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SDMS 263170

**AMBIENT AIR MONITORING FOR PCB
JULY 7, 1996 THROUGH SEPTEMBER 27, 1996**

**191 NEWELL STREET
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS**

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September 1997

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PROJECT SUMMARY

Berkshire Environmental Consultants, Inc. has completed ambient air monitoring for polychlorinated biphenyls (PCBs) for General Electric Company (GE) at 191 Newell Street in Pittsfield, Massachusetts. The sampling was conducted as part of continuing Site Assessment activities for General Electric (GE) in Pittsfield, Massachusetts. This sampling program follows two previous ambient PCB air sampling programs: a one year sampling program for ambient PCBs at and around the GE facility conducted from August 14, 1991 to August 20, 1992, and a four month sampling program at and around the GE facility conducted from May 1993 through August 1993. The current ambient air sampling program was conducted to obtain additional ambient air data at high and low elevations at 191 Newell Street.

The ambient air sampling program consisted of four 24 hour high-volume sampling events on July 24-25, August 7-8, August 22-23, and September 26-27, 1996 and three low-volume sampling events on July 24-25, August 7-8, and August 22-23, 1996. Two high-volume sampling stations were located at 191 Newell Street. A third high-volume station, used for determining background PCB concentrations, was located 3.5 miles west of the GE facility at Berkshire Community College. Low-volume sampling was conducted close to ground level at the rear of 191 Newell Street site. Meteorological data from an on-site weather station were collected concurrently with the ambient PCB data.

The ambient monitoring program was conducted in accordance with the Scope of Work for Additional PCB Ambient Air PCB Monitoring at 191 Newell Street, dated June, 1996, and the 1995 Quality Assurance Project Plan (QAPP) for PCB ambient air monitoring.

High-volume samples were collected in accordance with the EPA Compendium Method TO-4. Low-volume samples were collected in accordance with EPA Compendium Method TO-10. Sample extracts were analyzed for seven PCB Aroclors using gas chromatography with electron capture detection (GC-ECD) as described in EPA Method 608.

The high-volume sampling results measured at the front of 191 Newell Street show an average ambient concentration of $0.012 \mu\text{g}/\text{m}^3$ PCB, while the co-located monitor at the front of 191 Newell Street had an average ambient PCB concentration of $0.015 \mu\text{g}/\text{m}^3$. (The results from the August 22-23, 1996 sampling event were not included in calculating these averages due to a significant difference (>65%) between the concentrations reported for the two co-located monitors, thus indicating the possibility of erroneous measurements.) The average ambient PCB concentration in the rear of 191 Newell Street was $0.0064 \mu\text{g}/\text{m}^3$. A mean ambient PCB concentration of $0.0013 \mu\text{g}/\text{m}^3$ was recorded during this 1996 sampling period at Berkshire Community College (BCC), which is comparable to concentrations observed at BCC in the summer of 1993 ($0.0015 \mu\text{g}/\text{m}^3$) and in the summer of 1995 ($0.0012 \mu\text{g}/\text{m}^3$).

Low-volume sampling at 191 Newell Street was completed at a low elevation close to ground surface on three sampling days. No PCB was detected in the low elevation, low-volume samples. The average ambient concentration just above the ground surface has therefore been estimated as less than $0.031 \mu\text{g}/\text{m}^3$ (which is the detection limit for this sampler divided by the volume of air drawn through the sample). Table S-1, following, summarizes the results of the entire sampling program.

TABLE S-1
 24-HOUR HIGH-VOLUME AMBIENT PCB CONCENTRATION IN $\mu\text{g}/\text{m}^3$ ¹
 191 NEWELL STREET, PITTSFIELD, MASSACHUSETTS
 METHOD 608

DATE	FRONT High-volume (Primary)	FRONT High-volume (Co-located)	REAR High-volume	BCC High-volume	REAR Low Volume (Primary)	REAR Low Volume (Co-located)
July 24-25, 1996	0.012 ²	0.015 ²	0.0068 ²	0.0013 ²	ND (<0.031) ⁵	ND (<0.031) ⁵
August 7-8, 1996	0.020	0.024	0.0089	0.0024 ⁴	ND (<0.031) ⁵	ND (<0.031) ⁵
August 22-23, 1996	0.019 ³	0.032 ³	0.034	0.0011 ⁴	ND (<0.031) ⁵	ND (<0.031) ⁵
September 26-27, 1996	0.0039	0.0050	0.0034	ND (<0.0005 ⁵)	-----	-----
Mean Concentration	0.012	0.015	0.0064	0.0013 ⁶	0.016 ⁶	0.016 ⁶
Max 24-Hr Occurrence Date of Occurrence	0.020 8/7-8/96	0.024 8/7-8/96	0.0089 8/7-8/96	0.0024 8/7-8/96		
Min 24-Hr Occurrence Date of Occurrence	0.0039 9/26-27/96	0.0050 9/26-27/96	0.0034 9/26-27/96	<0.0005 9/26-27/96		

¹ Quantified as Aroclor 1242 and 1254 unless otherwise noted. However, all results showed altered Aroclor patterns.

² Quantified as Aroclor 1254

³ The difference in concentrations of co-located samples is greater than 65%. Thus, the high-volume data for this event were not used in calculating the mean concentration or determining site high or low concentrations.

⁴ Quantified as Aroclor 1242

⁵ No PCBs were detected. Value shown is the analytical detection limit divided by the volume of air drawn through the sample.

⁶ Mean Concentration is determined using one-half of ND values.

1.0 INTRODUCTION

Ambient air monitoring for polychlorinated biphenyls (PCBs) was conducted for General Electric Company (GE) at 191 Newell Street in Pittsfield, Massachusetts. This PCB ambient air monitoring program was conducted as part of continuing MCP Phase II site assessment activities.

The ambient air sampling program was designed to provide additional valid and representative data on ambient air levels of polychlorinated biphenyls (PCB) around the property at 191 Newell Street.

The ambient monitoring program was conducted in accordance with the Scope of Work for Additional PCB Ambient Air PCB Monitoring at 191 Newell Street, dated June, 1996, and the 1995 Quality Assurance Project Plan (QAPP) for PCB ambient air monitoring. A copy of the June 1996 Scope of Work is presented in Appendix IV.

Ambient air monitoring consisted of four high-volume monitoring events on July 24-25, August 7-8, August 22-23, and September 26-27, 1996 and three low-volume sampling events on July 24-25, August 7-8, and August 22-23, 1996. The fourth high-volume sampling event on September 26-27, 1996 was performed because of inconsistencies in the precision check of the August 22-23, 1996 data. Meteorological data from an on-site weather station were collected concurrently with the ambient PCB sampling. All ambient air sampling, field work, sample collection, sample shipment and recordkeeping were completed by Berkshire Environmental Consultants, Inc., Pittsfield, Massachusetts. The samples were analyzed by Quanterra Environmental Services in Knoxville, Tennessee.

This final report presents a summary of all ambient air analytical results, sampling activities, quality assurance/quality control objectives, laboratory data sheets, meteorological data, and conclusions regarding the sampling objectives.

2.0 AMBIENT AIR SAMPLING PROJECT DESCRIPTION

2.1 Ambient Air Sampling Program

2.1.1 High-Volume

Ambient air sampling for PCBs was completed using four high-volume samplers at three sampling sites. Two sampling stations were located at 191 Newell Street. Two co-located monitors were situated at the front of the property. A second station was located in the rear of the Newell Street property. A third sampling station was located at Berkshire Community College, approximately 3.5 miles west of the GE facility, and was used as a background sample. The locations of the sampling stations at the Newell Street Site are shown in Figure A.

High-volume samples were collected using General Metal Works PS-1 samplers in accordance with EPA Method TO-4 summarized in Section 2.2.1. The sampler inlets were approximately two meters above ground level. Samples were collected at all three sites on July 24-25, August 7-8, August 22-23, and September 26-27, 1996.

2.1.2 Low-Volume

Low-volume sampling was completed at the rear of the Newell Street site. Co-located, low elevation, low-volume samplers were placed approximately one foot above the ground at this site. The purpose of these low elevation, low-volume samplers was to collect data close to the ground surface for comparison with the similar data collected in 1993. The co-located sampler was installed to provide a precision check on the primary samplers. The location of the low-volume co-located samplers is shown in Figure A.

Low-volume samples were collected in accordance with EPA Method TO-10 described below in Section 2.2.2. Samples were collected on July 24-25, August 7-8, and August 22-23, 1996 for a total of three 24-hour sampling events.

2.2 Ambient Air Sampling Methods

2.2.1 High-Volume Method

A 24-hour sample was collected from 7 a.m. to 7 a.m. on each sampling day at each of the sampling sites. The samples were collected

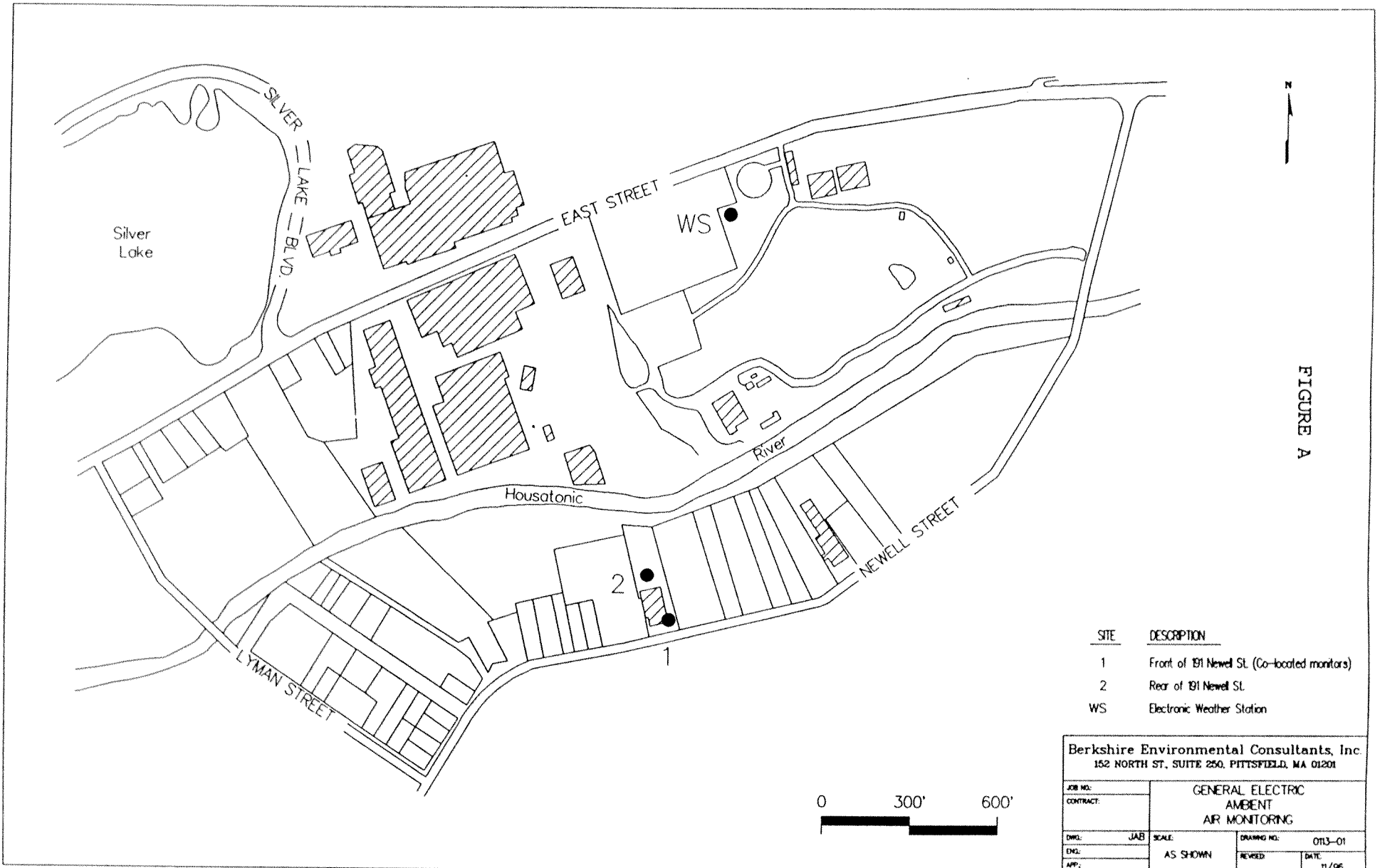


FIGURE A

SITE	DESCRIPTION
1	Front of 191 Newell St. (Co-located monitors)
2	Rear of 191 Newell St.
WS	Electronic Weather Station

Berkshire Environmental Consultants, Inc.
 152 NORTH ST., SUITE 250, PITTSFIELD, MA 01201

JOB NO.:	GENERAL ELECTRIC		
CONTRACT:	AMBIENT		
	AIR MONITORING		
DWG.:	JAB	SCALE:	DRAWING NO. 0113-01
ENG.:		AS SHOWN	REVISION DATE
APP.:			11/95

according to the U.S. EPA Compendium Method TO-4, Method for the Determination of Organochlorine Pesticides and Polychlorinated Biphenyls in Ambient Air. This method employs a General Metal Works PS-1 modified high-volume sampler consisting of a glass fiber filter with a polyurethane foam (PUF) backup absorbent cartridge. The sampler inlet was located 2-6 meters from the ground. Ambient air was drawn through the cartridge at a rate of 200-280 liters per minute for 24-hours. The total air volume collected for each sample was approximately 370 standard cubic meters. A figure describing the sampler and a complete copy of EPA Compendium Method TO-4 is presented in Appendix I.

The samplers were monitored at six-hour intervals over the 24-hour sampling period. At the end of the sampling period, the sampling modules containing the fiber filters and PUF absorbents were removed from the samplers. Each glass fiber filter was placed in a glass petri dish and each PUF adsorbent (inside a glass cartridge) was wrapped in hexane rinsed aluminum foil. Each fiber filter and PUF adsorbent set was labeled as one sample. The samples were wrapped, packaged in blue ice and sent under chain of custody to the Quanterra Environmental Services Laboratory in Knoxville, Tennessee for analysis.

2.2.2 Low-Volume Method

A 24-hour low-volume air sample was collected from 7 a.m. to 7 a.m. at the low elevation, low-volume sampling site on each of the three sampling days. The samples were collected according to the U.S. EPA Compendium Method TO-10, Method for the Determination of Organochlorine Pesticides in Ambient Air Using Low-Volume Polyurethane Foam (PUF) Sampling with Gas Chromatography/Electron Capture Detector (GC/ECD). This method employs a low-volume pump, controlled by a flow meter, which draws ambient air through a polyurethane foam cartridge (PUF) contained in a glass holder. The sampler inlet was located approximately 12 inches from ground level for the low elevation samplers. Ambient air was drawn through the cartridge at a rate of approximately 5 liters per minute for 24-hours. The total air volume collected for each sample was approximately 7.0 standard cubic meters. A copy of EPA Compendium Method TO-10 is included in Appendix II.

The samplers were monitored at six-hour intervals over the 24-hour sampling period. During these six-hour checks, barometric pressure, temperature, flow and magnehelic pressure readings were taken. When necessary, the air flow was adjusted to the target flowrate. At the end of

the sampling period, the PUF cartridges were removed from the sampling train. Each PUF cartridge (inside a glass holder) was wrapped in hexane rinsed aluminum foil. The PUF samples were labeled, wrapped, packaged in blue ice and sent under chain of custody to the Quanterra Environmental Services Laboratory in Knoxville, Tennessee for analysis.

2.3 Analytical Methods

The PCBs in the samples were recovered by Soxhlet extraction with 5% ether in hexane. The extracts were reduced in volume using Kuderna-Danish (K-D) concentration techniques and subjected to column chromatographic cleanup. The extracts were analyzed for PCB using gas chromatography with electron capture detection (GC-ECD), as described in EPA Method 608.

Quanterra Environmental Services analyzed the samples for the following individual PCB Aroclors: PCB-1016, PCB-1221, PCB-1232, PCB-1242, PCB-1248, PCB-1254, and PCB-1260.

The quantities of PCB in each sample were reported by Quanterra Environmental Services as a specific Aroclor in $\mu\text{g}/\text{PUF}$ above the analytical detection limit of $0.2 \mu\text{g}/\text{PUF}$. These quantities were divided by the standard air volume sampled to provide ambient concentrations in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$).

2.4 Project Detection Limits

The PCB project detection limit for high-volume, high elevation samples is $0.0005 \mu\text{g}/\text{m}^3$, based on a laboratory detection limit of $0.2 \mu\text{g}/\text{PUF}$ for an average 24-hour air volume of 370 m^3 . The project detection limit for low elevation samples is $0.029 \mu\text{g}/\text{m}^3$ based on a laboratory detection limit of $0.2 \mu\text{g}/\text{PUF}$ for an average 24-hour air volume of 6.8 m^3 .

2.5 Meteorological Data

An on-site weather station was installed in East Street Area 2 at the GE facility in July 1991 to continuously record meteorological data concurrently with sampling. The Climatronics Electric Weather Station (EWS) measures and records, every 15 minutes, wind speed, wind direction, wind standard deviation, precipitation, relative humidity, temperature, and integrated solar radiation.

The station was installed and continues to operate in accordance with EPA guidance contained in On-Site Meteorological Program Guidance for Regulatory

Modeling Applications, U.S. EPA, June 1987 and the Quality Assurance Plan for Meteorological Monitoring Station at General Electric Company, Pittsfield, Massachusetts. The siting of the meteorological station was approved by the Massachusetts Department of Environmental Protection in May 1991. The meteorological station has been successfully audited by DEP.

2.6 Quality Assurance/Quality Control

The objective of the Quality Assurance Project Plan is to ensure that the data collected on ambient levels of PCB were adequate to meet the objective of the monitoring program and the intended uses of the data. The following procedures were carried out to assure quality in the design and implementation of the monitoring program.

- The sampling and analytical procedures were conducted in accordance with EPA Compendium Method TO-4, EPA Compendium Method TO-10 and EPA recommended guidelines.
- All phases of the sampling program were adequately documented. Documentation was maintained to evidence the validity of calibrations, sample collection, flow calculations, sample custody, analytical performance, data reduction and audit procedures. Records have been maintained to identify and reconstruct sampling events, calibration procedures, maintenance and repair activity, and other related information.
- The GE Project Manager was kept informed of sampling activity.

2.6.1 Calibrations

Calibrations for all sampling equipment were conducted in accordance with the schedules and procedures specified in the relevant EPA methods. All data and calculations for the calibrations are maintained in a calibration log file (Appendix VI).

2.6.2 Quality Control

The following internal quality control checks were performed on each high-volume sampler:

- A one-point calibration check of the calibrated flow rate versus sampler magnehelic pressure indication was performed on each sampler before and after each sampling event;

- A zero check on the samplers' pressure gauges was verified before and after each sampling event;
- A leak check was performed on each sampler before and after each sampling event;
- A recording and adjustment of the sampler pressure indicator was undertaken to maintain a constant rate flow at six-hour intervals during the sampling event; and
- Co-located high-volume samplers were positioned at the sampling site in front of the Newell Street Site. The ambient PCB data from the co-located samplers were used to verify the precision of the primary sampler.

The following internal quality control checks were performed on each low-volume sampler:

- A zero check on the samplers' pressure gauges was verified before and after each sampling event;
- A leak check was performed on each sampler before and after each sampling event;
- A recording and adjustment of the sampler's pressure indicator and flowmeter reading was undertaken to maintain a constant rate flow at six-hour intervals during the sampling event; and
- Co-located low-volume samplers were located behind the Newell Street Site. The ambient PCB data from the co-located samplers were used to verify the precision of the primary sampler.

The following quality control measures were performed in the ambient air sampling to insure the integrity of the ambient air samples:

- One PUF from each batch of 21 PUFs was extracted by Quanterra Environmental Services before the batch was shipped from Quanterra. The PUF was analyzed as a blank check for PCBs for that batch. The blank control limit was the detection limit. Each set of PUFs used for sampling was verified using this method.

- One PUF field blank was transported with the samples to and from the field and was handled as all of the other PUFs, except no air was drawn through it. The PUF was shipped along with the samples to the laboratory for analysis. None of the field blanks for this sampling project detected any PCBs.
- All samples were labeled and transported under chain-of-custody by Federal Express to Quanterra Environmental Services. At Quanterra, the samples were recorded and handled according to strict chain-of-custody outlined in the SOP provided in the Quality Assurance Project Plan (QAPP) for this project.

2.6.3 Data Validation

As part of the data validation procedures, the following data were reviewed by the Project Manager: all sampling data recorded in the field and flow calculations based on the field data; calibration records and charts for flow calculations; field quality control data; precision and accuracy data for sampling activity; analytical precision and accuracy data; and analytical results.

Quanterra Environmental Services has documented procedures for data validation of analytical results. These procedures comply at a minimum with the requirements in Method TO-4, Method TO-10 and associated references. These were submitted as part of the QAPP.

2.6.4 Meteorological Data

The meteorological station was installed and operates in accordance with the standard operating procedures recommended by the manufacturer, Climatronics Corporation. Additional EPA guidance is contained in On-Site Meteorological Program Guidance for Regulatory Modeling Applications, U.S. EPA, revised February 1993. The meteorological station is operated in accordance with the Quality Assurance Plan for Meteorological Monitoring Station at General Electric Company, Pittsfield, Massachusetts. The siting of the meteorological station was approved by MA DEP in May 1991. The MA DEP conducted a Quality Assurance audit of the station in August 1993.

3.0 ANALYTICAL RESULTS

3.1 Ambient PCB Concentrations

3.1.1 Results

Ambient 24-hour concentrations of total PCBs in $\mu\text{g}/\text{m}^3$ from samples collected between July 24, 1996 and August 23, 1996, for each of the monitoring locations are presented in Table 1. In computing the average site concentrations for the July - August sampling period, non-detect (ND) measurements were assumed for the purposes of this report to be one half the detection limit (per EPA Guidance in Air/Superfund National Technical Guidance Study Series. Volume 4, Procedures for Dispersion Modeling and Air Monitoring for Superfund Air Pathway Analysis. U.S. EPA, July 1989).

Complete sets of the analytical results provided by Quanterra Environmental Services are contained in Appendix III.

3.1.2 Data Anomalies

As part of the data review procedures, all of the sampling results were reviewed for trends and characteristic values. Data that appeared to be unusually high, low, or otherwise irregular were flagged for further evaluation. Because there were only three sampling events, it was difficult to identify true data anomalies. The high-volume analytical results from the August 22-23, 1996 sampling event, however, were flagged because of an apparent significant difference between the concentrations of the two co-located samples from the front of Newell Street. The sample from the rear of Newell Street for the same day was also flagged. The significant difference (>65%) between the concentration values for the two co-located sites raised the possibility of an error in the sampling or analytical procedures. Because of this possibility, the high-volume results from the August 22-23, 1996 sampling were not included in the site average. At the earliest possible date (September 26-27, 1996), an additional sampling event was conducted and the results from this event were included in the calculation of the site average.

3.2 Meteorological Data

Data from the on-site weather station were summarized and tabulated for each of the sampling days. Table 2 summarizes the mean, maximum and minimum temperatures for each sampling day. Table 3 summarizes the mean, maximum and minimum wind speed for each sampling day. Table 4 presents barometric pressure and total precipitation for each sampling day. Raw data from the meteorological station are presented in Appendix XI.

TABLE 1
 24-HOUR HIGH-VOLUME AMBIENT PCB CONCENTRATION IN $\mu\text{g}/\text{m}^3$ ¹
 191 NEWELL STREET, PITTSFIELD, MASSACHUSETTS
 METHOD 608

DATE	FRONT High-volume (Primary)	FRONT High-volume (Co-located)	REAR High-volume	BCC High-volume	REAR Low Volume (Primary)	REAR Low Volume (Co-located)
July 24-25, 1996	0.012 ²	0.015 ²	0.0068 ²	0.0013 ²	<0.031 ⁵	<0.031 ⁵
August 7-8, 1996	0.020	0.024	0.0089	0.0024 ⁴	<0.031 ⁵	<0.031 ⁵
August 22-23, 1996	0.019 ³	0.032 ³	0.034	0.0011 ⁴	<0.031 ⁵	<0.031 ⁵
September 26-27, 1996	0.0039	0.0050	0.0034	<0.0005 ⁵	-----	-----
Mean Concentration	0.012	0.015	0.0064	0.0013	0.016 ⁶	0.016 ⁶
Max 24-Hr Occurrence Date of Occurrence	0.020 8/7-8/96	0.024 8/7-8/96	0.0089 8/7-8/96	0.0024 8/7-8/96		
Min 24-Hr Occurrence Date of Occurrence	0.0039 9/26-27/96	0.0050 9/26-27/96	0.0034 9/26-27/96	<0.0005 9/26-27/96		

¹ Quantified as Aroclor 1242 and 1254 unless otherwise noted. However, all results showed altered Aroclor patterns.

² Quantified as Aroclor 1254

³ The difference in concentrations of co-located samples is greater than 65%. Thus, the high-volume data for this event were not used in calculating the mean concentration or determining site high or low concentrations.

⁴ Quantified as Aroclor 1242

⁵ No PCBs were detected. Value shown is the analytical detection limit divided by the volume of air drawn through the sample.

⁶ Mean Concentration is determined using one-half of ND values.

TABLE 2
 MEAN, MAXIMUM, AND MINIMUM TEMPERATURE (°F)
 ON SAMPLING DAYS

DATE	MEAN	MAXIMUM	MINIMUM
July 24-25, 1996	63.45	67.63	60.31
August 7-8, 1996	74.31	85.00	61.19
August 22-23, 1996	69.33	82.40	56.75
Sept. 26-27, 1996	50.24	61.31	40.10

TABLE 3
 MEAN, MAXIMUM, AND MINIMUM WIND SPEED (mph)
 ON SAMPLING DAYS

DATE	MEAN	MAXIMUM	MINIMUM
July 24-25, 1996	2.47	4.62	0.75
August 7-8, 1996	3.06	6.96	0.46
August 22-23, 1996	2.73	6.86	0.50
Sept. 26-27, 1996	2.33	5.64	0.22

TABLE 4
 AVERAGE BAROMETRIC PRESSURE (in Hg) AND
 TOTAL PRECIPITATION (in) ON SAMPLING DAYS

DATE	MEAN PRESSURE (in Hg)	TOTAL PRECIPITATION (in)
July 24-25, 1996	30.02	0.01
August 7-8, 1996	30.29	0.00
August 22-23, 1996	30.12	0.00
Sept. 26-27, 1996	29.88	0.01

4.0 DATA QUALITY

4.1 Data Quality in Terms of the Data Quality Objectives

Quality assurance and quality control (QA/QC) procedures for the air sampling program followed those described in GE's Sampling and Analysis Plan/Data Collection and Analysis Quality Assurance Plan (SAP/DCAQAP).

To establish appropriate quality assurance procedures for the air sampling and analysis, a Quality Assurance Project Plan (QAPP) was developed and submitted to the MA DEP and EPA. A revised version of the QAPP, dated May 1995, was submitted as a supplement to the SAP/DCAQAP. The QAPP defined the quality assurance objectives in terms of comparability, completeness, representativeness, precision and accuracy. The QAPP also fully described the organization of the project including the assignment of responsibility for specific quality assurance and quality control procedures to meet the project's quality assurance objectives. The QAPP was developed in accordance with the OTS Guidance Document for the Preparation of Quality Assurance Project Plans, U.S. EPA, 1984, and the Quality Assurance Handbook for Air Pollution Measurement Systems, U.S. EPA, 1976.

4.1.1 Validity

A valid high-volume sample was defined as an air sample that was collected over 24-hours, +/- 30 minutes at a rate of 200 - 280 liters per minute and met the requirements for sampling and analytical accuracy, precision and completeness. Additionally, a valid sample represented a minimum total collected volume of air of 288 cubic meters. A valid low-volume sample was defined as an air sample that was collected over 24 hours \pm 30 minutes at a rate of 5 l/min. A valid low-volume sample represented a minimum total collected volume of 6.5 m³ of air.

4.1.2 Representativeness

All samples were collected at the locations approved by the MA DEP and EPA as being representative for the purpose of this study.

4.1.3 Comparability

All measured PCB concentrations were converted to $\mu\text{g}/\text{m}^3$ for comparison with the standard.

4.1.4 Completeness

Including the co-located sites and trip blanks, there were 26 possible samples from the entire monitoring event. Of these, 19 samples met the criteria for validity as defined above. Completeness, therefore, was measured as 73 percent.

4.1.5 Precision

Field sampling precision was measured by samples taken at the co-located samplers. The samplers were positioned 2-4 meters apart. The calibration, sampling and analytical procedures for the two samplers were the same as for all samplers. The co-located samplers operated whenever the primary samplers operated.

The average percent difference was calculated in accordance with procedures defined in the QAPP. The calculations were made only with data which were considered hits (i.e. not ND). The calculations are presented in Appendix V. The percent difference between the high-volume co-located monitors was 68% for the August 22-23, 1996 sampling event. Although there is no specified limit of variation in the QAPP, this difference was determined to be too high to demonstrate repeatability. The high-volume results for the Newell sites from this event were not used in the calculations for mean concentration. A repeat sampling event was calculated on September 26-27, 1996. The average percent difference in ambient concentrations between the co-located sampling sites for July 24-25, August 7-8, and September 26-27, 1996 was 24.3 percent. Low-volume co-located samples were all non-detect. Therefore, a percent difference was not calculated. The standard deviation was not calculated because the value is meaningless for a data set with three points.

4.1.6 Accuracy

One-point calibration checks were conducted before and after each sampling event and were used as a check of flow measurements. The one-point calibration checks on all samplers were within $\pm 10\%$ deviation of calculated flow values.

Analytical accuracy limits based on surrogate recoveries met all specified criteria.

4.2 Quality Assurance/Quality Control

Calibrations for all sampling equipment were conducted in accordance with the schedules and procedures specified in the relevant EPA methods. The calibration orifice calibration was completed by BGI Incorporated of Waltham, MA.

One-point calibration checks of the calibrated flow rate versus sampler magnehelic pressure indication were performed on each sampler before and after each sampling event. The readings were documented and are presented in Appendix VII.

Six-hour recordings of the sampler pressure indicators, adjusted flowrate, flowmeter readings, temperature readings, and barometric pressure readings were recorded on the sampling event data sheets. All sampling event data sheets are presented in Appendix VIII.

All air flow calculations to determine air flow through the samplers were conducted on air flow calculation sheets, contained in the sampling event file. Copies of all air flow calculation sheets are contained in Appendix IX.

All samples were sent to Quanterra Environmental Services under Chain of Custody/Request for Analysis (COC/RA) by Federal Express. All COC/RA forms and Federal Express Airbills are maintained with the analytical results. Copies are presented in Appendix X.

4.3 Problems and Disruptions

Except as noted in the precision summary, there were no disruptions during the three sampling events.

APPENDIX IV
SCOPE OF WORK

SCOPE OF WORK
for
Ambient Air PCB Monitoring
at
191 Newell Street

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1.0 INTRODUCTION

Berkshire Environmental Consultants, Inc. proposes to provide environmental engineering services to complete ambient air monitoring for polychlorinated biphenyls (PCBs) in the front and rear of 191 Newell Street in Pittsfield, Massachusetts.

The Scope of Work for this proposal is predicated on the results of previous ambient monitoring programs for PCBs at this site. These programs were conducted as part of continuing MCP Phase II site assessment activities. This site was monitored as part of a year-long ambient monitoring program using high volume monitors from August 1991 to August 1992. A Final Report was submitted to the Massachusetts Department of Environmental Protection (DEP) on November 18, 1992, with a copy to the U.S. Environmental Protection Agency (EPA). Additional PCB monitoring at this site was conducted as part of a larger monitoring effort using high and low volume (low elevation) samples from May 1993 through August 1993. A Final Report on this four month program was submitted on November 8, 1993. The ambient air monitoring currently proposed for 191 Newell Street is in response to DEP review and comments on the MCP Supplemental Phase II Scope of Work for Newell Street Oxbow Area I Site, June 1995.

2.0 SAMPLING OBJECTIVE

The DEP letter Review of Supplemental Phase II Scope of Work and Requirement for Evaluation Proposal established the following sampling objective:

To obtain valid and representative data on ambient levels of PCBs at the front and rear of 191 Newell Street for the purpose of providing additional baseline data and for the purpose of ensuring that concentrations do not pose an imminent hazard.

3.0 MONITORING PROGRAM

3.1 High Volume PCB Sampling

The high volume PCB sampling program will include the following elements:

HIGH-VOLUME MONITORING LOCATIONS	2
CO-LOCATED SITES	1
SAMPLING TIME	24 hrs per event

SAMPLING PERIOD	July - August 1996
NO. OF SAMPLING EVENTS	3
NO. OF SAMPLES	9 ¹
NO. OF BLANKS	3
SAMPLING METHOD	EPA TO-4
ANALYTICAL METHOD	EPA 608/8088

¹ Including Co-located Site

Three high volume, General Metal Works, GPS-1 ambient air monitors will be installed. Two monitors will be installed in the rear of 191 Newell Street. This site was part of the two previous monitoring studies. These two co-located monitors will operate concurrently and will provide a precision check on collected data. The third high volume monitor will be installed in the front of 191 Newell Street.

The detection limit (DL) for PCB analysis of the high volume samples in this study will be 0.0005 ug/m³, in consideration of the following:

Sampling Rate	0.25 - 0.26 m ³ /min.
Avg. Sample Volume	370 m ³ /PUF
Analytical DL	0.20 ug/PUF
Project DL	0.0005 ug/m ³

The sampling method for PCBs in the high volume samples will be US EPA Compendium Method TO-4, Method for the Determination of Organochlorine Pesticides and Polychlorinated Biphenyls in Ambient Air. This method employs a modified high volume sampler consisting of a glass fiber filter with a polyurethane foam (PUF) backup absorbent cartridge to sample ambient air at a rate of 200-280 L/minute (0.20 - 0.28 m³/min). BEC will use a General Metal Works Model PS-1 Sampler. The filter and cartridge will be placed in clean, sealed containers and returned to the laboratory for analysis.

Method TO-4 cites the U.S. EPA Reference Method for the Determination of Suspended Particulates (TSP) in the Atmosphere (High Volume Method) contained in 40 CFR 50, Appendix B for procedures on equipment calibration. The TSP reference method is also used as a QA guideline for sampling procedures, calculation and data reporting, maintenance, and the assessment of data for accuracy and precision.

The samplers will be monitored at six hour intervals over the 24 hour sampling period. During these six-hour checks, barometric pressure, temperature,

flow and magnehelic pressure readings will be taken. When necessary, the air flow will be adjusted to the target flow rate. At the end of the sampling period, the PUF cartridges will be removed from the sampling train. Each PUF cartridge (inside a glass holder) will be wrapped in hexane rinsed aluminum foil. The PUF samples will be labeled, wrapped, packaged in blue ice and sent under chain-of-custody to the contract laboratory for analysis.

The PCB sampling probe height for all high volume monitors will be approximately 2.0 meters above the ground. This height is adequate to represent the breathing zone and be above the influence of ground activity around the monitor. The location of the samplers will be in conformance, to the extent practical, with the siting requirements for ambient monitors in Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD), U.S. EPA. May, 1987.

Three rounds of high volume ambient air sampling will be conducted during July - August 1996. The sampling events will be spaced at 15 days apart beginning in mid-July and concluding in early August. Samples will be collected for 24 hours from approximately 7am to 7am during each event.

3.2 Low Volume PCB Sampling

Low volume sampling at or near ground level will be conducted at the rear of 191 Newell Street. A co-located low volume monitor will also be installed as a precision check on the primary samplers.

The elements of the low volume PCB sampling program will be as follows:

LOW-VOLUME MONITORING LOCATIONS	1
CO-LOCATED SITES	1
SAMPLING TIME	24 hrs per event
SAMPLING PERIOD	July-Aug. 1996
NO. OF SAMPLING EVENTS	3
NO. OF SAMPLES	6 ¹
NO. OF BLANKS	3
SAMPLING METHOD	EPA TO-10
ANALYTICAL METHOD	EPA 608/8088

¹ Including Co-located Site

The detection limit (DL) for PCB analysis of the low volume samples in this study will be 0.029 ug/m^3 , in consideration of the following:

Sampling Rate	0.005 m^3/min
Avg. Sample Volume	6.8 m^3/PUF
Analytical DL	0.20 ug/PUF
Project DL	0.029 ug/m^3

The samples will be collected according to the U.S. EPA Compendium Method TO-10, Method for the Determination of Organochlorine Pesticides in Ambient Air Using Low Volume Polyurethane Foam (PUF) Sampling with Gas Chromatography/Electron Capture Detector (GC/ECD). This method employs a low volume pump controlled by a flowmeter which draws air through a polyurethane foam cartridge (PUF) contained in a glass holder. Ambient air will be drawn through the cartridge at a rate of approximately 5 L/minute ($0.005 \text{ m}^3/\text{min}$) for 24 hours. The total air volume collected for each sample will be approximately 6.8 standard cubic meters.

The samplers will be monitored at six hour intervals over the 24 hour sampling period. During these six-hour checks, barometric pressure, temperature, and flow rate readings will be taken. When necessary, the air flow will be adjusted to the target flow rate. At the end of the sampling period, the PUF cartridges will be removed from the sampling train. Each PUF cartridge (inside a glass holder) will be wrapped in hexane rinsed aluminum foil. The PUF samples will be labeled, wrapped, packaged in blue ice and sent under chain-of-custody to the contract laboratory for analysis.

Three rounds of low volume ambient air sampling will be conducted 15 days apart beginning in mid-July and concluding in early August. Samples will be collected for 24 hours from approximately 7am to 7am during each event.

3.3 Analytical Procedures

In both the high volume and the low volume samples, the PCBs will be recovered by Soxhlet extraction with 5% ether in hexane. The extracts will be reduced in volume using Kuderna-Danish (K-D) concentration techniques and subjected to column chromatographic cleanup. The extracts will be analyzed for PCBs using gas chromatography with electron capture detection (GC-ECD) as described in U.S. EPA Method 608. EPA Method 608 - Organochlorine Pesticides and PCBs is a gas chromatographic (GC) method applicable to the determination of certain PCB aroclors and organochlorine pesticides in municipal and industrial waste water discharges.

The samples will be analyzed for the following PCB aroclors:

PCB-1016
PCB-1221
PCB-1232
PCB-1242
PCB-1248
PCB-1254
PCB-1260

4.0 QUALITY ASSURANCE AND QUALITY CONTROL PROCEDURES

Quality assurance and quality control (QA/QC) procedures for the air sampling program will follow those described in the SAP/DCAQAP.

5.0 SAMPLE DOCUMENTATION, HANDLING AND SHIPMENT

Each filter holder and PUF cartridge holder will be pre-marked with a permanent identification number. As each sample is collected it will be recorded on a field data form and a Chain-of-Custody form, along with the date, time and location of collection. Examples of the field data forms for PCB sampling are presented in the SAP/DCAQAP.

All samples will be securely wrapped for shipment. PCB samples will be preserved at 4°C and shipped on blue ice. Samples will be shipped under chain-of-custody by commercial overnight carrier to the analytical laboratory. Complete details on the sample shipment procedures are contained in the SAP/DCAQAP.

6.0 METEOROLOGICAL MONITORING

Meteorological data from the Climatronics Electronic Weather Station (EWS) operated at the GE facility in Pittsfield, Massachusetts will be obtained and included with the sampling results. This EWS has been operating continuously since 1991 at GE East Street Area 2 providing data to support other GE activities under the MCP. The EWS measures and records wind speed, wind direction, precipitation, temperature, relative humidity and integrated solar radiation. Barometric pressure will be measured and recorded manually on each sampling day. The siting of the meteorological station was established with the approval of DEP. The station was installed and continues to operate in accordance with EPA On-site Meteorological Program Guidance for Regulatory Modeling Applications and a Site Specific Meteorological Monitoring Quality

Assurance Project Plan. The operation of the EWS has been successfully audited by DEP.

7.0 DOCUMENTATION AND REPORTING

All field and laboratory data recorded during ambient monitoring will be documented according to the procedures in the SAP/DCAQAP. A written report summarizing the results and providing the following information will be provided to GE within 8 weeks of the collection of the last sample:

- Date and Time of Sampling
- Sampling Locations
- Calibration and Maintenance Activities
- Pollutants Monitored
- Number of Samples Collected
- Analytical Results
- Quality Assurance Assessment
- Meteorological Data Summary
- Discussion of Problems or Disruptions
- Signature of Individual Responsible For Monitoring Program