


July 26, 2007

Robert Martin  
Martin & Slagle, LLC  
P.O. Box 1023  
Black Mountain, NC 28711

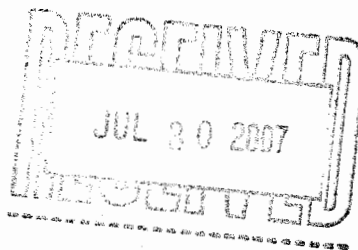
Dear Mr. Martin,

Enclosed is the Technical Memorandum for work completed at the former Borg Warner and current Kuhlman Electric facility in Crystal Springs, Mississippi during the month of March. If you have any questions concerning this information, please give me a call.

Sincerely,

 Richard Johnson

Enclosure



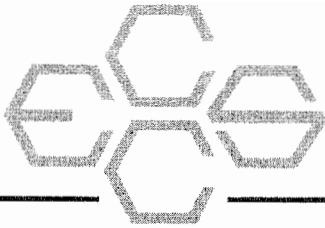
Environmental Chemistry Consulting Services, Inc.

2525 Advance Road • Madison, WI 53718 • Phone (608) 221-8700 • FAX (608) 221-4889

**Technical Memorandum**

**Borg Warner / Kuhlman Electric**

**Crystal Springs, Mississippi**




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## TECHNICAL MEMORANDUM

July 26, 2007

**To:** Robert Martin  
Martin Slagle Inc.

**From:** Richard Johnson   
ECCS, Inc.

**Re:** Field Analytical Methods – QC Summary  
Borg Warner – Kuhlman Electric Facility  
Crystal Springs, Mississippi

### INTRODUCTION

This Technical Memorandum provides documentation of the field analytical test methods used to analyze KEP-GW samples collected during March 2005 at an accelerated site investigation episode around the former Borg Warner and current Kuhlman Electric facility in Crystal Springs, Mississippi. Water samples were analyzed for polychlorinated biphenyls (PCBs) and chlorinated benzenes by gas chromatography (GC) in accordance with ECCS's Polychlorinated Biphenyl (PCB) Mini Extraction Screening Procedure. A summary of test results is provided in Table 1. A summary of method blanks, laboratory control samples and matrix spike/matrix spike duplicate data is provided in Table 2.

In addition copies of the chain of custody sheets can be found in appendix A.

- A) Chain of custody sheets for samples
- B) FEDEX shipping label for Paradigm Labs
- C) Chain of custody sheets for samples sent to Paradigm Labs

The PCB mini-extraction procedure is based on the existing EPA SW846 methods 8082/8141. The procedure incorporates all the quality control rigors of the full 8082/8141 methods including quantification based on 6-point calibration with continuing calibration verification, surrogate method performance monitoring, method blanks, laboratory control samples (LCS), and matrix spike/matrix spike (MS/MSD) duplicate samples. As such, you should consider these test results as comparable to what you would get from a fixed-based laboratory using the more-widely accepted extraction procedure.

The primary project objective of the sampling and testing episode was to delineate the PCB contamination at and around the site using the accelerated site characterization approach. The mobile laboratory was required to provide data as quickly as possible to keep the accelerated site investigation process on track while trying to maintain a goal of level three data quality.

Environmental Chemistry Consulting Services, Inc.

## **CASE NARRATIVE**

During the episode, all samples collected were analyzed. To maintain rapid turnaround and to meet the project objective, three GCs were operated on a nearly continuous basis.

Quality control including proper calibration, continuing calibration verification, surrogates, method blanks, laboratory control samples and matrix spike/matrix spike duplicate samples was performed at the method-specified intervals. Overall quality of the data is very good. The following quality related issues should be noted:

1. All surrogate recoveries were within acceptable ranges with the exception of three samples (W1115, W1116 and W1120). Method states that 1 of the 2 required surrogates must be within range.
2. All LCS recoveries were within acceptable ranges. See Table 2.
3. All MS/MSD recoveries were within acceptable ranges. Percent repeatability was also within acceptable ranges. See Table 2.

## **METHOD SUMMARY**

This method employs a mini-extraction procedure and gas chromatography analysis for the detection of PCBs and chlorinated benzenes. Reporting limits are provided in the results Tables. Four grams of sample are dried with anhydrous sodium sulfate and extracted with eight mLs of 80/20 iso-octane/acetone. The extract is then analyzed by Gas Chromatography-Electron Capture Detector (GC-ECD).

## **Procedure**

1. Standards Preparation - Primary standards are prepared from a solution purchased from various vendors at Certified concentrations. Stock standards are prepared in suitable solvents and stored in a freezer when not in use. Secondary standards are prepared in 80/20 iso-octane/acetone and stored in a freezer when not in use. Standard curve mixes for this project was prepared at six concentrations: PCBs – 0.05, 0.10, 0.20, 0.50, 1.0 and 2.0 ug/m; chlorinated benzenes – 0.005, 0.01, 0.02, 0.05, 0.10 and 0.20 ug/ml.

2. WATER Samples: 200 grams of water was weighed into a clean jar containing 50 grams of sodium chloride. The samples were spiked with a surrogate in addition the LCS/MS/MSD were spiked with PCB's and chlorinated benzenes. Added 10 ml of isooctane to each and shake 3 times for 2 minutes each time. Samples were allowed to settle for approximately 5 minutes between each shake. Isooctane was decanted into a scintillation vial and then an aliquot was transferred to an autosampler vial. Then extracts were injected into a GC-ECD.

3. GC-ECD Analysis - A sample aliquot is injected into an HP5890 GC with an ECD equipped with an HP ChemStation for data processing. PCBs were identified by matching retention times of standards to the same retention time in the sample. Regression analysis was performed on each of the selected peak's height verses concentration of the standard using a LN/LN transformed linear regression. For PCBs nine peaks were selected for quantification. The ug/mL value for each peak was added together and divided by the number of peaks selected to obtain the total PCB ug/mL result. If interference occurred at any of the peaks, these peaks were not included in the total, and the divisor was reduced accordingly.

4. Quality Control - Quality control consisted of the following items:

- Continuing calibration standards analyzed every ten samples or less and at the end of a run.
- Blank and LCS samples analyzed every twenty sample or less with a minimum of one per day.
- MS/MSD samples analyzed every twenty samples or less with a minimum of one per day.
- Information is documented in logbook 45 and March run sheets.

5. Instrument Conditions - Two HP5890 gas chromatographs were equipped with RTX-35 capillary columns. Each system had a Leap Technologies A200S auto-sampler and an HP ChemStation for data handling.

**Table 1**

**Sample Results – March**

Kuhlman Electric  
Crystal Springs, Mississippi  
Chlorinated Benzenes Detected in ug/L

Field Lab Sample ID	Sample ID	Depth	Date Collected	Time Collected	Date Analyzed	Field Laboratory										
						1,3,5-Trichloro-benzene	1,2,4-Trichloro-benzene	1,2,3-Trichloro-benzene	1,2,3,4,5-Tetrachloro-benzene	1,2,3,4-Tetrachloro-benzene	Penta-chloro-benzene	Hexa-chloro-benzene	Surrogate TCMX(%)	Surrogate DCBP(%)		
W1083	KEP-GW-001-003	-	2-Mar-05	11:04	3-Mar-05	< 0.025	< 0.025	0.10	< 0.050	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	103	115
W1084	KEP-GW-003-003	-	2-Mar-05	13:06	3-Mar-05	0.079	0.14	0.45	0.059	0.29	0.032	< 0.025	< 0.025	< 0.025	94.2	113
W1085	KEP-GW-008-003	-	2-Mar-05	14:24	3-Mar-05	< 0.025	< 0.025	< 0.025	< 0.050	< 0.025	< 0.025	< 0.025	< 0.025	100	118	
W1086	KEP-GW-007-003	-	2-Mar-05	14:57	3-Mar-05	< 0.025	< 0.025	< 0.025	< 0.050	< 0.025	< 0.025	< 0.025	< 0.025	98.2	113	
W1087	KEP-GW-006-003	-	2-Mar-05	15:14	3-Mar-05	0.097	< 0.025	0.039	0.20	0.25	0.22	< 0.025	< 0.025	102	118	
W1088	KEP-GW-005-003	-	2-Mar-05	15:28	3-Mar-05	< 0.025	< 0.025	< 0.025	< 0.050	< 0.025	< 0.025	< 0.025	< 0.025	98.9	121	
W1089	KEP-GW-004-003	-	2-Mar-05	16:03	3-Mar-05	< 0.025	< 0.025	0.029	< 0.050	< 0.025	< 0.025	< 0.025	< 0.025	100	113	
W1090	KEP-GW-002-003	-	2-Mar-05	16:17	3-Mar-05	< 0.025	< 0.025	< 0.025	< 0.050	< 0.025	< 0.025	< 0.025	< 0.025	95.2	114	
W1091	KEP-Duplicate	-	2-Mar-05	-	3-Mar-05	0.072	0.14	0.50	0.057	0.29	0.031	< 0.025	< 0.025	101	118	
W1092	KEP-FB-004	-	2-Mar-05	16:34	3-Mar-05	< 0.025	< 0.025	< 0.025	< 0.050	< 0.025	< 0.025	< 0.025	< 0.025	99.7	95.2	
W1093	Equip Rinsate	-	2-Mar-05	16:37	3-Mar-05	< 0.025	< 0.025	< 0.025	< 0.050	< 0.025	< 0.025	< 0.025	< 0.025	101	122	
W1140	KEP-GW-009-001	-	12-Mar-05	11:19	12-Mar-05	< 1.0	< 1.0	< 1.0	< 0.40	< 0.40	< 0.20	< 0.20	< 0.20	70.6	109	
W1142	KEP-Duplicate	-	12-Mar-05	-	12-Mar-05	< 1.0	< 1.0	< 1.0	< 0.40	< 0.40	< 0.20	< 0.20	< 0.20	75.7	113	

**Table 2**  
**QC Samples - March**



Table 2  
QC Results

Lab # associated with qc samples: W1083 through W1093

	Matrix Spike W1090	Matrix Spike Duplicate W1090	Blank	LCS
Date Analyzed:	3/3/05	3/3/05	3/3/05	3/3/05

Compound	% Rec		% Rec		% RPD	ug/L	% Rec
1,3,5-Trichlorobenzene	118		117		1%	< 0.025	109
1,2,4-Trichlorobenzene	115		114		1%	< 0.025	110
1,2,3-Trichlorobenzene	115		114		1%	< 0.025	109
1,2,3,5- & 1,2,4,5-Tetrachlorobenzene	114		113		1%	< 0.050	108
1,2,3,4-Tetrachlorobenzene	113		112		1%	< 0.025	108
Pentachlorobenzene	112		111		1%	< 0.025	108
Hexachlorobenzene	111		109		2%	< 0.025	108

Table 2  
QC Results

Lab # associated with qc samples: W1140 and W1142

	Matrix	Matrix		
	Spike	Spike		
	W1138	Duplicate	Blank	LCS
		W1138		

Date Analyzed:	3/12/05	3/12/05	3/12/05	3/12/05
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Compound	% Rec		% Rec		% RPD	ug/L	% Rec
1,3,5-Trichlorobenzene	102		103		-1%	< 1.0	103
1,2,4-Trichlorobenzene	103		103		0%	< 1.0	104
1,2,3-Trichlorobenzene	103		103		0%	< 1.0	104
1,2,3,5- & 1,2,4,5-Tetrachlorobenzene	106		104		2%	< 0.40	109
1,2,3,4-Tetrachlorobenzene	105		103		2%	< 0.40	107
Pentachlorobenzene	107		105		2%	< 0.20	109
Hexachlorobenzene	110		110		0%	< 0.20	114

## **Appendix A**

### **Chain of Custody Sheets for Samples**



**Environmental Chemistry  
Consulting Services, Inc.**

2525 Advance Road  
Madison, WI 53718  
Phone 608-221-8700 FAX 608-221-4889

**CHAIN OF CUSTODY**

No. 008865 \*  
Page 1 of 1

Turn Around (circle one) Normal Rush  
Report Due:

Project Number: \_\_\_\_\_  
 Project Name: **KUTTMAN ELECTRIC**  
 Project Location: **CRYSTAL SPRINGS**  
 Sampled By (Print): **Robert Martin**  
 Mail Report To: \_\_\_\_\_  
 Company: **WILKINSON & SUTCLIFFE**  
 Address: \_\_\_\_\_

Sample Description	Collection		Matrix	Total Bottles	Preserv*	Analysis Requested	Comments	Laboratory Number
	Date	Time						
KEP-6W-001-003	3/2/05	1104	W	4	A/B	PURPOSE / 82608	See attached list	W1083
KEP-6W-003-003		1306	W	4				W1084
KEP-6W-008-003		1424	W	4				W1085
KEP-6W-007-003		1457	W	4				W1086
KEP-6W-006-003		1514	W	4				W1087
KEP-6W-005-003		1528	W	4				W1088
KEP-6W-004-003		1603	W	4				W1089
KEP-6W-002-003		1617	W	4				W1090
DUPLICATE			W	4				W1091
KEP-FB-003-004		1624	W	2				W1092
EQ41P NINOSATE		1637	W	2				W1093
TRIP BLANK			W	1	B	82608		W1094

\*Preservation Code  
 A=None B=HCL C=H2SO4  
 D=HNO3 E=EnCore F=Methanol  
 G=NaOH O=Other(Indicate)

Relinquished By: **Robert Martin** Date/Time: **3/2/05 1737**  
 Relinquished By: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Received By: \_\_\_\_\_ Date/Time: \_\_\_\_\_  
 Received By: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Quote No.: \_\_\_\_\_  
 Date/Time: **03/02/05 1740**

Custody Seal: Present/Absent  
 Shipped Via: \_\_\_\_\_  
 Receipt Temp: \_\_\_\_\_  
 Temp Blank Y N



**Environmental Chemistry  
Consulting Services, Inc.**

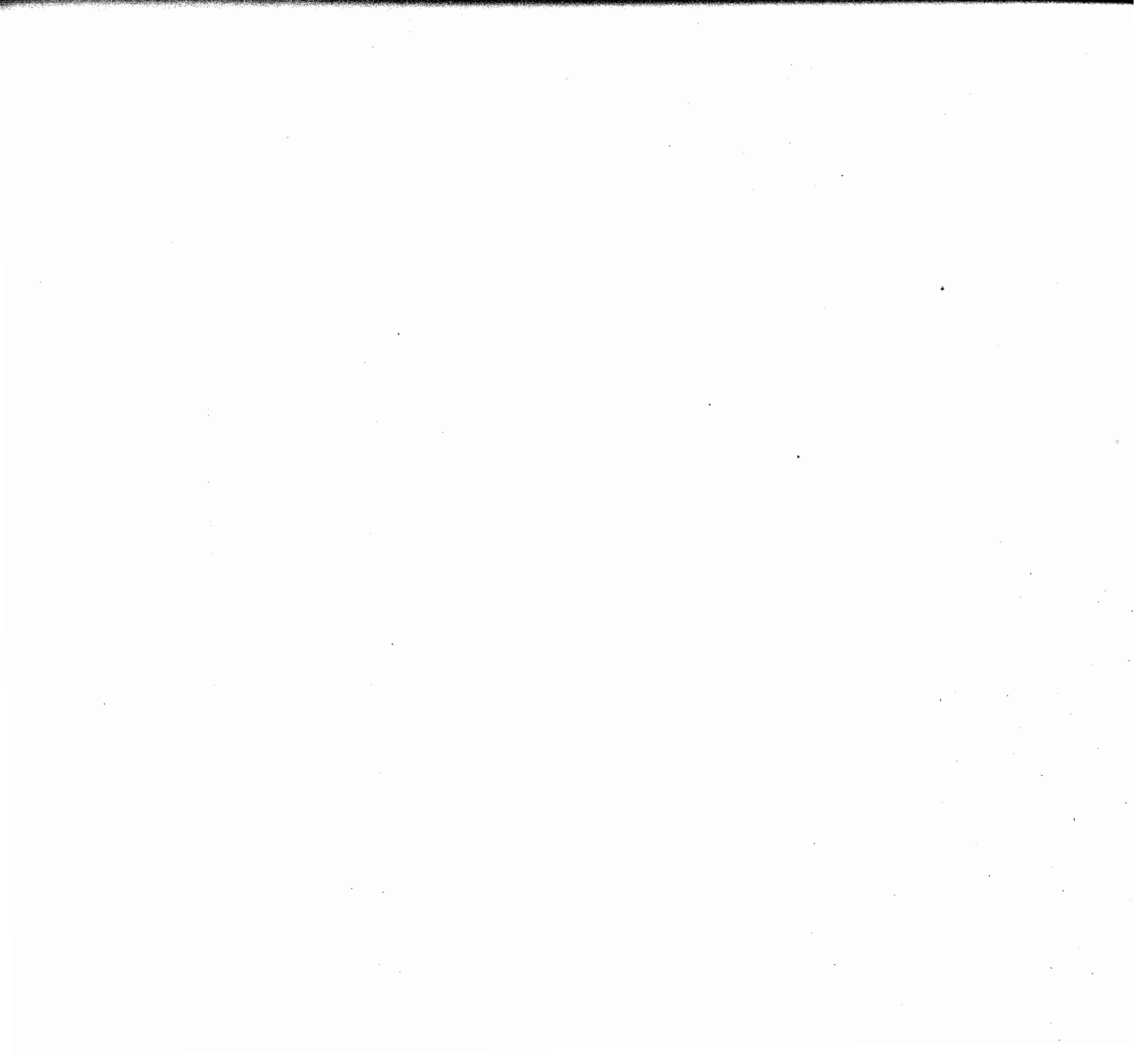
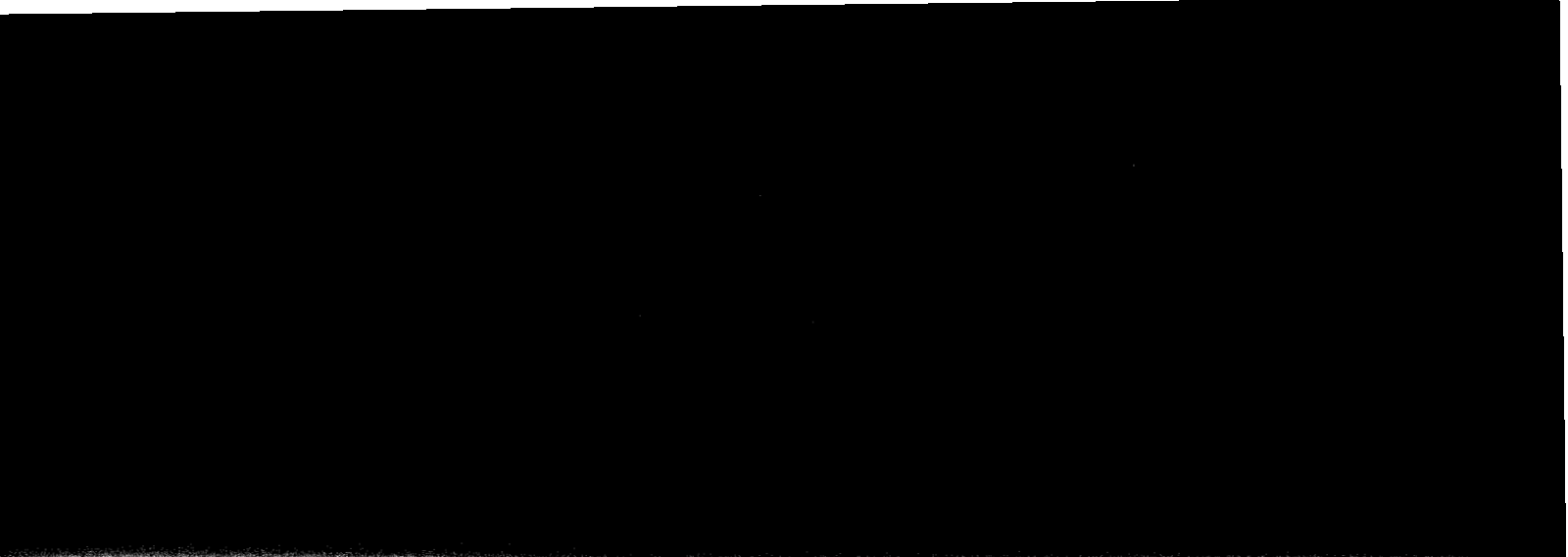
2525 Advance Road  
Madison, WI 53718  
Phone 608-221-8700 FAX 608-221-4889

**CHAIN OF CUSTODY**  
*3/12/05*

No. 008873 \*  
Page 1 of 1

Turn Around (circle one) Normal Rush  
Report Due:

Project Number:		Mail Report To:		P.O. No.:		Quote No.:	
Project Name: <i>KULPMAN ELECTRIC</i>		Company: <i>WINSLOW &amp; SULLIVAN</i>		Analysis Requested:		Laboratory Number	
Project Location: <i>CHESTER SPRINGS</i>		Address:		Preserv*:		Comments	
Sampled By (Print): <i>Robert Martin</i>		Matrix:		Total Bottles:		Date/Time:	
Sample Description	Collection		Matrix	Preserv*	Analysis Requested	Comments	Laboratory Number
	Date	Time					
<i>KEP-WP-005-006</i>	<i>3/12/05</i>	<i>0942</i>	<i>W</i>	<i>A/B</i>	<i>80P2061 / P2008</i>	<i>95'</i>	<i>W1138</i>
<i>KEP-WP-005-007</i>		<i>1047</i>	<i>W</i>	<i>A/B</i>	<i>80P2061 / P2008</i>	<i>105'</i>	<i>W1139</i>
<i>KEP-GW-009-001</i>		<i>1119</i>	<i>W</i>	<i>A/B</i>	<i>80P2061 / P2008</i>		<i>W1140</i>
<i>QUIP RINSE</i>		<i>1151</i>	<i>W</i>	<i>A/B</i>	<i>80P2061 / P2008</i>		<i>W1141</i>
<i>Duplicate</i>			<i>W</i>	<i>A/B</i>	<i>80P2061 / P2008</i>		<i>W1142</i>
<i>KEP-WP-006-001</i>		<i>1542</i>	<i>W</i>	<i>A/B</i>	<i>80P2061 / P2008</i>	<i>65'</i>	<i>W1143</i>
<i>KEP-WP-006-002</i>		<i>1618</i>	<i>W</i>	<i>A/B</i>	<i>80P2061 / P2008</i>	<i>70'</i>	<i>W1144</i>
<i>KEP-WP-006-003</i>		<i>1657</i>	<i>W</i>	<i>A/B</i>	<i>80P2061 / P2008</i>	<i>75'</i>	<i>W1145</i>
<i>KEP-WP-006-004</i>		<i>1733</i>	<i>W</i>	<i>A/B</i>	<i>80P2061 / P2008</i>	<i>80'</i>	<i>W1146</i>
Relinquished By: <i>Robert Martin</i>		Date/Time: <i>3/12/05 1754</i>		Received By: <i>[Signature]</i>		Date/Time: <i>3/12/05 1754</i>	
Relinquished By:		Date/Time:		Received By:		Date/Time:	
*Preservation Code		Intact/Not Intact		Receipt Temp:		Temp Blank Y N	
A=None B=HCL C=H2SO4		Present/Absent		Seal #s		Shipped Via:	
D=HNO3 E=EnCore F=Methanol							
G=NaOH O=Other(Indicate)							



**Appendix B**

**FEDEX shipping label for Paradigm Labs**





## **Appendix C**

### **Chain of Custody Sheets for samples sent to Paradigm Labs**



## Paradigm:

TRG (ug/L)

sec-Butylbenzene	60
tert-Butylbenzene	60
Chlorobenzene	100
1,3-Dichlorobenzene	14.4
1,4-Dichlorobenzene	75
1,1-Dichloroethane	798
1,1-Dichloroethene	7
trans-1,3-Dichloropropene	n/a
Ethylbenzene	700
Isopropylbenzene	658
n-Propylbenzene	60.8
1,1,1-Trichloroethane	200
1,2,3-Trichlorobenzene	n/a
1,2,4-Trichlorobenzene	70
1,3,5-Trichlorobenzene	n/a
1,2,4-Trimethylbenzene	12.3
1,3,5-Trimethylbenzene	12.3
m,p,o-Xylene	12000
Pentachlorobenzene	4.87
1,2,4,5-Tetrachlorobenzene	1.83
1,2,3,4-Tetrachlorobenzene	n/a