/98	ND	
Acenaphthylene	EPA 3520B	610	1	1	1/14/98	1/23/98	ND	
Acenaphthene	EPA 3520B	610	1	1	1/14/98	1/23/98	ND	
Fluorene	EPA 3520B	610	0.2	1	1/14/98	1/23/98	ND	
Phenanthrene	EPA 3520B	610	3	1	1/14/98	1/23/98	ND	B
Anthracene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	ND	
Fluoranthene	EPA 3520B	610	0.2	1	1/14/98	1/23/98	3.3	
Pyrene	EPA 3520B	610	5	1	1/14/98	1/23/98	ND	B
Benz(a)anthracene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	1.1	
Chrysene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	1.6	
Benzo(b)fluoranthene	EPA 3520B	610	0.2	1	1/14/98	1/23/98	1.9	
Benzo(k)fluoranthene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	0.8	
Benzo(a)pyrene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	1.6	
Dibenz(a,h)anthracene	EPA 3520B	610	0.3	1	1/14/98	1/23/98	ND	B
Benzo(g,h,i)perylene	EPA 3520B	610	2	1	1/14/98	1/23/98	ND	B
Indeno(1,2,3-cd)pyrene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	1.2	

B The MRL is elevated because of matrix interferences.

Approved By: _____ Date: 1/30/98

1S22/052595

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	J. H. Baxter & Company	**Service Request:**	K9800155
Project:	Drain Water	**Date Collected:**	1/8/98
Sample Matrix:	Water	**Date Received:**	1/9/98

Polynuclear Aromatic Hydrocarbons

Sample Name:	Drains #10-22	Units:	ug/L (ppb)
Lab Code:	K9800155-006	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Naphthalene	EPA 3520B	610	1	1	1/14/98	1/23/98	ND	
Acenaphthylene	EPA 3520B	610	1	1	1/14/98	1/23/98	ND	
Acenaphthene	EPA 3520B	610	1	1	1/14/98	1/23/98	ND	
Fluorene	EPA 3520B	610	0.2	1	1/14/98	1/23/98	ND	
Phenanthrene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	0.2	
‘hracene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	ND	
ranthene	EPA 3520B	610	0.3	1	1/14/98	1/23/98	ND	B
Pyrene	EPA 3520B	610	1	1	1/14/98	1/23/98	ND	B
Benz(a)anthracene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	ND	
Chrysene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	0.1	
Benzo(b)fluoranthene	EPA 3520B	610	0.2	1	1/14/98	1/23/98	ND	
Benzo(k)fluoranthene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	ND	
Benzo(a)pyrene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	ND	
Dibenz(a,h)anthracene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	ND	
Benzo(g,h,i)perylene	EPA 3520B	610	2	1	1/14/98	1/23/98	ND	B
Indeno(1,2,3-cd)pyrene	EPA 3520B	610	0.1	1	1/14/98	1/23/98	ND	

B The MRL is elevated because of matrix interferences.

Approved By: _____ Date: 1/30/98

1S22/052595

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	J. H. Baxter & Company	**Service Request:**	K9800155
Project:	Drain Water	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Polynuclear Aromatic Hydrocarbons

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	K980114-WB	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Naphthalene	EPA 3520B	610	1	1	1/14/98	1/22/98	ND	
Acenaphthylene	EPA 3520B	610	1	1	1/14/98	1/22/98	ND	
Acenaphthene	EPA 3520B	610	1	1	1/14/98	1/22/98	ND	
Fluorene	EPA 3520B	610	0.2	1	1/14/98	1/22/98	ND	
Phenanthrene	EPA 3520B	610	0.1	1	1/14/98	1/22/98	ND	
·¬thracene	EPA 3520B	610	0.1	1	1/14/98	1/22/98	ND	
ranthene	EPA 3520B	610	0.2	1	1/14/98	1/22/98	ND	
Pyrene	EPA 3520B	610	0.2	1	1/14/98	1/22/98	ND	
Benz(a)anthracene	EPA 3520B	610	0.1	1	1/14/98	1/22/98	ND	
Chrysene	EPA 3520B	610	0.1	1	1/14/98	1/22/98	ND	
Benzo(b)fluoranthene	EPA 3520B	610	0.2	1	1/14/98	1/22/98	ND	
Benzo(k)fluoranthene	EPA 3520B	610	0.1	1	1/14/98	1/22/98	ND	
Benzo(a)pyrene	EPA 3520B	610	0.1	1	1/14/98	1/22/98	ND	
Dibenz(a,h)anthracene	EPA 3520B	610	0.1	1	1/14/98	1/22/98	ND	
Benzo(g,h,i)perylene	EPA 3520B	610	0.2	1	1/14/98	1/22/98	ND	
Indeno(1,2,3-cd)pyrene	EPA 3520B	610	0.1	1	1/14/98	1/22/98	ND	

Approved By: _____ Date: 1/30/98

1522/052595

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	J. H. Baxter & Company	**Service Request:**	K9800155
Project:	Drain Water	**Date Collected:**	1/8/98
Sample Matrix:	Water	**Date Received:**	1/9/98
		Date Extracted:	1/14/98
		Date Analyzed:	1/22-1/23/98

Surrogate Recovery Summary
Polynuclear Aromatic Hydrocarbons

Prep Method:	EPA 3520B	Units:	PERCENT
AnalysisMethod:	610	Basis:	NA

Sample Name	Lab Code	Test Notes	Percent Recovery p-Terphenyl
Drains #13 + 14	K9800155-001		94
Drain #23	K9800155-002		92
Drain #24	K9800155-003		93
Drain #25	K9800155-004		85
Drain #30	K9800155-005		106
Drains #10-22	K9800155-006		76
Method Blank	K980114-WB		102

CAS Acceptance Limits: 35-110

Approved By: _____ Date: 1/30/98

TREATING SOLUTION

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

.ent:	J.H. Baxter & Company	**Service Request:**	K9800155
Project:	Drain Water	**Date Collected:**	1/8/98
Sample Matrix:	Oil	**Date Received:**	1/9/98
		Date Extracted:	1/15/98
		Date Analyzed:	1/24/98

Chlorinated Phenols
EPA Methods 8151 Modified
Units: µg/Kg (ppb)

	Analyte:	2,4,6-Trichlorophenol	Total Tetrachlorophenols	Pentachlorophenol
	Method Reporting Limit:	100	100	100
Sample Name	**Lab Code**			
Treating Solu.	K9800155-007	<600,000(D)	<600,000(D)	18000000
Method Blank	K980115-OB	ND	ND	ND

D The MRL is elevated because of matrix interferences and because the sample required diluting.

Approved By: MMarthe Date: 2/2/98

3A/102094
00155SVG.AY2 - p-t-tri 2/2/98

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: J.H. Baxter & Company
Project: Drain Water
Sample Matrix: Oil

Service Request: K9800155
Date Collected: 1/8/98
Date Received: 1/9/98
Date Extracted: 1/15/98
Date Analyzed: 1/24/98

Surrogate Recovery Summary
Chlorinated Phenols
EPA Methods 8151 Modified

Sample Name	Lab Code	Percent Recovery 4-Bromo-2,6-dichlorophenol
Treating Solu.	K9800155-007	NA
Method Blank	K980115-OB	41

CAS Acceptance Limits: NA

NA Not Applicable due to dilution.

Approved By: _____ Date: 2/24/98

SUR1/111594
00155SVG.AY2 - sur 2/24/98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	J. H. Baxter & Company	**Service Request:**	K9800155
Project:	Drain Water	**Date Collected:**	1/8/98
Sample Matrix:	Oil	**Date Received:**	1/9/98

Polynuclear Aromatic Hydrocarbons

Sample Name:	Treating Solu.	Units:	ug/L (ppb)
Lab Code:	K9800155-007	Basis:	NA
Test Notes:	D		

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Naphthalene	EPA 3580A	610	400	100	1/15/98	1/23/98	ND	
Acenaphthylene	EPA 3580A	610	50	100	1/15/98	1/23/98	ND	
Acenaphthene	EPA 3580A	610	50	100	1/15/98	1/23/98	ND	
Fluorene	EPA 3580A	610	100	100	1/15/98	1/23/98	1390	
Phenanthrene	EPA 3580A	610	1200	1000	1/15/98	1/23/98	ND	
[illegible]thracene	EPA 3580A	610	5	100	1/15/98	1/23/98	ND	
[illegible]anthene	EPA 3580A	610	10	100	1/15/98	1/23/98	ND	
Pyrene	EPA 3580A	610	10	100	1/15/98	1/23/98	ND	
Benz(a)anthracene	EPA 3580A	610	5	100	1/15/98	1/23/98	ND	
Chrysene	EPA 3580A	610	5	100	1/15/98	1/23/98	ND	
Benzo(b)fluoranthene	EPA 3580A	610	10	100	1/15/98	1/23/98	ND	
Benzo(k)fluoranthene	EPA 3580A	610	5	100	1/15/98	1/23/98	ND	
Benzo(a)pyrene	EPA 3580A	610	5	100	1/15/98	1/23/98	ND	
Dibenz(a,h)anthracene	EPA 3580A	610	5	100	1/15/98	1/23/98	ND	
Benzo(g,h,i)perylene	EPA 3580A	610	10	100	1/15/98	1/23/98	ND	
Indeno(1,2,3-cd)pyrene	EPA 3580A	610	5	100	1/15/98	1/23/98	ND	

D The MRL is elevated because of matrix interferences and because the sample required diluting.

Approved By: _____ Date: 1/29/98

IS22/052595

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	J. H. Baxter & Company	**Service Request:**	K9800155
Project:	Drain Water	**Date Collected:**	NA
Sample Matrix:	Oil	**Date Received:**	NA

Polynuclear Aromatic Hydrocarbons

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	K980115-OB	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Naphthalene	EPA 3580A	610	5	1	1/15/98	1/23/98	ND	
Acenaphthylene	EPA 3580A	610	5	1	1/15/98	1/23/98	ND	
Acenaphthene	EPA 3580A	610	5	1	1/15/98	1/23/98	ND	
Fluorene	EPA 3580A	610	1	1	1/15/98	1/23/98	ND	
Phenanthrene	EPA 3580A	610	0.5	1	1/15/98	1/23/98	ND	
[illegible]racene	EPA 3580A	610	0.5	1	1/15/98	1/23/98	ND	
[illegible]nthene	EPA 3580A	610	1	1	1/15/98	1/23/98	ND	
Pyrene	EPA 3580A	610	1	1	1/15/98	1/23/98	ND	
Benz(a)anthracene	EPA 3580A	610	0.5	1	1/15/98	1/23/98	ND	
Chrysene	EPA 3580A	610	0.5	1	1/15/98	1/23/98	ND	
Benzo(b)fluoranthene	EPA 3580A	610	1	1	1/15/98	1/23/98	ND	
Benzo(k)fluoranthene	EPA 3580A	610	0.5	1	1/15/98	1/23/98	ND	
Benzo(a)pyrene	EPA 3580A	610	0.5	1	1/15/98	1/23/98	ND	
Dibenz(a,h)anthracene	EPA 3580A	610	0.5	1	1/15/98	1/23/98	ND	
Benzo(g,h,i)perylene	EPA 3580A	610	1	1	1/15/98	1/23/98	ND	
Indeno(1,2,3-cd)pyrene	EPA 3580A	610	0.5	1	1/15/98	1/23/98	ND	

Approved By: TQ Date: 1/28/98

1S22/052595

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	J. H. Baxter & Company	**Service Request:**	K9800155
Project:	Drain Water	**Date Collected:**	1/8/98
Sample Matrix:	Oil	**Date Received:**	1/9/98
		Date Extracted:	1/15/98
		Date Analyzed:	1/23/98

Surrogate Recovery Summary
Polynuclear Aromatic Hydrocarbons

Prep Method:	EPA 3580A	**Units:**	PERCENT
AnalysisMethod:	610	**Basis:**	NA

Sample Name	Lab Code	Test Notes	Percent Recovery p-Terphenyl
Treating Solu.	K9800155-007		NA
Method Blank	K980115-OB		97

CAS Acceptance Limits: 35-110

NA Not Applicable due to dilution.

Approved By: _____ Date: 2/24/98

APPENDIX A
OUTSIDE LABORATORY RESULTS

Columbia Analytical Services, Inc.

PROJECT: 98-1194
FILE: J23143
LAB ID.: 12-94-1

PCDD/PCDF ANALYSIS REPORT
REFERENCE: K98-0155
SAMPLE: Drains #13 &14

Project ID/P.O.:	K98-0155	Date collected:	1/8/98	Accession No.:	12-94-1
Sample origin:	CAS	Date received:	1/15/98	RTWin / Col Prm:	J23138
Sample matrix:	WATER	Date extracted:	1/16/98	Beginning CCAL:	J23139
Sample size:	1 L	Date analyzed:	3/5/98	Ending CCAL:	J23150
		Date processed:	3/7/98	Initial CAL:	1613

SPECIFIC ANALYTES	EMPC (PPQ)	CONC (PPQ)	MDL (PPQ)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD		-	2.4	-		U
1,2,3,7,8-PeCDD		1011.3	17.8	1.59	28:58	
1,2,3,4,7,8-HxCDD		3822.1	21.3	1.29	33:35	
1,2,3,6,7,8-HxCDD		11648.5	18.0	1.35	33:42	
1,2,3,7,8,9-HxCDD		11663.8	20.0	1.30	34:07	
1,2,3,4,6,7,8-HpCDD		429315.8	29.2	1.05	38:06	E
OCDD		4016164.2	12.7	0.89	42:48	E
2,3,7,8-TCDF		-	7.4	-		U
1,2,3,7,8-PeCDF		-	21.7	-		U
2,3,4,7,8-PeCDF		-	13.5	-		U
1,2,3,4,7,8-HxCDF		1011.5	25.1	1.33	32:30	
1,2,3,6,7,8-HxCDF		2094.8	15.5	1.39	32:38	
2,3,4,6,7,8-HxCDF		1863.1	13.4	1.20	33:23	
1,2,3,7,8,9-HxCDF		-	29.4	-		U
1,2,3,4,6,7,8-HpCDF		95637.7	13.3	1.05	36:43	E
1,2,3,4,7,8,9-HpCDF		4181.8	21.2	1.08	38:45	
OCDF		544877.8	17.2	0.89	43:03	E

TOTAL ANALYTES	NO	CONC (PPQ)	MDL (PPQ)	RT WINDOW (min)	FLAGS
TOTAL TCDD	0	-	2.4	—	U
TOTAL PeCDD	3	1794.0	17.8	—	
TOTAL HxCDD	8	78863.3	21.3	—	E
TOTAL HpCDD	2	746103.5	29.2	—	E
TOTAL TCDF	3	329.7	7.4	—	
TOTAL PeCDF	4	12177.4	21.7	—	
TOTAL HxCDF	5	99373.5	29.4	—	E
TOTAL HpCDF	4	419940.5	21.2	—	E

DATA REVIEWER: AMA 3/8/98

IONICS INTERNATIONAL, INC.
(800) 4-DIOXIN

10655 Richmond Ave., Ste. 150
Houston, TX 77042

Phone: (713) 972-1037
Fax: (713) 784-1152

Columbia Analytical Services, Inc.

PROJECT: 98-1194
FILE: A10979
LAB ID.: 12-94-2

PCDD/PCDF ANALYSIS REPORT
REFERENCE: K98-0155
SAMPLE: Drains #23

Project ID/P.O.:	K98-0155	Date collected:	1/8/98	Accession No.:	12-94-2
Sample origin:	CAS	Date received:	1/15/98	RTWin / Col Pfm:	A10976
Sample matrix:	WATER	Date extracted:	1/16/98	Beginning CCAL:	A10977
Sample size:	1 L	Date analyzed:	2/27/98	Concal:	A050797
		Date processed:	3/3/98	Method:	1613

SPECIFIC ANALYTES	EMPC (PPQ)	CONC (PPQ)	MDL (PPQ)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD	-	-	2.4	-		U
1,2,3,7,8-PeCDD	-	273.0	17.8	1.71	23:18	
1,2,3,4,7,8-HxCDD	-	2773.7	21.3	1.10	27:36	
1,2,3,6,7,8-HxCDD	-	4581.3	18.0	1.32	27:44	
1,2,3,7,8,9-HxCDD	-	5147.4	20.0	1.35	28:10	
1,2,3,4,6,7,8-HpCDD	-	85674.4	29.2	1.11	32:21	E
OCDD	-	394351.0	12.7	0.88	36:55	E
2,3,7,8-TCDF	-	-	7.4	-		U
1,2,3,7,8-PeCDF	-	750.8	21.7	1.74	22:07	
2,3,4,7,8-PeCDF	-	-	13.5	-		U
1,2,3,4,7,8-HxCDF	-	-	25.1	-		U
1,2,3,6,7,8-HxCDF	-	-	15.5	-		U
2,3,4,6,7,8-HxCDF	-	-	13.4	-		U
1,2,3,7,8,9-HxCDF	-	-	29.4	-		U
1,2,3,4,6,7,8-HpCDF	-	16196.8	13.3	1.07	30:52	
1,2,3,4,7,8,9-HpCDF	-	-	21.2	-		U
OCDF	-	67842.8	17.2	0.90	37:03	

TOTAL ANALYTES	NO	CONC (PPQ)	MDL (PPQ)	RT WINDOW (min)	FLAGS
TOTAL TCDD	0	-	2.4	—	U
TOTAL PeCDD	5	762.8	17.8	—	
TOTAL HxCDD	8	26006.1	21.3	—	E
TOTAL HpCDD	2	190915.2	29.2	—	E
TOTAL TCDF	0	-	7.4	—	U
TOTAL PeCDF	5	13301.3	21.7	—	
TOTAL HxCDF	12	20654.6	29.4	—	E
TOTAL HpCDF	2	89248.5	21.2	—	E

DATA REVIEWER: _____ 3/8/98
AMA

IONICS INTERNATIONAL, INC.
(800) 4-DIOXIN

10655 Richmond Ave., Ste. 150
Houston, TX 77042

Phone: (713) 972-1037
Fax: (713) 784-1152

Columbia Analytical Services, Inc.

PROJECT: 98-1194
FILE: A10980
LAB ID.: 12-94-3

PCDD/PCDF ANALYSIS REPORT
REFERENCE: K98-0155
SAMPLE: Drain #24

Project ID/P.O.:	K98-0155	Date collected:	1/8/98	Accession No.:	12-94-3
Sample origin:	CAS	Date received:	1/15/98	RTWin / Col Prm:	A10976
Sample matrix:	WATER	Date extracted:	1/16/98	Beginning CCAL:	A10977
Sample size:	1 L	Date analyzed:	2/27/98	Concal:	A050797
		Date processed:	3/3/98	Method:	1613

SPECIFIC ANALYTES	EMPC (PPQ)	CONC (PPQ)	MDL (PPQ)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD	-	29.6	2.4	0.68	18:55	
1,2,3,7,8-PeCDD	-	681.7	17.8	1.64	23:22	
1,2,3,4,7,8-HxCDD	-	3133.6	21.3	1.32	27:46	
1,2,3,6,7,8-HxCDD	-	14728.8	18.0	1.31	27:54	
1,2,3,7,8,9-HxCDD	-	13322.4	20.0	1.29	28:18	
1,2,3,4,6,7,8-HpCDD	-	194781.3	29.2	1.03	32:33	E
OCDD	-	749444.9	12.7	0.90	37:32	E
2,3,7,8-TCDF	-	-	7.4	-		U
1,2,3,7,8-PeCDF	-	1289.0	21.7	1.53	22:08	
2,3,4,7,8-PeCDF	-	-	13.5	-		U
1,2,3,4,7,8-HxCDF	-	-	25.1	-		U
1,2,3,6,7,8-HxCDF	-	-	15.5	-		U
2,3,4,6,7,8-HxCDF	-	-	13.4	-		U
1,2,3,7,8,9-HxCDF	-	-	29.4	-		U
1,2,3,4,6,7,8-HpCDF	-	43499.2	13.3	1.07	31:04	E
1,2,3,4,7,8,9-HpCDF	-	-	21.2	-		U
OCDF	-	113183.7	17.2	1.02	37:34	

TOTAL ANALYTES	NO	CONC (PPQ)	MDL (PPQ)	RT WINDOW (min)	FLAGS
TOTAL TCDD	7	229.7	2.4	—	
TOTAL PeCDD	7	3111.2	17.8	—	
TOTAL HxCDD	5	60909.7	21.3	—	E
TOTAL HpCDD	2	311186.5	29.2	—	E
TOTAL TCDF	0	-	7.4	—	U
TOTAL PeCDF	9	12580.4	21.7	—	
TOTAL HxCDF	16	64416.8	29.4	—	E
TOTAL HpCDF	3	181922.2	21.2	—	E

DATA REVIEWER: AMA 3/9/98

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Columbia Analytical Services, Inc.

PROJECT: 98-1194
FILE: A10981
LAB ID.: 12-94-4

PCDD/PCDF ANALYSIS REPORT
REFERENCE: K98-0155
SAMPLE: Drain #25

Project ID/P.O.:	K98-0155	Date collected:	1/8/98	Accession No.:	12-94-4
Sample origin:	CAS	Date received:	1/15/98	RTWin / Col Prm:	A10976
Sample matrix:	WATER	Date extracted:	1/16/98	Beginning CCAL:	A10977
Sample size:	1 L	Date analyzed:	2/27/98	Concal:	A050797
		Date processed:	3/3/98	Method:	1613

SPECIFIC ANALYTES	EMPC (PPQ)	CONC (PPQ)	MDL (PPQ)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD	-	-	2.4	-		U
1,2,3,7,8-PeCDD	-	360.2	17.8	1.48	23:23	
1,2,3,4,7,8-HxCDD	-	1190.9	21.3	1.26	27:42	
1,2,3,6,7,8-HxCDD	-	7132.2	18.0	1.23	27:49	
1,2,3,7,8,9-HxCDD	-	7262.1	20.0	1.38	28:16	
1,2,3,4,6,7,8-HpCDD	-	106341.8	29.2	1.04	32:31	E
OCDD	-	478616.5	12.7	0.94	37:19	E
2,3,7,8-TCDF	-	-	7.4	-		U
1,2,3,7,8-PeCDF	-	-	21.7	-		U
2,3,4,7,8-PeCDF	-	-	13.5	-		U
1,2,3,4,7,8-HxCDF	-	2812.7	25.1	1.33	26:39	
1,2,3,6,7,8-HxCDF	-	-	15.5	-		U
2,3,4,6,7,8-HxCDF	-	-	13.4	-		U
1,2,3,7,8,9-HxCDF	-	-	29.4	-		U
1,2,3,4,6,7,8-HpCDF	-	21380.1	13.3	1.06	31:02	E
1,2,3,4,7,8,9-HpCDF	-	4650.6	21.2	1.05	33:04	
OCDF	-	64550.4	17.2	0.91	37:26	

TOTAL ANALYTES	NO	CONC (PPQ)	MDL (PPQ)	RT WINDOW (min)	FLAGS
TOTAL TCDD	0	-	2.4	—	U
TOTAL PeCDD	5	1226.6	17.8	—	
TOTAL HxCDD	6	39898.0	21.3	—	E
TOTAL HpCDD	2	186942.2	29.2	—	E
TOTAL TCDF	3	313.7	7.4	—	
TOTAL PeCDF	6	4294.6	21.7	—	
TOTAL HxCDF	6	25303.6	29.4	—	E
TOTAL HpCDF	3	82518.4	21.2	—	E

DATA REVIEWER: AMA 3/9/98

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Columbia Analytical Services, Inc.

PROJECT: 98-1194
FILE: J23142
LAB ID.: 12-94-5

PCDD/PCDF QUALITY CONTROL REPORT
REFERENCE: K98-0155
SAMPLE: Drain #30

Project ID/P.O.:	K98-0155	Date collected:	1/8/98	Accession No.:	12-94-5
Sample origin:	CAS	Date received:	1/15/98	RTWin / Col Pfm:	J23138
Sample matrix:	WATER	Date extracted:	1/16/98	Beginning CCAL:	J23139
Sample size:	1 L	Date analyzed:	3/5/98	Initial ICAL:	J082393
		Date processed:	3/7/98	Method:	1613

LABELED COMPOUNDS	CONC (PPQ)	% REC.	RATIO	RT	FLAGS
13C12-2,3,7,8-TCDD	1471.3	73.6	0.74	24:14	-
13C12-1,2,3,7,8-PeCDD	753.7	37.7	1.70	28:57	Y
13C12-1,2,3,4,7,8-HxCDD	1566.7	78.3	1.29	33:36	-
13C12-1,2,3,6,7,8-HxCDD	1357.5	67.9	1.40	33:44	-
13C12-1,2,3,4,6,7,8-HpCDD	644.5	32.2	1.14	38:06	Y
13C12-OCDD	1875.3	46.9	0.80	42:49	-
13C12-2,3,7,8-TCDF	1660.5	83.0	0.76	23:36	-
13C12-1,2,3,7,8-PeCDF	1164.4	58.2	1.72	27:43	-
13C12-2,3,4,7,8-PeCDF	835.4	41.8	1.72	28:33	-
13C12-1,2,3,4,7,8-HxCDF	1378.3	68.9	0.52	32:31	-
13C12-1,2,3,6,7,8-HxCDF	1216.3	60.8	0.51	32:40	-
13C12-2,3,4,6,7,8-HxCDF	1339.3	67.0	0.44	33:28	-
13C12-1,2,3,7,8,9-HxCDF	1404.7	70.2	0.53	34:24	-
13C12-1,2,3,4,6,7,8-HpCDF	718.9	35.9	0.45	36:43	Y
13C12-1,2,3,4,7,8,9-HpCDF	475.7	23.8	0.47	38:45	Y

INTERNAL STANDARDS	RATIO	RT	FLAGS
13C12-1,2,3,4-TCDD	0.77	24:03	-
13C12-1,2,3,7,8,9-HxCDD	1.25	34:09	-

CLEANUP STANDARD	CONC (PPQ)	% REC.	RT	FLAGS
37Cl4-TCDD	684.1	85.5	24:15	-

Flags:

- **U** — The compound was analyzed for but not detected at or above the detection limit.
- **J** — The analyte was detected at concentrations between the calibrated range and the detection limit.
- **E** — The analyte was detected at concentrations greater than the calibrated range.
- **B** — The analyte was found in the associated blank.
- **D** — The analyte was identified in the analysis at a secondary dilution factor.
- **RO** — Ions used for identification are out of ratio QC limits.
- **S** — The analyte in question is, in the opinion of the reviewer, a PCDD/PCDF, even though the fragment ion due to the loss of COCl did not meet the signal- to-noise ratio criterion of 2.5:1
- **X** — An interferent peak or peaks were observed within the retention window that may obscure otherwise detectable peaks.
- **Y** — The recovery of the indicated standard is outside of QC advisory limits.

Definitions:

- **CONC** — The concentration, given in parts per quadrillion (ppq) or parts per trillion (ppt).
- **EDL** — Estimated detection limit based on a 2.5:1 signal-to-noise criteria, given in parts per quadrillion (ppq), parts per trillion (ppt), or in picograms (pg).
- **RATIO** — The ratio of the low- to high-mass ion areas for the confirmation and quantitation ions.
- **RT** — The retention time of an analyte.
- **NO** — The total number of peaks identified as analytes within the retention time window.
- **% REC** — The percent recovery of the indicated standard.
- **EMPC** — Estimated Maximum Possible Concentration.

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Columbia Analytical Services, Inc.

PROJECT: 98-1194
FILE: J23142
LAB ID.: 12-94-5

PCDD/PCDF TOXICITY EQUIVALENCE REPORT
REFERENCE: K98-0155
SAMPLE: Drain #30

Project ID/P.O.:	K98-0155	Date collected:	1/8/98	Accession No.:	12-94-5
Sample origin:	CAS	Date received:	1/15/98	RTWin / Col Pfm:	J23138
Sample matrix:	WATER	Date extracted:	1/16/98	Beginning CCAL:	J23139
Sample size:	1 L	Date analyzed:	3/5/98	Initial ICAL:	J082393
		Date processed:	3/7/98	Method:	1613

SPECIFIC ANALYTES	CONC (PPQ)		TEF		TEF CONC (PPQ)
2,3,7,8-TCDD	0.0	x	1	=	-
1,2,3,7,8-PeCDD	763.3	x	0.5	=	381.66
1,2,3,4,7,8-HxCDD	2718.4	x	0.1	=	271.84
1,2,3,6,7,8-HxCDD	8651.9	x	0.1	=	865.19
1,2,3,7,8,9-HxCDD	8764.0	x	0.1	=	876.4
1,2,3,4,6,7,8-HpCDD	357390.0	x	0.01	=	3573.9
OCDD	1292467.0	x	0.001	=	1292.47
2,3,7,8-TCDF	0.0	x	0.1	=	-
1,2,3,7,8-PeCDF	0.0	x	0.05	=	-
2,3,4,7,8-PeCDF	0.0	x	0.5	=	-
1,2,3,4,7,8-HxCDF	1707.4	x	0.1	=	170.74
1,2,3,6,7,8-HxCDF	1797.1	x	0.1	=	179.71
2,3,4,6,7,8-HxCDF	1613.3	x	0.1	=	161.33
1,2,3,7,8,9-HxCDF	0.0	x	0.1	=	-
1,2,3,4,6,7,8-HpCDF	74647.1	x	0.01	=	746.47
1,2,3,4,7,8,9-HpCDF	7240.5	x	0.01	=	72.41
OCDF	184839.8	x	0.001	=	184.84

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: 8776.96 PPQ

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Columbia Analytical Services, Inc.

PROJECT: 98-1194
FILE: J23142
LAB ID.: 12-94-5

PCDD/PCDF ANALYSIS REPORT
REFERENCE: K98-0155
SAMPLE: Drain #30

Project ID/P.O.:	K98-0155	Date collected:	1/8/98	Accession No.:	12-94-5
Sample origin:	CAS	Date received:	1/15/98	RTWin / Col Pfm:	J23138
Sample matrix:	WATER	Date extracted:	1/16/98	Beginning CCAL:	J23139
Sample size:	1 L	Date analyzed:	3/6/98	Initial ICAL:	J082393
		Date processed:	3/7/98	Method:	1613

SPECIFIC ANALYTES	EMPC (PPQ)	CONC (PPQ)	MDL (PPQ)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD	-	-	2.4	-		U
1,2,3,7,8-PeCDD	-	763.3	17.8	1.76	28:58	
1,2,3,4,7,8-HxCDD	-	2718.4	21.3	1.30	33:37	
1,2,3,6,7,8-HxCDD	-	8651.9	18.0	1.27	33:45	
1,2,3,7,8,9-HxCDD	-	8764.0	20.0	1.28	34:10	
1,2,3,4,6,7,8-HpCDD	-	357390.0	29.2	1.20	38:07	E
OCDD	-	1292467.0	12.7	0.90	42:50	E
2,3,7,8-TCDF	-	-	7.4	-		U
1,2,3,7,8-PeCDF	-	-	21.7	-		U
2,3,4,7,8-PeCDF	-	-	13.5	-		U
1,2,3,4,7,8-HxCDF	-	1707.4	25.1	1.28	32:32	
1,2,3,6,7,8-HxCDF	-	1797.1	15.5	1.25	32:37	
2,3,4,6,7,8-HxCDF	-	1613.3	13.4	1.32	33:26	
1,2,3,7,8,9-HxCDF	-	-	29.4	-		U
1,2,3,4,6,7,8-HpCDF	-	74647.1	13.3	1.05	36:44	E
1,2,3,4,7,8,9-HpCDF	-	7240.5	21.2	1.15	37:01	
OCDF	-	184839.8	17.2	0.90	43:05	

TOTAL ANALYTES	NO	CONC (PPQ)	MDL (PPQ)	RT WINDOW (min)	FLAGS
TOTAL TCDD	0	-	2.4	—	U
TOTAL PeCDD	4	1953.5	17.8	—	
TOTAL HxCDD	6	54700.0	21.3	—	E
TOTAL HpCDD	2	615500.6	29.2	—	E
TOTAL TCDF	4	383.1	7.4	—	
TOTAL PeCDF	4	7585.8	21.7	—	
TOTAL HxCDF	5	86241.4	29.4	—	E
TOTAL HpCDF	4	373356.9	21.2	—	E

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Columbia Analytical Services, Inc.

PROJECT: 98-1194
FILE: J23141
LAB ID.: 12-94-6

PCDD/PCDF ANALYSIS REPORT
REFERENCE: K98-0155
SAMPLE: Treating Solv.

Project ID/P.O.:	K98-0155	Date collected:	1/8/98	Accession No.:	12-94-6
Sample origin:	CAS	Date received:	1/15/98	RTWin / Col Pfm:	J23136
Sample matrix:	OIL	Date extracted:	1/16/98	Beginning CCAL:	J23139
Sample size:	1 g	Date analyzed:	3/5/98	Ending CCAL:	J23150
		Date processed:	3/7/98	Initial CAL:	1613

SPECIFIC ANALYTES	EMPC (PPT)	CONC (PPT)	MDL (PPT)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD	-	-	0.6	-		U
1,2,3,7,8-PeCDD	-	-	1.6	-		U
1,2,3,4,7,8-HxCDD	-	-	1.2	-		U
1,2,3,6,7,8-HxCDD	-	-	1.3	-		U
1,2,3,7,8,9-HxCDD	-	6488.6	1.7	1.36	33:53	
1,2,3,4,6,7,8-HpCDD	-	7936597.3	1.9	1.01	38:08	E
OCDD	-	72548305.9	21.4	0.89	43:02	E
2,3,7,8-TCDF	-	-	0.7	-		U
1,2,3,7,8-PeCDF	-	-	1.3	-		U
2,3,4,7,8-PeCDF	-	82.2	1.8	1.40	28:30	
1,2,3,4,7,8-HxCDF	-	19515.9	1.5	1.27	32:17	
1,2,3,6,7,8-HxCDF	-	11163.2	1.3	1.26	33:07	
2,3,4,6,7,8-HxCDF	-	-	1.1	-		U
1,2,3,7,8,9-HxCDF	-	-	1.6	-		U
1,2,3,4,6,7,8-HpCDF	-	164686.4	2.4	1.06	38:45	E
1,2,3,4,7,8,9-HpCDF	-	-	0.8	-		U
OCDF	-	35342557.0	2.6	1.01	43:13	E

TOTAL ANALYTES	NO	CONC (PPT)	MDL (PPT)	RT WINDOW (min)	FLAGS
TOTAL TCDD	0	-	0.6	—	U
TOTAL PeCDD	2	343.6	1.6	—	
TOTAL HxCDD	5	107610.0	1.7	—	E
TOTAL HpCDD	2	20053622.2	1.9	—	E
TOTAL TCDF	0	-	0.7	—	U
TOTAL PeCDF	2	1197.2	1.8	—	
TOTAL HxCDF	7	1495050.7	1.6	—	E
TOTAL HpCDF	4	23734561.7	2.4	—	E

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Columbia Analytical Services

PROJECT: 98-1194
FILE: J23146
LAB ID.: LS B3-181

PCDD/PCDF ANALYSIS REPORT
REFERENCE: K98-0155
SAMPLE: Lab Spike

Project ID/P.O.:	K98-0155	Date collected:	N/A	Accession No.:	LS B3-181
Sample origin:	CAS	Date received:	N/A	RTWin / Col Pfm:	J23138
Sample matrix:	Water	Date extracted:	1/16/98	Beginning CCAL:	J23139
Sample size:	1 L	Date analyzed:	3/5/98	Initial ICAL:	J082396
		Date processed:	3/16/98	Method:	1613

SPECIFIC ANALYTES	EMPC (PPQ)	CONC (PPQ)	MDL (PPQ)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD	-	190.6	2.4	0.87	24:07	
1,2,3,7,8-PeCDD	-	942.4	17.8	1.73	28:50	
1,2,3,4,7,8-HxCDD	-	818.2	21.3	1.18	33:15	
1,2,3,6,7,8-HxCDD	-	896.4	18.0	1.32	33:23	
1,2,3,7,8,9-HxCDD	-	805.3	20.0	1.13	33:51	
1,2,3,4,6,7,8-HpCDD	-	1114.9	29.2	1.00	38:00	
OCDD	-	2016.8	12.7	0.79	42:39	
2,3,7,8-TCDF	-	182.1	7.4	0.80	23:28	
1,2,3,7,8-PeCDF	-	1004.0	21.7	1.74	27:37	
2,3,4,7,8-PeCDF	-	1025.4	13.5	1.69	28:26	
1,2,3,4,7,8-HxCDF	-	1072.3	25.1	1.26	32:14	
1,2,3,6,7,8-HxCDF	-	942.8	15.5	1.27	32:23	
2,3,4,6,7,8-HxCDF	-	930.4	13.4	1.24	33:06	
1,2,3,7,8,9-HxCDF	-	857.8	29.4	1.28	34:15	
1,2,3,4,6,7,8-HpCDF	-	1084.0	13.3	1.17	36:35	
1,2,3,4,7,8,9-HpCDF	-	859.1	21.2	1.14	38:40	
OCDF	-	1863.0	17.2	0.97	42:54	

TOTAL ANALYTES	NO	CONC (PPQ)	MDL (PPQ)	RT WINDOW (min)	FLAGS
TOTAL TCDD	1	190.6	2.4	—	
TOTAL PeCDD	1	942.4	17.8	—	
TOTAL HxCDD	3	2519.9	21.3	—	
TOTAL HpCDD	1	1114.9	29.2	—	
TOTAL TCDF	1	182.1	7.4	—	
TOTAL PeCDF	2	2029.4	21.7	—	
TOTAL HxCDF	4	3803.2	29.4	—	
TOTAL HpCDF	2	1943.1	21.2	—	

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Columbia Analytical Services

PROJECT: 98-1194
FILE: J23146
LAB ID.: LS B3-181

PCDD/PCDF QUALITY CONTROL REPORT
REFERENCE: K98-0155
SAMPLE: Lab Spike

Project ID/P.O.:	K98-0155	Date collected:	N/A	Accession No.:	LS B3-181
Sample origin:	CAS	Date received:	N/A	RTWin / Col Pfm:	J23138
Sample matrix:	Water	Date extracted:	1/16/98	Beginning CCAL:	J23139
Sample size:	1 L	Date analyzed:	3/5/98	Initial ICAL:	J082396
		Date processed:	3/16/98	Method:	1613

LABELED COMPOUNDS	CONC (PPQ)	% REC.	RATIO	RT	FLAGS
13C12-2,3,7,8-TCDD	1292.8	64.6	0.77	24:06	-
13C12-1,2,3,7,8-PeCDD	950.7	47.5	1.62	28:49	-
13C12-1,2,3,4,7,8-HxCDD	2646.6	132.3	1.31	33:14	-
13C12-1,2,3,6,7,8-HxCDD	2172.4	108.6	1.33	33:22	-
13C12-1,2,3,4,6,7,8-HpCDD	735.1	36.8	0.97	38:00	Y
13C12-OCDD	601.5	15.0	1.01	42:38	Y
13C12-2,3,7,8-TCDF	1802.0	90.1	0.80	23:28	-
13C12-1,2,3,7,8-PeCDF	1430.7	71.5	1.66	27:36	-
13C12-2,3,4,7,8-PeCDF	1172.0	58.6	1.68	28:25	-
13C12-1,2,3,4,7,8-HxCDF	2619.8	131.0	0.44	32:14	-
13C12-1,2,3,6,7,8-HxCDF	2514.9	125.7	0.46	32:22	-
13C12-2,3,4,6,7,8-HxCDF	2253.4	112.7	0.47	33:05	-
13C12-1,2,3,7,8,9-HxCDF	1445.9	72.3	0.46	34:14	-
13C12-1,2,3,4,6,7,8-HpCDF	921.6	46.1	0.41	36:34	-
13C12-1,2,3,4,7,8,9-HpCDF	745.4	37.3	0.46	38:39	Y

INTERNAL STANDARDS	RATIO	RT	FLAGS
13C12-1,2,3,4-TCDD	0.78	23:56	-
13C12-1,2,3,7,8,9-HxCDD	1.39	33:50	-

CLEANUP STANDARD	CONC (PPQ)	% REC.	RT	FLAGS
37Cl4-TCDD	521.0	65.1	24:07	-

Flags:

- **U** — The compound was analyzed for but not detected at or above the detection limit.
- **J** — The analyte was detected at concentrations between the calibrated range and the detection limit.
- **E** — The analyte was detected at concentrations greater than the calibrated range.
- **B** — The analyte was found in the associated blank.
- **D** — The analyte was identified in the analysis at a secondary dilution factor.
- **RO** — Ions used for identification are out of ratio QC limits.
- **S** — The analyte in question is, in the opinion of the reviewer, a PCDD/PCDF, even though the fragment ion due to the loss of COCl did not meet the signal- to-noise ratio criterion of 2.5:1
- **X** — An interferent peak or peaks were observed within the retention window that may obscure otherwise detectable peaks.
- **Y** — The recovery of the indicated standard is outside of QC advisory limits.

Definitions:

- **CONC** — The concentration, given in parts per quadrillion (ppq) or parts per trillion (ppt).
- **EDL** — Estimated detection limit based on a 2.5:1 signal-to-noise criteria, given in parts per quadrillion (ppq), parts per trillion (ppt), or in picograms (pg).
- **RATIO** — The ratio of the low- to high-mass ion areas for the confirmation and quantitation ions.
- **RT** — The retention time of an analyte.
- **NO** — The total number of peaks identified as analytes within the retention time window.
- **% REC** — The percent recovery of the indicated standard.
- **EMPC** — Estimated Maximum Possible Concentration.

IONICS INTERNATIONAL, INC.
(800) 4-DIOXIN

10655 Richmond Ave., Ste. 150
Houston, TX 77042

Phone: (713) 972-1037
Fax: (713) 784-1152

Columbia Analytical Services

PROJECT: 98-1194
FILE: J23148
LAB ID.: LS B3-182

PCDD/PCDF ANALYSIS REPORT
REFERENCE: K98-0155
SAMPLE: Lab Spike

Project ID/P.O.:	K98-0155	Date collected:	N/A	Accession No.:	LS B3-182
Sample origin:	CAS	Date received:	N/A	RTWin / Col Pfm:	J23138
Sample matrix:	Oil	Date extracted:	1/16/98	Beginning CCAL:	J23139
Sample size:	1 g	Date analyzed:	3/5/98	Initial ICAL:	J082396
		Date processed:	3/16/98	Method:	1613

SPECIFIC ANALYTES	EMPC (PPT)	CONC (PPT)	MDL (PPT)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD	-	164.8	0.6	0.76	24:07	
1,2,3,7,8-PeCDD	-	860.1	1.6	1.73	26:49	
1,2,3,4,7,8-HxCDD	-	924.6	1.2	1.13	33:15	
1,2,3,6,7,8-HxCDD	-	880.6	1.3	1.41	33:22	
1,2,3,7,8,9-HxCDD	-	849.0	1.7	1.25	33:50	
1,2,3,4,6,7,8-HpCDD	-	912.4	1.9	1.20	38:00	
OCDD	-	1647.2	21.4	0.81	43:01	
2,3,7,8-TCDF	-	189.4	0.7	0.71	23:28	
1,2,3,7,8-PeCDF	-	960.2	1.3	1.62	27:36	
2,3,4,7,8-PeCDF	-	1021.0	1.8	1.58	28:25	
1,2,3,4,7,8-HxCDF	-	928.2	1.5	1.20	32:14	
1,2,3,6,7,8-HxCDF	-	927.1	1.3	1.20	32:22	
2,3,4,6,7,8-HxCDF	-	943.5	1.1	1.23	33:05	
1,2,3,7,8,9-HxCDF	-	895.9	1.6	1.18	34:14	
1,2,3,4,6,7,8-HpCDF	-	913.4	2.4	1.08	36:35	
1,2,3,4,7,8,9-HpCDF	-	982.2	0.8	0.98	38:39	
OCDF	-	1677.4	2.6	0.83	42:53	

TOTAL ANALYTES	NO	CONC (PPT)	MDL (PPT)	RT WINDOW (min)	FLAGS
TOTAL TCDD	1	164.8	0.6	—	
TOTAL PeCDD	1	860.1	1.6	—	
TOTAL HxCDD	3	2654.2	1.7	—	
TOTAL HpCDD	1	912.4	1.9	—	
TOTAL TCDF	1	189.4	0.7	—	
TOTAL PeCDF	2	1981.2	1.8	—	
TOTAL HxCDF	4	3694.7	1.6	—	
TOTAL HpCDF	2	1895.5	2.4	—	

DATA REVIEWER: _____ 3/26/98
AMA

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10655 Richmond Ave., Ste. 150
Houston, TX 77042

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Columbia Analytical Services

PROJECT: 98-1194
FILE: J23148
LAB ID.: LS B3-182

PCDD/PCDF QUALITY CONTROL REPORT
REFERENCE: K98-0155
SAMPLE: Lab Spike

Project ID/P.O.:	K98-0155	Date collected:	N/A	Accession No.:	LS B3-182
Sample origin:	CAS	Date received:	N/A	RTWin / Col Pfm:	J23138
Sample matrix:	Oil	Date extracted:	1/16/98	Beginning CCAL:	J23139
Sample size:	1 g	Date analyzed:	3/5/98	Initial ICAL:	J082396
		Date processed:	3/16/98	Method:	1613

LABELED COMPOUNDS	CONC (PPT)	% REC.	RATIO	RT	FLAGS
13C12-2,3,7,8-TCDD	1776.1	88.8	0.74	24:06	-
13C12-1,2,3,7,8-PeCDD	1447.7	72.4	1.70	28:48	-
13C12-1,2,3,4,7,8-HxCDD	2338.5	116.9	1.24	33:14	-
13C12-1,2,3,6,7,8-HxCDD	1982.1	99.1	1.32	33:21	-
13C12-1,2,3,4,6,7,8-HpCDD	1301.2	65.1	1.03	37:59	-
13C12-OCDD	1362.7	34.1	0.93	43:00	Y
13C12-2,3,7,8-TCDF	1867.8	93.4	0.80	23:27	-
13C12-1,2,3,7,8-PeCDF	1888.5	94.4	1.70	27:35	-
13C12-2,3,4,7,8-PeCDF	1600.8	80.0	1.66	28:24	-
13C12-1,2,3,4,7,8-HxCDF	2233.4	111.7	0.46	32:13	-
13C12-1,2,3,6,7,8-HxCDF	1930.1	96.5	0.48	32:21	-
13C12-2,3,4,6,7,8-HxCDF	1935.4	96.8	0.47	33:04	-
13C12-1,2,3,7,8,9-HxCDF	1679.4	84.0	0.46	34:14	-
13C12-1,2,3,4,6,7,8-HpCDF	1203.2	60.2	0.42	36:34	-
13C12-1,2,3,4,7,8,9-HpCDF	1143.4	57.2	0.39	38:39	-

INTERNAL STANDARDS	RATIO	RT	FLAGS
13C12-1,2,3,4-TCDD	0.82	23:56	-
13C12-1,2,3,7,8,9-HxCDD	1.27	33:49	-

CLEANUP STANDARD	CONC (PPT)	% REC.	RT	FLAGS
37Cl4-TCDD	722.4	90.3	24:07	-

Flags:

- U — The compound was analyzed for but not detected at or above the detection limit.
- J — The analyte was detected at concentrations between the calibrated range and the detection limit.
- E — The analyte was detected at concentrations greater than the calibrated range.
- B — The analyte was found in the associated blank.
- D — The analyte was identified in the analysis at a secondary dilution factor.
- RO — Ions used for identification are out of ratio QC limits.
- S — The analyte in question is, in the opinion of the reviewer, a PCDD/PCDF, even though the fragment ion due to the loss of COCl did not meet the signal- to-noise ratio criterion of 2.5:1
- X — An interferent peak or peaks were observed within the retention window that may obscure otherwise detectable peaks.
- Y — The recovery of the indicated standard is outside of QC advisory limits.

Definitions:

- CONC — The concentration, given in parts per quadrillion (ppq) or parts per trillion (ppt).
- EDL — Estimated detection limit based on a 2.5:1 signal-to-noise criteria, given in parts per quadrillion (ppq), parts per trillion (ppt), or in picograms (pg).
- RATIO — The ratio of the low- to high-mass ion areas for the confirmation and quantitation ions.
- RT — The retention time of an analyte.
- NO — The total number of peaks identified as analytes within the retention time window.
- % REC — The percent recovery of the indicated standard.
- EMPC — Estimated Maximum Possible Concentration.

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APPENDIX B

CHAIN OF CUSTODY INFORMATION

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

Columbia Analytical Services, Inc. 1317 South 13th Ave. • Kelso, WA 98626 • (360) 577-7222 • (800) 695-7222 • FAX (360) 636-1068

DATE 1-8-98 PAGE 1 OF 1

PROJECT NAME J.H. BAXTER & CO. STORM WATER
PROJECT MANAGER TOM ORTHMERE
COMPANY/ADDRESS J.H. BAXTER & CO.
6520 188TH ST. N.E. 98446
FAX PHONE 360-435-9317
SAMPLERS SIGNATURE Jim Clawson

ANALYSIS REQUESTED

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX	NUMBER OF CONTAINERS	REMARKS
DRAINS # 13 14	1-8	1:00pm	1	WATER	5	
DRAIN # 23	1-8	12:30p	2		5	
DRAIN # 24	1-8	1:30p	3		5	
DRAIN # 25	1-8	2:00p	4		5	
DRAIN # 30	1-8	12:00pm	5		5	
DRAINS # 10-22	1-8	2:30p	6		4	
TREATING SOLN.	1-8	3:00p	7	OIL/BORNE	3	

Base/Neu/Acid Organics GC/MS 625/8270 □ | Volatile Organics GC/MS 624/8240 □ | Halogenated or Aromatic Volatiles 601/8010 □ 602/8020 □ | Pesticides/PCBs 608/8080 □ | Total Petroleum Hydrocarbons EPA/418.1 □ OR/418.1 □ WA/418.1 □ | TPH/Gas/BTEX Gas □ BTEX 5030/8015/8020 □ | TPH/8015 Modified Diesel □ Hydrocarbon Scan □ | TPH/HCID □ OR/HCID □ WA/HCID □ | TCLP Metals □ VOA □ VOA □ Semi Pest/ Herb □ | Metals (total or dissolved) List Below | Cyanide | Oil & Grease | pH, Cond., Cl, SO4, NO2, NO3, (circle) Perf. Br. | NH3-N, COD, Total-P, TKN, TOC (circle) TSS | Total Organic Halides (TOX) 9020 □ (AOX) 1650 □ | PCP-8150 (1) | PAH-8310 (610) | Dioxins & Furans (2)

RELINQUISHED BY:
Jim Clawson
Signature
JIM CLAWSON
Printed Name
J.H. BAXTER & CO
Firm
1-8-98 3:30pm
Date/Time

RECEIVED BY:
Signature
Printed Name
CAS
Firm
010998
Date/Time

RECEIVED JAN 09 1998

TURNAROUND REQUIREMENTS
___ 24 hr ___ 48 hr. ___ 5 day
X Standard (10-15 working days)
___ Provide Verbal Preliminary Results
___ Provide FAX preliminary Results
Requested Report Date ___

REPORT REQUIREMENTS
X I. Routine Report
___ II. Report (includes DUP.MS. MSD, as required, may be charged as samples)
___ III. Data Validation Report (includes All Raw Data)
___ IV. CLP Deliverable Report

INVOICE INFORMATION:
P.O.# ___
Bill To J.H. BAXTER & CO.
P.O. BOX 5902
SAN MATEO, CA. 94402
ATT: CAROLINE MARTIN

SAMPLE RECEIPT:
Shipping VIA: ___
Shipping #: ___
Condition: ___
___
Lab No: K98-0105

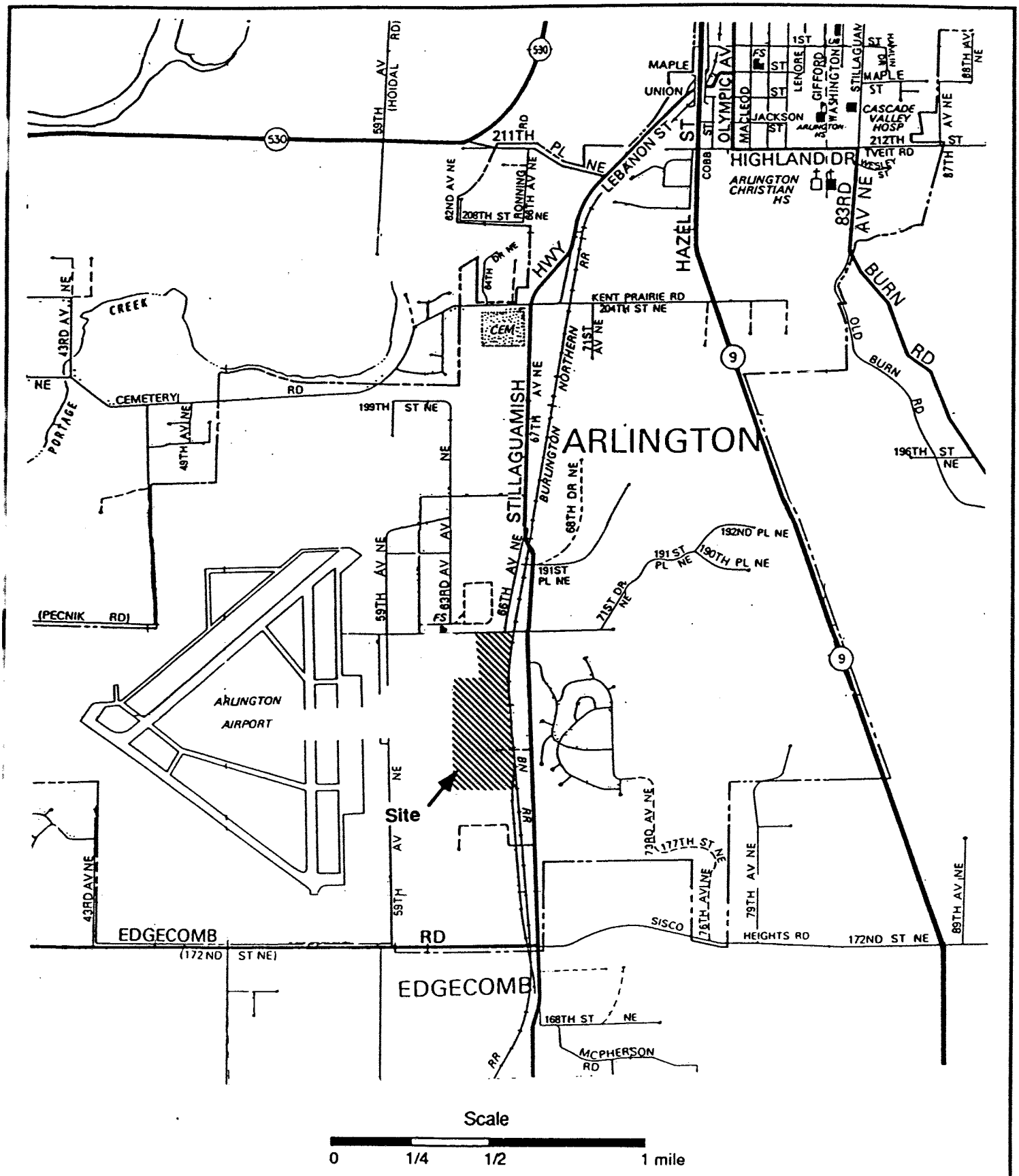
RELINQUISHED BY:
Signature
Printed Name
Firm
Date/Time

RECEIVED BY:
Signature
Printed Name
Firm
Date/Time

RECEIVED APR 06 1998

SPECIAL INSTRUCTIONS/COMMENTS:
(1) PLEASE REPORT MRL of 1.0ppb. — ANALYZE FOR 2,4,6 TRICHLORAPHENOL, 2,3,4,6-TETRACHLOROPHENOL AND PENTACHLORA (PHENOL)
(2) PLEASE USE EPA METHOD 1613: TETRA-THROUGH OCTACHLORINATED DIOXINS AND FURANS BY ISOTOPE DILUTION.
NOTE: TREATING SOLUTION MAY HAVE MUCH HIGHER CONCENTRATIONS OF PCP, PAH. NOTE: STORM WATER OVER ALL DRAINS

6006



Project No. 90C0456A	J.H. Baxter and Co. Arlington WA Facility	Vicinity Map	Figure 1
Woodward-Clyde Consultants			