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Wehran EMCON
Northeast

ADIRONDACK STEEL

WORKPLAN

comments for
Dilshad Perwin

ONLY PCBs
IN CONSENT

March 1995

Wehran-New York, Inc.
Grand Island, New York

DO Lead INORGANICS
Copper
on soil

Environmental Engineers · Scientists · Constructors

ADIRONDACK STEEL
REMEDIAL SAMPLING AND CLEANUP PLAN

Prepared For

TIMMONS CORPORATION

Stearns Road

Keene, New Hampshire 04331

Prepared By

WEHRAN-NEW YORK, INC.

1775 Baseline Road

Grand Island, New York 14072

Project No. 04862.WP

March 1995

Wehran EMCON
Northeast

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March 17, 1995
Project 04862.WP

Mr. Dilshad J. Perera
USEPA, Region II
Woodbridge Avenue
MS 211
Edison, New Jersey 08837

Re: Work Plan for PCB Remediation
at the Former Adirondack Steel Facility
Town of Colonie
Albany, New York

Dear Mr. Perera:

On behalf of Timmons Corporation, Wehran-New York, Inc. (EMCON) is submitting this Remedial Sampling and Cleanup Plan to the USEPA in support of a remedial effort to be conducted at the former Adirondack Steel Facility in the Town of Colonie, Albany County, New York. The remedial action is being conducted pursuant to a request by the USEPA as a follow-up to an initial USEPA response to a spill of transformer oil containing polychlorinated biphenyls (PCBs) in 1993.

This plan provides for the delineation of the areas requiring remediation as well as the general approach to be taken following delineation.

If there are any questions on the Work Plan or additional detail is required, please do not hesitate to contact the undersigned.

Sincerely,

EMCON

David B. Thompkins

David B. Thompkins
Senior Scientist

Kenneth C. Malinowski, Ph.D.
Office Director

Attachments

ENE-G11J:\PROJ\04862\COVERLTR.DOC-94\jviola:1

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APPENDICES

1.0 INTRODUCTION

On behalf of Timmons Corporation, Wehran-New York, Inc. (Wehran) is submitting this Remedial Sampling and Cleanup Plan to the USEPA in support of a remedial effort to be conducted at the former Adirondack Steel facility in the Town of Colonie, Albany County, New York. The remedial action is being conducted pursuant to a request by the USEPA as a follow-up to an initial USEPA response to a spill of transformer oil containing polychlorinated biphenyls (PCBs) in 1993.

This plan provides for the delineation of the areas requiring remediation as well as the general approach to be taken following delineation.

Additional sampling has been requested by the USEPA to identify which areas will require remedial action. Areas to be investigated were identified based on Wehran's review of existing site data and observations made during a recent site inspection performed by Wehran with Mr. Dilshad J. Perera of USEPA Region II.

2.0 SITE AND PROJECT DESCRIPTION

The Adirondack Steel foundry is located at 191 Watervliet Shaker Road in the Town of Colonie, Albany County, New York. The site is located in an industrial area bounded by Watervliet Shaker Road to the south, undeveloped and residential properties to the north and the D&H Railroad to the east.

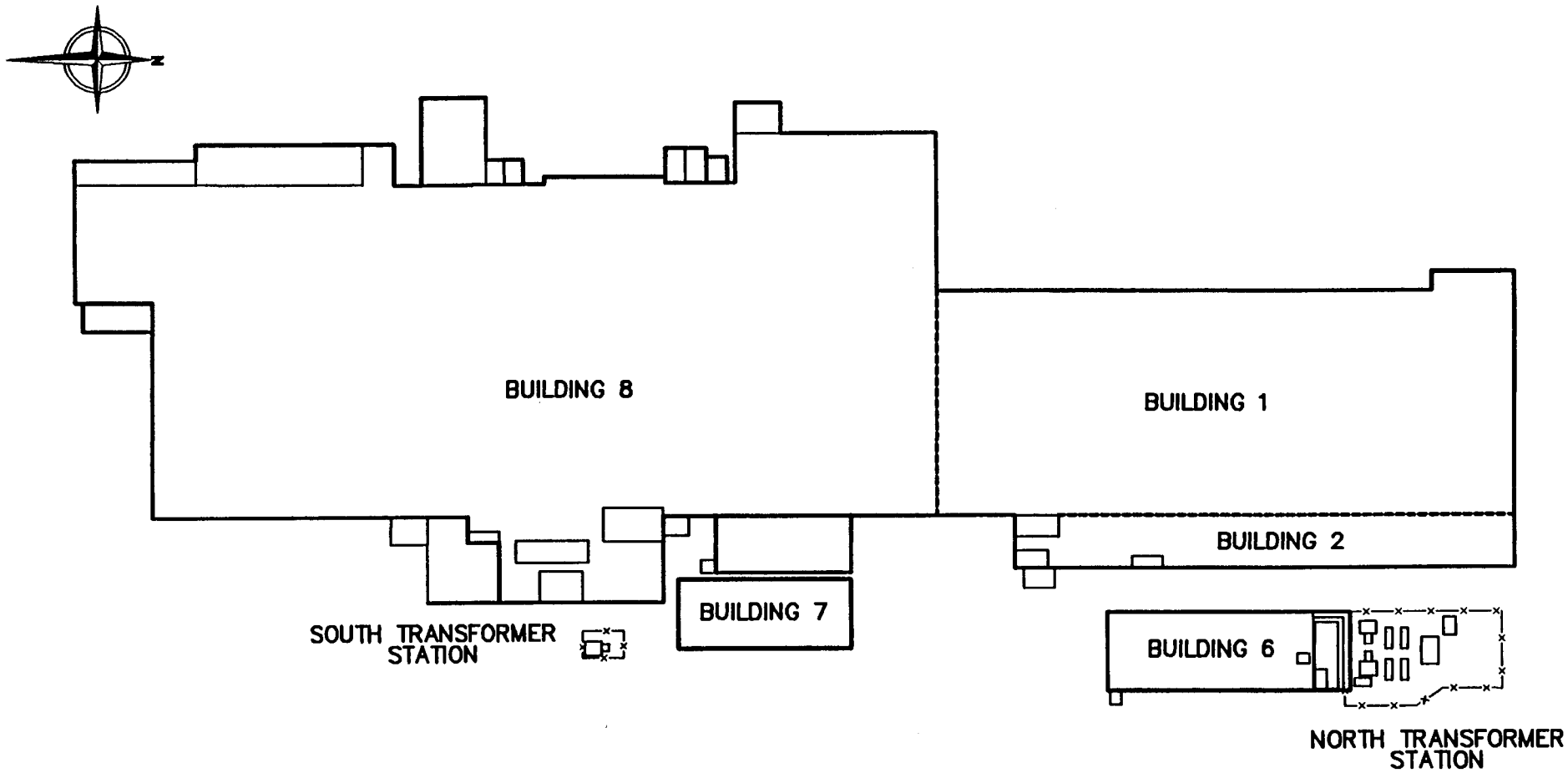
The site includes an approximately 140,000 square-foot foundry building (Building 8), and 12 smaller support (stand-alone) buildings (Figure 1). The main building was used as a steel casting foundry from 1918 to 1987. The interior of Buildings 7 and 8 contains a concrete floor with several inches of foundry sand covering the floor. Timmons Corporation purchased the site in 1989.

Electric power was delivered to the facility via overhead power lines to an outdoor transformer substation located on the northeast side of the main foundry building. The power was then directed to an interior transformer substation, which served the electric arc furnaces inside the main foundry building, and to another outdoor transformer substation located on the east side of the foundry building. Most, if not all, of the transformers in the outdoor substations were insulated with dielectric fluid which contained polychlorinated biphenyls (PCBs). The interior substation transformers contained dielectric fluid, but they were removed from the site in 1988.

Some time after the end of foundry operations at the facility, approximately 300 gallons of dielectric fluid containing PCBs were drained from electrical transformers onto the ground, contaminating the area around the northern transformer pad as well as sections of the floor of the foundry building itself.

What about other pad

On February 5, 1993, USEPA issued an Action Memorandum for stabilization activities at the site. USEPA then excavated approximately 70 yards of soils contaminated with PCBs at the site, and placed them into Building 7 at the site pending proper disposal. In addition, USEPA drained the transformers that still contained PCB-contaminated oil into drums, and staged the drums in Building 7 also. Some of the drums, that had been previously packed during a NYSDEC cleanup response, were moved by USEPA into this



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DWN K.A.S.
APP D.B.T.
REV

ADIRONDACK STEEL
REMEDIATION PROJECT
SHAKER ROAD, WATERVLIET, NEW YORK

SITE PLAN

FIGURE
1
PROJECT NO.
04862.WP

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Scale: 1" = 1.0000 Date: 3/1/95 Time: 4:28 PM Operator: <unknown>

building. Some of the drums containing PCB-contaminated materials have leaked onto the concrete floor in the building.

At the direction of USEPA, Timmons Corporation has been directed to complete the following remedial actions:

A. Excavate and dispose of all PCB-contaminated soil exhibiting a concentration of 10 ppm PCBs or greater.

B. Decontaminate concrete pads at the base of the northern and southern transformer substations.

C. Decontaminate transformer units to remove residual dielectric fluid at the northern and southern transformer substations.

D. Evaluate all sump systems inside buildings for potential PCB contamination and remove and dispose of material in excess of 50 ppm PCBs. contradiction? with info above

E. Dispose of PCB-contaminated soil and dielectric fluid previously secured by USEPA.

F. Backfill the areas of excavation with certified clean backfill.

G. Decontaminate concrete floors in the buildings at the site where the drums of PCB-contaminated material leaked.

confirmatory sampling?

3.0 DATA QUALITY OBJECTIVES

Data generated during this remedial effort will be used to evaluate the vertical and horizontal extent of contamination in areas identified or suspected as having surficial PCB concentrations above 10 ppm, and to verify the cleanup criteria (10 ppm, New York State industrial property guideline) has been met following remediation.

Data Quality Objectives (DQOs) are qualitative and quantitative statements which specify the quality of the data required to support decisions made during remedial investigation and construction activities and are based on the end uses of the data to be collected. As such, different data uses may require different levels of data quality. There are five analytical levels which address various data uses and the QA/QC effort and methods required to achieve the desired level of quality. These levels are:

- ***Screening (DQO Level 1).*** This provides the lowest data quality but the most rapid results. It is often used for health and safety monitoring at the site, initial site characterization to locate areas for subsequent and more accurate analyses, and for engineering screening of alternatives (bench-scale tests). These types of data include those generated on site through the use of HNu, pH, conductivity, and other real-time monitoring equipment at the site.
- ***Field Analyses (DQO Level 2).*** This provides rapid results and better quality than in Level 1. This level may include mobile lab-generated data depending on the level of quality control exercised. Field measurements such as pH, conductivity, and dissolved oxygen must be accurately calibrated so as to provide Level 2 data.
- ***Engineering (DQO Level 3).*** This provides an intermediate level of data quality and is used for site characterization. Engineering analyses may include mobile lab-generated data and some analytical lab methods (e.g., laboratory data

with quick turnaround used for screening but without full quality control documentation).

- ***Confirmational (DQO Level 4).*** This provides the highest level of data quality and is used for purposes of risk assessment, evaluation of remedial alternatives and Potential Responsible Party (PRP) determination. These analyses require full Contract Laboratory Program (CLP) analytical and data validation procedures in accordance with USEPA-recognized protocols. All samples collected for routine CLP laboratory analysis will provide Level 4 data.
- ***Non-Standard (DQO Level 5).*** This refers to analyses by non-standard protocols, for example, when exacting detection limits or analysis of an unusual chemical compound is required. These analyses often require method development or adaptation. The level of quality control is usually similar to DQO Level 4 data.

All confirmatory laboratory analyses performed during the investigative phase of this project will follow the methods specified in SW-846 for the analysis of PCBs (USEPA Method 8080). Conformance with all quality assurance and quality control protocols specified in SW-846 will provide a high level of data quality for all confirmatory laboratory analyses of PCBs at the 10 ppm level, without the expense of CLP and data validation procedures. Field measurements and PCB field screening will be equivalent to DQO Level 2. All confirmatory analyses performed during the remediation phase of this project will follow USEPA CLP protocols. In addition, data will undergo data validation procedures. Further detail concerning the quality assurance/quality control (QA./QC) measures that will be followed during the collection and analysis of samples is described in the Quality Assurance Project Plan (QAPP) found in Appendix A.

ok ?
Alec.

4.0 ANALYTICAL TESTING

All confirmatory laboratory analyses will be completed by a New York State Department of Health (NYSDOH) approved laboratory following the procedures in the QAPP (Appendix A).

For purposes of delineating the extent of contamination at the site, the Envirogard and/or ENSYS PCB Test Kit will be utilized. The application of this immunoassay procedure for determining the presence or absence of PCBs above or below a specified level (i.e., 10 ppm) is outlined in Section 6.3. The SOP for this bioassay methodology is presented in the QAPP (Appendix A). Specific QA/QC procedures for this method are also provided in the QAPP.

5.0 SITE WORK

In order to render the Adirondack Steel site a useful and productive property, four phases of work are required for the site. First, and prior to remediation, it is necessary to provide additional characterization of the site. This work is outlined in Section 5.1 - PCB Investigation. The second through third phases - Site Remediation, Decontamination, and Disposal Activities are outlined in Sections 5.2, 5.3, and 5.4, respectively.

5.1 PCB INVESTIGATION

Contamination at the site is suspect in five locations. Consequently, this work plan has been focused at these five locations. These areas include the following:

- Interior areas of Buildings 8 and 1
- Southern end of Building 2
- The north end of Building 6 and the fenced transformer area located north of Building 6
- The interior of Building 7
- The transformer pad south of Building 7

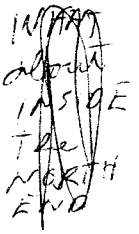
e How about the PCBs found in the drainage swale on East side of plant west of RR.

The emphasis of this work plan is to address the sampling and clean up of these five areas. Work efforts described throughout the work plan will refer to these five areas described above.

The goal of the investigative site work is to identify and delineate areas of PCB contamination both inside and outside of Buildings 1, 2, and 8, as well as near the north and south transformer stations. As part of this work, the location of sumps, pits and subsurface piping will be identified, mapped, and, if necessary, sampled.

- ***Buildings 8 and 1***

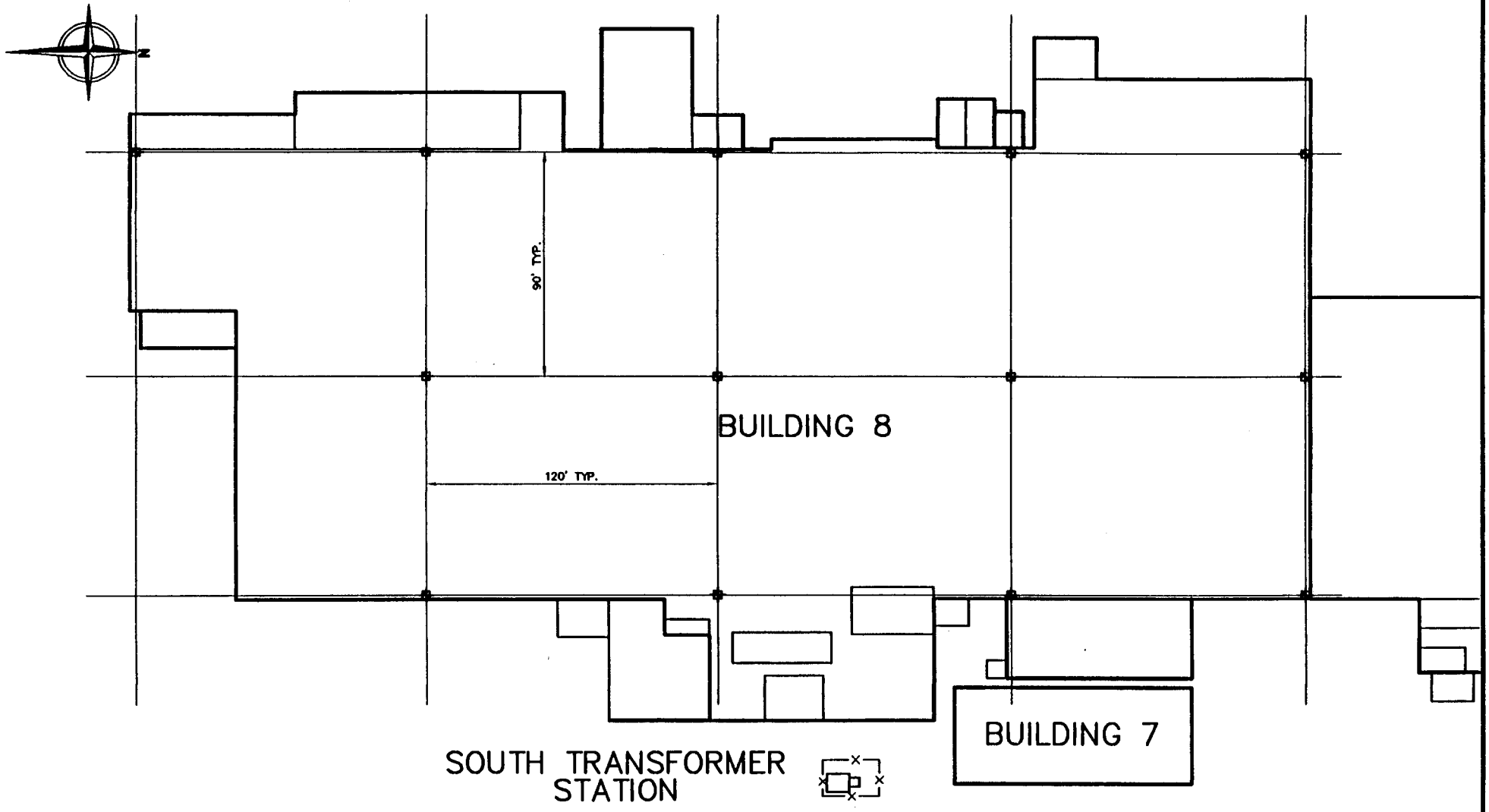
Since most of the floor surface of these buildings are covered with foundry sands over the concrete floor, field screening/sampling of both media may be required. Field screening of sands and/or the concrete floor will consist of visual examination of the media for any evidence of staining. If staining is encountered, field notes will be taken to document the location. Also at locations where staining is encountered, foundry sands will be collected by methods described in Section 6.2 (Soil Sampling Procedure) for immunoassay analysis. If staining of the concrete surface is present at these same locations, concrete cores will be collected by methods described in Section 6.4 (Cement Core Sampling Procedure). Field screening will occur on a 120 x 90 foot grid pattern superimposed over the interior of the building (Figure 2). At the discretion of the field technicians, some samples may be biased towards stained areas. This pattern will result in a maximum of 15 samples from inside Building 8 and a maximum of six samples in Building 1 being analyzed (Figure 3).



- ***Building 6 and Northern Transformer Area***

Current data indicate that soils inside the fenced enclosure north of Building 6 exceed the clean-up goal of 10 ppm and require removal. Subsequently, samples will be obtained from the outside perimeter of the fenced area and submitted for immunoassay analyses to determine the horizontal extent based on a 10-foot grid interval (first sample will be 5 feet) emanating outward in 45° radial arcs from the fence. When two consecutive samples are obtained below the 10 ppm level, sampling in that direction will be terminated. Sampling direction will be based on 45° arc from the center of the Transformer Area (Figure 4).

To determine the amount of soil which will require removal in this Area, it will also be necessary to define the depth at which the PCBs have migrated. To accomplish this task, subsurface field screening of soils will be conducted at each sample location by advancing a boring downward at six-inch intervals to document the vertical migration of PCBs in excess



LEGEND:

SAMPLE LOCATION

0 40 80

SCALE IN FEET

EMCON

DATE 3/95
DWN K.A.S.
APP D.B.T.
REV

ADIRONDACK STEEL
REMEDIATION PROJECT
SHAKER ROAD, WATERVLIET, NEW YORK

BUILDING 8 SAMPLING PLAN

FIGURE 2

PROJECT NO. 04862.WP

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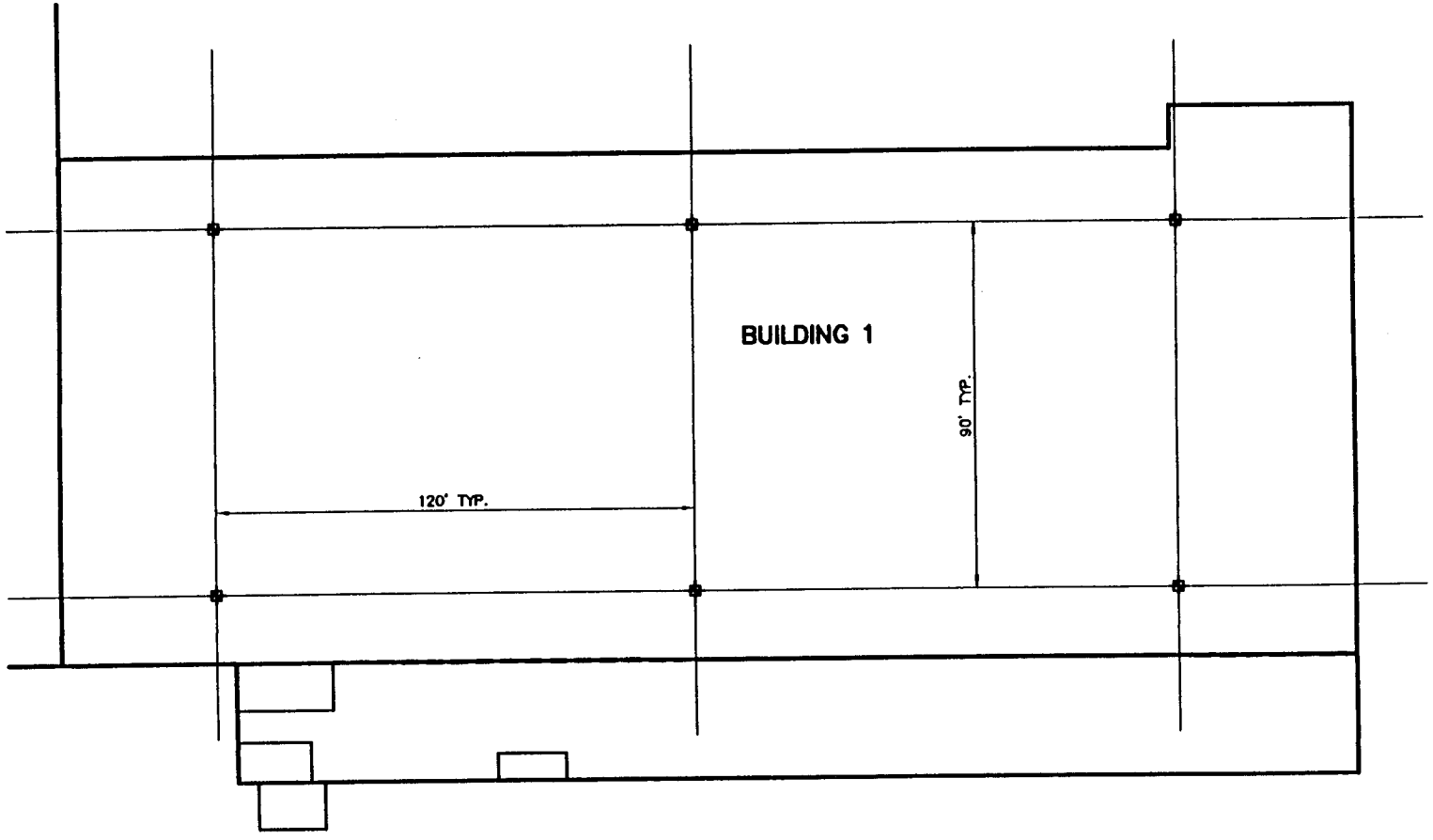
Scale: 1 = 40.0000 Date: 3/15/95 Time: 3:04 PM Operator: HSCHUBER



LEGEND:

⌖ SAMPLING LOCATION

0 30 60

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ADIRONDACK STEEL
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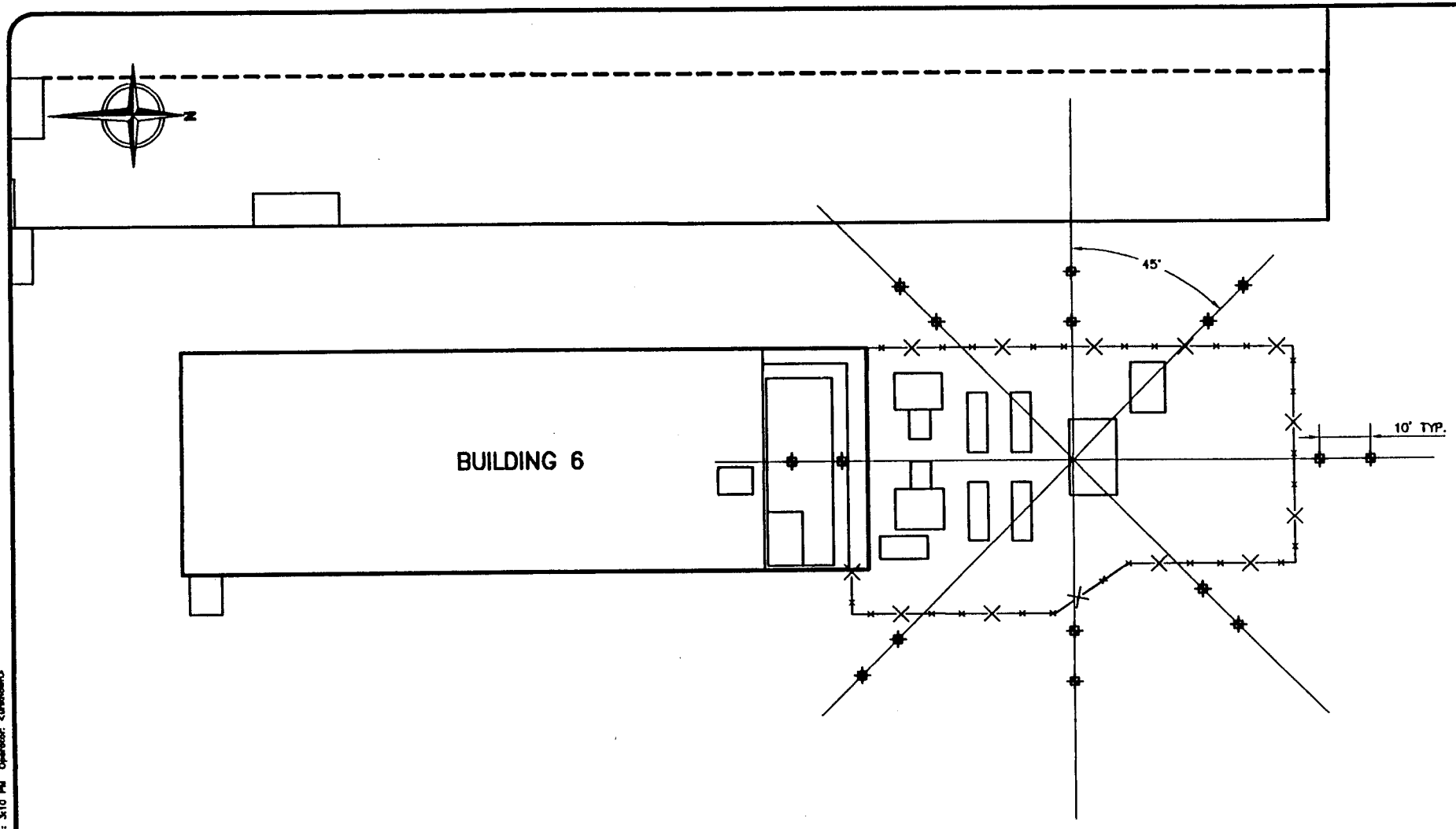
SHAKER ROAD, WATERVLIET, NEW YORK

SAMPLING LOCATION BUILDING 1

FIGURE 3

PROJECT NO. 04862.MP



LEGEND:

SAMPLING LOCATION

FENCE

0 20 40

SCALE IN FEET

EMCON

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SHAKER ROAD, WATERVLIET, NEW YORK

SAMPLING LOCATION BUILDING 6

FIGURE
4
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of 10 ppm. No sampling or analysis is proposed at these locations unless field indications (i.e., staining, odor, sheen) reveal the presence of oils.

Up to four samples will also be obtained and analyzed via immunoassay analysis inside Building 6 of any fluids located in sumps, stained concrete or other visual indications of staining. Existing data indicate that only the sump contains residual PCBs in excess of 10 ppm.

Following completion of the sampling effort, a detailed sketch and volume estimate will be prepared to estimate the volume of contaminated material to be removed.

- ***Building 2***

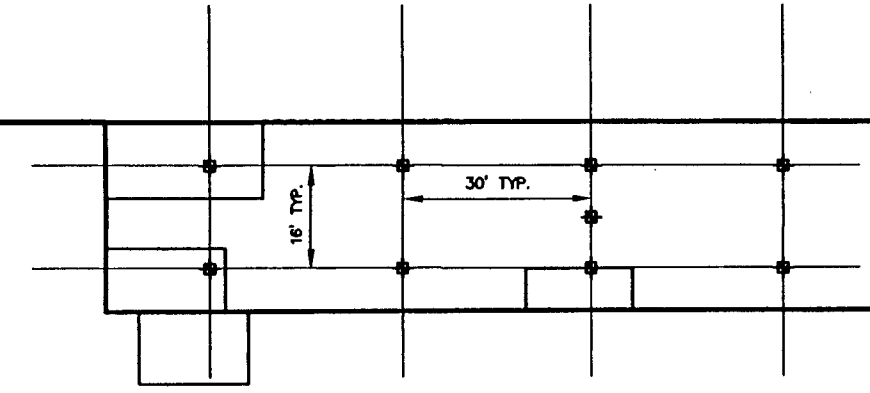
Although Building 2 is attached to Building 1, it will be treated as a discrete entity. The interior (foundry sands and concrete floor) of the building will be screened and sampled on a 30 x 16-foot grid system using procedures described for Building 8 to delineate the extent of contamination (Figure 5). Transformer equipment will be reclaimed as described in Section 5.4 3.

- ***Transformer Oil Drum Sampling***

Prior to transporting the drums of transformer oil off site, each drum will be sampled to determine the off site disposal requirements of each drum. Drums will be marked with an identification number to correspond to the sample ID. If drums are composited, a relative portion of each drum will be used to make up each sample. The ENSYS PCB Waste Liquid Test Kit will be used for the drum sampling. Confirmatory testing via Method 8080 will be employed for drums whose contents indicate PCB concentrations of less than 50 ppm. Procedures used to sample the drums are presented in Section 6.6.

- ***South Transformer Station***

Existing data indicate that soils in this area are below the 10 ppm action level for this site. However, to substantiate this data, soils outside the fence will be field-screened



BUILDING 2

LEGEND:

SAMPLING LOCATION

0 20 40

SCALE IN FEET

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REMEDIATION PROJECT
SHAKER ROAD, WATERVLIET, NEW YORK

SAMPLING LOCATION BUILDING 2

FIGURE 5

PROJECT NO. 04862.WP

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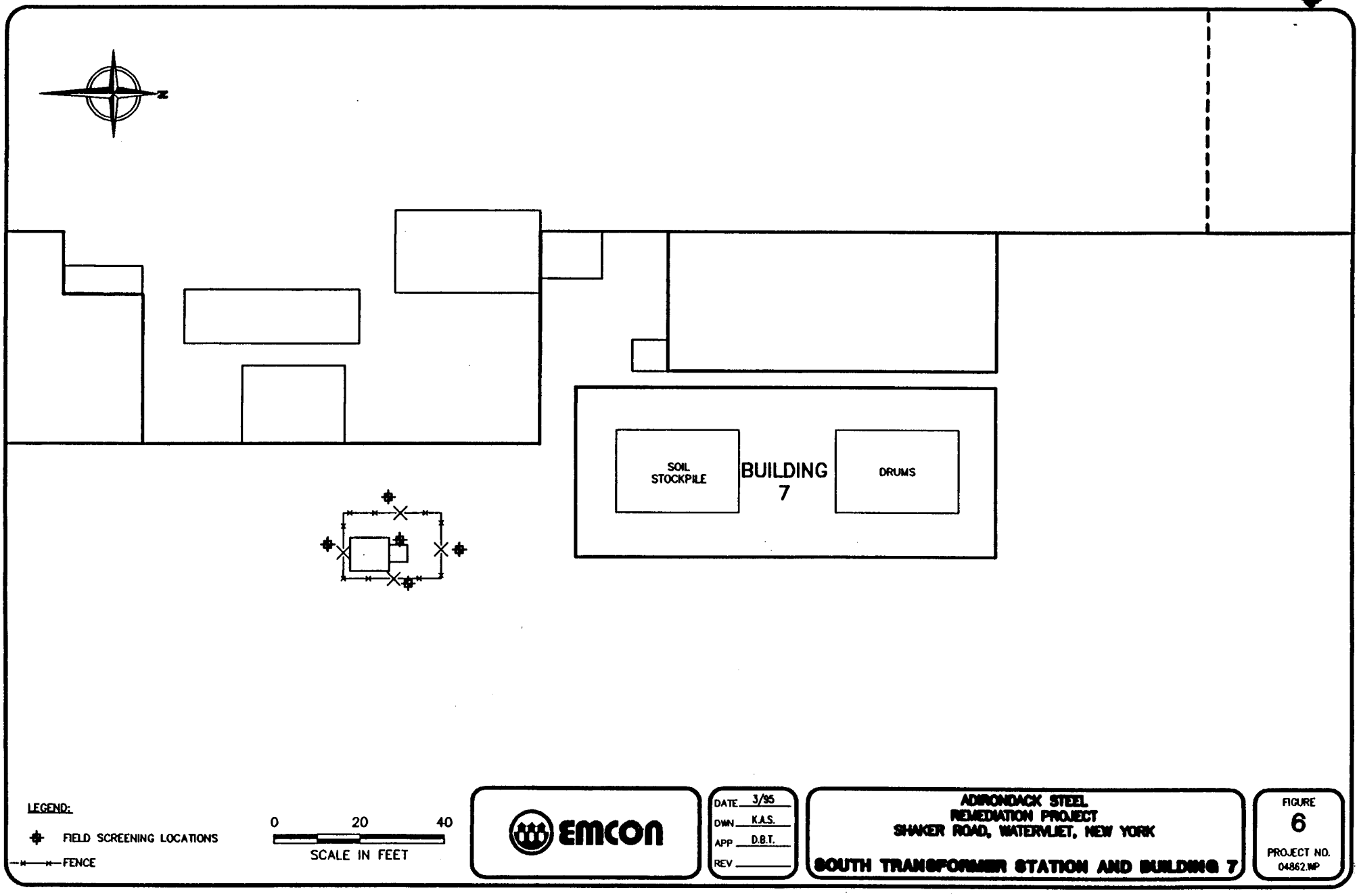
down to approximately 1 foot in depth for visual evidence of contamination. Samples will only be obtained at these locations if field screening detects the possible presence of oils. Field screening will also occur at one location within the fenced area (Figure 6). If visual evidence of staining is present, two additional samples may be obtained from inside the fenced area.

5.2 SITE REMEDIATION

Following the completion of all sampling and field screening, a detailed sketch and volume estimates of materials to be removed will be prepared for each area. Methods of remediation for each area will be finalized based on the outcome of the site investigation activities. The probable activities could include the following:

- Excavate all soils exceeding 10 ppm
- Backfill all excavated areas with clean fill
- Removal of all foundry sands exceeding 10 ppm (to be disposed as PCB-contaminated). Other foundry sands will be disposed as an industrial non-hazardous waste (as part of building renovation). Lead ? TCLP
- Removal of all PCB fluids
- Removal of all transformer equipment
- Detergent washing of all stained concrete
- Testing and removal of all wash water
- Wipe sampling to confirm attainment of cleanup goal BINGHAMTON STAND WIPE Acceptance
- Encapsulation of concrete areas exceeding 10 ppm
- Obtain confirmatory samples to document achievement of the 10 ppm cleanup goal Cores
- Removal of concrete-contaminated floors where 10 ppm PCBs are deeper than 1 cm
- Scarification and removal of the upper 1 cm of PCB-contaminated concrete



LEGEND:

FIELD SCREENING LOCATIONS

FENCE

0 20 40

SCALE IN FEET

EMCON

DATE 3/95
DWN K.A.S.
APP D.B.T.
REV

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REMEDIATION PROJECT
SHAKER ROAD, WATERVLIET, NEW YORK

SOUTH TRANSFORMER STATION AND BUILDING 7

FIGURE 6

PROJECT NO. 04862.MP

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Scale: 1 = 1.0000 Date: 3/15/95 Time: 4:57 PM Operator: HSCHUBER

5.3 DECONTAMINATION

Following the removal of all bulk or gross contamination, select areas of the site (i.e., concrete floors, sumps, pads) may require cleaning and/or decontamination.

Areas that require cleaning/decontamination will be cleaned by using a commercial surfactant. All wash waters will be vacuumed dry and drummed for off-site disposal. It may also be necessary to use an alcohol-based surfactant for this purpose.

Following decontamination, wipe sampling will be conducted to verify the clean-up levels have been met. Procedures to be used for wipe sampling are outlined in Section 6.5.

5.4 DISPOSAL ACTIVITIES

Disposal activities will either be conducted or coordinated by Waste Transportation, Inc. (WTI) of Attleboro, Massachusetts. All non-hazardous materials which require disposal will be handled by WTI directly. However, WTI will contract with Rollins Environmental Service, Inc. (USEPA ID No. D055 141376) of Deer Park, Texas to handle disposal of all PCB oils. These materials are proposed for incineration. Soils exceeding 10 ppm will be handled by Chemical Waste Management (USEPA ID No. NYD0498 36679) of Model City, New York.

5.4.1 Soil Disposal

During site remediation, all excavated soil exceeding the 10 ppm clean-up level will be removed, segregated and stockpiled (or containerized) based on the contaminant levels in the soil into one of the following stockpile categories:

- Soils exceeding 500 ppm - disposal at a TSCA Landfill
- Soils greater than 10 ppm but less than 500 ppm (PCB contaminated) Subtitle C Facility.

All stockpiles will be placed on 2 sheets of 60 mil plastic and contained using plastic coverings and hay bales.

5.4.2 Disposal - Transformer Oil Drums

All oil drums will be sampled to determine the appropriate method of disposal. Based on the analytical data obtained during the drum sampling, each drum will be scheduled for disposal based on the PCB concentration of oil contained in that drum.

WTI is currently proposing using a bulk vacuum truck for the hauling and disposal of all PCBs which require incineration. This process will consist of emptying the drums on site into a vacuum truck. Bulk transfer of the oils will be conducted by Rollins Environmental Services. Empty drums will be handled in accordance with TSCA Regulations (40CFR 761.60) and transported to Chemical Waste Management in Model City, New York for disposal. All decontamination and personal protective equipment (PPE) will be disposed in a similar manner.

5.4.3 Transformer Equipment

All salvageable transformer equipment at the site will be handled by an appropriately licensed electrical contractor. The equipment will be inspected to verify it is drained. All fluids drained from the transformers will be drummed for off-site disposal. Oils will be handled as described above.

Once the equipment is drained, the equipment will be loaded onto trucks for transport to a reprocessing facility. The contractor, under the supervision of WTI, will be responsible for handling all transformer equipment in accordance with applicable Federal and State regulations.

PCB articles or transformer equipment which cannot be salvaged for reuse will be disposed by Chemical Waste Management at their Model City, New York facility.

6.0 SAMPLING METHODOLOGY

6.1 PREPARATION FOR FIELD ENTRY

Prior to the initiation of field activities, the following tasks will be performed:

1. Kick-off meeting with all involved personnel to review the scope of work to be performed, and the Sampling and Analysis Plan.
2. Review of the Health and Safety Plan by all on-site personnel.
3. Operational check-out and pre-calibration of all equipment to be taken into the field.
4. Location, flagging and labeling of all proposed borings and sampling locations.
5. Arrange access for drill rig at proposed drilling locations.
6. Mobilization of equipment and personnel to site.

Prior to any field activity, the required Health and Safety procedures will be followed (Appendix B). In the event of adverse weather conditions, outside sampling events will be postponed so that the integrity of the samples is maintained. A general overview of the site will be made to foresee possible hazards or delays. If applicable, the site manager will be informed of the field team's intention.

All reusable sampling equipment (split-spoons, trowels, bowls, etc.) will be pre-cleaned prior to field entry according to the procedures outlined in the QAPP (Appendix A).

Whenever possible, pre-cleaned equipment will be used; however, if the need arises, equipment will be cleaned in the field according to the procedures outlined in the QAPP (Appendix A).

6.2 SOIL SAMPLING PROCEDURE

Soil samples will be collected prior to remediation to confirm the areal extent of contamination around potential source locations previously identified as well as from the remedial excavation area for field screening and confirmatory purposes to ensure compliance with the 10 ppm cleanup criteria. A hand-held soil auger will be utilized to obtain soil samples up to 1 foot in depth. Samples will be collected in the following manner:

1. Vertically line up the pre-cleaned sampler and push the sampler in a smooth and continuous movement through the soil to the desired penetration (maximum of six inches).
2. Hold corer in upright vertical position and extrude sample with stainless steel spoon to six inches into a stainless steel pan. If a sample is to be collected for vertical evaluation, retain sample portion from 6 to 12-inch also.
3. When collecting soil samples, the sample must be homogenized before placing the sample in the appropriate containers.

   To homogenize a sample of a soil or sediment matrix, first rocks, twigs and other debris must be removed if they are not to be considered part of the sample. The sample should be removed from the sampling device and placed in a stainless steel pan and thoroughly mixed using a stainless steel spoon. The sample in the pan should be scraped from the sides, corners, and bottom of the pan, rolled to the middle of the pan, and initially mixed. The sample should then be quartered and moved to the four corners of the pan. Each quarter of the sample should be mixed individually and then rolled to the center of the container, and entire sample mixed again.
4. Split the fully mixed sediment sample in equal halves for field screening and laboratory analysis and transfer adequate sample volume to appropriate sample jars using separate stainless steel spoons.

5. Label samples appropriately and store in a cooler on ice or ice packs as soon as possible.
6. Follow recordkeeping and chain-of-custody procedures as detailed in the QAPP (Appendix A).
7. Thoroughly field-clean corer as described in the QAPP (Appendix A).
8. At the end of the sampling day, the coolers containing confirmatory samples will be taped shut with the custodian's initials placed on the tape at cooler openings. Confirmatory samples will be shipped via Federal Express to the contract laboratory for morning delivery, or delivered directly to the laboratory by the field personnel at the end of the sampling day.
9. Contact with the laboratory will be made within 24 hours after each sampling event to ensure that samples arrive safely and with proper integrity preserved.

6.3 PCB FIELD TEST PROCEDURE

Field testing for confirmation of the limit of the outside remedial area and compliance with the 10 ppm PCB cleanup criterion will be performed at the site utilizing the Envirogard PCB Test Kit. Procedures for sample processing and analysis will be performed in accordance with the assay procedures provided by the manufacturer. These procedures are included in the QAPP (Appendix A). Homogenization of samples will occur during sample collection as outlined in Section 6.2.

Following testing of all samples to determine the limit of the remedial area, 25 percent of compliant samples will be selected for confirmatory analysis of corresponding split samples collected as described in Section 6.2. Following remedial excavation, confirmatory samples will be sent to the laboratory for analysis at the rate of one (1) per every 100 square feet of remediated area.

6.4 CEMENT CORE SAMPLING PROCEDURE

Cement core samples will be obtained from interior floor areas identified as having surficial PCB contamination. Prior to obtaining the core samples, the areas of the floor to be sampled will be cleaned to remove surface contaminants. Core samples will be obtained to determine if contaminants have penetrated the surface of the floor and, if so, to what depth. The following procedures will be followed to obtain samples from the floor.

1. Clean a 100 cm square around the sample location using a detergent wash and scrub brush.
2. Rinse sample area with potable water and allow to air dry.
3. Obtain core sample using decontaminated cement coring device from center of cleaned area. Core should be collected from entire thickness of floor.
4. Note any discoloration of sample in logbook including the depth to which it occurs.
5. Cut top two centimeters of sample into 1 cm thick subsamples.
6. Crush each subsample using a mortar and pedestal and transfer crushed concrete into unpreserved glass sample containers.
7. Label samples appropriately and store in a cooler on ice or ice packs as soon as possible.
8. Follow recordkeeping and chain-of-custody procedures as detailed in the QAPP (Appendix A).
9. Thoroughly field-clean corer as described in the QAPP (Appendix A).
10. At the end of the sampling day, the coolers containing confirmatory samples will be taped shut with the custodian's initials placed on the tape at cooler openings. Confirmatory samples will be shipped via Federal Express to the contract laboratory for morning delivery, or delivered directly to the laboratory by the field personnel at the end of the sampling day.
11. Contact with the laboratory will be made within 24 hours after each sampling event to ensure that samples arrive safely and with proper integrity preserved.

6.5 WIPE SAMPLING

Wipe samples will be obtained by using a presoaked (soaked in hexane) gauze pad over a 100 cm^2 surface. The pad will be held by a pair of stainless steel forceps to thoroughly swab the predetermined 100 cm^2 sample area. The pad will then be placed in a sample jar, labeled, and forwarded to the laboratory for analysis.

6.6 DRUM SAMPLING

Sampling of drums will occur using a disposable glass coliwasa that will be lowered into each drum and sealed with a rubber stopper. When removed from each drum, a representative sample will be placed into an appropriate sample container.

Specific steps to be followed include the following:

1. Open drum cover or bung.
2. Insert glass tubing almost to the bottom of the container. Try to keep at least 30 cm of tubing above the top of the container.
3. Allow the waste in the drum to reach its natural level in the tube.
4. Cap the top of the tube with a rubber stopper.
5. Carefully remove the capped tube from the drum and insert the uncapped end in the sample container.
6. Release the stopper on the tube and allow the sample container to fill to approximately 90 percent of its capacity.
7. Repeat steps 2 through 6 if more volume is needed to fill the sample container.
8. Remove the tube from the sample container and replace the tube in the drum.
9. Cap the sample container tightly with a Tefloon-lined cap and affix the sample identification tag.
10. Break the glass sampling tube in such a way that all parts of it are discarded inside the drum.
11. Replace the bung or cover.
12. Place sample container in a Ziplock plastic bag (one per bag).

13. Mark the sample identification number on the outside of each sample container and complete chain-of-custody log and the field logbook.

APPENDIX A
QUALITY ASSURANCE PROJECT PLAN

QUALITY ASSURANCE PROJECT PLAN

Prepared for

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Project No. 04862.WP

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APPENDICES

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) describes the quality assurance/quality control (QA/QC) measures that will be taken during the collection and analysis of multi-media samples as outlined in the work plan. Procedures for field and laboratory QA/QC and analysis; data reduction, validation, and reporting; and sample control and chain-of-custody are outlined in this plan.

Quality assurance objectives are delineated in Section 2.0 and sampling procedures are discussed in Section 3.0. Activities planned that will acquire information requiring quality controlled generation of analytical data include:

- Subsurface soil sampling and characterization;
- Sampling and analysis of sumps;
- Sampling and analysis of drums;
- Surface soil sampling and characterization;
- Swipe or chip sampling of concrete surfaces; and
- Data review, validation, and management.

Soil, oil, concrete, and aqueous samples will be analyzed for polychlorinated biphenyls (PCBs). Analytical protocol is outlined in Section 5.0 of this report.

2.0 QUALITY ASSURANCE OBJECTIVES

The primary objective of the QA program for this project is to 1) maintain the evidentiary value of the information produced and 2) insure that field investigations, laboratory analysis, and reports are carried out in accordance with approved protocols. The QA Officer for the project is responsible for reviewing data to ensure compliance with protocols and that data is complete, representative, compliant usable and comparable. The quality of data generated by sampling, monitoring or analysis is defined in terms of the following elements.

Precision and Accuracy

The objectives for precision and accuracy are indicated in Section 10.0. Results of field and laboratory quality control samples are evaluated against approved criteria which measures the precision and accuracy of a given measurement system.

Duplicate analyses are conducted at a minimum rate of ten percent for batch analyses of ten or more samples or at least one sample per every batch if batches are less than ten. Statistics are calculated for determinations of analytical precision as described in Section 10.0.

Accuracy is monitored by the analyses of accepted reference samples (either reference control samples, spiked control samples or surrogate spikes). The use of reference samples is fully described in Section 10.0.

Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared with the amount that was expected to be obtained under correct normal conditions. Naturally, the amount of valid data obtained for this study is expected to be virtually complete, based on the use of published sampling and analytical methods. When comparing the amount of valid data obtained to that of a correct, normal condition, deviations may arise that are a result of the sample matrix. For instance, organic

analysis requires an extraction and the proposed method may not fully recover the analyates of interest from the matrix. Dilutions may be necessary to reduce the effect of non-target species which extract with the target ones. These dilutions will raise detection limits above those for correct normal conditions. If this in fact occurs, the QA Officer will review the body of data to provide assurance that the data is adequate for the intended use.

Representativeness

Representativeness expresses the degree to which data accurately and precisely represents a characteristic or environmental condition. By way of the approved work plan, the frequency and location of sampling locations and method of sample acquisition have been designed such that data obtained will be considered representative of site conditions.

Comparability

Comparability expresses the confidence with which one data set can be compared to another. The use of published sampling and analytical methods, standard reporting units, and a program executed in accordance with this QAPP will aid in ensuring this comparability.

3.0 SAMPLE CONTROL PROCEDURES/CHAIN-OF-CUSTODY

Sample control consists of maintaining sample integrity, providing adequate documentation of all sampling procedures, avoiding sample cross-contamination, and ensuring proper sample custody. Sample control and chain-of-custody procedures are described in the following sections.

3.1 MAINTENANCE OF SAMPLE INTEGRITY

All sample containers will be pre-cleaned by the analytical laboratory according to the procedures specified in the USEPA's "Specifications Guidance for Obtaining Contaminant-Free Sample Containers" (April, 1990) or certified clean by the manufacturer providing sample containers. The laboratory will provide manufacturer's certificates attesting to same.

3.2 FIELD DATA AND INFORMATION ACQUISITION

The sampler's field records will contain sufficient information such that someone can reconstruct the sampling situation without reliance on the collector's memory. Entries in the field records will include the following:

- Name and address of project;
- Name of sampler;
- Name of others present;
- Location of sampling and address;
- Date and time of collection;
- Type of sample;
- Description of sampling point;
- Quantity of sample collected;
- Parameters requested for analysis;

- Type of sample container used;
- Preservative(s) used;
- Filtering, if performed;
- Sample collection procedure and equipment;
- Specific information such as discoloration, staining, depth, etc;
- Sample layering;
- Sample identification number(s);
- Field observations;
- Pertinent weather factors such as temperature, wind direction, and precipitation;
- Any field measurements made; and
- Health and safety information.

3.3 EQUIPMENT DECONTAMINATION/PREPARATION

All sampling equipment that comes in direct contact with samples will be cleaned prior to use and in the field between sample locations to prevent possible sample contamination and cross-contamination. Decontamination and cleaning will be performed using the procedure outlined below:

- Alconox detergent and potable water scrub;
- Potable water rinse;
- Methanol rinse;
- Ten percent nitric acid rinse;
- Deionized water rinse;
- Air dry; and
- Wrap in aluminum foil or store in sealed polyethylene bags.

Large equipment used during field activities will be decontaminated at an on-site decontamination pad with high pressure hot water or steam. All wash water from

decontamination activities will be collected and disposed of in accordance with State and Federal regulations.

3.4 SAMPLE CUSTODY

Chain-of-custody records for all samples, beginning with the cleaning and numbering of the sample containers at the laboratory, shall be maintained. A written record of container decontamination procedures shall be kept as well as the source of such containers. A sample shall be considered to be "in the custody" of an individual if said sample is either in direct view of, or otherwise directly controlled by, the individual in custody. Storage of samples during custody shall be accomplished according to established preservation techniques in appropriately sealed and numbered storage containers. Chain-of-custody shall be accomplished by the exchange of the samples or sealed sample shuttle (e.g., shipping cooler) being directly transferred from one individual to the next with the transferor witnessing the signature of the recipient upon the chain-of-custody record.

The chain-of-custody records will contain the following information:

- Sample number;
- Signature of collector;
- Date and time of collection;
- Sample type (e.g., groundwater or soil);
- Identification of well or sampling point;
- Number of containers;
- Parameters requested for analysis;
- Signature of person(s) involved in the chain of possession;
- Description of sample bottles and their condition; and
- Problems associated with sample collection (i.e., breakage, no preservatives).

The laboratory chain-of-custody procedures, at a minimum, will include the following:

- Designate a sample custodian/chain-of-custody officer;
- Have set and detailed written procedures for sample tracking through the lab from the time of receipt to final disposition of the sample; and
- Have set procedures to ensure sample holding times are not exceeded.

All sample containers will be labeled with the sample identification number, the preservative (if any), and the parameter(s) requested for analysis. Labels will be affixed to sample containers prior to or at the time of sampling and should be filled out at the time of collection.

Sample seals are used to detect unauthorized tampering of samples following sample collection. The paper seal will include the following information:

- Name of sample;
- Date and time of sampling; and
- Place of collection.

The seal will be attached in such a way that it is necessary to break it in order to open the sample shipping cooler. These seals will be affixed to the sample shipping containers before the samples leave the custody of the sampling personnel.

4.0 CALIBRATION PROCEDURES AND FREQUENCY

There are two areas where calibration procedures and frequency are important: 1) for field equipment; and 2) for laboratory analytical equipment. Each of these areas is discussed below.

Field

All instruments used in the field to gather, generate, or measure environmental data will be calibrated in accordance with procedures consistent with those recommended by the manufacturer to provide Level 2 quality data. All equipment to be used during the field work will be examined to verify that it is in proper operating condition prior to mobilization. Field notes from previous sampling work will also be reviewed to ensure any previous equipment problems are not overlooked and that all necessary repairs have been carried out before entering the field.

Calibration of field instruments will be performed at intervals specified by the manufacturer, or more frequently, as conditions warrant. Further detail can be found in Appendix A-1: SOPs for Immunoassay Field Screening Procedure, and Appendix A-2: SOP for HNU Photoionization Detector.

Equipment log forms will be maintained for each piece of equipment used in the field. The forms will include the following information:

- Instrument identification/serial number;
- Date and time of calibration;
- Identification of calibrant/standard used;
- Personnel performing calibration;
- Calibration results; and
- Corrective action, if necessary.

In addition, problems encountered and corrective measures taken with a piece of field equipment will be documented on the log forms.

Laboratory

All laboratory instruments will be calibrated according to the specified methodology in Methods for Chemical Analysis of Water and Wastes (EPA-600/4-79-020; March 1983), and Test Methods for Evaluating Solid Waste, SW-846, Third Edition (USEPA, Office of Solid Waste and Emergency Response).

5.0 ANALYTICAL PROCEDURES

Laboratory analytical procedures for soil, oil, aqueous, and concrete matrices will follow the methodologies outlined in Methods for Chemical Analysis of Water and Wastes (EPA 60014-79-020; March 1983), and/or Test Methods for Evaluating Solid Waste (SW-846), Third Edition.

An Envirogard and/or ENSYS PCB Test Kit will be utilized to delineate PCB contamination in the field. The SOP for this procedure is contained in Appendix A-1. This SOP contains specific information on the method including QA/QC procedures.

6.0 DATA REDUCTION, VALIDATION AND REPORTING

This section addresses the requirements for data reduction, validation and reporting for each major measurement parameter. There are two separate areas where data reduction, validation and reporting apply. These areas are in the field investigation and in the analytical laboratory. Each is discussed separately below.

6.1 FIELD PROCEDURES

6.1.1 Field Recordkeeping

Field measurements (whether analytical or other) will be recorded in the field team member's logbook. This book will have consecutively numbered pages, will be written only in ink, and will be signed at the bottom of each page. The data recorded in the logbook will be spot-checked frequently by the site manager/project manager to ensure that proper procedures for sampling, analysis, and measuring (detailed in other sections of the QAPP) are being followed.

6.1.2 Field Measurements

Field measurements will include measuring the presence of organic vapors with an HNu, and screening for PCBs using an immunoassay field test kit (Envirogard PCB Test Kit or similar). The field procedures for HNu use and PCBs are provided in Appendices A-1 and A-2. Specific QA/QC procedures for these methods are provided in the respective SOPs.

6.2 LABORATORY PROCEDURES AND REPORTING

The appropriate data and reporting forms outlined below for the sample analyses will be reviewed. Once the entire data package has been reviewed, a narrative report and deliverables summary will be prepared describing data reduction and reporting procedures.

Target Compound - PCBs

- Chain-of-custody (field and laboratory);
- Holding times;
- Instrument performance;
- Calibration - initial and continuing;
- Blanks;
- Surrogate recovery;
- Matrix spike/matrix spike duplicate;
- Full CLP deliverables;
- Field duplicate; and
- Compound identification/quantification.

6.3 DATA VALIDATION

Data will be validated for format and content following the guidelines presented in USEPA's Laboratory Data Validation, Functional Guidelines for Evaluating Inorganic (June 13, 1988) and Organic (February 1, 1988) Analyses. The actual validation will be conducted by an independent laboratory under the oversight of the project QA Officer.

Data will be ranked by the independent validator in one of four categories as follows:

- **Acceptable** - Data is within established control limits, or the data which is outside established control limits does not affect the validity of the analytical results.
- **Acceptable with Exceptions** - Data is not completely within established control limits. The deficiencies are identified and specific data is still valid, given certain qualifications.

- **Questionable** - Data is not within established control limits. The deficiencies bring the validity of the entire data set into question. However, the data validity is neither proved nor disproved by the available information.
- **Unacceptable** - Data is not within established control limits. The deficiencies imply the results are not meaningful.

7.0 QUALITY CONTROL CHECKS

There are two segments to QC checks; those initiated in the field and those initiated in the laboratory. The internal QC checks performed by the laboratory will follow EPA Protocol (SW 846, 3rd Edition). Field QC checks will consist of the collection of the following samples:

- **Field Blanks** are collected to check the effectiveness of decontamination procedures for sampling equipment. Following a sampling event, sampling equipment will be decontaminated. Deionized water then will be passed through the sampler into the designated container. The field blank should be transported to the laboratory and analyzed for the appropriate parameters with the other samples. At a minimum, one field blank should be collected for each sampling event or for each different type of sampling equipment used.
- **Trip Blanks** are used to check for contaminant introduction due to: (1) interaction between the sample and the container, or (2) a handling procedure which alters the sample analysis results. A trip blank is created by filling a designated sample container with deionized water in the laboratory. The trip blank should be transported to the sampling location and returned to the laboratory in a manner identical to the handling procedures used for all the samples. These blanks should be subjected to the same analyses. At a minimum, one trip blank per day is required.
- **Duplicates** can provide indications of the precision of the analytical system. A duplicate sample is a second sample collected at the exact same location and depth and time as the original sample. A duplicate sample serves to check accuracy and reliability of laboratory instruments and procedures, and field activities. Duplicates should be collected for each matrix at a frequency of ten percent.

- **Confirmatory Samples - Pre-Remediation** - PCB screening will be performed prior to soil excavation/remediation to ensure delineation of the remedial areas. The laboratory will perform confirmatory analyses on 25 percent of compliant samples. The analysis shall be performed on the corresponding split sample.
- **Confirmatory Samples - Post-Remediation** - One (1) confirmatory sample for the first 100 square feet of remediated area. One (1) additional confirmatory sample for each additional area of 100 square feet.

8.0 PERFORMANCE AND SYSTEM AUDITS

Field audits from USEPA when required, will be allowed. A review of field notes and discussions with field team members will verify that field activities were performed according to the work plan and QAPP. The field team leader will provide documentation of all work performed in the form of narrative and checklist tasks.

The laboratory QA/QC director or laboratory project manager will observe work being performed during the time that samples from this project are being processed and analyzed. The laboratory QA/QC director will certify in a short narrative report, and by means of signature approval on any QC reports, that the appropriate work has been performed.

The laboratory chosen for this project will be a NYSDOH approved laboratory for environmental analyses. The laboratory QAPP will be provided on request.

The field sampling team will be required to document all field activities in a bound log book. The QA Officer will review the field book to ensure the following information has been recorded regarding sample collection:

- Date and time;
- Sampling point identification number/sample number;
- Sample depth and surface area;
- Sample description/characteristics;
- Collection device.
- Duplicate sample locations;
- Location of equipment blanks;
- Number of trip blanks; and
- Equipment decontamination procedures.

The sample collector will ensure that the laboratory is informed of any unusual sample characteristics.

The sample collector will ensure that the laboratory is informed of any unusual sample characteristics.

9.0 PREVENTIVE MAINTENANCE

Preventive maintenance is primarily a function performed by the laboratory on their analytical equipment to ensure accurate results and to minimize equipment breakdowns/failure. While this is the case, there are a number of items used in field investigations for which preventive maintenance is an important consideration. Specific considerations for laboratory and field equipment are discussed below.

9.1 FIELD EQUIPMENT

Field monitoring equipment (e.g., photoionization detector) will be checked and maintained according to the standard maintenance schedule. These instruments are normally under contract to be checked/overhauled once annually or whenever problems arise. Batteries for all the equipment should be charged to full capacity prior to use.

A log which documents problems experienced with the instruments, corrective measures taken, battery replacement dates, and when used and by whom for each field instrument will be maintained. Appropriate new batteries will be purchased and kept with the meters to facilitate immediate replacement, when necessary, in the field.

All equipment to be utilized during the field sampling will be examined to certify that it is in operating condition. This includes checking the manufacturer's operating manuals and the instructions with each instrument to ensure that all maintenance items are being observed. Field notes from previous equipment usage and the maintenance log will be reviewed so that any prior equipment problems are not overlooked and all necessary repairs to equipment have been carried out.

In the field, each field instrument will be visually inspected prior to field activities to detect any damages or operational problems. Instrument responses will be checked against known standards prior to beginning field work. The instrument operation manuals will be referred to for trouble-shooting methods should equipment check-out indicate a problem. Instrumentation problems identified in the field should be relayed to the Project Manager.

9.2 LABORATORY

Laboratory equipment is monitored by means of a log book for each instrument recording any maintenance activities and schedule. Daily and weekly tasks serve to maintain instrumentation in proper working order. Validation of optimal instrument performance by acceptable calibration and tuning criteria further support satisfactory data quality. Review of these logs and communication between QA/QC personnel allow for discovery and timely correction of problems. Since most analytical laboratories have sufficient inventory of supplies and equipment, downtime is not anticipated to occur.

10.0 DATA MEASUREMENT ASSESSMENT PROCEDURES

Data assessment procedures are employed to ascertain how reliably the concentration reported by the laboratory reflects the actual concentration of a given analyte in the sampled media. Precision and accuracy are two characteristics of data which can be examined to determine the reliability of results.

Precision is a measure of the mutual agreement among individual measurements of the same property. Reference control samples and analytical replicate control samples are used to determine that the results from an analytical batch of samples are within a known range of precision. The acceptance limits for the reference control samples reflect the precision under conditions with no matrix interferences. The acceptance limits for the analytical replicate control samples reflect the precision that can be obtained. Precision is expressed as either relative percent difference (% RPD) or relative standard deviation (% RSD).

Accuracy is the degree of agreement of a measurement with an accepted reference or true value. Reference control samples, spiked control samples, and surrogate spikes are used to determine that the results from an analytical batch of samples are within a known range of accuracy. The means of the reference control samples reflect the accuracy under conditions with no matrix interferences. The mean recoveries for the spiked control samples and surrogate spikes reflect the accuracy that can be obtained where there may be matrix interferences. Accuracy is expressed as percent recovery.

11.0 CORRECTIVE ACTION

Corrective action is required when field and laboratory generated data are not within the predetermined limits for data acceptability. In most field related instances, data acceptability is determined by, and referenced to, manufacturer specifications during calibration. Once calibrated and operational, data generated by the field instrumentation is assumed to be representative of the field condition measured.

In the event of erratic readings which do not stabilize during the critical usage of the equipment, corrective action will be implemented to identify the problem and its source. Appropriate documentation of this action will be recorded in the field log book and project file.

The laboratory selected to perform the analytical work detailed in the work plan has set protocols for corrective actions. These protocols are the responsibility of the laboratory QA Officer.

Regardless of whether a problem arises in the laboratory or the field, all proposed corrective actions must be approved by the Project Manager prior to their implementation (unless the problem contains the elements of an emergency).

12.0 QUALITY ASSURANCE REPORTS TO MANAGEMENT

12.1 LABORATORY

The QA Officer of the laboratory provides periodic assessments of measurement data accuracy and precision to the Laboratory Director, who distributes them to appropriate laboratory staff. Results of the performance audits and system audits are received by the Laboratory Director and also passed on to the lab staff. Other significant QA problems which may be detected throughout the review process of the analytical data are brought to the attention of the Laboratory Director and other appropriate individuals as they arise. The Laboratory Director will immediately notify the Consultant's Project Manager/QA Officer of problems detected, if any, and a mutual solution to the problem will be developed. A written report detailing problems, solutions taken to resolve the problems and impacts on analytical data will be provided to the Consultant with the actual sample analyses data.

12.2 PROJECT REPORTS

All applicable raw QA/QC data in support of analyses will be provided as a part of the final report.

In the final project report, a separate QA section will resummarize all data quality information (including audit reports) obtained during the investigation.

The QA section will contain:

- A data quality statement for precision;
- A data quality statement for accuracy;
- A discussion of the QA objectives that were met and not met;
- If QA objectives were not met, a discussion of the impact to the project for not having met them; and
- Changes in the QAPP.

APPENDIX A-1

SOPs FOR IMMUNOASSAY FIELD SCREENING PROCEDURE

EnviroGard™ PCB Test Kit

ENVR 000 09 (with PCB calibrators)
ENVR 0NC 09 (without PCB calibrators)

Note: The following directions are specifically for use with the EnviroGard PCB Test Kit with PCB calibrators (ENVR 000 09). If you are using the EnviroGard PCB Test Kit (ENVR 0NC 09) with alternative calibrators, the directions should be modified accordingly.

Intended Use

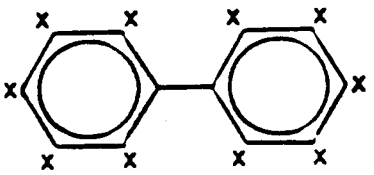
The EnviroGard PCB Test Kit is an enzyme immunoassay for the detection of a range of polychlorinated biphenyls (PCBs) in soil.

Note: This test kit is only recommended for the purpose of screening in soil.

A soil sample that generates a signal (optical density) greater than the signal of the positive assay calibrator has a 99% probability of containing *less* PCB than the concentration of PCB stated on the calibrator label. The EnviroGard PCB Test Kit can be used as a reliable and rapid screening tool to identify soils that contain less PCB than is permissible per applicable regulations.

Test Summary and Explanation

PCBs are a family of compounds with the following general structure.



where x = Hydrogen (H) or Chlorine (Cl)

There are 209 individual forms (or congeners) containing from 1 to 10 chlorine atoms on the biphenyl structure shown. PCBs were originally sold in the U.S.A. under the trade name Aroclor. Each Aroclor is composed of many congeners. Many of the congeners may be found in more than one Aroclor. Aroclors are differentiated on the basis of average chlorine content (percent chlorine by weight). For Aroclor nomenclature, the last two digits of the four digit label are used to indicate this percentage. For example, Aroclor 1248 is approximately 48% chlorine by weight.

The EnviroGard PCB Test Kit employs an antibody against PCB that is coated onto 12 mm x 75 millimeter (mm) polystyrene test tubes. The method is based on the principles of competitive immunoassay, wherein the absorbance signal (optical density) of the final reaction mixture is inversely proportional to the concentration of analyte (PCB) present in the original sample. Refer to the section, "*Specificity*," for more information about Aroclors.

Test Principles

PCBs that are present in the soil extracts and assay calibrators will be bound during the first incubation by the anti-PCB antibodies, which have been adsorbed onto the test tubes. After the sample is decanted and the test tubes are washed thoroughly, a peroxidase-PCB conjugate is added.

Note: The amount of conjugate that will be bound (by unoccupied anti-PCB antibody binding sites in the test tube) is inversely proportional to the amount of PCB that was originally present in the sample.

After a short incubation, unbound conjugate is decanted and the test tubes are thoroughly washed again. Finally, a chromogenic peroxidase substrate and hydrogen peroxide are added to the test tubes.

Note: Color development is directly proportional to enzyme concentration and inversely proportional to PCB concentration in the original sample in the test tubes.

Visual or spectrophotometric analysis of the test tubes can be used to determine the level of PCBs in unknown samples relative to standard or assay calibrator concentrations of PCB (e.g., 50 ppm).

Precautions

- Treat PCBs, solutions containing PCBs, and potentially contaminated soil samples as hazardous materials.
- Where appropriate, use gloves, proper protective clothing, and means to contain and handle hazardous material.
- Obtain (if appropriate) permits pertaining to the handling, analysis, and transport of PCB-containing materials.
- Store all test kit components at 2°C to 8°C (36°F to 46°F) when not in use.
- Do not freeze test kit components or expose them to temperatures greater than 37°C (99°F).
- Do not use test kit components after the expiration date.
- Do not use reagents or test tubes from one test kit with reagents or test tubes from a different test kit.
- Use approved methodologies to confirm any positive results.
- Distribution of PCB in soils may be highly variable. The use of a composite sampling technique may be appropriate. Adequate sample number and distribution are the responsibility of the analyst.

Materials Provided

EnviroGard PCB Test Kit

contains:

- 20 PCB antibody-coated, 12 mm x 75 mm polystyrene test tubes
- 14 mL Assay Diluent
- 0.5 mL Negative Control (Methanol)
- 4.8 mL PCB-Enzyme Conjugate
- 4.8 mL Substrate
- 4.8 mL Chromogen
- 15 mL Stop Solution
- 20-place test tube rack
- 3 PCB positive assay calibrators:
  0.5 mL 5 ppm calibrator
  0.5 mL 10 ppm calibrator
  0.5 mL 50 ppm calibrator

Note: The PCB positive assay calibrators do not reflect the actual PCB (Aroclor) concentrations provided (see "*Calibrator Concentration*" for the actual PCB concentrations).

Materials Required and Ordered Separately

See "*Ordering Information*" for the appropriate catalogue numbers.

EnviroGard Soil Extraction Kit II

For the extraction of PCB from soil samples. Contains the following items to test 12 samples:

- 12 polypropylene bottles w/screw caps, 30 mL (each bottle should contain five stainless steel mixing beads)
- 12 filtration devices, comprised of 12 upper (filter unit) and lower (sample tube) units
- 12 polyethylene prefilter frits
- 15 wooden spatulas
- 12 screw top glass vials, 4 mL
- 15 weigh boats

Methanol

Methanol (60 mL for 12 samples) is required for soil extraction, but is not included in the EnviroGard Soil Extraction II kit and must be ordered separately (see "*Ordering Information*").

EnviroGard PCB Field Lab

Starter Accessory Kit contains:

- 1 positive displacement precision pipettor, 5 µL
- 1 Eppendorf™ Repeater® pipettor
- 1 electronic timer
- 1 polystyrene test tube, 12 mm x 75 mm, (for blanking the spectrophotometer)
- 1 portable balance with a 50 gram calibrator weight
- 1 wash bottle, 500 mL
- 2 six-position test tube racks
- 1 rack of pipette tips for the positive displacement pipettor
- 8 pipette tips for the Repeater pipettor, 5.0 mL, for dispensing volumes between 0.1 mL and 0.5 mL
- 4 pipette tips for the Repeater pipettor, 12.5 mL, for dispensing volumes between 0.25 mL and 0.625 mL
- 1 pipette tip for the Repeater pipettor, 50 mL, for dispensing volumes between 1.0 mL and 5.0 mL

Note: Replacement pipettor tips can be ordered separately (see "*Ordering Information*").

Millipore Differential Photometer

Refer to "Ordering Information."

Materials Required but Not Provided

- water for washing assay test tubes

Materials Suggested but Not Required

- protective clothing (i.e., latex gloves)
- absorbent paper for blotting test tubes
- waste and liquid containers

ASSAY PROCEDURE

Collect/Store the Sample

- Collect soil in appropriately-sized and labeled containers.
- Take care to remove excess twigs, organic matter, and rocks or pebbles from the sample (especially from the soil to be extracted).
- Soils obtained from areas adjacent to standing water, surface soils collected during or immediately after rain or snow, or any soils with relatively high amounts of water (≥ 30% by weight) should be dried overnight before testing.
- Store soil samples at 4°C (39°F) or room temperature for up to 1 month. Recommended soil stor-age for EPA method 8080 (gas chrom-atography (GC) analysis of PCBs in soil) is at 4°C (39°F).

Prepare the Sample/Extract the Soil

Refer to the EnviroGard Field Soil Extraction II product insert.

1. Use the portable balance and a weigh boat to measure out 5 grams of soil:
   - Place the balance on a level surface and press ON/MEMORY.
   - Place the weigh boat on the balance and press TARE.
   - Weigh the soil.
2. Transfer the 5 grams of soil into an appropriately labeled, 30 mL polypropylene vial. If you are testing more than one soil sample, cap the vial loosely and repeat steps 1 and 2 until all soil samples have been weighed out. Use a clean weigh boat for each sample.

4. Position the Repeater pipettor at setting 5 and use a 50 mL pipette tip to pipette 5 mL of Methanol into each soil sample.

4. Cap all vials tightly and shake vigorously for approximately 2 minutes. Let the contents settle briefly.

5. Pour the liquid contents of each vial into the appropriately labeled, lower (sample tube) piece of the filter base unit. In order to obtain optimal filtering efficiency, do not let more than one or two mixing beads slip into the filter device.

   Note: When extracting clay samples, it is possible that all of the Methanol will be soaked up by the soil, leaving little or no excess liquid to decant. If this should happen, add an additional 5 mL of Methanol to the sample, cover, and shake vigorously for an additional 1 to 2 minutes. Continue on to step 6. Make sure to factor the dilution into the calculations (see "*Interpret the Results*").

6. Insert a polyethylene frit into the outside, capped filter end of each plunger unit.

   Note: It is not necessary to use the frit for a number of soil types; however, doing so improves filtration efficiency.

7. Insert the plunger into the filter base unit.

8. Push down on the plunger. After 30 to 60 seconds, push down on the plunger again.

9. For longer term or spill-safe storage, remove the cap from the plunger and carefully pour the sample extract into an appropriately labeled 4 mL glass vial. Cap the vial. Repeat this step for each of the sample extracts.

Perform the Test

Note: Allow all test kit components to come to ambient temperature before use.

1. Label the 12 mm x 75 mm test tubes (no more than 20 tubes/assay).*

Tube Label	Tube Contents
NC	Negative Control (optional control for quality control purposes)
5 ppm	5 ppm positive assay calibrator**
10 ppm	10 ppm positive assay calibrator
50 ppm	50 ppm positive assay calibrator
S1	sample 1
S2	sample 2

*It is not required to perform the assay in duplicate; however, doing so increases the precision.

**The selection of the appropriate positive assay calibrators will depend on the application and specific screening requirements.

   Place the test tubes in the test tube rack and push down on each tube so that it is held firmly and will not fall out when shaken.

   Caution: Do not "snap" the test tubes into the rack as this may result in a cracked tube.

2. Using the positive displacement pipettor, add 5 µL of Negative Control (Methanol) to the "NC" test tubes. Choose an appropriate calibrator (5 ppm, 10 ppm, or 50 ppm) and add it to the corresponding test tubes as follows:
   - 5 µL of the 5 ppm calibrator to the "5 ppm" test tubes
   - 5 µL of the 10 ppm calibrator to the "10 ppm" test tubes
   - 5 µL of the 50 ppm calibrator to the "50 ppm" test tubes
   - 5 µL of each sample extract to the appropriately labeled sample test tubes.

Caution: Replace the cap(s) on the calibrator vials immediately after use to minimize evaporation.

3. Position the Repeater pipettor at setting 2 and use the **12.5 mL** syringe to add 500 µL of Assay Diluent to all test tubes. Briefly shake the test tube rack to mix, then incubate for 5 minutes.

4. Vigorously shake out the test tube contents into a sink or suitable container. Fill the test tubes to overflowing with cool tap or distilled water, then decant and vigorously shake out the remaining water.

   Repeat this wash step three more times, being certain to shake out as much water as possible on each wash. After the final wash, remove as much water as possible by tapping the inverted tubes on absorbant paper.

5. Position the Repeater pipettor at setting 2 and use the **5 mL** syringe to add 200 µL of the PCB enzyme-conjugate to all test tubes. Briefly shake the test tube rack to mix, then incubate for 5 minutes.

6. Vigorously shake out the test tube contents into a sink or suitable container. Fill the test tubes to overflowing with cool tap or distilled water, then decant and vigorously shake out the remaining water.

   Repeat this wash step three more times, being certain to shake out as much water as possible on each wash. After the final wash, remove as much water as possible by tapping the inverted tubes on absorbant paper.

7. Position the Repeater pipettor at setting 2 and use a clean **5 mL** syringe to add 200 µL of Substrate to all test tubes. Using a clean 5 mL syringe, follow immediately with 200 µL of Chromogen to all test tubes.

   Caution: The Substrate *must* be added *before* the Chromogen. Do not reverse this order.

   Briefly shake the test tube rack to mix, then incubate for 5 minutes.

8. Position the Repeater pipettor at setting 2 and use a **12.5 mL** syringe to add 500 µL of Stop Solution to all test tubes.

   Warning: Stop Solution is 1.0 N sulfuric acid. Handle carefully.

9. Add 1.0 mL of Stop Solution to the blank test tube and insert the tube into the left well of the spectrophotometer. Dry the outside of each assay tube and measure the absorbance by placing each tube into the right well of the spectrophotometer. Record the absorbance of each tube.

Interpret the Results

- Samples with OD_{450} values ≥ OD_{450} of the 5 ppm positive assay calibrator contain *less* than 5 ppm PCB.
- Samples with OD_{450} values ≤ OD_{450} of the 5 ppm positive assay calibrator *may* contain *more* than 5 ppm PCB.
- Samples with OD_{450} values ≥ OD_{450} of the 10 ppm positive assay calibrator contain *less* than 10 ppm PCB.
- Samples with OD_{450} values ≤ OD_{450} of the 10 ppm positive assay calibrator *may* contain *more* than 10 ppm PCB.
- Samples with OD_{450} values ≥ OD_{450} of the 50 ppm positive assay calibrator contain *less* than 50 ppm PCB.
- Samples with OD_{450} values ≤ OD_{450} of the 50 ppm positive assay calibrator *may* contain *more* than 50 ppm PCB.

Soil samples that were extracted with more than 1.0 mL of Methanol per gram of soil (e.g., for clay samples), require a correction factor in order to interpret the results. Multiply each of the calibrator concentrations by the ratio of Methanol (mL) to soil (grams).

Example

If 10 mL of Methanol is used to extract 5 grams of soil, then the ratio of Methanol to soil would be "2" (10/5). The calibrator levels to be used for this soil would change to 10 ppm, 20 ppm, and 100 ppm (2 x 5 ppm, 10 ppm, and 50 ppm).

For Aroclors 1242, 1016, 1248, and 1254, the confidence interval for negative samples (i.e., ≤ 5 ppm, ≤ 10 ppm, and ≤ 50 ppm) exceeds 99%. For Aroclor 1260, and for PCBs that have a lower chlorine content than Aroclor 1242, the confi-dence interval is smaller.

In order to maximize the accuracy of the EnviroGard PCB Test when measuring Aroclor 1221, 1232, or 1260, it is recommended that Aroclor-specific calibrators (corresponding to the Aroclor present in the soil samples) should be substituted for the Aroclor 1248 calibrators that are normally used (for more information, refer to the section, *"Technical Assistance"* for the number of the Millipore office nearest you).

Performance Characteristics

Sensitivity

The primary purpose of the EnviroGard PCB Test is to screen out soil samples that have PCB concentrations below certain mandated action levels (i.e., 5 ppm, 10 ppm, or 50 ppm). Sensitivity is sufficient to perform the test at the three calibrator levels with 99% confidence.

The minimum reliable detection limit for the EnviroGard PCB Test Kit is 3.3 ppm. This is the lowest concentration of PCB in soil that can be differentiated 99% of the time from zero.

The sensitivity of the assay also depends on the specific Aroclor being measured (see "*Specificity*").

Specificity

The PCB antibody in this kit will bind to different Aroclors with different affinities. The test specificity is restricted to PCBs. The test response to Aroclors 1016, 1242, 1254, and 1260 is within twofold of the response for Aroclor 1248.

Interfering Substances

The following substances were tested and found to have less than 0.5% (w/w) of the immunoreactivity of Aroclor 1248.

1,2-dichlorobenzene	2,5-dichlorophenol
1,3-dichlorobenzene	2,4,5-trichlorophenol
1,4-dichlorobenzene	2,4,6-trichlorophenol
1,2,4-trichlorobenzene	biphenyl
2,4-dichlorophenol	pentachlorophenol (PCP)

Limitations of the Procedure

The EnviroGard PCB Test Kit is a screening test *only*. Actual quantitation of PCBs by EnviroGard immunoassay is only possible if the contaminating Aroclor is known, and if the assay is standardized using the corresponding PCB mixture.

Soil sampling error may significantly affect testing reliability. The distribution of PCBs in different soils can be extremely heterogeneous. Soils should be dried and then homogenized thoroughly before analysis by any method. Split samples (i.e., for GC and immunoassay) should always come from the same homogenate.

Every effort should be made to perform the EnviroGard PCB Test at temperatures between 15°C (59°F) and 30°C (86°F).

Expected Values for PCB-Contaminated Soils

Contaminated soils will have PCB levels that correlate well (correlation coefficient r) ~ 0.9) with GC values. The slope of the correlation will depend on the contaminating Arocior. Arocior 1248-contaminated samples have a slope close to "1" because the EnviroGard PCB Test Kit is standardized using Arocior 1248.

Calibrator Concentrations

Positive Assay Calibrator	Actual Arocior Conc. (ppm)
0.5 mL 5 ppm calibrator	3.0 ppm Arocior 1248
0.5 mL 10 ppm calibrator	5.0 ppm Arocior 1248
0.5 mL 50 ppm calibrator	22.0 ppm Arocior 1248

Storage

- Store all test kit components at 2°C to 8°C (36°F to 46°F) when not in use.
- Do not expose test kit components to temperatures greater than 37°C (99°F). Prolonged exposure (many days) or repeated exposure to ambient temperatures may result in a loss of reagent (especially the conjugate) activity.
- Do not freeze test kit components. This will likely result in a significant decrease in enzyme conjugate activity.
- Do not use test kit components after the expiration date. The expiration date is located on the product label.

Quality Control

If a blue color does not develop in the negative control test tube within 5 minutes after adding the Substrate and Chromogen, the test is invalid and must be repeated.

References

All data related to the EnviroGard PCB Test Kit is on file at Millipore Corporation. Refer to the section, *"Technical Assistance,"* for the phone number of the nearest Millipore office.

TECHNICAL INFORMATION

Ordering Information

Description	Catalogue No.
EnviroGard PCB Test Kit includes:	ENVR 000 09

- 20 PCB antibody-coated, 12 mm x 75 mm polystyrene test tubes
- 14 mL Assay Diluent
- 0.5 mL Negative Control (Methanol)
- 0.5 mL 5 ppm calibrator
- 0.5 mL 10 ppm calibrator
- 0.5 mL 50 ppm calibrator
- 4.8 mL PCB-Peroxidase conjugate
- 4.8 mL peroxide solution (Substrate)
- 4.8 mL TMB solution (Chromogen)
- 15 mL Stop Solution (1.0 N sulfuric acid)
- 20-place test tube rack

Description	Catalogue No.
EnviroGard Field Soil Extraction Kit II includes the following items to test 12 samples: • 12 polypropylene bottles w/screw caps, 30 mL, each containing 5 stainless steel mixing beads • 12 filtration devices, comprised of 12 upper (filter unit) and lower (sample tube) units • 12 polyethylene prefilter frits • 15 wooden spatulas • 12 screw top glass vials, 4 mL • 15 weigh boats	ENSP 000 20
EnviroGard PCB in Soil Test Kit shipping kit, which includes: • EnviroGard PCB Test Kit (ENVR 000 09) • EnviroGard Field Soil Extraction Kit II (ENSP 000 20) • Methanol, 100 mL (ELCR 000 07)	ENVR 000 10
Methanol for soil extraction, 100 mL bottle	ELCR 000 07
EnviroGard PCB Field Lab Starter Accessory Kit, for use with the EnviroGard PCB in Soil Test Kit, which includes: • 1 positive displacement precision pipettor, 5 µL • 1 Repeater pipettor • 1 electronic timer • 1 polystyrene test tube, 12 mm x 75 mm (for blanking the spectrophotometer) • 1 portable balance with a 50 gram calibrator weight • 1 wash bottle, 500 mL • 2 test tube racks, six-position • 1 rack of pipette tips for the positive displacement pipettor • 8 pipette tips for the repeat pipettor, 5.0 mL, for dispensing volumes between 0.1 mL and 0.5 mL • 4 pipette tips for the repeat pipettor, 12.5 mL, for dispensing volumes between 0.25 mL and 0.625 mL • 1 pipette tip for the repeat pipettor, 50 mL, for dispensing volumes between 1.0 mL and 5.0 mL	ENVR L00 09
Millipore Differential Photometer 115 V 230 V	 ENVR 000 00 ENVR 002 30

Description	Catalogue No.
EnviroGard Replacement Pipettor Tips (available separately):	
• Positive displacement pipettor tips, 1 rack of 96	ENVR L04 09
• Repeater pipettor tips, 5.0 mL 100/pk	ENVR L01 09
• Repeater pipettor tips, 12.5 mL 100/pk	ENVR L02 09
• Repeater pipettor tips, 50 mL 10/pk	ENVR L03 09
EnviroGard PCB Test Kit (without PCB calibrators)	ENVR 0NC 09

Technical Assistance

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EnviroGard™ Field Soil Extraction Kit II

ENSP 000 20

For use with the EnviroGard PCB Test Kit. For laboratory and on-site analysis of soil.

Intended Use

The EnviroGard PCB Field Soil Extraction Kit II is used for extracting polychlorinated bi-phenyls (PCBs) and/or pesticides from soil samples, prior to analysis. The EnviroGard Field Soil Extraction Kit II devices have been qualified for use with methanol solvent, which is used in the EnviroGard PCB Test Kit Soil Extraction procedure.

Before You Start

The EnviroGard Field Soil Extraction Kit II contains the following components:

12 soil extraction bottles with mixing beads
12 two-piece filter/plunger units
12 prefilter frits
15 weigh boats
15 wood spatulas
12 glass vials (5 mL)

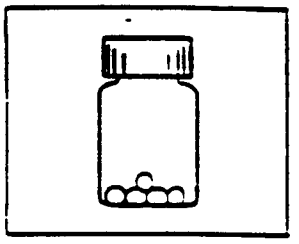
Other Items Needed

- 5 mL of methanol per sample extracted
- pipettes and glass test tubes for diluting high concentration extract (>50 ppm), if a more accurate estimate of these concentrations is desired
- a balance to weigh 5 gram soil samples
- 10 mL glass vials to hold soil extracts

PERFORM SOIL EXTRACTION

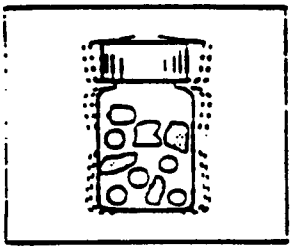
1. Weigh out 5 grams of soil (refer to the application sheet, "*Gravimetric Soil Analysis with the EnviroGard PCB Test Kit*").

2. Add a 5 gram soil sample to the solvent extraction bottle with mixing beads.

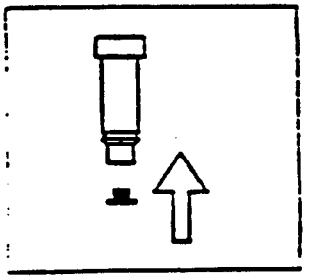


3. Add 5 mL of methanol to the sample in the solvent extraction bottle.

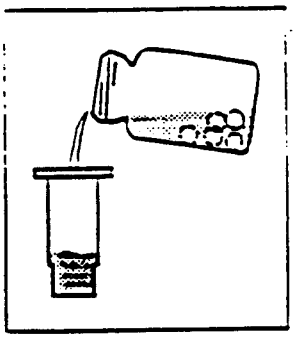
4. Cap and vigorously agitate the bottle for 2 minutes to break up the soil matrix.



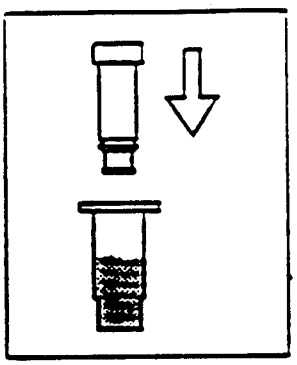
5. Insert a prefilter frit into the filter end of the plunger unit.



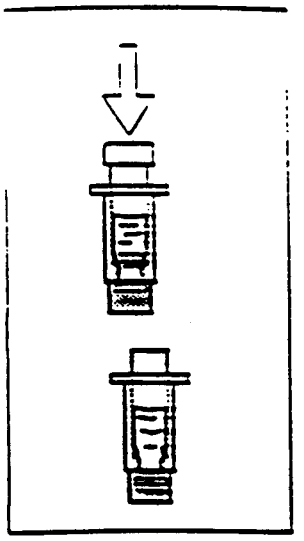
To transfer the soil methanol mixture, simply pour off the mixture into the filter base unit.



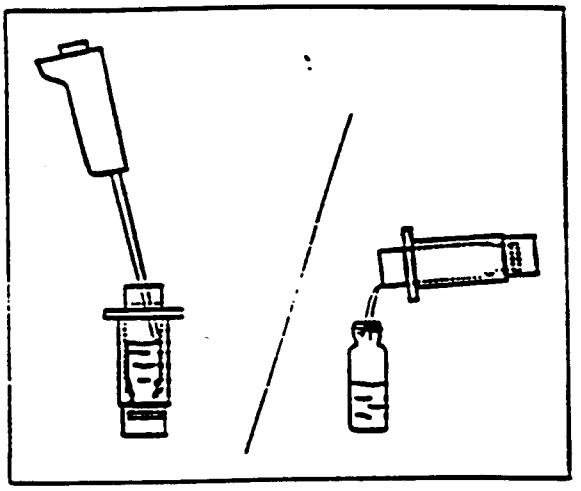
7. Insert the plunger unit into the filter base unit.



8. Press down firmly on the plunger.



9. Uncap the plunger. Using a pipettor, remove the extract for analysis (refer to *"Perform the Test"* in the EnviroGard PCB Test Kit insert).



Label the antibody-coated test tubes (≤ 20 tubes/assay) and place them into the test tube holder.

3. Using the positive displacement pipettor, add:
   - 5 µL of MeOH into the "0.0 ppm" test tubes.
   - 5 µL of the 5 ppm calibrator to the "5 ppm" test tubes
   - 5 µL of the 10 ppm calibrator into the "10 ppm" test tubes.
   - 5 µL of the 50 ppm calibrator into the "50 ppm" test tubes.
   - 5 µL of each MeOH soil extract into appropriately labeled sample test tubes.

   Note: Only use the positive calibrators that are required for your analysis.

4. Position the Repeater® pipettor at setting 2 and use the 12.5 mL syringe to add 500 µL of Assay Diluent to all test tubes. Gently shake the test tubes and incubate for 5 minutes.

5. Vigorously shake the test tube contents into an appropriate waste receptacle. Thoroughly wash the test tubes with water, then shake to empty. Repeat this wash step four times. Invert the test tubes and tap out as much water as possible.

6. Position the Repeater pipettor at setting 2 and use the 5 mL syringe to add 200 µL of PCB enzyme-conjugate into all test tubes. Gently shake the test tubes and incubate for 5 minutes.

7. Vigorously shake the test tube contents into an appropriate waste receptacle. Thoroughly wash the test tubes with water, then shake to empty. Repeat this wash step four times. Invert the test tubes and tap out as much water as possible.

8. Position the Repeater pipettor at setting 2 and use the 5 mL syringe to add 200 µL of Substrate into all test tubes. Follow immediately with 200 µL of Chromogen into all test tubes. Gently shake the test tubes and incubate for 5 minutes.

9. Position the Repeater pipettor at setting 2 and use a 12.5 mL syringe to add 500 µL of Stop Solution into all test tubes. Gently shake the test tubes.

10. Measure the OD of each test tube at 450 nm.

Interpret the Results

- Samples with OD_{450} values ≥ OD_{450} of the 5 ppm positive assay calibrator contain *less than* 5 ppm PCB.
- Samples with OD_{450} values ≤ OD_{450} of the 5 ppm positive calibrator *may* contain *more than* 5 ppm PCB.
- Samples with OD_{450} values ≥ OD_{450} of the 10 ppm positive assay calibrator contain *less than* 10 ppm PCB.
- Samples with OD_{450} values ≤ OD_{450} of the 10 ppm positive calibrator *may* contain *more than* 10 ppm PCB.
- Samples with OD_{450} values ≥ OD_{450} of the 50 ppm positive assay calibrator contain *less than* 50 ppm PCB.
- Samples with OD_{450} values ≤ OD_{450} of the 50 ppm positive assay calibrator *may* contain *more than* 50 ppm PCB.

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MILLIPORE

Reference Card for EnviroGard™ PCB Field Lab

ENVR L00 09

EnviroGard Soil Extraction II Protocol

Components

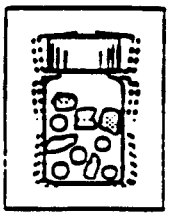
12 soil extraction bottles with mixing beads
12 two-piece filter/plunger units
12 prefilter frits
15 weigh boats
15 wood spatulas
12 glass vials (5 mL)

Other Items Needed

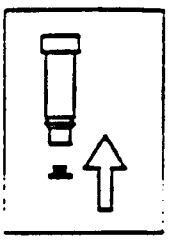
- 5 mL of methanol per sample extracted
- pipettes and glass test tubes for diluting high concentration extract (>50 ppm), if a more accurate estimate of these concentrations is desired
- a balance to weigh 5 gram soil samples
- 10 mL glass vials to hold soil extracts (for sample storage, if required)

Perform Soil Extraction

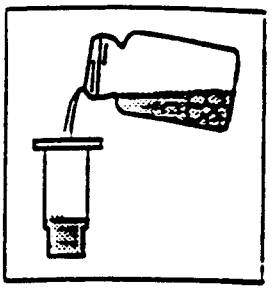
1. Weigh out 5 grams of soil.
2. Add the 5 gram soil sample to a solvent extraction bottle with mixing beads.
3. Add 5 mL of methanol to the sample in the solvent extraction bottle.
4. Cap and vigorously agitate the bottle for 2 minutes to break up the soil matrix.



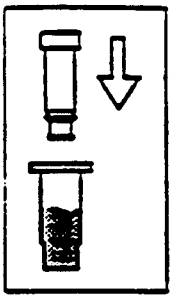
5. Insert the prefilter frit into the filter end of the plunger unit.



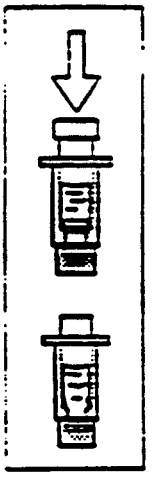
6. Transfer the soil/methanol mixture by pouring it into the filter base unit.



7. Insert the plunger unit into the filter base unit.



8. Press down firmly on the plunger.



9. Uncap the plunger. Using a pipettor, remove the extract for analysis. For long term storage, pour the extract into the glass vials.

This starter accessory kit contains the following items:

- 1 positive displacement precision pipettor, 5 µL
- 1 Eppendorf™ Repeater® pipettor
- 1 electronic timer
- 1 polystyrene test tube, 12 mm x 75 mm, (for blanking the spectrophotometer)
- 1 portable balance with a 50 gram calibrator weight
- 1 wash bottle, 500 mL
- 2 six-position test tube racks
- 1 rack of pipette tips for the positive displacement pipettor
- 8 pipette tips for the Repeater pipettor, 5.0 mL, for dispensing volumes between 0.1 mL and 0.5 mL
- 4 pipette tips for the Repeater pipettor, 12.5 mL, for dispensing volumes between 0.25 mL and 0.625 mL
- 1 pipette tip for the Repeater pipettor, 50 mL, for dispensing volumes between 1.0 mL and 5.0 mL
- 1 reference card

Refer to the *Reference Card for EnviroGard PCB Field Lab* for soil extraction and PCB test instructions.

PS1334, Rev. -, 6/92

MILLIPORE

TECHNICAL INFORMATION

Ordering Information

Description	Catalogue No.
EnviroGard PCB Test Kit	ENVR 000 09
EnviroGard Field Soil Extraction Kit II, for gravimetric sample handling	ENSP 000 20
Methanol for soil extraction, 100 mL bottle	ELCR 000 07
EnviroGard PCB in Soil Test Kit shipping kit, which includes: • EnviroGard PCB Test Kit (ENVR 000 09) • EnviroGard Field Soil Extraction Kit II (ENSP 000 20) • Methanol, 100 mL (ELCR 000 07)	ENVR 000 10

Technical Assistance

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Tel. (617) 275-9200

General Limited Warranty

Millipore Corporation ("Millipore") warrants the products manufactured by it against defects in materials and workmanship when used in accordance with the applicable instructions for a period of one year from the date of shipment of the products or where applicable, for a period not to extend beyond a product's printed expiration date. MILLIPORE MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED. THERE IS NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. The warranty provided herein and the data, specifications and descriptions of Millipore products appearing in Millipore's published catalogues and product literature may not be altered except by express written agreement signed by an officer of Millipore. Representations, oral or written, which are inconsistent with this warranty or such publications are not authorized and if given, should not be relied upon.

In the event of a breach of the foregoing warranty, Millipore's sole obligation shall be to repair or replace, at its option, any product or part thereof that proves defective in materials or workmanship within the warranty period, provided the customer notifies Millipore promptly of any such defect. The exclusive remedy provided herein shall not be deemed to have failed of its essential purpose so long as Millipore is willing to repair or replace any nonconforming Millipore product or part. Millipore shall not be liable for consequential damages resulting from economic loss or property damages sustained by a customer from the use of its products.

However, in some states the purchaser may have rights under state law in addition to those provided by this warranty.

P34305, Rev -, 6/92

APPENDIX A-2

SOP FOR HNU PHOTOIONIZATION DETECTOR

VOC MEASUREMENT

HNU

An HNU photoionization detector can be used to detect a variety of trace gasses, particularly volatile organic compounds (VOCs). The HNU uses the principle of photoionization to detect and measure the concentrations VOCs in the atmosphere or being emitted from a sample.

The HNU operates using an ultraviolet light source in the sensor. The ultraviolet light emits photons which are absorbed by gas molecules in the chamber with an ionization potential less than that of the lamp. This causes the release of an electron and resulting in a positive ion. The sensor also contains a pair of electrodes, one a bias electrode and the other a collector electrode. When a positive potential is applied to the bias electrode, the positive ions travel toward the collector electrode. An electric current which is created is then measured and the concentration is displayed on the meter in parts per million.

The following procedure is used for calibrating and operating the HNU:

1. Turn the function switch to BATT. The needle should be in the green; if not, the battery should be recharged.
2. Turn function switch to STANDBY and adjust meter needle to read zero using the ZERO set control.
3. Turn the function switch to the 0-200 range with the probe connected to the calibration gas (isobutylene) and note the meter reading. Adjust the SPAN control as needed to obtain the proper concentration reading.
4. Recheck zero setting; if readjustment is needed, repeat step 3.
5. At this point, a two-point calibration has been made (against zero and the gas standard) and is ready to use.
6. Turn function switch to the 0-20 range. The instrument will measure the concentration of any gasses with ionization potential less than the lamp.
7. Use HNU to monitor breathing zone for health and safety precautions or use to screen samples by placing probe near suspected sources of contaminants.
8. Adjust function switch as needed depending on concentrations detected.

APPENDIX B

HEALTH AND SAFETY PLAN

EMCON
SITE HEALTH AND SAFETY FORM

Site Name: Adirondack Steel
Site Location: Colonie, New York
Project Manager: Kenneth C. Malinowski, Ph.D.

Date: March 13, 1995
Project #: 04862.WP
HASP #: 576

SITE AND PROJECT DESCRIPTION:

Adirondack Steel is a building complex located at 191 Watervliet Shaker Road in the Town of Colonie, Albany County, New York. EMCON Personnel will be conducting remedial sampling at this site consisting of the following:

Task 1.- Soil and concrete core sampling and analysis including confirmatory sampling for Polychlorinated Biphenyls (PCB's).

Task 2. - On-site observation for the duration of remedial activities.

Task 3.- Drum sampling for PCB's.

TRAINING REQUIREMENTS

EMCON personnel shall have a minimum of 24 hours of health and safety training in accordance with OSHA 29 CFR 1910.120 and must be current in their 8 hour training. All personnel shall have completed a periodic exam prior to commencement of field activities.

SITE HEALTH AND SAFETY INFORMATION

Potential site contaminants include PCB's and foundry sand. Potential exposure to these contaminants may occur through inhalation of organic vapors and particulates and by direct contact with contaminated media. Potential physical hazards associated with this scope of work include utilities, close proximity to heavy equipment, drill rigs, noise, traffic, and slip/ trip/ fall type injuries. As much of the work will take place indoors there are also the hazards associated with operation of the equipment limited by the internal configuration of the building. Procedures and safety guidelines for utility clearance, heavy equipment and drill rigs are attached.

Compound	Concentration (ppm)	Exposure Limit (TLV/PEL)
PCB's	280,000	0.5 mg/m3

* Maximum concentration detected in groundwater/soil
** Exposure limit for an 8 hour time weighted average in airborne concentration

PCB HAZARDS (signs and symptoms)

Primary PCB exposure occurs from inhalation, skin absorption and ingestion. Foundry sand exposure is primarily through inhalation. Therefore skin and respiratory protection are very important. Symptoms of PCB overexposure include irritated eyes and chloracne. Extended exposure can cause liver damage. The attached site diagram indicating PCB concentration should be used as a guide. Areas of highest concentration include soil piles, oil drums and areas directly

near electrical equipment. Working outdoors creates potential airborne hazards due to the entrainment of particles by wind possibly contaminated with PCB's or foundry sand. Working indoors has additional hazards associated with the lack of natural dispersion of airborne contaminants. Monitoring should include organic compounds and particulates.

Hand Drilling

The following practices shall be used by personnel performing hand drilling:

- Equipment should be inspected daily to ensure that there is no exposure to moving belts, fans, etc.
- Employees involved in the operation shall not wear any loose fitting clothing which could get caught in any exposed moving machinery.

Utility Clearance

- During all intrusive activities (eg.drilling, excavating, probing) the locator line service should be contacted to mark underground lines before any work is started.
- Personnel involved in intrusive work shall determine the minimum distance from marked utilities which work can be conducted with the assistance of the locator line service.

PERSONNEL PROTECTIVE REQUIREMENTS

Activity	Level of Protection	Equipment Requirements
Task 1	D	Steel toed boots, latex gloves, safety glasses, hard hat, hearing protection, and poly coated Tyvek Suit
Task 1	C	Steel toed boots, inner nitrile gloves, outer neoprene gloves, a full face air purifying respirator with an MSA-GMC-H type cartridge. Hard hat and hearing protection shall be worn during drilling activities.

Activity	Level of Protection	Equipment Requirements
Task 2	D	Steel toed boots, latex gloves, safety glasses, hard hat, hearing protection, and poly coated Tyvek Suit
Task 2	C	Steel toed boots, inner nitrile gloves, outer neoprene gloves, a full face air purifying respirator with an MSA-GMC-H type cartridge. Hard hat and hearing protection shall be worn during drilling activities.

Activity	Level of Protection	Equipment Requirements
Task 3	C	Steel toed boot, inner nitrile gloves, outer neoprene gloves, a full-face air purifying respirator with MSA-GMC-H type cartridges. Hard hat and hearing protection shall be worn during drilling activities.
Task 3	D	Steel toed boots, latex gloves, safety glasses, hard hat, hearing protection, and poly coated Tyvek suit.

Task 3 shall begin in level C and may be downgraded to level D if the air monitoring results do not approach the action level.

MONITORING

Air monitoring shall be conducted with a photionization detector with a 10.2 eV lamp or greater. Monitoring shall be conducted in the breathing zone. Particulate monitoring shall be performed with a mini-Ram or equivalent.

Instrument	Monitoring Frequency	Action Level	Level of Protection
PID	Initially and every 15 minutes	<5ppm	Modified D
	Continuous	5-50 ppm	C
	NA	>50 ppm	Evacuate area
Respirable dust	Initially and every 15 minutes	<0.1 mg/m3	Modified D
	Continuous	0.1-10mg/m3	C
	NA	>10 mg/m3	Evacuate area

DECONTAMINATION

Level D Contamination

Wash and rinse gloves, remove gloves, wash and rinse hands with potable water.

Level C Contamination

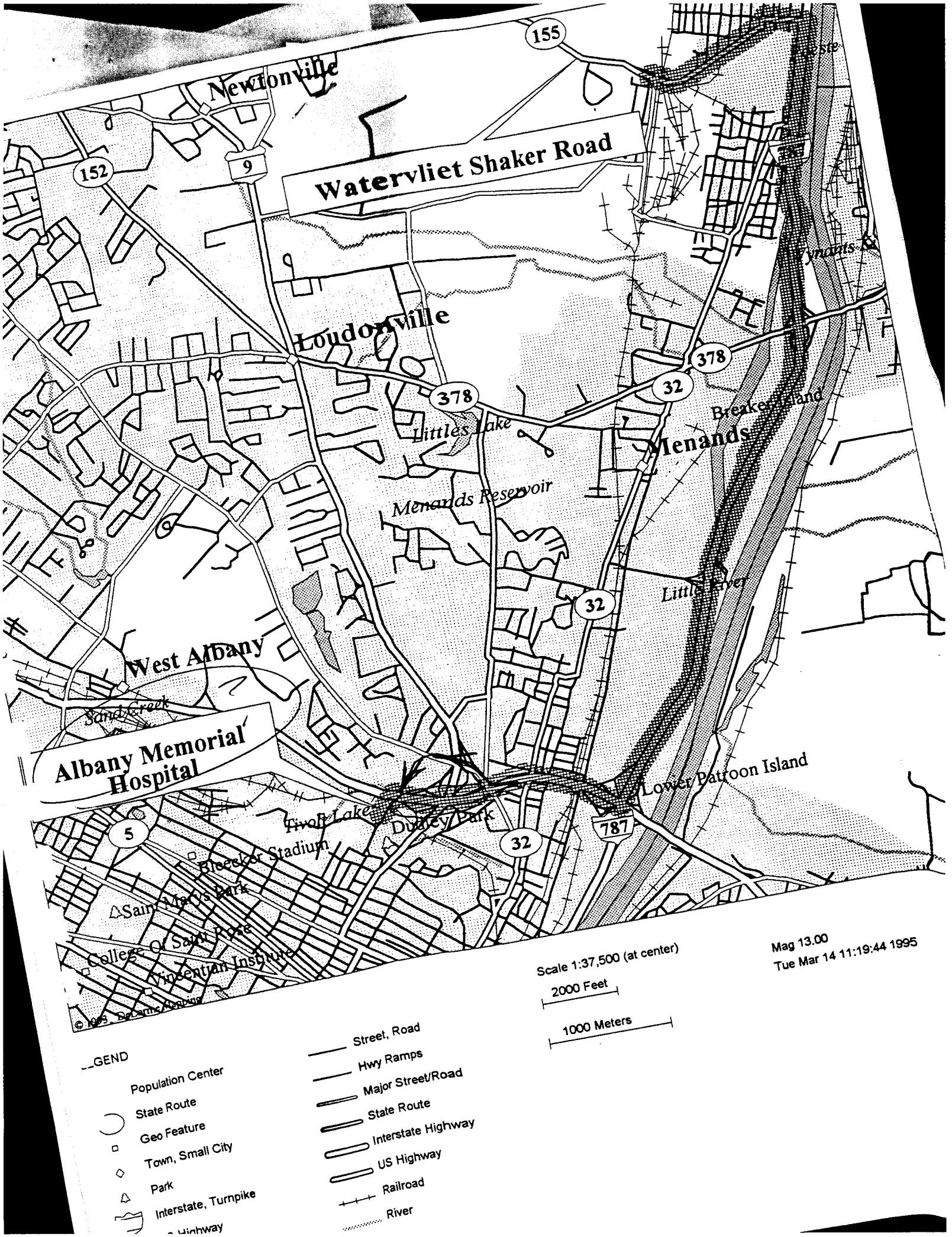
Wash and rinse gloves and overboots, remove boot covers, remove outer gloves, remove Tyvek suit, wash inner gloves, remove gloves, wash and rinse hands with potable water.

Level B Contamination

Remove SCBA backpack or disconnect airline, wash and rinse suit, gloves and overboots, remove boot covers, remove outer gloves, remove suit, wash and rinse inner gloves, remove respirator, remove inner gloves wash and rinse hands with potable water.

Remove and handle all clothing inside out when possible.

EMERGENCY INFORMATION		
Contact	**Phone Number**	**Directions to Hospital**
Local Police	518-270-3833 518-477-9333	Exit site and follow Watervliet Shaker Rd. (SR155) to I-787 South. Take I-787 South to I-90 West (NYS Thruway). Exit at Northern Blvd. Take Northern Boulevard South. The hospital will be visible when the turn is made onto Nothern Blvd.
Fire Department	518-273-6622 518-270-3826	
Ambulance	518-273-6622 518-270-3833	
Local Hospital	518-471-3111	
Regional H&S Officer: L. Birnbaum	914-343-0660	
H&S Officer: S. Wilsey	716-773-1801	
Project Manager: Ken Malinowski	716-773-1801	
Client Contact: Mr. Donald Stone, Jr.	518-274-2116	
Dig Safe	1-800-962-7962 or 1-800-245-2828	


Newtonville
155
Watervliet Shaker Road
152
9
Loudonville
378
32
Menands
Breaker Island
Little Lake
Menands Reservoir
Little River
West Albany
Albany Memorial Hospital
Sand Creek
Lower Patroon Island
Dudley Park
Tivoli Lake
Bleecker Stadium
Saint Mary's Park
College Of Saint Rose
Rensselaer Institute
5
787
© 1993, DeLorme Mapping
Scale 1:37,500 (at center)
2000 Feet
1000 Meters
Mag 13.00
Tue Mar 14 11:19:44 1995
LEGEND
Population Center
State Route
Geo Feature
Town, Small City
Park
Interstate, Turnpike
Street, Road
Hwy Ramps
Major Street/Road
State Route
Interstate Highway
US Highway
Railroad
River

Site Personnel Sign-off:

_____

_____

_____

EMCON Project Manager:

_____

EMCON Regional Safety Officer:

_____

******Please return this form to the Health and Safety Department******

MEDICAL DATA SHEET

This brief Medical Data Sheet will be completed by all Wehran Personnel potentially working on-site and will be kept in the Support Zone during the conductance of site operations. This data sheet will accompany any personnel when medical assistance is needed or if transport to the hospital facilities is required:

Site: _____

Name: _____ Home Telephone: _____

Address:

_____

_____

_____

Age: _____ Height: _____ Weight: _____

Person to Contact in Case of Emergency:

_____ Phone No. _____

Drug or other Allergies:

_____

_____

_____

Particular Sensitivities:

_____

Do You Wear Contacts? YES NO

Provide a Checklist of Previous Illnesses or Exposures to Hazardous Chemicals:

_____

_____

_____

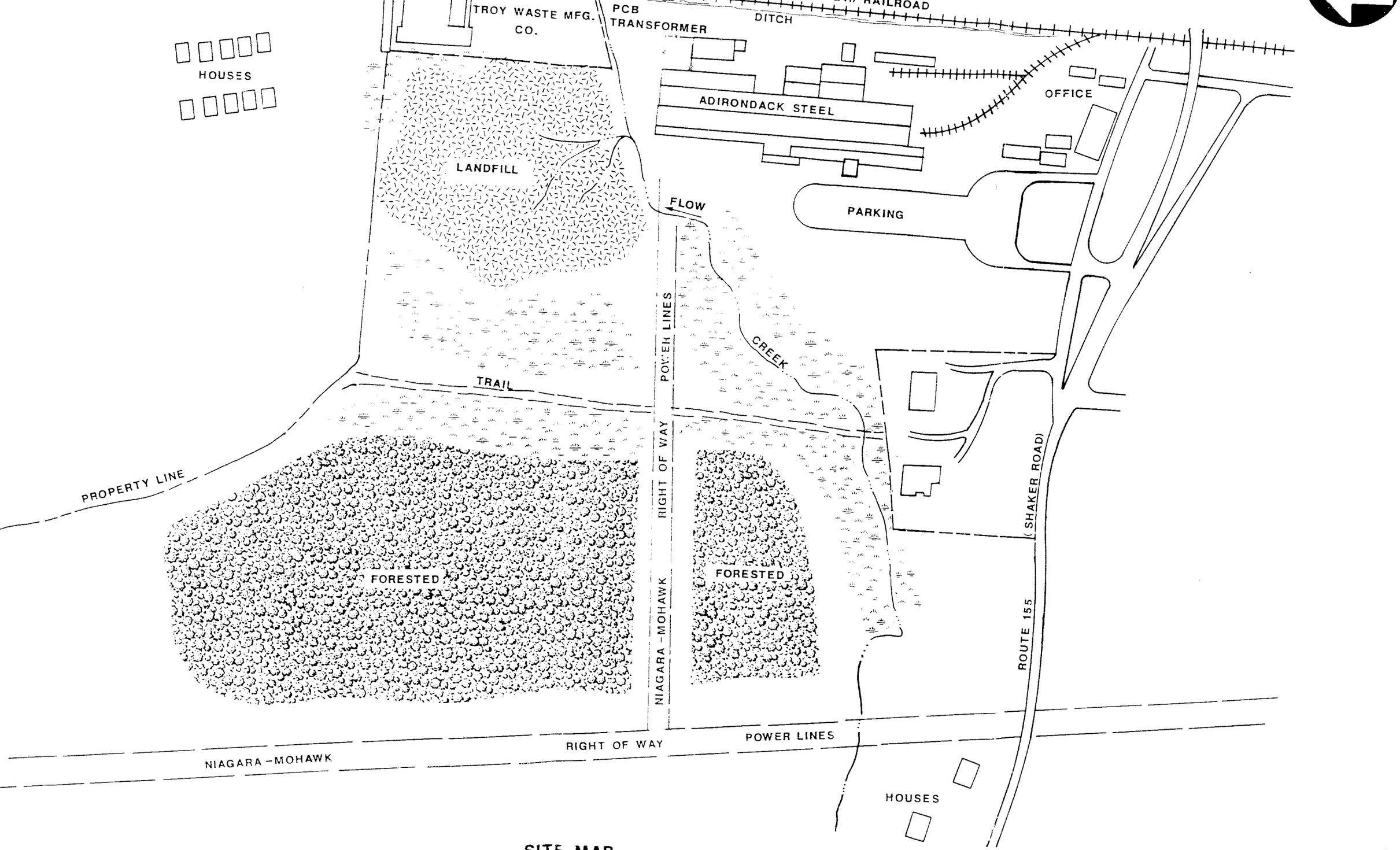
_____

What Medications are you Presently using?

_____

_____

_____



SITE MAP

FIGURE 2

SITE ASSESSMENT REPORT: SITE INSPECTION

PART I: SITE INFORMATION

1. Site Name/Alias Adirondack Steel

   Street Shaker Road

   City Watervliet State New York Zip 12189

2. County Albany County Code 001 Cong. Dist. 23

3 EPA ID No. NJD002073633

4. Block No. 32.3 Lot No. 1-29

5. Latitude 42° 43'25" N Longitude 73° 43' 05" W

   USGS Quad. Troy South, New York

6. Owner The Timmons Corporation Tel. No.(603) 357-3700

   Street Sterns Road

   City Keene State New Hampshire Zip 03431

7. Operator The Timmons Corporation Tel. No. (603) 357-3700

   Street Sterns Road

   City Keene State New Hampshire Zip 03431

8. Type of Ownership

   ☒ Private ☐ Federal ☐ State
   ☐ County ☐ Municipal ☐ Unknown ☐ Other _____

9. Owner/Operator Notification on File

   ☐ RCRA 3001 Date _____ ☐ CERCLA 103c Date _____
   ☐ None ☒ Unknown

10. Permit Information

Permit	Permit No.	Date Issued	Expiration Date	Comments
Unknown				

11. Site Status

    ☐ Active ☒ Inactive ☐ Unknown

12. Years of Operation 1918 to Approximately 1988

13. Identify the types of waste sources (e.g., landfill, surface impoundment, piles, stained soil, above- or below-ground tanks or containers, land treatment, etc.) on site. Initiate as many waste unit numbers as needed to identify all waste sources on site.

(a) Waste Sources

Waste Unit No.	Waste Source Type	Facility Name for Unit
1	Landfill	Adirondack Steel Industrial Landfill
2	Contaminated Soil	Transformer Area

(b) Other Areas of Concern

Identify any miscellaneous spills, dumping, etc. on site; describe the materials and identify their locations on site.

_____

_____

_____

14. Information available from

Contact Amy Brochu Agency U.S. EPA Tel. No. (908) 906-6802

Preparer Anthony J. Bonasera Agency NUS Corp. Region 2 FIT Date 3/31/91

PART II: WASTE SOURCE INFORMATION

For each of the waste units identified in Part I, complete the following items.

Waste Unit 1 - Industrial Landfill

Source Type

X	Landfill		Contaminated Soil
	Surface Impoundment		Pile
	Drums		Land Treatment
	Tanks/Containers		Other

Description:

The Adirondack Steel Site, shown in Figure 2, operated an industrial landfill from 1918 to approximately 1988. The landfill approximately 9 acres in size, occupies the northernmost section of the Adirondack Steel property. The waste products deposited in the landfill consisted of spent molding and core sands, refractories, dust from collector furnace and slag. These wastes were only the by-products of the Adirondack Steel manufacturing processes. The foundry and core wastes constitute over 80 percent of the yearly tonnage of material disposed at the landfill. This type of waste consists mostly of silica and zircon sand. About 100 tons per year of shell coated sand containing 2 percent phenolic resin along with slag, refractories, and dust make up the last of the wastes. Additional binders used in the preparation of core/molding sand include furan resin, polyester, no bake, and sodium silicate. Construction debris and other miscellaneous solid wastes from the plant maintenance operations were also disposed of in the landfill. Other company residual materials such as cafeteria waste, wood scraps, and general office debris were hauled away by a local contractor. The landfill rests on a flat to gently sloping area. The soils underneath can be best described as poorly drained and have a moderately fine textured subsoil. These soils have an estimated permeability of 10^{-4} to 10^{-5} cm/sec. No cover material was spread over the wastes and the landfill is unlined.

Hazardous Waste Quantity

Since 1918 the landfill facility has received the following quantities of waste materials each year:

Refractories	620 tons
Molding and Core Sands	10,250 tons
Core Butts	240 tons
Cleaning	260 tons
Slag	930 tons
Dust from Collector Furnace	100 tons

From 1918 to 1988, approximately 868,000 tons were deposited in the landfill.

Hazardous Substances/Physical State

Hazardous substances that were received by the landfill facility include: phenols, heavy metals, and chlorides. PCB's are also present as Aroclor 1260 was detected at an estimated concentration of 400 ug/kg from subsurface soil sample S10. The physical state of the waste is solid.

Ref. Nos 16, 17

PART II: WASTE SOURCE INFORMATION

For each of the waste units identified in Part I, complete the following items.

Waste Unit 2 - Transformer Area

Source Type

____	Landfill	__X__	Contaminated Soil
____	Surface Impoundment	____	Pile
____	Drums	____	Land Treatment
____	Tanks/Containers	____	Other

Description:

Contaminated soil was found within the enclosed transformer area located along the eastern side of the building. A warning label indicating PCB contents was found on a transformer in the enclosed area during the on-site reconnaissance conducted by NUS Corp. Region 2 FIT personnel on November 15, 1990.

Hazardous Waste Quantity

The quantity of contaminated soil is an area approximately 10 feet x 15 feet.

Hazardous Substances/Physical State

The hazardous substances found within this area are polychlorinated biphenyls (PCBs). Analysis of surface soil sample S4 has indicated the presence of Aroclor 1260 at 2,700,000 ug/kg within the area of contaminated soil. The physical state of the hazardous substances is liquid.

Ref. Nos. 24, 25, 26

PART III: SAMPLING RESULTS

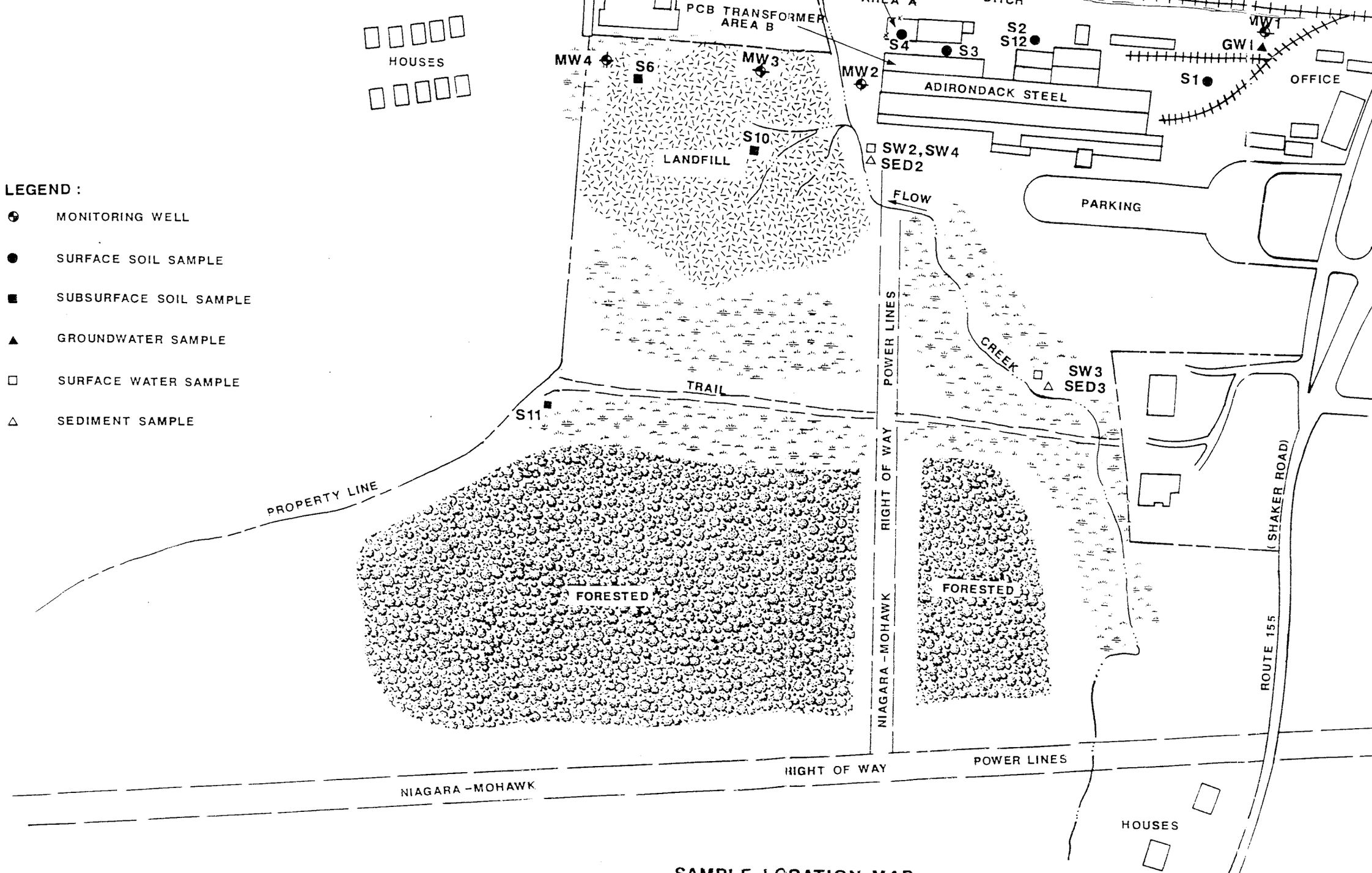
EXISTING ANALYTICAL DATA

Clough Associates performed soil and surface water sampling at the site in 1979. Analyses of soil samples collected in the landfill detected phenol (0.38 mg/kg) copper (53 to 141 mg/kg), chromium (97 to 157 mg/kg), lead (28.8 to 47 mg/kg), and zinc (21.4 to 65 mg/kg). Analyses of surface water samples from the on-site stream and landfill runoff collected in May 1979, indicate that no release of inorganic compounds has occurrred. Goldberg, Zoino Associates performed a four month exstensive investigation at the site from November 1988 to February 1989. It is reported that during this time 30 to 40 monitoring wells were installed on the site; the NUS on-site reconnaissance only found four of these monitoring wells.

Ref. Nos. 16, 17

SITE INSPECTION RESULTS

NUS Corporation collected 16 environmental samples from the Adirondack Steel property on November 15, 1990. The samples were analyzed under the Contract Laboratory Program for Target Compound List (TCL). Figure 3 provides a sample location map. Table 1 provides the site inspection sample results. Groundwater sample GW1 was collected from monitoring well 1 which is located on the southern part of the site near the D&H Railroad Track. Four surface water and three sediment samples were collected from the following locations: Surface water sample SW1 and sediment sample SED1 east of the landfill near the D& H Railroad Track, surface water sample SW2, surface water sample SW4 and sediment sample SED 2 from a stream at the southern base of the landfill, surface water sample SW3 and sediment sample SED3 upstream and west of the landfill. Eight soil samples from the following locations: Soil sample S1 near the southern end of the main building between two access rails, soil samples S2 and S12 near the eastern side of the main building in an area of stained soil, soil sample S3 also directly east off the main building among concrete piers, soil sample S4 at the northeast corner of the main building in an area of stained soil around a transformer storage area, soil samples S6 and S10 subsurface from within the landfill, and soil sample S11 from north of the landfill, near the property boundary as a background sample.



SAMPLE LOCATION MAP
ADIRONDACK STEEL