PROJECT REPORT FOR THE PCB CLEAN UP AT THE UNIVERSITY OF ROCHESTER S & A TRANSFORMER SUBSTATION

Project No. 95025

Prepared For:

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1.0 INTRODUCTION

This report has been prepared by Leader Environmental, Inc. ("Leader") for the University of Rochester to document the PCB cleanup activities at the S & A Transformer Substation. This report meets the requirements of the United States Environmental Protection Agency ("USEPA") codified at 40 Code of Federal Regulations ("CFR") Part 761 regarding recordkeeping for PCB spill cleanup activities. Leader performed the cleanup work at the request of personnel with the University of Rochester Environmental, Health and Safety ("EH&S") and Facilities Design/Construction Departments.

2.0 BACKGROUND INFORMATION

During July 1996, personnel from the University of Rochester EH&S and Facilities Design/Construction Departments investigated a spill of transformer oil at a substation located in the S & A Parking Area of Strong Memorial Hospital (the Facility). The transformers are located at the north and south sides of the S & A Substation (See Figure 2). Upon visual examination of the two transformers located in the substation, it was observed that very small amounts of transformer oil were accumulating on some of the tap valves and fittings located on the underside of cooling vanes on the transformers. According to the University of Rochester, the reported concentration of PCBs in the transformer oil contained in the transformers is 80% (800,000 ppm). The transformers are scheduled to be removed and replaced in 1997 with non-PCB equipment by an approved contractor.

At the time of the investigation, no transformer oil was actually observed dripping from the tap valves, however, spill collection pans containing absorbent had been placed under the leaking tap valves by electrical maintenance personnel, therefore it was assumed that some oil may have dripped onto the substation area ground surface below the transformer cooling vanes. In addition, it was observed that the spill pans were partially unprotected from precipitation, and that rainwater may have overflowed from the pans. No obvious evidence of spills, such as discolored stone or staining in the area of the transformers was observed by any of the parties investigating this matter.

Two pre-cleanup grab samples were taken from the stone beneath each the north and south transformers. The samples were analyzed by Paradigm for PCBs (see Table 1). The samples from beneath the south transformer was found to contain PCB Aroclor 1248 at 11.6 and 2084.1 ppm. The analytical results of sample from the stone beneath the north transformer indicated PCBs at 1.6 and 7.1 ppm, respectively. For further discussion of the pre-cleanup sampling and analysis, please see Section 2.3.

The University of Rochester immediately contracted several firms to provide technical support to the investigation and cleanup. The firms included Paradigm Environmental Services, Inc. ("Paradigm") for sampling and analytical services, Leader for consulting/engineering services and AWI for cleanup and disposal services. The University of Rochester required an immediate technical solution which met the intent of the applicable requirements.

The University of Rochester immediately took steps to prevent the further spilling of PCB oil onto the stone. AWI installed absorbent pads which are attached to the leaking valves

TABLE 1
Sampling and Analytical Data

Sample Number	Sample Description	Date	Analytical Results	Sampler
North A	Grab - stone south transformer, 1 ft depth	8-Jul	1.6 mg/kg	Uof R
North B	Grab -stone from south transformer, 1 foot depth	8-Jul	7.1 mg/kg	U of R
South A	Grab - stone from north transformer, 1 foot depth	8-Jul	11.6 mg/kg	U of R
South B	Grab - stone from north transformer, 1 foot depth	8-Jul	2084.1 mg/kg	U of R
1 ExC	Composite- Sandy Clay, Bottom of Excavation, Along South Transformer Concrete Pad	19-Jul	150 mg/kg	Leader
2 Wipe	Wipe- Top of South Concrete Duct	19-Jul	880 ug/100 cm2	Leader
3 ExC Re	Composite- Sandy Clay, Bottom of Excavation, Along South Transformer Concrete Pad (Same Location as Sample 1 ExC)	22-Jul	0.62 mg/kg	Leader
4 Wipe Re	Wipe- Top of South Concrete Duct (Same Location as Sample 2 Wipe)	22-Jul	223 ug/100 cm2	Leader
5 Wipe Re	Wipe- Top of South Concrete Duct (Same Location as Samples 2 Wipe and 4 WipeRe)	22-Jul	148 ug/100 cm2	Leader
6 Wipe Re	Wipe- Top of South Concrete Duct (Same Location as Samples 2 Wipe, 4 WipeRe, and 5 WipeRe)	24-Jul	5.5 ug/100 cm2	Leader
7 ExC	Composite- Sandy Clay, Bottom of Excavation, Along North Side of South Concrete Duct	24-Jul	2148 mg/kg	Leader
8 ExC	Composite- Sandy Clay, Bottom of Excavation, Along South Side of North Concrete Duct	24-Jul	878 mg/kg	Leader
9 Wipe	Wipe- Top of Middle (Lower) Concrete Duct, Approximate Center	24-Jul	900 ug/100 cm2	Leader
10 Wipe	Wipe- Top of Middle (Lower) Concrete Duct, Northwest Corner Near "Pit"	24-Jul	320 ug/100 cm2	Leader
11 FoundC	Composite- Sandy Soil Along Building Foundation	24-Jul	49.5 mg/kg	Leader
12 Pit Grab	Grab- Sandy Soil in Pit, NW Corner of Excavation	24-Jul	8604.8 mg/kg	Leader
13 Wipe	Wipe- Backhoe Bucket	25-Jul	13.5 ug/100 cm2	Leader
14 Wipe	Wipe- Vacuum Truck	25-Jul	14.5 ug/100 cm2	Leader
15 ExC Re	Composite- Sandy Clay, Bottom of Excavation, Along North Side of South Concrete Duct (Same Location as Sample 7 ExC)	25-Jul	225.5 mg/kg	Leader
16 ExC Re	Composite- Sandy Clay, Bottom of Excavation, Along South Side of North Concrete Duct (Same Location as Sample 8 ExC)	25-Jul	1.7 mg/kg	Leader
17 ExC Re	Composite- Sandy Clay, Bottom of Excavation, Along South Side of North Concrete Duct (Same Location as Samples 8 ExC and 16 ExC)	26-Jul	None Detected	Leader
18 ExC Re	Composite- Sandy Clay, Bottom of Excavation, Along North Side of South Concrete Duct (Same Location as Samples 7 ExC and 15 ExC)	26-Jul	240.8 mg/kg	Leader
19 Wipe Re	Wipe- Backhoe Bucket	26-Jul	3.2 ug/100 cm2	Leader
20 Wipe Re	Wipe- Vacuum Truck	26-Jul	None Detected	Leader

on the underside of the cooling vanes. The absorbent is made of a material which repels rainwater but absorbs oil. The pads will be changed out periodically by University of Rochester Electrical Maintenance staff.

2.1 Regulatory Requirements

Several major federal and New York State regulatory programs were reviewed by Leader and the University Rochester for application to the PCB cleanup project, including:

- USEPA's PCB Regulations at 40 CFR Part 761, specifically, the USEPA's Spill Cleanup Policy, 40 CFR Part 761 Subpart G;
- USEPA's Reportable Quantities Release Reporting Regulations, 40 CFR Part 302;
- OSHA's Hazardous Waste Operations and Emergency Response Requirements, 29 CFR Section 1910.120, and;

USEPA's PCB Regulations contained at 40 CFR Part 761 apply to the various components of the University of Rochester S & A Substation project. These include the management and inspection of the transformers, recordkeeping, reporting, disposal of PCB waste materials and documentation. The Spill Cleanup Policy at 40 CFR Section 761.120 was followed, however, it only applies to that portion of the spill which occurred after May 4, 1987. As the portion of the spill that predates the Spill Cleanup Policy is difficult to accurately estimate, and due to the lack of any other regulatory cleanup standards and procedures provided by USEPA, the Spill Cleanup Policy was used for this project as guidance and to provide cleanup objectives. For spills predating the Spill Cleanup Policy, USEPA typically requires a site by site evaluation to address cleanup. USEPA retains the ability to apply more or less stringent requirements on a spill according to site by site characteristics.

Pre-cleanup sampling and analysis were used to determine the location of the spill. Generally, the Leader and he University of Rochester used visual-based pre-cleanup boundaries to determine the extent of the removal. Post cleanup field screening and laboratory analysis was used to confirm PCB removal.

The Spill Cleanup Policy sets out specific reporting requirements. The reporting requirements include:

- documentation of spill cleanup with records and certification of decontamination;
- identification of the source of the spill;
- date and time of the spill occurrence;
- a description of the spill location;
- a report of pre-cleanup sampling data used to determine spill boundaries;
- a description of the sampling methodology used;
- a description of the solid surfaces cleaned and cleaning method used;
- the depth of soil excavation and amount of soil removed;
- report of post cleanup sampling; and
- an estimate of the cost of cleanup.

These reporting requirements do not supersede any other USEPA or NYSDEC reporting requirements.

Under USEPA's Reportable Quantities Release Reporting Regulations, at 40 CFR Part 302, releases of certain Aroclors of PCBs over the release thresholds of one (1) pound within 24 hours to the environment require reporting to the National Response Center. In this case, the PCB release was not of a quantity exceeding the threshold of 1 lb., and it did not reach surface or groundwater, nor did it present an exposure hazard to the public as it was contained within a limited area of soils and fill materials. Therefore, no "release" as defined by 40 CFR Part 302 occurred.

As PCBs are regulated in New York State under the Hazardous Waste Regulations at 6 NYCRR 371, this project was reported and coordinated through NYSDEC Region 8.

2.2 Site Description

The substation containing the transformers is located adjacent to a shipping and receiving area (known as the "S & A Area") on the north side of the Strong Memorial Hospital (see Site Plan at Figure 1). The substation is in an outdoor courtyard area, surrounded by concrete block building walls and secured by a locked iron gate at the access point (see Substation Plan at Figure 2). The substation is not accessible to the public or unauthorized employees. It is only accessible to University of Rochester maintenance and facilities employees.

The two transformers located in the substation are large, 20 mV Westinghouse Electric Corporation units mounted on large concrete pads which extend approximately four (4) feet above grade and ten (10) feet below grade. The pads are approximately ten (10) feet wide by eight (8) feet long. The transformers are located in a north and south orientation in the substation (see Figure 2). The transformers contain the dielectric fluid "Inerteen", a Westinghouse product. The substation area is filled with loose 2" washed stone and gravel to a depth of approximately seven (7) feet. Beneath the stone are three (3) large concrete ducts extending in parallel along the east-west plane of the substation which contain high voltage power lines from the transformers to other areas of the University. Due to the high voltage electrical equipment and power lines, special equipment, great care and safe work procedures were required when working in the substation area.

2.3 Site Health and Safety Plan

A site specific Health and Safety Plan ("HASP") was prepared by Leader for this project. A copy of this HASP is included with this report at Appendix F.

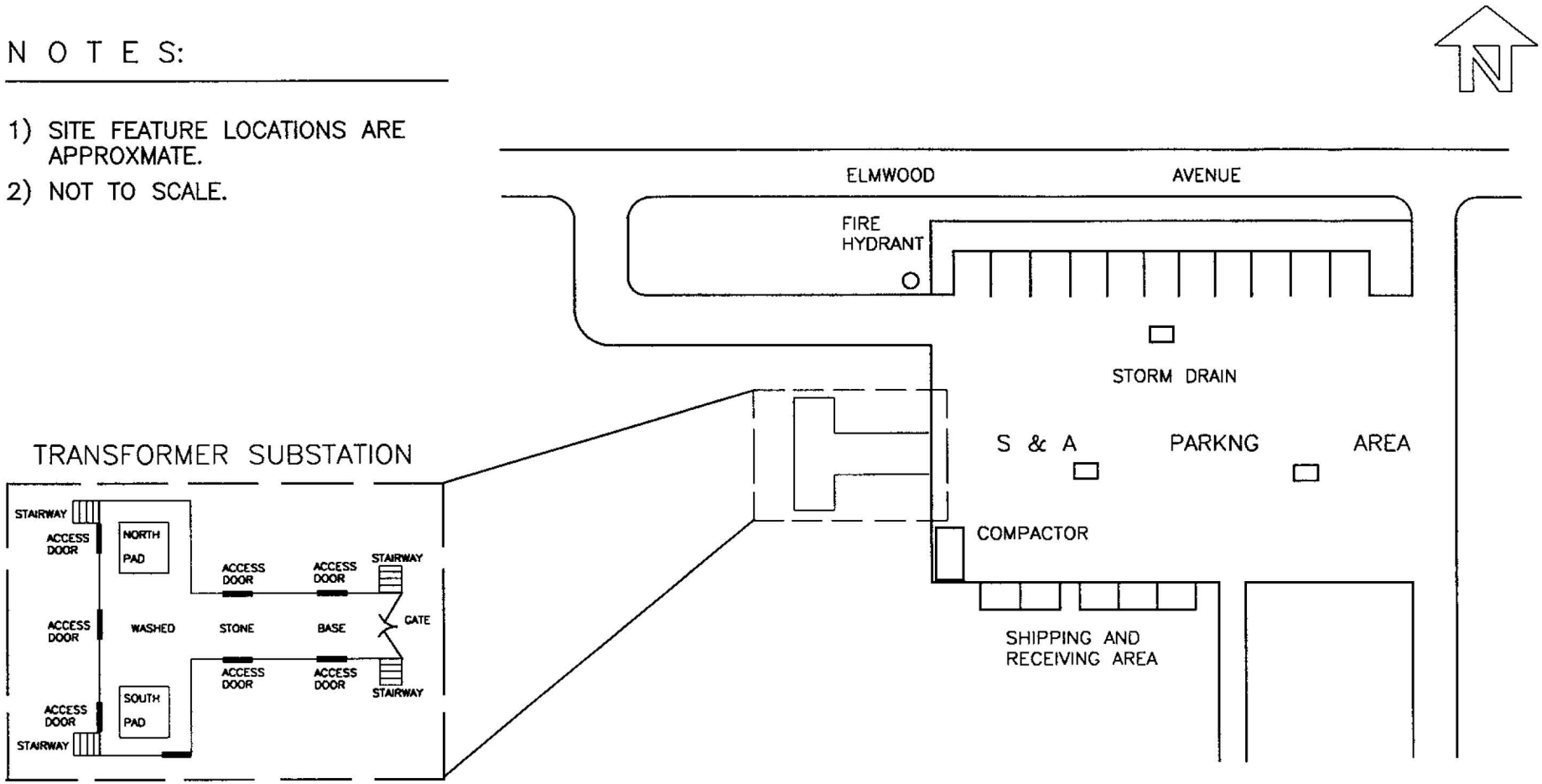
3.0 TECHNICAL APPROACH

3.1 Pre-Cleanup Sampling and Analysis

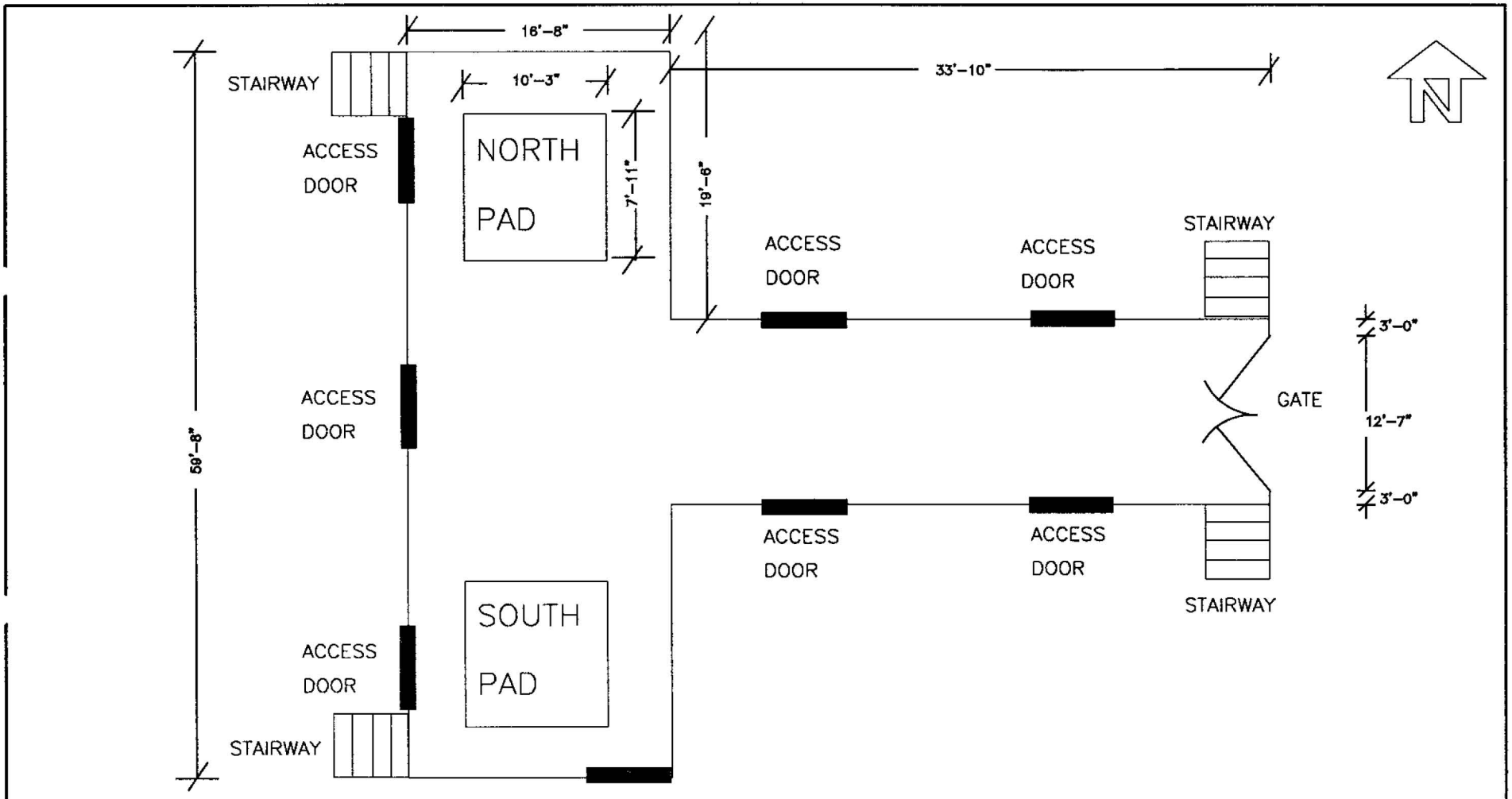
On July 8, 1996, two grab samples of the stone were taken at each transformer by the University of Rochester Environmental, Health and Safety Staff and Paradigm. The samples were taken from a depth of approximately one (1) foot. The analytical results indicated that PCBs were present in the loose stone located under the south transformer at

N O T E S:

1) SITE FEATURE LOCATIONS ARE APPROXMATE.
2) NOT TO SCALE.



LEADER ENVIRONMENTAL, INC.	TITLE: SITE PLAN STRONG MEMORIAL HOSPITAL COURTYARD UNIVERSITY OF ROCHESTER	SCALE: AS SHOWN DRAWN: WSW CHECKED: MPR	DATE: 7/17/96	PROJECT NO.: 135.001 PREPARED FOR: UNIVERSITY OF ROCHESTER	FIGURE: 1



LEADER ENVIRONMENTAL, INC.	TITLE: TRANSFORMER SUBSTATION STRONG MEMORIAL HOSPITAL COURTYARD UNIVERSITY OF ROCHESTER	SCALE: NO SCALE	DATE:	PROJECT NO.: 135.001	FIGURE:
		DRAWN: WSW	7/17/96	PREPARED FOR: UNIVERSITY OF ROCHESTER	2
		CHECKED: MPR	7/18/96		

a level of 2,084 ppm. The sample results from the loose stone under the north transformer indicated levels of PCBs at 1.6 and 7.1 ppm. The sample results are provided at Table 1 and Appendix A.

3.2 Scope of Work

Leader prepared a Scope of Work for the project dated July 1996. Leader, University of Rochester and AWI held a site walk on July 16, 1996 to plan for site operations and review the Scope of Work. The Scope of Work was submitted to NYSDEC Region 8 on July 24, 1996.

3.3 Site Preparation

AWI mobilized equipment, personnel and materials to the site on July 18, 1996. Site preparation activities included setting up a decontamination station, control of site access with yellow warning tape and traffic cones, setting up a "hot" zone, and placing equipment in the work area. Leader coordinated the site mobilization with University of Rochester personnel to ensure safety and to prevent the interruption of traffic in the S & A Area.

A large, truck-mounted vacuum unit was chosen to perform the excavation and mobilized to the site. The vacuum truck was spotted within the confines of the substation courtyard to maximize lift and minimize noise and traffic disruption. The vacuum was used rather than mechanical power shovels due to the existence of high voltage equipment and conduit in the substation area.

3.4 Stone Removal

Site operations began on July 18, 1996. AWI removed the contaminated loose stone and soil using a "Vactor" industrial, truck-mounted vacuum unit. The amount of stone and soil removed was initially determined by overlaying a hypothetical rectangle over the surface area of the stone and soil located underneath the south transformer cooling vanes (See Figure 2). The length of the rectangle was approximately ten (10) feet, extending along the entire width of the transformer pad. s were established to insure all contaminated material were removed at the surfaces. It was initially anticipated that the loose stone extended to a depth of approximately three (3) feet to 5 (five) feet as it was thought concrete ducting would be encountered between three and five feet. The excavation was cut and graded to insure worker safety.

The excavation operations were performed on July 18 - 19, and 22 - 26, 1996. For detailed descriptions of daily activities, please see Appendix C. All stone was excavated from the designated areas. At the bottom of the excavation, the north and south concrete high voltage ducts were encountered at a depth of five (5) feet. A lower duct was encountered between the upper ducts at a depth of seven (7) feet. The three ducts were oriented running east to west in the substation. The ducts are composed of concrete, and are approximately 16 inches high by 18 inches wide. The ducts were surrounded on the sides and bottom by a foundation sand layer, approximately 6 inches thick. Stone and soil were removed from the top of the ducting and along the north and south sides of the upper ducts. The ducts were wipe sampled to determine PCB surface concentrations. During

the excavation work, it was observed that the south duct appeared to have an oil stain on the top surface.

Based on our site assumptions, it was originally anticipated that a minimum of 5.55 cu. yd. or seven (7) tons of stone will be removed from each transformer area. The actual volume of stone removed was approximately 20 cu. yd. or approximately 13.5 tons. The stone was transferred from the vacuum truck to three (3) lined, DOT-approved roll-off containers for transportation to the Chemical Waste Management disposal site at Model City, New York.

3.5 Soil Removal

Very compact, silty-clay and clay soils were encountered beneath the loose stone. This silty clay to clay soil has been seen at roughly the same elevation site-wide in other construction and investigation projects. Some the soil and foundation sand was found to be visibly-stained along the concrete ducting during the removal operations. The soil appeared to have a light oily "sheen" . Through field screen tests and confirmatory laboratory analysis it was determined that the soil was contaminated with PCBs. The soil was removed using the same methods described for the loose stone except that AWI personnel used hand tools in some cases to break up the densely packed soil while vacuuming. All equipment used at this site was either decontaminated or disposed of before site operations were terminated. The amount of soil removed was determined by visual observations of staining and using PCB field screening tests. At the termination of soil removal, confirmatory samples were taken from the soil beneath the excavation areas and along the building foundation (See Section 6.0).

The silty clay to clay soils observed appeared to provide a barrier to the further downward movement of the transformer oil. This was substantiated by the oil found in the foundation sand along the lower duct which extended horizontally in a westerly direction towards the building on the west side of the substation.

Note: at no time was any groundwater or standing water of any kind observed in the excavation by Leader.

3.6 Field Screening

Leader used "Chlor-N-Soil" PCB test kits to perform field screening of the soil found beneath the stone. The Chlor-N-Soil kit was used as a qualitative test to screen for PCBs in the soil above 50 ppm and thereby direct the excavation operations. A description of the Chlor-N-Soil tests is included in the Leader daily field logs at Appendix C. For final PCB removal confirmation determinations, all areas of the excavation were sampled by Leader and analyzed by Paradigm.

3.7 Concrete Surface Decontamination

As mentioned previously, the south duct appeared to have an oil stain in the center of it's upper surface directly underneath the leaking tap valves from the south transformer. This stain had a diameter of approximately eight (8) inches. The south and lower ducts were wipe sampled by Leader, due to their proximity to the leaking south transformer taps,

apparent spill pathway and visibly stained surfaces. The surface of the north duct was not wipe sampled as it was located out of the apparent spill pathway and no visible staining was observed. The north duct was mainly uncovered as a result of excavation cut-back operations to provide a safe working area. The south duct and the lower duct were found to have levels of PCBs on the upper surfaces. The south duct and the lower duct were cleaned using the AWI vacuum, scrub brushes and hand tools and cleaning agents. The cleaning agents used were "Orange Blossom", a citrus-based alkaline cleaner and "Capsur", a foaming agent specifically formulated for PCB removal from solid surfaces such as concrete. After cleaning, the surface of the north and lower ducts were wipe sampled by Leader to provide post cleanup analysis. Analysis results are presented in Table 1 and Appendix A.

Generally, the cleaning and extraction activities were successful in removing PCBs from the surface of the concrete ducting. The south concrete duct surface was cleaned several times, and the PCB wipe sample results went from 880 ug/100 sq. cm. to 5.5 ug/100 sq. cm. after successive cleaning efforts (see Table 1 and Appendix A). It was observed that the duct concrete matrix was a fairly porous aggregate, having been poured in-place rather than pre-fabricated. The south duct appeared to be a more recent installation since it (and the north duct) were at a shallower depth and the aggregate appeared to be less porous than the lower duct. The lower duct exhibited a much more porous aggregate, and appeared to be older. It was apparent that the PCBs have penetrated the surface of the concrete to an unknown depth. Capsur was effective in "drawing" the PCBs from the concrete aggregate, however, not all PCBs were removed from the concrete matrix of the ducts. The cleaning agents were much more effective in removing the PCBs from the south duct than the lower duct. At the lower duct, after a initial wipe sample result of 900 ug/100 sq. cm, the duct was cleaned several times using Orange Blossom and Capsur and the final wipe sample result from the lower duct was 320 ug/100 sq. cm.

3.8 Waste Disposal

The solid materials removed from the substation area were disposed of at Chemical Waste Management's ("CWM") facility located in Model City, NY. No liquids were generated or disposed during the project. A total of three (3) 20 cu. yd. roll-offs were used to transport the material. Approximately 13.5 tons of solid materials (4.5 tons per roll-off) were disposed at CWM.

Leader and the University of Rochester reviewed and approved all documentation associated with the waste disposal including waste profiles, waste characterization, land-ban notifications, variances, waste approvals, manifests and shipping papers. The University of Rochester provided a generator identification number and reviewed and signed the manifest and other waste documentation upon approval.

Copies of all licenses, permits, manifests and weigh certificates were provided to the University of Rochester for record keeping. Copies of the waste disposal documentation are included with this report at Appendix G. Copies of the Certificates of Disposal are provided at Appendix H.

3.9 Barrier Installation

Due to site conditions including soil characteristics, the location of structures, the high voltage electrical equipment and buried high voltage power lines, not all potentially contaminated soils were removed from beneath the substation area. The concrete ducting could not be undercut due to the risk of electrical discharge and power failure. Also, it was decided to not undercut the building foundation located along the west side of the substation (see Figure 2). Finally, as the soils encountered appeared to grade from silty clay to clay as depth increased, it was determined that the remaining PCBs would be contained after the installation of a rainwater infiltration barrier.

After excavation and solid surface decontamination activities were terminated, a 10 mil fiberglass reinforced polyethylene sheet was installed over the concrete ducts and the bottom of the excavation. The barrier size is approximately 10 feet by 10 feet. The barrier was installed to deflect rain water from infiltrating and coming into contact with concrete duct and remaining contaminated soil in the bottom of the excavation. In order to insure no contact with the remaining contaminated materials does not occur, a site Operation and Maintenance Plan has been prepared and is included at Appendix E. The Operation and Maintenance Plan requires that the substation remain a restricted access area and that the integrity of the polyethylene barrier be maintained. The Operations and Maintenance Plan also requires that diagrams be prepared with notations indicating the existence of the polyethylene barrier.

3.10 Site Restoration

AWI backfilled the excavation with a nominal 2" washed stone. The first 6" lift above the polyethylene barrier was hand-backfilled to preserve its integrity. The remaining stone backfilled into the excavation was pushed and graded by a backhoe. The stone was graded at the substation ground surface to the original grade.

The transformer ground net was checked and maintained throughout the backfilling operations.

AWI removed all material, waste and debris from site and demobilized equipment from the site. AWI performed further decontamination of the vacuum truck and backhoe bucket. Leader took wipe samples from both to detect the presence of any residual contamination.

A final site meeting with University of Rochester, Leader and AWI was held before demobilizing the site to insure proper restoration. The substation was then secured and the access gate was closed and locked.

4.0 DATA EVALUATION

4.1 Post Cleanup Sampling and Analysis

Post cleanup sampling and analysis was conducted by Leader throughout the project, as the excavation was advanced, and on solid surfaces using wipes. The samples were obtained by Leader and taken to Paradigm for analysis. All samples were placed in clean

glass sample jars provided by Paradigm and kept cool to maintain sample integrity. The results of the sampling and analysis are found in Table 1 and Appendix A.
Wipe samples were taken using USEPA's Standard Wipe Test as defined in 40 CFR 761.123. A standard-sized template of 10 centimeters by 10 centimeters (100 sq. cm.) was used to delineate the area of sampling. The wipe sampling method used a gauze pad saturated with hexane kept tightly sealed in a glass sampling jar. The wipe was obtained immediately after opening the glass jar to prevent hexane loss. All PCB samples for this project were analyzed using EPA Method 8080. Soil samples were taken at the lower limits of the excavation to confirm PCB removal. In certain cases, the post cleanup samples were taken to document levels of PCBs which remain in the subsurface of the substation. Please refer to Table 1 and Appendix A for analytical results.

AWI's vacuum and backhoe equipment were wipe sampled before leaving the University of Rochester. The equipment was cleaned several times using Orange Blossom. No equipment was released unless the wipe sample exhibited levels less than 5 ug/100 sq. cm.

4.2 Air Monitoring

Air monitoring was conducted at the substation on July 18, 1996 during the PCB removal project operations.

One (1) area air sample was collected and analyzed for PCBs using the National Institute of Occupational Safety and Health ("NIOSH") Method 5503. The principle of the Method is that a known volume of air is drawn through a tube containing Florisil to adsorb the PCBs present in the air sample. The air was drawn through the tube using a Gillian Gil-Air 5 Sampling Pump. The sample pump was calibrated initially and recalibrated after the sampling event. A Leader Environmental Engineer collected the sample and the analysis was performed by Galson Laboratories. The Sample Log Sheet with the sample pump calibration is attached to this report. The sample was then analyzed using a Gas Chromatography instrument.

The area sampled was representative of the work environment during the soil remediation project. An area sample is the practicable method to determine if the air was being contaminated with PCBs from the work operations. All personnel in the work area during excavation operations used Level C PPE including half-face respirators, regardless of the air monitoring results.

Results were initially compared to the Occupational Health and Safety Administration ("OSHA") permissible exposure limits ("PEL") for an 8-hour time-weighted average workday ("TWA") found in 29 CFR 1910, Subpart Z. However, OSHA only sets standards for PCB Aroclors 1242 and 1254, not Aroclor 1248. The source of PCBs in the substation contains Aroclor 1248. Therefore, our comparison against the OSHA PELs was made for guidance purposes only.

The results were also compared to the NIOSH TWA exposure levels for a 10-hour workday. NIOSH provides exposure levels for all PCB Aroclors. NIOSH's recommended TWA for occupational exposure to PCBs has been determined to the lowest reliably detectable limit by the sampling and analytical methods recommended in the NIOSH Publication No. 77-225. NIOSH develops recommendations of limits of

exposure to potentially hazardous substances or conditions in the workplace. These recommendations are then published and transmitted to OSHA for use in promulgating regulatory standards.

The following table summarizes the results of the July 18, 1996 sampling event.

Sample Area	Sample ID	8-Hour TWA	OSHA PEL	NIOSH TWA
Transformer Substation	PCB #1	0.0009 mg/m^3 or 0.9 ug/m^3	**1 mg/m^3 as Aroclor 1242**	**1 ug/m^3 PCBs**
Method Blank		< 0.05 ug		

The laboratory results indicate that for the period monitored, PCB in air at the work site did not exceed the OSHA PEL. The results indicate that the level of PCBs in air approached the NIOSH recommended limit. The Galson Laboratories report is attached.

Galson Laboratories reported the PCB detected as Aroclor 1242. The reported level of PCBs is near the quantitative limit of the instrumentation used. It is assumed that the analysis results were quantified by Galson as Aroclor 1242 because Aroclor 1248 resembles Aroclor 1242, and OSHA air standards are written only for Aroclor 1242 or 1254. At this level, it was probably difficult for the Galson analyst to distinguish between these two Aroclors. However, it is critical to note that Aroclor 1248 is the only PCB Aroclor present in the source at the site.

The results of the PCB air monitoring for the measured time periods at the Substation area were found to be below the OSHA regulatory limits for other similar Aroclors, and the NIOSH recommended exposure limits. Due to the high source concentration observed, it is recommended that for any future intrusive site activity which is undertaken in the substation such as excavation or equipment removal, further PCB air monitoring be conducted. This requirement will be included in the substation Operations and Maintenance Plan.

5.0 IN-SITU PCB OPERATIONS AND MAINTENANCE PLAN

A PCB Operations and Maintenance Plan ("O & M Plan") has been prepared for the "in-situ" materials contaminated with PCBs to insure that activities conducted in the Substation area do not contact contaminated material or the integrity of the polyethylene barrier is compromised. The O & M Plan will be included in the University of Rochester Electrical Maintenance Facilities Design/Construction and Environmental, Health and Safety Department files. Additionally, University of Rochester Facilities drawings for the substation area will be noted with the information on the PCB materials.

A copy of the O & M Plan is included at Appendix E.

6.0 PROJECT DOCUMENTATION

6.1 Contractor Documentation

AWI has provided all daily time sheets, material and equipment usage lists and rental slips so that the Leader and the University of Rochester may provide approvals and track project costs. This documentation was provided each week the project was conducted for the time preceding.

6.2 Field Logs, Photographs, Reporting and Correspondence

Leader maintained daily field logs which are included in Appendix C. Photographs were taken by Leader to document the work and several are included in Appendix D. At the completion of the project, this Report was prepared by Leader to document the work performed, provide sampling and analysis data, regulatory requirements and other project documentation. Also, an O & M Plan was prepared for future activities in the Substation area (see Appendix E). All project documentation, photographs, reports, correspondence are the property of the University of Rochester and are marked "Confidential" where appropriate. This Report and other documentation were prepared in accordance with the requirements of 40 CFR Section 761.120 regarding recordkeeping.

7.0 Summary and Conclusions

In summary, the University of Rochester discovered and investigated a spill of PCB transformer oil at the S & A Substation at the Strong Memorial Hospital. Leader prepared a site-specific Scope of Work and HASP. All work was conducted using USEPA's Spill Cleanup Policy, 40 CFR Section 761.120 to guide the project. The PCB spill was reported to NYSDEC Region 8.

Due to site conditions, including high voltage electrical equipment, the inability to interrupt the service of the transformers, loose stone material and space constraints, the Scope of Work included using AWI's truck-mounted "Vactor" vacuum to excavate the contaminated media. The site work included: 1) under Leader's oversight, AWI removed approximately 13.5 tons of solid material including stone and soil; 2) The material was disposed at Chemical Waste Management's Model City, NY facility; 3) Leader performed field screening tests and took confirmation samples for analysis of the excavation and solid surfaces; 4) AWI cleaned the solid concrete surfaces of the high voltage ducting using extraction agents; 5) an infiltration barrier was installed to prevent rainwater from contacting contaminated materials left in-place; 6) the excavation was carefully backfilled and the site restored; 7) Leader prepared an O & M Plan for the Substation; and 8) Leader prepared this report of project activities was prepared by Leader.

The major findings and conclusions of the investigation and removal activities are provided in the following.

Several of the tap valves found on the underside of the north and south transformers in the S & A Substation were found to be leaking at a very small rate. Thorough pre-cleanup analysis, it was found that significant concentrations of PCB transformer oil spilled onto the stone under the south transformer. The oil traveled through the stone where it was

intercepted by the top of the south concrete ducting, as evidenced by the oil stain on the surface of the duct. Based on visual observations and field screening and laboratory analysis, it is apparent that the majority of the oil traveled over the surface of the ducting to the soil and the lower ducting located north of the south duct. The oil was found in foundation sand around the lower duct, which runs horizontally in a west direction underneath a building associated with the substation. From observations and sample analysis of the sand at the building foundation, it is apparent that PCBs extend and are contained underneath the building.

The majority of PCB-contaminated media has been removed from the open area of the S & A Substation. However, due to site conditions, including the need to maintain the structural integrity of the high voltage concrete ducting, building foundations and the transformer pad foundations, not all of the contaminated soil could be safely and feasibly removed from the site. Instead, the site was capped by installing a polyethylene barrier over the bottom of the excavated area and high voltage ducts which extends to the building foundation wall. The western building serves as an impervious cap to the contaminated material in the sand along the lower duct.

Sandy clay to clay soils which have been found at other locations at the site were found at the bottom of the excavation. These soils provide a barrier to the transformer oil extending further downward. Rather, the observations of the oil in the sand along the lower high voltage duct indicate that the oil is found extending horizontally in a west direction under the building.

As the substation is already a restricted access area due to the dangerous high voltage equipment, and is secured by building walls and a locking iron gate, entry is permitted only by authorized electrical maintenance and facilities personnel. An O & M Plan will be used to guide any future facility operations in the S & A Substation area. Warning signs including USEPA's PCB placard will be maintained on the gate. No unauthorized access to the substation will be permitted Any intrusive work to be conducted in the substation will require the review and approval of the EH&S Department.

APPENDIX A
Lab Reports

PARADIGM
Environmental Services, Inc.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Polychlorinated Biphenyls Laboratory Analysis Report For Soil/Sludge

Client:	University of Rochester	**Lab Project No.:**	GE5192
		Lab Sample No.:	13370
Client Job Site:	S & A Transformer yard		
		Sample Type:	Rocks
Client Job No.:	N/A		
		Date Sampled:	07/08/96
Field Location:	North A	**Date Received:**	07/08/96
Field ID No:	N/A	**Date Analyzed:**	07/10/96

Polychlorinated Biphenyl	Result (mg/Kg)	Reporting Limit (mg/Kg)
PCB 1016	ND	0.40
PCB 1221	ND	0.40
PCB 1232	ND	0.40
PCB 1242	ND	0.40
PCB 1248	1.6	0.40
PCB 1254	ND	0.40
PCB 1260	ND	0.40

Analytical Method: EPA 8080 ELAP ID No.: 10958

Comments:
ND denotes Not Detected.

Approved By: _____
Laboratory Director

File ID: GE5192P1.XLS

PARADIGM
Environmental Services, Inc.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Polychlorinated Biphenyls Laboratory Analysis Report For Soil/Sludge

Client:	University of Rochester	**Lab Project No.:**	GE5192
		Lab Sample No.:	13371
Client Job Site:	S & A Transformer yard		
		Sample Type:	Rocks
Client Job No.:	N/A		
		Date Sampled:	07/08/96
Field Location:	North B	**Date Received:**	07/08/96
Field ID No:	N/A	**Date Analyzed:**	07/10/96

Polychlorinated Biphenyl	Result (mg/Kg)	Reporting Limit (mg/Kg)
PCB 1016	ND	0.91
PCB 1221	ND	0.91
PCB 1232	ND	0.91
PCB 1242	ND	0.91
PCB 1248	7.1	0.91
PCB 1254	ND	0.91
PCB 1260	ND	0.91

Analytical Method: EPA 8080 ELAP ID No.: 10958

Comments:
ND denotes Not Detected.

Approved By: _____
Laboratory Director

File ID: GE5192P2.XLS

PARADIGM
Environmental Services, Inc.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Polychlorinated Biphenyls Laboratory Analysis Report For Soil/Sludge

Client:	University of Rochester	**Lab Project No.:**	GE5192
		Lab Sample No.:	18372
Client Job Site:	S & A Transformer yard		
		Sample Type:	Rocks
Client Job No.:	N/A		
		Date Sampled:	07/08/96
Field Location:	South A	**Date Received:**	07/08/96
Field ID No:	N/A	**Date Analyzed:**	07/10/96

Polychlorinated Biphenyl	Result (mg/Kg)	Reporting Limit (mg/Kg)
PCB 1016	ND	3.43
PCB 1221	ND	3.43
PCB 1232	ND	3.43
PCB 1242	ND	3.43
PCB 1248	11.6	3.43
PCB 1254	ND	3.43
PCB 1260	ND	3.43

Analytical Method: EPA 8080 ELAP ID No.: 10958

Comments:
ND denotes Not Detected.

Approved By: _____
Laboratory Director

File ID: GE5192P3.XLS

PARADIGM
Environmental Services, Inc.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Polychlorinated Biphenyls Laboratory Analysis Report For Soil/Sludge

Client:	University of Rochester	**Lab Project No.:**	GE5192
		Lab Sample No.:	13373
Client Job Site:	S & A Transformer yard	**Sample Type:**	Rocks
Client Job No.:	N/A	**Date Sampled:**	07/08/96
Field Location:	South 8	**Date Received:**	07/08/96
Field ID No:	N/A	**Date Analyzed:**	07/10/96

Polychlorinated Biphenyl	Result (mg/Kg)	Reporting Limit (mg/Kg)
PCB 1016	ND	254.16
PCB 1221	ND	254.16
PCB 1232	ND	254.16
PCB 1242	ND	254.16
PCB 1248	2084.1	254.16
PCB 1254	ND	254.16
PCB 1260	ND	254.16

Analytical Method: EPA 8080 ELAP ID No.: 10958

Comments:
ND denotes Not Detected.

Approved By: _____
Laboratory Director

File ID: GE5192P4.XLS

PARADIGM
Environmental Services, Inc.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716- 647-3311

Polychlorinated Biphenyls Laboratory Analysis Report For Soil/Sludge

Client:	Leader Environmental, Inc.	**Lab Project No.:**	GE5278
		Lab Sample No.:	13699
Client Job Site:	U of R/Strong Memorial Hospital Transformer Area	**Sample Type:**	Soil/Sediment Composit
Client Job No.:	N/A		
		Date Sampled:	07/19/96
Field Location:	Bottom of Excavation	**Date Received:**	07/19/96
Field ID No:	1-Exc	**Date Analyzed:**	07/20/96

Polychlorinated Biphenyl	Result (mg/Kg)	Reporting Limit (mg/Kg)
PCB 1016	ND	44.2
PCB 1221	ND	44.2
PCB 1232	ND	44.2
PCB 1242	ND	44.2
PCB 1248	163	44.2
PCB 1254	ND	44.2
PCB 1260	ND	44.2

Analytical Method: EPA 8080 ELAP ID No.: 10958

Comments:
ND denotes Not Detected.

Approved By: _____
Laboratory Director

File ID: G5278P1.XLS

PARADIGM
Environmental Services, Inc.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716- 647-3311

Polychlorinated Biphenyls in Solids - Wipe Samples

Client:	Leader Environmental, Inc.	**Lab Project No.:**	GE5278
		Lab Sample No.:	13700
Client Job Site:	U of R/Strong Memorial Hospital Transformer Area	**Sample Type:**	Wipe
Client Job No.:	N/A		
		Date Sampled:	07/19/96
Field Location:	Top of Concrete Duct	**Date Received:**	07/19/96
Field ID No.:	2-Wipe	**Date Analyzed:**	06/20/96

Polychlorinated Biphenyl	Result (ug/wipe)	Reporting Limit (ug/wipe)
PCB 1221	ND	100
PCB 1232	ND	100
PCB 1016	ND	100
PCB 1242	ND	100
PCB 1248	880	100
PCB 1254	ND	100
PCB 1260	ND	100

Analytical Method: EPA 8080 ELAP ID: 10958

Comments: ND denotes not detected

Approved By: _____
Laboratory Director

File ID: G5278P2.XLS

PARADIGM
Environmental Services, Inc.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716- 647-3311

Polychlorinated Biphenyls Laboratory Analysis Report For Soil/Sludge

Client:	Leader Environmental, Inc.	**Lab Project No.:**	GE5284
		Lab Sample No.:	13706
Client Job Site:	U of R/Strong Memorial Hospital Tranformer Area	**Sample Type:**	Soil/Sediment
Client Job No.:	N/A		
		Date Sampled:	07/22/96
Field Location:	Bottom of Excavation	**Date Received:**	07/22/96
Field ID No:	3-ExC Re	**Date Analyzed:**	07/23/96

Polychlorinated Biphenyl	Result (mg/Kg)	Reporting Limit (mg/Kg)
PCB 1016	ND	0.54
PCB 1221	ND	0.54
PCB 1232	ND	0.54
PCB 1242	ND	0.54
PCB 1248	0.62	0.54
PCB 1254	ND	0.54
PCB 1260	ND	0.54

Analytical Method: EPA 8080 ELAP ID No.: 10958

Comments:
ND denotes Not Detected.

Approved By: _____
Laboratory Director

File ID: GE5284P2.XLS

PARADIGM
Environmental Services, Inc.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716- 647-3311

Polychlorinated Biphenyls Laboratory Analysis Report For Wipes

Client:	Leader Environmental, Inc.	**Lab Project No.:**	GE5284
Client Job Site:	U of R/Strong Memorial Hospital Transformer Area	**Sample Type:**	WIPE
Client Job No.:	N/A	**Date Sampled:**	07/22/96
Method Reference:	EPA 8080	**Date Received:**	07/22/96
		Date Analyzed:	07/23/96

Client Sample ID	Lab Sample ID	Aroclor ID	Concentration (ug/wipe)
4-Wipe Re	13707	PCB 1248	223
5-Wipe Re	13708	PCB 1248	148

ELAP ID: 10958

Comments: ND denotes Not Detected.

Approved By: _____ Laboratory Director

File ID: GE5284P1.XLS

PARADIGM
Environmental Services, Inc.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Polychlorinated Biphenyls Laboratory Analysis Report For Soil/Sludge

Client:	Leader Environmental, Inc.	**Lab Project No.:**	GE5302
		Lab Sample No.:	13748
Client Job Site:	U of R/Strong Memorial Hospital Transformer Area	**Sample Type:**	Soil
Client Job No.:	N/A	**Date Sampled:**	07/24/96
Field Location:	Composite Clay N. of S. Duct	**Date Received:**	07/24/96
Field ID No:	7 ExC	**Date Analyzed:**	07/25/96

Polychlorinated Biphenyl	Result (mg/Kg)	Reporting Limit (mg/Kg)
PCB 1016	ND	337
PCB 1221	ND	337
PCB 1232	ND	337
PCB 1242	ND	337
PCB 1248	2148	337
PCB 1254	ND	337
PCB 1260	ND	337

Analytical Method: EPA 8080 ELAP ID No.: 10958

Comments:
ND denotes Not Detected.

Approved By: _____
Laboratory Director

File ID: GE5302P1.XLS

PARADIGM
Environmental Services, Inc.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Polychlorinated Biphenyls Laboratory Analysis Report For Wipes

Client:	Leader Environmental, Inc.	**Lab Project No.:**	GE5302
Client Job Site:	U of R / Strong Memorial Hospital Transformer Area	**Sample Type:**	WIPE
Client Job No.:	N/A	**Date Sampled:**	07/24/96
Method Reference:	EPA 8080	**Date Received:**	07/24/96
		Date Analyzed:	07/25/96

Client Sample ID	Lab Sample ID	Aroclor ID	Concentration (ug/wipe)
6 Wipe RE	13752	PCB 1248	5.5
9 Wipe	13753	PCB 1248	900
10 Wipe	13754	PCB 1248	320

ELAP ID: 10958

Comments: ND denotes Not Detected.

Approved By: _____ Laboratory Director

File ID: GE5302P3.XLS

PARADIGM
Environmental Services, Inc.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Polychlorinated Biphenyls Laboratory Analysis Report For Soil/Sludge

Client:	Leader Environmental, Inc.	**Lab Project No.:**	GE5302
		Lab Sample No.:	13749
Client Job Site:	U of R/Strong Memorial Hospital Transformer Area	**Sample Type:**	Soil
Client Job No.:	N/A	**Date Sampled:**	07/24/96
Field Location:	Composite Clay S. of N. Duct	**Date Received:**	07/24/96
-	N. of Wood Barrier	**Date Analyzed:**	07/25/96
Field ID No:	8 ExC		

Polychlorinated Biphenyl	Result (mg/Kg)	Reporting Limit (mg/Kg)
PCB 1016	ND	295
PCB 1221	ND	295
PCB 1232	ND	295
PCB 1242	ND	295
PCB 1248	878	295
PCB 1254	ND	295
PCB 1260	ND	295

Analytical Method: EPA 8080 ELAP ID No.: 10958

Comments:
ND denotes Not Detected.

Approved By: _____
Laboratory Director

File ID: GE5302P2.XLS

PARADIGM
Environmental Services, Inc.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Polychlorinated Biphenyls Laboratory Analysis Report For Soil/Sludge

Client:	Leader Environmental, Inc.	**Lab Project No.:**	GE5302
Client Job Site:	U of R/Strong Memorial Hospital Transformer Area	**Lab Sample No.:**	13750
Client Job No.:	N/A	**Sample Type:**	Soil
Field Location:	Comp. Sand Sediment along Bldg.	**Date Sampled:**	07/24/96
Field ID No:	11 Found.C	**Date Received:**	07/24/96
		Date Analyzed:	07/26/96

Polychlorinated Biphenyl	Result (mg/Kg)	Reporting Limit (mg/Kg)
PCB 1016	ND	6.19
PCB 1221	ND	6.19
PCB 1232	ND	6.19
PCB 1242	ND	6.19
PCB 1248	49.5	6.19
PCB 1254	ND	6.19
PCB 1260	ND	6.19

Analytical Method: EPA 8080 ELAP ID No.: 10958

Comments:

ND denotes Not Detected.

Approved By: _____
Laboratory Director

File ID: GE5302P4.XLS

PARADIGM
Environmental Services, Inc.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Polychlorinated Biphenyls Laboratory Analysis Report For Soil/Sludge

Client:	Leader Environmental, Inc.	**Lab Project No.:**	GE5302
Client Job Site:	U of R/Strong Memorial Hospital Transformer Area	**Lab Sample No.:**	13751
Client Job No.:	N/A	**Sample Type:**	Soil
Field Location:	Bottom of Pit NW Excav.	**Date Sampled:**	07/24/96
Field ID No:	12 Pit Grab	**Date Received:**	07/24/96
		Date Analyzed:	07/26/96

Polychlorinated Biphenyl	Result (mg/Kg)	Reporting Limit (mg/Kg)
PCB 1016	ND	593.43
PCB 1221	ND	593.43
PCB 1232	ND	593.43
PCB 1242	ND	593.43
PCB 1248	8604.8	593.43
PCB 1254	ND	593.43
PCB 1260	ND	593.43

Analytical Method: EPA 8080 ELAP ID No.: 10958

Comments:
ND denotes Not Detected.

Approved By: [signature] Laboratory Director

File ID: GE5302P5.XLS

PARADIGM
Environmental Services, Inc.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Polychlorinated Biphenyls Laboratory Analysis Report For Wipes

Client:	Leader Environmental, Inc.	**Lab Project No.:**	GE5306
Client Job Site:	U of R/ Strong Memorial Hospital Transformer Area	**Sample Type:**	WIPE
Client Job No.:	N/A	**Date Sampled:**	07/25/96
Method Reference:	EPA 8080	**Date Received:**	07/25/96
		Date Analyzed:	07/26/96

Client Sample ID	Lab Sample ID	Aroclor ID	Concentration (ug/wipe)
13 Wipe	13773	PCB 1248	13.5
14 Wipe	13774	PCB 1248	14.5

ELAP ID: 10958

Comments: ND denotes Not Detected.

Approved By: _____ Laboratory Director

File ID: GE5306P1.XLS

PARADIGM
Environmental Services, Inc.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Polychlorinated Biphenyls Laboratory Analysis Report For Soil/Sludge

Client:	Leader Environmental, Inc.	**Lab Project No.:**	GE5306
		Lab Sample No.:	13775
Client Job Site:	U of R/ Strong Memorial Hospital Transformer Area	**Sample Type:**	Soil
Client Job No.:	N/A		
		Date Sampled:	07/25/96
Field Location:	Bottom of Exc. Comp, North of S. Duct	**Date Received:**	07/25/96
Field ID No:	15ExcRe	**Date Analyzed:**	07/26/96

Polychlorinated Biphenyl	Result (mg/Kg)	Reporting Limit (mg/Kg)
PCB 1016	ND	49.02
PCB 1221	ND	49.02
PCB 1232	ND	49.02
PCB 1242	ND	49.02
PCB 1248	225.5	49.02
PCB 1254	ND	49.02
PCB 1260	ND	49.02

Analytical Method: EPA 8080 ELAP ID No.: 10958

Comments:
ND denotes Not Detected.

Approved By: _____
Laboratory Director

File ID: GE5306P2.XLS

PARADIGM
Environmental Services, Inc.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Polychlorinated Biphenyls Laboratory Analysis Report For Soil/Sludge

Client:	Leader Environmental, Inc.	**Lab Project No.:**	GE5306
		Lab Sample No.:	13776
Client Job Site:	U of R/ Strong Memorial Hospital Transformer Area		
Client Job No.:	N/A	**Sample Type:**	Soil
		Date Sampled:	07/25/96
Field Location:	Bottom of Exc. Comp. South of N. Duc	**Date Received:**	07/25/96
Field ID No:	16ExcRe	**Date Analyzed:**	07/26/96

Polychlorinated Biphenyl	Result (mg/Kg)	Reporting Limit (mg/Kg)
PCB 1016	ND	0.49
PCB 1221	ND	0.49
PCB 1232	ND	0.49
PCB 1242	ND	0.49
PCB 1248	1.7	0.49
PCB 1254	ND	0.49
PCB 1260	ND	0.49

Analytical Method: EPA 8080 ELAP ID No.: 10958

Comments:
ND denotes Not Detected.

Approved By: [signature] Laboratory Director

File ID: GE5306P3.XLS

PARADIGM
Environmental Services, Inc.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Polychlorinated Biphenyls Laboratory Analysis Report For Soil/Sludge

Client:	Leader Environmental, Inc.	**Lab Project No.:**	GE5309
		Lab Sample No.:	13779
Client Job Site:	U of R/ Strong Memorial Hospital Transformer Area	**Sample Type:**	Soil
Client Job No.:	N/A		
		Date Sampled:	07/26/96
Field Location:	Comp. South of North Duct	**Date Received:**	07/26/96
Field ID No:	17ExcRe	**Date Analyzed:**	07/28/96

Polychlorinated Biphenyl	Result (mg/Kg)	Reporting Limit (mg/Kg)
PCB 1016	ND	0.49
PCB 1221	ND	0.49
PCB 1232	ND	0.49
PCB 1242	ND	0.49
PCB 1248	ND	0.49
PCB 1254	ND	0.49
PCB 1260	ND	0.49

Analytical Method: EPA 8080 ELAP ID No.: 10958

Comments:
ND denotes Not Detected.

Approved By: _____
Laboratory Director

File ID: GE5309P2.XLS

PARADIGM
Environmental Services, Inc.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Polychlorinated Biphenyls Laboratory Analysis Report For Soil/Sludge

Client:	Leader Environmental, Inc.	**Lab Project No.:**	GE5309
		Lab Sample No.:	13780
Client Job Site:	U of R/ Strong Memorial Hospital Transformer Area	**Sample Type:**	Soil
Client Job No.:	N/A	**Date Sampled:**	07/26/96
Field Location:	Comp. North of South Duct	**Date Received:**	07/26/96
Field ID No:	18ExcRe	**Date Analyzed:**	07/28/96

Polychlorinated Biphenyl	Result (mg/Kg)	Reporting Limit (mg/Kg)
PCB 1016	ND	22.94
PCB 1221	ND	22.94
PCB 1232	ND	22.94
PCB 1242	ND	22.94
PCB 1248	240.8	22.94
PCB 1254	ND	22.94
PCB 1260	ND	22.94

Analytical Method: EPA 8080 ELAP ID No.: 10958

Comments:
ND denotes Not Detected.

Approved By: _____
Laboratory Director

File ID: GE5309P3.XLS

PARADIGM
Environmental Services, Inc.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Polychlorinated Biphenyls Laboratory Analysis Report For Wipes

Client:	Leader Environmental, Inc.	**Lab Project No.:**	GE5309
Client Job Site:	U of R/ Strong Memorial Hospital Transformer Area	**Sample Type:**	WIPE
Client Job No.:	N/A	**Date Sampled:**	07/26/96
Method Reference:	EPA 8080	**Date Received:**	07/26/96
		Date Analyzed:	07/28/96

Client Sample ID	Lab Sample ID	Aroclor ID	Concentration (ug/wipe)
19WipeRe	13781	PCB 1248	3.2
20WipeRe	13782	None Detected	< 1.0

ELAP ID: 10958

Comments: ND denotes Not Detected.

Approved By: _____ Laboratory Director

File ID: GE5309P1.XLS

LABORATORY ANALYSIS REPORT

Galson Laboratories

Client : Leader Environmental, Inc.
Site : NS
Date Sampled : 18-JUL-96
Date Received : 22-JUL-96

Account No. : 12462
Login No. : L31088

Polychlorinated Biphenyls

Sample ID	Lab ID	Air Vol l	Front ug	Back ug	Total ug	mg/m3
PCB#1	L31088-1	87.885	0.08	<0.05	0.08	0.0009 /0.09 ug/m3
BLANK	L31088-2	NA	<0.05	<0.05	<0.05	NA

1242 1 mg/m3
1254 0.5 mg/m3

COMMENTS: Results quantified as Aroclor 1242.

Level of quantitation: 0.05 ug
Analytical Method : NIOSH 5503
OSHA PEL (TWA) : 1 mg/m3
Collection Media : Florisil

Submitted by: JEREMY MACIE
Approved by : JMT
Date : 23-JUL-96
QC by: QC STAFF
NYS DOH # : 10186

< -Less Than
> -Greater Than
NA -Not Applicable
mg -Milligrams
ug -Micrograms
ND -Not Detected
m3 -Cubic Meters
l -Liters
ppm -Parts per Million
kg -Kilograms
NS -Not Specified

APPENDIX B
Chain of Custody

PARADIGM ENVIRONMENTAL SERVICES, INC.

Chain-of Custody

Client: University of Rochester
Address: 320 Intercampus Dr.
14627

Phone No: 275-4699
FAX No: 203-1122

Lab Project No: GE5192
Client Job No:
Client Job Site: S+A Transformer Yard
Sampled By: M. Shannon

Lab Sample Number	Field ID Number	Field Location	Date Sampled	Time Sampled	Sample Type	Preservation	Analyses Requested
13370		North A	7/8/96	9:30	Rocks	NA	PCB's
13371		North B		9:33			
13372		South A		9:41			
13373		South B		9:43			

Relinquished By: _____
Relinquished By: _____

Received By: [signature]
Received By: _____
Date/Time: 7/8/96 09:45

NOTE:
RAPID TURN AROUND REQUESTED — RESULTS BY MONDAY, 7/22 10:00 am.

PARADIGM ENVIRONMENTAL SERVICES, INC.

Chain-of Custody

Client: Leader Environmental Inc.
Address: 640 Kreag Road Suite 300
Pittsford NY 14534

Phone No: 248-2413
FAX No: 248-2834

Lab Project No:
Client Job No:
Client Job Site: U of R/Strong Memorial Hospital Transformer Area
Sampled By: Tuori

Lab Sample Number	Field ID Number	Field Location	Date Sampled	Time Sampled	Sample Type	Preservation	Analyses Requested
	1-ExC	Bottom of Excavation - between duct and foundation	7/19/96	3:10	Soil/Sediment Composite		PCBs
	2-Wipe	Top of Concrete duct	"	3:20	wipe		PCBs

Relinquished By: Tuori
Relinquished By:

Received By:
Received By:
Date/Time: 7/19/96 4:47 pm

PARADIGM ENVIRONMENTAL SERVICES, INC.

NOTE: RAPID TURN-AROUND REQUESTED - RESULTS BY TUESDAY 7/23 4:00pm

Chain-of Custody

Client: Leader Environmental Inc.
Address: 640 Kreag Road Suite 300
Pittsford NY 14534

Phone No: 248-2413
FAX No: 248-2824

Lab Project No: —
Client Job No: —
Client Job Site: UofR/Strong Memorial Hospital Transformer Area
Sampled By: Tivoli

Lab Sample Number	Field ID Number	Field Location	Date Sampled	Time Sampled	Sample Type	Preservation	Analyses Requested
	3-ExCRe	Bottom of Excavation - between conduct and foundation	7/22	10:15	Soil/Sediment		PCBs
	4-Wipe	Top of Concrete Duct	7/22	11:15	Wipe		PCBs
	5-Wipe	"	7/22	11:45	Wipe		PCBs

Relinquished By: X Scott Towers
Relinquished By:

Received By:
Received By:
Date/Time: 7/22/96 1555

NOTE: RAPID TURNAROUND REQUESTED - RESULTS BY 7/26/96 (THURSDAY) 4 PM PLEASE!

PARADIGM ENVIRONMENTAL SERVICES, INC.

Chain-of Custody

Client: Leader Environmental Inc.
Address: 640 Kreag Road - Suite 300
Pittsford NY 14534

Phone No: 248-2413
FAX No: 248-2834

Lab Project No: GE 5302
Client Job No:
Client Job Site: U of R/Strong Memorial Hospital Transformer Area
Sampled By: Tom

except for Samples 11 & 12 - Hold for authorization to analyze for Leader

Lab Sample Number	Field ID Number	Field Location	Date Sampled	Time Sampled	Sample Type	Preservation	Analyses Requested
13752	6 Wipe Blk	Top of South Duct (2,4 Rec, Sht)	7/25/96	2:30	Wipe		PCBs
13748	7 Exc C	Composite - Clay north of South Duct	"	2:50	Soil		PCBs
13749	8 Exc C	Composite - Clay South of North Duct, North of Wood Barrier	"	3:05	Soil		PCBs
13753	9 Wipe	Top of Middle (Lower) Duct	"	3:20	Wipe		PCBs
13754	10 Wipe	Top of Middle (Lower) Duct	"	3:30	Wipe		PCBs
13750	11 Found C	Composite - Sand/Sediment	"	3:40	Soil		PCBs
		Along Bldg. Foundation at West End of Pit					
13755	12 Pit Grab	Bottom of Pit in NW	"	3:45	Soil		PCBs
		Corner of Excavation					

DO NOT ANALYZE UNTIL GIVEN GO BY LEADER!

Relinquished By: Tom
Relinquished By:

Received By: Michael A. Allen
Received By:
Date/Time: 7/24/96 16:15

NOTE: RAPID TURNAROUND REQUESTED – RESULTS BY 7/26/96 – 12 NOON?

PARADIGM ENVIRONMENTAL SERVICES, INC.

Chain-of Custody

Client: Leader
Address: 640 Kreag Road Suite 300
Pittsford NY 14534
Phone No: 248-2413
FAX No: 248-2834

Lab Project No:
Client Job No:
Client Job Site: U of R / Strong Memorial Hospital Transformer Area
Sampled By: Tuori

Lab Sample Number	Field ID Number	Field Location	Date Sampled	Time Sampled	Sample Type	Preservation	Analyses Requested
	13 Wipe	Backhoe Bucket	7/24/96	2:50	Wipe		PCBs
	14 Wipe	Vacuum Truck – Middle of Bottom – ~1' From Backend	"	3:15	Wipe		PCBs
Resample – 7Ex C	15 ExCRe	Bottom of Excavation – Composite – North of South Duct-clay	"	2:15	Soil		PCBs
Resample – 8Ex C	16 ExCRe	Bottom of Excavation – Composite – South of North Duct-clay	"	2:15	Soil		PCBs

Relinquished By: Tuori
Relinquished By:

Received By: Mary Dahl
Received By:
Date/Time: 7/25/96 5:55 pm

Note: Estimated Values for 15 ExCRe and 16 ExCRe – ~100 ppm

NOTE: RAPID TURNAROUND REQUESTED – RESULTS BY MONDAY (7/29) NOON. Thanks.

PARADIGM ENVIRONMENTAL SERVICES, INC.

Chain-of Custody

Client: LEADER ENVIRONMENTAL, INC.
Address: PO Box 151
164D KREAG ROAD
PITTSFORD NY 14534
Phone No: (716) 248-2413
FAX No: (716) 248-2834

Lab Project No:
Client Job No:
Client Job Site: U of R/Strong Memorial Hospital
Transformer Area
Sampled By: Tuori

Lab Sample Number	Field ID Number	Field Location	Date Sampled	Time Sampled	Sample Type	Preservation	Analyses Requested
	17ExCRe	Composite – Clay, South of North Duct, Bottom of Excavation	7/26/96	10:45	SOIL		PCBs (1248)
	18ExCRe	Composite – Clay, North of South Duct, Bottom of Excavation	"	11:00	SOIL		PCBs (1248)
(resample)	19 WIPERe	BACKHOE BUCKET	7/26	3:15 PM	WIPE		PCBs (1248)
(resample)	20 WIPERe	VAC TRUCK	7/26	3:30 PM	WIPE		PCBs (1248)

Relinquished By: M Russin / 4:10 PM
Relinquished By: Tuori / 4:35 pm

Received By: Tuori / 4:10 pm
Received By:
Date/Time: 4:35 PM

NOTE: Sample 17 ExCRe – Location of Samples 8ExC & 16ExCRe – But ~6–8" Deeper
Sample 18 ExCRe – Location of Samples 7ExC & 15ExCRe – But ~6–8" Deeper

APPENDIX C
Field Logs

UNIVERSITY OF ROCHESTER
PCB PROJECT
DAILY FIELD LOG SUMMARY

July 18, 1996

- Kick-off meeting is held at the transformer substation.
- Work hazards are explained to all personnel on-site. The transformers are to be left energized.
- MPR discusses the workplan, Scope and anticipated PCB contamination limits around the south transformer pad. Previous UofR sampling indicated heavy PCB levels at the south transformer pad and negligible results at the north transformer pad (approximately 20 feet to the north)
- The gravel bed within a 10'x5'x5' area is to be vacuum-collected into a vac truck instead of traditional excavation methods to reduce the potential of hitting underground conduit. Three concrete conduit vaults are anticipated to be between 3' to 8' below ground surface
- At approximately 9:00 AM, AWI stages the vac truck at the substation gate. Poly liner is placed from the rear of the truck to the proposed excavation area adjacent to the southern transformer pad. AWI directs the placement of the 20-yard roll-off container to the east parking lot area. Leader begins particulate air monitoring. The air pump is staged at the north transformer pad.
- Vac truck operations begin at 9:30 AM. AWI has defined the exclusion zone. AWI technicians are in Level C PPE. Watering is used for dust suppression. As the excavation continues, Leader observes stratification of the gravel bed. Different gravel size and color is observed, indicating previous gravel removal and placement. Possible staining is present @3' BGS.
- A concrete conduit duct is uncovered @3' BGS at the south end of the excavation. The decision is made to continue gravel removal to 5' BGS and attempt wall shoring. UofR personnel request sampling of the excavation walls and floor upon completion at 5' BGS. AWI cannot adequately shore the excavation walls. Gravel continues to fall into the pit.
- Vacuum operations continue to 5' BGS. Silty/clay soil material is observed at 5' BGS indicating the lower limit of the gravel bed. Upon delineating the dimensions of the pit (approximately 10'x5'x5'), Leader collects grab samples from excavation floor and perform Chlor-n-soil field screening. Results indicate PCB levels greater than 50 ppm are still present within the soil. Oil staining is observed on the concrete duct. The duct appears to be directly underneath the south transformer taps which were reportedly leaking. The duct also appears to have a slight pitch to the north, based on the oil staining present. It appears that the PCB oil has passed through the gravel bed, over the concrete duct and flowed to the north of the southern transformer pad.
- Uof R personnel arrive on-site to inspect the operations. AWI will continue removal tomorrow based on Leader field screening and visual observation results. Upon

observing PCB levels less than 50 ppm and visual observations, confirmatory composite samples will be collected. AWI covered the excavation pit with poly and placed caution tape around the excavation pit. PCB placards and caution tape were placed on the vac truck (approximately 75% capacity achieved) staged adjacent to the roll-off.

- All personnel off site by 4:30 PM.

UNIVERSITY OF ROCHESTER
PCB PROJECT
DAILY FIELD LOG SUMMARY

July 19, 1996

- Held "tail gate" meeting with University of Rochester, Leader and AWI.
- Installed absorbent pads on the three valves on each of the two transformers.
- Emptied stone (that was removed on 7/18/96) from vacuum truck into roll-off (stone was dumped onto polyethylene sheeting in the receiving area and then shoveled into the roll-off).
- Re-installed polyethylene sheeting over the excavation.
- Started "cutting back" top few feet of "clean" stone from north side of excavation.
- Vacuumed stone/soil from the 3' wide area between south concrete duct and south transformer foundation.
- Vacuumed stone from top of south concrete duct.
- Performed cleaning of top and north side of south concrete duct: 1) applied "Capsur" Extraction Agent to top and north side of the duct, 2) 5 minutes later vacuumed up the Capsur and the extracted materials, 3) applied concentrated "Orange Blossom" cleaner and then distilled water to top and north side of duct, 4) immediately vacuumed up the Orange Blossom, distilled water, and residue from the top and north side of the duct.
- Vacuumed some stone from north of the south concrete duct.
- Vacuumed remaining stone and several inches of the underlying sandy clay soil from area between south concrete duct and south transformer foundation.
- Collected composite sample "**1ExC**" from sandy clay soil at bottom of excavation between south concrete duct and south transformer foundation.
- Collected wipe sample "**2Wipe**" from top of south concrete duct in approximate location of former oil stain.
- Ceased activity and secured the remediation site.
- Moved vacuum truck to U of R Central Utilities for staging until commencement of work on Monday, July 22, 1996.
- Applied "Hazardous Waste" label to vacuum truck staged at U of R Central Utilities.
- Transported samples 1ExC and 2Wipe to Paradigm Laboratories for expedited PCB analysis.

UNIVERSITY OF ROCHESTER
PCB PROJECT
DAILY FIELD LOG SUMMARY

July 22, 1996

- Held "tail gate" meeting with University of Rochester, Leader and AWI.
- Continued cutting back clean stone from north and west sides of excavation.
- Removed 4 to 6 inches of sandy clay from area between south concrete duct and south transformer foundation, in preparation for resampling in location of sample 1ExC.
- Collected composite sample "**3ExCRe**" (1ExC resample) from sandy clay soil approximately 1 inch below the bottom of the excavation between south concrete duct and south transformer foundation.
- Performed recleaning of top and north side of south concrete duct, in preparation for resampling in location of sample 2Wipe: 1) applied Capsur to top and north side of the duct and immediately vacuumed up, 2) applied Orange Blossom cleaner and immediately vacuumed up, 3) applied Capsur and covered with clean absorbent pads, 4) 20 minutes later dabbed up Capsur with absorbent pads.
- Collected wipe sample "**4WipeRe**" from top of south concrete duct in approximate location of sample 2Wipe (and former oil stain).
- Applied Orange Blossom to top and north side of south concrete duct and immediately dabbed up with clean absorbent pads, in preparation for resampling in location of samples 2Wipe and 4WipeRe.
- Collected wipe sample "**5WipeRe**" from top of south concrete duct in approximate location of samples 2Wipe and 4WipeRe (and former oil stain).
- Moved full, tarpaulin covered roll-off to U of R Central Utilities for staging until manifest paperwork is completed.
- Accepted delivery of second roll-off.
- Emptied stone from vacuum truck into second roll-off (stone was dumped into the bucket of a backhoe and then transferred to the roll-off).
- Transported samples 3ExCRe, 4WipeRe, and 5WipeRe to Paradigm Laboratories for expedited PCB analysis.
- Continued cutting back clean stone from north and west sides of excavation.
- Ceased activity and secured the remediation site.
- Moved vacuum truck and backhoe to U of R Central Utilities for staging until commencement of work on Tuesday, July 23, 1996.

UNIVERSITY OF ROCHESTER
PCB PROJECT
DAILY FIELD LOG SUMMARY

July 23, 1996

- Held "tail gate" meeting with University of Rochester, Leader and AWI.
- Vacuumed stone from the north side of the south concrete duct and uncovered north concrete duct.
- Performed Chlor-N-Soil screening test on sandy clay soil from east end of excavation, just north of the south concrete duct- results indicated that soil had less than 50 ppm PCBs.
- Performed Chlor-N-Soil screening test on sandy clay soil from small depression in excavation (approximate location of apparent "hot spot" that had been shoveled out previously), just north of south concrete duct- results indicated that the soil had greater than 50 ppm PCBs.
- Performed Chlor-N-Soil screening test on sandy clay soil from approximate center of excavation, equidistant between the north and south concrete ducts- results indicated that the soil had greater than 50 ppm PCBs.
- Removed sandy soil from bottom of excavation and uncovered lower "middle" concrete duct.
- Moved vacuum truck and backhoe to U of R Central Utilities for staging until commencement of work on Wednesday, July 24, 1996.
- Ceased activity and secured the remediation site (at 11:30 a.m.).

UNIVERSITY OF ROCHESTER
PCB PROJECT
DAILY FIELD LOG SUMMARY

July 24, 1996

- Held "tail gate" meeting with University of Rochester, Leader and AWI.
- Spotted third roll-off that had been delivered Tuesday afternoon adjacent to (west of) the second roll-off.
- Removed sandy clay soil from bottom of the excavation between the south and north concrete ducts.
- Stopped activity temporarily due to rain.
- Constructed polyethylene canopy for excavation that allowed for continuation of activity.
- Performed Chlor-N-Soil screening test on sandy soil/sediment from below the south concrete duct (approx. 6 inches into sandy soil/sediment, approx. 2 inches above bottom of excavation)- results indicated that the sandy soil/sediment had greater than 50 ppm PCBs.
- Performed Chlor-N-Soil screening test on sandy soil/sediment from bottom of deep hole in northwest corner of excavation, north of plywood barrier adjacent to the lower middle duct- results indicated that the sandy soil/sediment had greater than 50 ppm PCBs.
- Performed Chlor-N-Soil screening test on sandy soil/sediment from along foundation of building on the west side of the remediation site (approx. 1 inch above bottom of excavation)- results indicated that the sandy soil/sediment had greater than 50 ppm PCBs.
- Continued removal of sandy clay soil from bottom of excavation between the south and north concrete ducts.
- Applied Capsur to top of south concrete duct and top of lower middle duct.
- Vacuumed Capsur from top of south concrete duct and top of lower middle duct (approx. 1 hour and 35 minutes after application).
- Continued cleaning of south concrete duct and lower middle concrete duct, as follows: 1) applied Capsur (second coating) to the tops of the ducts, 2) 5 minutes later vacuumed up Capsur, 3) applied Orange Blossom to the tops of the ducts and immediately vacuumed up, 4) applied Capsur (third coating) to the tops of the ducts, 5) 15 minutes later applied Orange Blossom to the tops of the ducts and immediately vacuumed up, 6) double rinsed the tops of the ducts with distilled water and immediately vacuumed up after each rinse.
- Collected wipe sample "**6WipeRe**" from top of south concrete duct in approximate location of samples 2Wipe, 4WipeRe, and 5WipeRe (and former oil stain).
- Collected composite sample "**7ExC**" from sandy clay soil strip at bottom of excavation just north of south concrete duct (south of lower middle concrete duct).

- Collected composite sample "**8ExC**" from sandy clay soil strip at bottom of excavation just south of north concrete duct (north of the lower middle concrete duct).
- Collected wipe sample "**9Wipe**" from approximate center of top of lower middle concrete duct.
- Collected wipe sample "**10Wipe**" from northwest corner of top of lower middle concrete duct.
- Collected composite sample "**11FoundC**" from sandy soil/sediment along foundation of building on the west side of remediation site (approx. 2 inches above top of lower middle concrete duct).
- Collected grab sample "**12PitGrab**" from sandy soil/sediment at bottom of deep hole in northwest corner of excavation, north of plywood barrier adjacent to the lower middle duct.
- Ceased activity and secured the remediation site.
- Moved vacuum truck and backhoe to U of R Central Utilities for staging until commencement of work on Thursday, July 25, 1996.
- Transported samples 6WipeRe, 7ExC, 8ExC, 9Wipe, 10Wipe, 11FoundC, and 12PitGrab to Paradigm Laboratories for expedited PCB analysis.

UNIVERSITY OF ROCHESTER
PCB PROJECT
DAILY FIELD LOG SUMMARY

July 25, 1996

- Held "tail gate" meeting with University of Rochester, Leader and AWI.
- Emptied stone from vacuum truck into third roll-off (stone was dumped into the bucket of a backhoe and then transferred to the roll-off).
- 2 to 3 inches of soil removed from the sandy clay soil at the bottom of the excavation, south and north of the lower middle concrete duct.
- Accepted delivery of crushed stone (approx. 16 yards), which was dumped east of the excavation.
- Decontaminated vacuum truck tank and backhoe bucket (with Capsur, Orange Blossom, and distilled water).
- Collected wipe sample "**13Wipe**" from approximate center of backhoe bucket.
- Collected wipe sample "**14Wipe**" from bottom of vacuum truck tank interior, approximately 1 foot from back end.
- Collected composite sample "**15ExC**" (7ExC resample) from sandy clay soil strip at bottom of excavation just north of south concrete duct (south of lower middle concrete duct), for possible submission to lab depending on the results from sample 7ExC.
- Collected composite sample "**16ExC**" (8ExC resample) from sandy clay soil strip at bottom of excavation just south of north concrete duct (north of the lower middle concrete duct), for possible submission to lab depending on the results from sample 8ExC.
- Started to backfill excavation (the pit in the northwest corner and along the south and north concrete ducts) in preparation for placement of polyethylene liner between the south and north concrete ducts.
- Installed 10 ft x 10 ft 10 mil fiberglass reinforced poly barrier in excavation at 5 ft depth, above concrete ducting and beneath transformer ground net.
- Terminated backfilling and installation of liner when results for samples 7ExC and 8ExC were received. Results indicated that soil in bottom of excavation should be removed. Sandy clay soil was resampled (15ExCRe and 16ExCRe).
- Performed Chlor-N-Soil screening test on soil from sample 15ExCRe (sandy clay at bottom of excavation just north of south concrete duct)- results indicated that the soil had greater than 50 ppm PCBs.
- Performed Chlor-N-Soil screening test on soil from sample 16ExCRe (sandy clay at bottom of excavation just south of north concrete duct)- results indicated that soil had slightly less than 50 ppm PCBs.
- Prepared samples 15ExCRe and 16ExCRe for submission to Paradigm Laboratories.

- Reconstructed canopy over the excavation.
- Ceased activity and secured the remediation site.
- Moved vacuum truck and backhoe to U of R Central Utilities for staging until commencement of work on Friday, July 26, 1996.
- Transported samples 13Wipe, 14Wipe, 15ExCRe, and 16ExCRe to Paradigm Laboratories for expedited PCB analysis.

UNIVERSITY OF ROCHESTER
PCB PROJECT
DAILY FIELD LOG SUMMARY

July 26, 1996

- Held "tail gate" meeting with University of Rochester, Leader and AWI.
- Performed field screen test of clay/sand soils adjacent to north duct.
- Sampled clay/sand soils adjacent to north duct (17Ex and 18Ex).
- AWI backfilled excavation with 2" washed stone. Hand backfilled 6" above poly barrier. Used backhoe to push and grade remaining stone in lifts in excavation. Maintained integrity of transformer ground net.
- Graded loose stone at surface to original grade.
- AWI removed all material, waste and debris from site; demobilized equipment from site.
- AWI performed further decontamination of vacuum truck and backhoe bucket. Took wipe samples from both.
- Final site meeting with University of Rochester, Leader and AWI.
- Leader demobilized from site.
- Secured roll offs.
- Secured substation; closed and locked gate.
- Site operations ended.

UNIVERSITY OF ROCHESTER
PCB PROJECT
DAILY FIELD LOG SUMMARY

July 26, 1996

- Held "tail gate" meeting with University of Rochester, Leader and AWI.
- Performed field screen test of clay/sand soils adjacent to north duct.
- Sampled clay/sand soils adjacent to north duct (17Ex and 18Ex).
- AWI backfilled excavation with 2" washed stone. Hand backfilled 6" above poly barrier. Used backhoe to push and grade remaining stone in lifts in excavation. Maintained integrity of transformer ground net.
- Graded loose stone at surface to original grade.
- AWI removed all material, waste and debris from site; demobilized equipment from site.
- AWI performed further decontamination of vacuum truck and backhoe bucket. Took wipe samples from both.
- Final site meeting with University of Rochester, Leader and AWI.
- Leader demobilized from site.
- Secured roll offs.
- Secured substation; closed and locked gate.
- Site operations ended.

APPENDIX D
Photographs

Photograph descriptions

1. View of substation across S & A Parking area, looking west, note AWI Vactor vac truck spotted in substation area.
2. South transformer cooling vanes showing absorbent affixed to tap valves, tarpaulin installed end of each day covering excavation.
3. AWI field technician removing stone with vacuum, south upper high voltage duct visible.
4. Overhead view of AWI removal operations in substation area.
5. AWI field technician using Capsur extraction agent on stain on surface of south duct.
6. AWI field technician using vacuum to remove material from lower high voltage duct.
7. Installation of poly barrier over south and lower high voltage ducting.
8. Transfer operations between Vactor vac truck and roll-offs using backhoe.
9. Substation are after site restoration.
10. View of substation looking west - note locking iron gates.

Photo 1

Photo 2

Photo 3

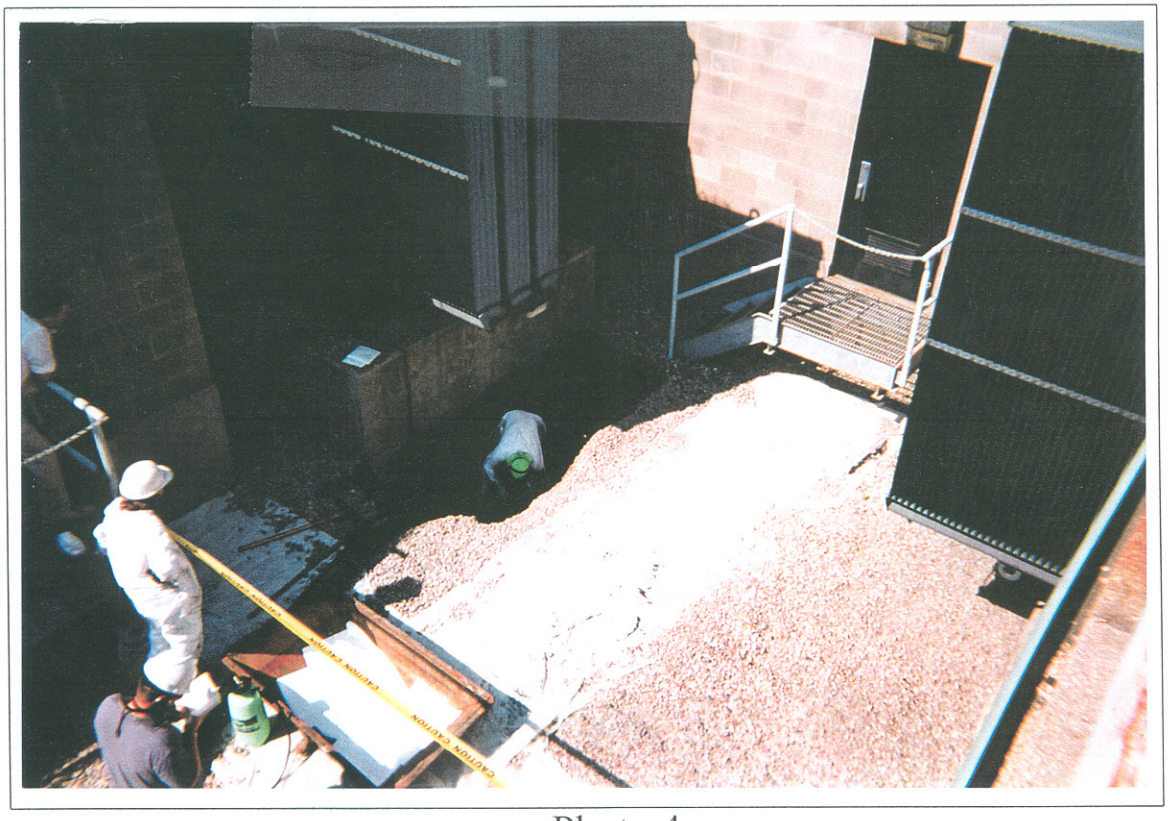


Photo 4

Photo 5

Photo 6

Photo 7

Photo 8

Photo 9

Photo 10

APPENDIX E
Substation Operations and Maintenance Plan

IN-SITU PCB OPERATIONS AND MAINTENANCE PLAN FOR THE S & A TRANSFORMER SUBSTATION

THE UNIVERSITY OF ROCHESTER
ROCHESTER, NEW YORK

Prepared for: The University of Rochester
Environmental, Health and Safety and
Facilities Design/Construction Departments
Rochester, New York

Prepared by: Leader Environmental, Inc.
Pittsford, New York

August 1996

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LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

This Operations and Maintenance Plan ("O & M Plan") has been prepared by Leader Environmental, Inc. ("Leader") for the University of Rochester. The intent of the O & M Plan is to provide a document which describes the conditions, operations and maintenance procedures for the S & A Transformer Substation in relation to PCBs. This O & M Plan may then be filed in the appropriate Environmental, Health and Safety Department and Facilities Design/Construction offices.

During July 1996, personnel from the University of Rochester Environmental, Health and Safety and Facilities Design/Construction Departments investigated a spill of transformer oil at a substation located in the S & A Parking Area of Strong Memorial Hospital (see Figure 1). According to the University of Rochester, the reported concentration of PCBs in the oil contained in the transformers is 80% (800,000 ppm). Upon visual examination of the two transformers located in the substation, it was observed that very small amounts of transformer oil were accumulating on some of the tap valves and fittings located on the underside of cooling vanes on the transformers. The transformers are scheduled to be removed and replaced in 1997 with non-PCB equipment by an approved contractor. The transformers are currently located at the north and south sides of the S & A Substation.

At the time of the investigation, no transformer oil was actually observed dripping from the tap valves, however, spill collection pans containing absorbent had been placed under the leaking tap valves by electrical maintenance personnel, therefore it was assumed that some oil may have dripped onto the substation area ground surface below the transformer cooling vanes. No obvious evidence of spills, such as discolored stone or staining in the area of the transformers was observed by any of the parties investigating this matter.

The University of Rochester immediately contracted several firms to provide technical support to the investigation. The firms included Paradigm Laboratories ("Paradigm") for sampling and analytical services, Leader for consulting/engineering services and AWI for clean up and disposal services. The University of Rochester required an immediate technical solution which met the intent of the applicable requirements.

2.0 REGULATORY REQUIREMENTS

USEPA's PCB Regulations contained at 40 CFR Part 761 apply to the management and disposal of PCBs at the University of Rochester S & A Substation project. These include the management and inspection of the transformers, recordkeeping and reporting, disposal of PCB waste materials and PCB removal activities and documentation. The Spill Cleanup Policy at Section 761.120 was followed, however, it only applies to that portion of the spill which occurred after May 4, 1987. The Spill Cleanup Policy was used for this project as guidance and to provide cleanup objectives.

The NYSDEC regulates PCBs in New York State through the Hazardous Waste Regulations at 6 NYCRR 371. The cleanup project was reported to and coordinated through NYSDEC Region 8.

3.0 SITE DESCRIPTION

The S & A substation containing the transformers is located adjacent to the shipping and receiving area (known as the S & A Area) on the north side of the Strong Memorial Hospital (see Figure 1). The substation is in an outdoor courtyard area, surrounded by concrete block building walls and secured by a locked iron gate at the access point. The substation is not accessible to the public. It is only accessible to University of Rochester maintenance and facilities employees.

4.0 STONE AND SOIL REMOVAL

Site operations began on July 18, 1996. The Contractor removed the contaminated loose stone and soil using a industrial, truck-mounted vacuum unit. The amount of stone and soil removed was initially determined by overlaying a hypothetical rectangle over the surface area of the stone and soil located underneath the south transformer cooling vanes. The length of the rectangle was approximately ten (10) feet, and the width was five (5) feet. The excavation boundaries were established to insure all contaminated material were removed at the surfaces.

The excavation operations were performed in July 1996. All stone and portions of the soil were excavated from the designated areas. At the north and south side in the bottom of the excavation, concrete ducting containing high voltage power lines were encountered. Stone and soil were removed form the top of the ducting and along the north and south sides of the ducting. The ducts were wipe sampled. The south duct appeared to have an oil stain in the center of the duct. This stain had a diameter of approximately 8 inches.

The actual volume of stone removed was approximately 20 cu. yd. or approximately 13.5 tons. The stone was transferred from the vacuum truck to DOT-approved roll-off containers for transportation to the CWM disposal site at Model City, NY.

Visibly-stained soil ("oily" appearance) was encountered beneath the loose stone along the concrete ducting during the removal operations. Through field screen tests and confirmatory laboratory analysis it was determined that the soil was contaminated with PCBs. The soil was removed using the same methods described for the loose stone except that AWI personnel used hand tools in some cases to break up the densely packed soil while vacuuming. All equipment used at this site was either decontaminated or disposed of before site operations were terminated. The amount of soil removed was determined by visual observations of staining and using PCB field screening tests. At the termination of soil removal, confirmatory samples were taken from beneath the excavation areas and along the building foundation.

5.0 SOLID SURFACES CLEANING

The concrete ducting containing high voltage power lines encountered in the excavation area were cleaned using the vacuum, scrub brushes and hand tools and then were decontaminated using cleaning agents. The cleaning agents used were "Orange Blossom", a citrus-based alkaline cleaner and "Capsur", a foaming agent specifically formulated for PCB removal from solid surfaces such as concrete. After cleaning, the surface of the ducting was wipe sampled by Leader. Analysis results are presented in Table 1.

6.0 BARRIER INSTALLATION

Due to site conditions including soil characteristics, the location of structures, the high voltage electrical equipment and buried high voltage power lines, not all potentially contaminated soils were removed from beneath the substation area. The concrete ducting could not be undercut due to the risk of electrical discharge and power failure. Also, it was decided to not undercut the building foundation located along the west side of the substation. Finally, as the soils encountered appeared to grade from sandy clay to clay as depth increased, it was determined that the remaining PCBs would be contained after the installation of a rainwater infiltration barrier.

After excavation and solid surface decontamination activities were terminated, a flame retardant, 6 mil fiberglass reinforced polyethylene sheet was installed over the concrete ducts and the bottom of the excavation t a depth of approximately five (5) feet.. The barrier size is approximately 10 feet by 10 feet. The barrier was installed to deflect rain water from infiltrating and coming into contact with concrete duct and remaining contaminated soil in the bottom of the excavation. In order to insure no contact with the remaining contaminated materials does not occur, this Site O & M Plan has been prepared which requires that the substation remain a restricted access area and that the integrity of the polyethylene barrier be maintained. The O & M Plan also requires that facility diagrams be prepared with notations indicating the existence of the barrier.

7.0 IN-SITU PCB OPERATIONS AND MAINTENANCE PLAN

This O & M Plan has been prepared to insure that facility activities conducted in the Substation area do not contact PCB contaminated material or cause the integrity of the polyethylene barrier to be compromised. The O & M Plan will be included in the University of Rochester Electrical Maintenance Facilities Design/Construction and Environmental, Health and Safety Department files. Additionally, University of Rochester Facilities drawings for the substation area will be noted with the information on the PCB materials.

7.1 Post Cleanup Operations and Maintenance Procedures

PCBs remain in several subsurface area. These include: the surface of the south and lower concrete high voltage ducting; the clay soils along and underneath the lower duct; and foundation sand supporting the lower duct underneath the building located on the west side of the substation courtyard. Also, until the transformers are changed out, PCBs exist in the dielectric fluids in the transformers. The PCBs are mainly in locations which non-authorized public and University personnel can not come into contact. The "in-situ" PCBs are located 5-7 feet beneath the substation surface, covered with clean stone and a polyethylene sheeting barrier. The substation is a restricted area, with brick walls and a locking iron gate.

7.2 Employee Protection

Non-authorized personnel shall not be allowed access into the substation area. This is the normal method of operations as the substation contains high voltage equipment.

Typically, only Electrical Maintenance, Facilities and Environmental/Safety personnel enter the substation. All of these personnel have been provided with PCB and other hazardous substances training. No other personnel may be allowed access without the permission of the Environmental, Health and Safety Department ("EH&S").

During any intrusive maintenance or construction activities in the substation area, all authorized personnel must be provided with the proper respiratory and personal protective equipment ("PPE"). PPE used is subject to the approval of EH&S. An intrusive work permit is provided at Attachment 1.

7.3 Waste Disposal

Any materials removed from the substation area in the vicinity of the transformers beneath the depth of the polyethylene barrier (5 feet) must be characterized and properly disposed with the approval of EH&S.

7.4 Air Monitoring

Leader recommends that ambient and/or personal air monitoring be conducted if intrusive operations are to be considered beneath the level of the polyethylene barrier (5 feet).

The air monitoring should be conducted using a battery operated personal air pump and a Florisil tape. The sample is then analyzed using NIOSH Method 5503. The laboratory results may then be compared to the OSHA PEL found in OSHA 29 CFR 190 Subpart 2, however, those PELs are for Aroclor 1242 and 1254, sot he comparison is made for guidance purposes only. The laboratory results also are compared to NIOSH TWA exposure limits in publication No. 77-225, which are applicable to Aroclor 1248.

7.5 General Work Guidelines

General work practices in the Substation can be largely unrestricted with the exception of intrusive activities pertaining to items identified in Section 7.2. Intrusive activities refer to those activities where internal portions of certain equipment are accessed, or demolition, drilling, excavation activities are performed, and when PCB contaminated items are handled. Training of workers affiliated with the Electrical and Facilities Staff should vary with respect to roles and responsibilities. These roles and responsibilities can be divided into two groups with respect to awareness, training, and job responsibilities as defined below.

Group 1	Personnel working in proximity to, but not handling or disturbing potentially PCB contaminated materials.
Group 2	Personnel engaged in maintenance activities on PCB contaminated equipment and building features or otherwise contact PCB contaminated equipment.
	Personnel engaged in cleanup of PCB contaminated spill material.

Personnel using personal protective equipment to prevent exposure to PCB contaminated surfaces.

Responsibilities of personnel in Group 1 include:

- Avoid Food consumption and smoking in the Substation.
- Report suspected spills in the area to EH&S.

In addition to Group 1 responsibilities, Group 2 responsibilities include:

- Use of personal protective clothing and respiratory protection when engaged in activities requiring contact with PCB contaminated items identified above.
- Obtain an Intrusive Work Permit from Environmental, Health and Safety when engaged in intrusive activities in the restricted access areas.

7.6 Training

All personnel (i.e. Group 1 & 2) who, in the course of their duties, do not contact PCB contaminated surfaces, handle or contact transformer oil, or, in any other way become exposed to PCB contamination while performing their duties should be made aware of the following subjects by means of a hazard communication program:

- The presence of PCBs;
- Location of PCBs;
- Restricted Access Areas;
- Physical and toxicological hazards associated with PCBs;
- Methods to prevent exposure to PCBs;
- Availability of physical, chemical and toxicological data associated with PCBs (i.e. Material Safety Data Sheet); and
- PCB Management Practices for the Substation

Employees engaged in PCB spill cleanup procedures, and maintenance activities involving prolonged direct contact with PCBs should be trained in the following subject areas as outlined in the corresponding regulations:

Hazard Communication	29 CFR Part 1910.1200
Hazardous Waste Operations	29 CFR Part 1910.120
Respirator Use	29 CFR Part 1910.134
Personal Protective Equipment	29 CFR Part 1910 Subpart I

7.7 Management Controls

Training records for all employees receiving the training outlined above should be maintained to include:

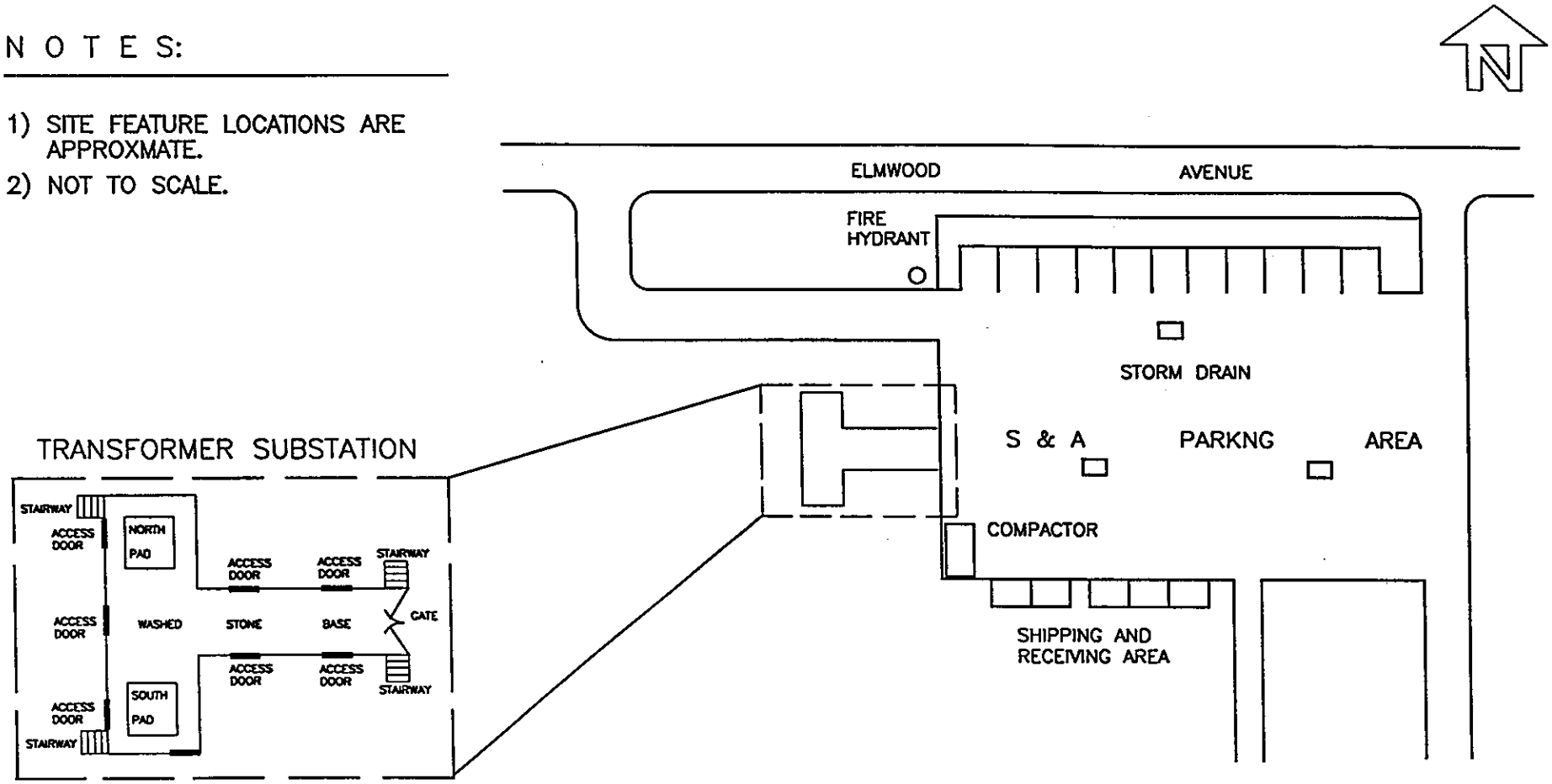
- Course title and date;
- Number of training hours;
- Course Instructor;
- Course Outline; and
- Employee name.

Intrusive work permits should be required before any work involving contact with PCB contaminated material is initiated. The permit should be completed by the person performing the work and should address the exact location of the work to be performed, the type of work to be performed, and the duration of the work. The permit should be authorized by EH&S.

In addition, University Facilities Staff will insure all standard diagrams, plans, drawings and maps made for the substation area are noted with a reference to this O & M Plan and/or the existence of PCBs in the subsurface materials.

N O T E S:

1) SITE FEATURE LOCATIONS ARE APPROXMATE.
2) NOT TO SCALE.



LEADER ENVIRONMENTAL, INC.	TITLE: SITE PLAN STRONG MEMORIAL HOSPITAL COURTYARD UNIVERSITY OF ROCHESTER	SCALE: AS SHOWN DRAWN: WSW CHECKED: MPR	DATE: 7/17/96 7/12/96	PROJECT NO.: 135.001 PREPARED FOR: UNIVERSITY OF ROCHESTER	FIGURE: 1

TABLE 1
Sampling and Analytical Data

Sample Number	Sample Description	Date	Analytical Results	Sampler
North A	Grab - stone south transformer, 1 ft depth	8-Jul	1.6 mg/kg	Uof R
North B	Grab -stone from south transformer, 1 foot depth	8-Jul	7.1 mg/kg	U of R
South A	Grab - stone from north transformer, 1 foot depth	8-Jul	11.6 mg/kg	U of R
South B	Grab - stone from north transformer, 1 foot depth	8-Jul	2084.1 mg/kg	U of R
1 ExC	Composite- Sandy Clay, Bottom of Excavation, Along South Transformer Concrete Pad	19-Jul	150 mg/kg	Leader
2 Wipe	Wipe- Top of South Concrete Duct	19-Jul	880 ug/100 cm2	Leader
3 ExC Re	Composite- Sandy Clay, Bottom of Excavation, Along South Transformer Concrete Pad (Same Location as Sample 1 ExC)	22-Jul	0.62 mg/kg	Leader
4 Wipe Re	Wipe- Top of South Concrete Duct (Same Location as Sample 2 Wipe)	22-Jul	223 ug/100 cm2	Leader
5 Wipe Re	Wipe- Top of South Concrete Duct (Same Location as Samples 2 Wipe and 4 WipeRe)	22-Jul	148 ug/100 cm2	Leader
6 Wipe Re	Wipe- Top of South Concrete Duct (Same Location as Samples 2 Wipe, 4 WipeRe, and 5 WipeRe)	24-Jul	5.5 ug/100 cm2	Leader
7 ExC	Composite- Sandy Clay, Bottom of Excavation, Along North Side of South Concrete Duct	24-Jul	2148 mg/kg	Leader
8 ExC	Composite- Sandy Clay, Bottom of Excavation, Along South Side of North Concrete Duct	24-Jul	878 mg/kg	Leader
9 Wipe	Wipe- Top of Middle (Lower) Concrete Duct, Approximate Center	24-Jul	900 ug/100 cm2	Leader
10 Wipe	Wipe- Top of Middle (Lower) Concrete Duct, Northwest Corner Near "Pit"	24-Jul	320 ug/100 cm2	Leader
11 FoundC	Composite- Sandy Soil Along Building Foundation	24-Jul	49.5 mg/kg	Leader
12 Pit Grab	Grab- Sandy Soil in Pit, NW Corner of Excavation	24-Jul	8604.8 mg/kg	Leader
13 Wipe	Wipe- Backhoe Bucket	25-Jul	13.5 ug/100 cm2	Leader
14 Wipe	Wipe- Vacuum Truck	25-Jul	14.5 ug/100 cm2	Leader
15 ExC Re	Composite- Sandy Clay, Bottom of Excavation, Along North Side of South Concrete Duct (Same Location as Sample 7 ExC)	25-Jul	225.5 mg/kg	Leader
16 ExC Re	Composite- Sandy Clay, Bottom of Excavation, Along South Side of North Concrete Duct (Same Location as Sample 8 ExC)	25-Jul	1.7 mg/kg	Leader
17 ExC Re	Composite- Sandy Clay, Bottom of Excavation, Along South Side of North Concrete Duct (Same Location as Samples 8 ExC and 16 ExC)	26-Jul	None Detected	Leader
18 ExC Re	Composite- Sandy Clay, Bottom of Excavation, Along North Side of South Concrete Duct (Same Location as Samples 7 ExC and 15 ExC)	26-Jul	240.8 mg/kg	Leader
19 Wipe Re	Wipe- Backhoe Bucket	26-Jul	3.2 ug/100 cm2	Leader
20 Wipe Re	Wipe- Vacuum Truck	26-Jul	None Detected	Leader

APPENDIX F
Health and Safety Plan

HEALTH AND SAFETY PLAN

University of Rochester S & A Transformer Substation PCB Project

Prepared For:
The University of Rochester
Environmental, Health and Safety Department

Prepared By:
Leader Environmental, Inc.
640 Kreag Road, Suite 300
Pittsford, NY 14534

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1.0 PROJECT PERSONNEL RESPONSIBILITIES

Project organization is presented below at Section 1.6.

1.1 Project Manager

This person will act in a supervisory capacity over all employees and activities with respect to the University of Rochester project site. The project manager has the authority to direct response operations and assumes total control over all site activities.

1.2 Project Supervisor

This individual may be the same person as the project manager and may be a member of the work party. The project supervisor oversees all field and related activities specific to the project. The project supervisor for the University of Rochester project site will be determined prior to commencement of the work.

1.3 Site Safety and Health Officer

Leader will provide the SSHO. This individual advise the project manager/supervisor on all aspects of health and safety on site. The individual also has the authority to stop work if any operation threatens the health and safety of workers or the public.

1.4 Work Party

AWI will comprise the work part for the University of Rochester project. All AWI personnel have received the required OSHA 29 CFR 1910.120 hazardous waste worker training required for this project.

1.5 Decontamination Officer(s)

Responsible for decontamination procedures, equipment, and supplies, the decontamination officer for the drum removal and disposal at the University of Rochester facility will be determined prior to commencement of the work.

Note: All personnel working at the University of Rochester site will have the required 40-Hour OSHA training in accordance with the provisions set forth in 29CFR 1910.120(e). Supervisors will have an additional eight hours of training.

1.6 Project Organization

University of Rochester Project Manager - Mike Roszyk, University of Rochester
Project Manager - Mike Rumrill, Leader Environmental
Allwash Inc. Supervisor - Pete Breen, AWI
Project Engineer/Site Safety and Health Officer - Tom Tuori, Leader Environmental

2.0 SITE STANDARD OPERATING SAFETY PROCEDURES

Standard operating and safety procedures include safety precautions and operating practices, that all personnel will follow. These include:

2.1 Personal Precautions

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited in any area designated contaminated.

- Hands and face must be thoroughly washed upon leaving the work area.

- Whenever decontamination procedures for outer garments are in effect, the entire body should be thoroughly washed as soon as possible after the protective garment is removed.

- No facial hair which interferes with a satisfactory fit of the mask-to-face seal is allowed on personnel required wear respirators. Personnel will use the negative pressure fit test prior to each use of the equipment.

- Contact with contaminated or suspected contaminated surfaces should be avoided. Whenever possible, do not walk through puddles, leachate, discolored surfaces, kneel on ground, lean, sit or place equipment on drums, containers, or the ground.

- Medicine and alcohol can increase the effects from exposure to toxic chemicals. Prescribed drugs should not be taken by personnel on response operations where the potential for absorption, inhalation, or ingestion of toxic substances exists unless specifically approved by a qualified physician. Alcoholic beverages should be avoided, in the off-duty hours, during response operations.

- Fluids, rest periods and frequent breaks must be used while impervious or multi-layered protective clothing and respirators are used during warm weather conditions. Personnel must be monitored to prevent heat stress. See Appendix C.

2.2 Operations

- All personnel going on-site must be adequately trained and thoroughly briefed on anticipated hazards, equipment to be worn, safety practices to be followed, emergency procedures, and communications.

- Any required respiratory protection and chemical protective clothing must be worn by all personnel going into areas designated for wearing protective equipment.

- Personnel on-site must use the buddy system when wearing respiratory protection. As a minimum, two other persons, suitably equipped, are required as safety backup during initial entry.

- Visual contact must be maintained between pairs on-site and safety personnel. Entry team members should remain together to assist each other during emergencies.

- During continual operations, on-site workers act as safety backup to each other. Off-site personnel provide emergency assistance.

- Personnel should practice unfamiliar operations prior to doing the actual procedure.

- Entrance and exit locations must be designated and emergency escape routes delineated. Warning signals for site evacuation must be established.

- Communications using radios, hand signals, signs, or other means must be maintained between initial entry members at all times. Emergency communications should be prearranged in case of radio failure, necessity for evacuation of site, or other reasons.

- Wind indicators visible to all personnel should be strategically located throughout the site, if required.

- Personnel and equipment in the contaminated area should be minimized, consistent with effective site operations.

- Work areas for various operational activities must be established.

- Procedures for leaving a contaminated area must be planned and implemented prior to going on-site. Work areas and decontamination procedures must be established based on expected site conditions.

  Note: These procedures will be posted at the University of Rochester site prior to commencing work.

3.0 HEALTH AND SAFETY HAZARDS

The potential exists for personnel in the work party coming into contact with hazardous materials during the performance of the work. Areas where concentrations of hazardous materials may exceed the established permissible exposure limits will be roped off from general access.

Table 1 list potential health and safety hazards that may be encountered based on general site tasks. This list has been compiled based on the scheduled activities and potential site conditions.

Table 1

Hazard	OSHA Standard	Description	Response
Excavation Safety	29 CFR 1926 Subpart P	Removal of loose stone and soil from substation area	Cutback excavation minimum 1.5:1
Construction Safety	29 CFR 1926	Operation of heavy equipment: Vactor vac truck, backhoe, roll-off loading	Only licensed operators permitted to operate equip
Confined Space Entry	29 CFR 1910.146	No confined spaces anticipated	Amend HASP if encountered
Chemical Hazards	29 CFR 1910.120, 1910.1200	PCB - Aroclor 1248 Capsur Orange Blossom (see Appendix A for MSDS)	PPE: Level C w/ Half face required during excavation for those in work zone /Haz Comm Training/ Chem Use
Electrical Hazards	29 CFR 1910.147	Transformers, overhead and subsurface high voltage lines, transformer ground net	Lockout not practicable, therefore use extreme caution, use vacuum to excavate (see Appendix B)
Heat Stress	29 CFR 1910.120	PPE - Level D, Level C Tyvek w/half face	Frequent breaks during warm weather, monitor fluids intake (see Appendix C)
Noise	29 CFR 1910.95	Vactor, Backhoe - confined substation are enclosed by walls	Approved Hearing Protection required during operation
Vehicular Traffic	N/A	S & A Parking Area - Truck/Auto Traffic	Use traffic controls to separate work area - traffic cones, warning tape, confine activities to work area

4.0 PERSONAL PROTECTIVE EQUIPMENT

4.1 Protective Equipment

All personnel will be provided with appropriate personal safety equipment and protective clothing. Each individual will be properly trained in the use of this safety equipment before the start of field activities. Safety equipment and protective clothing shall be used as directed by the Project Supervisor and/or Site Health and Safety Officer. All such equipment and clothing will be cleaned and maintained in proper condition by the personnel. The Site Health and Safety Officer will monitor the maintenance of personnel protective equipment to ensure proper procedures are followed.

Personal protective equipment will be worn at all times designated by this Health and Safety Plan. Levels of protective clothing and equipment are not expected to exceed Level B. Results from the site walk-through, and on-site readings will be used to set task and location specific action levels and levels of personal protection. These are detailed in Section 6.

The personal protective equipment levels designated below are in conformance with EPA criteria for Level A, B, C, and D protection. All respiratory protective equipment used will be approved by National Institute for Occupational Safety and Health (NIOSH) and Mine Safety and Health Administration (MSHA).

4.2 Level A Protection

A. Personnel Protective Equipment

- Supplied air respirator approved by the NIOSH and MSHA. Respirators may be:

  ~ Pressure-demand, self-contained breathing apparatus (SCBA)

  or

  ~ Pressure-demand, airline respirator (with escape bottle for Immediately Dangerous to Life and Health (IDLH) or potential for IDLH atmosphere).

- Fully encapsulating chemical resistant suit.

- Coveralls*

- Long cotton underwear*

- Gloves (inner), chemical resistant

- Boots, chemical resistant, steel toe and shank. (Depending on suit construction, worn over or under suit boot.

- Hard hat* (under suit)

- Disposal gloves and boot covers* (worn over fully encapsulating suit)

- Two-way radio communications* (inherently safe).

  * Optional

B. Criteria for Selection

Meeting any of these criteria warrants use of Level A Protection:

- The chemical substance has been identified and requires the highest level of protection for skin, eyes, and the respiratory system based on:

  ~ Measured (or potential for) high concentration of atmospheric vapors, gases or particulate.

  or

  ~ Site operations and work functions involves high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulate of materials highly toxic to the skin

  - Substances with a high degree of hazard to the skin are known or suspected to be present, and skin contact is possible.

  - Operations must be conducted in confined, poorly ventilated areas until the absence of substances requiring Level A Protection is determined.

  - Direct readings on field Flame Ionization Detectors (FID) or Photoionization Detectors (PID) and similar instruments, indicate high levels of unidentified vapors and gases in the air. (See Appendices I and II).

C. Guidance on Selection

1. Fully encapsulating suits are primarily designed to provide a gas or vapor tight barrier between the wearer and atmospheric contaminants. Therefore, Level A is generally worn when high concentrations of airborne substances could severely effect the skin. Since Level A requires the use of a self-contained breathing apparatus, the eyes and respiratory system are also more protected.

   Until air surveillance data becomes available to assist in the selection of the appropriate Level of Protection, the use of Level A may have to be based on indirect evidence of the potential for atmospheric contamination or other means of skin contact with severe skin affecting substances.

   Conditions that may require Level A Protection include:

   - Confined spaces: Enclosed, confined, or poorly ventilated areas are conducive to the build up of toxic vapors, gases, or particulate. (Explosive or oxygen-deficient atmospheres also are more probable in confined spaces). Confined space entry does not automatically warrant wearing Level A Protection, but should serve as a cue to carefully consider and to justify a lower level of protection.

   - Suspected/known highly toxic substances: Various substances that are highly toxic especially skin absorption for example, fuming corrosives, cyanide compounds, concentrated pesticides. Department of Transportation Poison "A" materials, suspected carcinogens, and infectious substances may be known or suspected to be involved. Field instruments may not be available to detect or quantify air concentrations of these materials. Until these substances are identified and concentrations measured, maximum protection may be necessary.

- Visible emissions: Visible air emissions from leaking containers or railroad/vehicular tank cars, as well as smoke from chemical fires and others, indicate high potential for concentrations of substances that could be extreme respiratory or skin hazards.

- Job Functions: Initial site entries are generally walk-through in which instruments and visual observations are used to make a preliminary evaluation of the hazards. In initial site entries, Level A should be worn when:

  ~ There is a probability for exposure to high concentrations of vapors, gases, or particulate.

  ~ Substances are known or suspected of being extremely toxic directly to the skin or being absorbed.

Subsequent entries are to conduct the many activities needed to reduce the environmental impact of the incident. Levels of protection for later operations are based not only on data obtained from the initial and subsequent environmental monitoring, but also on the probability of contamination and ease of decontamination.

Examples of situations where Level A has been worn are:

- Excavating of soil to sample buried drums suspected of containing high concentrations of dioxin.

- Entering a cloud of chlorine to repair a valve broken in a railroad accident.

- Handling and moving drums known to contain waste.

- Responding to accidents involving cyanide, arsenic, and undiluted pesticides.

2. The fully encapsulating suit provides the highest degree of protection to skin, eyes, and respiratory system if the suit material resists chemicals during the time the suit is worn. While Level A provides maximum protection, all suit material may be rapidly permeated and degraded by certain chemicals from extremely high air concentrations, splashes, or immersion of boots or gloves in concentrated liquids or sludge. These limitations should be recognized when specifying the type of fully encapsulating suit. Whenever possible, the suit material should be matched with the substance it is used to protect against.

4.3 Level B Protection

A. Personal Protective Equipment

- Pressure-demand, self-contained breathing apparatus (MSHA/NIOSH approved).

Or

- Pressure-demand, airline respirator (with escape bottle for IDLM or potential for IDLH, atmosphere) OSHA/NIOSH approved.

- Chemical resistant clothing (overalls and long sleeved jacket; coveralls or hooded, one or two-piece chemical splash suit; disposable chemical resistant one-piece suits).

- Coveralls

- Gloves (outer), chemical resistant
- Gloves (inner), chemical resistant
- Boots (inner), leather work shoe with steel toe and shank
- Boots (outer), chemical resistant (disposable*)
- Hard Hat (face shield*)
- Taping between suit and gloves, and suit and boots

* Optional

B. Criteria for Selection

Anyone of the following conditions warrants use of Level B Protection:

1) The type and atmospheric concentration of toxic substances have been identified and require a high level of respiratory protection. These would be atmospheres:

   ~ With concentrations Immediately Dangerous to Life and Health (IDLH)

   or

   ~ Exceeding limits of protection afforded by a full-face, air-purifying mask.

   Or

   ~ Containing substances for which air-purifying canisters do not exist or have low removal efficiency.

2) The atmosphere contains less than 19.5% oxygen.

3) Site operations make it highly unlikely that the small, unprotected area of the head or neck will be contacted by splashes of extremely hazardous substances.

4) Working in confined spaces.

C. Guidance on Selection Criteria

Level B equipment provides a high level of protection to the respiratory tract, but a somewhat lower level of protection to skin than Level A. The chemical resistant clothing required in Level B is available in a wide variety of styles, materials, construction detail, permeability, etc. These factors all affect the degree or protection afforded. Therefore, the Safety Officer should select the most effective chemical resistant clothing based on the known or anticipated hazards and/or job function. (It is anticipated that Level A Protection will not be required under this contract.)

Generally, if a self-contained breathing apparatus is required, Level B clothing rather than a fully encapsulating suit (Level A) is selected based on needing less protection against known or anticipated substances affecting the skin. Level B skin protection is selected by:

- Comparing the concentrations of known or identified substances in air with skin toxicity data.

- Determining the presence of substances that are destructive to and/or readily absorbed through the skin by liquid splashes, unexpected high levels of gases, vapor or particulate, or other means of direct contact.

- Assessing the effect of the substance (at its measured air concentrations or splash potential) on the small area of the head and neck unprotected by chemical resistant clothing.

4.4 Level C Protection

A. Personal Protective Equipment

- Full-face, air-purifying, canister-equipped respirator (MSHA/NIOSH approved) for acid/gas/organic vapor with particulate filter.

- Chemical resistant clothing (overalls and long sleeved jacket; coveralls or hooded, one piece or two-piece chemical-splash suit; disposable chemical resistant one-piece suits).

- Coveralls

- Gloves (outer), chemical resistant

- Gloves (inner), chemical resistant

- Boots (inner), leather work shoe with steel toe and shank

- Boots (outer), chemical resistant (disposable*)

- Hard Hat (face shield*)

- Taping between suit and gloves, and suit and boots

* Optional

B. Criteria for Selection

Meeting all of these criteria permits use of Level C Protection.

- Measured air concentration of identified substances will be reduced by the respirator to, at, or below the substance's Threshold Limit Value (TLV)/Permissible Exposure Limits (PEL) and the concentration is within the service limit of the canister.

- Atmospheric contaminant concentrations do not exceed IDLH levels.

- Atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect the small area of skin left unprotected by chemical resistant clothing.

4.5 Level D Protection

A. Personal Protective Equipment

- Coveralls
- Leather, steel-toed boots
- As required:
    - Hard hat
    - Safety glasses/goggles
    - Hearing protection
    - Gloves

B. Criteria for Selection

Meeting all of these criteria permits the use of Level D Protection.

- Measured air concentrations of identified substances are below the substances Permissible Exposure Limit (PEL) or TLV.
- Oxygen content is > 19.5%.
- No unknown substances are present.

5 DECONTAMINATION

It is expected that the usual level of protection to be used at the University of Rochester site will be Level C. Level B will be used on occasion at the direction of the Project Manager(s) and the Site Safety and Health Officer when potential exposures to contaminants justify increased protection. A decontamination zone will be set up at the entrance of the site. Based on the level of expected exposure to contaminants, the following decontamination protocol will be used.

5.1 Personnel Decontamination

It is expected that a minimum of Level C decontamination will be continually in effect at the University of Rochester site. On these occasion when higher levels of protection are required, appropriate decontamination procedures will be used. The extent of the decontamination procedures will be at the discretion of the site Health and Safety Officer. Guidelines for setup of the decontamination line are listed in Appendix 5.

All decontamination waste waters will be collected and disposed of according to applicable regulations. This disposal will be done at the direction of the Project Supervisor or Project Manager.

In general, decontamination involves scrubbing with a non-phosphate soap/water solution followed by clean water rinses. All disposable items will be disposed of in a dry container. Certain parts of contaminated respirators, harness assemblies and leather or cloth components, are difficult to decontaminate. If grossly contaminated, they may have to be discarded. Rubber components can be soaked in soap and water and scrubbed with a brush. In addition to being decontaminated, all respirators, non-disposable protective clothing, and other personal articles must be sanitized before they can be used again unless they are assigned to individuals. The manufacturer's instruction should be followed in sanitizing the respirator masks. The Site Safety Officer will be responsible for supervising the proper protective equipment.

5 Equipment Decontamination

Decontamination will be applicable to all activities on-site and in the contamination reductions zone (CRZ). All equipment (i.e., tools, monitoring equipment, etc.) will receive initial decontamination. All equipment which has been in contact with contaminants shall be stored in an area within the limits of the existing exclusion zone or shall be thoroughly decontaminated prior to leaving the work area. Decontamination will consist of cleaning of the entire piece of equipment to the satisfaction of the Site Supervisor or the responsible Quality Assurance Personnel. All dirt, oil, grease, or other foreign materials that are visible will be removed from metal surfaces. Scrubbing with a wire brush may be required to remove materials that adhere to the surfaces.

Decontamination will take place inside the exclusion area. All equipment will be stored on plastic sheeting above ground. All decontamination waters will be collected and disposed of in accordance with applicable regulations. Equipment not in use will be covered with plastic and stored at a designated storage area.

Air monitoring equipment will be protected with an outer coating (i.e., plastic) prior to the initial entry into the exclusion zone. Decontamination will then consist of removal of the protective coating in a manner that will not contaminate the air monitoring equipment.

Note: Any changes to the decontamination procedures listed in this section will be approved by the Site Safety and Health Officer.

7.0 ACTION LEVELS

Action levels have been established for the upgrade and downgrade in the levels of personal protective equipment. Table 2 lists the action levels, airborne concentrations and their respective personal protection for unknown sources of organic vapor concentrations. Section 8.0 discusses the minimal personal protection required for specific site activities based on current information. Changes to these specified levels are dependent on the result of air monitoring as outlined below.

The clean up project involves the removal of solid materials, soil and stone that has been contaminated with PCB's plus the decontamination of surfaces. In as much as there is no way to directly quantify PCB levels in the air without laboratory analysis, action level will be based on the measurement of airborne dusts from sources within the work site.

TABLE 2

PCB/DUST CONCENTRATIONS	LEVEL OF PROTECTION
$< 1\ mg/m^3$	Level D with no respirator protection necessary
$> 1\ mg/m^3$	Level C air purifying respirator required
$>= 10\ mg/m^3$*	Level B supplied air respirator required

* NOTE:

This concentration level/action level may vary depending on the purifying properties of the respirator cartridge to be used.

8.0 SITE ACTIVITIES AND ASSOCIATED PERSONNEL PROTECTIVE REQUIREMENTS

The levels of protection assigned to each activity (below) represent a best estimate of exposure potential and protective equipment needed for that exposure. The site safety officer will revise those levels of protection, up or down, based on air monitoring results and on-site assessment of actual exposures.

- *Level D* - General site walk through with no physical contact with contaminated areas by personnel.

- *Level C* - General cleaning of interior and exterior surfaces of contaminated equipment where personnel will be in direct contact with contaminated surfaces, where ingress and egress can be accomplished without the aid of additional equipment such as ladders, scaffolding, retrieval systems, etc.

- *Level* B - All confined space entry situations.

Note: The site Safety and Health Officer will make changes to the levels of protection required based on the identification of known substances and any required changes to the scope of the work.

9.0 CONTINGENCY PLAN

The Project Supervisor is responsible for implementing the Contingency Plan whenever there is either a threat to human health or an environmental hazard. Possible such situations include actual or imminent fires, explosions or spills.

The individual discovering the emergency situation is to notify the Project Supervisor who will then notify the appropriate organizations as described in Table 3.

9.1 Assessment

The Project Supervisor is responsible for ascertaining any possible health or environmental hazards and determining the need for evacuation and notification of the proper authorities.

9.2 Control Procedures

The employee discovering a fire, explosion, spill or other emergency situation is responsible for notifying the Project Supervisor and as much as possible, provide the information listed in Section 3.0. The Emergency Response Coordinator will assess the situation to determine if it can be adequately handled by plant personnel or if additional assistance is needed.

Before any employee attempts to extinguish a fire, clean-up and contain a spill or take any action, he or she must be aware of the properties of the material involved and its associated hazards. All employees are familiarized with this information during their training period and are instructed on the proper protective clothing to be worn in such a situation.

Table 3 includes a list of the organizations that are available to provide emergency assistance.

9.3 Fire and/or Explosion

The most serious emergency situation that could be faced at the University of Rochester site would be a chemical release or major fire. In the event of a fire or explosion, the Project Supervisor should be notified as described in the preceding section. The Emergency Response Coordinator is responsible for determining the requirements for outside assistance as well as the necessity for facility evacuation.

The Fire Department should be notified immediately once a fire is detected. Small fires can be extinguished using a fire extinguisher located at the site. Larger fires will require the assistance of the fire department. The fire department will be informed of the nature of the wastes at the site and that water is not an adequate extinguishing material. Foam will be required to extinguish major fires at the site.

Any contaminated structures or equipment must be properly cleaned before being returned to service. Decontamination procedures are described in Section 9.6.

9.4 Spill and/or Material Releases

The procedure for notification of the Project Supervisor and the appropriate authorities was described in Section 9.2. In addition, Section 103 of the Comprehensive Environmental Response, Compensation, and Liability act of 1980 (CERCLA, or Superfund) requires that the National Response Center be notified of any release in excess of the reportable quantity of a listed material.

In addition to the procedures outlined in this section the University of Rochester has specific procedures for hazardous chemicals and/or waste spills. Refer to Appendix 2 for these procedures. These steps must be followed and the appropriate University of Rochester personnel must be notified in the event of spill and/or material releases.

Spill clean-up poses no danger under normal conditions. The first step is to determine the source of the spill and correct it which would normally involve patching a leaking drum, closing a valve or turning off a pump. In the event of a small spill, absorbent granules or sorbent pads will be utilized to soak up the spilled material. Absorbent materials are kept in designated storage locations in the facility. The granules would then be swept up and containerized in Department of Transportation approved drums.

On-site equipment, i.e., pumps and vacuum trucks, would then be put into service to transfer the spilled material from the collection area into storage tanks. This equipment is always kept on-site and can be implemented in the event of a large spill. Final clean-up of residuals would involve the use of adsorbents as described for a small spill. Once the cause of the spill is determined and restorative work is complete, the recovered waste could be transferred back into the storage tanks or drums. All sorbent materials would be placed in DOT approved drums.

Any contaminated structures and equipment must be properly cleaned before being returned to service. This procedure will include use of pressure washers and sorbent materials. All affected equipment, surfaces and other affected areas will be cleaned with detergent.

9.5 Container Spills and Leakage

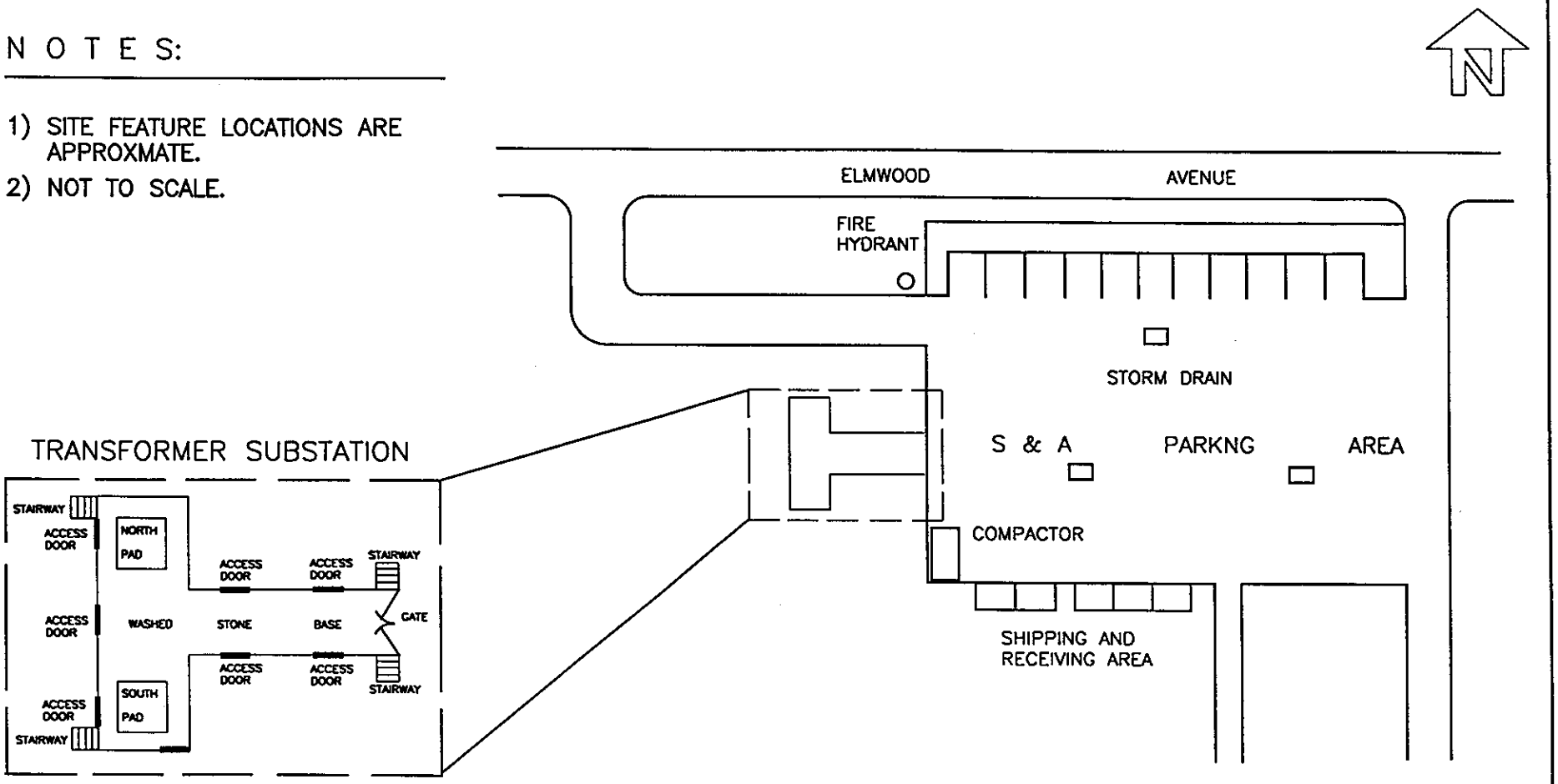
Emergency response procedures for container spills and leakage are specified in Section 9.4.

10.0 WORK AREAS

This project will be conducted within the transformer substation in the S & A parking area at Strong Memorial hospital. The Work Area will be defined as the substation area, bounded by the walls of the substation and the gate at the east end. The exclusion area will include the substation and the area immediately outside the substation gate, which will be marked with orange traffic cones and yellow warning tape. All unauthorized personnel will be prohibited from the work area and the exclusion zone. Due to traffic concerns, the waste roll-offs will be staged at the opposite (east) side of the S & A parking area from the substation. For site location, see Figure 1.

N O T E S:

1) SITE FEATURE LOCATIONS ARE APPROXMATE.
2) NOT TO SCALE.



LEADER ENVIRONMENTAL, INC.	TITLE: SITE PLAN STRONG MEMORIAL HOSPITAL COURTYARD UNIVERSITY OF ROCHESTER	SCALE: AS SHOWN DRAWN: WSW CHECKED: MPR	DATE: 7/17/96	PROJECT NO.: 135.001 PREPARED FOR: UNIVERSITY OF ROCHESTER	FIGURE: 1

HASP
APPENDIX A
MATERIAL SAFETY DATA SHEETS

MONSANTO PRODUCT NAME

Polychlorinated Biphenyls (PCBs)

MONSANTO COMPANY
800 N. LINDBERGH BLVD.
ST. LOUIS, MO 63167

Emergency Phone No.
(Call Collect)
314-694-1000

Date: 10/88

PRODUCT IDENTIFICATION

Synonyms: PCBs
Chlorodiphenyl (__% Cl)
Chlorinated biphenyl
Polychlorinated biphenyl
Chlorinated biphenyls
(approx. __% Cl)

Trade Names/ Common Names: Aroclor®[1] Series 1016, 1221, 1232, 1242, 1248, 1254, 1260
Therminol®[1] FR Series

PYRANOL®[2] and INERTEEN®[3] are trademarks for commonly used dielectric fluids that may have contained varying amounts of PCBs as well as other components including chlorinated benzenes.

ASKAREL - Generic name for a broad class of fire-resistant synthetic chlorinated hydrocarbons and mixtures used as dielectric fluids that commonly contained about 30-70% PCBs. Some ASKAREL fluids contained 99% or greater PCBs and some contained no PCBs.

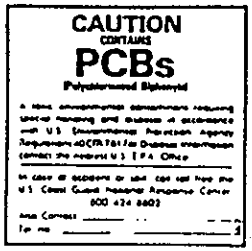
This list of trade names is representative of several commonly used Monsanto products (or products formulated with Monsanto products). Other trademarked PCB products were marketed by Monsanto and other manufacturers. PCBs were also manufactured and sold by several European and Japanese companies. Contact the manufacturer of the trademarked product, if not in this listing, to determine if the formulation contained PCBs.

[1] Registered trademark of Monsanto Company
[2] Registered trademark of General Electric Company
[3] Registered trademark of Westinghouse Electric Corporation

CAS No.'s: 001336363, 053469219, 021672296, 01109769, 011096825 and others

WARNING STATEMENTS

Federal regulations under the Toxic Substances Control Act require PCBs, PCB items, storage areas, transformer vaults, and transport vehicles to be marked. (check regulations, 40 CFR 761, for details)



MATERIAL SAFETY DATA Polychlorinated Biphenyls (PCBs)

PRECAUTIONARY MEASURES

Care should be taken to prevent entry into the environment through spills, leakage, use, vaporization, or disposal of liquid or containers. Avoid prolonged breathing of vapors or mists. Avoid contact with eyes or prolonged contact with skin. If skin contact occurs, remove by washing with soap and water. Following eye contact, flush with water. In case of spillage onto clothing, the clothing should be removed as soon as practical, skin washed, and clothing laundered. Comply with all federal, state, and local regulations.

EMERGENCY AND FIRST AID PROCEDURES

Ingestion: Consult a physician. Do not induce vomiting or give any oily laxatives. NOTE TO PHYSICIAN—If large amounts are ingested, gastric lavage is suggested.

Skin: If liquid or solid PCBs are splashed or spilled on skin, contaminated clothing should be removed and the skin washed thoroughly with soap and water. NOTE TO PHYSICIAN—Hot PCBs may cause thermal burns.

Eyes: Eyes should be irrigated immediately with copious quantities of running water for at least 15 minutes if liquid or solid PCBs get into them. A petrolatum-based opthalmic ointment may be applied to the eye to relieve the irritating effects of PCBs.

Inhalation: Remove to fresh air. If skin rash or respiratory irritation persists, consult a physician. NOTE TO PHYSICIAN—If electrical equipment arcs over, PCBs or other chlorinated hydrocarbon dielectric fluids may decompose to produce HCl, hydrochloric acid, a respiratory irritant.

OCCUPATIONAL CONTROL PROCEDURES

Eye Protection: Wear chemical splash goggles and have eye baths available where there is significant potential for eye contact.

Skin Protection: Wear appropriate protective clothing and chemical resistant gloves to prevent skin contact. Consult glove manufacturer to determine appropriate type glove for given application. Wear chemical goggles, face shield, and chemical resistant clothing such as a rubber apron when splashing is likely. Wash immediately if skin is contaminated. Remove contaminated clothing promptly and launder before reuse. Clean protective equipment before reuse. Provide a safety shower at any location where skin contact can occur. Wash thoroughly after handling.

ATTENTION! Repeated or prolonged contact may cause chloracne in some people.

Respiratory Protection: Avoid breathing vapor or mist. Use NIOSH/MSHA approved equipment when airborne exposure limits are exceeded. Full facepiece equipment is recommended and, if used, replaces need for face shield and/or chemical splash goggles. Consult respirator manufacturer to determine the type of equipment for a given application. The respirator use limitations specified by NIOSH/MSHA or the manufacturer must be observed. High airborne concentrations may require use of self-contained breathing apparatus or supplied air respirator. Respiratory protection programs must be in compliance with 29 CFR Part 1910.134.

Ventilation: Provide natural or mechanical ventilation to control exposure levels below airborne exposure limits (see below). If practical, use local mechanical exhaust ventilation at sources of air contamination such as open process equipment.

Airborne Exposure Limits: Chlorinated biphenyl (approximately 42% chlorine)
OSHA PEL: 1 mg/m³ 8-hour time-weighted average - Skin*
ACGIH TLV: 1 mg/m³ 8-hour time-weighted average - Skin*
2 mg/m³ short-term exposure limit - Skin*

*Skin notation means that skin absorption of this material may add to the overall exposure. Avoid skin contact.

(OCCUPATIONAL CONTROL PROCEDURES continued on page 3)

OCCUPATIONAL CONTROL PROCEDURES *(continued)*

Airborne Exposure Limits (Continued): Chlorinated biphenyl (approximately 54% chlorine)

OSHA PEL: 0.5 mg/m³ 8-hour time-weighted average - Skin*
ACGIH TLV: 0.5 mg/m³ 8-hour time-weighted average - Skin*
1 mg/m³ short-term exposure limit - Skin*

**Skin notation means that skin absorption of this material may add to the overall exposure. Avoid skin contact.*

FIRE PROTECTION INFORMATION

Fire and Explosion: PCBs are fire-resistant compounds. They may decompose to form CO, CO_2, HCl, phenolics, aldehydes and other toxic combustion products under severe conditions such as exposure to flame or hot surfaces.

At temperatures in the range of 600-650°C in the presence of excess of oxygen PCBs may form polychlorinated dibenzofurans (PCDFs). Laboratory studies under similar conditions have demonstrated that PCBs do not produce polychlorinated dibenzo-p-dioxins (PCDDs).

PCBs in electrical equipment have been reported to produce both chlorinated dioxins (PCDDs) and furans (PCDFs) during fire situations. These combustion products may result all, or in part, from non-PCB components of the dielectric fluids or other combusted materials. Consult the equipment manufacturer for information regarding composition of the dielectric fluids in electrical apparatus.

Standard fire fighting wearing apparel and self-contained breathing apparatus should be worn when fighting fires that involve possible exposure to chemical combustion products. Fire fighting equipment should be thoroughly cleaned and decontaminated after use.

Federal regulations require all PCB transformers to be registered with fire response personnel.

If a PCB transformer is involved in a fire-related incident, the owner of the transformer may be required to report the incident. Consult and follow appropriate federal, state, and local regulations.

REACTIVITY DATA

PCBs are very stable, fire-resistant compounds.

HEALTH EFFECTS SUMMARY

Skin Contact: PCBs can be absorbed through intact skin. Local action on skin is similar to that of common organic solvents where contact leads to removal of natural fats and oils with subsequent drying and cracking of the skin. A potential exists for contracting chloracne.

Eye Contact: The liquid products and their vapors are moderately irritating to eye tissues.

Ingestion: The acute oral toxicities of the undiluted compounds are: LD_{50} rats—8.65 gm/kg for 42% chlorinated, and 11.9 gm/kg for 54% chlorinated—"slightly toxic."

Inhalation: Animal experiments of varying duration and at different air concentrations show that for similar exposure conditions, the 54% chlorinated material produces more liver injury than the 42% chlorinated material.

(HEALTH EFFECTS SUMMARY continued on page 4)

MATERIAL SAFETY DATA — Polychlorinated Biphenyls (PCBs)

HEALTH EFFECTS SUMMARY *(continued)*

Other: There are literature reports that PCBs can impair reproductive functions in monkeys. The National Cancer Institute performed a study in 1977 using Aroclor 1254 with both sexes of rats. NCI stated that the PCB, Aroclor 1254, was not carcinogenic under the conditions of their bioassay. There is sufficient evidence in the scientific literature to conclude that Aroclor 1260 can cause liver cancer when fed to rodents at high doses. Similar experiments with less chlorinated PCB products have produced negative or equivocal results.

The consistent finding in animal studies is that PCBs produce liver injury following prolonged and repeated exposure by any route, if the exposure is of sufficient degree and duration. Liver injury is produced first, and by exposures that are less than those reported to cause cancer in rodents. Therefore, exposure by all routes should be kept sufficiently low to prevent liver injury.

Numerous epidemiological studies of humans, both occupationally exposed and non-worker environmentally exposed populations, have not demonstrated any causal relationship between PCB exposures and chronic human illnesses such as cancer or neurological or cardiovascular effects. PCBs can cause dermatological symptoms; however, these are reversible upon removal of exposure source.

PCBs are identified as hazardous chemicals under criteria of the OSHA Hazard Communication Standard (29 CFR Part 1910.1200). PCBs have been listed in the International Agency for Research on Cancer (IARC) Monographs (1987)-Group 2A and in the National Toxicology Program (NTP) Annual Report on Carcinogens (Fourth).

PHYSICAL DATA

PROPERTIES OF SELECTED AROCLORS*

PROPERTY	1016	1221	1232	1242	1248	1254	1260
Color (APHA)	40	100	100	100	100	100	150
Physical state	mobile oil	mobile oil	mobile oil	mobile oil	mobile oil	viscous liquid	sticky resin
Stability	inert	inert	inert	inert	inert	inert	inert
Density (lb/gal 25°C)	11.40	9.85	10.55	11.50	12.04	12.82	13.50
Specific gravity x/15.5°C	1.36-1.37 x-25°	1.18-1.19 x-25°	1.27-1.28 x-25°	1.30-1.39 x-25°	1.40-1.41 x-65°	1.49-1.50 x-65°	1.55-1.56 x-90°
Distillation range (°C)	323-358	275-320	290-325	325-366	340-375	365-390	385-420
Acidity mg KOH/g, maximum	.010	.014	.014	.015	.010	.010	.014
Fire point (°C)	none to boiling point	176	238	none to boiling point	none to boiling point	none to boiling point	none to boiling point
Flash point (°C)	170	141-150	152-154	176-180	193-196	none	none
Vapor pressure (mm Hg @ 100°F)	NA	NA	0.005	0.001	0.00037	0.00006	NA
Viscosity (Saybolt Univ. Sec. @ 100°F) (centistokes)	71-81 13-16	38-41 3.6-4.6	44-51 5.5-7.7	82-92 16-19	185-240 42-52	1800-2500 390-540	— —

NA—Not Available

SPILL, LEAK & DISPOSAL INFORMATION

Cleanup and disposal of liquid PCBs and other PCB items are strictly regulated by the federal government. The regulations are found at 40 CFR Part 761. Consult these regulations as well as applicable state and local regulations prior to any disposal of PCBs, PCB items, or PCB-contaminated items.

If PCBs leak or are spilled, the following steps should be taken immediately:

All non-essential personnel should leave the leak or spill area.

The area should be adequately ventilated to prevent the accumulation of vapors.

The spill/leak should be contained. Loss to sewer systems, navigable waterways and streams should be prevented. Spills/leaks should be removed promptly by means of absorptive material, such as sawdust, vermiculite, dry sand, clay, dirt or other similar materials, or trapped and removed by pumping or other suitable means (traps, drip-pans, trays, etc.).

Personnel entering the spill or leak area should be furnished with appropriate personal protective equipment and clothing as needed. See Occupational Control Procedures section of this MSDS.

Personnel trained in the emergency procedures and protected against the attendant hazards should shut off sources of PCBs, clean up spills, control and repair leaks and fight fires in PCB areas.

All wastes and residues containing PCBs (e.g., wiping cloths, absorbent material, used disposable protective gloves, clothing, etc.) should be collected, placed in proper containers, marked and disposed of in the manner prescribed by EPA regulations (40 CFR Part 761) and applicable state and local regulations.

Various federal, state and local regulations may require immediate reporting of PCB spills and may also define spill clean-up levels. Consult your attorney or appropriate regulatory officials for information relating to spill reporting and spill clean-up.

ENVIRONMENTAL INFORMATION

Care should be taken to prevent entry of PCBs into the environment through spills, leakage, use, vaporization or disposal of liquids or solids. PCBs can accumulate in the environment and can adversely affect some animals and aquatic life. In general, PCBs have low solubility in water, are strongly bound to soils and sediments, and are slowly degraded by natural processes in the environment.

ADDITIONAL COMMENTS

Polychlorinated Biphenyls

For regulatory purposes, under the Toxic Substances Control Act the term "PCBs" refers to a chemical substance limited to the biphenyl molecule that has been chlorinated to varying degrees or any combination of substances which contain such substance (40 CFR Part 761).

Chemically, commercial PCBs are defined as a series of technical mixtures, consisting of many isomers and compounds that vary from mobile oily liquids to white crystalline solids and hard non-crystalline resins. Technical products vary in composition, in the degree of chlorination and possibly according to batch.

The mixtures generally used contain an average of 3 atoms of chlorine per molecule (42% chlorine) to 5 atoms of chlorine per molecule (54% chlorine). They are used as components of dielectric fluids in transformers and capacitors. Prior to 1972, PCB applications included heat transfer media, hydraulic and other industrial fluids, plasticizers, carbonless paper, paints, inks and adhesives.

In 1972 Monsanto restricted sales of PCBs to applications involving only closed electrical systems (transformers and capacitors). In 1977 all manufacturing and sales were voluntarily terminated. In 1979 EPA restricted the manufacture, processing, use, and distribution of PCBs to specifically exempted and authorized activities.

MATERIAL SAFETY DATA *Polychlorinated Biphenyls (PCBs)*

DATE: 10/1/88 **SUPERSEDES:** All prior to 10/1/88

FOR ADDITIONAL NON-EMERGENCY INFORMATION, CONTACT:

John H. Craddock
Product & Environmental Safety Director

Paul R. Michael
Product & Environmental Safety Manager

Environmental Policy Staff
Monsanto Company
800 North Lindbergh Boulevard
St. Louis, Missouri 63167
(314) 694-4764

INTEGRATED CHEMISTRIES, INC.
1970 Oakcrest Avenue, Suite 215
St. Paul, Minnesota 55113
612-636-2380 FAX 612-636-3106

PCB EXTRACTION SYSTEM

CAPSUR®

CAPSUR® is an aqueous-based solvent system developed specifically for the cleanup of Polychlorinated Biphenyl (PCBs) spills on solid surfaces. CAPSUR® has the capability of being applied as a foam blanket which allows application to overhead, vertical, and horizontal surfaces.

CAPSUR® is formulated to remove PCBs from concrete, asphalt and metal surfaces, and has demonstrated success on new and old spills. In laboratory tests and customer use, CAPSUR® has demonstrated extraction efficiencies greater than 85 percent. This efficiency rate translates into less work, less time, and less product usage than other PCB cleaning products.

CAPSUR® easily vacuums up from surfaces. Surfaces then are lightly rinsed with water, which also is vacuumed off. Easier removal results in lower labor cost. PCB cleanups with CAPSUR® use dramatically less product than other PCB remediation products, resulting in less hazardous material to dispose of after the cleanup.

CAPSUR® Benefits

- High Extraction Rate
- Lower Labor Cost
- Successful on New and Old Spills
- Widely Applicable

Integrated Chemistries, Inc. holds three patents for the product CAPSUR®: U.S. Patent No.4,792,413, No.4,844,745, and No.4,921,628.

Product Coverage

Application coverage rate will vary with surface porosity and operator proficiency.

The following are average coverage rates:

Porous Concrete = 125 sq. ft. per gallon
Asphalt = 175 sq. ft. per gallon
Metals = 200 sq. ft. per gallon

CAPSUR® is available in 5-and 55-gallon containers.

Painted surfaces should be patch tested prior to application as paint softening or discoloration may occur.

Emergency information regarding ingestion, skin contact, eye contact or inhalation is included in the Material Safety Data Sheet. If any of these emergencies occur, the Poison Control Emergency Response number is 1-800-228-5635.

For additional product information, contact:

INTEGRATED CHEMISTRIES, INC.
1970 Oakcrest Avenue, Suite 215
St. Paul, Minnesota 55113
612-636-2380 FAX 612-636-3106

Printed on recycled paper consisting of 50% waste paper, including 10% post-consumer fiber.

MATERIAL SAFETY DATA SHEET

IDENTITY: PCB EXTRACTION SYSTEM

PRODUCT NAME: CAPSUR®
U.S. PATENT NO. 4,792,413
U.S. PATENT NO. 4,844,745
U.S. PATENT NO. 4,921,628

SECTION I

INTEGRATED CHEMISTRIES, INCORPORATED
1970 Oakcrest Avenue, Suite #215
St. Paul, Minnesota 55113

Emergency Phone Number:
1-800-228-5635
Information Phone Number:
(612) 636-2380
ISSUE DATE: 04/17/93

SECTION II - Hazardous Ingredients/Identity Information

Hazardous Components	OSHA PEL	ACGIH TLV	CAS Number	%
Aromatic Hydrocarbon Mixture			64742-94-5	>25
*Naphthalene	10 ppm	10 ppm	91-20-3	<10
Trimethylbenzenes	25 ppm	25 ppm	2551-13-7	
*1,2,4-Trimethylbenzene		Not Established	95-63-6	<10
Ethylene glycol monobutyl ether	25 ppm (skin)	25 ppm (skin)	111-76-2	<10
Cyclohexanol	50 ppm	25 ppm (skin)	108-93-0	<10
Monoethanolamine	3 ppm	3 ppm	141-43-5	<10

* These chemicals are subject to the reporting requirements of SARA 313 and 40 CFR Part 372. The other materials (water and surfactants) in this product are not considered hazardous in accordance with the criteria of 29 CFR 1910.1200.

SECTION III - Physical Data

Boiling Point: 212 degrees F
Vapor Pressure: Negligible (mm hg)
Vapor Density: 4.8 (AIR = 1)
Solubility in Water: Moderate
Percent Volatile by Volume: 60%

Specific Gravity: 0.965-0.985 @ 60 degrees F (H_2O = 1)
Melting Point: < 0 degrees C
Evaporation Rate: <1(Butyl Acetate = 1)
Appearance/Odor: Clear purple liquid/ sassafras odor
pH: 11.0 (undiluted)

SECTION IV - Fire and Explosion Hazard Data

Flash Point:: 145°F (COC)

Flammable Limits: LEL: 0.5
(% Vol.) UEL: 6.0

Extinguishing Media: CO_2 - Foam - Dry Chemical
Special Fire Fighting Procedures: Self-contained breathing apparatus
Unusual Fire Explosion Hazards: Do not store or mix near strong oxidizing agents

SECTION V - Reactivity Data

Stability: Stable
Conditions to Avoid: Temperatures approaching flashpoint
Incompatibility: Rubber, plastic, strong acids, and strong oxidizing agents
Hazardous Decomposition Products: Thermal decomposition may yield oxides of carbon, nitrogen and sulfur
Hazardous Polymerization: Will not occur

SECTION VI - Health Hazard Data

Threshold Limit Value: Not established

Effects Of Overexposure: **INGESTION**: While this material has a low degree of toxicity, ingestion of excessive quantities may cause irritation of the digestive tract. Sign of nervious system depression (drowsiness, dizziness, loss of coordination and fatigue). Aspiration Hazard -- this material can enter lungs during swallowing or vomiting and cause lung inflammation and damage. **EYE CONTACT**: May cause eye irritation, direct contact with the liquid may cause stinging, tearing and redness. **SKIN CONTACT**: May cause skin irritation, and prolonged contact may cause redness, burning and drying and cracking of the skin. **INHALATION**: While this material has a low degree of toxicity, breathing high concentrations of vapors or mists may cause irritation of the nose and throat. Signs of nervous system depression (drowsiness, dizziness, loss of coordination and fatigue). Respiration symptoms associated with pre-existing lung disorders (asthma-like conditions) may be aggravated by exposure to this material. **CHRONIC EXPOSURE**: no information found.

Health Hazard Data continued on next page ...

Health Hazard Data continued ...

Emergency First Aid Procedures: **EXTERNAL**: Immediately cleanse affected areas by washing with mild soap and water. Immediately remove contaminated clothing and wash before reuse. If inhaled, remove to fresh air. If symptoms persist, seek medical attention immediately. If victim is not breathing, artificial respiration should be administered by qualified personnel. **EYES**: Immediately flush with plenty of cool running water. Remove contact lenses, if applicable. **GET EMERGENCY MEDICAL ATTENTION IMMMEDATELY. INTERNAL**: Call local Poison Control Center for assistance immediately. If victim is drowsy or unconscious, place on the left side with the head down. Do not give anything by mouth. If victim is conscious and alert, vomiting should be induced for ingestion of large amounts (more than 5 ounces in an adult) preferably with syrup of Ipecac under direction from a physician of Poison Center. Do not leave the victim unattended. **GET EMERGENCY MEDICAL ATTENTION IMMEDIATELY.**

NOTE: The above Health Hazard Data applies to contact with PENTAGONE itself, not the operating solutions in which it is used, which typically contain concentrated PCPs. In case of contact with the operating solution, follow treatment methods applicable for exposure to solutions of this type.

SECTION VII - Precautions for Safe Handling and Use

In case material is released or spilled: Contain spill. Soak up with inert absorbent. Place in a suitable container for disposal.

NOTE: These spill or leak procedures apply to it CAPSUR® self, not to the operating conditions in which it is used, which will contain PCPs. In case of a spill during cleanup operations, follow treatments applicable to PCP spills.

Waste Disposal Method:. Dispose of in accordance with all federal, state and local regulations.

SECTION VIII - Control Measures

Respiratory Protection: Respiratory protection may be necessary to minimize exposure to vapors, mists or aerosols. Use a respirator with OV cartridges. A HEPA filter may also be required under certain enclosed application conditions. **VENTILATION**: If current ventilation practices are not adequate for minimizing exposures, additional ventilation or exhaust systems may be required. Where explosive mixtures may be present, systems safe for such locations must be used. None generally required if using proper respiration protection. **SKIN PROTECTION**: Gloves suitable for

hydrocarbon use. **EYE PROTECTION**: Approved eye protection to safeguard against potential eye contact, irritation or injury is recommended. **OTHER**: Coveralls (Saranex-coated Tyvek is recommended) and neoprene boots or boot covers.

Handling and Storing: Keep containers closed when not in use. Do not store in contact with rubber or plastic. Store away from heat, sparks, and open flame.

> ORDER #: 28501 CUSTOMER #: 2621-00 ALL WASH OF SYRACUSE ORANGE BLOSSOM DE-
> Greaser QT

MATERIAL SAFETY DATA SHEET U.S. Dept of Labor

> PARISH MAINTENANCE SUPPLY CO
>
> MATERIAL SAFETY DATA SHEET U.S. DEPARTMENT OF LABOR
COMPLIES WITH USDL SAFETY AND HEALTH REGULATIONS, (29 CFR 1910.1200)
>
> **********
>
MANUFACTURER PRODUCT IDENTIFICATION
>
> ORANGE BLOSSOM DEGREASER QT
> 0040704
>

Copy of OSHA Form 174

IDENTITY (As Used on Label): ORANGE BLOSSOM

Section 1

Manufactured For:
PARISH MAINTENANCE SUPPLY CORP.
Address:
1015 E. HIAWATHA BLVD.
SYRACUSE, NY 13208

Emergency Telephone number
(215)926-4106
Telephone # for Information
(315)422-1495

Date Prepared: 11/21/86

Section 2-Hazardous Ingredients/Identity Information

Chemical Name/Common Name	CAS#	PERCENT	TLV(SOURCE)
1-METHYL-4-(1-METHYLETHENYL) CYCLOHEXENE(D-LIMONENE)	5989-27-5		SEE NOTE BELOW

NOTE: FEMA-GRAS; FDA GRAS; RIFM LISTS ACTIVE ORAL LD50(RAT) > 5000mg/kg,WHICH MAY BE CONSIDERED NON TOXIC. DERMAL LD50= >5000mg/kg(RAT). IRRITATION (DERMAL) IS MILD. THIS INGREDIENT IS LISTED AS HAZARDOUS BECAUSE OF ITS COMBUSTIBILITY (SEE BELOW).

Section 3 -Physical Data

Boiling Point: 350 F

Specific Gravity (H20=1): 0.91

Vapor Pressure (mm Hg): 1mm @ 20C

Evaporation Rate: ABOUT THE SAME (Butyl Acetate=1)

Vapor Density (Air=1): 4.70

Solubility in Water: EMULSIFIABLE

Appearance and Odor: BRILLIANT ORANGE CLEAR LIQUID WITH STRONG CITRUS ORANGE FRAGRANCE.

Section 4 -Fire and Explosion Hazard Data

Flash point (Method Used): 150F

Flammable Limits: C302F
LEL: 0.9 UEL: 7.0

Extinguishing Media: DRY POWDER, FOAM. CO2, OR HALOGEN TYPE.

Special Fire Fighting Procedures: KEEP FIRE EXPOSED CONTAINERS COOL WITH STR-

Section 6 -Health Hazard Data

Threshold Limit Value-Product: NOT APPLICABLE CONSIDERED NON-TOXIC

Primary Routes of Exposure: Eye_XX_ Skin____ Inhalation____ Ingestion_XX_

Signs and Symptoms of Exposure(Acute): CONTACT WITH EYES MAY RESULT IN SLIGHT TO MODERATE IRRITATION WITH REDDENING, TEARING AND SLIGHT BURNING SENSATION. CONTACT WITH SKIN HAS REPORTED NO KNOWN EFFECTS OR ABSORPTION OF MATERIAL (SEE SECTION 2) HARMFUL IF SWALLOWED! SYMPTOMS INCLUDE NAUSEA, VOMITING AND OTHER GASTRO-INTESTINAL DISTURBANCES. PROLONGED BREATHING OF VAPORS MAY CAUSE HEADACHES, NAUSEA OR DIZZINESS.

Signs and Sypmtoms of Exposure(Chronic): NONE REPORTED

Medical Conditions Generally Aggravated by Exposure: SKIN PROBLEMS SUCH AS DERMATITIS MAY BE AGGRAVATED WITH PROLONGED CONTACT WITH THIS PRODUCT.

Section 7-Emergency and First Aid Procedures

Eyes: FLUSH WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES. CALL PHYSICIAN IMMEDIATELY.

Skin: WASH FROM SKIN WITH WARM WATER. REMOVE ANY CONTAMINATED CLOTHING AND LAUNDER BEFORE REUSE. SEEK MEDICAL ATTENTION IF IRRITATION DEVELOPS OR IF SKIN PROBLEMS ARE AGGRAVATED.

Ingestion: DO NOT INDUCE VOMITING. CALL PHYSICIAN OR POISON CONTROL IMMEDIATELY.

Inhalation: REMOVE TO FRESH AIR AND MONITOR. SEEK MEDICAL ADVICE IF PROBLEMS DEVELOP.

Section 8- Special Protection Information

Respiratory Protection: NONE REQUIRED

Ventilation Requirements: LOCAL EXHAUST

Protective Gloves: RUBBER OR CHEMICAL RESISTANT.

Eye Protection: CHEMICAL GOGGLES WHERE MIST CONTACT OCCURS.

Other Protective Clothing: NOT GENERALLY REQUIRED.

Section 9-Spill or Leak Procedures

Steps to be Taken if Released or Spilled: CONTAIN SPILL TO PREVENT DISCHARGE INTO OPEN WATERWAYS. REMOVE ANY SOURCES OF IGNITION. USE ABSORBENT TO CONTAIN (DIRT, SAND OR OTHER) EXTREMELY SLIPPERY CONDITIONS WILL RESULT FROM SPILL.

Waste Disposal Methods: PICK UP WITH DAMP MOP, RAGS, AND PLACE INTO CONTAINER FOR SALVAGE. SMALL SPILLS MAY BE FLUSHED TO APPROVED SEWER SYSTEM WITH CLEAR WATER. CONSULT LOCAL, STATE, AND FEDERAL AGENCIES FOR DISPOSAL OF LARGER SPILLS.

Section 10-Storage and Handling Information

Precautions to be Taken in Handling and Storage: AVOID CONTACT WITH SKIN OR EYES. DO NOT TAKE INTERNALLY. USE WITH ADEQUATE VENTILATION. KEEP OUT OF THE REACH OF CHILDREN. WASH THOROUGHLY AFTER HANDLING.

HASP
APPENDIX B
UNDERGROUND/OVERHEAD UTILITIES CHECKLIST

UNDERGROUND/OVERHEAD UTILITY CHECKLIST

Project Name/Number _____ ***Date*** _____

Location _____

Prepared By _____ ***Project Manager*** _____

This checklist must be completed for any intrusive subsurface work such as excavation or drilling. It documents that overhead and underground utilities in the work are identified and located. The Project Manager shall request utility markouts before the start of field operations to allow the client and utility companies sufficient time to provide them. If complete information is not available, a magnetometer or other survey shall be performed to locate obstacles prior to intrusive subsurface activities.

Procedure

A diagram of the work area depicting the proposed location of intrusive subsurface work sites (i.e., boring locations, excavation locations) must be attached to this form. The diagram must clearly indicate the areas checked for underground structures/utilities, and overhead power lines. This form and the diagram must be signed by the Site Supervisor and the client representative.

Checklist

Type of Structure	Present	Not Present	Method of Markout
Electric Power Line			
Natural Gas Line			
Telephone Line			
Water Line			
Product Line			
Sewer Line			
Steam Line			
Drain Line			
Underground Tank			
Underground Cable			
Overhead Power Line			
Overhead Product			
Other (Specify)			

Client Representative _____ **Date** _____

Site Supervisor _____ **Date** _____

HASP
APPENDIX C
HEAT STRESS SAFETY

Appendix C - Heat Stress/Heat-Related Illnesses

Heat stress is caused by a number of interacting factors including environmental conditions, clothing, workload, etc., as well as the physical and conditioning characteristics of the individual. Since heat stress is one of the most common illnesses associated with hazardous waste sites, clean-up and/or corrective actions, heavy outdoor work conducted with direct solar load and, in particular, because wearing personal protective equipment can increase the risk of developing heat stress, workers must be capable of recognizing the signs and symptoms of heat-related illnesses. Personnel must be aware of the types and causes of heat-related illnesses and be able to recognize the signs and symptoms of these illnesses in both themselves and their co-workers.

Heat rashes are the one of the most common problems in hot work environments. Commonly known as prickly heat , a heat rash is manifested as red papules and usually appears in areas where the clothing is restrictive. As sweating increases, these papules give rise to a prickling sensation. Prickly heat occurs in skin that is persistently wetted by unevaporated sweat, and heat rash papules may become infected if they are not treated. In most cases, heat rashes will disappear when the affected individual returns to a cool environment.

Heat cramps are usually caused by performing hard physical labor in a hot environment. These cramps have been attributed to an electrolyte imbalance caused by sweating. It is important to understand that cramps can be caused both by too much and too little salt.

Cramps appear to be caused by the lack of water replenishment. Because sweat is a hypotonic solution (plus or minus 0.3% NaCl), excess salt can build up in the body if the water lost through sweating is not replaced. Thirst cannot be relied on as a guide to the need for water; instead, water must be taken every 15 to 20 minutes in hot environments.

Under extreme conditions, such as working for 6 to 8 hours in heavy protective gear, a loss of sodium may occur. Drinking commercially available carbohydrate-electrolyte replacement liquids is effective in minimizing physiological disturbances during recovery.

Heat exhaustion occurs from increased stress on various body organs due to inadequate blood circulation, cardiovascular insufficiency, or dehydration. Signs and symptoms include pale, cool, moist skin; heavy sweating; dizziness; nausea; headache, vertigo, weakness, thirst, and giddiness. Fortunately, this condition responds readily to prompt treatment.

Heat exhaustion should not be dismissed lightly, however, for several reasons. One is that the fainting associated with heat exhaustion can be dangerous because the victim may be operating machinery or controlling an operation that should not be left unattended; moreover, the victim may be injured when he or she faints. Also, the signs and symptoms seen in heat exhaustion are similar to those of heat stroke, which is a medical emergency.

Workers suffering from heat exhaustion should be removed from the hot environment, be given fluid replacement, and be encouraged to get adequate rest.

Heat stroke is the most serious form of heat stress. Heat stroke occurs when the body's system of temperature regulation fails and the body's temperature rises to critical levels. This condition is caused by a combination of highly variable factors, and its occurrence is difficult to predict.

Heat stroke is a medical emergency. The primary signs and symptoms of heat stroke are confusion; irrational behavior; loss of consciousness; convulsions; a lack of sweating (usually); hot, dry skin; and an abnormally high body temperature, e.g., a rectal temperature of 41 deg. C (105.8 deg. F). If body temperature is too high, it causes death. The elevated metabolic temperatures caused by a combination of work load and environmental heat load, both of which contribute to heat stroke, are also highly variable and difficult to predict.

If a worker shows signs of possible heat stroke, professional medical treatment should be obtained immediately. The worker should be placed in a shady area and the outer clothing should be removed. The worker's skin should be wetted and air movement around the worker should be increased to improve evaporative cooling until professional methods of cooling are initiated and the seriousness of the condition can be assessed. Fluids should be replaced as soon as possible. The medical outcome of an episode of heat stroke depends on the victim's physical fitness and the timing and effectiveness of first aid treatment.

Regardless of the worker's protestations, no employee suspected of being ill from heat stroke should not be sent home or left unattended unless a physician has specifically approved such an order.

Proper training and preventive measures will help avert serious illness and loss of work productivity. Preventing heat stress is particularly important because once someone suffers from heat stroke or exhaustion, that person may be predisposed to additional heat injuries.

Heat Stress Safety Precautions

Heat stress monitoring and work rest cycle implementation should commence when the ambient adjusted temperature exceeds 72 degrees Fahrenheit (°F). A minimum work rest regimen and procedures for calculating ambient adjusted temperature are described in the Table C-1.

Table C-1

WORK/REST SCHEDULE

ADJUSTED TEMPERATURE[b]	WORK-REST REGIMEN NORMAL WORK ENSEMBLE[c]	WORK-REST REGIMEN IMPERMEABLE ENSEMBLE
90°F (32.2°C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5°-90°F (30.8°-32.2°C)	After each 60 minutes of work	After each 30 minutes of work
82.5°-87.5°F (28.1°-30.8°C)	After each 90 minutes of work	After each 60 minutes of work
77.5°-82.5°F (25.3°-28.1°C)	After each 120 minutes of work	After each 90 minutes of work
72.5°-77.5°F (30.8°-32.2°C)	After each 150 minutes of work	After each 120 minutes of work

---

[a] For work levels of 250 kilocalories/hour (Light-Moderate Type of Work)

[b] Calculate the adjusted air temperature (ta adj) by using this equation: ta adj °F = ta °F + (13 x % sunshine). Measure air temperature (ta) with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow. (100 percent sunshine = no cloud cover and a sharp, distinct shadow; 0 percent sunshine = no shadows.)

[c] A normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.

[d] The information presented above was generated using the information provided in the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV) Handbook.

In order to determine if the work rest cycles are adequate for the personnel and specific site conditions additional monitoring of individuals heart rates will be conducted during the rest cycle. To check the heart rate, count the radial pulse for 30 seconds at the beginning of the rest period. If the heart rate exceeds 110 beats per minute, shorten the next work period by one-third and maintain the same rest period

Additional one or more of the following control measures can be used to help control heat stress and are mandatory if any site worker has a heart rate (measure immediately prior to rest period) exceeding of 115 beats per minute:

- Site workers will be encouraged to drink plenty of water and electrolyte replacement fluids throughout the day.
- On-site drinking water will be kept cool (50 to 60°F).
- A work regimen that will provide adequate rest periods for cooling down will be established, as required.
- All personnel will be advised of the dangers and symptoms of heat stroke, heat exhaustion, and heat cramps.
- Cooling devices such as vortex tubes or cooling vests should be used when personnel must wear impermeable clothing in conditions of extreme heat.
- Employees should be instructed to monitor themselves and coworkers for signs of heat stress and to take additional breaks as necessary.
- A shaded rest area must be provided. All breaks should take place in the shaded rest area.
- Employees must not be assigned to other tasks during breaks.
- Employees must remove impermeable garments during rest periods. This includes white Tyvek-type garments.
- All employees must be informed of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress disorders.

APPENDIX G
Waste Disposal Manifests

DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF HAZARDOUS SUBSTANCES REGULATION

HAZARDOUS WASTE MANIFEST

P.O. Box 12820, Albany, New York 12212

Please print or type. Do not Staple.

Form Approved OMB No. 2050-0039. Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA No. N Y D 0 0 0 6 3 1 9 9 4 Manifest Document No. 00727
2. Page 1 of 1

Information in the shaded areas is not required by Federal Law.

3. Generator's Name and Mailing Address: UNIVERSITY OF ROCHESTER 520 INTER CAMPUS DR. ROCHESTER, N.Y. 14627
4. Generator's Phone (716) 275-7647

A. State Manifest Document No. NY B 272505 6

B. Generator's ID ~~612 ELMWOOD AVE ROCHESTER, N.Y. 14642~~ SAME

5. Transporter 1 (Company Name): PAGE TRANSPORTATION
6. US EPA ID Number: N Y D 9 8 6 9 6 9 9 4 7

C. State Transporter's ID #16054 ME

D. Transporter's Phone (800) 233-2125

7. Transporter 2 (Company Name)
8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone ( )

9. Designated Facility Name and Site Address: CWM CHEMICAL SERVICES INC. 1550 BALMER ROAD MODEL CITY, NEW YORK 14107
10. US EPA ID Number: N Y D 0 4 9 8 3 6 6 7 9

G. State Facility's ID

H. Facility's Phone (716) 754-8231

GENERATOR

11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, NOS (POLYCHLORINATED BIPHENYLS) 9, UN 3077, PGIII	001	CM	est 07000	K	EPA PCB2 STATE B007
b.					EPA STATE
c.					EPA STATE
d.					EPA STATE

J. Additional Descriptions for Materials listed Above

a. POLYCHLORINATED BIPHENYLS
b.
c.
d.

K. Handling Codes for Wastes Listed Above

a. L
b.
c.
d.

15. Special Handling Instructions and Additional Information

2143/710

11a) GENERIC MDC008-BZ1431 EMERGENCY RESPONSE # (716) 275-3333
CWM W/O# BZ1431-MDC OUT OF SERVICE DATE 7/8/96 BRAD MILLER

SC 2520

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and state laws and regulations.

If I am a large quantity generator, I certify that I have program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR if I am a small generator, I have made a good faith effort to minimize my waste and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: MARVIN R STILLMAN Signature: Marvin R Stillman Mo. Day Year 07 31 96

TRANSPORTER

17. Transporter 1 (Acknowledgement of Receipt of Materials)

Printed/Typed Name: [illegible] Signature: [illegible] Mo. Day Year [illegible]

18. Transporter 2 (Acknowledgement of Receipt of Materials)

Printed/Typed Name Signature Mo. Day Year

FACILITY

19. Discrepancy Indication Space

7/3[illegible]K

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name: [illegible] Signature: [illegible] Mo. Day Year [illegible]

NY B 272505 6

For emergency call the National Response Center (800) 424-8802 and the N.Y. Dept. of Environmental Conservation (518) 457-7362

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

COPY 5—Generator—mailed by TSD facility

STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF HAZARDOUS SUBSTANCES REGULATION

HAZARDOUS WASTE MANIFEST

P.O. Box 12820, Albany, New York 12212

Please print or type. Do not Staple.

Form Approved. OMB No. 2050-0039 Expires: 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA No. NYD099681994 — Manifest Document No. 000730

2. Page 1 of 1 — Information in the shaded areas is not required by Federal Law.

3. Generator's Name and Mailing Address: UNIVERSITY OF ROCHESTER, 520 INTER CAMPUS DR., ROCHESTER, N.Y. 14627

4. Generator's Phone (716) 275-7647

A. State Manifest Document No. NY B272509 2

B. Generator's ID 612 ELMWOOD AVE Rochester, N.Y. 14642

5. Transporter 1 (Company Name): PAGE TRANSPORTATION — 6. US EPA ID Number: NYD986990947

C. State Transporter's ID

D. Transporter's Phone (800) 233-2126

7. Transporter 2 (Company Name) — 8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone ( )

9. Designated Facility Name and Site Address: CWM CHEMICAL SERVICES INC., 1550 BALMER ROAD, MODEL CITY, NEW YORK 14107 — 10. US EPA ID Number: NYD049836679

G. State Facility's ID

H. Facility's Phone 716) 754-8231

11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, NOS (POLYCHLORINATED BIPHENYLS) 9, UN 3077, PGIII	001	CM	0.5 EST	K	EPA PCB2 5059
b.					EPA / STATE
c.					EPA / STATE
d.					EPA / STATE

J. Additional Descriptions for Materials listed Above: a. POLYCHLORINATED BIPHENYLS

K. Handling Codes for Wastes Listed Above: a. [L]

15. Special Handling Instructions and Additional Information

11a) GENERIC NDC008-BZ1431 — EMERGENCY RESPONSE #(716) 275-3333
CWM W/O# BZ1431-MDC — OUT OF SERVICE DATE 7/8/96 BRAD MILLER

11n) ERG# 31 C-318

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and state laws and regulations.

If I am a large quantity generator, I certify that I have program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR if I am a small generator, I have made a good faith effort to minimize my waste and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name	Signature	Mo.	Day	Year
Brad Miller		08	01	96

17. Transporter 1 (Acknowledgement of Receipt of Materials)

Printed/Typed Name	Signature	Mo.	Day	Year

18. Transporter 2 (Acknowledgement of Receipt of Materials)

Printed/Typed Name	Signature	Mo.	Day	Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Mo.	Day	Year
Ted Harris		08	01	96

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

COPY 5—Generator—mailed by TSD facility

NY B 272509 2

DIVISION OF HAZARDOUS SUBSTANCES REGULATION

HAZARDOUS WASTE MANIFEST

P.O. Box 12820, Albany, New York 12212

Please print or type. Do not Staple.

Form Approved OMB No. 2050-0039. Expires [illegible]

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA No. NYD000000000 Manifest Document No. 00752
2. Page 1 of 1

Information in the shaded areas is not required by Federal Law.

3. Generator's Name and Mailing Address: UNIVERSITY OF ROCHESTER, 520 INTER CAMPUS DR., ROCHESTER, N.Y. 14627
4. Generator's Phone (716) 275-7647

A. State Manifest Document No. NY B 272508 3

B. Generator's ID SAME ~~612 ELMWOOD AVE ROCHESTER N.Y. 14642~~

5. Transporter 1 (Company Name): ~~PAGE TRANSPORATION~~
6. US EPA ID Number: NYD986969947

C. State Transporter's ID [illegible]

D. Transporter's Phone (800) 233-2126

7. Transporter 2 (Company Name)
8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone ( )

9. Designated Facility Name and Site Address: CWM CHEMICAL SERVICES INC., 1550 BALMER ROAD, MODEL CITY, NEW YORK 14107
10. US EPA ID Number: NYD049836679

G. State Facility's ID

H. Facility's Phone (716) 754-8231

11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, NOS (POLYCHLORINATED BIPHENYLS) 9, UN 3077, PGIII	001	CM	est: 07000	K	EPA; STATE B007
b.					EPA; STATE
c.					EPA; STATE
d.					EPA; STATE

J. Additional Descriptions for Materials listed Above: a POLYCHLORINATED BIPHENYLS; b; c; d

K. Handling Codes for Wastes Listed Above: a L; b; c; d

874577C

15. Special Handling Instructions and Additional Information

11a) GENERIC MDC008-BZ1431 EMERGENCY RESPONSE #(716) 275-3333
CWM W/O# BZ143-MDC OUT OF SERVICE DATE 7/8/96 BRAD MILLER
11a) ERG # 31 SC 2004

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and state laws and regulations.

If I am a large quantity generator, I certify that I have program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR if I am a small generator, I have made a good faith effort to minimize my waste and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: Brad Miller Signature: Brad Miller Mo. Day Year: 08 02 96

17. Transporter 1 (Acknowledgement of Receipt of Materials)

Printed/Typed Name: Robert L Taylor Signature: Robert L Taylor Mo. Day Year: [illegible]

18. Transporter 2 (Acknowledgement of Receipt of Materials)

Printed/Typed Name Signature Mo. Day Year

19. Discrepancy Indication Space

[illegible] 7031K

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name: Ellen J Canton Signature: Ellen Canton Mo. Day Year: [illegible]

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete

COPY 5—Generator—mailed by TSD facility

IN CASE OF EMERGENCY OR SPILL, IMMEDIATELY CALL THE NATIONAL RESPONSE CENTER (800) 424-8802 AND THE N.Y. DEPT. OF ENVIRONMENTAL CONSERVATION [illegible]

NC717 0 INC 5

APPENDIX H
Certificates of Disposal

Waste Management, Inc.

CWM Chemical Services, Inc. Phone 716/754-8231
1550 Balmer Rd.
P.O. Box 200
Model City, N.Y. 14107

Federal EPA ID: NYD049836679

UNIVERSITY OF ROCHESTER
ATTN: MANIFEST SECTION
NYD000631994
520 INTER CAMPUS DR.
ROCHESTER NY 14627

CERTIFICATE OF DISPOSAL

CWM Chemical Services, Inc. has received waste material from UNIVERSITY OF ROCHESTER on 07/31/96 as described on Hazardous Waste Manifest number NYB2725056 Sequence number 01. CWM Chemical Services, Inc., hereby certifies that the above described material was landfilled in accordance with the 40 CFR part 761 as it pertains to the land disposal of polychlorinated biphenyl contaminated materials.

Profile Number: BZ1431
CWM Tracking ID: 8145171001
CWM Unit #: 1*0
Disposal Date: 07/31/96

Under civil and criminal penalties of law for the making or submission of false or fraudulent statements or representations (18 U.S.C 1001 and 15 U.S.C. 2615) I certify that the information contained in or accompanying this document is true accurate and complete. As to the identified section(s) of this document for which I cannot personally verify truth and accuracy, I certify as the company official having supervisory responsibility for the persons who, acting under my direct instructions, made the verification that this information is true accurate and complete.

Kathleen D. Morrison

KATHLEEN D. MORRISON
RECORDS DEPT. SUPERVISOR
Certificate # 64759
08/01/96

Waste Management, Inc.

CWM Chemical Services, Inc. Phone 716/754-8231
1550 Balmer Rd.
P.O. Box 200
Model City, N.Y. 14107

Federal EPA ID: NYD049836679

UNIVERSITY OF ROCHESTER
ATTN: MANIFEST SECTION
NYD000631994
520 INTER CAMPUS DR.
ROCHESTER NY 14627

CERTIFICATE OF DISPOSAL

CWM Chemical Services, Inc. has received waste material from UNIVERSITY OF ROCHESTER on 08/01/96 as described on Hazardous Waste Manifest number NYB2725092 Sequence number 01. CWM Chemical Services, Inc., hereby certifies that the above described material was landfilled in accordance with the 40 CFR part 761 as it pertains to the land disposal of polychlorinated biphenyl contaminated materials.

Profile Number: BZ1431
CWM Tracking ID: 8145177901
CWM Unit #: 1*0
Disposal Date: 08/01/96

Under civil and criminal penalties of law for the making or submission of false or fraudulent statements or representations (18 U.S.C 1001 and 15 U.S.C. 2615) I certify that the information contained in or accompanying this document is true accurate and complete. As to the identified section(s) of this document for which I cannot personally verify truth and accuracy, I certify as the company official having supervisory responsibility for the persons who, acting under my direct instructions, made the verification that this information is true accurate and complete.

Kathleen D. Morrison

KATHLEEN D. MORRISON
RECORDS DEPT. SUPERVISOR
Certificate # 64832
08/02/96

Waste Management, Inc.

CWM Chemical Services, Inc. Phone 716/754-8231
1550 Balmer Rd.
P.O. Box 200
Model City, N.Y. 14107

Federal EPA ID: NYD049836679

UNIVERSITY OF ROCHESTER
ATTN: MANIFEST SECTION
NYD000631994
520 INTER CAMPUS DR,
ROCHESTER NY 14627

CERTIFICATE OF DISPOSAL

CWM Chemical Services, Inc. has received waste material from UNIVERSITY OF ROCHESTER on 08/02/96 as described on Hazardous Waste Manifest number NYB2725083 Sequence number 01. CWM Chemical Services, Inc., hereby certifies that the above described material was landfilled in accordance with the 40 CFR part 761 as it pertains to the land disposal of polychlorinated biphenyl contaminated materials.

Profile Number: BZ1431
CWM Tracking ID: 8145184601
CWM Unit #: 1*0
Disposal Date: 08/02/96

Under civil and criminal penalties of law for the making or submission of false or fraudulent statements or representations (18 U.S.C 1001 and 15 U.S.C. 2615) I certify that the information contained in or accompanying this document is true accurate and complete. As to the identified section(s) of this document for which I cannot personally verify truth and accuracy, I certify as the company official having supervisory responsibility for the persons who, acting under my direct instructions, made the verification that this information is true accurate and complete.

Kathleen D. Morrison

KATHLEEN D. MORRISON
RECORDS DEPT. SUPERVISOR
Certificate # 64897
08/05/96