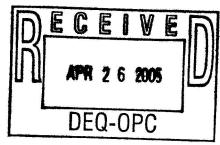
# DATA SUMMARY and SITE CHARACTERIZATION WORKPLAN FILE COPY

104, 106 and 110 Puckett Street Crystal Springs, Mississippi

Prepared for

BorgWarner Inc.

April 2005



## DATA SUMMARY and SITE CHARACTERIZATION WORKPLAN

#### 104, 106 and 110 Puckett Street Crystal Springs, Mississippi

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FILE COPY

Prepared by

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**April 2005** 

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#### 1.0 INTRODUCTION

The Kuhlman Electric Corporation (KEC) plant in Crystal Springs, Mississippi was constructed and has been owned and operated as a transformer manufacturing plant since the 1950s by KEC or its predecessors (collectively "KEC"). KEC continued to own and operate the plant in March 1999 when BorgWarner Inc. purchased the stock of Kuhlman Corporation, the parent of KEC, and thereafter as well. Seven months later, on October 5, 1999, Kuhlman Corporation sold KEC's stock to KEC Acquisition Corporation. BorgWarner and Kuhlman Corporation indemnified KEC, KEC Acquisition Corporation and their affiliates for historic contamination at the site and have, under the purchase agreement, exercised their right to control any remediation of such contamination.

Previous environmental assessments conducted at the KEC plant site indicated that soil contaminated with polychlorinated biphenyl (PCB) Aroclor 1260 was present on-site. PCB impacted soil was reportedly transported and deposited on the property located at 106 Puckett Street in Crystal Springs, Mississippi.

On August 28, 2001 3TM International, Inc. collected twenty soil samples at 106 Puckett Street (Figure 1). One of the samples had a concentration of PCBs as Aroclor 1260 at 1.83 milligrams per kilogram (mg/Kg), above the 1 mg/Kg residential standard established by the Mississippi Department of Environmental Quality (MDEQ). The 3TM International, Inc. (3TM) report was submitted to MDEQ with a cover letter dated October 18, 2004. Upon receipt of the 3TM report MDEQ, on October 25, 2004, requested that BorgWarner investigate the soils at the 106 Puckett Street property. At MDEQ's request, on January 17, 2005 BorgWarner began soil sampling activities at 106 Puckett Street.

#### 1.1 Summary of Soil Sampling Activities

On January 17 and 18, 2005, a total of 36 soil samples were collected and analyzed for PCBs from 106 Puckett Street. Laboratory results indicated that nine samples had PCB concentrations greater than 1 mg/Kg.

On February 25, and 26, 2005 the assessment was expanded to include samples from the side yards of 104 and 110 Puckett Street, as well as the backyard of 106 Puckett Street north to the fence line. A total of 84 soil samples were collected during this second sampling event. Soil samples were collected at depths ranging from 0-1 foot below ground surface (bgs) and 1-2 feet bgs. Analytical results from the expanded assessment indicated that of the 84 samples collected, 19 samples had PCB concentrations exceeding the MDEQ regulatory limit of 1 mg/Kg. Of the samples that exceeded 1 mg/Kg, one sample had a PCB concentration in excess of 50 mg/Kg with a concentration of 51 mg/Kg. All samples with PCB concentrations greater than 1 mg/Kg were collected from 0-1 foot bgs except one sample collected at 106 Puckett Street. Sample locations and corresponding analytical results are presented on Figure 2. Summaries of the analytical results are presented in Tables 1, 2, and 3. Laboratory reports are included in Appendix 1, and the Data Evaluation Report is included in Appendix 2.

#### 1.2 Assessment Objectives

The site characterization objective for the Puckett Street properties is to determine the horizontal and vertical extent of impacted soil. Soil samples will be collected along the roadside ditch located on the south side of the property. Samples will also be collected to the west and north of the areas previously sampled and at depth until the horizontal and vertical extent of impacted soil is delineated. Results from this assessment will be used to prepare a remediation work plan. The following sections of this work plan include a sampling plan, sampling protocols, and quality assurance and quality control procedures.

#### 2.0 FIELD SAMPLING PLAN

During soil sampling activities at the 106, 104, and 110 Puckett Street properties, a total of 120 soil samples were collected from 60 locations in January and February 2005. Sampling results indicate that the soils at these three properties have PCB concentrations in excess of the 1.0 mg/Kg residential standard established by MDEQ. This work plan describes proposed sampling activities necessary to delineate the extent of PCB impacted soil at 106 Puckett Street and surrounding properties.

This site characterization plan was prepared in accordance with the US Environmental Protection Agency (USEPA), *Environmental Investigations Standard Operating Procedure and Quality Assurance Manual*, November 2001 (EISOPQAM).

#### 2.1 Regional Geology

Sediments consisting of fine-grained sands with local lenses of clay and gravel underlie Crystal Springs and the surrounding area. These red and orange sediments comprise the Citronelle Formation. The Citronelle Formation covers approximately 30 percent of Copiah County and is present at ground surface in the vicinity of Crystal Springs. Gravel, mainly consisting of chert and quartz is present throughout the formation near Crystal Springs and is heavily mined in the surrounding area. The thickness of this formation ranges from a few feet to a maximum of 100 feet with average depths ranging from 20 to 80 feet. Thickness of the unit is controlled by erosion of surface soils. The thinner segments are located in washes and drainage channels, while the thicker portions are located on topographically high areas. The Citronelle formation lies unconformably over the Catahoula Formation in the vicinity of Crystal Springs with the base elevations of the Citronelle ranging from 375 feet mean sea level (msl) to about 430 msl.

According to published literature, the uppermost aquifer in the area of Crystal Springs exists under phreatic conditions (unconfined) and rises into the Citronelle Formation.

Groundwater generally exists near the base of the Citronelle. Since the surficial aquifer is under phreatic conditions, no extensive clay confining units are anticipated above this first aquifer. Depth to groundwater ranges from 20 to greater than 100 feet with more than half of the water levels measured in wells deeper than 50 feet. Average rainfall totals 57.2 inches per year in the Copiah County area, of which approximately 44 inches evaporate. Precipitation that does not evaporate or does not run off into streams and drainages recharges the surficial aquifer.

Eight municipal water supply wells are currently in operation in within 1.5 miles of the Puckett Street properties. Seven of the municipal wells are used for drinking water and one is used as a water supply for the municipal pool. These wells are screened in the upper aquifer (Citronelle Formation). The municipal wells supply water to the City of Crystal Springs. A survey is currently underway to identify any existing private drinking water wells located within a 0.5 mile radius of the KEC plant site.

#### 2.2 Sampling of the 106 Puckett Street Site and Adjacent Properties

Sampling results indicate that the horizontal extent of impacted soil is defined to the east of 106 Puckett Street. Impacted soil extends approximately 3 to 10 feet into the property at 104 Puckett Street. The horizontal extent of impact to the north and west has not yet been defined. Samples have been collected at 110 Puckett Street to the west and results indicate that site soils have PCB concentrations in excess of 1.0 mg/Kg. Samples have not been collected to the north of 106 Puckett Street pending identification of land owners and gaining access to those properties.

The sampling grid will be horizontally expanded beyond 106 Puckett Street property onto 110 Puckett Street and the northern adjacent properties until the edge of impacted soil is identified. Sampling will proceed laterally until PCB concentrations detected in soil samples are below the MDEQ limit of 1.0 mg/Kg. Properties to the south across Puckett

Street have not been sampled. The roadside drainage ditch on the south side of 106, 104, 110 Puckett Street intercepts runoff and channels flow to the west toward McPherson Street and the North Drainage Channel and acts as a boundary to southern migration of PCBs.

To complete the assessment, samples will be collected with depth at each new sample location, and at sample location MWP-HA-027 previously sampled, to identify the depth of impacted soil. The previously mentioned sample location has 12 mg/kg at a depth of 2 feet and the depth of impacted soil has not been defined at this location. The depth of impacted soil has been identified at all other locations sampled to date.

The horizontal and vertical extent of PCB contamination will be determined by:

- Collecting surface and subsurface soil samples;
- Analyzing samples by the on-site laboratory; and,
- Analyzing at least 10% of the soil samples by the off-site laboratory to confirm the results of the on-site laboratory.

Sample points will be located on a grid with collection points no greater than 20 feet apart. The grid will be extended on all sides of each sample point when analytical results indicate that the sample from that location exceeds 1.0 mg/Kg. The grid will be extended horizontally until the PCB concentrations in soil collected from outermost points are less than 1.0 mg/Kg. Approximate sampling point locations are presented in Figure 2.

Samples will be collected by the field geologist using a direct-push sampling rig with GeoProbe® and MacroProbe™ equipment using a hydraulically driven hammer to advance a hollow stainless steel sampler to the desired depth. The sampler contains an acetate liner in which a sample of the cored soil is retained. The MacroProbe™ corer

retains a 1.25-inch diameter continuous core 4 feet in length. In areas inaccessible to the direct push sampling rig samples will be collected using a hand auger.

Prior to the beginning of sampling activities, boundary line surveys will be conducted on the properties within the study area. Samples will be located within each property and given a unique sample designation that identifies the sample with the specific property. Sample location control will be conducted by a registered land surveyor using a robotic total station. Each sample will be mapped on the state plane coordinate system.

#### 2.3 Soil Sample Handling and Analysis

All soil samples will be collected and managed in accordance with USEPA Region IV EISOPQAM protocols. Samples will be collected using clean sampling equipment. Equipment rinseate samples will be collected and analyzed to confirm the effectiveness of the decontamination procedures.

Each sample will be assigned a unique sample identification designation in accordance with the labeling requirements under section 3.2.1 of Environmental Investigation Standard Operating Procedure and Quality Assurance Manual (EISOPQAM). Field records will be kept in accordance with procedures specified in section 3.5 of EISOPQAM. The sample identification designation, date, and time of collection will be recorded in the field book and on the chain of custody for cross-referencing.

Upon collection, samples will be placed in 4-ounce amber glass jars, and the jars transferred to a sample cooler. Field personnel will deliver samples to the on-site lab several times each day. Upon arrival at the on-site lab, the samples will be transferred to the sample custodian who will log each sample on the chain of custody form. Each sample will be assigned a unique on-site laboratory internal ID number for tracking purposes. After analysis, the samples will be transferred to either a sample refrigerator in

the on-site lab or stored in coolers until, either sent to the off-site lab for confirmation analysis or designated for disposal. Chain of custody forms will be completed for all samples packaged and shipped to the off-site laboratory for confirmation analysis.

#### 2.4 Analytical Procedures

For analysis of samples in the on-site lab, EPA method 8082m, modified for the miniextraction will be used. The off-site laboratory will use EPA method 8082 for quantitation of PCBs. The Quality Assurance/Quality Control Project Plan is included in Section 3.0.

#### 2.5 Investigation Derived Waste

Management of investigation derived waste (IDW) will be the responsibility of the Field Manager. IDW includes but is not limited to, soil cuttings, acetate sampling tubes, decontamination solutions and water, personal protective clothing, gloves, and any other material to be discarded that has come in contact with PCBs.

All daily IDW will be placed in labeled, open-top drums in a secure location at the point of use. At the end of each day the IDW will be transferred to a designated roll-off box located in a secure location on the KEC plant site until removal to an appropriate disposal facility. Prior to disposal, IDW will be profiled either by direct sampling and analysis of the material or by using current, existing analytical data from the assessment activities. The roll-off box containing the IDW will be manifested under the KEC EPA I.D. Number and transported to a disposal facility within 90 days of final IDW accumulation.

#### 2.6 Regulatory Involvement

MDEQ is the lead regulatory agency in charge of this assessment. The responsible parties and MDEQ currently hold monthly meetings to receive updates on activities related to the PCB cleanup in Crystal Springs, MS. These meetings will continue throughout this assessment. Additionally, MDEQ representatives periodically visit the various sites where assessment and/or remediation are taking place to observe operations and split samples for state laboratory confirmation. A notification will be made to MDEQ three days prior to the beginning of the assessment to allow for an MDEQ representative to observe the sampling activities and obtain split samples.

#### 2.7 Permitting

Based on the assessment activities presented in this work plan, no permits are required to initiate or complete the sampling.

#### 3.0 QUALITY ASSURANCE /QUALITY CONTROL PLAN

As established by the Mississippi Department of Environmental Quality (MDEQ) guidelines, all work related to the site characterization of the 106 Puckett Street and adjacent properties will be performed in accordance with the *Environmental Protection Agency (EPA)*, Region IV "Environmental Investigations, Standard Operating Procedures and Quality Assurance Manual", November 2001 (EISOPQAM). Copies of relevant and applicable portions of the EISOPQAM will be maintained on site during all field activities and all field personnel will be trained in its implementation.

#### 3.1 Sampling Objectives

The sampling objective for this characterization work is to determine the horizontal and vertical extent of PCBs in soils, specifically Aroclor 1260. Soil samples will be collected from direct push tubes or hand augers by the field geologist at the locations and frequencies prescribed in Section 2 of this work plan.

#### 3.2 Analytical Methods

Samples will be analyzed for PCBs by the on-site laboratory, Environmental Chemistry Consulting Services (ECCS) of Madison, Wisconsin. Soil samples will be screened by the on-site laboratory to quantify PCB concentrations in soils. At least 10% of all samples will be split and sent to the off-site laboratory, Paradigm Analytical Laboratories, Inc. (PAL) in Wilmington, North Carolina for analysis of the same parameters analyzed by the on-site laboratory. This measure is taken to corroborate the results of on-site laboratory analyses.

The on-site laboratory will analyze the soil samples using a mini-extraction procedure based on EPA Method 8082/8141 for PCBs. The procedure incorporates all the quality

control rigors of the full 8082 method, 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 duplicate (MS/MSD) samples.

The off-site laboratory will analyze all soil samples using EPA method 8082 for PCBs.

#### 3.3 Key Personnel

The following is the list of key personnel dedicated to this project:

Project Manager: Robert Martin, Martin & Slagle GeoEnvironmental Associates,

LLC

Duties: Responsible for overall management of project, including all field

coordination efforts.

<u>Field Manager</u>: Charles Peel, Peel Consulting, PLLC

Duties: Field oversight of remedial activities. Collection of samples.

Maintenance of all field logs and records.

On-Site Laboratory

Manager: Richard Johnson, ECCS

Duties: Responsible for accepting custody of samples from the field

personnel. Maintenance of laboratory records. Analyze samples.

QA/QC

Coordinator: Christine Slagle, Martin & Slagle GeoEnvironmental Associates,

LLC

Data Summary and Site Characterization Work Plan Puckett Street, Crystal Springs, Mississippi April 2005

**Duties:** 

Review daily sample logs. Confirm that QC samples are collected and sampling protocols are met. Assure that data quality objectives are met.

#### 3.4 Quality Assurance Objectives for Data

The data quality objectives are pre-defined for the ECCS data in that Mississippi considers all on-site lab data screening level data. ECCS uses the same equipment and methodology as the off-site lab, with the exception of the mini-extraction modification. A total of 10% of the samples collected will be split and submitted to Paradigm Analytical for confirmation analysis. Following this procedure, the data will qualify as screening data with definitive confirmation under EPA Region IV EISOPQAM guidelines.

Samples designated for further analysis by Paradigm will be delivered to the on-site lab where ECCS personnel will take their aliquot for analysis following thorough mixing of the sample in the sample container. Due to the limited sample volume required by the ECCS mini-extraction and the low volatility of the contaminants of concern, the sample container will be resealed, refrigerated, and then sent to the off-site (Paradigm) laboratory for analysis. Therefore, Paradigm will be analyzing the exact same sample as the on-site (ECCS) laboratory.

Equipment rinsates will be collected, preserved and analyzed for evaluation of cross-contamination potential. Equipment rinsates will be prepared by pouring distilled water over the sampling equipment after its decontamination.

Field blanks will be collected by filling sampling containers, which have been kept in the transition zone with distilled water.

Blind duplicate samples will be collected for analysis and sent to both the on-site and off-site labs. Blind duplicate samples will be prepared by splitting the homogenized sample into 2 separate sample containers. After the on-site lab (ECCS) retains its aliquot the remainder of the sample will be sent to the off-site (Paradigm) lab for analysis.

#### 3.5 Sample Control and Field Records

#### 3.5.1 Sample Identification

Each sample will be assigned a unique alpha-numeric identifier that will be clearly recognizable by both laboratories. Sample labels will conform to the labeling requirements under section 3.2.1 of the EISOPQAM.

#### 3.5.2 Chain of Custody Procedures

The field geologist will record the sample ID, date, and time sampled in the field logbook at the time of collection. Samples will be placed in a cooler and transferred by the field geologist to the on-site laboratory. Upon arrival at the on-site lab, the samples will be transferred to the ECCS laboratory manager who will log each sample on ECCS chain of custody forms. Each sample will be assigned a unique ECCS internal ID for tracking purposes. After analysis, the samples will be transferred to a sample refrigerator in the on-site lab until they are either sent to Paradigm for confirmation analysis or disposed of. For samples sent to Paradigm, a new chain of custody form will be filled out by the field geologist for the sample transfer.

#### 3.5.3 Field Records

Field records will be kept in accordance with procedures specified in section 3.5 of EISOPQAM.

#### 3.6 Laboratory QA/QC

QA/QC for both labs is identical. Summaries of each lab's procedures follow.

#### **On-site Laboratory, ECCS:**

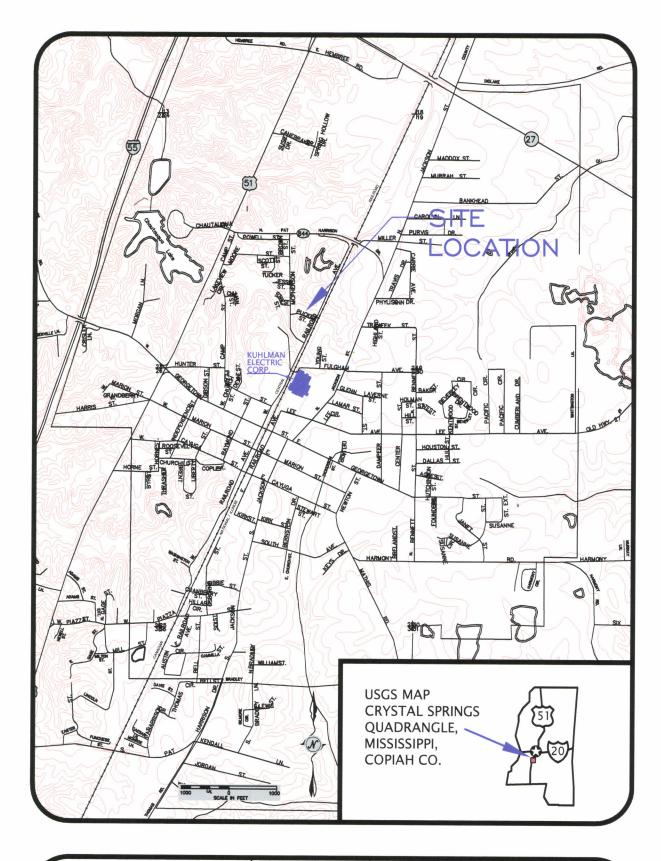
- Continuing calibration standards will be analyzed every ten samples or less and at the end of a run.
- Blank and LCS samples will be analyzed every twenty samples or less with a minimum of one per day.
- MS/MSD samples will be analyzed every twenty samples or less with a minimum of one per day.

#### Off -Site Laboratory, Paradigm:

- Continuing calibration standards will be analyzed at least once every 12-hour shift plus a minimum of every 20 samples (GC/MS criteria follows method specific tuning requirements per EPA 8270).
- Blank and LCS samples will be analyzed every twenty sample or less with a minimum of one per day.
- MS/MSD samples will be analyzed every twenty samples or less with a minimum of one per day.

#### 3.7 Data Review and Validation

All laboratory reports will be reviewed for reporting accuracy and consistency with laboratory QA/QC protocols. The primary validation of the on-site lab data will be accomplished through comparison with the data from the off-site lab. The relative percent difference (RPD) between the laboratory's results for split samples will be calculated and compared to a 100 % RPD acceptability threshold.



## MARTIN&SLAGLE GeoEnvironmental Associates, LLC PO Box 1023 Black Mountain NC 28711 828.669.3929 828.669.5289 SCALE = 1":2000' REV: 0 DATE: 04/14/05 DR: DGR CHK: RLM PREPARED FOR: BorgWarner Inc. SCALE = 1":2000' REV: 0 DATE: 04/14/05 DR: DGR CRYSTAL SPRINGS, MS FIGURE 1

Summary of Analytical Results
Maggie Williams Property
Puckett Street
Crystal Springs, Mississippi

							On-site	On-site Laboratory		Off-site Laboratory	oratory
		!	1	-	Date	Time	Date	Concentration	Date	Date	Concentration
	Ē	Sample ID	Depth	Z DIII	Collected	Collected	Analyzed	PCB mg/kg	Extracted	Analyzed	PCB mg/kg
MWP	¥	001 001	0-12"	Yes	1/17/2005	10:10	01/17/2005	2.1	01/30/05	01/31/05	2.2
MWP	¥	001 002	12-24"		1/17/2005	10:31	01/17/2005	0.32			
MWP	₹	002 001	0-12"		1/17/2005	10:43	01/17/2005	3.6			AL - 15
MWP	¥	002 002	12-24"	Const	1/17/2005	11:09	01/17/2005	0.18			
MWP	¥	003 001	0-12"		1/17/2005	11:21	01/17/2005	15			
MWP	НА	003 002	12-24"		1/17/2005	11:55	01/17/2005	<0.1			
MWP	¥	004 001	0-12"		1/17/2005	13:10	01/18/2005	3.6			ili N
MWP	¥	004 002	12-24"		1/17/2005	13:22	01/18/2005	0.24			
MWP	¥	005 001	0-12"	Yes	1/17/2005	13:34	01/18/2005	7.7	01/30/05	02/03/05	3.55
MWP	¥	005 002	12-24"		1/17/2005	13:43	01/18/2005	<0.1			
MWP	¥	006 001	0-12"	Yes	1/17/2005	13:56	01/18/2005	19	01/30/05	02/03/05	12.7
MWP	¥	006 002	12-24"		1/17/2005	14:04	01/18/2005	0.95			
MWP	¥	100 200	0-12"		1/17/2005	14:23	01/18/2005	4.5			
MWP	¥	007 002	12-24"		1/17/2005	14:33	01/18/2005	0.13			
MWP	¥	008 001	0-12"		1/17/2005	14:43	01/18/2005	0.12			
MWP	¥	008 002	12-24"		1/17/2005	14:52	01/18/2005	<0.1			
MWP	¥	100 600	0-12"		1/17/2005	15:08	01/18/2005	0.16			
MWP	¥	000 002	12-24"		1/17/2005	15:15	01/18/2005	<0.1			
MWP	H	010 001	0-12"		1/17/2005	15:28	01/18/2005	<0.1			
MWP	¥	010 002	12-24"		1/17/2005	15:35	01/18/2005	<0.1			
MWP	¥	011 001	0-12"	Yes	1/17/2005	15:46	01/18/2005	0.23	01/30/05	01/31/05	0.288
MWP	¥	011 002	12-24"		1/17/2005	15:55	01/18/2005	<0.1			
MWP	¥	012 001	0-12"	Yes	1/18/2005	08:24	01/18/2005	0.33	01/30/05	01/31/05	0.366
MWP	¥	012 002	12-24"		1/18/2005	08:37	01/18/2005	<0.1		The state of the s	
MWP	¥	013 001	0-12"		1/18/2005	08:48	01/18/2005	0.28			
MWP	¥	013 002	12-24"		1/18/2005	08:58	01/18/2005	<0.1			
MWP	¥	014 001	0-12"		1/18/2005	70:60	01/18/2005	0.35	Company to the state of the sta	The second data was considered as the second	The state of the s
MWP	HA	014 002	12-24"		1/18/2005	09:16	01/18/2005	<0.1			
MWP	¥	015 001	0-12"		1/18/2005	09:55	01/18/2005	2.0			The state of the s
MWP	HA	015 002	12-24"		1/18/2005	10:09	01/18/2005	0.36			
MWP	H	016 001	0-12"	Yes	1/18/2005	10:19	01/18/2005	2.1	01/30/05	02/01/05	1.82

Summary of Analytical Results
Maggie Williams Property
Puckett Street
Crystal Springs, Mississippi

							On-site	On-site Laboratory		Off-site Laboratory	oratory 🐔 🐇
					Date		Date	Concentration	Date	Date	Concentration
,	Sam	Sample ID	Depth	Split	Collected	Collected	Analyzed	PCB mg/kg	Extracted	Analyzed	PCB mg/Kg
MWP	¥	016 002	12-24"		1/18/2005	10:32	01/18/2005	0.11			
MWP	¥	017 001	0-12"		1/18/2005	10:41	01/18/2005	<0,1			
MWP	¥	017 002	12-24"		1/18/2005	10:50	01/18/2005	<0.1			
MWP	¥	018 001	0-12"		1/18/2005	10:58	01/18/2005	<0.1			
MWP	Ħ	018 002	12-24"		1/18/2005	11:07	01/18/2005	<0.1			A CANADA
MWP	¥	019 001	0-12"	Yes	2/25/2005	12:34	02/25/2005	6.8	03/12/05	03/12/05	4.14
MWP	¥	019 002	12-24"		2/25/2005	12:45	02/25/2005	0.24			
<b>JWW</b>	¥	020 001	0-12"		2/25/2005	12:54	02/25/2005	1.1			
MWP	¥	020 002	12-24"		2/25/2005	13:03	02/25/2005	0.12			
MWP	¥	021 001	0-12"		2/25/2005	13:12	02/25/2005	0.20			
MWP	¥	021 002	12-24"		2/25/2005	13:20	02/25/2005	<0.1			
MWP	¥	022 001	0-12"		2/25/2005	13:32	02/25/2005	1.6			
	¥	022 002	12-24"		2/25/2005	13:40	02/25/2005	<0.1			
MWP	¥	023 001	0-12"	Yes	2/25/2005	16:12	02/25/2005	2.6	03/10/05	03/12/05	1.7
MWP	¥	023 002	12-24"		2/25/2005	16:18	02/25/2005	<0.1			
MWP	¥	024 001	0-12"		2/25/2005	17:05	02/25/2005	<0.1			
MWP	¥	024 002	12-24"		2/25/2005	17:12	02/25/2005	<0.1			
MWP	¥	025 001	0-12"		2/25/2005	17:23	02/25/2005	0.42			8
MWP	¥	025 002	12-24"		2/25/2005	17:31	02/25/2005	<0.1			
MWP	¥	026 001	0-12"	Yes	2/26/2005	17:21	02/26/2005	2.0	03/10/05	03/12/05	2.28
MWP	₹	026 002	12-24"		2/26/2005	17:26	02/26/2005	0.35			
MWP	¥	027 001	0-12"		2/26/2005	17:30	02/26/2005	51			
MWP	¥	027 002	12-24"		2/26/2005	17:35	02/26/2005	12			
MWP	₹	028 001	0-12"		2/26/2005	17:41	02/26/2005	4.2		e e	
MWP	H	028 002	12-24"		2/26/2005	17:47	02/26/2005	0.74			the third work

Table 2
Summary of Analytical Results
Zedie Wilson Property
104 Puckett Street
Crystal Springs, Mississippi

							On-sit	On-site Laboratory		Off-site Laboratory	oratony
	Sar	Sample ID	Depth	Split	Date Collected	Time Collected	Date Analyzed	Concentration PCB mg/Kg	Date Extracted	Date Analyzed	Concentration PCB mg/Kg
ZWP	¥	001 001	0-12"	Yes	2/25/2005	08:50	02/25/2005	<0.1	03/10/05	03/12/05	<.122
ZWP	¥	001 002	12-24"		2/25/2005	09:03	02/25/2005	<0.1			
ZWP	Η	002 001	0-12"		2/25/2005	09:10	02/25/2005	٥٥.1			
ZWP	HA	002 002	12-24"		2/25/2005	09:20	02/25/2005	<0.1			
ZWP	H	003 001	0-12"		2/25/2005	09:30	02/25/2005	<0.1			
ZWP	HA	003 002	12-24"		2/25/2005	09:40	02/25/2005	<b>c</b> 0.1			
ZWP	¥	004 001	0-12"		2/25/2005	09:20	02/25/2005	0.15		An area of the section of the sectio	and comment that the property of the contract
ZWP	HA	004 002	12-24"		2/25/2005	09:58	02/25/2005	<0.1	The state of the s		
ZWP	H	005 001	0-12"		2/25/2005	10:08	02/25/2005	<0.1			ATTENDED TO THE CONTRACT OF TH
ZWP	¥	005 002	12-24"		2/25/2005	10:15	02/25/2005	<0.1			
ZWP	¥	006 001	0-12"		2/25/2005	10:26	02/25/2005	<0.1		Communication of the Communica	
	H	006 002	12-24"		2/25/2005	10:34	02/25/2005	<0.1			
	¥	007 001	0-12"		2/25/2005	10:43	02/25/2005	<0.1			
ZWP	¥	007 002	12-24"		2/25/2005	10:53	02/25/2005	<0.1			
	¥	008 001	0-12"	Yes	2/25/2005	11:02	02/25/2005	0.78	03/10/05	03/12/05	0.394
ZWP	Η	008 002	12-24"		2/25/2005	11:08	02/25/2005	<0.1		1000	
ZWP	HA	009 001	0-12"	Yes	2/25/2005	16:27	02/25/2005	2.4	03/10/05	03/12/05	1.94
ZWP	¥	000 005	12-24"		2/25/2005	16:36	02/25/2005	0.56			
ZWP	¥	010 001	0-12"		2/25/2005	16:45	02/25/2005	0.53			
ZWP HA		010 002	12-24"		2/25/2005	16:53	02/25/2005	<0.1			

Table 3
Summary of Analytical REsults
Gregory Turner Property
110 Puckett Street
Crystal Springs, Mississippi

					On-site	On-site Laboratory		Off-site Laboratory	oratory
Joseph		Colif	Date	Time	Date	Concentration	Date		Concentration
eptil	2000	nido.	Collected	Collected	Analyzed	PCB mg/kg	Extracted	Analyzed	PCB mg/Kg
2.7		3	100011010						
71-0	+	res	2/25/2005	14:10	02/25/2005	0.11			<.105
12-24"	_		2/25/2005	14:20	02/25/2005	<0.1		and the second s	Street and the street
0-12"	+		2/25/2005	14:32	02/25/2005	0.37		The state of the s	
12-24"			2/25/2005	14:39	02/25/2005	<0.1			
0-12"			2/25/2005	14:45	02/25/2005	1.6			The state of the s
12-24"			2/25/2005	14:52	02/25/2005	<0.1			
0-12"			2/25/2005	15:04	02/25/2005	2.2			
12-24"			2/25/2005	15:10	02/25/2005	<0.1			
0-12"		Yes	2/26/2005	08:52	02/26/2005	0.18	03/10/05	03/12/05	0.162
12-24"			2/26/2005	09:03	02/26/2005	<0.1			The state of the s
0-12"			2/26/2005	09:15	02/26/2005	0.32			
12-24"			2/26/2005	09:22	02/26/2005	<0.1			The state of the s
0-12"	- 1		2/26/2005	08:30	02/26/2005	<0.1			
12-24"	- 1		2/26/2005	09:37	02/26/2005	<0.1			A SALA (Alla Sala a ) and all
0-12"			2/26/2005	09:47	02/26/2005	0.22			
12-24"			2/26/2005	09:56	02/26/2005	<0.1			1000000
0-12"	- 1		2/26/2005	10:03	02/26/2005	1.2			
12-24"			2/26/2005	10:13	02/26/2005	<0.1			The contraction of the contracti
0-12"	!		2/26/2005	10:38	02/26/2005	1.3			
12-24"			2/26/2005	10:46	02/26/2005	0.22			
0-12"		Yes	2/26/2005	10:53	02/26/2005	1.3	03/10/05	03/12/05	1.25
12-24"			2/26/2005	11:00	02/26/2005	<0.1			
0-12"			2/26/2005	11:08	02/26/2005	0.7			
12-24"	1		2/26/2005	11:15	02/26/2005	<0.1			
0-12"			2/26/2005	11:24	02/26/2005	0.18			
12-24"	- 1		2/26/2005	11.34	02/26/2005	<0.1			
0-12"			2/26/2005	13:19	02/26/2005	1.8			in a series of the series of t
12-24"			2/26/2005	13:26	02/26/2005	0.12			
0-12"			2/26/2005	13:35	02/26/2005	0.19			and developed
12-24"			2/26/2005	13:43	02/26/2005	<0.1			
0-12"		Yes	2/26/2005	13:55	02/26/2005	4.1	03/10/05	03/12/05	2.67
12-24"		8	2/26/2005	14:00	02/26/2005	0.14			Constitution and the second

Table 3
Summary of Analytical REsults
Gregory Turner Property
110 Puckett Street
Crystal Springs, Mississippi

								On-site	On-site Laboratory		Off-site Laboratory	oratory
	Sam	Sample ID		Depth	Split	Date Collected	Time Collected	Date Analyzed	Concentration PCB mg/Kg	Date Extracted	Date Analyzed	Concentration PCB mg/Kg
GTP	¥	017	90	0-12"	*	2/26/2005	14:10	02/26/2005	8			
GТР	¥	017	002	12-24"		2/26/2005	14:21	02/26/2005	0.15		i	
GTP	¥	018	100	0-12"		2/26/2005	14:33	02/26/2005	<0.1			
GTP	¥	018	002	12-24"		2/26/2005	14:40	02/26/2005	<0.1			
GTP	¥	019	100	0-12"		2/26/2005	15:40	02/26/2005	3.6			
GTP	¥	019	002	12-24"		2/26/2005	15:45	02/26/2005	0.33			T O Common Common
GTP	¥	020	100	0-12"		2/26/2005	15:50	02/26/2005	0.46			
GTP	Η	020	005	12-24"		2/26/2005	15:54	02/26/2005	<0.1			
GTP	Н	021	100	0-12"	Yes	2/26/2005	15:58	02/26/2005	2.4	03/10/05	03/12/05	2.25
GTР	¥	021	002	12-24"		2/26/2005	16:02	02/26/2005	0.36			
GTP	¥	022	001	0-12"		2/26/2005	16:06	02/26/2005	0.38			
GTP	¥	022	002	12-24"		2/26/2005	16:10	02/26/2005	<0.1	1.000		



April 7, 2005

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

Jari- Ann Bellian

Dear Mr. Martin,

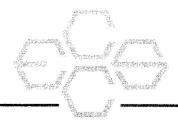
Enclosed is the Technical Memorandum for work completed at the former Borg Warner and current Kuhlman Electric facility in Crystal Springs, Mississippi during the month of January. If you have any questions concerning this information, please give me a call.

Sincerely,

Richard Johnson

Enclosure

## Technical Memorandum Borg Warner / Kuhlman Electric Crystal Springs, Mississippi



#### TECHNICAL MEMORANDUM

April 7, 2005

To: Re

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 soil and water samples collected from MWP-HA samples during January 2005 during an accelerated site investigation episode around the former Borg Warner and current Kuhlman Electric facility in Crystal Springs, Mississippi. Soil and 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 for soils and Table 2 for waters. A summary of method blanks, laboratory control samples and matrix spike/matrix spike duplicate data is provided in Table 3 for the soils and Table 4 for the waters.

In addition copies of the chain of custody sheets and shipping sheets can be found in appendix A through C.

- A) Chain of custody sheets for mobile lab PCB analysis for Excavation 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.

Environmental Chemistry Consulting Services, Inc.

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.

#### **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 two samples (DD005 and DD037). Method states that 1 of the 2 required surrogates must be within range.
- 2. All LCS recoveries were within acceptable ranges. See Table 3 and 4.
- 3. All MS/MSD recoveries were within acceptable ranges. Percent repeatability was also within acceptable ranges. See Table 3 and 4.
- 4. Since electron capture of detectors tend to have a very narrow linear range, many sample extracts required dilution. Dilutions were accurately done.

#### 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. Sample Preparation SOILS: Each sample or quality control sample is prepared in identical fashion. Approximately four grams of silica sand (blanks and control spikes) or sample is transferred into a clean scintillation vial. Ten grams of anhydrous sodium sulfate are added to the vial and mixed well. Extra sodium sulfate is added when necessary to assure the sample is dried. A surrogate, spike compound mix (if necessary) and eight mLs of 80/20 iso-octane/acetone are added to the vial. The vial is shaken for 30 seconds, allowed to settle for 2 minutes, shaken again for 30 seconds, and allowed to settle for 10 minutes. An aliquot of the extract is transferred to an autosampler vial for injection into the GC-ECD.
- 3. 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.
- 4. 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.
- 5. 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 January run sheets.
- 6. 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 Soil Sample Results – January

## Table 1 Kuhlman Electric Crystal Springs, Mississippi PCB Concentrations as Aroclor 1260 Detected

						Field Labo	ratory		
Field Lab Sample ID		Sample Depth	Date Collected	Time Collected	Date Analyzed	Concentration (mg/kg)	Surrogate TCMX(%)	Surrogate	
DD001	MWP-HA-001-001	0-12"	17-Jan-05	10:10	47.1 05				Ī
DD002	MWP-HA-001-002	12-24"	17-Jan-05	10:10	17-Jan-05	2.1	97.8	94.5	
DD003	MWP-HA-002-001	0-12"	17-Jan-05	10:31	17-Jan-05	0.32	96.0	90.0	
DD004	MWP-HA-002-002	12-24"	17-Jan-05	10:43	17-Jan-05	3.6	96.3	85.2	
DD005	MWP-HA-003-001	0-12"	17-Jan-05	11:09	17-Jan-05	0.18	96.2	91.8	
DD006	MWP-HA-003-002	12-24"	17-Jan-05	11:21	17-Jan-05	0.15	119	64.0	
DD007	MWP-Duplicate	12-24		11:55	17-Jan-05	< 0.10	97.5	96.3	T
DD008	MWP-HA-004-001	0-12"	17-Jan-05	40.40	17-Jan-05	1.9	95.5	88.6	T
DD009	MWP-HA-004-001	12-24"	17-Jan-05	13:10	18-Jan-05	3.6	117	82.9	
DD000	MWP-HA-005-001		17-Jan-05	13:22	18-Jan-05	0.24	94.7	89.5	T
DD010	MWP-HA-005-001	0-12"	17-Jan-05	13:34	18-Jan-05	7.7	130	79.5	7,
DD011	MWP-HA-006-001	12-24"	17-Jan-05	13:43	18-Jan-05	< 0.10	95.2	78.7	T
DD012	MWP-HA-006-001	0-12"	17-Jan-05	13:56	18-Jan-05	19	95.3	77.7	T
DD013	MWP-HA-007-001	12-24"	17-Jan-05	14:04	18-Jan-05	0.95	97.1	91.0	T
DD014		0-12"	17-Jan-05	14:23	18-Jan-05	4.5	98.2	84.6	Ť
DD015	MWP-HA-007-002	12-24"	17-Jan-05	14:33	18-Jan-05	0.13	101	92.9	十
DD016	MWP-HA-008-001	0-12"	17-Jan-05	14:43	18-Jan-05	0.12	90.4	74.5	†
DD017	MWP-HA-008-002	12-24"	17-Jan-05	14:52	18-Jan-05	< 0.10	95.8	90.0	十
	MWP-HA-009-001	0-12"	17-Jan-05	15:08	18-Jan-05	0.16	98.8	79.8	†
DD019	MWP-HA-009-002	12-24"	17-Jan-05	15:15	18-Jan-05	< 0.10	95.6	82.5	†
DD020	MWP-HA-010-001	0-12"	17-Jan-05	15:28	18-Jan-05	< 0.10	92.9	81.8	十
DD021	MWP-HA-010-002	12-24"	17-Jan-05	15:35	18-Jan-05	< 0.10	94.2	78.1	t
DD022	MWP-HA-011-001	0-12"	17-Jan-05	15:46	18-Jan-05	0.23	94.1	81.6	t
DD023	MWP-HA-011-002	12-24"	17-Jan-05	15:55	18-Jan-05	< 0.10	98.8	96.4	t
DD024	MWP-HA-012-001	0-12"	18-Jan-05	08:24	18-Jan-05	0.33	91.9	72.6	十
DD025	MWP-HA-012-002	12-24"	18-Jan-05	08:37	18-Jan-05	< 0.10	97.7	88.8	t
DD026	MWP-HA-013-001	0-12"	18-Jan-05	08:48	18-Jan-05	0.28	90.1	75.8	t
DD027	MWP-HA-013-002	12-24"	18-Jan-05	08:58	18-Jan-05	< 0.10	92.1	95.8	t
DD028	MWP-HA-014-001	0-12"	18-Jan-05	09:07	18-Jan-05	0.35	95.9	70.7	H
DD029	MWP-HA-014-002	12-24"	18-Jan-05	09:16	18-Jan-05	< 0.10	92.3	82.8	H
DD030	MWP-Duplicate		18-Jan-05	100 avo (100 av )	18-Jan-05	0.35	96.0	82.1	$\vdash$
DD031	MWP-HA-015-001	0-12"	18-Jan-05	09:58	18-Jan-05	2.0	89.7	75.8	⊢
DD032	MWP-HA-015-002	12-24"	18-Jan-05	10:09	18-Jan-05	0.36	92.4	95.0	┝
DD033	MWP-HA-016-001	0-12"	18-Jan-05	10:19	18-Jan-05	2.1	91.3	74.4	-
DD034	MWP-HA-016-002	12-24"	18-Jan-05	10:32	18-Jan-05	0.11	100	95.0	$\vdash$
DD035	MWP-HA-017-001	0-12"	18-Jan-05	10:41	18-Jan-05	< 0.10	92.4	76.0	
DD036	MWP-HA-017-002	12-24"	18-Jan-05		18-Jan-05	< 0.10	91.8	81.1	
DD037	MWP-HA-018-001	0-12"	18-Jan-05		18-Jan-05	< 0.10	123	56.2	Α
DD038	MWP-HA-018-002	12-24"	18-Jan-05		18-Jan-05	< 0.10	91.7	81.5	$\stackrel{\frown}{}$

#### NOTES:

= Acid Treated.

Surrogate recoveria criteria 60-140% unless sample is acid treated. Surrogate recoveria criteria 75-175% if sample is acid treated.

Table 2
Water Sample Results – January

#### Table 2 Kuhlman Electric Crystal Springs, Mississippi PCB Concentrations as Aroclor 1260 Detected

1						Field Labo	ratory	
Field Lab Sample ID	Sample ID	Sample Depth	Date Collected	Time Collected	Date Analyzed	Concentration (ug/L)	Surrogate TCMX(%)	Surrogate DCBP(%)
W1061	MWP-FB-001	-	17-Jan-05	13:15	20-Jan-05	< 0.25	98.2	106

## Table 3 Soil QC Samples - January

#### Table 3 QC Results

Lab # associated with qc samples:

DD001 through DD002

Matrix

Matrix

Spike

Spike

Duplicate DD003

Blank

LCS

DD003

816

816

Date Analyzed:

1/17/05

1/17/05

1/17/05

1/17/05

Compound	% Rec	% Rec	% RPD	mg/kg	% Rec
PCB as 1260	107	91.3	16%	< 0.10	101

Table 3 QC Results

Lab # associated with qc samples: D

DD021 through DD023

Matrix

Matrix

Spike

Spike

Duplicate

DD023

DD023

Blank 817 LCS 817

Date Analyzed:

1/18/05

1/18/05

1/18/05

1/18/05

Compound	% Rec	% Rec	% RPD	mg/kg	% Rec
DCD on 4200					
PCB as 1260	97.8	103	-5%	< 0.10	95.3

Table 3 QC Results

Lab # associated with qc samples:

DD024 through DD038

Matrix

Matrix

Spike

Spike

Duplicate

DD038

DD038

Blank 818 LCS 818

Date Analyzed:

1/18/05

1/18/05

1/18/05

1/18/05

Compound	% Rec	% Rec	% RPD	mg/kg	% Rec
PCB as 1260	92.4	93.7	-1%	< 0.10	93.4
	02.4	00.7	-176	<u> </u>	9.

### Table 4 Water QC Samples - January

#### Table 4 QC Results

Lab # associated with qc samples: W1061

Matrix

Matrix

Spike

Spike

Duplicate

W1061

W1061

Blank

LCS

Date Analyzed:

1/20/05

1/20/05

1/20/05

1/20/05

Compound	% Rec	% Rec	% RPD	ug/L	% Rec
PCB as 1260	109	120	-10%	< 0.25	120
44.					

#### Appendix A

Chain of Custody Sheets for mobile lab PCB analysis Samples

				11
	100			.1.4
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25.00				13
				11
				4.1

SS, Inc. MAGIC WILLIAM

**CHAIN OF CUSTODY** 

No. 008831

\*

Page / of V

D0000 Laboratory DOODY too do 300 Od >0000 00003 Number DUDOS 00000 7000 Dood 60000 11000 Date/Time: Date/Time: 002/ Turn Around (circle one) Normal Rush Quote No.: Comments , 7-1 1-10 Report Due: invoice To: 1-0 70 DEPTH 1-0 Company: Address: 7-1 1-0 P.O. No. 1-0 7 1-0 Received By Received By Requested ノクナーコント Analysis Company my net in 8 SLACE 11765 Date/Time: Date/Time: Bottles | Preserv\* 1000 FAX 608-221-4889 Mail Report To. Address: Total Matrix 5  $\Diamond$ S 5 5 S 5 Phone 608-221-8700 Merch M 1/14/55/010 1356 Time 1043 1310 1343 108 1322 1334 えか 631 1211 Collection CLECTRIC Relinquished By elinquished By: No. Date Chikk MWP-44003-001 MW1-44001-002 MWP- HACOL-WZ MWP-44001-601 MWP-4402-001 MWP-44 003-002 Project Location: CRYSTAL MWP. 44004-002 Project Name: KMMn MWP- KA 005-002 MWP-HA 004-001 mwp-44006-001 MWP - HA 005. 00 1 D=HNO3 E=EnCore F=Methanol Preservation Code Sample Description A=None B=HCL C=H2SO4 G=NaOH O=Other(Indicate) mwp-oup Sampled By (Print): Project Number

WHITE - REPORT COPY YELLOW - LABORATORY COPY PINK - SAMPLER/SUBMITTER

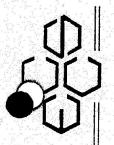
Receipt Temp:

Seal #'s

Intact/Not Intact

Custody Seal: Present/Absent

Shipped Via:



2525 Advance Road

CHAIN OF CUSTODY MAGGIE WICCIAMS 150-21-1

008828 <u></u>

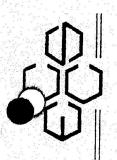
Z of Z Page

Turn Around (circle one) Normal Rush

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CHAIN OF CUSTODY Madison, WI 53718

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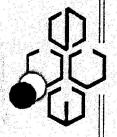
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# **Environmental Chemistry**

Madison, WI 53718 Consulting Services, Inc. 2525 Advance Road

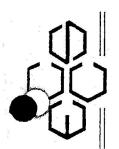
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Madison, WI 53718 FAX 608-221-4889

Phone 608-221-8700

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#### Appendix B

FEDEX shipping label for Paradigm Labs

SCEX US Airbill Factor B469 0347 2545 Express	Total Control Control Control
OM Phase print and press hard.	4a Express Package Service Packages up to 150 lbs.
te 01 24/05 Sender's FedEx Account Number	FedEx Priority Overnight Next business morning*  FedEx Standard Overnight Next business morning*  FedEx Standard Overnight FedEx Standard Overnight FedEx priority Overnigh
ind Chuck Pecl Phone (601) PZP 2712	FedEx 2Day FedEx Express Saver Third business day* FedEx Express Saver Third business day*
moony feel Consulting	4b Express Freight Service Packages over 150 lbs. ** To most locations
tdress 140 Chaje ( Lane	FedEx 1Day Freight FedEx 2Day Freight FedEx 3Day Freight Second business day**  * Call for Confirmation:
Dept/Poor/Sura/Room  ty Madician State MS ZIP 39/10	5 Packaging  FedEx Pak* Includes FedEx Snell Pek, FedEx Surrey Pak  FedEx Large Pak, and FedEx Surrey Pak  FedEx Large Pak, and FedEx Surrey Pak  FedEx Surr
DUT Internal Billing Reference state characters will appear on Provide.  WHALT, N + SVAELE	6 Special Handling include FedEx address in Section 3.
ecipient's SAMPLE CUSTIVANAM Phone (910) 350-1903	SATURDAY Delivery  Available ONLY for Feds: Norty Ownight Feds: 20ey, Feds: 10ey Freight, and Feds: 20ey Freight to select 27D contains dangerous goods?  Does this shipment contain dangerous goods?
OMPRHY PARADIGM ANALYTICAL LABS	No Yes Shipper's Declaration required Dangerous goods (including Dry cel ceramination and in Fedits peckaging.
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digress request a package be held at a specific FedEx location, print FedEx eddress here.	FedEx April No. Dates
NWILMINGTON State NC ZP 28405-8446	Total Packages Total Weight Total Declared Value <sup>†</sup>
	\$ .00  Tour liability is smited to \$100 unless you declare a higher value. See back for details.  FedEx Use Only
	8 Sign to Authorize Delivery Without a Signature

Try on fine: Sbi porting affected court,

By using this Arbill you agree to the service conditions on the back of this Arbill
and in our current Service Guide, including terms that limit our liability.

Questions? Visit our Web site at fedex.com
or call 1.800.GoFedEx 1.800.463.3339.

By signing you authorize us to deliver this shipment without obtaining a signature and agree to indemnify and hold us harmless from any resulting claims.

0282993908 SRF-Rev. Date 17/03-Part #158279-©1994-2003 Fed&-PFRINTED IN U.S.A.

#### Appendix C

Chain of Custody Sheets for samples sent to Paradigm Labs

PARADIGM ANALYTICAL LABORATORIES, INC.

Phone: (910)-350-1903 FAX: (910)-350-1557 5500 Business Drive, Wilmington, NC 28405

Chain-of Custody Record & Analytical Request

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Report To: SHUIE	Invoice To:	Comments:	Please specify any special reporting requirements	Just Deft	<b>1</b>	DD001 0.1	Dooof	1-0 01000	No 12- 5-1	01022 0-1	Bb 02 4 3-11	Dh o 30	DD 0 3.5 5-1'			Temperature State Certification Requested	NC SC Other	SEE REVERSE FOR TERMS AND CONDITIONS	
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PARADIGM ANALYTICAL LABORATORIES, INC.

PARADIGM AMALYTICAL LABORATORIES, INC.

5500 Business Drive, Wilmington, NC 28405

Phone: (910)-350-1903 FAX: (910)-350-1557

Chain-of Custody Record & Analytical Request

coc# 44540

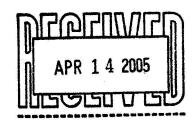
Please specify any special reporting State Certification Requested **TERMS AND CONDITIONS** SEE REVERSE FOR requirements Comments: Other \_ SAMB Invoice To: SAIN-6? SC Report To: DD035-00037 S S Temperature Date: 01/24/06 Turnaround: Analyses Time Job Number: P.O. Number: THENT COM Date Project ID: Kill man ciocati C Contact: Resister Missellin Received By **Preservatives** Phone: Fax: Alp بذر X Time Time Matrix S Date 1/05/ Address: & ACK meun TAIN, L.C. 10% "Hufar-Client: MMTIN 3 846-10 Date MWP-44-017-001 1/4/05-Relinquished By 100-810-M- 9WM Sample ID Address: Quote #:



April 13, 2005

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

Kari Ann Kelhan



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 February. If you have any questions concerning this information, please give me a call.

Sincerely,

Richard Johnson

Enclosure

# Technical Memorandum Borg Warner / Kuhlman Electric Crystal Springs, Mississippi



#### TECHNICAL MEMORANDUM

April 13, 2005

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 soil and water samples collected from MWP-HA samples during February 2005 during an accelerated site investigation episode around the former Borg Warner and current Kuhlman Electric facility in Crystal Springs, Mississippi. Soil and 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 for soils and Table 2 for waters. A summary of method blanks, laboratory control samples and matrix spike/matrix spike duplicate data is provided in Table 3 for the soils and Table 4 for the waters.

In addition copies of the chain of custody sheets and shipping sheets can be found in appendix A through C.

- A) Chain of custody sheets for mobile lab PCB analysis for Excavation 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.

Environmental Chemistry Consulting Services, Inc.

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.

#### **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.
- 2. All LCS recoveries were within acceptable ranges. See Table 3 and 4.
- 3. All MS/MSD recoveries were within acceptable ranges. Percent repeatability was also within acceptable ranges. See Table 3 and 4.
- 4. Since electron capture of detectors tend to have a very narrow linear range, many sample extracts required dilution. Dilutions were accurately done.

#### **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. Sample Preparation SOILS: Each sample or quality control sample is prepared in identical fashion. Approximately four grams of silica sand (blanks and control spikes) or sample is transferred into a clean scintillation vial. Ten grams of anhydrous sodium sulfate are added to the vial and mixed well. Extra sodium sulfate is added when necessary to assure the sample is dried. A surrogate, spike compound mix (if necessary) and eight mLs of 80/20 iso-octane/acetone are added to the vial. The vial is shaken for 30 seconds, allowed to settle for 2 minutes, shaken again for 30 seconds, and allowed to settle for 10 minutes. An aliquot of the extract is transferred to an autosampler vial for injection into the GC-ECD.
- 3. 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.
- 4. 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.
- 5. 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 February run sheets.
- 6. 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 Soil Sample Results – February

Table 1
Kuhlman Electric
Crystal Springs, Mississippi
PCB Concentrations as Aroclor 1260 Detected

						Field Labo	ratory		
Field Lab Sample ID	Sample ID	Sample Depth	Date Collected	Time Collected	Date Analyzed	Concentration (mg/kg)	Surrogate TCMX(%)	Surrogate DCBP(%)	
DD039	MWP-HA-019-001	0-12"	25 Eab 05	40.04	05 5-1-05				
DD039	MWP-HA-019-002		25-Feb-05	12:34	25-Feb-05	6.8	104	98.8	
DD040		12-24"	25-Feb-05	12:45	25-Feb-05	0.24	107	97.9	$oldsymbol{oldsymbol{oldsymbol{\sqcup}}}$
	MWP-HA-020-001	0-12"	25-Feb-05	12:54	25-Feb-05	1.1	95.2	84.4	
DD042	MWP-HA-020-002	12-24"	25-Feb-05	13:03	25-Feb-05	0.12	96.2	90.6	
DD043	MWP-HA-021-001	0-12"	25-Feb-05	13:12	25-Feb-05	0.20	101	90.9	$\prod$
DD044	MWP-HA-021-002	12-24"	25-Feb-05	13:20	25-Feb-05	< 0.10	96.3	80.9	П
DD045	MWP-Duplicate	-	25-Feb-05	-	25-Feb-05	5.7	100	98.0	П
DD046	MWP-HA-022-001	0-12"	25-Feb-05	13:32	25-Feb-05	1.6	96.0	81.9	П
DD047	MWP-HA-022-002	12-24"	25-Feb-05	13:40	25-Feb-05	< 0.10	96.6	89.8	$\sqcap$
DD048	MWP-HA-023-001	0-12"	25-Feb-05	16:12	25-Feb-05	2.6	90.6	93.7	П
DD049	MWP-HA-023-002	12-24"	25-Feb-05	16:18	25-Feb-05	< 0.10	97.9	95.5	Ħ
DD050	MWP-HA-024-001	0-12"	25-Feb-05	17:05	25-Feb-05	< 0.10	101	98.5	H
DD051	MWP-HA-024-002	12-24"	25-Feb-05	17:12	25-Feb-05	< 0.10	91.1	71.4	H
DD052	MWP-HA-025-001	0-12"	25-Feb-05	17:23	25-Feb-05	0.42	93.4	88.1	H
DD053	MWP-HA-025-002	12-24"	25-Feb-05	17:31	25-Feb-05	< 0.10	94.8	92.4	Н
DD054	MWP-HA-026-001	0-12"	26-Feb-05	17:21	26-Feb-05	2.0	102	98.9	$\vdash$
つD055	MWP-HA-026-002	12-24"	26-Feb-05	17:26	26-Feb-05	0.35	103	92.2	Н
JD056	MWP-HA-027-001	0-12"	26-Feb-05	17:30	26-Feb-05	51	138	104	A
DD057	MWP-HA-027-002	12-24"	26-Feb-05	17:35	26-Feb-05	12	102	94.6	H
DD058	MWP-HA-028-001	0-12"	26-Feb-05	17:41	26-Feb-05	4.2	101	93.6	H
DD059	MWP-HA-028-002	12-24"	26-Feb-05	17:47	26-Feb-05	0.74	108	89.2	H
DD060	MWP-Duplicate		26-Feb-05		26-Feb-05	1.4	99.2	92.5	H

#### NOTES:

A = Acid Treated.

Surrogate recoveria criteria 60-140% unless sample is acid treated.

Surrogate recoveria criteria 75-175% if sample is acid treated.

## Table 2 Water Sample Results – February

# Table 2 Kuhlman Electric Crystal Springs, Mississippi PCB Concentrations as Aroclor 1260 Detected

Sample ID Depth Collected Collected	Analyzed	(ug/L)	TCMX(%)	DCBP(%)
Field Lab Sample Date Time		Concentration	Surrogate	Surrogate

## Table 3 Soil QC Samples - February

#### Table 3 QC Results

Lab # associated with qc samples:

DD039 through DD053

Matrix

Matrix

Spike

Spike

Duplicate

Blank

LCS

**DD044** 

DD044

823

823

Date Analyzed:

2/25/05

2/25/05

2/25/05

2/25/05

Compound	% Rec	% Rec	% RPD	mg/kg	% Rec
PCB as 1260	86.4	86.8	0%	< 0.10	98.6

#### Table 3 QC Results

Lab # associated with qc samples:

DD054 through DD060

Matrix

Matrix

Spike

Spike DD059 Duplicate

DD059

Blank 827 LCS 827

Date Analyzed:

2/26/05

2/26/05

2/26/05

2/26/05

			mg/kg	% Rec
93.5	102	-9%	< 0.10	89.4
	93.5	93.5 102	93.5 102 -9%	93.5 102 -9% < 0.10

### Table 4 Water QC Samples - February

#### Table 4 QC Results

Lab # associated with qc samples: W1081

Matrix

Matrix

Spike

Spike W1082 Duplicate

W1082

Blank

LCS

Date Analyzed:

3/3/05

3/3/05

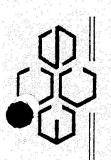
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3/3/05

Compound	% Rec	% Rec	% RPD	ug/L	% Rec
PCB as 1260	107	102	5%	< 0.25	103

#### Appendix A

Chain of Custody Sheets for mobile lab PCB analysis Samples



CHAIN OF CUSTODY C2/22/05

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Intact/Not Intact

Custody Seal: Present/Absent

Shipped Vir

G=NaOH O=Other(Indicate)

Received By:

2/25/65

Date/Time:

Relinquished By:

D=HNO3 E=EnCore F=Methanol

A=None B=HCL C=H2SO4

Relinquished By:

MWP-##-023-002

MWP-HA-024-001

\*Preservation Code

MWP-HA - 023-001

MWP-HA-022-002

MWP-##-022-00)

MWP-Dufuctor

MWP- 44-021-002

MWP- 41-019-002

MWP- HA -019-001

Sample Description

Sampled By (Print):

Project Name: Project Location:

Project Number

MWP- 1+4-620-001

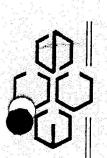
MWP-1+4-020-002

MWP-HA-621-001

Date/Time:

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Date/Time:



# **Environmental Chemistry**

Consulting Services, Inc. 2525 Advance Road

Madison, WI 53718 FAX 608-221-4889

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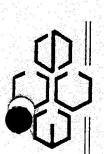
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Sampled By (Print):	0.0.0	0.0							
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Sample Description	Coll	Collection te Time	Matrix	Total Bottles	Preserv*	Analysis Requested		Det Comments	Laboratory Number
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								<b>C</b>	
*Preservation Code A=None B=HCL C=H2SO4	Relinquished By.	tuished By:	13			Date/Time:	Received By:	Mubal	Date/Time: 65-
D=HNO3 E=EnCore F=Methanol G=NaOH O=Other(Indicate)	Relinquished By:	hed By.				Date/Time:	Reseived By:/		Date/Time:
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# **Environmental Chemistry**

Consulting Services, Inc. 2525 Advance Road Phone 608-221-8700

Madison, WI 53718

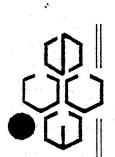
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No. 008858

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Madison, WI 53718

**CHAIN OF CUSTODY** 

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## Appendix B FEDEX shipping label for Paradigm Labs

Express US Airbill Freds 8469 0347 2410	三 ITAIS Sender's Copy
TOM Please print prod proce hard.	4a Express Package Service Packages up to 150 lbs.
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iam Chuck Peel Prone (601) PEP-2992	FedEx ZDay Second business day*  Second business day*
impany Peel Consulting	4b Express Freight Service Packages over 150 lbs.
udtress 140 Chazel Lane	FedEx 1Day Freight* FedEx 2Day Freight FedEx 3Day Freight  *Call for Confirmation:  FedEx 2Day Freight  FedEx 3Day Freight  FedEx 3Day Freight
Mar Lisan State MS ZP 39110	5 Packaging  "Declared value field \$500  FedEx FredEx FedEx FedEx Nother field \$500  FedEx FredEx FedEx Tube
Our Internal Billing Reference on MARTIN + SLACTE	Feder Large Pal, and Feder Startey Pal;  S. Changini Manufilines
To lecipient's SHAPLE CLSTODIAN Phone (910) 350-1903	SATURDAY Delivery Assessable ONLY for Feder Ziber, Feder
Company PARADIGM ANALYTICAL LABS	No Yes Stage of Declaration Not required Declaration Not required Cargo Aircraft Only
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WILMINGTON Same NC ZP 28405-8446	Total Packagus Total Weight Total Declared Value*
	<u> </u>
	†Our fability is limited to \$100 unless you declare a higher value. See back for details.
Try online shipping at fedex.com	8 Sign to Authorize Delivery Without a Signature
By using this Airbill your agree to the service conditions on the back of this Airbill and in our current Service Gulds, including terms that finit our flebility.  Cluestions? Visit our Web site at fedex.com or call 1,800.GoFedEx 1,800.483,3338.  O2829939	By signing you exthorize us to deliver this shipment without obtaining a signature and agree to indemnify and hold us hermises from any resulting claims.  708 SNP-Rex Gee 11/05-Part #156279-01994-2003 Fedig-PRINTED IN U.S.A.

#### Appendix C

Chain of Custody Sheets for samples sent to Paradigm Labs

# PARADIGM ANALYTICAL LABORATORIES, INC.

5500 Business Drive, Wilmington, NC 28405 Phone: (910)-350-1903 FAX: (910)-350-1557

Chain-of Custody Record & Analytical Request

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April 13, 2005

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 February. If you have any questions concerning this information, please give me a call.

Sincerely,

Richard Johnson

**Enclosure** 

### Technical Memorandum Borg Warner / Kuhlman Electric

Crystal Springs, Mississippi



#### TECHNICAL MEMORANDUM

April 13, 2005

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 soil and water samples collected from GTP-HA samples during February 2005 during an accelerated site investigation episode around the former Borg Warner and current Kuhlman Electric facility in Crystal Springs, Mississippi. Soil and 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 for soils and Table 2 for waters. A summary of method blanks, laboratory control samples and matrix spike/matrix spike duplicate data is provided in Table 3 for the soils and Table 4 for the waters.

In addition copies of the chain of custody sheets and shipping sheets can be found in appendix A through C.

- A) Chain of custody sheets for mobile lab PCB analysis for Excavation 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.

Environmental Chemistry Consulting Services, Inc.

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.

#### **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.
- 2. All LCS recoveries were within acceptable ranges. See Table 3 and 4.
- 3. All MS/MSD recoveries were within acceptable ranges. Percent repeatability was also within acceptable ranges. See Table 3 and 4.
- 4. Since electron capture of detectors tend to have a very narrow linear range, many sample extracts required dilution. Dilutions were accurately done.

#### **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. Sample Preparation SOILS: Each sample or quality control sample is prepared in identical fashion. Approximately four grams of silica sand (blanks and control spikes) or sample is transferred into a clean scintillation vial. Ten grams of anhydrous sodium sulfate are added to the vial and mixed well. Extra sodium sulfate is added when necessary to assure the sample is dried. A surrogate, spike compound mix (if necessary) and eight mLs of 80/20 iso-octane/acetone are added to the vial. The vial is shaken for 30 seconds, allowed to settle for 2 minutes, shaken again for 30 seconds, and allowed to settle for 10 minutes. An aliquot of the extract is transferred to an autosampler vial for injection into the GC-ECD.
- 3. 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.
- 4. 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.
- 5. 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 February run sheets.
- 6. 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
Soil Sample Results – February

# Table 1 Kuhlman Electric Crystal Springs, Mississippi PCB Concentrations as Aroclor 1260 Detected

						Field Labo	ratory		
Field Lab Sample ID	Sample ID	Sample Depth	Date Collected	Time Collected	Date Analyzed	Concentration (mg/kg)	Surrogate TCMX(%)		
GG001	GTP-HA-001-001	0-12"	25-Feb-05	14:10	25-Feb-05	0.11	94.6	97.9	+
GG002	GTP-HA-001-002	12-24"	25-Feb-05	14:20	25-Feb-05	< 0.10	99.2	102	╁
GG003	GTP-HA-002-001	0-12"	25-Feb-05	14:32	25-Feb-05	0.37	79.0	72.8	十
GG004	GTP-HA-002-002	12-24"	25-Feb-05	14:39	25-Feb-05	< 0.10	103	97.5	十
GG005	GTP-HA-003-001	0-12"	25-Feb-05	14:45	25-Feb-05	1.6	93.9	92.6	+
GG006	GTP-HA-003-002	12-24"	25-Feb-05	14:52	25-Feb-05	< 0.10	98.9	85.8	十
GG007	GTP-Duplicate	-	25-Feb-05		25-Feb-05	0.12	96.1	96.1	+
GG008	GTP-HA-004-001	0-12"	25-Feb-05	15:04	25-Feb-05	2.2	140	106	A
GG009	GTP-HA-004-002	12-24"	25-Feb-05	15:10	25-Feb-05	< 0.10	94.0	89.8	$oxed{\mathbb{L}}$
GG010	GTP-HA-005-001	0-12"	26-Feb-05	08:52	26-Feb-05	0.18	146	108	Α
GG011	GTP-HA-005-002	12-24"	26-Feb-05	09:03	26-Feb-05	< 0.10	99.4	111	
GG012	GTP-HA-006-001	0-12"	26-Feb-05	09:15	26-Feb-05	0.32	149	114	Α
GG013	GTP-HA-006-002	12-24"	26-Feb-05	09:22	26-Feb-05	< 0.10	102	90.9	<del> </del>
GG014 GG015	GTP-Duplicate GTP-HA-007-001	0-12"	26-Feb-05	00.20	26-Feb-05	0.24	143	106	A
GG015 GG016	GTP-HA-007-001	12-24"	26-Feb-05 26-Feb-05	09:30 09:37	26-Feb-05	< 0.10	108	98.0	╄
GG010 GG017	GTP-HA-008-001	0-12"	26-Feb-05	09:37	26-Feb-05 26-Feb-05	< 0.10 <b>0.22</b>	101 102	103 101	┿
G018	GTP-HA-008-002	12-24"	26-Feb-05	09:56	26-Feb-05	< 0.10	102	100	+-
GG019	GTP-HA-009-001	0-12"	26-Feb-05	10:03	26-Feb-05	1.2	139	105	A
GG020	GTP-HA-009-002	12-24"	26-Feb-05	10:13	26-Feb-05	< 0.10	101	93.4	幵
GG021	GTP-HA-010-001	0-12"	26-Feb-05	10:38	26-Feb-05	1.3	105	97.4	一
GG022	GTP-HA-010-002	12-24"	26-Feb-05	10:46	26-Feb-05	0.22	103	106	$t^{-}$
GG023	GTP-HA-011-001	0-12"	26-Feb-05	10:53	26-Feb-05	1.3	98.6	91.7	T
GG024	GTP-HA-011-002	12-24"	26-Feb-05	11:00	26-Feb-05	< 0.10	102	86.8	1
GG025	GTP-HA-012-001	0-12"	26-Feb-05	11:08	26-Feb-05	0.70	96.6	92.3	T
GG026	GTP-HA-012-002	12-24"	26-Feb-05	11:15	26-Feb-05	< 0.10	100	95.1	
GG027	GTP-HA-013-001	0-12"	26-Feb-05	11:24	26-Feb-05	0.18	116	99.0	Α
GG028	GTP-HA-013-002	12-24"	26-Feb-05	11:34	26-Feb-05	< 0.10	92.2	64.4	
GG029	GTP-HA-014-001	0-12"	26-Feb-05	13:19	26-Feb-05	1.8	103	100	
GG030	GTP-HA-014-002	12-24"	26-Feb-05	13:26	26-Feb-05	0.12	100	95.5	
GG031	GTP-HA-015-001	0-12"	26-Feb-05	13:35	26-Feb-05	0.19	94.6	95.0	┰
GG032	GTP-HA-015-002	12-24"	26-Feb-05	13:43	26-Feb-05	< 0.10	98.6	87.1	╀┦
GG033 GG034	GTP-HA-016-001 GTP-HA-016-002	0-12" 12-24"	26-Feb-05 26-Feb-05	13:55 14:00	26-Feb-05 26-Feb-05	4.1 0.14	97.5 95.0	96.0	₽
GG034 GG035	GTP-HA-017-001	0-12"	26-Feb-05	14:10	26-Feb-05	3.0	136	83.0 110	A
GG036	GTP-HA-017-002	12-24"	26-Feb-05	14:21	26-Feb-05	0.15	100	89.9	+~
GG037	GTP-HA-018-001	0-12"	26-Feb-05	14:33	26-Feb-05	< 0.10	102	94.1	H
GG038	GTP-HA-018-002	12-24"	26-Feb-05	14:40	26-Feb-05	< 0.10	97.7	92.2	Н
GG039	GTP-HA-019-001	0-12"	26-Feb-05	15:40	26-Feb-05	3.6	95.4	92.5	П

#### NOTES:

Acid Treated

rrogate recoveria criteria 60-140% unless sample is acid treated.

Surrogate recoveria criteria 75-175% if sample is acid treated.

#### Table 1 **Kuhlman Electric** Crystal Springs, Mississippi PCB Concentrations as Aroclor 1260 Detected

						Field Labo	ratory		
Field Lab Sample ID	Sample ID	Sample Depth	Date Collected	Time Collected	Date Analyzed	Concentration (mg/kg)	Surrogate TCMX(%)	Surrogate DCBP(%)	R i n s
66040	GTP-HA-019-002	12-24"	26-Feb-05	15:45	26-Feb-05	0.33	101	90.4	╀-
GG040 GG041	GTP-HA-020-001	0-12"	26-Feb-05	15:50	26-Feb-05	0.46	98.2	95.8	十
GG042	GTP-HA-020-002	12-24"	26-Feb-05	15:54	26-Feb-05	< 0.10	102	96.4	十
GG043	GTP-HA-021-001	0-12"	26-Feb-05	15:58	26-Feb-05	2.4	98.0	93.3	十
GG044	GTP-HA-021-002	12-24"	26-Feb-05	16:02	26-Feb-05	0.36	99.8	96.4	T
GG045	GTP-HA-022-001	0-12"	26-Feb-05	16:06	26-Feb-05	0.38	102	94.8	Τ
GG046	GTP-HA-022-002	12-24"	26-Feb-05	16:10	26-Feb-05	< 0.10	104	107	Т



A = Acid Treated.

Surrogate recoveria criteria 60-140% unless sample is acid treated. Surrogate recoveria criteria 75-175% if sample is acid treated.

## Table 2 Water Sample Results – February

# Table 2 Kuhlman Electric Crystal Springs, Mississippi PCB Concentrations as Aroclor 1260 Detected

1							ratory	
Field Lab Sample ID		Sample Depth	Date Collected	Time Collected		Concentration (ug/L)	Surrogate TCMX(%)	Surrogate DCBP(%)
W1082	GTP-FB-001	-	25-Feb-05	14:24	03-Mar-05	< 0.25	112	95.2

## Table 3 Soil QC Samples - February

#### Table 3 QC Results

Lab # associated with qc samples:

GG001 through GG009

Matrix

Matrix

Spike

Spike GG009 Duplicate

GG009

Blank 824 LCS 824

Date Analyzed:

2/25/05

2/25/05

2/25/05

2/25/05

Compound	% Rec	% Rec	% RPD	mg/kg	% Rec
PCB as 1260	111	102	8%	< 0.10	99.3
CB as 1260		102		0%	0% < 0.10

#### Table 3 QC Results

Lab # associated with qc samples:

GG010 through GG029

Matrix

Matrix

Spike

Spike GG013 Duplicate

GG013

Blank 825 LCS 825

Date Analyzed:

2/26/05

2/26/05

2/26/05

2/26/05

Compound	% Rec	% Rec	% RPD	mg/kg	% Rec
PCB as 1260	93.2	100	-7%	< 0.10	98.3

#### Table 3 QC Results

Lab # associated with qc samples:

GG030 through GG046

Matrix

Matrix

Spike

Spike

Duplicate

Blank

LCS

GG032

GG032

826

826

Date Analyzed:

2/26/05

2/26/05

2/26/05

2/26/05

		% RPD	mg/kg	% Rec
84.9	99.5	-16%	< 0.10	105
	84.9	84.9 99.5	84.9 99.5 -16%	84.9 99.5 -16% < 0.10

### Table 4 Water QC Samples - February

#### Table 4 QC Results

Lab # associated with qc samples: W1082

Matrix

Matrix

Spike

Spike

Duplicate

W1082

W1082

Blank

LCS

Date Analyzed:

3/3/05

3/3/05

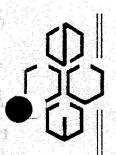
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Compound	% Rec	% Rec	% RPD	ug/L	% Rec
PCB as 1260	107	102	5%	< 0.25	103

#### Appendix A

Chain of Custody Sheets for mobile lab PCB analysis Samples



**Environmental Chemistry** 

Madison, WI 53718 Consulting Services, Inc. 2525 Advance Road

FAX 608-221-4889

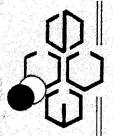
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FAX 608-221-4889

Phone 608-221-8700

2525 Advance Road

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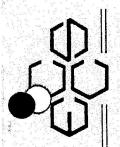
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Madison, WI 53718

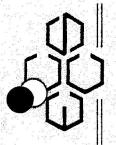
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CTP-44-014-002		1221						7-1	66030
CTP- HA - 6K-001		1331						1-0	66031
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# **Environmental Chemistry** Consulting Services, Inc.

Madison, WI 53718 FAX 608-221-4889 Phone 608-221-8700

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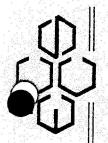
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67P-HA-01F-002		0/1/1						7.7		6003F
CTP- 414-0/9-001		0/21						1-9		CC039
500-710-AH-019		Jest						2-1		Ccoyo
GTP-HA-020-001		l Sro						1-0		66041
6TP-HA-020-002		hssl						7-1		240 23
6TP-HA-621-001		85.31	42 T					6-1		60043
679-44-621-002		7602						2-1		60044
CTP-HA-622-001	3	1606	<del>)</del>	->	<del>)</del>	4		1 - 0		60045
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Madison, WI 53718 Environmental Chemistry Consulting Services, Inc.

2525 Advance Road

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# Appendix B FEDEX shipping label for Paradigm Labs

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Chuck Peel Phone (601) PEP-2992	FedEx 2Day FedEx Express Saver That business day FedEx Express Saver That business day FedEx Express Saver
sompany Peel Consulting	4b Express Freight Service Packages over 150 lbs.
Address 140 Chapel Lane	FedEx 1Day Freight*   FedEx 2Day Freight   FedEx 3Day Freight   FedEx 3D
Toy Mar Lison State MS ZIP 39110	5 Packaging  FedEx FredEx Pak* FredEx Box FredEx Fr
Your Internal Billing Reference on 20 connector will appear on monics.  WHITIN + SLIFG UE	6 Special Handling Include FreEx address in Section 1.
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	8 Sign to Authorize Delivery Without a Signature
By using the Airbill you agree to the service conditions on the back of this Airbill and in our current Service Guide, including terms that limit our liability.  Questions? Visit our Web site at fedex.com	By signing you authorize us to deliver this shipment without obtaining a signature and agree to indemnify and hold us narmless from any resulting claims.
or call 1.800.GoFedEx 1.800.463.3339. 0282993	908 SRF-Rev Date 11/00-Part #159279-©1994-2000 Paudi-PRINTED IN U.S.A.

#### Appendix C

Chain of Custody Sheets for samples sent to Paradigm Labs

# PARADIGM ANALYTICAL LABORATORIES, INC.

Phone: (910)-350-1903 FAX: (910)-350-1557 5500 Business Drive, Wilmington, NC 28405

Chain-of Custody Record & Analytical Request

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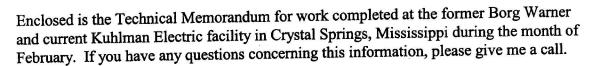
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April 13, 2005

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

Dear Mr. Martin,



Sincerely,

Richard Johnson

Enclosure

Technical Memorandum

Borg Warner / Kuhlman Electric

Crystal Springs, Mississippi



#### TECHNICAL MEMORANDUM

April 13, 2005

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 soil and water samples collected from ZWP-HA samples during February 2005 during an accelerated site investigation episode around the former Borg Warner and current Kuhlman Electric facility in Crystal Springs, Mississippi. Soil and 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 for soils and Table 2 for waters. A summary of method blanks, laboratory control samples and matrix spike/matrix spike duplicate data is provided in Table 3 for the soils and Table 4 for the waters.

In addition copies of the chain of custody sheets and shipping sheets can be found in appendix A through C.

- A) Chain of custody sheets for mobile lab PCB analysis for Excavation 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.

Environmental Chemistry Consulting Services, Inc.

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.

#### **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.
- 2. All LCS recoveries were within acceptable ranges. See Table 3 and 4.
- 3. All MS/MSD recoveries were within acceptable ranges. Percent repeatability was also within acceptable ranges. See Table 3 and 4.
- 4. Since electron capture of detectors tend to have a very narrow linear range, many sample extracts required dilution. Dilutions were accurately done.

#### **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. Sample Preparation SOILS: Each sample or quality control sample is prepared in identical fashion. Approximately four grams of silica sand (blanks and control spikes) or sample is transferred into a clean scintillation vial. Ten grams of anhydrous sodium sulfate are added to the vial and mixed well. Extra sodium sulfate is added when necessary to assure the sample is dried. A surrogate, spike compound mix (if necessary) and eight mLs of 80/20 iso-octane/acetone are added to the vial. The vial is shaken for 30 seconds, allowed to settle for 2 minutes, shaken again for 30 seconds, and allowed to settle for 10 minutes. An aliquot of the extract is transferred to an autosampler vial for injection into the GC-ECD.
- 3. 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.
- 4. 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.
- 5. 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 February run sheets.
- 6. 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 Soil Sample Results – February

# Table 1 Kuhlman Electric Crystal Springs, Mississippi PCB Concentrations as Aroclor 1260 Detected

						Field Labo	ratory		
Field Lab Sample ID	Sample ID	Sample Depth	Date Collected	Time Collected	Date Analyzed	Concentration (mg/kg)	Surrogate TCMX(%)	Surrogate DCBP(%)	R-nøe
FE004	ZWP-HA-001-001	0-12"	25-Feb-05	08:50	25-Feb-05	< 0.10	98.0	80.2	⊢
FF001 FF002	ZWP-HA-001-001	12-24"	25-Feb-05	09:03	25-Feb-05	< 0.10	101	96.9	H
FF002	ZWP-HA-002-001	0-12"	25-Feb-05	09:10	25-Feb-05	< 0.10	105	94.8	T
FF004	ZWP-HA-002-001	12-24"	25-Feb-05	09:20	25-Feb-05	< 0.10	96.6	93.8	
FF005	ZWP-HA-003-001	0-12"	25-Feb-05	09:30	25-Feb-05	< 0.10	99.0	86.2	T
FF006	ZWP-HA-003-002	12-24"	25-Feb-05	09:40	25-Feb-05	< 0.10	98.9	103	T
FF007	ZWP-HA-004-001	0-12"	25-Feb-05	09:50	25-Feb-05	0.15	104	91.9	1
FF008	ZWP-HA-004-002	12-24"	25-Feb-05	09:58	25-Feb-05	< 0.10	98.9	101	Т
FF009	ZWP-Duplicate	-	25-Feb-05		25-Feb-05	< 0.10	101	74.1	T
FF010	ZWP-HA-005-001	0-12"	25-Feb-05	10:08	25-Feb-05	< 0.10	98.1	98.8	T
FF011	ZWP-HA-005-002	12-24"	25-Feb-05	10:15	25-Feb-05	< 0.10	103	105	T
FF012	ZWP-HA-006-001	0-12"	25-Feb-05	10:26	25-Feb-05	< 0.10	99.4	96.6	
FF013	ZWP-HA-006-002	12-24"	25-Feb-05	10:34	25-Feb-05	< 0.10	97.2	82.8	
FF014	ZWP-HA-007-001	0-12"	25-Feb-05	10:43	25-Feb-05	< 0.10	101	102	
FF015	ZWP-HA-007-002	12-24"	25-Feb-05	10:53	25-Feb-05	< 0.10	96.7	83.8	L
FF016	ZWP-HA-008-001	0-12"	25-Feb-05	11:02	25-Feb-05	0.78	99.1	99.9	
F017	ZWP-HA-008-002	12-24"	25-Feb-05	11:08	25-Feb-05	< 0.10	102	101	
F018	ZWP-HA-009-001	0-12"	25-Feb-05	16:27	25-Feb-05	2.4	97.0	99.4	L
FF019	ZWP-HA-009-002	12-24"	25-Feb-05	16:36	25-Feb-05	0.56	102	98.9	
FF020	ZWP-HA-010-001	0-12"	25-Feb-05	16:45	25-Feb-05	0.53	99.7	98.8	
FF021	ZWP-HA-010-002	12-24"	25-Feb-05	16:53	25-Feb-05	< 0.10	102	100	

#### NOTES:

A = Acid Treated.

Surrogate recoveria criteria 60-140% unless sample is acid treated.

Surrogate recoveria criteria 75-175% if sample is acid treated.

Table 2

Water Sample Results – February

### Table 2 Kuhlman Electric

### Crystal Springs, Mississippi PCB Concentrations as Aroclor 1260 Detected

						Field Labor	ratory	
Field Lab Sample ID	Sample ID	Sample Depth	Date Collected	Time Collected	Date Analyzed	Concentration (ug/L)	Surrogate TCMX(%)	Surrogate DCBP(%
W1080	ZWP-FB-001	-	25-Feb-05	08:45	03-Mar-05	< 0.25	114	99.5

### Table 3 Soil QC Samples - February

### Table 3 QC Results

Lab # associated with qc samples:

FF001 through FF020

Matrix

Matrix

Spike

Spike

Duplicate

Blank

LCS

FF002

FF002

822

822

Date Analyzed:

2/25/05

2/25/05

2/25/05

2/25/05

% Rec	% Rec	% RPD	mg/kg	% Rec
95.6	85.4	11%	< 0.10	94.5

### Table 3 QC Results

Lab # associated with qc samples: FF021

Matrix

Matrix

Spike

Spike

Duplicate

Blank

LCS

GG009

GG009

824

824

Date Analyzed:

2/25/05

2/25/05

2/25/05

2/25/05

Compound	% Rec	% Rec	% RPD	mg/kg	% Rec
PCB as 1260	111	102	8%	< 0.10	99.3
1 OD 03 1200					

Table 4
Water QC Samples - February

### Table 4 QC Results

Lab # associated with qc samples:

Matrix

W1080

Matrix

Spike

Spike

Duplicate

Blank

LCS

W1082

W1082

Date Analyzed:

3/3/05

3/3/05

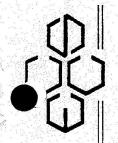
3/3/05

3/3/05

5%	< 0.25	103
	5%	5% < 0.25

### Appendix A

Chain of Custody Sheets for mobile lab PCB analysis Samples



**Environmental Chemistry** 

Madison, WI 53718 Consulting Services, Inc. 2525 Advance Road

FAX 608-221-4889

Phone 608-221-8700

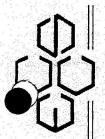
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2 Page

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Sample Description	Date	Time	Matrix	Bottles	Preserv*	Requested		Comments	Number
ZWP-HA-601-001	orticles	othelle OPSO	S		<b>Š</b>	<b>3</b>			F5001
200-100 - HH - 105		5060						7	FFOOL
2Wf-HA-002-001		0160						0.	FFOOZ
300-100-4H-MZ		0260							FFOOY
ZW/- HA - 003-001		0530						<b>0</b> -0	FFOOS
ZWP- 44-003-002		opto						7-7	FFOOL
700- HA -004-001		0950						1-0	FF007
700-44-004-002		3560						7.7	FFOOP
3WP-Duflithe									FFUOS
7-44-005-001		8001						6-1	66010
ZWP- (14-015-002		5101						7-7	FF011
2WP- HK-006-001	<b>-&gt;</b>	7201	->	<del>-}</del>	->	•		0 - 0	21075
*Preservation Code A=None B=HCL C=H2SO4	Relinquished By	hed By:	1			Date/Time: 2/15/6 / 03.0	Received By:	Shubel	Date/Time; 02 (1:5/05/ 11:50
D=HNO3 E=EnCore F=Methanol G=NaOH O=Other(Indicate)	Relinquished By:	hed By.				Date/Time:	Received B/		Date/Time:
Custody Seal: Present/Absent	Intact/Not Intact	ıt İntact	Seal #'s				Receipt Temp:	~ ~	
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# **Environmental Chemistry**

Consulting Services, Inc.

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Page 2 of 2
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7WP- HA -009-002	72)							610-3
ZW1-HA-010-001	1691						1-0	FF020
200-010-4H-92	1653	•	>				7./	FF 021
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**Environmental Chemistry** Consulting Services, Inc.

2525 Advance Road

Madison, WI 53718

**CHAIN OF CUSTODY** 

No. 008850

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G=NaOH O=Other(Indicate)	introdiklot lotast	Cool #'c				Receipt Temp:		

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Seal #'s

Intact/Not Intact

Custody Seal: Present/Absent

Shipped Via:

### Appendix B FEDEX shipping label for Paradigm Labs

Express US Air bill Freign 4469 0347 2410	Semies's Cope
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Chuck Pee ( Mone (601) PEP-2P92	FedEx 2Day Second business day  FedEx Express Saver Ted business day  FedEx Express Saver
Company Peel Consulting Address 140 Chapel Lane	FedEx Environe room not products. Minimum charge: One-pound role  4b Express Freight Service  FedEx 1Day Freight*  FedEx 2Day Freight  FedEx 3Day Freight
City Ma Lise State MS 719 39110  Your Internal Billing Reference MARTIN + SCHOOL OF THE STATE OF	5 Packaging  "Declared value last 2000  FedEx Envelope"  FedEx Pak* Include FedEx Same Pak FedEx Box  FedEx Tube  Other
Recipient's SHAPLE LUSTODIAN Phone (910) 350-1903	6 Special Handling SATURDAY Delivery Assistable ONLY for HOLD Weekslay at FedEx Location NOT Assistable for Revision And R
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Address 3 request a package his held at a specific Footic location, print Footic address here.  Thy WILMINGTON State NC ZIP 28405—8446	Total Packages Total Weight Total Declared Value
Try online shipping at fedex.com.  By using the Arbit you agree to the service conditions on the back of this Arbit and in our current Service Guide, including turns that feel our leability.  Questions? Visit our Web site at fedex.com or call 1.800.GoFedEx 1.800.463.3339.  O2829939	The fieldity is limited to \$100 unless you declare a higher value. See back for details.  8 Sign to Authorize Delivery Without a Signature  8 Syspany you authorize us to deliver this shipment visitous obtaining a signature and agree to indemnity and hold us harmless from any resulting claims.  SSE-Rec Date 11/03-Pat #158279-01994-2003 Podds-PREVIDE IN U.S.A.

### Appendix C

Chain of Custody Sheets for samples sent to Paradigm Labs

PARADIGMANALYTICAL LABORATORIES, INC.

5500 Business Drive, Wilmington, NC 28405 Phone: (910)-350-1903 FAX: (910)-350-1557

Chain-of Custody Record & Analytical Request

coc# 44545

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April 7, 2005



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 January. If you have any questions concerning this information, please give me a call.

Sincerely,

Katislan Kilhan PRichard Johnson

**Enclosure** 

# Technical Memorandum Borg Warner / Kuhlman Electric Crystal Springs, Mississippi



### TECHNICAL MEMORANDUM

April 7, 2005

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 rinsate samples collected during January 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

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.
- 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 January 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 – January

### Table 1 Kuhlman Electric Crystal Springs, Mississippi PCB Concentrations as Aroclor 1260 Detected in Rinsates

						Field Labo	ratory	
Field Lab Sample ID	Sample ID	Sample Database Number	Date Collected	Time Collected	Date Analyzed	Concentration (ug/L)	Surrogate TCMX(%)	Surrogate DCBP(%)
W1046	Rinsate 1	MSL-RS-026	04-Jan-05	13:00	06-Jan-05	< 0.25	114	113
W1046	Rinsate 1	MSL-RS-027	04-Jan-05	13:03	06-Jan-05	< 0.25	116	119
W1048	Rinsate 3	MSL-RS-028	04-Jan-05	13:06	06-Jan-05	< 0.25	116	117
W1049	Rinsate 4	MSL-RS-029	04-Jan-05	13:08	06-Jan-05	< 0.25	121	124
W1049	Rinsate 1	MSL-RS-030	10-Jan-05	10:10	12-Jan-05	< 0.25	101	106
W1052	Rinsate 2	MSL-RS-031	10-Jan-05	10:12	12-Jan-05	< 0.25	96.9	102
W1054	Rinsate 3	MSL-RS-032	10-Jan-05	10:15	12-Jan-05	< 0.25	101	107
W1055	Rinsate 4	MSL-RS-033	10-Jan-05	10:18	12-Jan-05	< 0.25	99.0	108
W1058	Rinsate 1	MSL-RS-034	17-Jan-05	08:30	20-Jan-05	< 0.25	98.0	94.2
W1059	Rinsate 2	MSL-RS-035	17-Jan-05	08:32	20-Jan-05	< 0.25	98.7	86.2
W1060	Rinsate 3	MSL-RS-036	17-Jan-05	08:35	20-Jan-05	< 0.25	98.7	86.2
W1062	Rinsate 1	MSL-RS-037	24-Jan-05	13:25	25-Jan-05	< 0.25	105	110
W1063	Rinsate 2	MSL-RS-038	24-Jan-05	13:29	25-Jan-05	< 0.25	111	120
W1064	Rinsate 3	MSL-RS-039	24-Jan-05	13:32	25-Jan-05	< 0.25	113	119
W1065	Rinsate 4	MSL-RS-040	24-Jan-05	13:35	25-Jan-05	< 0.25	102	123

### Table 2 QC Samples - January

Lab # associated with qc samples: W1046 through W1049

Matrix

Matrix

Spike

Spike

Duplicate

Blank

LCS

W1046

W1046

Date Analyzed:

1/6/05

1/6/05

1/6/05

1/6/05

Compound	% Rec	% Rec	% RPD	ug/L	% Rec
PCB as 1260	116	118	-2%	< 0.25	(1)

(1) = Sample ran as blank - no LCS recovery.

Lab # associated with qc samples:

W1052 through W1055

Matrix

Matrix

Spike

Spike

Duplicate

Blank

LCS

W1056

W1056

Date Analyzed:

1/12/05

1/12/05

1/12/05

1/12/05

Compound	% Rec	% Rec	% RPD	ug/L	% Rec
PCB as 1260	121	114	6%	< 0.25	121
					<u> </u>

Lab # associated with qc samples:

W1058 through W1060

Matrix

Matrix

Spike

Spike

Duplicate

Blank

LCS

W1061

W1061

Date Analyzed:

1/20/05

1/20/05

1/20/05

1/20/05

Compound	% Rec	% Rec	% RPD	ug/L	% Rec
PCB as 1260	109	120	-10%	< 0.25	120

Lab # associated with qc samples: W1062 through W1065

Matrix

Matrix

Spike

Spike

Duplicate

Blank

LCS

W1066

W1066

Date Analyzed:

1/25/05

1/25/05

1/25/05

1/25/05

Compound	% Rec	% Rec	% RPD	ug/L	% Rec
PCB as 1260	137	139	-1%	< 0.25	129
1 OD 43 1200					

### Appendix A Chain of Custody Sheets for Samples

200A W1048 wp46 W/047 400 Laboratory Date/Time: Date/Time: WHITE - REPORT COPY YELLOW - LABORATORY COPY PINK - SAMPLER/SUBMITTER Rush ion o 4) 405 Normal MIL-11-94027 MIL-RS-24-025 MIL. RI-028027 Quote No. M. - 15-25-026 908800 Comments (circle one) Turn Around Report Due: Invoice To: Company Address: P.O. No. <u>ار</u> Temp Blank Y N Receipt Temp: ■04 JA 0 S CHAIN OF CUSTODY SCAGLE Requested した。三 Analysis Date/Time 75 Madison, WI 53718 Preserv\* FAX 608-221-4889 Mail Report To: **Environmental Chemistry** Consulting Services, Inc. Company: Address: Bottles Total Seal #'s Matrix 783 1300 Ap <u>/ 88</u> Phone 608-221-8700 Z 30e [303 Time 2525 Advance Road Relinquished By: Relinquished By. Intact/Not Intact Collection SPR/NES Project Warme/ 2014 LOTAN BLECTRIC Date Project Location: CATSTAC D=HNO3 E=EnCore F=Methanol Custody Seal: Present/Absent A=None B=HCL C=H2SO4 Preservation Code G=NaOH O=Other(Indicate) Sample Description PLINSAID # Sampled By (Print): Project Number Shipped Via:

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**Environmental Chemistry** 

Consulting Services, Inc. 2525 Advance Road

Madison, WI 53718 FAX 608-221-4889 Phone 608-221-8700

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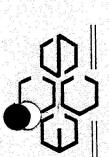
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G=NaOH O=Other(Indicate) Custody Seal: Present/Absent	Intact/Not Intact	ntact	Seal #'s				Receipt Temp:	2	
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Shipped Via:



Environmental Chemistry Consulting Services, Inc.

2525 Advance Road

Madison, WI 53718

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**Environmental Chemistry** 

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April 13, 2005



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 February. If you have any questions concerning this information, please give me a call.

Sincerely,

Richard Johnson

**Enclosure** 

# Technical Memorandum Borg Warner / Kuhlman Electric Crystal Springs, Mississippi



### TECHNICAL MEMORANDUM

April 13, 2005

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 rinsate samples collected during February 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

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.
- 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 February 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 – February

# Table 1 Kuhlman Electric Crystal Springs, Mississippi PCB Concentrations as Aroclor 1260 Detected in Rinsates

					Field Laboratory			
Field Lab Sample ID	Sample ID	Sample Database Number	Date Collected	Time Collected	Date Analyzed	Concentration (ug/L)	Surrogate TCMX(%)	Surrogate DCBP(%)
W1070	Rinsate 1	MSL-RS-041	15-Feb-05	08:15	15-Feb-05	< 0.25	107	405
W1071	Rinsate 2	MSL-RS-042	15-Feb-05	08:17	15-Feb-05	< 0.25	102	105
W1072	Rinsate 3	MSL-RS-043	15-Feb-05	08:19	15-Feb-05	< 0.25	102	122 111
W1073	Rinsate 4	MSL-RS-044	15-Feb-05	08:21	15-Feb-05	< 0.25	111	119
W1076	Rinsate 1	MSL-RS-045	25-Feb-05	07:20	03-Mar-05	< 0.25	112	92.6
W1077	Rinsate 2	MSL-RS-046	25-Feb-05	07:22	03-Mar-05	< 0.25	112	93.8
W1078	Rinsate 3	MSL-RS-047	25-Feb-05	07:24	03-Mar-05	< 0.25		
W1079	Rinsate 4	MSL-RS-048	25-Feb-05	07:26	03-Mar-05	< 0.25	116 112	98.9 94.3

## Table 2 QC Samples - February

#### Table 2 **Rinsate Samples** QC Results

Lab # associated with qc samples:

W1070 through W1073

Matrix

Matrix

Spike

Spike

**Duplicate** 

W1073

W1073

Blank

LCS

Date Analyzed:

2/15/05

2/15/05

2/15/05

2/15/05

Compound	% Rec	% Rec	% RPD	ug/L	% Rec
PCB as 1260	98.8	104	-5%	< 0.25	99.3
			0,0	0.20	99.5

#### Table 2 Rinsate Samples QC Results

Lab # associated with qc samples:

W1076 through W1079

Matrix

Matrix

Spike

Spike

Duplicate

W1082

W1082

Blank

LCS

Date Analyzed:

3/3/05

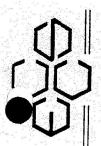
3/3/05

3/3/05

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% Rec	% Rec	% RPD	ug/L	% Rec
107	102	5%	< 0.25	103

# Appendix A Chain of Custody Sheets for Samples



**Environmental Chemistry** 

Consulting Services, Inc.

Madison, WI 53718

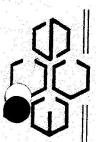
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**CHAIN OF CUSTODY** 

No. 008844

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Project Name:

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Custody Seal: Present/Absent

Shipped Via:

G=NaOH O=Other(Indicate)

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Date/Time:

5500 Business Drive Wilmington, North Carolina 28405 (910) 350-1903 Fax (910) 350-1557

Mr. Robert Martin Martin & Slagle Box 1023 Black Mountain NC 28711

Report Number: G442-309

Client Project: Kuhlman Electric

APR 1 2005

Dear Mr. Martin:

Enclosed are the results of the analytical services performed under the referenced project. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of five years in the event they are required for future reference. Any samples submitted to our laboratory will will be retained for a maximum of thirty (30) days from the date of this report unless other arrangements are requested.

If there are any questions about the report or the services performed during this project, please call Paradigm at (910) 350-1903. We will be happy to answer any questions or concerns which you may have.

Thank you for using Paradigm Analytical Labs for your analytical services. We look forward to working with you again on any additional analytical needs which you may have.

Sincerely,

Paradigm Analytical Laboratories, Inc.

J. Patrick Weaver

#### **Results for PCBs** by EPA 8082

Client Sample ID: MWP-HA-001-001

Analyzed By: CLP

Client Project ID: Kuhlman Electric

Date Collected: 01/17/2005 10:10

Lab Sample ID: G442-309-1B

Date Received: 1/25/2005 Date Analyzed: 1/31/2005

Lab Project ID: G442-309

Matrix: Soil

%SOLIDS: 78.6

Date Extracted: 1/30/2005

Report Basis: Dry Weight

Dilution: 1

	Quantitation	Result
Compound	Limit ug/KG	ug/KG
Aroclor-1016	124	BQL
Aroclor-1221	124	
Aroclor-1232	124	
Aroclor-1242	124	
Aroclor-1248	124	
Aroclor-1254	124	BQL
Aroclor-1260	124	2200
Aroclor-1262	124	BQL
Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260	124 124 124 124 124 124	BQL BQL BQL BQL BQL

Surrogate Spike Recoveries	Spike	Spike	Percent
	Added	Result	Recovered
TCMX	100	88	88

Comments:

**BQL = Below Quantitation Limit** 

NA = Not applicable, surrogate diluted out.

<sup>\*</sup>Sample was quantitated as Aroclor 1260, but may contain a mixture of Aroclor 1260 and Aroclor 1262.

#### Results for PCBs by EPA 8082

Client Sample ID: MWP-Duplicate-DD007

Client Project ID: Kuhlman Electric

Lab Sample ID: G442-309-2B Lab Project ID: G442-309

Matrix: Soil

%SOLIDS: 79.6

Report Basis: Dry Weight

Analyzed By: CLP

Date Collected: 01/17/2005 00:00

Date Received: 1/25/2005 Date Analyzed: 1/31/2005 Date Extracted: 1/30/2005

Dilution: 1

Compound	Quantitation Limit ug/KG	Result ug/KG
Aroclor-1016	116	BQL
Aroclor-1221	116	BQL
Aroclor-1232	116	BQL
Aroclor-1242	116	BQL
Aroclor-1248	116	BQL
Aroclor-1254	116	BQL
Aroclor-1260	116	1960
Aroclor-1262	116	BQL

Surrogate Spike Recoveries	Spike	Spike	Percent
	Added	Result	Recovered
TCMX	100	70	70

**Comments:** 

BQL = Below Quantitation Limit
NA = Not applicable, surrogate diluted out.

<sup>\*</sup>Sample was quantitated as Aroclor 1260, but may contain a mixture of Aroclor 1260 and Aroclor 1262.

#### Results for PCBs by EPA 8082

Client Sample ID: MWP-HA-005-001

Client Project ID: Kuhlman Electric

Lab Sample ID: G442-309-3B Lab Project ID: G442-309

Matrix: Soil

%SOLIDS: 76.5

Report Basis: Dry Weight

Analyzed By: CLP

Date Collected: 01/17/2005 13:34

Date Received: 1/25/05 Date Analyzed: 2/3/05

Date Extracted: 1/30/05

Dilution: 2

Compound Aroclor-1016 Aroclor-1221	Quantitation Limit ug/KG 255 255		<b>Result</b> ug/KG BQL BQL
Aroclor-1232	255		BQL
Aroclor-1242	255		BQL
Aroclor-1248	255		BQL
Aroclor-1254	255		BQL
Aroclor-1260	255		<b>3550</b>
Aroclor-1262	255		BQL
A100101-1202	200		DQL
Surrogate Spike Recoveries	Spike	Spike	Percent
	Added	Result	Recovered
TCMX	100	54	54

#### Comments:

BQL = Below Quantitation Limit
NA = Not applicable, surrogate diluted out.

Reviewed By: PNP

<sup>\*</sup>Sample was quantitated as Aroclor 1260, but may contain a mixture of Aroclor 1260 and Aroclor 1262.

#### Results for PCBs by EPA 8082

Client Sample ID: MWP-HA-006-001

Client Project ID: Kuhlman Electric

Lab Sample ID: G442-309-4B Lab Project ID: G442-309

Matrix: Soil

%SOLIDS: 76.7

Report Basis: Dry Weight

Analyzed By: CLP

Date Collected: 01/17/2005 13:56

Date Received: 1/25/05 Date Analyzed: 2/3/05

Date Extracted: 1/30/05

Dilution: 10

	Quantitation	Result
Compound	Limit ug/KG	ug/KG
Aroclor-1016	1210	BQL
Aroclor-1221	1210	BQL
Aroclor-1232	1210	BQL
Aroclor-1242	1210	BQL
Aroclor-1248	1210	BQL
Aroclor-1254	1210	BQL
Arocior-1260	1210	12700
Aroclor-1262	1210	BQL

Surrogate Spike Recoveries	Spike	Spike	Percent
	Added	Result	Recovered
TCMX	100	N/A	N/A

#### Comments:

BQL = Below Quantitation Limit
NA = Not applicable, surrogate diluted out.

<sup>\*</sup>Sample was quantitated as Aroclor 1260, but may contain a mixture of Aroclor 1260 and Aroclor 1262.

#### Results for PCBs by EPA 8082

Client Sample ID: MWP-HA-011-001

Client Project ID: Kuhlman Electric

Lab Sample ID: G442-309-5B Lab Project ID: G442-309

Matrix: Soil

%SOLIDS: 75.8

Report Basis: Dry Weight

Analyzed By: CLP

Date Collected: 01/17/2005 15:46

Date Received: 1/25/05

Date Analyzed: 1/31/05 Date Extracted: 1/30/05

Dilution: 1

	Quantitation	Result
Compound	Limit ug/KG	ug/KG
Aroclor-1016	124	BQL
Aroclor-1221	124	BQL
Aroclor-1232	124	BQL
Aroclor-1242	124	BQL
Aroclor-1248	124	BQL
Aroclor-1254	124	BQL
Aroclor-1260	124	288
Aroclor-1262	124	BQL

Surrogate Spike Recoveries	Spike	Spike	Percent
	Added	Result	Recovered
TCMX	100	80	80

#### Comments:

BQL = Below Quantitation Limit
NA = Not applicable, surrogate diluted out.

Reviewed By: PNP

<sup>\*</sup>Sample was quantitated as Aroclor 1260, but may contain a mixture of Aroclor 1260 and Aroclor 1262.

#### Results for PCBs by EPA 8082

Client Sample ID: MWP-HA-012-001

Client Project ID: Kuhlman Electric

Lab Sample ID: G442-309-6B Lab Project ID: G442-309

Matrix: Soil

%SOLIDS: 80.9

Report Basis: Dry Weight

Analyzed By: CLP

Date Collected: 01/18/2005 08:24

Date Received: 1/25/05 Date Analyzed: 1/31/05 Date Extracted: 1/30/05

Dilution: 1

77

77

Compound Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Aroclor-1262	Quantitation Limit ug/KG 120 120 120 120 120 120 120 120 120	y •	Result ug/KG BQL BQL BQL BQL BQL BQL BQL BQL BQL
Surrogate Spike Recoveries	Spike	Spike	Percent
	Added	Result	Recovered

100

#### Comments:

**TCMX** 

BQL = Below Quantitation Limit
NA = Not applicable, surrogate diluted out.

Reviewed By: 12.0

<sup>\*</sup>Sample was quantitated as Aroclor 1260, but may contain a mixture of Aroclor 1260 and Aroclor 1262.

#### Results for PCBs by EPA 8082

Client Sample ID: MWP-Duplicate-DD030

Client Project ID: Kuhlman Electric

Lab Sample ID: G442-309-7B Lab Project ID: G442-309

Matrix: Soil

%SOLIDS: 79.0

Report Basis: Dry Weight

Analyzed By: CLP

Date Collected: 01/18/2005 00:00

Date Received: 1/25/2005 Date Analyzed: 2/1/2005 Date Extracted: 1/30/2005

Dilution: 1

65

Compound Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Aroclor-1262	Quantitation Limit ug/KG 117 117 117 117 117 117 117		Result ug/KG BQL BQL BQL BQL BQL BQL BQL BQL BQL
Surrogate Spike Recoveries	Spike	Spike	Percent
	Added	Result	Recovered

100

Comments:

**TCMX** 

BQL = Below Quantitation Limit
NA = Not applicable, surrogate diluted out.

Reviewed By:

65

<sup>\*</sup>Sample was quantitated as Aroclor 1260, but may contain a mixture of Aroclor 1260 and Aroclor 1262.

#### Results for PCBs by EPA 8082

Client Sample ID: MWP-HA-016-001

Client Project ID: Kuhlman Electric

Lab Sample ID: G442-309-8B Lab Project ID: G442-309

Matrix: Soil

%SOLIDS: 79.6

Report Basis: Dry Weight

Analyzed By: CLP

Date Collected: 01/18/2005 10:19

Date Received: 1/25/05 Date Analyzed: 2/1/05 Date Extracted: 1/30/05

Dilution: 1

Compound Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Aroclor-1262	Quantitation Limit ug/KG 103 103 103 103 103 103 103 103		Result ug/KG BQL BQL BQL BQL BQL BQL BQL BQL BQL
Surrogate Spike Recoveries TCMX	Spike Added 100	Spike Result 48	Percent Recovered

#### Comments:

BQL = Below Quantitation Limit
NA = Not applicable, surrogate diluted out.

<sup>\*</sup>Sample was quantitated as Aroclor 1260, but may contain a mixture of Aroclor 1260 and Aroclor 1262.

#### **Results for PCBs** by EPA 8082

Client Sample ID: Method Blank

Client Project ID:

Lab Sample ID: PB2279

Lab Project ID:

Matrix: SOIL Report Basis: Dry Weight

%SOLIDS: 100.0

Date Collected:

Date Received:

Date Analyzed: 1/31/2005 Date Extracted: 1/30/2005

Analyzed By: CLP

Dilution: 1

Compound	Quantitation Limit ug/KG	Result
Aroclor-1016	100	ug/KG
Aroclor-1221	100	BQL BQL
Aroclor-1232	100	BQL
Arocior-1242	100	BQL
Aroclor-1248	. 100	BQL
Aroclor-1254	100	BQL
Aroclor-1260	100	BQL
Aroclor-1262	100	BQL

Surrogate Spike Recoveries	Spike	Spike	Percent
	Added	Result	Recovered
TCMX	100	87	87

Comments:

**BQL** = Below Quantitation Limit

NA = Not applicable, surrogate diluted out.

#### QC Results for PCBs by EPA 8082

Client Sample ID: Batch QC Lab Sample ID: G442-309-1B Batch ID: 2279

Analyzed By: CLP Matrix: Soil

#### MS/MSD

Analyte	Sample ug/KG	Spiked ug/KG	MS ug/KG	REC %	Spiked ug/KG	MSD ug/KG	REC %	RPD %
Aroclor-1260	2200	1210	3440	102	1260	3340	90.5	11.9

#### LCS

Analyte	Analyte Spiked Result REC	REC	Limits		
	ug/KG	ug/KG	%	Lower	Upper
Aroclor-1260	1000	1100	110	70	130

Comments:

# = Outside Control Limits

## List of Reporting Abbreviations and Data Qualifiers

B = Compound also detected in batch blank

**BQL** = Below Quantitation Limit

DF = Dilution Factor

Dup = Duplicate

E = Estimated concentration, exceeds calibration range.

J = Estimated concentration, below calibration range and above MDL

LCS(D) = Laboratory Control Spike (Duplicate)

MDL = Method Detection Limit

MS(D) = Matrix Spike (Duplicate)

PQL = Practical Quantitation Limit

RL = Reporting Limit

RPD = Relative Percent Difference

mg/kg = milligram per kilogram, ppm, parts per million

ug/kg = micrograms per kilogram, ppb, parts per billion

mg/L = milligram per liter, ppm, parts per million

ug/L = micrograms per liter, ppb, parts per billion

% Rec = Percent Recovery

% soilds = Percent Solids

#### **Special Notes:**

- 1) Metals and mercury samples are digested with a hot block, see the standard operating procedure document for details.
- 2) Uncertainty for all reported data is less than or equal to 30 percent.

MI34.011404.1

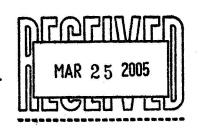
44641 SAME Page \_\_\_ #**202** Report To: \_ Chain-of Custody Record & Analytical Request 20/24/10 E Turnaround: Date: Project ID: Kunuman Electric Contact: CATTAC STRIUC PARADIGM ANALYTICAL LABORATORIES, INC. Phone: (910)-350-1903 FAX: (910)-350-1557 5500 Business Drive, Wilmington, NC 28405

13 of 13

CERTIFICATION #48 Dut 6412-309 Please specify any special reporting requirements State Certification Requested SEE REVERSE FOR TERMS AND CONDITIONS Comments: Other SAME , 1-9 1 -0 11-0 11-0 0.1 1-0 1 Invoice To:\_ SC 42000 1009d 20030 22000 Dood \$ \$ ₹ 31 01000 72000 7000 NC Temperature 0,2% Amilyaes 125/05/07YS There P.O. Number: Job Number: Date Kut 1665 X × ×  $\succ$ X × X Received By Preservatives Phone: Fax: 专 X × メ × × × X X The Time Matrix 7 4 ٦ 5 7 4 J Date 1334 4180 Sola1/10 1010 This softifie 7521 50/61/10 8101 Sottil10 Client: MANTIN & SUACUE Address: butck mounthin softho. 20/21/10 or light ol Blok Relinquished By Mwp-H4-001-001 M W H - 005-001 JAWA- HA-006 - 001 -MW-114-011-001 Janut HA -012 -001 Mut - Duplicates HA-016 -00 / TRUP-DUPLICATE 0, M. W. H+66. Address: Quote #:

OPIGINAL

5500 Business Drive Wilmington, North Carolina 28405 (910) 350-1903 Fax (910) 350-1557



Mr. Robert Martin Martin & Slagle Box 1023 Black Mountain NC 28711

Report Number: G442-313

Client Project: Kuhlman Electric

Dear Mr. Martin:

Enclosed are the results of the analytical services performed under the referenced project. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of five years in the event they are required for future reference. Any samples submitted to our laboratory will will be retained for a maximum of thirty (30) days from the date of this report unless other arrangements are requested.

If there are any questions about the report or the services performed during this project, please call Paradigm at (910) 350-1903. We will be happy to answer any questions or concerns which you may have.

Thank you for using Paradigm Analytical Labs for your analytical services. We look forward to working with you again on any additional analytical needs which you may have.

Sincerely,

Paradigm Analytical Laboratories, Inc.

Labbratory Director

J. Parciek Weaver

#### **Results for PCBs**

by EPA 8082

Client Sample ID: MWP-HA-019-001 Analyzed By: CLP

Client Project ID: Kuhlman Electric Date Collected: 2/25/05 12:34 Lab Sample ID: G442-313-1B

Date Received: 3/3/05 Lab Project ID: G442-313 Date Analyzed: 3/12/05

Matrix: Soil %SOLIDS: 76.5 Date Extracted: 3/10/05 Sample Wt/Vol: 10.86 g

Report Basis: Dry Weight

ColumnID: STX-CLPest Dilution: 1

Compound	Quantitation Limit ug/KG	Result
Aroclor-1016	120	ug/KG
Aroclor-1221	120	BQL
Aroclor-1232	120	BQL
Aroclor-1242	120	BQL
Aroclor-1248	120	BQL
Aroclor-1254	120	BQL
Aroclor-1260	120	BQL
Aroclor-1262	120	<b>4140</b> BOI

Surrogate Spike Recoveries	Spike	Spike	Percent
	Added	Result	Recovered
TCMX	100	92	92

Comments:

**BQL = Below Quantitation Limit** NA = Not applicable, surrogate diluted out.

<sup>\*</sup>Sample was quantitated as Aroclor 1260, but may contain a mixture of Aroclor 1260 and Aroclor 1262.

#### **Results for PCBs**

by EPA 8082

Client Sample ID: MWP-Duplicate-DD045
Client Project ID: Kuhlman Electric
Lab Sample ID: G442-313-2B
Lab Project ID: G442-313
Matrix: Soil

Analyzed By: CLP
Date Collected: 2/25/05 0:00
Date Received: 3/3/05
Date Analyzed: 3/12/05
Date Extracted: 3/10/05

Sample Wt/Vol: 11.23 g ColumnID: STX-CLPest Dilution: 1

Report Basis: Dry Weight

Compound	Quantitation Limit ug/KG	Result ug/KG
Aroclor-1016	119	
Aroclor-1221	119	BQL BQL
Aroclor-1232	119	BQL
Aroclor-1242	119	BQL
Aroclor-1248	119	BQL
Aroclor-1254	119	BQL
Aroclor-1260	119	4490
Aroclor-1262	119	BQL

Surrogate Spike Recoveries	Spike	Spike	Percent
	Added	Result	Recovered
TCMX	100	108	108

Comments:

**BQL** = Below Quantitation Limit

NA = Not applicable, surrogate diluted out.

<sup>\*</sup>Sample was quantitated as Aroclor 1260, but may contain a mixture of Aroclor 1260 and Aroclor 1262.

#### Results for PCBs by EPA 8082

Client Sample ID: MWP-HA-023-001 Analyzed By: CLP
Client Project ID: Kuhlman Electric Date Collected: 2/25/05 16:12

Lab Sample ID: G442-313-3B Date Received: 3/3/05
Lab Project ID: G442-313 Date Analyzed: 3/12/05

Matrix: Soil %SOLIDS: 76.1 Date Extracted: 3/10/05 Sample Wt/Vol: 11.12 g ColumnID: STX-CLPest Dilution: 1

Report Basis: Dry Weight

Compound	Quantitation Limit ug/KG	Result ug/KG
Aroclor-1016	118	BQL
Aroclor-1221	118	BQL
Aroclor-1232	118	BQL
Aroclor-1242	118	BQL
Aroclor-1248	118	BQL
Aroclor-1254	118	BQL
Aroclor-1260	118	1700
Aroclor-1262	118	BQL

Surrogate Spike Recoveries	Spike	Spike	Percent
	Added	Result	Recovered
TCMX	100	91	91

Comments:

BQL = Below Quantitation Limit

NA = Not applicable, surrogate diluted out.

<sup>\*</sup>Sample was quantitated as Aroclor 1260, but may contain a mixture of Aroclor 1260 and Aroclor 1262.

#### **Results for PCBs** by EPA 8082

Client Sample ID: MWP-HA-026-001 Client Project ID: Kuhlman Electric

Analyzed By: CLP

Date Collected: 2/26/05 17:21

Lab Sample ID: G442-313-4B

Date Received: 3/3/05

Lab Project ID: G442-313 Matrix: Soil

%SOLIDS: 75.6

Date Analyzed: 3/12/05

Sample Wt/Voi: 10.59 g

ColumnID: STX-CLPest

Date Extracted: 3/10/05

Report Basis: Dry Weight

Dilution: 1

Compound	Quantitation Limit ug/KG	Result
Aroclor-1016	125	ug/KG
Aroclor-1221	125	BQL
Aroclor-1232	- <del></del>	BQL
Aroclor-1242	125	BQL
Aroclor-1248	125	BQL
Aroclor-1254	125	BQL
Aroclor-1260	125	BQL
	125	2280
Aroclor-1262	125	BQL

Surrogate Spike Recoveries	Spike	Spike	Percent
	Added	Result	Recovered
TCMX	100	95	95

Comments:

**BQL** = Below Quantitation Limit NA = Not applicable, surrogate diluted out.

<sup>\*</sup>Sample was quantitated as Aroclor 1260, but may contain a mixture of Aroclor 1260 and Aroclor 1262.

#### Results for PCBs by EPA 8082

Client Sample ID: MWP-Duplicate-DD060

Client Project ID: Kuhlman Electric

Lab Sample ID: G442-313-5B

Lab Project ID: G442-313

Matrix: Soil

Sample Wt/Vol: 10.20 g

Client Project ID: Analyzed By: CLP

Date Collected: 2/26/05 0:00

Date Received: 3/3/05

Date Analyzed: 3/12/05

Date Extracted: 3/10/05

Date Extracted: 3/10/05

Date Project ID: MWP-Duplicate-DD060

Analyzed By: CLP

Date Collected: 2/26/05 0:00

Date Received: 3/3/05

Date Extracted: 3/10/05

Date Extracted: 3/10/05

Report Basis: Dry Weight

Compound	Quantitation Limit ug/KG	Result ug/KG
Aroclor-1016	130	BQL
Aroclor-1221	130	BQL
Aroclor-1232	130	BQL
Aroclor-1242	130	BQL
Aroclor-1248	130	BQL
Aroclor-1254	130	BQL
Aroclor-1260	130	1480
Aroclor-1262	130	BQL

Surrogate Spike Recoveries	Spike	Spike	Percent
	Added	Result	Recovered
TCMX	100	78	78

Comments:

BQL = Below Quantitation Limit
NA = Not applicable, surrogate diluted out.

<sup>\*</sup>Sample was quantitated as Aroclor 1260, but may contain a mixture of Aroclor 1260 and Aroclor 1262.

#### Results for PCBs by EPA 8082

Client Sample ID: Method Blank
Client Project ID:
Lab Sample ID: PB2499
Lab Project ID:
Date Collected:
Date Received:
Date Analyzed: 3/12/0

ab Project ID: Date Analyzed: 3/12/05
Matrix: SOIL %SOLIDS: 100.0 Date Extracted: 3/10/05

Sample Wt/Vol: 10.0 g ColumnID: STX-CLPest Dilution: 1

Report Basis: Dry Weight

Compound	Quantitation Limit ug/KG	Result ug/KG
Aroclor-1016	100	BQL
Aroclor-1221	100	BQL
Aroclor-1232	100	BQL
Aroclor-1242	100	BQL
Aroclor-1248	100	BQL
Aroclor-1254	100	BQL
Aroclor-1260	100	BQL
Aroclor-1262	100	BQL

Surrogate Spike Recoveries	Spike	Spike	Percent
	Added	Result	Recovered
TCMX	100	86	86

Comments:

BQL = Below Quantitation Limit
NA = Not applicable, surrogate diluted out.

#### QC Results for PCBs by EPA 8082

Client Sample ID: Batch QC Lab Sample ID: G442-313-1B

Batch ID: 2499

Analyzed By: CLP Matrix: Soil

#### MS/MSD

Analyte	Sample ug/KG	Spiked ug/KG	MS ug/KG	REC %		Spiked ug/KG	MSD ug/KG	REC %	RPD
Aroclor-1260	3810	1260	8600	380	#	1300	9080	405 #	<del>                                     </del>

#### LCS

Analyte	Spiked	Result	REC	Limits	
	ug/KG	ug/KG	%	Lower	Upper
Aroclor-1260	1000	839	83.9	70	130

Comments:

# = Outside Control Limits

## List of Reporting Abbreviations and Data Qualifiers

B = Compound also detected in batch blank

**BQL** = Below Quantitation Limit

DF = Dilution Factor

Dup = Duplicate

E = Estimated concentration, exceeds calibration range.

J = Estimated concentration, below calibration range and above MDL

LCS(D) = Laboratory Control Spike (Duplicate)

MDL = Method Detection Limit

MS(D) = Matrix Spike (Duplicate)

PQL = Practical Quantitation Limit

RL = Reporting Limit

RPD = Relative Percent Difference

mg/kg = milligram per kilogram, ppm, parts per million

ug/kg = micrograms per kilogram, ppb, parts per billion

mg/L = milligram per liter, ppm, parts per million

ug/L = micrograms per liter, ppb, parts per billion

% Rec = Percent Recovery

% soilds = Percent Solids

#### **Special Notes:**

- 1) Metals and mercury samples are digested with a hot block, see the standard operating procedure document for details.
- 2) Uncertainty for all reported data is less than or equal to 30 percent.

MI34.011404.1

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PARADIGM ANALYTICAL LABORATORIES, INC.

Phone: (910)-350-1903 FAX: (910)-350-1557 5500 Business Drive, Wilmington, NC 28405

Chain-of Custody Record & Analytical Request

coc# 44646

Please specify any special reporting requirements State Certification Requested SEE REVERSE FOR TERMS AND CONDITIONS Committeents: ZHURS SHALE Other. ,1-0 6442-313 1-0 0-1 Invoice To: Report To: SC 25000 Mostic DDOYF PB054 145 F D1039 07000 NC Temperature Solvolso 575 Anthrees Time 0/0/ Turnaround: Job Number: P.O. Number: 3/3/05 Date Project ID: Kultunty Electric Contact: Loser MARTIN 15 × X × × × Received By Preservatives Phone: Fax: メ 圣 × × Time Time Matrix 1217 4 NC C 12. AST 421 solsy Date MWP-14-023-001 02/25/05 1612 1721 Client: MACTIN & SUACCE WOULTHIN 50/11/20 24242 oruke Pate Relinquished By AWP-#A-019-001 Address: Butck MWF HA-024-001 A 0.11. MWP-Depucher Attmb-Dafricates Address: Quote #:

OPIGINAL

MAR 25 2005

5500 Business Drive
Wilmington, North Carolina 28405
(910) 350-1903
Fax (910) 350-1557

Mr. Robert Martin
Martin & Slagle
Box 1023
Black Mountain NC 28711

Report Number: G442-314

Client Project: Kuhlman Electric

Dear Mr. Martin:

Enclosed are the results of the analytical services performed under the referenced project. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of five years in the event they are required for future reference. Any samples submitted to our laboratory will will be retained for a maximum of thirty (30) days from the date of this report unless other arrangements are requested.

If there are any questions about the report or the services performed during this project, please call Paradigm at (910) 350-1903. We will be happy to answer any questions or concerns which you may have.

Thank you for using Paradigm Analytical Labs for your analytical services. We look forward to working with you again on any additional analytical needs which you may have.

Sincerely,

Paradignt Analytical Laboratories, Inc.

Laboratory Director

J. Patrick Weaver

#### Results for PCBs by EPA 8082

Client Sample ID: ZWP-HA-001-001 Analyzed By: CLP
Client Project ID: Kuhlman Electric Date Collected: 2/25/05 8:50
Lab Sample ID: G442-314-1B Date Received: 3/3/05
Lab Project ID: G442-314 Date Analyzed: 3/12/05
Matrix: Soil %SOLIDS: 76.5 Date Extracted: 3/10/05

Sample Wt/Vol: 10.73 g ColumnID: STX-CLPest Dilution: 1

Report Basis: Dry Weight

	Quantitation	Result
Compound	Limit ug/KG	ug/KG
Aroclor-1016	122	BQL
Aroclor-1221	122	BQL
Aroclor-1232	122	BQL
Aroclor-1242	122	BQL
Aroclor-1248	122	BQL
Aroclor-1254	122	BQL
Aroclor-1260	122	BQL
Aroclor-1262	122	BQL

Surrogate Spike Recoveries	Spike	Spike	Percent
	Added	Result	Recovered
TCMX	100	107	107

Comments:

BQL = Below Quantitation Limit

NA = Not applicable, surrogate diluted out.

#### Results for PCBs by EPA 8082

Client Sample ID: ZWP-Duplicate-FF009

Client Project ID: Kuhlman Electric

Lab Sample ID: G442-314-2B

Lab Project ID: G442-314

Matrix: Soil

Sample Wt/Vol: 10.33 g

ColumnID: STX-CLPest

Analyzed By: CLP

Date Collected: 2/25/05 0:00

Date Received: 3/3/05

Date Analyzed: 3/12/05

Date Extracted: 3/10/05

Report Basis: Dry Weight

	Quantitation	Result
Compound	Limit ug/KG	ug/KG
Aroclor-1016	127	BQL
Aroclor-1221	127	BQL
Aroclor-1232	127	BQL
Aroclor-1242	127	BQL
Aroclor-1248	127	BQL
Aroclor-1254	127	BQL
Aroclor-1260	127	BQL
Aroclor-1262	127	BQL

Surrogate Spike Recoveries	Spike	Spike	Percent
	Added	Result	Recovered
TCMX	100	93	93

Comments:

BQL = Below Quantitation Limit

NA = Not applicable, surrogate diluted out.

#### **Results for PCBs**

by EPA 8082

Client Sample ID: ZWP-HA-008-001

Client Project ID: Kuhlman Electric

Lab Sample ID: G442-314-3B

Lab Project ID: G442-314

Matrix: Soil

Matrix: Soil

Sample Wt/Vol: 10.46 g

ClP

Date Collected: 2/25/05 11:02

Date Received: 3/3/05

Date Analyzed: 3/12/05

Date Extracted: 3/10/05

Date Extracted: 3/10/05

Report Basis: Dry Weight

Compound	Quantitation Limit ug/KG	Result ug/KG
Aroclor-1016	122	BQL
Aroclor-1221	122	BQL
Aroclor-1232	122	BQL
Aroclor-1242	122	BQL
Aroclor-1248	122	BQL
Aroclor-1254	122	BQL
Aroclor-1260	122	394
Aroclor-1262	122	BQL

Surrogate Spike Recoveries	Spike	Spike	Percent
	Added	Result	Recovered
TCMX	100	117	117

Comments:

BQL = Below Quantitation Limit
NA = Not applicable, surrogate diluted out.

<sup>\*</sup>Sample was quantitated as Aroclor 1260, but may contain a mixture of Aroclor 1260 and Aroclor 1262.

#### Results for PCBs by EPA 8082

Client Sample ID: ZWP-HA-009-001

Client Project ID: Kuhlman Electric

Lab Sample ID: G442-314-4B

Lab Project ID: G442-314

Matrix: Soil

Sample Wt/Vol: 10.04 g

ColumnID: STX-CLPest

Analyzed By: CLP

Date Collected: 2/25/05 16:27

Date Received: 3/3/05

Date Analyzed: 3/12/05

Date Extracted: 3/10/05

Report Basis: Dry Weight

Compound Aroclor-1016	Quantitation Limit ug/KG 127	Result ug/KG
Aroclor-1221	127	BQL BQL
Aroclor-1232	127	BQL
Aroclor-1242	127	BQL
Aroclor-1248	127	BQL
Aroclor-1254	127	BQL
Aroclor-1260	127	1940
Aroclor-1262	127	BQL

Surrogate Spike Recoveries	Spike	Spike	Percent
	Added	Result	Recovered
TCMX	100	98	98

Comments:

**BQL = Below Quantitation Limit** 

NA = Not applicable, surrogate diluted out.

Reviewed By: 4+

<sup>\*</sup>Sample was quantitated as Aroclor 1260, but may contain a mixture of Aroclor 1260 and Aroclor 1262.

#### **Results for PCBs**

by EPA 8082

Client Sample ID: Method Blank

Client Project ID:

Analyzed By: CLP **Date Collected:** 

Lab Sample ID: PB2499

Date Received:

Lab Project ID:

Matrix: SOIL

Date Analyzed: 3/12/05

Sample Wt/Vol: 10.0 g

Date Extracted: 3/10/05

Report Basis: Dry Weight

Dilution: 1

	Quantitation	Result
Compound	Limit ug/KG	ug/KG
Aroclor-1016	100	BQL
Aroclor-1221	100	BQL
Aroclor-1232	100	BQL
Aroclor-1242	100	BQL
Aroclor-1248	100	BQL
Aroclor-1254	100	BQL
Aroclor-1260	100	BQL
Aroclor-1262	100	BQL

%SOLIDS: 100.0

ColumnID: STX-CLPest

Surrogate Spike Recoveries	Spike	Spike	Percent
	Added	Result	Recovered
TCMX	100	86	86

Comments:

**BQL** = Below Quantitation Limit

NA = Not applicable, surrogate diluted out.

#### QC Results for PCBs by EPA 8082

Client Sample ID: Batch QC Lab Sample ID: G442-313-1B

Batch ID: 2499

Analyzed By: CLP Matrix: Soil

#### MS/MSD

Analyte	Sample ug/KG	Spiked ug/KG	MS ug/KG	REC %	Spiked ug/KG	MSD ug/KG	REC %		RPD %
Aroclor-1260	3810	1260	8600	380 #	1300	9080	405	#	6.37

#### LCS

Analyte	Spiked	Result	REC	Lin	nits
	ug/KG	ug/KG	%	Lower	Upper
Aroclor-1260	1000	839	83.9	70	130

Comments:

# = Outside Control Limits

## List of Reporting Abbreviations and Data Qualifiers

B = Compound also detected in batch blank

BQL = Below Quantitation Limit

DF = Dilution Factor

Dup = Duplicate

E = Estimated concentration, exceeds calibration range.

J = Estimated concentration, below calibration range and above MDL

LCS(D) = Laboratory Control Spike (Duplicate)

MDL = Method Detection Limit

MS(D) = Matrix Spike (Duplicate)

PQL = Practical Quantitation Limit

RL = Reporting Limit

RPD = Relative Percent Difference

mg/kg = milligram per kilogram, ppm, parts per million

ug/kg = micrograms per kilogram, ppb, parts per billion

mg/L = milligram per liter, ppm, parts per million

ug/L = micrograms per liter, ppb, parts per billion

% Rec = Percent Recovery

% soilds = Percent Solids

#### **Special Notes:**

- 1) Metals and mercury samples are digested with a hot block, see the standard operating procedure document for details.
- 2) Uncertainty for all reported data is less than or equal to 30 percent.

MI34.011404.1

PARADIGM ANALYTICAL LABORATORIES, INC. Phone: (910)-350-1903 FAX: (910)-350-1557 5500 Business Drive, Wilmington, NC 28405

Chain-of Custody Record & Analytical Request

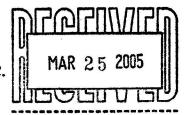
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5500 Business Drive Wilmington, North Carolina 28405 (910) 350-1903 Fax (910) 350-1557



Mr. Robert Martin Martin & Slagle Box 1023 Black Mountain NC 28711

Report Number: G442-315

Client Project: Kuhlman Electric

Dear Mr. Martin:

Enclosed are the results of the analytical services performed under the referenced project. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of five years in the event they are required for future reference. Any samples submitted to our laboratory will will be retained for a maximum of thirty (30) days from the date of this report unless other arrangements are requested.

If there are any questions about the report or the services performed during this project, please call Paradigm at (910) 350-1903. We will be happy to answer any questions or concerns which you may have.

Thank you for using Paradigm Analytical Labs for your analytical services. We look forward to working with you again on any additional analytical needs which you may have.

Sincerely,

Paradigm Analytical Laboratories, Inc.

Laboratory Director

J. Patrick Weaver

#### Results for PCBs by EPA 8082

Client Sample ID: GTP-HA-001-001 Analyzed By: CLP

Client Project ID: Kuhlman Electric Date Collected: 2/25/05 14:10
Lab Sample ID: G442-315-1B Date Received: 3/3/05
Lab Project ID: G442-315 Date Analyzed: 3/12/05

Matrix: Soil %SOLIDS: 84.5 Date Extracted: 3/10/05

Sample Wt/Vol: 11.30 g ColumnID: STX-CLPest Dilution: 1

Report Basis: Dry Weight

O	Quantitation	Resuit
Compound	Limit ug/KG	ug/KG
Aroclor-1016	105	BQL
Arocior-1221	105	BQL
Aroclor-1232	105	BQL
Aroclor-1242	105	BQL
Aroclor-1248	105	BQL
Aroclor-1254	105	BQL
Aroclor-1260	105	BQL
Aroclor-1262	105	BQL

Surrogate Spike Recoveries	Spike	Spike	Percent
	Added	Result	Recovered
TCMX	100	92	92

Comments:

BQL = Below Quantitation Limit
NA = Not applicable, surrogate diluted out.

Reviewed By: \_/

#### **Results for PCBs**

by EPA 8082

Client Sample ID: GTP-Duplicate-GG007

Client Project ID: Kuhlman Electric

Lab Sample ID: G442-315-2B

Lab Project ID: G442-315

Date Received: 3/3/05

Date Analyzed: 3/12/05

Matrix: Soil %SOLIDS: 87.3 Date Extracted: 3/10/05

Sample Wt/Vol: 10.53 g ColumnID: STX-CLPest Dilution: 1
Report Basis: Dry Weight

Quantitation Result Compound Limit ug/KG ug/KG Aroclor-1016 109 BQL Aroclor-1221 109 BQL Aroclor-1232 109 BQL Aroclor-1242 109 BQL Aroclor-1248 109 BQL Aroclor-1254 109 BQL Aroclor-1260 109 BQL Aroclor-1262 109 BQL

Surrogate Spike Recoveries	Spike	Spike	Percent
	Added	Result	Recovered
TCMX	100	75	75

Comments:

**BQL** = Below Quantitation Limit

NA = Not applicable, surrogate diluted out.

#### Results for PCBs

by EPA 8082

Client Sample ID: GTP-HA-005-001 Analyzed By: CLP
Client Project ID: Kuhlman Electric Date Collected: 2/26/05 8:52
Lab Sample ID: G442-315-3B Date Received: 3/3/05
Lab Project ID: G442-315 Date Analyzed: 3/12/05
Matrix: Soil %SOLIDS: 91.5 Date Extracted: 3/10/05

Sample Wt/Vol: 10.45 g ColumnID: STX-CLPest Dilution: 1

Report Basis: Dry Weight

	Quantitation	Result
Compound	Limit ug/KG	ug/KG
Aroclor-1016	104	BQL
Aroclor-1221	104	BQL
Aroclor-1232	104	BQL
Aroclor-1242	104	BQL
Aroclor-1248	104	BQL
Aroclor-1254	104	BQL
Aroclor-1260	104	162
Aroclor-1262	104	BQL

Surrogate Spike Recoveries	Spike	Spike	Percent
	Added	Result	Recovered
TCMX	100	96	96

Comments:

BQL = Below Quantitation Limit

NA = Not applicable, surrogate diluted out.

<sup>\*</sup>Sample was quantitated as Aroclor 1260, but may contain a mixture of Aroclor 1260 and Aroclor 1262.

#### **Results for PCBs**

by EPA 8082

Client Sample ID: GTP-Duplicate-GG014 Analyzed By: CLP

Client Project ID: Kuhlman Electric Date Collected: 2/26/05 0:00
Lab Sample ID: G442-315-4B Date Received: 3/3/05
Lab Project ID: G442-315 Date Analyzed: 3/12/05

Matrix: Soil %SOLIDS: 91.3 Date Extracted: 3/10/05

Sample Wt/Vol: 10.22 g ColumnID: STX-CLPest Dilution: 1

Report Basis: Dry Weight

	Quantitation	Result
Compound	Limit ug/KG	ug/KG
Aroclor-1016	107	BQL
Aroclor-1221	107	BQL
Aroclor-1232	107	BQL
Aroclor-1242	107	BQL
Aroclor-1248	107	BQL
Aroclor-1254	107	BQL
Aroclor-1260	107	139
Aroclor-1262	107	BQL

Surrogate Spike Recoveries	Spike	Spike	Percent
	Added	Result	Recovered
TCMX	100	98	98

Comments:

BQL = Below Quantitation Limit

NA = Not applicable, surrogate diluted out.

<sup>\*</sup>Sample was quantitated as Aroclor 1260, but may contain a mixture of Aroclor 1260 and Aroclor 1262.

#### Results for PCBs by EPA 8082

Client Sample ID: GTP-HA-011-001 Analyzed By: CLP

Client Project ID: Kuhlman Electric Date Collected: 2/26/05 10:53

 Lab Sample ID: G442-315-5B
 Date Received: 3/3/05

 Lab Project ID: G442-315
 Date Analyzed: 3/12/05

 Matrix: Soil
 %SOLIDS: 82.9

 Date Extracted: 3/10/05

Sample Wt/Vol: 10.28 g ColumnID: STX-CLPest Dilution: 1

Report Basis: Dry Weight

	Quantitation	Result
Compound	Limit ug/KG	ug/KG
Aroclor-1016	117	BQL
Aroclor-1221	117	BQL
Aroclor-1232	117	BQL
Aroclor-1242	117	BQL
Aroclor-1248	117	BQL
Aroclor-1254	117	BQL
Aroclor-1260	117	1250
Aroclor-1262	117	BQL

Surrogate Spike Recoveries	Spike	Spike	Percent
	Added	Result	Recovered
TCMX	100	98	98

Comments:

**BQL** = Below Quantitation Limit

NA = Not applicable, surrogate diluted out.

<sup>\*</sup>Sample was quantitated as Aroclor 1260, but may contain a mixture of Aroclor 1260 and Aroclor 1262.

#### **Results for PCBs**

by EPA 8082

Client Sample ID: GTP-HA-016-001
Client Project ID: Kuhlman Electric
Lab Sample ID: G442-315-6B
Lab Project ID: G442-315
Matrix: Soil
Sample Wt/Vol: 11.45 g
ColumnID: STX-CLPest

Analyzed By: CLP
Date Collected: 2/26/05 13:55
Date Received: 3/3/05
Date Analyzed: 3/12/05
Date Extracted: 3/10/05

Report Basis: Dry Weight

Compound	Quantitation Limit ug/KG	Result ug/KG
Aroclor-1016	106	BQL
Aroclor-1221	106	BQL
Aroclor-1232	106	BQL
Aroclor-1242	106	BQL
Aroclor-1248	106	BQL
Aroclor-1254	106	BQL
Aroclor-1260	106	2670
Aroclor-1262	106	BQL

Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
TCMX	100	80	80

Comments:

BQL = Below Quantitation Limit

NA = Not applicable, surrogate diluted out.

<sup>\*</sup>Sample was quantitated as Aroclor 1260, but may contain a mixture of Aroclor 1260 and Aroclor 1262.

#### Results for PCBs by EPA 8082

Client Sample ID: GTP-HA-021-001

Client Project ID: Kuhlman Electric

Lab Sample ID: G442-315-7B

Lab Project ID: G442-315

Date Collected: 2/26/05 15:58

Date Received: 3/3/05

Date Analyzed: 3/12/05

Matrix: Soil %SOLIDS: 75.5 Date Extracted: 3/10/05

Sample Wt/Vol: 10.01 g ColumnID: STX-CLPest Dilution: 1

Report Basis: Dry Weight

	Quantitation	Result
Compound	Limit ug/KG	ug/KG
Aroclor-1016	132	BQL
Aroclor-1221	132	BQL
Aroclor-1232	132	BQL
Aroclor-1242	132	BQL
Aroclor-1248	132	BQL
Aroclor-1254	132	BQL
Aroclor-1260	132	2250
Aroclor-1262	132	BQL

Surrogate Spike Recoveries	Spike	Spike	Percent
	Added	Result	Recovered
TCMX	100	77	77

Comments:

BQL = Below Quantitation Limit

NA = Not applicable, surrogate diluted out.

Reviewed By: 14

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<sup>\*</sup>Sample was quantitated as Aroclor 1260, but may contain a mixture of Aroclor 1260 and Aroclor 1262.

#### Results for PCBs by EPA 8082

Client Sample ID: Method Blank
Client Project ID:
Lab Sample ID: PB2499
Lab Project ID:
Matrix: SOIL

Analyzed By: CLP
Date Collected:
Date Received:
Date Analyzed: 3/12/05
Date Extracted: 3/10/05

Sample Wt/Voi: 10.0 g ColumnID: STX-CLPest Dilution: 1

Report Basis: Dry Weight

Compound	Quantitation Limit ug/KG	Result ug/KG
Aroclor-1016	100	BQL
Aroclor-1221	100	BQL
Aroclor-1232	100	BQL
Aroclor-1242	100	BQL
Aroclor-1248	100	BQL
Aroclor-1254	100	BQL
Aroclor-1260	100	BQL
Aroclor-1262	100	BQL

Surrogate Spike Recoveries	Spike	Spike	Percent
	Added	Result	Recovered
TCMX	100	86	86

Comments:

BQL = Below Quantitation Limit

NA = Not applicable, surrogate diluted out.

#### QC Results for PCBs by EPA 8082

Client Sample ID: Batch QC Lab Sample ID: G442-313-1B

Batch ID: 2499

Analyzed By: CLP

Matrix: Soil

#### MS/MSD

Analyte	Sample ug/KG	Spiked ug/KG	MS ug/KG	REC %		Spiked ug/KG	MSD ug/KG	REC %		RPD
Aroclor-1260	3810	1260	8600	380	#	1300	9080	405	#	6.37

#### LCS

Analyte	Spiked Resi		REC	Limits	
	ug/KG	ug/KG	%	Lower	Upper
Aroclor-1260	1000	839	83.9	70	130

Comments:

# = Outside Control Limits

## List of Reporting Abbreviations and Data Qualifiers

B = Compound also detected in batch blank

**BQL** = Below Quantitation Limit

DF = Dilution Factor

Dup = Duplicate

E = Estimated concentration, exceeds calibration range.

J = Estimated concentration, below calibration range and above MDL

LCS(D) = Laboratory Control Spike (Duplicate)

MDL = Method Detection Limit

MS(D) = Matrix Spike (Duplicate)

PQL = Practical Quantitation Limit

RL = Reporting Limit

RPD = Relative Percent Difference

mg/kg = milligram per kilogram, ppm, parts per million

ug/kg = micrograms per kilogram, ppb, parts per billion

mg/L = milligram per liter, ppm, parts per million

ug/L = micrograms per liter, ppb, parts per billion

% Rec = Percent Recovery

% soilds = Percent Solids

#### **Special Notes:**

- 1) Metals and mercury samples are digested with a hot block, see the standard operating procedure document for details.
- 2) Uncertainty for all reported data is less than or equal to 30 percent.

MI34.011404.1

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PARADIGM ANALYTICAL LABORATORIES, INC. 5500 Business Drive, Wilmington, NC 28405

Chain-of Custody Record & Analytical Request

44647 **#**000

Phone: (910)-350-1903 FAX: (910)-350-1557

Please specify any special reparting 24 State Certification Requested SEE REVERSE FOR TERMS AND CONDITIONS Page / requirements SAME Comments 7 25 ES Other 54/12-3/5 ,1-0 11-0 11-0 1-0 1-0 Report To: Invoice To: FISTIL SC £0039 66010 66023 10099 41099 66033 60043 SC Temperature Date: 03/02/05 300 Analyses Turnaround: \_ P.O. Number: 3/3/est 1010 Job Number: Time OFFIGINAL Date Project ID: Kuttunto Electric Contact: Coseer MARTIN R × × hu X × × Received By Preservatives Phone: Fax Z × X × × × × × Time Time Matrix 172 Ž 5 4 4 4 5 3/2/65 01/11/02/1410 Date other offer JSE Softy dssi solnho Esol solnto -MARTIN + SLACIE Address: butch Mountain 50/54/20 Jol nopo Date Relinquished By 6TP-HA-001-001 O.A. Sample ID 671-44-011-001 6TP-H4-016-001 (TP-HA-005-001 6TP- Duplicatio 6TP-DUPLICATE 6TP-HA-021-001 Address: Client: Quote #:

# Evaluation of On-Site Analytical PCB Determinations Supporting 106 Puckett Street

Crystal Springs, MS

Prepared for Martin & Slagle P.O. Box 1023 118 F Cherry Street Black Mountain, NC 28711

Prepared by Gradient Corporation 238 Main Street Cambridge, MA 02142

April 13, 2005

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	x <b>v</b> 0. <b>w</b> 000

#### **Executive Summary**

An on-site laboratory, Environmental Chemistry Consulting Services, Inc. (ECCS), successfully analyzed soil samples for polychlorinated biphenyls (PCBs) in support of sampling activities performed at 106 Puckett Street in Crystal Springs Mississippi. Approximately 10 percent of the soil samples collected during the program were split in the field and sent to an off-site laboratory, Paradigm Analytical Laboratories, Inc. (Paradigm), for confirmatory analysis. The on-site laboratory successfully implemented an extensive Quality Assurance/Quality Control (QA/QC) program, a program essentially as comprehensive and strict as those of off-site laboratories (see Appendix 1 for on-site laboratory reports). A careful examination of the on-site laboratory QA/QC results and the results of the split soil samples analyzed by both the on-site (ECCS) and the off-site confirmatory (Paradigm) laboratories demonstrated the outstanding consistency and accuracy of the on-site laboratory. Comparison of results of the split samples analyzed by both laboratories showed excellent agreement across the full range of encountered Aroclor 1260 concentrations, including those near the PCB action level of 1.0 mg/kg, confirming the suitability of the on-site measurements for site characterization and future decision-making.

- Both laboratories consistently met internal QA/QC criteria. Analytical systems were under control with regard to calibration, surrogate recoveries, matrix spikes, matrix spike duplicates, laboratory control samples, and blanks.
- Overall, 100% of split samples (i.e., on-site vs. off-site laboratory) fell within the range of acceptable Relative Percent Differences (RPDs) for split soil samples.
- 100% of the duplicate sample pairs analyzed by the on-site laboratory fell within the acceptable range for RPDs for duplicate soil samples.
- 100% of the duplicate sample pairs analyzed by the off-site laboratory fell within the acceptable range for RPDs for duplicate soil samples.
- 100% of on-site laboratory results of <1.0 mg/kg and > 10 mg/kg were confirmed by the off-site laboratory.
- The precision, accuracy, selectivity, and sensitivity of the on-site laboratory were excellent throughout the program.

During the initial phase of the 2002 Drainage Channel Remediation program, comparability issues were revealed for some of the split samples. However, the comparability issues were resolved by modifying the off-site laboratory's sample preparation procedures, and the comparability demonstrated subsequently confirmed the strong performance of the on-site laboratory throughout the entire program.

#### 1 On-Site Laboratory Method Procedures

The use of the on-site laboratory was approved by MDEQ and USEPA Region IV for assessment and confirmation of remediation on this project as discussed in Section 7.0 of this report. Both laboratories have consistently performed well during previous phases of assessment and remediation associated with the Kuhlman Electric project. In accordance with the approved QA/QC plan, ten percent of samples collected were split and sent to the off-site laboratory, Paradigm, to confirm the on-site laboratory results and applicability of these results to the assessment and remediation programs

The on-site method used for the determination of PCBs during this program was an abbreviated, modified version of approved methods (a mini-extraction modifying EPA Method 3500B for sample extraction, EPA Method 3665A for extract cleanup, and EPA Method 8082 for determination of PCBs). The method was very sophisticated for an on-site analysis protocol: surrogates were added to each sample to monitor extraction performance; analysis was carried out on a gas chromatograph using capillary columns and an electron capture detector (ECD); and quantitation was based on comparison to standards using daily 6-point calibration curves. Through the use of the gas chromatograph and ECD, the selectivity and sensitivity of the on-site method was equivalent to that of the off-site laboratory. The method was also similar to one previously demonstrated to be successful for PCBs by the EPA (USEPA, 1995).

#### 1.1 On-Site Laboratory Sample Preparation and Extraction

For each sample, the on-site laboratory received a 9 oz. sample jar filled with soil that had been homogenized by the sample collectors. After processing the sample, as described below, on-site laboratory staff transferred soil from the original 9 oz. jar into a 4 oz. jar which was shipped to the off-site laboratory for confirmatory analysis. The on-site laboratory retained the balance of sample in the 9 oz. jar.

In the on-site laboratory, approximately 4 grams of each sample were weighed into a 20 mL scintillation vial. Approximately 10 grams of sodium sulfate were added to the vial and mixed with the soil until the mixture was free flowing. Surrogate solution containing decachlorobiphenyl [DCBP] and tetrachlorometaxylene [TCMX] was added, followed by addition of 8 mLs of solvent (80:20, isooctane:acetone). The container was then sealed and shaken for 3 thirty-second intervals. If the extract

exhibited color following the shaking step, it was treated with sulfuric acid to remove interferants. Otherwise, the extract was decanted into injection vials and subsequently injected onto a gas chromatograph equipped with an electron capture detector.

#### 1.2 On-Site Laboratory Analysis

Sample analysis was performed on an RTX-35, 30 m X 0.53mm ID X 0.5-micron film capillary column. Based on site history and prior analyses (and confirmed by this program), the PCBs were quantified as Aroclor 1260. Up to 9 Aroclor 1260 peaks were used to quantify the concentration of PCBs present, based on a 6-point calibration curve, which was generated each day. Continuing Calibration Verification (CCV) samples were also run regularly. Allowable surrogate recoveries were 60-140 % for both DCPB and TCMX (75-175% for acid treated samples). The nominal reporting limit was approximately 0.100 mg/kg, well below the target action level of 1.0 mg/kg.

#### 1.3 On-Site Laboratory QA/QC

The QA/QC parameters of the on-site methodology are described in the on-site laboratory reports (Appendix 1). The on-site laboratory consistently met its QA/QC criteria, ensuring that the analytical system was under control with regard to calibrations, matrix spikes, matrix spike duplicates, laboratory control samples, and blanks. Sample surrogate recoveries were calculated on a real-time basis and re-extractions and re-analyses were performed on the infrequent occasions that allowable recoveries were not achieved.

#### 2 Off-Site Laboratory Method Procedures

The confirmatory off-site laboratory, Paradigm, used approved EPA methods, including EPA Method 3545 for extraction, EPA Method 3665A for cleanup of the extract, and EPA Method 8082 for analysis of the extract for PCBs.

#### 2.1 Off-Site Laboratory Sample Preparation and Extraction

EPA Method 3545, Accelerated Solvent Extraction (or, Pressurized Solvent Extraction), was used to extract PCBs from the split samples sent to the off-site laboratory. Approximately 10 grams of soil were mixed and dried with approximately 20 grams of drying agent (sodium sulfate), then extracted in a pressurized, heated extraction device. Two extraction cycles were used.

#### 2.2 Off-Site Laboratory Analysis

The off-site laboratory used EPA Method 8082 for the analysis of samples (USEPA, 1997). The method was virtually the same as that of the on-site laboratory with regard to equipment and methodology.

#### 2.3 Off-Site Laboratory QA/QC

The off-site laboratory consistently met its QA/QC criteria, ensuring that the analytical system was under control with regard to calibrations, surrogate recoveries, matrix spikes, matrix spike duplicates, laboratory control samples, and blanks (See Appendix 1).

## 3 Comparison of On-Site Laboratory and Off-Site Laboratory Results

#### 3.1 Split Samples

The PCB (Aroclor 1260) data for all split samples are presented in Table 1. Other information regarding these samples, such as collection dates, depth of sample, etc., are presented in Appendix 1.

Throughout this document we use the on-site laboratory results directly (expressed on an as received, or wet weight basis) to compare with the off-site laboratory results. This comparison is most appropriate for evaluating the performance of the on-site laboratory because it coincides exactly with how the on-site laboratory results were used on a real-time basis and in generating a conceptual site model. Also, for all calculations and plotting, all nondetects were set to values equal to the reporting limit.

A comparison of all on-site and off-site laboratory results for January – February 2005 is illustrated in Figure 1. Figures 2 and 3 present the data by month. The regression line, its equation, and the coefficient of determination (R<sup>2</sup>, [Zar, 1984]) are also presented in the figure (and is presented in all similar figures in this report). The on-site laboratory results correlated strongly with the off-site laboratory results.

To evaluate precision and accuracy further, the Relative Percent Difference (RPD; RPD =([on-site-off-site]/{[on-site+off-site]/2} X 100%)) was calculated for each pair of split samples (see Table 1). For this data analysis, we evaluated the split sample data against an RPD criterion of 100%. This criterion was used by EPA Region IV at the Anniston, Alabama site (CHMM, 2000; USEPA Region IV, 2000). Unfortunately, USEPA Region IV's data validation guidance does not specify a criterion for split sample precision, other than to note whether precision was acceptable, provisional, or unacceptable; based on our analysis the precision is acceptable (USEPA Region IV, 1999). For the purposes of our evaluation, nondetects were set to detected values equal to the reporting limit.

Figure 4 plots the RPD versus the off-site laboratory concentration (Paradigm). In general, we would expect the magnitude of the RPDs to be greater and more variable as one approaches zero

concentration simply because a given absolute difference in concentration constitutes a larger percentage difference. However, these data do not exhibit this trend. Figure 5 presents the median RPD along with percentile information, for split samples within the concentration ranges  $\leq 10$  mg/kg. There were too few results between 10 and 100 mg/kg to perform an evaluation within that concentration range, and there were no results detected  $\geq 100$  mg/kg.

Poor precision can be caused by a number of things, including poor instrument performance or inconsistent analysis methods, but, especially in the case of soils, a difficult, heterogeneous sample matrix is often the reason. Soil contamination is prone to heterogeneity for semivolatile organics like PCBs because PCBs adhere to soil particles and do not generally get mixed well in the environment. This trait of soil contamination is recognized by regulatory agencies and is reflected in the larger RPD tolerances for soil samples relative to aqueous samples (USEPA Region I, 1996). However, the precision and accuracy of the 106 Puckett Street on-site data as reflected in the RPD determinations were excellent (see Table 1). There were no instances where the RPDs of split samples exceeded 100%.

#### 3.2 Duplicate Samples

Table 2 presents the data for each duplicate sample pair analyzed by both the on-site laboratory and the off-site laboratory. On-site and off-site duplicate pair results were evaluated for precision using criteria presented for non-aqueous matrices in USEPA's Region I data validation guidelines (USEPA Region I, 1996). Region I's precision criterion is RPD < 50% for non-aqueous duplicate results that are greater than 2 times the quantitation limit. For results less than 2 times the quantitation limit, if the difference between the results was less than the quantitation limit, the results were deemed to have demonstrated acceptable precision. This allows for evaluation of the results, taking into consideration the increased variability of data near the sample quantitation limit (USEPA Region I, 1996). For the on-site laboratory 7 out of 7 duplicate pair analyses (100%) met RPD criteria. For the off-site laboratory, 7 out of 7 pairs (100%) also met RPD criteria.

A comparison of each sample and its duplicate (January – February 2005) is presented in Figure 6 (on-site laboratory) and Figure 7 (off-site laboratory). Note that generally, the precision achieved by the on-site laboratory was marginally better to that of the off-site laboratory (as seen by a slightly higher R<sup>2</sup> and smaller y-intercept), although both laboratories performed exceptionally well in this regard.

Figure 8 presents the RPD of the field duplicate analyses *versus* the average concentration for the pair (January – February 2005). In general, the magnitude of the RPD tends to increase at low concentrations, but this is inconsistently true for these data. Figure 9 presents the equivalent information for the off-site laboratory.

In the majority of the figures described above, RPDs were allowed to be either positive or negative in order to evaluate data trends (e.g., if either the bonafide sample or its duplicate were consistently higher or lower). The RPDs were positive when the field sample result was greater than the duplicate result and negative when the field sample result was less than the duplicate result. For Figure 10, however, we present the mean of the absolute value of the RPDs (e.g., an RPD of –18% becomes 18%) for the duplicate analyses for both the on-site laboratory and the off-site laboratory. Figure 10 demonstrates that the precision of the on-site laboratory compares quite favorably with that of the off-site laboratory (RPDs were 15.1% versus 12.2%, respectively).

#### 3.3 Action Level Decisions

An important aspect of on-site chemistry programs relates to the reliability of real-time decisions based on on-site laboratory results. The performance of the on-site chemistry program with respect to the action level of 1.0 mg/kg was excellent in this regard. Tables 3 and 4 summarize our findings. The off-site laboratory confirmed the on-site finding of < 1.0 mg/kg 6 times out of 6 (100%), and also confirmed findings of  $\ge 1$  mg/kg 11 out of 11 times.

#### 3.4 Summary

Overall, the agreement between the results of the on-site laboratory and the off-site laboratory was excellent. This conclusion is based on the high correlations achieved in the regressions of on-site results *versus* off-site laboratory results; the near 100% accuracy in determining PCBs near the action level of 1.0 mg/kg; the high precision attained by the on-site laboratory; and the virtual absence of significant QA/QC issues in the on-site laboratory throughout the program.

#### 4 References

CHMM. 2000. "Split Sampling Guideline for the Anniston PCB Site. Anniston, Calhoun County, Alabama." Prepared for USEPA Region IV. April 21.

U.S. Environmental Protection Agency (USEPA). 1995. "Field Analytical Screening Program: PCB Method." EPA/540/R-95/521. National Risk Management Research Laboratory (Cincinnati) and National Exposure Research Laboratory (Las Vegas), Office of Research and Development, USEPA. 37 p.

U.S. Environmental Protection Agency (USEPA). 1997. "SW 846."

U.S. Environmental Protection Agency Region I (USEPA Region I). 1996. "Region I, EPA-New England Data Validation Functional Guidelines for Evaluating Environmental Analyses." July, Revised December.

U.S. Environmental Protection Agency Region IV (USEPA Region IV). 1999. "Data Validation Standard Operating Procedures for Contract Laboratory Program Routine Analytical Services. Revision 2.1." July.

U.S. Environmental Protection Agency Region IV (USEPA Region IV). 2000. "Quality Assurance Project Plan for the Anniston PCB Site, Calhoun County, Aniston, Alabama. Region IV." January.

Zar, J.H. 1984. Biostatistical Analysis. Prentice-Hall, Inc., Englewood Cliffs, NJ. 718pp.

Table 1 Comparison of All On-Site and Off-Site Laboratory PCB (Aroclor 1260) Results for 106 Puckett Street Samples Collected Jan . - Feb. 2005 Crystal Springs, MS

		Sample	Field Result		Paradigm Result		Relative %
Sample Name	Mobile #	Date	(mg/kg) <sup>a</sup>		(mg/kg) <sup>b</sup>		Difference <sup>c</sup>
MWP-HA-001-001	DD001	1/17/2005	2.1		2.2		-4.7
MWP-HA-006-001	DD012	1/17/2005	19		12.7		39.7
MWP-HA-005-001	DD010	1/17/2005	7.7		3.55		73.8
MWP-HA-011-001	DD022	1/17/2005	0.23		0.288		-22.4
MWP-HA-012-001	DD024	1/18/2005	0.33		0.366		-10.3
MWP-HA-016-001	DD033	1/18/2005	2.1		1.82		14.3
GTP-HA-001-001	GG001	2/25/2005	0.11		0.105	U	4.7
ZWP-HA-009-001	FF018	2/25/2005	2.4		1.94		21.2
ZWP-HA-008-001	FF016	2/25/2005	0.78		0.394		65.8
ZWP-HA-001-001	FF001	2/25/2005	0.1	U	0.122	U	-19.8
MWP-HA-019-001	DD039	2/25/2005	6.8		4.14		48.6
MWP-HA-023-001	DD048	2/25/2005	2.6		1.7		41.9
GTP-HA-016-001	GG033	2/26/2005	4.1		2.67		42.2
GTP-HA-005-001	GG010	2/26/2005	0.18		0.162		10.5
GTP-HA-021-001	GG043	2/26/2005	2.4		2.25	Armidae	6.5
MWP-HA-026-001	DD054	2/26/2005	2		2.28		-13.1
GTP-HA-011-001	GG023	2/26/2005	1.3		1.25		3.9

#### NOTES:

- U Not detected at the reported quantitation limit.
- a) Field laboratory results expressed in wet weight on an 'as received' basis.
- b) Fixed laboratory results expressed on a dry weight basis.
- c) In instances where one result in the duplicate pair is nondetected and the other result is detected, if the difference between results is within 2x the quantitation limit, precision criteria are considered to be met.

**Gradient CORPORATION** 

_			_		_	100			7		100	
	rings, MS	Relative %	Difference,	Paradigm	Results	11.5	0.0	-8.1	-3.7	-4.0	42.6	15.3
	5, Crystal Spi	Duplicate Paradigm Result (mg/Kg) <sup>b</sup> 1.96	0.366	4.49	0.109 U	0.127 U	1.48	0.139				
	ed Jan - Feb. 200		Paradigm	Result	(mg/kg) <sup>b</sup>	2.2	0.366	4.14	0.105 U	0.122 U	2.28	0.162
	Samples Collect		Relative %	Difference,	Field Results	10.0	-5.9	17.6	-8.7	0.0	35.3	-28.6
	6 Puckett Street MS	Duplicate	Field	Result	(mg/kg)*	1.9	0.35	5.7	0.12	0.1 U	1.4	0.24
Table 2	licate Pair for 106 Pu Crystal Springs, MS		Field	Result	(mg/kg) <sup>a</sup>	2.1	0.33	8.9	0.11	0.1 U	2	0.18
	nd Duplica Cry			Duplicate	Mobile #   Mobile #   (mg/kg)ª	DD007	DD030	DD045	CG007	FF009	090GG	GG014
Table 2 Comparison of PCB (Aroclor 1260) Results between Sample and Duplicate Pair for 106 Puckett Street Samples Collected Jan - Feb. 2005, Crystal Springs, MS	n Sample a				Mobile #	DD001	DD024	DD039	GG001	FF001	DD054	GG010 GG014
	CB (Aroclor 1260) Results betwee	B (Arocior 1200) Kesuits betwee		Field Duplicate	DUPLICATE-01/17/05-0-0	DUPLICATE-01/18/05-0-0	MWP-HA-019-001   DUPLICATE-02/25/05-002-0	DUPLICATE-02/25/05-003-0	DUPLICATE-02/25/05-001-0	DUPLICATE-02/26/05-002-0	DUPLICATE-02/26/05-001-0	
	Comparison of PC				Sample Name	MWP-HA-001-001	MWP-HA-012-001	MWP-HA-019-001	GTP-HA-001-001	ZWP-HA-001-001	MWP-HA-026-001	GTP-HA-005-001

## NOTES:

- U Not detected at the reported quantitation limit.
- a) Field laboratory results expressed in wet weight on an 'as received' basis.
- b) Fixed laboratory results expressed on a dry weight basis.
   c) In instances where one result in the duplicate pair is nondetected and the other result is detected, if the difference between results is within 2x the quantitation limit, precision criteria are considered to be met.

#### Table 3

Comparison of Number of Samples Reported by On-Site Laboratory and Confirmed by Off-Site Laboratory with Concentrations < 1 mg/kg and ≥1mg/kg
106 Puckett Street Samples Collected Jan. - Feb. 2005
Crystal Springs, MS

PCB (Aroclor 1260) Field Result	# Reported by Field	# Confirmed By Paradigm
<1mg/kg	6	6
≥1 mg/kg	11	11

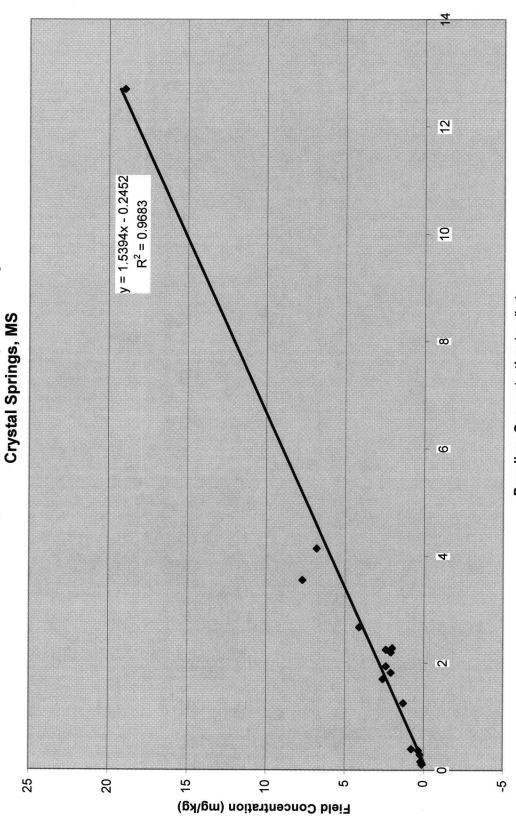
Table 4									
Summary of On-Site Laboratory Samples < 1mg/kg and Off-Site Laboratory Samples 									
		Sample	PCB (Aroclor 1260) Field Result	PCB (Aroclor 1260) Paradigm Result	Relative %				
Sample Name	Mobile #	Date	(mg/kg) <sup>a</sup>	(mg/kg) <sup>b</sup>	Difference				

No samples fell into this category

#### Notes:

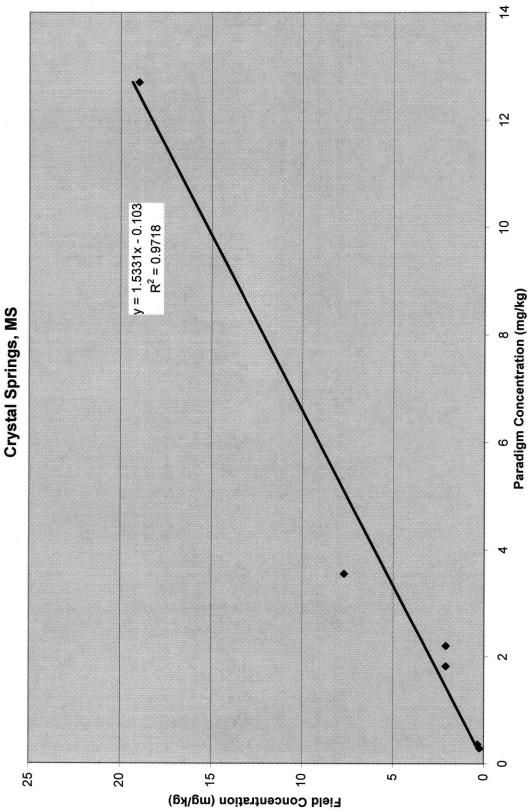
- a) Results expressed on an 'as received' basis.
- b) Results expressed on a dry weight basis.

Comparison of Off-Site and On-Site PCB (Aroclor 1260) Results for 106 Puckett Street Samples Collected January - February 2005 Figure 1



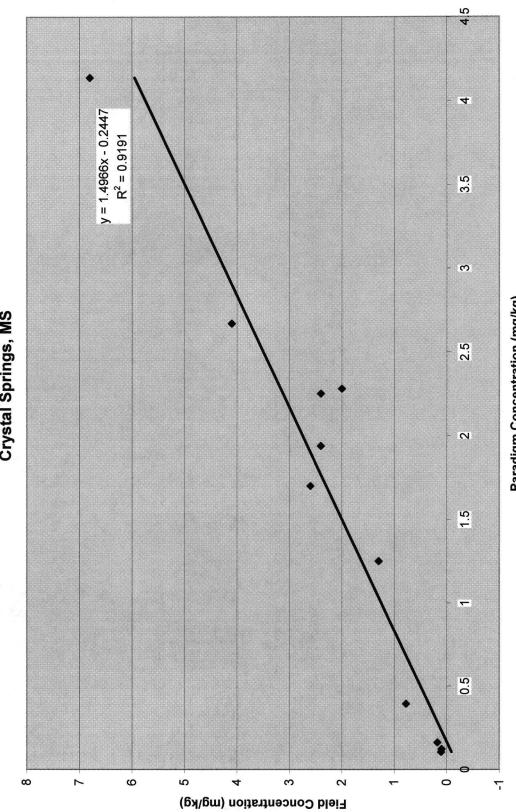
Paradigm Concentration (mg/kg)

Comparison of Off-Site and On-Site PCB (Aroclor 1260) Results for 106 Puckett Street Samples Collected January 2005 Figure 2



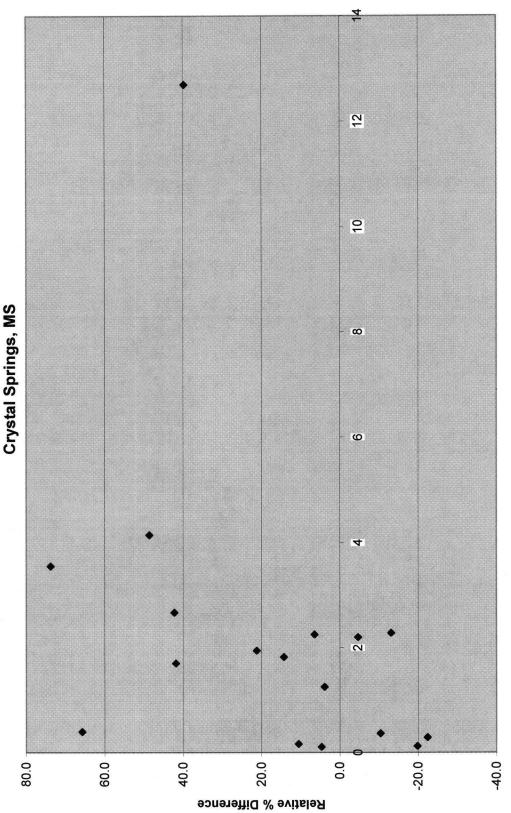
**Gradient** CORPORATION

Comparison of Off-Site and On-Site PCB (Aroclor 1260) Results for 106 Puckett Street Samples Collected February 2005 Crystal Springs, MS Figure 3



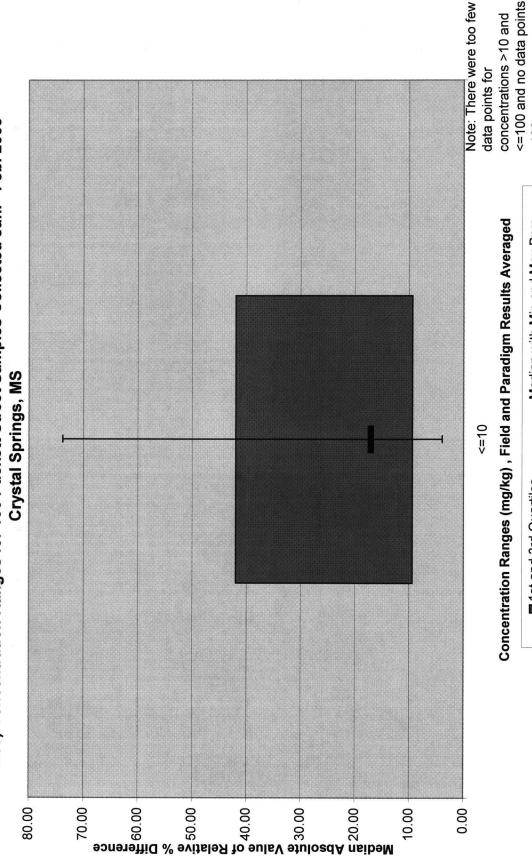
Paradigm Concentration (mg/kg)

Figure 4 Comparison of Relative % Difference and Off-Site PCB (Aroclor 1260) Concentration for 106 Puckett Street Samples Collected January - February 2005



Paradigm Concentration (mg/kg)

Comparison of Median Absolute Value of Relative % Difference by Average PCB (Aroclor 1260) Concentration Ranges for 106 Puckett Street Samples Collected Jan. - Feb. 2005 Figure 5

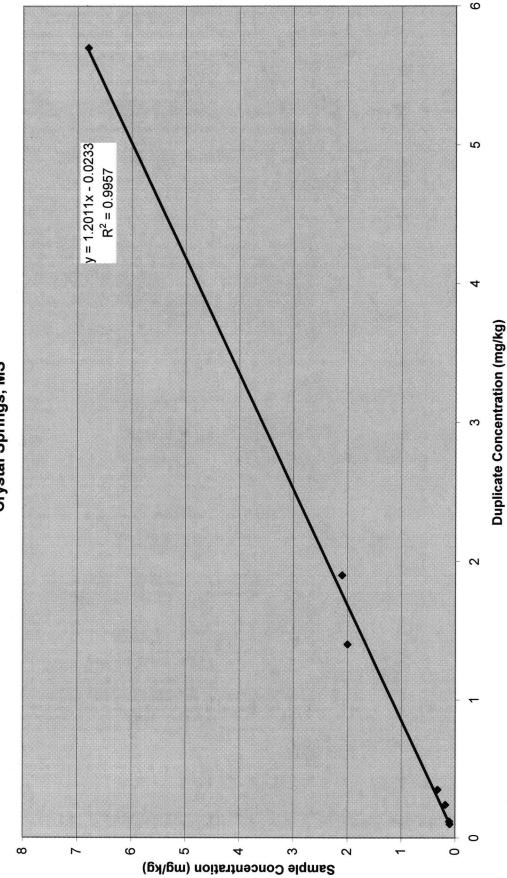


■ 1st and 3rd Quartiles

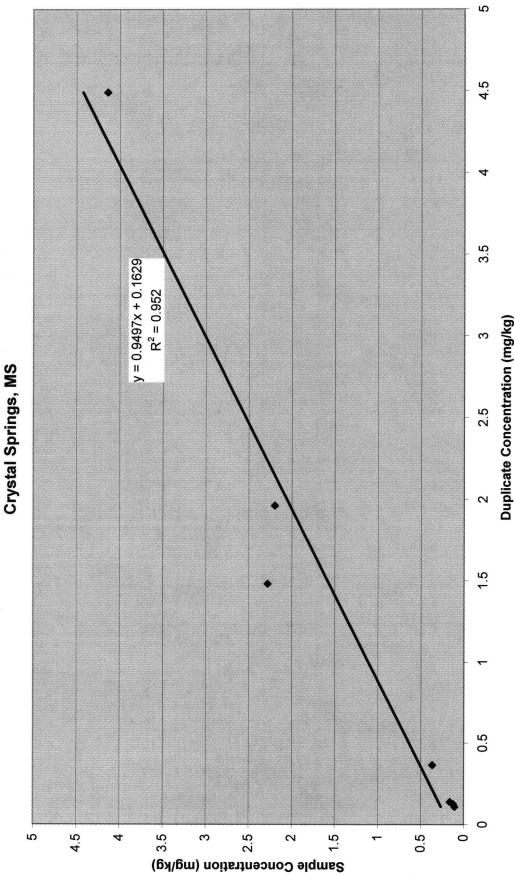
- Median with Min and Max Bars

<=100 and no data points for concentrations >10 and

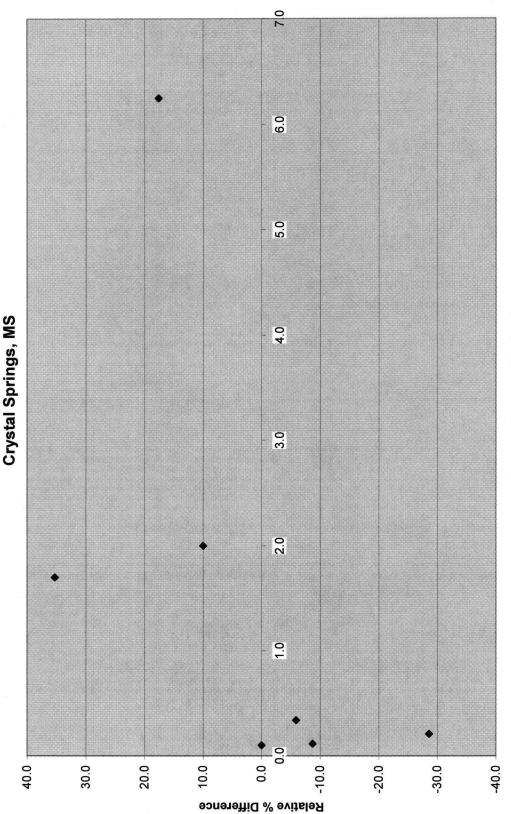
Comparison of On-Site Laboratory Sample and Duplicate Pair PCB (Aroclor 1260) Results 106 Puckett Street Samples Collected January - February 2005 Crystal Springs, MS Figure 6



Comparison of Off-Site Sample and Duplicate Pair PCB (Aroclor 1260) Results for 106 Puckett Street Samples Collected January - February 2005 Figure 7

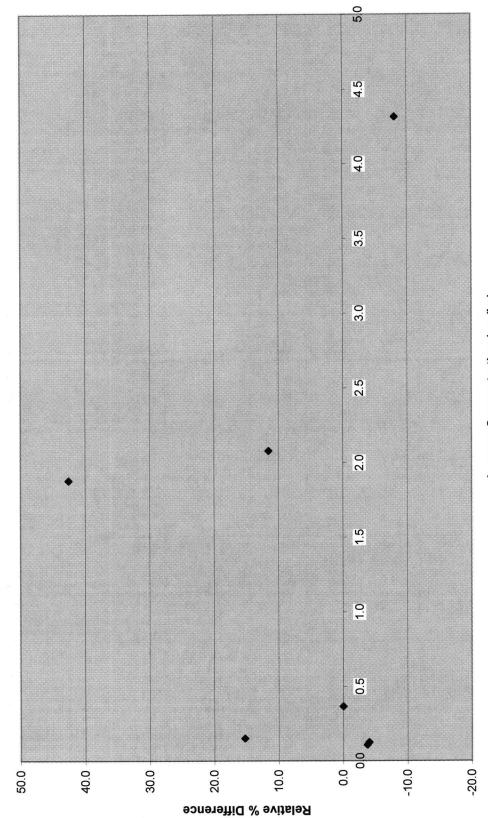


Comparison of Relative % Difference and Average PCB (Aroclor 1260) Concentration for 106 Puckett Street On-Site Laboratory Duplicate Pairs Collected Jan. - Feb. 2005 Figure 8



Average Concentration (mg/kg)

Comparison of Relative % Difference and Average PCB (Aroclor 1260) Concentration for 106 Puckett Street Off-Site Laboratory Duplicate Pairs Collected Jan. - Feb. 2005 Crystal Springs, MS Figure 9



Average Concentration (mg/kg)

Comparison of Mean Absolute Value of Relative % Difference of Samples and Duplicate Pairs for PCBs (Aroclor 1260), 106 Puckett Street Samples Collected Jan. - Feb. 2005 Crystal Springs, MS Figure 10

