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Rev. 07/10/02

Document 9

REMEDIAL ACTION WORK PLAN
FOR
THE STORM SEWER LINES AND ON-SITE DITCH
KALAMAZOO PLANT
BENTELER INDUSTRIES

prepared for

BENTELER INDUSTRIES
GRAND RAPIDS, MICHIGAN

prepared by

WW ENGINEERING & SCIENCE
5555 Glenwood Hills Parkway, S.E.
Grand Rapids, Michigan 49588

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ATTACHMENTS

A Outline of the Community Relations Activities at the Benteler Industries Kalamazoo Plant

B Comparative Analyses of Alternatives

C Quality Assurance Project Plan (QAPP) for Addressing PCB-Impacted Ditch Sediments and Storm Sewer Lines at the Benteler Industries Kalamazoo Plant.

REMEDIAL ACTION WORK PLAN
FOR
THE STORM SEWER LINES AND ON-SITE DITCH
KALAMAZOO PLANT
BENTELER INDUSTRIES

1.0 INTRODUCTION

At the request of Benteler Industries (Benteler), WW Engineering and Science (WWES) has prepared the following work plan to address two activities at the Benteler facility in Galesburg, Michigan. These activities include: 1) the design of a remedial action plan (RAP) for removing polychlorinated biphenyl (PCB) containing sediments from the storm sewer drain lines at the facility; and 2) the design of a RAP for removal and disposal of PCB and other chemically contaminated sediments in the drainage ditch on the southern portion of the property (the current outfall for the storm sewer). Where appropriate, the work plan is designed to meet the regulatory requirements of the Michigan Environmental Response Act (P.A. 307 of 1982, as amended) (Act 307) and the Toxic Substance Control Act (TSCA).

The work plan is also designed to be in substantial compliance with the following specific requirements of the National Contingency Plan (NCP):

- A Health and Safety Plan will be prepared that will specify employee training and protective equipment and standard health and safety operating procedures that conform with 19 CFR 1910.120(1)(1) and (1)(2).

- Documentation supporting all activities relating to the remediation of storm sewer lines and ditch sediments, including the circumstances of the release, response actions taken, and an accurate accounting of costs incurred, will be maintained in a file. The original documents will be maintained at WWES' Grand Rapids office, and copies of all pertinent documents will also be maintained at the Benteler Kalamazoo facility.

- The work plan will comply with applicable or relevant and appropriate requirements (ARAR's) for remediation of on-site contamination pursuant to regulations developed under Michigan Act 307, TSCA, and the Resource Conservation and Recovery Act (RCRA). Specifically, cleanup standards generated pursuant to Act 307 will be

considered the controlling remedial goals. A detailed evaluation of ARAR's for the Benteler site is presented in Section 2.0

- When completed, the final work plan will be made available for community review and comment. Community comments will be addressed and, as appropriate, revisions to the proposed plan will be made. Attachment A presents an outline of the community relations work plan developed for the Benteler Industries Kalamazoo Plant. The primary purpose of the community relations activities is to ensure the public has an opportunity for involvement in site-related decisions. The community relations activities will allow for Benteler to be sensitive to local community concerns and provide an avenue for the prompt response to those concerns.

1.1 LOCATION

Benteler Industries is located at 9000 E. Michigan Avenue, Galesburg, Kalamazoo County, Michigan (NW 1/4 of the NE 1/4 Section 23, T2S, R10W). The site is bordered to the north by Michigan Avenue, to the south by an open field, to the east by a residence and open field, and to the west by an open field. The site location map is shown in Figure 1.

The facility is located approximately one-half mile north of Lake Morrow, an impoundment of the Kalamazoo River. The surface topography of the site slopes gently from north to south. Surface water drainage from manufacturing areas of the site is collected in the site storm sewer and then flows through an on-site drainage ditch to the south, towards Lake Morrow.

1.2 SITE BACKGROUND

The property has been used for manufacturing operations since 1955. Benteler began operations at the facility in 1989 and uses the facility for the manufacture of automotive parts.

Prior to 1973, the sanitary sewer lines at the facility discharged to the sewage treatment plant located south of the plant (Figure 2). Wastes were treated at the sewage treatment plant and discharged to the drainage ditch at a point south of the sewage plant. Storm water drains at the facility discharge to the drainage ditch at its origin, located directly adjacent to the north head wall south of the east parking lot (Figure 2). Prior to 1989, floor drains in the manufacturing area were also connected to the storm drain network.

1.3 PREVIOUS INVESTIGATIONS

DITCH

Previous investigations were conducted at the Kalamazoo Plant in order to identify any contamination present at the Benteler site, to determine the nature and extent of the contamination, and to determine the need for any removal action. The results of investigations conducted in 1990 and 1991 are presented in the March 1990 WWES report entitled ***Summary Report of the Plant Floor Decontamination*** and the July 1991 WWES report entitled ***Four Area Site Investigation***, respectively.

In addition to the two previously mentioned investigations, in 1989 WWES collected five sediment samples (S1 to S5) from the drainage ditch. The locations of these samples are shown in Figure 3. The sediment samples were analyzed for PCB's and the results of the analyses are presented in Table 1. As shown in the table, PCB's were detected in all five samples at concentrations ranging from 1.6 to 120 mg/kg. The PCB concentrations in all five of the samples exceeded the Type B soil criteria for PCB's of 1.0 mg/kg per Aroclor.

During the 1991 investigation, environmental samples were collected from the drainage ditch area, the storm sewer lines (both exterior and in the Butler building), and the former sewage treatment plant. The sediment sample locations for the drainage ditch area (Figure 3) were chosen based on guidance presented in the Michigan Department of Natural Resources (MDNR) draft document entitled, ***Verification of Soil Remediation*** (October 26, 1990). All of the sediment samples (20) from the drainage ditch were analyzed for PCB's and four of the samples were analyzed for volatile organic compounds (VOC's) and inorganic compounds.

The analytical results for the sediment samples are presented in Tables 1 through 3. Nine sediment samples contained detectable levels of PCB's. However, only one of these samples contained PCB's (Aroclor 1248) at a concentration exceeding its Type B soil criterion. This sample was collected from location 1+15 (115 feet south of the outfall) near the north headwall of the ditch.

Several VOC's were detected in the sediment samples collected from the drainage ditch. Only 1,4 dichlorobenzene (sample 1+15), however, was detected at a concentration exceeding its Type B soil criterion.

Several metals were also detected in the sediment samples at concentrations exceeding their respective Type B soil criteria (predominantly for the protection of ground water). No analysis of background metal concentrations has been conducted. Furthermore, no site specific leach tests (e.g., the TCLP test) have been conducted at the site to determine if indeed the metals in these sediments are present at concentrations which could present a threat to ground water.

STORM SEWERS

Sediment samples from the storm sewer line were also collected and analyzed for PCB's. Of four sediment samples collected from the storm sewer, Aroclor 1248 was detected in two samples and Aroclor 1260 was detected in four samples. Each of these samples contained PCB's at concentrations exceeding the Type B soil criteria of 1 mg/kg. The highest detected concentration of PCB's was 12 mg/kg of Aroclor 1248 in sample SS-4.

FORMER SEWAGE TREATMENT PLANT

Three sludge/sediment samples were collected from the former sewage treatment plant. One sample was collected in the digester and the other two samples were collected from the primary and final clarifier (Figure 3). PCB's were detected in only one of these samples. Aroclor 1260 was detected in the sludge sample collected from the digester at a concentration of 0.046 mg/kg. This level is below the Type B soil criterion of 1 mg/kg.

2.0 REGULATORY OVERVIEW

As documented in the above referenced reports, sediments containing PCBs are present in the storm sewer and drainage ditch at the Benteler site. Human or ecological exposures to these sediments could result in potential adverse human health and ecologic affects. Under current site conditions (PCB impacted sediments having been identified in stretches of the ditch immediately downstream from the site outfall), potential ecologic impacts are likely greatest for terrestrial species residing near the ditch. Potential aquatic impacts would be somewhat limited due to the general low flow and intermittent nature of water in this ditch. In the future, contaminants in the drainage ditch could migrate further down the ditch into the adjacent impoundment of the Kalamazoo River. Such migration, if it were to occur, could present a potentially greater impacts to the aquatic environment.

Currently, human exposures to contaminants in the sediment are limited by; 1) its location outside normal areas of worker activity at the site, 2) the relatively inaccessible nature of those areas that are impacted, and 3) the overall small percentage of the ditch that is impacted. Potential use of the ditch area by neighboring residents is considered small. Trespassers or other site visitors are not routinely observed near any impacted area. While there is currently a low potential for significant human exposure to the contaminants in the ditch, under potential future uses of the site, such exposures could be more significant.

To address the potential human health and ecologic risks presented by the impacted sediments, cleanup actions consistent with Michigan Act 307 and the NCP are presented in this plan. Consistent with the NCP, cleanup levels required to address the potential human health and ecological risks at sites were determined from an evaluation of federal or state environmental or public health laws that can reasonably be applied to the site. These "applicable or relevant and appropriate requirements" (ARARs) consist, among other things, of specific environmental criteria, environmental performance standards, monitoring requirements, and RCRA and TSCA requirements related to cleanup actions and waste handling and disposal.

The NCP specifies that state standards that are promulgated, identified by the state in a timely manner, and are more stringent than Federal requirements may be applicable or relevant and appropriate (40 CFR 300.400(g)(4)). The MDNR has identified rules published pursuant to the Michigan Environmental Response Act (P.A. Act 307 of 1982, as amended) (Act 307) as ARARs, or potential ARARs, for actions conducted pursuant to the NCP in the State of Michigan (Letter of D. Rector, MDNR, August 28, 1990). This designation has been agreed upon by U.S. EPA.

For the contaminants of concern at this site, cleanup criteria established pursuant to Part 7 of the Act 307 Administrative Rules have been selected as the target ARAR's. This remedial action Work Plan is designed, therefore, to meet regulatory requirements established in the Administrative Rules for Act 307. The Act 307 rules provide a three-tiered approach (Type A, B, or C) for determining cleanup levels at impacted sites. Compliance with Type A criteria is achieved when the concentrations of contaminants in any affected environmental media are below background levels or the method detection limit (MDL) for the contaminant. The Type B and Type C cleanup approaches are both risk-based; they differ in the degree of assumptions used in the assessment of risk, in the point of compliance, and in the degree of post-cleanup responsibilities and requirements.

The Type B cleanup criteria are designed to be protective of human health during a lifetime of exposure to contaminants. The Type B criteria for carcinogenic compounds are representative of an incremental risk of one in one million. The Type B criteria for non-carcinogenic compounds are established to prevent adverse health effects. The Type B cleanup criteria use standard exposure assumptions developed by the MDNR and specified in the Administrative Rules for Act 307. Because the cleanup standards must be achieved at every point within the site, the Type B cleanup approach has no post-closure requirements or responsibilities.

The Type C cleanup approach is based on similar risk assessment procedures used in the Type B approach but allows site-specific information to be included in the assessment of risks posed by contaminants at the site. Unlike the Type B approach, the Type C approach allows on-site containment of hazardous substances. This moves the point of compliance from every point within a site, as in Type A or Type B, to the point of exposure by human or environmental receptors. This approach generally requires extensive documentation in the form of remedial investigations and feasibility studies, and financial assurance mechanisms. These cleanups are generally most appropriate where there are large volumes of contaminated material or where it is not feasible to remove the contamination.

The remedial actions to be undertaken at the Benteler site are designed to meet the Type B soil criteria for PCB's. The Type B soil criteria are currently established at 1 mg/kg per individual Aroclor (MERA Operational Memorandum #8, Revision 1, March 16, 1992).

Part 7 of the Act 307 Administrative Rules does not specifically address appropriate cleanup levels for sediments within a storm sewer line. As the sediments in these lines are a potential source of ongoing PCB release and potential sediment contamination, this plan is designed to remediate sediments which could contain PCB's at concentrations greater than 1 mg/kg per Aroclor.

Any waste materials generated during these remedial actions will be disposed at regulated off-site disposal facilities in accordance with regulations established pursuant to the State of Michigan, and relevant federal regulations including RCRA and TSCA.

3.0 ACTION SPECIFIC WORK PLANS

This Work Plan addresses two areas of action at the Benteler site; removal of PCB containing sediments from the storm sewer lines, and the removal of PCB containing sediments from the drainage ditch area. The work plan will be implemented in a sequential manner beginning with remediation and verification of remediation of the storm sewer lines. Following verification that PCB's are no longer being discharged from this line, the on-site ditch will be remediated.

The work plans for the storm sewer lines and the drainage ditch are divided into three separate phases, a remediation phase, a verification of remediation phase, and a waste characterization phase. Waste generated during each step will be disposed off-site according to applicable RCRA/TSCA regulations. The following discussion outlines the scope of work for each of the areas of investigation at the Benteler site.

3.1 STORM SEWER LINES

3.1.1 REMEDIATION

As discussed above, previous sediment sampling in the storm sewer lines at the site indicated the presence of PCB's in samples from several discrete areas. Based on these results, it is assumed that residual levels of PCB's could be present in all areas of the storm sewer beneath and downstream from active manufacturing areas. A diagram of these storm sewer lines at the Benteler facility is presented in Figure 2. As seen in this figure, it is estimated that 2,240 feet of storm sewer lines will require remediation.

In accordance with 40 CFR 300.430(e)(9)(iii), a comparative analyses of remedial alternatives to determine the most feasible remedial alternative for the storm sewer lines was conducted. The results of the comparative analyses are presented in attachment B. Based on this analyses, high pressure flushing was considered the most feasible alternative for remediation of the storm sewer lines. Using this technique, sections of the storm sewer will be accessed, a high pressure hose with a back spraying head will be inserted, the hose will be allowed to propel itself upstream and then retrieved downstream. The aqueous rinsate will be applied at approximately 1,500 to 1,700 psi at a flow rate of approximately 60 gpm. Storm sewers will be flushed beginning with upstream sections and working downwards towards the outfall. Sections of the storm sewer line will be accessed by manhole, or if necessary, by excavation and construction

of temporary access ports. Non-manhole access may be necessary for sections of pipe having no current manhole and storm sewer line turns of 90 degrees.

Rinsate and sediments will be collected by vacuum hose at the point of access. Rinsate not captured by suction hose will be collected in a temporary tank setup at the outfall of the storm sewer line. Following collection in vacuum trucks, all rinse waters will be transferred to temporary tanks setup on-site prior to off-site disposal.

Each line will be flushed four times. The first two flushes will be completed with a high pH aqueous solution. The final (third and fourth) flushes will be performed using water only. Rinsates from flushes one and two will be consolidated in separate temporary tanks from rinseates from flushes three and four.

Sediments will be separated from the aqueous phase rinseates through operation of a separator while off loading the vacuum units. Collected sediments will be staged in drums and stored on-site.

3.1.2 VERIFICATION

After the storm sewer lines have been flushed, water samples will be collected from the outfall to verify that PCB's are not detectable in the storm sewer discharge. Sampling at the outfall will be conducted in two phases with one sample collected immediately following remediation and one sample collected approximately one-week following remediation. Both filtered and unfiltered water samples will be analyzed. Verification will also include visual inspection of lines at points of access to determine the presence of unremoved sediment. The pipeline will be considered remediated when visible sediments are not present and PCB's are not detected in the outfall water sample. If significant quantities of sediments remain or elevated PCB concentrations are observed in the outfall water samples following the remedial activities, Benteler will be consulted prior to any potential additional actions.

After remediation of the storm sewers is complete, WWES will verify that floor drains in the building are sealed and do not allow for any discharge from indoor manufacturing areas to the storm water sewer lines.

3.1.3 WASTE CHARACTERIZATION

It is estimated that the storm sewer line rinsing will generate 84,000 gallons of rinsate. As discussed above, the rinsate generated during the high pressure washing of the sewer line will be collected by vacuum truck or in the final tank placed at the outfall. Following storm sewer flushing, all waters will be consolidated in temporary on-site tanks. Two aqueous composite samples of rinsate will be collected, one from flushes using the high pH aqueous solution (flushes 1 and 2), and the second from the 3rd and 4th water rinses. The two composite samples will be submitted for laboratory analyses for PCB's.

The analytical data will be used to classify the RCRA/TSCA status of the rinsate. If no PCB's are detectable in the aqueous phase rinseates, the rinsate will be disposed by transport to the municipal waste water treatment facility. In the event that PCB's are detectable in the rinsate at concentrations exceeding acceptable levels (as established by the municipal wastewater authority), the water will be filtered with a portable, on-site, activated carbon unit, prior to discharge to the sanitary sewer.

Sediments separated from the aqueous phase rinsate or that settle in the bottom of the holding tanks will be containerized in drums, characterized as to PCB content, and disposed with other sediments collected during remediation of the on-site ditch (described below). This work plan assumes that sediments on the bottom of these tanks will be sufficiently dry to pass a paint filter test. If sediments failing to pass a paint filter test are generated during this step, additional stabilizing agents will be added during containerization.

3.2 DRAINAGE DITCH AREA

3.2.1 REMEDIATION

Previous investigations (WWES 1989 and 1991) have defined the lateral extent of PCB and other VOC impacts in surficial sediments in the on-site drainage ditch. PCB's were present at concentrations exceeding Type B soil criteria in surficial sediment samples collected from the drainage ditch upstream of the former waste water treatment facility. The area of exceedances extends from the origin of the ditch at the north head wall to a point 600 feet downstream (see Figure 3). Beyond the 600 foot mark, PCB's were detected in the sediment samples at concentrations below Type B soil criteria. In addition, PCB's were not detected in the three samples collected at the 1500 foot mark (the furthest sampling location from the point of origin). Based on this information, it

appears that the horizontal extent of PCB contamination in the drainage ditch has been defined.

As discussed in Section 1.0, four samples collected during the 1991 investigation were analyzed for metals. As seen in Table 3, two of these samples (from the ditch bottom) have concentrations of several metals above Type B soil criteria for the protection of ground water (i.e. the default value of 20 X the Type B ground water criteria). The location of one of these samples was 625 feet south of the headwall, which is beyond the area where PCB levels above Type B soil criteria were observed. Before any remedial action is conducted on the drainage ditch, it is necessary to determine if the metals are of potential concern with respect to Act 307. Therefore, WWES recommends that a soil sample be collected from the 625 foot location prior to conducting remediation and submitted for total constituent and TCLP metals analyses. Under Act 307, a TCLP or comparable leach test is an alternative method (i.e., other than the default 20 X value) for demonstrating compliance with the Type B ground water impact pathway. The analytical results for the leachate analyses will be evaluated by direct comparison to the Type B ground water criteria. If, after the results of the leachate test are evaluated, there are still exceedances of Type B criteria for metals, a comparison of the total constituent metals concentrations to appropriate background levels may be conducted.

In accordance with 40 CFR 300.430(e)(9)(iii), a comparative analyses of remedial alternatives to determine the most feasible remedial alternative for the drainage ditch area was conducted. The results of the comparative analyses are presented in attachment B. Based on this analyses, the remediation of the drainage ditch area will consist of excavation of soils impacted with PCBs above Type B soil criteria. The proposed total extent of the excavation is shown on Figure 4. The area of excavation will extend approximately 600 feet south from the origin of the drainage ditch at the north headwall. The width of the excavation will measure approximately 4 to 5 feet, depending on the width of the ditch at any particular point. Soils/sediments from the drainage ditch will be excavated to a depth of 2 feet.

Because of differences in regulatory requirements based on PCB content, segregation of different areas of sediment will be conducted during excavation. Sediments in areas likely to be above 25 ppm PCB's will be excavated and staged separately from sediment from areas where the PCB content is likely to be less than 25 ppm. Figure 5 presents a diagram of the four separate areas in the proposed staging system. These areas include:

Area 1: sediments from the first 200 feet of the ditch from a depth of 0 to 1 feet.
Area 2: sediments from 200 to 600 feet from a depth of 0 to 1 feet.
Area 3: sediments from the first 200 feet from a depth of 1 to 2 feet.
Area 4: sediments from 200 to 600 feet from a depth of 1 to 2 feet.

The estimated total volume of sediments that will be excavated is approximately 250 yds^3. Allowing for expansion of excavated material (using a factor of 1.3), it is estimated that 330 yds^3 will be generated for off-site disposal. The estimated volume for each area described above is:

Area 1: 55 cubic yards
Area 2: 110 cubic yards
Area 3: 55 cubic yards
Area 4: 110 cubic yards

In order to limit the quantity of water in the ditch sediments, remedial activities will be initiated no sooner than 48-hours after significant rainfall and no-sooner than 24-hours following elimination of all facility related sources of discharge to the sewer and ditch. If water remains in the ditch following these measures, water will be pumped from the location of the area of excavation and discharged further downstream or into an on-site tank prior to excavation. Water collected in this manner will be discharged back to the ditch following sediment removal activities. Excessive water in the ditch sediments (evidenced by failure to pass a paint filter test) will require additional staging and stabilization/solidification steps not included in this work plan.

Sediments will be excavated by a track mounted back-hoe. Assuming that pre-approval of a disposal location is obtained prior to initiating the excavation (see waste characterization below), and sediments are dry enough to pass a paint filter test, excavated sediments will be placed directly into dump trucks for immediate off-site disposal.

3.2.2 VERIFICATION SAMPLING

Verification samples will be collected from the floor of the excavation. Since the previous sampling indicated that the sidewalls of the ditch were not impacted, and the depth of excavation will be no more than 2 feet, sidewall verification samples will not be collected. Based on the above dimensions for the excavation, the area of excavation will measure approximately 3,000 ft^2. In accordance with the MDNR draft guidance document for verification sample collection, five verification soil samples will be

collected from the floor of the excavation to demonstrate removal of impacted soils. The approximate locations for the verification samples are shown in Figure 4.

All of the verification samples will be analyzed for PCB's. In addition, the verification sample collected near the 100 foot mark will be analyzed for MDNR Scan 1 VOC's. Previous sampling at this location identified 1,4-dichlorobenzene at a concentration above its Type B soil criterion. This verification sample will determine if there has been any vertical migration of VOC's in soils.

If necessary based on the results of the previously described metals evaluation, verification samples may also be analyzed for inorganic parameters. All laboratory analysis will be conducted at the WWES Environmental Laboratory in Grand Rapids, Michigan. The analytical results will be compared to the applicable Type B soil criteria. Remediation will be considered complete in this area if all verification sample results are below applicable Type A and/or B soil criteria. If one or more soil verification samples indicates the residual presence of PCB's or VOC's at concentrations above the Type B criteria, additional soils may be excavated in a second phase and additional verification samples collected in the excavated area.

3.2.3 WASTE CHARACTERIZATION AND DISPOSAL

WWES anticipates obtaining pre-approval for disposal of sediment off-site prior to onset of remedial activities. Depending on the off-site disposal facility selected, pre-approval will be based either on the existing sampling data or additional soil characterization samples performed at the request of the disposal facility. Additional sampling which may be necessary to obtain disposal approval could include the collection of sediment composite samples and subsequent analysis for PCB's, VOC's, and TCLP analyses for metals.

It is anticipated that sediments from Area 1 will be disposed at a TSCA-approved treatment, storage, and disposal (TSD) facility capable of accepting soils with a PCB content greater than 50 mg/kg. WWES anticipates that sediments from Areas 2, 3, and 4 (and stockpiled sediments from the storm sewer remediation) can be disposed at a Michigan Act 641 Type II Landfill.

3.3 BACKFILLING OF DITCH

Following excavation and off-site removal of sediments and verification that remediation is complete, the storm water ditch will be backfilled, if necessary, to restore its pre-excavation flow pattern. Backfill soil, if necessary, will be obtained from adjacent areas of the Benteler site.

3.4 RELEASE REPORTING

If, during remediation activities a release is discovered at the Benteler site, the release will be reported to the National Response Center. The report will include the location of the release, the types of materials released, an estimate of the quantity of material released, the possible source of the release, and the date and time of the release.

4.0 ANALYTICAL METHODS

All soil, sediment, and water analyses will be conducted by the WWES Analytical Laboratory in Grand Rapids, Michigan.

4.1 STORM SEWER LINES

4.1.1 VERIFICATION SAMPLES

Verification water samples collected after flushing the sewer lines will be analyzed for PCB's using U.S. EPA analytical method 8080. Analysis of both filtered and unfiltered water samples will be conducted.

4.1.2 WASTE CHARACTERIZATION SAMPLES

The composite water samples used to characterize the flush water collected after sewer line remediation will be analyzed for PCB's using U.S. EPA analytical method 8080. This sample will not be filtered prior to analysis. If necessary, an additional composite water sample(s) will be analyzed, following carbon adsorption treatment, if the initial composite sample is found to contain PCB's at concentrations exceeding applicable disposal criteria.

Sediments collected from the storm sewer line will be analyzed for PCB's using U.S. EPA analytical method 8080.

4.2 DRAINAGE DITCH AREA

4.2.1 VERIFICATION SAMPLES

The soil/sediment verification samples will be analyzed for PCBs according to U.S. EPA analytical method 8080 and VOCs according to U.S. EPA analytical method 8240. Results will be reported on a dry weight basis.

4.2.2 WASTE CHARACTERIZATION SAMPLES

As stated above, previously collected data combined with potential additional data (e.g., TCLP analyses, composite soil/sediment total constituent analyses) will be used to characterize the excavated material prior to disposal. Any additional samples will be analyzed for PCB's using U.S. EPA analytical method 8080. Results will be reported on a dry weight basis.

4.3 QUALITY ASSURANCE/QUALITY CONTROL

WWES will implement standard quality assurance/quality control (QA/QC) procedures to ensure that a high standard of quality is maintained throughout the duration of this project. Attachment C presents a copy of the quality assurance project plan (QAPP) developed for the Benteler site. WWES' Laboratory Services also routinely analyzes reagent and method blanks to ensure that laboratory chemicals are pure and analytical procedures are not potential sources of sample contamination.

4.4 CHAIN OF CUSTODY

Each sample will be logged onto a chain-of-custody form upon labeling and completing the preservation process in the field. The chain-of-custody form will be maintained throughout the collection, transport, and analyses of each sample to document that authorized persons, only, have handled the samples. Following sample analysis the form will become a permanent record that will be kept on file with the analytical results.

5.0 HEALTH AND SAFETY PLANS

A health and safety plan will be prepared, prior to the initiation of field activities. The health and safety plan will provide for the protection of WWES staff and its contractors. The health and safety plan will specify that all work described in this work plan will be performed in accordance with the provisions, guidelines and procedures of the Site

Health & Safety Plan and the requirements of applicable Occupational Safety and Health Administration (OSHA) regulations in 29 CFR Part 1910 and/or 29 CFR Part 1926. The health and safety plan will be prepared assuming Level D conditions at the site. The health and safety plan will be reviewed and approved by WWES' Corporate Health and Safety Officer prior to initiation of any on-site activities.

6.0 DATA EVALUATION AND REPORTING

WWES will prepare a written closure report which documents the remediation activities conducted at the storm sewer and drainage ditch areas. This report will include results of sampling performed to verify that these areas have been remediated in accordance with the Act 307 rules and regulations. The closure report will document that the remediation activities meet the statutory requirements of Act 307 and that waste disposal was conducted within the regulatory framework of applicable state and federal waste disposal regulations (including but not limited to RCRA and TSCA).

TABLES

Table 1
Drainage Ditch Area
Analytical Results for PCB's in Soil Samples
1989
(Units in ug/kg)

Site Name: Location: Sample Date: Sample Id:	M.L. ACT 307 Type B Criteria	SS-1 Below Pipe 10/02/93 26203		SS-2 25' North 10/02/93 26204		SS-3 Bet Pip&Skim 10/02/93 26205		SS-4 N. of Skim 10/02/93 26206		SS-5 50' S Skim 10/02/93 26207	
Parameter		Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit
PCB: Aroclor 1242	1000	ND	13000	ND	8000	ND	4000	ND	700	ND	100
PCB: Aroclor 1248	1000	ND	13000	120000	8000	ND	4000	5100	700	ND	100
PCB: Aroclor 1254	1000	ND	13000	ND	8000	ND	4000	ND	700	ND	100
PCB: Aroclor 1260	1000	64000	13000	ND	8000	43000	4000	1500	700	1600	100

Table 1, cont'd
Drainage Ditch Area
Analytical Results for PCB's in Soil Samples
(1991)
(Units in ug/kg)

Site Name:	M.I.	0+62		2+30		4+38		5+20		7+25		1+15		3+25		6+25		7+25		9+35		10+00	
Location:	ACT 307	W. Wall		W. Wall		W. Wall		W. Wall		W. Wall		Ditch		Ditch		Ditch		Ditch		Ditch		Ditch	
Sample Date:	Type B	05/07/91		05/07/91		05/07/91		05/07/91		05/08/91		05/07/91		05/07/91		05/08/91		05/08/91		05/08/91		05/08/91	
Sample Id:	Criteria	E64634		E64636		E64639		E64651		E64640		E64649		E64638		E64652		E64641		E64643		E64644	
Parameter		Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit
PCB Aroclor 1242	1000	ND	33	ND	33	ND	33	ND	33	ND	33	ND	13000	ND	120	ND	250	ND	120	ND	120	ND	400
PCB Aroclor 1248	1000	ND	33	ND	33	ND	33	ND	33	ND	33	84000	13000	190	120	ND	250	ND	120	ND	120	ND	400
PCB Aroclor 1254	1000	ND	33	ND	33	ND	33	ND	33	ND	120	ND	13000	ND	120	ND	250	ND	33	ND	33	ND	60
PCB Aroclor 1260	1000	ND	33	ND	33	ND	33	ND	33	ND	33	ND	13000	180	120	900	250	112	33	33	33	90	60

Site Name:	M.I.	11+25		12+50		14+00		14+25		14+50		1+46		2+30		5+20		7+20		Tran. Area		Tran. Area	
Location:	ACT 307	Ditch		Ditch		Ditch		Ditch		Ditch		E. Wall		E. Wall		E. Wall		E. Wall		W. Sample		E. Sample	
Sample Date:	Type B	05/08/91		05/08/91		08/08/91		08/08/91		08/08/91		05/07/91		05/07/91		05/07/91		05/08/91		05/08/91		05/08/91	
Sample Id:	Criteria	E64645		E64646		E70735		E70736		E70737		E64635		E64637		E64650		E64642		E64648		E64647	
Parameter		Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit
PCB Aroclor 1242	1000	ND	33	ND	120	ND	33	ND	33	ND	33	ND	33	ND	33	ND	33	ND	33	ND	33	ND	33
PCB Aroclor 1248	1000	ND	33	ND	120	ND	33	ND	33	ND	33	ND	33	ND	33	ND	33	ND	33	ND	33	ND	33
PCB Aroclor 1254	1000	ND	33	ND	33	ND	33	ND	33	ND	33	ND	33	ND	33	ND	33	ND	33	ND	33	ND	33
PCB Aroclor 1260	1000	60	33	110	33	ND	33	ND	33	ND	33	ND	33	40	33	ND	33	ND	33	ND	33	ND	33

BE 000057

Table 2
Drainage Ditch
Analytical Results for Inorganics in Soil Samples
(Units in mg/kg)

Site Name: Location: Sample Date: Sample Id:	M.I. ACT 307 Type B Criteria	Detection Limit	5+20 W. Sidewall 05/07/91 E64651	3+15 Ditch 05/07/91 E64649	6+25 Ditch 05/08/91 E64652	5+20 E. Sidewall 05/07/91 E64650
Parameter						
Arsenic, total	0.0004	0.025	2.11	5.38	4.75	5.75
Barium, total	NA	0.40	16	219	86	24
Cadmium, total	0.08	0.040	0.095	9.17	8.63	0.093
Chromium, total	0.6	0.40	4.7	145	447	5.4
Copper, total	NA	0.60	7.2	590	457	8.5
Lead, total	NA	1.0	6.4	588	376	11
Mercury, total	0.04	0.05	ND	0.78	0.566	ND
Selenium, total	0.2	0.05	ND	0.217*	0.729	ND
Silver, total	0.4	0.0002	0.032	1.7	4.4	0.034
Zinc, total	20	0.40	15	598	1880	15

Value exceeds Type B Criteria

ND = Non Detectable
NA = Not available
**** = Quality control performance criteria not met for this parameter, all other parameters fell within acceptable quality control limits.***

BE 000058

Table 3
Drainage Ditch
Analytical Results for Volatile Organic Compounds in Soil Samples
(Units in ug/kg)

Site Name: Location: Sample Date: Sample Id:	M.I. ACT 307 Type B Criteria *	Detection Limit	5+20 W. Sidewall 05/07/91 E64651	1+15 Ditch 05/07/91 E64649	6+25 Ditch 05/08/91 E64652	5+20 E. Sidewall 05/07/91 E64650
Parameter						
Benzene		10	ND	ND	ND	ND
Bromodichloromethane		10	ND	ND	ND	ND
Bromoform		10	ND	ND	ND	ND
Bromomethane		10	ND	ND	ND	ND
Carbon tetrachloride		10	ND	ND	ND	ND
Chlorobenzene	2000	10	ND	500	ND	ND
Chlorodibromomethane		10	ND	ND	ND	ND
Chloroethane		10	ND	ND	ND	ND
Chloroform		10	ND	ND	ND	ND
1,1-Dichloroethane		10	ND	ND	ND	ND
1,2-Dichloroethane		10	ND	ND	ND	ND
1,1-Dichloroethylene		10	ND	ND	ND	ND
trans-1,2-Dichloroethylene		10	ND	ND	ND	ND
1,2-Dichloropropene		10	ND	ND	ND	ND
cis-1,3-Dichloropropylene		10	ND	ND	ND	ND
trans-1,3-Dichloropropylene		10	ND	ND	ND	ND
Ethyl benzene	600	10	ND	98	16	ND
Methylene chloride		10	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane		10	ND	ND	ND	ND
Tetrachloroethylene		10	ND	ND	ND	ND
Toluene	800	10	ND	31	ND	ND
1,1,1-Trichloroethane		10	ND	ND	ND	ND
1,1,2-Trichloroethane		10	ND	ND	ND	ND
Trichloroethylene		10	ND	ND	ND	ND
Trichlorofluoromethane		10	ND	ND	ND	ND
Vinyl chloride		10	ND	ND	ND	ND
Xylene	400	10	ND	400	ND	ND
cis-1,2-Dichloroethylene		10	ND	ND	ND	ND
1,2-Dichlorobenzene	10000	10	--	780	--	--
1,3-Dichlorobenzene	NA	10	--	240	--	--
1,4-Dichlorobenzene	20	10	--	410	--	--

ND = Non Detectable
**** = Provided for detected chemicals only***
NA = Not available
-- = Not analyzed

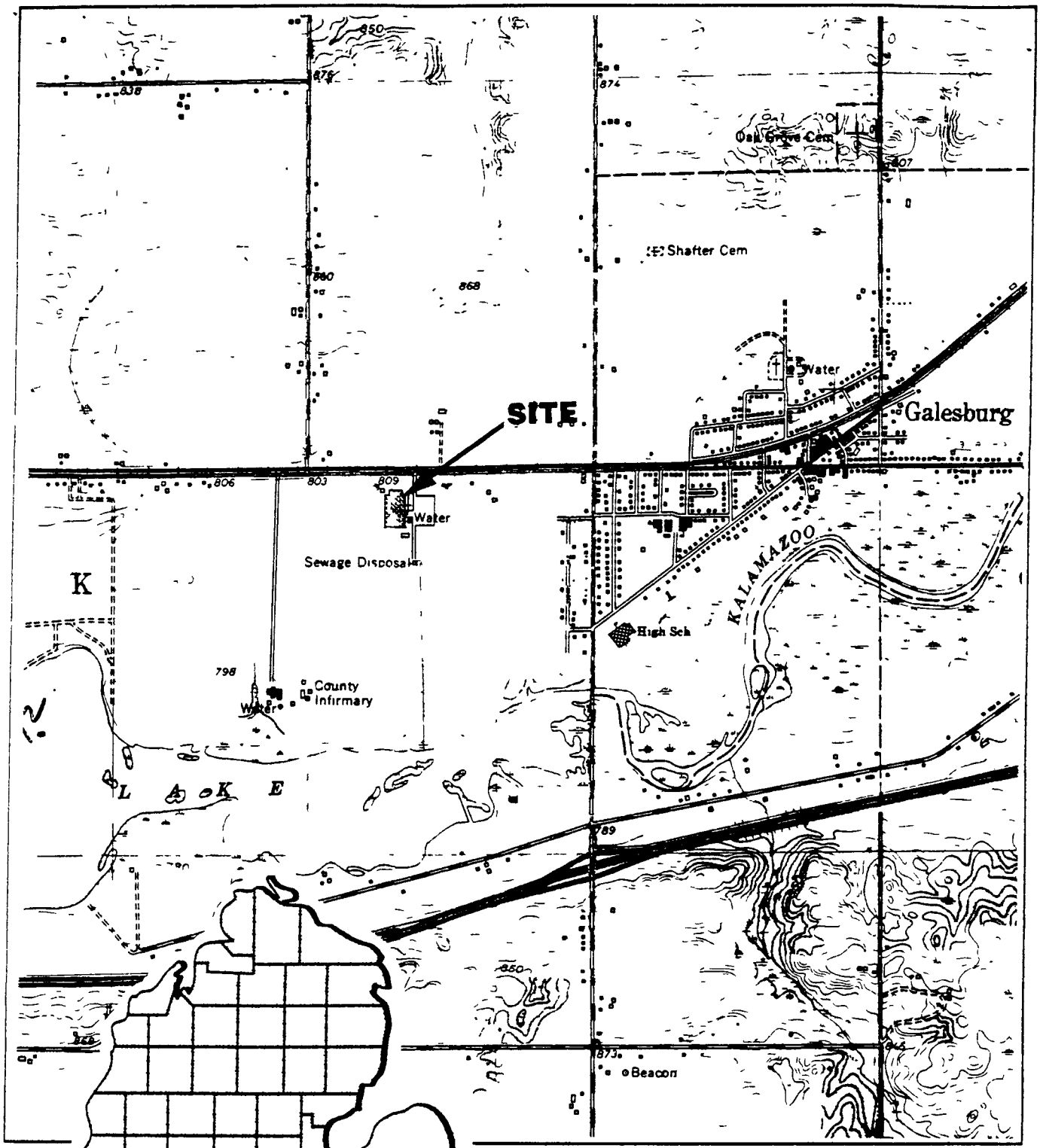
Value exceeds Type B Criteria

Table 4
Sewage Treatment Plant
Analytical Results for Sludge Samples
(Units in ug/kg)

Site Name:	Final Clarifier		Digester Sludge		Primary Clarifier	
Sample Date:	05/02/91		04/30/91		05/03/91	
Sample Id:	E64239		E64241		E64359	
Parameter	**Result**	**Detect Limit**	**Result**	**Detect Limit**	**Result**	**Detect Limit**
PCB: Aroclor 1242	ND	33	ND	240	ND	33
PCB: Aroclor 1248	ND	33	ND	240	ND	33
PCB: Aroclor 1254	ND	33	ND	33	ND	33
PCB: Aroclor 1260	ND	33	46	33	ND	33

ND = Non Detectable

FIGURES



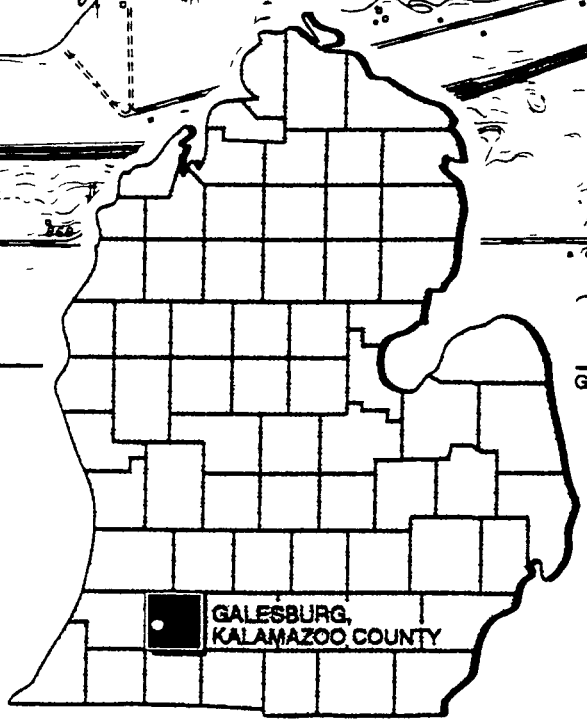


Figure 1

SITE LOCATION MAP

Benteler Industries
Galesburg, Michigan

October 1992 22433

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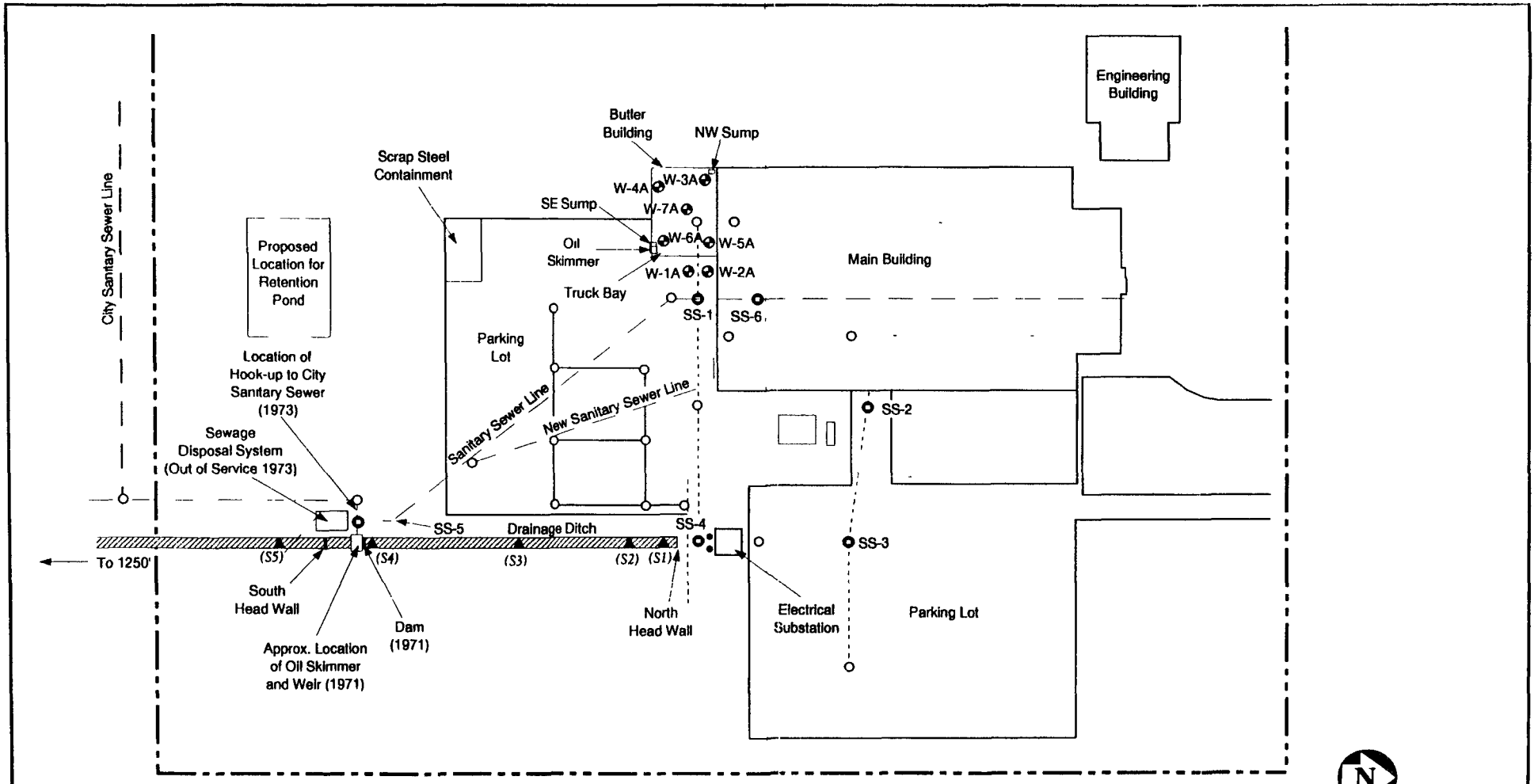
BE 000062



LEGEND

- Manhole Location
- Manhole Sample Location
- Wipe Sample Location
- Surface Soil Sample Location
- Approximate Location of Previous Sample (10/2/89)
- Storm Sewer Line
- Sanitary Sewer Line

Figure 2

Site Map

Benteler Industries
Galesburg, Michigan

October 1992

22433

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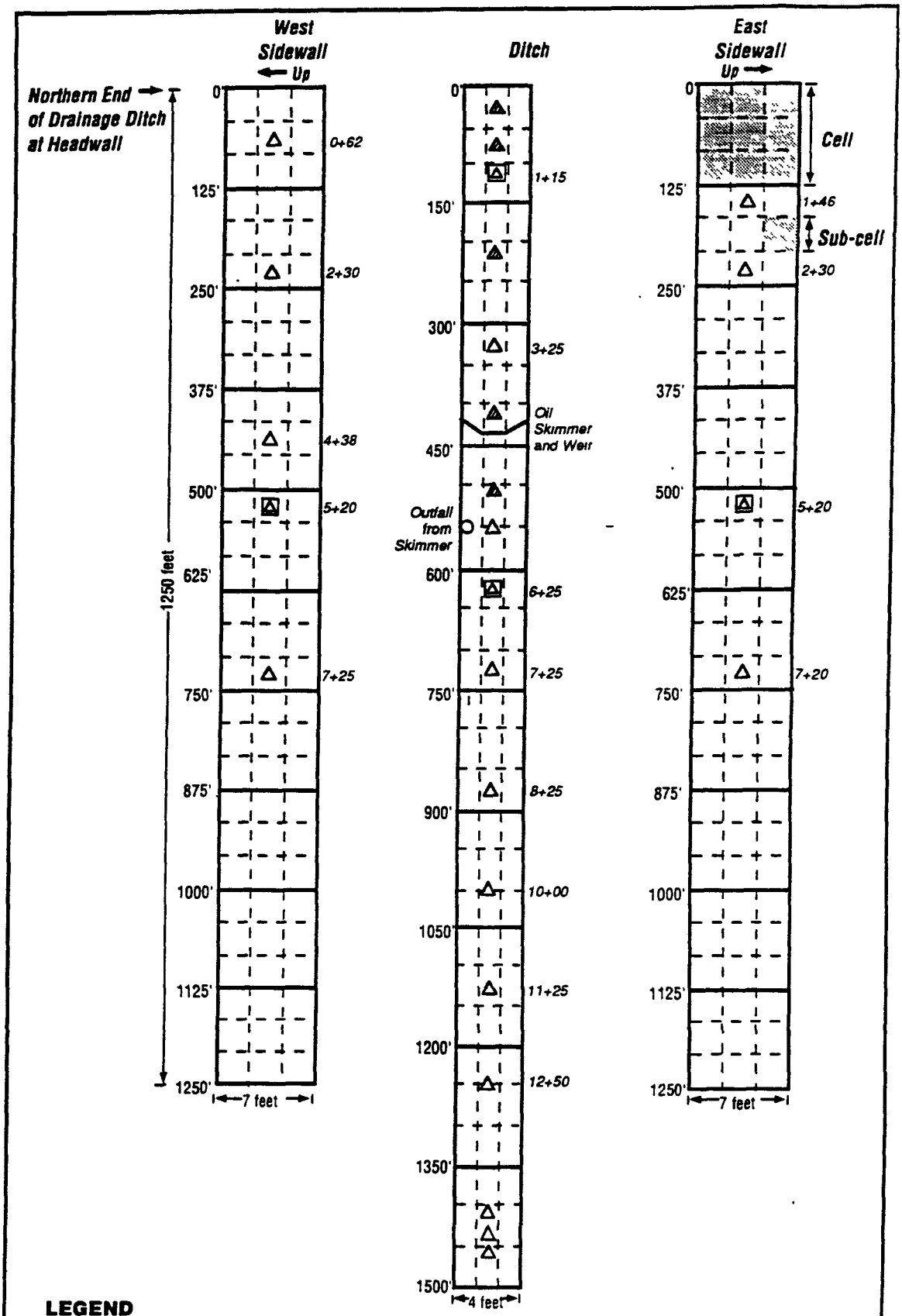
BF 000063



LEGEND

- Approximate Location of Soil Samples Collected 10/02/89
- Total Analysis (VOC's & Metals) Collected 5/07/91
- Soil Sample Locations at 0 to 0.5 Foot Depth Collected 5/07/91

Figure 3

Drainage Ditch Sample Locations

BENTELER INDUSTRIES
Galesburg, Michigan

October 1992

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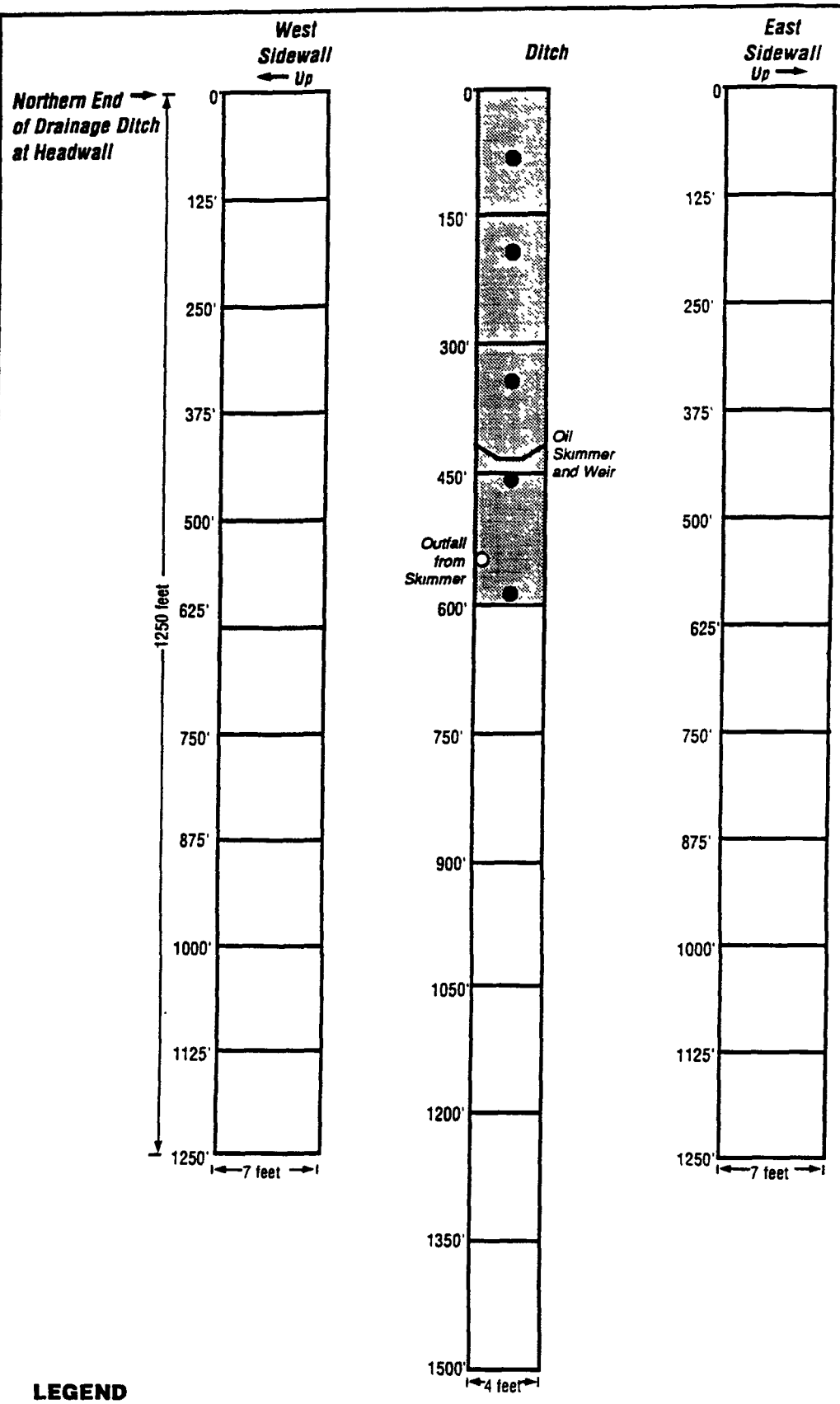

LEGEND

Proposed Area of Excavation

Approximate Location of Verification Samples

Figure 4

Drainage Ditch Proposed Area of Excavation

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Galesburg, Michigan

October 1992

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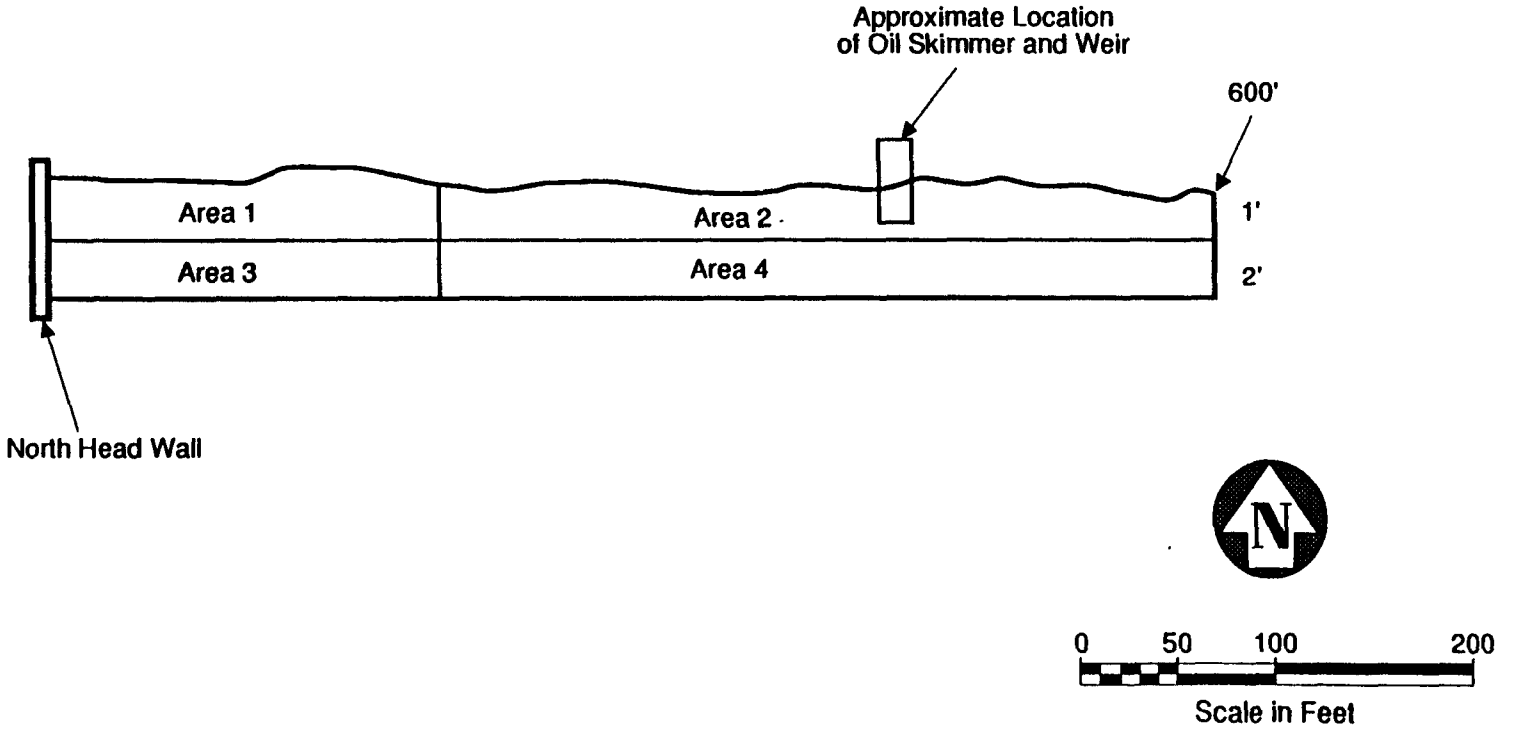

Figure 5

Cross-Section Showing Areas of Excavation at the Drainage Ditch

BENTELER INDUSTRIES

Galesburg, Michigan

November 1992

22433

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BE 000066

Attachment A

Outline of the Community Relations Activities at the Benteler Industries Kalamazoo Plant

ATTACHMENT A

OUTLINE OF THE COMMUNITY RELATIONS ACTIVITIES AT THE BENTELER INDUSTRIES KALAMAZOO PLANT

This attachment outlines the community relations activities for the remedial action work conducted at the Benteler Industries facility located in Kalamazoo, Michigan. This community relations work plan for the Benteler Industries is prepared in accordance with the requirements contained in 40 CFR 300.700(c)(6). The community relations activities for the Benteler site will consist of a series of discrete tasks. Each of these tasks is intended to insure that sufficient information is provided to interested citizens regarding the remedial activities at the site and to allow for public input into the remedy selection. The following is a description of each of these tasks.

Task 1 Designation of Project Spokesperson

In accordance with 40 CFR 300.415(m)(1), a project spokesperson will be designated. The project spokeperson will be available to inform the community of all actions taken concerning the remedial activities at the Benteler site. The project spokesperson will be responsible for responding to all citizen inquiries and will coordinate all press releases regarding remedial activities at the site.

Task 2 Publishing of Notice of Availability of Project Plans

In accordance with 40 CFR 300.415(m)(2)(i), within 60 days of the initiation of remedial activities at the Benteler site, a notice of the availability of a summary of the proposed plan and the rationale for the selection of the proposed plan will be published in the local Galesburg newspaper.

Task 3 Public Comment Period

A public comment period of not less than 30 days from the time the summary of remedial activities is made available for public inspection will be made available (40 CFR 300.415(m)(2)(ii)). In addition, Benteler will provide for the opportunity for a public meeting at a location near the site (40 CFR 300.430(f)(3)(D)). If a public meeting is held, a transcript will be kept and made available for public review.

Task 4 Preparation of Responses to Significant Public Comments

A written summary of significant public comments and criticisms will be prepared along with responses to those comments (40 CFR 300.415(m)(2)(iii)). The written summary will also include any new relevant information submitted during the public comment period.

Task 5 Publishing Notice of Final Remedy Selection

Once public comments are addressed and the work plan appropriately revised, the proposed final remedy will be presented in a decision document for the site. The decision document will be available to the public upon request.

Attachment B

Comparative Analyses of Alternatives

ATTACHMENT B

COMPARATIVE ANALYSES OF ALTERNATIVES

1.0 INTRODUCTION

This attachment presents a comparative analyses of several potential remedial alternatives for the Benteler site. The primary objective of the comparative analyses of alternative is to ensure that appropriate remedial alternatives are developed and evaluated to ensure the final alternatives provide adequate protection of public health, environment, and natural resources. The National Contingency Plan (40 CFR 300.430(e)(9)(iii)) lists nine criteria which must be considered when evaluating the appropriateness of remedial alternatives for a site. The following discussion includes a brief description of each alternative proposed for the Benteler site, as well as a summary of the relative performance of each alternatives against the nine criteria.

2.0 LIST OF ALTERNATIVES

2.1 DITCH SEDIMENTS

ALTERNATIVE 1: NO ACTION

Under the No Action alternative, no further remedial measures would be taken for the ditch sediments to remove polychlorinated biphenyls (PCBs). The potential for direct contact with impacted soils would not be mitigated. In addition, under the No Action alternative, the potential for migration of PCBs through surface water runoff would not be mitigated.

No time is required for implementation of the of the No Action alternative, and there are no capital or annual operation and maintenance costs associated with this alternative.

ALTERNATIVE 2: EXCAVATION OF IMPACTED SEDIMENTS AND OFF-SITE DISPOSAL

Alternative 2 involves the excavation of PCB-impacted sediments from the ditch and the disposal at an off-site location. The excavated sediments would be loaded on trucks and transported to a Type II landfill for disposal. Verification sampling would be performed

to assure that all PCB-impacted soils were removed to levels below Act 307 Type B cleanup criteria. Implementation of this alternative would effectively mitigate any long-term risks posed by the impacted sediments.

The time required for implementation of this alternative is approximately one month. Since no contaminants above Type B criteria would remain in the ditch after excavation, there would be no long-term requirements for operation and maintenance or monitoring.

ALTERNATIVE 3: *IN SITU* BIOREMEDIATION

Implementation of *in situ* bioremediation at the Benteler site would involve the installation of systems which deliver oxygen and nutrients to the impacted sediments. Oxygen and nutrients would be supplied in sufficient quantity to satisfy microbial requirements for aerobic biological degradation of the PCBs contained in the ditch. An infiltration system would distribute water containing oxygen and nutrients to the impacted soils, as well as to maintain the moisture content of the soils in a range optimum for microbial degradation. Chemical storage and feed equipment would be supplied for storage, mixing, and metering of oxygen and nutrients into the flushing water. Recovery wells or trenches would be installed in or around the perimeter of the impacted soils to capture water used to flush the oxygen and nutrients through the impacted soils.

Implementation of this remedy will require that the current storm water flow through the impacted area be altered by extension of the outfall or other diversion actions.

Institutional controls and deed restriction would be put in place for the period that the *in situ* bioremediation system is operated. Verification sampling would be conducted at the conclusion of the bioremediation to confirm the cleanup objectives (Act 307 Type B criteria) are met.

ALTERNATIVE 4: EXCAVATION AND ON-SITE INCINERATION

Alternative 4 involves the excavation of PCB-impacted sediments and the on-site incineration of the excavated material. Thermal-destruction of PCBs would be accomplished in a mobile incinerator. Incinerated sediments would be sampled to ensure PCB removal and returned to the excavation. Verification sampling within the area of excavated sediments would be performed to assure all soils exceeding Act 307 Type B criteria have been remediated.

Implementation of this remedy would mitigate long-term risks posed by the impacted sediments. The time required for implementation of this alternative is approximately two months. Since no contaminants above Type B criteria would remain in the ditch after excavation and incineration, there would be no long-term requirements for operation and maintenance or monitoring.

2.2 STORM SEWER LINES

ALTERNATIVE 1: NO ACTION

Under the No Action alternative, no further remedial measures would be taken for the storm sewer lines to prevent potential exposures to, or migration of PCBs. No time is required for implementation of the No Action alternative, and there are no capital or annual operation and maintenance costs associated with this alternative.

ALTERNATIVE 2: HIGH PRESSURE FLUSHING OF PCB-IMPACTED SEDIMENTS FROM THE STORM SEWER LINES

Alternative 2 involves the high pressure flushing of the storm sewer lines and the disposal of sediments from the lines to an off-site location. A high pressure hose with a back spraying head would be inserted into the sewer line and allowed to propel itself upstream. The aqueous rinsate would be applied at approximately 1,500 to 1,700 psi at a flow rate of approximately 60 gpm. Rinsate and sediments would be collected by a vacuum hose at the point of access and transported for disposal off-site.

The time required for implementation of this alternative is approximately one month. Under this alternative, there would be no long term requirements for operation and maintenance or monitoring.

ALTERNATIVE 3: REPLACEMENT OF EXISTING STORM SEWER LINES

Under this alternative, all potentially impacted storm sewer lines at the Benteler facility would be removed and replaced with new storm sewer lines. The existing sewer lines would be excavated and disposed off-site at a Type II landfill. The time required for implementation of this alternative is estimated to be approximately 4 months.

3.0 COMPARATIVE ANALYSES OF ALTERNATIVES FOR THE DITCH SEDIMENTS

The following discussion provides a summary of the nine criteria considered under 40 CFR 300.430(e)(9)(iii), and a comparative evaluation of the three alternatives with respect to the criteria.

3.1 DITCH SEDIMENTS

3.1.1 OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

This criterion addresses whether a remedy provides adequate protection of human health and the environment, and describes how risks are eliminated, reduced or controlled through treatment, engineering controls or institutional controls.

With the exception of Alternative 1, each of the alternatives provides adequate protection by mitigating or eliminating long-term risks to human health and the environment through either treatment or removal. Alternatives 2, 3 and 4 would each seek to achieve a Type B cleanup of the site. While each alternative (other than number 1) provides adequate protection: 1) short-term risks, particularly to excavation workers, may be increased with Alternatives 2 and 4; and 2) Alternative 3 may require a substantially longer time-period to achieve an acceptable level of protection than Alternatives 2 and 4.

3.1.2 COMPLIANCE WITH ARARS

This criterion addresses whether a remedy achieves compliance with applicable, relevant, and appropriate criteria (ARARs). ARARs are federal or state environmental or public health laws that establish cleanup criteria that can be applied to a contaminated site. As discussed in Section 2.0 of the text, Act 307 Type B cleanup criteria are appropriate ARARs for application at the Benteler site.

With the exception of the No Action alternative, each alternative will achieve compliance with Act 307 Type B criteria.

3.1.3 LONG-TERM EFFECTIVENESS AND PERMANENCE

The long-term effectiveness and permanence criterion refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met.

The No Action alternative would not be an effective long-term solution, since it does not address existing or future risks posed by the contaminated sediments. The greatest long-term protection from contaminant migration and the greatest degree of permanence is afforded by Alternatives 2 and 4, which involve the complete removal of contaminants. The long-term effectiveness of Alternative 3 will be dependent upon the efficiency of the bioremediation system to degrade PCBs to levels below Type B criteria. As stated previously, the time frame required to achieve compliance under Alternative 3 is unknown.

3.1.4 REDUCTION OF TOXICITY, MOBILITY OR VOLUME THROUGH TREATMENT

This criterion refers to the preference for remedies that involve treatment to permanently reduce, the toxicity, mobility, or volume of hazardous substances and contaminants.

No reduction in toxicity, mobility or volume of contaminants would be achieved by the No Action Alternative. Alternative 2, which involves excavation and off-site disposal, would not achieve a reduction in toxicity or volume, but the mobility of the contaminants would be controlled through disposal to a Type II landfill. Alternative 3, *in situ* bioremediation, would achieve a reduction in toxicity, mobility, and volume of contaminants, although it would likely be a period of years before this objective is accomplished. Alternative 4 would achieve a permanent reduction in toxicity, mobility and volume in a much shorter time period than Alternative 3.

3.1.5 SHORT-TERM EFFECTIVENESS

This criterion considers the potential short-term risks to workers and the general public during the construction and implementation phases of the remedial alternative. This criterion does not apply to the No Action alternative.

Alternatives 2 and 4 present short-term risks to workers and the community since they involve excavation of impacted soils at the site. Such actions could result in direct contact and airborne dust exposures during remediation. However, remedial action objectives would be met within a short time-frame (a matter of days or weeks) under these alternatives. Due to the uncertain time period for bioremediation, Alternative 3 also presents a potential short-term risk as PCBs could remain in the ditch for a substantial period of time. To limit potential exposure, long-term access restrictions would have to be emplaced at the site.

3.1.6 IMPLEMENTABILITY

This criterion considers the ease or difficulty of implementing an alternative both from a technical and administrative perspective. This criterion does not apply to the No Action alternative.

The technology associated with Alternatives 2 and 4 are well known. Alternative 2 would involve the use of standard earth-moving equipment and hauling vehicles. Adequate removal equipment are readily available, however, the landfill capacity availability would need to be identified. Alternative 4 would require that the excavated soils be processed on-site in a mobile incinerator. Such equipment is also generally available through a variety of remedial contractors.

Alternative 3, *in situ* bioremediation for PCBs is a relatively innovative technology. Although it has been proven to be successful in applications to other large organic compounds, there is not a significant amount of data available to demonstrate the ability of this technology to meet the Type B cleanup criteria for PCBs.

The implementation of Alternative 2 is more administratively feasible than alternative 3 and 4. Implementation of Alternative 2 would be dependent only upon approval for disposal of impacted soils at a Type II landfill. Alternatives 3 and 4 would both likely require additional permits to allow completion of the remedy.

3.1.7 COSTS

Cost refers to both capital and annual operation and maintenance costs for each alternative.

Outside of Alternative 1 (No Action), Alternative 2 is the lowest cost alternative for the Benteler site that substantially meets the other eight criteria discussed here. There are no long-term operational and maintenance costs associated with this alternative. Alternative 3 would likely be the most expensive alternative in terms of capital and annual costs. Annual costs would be incurred throughout the duration of the bioremediation project. Alternative 4 would be more expensive than Alternative 2 (due to mobilization and operation of an on-site incinerator) but may be less expensive than Alternative 3.

3.1.8 STATE ACCEPTANCE

This criterion mandates that the State's concerns regarding remedial alternatives must be considered in selecting an appropriate action. Documentation of activities at the Benteler site will be made available and any concerns expressed by the State of Michigan will be addressed.

3.1.9 COMMUNITY ACCEPTANCE

This criterion mandates that community concerns regarding remedial alternatives must be considered. A community relations work plan outlining the steps that Benteler will take to ensure community awareness and input regarding remedial activities at the site is presented in Attachment 1.

3.2 STORM SEWER LINES

3.2.1 OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

With the exception of alternative 1, each of the alternatives provides adequate protection by mitigating or eliminating long-term risks to human health and the environment through removal of impacted sediments and preventing further impact to ditch sediments. However, short-term risks, particularly to workers during remediation implementation, may be increased with both Alternatives 2 and 3.

3.2.1 COMPLIANCE WITH ARARS

Alternative 1 will not mitigate the potential that sediments within the storm sewer could continue to be released and impact ditch sediment. Alternatives 2 and 3 will each remove the impacted sediments, therefore, eliminating the potential that the storm sewer will be a continued source of release of PCB impacted sediments to the on-site ditch.

3.2.3 LONG-TERM EFFECTIVENESS AND PERMANENCE

The No Action alternative would not be an effective long-term solution, since it does not address existing or future risks posed by PCBs in the storm sewer lines. Alternatives 2 and 3 both will provide long-term protection from contaminant migration since both involve the removal of PCB impacted sediments.

3.2.4 REDUCTION OF TOXICITY, MOBILITY OR VOLUME THROUGH TREATMENT

No reduction in toxicity, mobility or volume of contaminants would be achieved by the No Action alternative. Alternatives 2 and 3 would not achieve a reduction in toxicity or volume, but the mobility of the contaminants would be controlled through disposal to a Type II landfill.

3.2.5 SHORT-TERM EFFECTIVENESS

Alternative 3 presents the greatest short-term risks to workers and the community since it would involve the destruction of the sewer lines, increasing the potential for airborne release of PCBs through fugitive emissions. Alternative 2 also presents short-term risk to workers potentially exposed to sediments during flushing (but probably to a lesser extent than Alternative 3).

3.2.6 IMPLEMENTABILITY

The technology associated Alternatives 2 and 3 are well known. Alternative 2 would involve the use of high pressure flushing to remove debris and sediments from the sewer line and would involve little disruption of the daily operations at the facility. Although the technology associated with Alternative 3 is well known, the implementation of this alternative could result in a significant disruption of the daily operations at the facility.

3.2.7 COSTS

Alternative 2 is the lowest cost alternative which substantially meets the other eight evaluation criteria for remediation of the storm sewer lines. There are no long-term operational and maintenance costs associated with this alternative. Alternative 3 would require substantially greater cost than Alternative 2.

3.2.8 STATE ACCEPTANCE

See 3.1.8.

3.2.9 COMMUNITY ACCEPTANCE

See 3.1.9.

4.0 CONCLUSIONS

4.1 DITCH SEDIMENTS

The performance of each of the alternatives proposed for remediation of the ditch sediments was assessed against nine evaluation criteria in order to evaluate the effectiveness of the alternatives for protecting human health and the environment. Based on that evaluation, Alternative 2 (excavation and disposal) is considered to be the most feasible remedial alternative for ditch sediments at the Benteler site.

4.2 STORM SEWER LINES

The performance of each of the alternatives proposed for remediation of the storm sewer lines was assessed against nine evaluation criteria in order to evaluate the effectiveness of the alternatives for protecting human health and the environment. Based on that evaluation, Alternative 2 (high pressure flushing) is considered to be the most feasible remedial alternative for storm sewer lines at the Benteler site.

Attachment C

Quality Assurance Project Plan (QAPP) for Addressing PCB-Impacted Ditch Sediments and Storm Sewer Lines at the Benteler Industries Kalamazoo Plant

ATTACHMENT C

QUALITY ASSURANCE PROJECT PLAN (QAPP) FOR ADDRESSING PCB IMPACTED STORM SEWER AND DITCH SEDIMENTS

AT THE

BENTELER INDUSTRIES
KALAMAZOO, MICHIGAN

JANUARY 1993

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APPENDICES

A List of Analytical Parameters and Detection Limits
B Environmental Laboratory Quality Assurance/Quality Control Procedures Manual
C Standard Operating Procedures
D Required Sample Volumes, Containers, Preservation Techniques and Holding Times

ATTACHMENT C

QUALITY ASSURANCE PROJECT PLAN

1.0 PROJECT DESCRIPTION

1.1 GENERAL

This Quality Assurance Project Plan (QAPP) presents the organization, objectives, functional activities and specific quality assurance (QA) and quality control (QC) activities associated with remediation of storm sewer lines and on-site ditch sediments at the Benteler Industries Kalamazoo Plant. This QAPP describes the specific protocols which will be followed for sampling, sample handling and storage, chain-of-custody, and laboratory analysis. All samples will be analyzed at the WWES Environmental Laboratory in Grand Rapids, Michigan or at a selected environmental laboratory capable of providing appropriate quality, and satisfying the requirements of this QAPP.

QA/QC procedures will be conducted in accordance with applicable professional technical standards, applicable United States Environmental Protection Agency (U.S. EPA) and Michigan Department of Natural Resources (MDNR) requirements, governmental regulations and pertinent guidelines, and specific project goals and requirements.

1.2 PARAMETERS TO BE TESTED AND FREQUENCY OF SAMPLE COLLECTION

Sample matrices, analytical parameters and frequencies of sample collection as well as the rationale for these parameters and frequencies are described for the storm sewers and ditch in Section 3.0 of the Work Plan. The analytical methods for the laboratory analysis of samples are presented in Appendix A.

1.3 DATA QUALITY OBJECTIVES

Data quality objectives (DQOs), as defined by the U.S. EPA, are qualitative and quantitative statements which specify the quality of the data required to support decisions made during the environmental investigation and remedial activities and are based on the end uses of the data to be collected. As such, different data uses may require different DQOs. There are five analytical levels specific to U.S. EPA guidance 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);*
- *Field Analyses (DQO level 2);*

- *Engineering (DQO level 3);*
- *Confirmational (DQO level 4);*
- *Non-Standard (DQO level 5).*

For this project, DQO level 4 will be employed. DQO level 4 provides the highest level of data quality and will be used for purposes of the laboratory analyses at this site. These analyses require that analytical and data validation procedures be performed in accordance with appropriate QA procedures.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

Benteler and Benteler's consulting contractor (WWES) have responsibility for the direction of all phases of the remedial activities. WWES will be responsible for the overall quality of the work, including QA/QC, and will perform all the field activities and prepare the closure report. Project management will be provided by WWES under the direction of Benteler. The various quality assurance and management responsibilities of key project personnel are defined below.

- *Benteler Coordinator:* Joe Schmidt, the Benteler Coordinator, is responsible for general oversight of the project.
- *Project Manager:* Will Beaton, WWES's project manager, will provide direction for the project team and be responsible for communications and project deliverables to Benteler.
- *Technical Director:* Jim Rossi of WWES will serve as Technical Director and will be responsible for directing environmental compliance aspects of the project.
- *Site Coordinator:* WWES will assign a specific site coordinator who will be responsible for leading and coordinating the day-to-day activities of the various resource specialists under his or her supervision. The coordinator will be an experienced environmental professional and will report directly to the project manager.

The responsibilities for additional aspects of the project are as follows:

- *Laboratory Operations Manager:* The WWES laboratory operations manager is Jack Dullaghan. The laboratory operations manager ensures all resources of the laboratory are available on an as-required basis; oversees final analytical reports; and ensures that the protocols specified in the QAPP are followed.

- *Laboratory Project Manager:* The WWES laboratory project manager is Todd Colon. The laboratory project manager coordinates laboratory analyses; supervises in-house chain-of-custody; oversees data review; oversees preparation of analytical reports; and approves final analytical reports prior to submittal.

3.0 QUALITY ASSURANCE OBJECTIVES

The overall quality assurance (QA) objective is to develop and implement procedures for field sampling, chain-of-custody, laboratory analysis, and recordkeeping and reporting that will provide high quality results which are legally defensible in a court of law. Equipment blank, trip blank, and field duplicate samples will be analyzed to assess the quality of the data resulting from the field sampling program. Equipment blanks consisting of deionized or distilled water will be submitted to the environmental laboratory to provide the means to assess the quality of the data resulting from the field sampling program.

Equipment blank samples are analyzed to check for procedural contamination at the site which may cause sample contamination. To test the effectiveness of equipment decontamination procedures, equipment blanks will be collected at various times during the sampling activities. These equipment blanks will be collected following all decontamination steps. Deionized or distilled water will be placed in the sampling device or poured over it and collected. These equipment blank samples will be analyzed for PCB's.

Field duplicate samples are analyzed to check for sampling and analytical reproducibility. Field duplicate samples will be essentially identical to the original sample.

A description of field QC sample collection guidelines is given in the Standard Operating Procedure (SOP) "Field QC Sample Guidelines" contained in Appendix C.

Specific procedures for chain-of-custody and reporting of data are described in later sections of this QAPP.

4.0 SAMPLING PROCEDURES

This section details sampling procedures for the various matrices which will be sampled at the site. The specific purposes and analyses for which samples will be collected, as well as specific sampling locations, are identified in Section 3.0 of the Work Plan. It is not anticipated that sampling of any environmental media other than storm sewer and rinsate water and soils/sediments will be required.

4.1 SOIL/SEDIMENT SAMPLE COLLECTION

Shallow soil/sediment samples (from depth of 2 feet or less) will be collected using either a clean shovel or trowel, or a stainless steel hand held auger. The procedure to be used is provided in the SOP for "Grab Samples of Surface Soil" in Appendix C. Field notes identifying the condition of surface and shallow soils/sediments will be maintained for each sample.

4.2 WATER SAMPLES

Both filtered and unfiltered water samples will be collected from the storm sewer after flushing of the storm sewer lines. In addition, approximately one-week following remediation, an additional water sample will be collected from the storm sewer lines. Unfiltered water samples will also be collected from the rinsate collection tanks for purposes of characterizing for disposal of the rinse water. All unfiltered water samples will be collected directly into sampling jars by sampling personnel wearing hand- or shoulder-length gloves. All filtered water samples will be collected directly into sample jars using a hand-held portable field filter.

4.3 DECONTAMINATION PROCEDURES

All sampling equipment used to collect ditch sediment samples will be decontaminated between sampling events. A hexane rinse followed by air drying is suggested for sediment sampling equipment which may contact PCBs.

4.4 SAMPLE PRESERVATION AND SHIPMENT

Preservation techniques are used to retard the chemical and biological changes that may take place after a sample is taken from its parent source. Samples collected during remedial activities will be placed in clean glass jars and packed in coolers with containerized ice packs immediately upon collection and then transported to the environmental laboratory where they will be stored at 4°C until analysis. Table D-1 (Appendix D) lists sample preservation, holding time, and volume requirements for each type of sample collected.

5.0 SAMPLE CUSTODY

Benteler and WWES will follow the U.S. EPA Region V chain-of-custody protocols as described in "NEIC Policies and Procedures", U.S. EPA-330/9-78-001-R, revised June 1985. Under this protocol, a sample or evidence file is considered under your custody if the file or sample:

- is in your possession;
- is in your view, after being in your possession;

- is in your possession and you place it in a secured location; or
- is in a designated secure area.

5.1 FIELD CHAIN-OF-CUSTODY PROCEDURES

The sample packaging and shipment procedures summarized below will ensure that the samples will arrive at the laboratory with the chain-of-custody intact. Examples of chain-of-custody forms, and other field and sampling activity forms are located in Appendix C.

5.1.1 FIELD PROCEDURES

- The field sampler is personally responsible for the care and custody of the samples until they are transferred or properly dispatched. As few people as possible should handle the samples.
- All bottles will be tagged with sample numbers and locations.
- Sample tags are to be completed for each sample using waterproof ink.
- WWES will review all field activities to determine whether proper custody procedures were followed during the field work and decide if additional samples are required.

5.1.2 FIELD LOGBOOKS/DOCUMENTATION

Field logbooks will provide the means of recording the data collection and remedial activities performed. As such, entries will include as much detail as possible so that persons returning to the site may re-construct a particular situation without reliance upon memory. Field record keeping procedures and example field record forms are provided in the SOP "Field Notes/Records" in Appendix C.

Field logbooks will be bound books or notebooks.

Entries into the logbook will contain a variety of information. At the beginning of each entry, the date, start time, weather, names of all sampling team members present, level of personal protection being used, and the signature of the person making the entry will be entered. The names of visitors to the site, field sampling or investigation team personnel and the purpose of their visit will also be recorded in the field logbook.

Activities conducted (i.e., remediation of storm sewer and ditch sediments) and samples collected will be recorded. All entries will be made in ink and no erasures will be made. If an incorrect entry is made, the information will be crossed out with a single strike mark, initialed and dated.

5.1.3 TRANSFER OF CUSTODY AND SHIPMENT PROCEDURES

- Samples will be accompanied by a properly completed chain-of-custody form. The sample locations will be listed on the chain-of-custody form. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents transfer of custody of samples from the sampler to another person, to a mobile laboratory, to the permanent laboratory, or to/from a secure storage area.

- Samples will be properly packaged for shipment and dispatched to the laboratory for analysis, with a separate signed custody record enclosed in each sample box or cooler.

- All shipments will be accompanied by the chain-of-custody record identifying the contents. The original record will accompany the shipment, and a copy will be retained by the sampler and returned to the Consultant's site coordinator.

- If the samples are sent by common carrier, a bill of lading should be used. Receipts of bills of lading will be retained as part of the permanent documentation. If sent by mail, the package will be registered with return receipt requested. Commercial carriers are not required to sign off on the custody form as long as the custody forms are sealed inside the sample cooler.

5.2 LABORATORY CHAIN-OF-CUSTODY PROCEDURES

The chain-of-custody procedures for the environmental laboratory are described in the Quality Assurance/Quality Control Procedures Manual (Appendix B).

6.0 DATA REDUCTION, VALIDATION AND REPORTING

6.1 FIELD MEASUREMENTS AND SAMPLE COLLECTION

Raw data from field measurements and sample collection activities will be appropriately recorded in the field logbook. If the data are to be used in the project reports, they will be reduced or summarized and the method of reduction will be documented in the report.

6.2 LABORATORY SERVICES

The laboratory is responsible for assessing data quality and advising of any data which were rated "preliminary" or "unacceptable" or other notations which would caution the data user of possible unreliability.

The environmental laboratory will prepare and retain full analytical and QC documentation similar to that required by the Contract Laboratory Program. Such retained documentation need not be hard (paper) copy, but may be in other storage media (e.g., magnetic tape). As needed, the environmental laboratory will supply a hard copy of the retained information.

For appropriate analyses, chromatograms, GC/MS spectra, computer printouts, initial and continuous calibration verification of standards and blanks, standard procedural blanks, ICP interference check samples, raw data system printouts (or legible photocopies) identifying date of analyses, analyst, and parameters determined, will be retained by the environmental laboratory. This data will be made available upon request.

The environmental laboratory assessment of laboratory data will be accomplished by the joint efforts of the laboratory operations manager and environmental laboratory project manager. The data assessment by the project manager will be based on the criteria that the sample was properly collected and handled according to Sections 4 and 5 of this QAPP.

APPENDIX A

List of Analytical Parameters and Detection Limits

TABLE A-1

LIST OF ANALYTICAL PARAMETERS AND DETECTION LIMITS ORGANIC CHEMICALS

	Cas Number	MDNR Recommended Ground Water Detection Limits U.S. EPA - 8080	MDNR Recommended Soil Detection Limits* U.S. EPA - 8080
Aroclor-1242	53469-21-9	0.1 ug/L	330 ug/kg
Aroclor-1248	12672-29-6	0.1 ug/L	330 ug/kg
Aroclor-1254	11097-69-1	0.1 ug/L	330 ug/kg
Aroclor-1260	11906-82-5	0.1 ug/L	330 ug/kg

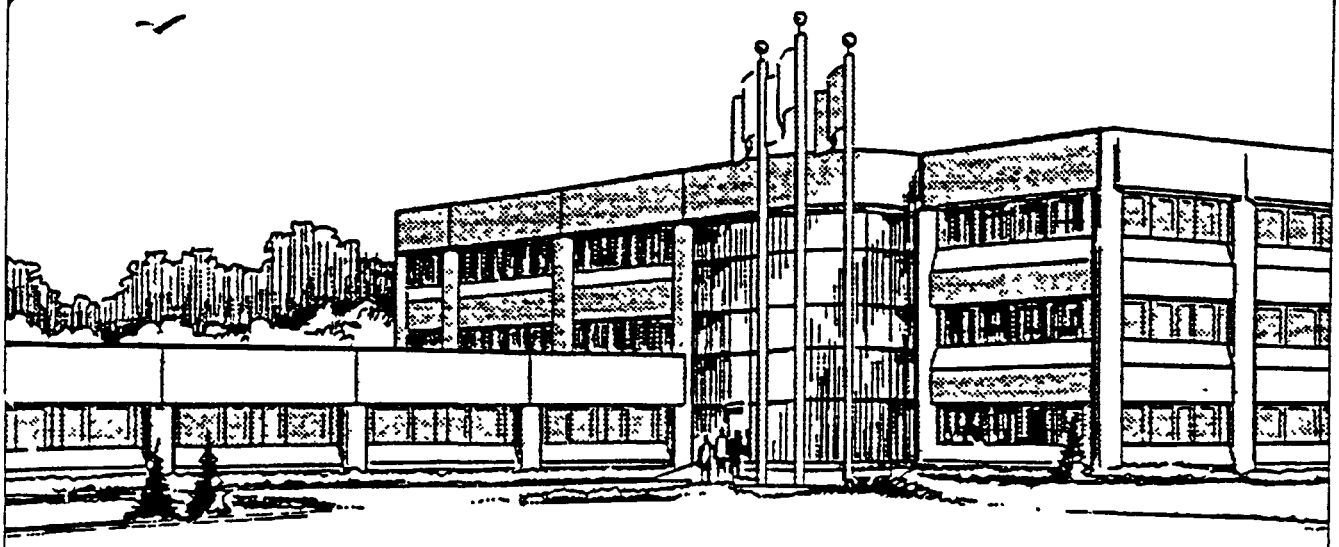
*Please note: Soil limits are based upon a dry weight basis.
All procedures from U.S. EPA SW 846, unless noted.
Detection limits provided are considered acceptable by MDNR (Mera Operational Memorandum #6, Revision #1, April 22, 1992).

APPENDIX B

Environmental Laboratory
Quality Assurance/Quality Control Procedures Manual

WW ENGINEERING & SCIENCE

Environmental Laboratory Division



Quality Assurance / Quality Control Procedures Manual

BE 000093

WW ENGINEERING & SCIENCE ENVIRONMENTAL LABORATORY DIVISION
QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES MANUAL

TABLE OF CONTENTS

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1.0 PURPOSE OF THE MANUAL

1.0 PURPOSE OF THE MANUAL

The purpose of this manual is to specify procedures and technical requirements to be used by the WW Engineering & Science (WWES) environmental laboratories to assure that the data generated by the laboratory is accurate, reproducible and timely. This manual provides the chemistry laboratory a quality control plan which is to be used by every individual involved in the analytical efforts at WWES.

1.1 THE NEED FOR ANALYTICAL QUALITY CONTROL

There is a growing importance attached to the measurement of the concentration of any contaminant in water, effluents, and solid samples. As with any type of measurement the results of the methods utilized to measure the concentrations of these contaminants generally differ from the true concentration, i.e. all results are subject to error. Many experimental studies have shown that errors can arise which are as large as a 50 percent variations from the true value, and in fact, may vary between laboratories. Inaccurate analytical results restrict the ability of the analyst and the recipient of the data to draw valid conclusions and usually lead to false or misleading conclusions. Examples of common problems which arise during an analytical effort are as follows:

A. Results, which are compared between two or more laboratories, are in error relative to each other.

B. Results are to be used to decide if a water quality standard has been observed especially as the level of the analysis approaches the detection level.

C. An inappropriate test procedure has been used to determine the analyte, resulting in values that do not represent the true sample concentration, i.e. direct aspiration of a turbid sample.

There is also increasing concern about the control of these errors being expressed at the local, the national and the international levels. The concern centers around the need to have a maximum amount of valid information obtained in a cost effective manner. In order to control errors, it is necessary to be able to measure the magnitude of these errors. This manual identifies the activities that are involved in the measurement and control of error. WWES considers analytical quality control of great importance, and requires that it be a primary feature in any analytical effort. The WWES requirements for analytical quality control are in concert with the quality control needs and demands of other organizations, such as the Environmental Protection Agency, various state regulatory agencies, and private industry.

Approximately twenty to thirty percent of all the available effort for routine analysis is absorbed in the execution of quality control requirements. It is often argued that the extent of this effort is too great with respect to routine laboratories and their need to be

profitable in their operation. The argument therefore claims that extensive quality control is an impractical expectation for a routine laboratory. However, the corporate policy at WWES demands that the appropriate level of quality control be applied to all analytical effort at WWES, regardless of the sample lot.

In the total effort, it is preferable to obtain twenty to thirty percent fewer results of known accuracy for each analytical batch than it is to obtain larger numbers of results of undefined accuracy. Due to the fact that all analytical procedures are subject to errors derived from many sources, it is not reasonable to assume that quality control is unnecessary with a "good" analyst. However, even a "good" analyst may not have an adequate idea of his (her) accuracy. Multiple studies by the EPA, both within laboratories and between laboratories, has shown this reasoning to be generally unsound.

2.0 QUALITY ASSURANCE ORGANIZATION AND RESPONSIBILITIES

2.0 QUALITY ASSURANCE ORGANIZATION AND RESPONSIBILITIES

2.1 OBJECTIVE OF THE QA PROGRAM AT WWES

The purpose of the quality control program is to continuously monitor error, both random and systematic, which inhibits the production of reliable and defensive analytical data. Error is inherent in any analytical routine, even with the most rigorous controls, and thus, a good QC program addresses not only the basic control techniques but also statistical means of measuring precision and accuracy and the confidence limits on these measurements.

The purpose of this manual is to specify the procedures, records, Chain-of-Command, and technical requirements which will be adhered to by the laboratories of WWES.

2.2 ORGANIZATION

Quality control at WWES begins with the bench analyst and moves up through the Chain of Command ultimately residing at the level of the President. A QC program which is administered only at the upper levels of management is doomed to failure and is unfair to the bench level analyst who needs a means by which he can observe the quality of his work. Quality Control is a two way program at WWES where directives from management are as important as suggestions and assistance from the bench analyst.

2.2.1 QC Chain of Command Flow Chart

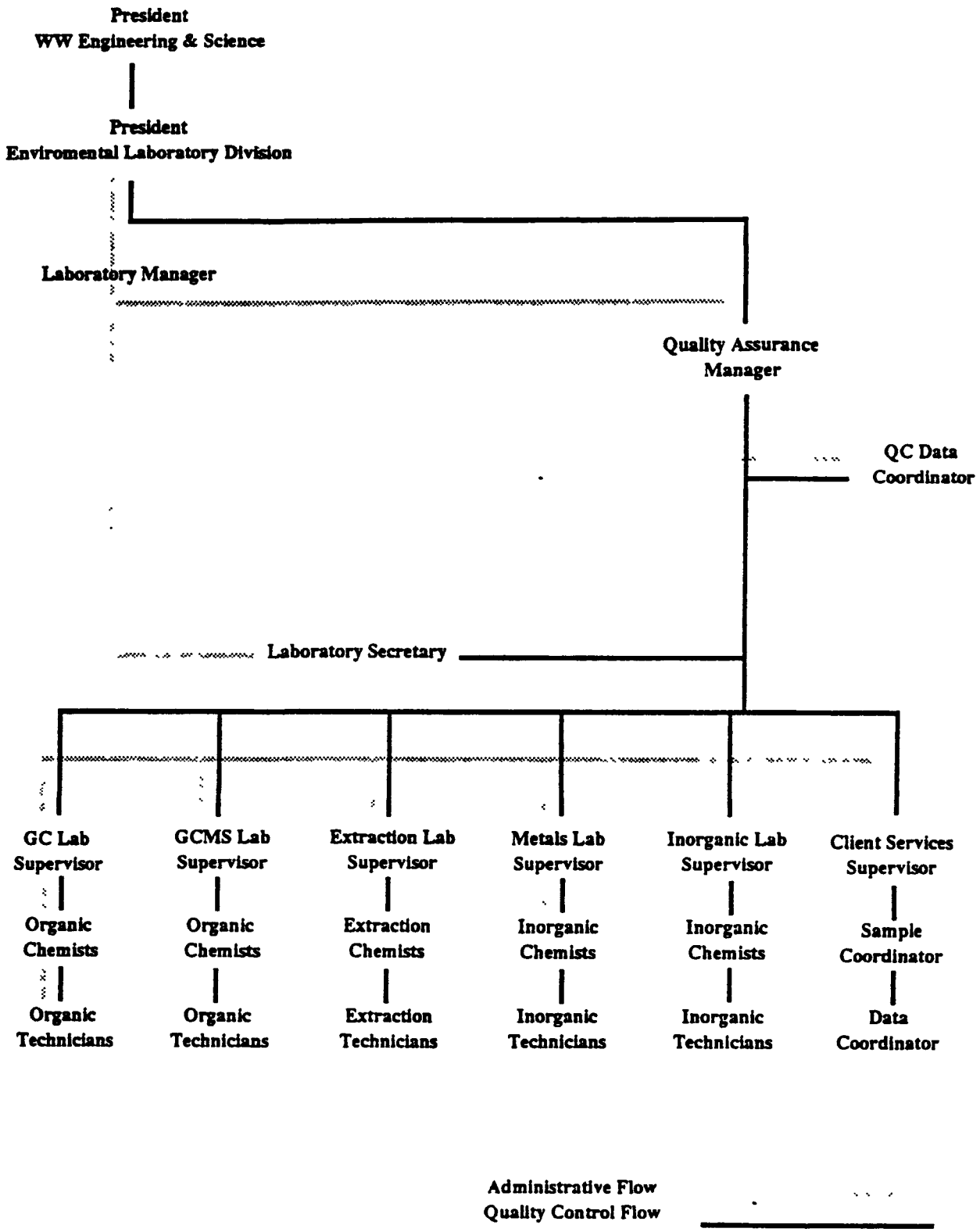
The following flow chart represents both the QA Chain of Command (solid line) and the Administrative Chain of Command (dotted). The flow chart represents the philosophy of WWES relative to the interaction of QC and production. Although the QC Manager reports to the Director of Analytical Services in the supervisory Chain-of-Command, his responsibilities for quality control require that he answer to the President of the Environmental Laboratory Division. The QC Manager acts as an immediate record keeper, QC administrator and liaison to the lab manager.

However, when a question relative to the quality of analytical data arises, the QA Manager, in conjunction with the President of the Environmental Laboratory Division, has the right to prevent data dissemination. In cases of conflict, the President of the Environmental Laboratory Division has final authority except when a compromise or directive is issued by the President of WW Engineering & Science.

2.2.2 Responsibilities of the Laboratory QC Manager

2.2.2.1 To monitor the Quality Assurance activities in the laboratory insuring adherence to all policies and procedures.

QUALITY CONTROL CHAIN OF COMMAND FLOW CHART



2.2.2.2 To identify problem areas and help in recommending improvement and changes.

2.2.2.3 To keep abreast of changing development in analytical QC particularly requirements set by regulatory agencies.

2.2.2.4 To arrange or produce random blind control samples.

2.2.2.5 To approve all laboratory data prior to recording such data for report generation purposes.

2.2.2.6 To maintain QC on all analytical activities and update control limits in a timely manner.

2.2.2.7 To oversee the maintenance of balance and controlled temperature apparatus record books on a daily basis and insure that such records are maintained on every piece of equipment.

2.2.2.8 To assure that bottle preparation, approval and storage meet established criteria.

2.2.3 Responsibilities of the Sample Coordinator

A full position description of the Sample Coordinator can be found in the "WWES Sample Receiving SOP".

- To insure that all samples received at WWES are properly preserved, split, logged-in, and stored in agreement with the log-in manual.
- To insure that all COC shipments are handled according to established procedures including storage, sample tracking and completion of files.
- To insure that all project sheets and subsequent paperwork is completed and filed.
- To insure that labile samples are distributed in a timely manner.
- To cooperate with the QC Manager in introducing blind samples.

2.2.4 Responsibilities of the Analytical Staff

- To insure that all records are generated and recorded on a daily basis.
- To insure that the following bench level QC requirements are met. To fill out lab notebooks daily as required. To provide for QC on every batch of samples. This level of effort generally includes:
  1) An initial calibration blanks and standards
  2) 10% sample matrix spikes

3) 10% sample matrix duplicates
4) Laboratory control sample and a method preparation blank for each batch.

- To insure that instruments are calibrated prior to initiating any analysis and that no analyses are started unless calibration has been satisfactorily completed.
- To insure that every batch of analyses meets established QC guidelines or is reanalyzed automatically.
- To inform the lab manager of any reoccurring problems or systematic trends which may effect quality.

2.2.5 Responsibilities of the Laboratory Supervisor

- To insure that sufficient competent staff is available to administer QC.
- To insure that all participating analysts are certified in the test they are performing.
- To insure that effective training and orientation takes place for every new analyst.
- To insure that all QC procedures, directives or project oriented requirements are met.
- To review all preliminary reports and approve them prior to the generation of a final report.
- To interface with the QC coordinator and QC Manager on a routine and consistent basis.
- To take responsibility for immediate solutions to QC problems which may slow or stop production.

2.2.6 Responsibilities of the Data Coordinator

The Data Coordinator's (DC) responsibilities are:

- To enter all data generated into the appropriate records.
- To insure that the Laboratory Supervisor has signed the data forms (bench sheets prior to entry).
- To inform the QC Manager when a project is complete and ready for a preliminary report.
- To provide corrections to all reports from preliminary report feedback.

3.0 FACILITIES AND EQUIPMENT

3.0 FACILITIES AND EQUIPMENT

3.1 The physical plant layout diagram is enclosed. The approximate square footage allocated to each analysis area is presented as well as the number of personnel normally working in each area. A listing of equipment presently utilized by WWES is also enclosed.

3.2 The quality of the analytical instrumentation utilized by WWES is of great importance considering its ultimate effect on data quality. The following guidelines exist for the procurement of analytical instrumentation:

3.2.1 Equipment Need

An equipment need is identified by the Lab Manager or the President as a result of:

- o New Contractural Effort
- o Regulatory Changes
- o Normal Upgrade/Replacement
- o Capacity Improvements

3.2.2 Procurement Procedure

The performance specifications defined by the need are used to identify prospective equipment suppliers. The Lab Manager mails the performance specifications to the prospective equipment suppliers. Those suppliers able to meet the performance specifications are asked to provide a quotation for the purchase or lease of the equipment. An evaluation of the quotations is made by the Lab Manager with consideration given to such items as: equipment ease of use, degree of automation, specification compliance, potential for computerization, price and space requirements.

A written recommendation by the Lab Manager is presented to the President for their review and comment.

A final recommendation by the President of the Laboratory Division is made to the Vice President of Corporate Finance. The final approval is granted based on the assurance of complying with all regulatory and corporate guidelines for the generation of the highest quality data.

3.3 CHEMICAL PROCUREMENT AND INVENTORY PROCEDURE

All reagent specifications are dictated by the EPA/APHA or NIOSH approve analytical methods. These reagent specifications are identified and maintained on the chemical inventory index card system. The chemical inventory system assures the order of chemical use and minimizes the possibility of exceeding their useful shelf life. The

addition of a new method or a change in an existing method that requires a corresponding addition or change in a reagent used for that method will be identified by the Lab Area Supervisor or Group Leader. The Supervisor or Group Leader will update the chemical inventory.

All reagent specifications including available vendors are listed in the chemical inventory tables.

All chemical reagents are received by a representative from the appropriate lab area. The representative opens the shipping package and compares the packing slip with the contents. Discrepancies are identified to the Area Supervisor. The materials receipt is identified and recorded on the chemical inventory. The materials are then inventoried on the chemical inventory index. The index system identifies the amount(s) received and when. When the last bottle/container of the chemical remains, the chemical is placed on an open order sheet located in the lab.

The group leader/supervisor for that lab area is responsible for picking up the chemical open order sheet each week and preparing a purchase order. The purchase order is approved by the Lab Manager and a typed purchase order is issued to the approved vendor that has been previously identified as being able to supply the specified material. The receipt of the new order initiates the inventory system activities.

3.4 PREVENTATIVE MAINTENANCE

Every analytical instrument has a separate maintenance log book as identified in the Document Control Section No. 7.3.9. The required maintenance activities have been developed by the Lab Manager and each Group Leader/Area Supervisor. The maintenance activities comply with manufacturer specifications and working experience requirements.

Each maintenance log book contains a table indicating the frequency and type of maintenance required. The maintenance activity is documented each day or as the frequency requirements dictate.

Analysts are assigned the responsibility of maintaining various instruments or equipment in their respective laboratory areas. The Group Leader or Area Supervisor is responsible for checking the maintenance log books each week and signing off as checked. The Quality Assurance Manager is notified of any deviations or lack of maintenance activity performance, and corrective actions are taken.

ANALYTICAL EQUIPMENT

WWES-INORGANIC LABORATORY

Instrument Description	Manufacturer	Model No.
Analytical Balance (2)	Metler	AE163
Analytical Balance	Metler	PC4400
Analytical Balance	Metler	BB2400
Auto-Analyzer (dual channel)	Bran & Lubbe	TRAACS 800
Auto-Analyzer	Technicon	AAII
Auto-Analyzer	Lachat	Quick Chem
Conductivity Meter	YSI	32
FTIR Spectrophotometer	Perkin-Elmer	1600
pH/mv Meter	Beckman/Altrex	70
pH/mw/ISE Meter	Orion	EA920
Spectrophotometer (visible)	Hitachi	100-40
Spectrophotometer (UV-VIS)	Shimadzu	1604
Spectrophotometer (UV-VIS)	Shimadzu	UV-1201
Total Organic Carbon Analyzer (TOC)	O.I.C.	700
Total Organic Halogen Analyzer (TOX)	Xertex/Dohrman	---
Nephlometer	HACH	2100A
Polarograph	EG&G Princeton Applied Research	384B
Auto-Titrator	Metler	DL12

( ) Designates multiple units.

BE 000106

ANALYTICAL EQUIPMENT

WWES-METALS LABORATORY

Instrument Description	Manufacturer	Model No.
AA Spectrophotomer (flame)	Perkin Elmer	5000
AA Spectrophotomer (flame/furnace)	Perkin Elmer	5100 PC
AA Spectrophotometer (furnace)	Perkin Elmer	5100 PC
ICP Spectrophotometer	Perkin Elmer	Plasma 40
ICP Spectrophotometer	Perkin Elmer	Plasma 400
Autosampler	Perkin Elmer	AS-50
Autosampler	Perkin Elmer	AS-51
Autosampler	Perkin Elmer	AS-60
Autosampler	Perkin Elmer	FIAS-200
Mercury Analgam System	Perkin Elmer	---
Microwave Digestion System	CEM	MDS 810
Ultrasonic Nebulizer	CTech	---

ANALYTICAL EQUIPMENT

WWES-GC LABORATORY

Instrument Description	Manufacturer	Model No.
Gas Chromatographs (3) w/ECD (2), PID/FID, FID/ECD	Varian	3700
Gas Chromatograph (3) w/FID/CED	Varian	3400
Gas Chromatograph (2) w/Hall-PID	Tracor	540
Gas Chromatograph (2) w/Hall-PID	Tracor	585
Gas Chromatograph w/Hall-PID	Tracor	9000
Gas Chromatograph w/FID	HNU	301
Autosampler	Varian	8000
Autosampler (3) w/Auto Sample Heater	Tekmar	ALS 2016
Concentrator (4)	Tekmar	LCS 2000
Autosampler	Tekmar	ALS 2050

( ) Designates multiple units.

ANALYTICAL EQUIPMENT

WWES-GC LABORATORY

Instrument Description	Manufacturer	Model No.
Autosampler (3)	Tekmar	ALS (10 place)
Concentrator (3)	Tekmar	LSC-2
Thermal Tube Desorber	Envirochem, Inc.	850
HPLC (UV)	Isco	2300
HPLC (UV-Fluorescence)	Perkin Elmer	Series 410
LC Oven	Perkin Elmer	101
Diode Acray Detector	Perkin Elmer	235
Fluorescence Detector	Perkin Elmer	LC240
Chromatography Data Systems:		
Integrators (7)	Spectra Physics	
Turbochrom	Perkin Elmer	

( ) Designates multiple units.

BE 000109

ANALYTICAL EQUIPMENT

WWES-GC/MS LABORATORY

Instrument Description	Manufacturer	Model No.
Mass Spectrometer (2)	Finnigan Mat	OWA 1000
Mass Spectrometer (2)	Extrel	ELQ-400
Mass Spectrometer (2)	Varian	Saturn
Autosampler (2)	Varian	8000
Gas Chromatograph (2)	Varian	3400
Gas Chromatograph (2)	Perkin Elmer	Sigma 3B
Gas Chromatograph w/FID	Varian	3400
Autosampler	Tekmar	ALS 2016
Concentrator	Tekmar	LCS 2000
Concentrator	Tekmar	LCS-2
Concentrator	Tekmar	LCS-2000

() Designates Multiple Units

COMPUTING EQUIPMENT

WWES-ALL LABORATORY AREAS

Instrument Description	Manufacturer	Model No.
Mini-Computer	Digital Equipment	Micro-Vax II
Personal Computer (18)	Club	386
Personal Computer (7)	Club	286
Personal Computer (3)	Everex Step	386
Personal Computer (2)	Macintosh	Plus
Personal Computer	Macintosh	SE
Personal Computer (2)	Compac	386
Personal Computer (2)	Zenth	386
Personal Computer	Epson	Equity III
Printer (3)	Pentronix	6280
Printer (2)	Hewlet Packard	Laser Jet
Printer	Hewlet Packard	Laser Jet II
Printer	Hewlet Packard	Laser Jet IIID
Printer (6)	Epson	FX-850
Printer	NEC-Laser Silent Writer	LC890

( ) Designates multiple units.

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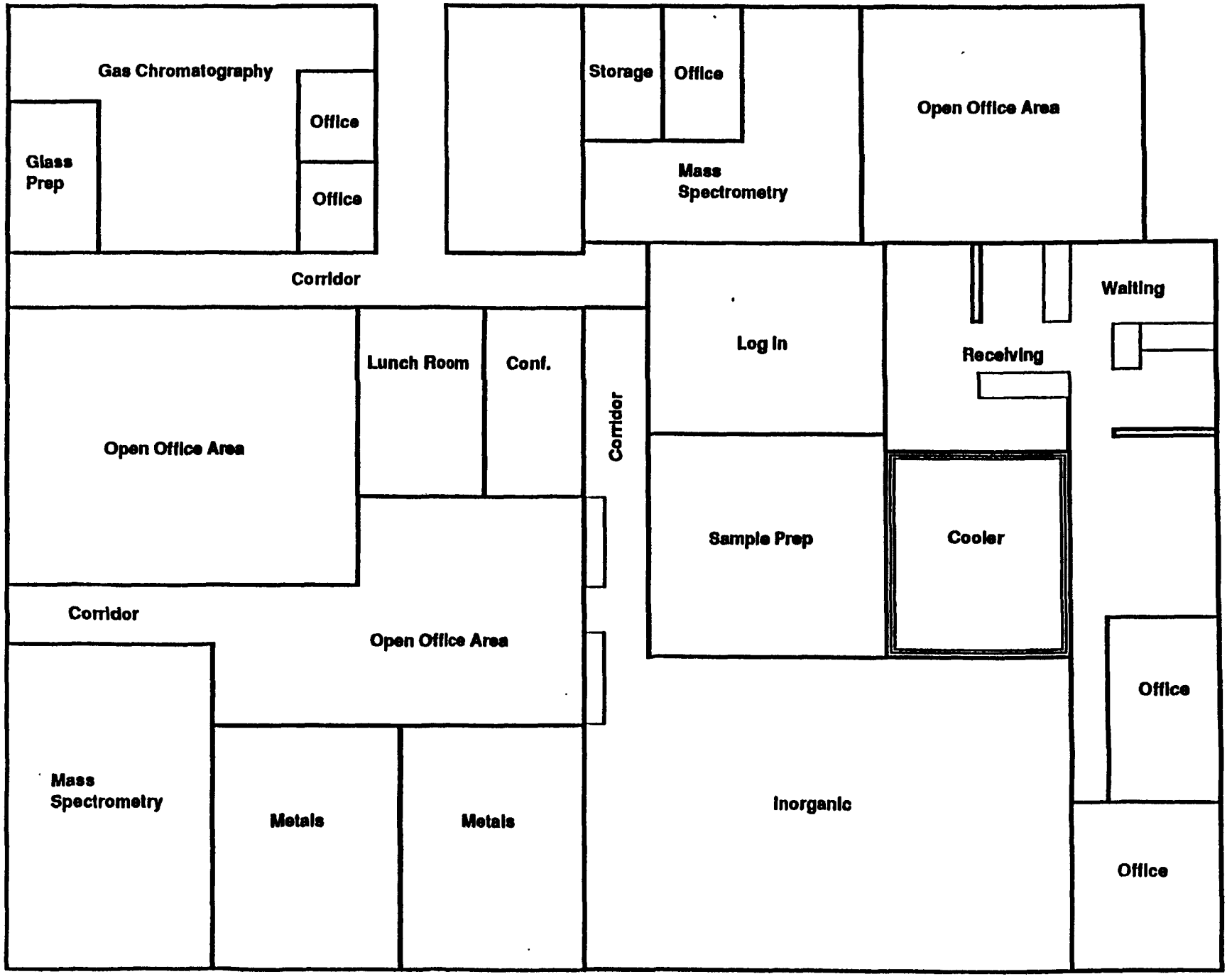
PHYSICAL PLANT:

Laboratory Name:	Environmental Laboratory Division WW Engineering & Science, Inc.
Address	5555 Glenwood Hills Parkway S.E. Grand Rapids, MI 49588
President	Richard R. Rediske, Ph.D.
Vice President/Lab Manager	John P. Dullaghan, MBA

An attached drawing of the laboratory indicates the general areas of analysis, the space allotted to each, and the number of personnel generally assigned to each area.

Analysis	Space Allotted, Ft^2	No. of Personnel (September, 1991)
Wet Chemistry/Microbiology	Approx. 2000	12
Atomic Absorption/Emission	Approx. 2000	12
Gas Chromatography (GC)	Approx. 2400	10
GC/Mass Spectrometry	Approx. 1500	8
Sample Processing & Storage	Approx. 1500	5
Administrative Offices	Approx. 2500	20
Organic Pretreatment	Approx. 1000	6
Laboratory Offices	Approx. 1000	10

WW Engineering & Science Environmental Laboratory Division



BE 000113

4.0 ANALYTICAL METHODOLOGIES

4.0 ANALYTICAL METHODOLOGIES

4.1 METHODS UTILIZED

The WWES Laboratory maintains and updated reference volumes of approved analytical methodologies for environmental and non-environmental analysis. A responsibility of the Lab Manager and the President of the Environmental Laboratory is to continually seek and review regulatory method changes and their impact on current laboratory practices. The most commonly referenced materials include:

- "Methods for Chemical Analysis of Water and Wastes" EPA-600/4-79-020 revised March, 1983.
- "Manual of Analytical Procedures" NIOSH, Volumes 1 & 2, Third Edition, Feb., 1984.
- Standard Methods for the Evaluation of Water and Wastewater 17th Edition, APHA, AWWA, WPCF; 1989..
- "Handbook for Analytical Quality Control in Water and Wastewater Laboratories", EPA 600/4-79-019, March 1979.
- "Physical and Chemical Methods for the Evaluation of Solid Waste" EPA-SW846 Third Edition, 1990.
- "Guidelines Establishing Text Procedures for the Analysis of Pollutants". CFR July 1, 1990.

4.2 METHOD CALIBRATION AND OPERATING PROCEDURES

A standard operating procedure manual exists for all analytical procedures. The S.O.P's include specific calibration procedures that must be followed by an analyst prior to conducting sample analysis. The analyst is required to perform and document the calibration procedure. The calibration activity is identified by each analyst in their lab notebooks. The actual standards utilized are found in each instrument log book. It is the responsibility of each analyst to document all calibration and operating procedures utilized in the instrument log books. It is the responsibility of the group leaders and/or supervisors to notify the Quality Assurance Manager when deviations occur so that corrective actions can be taken. The corrective action will be to identify whether the information is simply missing (not entered) and to have it recorded or if the calibration has not been performed, to not release data generated that day and require those samples to be rerun.

5.0 METHOD CERTIFICATION

5.0 METHOD CERTIFICATION

All methods used by WWES which were not developed by WWES will be certified prior to their use. Method Certification is contiguous with the certification of the analyst and requires essentially the same analytical program. Method certification is necessary in order to establish detection limits, method application limits and criteria for control limits. In most cases, detection limits and recoveries stated in a method are obtained under ideal conditions and do not reflect real world solutions, i.e.. silty well water and industrial effluent versus a drinking water supply. Method certification falls into 2 categories: 1) Methods being employed for the first time and 2) Methods which are to replace currently certified methods (replacement methods). In either case, analysis of client sample may not proceed until certification has occurred.

5.1 METHOD CERTIFICATION

5.1.1 Linear Range

The first step in certifying a method is to establish the linear range (operating range) of the method. A method may be used only over the range in which it is linear. Some methods do not have linear ranges but curves from which results are calculated. For the moment we will ignore methods with curves. A linear range must be established independent of the method data since instruments can effect the range. Standards and multiple detections will be used for establishing the linear range. For example, a range of 1 to 1000 has 3 decades (3 orders of magnitude or 103). Therefore, a range of 1 to 1000 requires 11 levels of test standards (.5, 1, 2, 5, 10, 20, 50, 100, 200, 500, 1000). Notice that each decade follows the 0.5x to 10x rule, i.e. the area 10 to 100 is covered by 5,10,20,50 and 100. The range to be attempted is dependent on the method, the instrument and the analytical supervisor. If the responses show linearity, the range has been established. If, however, a curve develops or there appear to be two linear ranges, the standards must be repeated including additional levels to verify the status of the questionable area.

5.1.2 Working Curves

Some methods operate from a curve response, i.e. sodium by emission spectroscopy. The method will indicate the working curve which must be verified. The method with working curves requires a full curve each time an analysis is to be performed.

5.1.3 The Generation of the Method Detection Limit

The method detection limit (MDL) is defined as the minimum concentration of a substance that can be identified, measured and reported with 99% confidence that

the analyte concentration is greater than zero and determined from analysis of a sample in a given matrix containing analyte.

SCOPE AND APPLICATION

This procedure is designed for applicability to a wide variety of sample types ranging from reagent (blank) water containing analyte to wastewater containing analyte. The MDL for an analytical procedure may vary as a function of sample type. The procedure requires a complete , specific and well defined analytical method. It is essential that all sample processing steps of the analytical method be included in the determination of the method detection limit.

The MDL obtained by this procedure is used to judge the significance of single measurement of a future sample.

The MDL procedure was designed for applicability to a broad variety of physical and chemical methods. To accomplish this, the procedure was made device or instrument independent.

PROCEDURE

1. Make an estimate of the detection limit using one of the following:

   (a) The concentration value that corresponds to an instrument signal/noise ratio in the range of 2.5 to 5. if the criteria for qualitative identification of the analyte is based upon pattern recognition techniques, the least abundant signal necessary to achieve identification must be considered in making the estimate (PCB).

   (b) The concentration value that corresponds to three times the standard deviation of replicate instrumental measurements for the analyte in reagent water.

   (c) The concentration value that corresponds to the region of the standard curve where there is a significant change in sensitivity at low analyte concentrations i.e. a break in the slope of the standard curve.

   (d) The concentration value that corresponds to known instrumental limitations.

   It is recognized that the experience of the analyst is important to this process. However, the analyst must include the above considerations in the estimate of the detection limit.

2. Prepare reagent (blank) water that is as free of analyte as possible. Reagent or interference free water is defined as a water sample in which analyte and interferent concentrations are not detected at the method detection limit of each analyte of interest. Interferences are defined as systematic errors in the measured analytical signal of an established procedure caused by the presence of interfering species (interferent). The interferent concentration is presupposed to be normally distributed in representative samples of a given matrix.

3. (a) If the MDL is to be determined in reagent water (blank) prepare a laboratory standard (analyte in reagent water) at a concentration which is at least equal to or in the same concentration range as the estimated MDL (Recommend between 1 and 5 times the estimated MDL) Proceed to Step 4.

   (b) If the MDL is to be determined in another sample matrix, analyze the sample. If the measured level of the analyte is in the recommended range of one to five times the estimated MDL proceed to Step 4.

   If the measured level of analyte is greater than five times the estimated MDL, add a known amount of analyte to bring the concentration of analyte to between one and five times the MDL in the case where an interference is co-analyzed with the analyte.

   If the measured level of analyte is greater than five times the estimated MDL there are two options:

   (1) Obtain another sample of lower level of analyte in same matrix if possible.

   (2) The sample may be used as is for determining the MDL if the analyte level does not exceed 20 times the MDL of the analyte in reagent water. The variance of the analytical method changes as in the analyte concentration increases from the MDL, hence the MDL determined under these circumstances may not truly reflect method variance at lower analyte concentrations.

4. (a) Take a minimum of seven aliquots of the sample to be used to calculate the MDL and process each through the entire analytical method. Make all computations according to the defined method with final results in the method reporting units. If blank measurements are required to calculate the measured level of

analyte, obtain separate blank measurements for each sample aliquot analyzed. The average blank measurement is subtracted from the respective sample measurements.

(b) It may be economically and technically desirable to evaluate the estimated MDL before proceeding with 4a. This will: (1) prevent repeating this entire procedure when the costs of analyses are high and (2) insure that the procedure is being conducted at the correct concentration. It is quite possible that an incorrect MDL can be calculated from data obtained at many times the real MDL even though the background concentration of analyte is less than five times the calculated MDL. To insure that the estimate of the MDL is a good estimate, it is necessary to determine that a lower concentration of analyte will not result in a significantly lower MDL. Take two aliquots of the sample to be used to calculate the MDL and process each through the entire method, including blank measurements as described above in 4a. Evaluate these data:

(1) If these measurements indicate the sample is in the desirable range for determining the MDL, take five additional aliquots and proceed. Use all seven measurements to calculate the MDL.

(2) If these measurements indicate the sample is not in the correct range, re-estimate the MDL, obtain new sample as in 3 and repeat either 4a or 4b.

5. Calculate the variance (S^2) and standard deviation (S) of the replicate measurements, as follows:

$$S^2 = \frac{1}{n-1}\left[\sum_{i=1}^{n} X_i^2 - \left(\sum_{i=1}^{n} X_i\right)^2 / n\right]$$

where the x1i = 1 to n are the analytical results in the final method reporting units obtained from the n sample aliquots and X,2 refers to the sum of the X values from i = 1 to n.

6. (a) Compute the MDL as follows:

$$MDL = t_{(n-1),-a = .99)} \cdot S$$

where:

MDL - the method detection

$t_{(n-1,1-a=.99)}$ = the students' t value appropriate for a 99% confidence level and a standard deviation estimate with n-1 degrees of freedom. See Table.

S = standard deviation of the replicate analyses.

(b) The 95% confidence limits for the MDL derived in 6a are computed according to the following equations derived from percentiles of the chi square over degrees of freedom distribution (X2/df) and calculated as follows:

MDLlcl = 0.64 MDL

MDLucl = 2.20 MDL

where MDLlcl and MDLucl are the lower and upper 95% confidence limits respectively based on seven aliquots.

7. Optional iterative procedure to verify the reasonableness of the estimated MDL and calculated MDL of subsequent MDL determinations.

(a) If this is the initial attempt to compute MDL based on the estimated MDL in Step 1, take the MDL as calculated in Step 6, spike in the matrix at the calculated MDL and proceed through the procedure starting with Step 4.

(b) If the current MDL determination is an iteration of the MDL procedure for which the spiking level does not permit qualitative identification, report the MDL as that concentration between the current spike level and the previous spike level which allows qualitative identification.

(c) If the current MDL determination is an iteration of the MDL procedure and the spiking level allows qualitative identification, use S2 from the current MDL calculation and S2 from the previous MDL calculation to compute the F ratio.

if $S^2_A/S^2_B < 3.05$

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then compute the pooled standard deviation by the following equation:

$$\text{Spooled} = \left[\frac{6S^2_A + 6S^2_B}{12}\right]^{1/2}$$

if $S^2_A/S^2_B > 3.05$, respike at the last calculated MDL and process the samples through the procedure starting with step 4.

(c) Use the Spooled as calculated in 7b to compute the final MDL according to the following equation:

$$\text{MDL} = 2.681\ (\text{Spooled})$$

where 2.681 is equal to t(12,1-a = .99)

(d) The 95% confidence limits for MDL derived in 7c are computed according to the following equations derived from percentiles of the chi squared over degrees of freedom distribution.

$$\text{MDLlcl} = 0.72\ \text{MDL}$$
$$\text{MDLucl} = 1.65\ \text{MDL}$$

where LCL and UCL are the lower and upper 95% confidence limits respectively based on 14 aliquots.

REPORTING

The analytical method used must be specifically identified by number or title and the MDL for each analyte expressed in the appropriate method reporting units, if the analytical method permits options which affect the method detection limit these conditions must be specified with the MDL value. The sample matrix used to determine the MDL must also be identified with the MDL value. Report the mean analyte level with the MDL if a laboratory standard or a sample that contained a known amount analyte was used for this determination, report the mean recovery, and indicate if the MDL determination was iterated.

If the level of the analyte in the sample matrix exceeds 10 times the MDL of the analyte in reagent water, do not report a value for the MDL

REFERENCE

40 CFR Part 136 Appendix B, USEPA Chapter 1, 7/1/90.

Table of Students t Values at the 99 Percent Confidence Level

Number of Replicates	Degrees of Freedom (n-1)	$t_{(n-1,1-oc=.99)}$
7	6	3.143
8	7	2.998
9	8	2.896
10	9	2.821
11	10	2.764
16	15	2.602
21	20	2.528
26	25	2.485
31	30	2.457
61	60	2.390
		2.326

5.1.4 Method Spikes

Method spikes will be carried out over 2 separate days at the specified levels including blanks and calibration standards. The data obtained at the 2x or 5x level (for each certified range) will be used to establish a mean and standard deviation for initial control charts. Once this data has been generated and approved by the analytical manager, the method has preliminary certification and is ready for application to real world samples. These control limits will be updated with every batch of samples until 30 numbers have been developed to establish reliable control limits. After 30 data points the DC will provide updated control limits with each additional 20 numbers.

5.2 REPLACEMENT METHOD CERTIFICATION

When a new method is to be employed (where a new method is defined as including a new instrument method, i.e. flame vs flameless AA or Hall vs ECD), the method must be certified prior to its use on client samples.

Certification follows the procedures described in Sections 5.1. The results of these tests are important but are not necessarily compared to the current method. The detection limit may change and the work range may change but if they meet the needs of the lab, these changes are to be ignored. One may elect to utilize a t-test analysis to identify the method differences as being significant or not.

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5.2.1 Comparison by the t-Test

One sample will be analyzed a minimum of 4 times by each method. The results will be subject to a t-test analyses. If the t-test indicates statistical correlation, regardless of the correlation coefficient, the new method is certified. If the t-test fails, refer to Section 5.2.2 below.

5.2.2 Decisions on Certification

The purpose of a new method is to improve accuracy, precision and efficiency. Efficiency is of no consequence if a method is imprecise and inaccurate, and therefore, is not a consideration in certifying new methods. However, a new method may fail the t-test because it is more accurate and/or more precise. Careful consideration and more analyses may be necessary with a new method by the analytical manager and supervisor.

6.0 ANALYST TRAINING AND CERTIFICATION

6.0 ANALYST TRAINING AND CERTIFICATION

6.1 RATIONAL

Consistent with requirements by the EPA and other regulatory agencies for analyst training and certification programs, WWES has a strict policy relative to the training and certification of analysts prior to their involvement in the analysis of client samples. The program is necessary in order to maintain continuity in all analytical programs and to insure the integrity of all data.

6.2 TRAINING

The supervisor is responsible for training all new personnel. This training will be in conjunction with the group (workstation) and group leader if applicable. Training will include, but not be limited to, WWES QC requirements, paperwork flow, lab safety and organizational structure. In addition, the new analyst will be given copies of the QC manual, log-in manual and methodologies which the analyst will be required to read. Training in the methods to be used will be initiated prior to analyst certification.

6.3 CERTIFICATION

Each new WWES analyst will be required to receive certification on all methods which he is to perform. Certification insures that the analyst can meet WWES detection limits and quality control limits as established for the method. Certification includes two parts, both of which must be completed satisfactorily.

6.3.1 Method Spikes

Analysis of spiked lab pure water at the levels of 0.5x, 1.0x, 2.0x, 5.0x and 10x where x is the established detection limit. This will include 2 blanks and a duplicated spike at 2.0x or 5.0x and will occur on 2 separate days. The data, where the duplicated results are averaged. These results must match current WWES Schwart control chart limits. Additional parameters such as consistent instrument calibration curves will be evaluated.

6.3.2 Check Sample Analysis

The analyst will test a known blind check sample in duplicate including a blank. All the data must fall within established control limits for the parameters.

6.3.3 Current Analysts Training

The LDI analyst, who is assigned a new method, must complete the certification program for the methods as outlined above prior to performing analyses on client samples.

6.4 RECERTIFICATION

All WWES analysts will recertify on all their respective methods when required or demonstrated by two method spike performance failures following the procedures set forth in Section 6.3.1. The results must meet previous data, assuming that the same methods are employed.

6.5 PERFORMANCE AUDITS

The Laboratory Manager, in cooperation with the QA Manager, will perform individual audits on all aspects of the operation biannually. These audits will include recertification data, control limits, all levels of records and laboratory performance on all check samples and instituted blind QC samples. A report of the audit results including recommendations will be forwarded to the President of the Environmental Laboratory Division.

BE 000127

7.0 DOCUMENT CONTROL, FLOW AND STORAGE

7.0 DOCUMENT CONTROL, FLOW AND STORAGE

7.1 PURPOSE

The paperwork trail must be designed to insure that after the issuance of a report, anyone - a client, a lawyer or the President of WWES can track a single sample result back through WWES records to the origin of the standards used in calibration and the identity of the person who prepared the sample bottles.

7.2 PAPERWORK FLOW

As shown in the attached, "Flow Diagram" the paperwork trail is eventually the same for routine work as it is for samples under Chain-of-Custody. The general axiom is that a COC procedure is doomed to failure without a pre-existing scheme of tight sample and analytical control available as a routine measure. This contention, however, is only of minimal consequence with respect to the need for detailed records. The records trail can provide the following:

- Answers to questions of analytical integrity for results which are 2 months or two years old.
- Assistance in finding and solving random and systematic problems.
- Assistance in preventing long term degradation of analytical integrity.
- Assistance in insuring continuity of analytical effort despite personnel and mechanical changes.

7.3 DOCUMENT REQUIREMENTS

The following subsection identifies all documents which are generated during the course of any project:

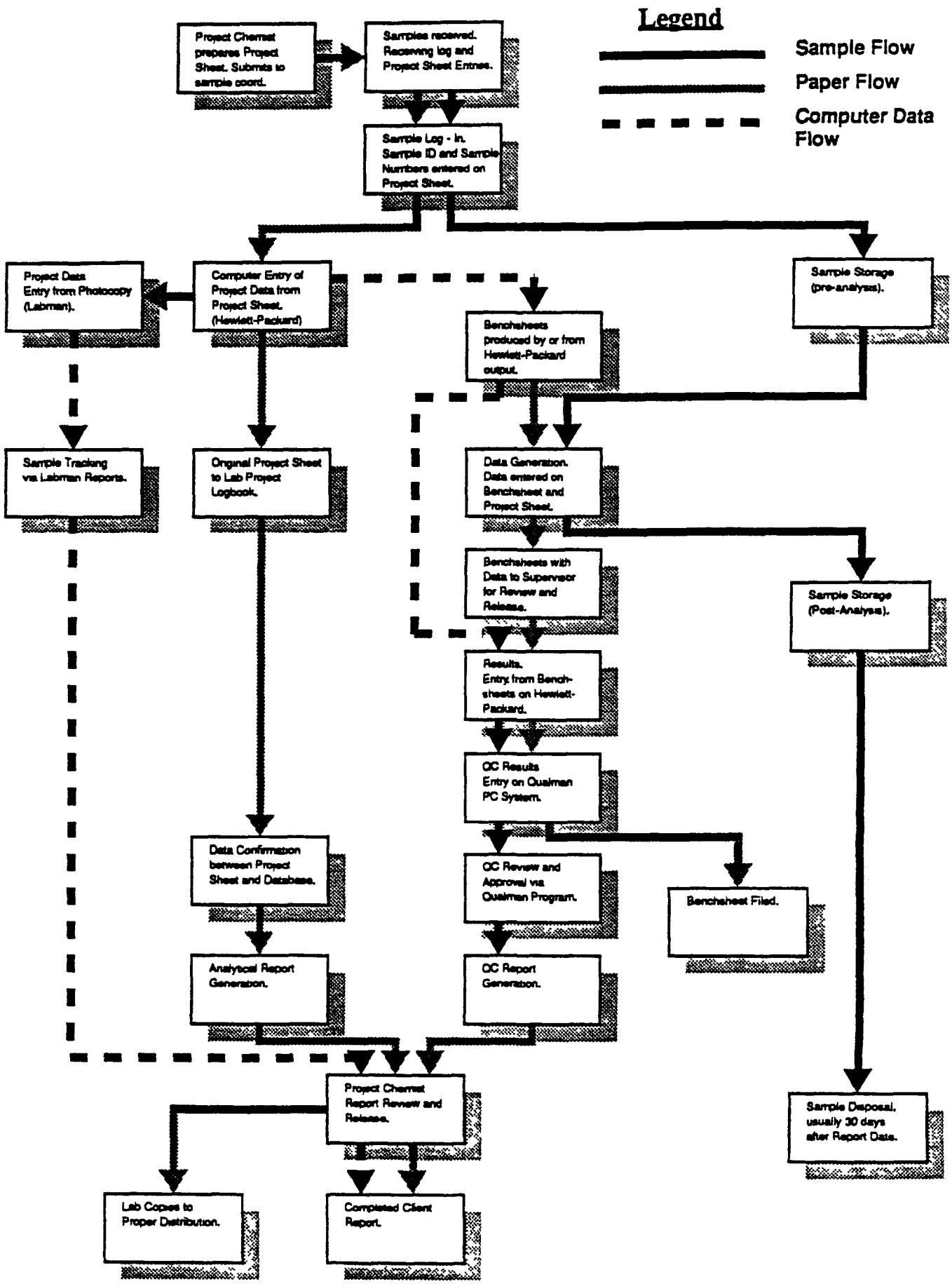
7.3.1 Project Sheets

Every sample or group of samples which enter the WWES facility must be accompanied by the appropriate project sheet which has been properly filled out and provided to the Sample Coordinator (SC). The SC may not log-in samples for which there are not project sheets or for which there the project sheet is incomplete. An example project sheet is attached as Figure 2.

7.3.2 New Project Approval Form

Projects which require testing or analyses not routinely provided at WWES must have prior approval on a Project Questionnaire and commitment from the Analytical Manager and the head of the appropriate analytical group(s). For the project manager's purpose, the approval forms insure that the analytical testing

Sample and Document Flow Diagram



BE 000130

ENVIRONMENTAL LABORATORY DIVISION
Project Initiation

Client Name
(32 characters available)

Report Address

Billing Address
(if different)

Client Alias

Client Contact
(20 characters available)

Phone ( ) - Ext.

Project Chemist

Client Expiration Date - - Narrative

Space for the Client Narrative is provided on the back side of this sheet

Project Description
(2 lines of 26 characters available)

Price Code Price Factor

Price Code Expire Date

Project Contact

Phone ( ) - Ext.

Project Expiration Date

Purchase Order No. Proj. Type[1] Report Format[2]

Contract No. Field Blanks Methods Page

CCS Mgr. Case Narr. QC Report

CCS Project No.

[1] C = Competitive Quote; D = Direct Request; R = Renewal
[2] S = Standard; C = Cas# Report

Figure 2

Frequency (1)		Turnaround		Flame		Bottles (4)	
Submit/Yr.		C.O.C. (2)		Reactive		Carrier	
# of Samples		QC Type (3)		Contact		Sample Storage	
				Health		Bottle Address (5)	
						Narrative	

(1) Days between submittals
(2) I = Internal (Lab)COC; E = External (Field)COC; N = None
(3) RAS, SAS, QAP
(4) H = Hold; S = Ship
(5) Y = Yes if Bottle Address is Different than Client Address

Bottle Shipping Address

Space for the Project Narrative is provided on the back side of this sheet

Submittal Description

(26 characters available)

Date Expected - -

Bottle Due Date - -

Turnaround Days

Narrative

Submittal Narrative

Figure 2

Test Group Description _____
(40 characters available)

Sample Matrix ____

Date Expected __ - ___ - ____ Bottle Due Date __ - ___ - ____

Parameters	Method Number (Reference Citation)	Specific DL

BE 000133

Figure 2

area has received notification and will be prepared. For the analytical managers purpose, proper notification has been received and sufficient time has been allotted for preparation and development. Projects requiring rush turn around on modified methods must be approved as well. An example of a Project Questionnaire is attached as Figure 3.

7.3.3 Problem Project Sheets

When the Sample Coordinator (SC) identifies a problem with a sample shipment or project sheet, a Problem Project Sheet will be initialed and sent to the project manager for resolution. See Figure 4.

7.3.4 Chain-of-Custody Forms

There are three forms for Chain-of-Custody samples. All three forms must be properly completed and included in the project file for each and every COC project.

7.3.4.1 COC Shipping Record

The shipping record must be received in the shipping container with every COC shipment. The form attached as Figure 5 is similar to the form used by the EPA. This form will be used by WWES field samplers and returned with the samples. Other forms of a similar nature may be used by other clients. However, the information required on the WWES form must be present on any other client form or they run the risk of their COC being rejected as a continuous trackable COC event.

7.3.4.2 COC Sample Control Record

This form is used as a record of the movement of COC samples in and out of the COC locked storage. The analyst signs samples in and out each time a sample(s) is removed for any analysis. A copy of the form is attached as Figure 6. After all analyses are complete, the Sample Coordinator files the form in the COC project file.

7.3.5 Work Sheets/Project Sheets

Work sheets are the analytical assignment forms generated by the computer or the lab manager within 24 hours after log-in for each project or group of projects. The work sheets are divided into work stations, i.e. the analytes for which one or more analysts has sole responsibility.. In many cases, the work sheets will have an entry position for the results of each analyses for each sample. In either case, the work sheet, upon completion of all analyses, will be turned into the appropriate

ENVIRONMENTAL LABORATORY DIVISION
PROJECT QUESTIONNAIRE

REQUEST FOR WORK/QUOTATION
(circle one)

1a. Client _____ Proj. No. _____

1b. Project Name_____Proj. Mgr._____ Initials: __
(How do you want it to look on the report)?

2. Where should report be routed?_____

3. Date of request of work?_____Lab Notified YES NO_____

4. Date samples will arrive in lab:_____

5. Project Frequency: One Time _____ Other (specify) _____

6. Turnaround required _____ Due Date:_____Time:_____
Confirmed in ELD by: _____

7. Job Description:_____

8. Quality control requirements: RAS SAS QAP

9. Does QC need to be reported? YES NO

10. Is strict Laboratory Chain of Custody required? YES NO

11. Have sample containers been requested? YES NO

12. Sample containers for the project have requested from Grand Rapids/Livonia (circle one).

13. **No. of water samples:**_____

14. Parameters required are or/see attached (circle one):_____

15. Specific methods, detection limits, and/or program requirements (e.g. NPDES, Act 307 . . .)

16. **No. of soil samples:**_____

17. Parameters required are or/see attached (circle one):_____

18. Specific methods, detection limits, and/or program requirements (e.g. RCRA, Act 307, etc.)

19. **No. of air samples:**_____

Emrich4/eldquest

Figure 3

20. Parameters required are or/see attached (circle one):_____

_____

_____

_____

_____

_____

21. Specific methods, detection limits, and/or program requirements (e.g. ACGIH, TLV, etc.)

_____

_____

_____

_____

_____

22. **No. of other samples:** _____ Type:_____

23. Parameters required are or/see attached (circle one):_____

_____

_____

_____

_____

_____

24. Specific methods, detection limits, and/or program requirements (e.g. Act 307, RCRA, etc.)

_____

_____

_____

_____

_____

25. Hazard levels associated with the samples are:_____

_____

26. Has the client has been advised that any hazardous samples will be returned to them? YES NO

27. Disposal of samples will take place 21 to 30 days after report mailing unless noted otherwise. _____ (If otherwise is noted a charge of $5/sample month will apply).

28. Costs for the analysis were confirmed by (ELD) _____ of the Grand Rapids Branch.

29. Is there any particular format needed for the final report? YES NO (If yes discuss with ELD Project Chemist)

30. Are there any field measurements to be reported? YES NO
If so specify _____

31a. Are you running field blanks? YES NO

31b. Are you running trip blanks? YES NO

32. Other Information:

33. Lab signature_____

34. CCS signature_____

FIGURE 4

WWES LABORATORY
PROBLEM PROJECT REPORT

SAMPLES RECEIVED ON _____ AT _____ AM/PM FROM: _____

AND DESCRIBED AS _____ WERE RECEIVED HAVING THE FOLLOWING DEFICIENCIES.

___ WWES PROJECT APPROVAL FORM - ABSENT/INCOMPLETE

___ CHAIN-OF-CUSTODY - ABSENT/INCOMPLETE

___ CHAIN-OF-CUSTODY - DOES NOT MATCH SAMPLE TAGS

___ SAMPLE BOTTLES - BROKEN

___ SAMPLES ABSENT - QUAN. DOES NOT MATCH APPROVAL FORM

___ SAMPLE BOTTLES - INCORRECT FOR ANALYSIS

___ SAMPLE PRESERVATIVES - INCORRECT FOR ANALYSIS

___ SAMPLE VOLUMES - INCORRECT FOR ANALYSIS

___ SAMPLE TAGS - WRONG I.D./ABSENT

___ FIELD FORMS - ABSENT/INCOMPLETE

___ CUSTODY SEALS - ABSENT/NOT INTACT

___ NON-ROUTINE PROJECT - NO PRIOR APPROVAL

THE SAMPLES IN QUESTION WILL BE PROCESSED AS IS ____ PLACED ON HOLD ____ UNTIL THE CORRECTIVE ACTIONS OR DIRECTIVES ARE ISSUED.

THANK YOU
WWES LABORATORY
SAMPLE COORDINATOR

WW Engineering & Science, Inc.
Environmental Laboratory Division
[illegible] Glenwood Hills Pkwy SE
Grand Rapids, Michigan [illegible]

Chain of Custody Record

№ 27823

Project No.	Project Name
Samplers (signature)	

Date	Time	Matrix*	Comp	GRAB	Sample I.D.	No. of Containers	Container Type & Volume	Preservation Method	Analysis Required/Comments

Relinquished by: (signature)	Date / Time	Received by:	Relinquished by:	Date / Time	Received by: (signature)	
Dispatched by: (signature)	Date / Time	Carrier:	Received to lab by:	Date / Time	Logged in by:	Date/Time

* MATRIX: WATER, SOIL, WASTEWATER

BE 000138

16-AUG-1991

WWES/ENVIRONMENTAL LABORATORY DIVISION
CHAIN OF CUSTODY

CLIENT: Rumpke of Ohio, Inc.

PROJECT: Quarterly Monitoring
Cincinnati, Ohio Landfill

SUBMITTAL: August, 1991 Groundwaters
PARAMETER: CARBON, TOTAL ORGANIC

METHOD: TOC/OXID/WTR

SAMPLE #	REMOVED BY: (SIGNATURE)	DATE & TIME REMOVED	RELINQUISHED BY: DATE & TIME	RECEIVED BY: DATE & TIME	DATE & TIME RETURNED
1279					
1280					
1281					
1282					
1283					
1284					
1285					

BE 000139

Figure 6

supervisor with the proper bench sheets attached. Unless specifically advised, data will not be accepted on any form other than the project approval form sheets.

7.3.6 Bench Sheets

The analysis of every analyte or group of analytes needed, i.e. VOA's requires a specific bench sheet which includes all results from the analysis of a group of samples. There are specific bench sheets for each analyte including specific requirements for their use. Examples of each bench sheet, can be found in Figures 7, 8 and 9.

7.3.7 Lab Notebooks

The lab notebooks are the daily records of all activities of an analyst, or group of analysts, working in the lab. The notebooks will be bound and paginated. The notebook will be cleanly labeled on the inside cover with the date issued, the analyst's name, and the date completed. There are several specific rules which will be follows:

- All entries are in ink
- There are no erasures, obliterations, or white outs allowed
- Corrections are single lined and initialed
- A new page is started each day or with every batch of samples
- Empty space is covered with a Z and signed and dated across the obtuse line
- Any and all work, observations and errors are noted
- Problem areas identified

When the instrument has just been repaired, a lamp changed, new column installed, detector repaired, or changed in any other manner, the log will also contain:

- A comment relative to the change or repair
- Reference page number to the Instrument Maintenance Log

The organic log books will also contain the following information relative to GC and GCMS oven and column conditions UNLESS they are exactly as specified in the referenced method which then will be commented on as such:

- column used (packing, diameter, length, type) o capillary as split or splitless
- current type and flow
- make up flow if appropriate
- oven temperature and program if appropriate
- injector temperature
- detector temperature
- ion chamber voltage (GCMS)

Test #: 198.01- 71.01
Parameter: COPPER, TOTAL
Method: FLAME/CU/WTR ODL: 0.01
Ref. Cit.: USEPA-220.1 Unit: mg/l

Instrument #:
Benchsheet ID: 2462
Owner:
Date run:
Reviewed By:
Est anal hrs: 1.6
Act anal hrs:
Samples in batch: 8
Stock std #:

Comments:

Client Submittal	Sample	COC	QC	Reported Conc.	Duplicate Result	Spike Result	Spike Qty.	Spike Stock #	% dif	% rec	ODL	Analyst	EXC	DNR
ICB:							XXXXXXXX	XXXXXXXX						
							XXXXXXXX	XXXXXXXX						
ICV: Stk														
GM BOC Lansing 453- 1	1720		RAS											
GM BOC Lansing 453- 1	1721		RAS											
GM BOC Lansing 453- 1	1722		RAS											
GM BOC Lansing 453- 1	1723		RAS											
GM BOC Lansing 453- 1	1724		RAS											
GM BOC Lansing 453- 1	1726		RAS											
GM BOC Lansing 453- 1	1727		RAS											
GM BOC Lansing 453- 1	1728		RAS											
MPB:							XXXXXXXX	XXXXXXXX						
							XXXXXXXX	XXXXXXXX						
Digested LCS: Stk														
LCS: Stk														
CCB:							XXXXXXXX	XXXXXXXX						
							XXXXXXXX	XXXXXXXX						
CCV: Stk														

Test #: 376.01- 35.01
Parameter: VOLATILE'S GC/MS 8240
Method: VOL/P&T/MS/WTR
Ref. cit.: USEPA-8240 Unit: ug/l

Client: 3M Company/St. Paul, Minnesota
Project: 428 3M Request # J2496
Main Plant
Submittal: 1 Volatile Organics Analysis
Sample: 1422 J2496-1

Expiration date: 05-SEP-1991 QC: RAS COC:
Lab due date: 05-SEP-1991
Client due date: 12-SEP-1991 C=0 F=0 H=1 R=0

Benchsheet ID: 2466
Owner: _____
Date run: _____
Instrument #: _____
Est anal hrs: 1
Act hrs: _____
Stock std #: _____
Supervisor: _____

*** SEMI-VOLATILES ORGANICS ***
Initial wt./vol. _____
Final volume _____
Dilution factor _____
***** VOLATILES ORGANICS ******
Initial wt./vol. _____
Volume purged _____
Dilution factor _____

	Parameter	Result		Parameter	Result	Parameter	Result
1.	ACETONE	< 50	21.	TRANS-1,3-DICHLOROPROPENE	< 4.0		
2.	BENZENE	< 1.0	22.	ETHYL BENZENE	< 1.0		
3.	BROMODICHLOROMETHANE	< 2.0	23.	2-HEXANONE	< 50		
4.	BROMOFORM	< 15	24.	4-METHYL-2-PENTANONE	< 50		
5.	BROMOMETHANE	< 10	25.	METHYLENE CHLORIDE	< 5.0		
6.	2-BUTANONE	< 50	26.	STYRENE	< 10		
7.	CARBON DISULFIDE	< 5.0	27.	1,1,2,2-TETRACHLOROETHANE	< 2.0		
8.	CARBON TETRACHLORIDE	< 4.0	28.	TETRACHLOROETHENE	< 2.0		
9.	CHLOROBENZENE	< 1.0	29.	1,1,1-TRICHLOROETHANE	< 2.0		
10.	CHLOROETHANE	< 10	30.	1,1,2-TRICHLOROETHANE	< 3.0		
11.	2-CHLOROETHYLVINYL ETHER	< 10	31.	TRICHLOROETHENE	< 2.0		
12.	CHLOROFORM	< 1.0	32.	TOLUENE	< 1.0		
13.	CHLOROMETHANE	< 10	33.	VINYL ACETATE	< 5.0		
14.	DIBROMOCHLOROMETHANE	< 3.0	34.	VINYL CHLORIDE	< 10		
15.	1,1-DICHLOROETHANE	< 2.0	35.	XYLENE(S)	< 5.0		
16.	1,2-DICHLOROETHANE	< 2.0					
17.	1,1-DICHLOROETHYLENE	< 2.0					
18.	1,2-DICHLOROETHENE(TOTAL)	< 4.0					
19.	1,2-DICHLOROPROPANE	< 3.0					
20.	CIS-1,3-DICHLOROPROPENE	< 4.0					

TestN: 389.01- 245.01
Parameter: CHLORIDE
Method: CL/TRAACS/WTR ODL: 2.0
Ref. Cit.: USEPA-325.2 Unit: mg/l

	STD VAL	OBS VAL	WKG STD NUMBER
1.			
2.			
3.			
4.			
5.			

Instrument N:
Benchsheet ID: 2463
Owner:
Date run:
Supervisor:
Est anal hrs: .8
Act anal hrs:
Samples in batch: 8
Stock std N:
Wavelength (nm):
Cell path (mm):

Comments:

Client..... Submittal	Sample	CDC	QC	Wt/dil factor	Reported Conc.	ODL	Spike Qty	% rec/dif	EXC	DNR
ICB:							XXXXXXXX XXXXXXXX			
ICV: Stk										
Rumpke of Indiana, Inc. 231- 7	1701	YES	RAS							
Rumpke of Indiana, Inc. 231- 7	1702	YES	RAS							
Rumpke of Indiana, Inc. 231- 7	1703	YES	RAS							
Nor-Am Chemical Co. 411- 1	1368		RAS							
Nor-Am Chemical Co. 411- 1	1369		RAS							
Nor-Am Chemical Co. 411- 1	1370		RAS							
Nor-Am Chemical Co. 411- 1	1371		RAS							
Nor-Am Chemical Co. 411- 1	1372 *		RAS							
MPB:							XXXXXXXX XXXXXXXX			
LCS: Stk										
SPK: Stk	Smp									
DUP:	Smp						XXXXXXXX XXXXXXXX			
CCB:							XXXXXXXX XXXXXXXX			
CCV: Stk										

7.3.9 Instrument Maintenance Log

The instrument maintenance log is a bound and paginated log which is used to track potential maintenance problems. The log is used every time the instrument is used but may contain several entries on one page. Entries on days where calibrations are correct may be as simple as "calibration met requirements". Anytime the instrument is repaired or modified in any way, the event must be noted with all specifics, including what was done, by whom, and why. A two detector GC has one log tracking, two detectors.

7.3.10 Oven, Refrigerator and Freezer Temperature Logs

Each oven, insulator or furnace, plus all cold storage devices, will have their temperatures checked and recorded daily, or at a minimum, 5 days a week. Each device will have a thermometer in place or a temperature recorder in-place which will be checked by the Data Coordinator. A bound log book with 31 entries will be used to record all entries for each device upon which the DC will record the date and temperature and will initial the entry. The DC will have an NBS thermometer which will move between devices to act as a QC check for the primary temperature device. The log will include the second temperature when measured monthly.

7.3.11 Balance Logs

An Area Analyst will check all balances in the laboratory every day (or at least 5 days a week) using NBS class S weights. The analyst will record each day's reading in a log developed to handle every balance. A balance which fails to meet criteria will be removed from service until repaired. The DC will insure that every balance is serviced and calibrated annually recording such service in the log.

7.3.12 Standard Record Books

Every standard used in the laboratory must be labeled and the label will possess the following information:

- The analyte or analytes contained in the standard
- The concentration
- The solvent
- The preservative, i.e. nitric acid
- The date made
- The Standard Reference Number

The last item, Standard Reference Number, is the identified standard and dilution sequence no. taken from the Standard Record Book in which the standard solution data is recorded.

All standards (including dilutions) will be recorded in a Standard Record Book assigned to the work station. Two record books will be used, each of which has a different purpose. The record books are subtitled as follows:

7.3.12.1 STOCK STANDARDS LOG

This book contains standards starting with the identification of the starting material. One standard and/or standard mix with it's corresponding dilutions are identified.

7.3.12.2 WORKING STANDARDS LOG

A working standard reference number is assigned and the corresponding dilutions are identified.

7.3.13 Control Charts

Each analytical method will require at least one control chart. Some tests may involve several control charts, i.e. duplicate, matrix spikes and method spikes. The QC coordinator will supply the limits to be used to the work station involved. Every data point generated with every analytical batch will be plotted on the chart. Every out-of-control data point will be noted and an action indicated as to the disposition of the data. Completed control charts will be turned in to the DC for permanent change.

7.3.14 Preliminary Reports

After all data has been entered for a project, the computer will flag a project ready for a preliminary report. The report will be identical to the final report in content except for the following:

- Preliminary Report will be reviewed and corrected if necessary on each page in large type.
- Comments necessary to the project will be printed under each sample or at the end of the report.

The DC will print the preliminary report and issue a copy along with the project file to the lab supervisor for review and corrections. The supervisor will sign off on the preliminary report after including comments, if appropriate, indicating that corrections are necessary. Afterwards, the supervisor(s) will pass the preliminary report to the QC Supervisor (QC) who will review and correct the report including a signature and comment. The QC will return the preliminary report

and file to the DC. The DC will make all corrections as required and review report structure for completeness. If no corrections are required, the DC will sign and date the preliminary report and place it in the Project File. The DC will then print a Final Report. When corrections are necessary, the DC will execute all corrections and indicate such changes on the initial preliminary, which is then filed in the project file. A new preliminary is then printed and issued for review.

7.3.15 Final Report

After the preliminary report has been corrected and cleared all reviews, the DC will manually alter the computer flag and print a Final Report which will be placed in the project file folder and forwarded to the AM for approval. Space will be provided on the c.o.c. project file folder for the signatures of the Analytical Manager, the QA Manager and the Project Manager, all of whom are thus certifying that the report is complete, correct and defensible. The DC will then arrange for delivery of the final report.

7.3.16 Project Files

The Project File is the comprehensive record of every project completed at WWES. A project file initially consists of a file folder set up by the Lab Secretary (LC) at the time of log-in. Chain-of-Custody projects will be stored in a locked COC file with strict limited access while routine project files are stored in a separate nominally limited access file. The LS will be responsible for including the following in the project file:

- Project Sheets
- Project Approval Sheets (if applicable)
- Problem Project Sheets
- Chain-of-Custody Forms
- All correspondence or documents received with the samples
- Preliminary Reports
- Separate Report Papers, i.e. Field Reports (if applicable) - Final Report
- Any additional paperwork which may follow the report

All project files are stored for a period of 4 years.

8.0 SAMPLE CONTROL, FLOW, AND STORAGE

8.0 SAMPLE CONTROL, FLOW, AND STORAGE

All samples received at the WWES Engineering and Sciences must be logged in before any work is performed on the samples. This procedural requirement is specific not only to the chemistry lab, but the microbiological laboratory. The purpose of the log-in procedure, including sequential numbers assigned to all samples received in the facility, is to insure that WWES has a means by which samples can be tracked, data can be stored, and quality control can be tracked for any sequence of events during a particular analytical period. In handling projects in this manner, WWES, or the client, can insure a consistent and documented sequence of events under any analytical situation.

Management acknowledges that there are situations in which log-in of samples will be difficult due to rapid turn around requirements for particular compounds that may decompose or volatilize. An example of this kind of analysis is the total coliform samples which can be anticipated and for which holding times are short. The project approval form discussed within this manual will make it possible to preassign project numbers to samples arriving at the facility. Should a secondary mode of operation be necessary for the receipt of such samples, a mechanism will be developed between the sample coordinator and the Quality Assurance Supervisor. Any deviation from the standard log-in procedures detailed herein will be at the discretion of the laboratory supervisor or the laboratory manager. The execution of the log-in procedures for Chain-of-custody samples (see Section 8.8) is extremely crucial. Samples, that have been designated for Chain-of-Custody by a client, possess the potential of involvement in litigation or other legal situations., i.e. standards development or patents. By breaking Chain-of-Custody requirements, all results are invalid for such purposes.

8.1 PROJECT INFORMATION

All information relative to a specific project must be recorded on a project approved form by the manager responsible for that project prior to the receipt and log-in of samples. Projects, and therefore samples which are not routine to the WWES laboratory, must have prior approval via the New Project Approval Form before samples may be received.

8.2 NEW PROJECT APPROVAL

The project approval form include the following information:

- Client name, address, and client contact personnel
- Anticipated due date of the report (i.e. report in client hands by _____)
- Compound names or computer test codes or group computer test code
- Project and sample comments
- Contract number or purchase order for project
- Instructions relative to the proper completion of the project
- Pricing information relative to the proper completion of the project
- Chain-of-custody requirements

- Specific report requirements
- Additional requirements such as rush, hazardous, labile

8.3 NEW PROJECT APPROVAL

If a new project will require support from the analytical facilities, that project must be approved by the laboratory supervisors and the laboratory manager prior to project pricing and sample receipt. Routine samples are those samples and analyses which are continuously processed by WWES, such as priority pollutant samples, microbiological samples, and drinking water samples.

Projects which are non-routine are those that may require special testing, or which request parameters not routinely run within the laboratory, special holding times, or rush turn around. Non-routine projects will require that a New Project Approval Form be completed which includes the signatures of all the parties involved with the project. For example, if specific physical testing is necessary, the supervisor of the physical testing facility and the laboratory manager will have to sign off on the form thereby agreeing, not only to the project content, but for the turn around, the report requirements, the detection limits and the quality control reports that may be necessary to properly carry out the project requirements. Projects and/or samples arriving at WWES which are non-routine in nature, and for which there is no signed Project Approval For,, will not be processed. In this case, the manager responsible for the non-routine project will be advised of the problem and will then explain to the client why the delay is necessary for the execution of testing before proceeding to obtain the necessary approvals. The Project Approval Form must be completed and signed by all parties prior to the start of log-in.

8.4 SAMPLE RECEIPT

8.4.1 Introduction

All samples will be received at the WWES facilities by the Sample Coordinator (SC). The job description for the Sample Coordinator is attached as Figure 10. It will be the responsibility of the SC to determine: a) whether or not the proper project sheet is available for the arriving samples; b) whether or not the samples require chain of custody; c) whether or not the samples are labile in nature and require immediate attention; d) the manner in which those samples will be split, preserved and stored or routed. It is the objective of the SC to insure that the receipt of all samples is consistent with the requirements of the WWES Manual and that all pertinent information relative to those samples is recorded. This information may be used in client reports, communicated to the laboratory or to the client and, in some cases, reported to a legal authority relative to Chain-of-Custody samples.

FIGURE 10

SPECIFIC RESPONSIBILITIES

The SC's duties and responsibilities shall include, but not be limited to:

1. Sample receipt.
2. Insuring that COC sample receipt includes shipper's signature on COC forms.
3. Inspection of sample shipping containers for presence/absence and condition of:
   a) custody seals, locks, "evidence tape", etc.
   b) container breakage and/or container integrity
4. Recording conditions of both shipping containers and sample containers (bottles, jars, cans, etc.) in appropriate logbooks or on appropriate forms.
5. Signing appropriate documents shipped with samples (i.e., Chain-of-custody record(s).
6. Verifying and recording agreement or non-agreement of information on sample documents (i.e., separate tags, Chain-of-Custody records, traffic reports, airbills, etc.) on appropriate forms and on the WWES project sheet.
7. Initiating the sample and project log-in procedures on appropriate laboratory documents and according to the WWES Log-in Procedures document, including the initiation of project files with sample control records.
8. Marking or labeling samples with laboratory sample numbers, as appropriate.
9. Placing samples and spent samples into appropriate storage and/or secure areas.
10. Controlling access to samples in storage and assuring that laboratory operating procedures are followed when samples are removed from and returned to storage.
11. Monitoring storage conditions for proper sample preservation such as refrigeration temperature and prevention of cross-contamination.
12. Returning shipping containers to the proper client or licensed disposal facility.
13. Providing for the splitting of samples into required aliquots, including preservation for each working station.

8.4.2 Examination of Shipping Container

Immediately upon receipt of a sample shipment at WWES, the SC will examine the shipping container (the container may be a box, a cooler, a styrofoam container, etc.) to ascertain and document the condition of the samples and to process Chain-of-Custody papers, where appropriate. The SC will record the condition of the shipping container, the identification of the shipper, the presence or absence of any seals on the container (if it is Chain-of-Custody), and the labeling which may include special instructions prior to opening the container. If the shipping container is damaged, a report will be sent immediately to the shipper and the lab supervisor (see Section 8.15.2, Problem Project Sheet).

8.4.3 Carrier Sign Off for Chain-of-Custody Container

Should the SC identify the shipping container as being a Chain-of-Custody container, the SC will attempt to have the carrier's representative sign off on the Chain-of-Custody papers which should be available either on the outside of the shipping container, or immediately inside. An example of a Chain-of-Custody record is attached as Figure 5, (Section 7). In the event that the carrier's representative is unwilling to cooperate in this fashion, the SC will identify, in the proper position on the Chain-of-Custody document, the shipment number, the date of receipt, and sign off, attaching a copy of the shipping log for that particular container.

8.5 EXAMINATION OF CONTAINER CONTENTS

Unless the shipping container contents are marked "hazardous" the SC will proceed to open the sample container. If the SC had not previously identified the project sheet appropriate for these samples, the SC will attempt to ascertain immediately the origin of the samples found in this container and obtain the appropriate project sheet. If a project sheet is not found, the SC will lock up the samples and notify the lab manager as described in Section 2.0. The SC will identify whether or not all the samples have arrived intact, whether or not the labels are intact and attached properly, and whether or not the samples have leaked in any fashion. The SC will also identify any shipping instructions, field instructions, or any other materials that may be present in the shipping container.

8.5.1 Chain-of-Custody Shipments

Should the SC identify the shipping container as a Chain-of-Custody project, the SC will immediately follow the procedure outlined in Section 4.0, "Chain-of-Custody Samples".

8.6 PROJECT VERIFICATION

The sample coordinator, having opened the shipping container and examined all the samples, will verify that the project sheet matches the samples, the number of samples received is consistent with the project sheet, and that the requirements identified on the project sheet are consistent with any paperwork obtained which will include the project sheet and any other documents in the sample container. The project files will be kept by the SC in a locked filing cabinet. If all required project information is not complete, the SC will fill out a Problem Project Sheet (see Section 5.2) and turn it over to the Project Manager.

8.7 LABILE SAMPLE DISTRIBUTION

Should the SC identify labile samples within the shipping container, (i.e. coliforms or nitrites) for which there is a very short holding time and a need to rapidly move the samples into the laboratory, the SC will make every effort to immediately log-in those samples. Should log-in be delayed, the SC will coordinate with the responsible analytical group in order to move the samples into analysis. The coordinated effort will included means by which the SC can label the samples after log-in and insure that the results correlate with the proper samples. The SC will provide computer generated sample identification to the responsible analytical group. It will be the responsibility of the SC, once labile samples have been distributed to the laboratory to insure that those samples are properly logged in and that they are labeled with properly sequenced numbers. The agreement that is made between the SC and the appropriate laboratory manage or laboratory supervisor will be based on the premise that the SC understands that he/she is ultimately responsible and will be held accountable for any samples that are lost in such a movement. Consequently, the SC will find the samples that are labile and apply the necessary labels.

If a shipping container is labeled "Hazardous", the SC will immediately notify the laboratory supervisor who will determine the extent of hazard and/or the manner in which the samples will be handled. The supervisor will involve the laboratory manager as needed in resolving questions of hazardous samples.

FIGURE 11

POSITION DESCRIPTION FOR SAMPLE COORDINATOR

GENERAL

The Sample Coordinator (SC) is responsible for the receipt, log-in, and storage of all client samples at WWES. The SC is responsible for the receipt, storage and custody of all Chain-of-Custody (COC) samples including distribution of COC samples to lab personnel per WWES COC procedures (section 4.0, WWES Log-in Procedure). In order to ensure the successful analyses of samples, it is critical that the SC obtain and communicate to Project Manager, lab supervisors, and lab personnel, all information necessary for the processing interpretation and reporting of all samples analyzed.

QUALIFICATIONS

High School Diploma and a minimum of 2 years of college or equivalent. A knowledge of chemistry and testing procedures helpful. Excellent verbal, written and organization skills, including a propensity for detail necessary for successful completion of job.

REPORTING RELATIONSHIPS

The SC will report to the laboratory manager. The SC will communicate closely with the Director and Project Managers to obtain project information.

8.8 CHAIN-OF-CUSTODY SAMPLES

8.8.1 Continuance of Log-In Procedures for Chain-of-Custody Samples

All samples in the possession of WWES under Chain-of-Custody (COC) procedures must be traceable from the time the samples are received at the WWES door (or collected by WWES staff) until results are reported and sample disposition has been determined from the client. For any samples that may be collected during enforcement investigations, under litigatory requirements, or evidentiary in nature, Chain-of-Custody procedures are required.

8.8.2 Examination of Container Contents

Although Section 8.4.2 under Sample Receipt discusses the thorough examination of container contents, the proper examination of a container which is involved in a Chain-of-Custody procedure is even more important. For example, should the sample labels be mismarked or a particular sample to somewhat strange in nature, it is necessary to note all observations and deviations from the project sheet. It is better to be overly observant than to allow possible anomalies to go unnoticed. It is the SC's responsibility to examine whether or not each of the sample containers are individually sealed, whether those seals are intact, whether a sampler's initials are on the seals, and whether or not the paperwork matches the contents of the package. In addition, the SC must note whether or not all the dates and times are consistent, and whether or not the sample description on the paper work matches the description on the sample container.

8.9 PROJECT VERIFICATION

In the same manner in which the examination of the container contents is critical to a COC project, the verification of the project is equally important. These project verification steps include not only the need to follow the requirements identified in Section 8.6, but also thorough examination of all aspects of the project and the consistency of all the paper work involved with those particular samples in that shipping container. It is also important that the SC place in the COC project file: the shipping document; a signed Chain-of-Custody document including the sign off from the shipper's representative (See Section 8.4.3); a copy of the project sheet; a copy of the Project Approval Form is appropriate; a copy of the filed sampling report if appropriate; and originals of all paperwork received for the project. The COC project file is kept in locked storage in the possession of the SC.

8.10 CHAIN-OF-CUSTODY LOG-IN

The log-in procedure identified in section 8.15 titled "Log-in", is followed in the same manner for Chain-of-Custody samples with a few modifications. Those areas which are changed are addressed in the following sections:

- Sample Storage
- Project Files
- Laboratory Access
- Data Storage

8.11 CHAIN-OF-CUSTODY SAMPLE STORAGE

All samples received under Chain-of-Custody procedures will be kept under locked storage and will be distributed for analysis to the laboratory only when the analyst has signed for the samples on the form shown in Figure 6, (Section 7). The SC or a designated representative will provide access to COC storage. Records of movement of all COC samples within the lab facility must be recorded.

8.12 CHAIN-OF-CUSTODY PROJECT FILES

All Chain-of-Custody project files will be kept in a project folder in a locked cabinet with all related documents and paperwork relative to those files.

8.13 MAINTENANCE OF LAB CUSTODY

Laboratory custody must be consistent with all the Chain-of-Custody requirements from the beginning of sampling to the final report. To this end, every analyst requiring access to the Chain-of-Custody samples will go to the SC for access to the COC locked sample storage. The SC will insure that the analyst signs for the receipt of all COC samples on the form shown in Figure 6, (Section 7) and that the analyst returns and signs in those same samples on the same day for which they were signed out. This documentation, after the completion of all analyses, will be placed in the locked Chain-of-Custody project file by the SC.

8.13.1 Sample Custodian

The COC sample custodian at WWES will be designated as the Sample Coordinator (SC). The SC is responsible for following the COC requirements outlined in these procedures for all samples received at WWES.

8.13.2 Lab Custodial Responsibilities

It will be the responsibility of every analyst signing for a Chain-of-Custody sample or samples to insure that; a) these samples are kept in a minimum access

facility; b) they are within their possession during the particular period during which they are being analyzed; and c) the analyst returns those samples to the Chain-of-Custody lockup in the manner prescribed. The analyst will sign out and return the samples to COC lock-up on the same day. The analyst will be using the SC as the sample custodian for all COC samples. Due to the legal implications for the client of breaking the COC procedures and possibility of legal action that could be taken against WWES, errors in the execution of Chain-of-Custody procedures will not be tolerated.

8.14 CHAIN-OF-CUSTODY SAMPLE DISPOSAL

All samples received for COC procedures will be stored in the WWES COC lock-up facilities until a final report is issued. It will be the responsibility of the Project Manager, in cooperation with the SC, to obtain information from the client relative to the length of time the COC samples will be stored. It is anticipated that for long term storage, i.e. more than 30 days, the client will reimburse WWES ' n appropriate rate for keeping completed samples under Chain-of-Custody procedures. No Chain-of-Custody samples may be discarded until written permission is received from the client relative to disposal of those samples.

8.15 LOG-IN

8.15.1 Introduction

After the Sc has inspected the shipping containers, the project sheets, the samples and any documentation required in Sections 8.4 and 8.8, the SC will insure that all pertinent information is entered on the project sheet. There are specific areas of the project sheet that are to be completed by the SC, i.e., date and time received. The WWES project sheet is included as Figure 2, (Section 7).

Minimum information required for log-in include:

- Client's name and Client contact, as well as client #, is assigned.
- The due date
- The analytical test or test codes or group tests
- Specific project comments
- Contract requirements
- Contract number
- Pricing if necessary
- The approval for non-routine projects
- Chains-of-Custody, if required
- Specific report requirements

8.15.2 Project Problems

If any of the information identified in sub-section 8.15.1 is missing, the SC will immediately notify the Project Manager, via a Problem Project Sheet, Figure 4, (Section 7) of the discrepancy. The Project Manager will make all reasonable efforts to insure that the answers are provided to the SC immediately.

Simple Project Sheet deficiencies such as client number, extra comments, or the contract number, should not prevent log-in. The SC will proceed with log-in addressing the unknowns as subjects that must be changed or modified once the information is received. It is the responsibility of the SC to log-in all samples as received at WWES whenever possible.

8.15.3 Samples on Hold

When there is a considerable amount of inadequate information on a project sheet, i.e. a missing test, or broken samples, the entire project will be placed on hold until the information is available or the corrective actions have been taken to insure that NSF is not held responsible for a poorly handled project. The SC will notify the Project Manager via a Problem Project Sheet as to the hold status of the project and the reasons for the hold. The Project Manager will make every attempt to quickly identify the necessary actions that will be taken for those samples or the remaining samples for that project. The Project Manager may approve log-in of the remaining samples for a portion of the project in order to insure that the project progresses. Projects that are placed on hold will be locked in a "project hold" area, (like the Chain-of-Custody sample storage area) so that those samples are not lost or confused within the system. The SC will insure that those samples are retrieved and logged in as soon as the appropriate changes have been made and the samples are freed for log-in.

8.15.4 Handling Labile Samples

All samples received by the SC that are labile in nature, i.e. coliforms, need to be logged into the facility in a very rapid fashion in order that they may e attended to within the analytical holding time. The most labile of all samples are the microbiological samples, which must be forwarded to the micro lab as soon as possible. The SC and the Project Managers responsible for micro work will attempt to insure that appropriate information is available to the SC in order that the SC can assign numbers for all labile samples. These numbers can be assigned in advance and samples may be logged into the system as soon as they are received. Samples such as nitrites, which are labile but have a somewhat longer holding time, will usually be logged into the system like normal samples. However, slow shipment or other problems may require the lab to initiate the analyses immediately. In such a case, assuming a project sheet was initiated in

advance o sample receipt, the SC can assign laboratory in an expedient fashion. The SC will make all efforts to insure that samples move through the laboratory in a timely fashion when holding times are of utmost importance to the proper completion of the analytical requirements.

8.16 COMPUTER LOG-IN

It is anticipated that all samples received at WWES will be logged on to the computer by the SC. The computer assigns a sequential number to every sample. Additional codes such as the month and the year of the samples may be added in front of the sequential number for continuous identification of these samples. The SC will have the computer generate these sequential numbers for each sample in every project. A project identifier will be printed on the labels which are attached to every sample and every aliquot of a sample.

8.17 SAMPLE SPLITTING FOR THE CHEMICAL LABORATORY

The WWES Project Manager will attempt to insure that all samples received at the WWES facility are received in the appropriate containers with the correct preservatives (Samples which must be split at log-in are subject to added error). The labels and the appropriate preservatives are depicted in Figure 12.

8.17.1 Bottles and Preservative Requirements

The WWES analytical facility has a series of bottle and preservative requirements that must be met before the log-in of samples into the laboratory. In the event that WWES is unable to provide sample bottles, or circumstances prevent the splitting of samples in the field, the SC will provide sample splitting services. These services will include taking the sample as received and subsampling it into the appropriate bottle and preservative requirements as set forward on the attached list of bottle and preservative requirements.

8.17.2 Inorganic Samples

The SC will insure that sufficient sample volume is available before initiating the splitting of a sample. If uncertain, the SC will involve the laboratory supervisors in order to insure that all areas of the lab have sufficient samples. In the event that sufficient samples does not exist, the SC will identify the sample as a problem and will notify the Project Manager immediately for resolution. The sample will be logged in only after a resolution has been reached.

8.17.3 Organic Analysis

When a bulk sample arrives for organic/inorganic analysis and sufficient sample exists, the SC will transfer the sample to the organic preparation supervisor who

Environmental Laboratory Division

WW Engineering & Science
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Grand Rapids, MI 49588 • (616) 942-0600

Date Requested: / / Date Due: / /
Dispatched By: _____
Project: _____
Project Manager: _____
Project No: _____
Location: _____

Sample Inventory and Master Bottle Packing List

Sample Locations	Sample Number	Sample Sub-Portions-Preservative and Tagging Codes																								
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18							

Indicate Sample Sub Portion with an X
Multiple Sub Portions for the same Bottle Type can be Identified by Entering the Number Needed

NO.	DESCRIPTION	PRESERVATIVE	TAG COLOR	FILTERED
	Waters			
1	40 ml Vial for Purgeable Organics	1+1 HCL Yes / No Cool to 4° C	Yellow	
2	1000 ml Amber Glass Non Purgeable Organics	Cool to 4° C	Salmon	
3	ml Plastic - Non Preserved	Cool to 4° C	Green	
4	ml Plastic - Nutrients	pH < 2.0 w/H_2SO_4	Blue	
5	ml Amber Plastic - Cyanides	pH to > 12 w/NaOH	Light Blue	
6	ml Plastic - Metals	pH to <2 w/HNO_3	Red	
7	1000 ml Glass - Oil & Grease / TPH	pH to <2 w/H_2SO_4	Dark Blue	
8	125 ml Whirl Pac Bag / Bottle Bacteria	Cool to 4° C	Brown	
9	500 ml Glass - Sulfide	0.5 ml Zinc Acetate + 0.5 ml NaOH to pH >9	Light Green	
10	250 ml Amber Glass - TOX	pH to < 2 w/H_2SO_4 Cool to 4° C	Lilac	
11	40 ml Amber Glass - TOC	pH to < 2 w/H_2SO_4 Cool to 4° C	Pink	
12	2000 ml Plastic - Radiological	pH to < 2 w/HNO_3	Gray	
13	500 ml Amber Glass - Phenols	pH to < 2 w/H_2SO_4	Brown	
14	250 ml Amber Glass - Formaldehyde	Cool to 4° C	Orange	
	Soils			
15	ml Wide Mouth Plastic	Cool to 4° C	White	
16	ml Wide Mouth Amber Glass	Cool to 4° C	Manilla	
17	125 ml Vial for Purgeable Organics in Soil	Cool to 4° C	Light Yellow	
18	Other			

will split the organic aliquots and return all aliquots to the SC. The remaining sample will then be returned to the SC who will split off the inorganic aliquots into the proper preserved containers.

8.17.4 Solid Samples Splitting

When solid samples, such as sediment or soil, are to be received at WWES, every attempt will be made by the Project Manager and field sampling personnel to insure that two samples are provided as replicates for the appropriate tests. One of these samples will be assigned to the organic facility; the other will be assigned to the inorganics facility. If only one sample is received and if organic analyses are required, the organics preparation chemist will be responsible for the initial splitting of the sample. Solid samples will be made homogeneous by either one or all of the following manners:

- Stirring especially when volatile organic analytes are required
- Air Drying and Grinding
- Particle separation (Sieving)
- Quartering by ASTM Procedures

The lead organic chemist and the SC are responsible for the decisions on how a solid sample will be split. Problems or concerns which may arise on a solid sample will be addressed to the Project Manager and the laboratory manager for resolution. After the organic portions have been removed or split, the remaining sample will be provided to the inorganic facilities for any further splitting they deem necessary.

8.18 SAMPLE LABELING

All samples received at the WWES facility will be labeled by the SC at the time of log-in. These labels will include information such as the requested sample number, the client number if supplied, the contract, the WWES project number, and/or the client. It is anticipated that sequential sample labels will be provided by the computer after the SC has logged the project into the computer.

8.19 DISTRIBUTION AND STORAGE

Logged samples will be taken by the SC to the appropriate walk-in cooler for cold storage or to the room temperature storage area indicated for metals.

COC samples are stored as set forth in Section 4.0.

8.20 PROJECT FILES

8.20.1 Routine Project Files

The SC will obtain a manila folder and label that manila folder with the name and number of the project. The folder will indicate the WWES project number, the WWES contract number, and Chain-of-custody if applicable. With the agreement of the laboratory supervisor (lead), the project manager, and the laboratory manager, a particular project folder may include a series of projects logged in under sequential numbers. An example would be a daily log-in for the same project for a week or month before a new project folder is generated. It is, however, the responsibility of the SC to insure that all logged projects are filled in a project file folder.

8.20.2 Chain-of-Custody File Folder

The SC, upon logging in any Chain-of-Custody project, will provide the same type of manila folder project file, as discussed in Section 5.7.1, for each project. However, the project folder will be maintained in the locked Chain-of-Custody file and cabinet and will be kept by the sample coordinator.

8.21 SAMPLE STORAGE

8.21.1 Non Chain-of-Custody Storage

The SC, after completing all the log-in processes of various samples connected with a particular project, will store the samples in the designated areas in the WWES laboratory.

- Routine Water and Solid Samples: Samples which need to be refrigerated will be stored in the walk in facility designated for all routine water and soil samples.
- Routine Volatile Water and Solid Samples: All these samples will be placed in the designated VOA refrigerator(s) located within the analytical facility. No other samples or standards may be stored in the VOA refrigerator(s).
- Routine Water and Solid Samples for Metal Parameters: The preserved water samples and solid samples, which are not preserved, may be stored on shelves designated for the metals analysis.
- Odoriferous and Hazardous Samples: These samples will be stored in a hooded facility within the laboratory which is designated for Odoriferous and hazardous samples. These samples will be identified to the lab

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personnel and noted on the log-in procedures in order to insure that the lab personnel are aware of the problems with these samples.

8.22 CHAIN-OF-CUSTODY SAMPLE STORAGE

All samples that are involved as physical evidence in a legal procedure or simply identified as Chain-of-Custody will be handled under certain procedural safeguards. These safeguards have been tentatively identified in section 4.0 but for purposes or reiteration are again addressed below:

> NOTE: For any legal proceedings, the court must be shown that the laboratory is a secured area, that all samples have been stored in a secured fashion, and samples can be accounted for at all times.

8.22.1 Chain-of-Custody Water and Solid Samples

All samples of this nature will be stored within the locked confines of the Analytical Laboratory. Access is only available to authorized personnel.

8.22.2 Water and Soil Samples for Metals

8.23 GENERAL LAB SECURITY

Access to the WWES lab will be handled in a secured fashion restricting entrance only to those people designated as having access to the laboratory facilities. Restricted access applies to all areas in which samples are stored or analysis takes place. It will be the responsibility of all the analysts, as well as the supervisors and the SC, to insure that the safeguards employed, including locked doors and limited access, are followed and maintained at all times.

9.0 DATA HANDLING, REPORTING, RECORDKEEPING AND VALIDATION

9.0 DATA HANDLING, REPORTING, RECORDKEEPING AND VALIDATION

There are two significant aspects of any analytical procedure:

- The selection and use of a method appropriate for the analyte and matrix
- The collection, control and interpretation of the data generated.

Encompassing these two components is the Quality Assurance program. The QA program provides means by which method selection can be validated, the method can be controlled and the appropriate data generated, displayed and reduced.

The following sections deal with error, data handling, data validation, data reporting and data recordkeeping.

9.1 ERROR: IT'S NATURE AND SIMPLE STATISTICAL CONCEPTS

9.1.1 Random Errors

Repeated analysis of identical aliquots of a homogeneous sample does not give a series of equivalent results. The results will differ among themselves and they will be more or less scattered about some value. The scatter can be attributed to random error, so named because the prediction of the sign or magnitude of the error of any particular result is not possible at the time of analysis.

One therefore, says that each result must have an uncertainty attached to it, and can be regarded only as an estimate of the true value. Generally that estimate will differ from the true value. Random errors are caused by uncontrolled and/or uncontrollable random variations in factors which affect analytical results, i.e. variations in the volumes of the reagents added, variations in the concentrations of reagents, variations in the time allotted for the chemical analysis, a contaminated glassware, poor quality reagents, instrumental fluctuations. Among the various texts that are available discussing errors, the terms repeatability, reproducibility and precision have been used to denote the scatter of results. The term "precision" will be used throughout this manual and is the most common term used for random error in this country and especially by the EPA.

Precision does improve as the scatter among results becomes smaller. All analytical results have random error present which necessitates statistical techniques to evaluate the results and to provide correct inferences of the true value of the result.

9.2 SYSTEMATIC ERRORS

Systematic errors are indicated by the tendency of results to be greater or smaller than, the true value. It is necessary to take care in exactly defining systematic error because

the analysis is also subject to random error. The mean of n analytical results on the same sample approaches a definite value u as the number of results increases indefinitely. When u differs from the true value Tau results are said to be subject to systematic error of the magnitude B, wherein B is equal u minus Tau. Bias is the term used synonymously with systematic error and will be used in that fashion throughout this manual. Analytical methods, which are subject to interferences from substances present in the sample, or methods that only recover a fraction of the material present are an example of systematic error.

It is impractical to make an indefinitely large number of analysis on a single sample in order to determine the true value of u is known. At the same time a practically obtained value for a sample that is based on minimal analysis is subject to random error, so that the experimental estimates of bias will also be subject to random error. Therefore, statistical techniques are also required when bias is to be estimated.

The basic difference between random and systematic error is that, in principal, the latter may be predicted so that a correction can be made to eliminate its effect. An example of this allowance can be accounted for in the effect of fluoride in the determination of aluminum by absorbance measurements. This effect is overcome by adding to the calibration standards an amount of fluoride equal to the fluoride content of the sample. The added fluoride in the calibration standards then eliminates the systematic error of fluoride interference. However, it must be recognized that the complete elimination of systematic error may require such detailed knowledge of the properties of the sample that the correction of the analytical system is impractical and would in fact increase the amount of random error. Thus, in all applications where unbiased results are necessary, the approach to be used is to devise and use analytical systems capable of giving results which have negligible systematic error.

9.3 TOTAL ERROR

Some analysts use the term accuracy to denote only systematic error. The term accuracy as applied in this manual will denote total error of the results. In other words, accuracy represents the combined systematic and random error of the results and, therefore, the accuracy of an analysis improves as the total error becomes smaller. For the purposes of visually seeing random and systematic error, Figure 6-1 should be referred to for any easy identification of the various types of error.

9.4 STATISTICAL TECHNIQUES

Statistical techniques are essential to the measurement of analytical error. This manual and this section recognize that many analysts have had little experience with statistical technique. This section is, therefore, written in such a way as to explain simple but basic concepts of the statistical approach and to describe the particular techniques most commonly required in dealing with analytical errors. There are a large number of text

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books dealing with statistics and this particular section does not attempt to replace these books. The intention is merely to present the essential aspects in the simplest manner possible. Certain approximations have been used when considered appropriate and no previous knowledge of statistics has been assumed. Should the analyst be interested in consulting additional texts for a more rigorous and detailed treatment of the subject, he is referred to the references at the end of section 9.0.

Analysts who are unfamiliar with statistical approach, may find this section on first glance rather complicated. In order to understand statistics for the QC function, it is important not to be put off by the first impression.

The fundamental statistical concepts are essentially simple and equivalent to the intuitive common sense, or perhaps scientific approach, adopted by any good analyst.

9.4.1 Random Error Distribution

If the results from the analysis of numerous aliquots of a homogeneous sample are plotted on a histogram, it is generally found that the proportion of the results deviating from the mean increased, i.e., as the deviation of the results from the mean grows broader. In other words, the probability of obtaining a random error of a given size decreases as the size of the error increases. The basis of statistical techniques is to quantitatively estimate the probabilities of errors of different sizes so that one can deduce the probable random error of a particular analytical result. If the analyst were to increase the number of analysis of a single sample indefinitely, and the size of the intervals used for plotting the histogram were decreased, the latter would tend to smooth the curve. This limiting curve is the frequency distribution of results and defines a relationship between the magnitude of the result and the probability of obtaining such a value. Throughout this manual, it will be assumed that the analytical results follow the normal distribution which is defined by the following equation:

$$p(x) =$$

Where: = the mean of all the conceptionally infinite number of results.

= the standard deviation of results

p(x) = the probability density which is interpreted by noting that the probability of obtaining a result between the values a & b is the area of the curve between those values.

and this interval can be evaluated given the equation for P(X).

The peak of this distribution curve occurs at x=u, the theoretically perfect mean established by an infinite number of results. The width (which is indicated by the

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scatter results) is determined solely by the standard deviation of the test. For example, 95% of the area under the curve, i.e. 95% of all results, is enclosed within the limits plus or minus 1.96. Such properties allow limits for the uncertainty of an individual analytical result to be calculated. Taking the current discussion, for example, on no more than 5 occasions in one hundred will the result differ from the mean u be more than 1.96. Thus, an analyst may attach to a result limits that define the range in which the true mean is expected to lie. The statement, R-1.96 is less than u which is less the R+1.96, is an accurate statement on 95% of all occasions. "R" in this particular case would stand for the result. By referring to texts on statistics, there are statistical tables which included a tabulation of areas enclosed between specific limits as an analyst might want to define them. It should be noted that the distribution is always symmetrical about the mean. In other words, if one is using the 1.96 levels 5% of the results will be outside of the range of u +/- 1.96, but only 2.5% of all results will exceed u + 1.96 and 2.5% of the results will be less than u - 1.96.

Focusing this into a discussion more pertinent to the laboratory and, perhaps more viable with respect to occurrences within the laboratory, let us discuss the rare exception in which an analyst is taking 20 tests on a particular sample using the 1.96 level. Considering that 5% of the results will lie outside that level, the analyst has 1 chance in 20 of missing the true value outside the stated confidence range. At the same time one can decrease this chance by increasing the allowable range. For instance, if the range is R =/- 2.58 the results will be included on 99% of the occasions or 99% of the tests. However, by increasing the confidence limit, one is also increasing the uncertainty in the true value. In this case, uncertainty can be decreased by taking the mean of several analytical results or by decreasing the value.

These statistical concepts allow valuable quantification of the random error of an analytical result and emphasize that decisions, based on the significance of the result, have some risk of being wrong. Knowledge of the standard deviation, of the results is, therefore, vital in reaching objective decisions. Use of the standard deviation will be explained in the following sections dealing with data handling and validation.

9.4.2 Data Handling, Reporting, Recordkeeping

A flow diagram, Figure 1, delineates the original and procedural steps in data generation.

The initiation of an analysis starts with the completion of a project approval form. The information is computer entered. The computer entry internally creates a report form and inventories the analysis by parameter or compound. The computer entry function of all analytical work requests is a shared responsibility

of the sample coordinator and data coordinator. A copy of the analysis request form is manually inserted into a three ring binder notebook for laboratory reference use. The maintenance of the laboratory job reference notebook is a responsibility of the sample coordinator. The group leader/supervisors requests from the data coordinator (D.C.), the computer generated analytical bench sheets for a given parameter each morning or the prior day. The samples and parameters testing sequence is dictated by a weekly work schedule. The weekly work schedule is developed manually each week by the group leaders/area supervisors and approved each week by the laboratory manager. The schedule is developed from a computer printout that inventories and ages by project job or parameter. Contractual due dates and sample holding times are the compliance criteria by which all schedules are judged.

The bench sheets examples are shown in Figure 7, 8, 9. The bench sheets identify to an analyst the proper samples to analyze that day. The analyst lab notebook and the bench sheets constitute the two raw data reporting locations. The content of the laboratory notebook is defined in an earlier section, 7.3.7. The analyst completes the benchsheet information, attaches a drawn calibration curve and follows the analytical sample sequence identified in section 10.0. The analyst identifies which sample(s) were utilized for precision and accuracy determinations. The analyst will assess the data set as being in control or not. The assessment will be described in the data validation section to follow. The analyst will submit to respective group leaders or supervisors all of the above-mentioned data and a written statement that the data set is in control for their review. An approved data set is signed off and the group leaders/supervisors transfer the approved data to all appropriate worksheets in the laboratory job reference notebook. The bench sheets and calibration curves are permanently stored. The last entry into the worksheet constitutes a completed project subject to computer generation of a preliminary report. The group leader/supervisors provide the DC with the approved worksheets for computer entry and preliminary report generation. The remaining activities related to preliminary report, final report generation and review and project filing are identified in this manual under sections 7.3.14, 7.3.15 and 7.3.16 respectively.

9.5 DATA VALIDATION

The data validation process includes a set of computerized and manual checks at various appropriate levels of the measurement process.

The data validation process starts with the laboratory analyst. The analyst verify in their lab notebook that all method specific operational parameters are utilized or met. This information is specifically documented in all instrument logbooks. The analyst then verifies that the calibration of the equipment is linear and documents this in the instrument logbooks. If the operating parameters of a particular method are modified, it

should be written in the analyst lab notebook and approved via signature by the group leader/supervisor in the lab notebook. A non-calibrated system must be identified by the analyst and corrections made to achieve calibration prior to sample analysis.

The generation of sample data by an analyst will include the generation of quality control data for each sample set. The monitoring of method blanks, sample spikes, method spikes and sample duplicate analysis is accomplished by the utilization of Schwart Quality Control Charts. All quality control data is entered on the precision and accuracy data summary form, Figure 11a. The analyst computes the data precision and accuracy and compares the computed value to the acceptance intervals identifies on the form for that parameter, method, and matrix. The computed value will be determined in control if it lies within the acceptance interval. If the computed value is deemed out-of-control the data set is not submitted for supervisor approval but is brought immediately to the attention of the supervisor and quality assurance officer that an out-of-control condition exists. Jointly, a review is conducted to determine the cause(s) and conduct corrective action. The data set is rerun once the corrective actions have taken place and the new data reviewed as stated above.

The DC receives all the completed precision and accuracy data summary forms and enters the data into the laboratory quality control computer system. The system produces summary reports each day of all quality control data generated for review by the quality assurance officer. The computer system also generates all Schwart Control Charts for method blanks, method spikes, sample duplicates and sample spikes. The charts are permanently maintained and reviewed each week by the group leader/supervisor and the quality assurance officer. The weekly generated charts provide an accurate review of all recently (last 30) qc data points and allows the monitoring of data trends or other anomalies to the system.

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10.0 GENERAL QUALITY CONTROL PRACTICES

10.0 GENERAL QUALITY CONTROL PRACTICES

The Quality Assurance/Quality Control practices at WWES are based on several of the following government guidelines:

- "Handbook for Analytical Quality Control in Water and Wastewater Laboratories "EPA 600/4-79-019, March 3, 1979
- The Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act 40 CFR; July, 1990.
- Manual of Analytical Methods for the Analysis of Pesticides in Humans and Environmental Samples" EPA 600/8-80-038 June 1980.
- ASTM
- Test methods for evaluating a solid waste; USEPA SW-846; Third Edition, Revision 0.

10.1 The quality control types normally analyzed during sample analysis includes the following: Initial Calibration Blank (ICB), Initial Calibration Verification (ICV), Method Preparation Blank (MPB), Laboratory Control Sample (LCS), Sample Matrix Spike Duplicate (MSD), Continuing Calibration Verification (CCV) and Continuing Calibration Blank (CCB).

10.2 The frequency of which these QC types are performed during the analytical run is usually stated within the analytical method. The general frequency over-all of these types, and their respective order within the analytical run is as follows: (following instrument calibration).

Type	Frequency
Initial Calibration Blank	1-per batch
Initial Calibration Standard	1-per batch
Sample #1	---
Sample #2	---
Sample #10	---
Method Preparation Blank	1-per batch
Laboratory Control Sample	1-per batch
Sample Matrix Spike	10%
Sample Matrix Duplicate	10%
Continuing Calibration Blank	10%
Continuing Calibration Verification	10%

Any high level concentrations of analyte will be followed by a blank.

10.3 The level of internal laboratory quality assurance effort for the following is divided into 4 different categories:

1. Routine Analytical Services - (RAS). No special reporting requirements are required.

2. Reportable Analytical Services - (REP). For this type, batch quality control is reported for all analytes.

3. Special Analytical Services - (SAS). Each matrix type for a particular submittal will have internal QC performed on these particular samples at the appropriate method frequency.

4. Quality Assurance Project Plan - (QAPP). This level of QC encompasses all aspects of the SAS type with full data deliverables similar to CLP reporting packages.

10.4 The fundamental QA objective with impacting accuracy, precision and sensitivity of laboratory analytical data is to achieve the QC acceptance criteria established for each analytical method and matrix type.

The control limits established for each method are based on $\pm$ 3 standard deviations from the analytical mean. Also encompassed are method advisory limits if provided within the analytical methodologies.

The standard operating procedures that would lead to an outlier being identified and the resulting corrective actions is described in section 9.0, Data Reporting, Validation and Handling. In general, if an out-of-control result occurs the analyst will identify it as such and report the occurrence to the Group Leader and/or Area Supervisor. The Group Leader and/or Area Supervisor will review the data with the analyst to identify the problem, implement a corrective action(s) and then re-analyze the sample(s). The Group Leader and/or Area Supervisor will report the out-of-control occurrence to the Quality Assurance Manager that day in writing (Figure 13). The corrective action(s) will be identified in the analyst notebook and in writing to the QA Manager.

FIGURE 13

Analytical Quality Control Occurrence Report

Parameter: _____

Method: _____

Date: _____

Analyst: _____

Description of Occurrence:

_____

_____

_____

Analysis of Occurrence:

_____

_____

_____

_____

_____

_____

_____

_____

_____

Disposition of Data:

_____

_____

_____

_____

_____

_____

APPENDIX C

Standard Operating Procedures

APPENDIX D

Required Sample Volumes, Containers, Preservation Techniques and Holding Times

TABLE D-1

REQUIRED SAMPLE VOLUMES, CONTAINERS, PRESERVATION TECHNIQUES AND HOLDING TIMES BENTELER INDUSTRIES - KALAMAZOO, MICHIGAN

MATRIX	ANALYSIS	CONTAINER	PRESERVATION	HOLDING TIME
Aqueous	PCBs	two 1 liter amber glass	cool 4°C	7 days to extract 30 days to analyze
Soil	PCBs	one 500 ml wide-mouthed amber glass	cool 4°C	14 days to extract 40 days to analyze

Document 10

BENTELER INDUSTRIES
REMEDIATION OF STORM SEWER
AND
ON SITE DITCH

FINAL REPORT
OCTOBER 14, 1993

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INTRODUCTION:

On May 21, 1993, Terra Environmental, Corporation (Terra) was requested to perform remedial activities at Benteler Industries, (Benteler), in Galesburg, Michigan, (See Apendix A.1). These activities included, the remediation of Polychlorinated Biphenol (PCB) contamination in the storm sewer lines, (See Appendix A.2), and the on-site ditch, (See Apendix A.3). Previous to Terra's involvement, W W Engineering and Science had prepared a Remedial Action Work Plan (February 1993) for this site. Remedial activities were based on the analytical results from that report. The contact for Benteler was Joe Schmidt, Plant Engineer.

Terra personnel pumped out the on site ditch and obtained samples of both the sludge/soil mix upstream of the oil skimmer housing, and of the soil just past the oil skimmer. The PCB and contaminates in the ditch, although at relatively low levels, were above the Michigan Department of Natural Resources' (MDNR) Type B clean-up criteria for clean closure, (See Apendix B.1).

REMEDIATION OF THE STORM SEWER:

Because the storm drains leading from the Benteler facility were shown to be the source of the contamination, they were cleaned before any excavating was done in the ditch. To achieve clean closure, Terra power washed the storm sewer lines with both cold and hot water respectively. The water source was an on site hydrant used with the permission of the City of Kalamazoo. Lines were televised to show that all the debris and sediment had been washed out. All the rinse water and sediment generated from these activities, was collected by a high powered vacuum truck, capable of collecting any liquids or sediments in the waste water knocked loose during the cleaning. A sample of the water discharging into the ditch from the sewer line, taken on August 6, 1993. This sample came back as clean, (See Appendix B.2). At the request of the City of Kalamazoo, the rinse water was treated before being discharged into the City's sanitary sewer.

During the remediation of the storm sewer lines, manhole number eight was found to be buried. After Anson Enterprises uncovered it on June 20, 1993, the soil was sampled, and the results showed that it was contaminated with PCB's, (See Appendix B.3). Terra excavated the manhole and the surrounding soils on July 27-28, 1993. A total of 75 cubic yards of soils were removed, (See Appendix C.1). Once the excavating of manhole number eight was completed, a second sample was taken, this sample showed that all of the contaminated soils in and around the manhole had been removed, (See Appendix B.3). The sewer lines previously running through manhole # 8 were re-routed directly through the excavation with new piping, with the exception of the line entering it from the north. This line was permanently plugged. The excavation was then backfilled and covered with pavement.

REMEDIATION OF THE ON SITE DITCH:

After the storm sewer remediation was completed, Terra began excavating the on site ditch, on August 2, 1993. A total of 755 cubic yards of soils were removed from the ditch, (See Appendix C.2). Samples were taken on August 4, 1993 (See Appendix B.4). These showed that not all of the PCB contamination was removed. So excavating procedures resumed on September 10, 1993. This time a total of 40 cubic yards were removed, (See Appendix C.2). The ditch was sampled again, and the sample came out clean, (See Appendix B.4).

DISCHARGE OF TREATED WATER:

The treatment used by Terra to eliminate the PCB and VOC contamination from the rinse water, was a system of three oil water separators followed by a limestone gravel, and finally a 400 pound carbon filter, (See Appendix B.6). The treated water was then pumped into an on site tanker for containment, until analytical results were obtained. Terra began treatment of the rinse water on June 18, 1993. The rate of flow was approximately 5 gallons per minute.

The first of the samples of the treated water requested by the City of Kalamazoo to confirm the absence of PCB contamination was taken on June 21, 1993. This sample was shown to still contain PCB's, and was the result of running the rinse water through the treatment system to quickly. The system's flow was decreased and re-sampled on July 12, 1993. The sample result came back clean. The Treated water continued to be stored on site and another sample was taken on August 11, 1993 to verify a clean discharge. This sample was shown to be contaminated. However after consulting with the lab, it was revealed that this was the result of lab error. A final sample was taken on September 10, 1993. This sample came back clean and the treated water was discharged to the City of Kalamazoo's sanitary on October 11, 1993, (See Appendix B.5 For Treated Water Analytical).

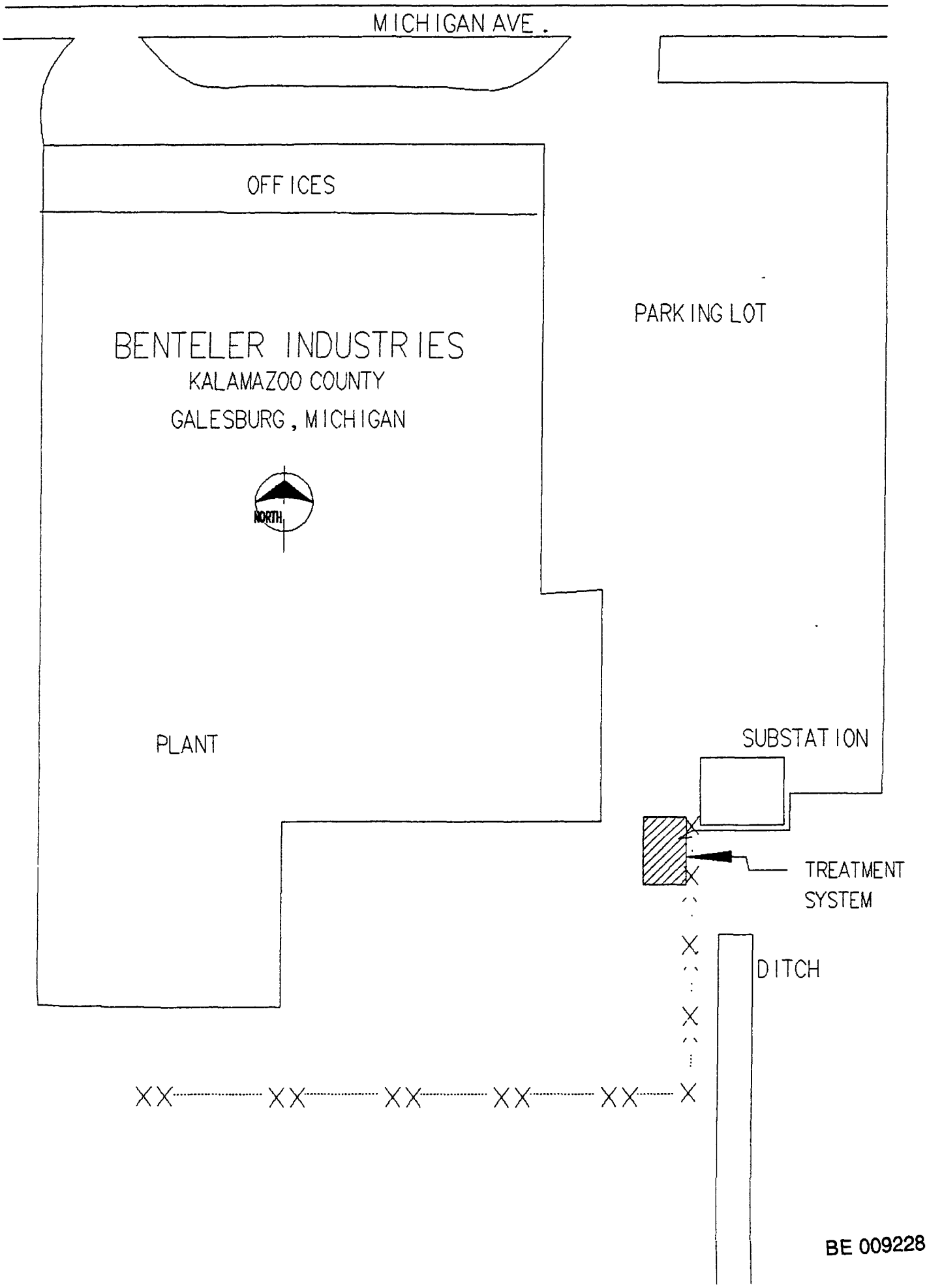
Terra finished working and demobilized their equipment on October 11, 1993.

Joel B. Abenth
Geologist
Terra Environmental, Corp.
October 14, 1993

APENDIX A

MAPS

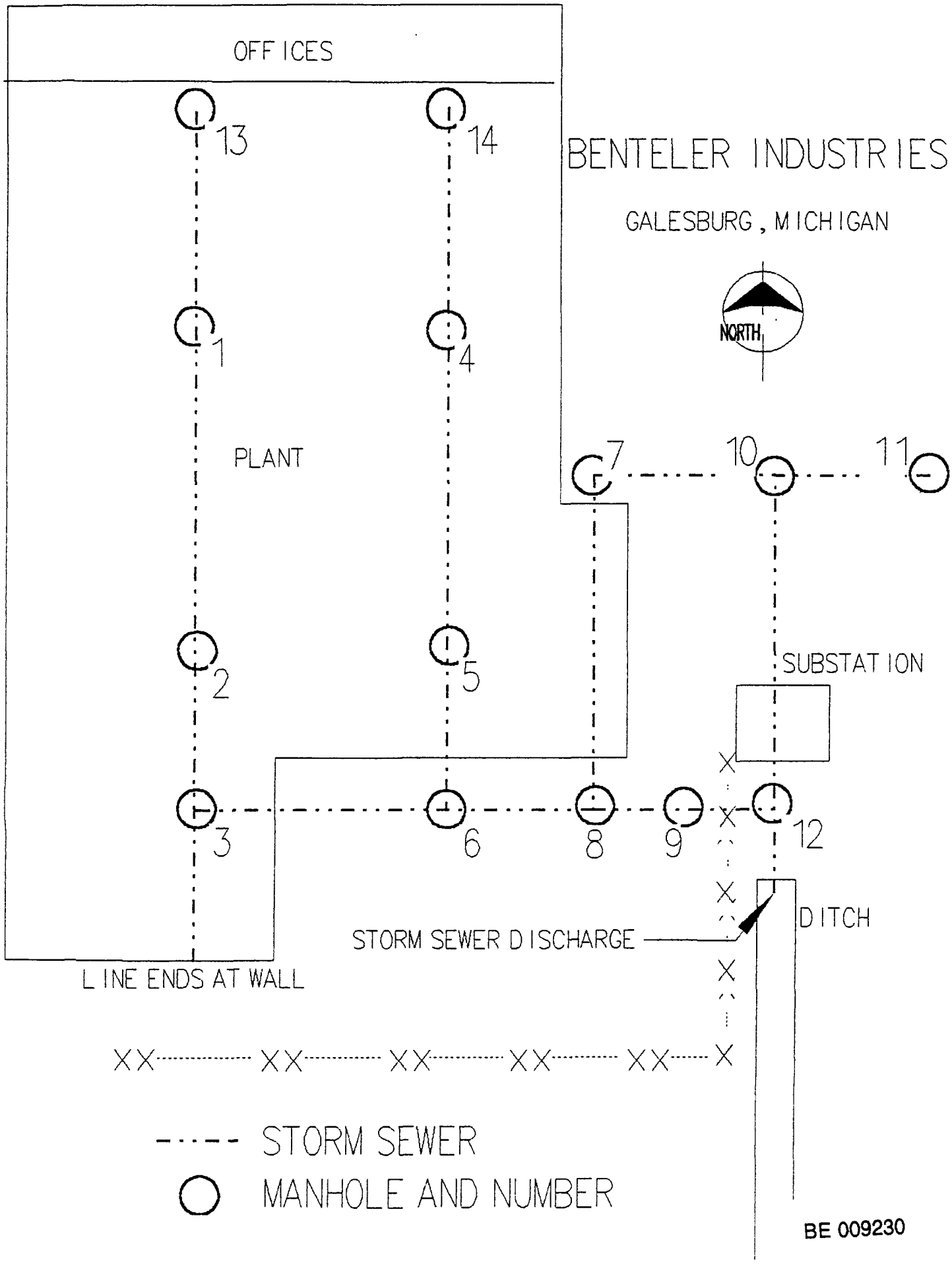
APPENDIX A.1


MICHIGAN AVE.
OFFICES
PARKING LOT
BENTELER INDUSTRIES
KALAMAZOO COUNTY
GALESBURG, MICHIGAN
NORTH
PLANT
SUBSTATION
TREATMENT SYSTEM
DITCH

BE 009228

APPENDIX A.2

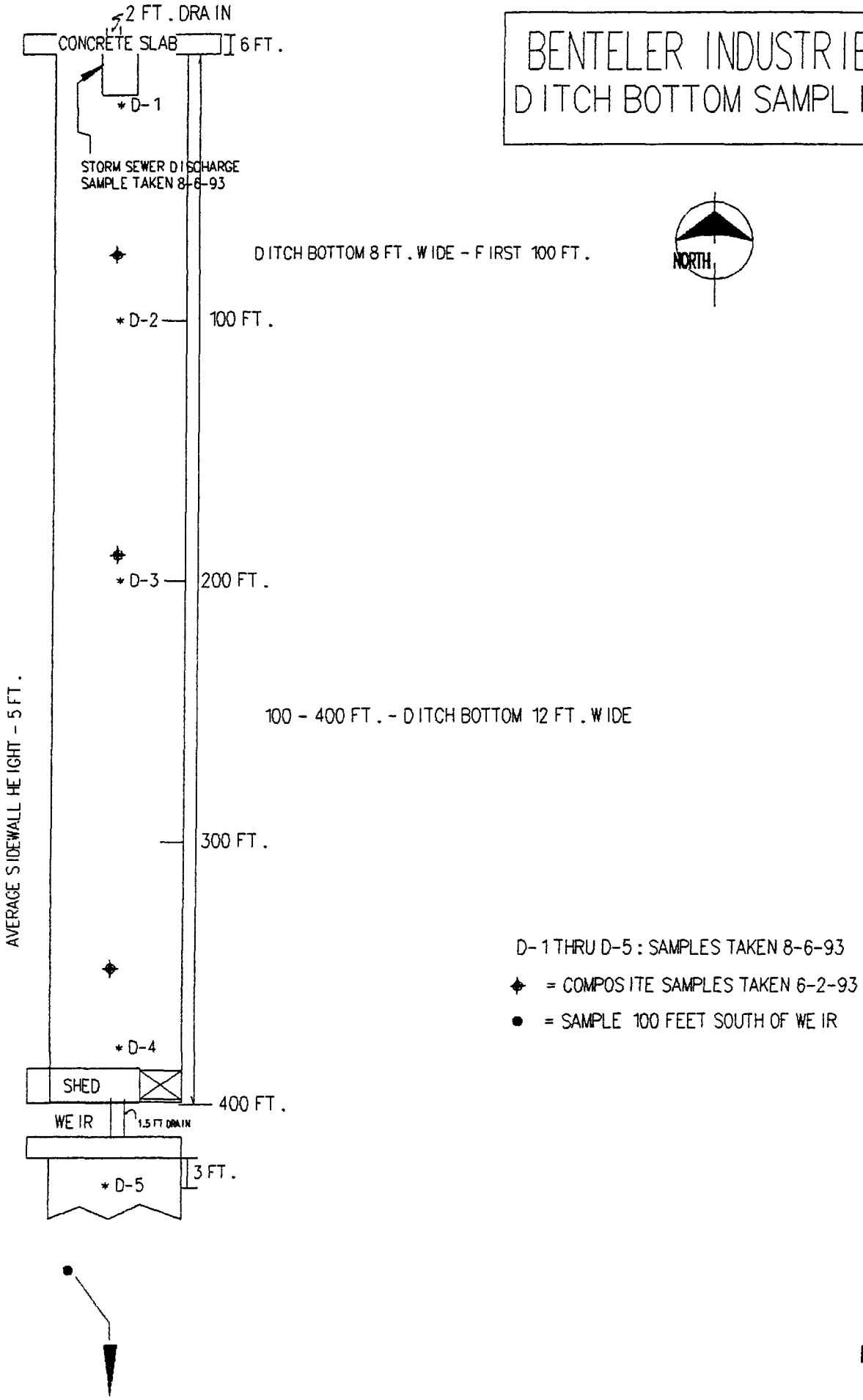
STORM SEWER DIAGRAM



BE 009230

APPENDIX A.3

BENTELER INDUSTRIES
DITCH BOTTOM SAMPLING



BE 009232

APPENDIX B

ANALYTICAL REPORTS

LABORATORY USED:

TRACE LABORATORIES
2241 BLACK CREEK ROAD
MUSKEGON, MICHIGAN
49444-2673

APPENDIX B.1

TRACE Analytical Laboratories, Inc.
Environmental Services
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 616-773-5998 • Fax 616-773-6537

19 JUN 1993

Ms. Bonnie Rosenberg/Mr. Steve Taplin
Terra Environmental Corporation
P.O. Box 19160
Kalamazoo, MI 49019-0160

ANALYTICAL REPORT
6/16/93

ANALYZED: 6/8/93

TRACE ID: C126-01
SAMPLE TYPE: Soil
CLIENT ID: Proj. #11300257
Benteler Industries
Remediation of Storm Sewers
& Ditch Sediment

SAMPLE DATE: 6/2/93
SAMPLE RECEIVED: 6/3/93
SAMPLE ID: #11300257 A
Sludge & Ditch
Sediment

TOTAL PCBs	RESULTS (mg/kg)
Aroclor 1232	* BDL <0.33
Aroclor 1242	* BDL <0.33
Aroclor 1248	1.4
Aroclor 1254	0.57
Aroclor 1260	0.31

* NOTE: Detection limit raised due to dilution.

BDL = Below Detection Limit

Tim Holt
Laboratory Manager

TRACE Analytical Laboratories, Inc.
Environmental Services
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 616-773-5998 • Fax 616-773-6537

19 JUN 1993

Ms. Bonnie Rosenberg/Mr. Steve Taplin
Terra Environmental Corporation
P.O. Box 19160
Kalamazoo, MI 49019-0160

ANALYTICAL REPORT
6/16/93

ANALYZED: 6/9/93

TRACE ID: C126-01
SAMPLE TYPE: Soil
CLIENT ID: Proj. #11300257
Benteler Industries
Remediation of Storm Sewers
& Ditch Sediment

SAMPLE DATE: 6/2/93
SAMPLE RECEIVED: 6/3/93
SAMPLE ID: #11300257 A
Sludge & Ditch
Sediment

EPA 601/602 VOLATILES	RESULTS (ug/kg)
Benzene	BDL <10
Bromodichloromethane	BDL <5
Bromoform	BDL <5
Bromomethane	BDL <5
Carbon tetrachloride	BDL <5
Chlorobenzene	BDL <5
Chloroethane	BDL <5
2-Chloroethylvinyl ether	BDL <5
Chloroform	BDL <5
Chloromethane	BDL <10
Dibromochloromethane	BDL <5
1,2-Dichlorobenzene	BDL <5
1,3-Dichlorobenzene	BDL <5
1,4-Dichlorobenzene	BDL <5
Dichlorodifluoromethane	BDL <10
1,1-Dichloroethane	BDL <5
1,2-Dichloroethane	BDL <5
1,1-Dichloroethene	BDL <5
trans-1,2-Dichloroethene	BDL <5
1,2-Dichloropropane	BDL <5
cis-1,3-Dichloropropene	BDL <5
trans-1,3-Dichloropropene	BDL <5
Ethyl benzene	BDL <10
Methylene chloride	BDL <20
1,1,2,2-Tetrachloroethane	BDL <5
Tetrachloroethene	5.2
Toluene	16
1,1,1-Trichloroethane	BDL <5
1,1,2-Trichloroethane	BDL <5
Trichloroethene	BDL <5
Trichlorofluoromethane	BDL <5
Vinyl chloride	BDL <5
Xylenes	BDL <30

BDL = Below Detection Limit

Tim Holt
Laboratory Manager

BE 009236

TRACE Analytical Laboratories, Inc.
Environmental Services
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 616-773-5998 • Fax 616-773-6537

19 JUN 1993

Ms. Bonnie Rosenberg/Mr. Steve Taplin
Terra Environmental Corporation
P.O. Box 19160
Kalamazoo, MI 49019-0160

ANALYTICAL REPORT
6/16/93

ANALYZED: 6/9/93

TRACE ID: C126-01
SAMPLE TYPE: Soil
CLIENT ID: Proj. #11300257
Benteler Industries
Remediation of Storm Sewers
& Ditch Sediment

SAMPLE DATE: 6/2/93
SAMPLE RECEIVED: 6/3/93
SAMPLE ID: #11300257 A
Sludge & Ditch
Sediment

TCLP METALS	RESULTS (mg/L)
Silver	BDL <0.100
Arsenic	BDL <0.100
Barium	1.12
Cadmium	BDL <0.100
Chromium	BDL <0.500
Copper	BDL <0.500
Mercury	BDL <0.010
Lead	BDL <0.500
Selenium	BDL <0.200
Zinc	0.912

BDL = Below Detection Limit

Tim Holt
Laboratory Manager

BE 009237

TRACE Analytical Laboratories, Inc.
Environmental Services
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 616-773-5998 • Fax 616 773-6537

Ms. Bonnie Rosenberg/Mr. Steve Taplin
Terra Environmental Corporation
P.O. Box 19160
Kalamazoo, MI 49019-0160

ANALYTICAL REPORT
6/16/93

ANALYZED: 6/11/93

TRACE ID: C126-02
SAMPLE TYPE: Soil
CLIENT ID: Proj. #11300257
Benteler Industries
Remediation of Storm Sewers
& Ditch Sediment

SAMPLE DATE: 6/2/93
SAMPLE RECEIVED: 6/3/93
SAMPLE ID: #11300257 B
Ditch Sediment

TOTAL METALS	RESULTS (mg/kg)	DUPLICATE (mg/kg)	SPIKE RECOVERY
Silver	BDL <0.500	BDL <0.500	119%
Arsenic	0.923	0.859	98%
Barium	9.36	10.8	94%
Cadmium	0.218	0.277	109%
Chromium	10.9	9.54	93%
Copper	44.9	58.0	102%
Mercury	BDL <0.100	BDL <0.100	97%
Lead	9.62	9.70	91%
Selenium	9.79	12.9	NA
Zinc	42.4	46.0	94%

BDL = Below Detection Limit

Tim Holt
Laboratory Manager

Environmental Corporation
P.O. Box 19160
Kalamazoo, MI 49019-0160
616-375-9595

CHAIN-OF-CUSTODY Nº 1270

RECEIVING ENTITY TRACE ANALYTICAL LABORATORIES, INC

PROJECT MANAGER SB TAPLIN

ENTITY CONTACT/PHONE 616-773-5998

TERRA SITE PHONE

Name of Client: Benteler Industries

Project Name, City State: Remediation of Storm Sewers & Ditch Sediment

Project #: 11300257

P.O. #:

Transfer#: 1 2 3 4

Item Number	Date	Time	Sample Number	Number & Size of Containers	Description	BTEX*	TPH**	PNA***	FLASH POINT	PCB	VOCS (60/62)	Total Metals (MD 10)	TCL Metals	Transfer 1	2	3	4
01	6/2/93	3:10 pm	11300257 A	1 32 oz.	Sludge & Ditch Sediment					X	X		X	✓			
02	6/2/93	3:10 pm	11300257 B	1 32 oz	Ditch Sediment							X		✓			

C1210

Trans. #	Item #	Samples Relinquished By	Accepted By	Date	Time
1	1 & 2	[illegible]	Kathy Quinn	6/3/93	3:45
2		[illegible]	Trace Storage	6/3	6:30
3		Trace Storage	[illegible]	6/4	10:00
4					

FAX results to:
BONNIE ROSENBERG
616-375-2830

TOTALS

Send hard copy & QA/QC results to Bonnie Rosenberg at Terra

Person Responsible for Samples	Affiliation	Date	Time	Special Instructions (use back of form if necessary - attach photocopies to other pages)

*BTEX: Benzene, Toluene, Ethyl Benzene, Xylene **TPH: Total Petroleum Hydrocarbons ***PNA: Poly Nuclear Aeromatics

BE 009239

APPENDIX B.2

TRACE Analytical Laboratories, Inc.
Environmental Services
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 616-773-5998 • Fax 616-773-6537

Ms. Bonnie Rosenberg
Terra Environmental Corporation
P.O. Box 19160
Kalamazoo, MI 49019-0160

ANALYTICAL REPORT
8/20/93

ANALYZED: 8/18/93

TRACE ID: C949-01
SAMPLE TYPE: Water
CLIENT ID: Benteler Ind.

SAMPLE DATE: 8/6/93
SAMPLE RECEIVED: 8/10/93
SAMPLE ID: #93056A-11300257L
Water From Pipe
Entering Creek

PCBs by EPA METHOD 8080	RESULTS (ug/L)
Aroclor 1016	BDL <0.1
Aroclor 1262	BDL <0.1
Aroclor 1232	BDL <0.1
Aroclor 1242	BDL <0.1
Aroclor 1248	BDL <0.1
Aroclor 1254	BDL <0.1
Aroclor 1260	BDL <0.1
PCBs, Total	BDL <0.1

BDL = Below Detection Limit

Tim Holt
Laboratory Manager

terra
Environmental Corporation
P.O. Box 19160
5100 West Michigan Avenue
Kalamazoo, MI 49019-0160
616-375-9595

CHAIN-OF-CUSTODY RECORD

CHAIN-OF-CUSTODY № 0642

RECEIVING ENTITY TRACE

PROJECT MANAGER MARK Stephens

ENTITY CONTACT/PHONE LAURA

TERRA SITE PHONE 616-375-9595

Name of Client: Benteler IND

Project Name, City State: Benteler IND. Galesburg, MI

Project #

P.O. #

Transfer# 1 2 3 4

Item Number	Date	Time	Sample Number	Number & Size of Containers	Description	BTEX*	TPH**	PNA***	FLASH POINT	PCB			
1	8-6-93	4:00PM	93056A-113002 57L	1-32 oz	Water From Pipe Entering Creek					X			

C9A9
KO

BE 009242

Trans. #	Item #	Samples Relinquished By	Accepted By	Date	Time
1	1	[signature]	[signature]	8/10/93	12:15
2		[signature]	[signature]	8/10/93	5:30 pm
3					
4					

FAX results to:
BONNIE ROSENBERG
616-375-2830

TOTALS

Send hard copy & QA/QC results to Bonnie Rosenberg at Terra

Person Responsible for Samples	Affiliation	Date	Time	Special Instructions (use back of form if necessary - attach photocopies to other pages)

APPENDIX B.3

TRACE Analytical Laboratories, Inc.
Environmental Services
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 616-773-5998 • Fax 616-773-6537

Ms. Bonnie Rosenberg/Mr. Steve Taplin
Terra Environmental Corporation
P.O. Box 19160
Kalamazoo, MI 49019-0160

ANALYTICAL REPORT
7/7/93

ANALYZED: 7/7/93

TRACE ID: C464-01
SAMPLE TYPE: Soil
CLIENT ID: Proj. #113-257 Benteler Industries Remediation of Storm Sewers & Ditch Sediment

SAMPLE DATE: 6/24/93
SAMPLE RECEIVED: 6/29/93
SAMPLE ID: #11300257D from Manhole #8

METHOD #8080

TOTAL PCBs	RESULTS (mg/kg)
Aroclor 1232	BDL <0.33
Aroclor 1242	BDL <0.33
Aroclor 1248	BDL <0.33
Aroclor 1254	35
Aroclor 1260	3.2

BDL = Below Detection Limit

Tim Holt
Laboratory Manager

terra
Environmental Corporation
P.O. Box 19160
Kalamazoo, MI 49019-0160
616-375-9595

CHAIN-OF-CUSTODY RECORD

CHAIN-OF-CUSTODY № 1281

RECEIVING ENTITY TRACE ANALYTICAL LABORATORIES

PROJECT MANAGER S TAPLIN

ENTITY CONTACT/PHONE 616 773-5998

TERRA SITE PHONE —

Name of Client: BENTELER INDUSTRIES

Project Name, City State: REMEDIATION OF STORM SEWERS & DITCH SEDIMENT

Project # 113-257

P.O. #

Transfer#. 1 2 3 4

Item Number	Date	Time	Sample Number	Number & Size of Containers	Description	BTEX*	TPH**	PNA***	FLASH POINT	TCB			
1	6/29/93	-	1130025TP	1-32 oz	Soil From Manhole # 8					X			

5 Day Turnaround

CAGA
KQ

Trans. #	Item #	Samples Relinquished By	Accepted By	Date	Time
1	1	[signature]	K. Queen	6/28/93	1:00
2		[signature]	[signature]	[illegible]	00
3					
4					

FAX results to:
BONNIE ROSENBERG
616-375-2830

TOTALS

Send hard copy & QA/QC results to Bonnie Rosenberg at Terra

Person Responsible for Samples	Affiliation	Date	Time	Special Instructions (use back of form if necessary - attach photocopies to other pages)

BE 009245

TRACE Analytical Laboratories, Inc.
Environmental Services
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 616-773-5998 • Fax 616-773-6537

Ms. Bonnie Rosenberg/Mr. Steve Taplin
Terra Environmental Corporation
P.O. Box 19160
Kalamazoo, MI 49019-0160

ANALYTICAL REPORT
8/12/93

ANALYZED: 8/10/93

TRACE ID: C888-01
SAMPLE TYPE: Soil
CLIENT ID: Proj. #133-257
Benteler Ind.

SAMPLE DATE: 7/28/93
SAMPLE RECEIVED: 8/3/93
SAMPLE ID: #11300257F
Soil from M.H. #8

PCBs by EPA METHOD 8080	RESULTS (mg/kg)
Aroclor 1232	BDL <0.33
Aroclor 1242	BDL <0.33
Aroclor 1248	2.1
Aroclor 1254	1.1
Aroclor 1260	BDL <0.33
PCBs, Total	3.2

BDL = Below Detection Limit

Tim Holt
Laboratory Manager

terra
Environmental Corporation
P.O. Box 19160
5100 West Michigan Avenue
Kalamazoo, MI 49019-0160
616-375-9595

CHAIN-OF-CUSTODY RECORD

CHAIN-OF-CUSTODY № 0635

RECEIVING ENTITY TRACE ANALYTICAL

PROJECT MANAGER S. B. TAPLIN

ENTITY CONTACT/PHONE LAURA - 616-773-5998

TERRA SITE PHONE 616-375-9595

Name of Client: Benteler

Project Name, City State: Benteler IND.

Project #: 133-257

P.O. #:

Item Number	Date	Time	Sample Number	Number & Size of Containers	Description	BTEX*	TPH**	PNA***	FLASH POINT	PCB				Transfer# 1	2	3	4
1	7-28-93	3:30pm	11300257F	1-320	Soil from M.H. #8					X				X			

8/10 TAT OK Per
DCS Vehicle [illegible]
[illegible] available.

EXPEDITED
TURNAROUND

8/10 TAT OK Per
[illegible]

C888

Trans. #	Item #	Samples Relinquished By	Accepted By	Date	Time
1	1	[signature]	[signature]	8/3/93	16:00
2		[signature]	[signature]	8/3/93	5:30
3					
4					

FAX results to:
BONNIE ROSENBERG
616-375-2830

TOTALS

Send hard copy & QA/QC results to Bonnie Rosenberg at Terra

Person Responsible for Samples	Affiliation	Date	Time	Special Instructions (use back of form if necessary - attach photocopies to other pages)

BE 009247

APPENDIX B.4

TRACE Analytical Laboratories, Inc.
Environmental Services
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 616-773-5998 • Fax 616-773-6537

Ms. Bonnie Rosenberg
Terra Environmental Corporation
P.O. Box 19160
Kalamazoo, MI 49019-0160

ANALYTICAL REPORT
9/2/93

ANALYZED: 8/11/93

TRACE ID: C951-04
SAMPLE TYPE: Soil
CLIENT ID: Proj. #11300257
Benteler Corporation

SAMPLE DATE: 8/4/93
SAMPLE RECEIVED: 8/10/93
SAMPLE ID: #93055 D D-4
Ditch Bottom
11300257J

EPA 8010 MDNR SCAN 1	RESULTS (ug/kg)
Bromodichloromethane	BDL <5
Bromoform	BDL <5
Bromomethane	BDL <5
Carbon tetrachloride	BDL <5
Chlorobenzene	BDL <5
Chloroethane	BDL <5
Chloroform	BDL <10
Chloromethane	BDL <10
Dibromochloromethane	BDL <5
1,1-Dichloroethane	BDL <5
1,2-Dichloroethane	BDL <5
1,1-Dichloroethene	BDL <5
trans-1,2-Dichloroethene	BDL <5
cis-1,2-Dichloroethene	BDL <5
1,2-Dichloropropane	BDL <5
cis-1,3-Dichloropropene	BDL <5
trans-1,3-Dichloropropene	BDL <5
Methylene chloride	BDL <20
1,1,2,2-Tetrachloroethane	BDL <5
Tetrachloroethene	BDL <5
1,1,1-Trichloroethane	BDL <5
1,1,2-Trichloroethane	BDL <5
Trichloroethene	BDL <5
Trichlorofluoromethane	BDL <5
Vinyl chloride	BDL <5

BDL = Below Detection Limit

Tim Holt
Laboratory Manager

TRACE Analytical Laboratories, Inc.
Environmental Services
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 616-773-5998 • Fax 616-773-6537

Ms. Bonnie Rosenberg
Terra Environmental Corporation
P.O. Box 19160
Kalamazoo, MI 49019-0160

ANALYTICAL REPORT
9/2/93

ANALYZED: 8/31/93

TRACE ID: C951-01
SAMPLE TYPE: Soil
CLIENT ID: Proj. #11300257
Benteler Corporation

SAMPLE DATE: 8/4/93
SAMPLE RECEIVED: 8/10/93
SAMPLE ID: #93055 A D-1
Ditch Bottom
11300257G

PCBs by EPA METHOD 8080	RESULTS (mg/kg)
Aroclor 1016	BDL <0.33
Aroclor 1262	BDL <0.33
Aroclor 1232	BDL <0.33
Aroclor 1242	BDL <0.33
Aroclor 1248	28
Aroclor 1254	BDL <0.33
Aroclor 1260	1.6
PCBs, Total	30

BDL = Below Detection Limit

Tim Holt
Laboratory Manager

BE 009250

TRACE Analytical Laboratories, Inc.
Environmental Services
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 616-773-5998 • Fax 616-773-6537

Ms. Bonnie Rosenberg
Terra Environmental Corporation
P.O. Box 19160
Kalamazoo, MI 49019-0160

ANALYTICAL REPORT
9/2/93

ANALYZED: 8/30/93

TRACE ID: C951-02
SAMPLE TYPE: Soil
CLIENT ID: Proj. #11300257
Benteler Corporation

SAMPLE DATE: 8/4/93
SAMPLE RECEIVED: 8/10/93
SAMPLE ID: #93055 B D-2
Ditch Bottom
11300257H

PCBs by EPA METHOD 8080	RESULTS (mg/kg)
Aroclor 1016	BDL <0.33
Aroclor 1262	BDL <0.33
Aroclor 1232	BDL <0.33
Aroclor 1242	BDL <0.33
Aroclor 1248	39
Aroclor 1254	BDL <0.33
Aroclor 1260	1.1
PCBs, Total	40

BDL = Below Detection Limit

Tim Holt
Laboratory Manager

TRACE Analytical Laboratories, Inc.
Environmental Services
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 616-773-5998 • Fax 616-773-6537

Ms. Bonnie Rosenberg
Terra Environmental Corporation
P.O. Box 19160
Kalamazoo, MI 49019-0160

ANALYTICAL REPORT
9/2/93

ANALYZED: 8/30/93

TRACE ID: C951-03
SAMPLE TYPE: Soil
CLIENT ID: Proj. #11300257
Benteler Corporation

SAMPLE DATE: 8/4/93
SAMPLE RECEIVED: 8/10/93
SAMPLE ID: #93055 C D-3
Ditch Bottom
11300257I

PCBs by EPA METHOD 8080	RESULTS (mg/kg)
Aroclor 1016	BDL <0.33
Aroclor 1262	BDL <0.33
Aroclor 1232	BDL <0.33
Aroclor 1242	BDL <0.33
Aroclor 1248	0.96
Aroclor 1254	BDL <0.33
Aroclor 1260	BDL <0.33
PCBs, Total	0.96

BDL = Below Detection Limit

Tim Holt
Laboratory Manager

BE 009252

TRACE Analytical Laboratories, Inc.
Environmental Services
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 616-773-5998 • Fax 616-773-6537

Ms. Bonnie Rosenberg
Terra Environmental Corporation
P.O. Box 19160
Kalamazoo, MI 49019-0160

ANALYTICAL REPORT
9/2/93

ANALYZED: 8/30/93

TRACE ID: C951-04
SAMPLE TYPE: Soil
CLIENT ID: Proj. #11300257
Benteler Corporation

SAMPLE DATE: 8/4/93
SAMPLE RECEIVED: 8/10/93
SAMPLE ID: #93055 D D-4
Ditch Bottom
11300257J

PCBs by EPA METHOD 8080	RESULTS (mg/kg)
Aroclor 1016	BDL <0.33
Aroclor 1262	BDL <0.33
Aroclor 1232	BDL <0.33
Aroclor 1242	BDL <0.33
Aroclor 1248	0.65
Aroclor 1254	BDL <0.33
Aroclor 1260	BDL <0.33
PCBs, Total	0.65

BDL = Below Detection Limit

Tim Holt
Laboratory Manager

TRACE Analytical Laboratories, Inc.
Environmental Services
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 616-773-5998 • Fax 616-773-6537

Ms. Bonnie Rosenberg
Terra Environmental Corporation
P.O. Box 19160
Kalamazoo, MI 49019-0160

ANALYTICAL REPORT
9/2/93

ANALYZED: 8/30/93

TRACE ID: C951-05
SAMPLE TYPE: Soil
CLIENT ID: Proj. #11300257
Benteler Corporation

SAMPLE DATE: 8/4/93
SAMPLE RECEIVED: 8/10/93
SAMPLE ID: #93055 E D-5
Ditch Bottom
11300257K

PCBs by EPA METHOD 8080	RESULTS (mg/kg)
Aroclor 1016	BDL <0.33
Aroclor 1262	BDL <0.33
Aroclor 1232	BDL <0.33
Aroclor 1242	BDL <0.33
Aroclor 1248	BDL <0.33
Aroclor 1254	BDL <0.33
Aroclor 1260	BDL <0.33
PCBs, Total	BDL <0.33

BDL = Below Detection Limit

Tim Holt
Laboratory Manager

terra
Environmental Corporation
P O Box 19160
5100 West Michigan Avenue
Kalamazoo, MI 49019-0160
616-375-9595

CHAIN-OF-CUSTODY RECORD

CHAIN-OF-CUSTODY № 1636

RECEIVING ENTITY TRACE

PROJECT MANAGER MARK W. STEPHENS

ENTITY CONTACT/PHONE LAURA

TERRA SITE PHONE (616) 375-9595

Name of Client: BENTELER CORP.

Project Name, City State: BENTELER CORPORATION GALESBURG, MI

Project #

PO #

Transfer# 1 2 3 4

Item Number	Date	Time	Sample Number	Number & Size of Containers	Description	BTEX*	TPH**	PNA***	FLASH POINT	PCBs	MDNR SCAN			
1	8/4/93	1240	D-1	1-16 OZ GLASS	DITCH BOTTOM SOILS					X				
2	8/4/93	1245	D-2	1-16 OZ GLASS	" " " " "					X				
3	8/4/93	1250	D-3	1-16 OZ GLASS	" " " " "					X				
4	8/4/93	1300	D-4	1-16 OZ GLASS	" " " " "					X	X			
5	8/4/93	1310	D-5	1-32 OZ GLASS 1-16 OZ GLASS	" " " " "					X				

CAST

Trans. #	Item #	Samples Relinquished By	Accepted By	Date	Time
1	1-5	[signature]	[signature]	8/4/93	12:15
2		[signature]	[signature]	8/10/93	5:30 PM
3					
4					

FAX results to:
BONNIE ROSENBERG
616-375-2830

TOTALS

Send hard copy & QA/QC results to Bonnie Rosenberg at Terra

Person Responsible for Samples	Affiliation	Date	Time	Special Instructions (use back of form if necessary - attach photocopies to other pages)

BE 009255

Quan Alloc #61

TRACE Analytical Laboratories, Inc.
Environmental Services
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 616-773-5998 • Fax 616-773-6537

Ms. Bonnie Rosenberg
Terra Environmental Corporation
P.O. Box 19160
Kalamazoo, MI 49019-0160

ANALYTICAL REPORT
9/30/93

ANALYZED: 9/24/93

TRACE ID: D399-01
SAMPLE TYPE: Soil
CLIENT ID: Benteler Ind.

SAMPLE DATE: 9/10/93
SAMPLE RECEIVED: 9/16/93
SAMPLE ID: #11300257N Resample at Location D-1

EPA 8080 PCBs	RESULTS (mg/kg)
Aroclor 1016	BDL <0.33
Aroclor 1262	BDL <0.33
Aroclor 1232	BDL <0.33
Aroclor 1242	BDL <0.33
Aroclor 1248	0.61
Aroclor 1254	BDL <0.33
Aroclor 1260	BDL <0.33
PCBs, Total	0.61

BDL = Below Detection Limit

Tim Holt
Laboratory Manager

TRACE Analytical Laboratories, Inc.
Environmental Services
2241 Black Creek Road • Muskegon MI 49444 2673 • Phone 616-773 5998 • Fax 616-773-6537

Ms. Bonnie Rosenberg
Terra Environmental Corporation
P.O. Box 19160
Kalamazoo, MI 49019-0160

ANALYTICAL REPORT
9/30/93

ANALYZED: 9/23/93

TRACE ID: D399-02
SAMPLE TYPE: Soil
CLIENT ID: Benteler Ind.

SAMPLE DATE: 9/10/93
SAMPLE RECEIVED: 9/16/93
SAMPLE ID: #11300257P Resample at Location D-2

EPA 8080 PCBs	RESULTS (mg/kg)
Aroclor 1016	BDL <0.33
Aroclor 1262	BDL <0.33
Aroclor 1232	BDL <0.33
Aroclor 1242	BDL <0.33
Aroclor 1248	BDL <0.33
Aroclor 1254	BDL <0.33
Aroclor 1260	BDL <0.33
PCBs, Total	BDL <0.33

BDL = Below Detection Limit

Tim Holt
Laboratory Manager

TRACE Analytical Laboratories, Inc
Environmental Services
2241 Black Creek Road • Muskegon MI 49444-2673 • Phone 616 773 5998 • Fax 616 773 6537

Ms. Bonnie Rosenberg
Terra Environmental Corporation
P.O. Box 19160
Kalamazoo, MI 49019-0160

ANALYTICAL REPORT
9/30/93

ANALYZED: 9/21/93

TRACE ID: D399-03
SAMPLE TYPE: Water
CLIENT ID: Benteler Ind.

SAMPLE DATE: 9/10/93
SAMPLE RECEIVED: 9/16/93
SAMPLE ID: #11300257Q From Poly & #19

EPA 8080 PCBs	RESULTS (ug/L)
Aroclor 1016	BDL <0.1
Aroclor 1262	BDL <0.1
Aroclor 1232	BDL <0.1
Aroclor 1242	BDL <0.1
Aroclor 1248	BDL <0.1
Aroclor 1254	BDL <0.1
Aroclor 1260	BDL <0.1
PCBs, Total	BDL <0.1

BDL = Below Detection Limit

Tim Holt
Laboratory Manager

terra
Environmental Corporation
5100 West Michigan Avenue
Kalamazoo, MI 49007
616-375-9595

CHAIN-OF-CUSTODY RECORD

RECEIVING ENTITY: TRACE LABS.
ENTITY CONTACT/PHONE:

CHAIN-OF-CUSTODY Nº CH 0312
PROJECT MANAGER: SBT
TERRA SITE PHONE:

Name of Client: Benteler

Project Name, City, State: Benteler Industries, 9000 E. Michigan Avenue, GALESBURG MI

Project #:
P.O. #:
Transfer # 1 2 3 4

Item Number	Date	Time	Sample Number	Number & Size of Containers	Description	BTEX*	TPH**	PNA***	FLASH POINT	PCB			
1	8/11/93	9 AM	11300257m	(1) 16 oz	Treated Water #19/Pout					X			

BE 009259

Trans. #	Item #	Samples Relinquised By	Accepted By	Date	Time
1	1	[illegible]	[illegible]		
2	2	[illegible]	[illegible]	8/12/93	5:40
3					
4					

FAX results to:
PAT TAPLIN
616-375-2830

TOTALS
Send hard copy & QA/QC data results to Pat Taplin at Terra

Person Responsible for Samples	Affiliation	Date	Time	Special Instructions (use back of form if necessary - attach photocopies to other pages)

APPENDIX B.5

TRACE Analytical Laboratories, Inc.
Environmental Services
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 616-773-5998 • Fax 616-773-6537

23 JUL 1993

Ms. Bonnie Rosenberg/Mr. Steve Taplin
Terra Environmental Corporation
P.O. Box 19160
Kalamazoo, MI 49019-0160

ANALYTICAL REPORT
7/20/93

ANALYZED: 7/15/93

TRACE ID: C626-01
SAMPLE TYPE: Water
CLIENT ID: Proj. #113-257
Benteler

SAMPLE DATE: 7/12/93
SAMPLE RECEIVED: 7/12/93
SAMPLE ID: #11300257E
Treated Water

PCBs by EPA METHOD 8080	RESULTS (ug/L)
Aroclor 1232	BDL <0.1
Aroclor 1242	BDL <0.1
Aroclor 1248	BDL <0.1
Aroclor 1254	BDL <0.1
Aroclor 1260	BDL <0.1
PCBs, Total	BDL <0.1

BDL = Below Detection Limit

Tim Holt

Tim Holt
Laboratory Manager

terra
Environmental Corporation
P.O. Box 19160
Kalamazoo, MI 49019-0160
616-375-9595

CHAIN-OF-CUSTODY RECORD

CHAIN-OF-CUSTODY № 1288

RECEIVING ENTITY TRACE LABS

PROJECT MANAGER S. TAPLIN

ENTITY CONTACT/PHONE

TERRA SITE PHONE

Name of Client: BENTELER

Project Name, City State: GALESBURG, MI C1626

Project # 113-257

P.O. #

Transfer#

Item Number	Date	Time	Sample Number	Number & Size of Containers	Description	BTEX*	TPH**	PNA***	FLASH POINT	PCB				Transfer# 1	2	3	4
1	7/12/93	2:45	113002257E	(1) 32 oz.	TREATED Water					X				X			
					5 Day Turnaround												

BE 009262

Trans. #	Item #	Samples Relinquished By	Accepted By	Date	Time
1	1	[illegible]	B. Rosenberg	7/12/93	5:00 pm
2	1	B. Rosenberg	Kathy Dunn	7/12/93	1:00
3		[illegible]	[illegible]	7/13/93	5:00
4					

TOTALS

FAX results to:
BONNIE ROSENBERG
616-375-2830
RUSH OK PLS

Send hard copy & QA/QC results to Bonnie Rosenberg at Terra

Person Responsible for Samples	Affiliation	Date	Time	Special Instructions (use back of form if necessary - attach photocopies to other pages)

TRACE Analytical Laboratories, Inc.
Environmental Services
2241 Black Creek Road • Muskegon MI 49444-2673 • Phone 616 773-5998 • Fax 616-773-6537

Ms. Bonnie Rosenberg
Terra Environmental Corporation
P.O. Box 19160
Kalamazoo, MI 49019-0160

ANALYTICAL REPORT
9/7/93

ANALYZED: 8/23/93

TRACE ID: C991-01
SAMPLE TYPE: Water
CLIENT ID: Benteler Industries

SAMPLE DATE: 8/11/93
SAMPLE RECEIVED: 8/12/93
SAMPLE ID: #11300257M Treated Water #19/Poly

PCBs by EPA METHOD 8080	RESULTS (ug/L)
Aroclor 1016	BDL <0.1
Aroclor 1262	BDL <0.1
Aroclor 1232	BDL <0.1
Aroclor 1242	BDL <0.1
Aroclor 1248	16
Aroclor 1254	BDL <0.1
Aroclor 1260	0.49
PCBs, Total	16

BDL = Below Detection Limit

Tim Holt
Laboratory Manager

terra
Environmental Corporation
5100 West Michigan Avenue
Kalamazoo, MI 49007
616-375-9595

CHAIN-OF-CUSTODY RECORD

RECEIVING ENTITY: TRACE LABS.
ENTITY CONTACT/PHONE:

CHAIN-OF-CUSTODY: № CH 0312
PROJECT MANAGER: SBT
TERRA SITE PHONE:

Name of Client: Benteler

Project Name, City, State: Benteler Industries, 9000 E. Michigan Avenue, GALESBURG, MI

Project #:
P.O. #:

Item Number	Date	Time	Sample Number	Number & Size of Containers	Description	BTEX*	TPH**	PNA***	FLASH POINT	PCB				Transfer # 1 2 3 4
01 1	8/11/93	9:00 A	11300257m	(1) 16 oz	Treated Water #19/Pout					X				

C991

BE 009264

Trans. #	Item #	Samples Relinquised By	Accepted By	Date	Time
1	1	Richard Wenzel	[signature]		
2	2	Steven Taplin	[signature]	8/12/93	15:40
3		Bros Data	TRACE STORAGE	8/12/93	6:00
4		TRACE STORAGE	[signature]	8/13/93	8:00 pm

FAX results to:
PAT TAPLIN
616-375-2830

TOTALS: Send hard copy & QA/QC data results to Pat Taplin at Terra

Person Responsible for Samples	Affiliation	Date	Time	Special Instructions (use back of form if necessary - attach photocopies to other pages)

TRACE Analytical Laboratories, Inc
Environmental Services
2241 Black Creek Road • Muskegon MI 49444 2673 • Phone 616 773 5998 • Fax 616 773 6537

Ms. Bonnie Rosenberg/Mr. Steve Taplin
Terra Environmental Corporation
P.O. Box 19160
Kalamazoo, MI 49019-0160

ANALYTICAL REPORT
6/29/93

ANALYZED: 6/28/93

TRACE ID: C375-01
SAMPLE TYPE: Water
CLIENT ID: Proj. #11300257 PO #000658
Benteler Industries
Storm Sewer Cleaning

SAMPLE DATE: 6/21/93
SAMPLE RECEIVED: 6/22/93
SAMPLE ID: #11300257B
Treated Water

METHOD #8080

TOTAL PCBs	RESULTS (ug/L)
Aroclor 1232	BDL <0.1
Aroclor 1242	BDL <0.1
Aroclor 1248	BDL <0.1
Aroclor 1254	BDL <0.1
Aroclor 1260	100

BDL = Below Detection Limit

Tim Holt
Laboratory Manager

terra
Environmental Corporation
P.O. Box 19160
Kalamazoo, MI 49019-0160
616-375-9595

CHAIN-OF-CUSTODY RECORD

CHAIN-OF-CUSTODY № 1280

RECEIVING ENTITY Trace Analytical

PROJECT MANAGER S. TAPLIN

ENTITY CONTACT/PHONE 616 773 5998

TERRA SITE PHONE

Name of Client: Benteler Industries

Project Name, City State: Storm Sewer Cleaning

Project # 11300257

P.O. # 000658

Item Number	Date	Time	Sample Number	Number & Size of Containers	Description	BTEX*	TPH**	PNA***	FLASH POINT	PCB				Transfer# 1	2	3	4
1	6/21	3:30 p	11300257B	1, 64 oz	Treated Water					X				X			
					5 Day Turnaround Time.												
					Sample rec'd in plastic. C375												
					RUSH OK PCS												
					6/23												

Trans. #	Item #	Samples Relinquished By	Accepted By	Date	Time
1	1	[signature]	K. Owen	6/22	4:00
2		K. Owen	[signature]	6/22	1800
3					
4					

FAX results to:
BONNIE ROSENBERG
616-375-2830

TOTALS

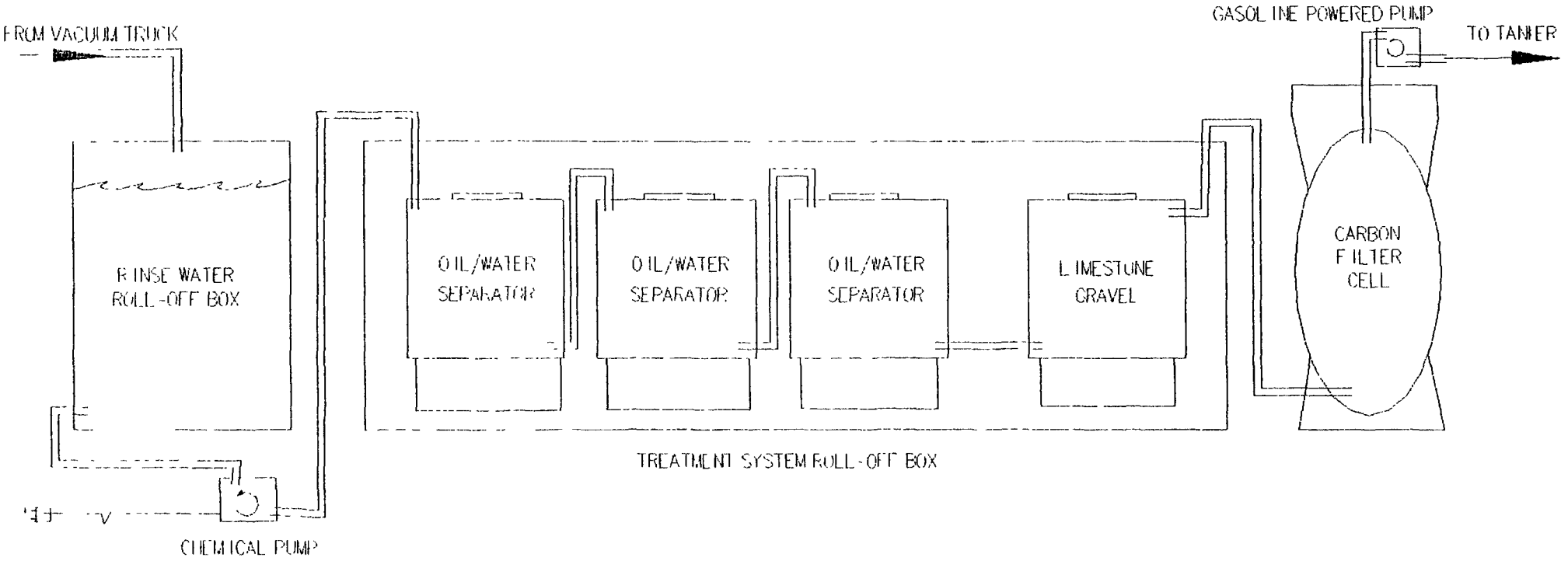
Send hard copy & QA/QC results to Bonnie Rosenberg at Terra

Person Responsible for Samples	Affiliation	Date	Time	Special Instructions (use back of form if necessary - attach photocopies to other pages)

BE 009266

APPENDIX B.6

PCB TREATMENT SYSTEM
BENTELER INDUSTRIES



BE 009268

APPENDIX C

DISPOSAL MANIFESTS

LANDFILL USED:

C & C LANDFILL
14800 P. DRIVE NORTH
MARSHALL, MICHIGAN
49068

APPENDIX C.1

Waste Systems™
OWNING-FERRIS INDUSTRIES

No. 729701

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

Generator Name: Bentelek Ind
Generating Location: SAME
Address: 9100 E. Michigan Ave
Galesburg, MI 49053
Address:
Phone No.: 616-6654261
Phone No.:

Waste Code: MI 576 940707 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
Non-Hazardous Soil	25	Y	01	T

Type: D - Drum, C - Carton, B - Bag, T - Truck, P - Pounds, Y - Yards, O - Other

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

Bentelek Ind. — Joseph Lee Schmidt — 072993
Generator Authorized Agent Name — Signature — Shipment Date

TRANSPORTER

Truck No.: 6415-92
Phone No.: 616-375-9595
Transporter Name: Terra Environmental Corp.
Driver Name (Print): Rod Brown
Address: 5100 W. Michigan
Kalamazoo, MI 49007
Vehicle License No./State:
Vehicle Certification:

I hereby certify that the above named material was picked up the generator site listed above.

Rodney Brown — 072993
Driver Signature — Shipment Date

I hereby certify that the above named material was delivered without incident to the destination listed below.

Rodney Brown — 072993
Driver Signature — Delivery Date

DESTINATION

Site Name: C+C Landfill
Phone No.: 616-7819742
Address: 14800 P. Drive North Marshall, MI

I hereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

[signature] — [signature] — 072993
Name of Authorized Agent — Signature — Receipt Date

PASS CODE: P11746

86 BE 009271 BFI260-7

BFI Waste Systems™
OWNING-FERRIS INDUSTRIES

No. 729702

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

Generator Name: BENTELER IND.
Address: 9000 E Michigan Ave.
Galesburg, MI 49053
Phone No.: 616-6654261

Generating Location: SAME
Address:
Phone No.:

I Waste Code: MI 576 9407077 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
Non-Hazardous Soil	25	Y	01	T

Type: D - Drum; C - Carton; B - Bag; T - Truck; P - Pounds; Y - Yards; O - Other

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

BENTELER — Generator Authorized Agent Name
Signature
Shipment Date: 072993

TRANSPORTER

Truck No.: 6415-92
Transporter Name: Terra Environmental Corp.
Address: 5100 W. Michigan Ave
Kalamazoo, MI 49007
Phone No.: 616-375-9595
Driver Name (Print): Rod Brown
Vehicle License No./State:
Vehicle Certification:

I hereby certify that the above named material was picked up at the generator site listed above.

Driver Signature
Shipment Date: 072993

I hereby certify that the above named material was delivered without incident to the destination listed below.

Driver Signature
Delivery Date: 07-29-93

DESTINATION

Site Name: C & C LANDFILL
Address: 14800 P. DRIVE NORTH
MARSHALL, MI 49068
(616) 781-9749
Phone No.:

I hereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate

Name of Authorized Agent
Signature
Receipt Date: 072993

PASS CODE: R1154

/86

BFI260 7

BE 009272

Waste Systems™
OWNING-FERRIS INDUSTRIES

No 729703

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

nerator Name Benteler Ind.
dress 9000 E. Michigan Ave.
Galesburg, MI 49053
one No. 616-6654261

Generating Location
Address SAME
Phone No.

I Waste Code MI 576 940707 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
Non-Hazardous Soil	25	Y	01	T

Type: D - Drum, C - Carton, B - Bag, T- Truck, P - Pounds, Y - Yards, O - Other

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

BENTELER IND — Joseph Lu Schmidt — 073093
nerator Authorized Agent Name — Signature — Shipment Date

TRANSPORTER

uck No. 76-92
ansporter Name Terra Environmental
ddress 5100 W. Michigan Ave.
Kalamazoo, MI 49007

Phone No. 616-375-9595
Driver Name (Print) Rod Brown
Vehicle License No./State
Vehicle Certification

ereby certify that the above named material was picked up the generator site listed above.

Rod Brown — 073093
ver Signature — Shipment Date

I hereby certify that the above named material was delivered without incident to the destination listed below.

Rodney Brown — 073093
Driver Signature — Delivery Date

DESTINATION

te Name G & C LANDFILL
14800 P. DRIVE NORTH
MARSHALL, MI 49068
(616) 781-9742
Phone No.
ddress

ereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate

DON GRAY — Don Gray
me of Authorized Agent — Signature — Receipt Date

PASS CODE B 11859

86 BFI260 7

BE 009273

APPENDIX C.2

Waste Systems™
WNING-FERRIS INDUSTRIES

No. 729705

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

erator Name Benteler Ind.
ress 9000 E. Michigan Ave
Galesburg, MI
ne No. 616-6654261

Generating Location
Address SAME
Phone No.

Waste Code MI 576 940707 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
Non-Hazardous Soil	18	Y	01	T

Type: D - Drum, C - Carton, B - Bag, T - Truck, P - Pounds, Y - Yards, O - Other

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

rator Authorized Agent Name — Signature — Shipment Date 080295

TRANSPORTER

ck No. 78
nsporter Name Terra Environmental Corp.
ress 5100 West Michigan
Kalamazoo, MI 49007

Phone No. 616-375-9595
Driver Name (Print) Thomas Burkett
Vehicle License No./State
Vehicle Certification

reby certify that the above named material was picked up ne generator site listed above.
r Signature — Shipment Date 080293

I hereby certify that the above named material was delivered without incident to the destination listed below.
Driver Signature — Delivery Date 080293

DESTINATION

Name
Phone No.
dress

J & C LANDFILL
4800 P. DRIVE NORTH
MARSHALL, MI 49068
(616) 781-9742

reby certify that the above named material has been delivered and to the best of my knowledge the foregoing is true and accurate.

e of Authorized Agent — Signature — Receipt Date 081295

PASS CODE R10045

BFI260-720

BE 009275

Waste Systems™
WNING-FERRIS INDUSTRIES

No. 729704

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

erator Name Benteler IND.

ress 9000 E. Michigan Ave.
Galesburg, MI 49053

ne No. 616-6654261

Generating Location

Address SAME

Phone No. ___-_____

Waste Code MI 576 940707 206866-094

Description of Waste	Quantity	Units	Containers No.	Containers Type
NON-Hazardous Soil	-25	Y	01	T

Type: D - Drum, C - Carton, B - Bag, T - Truck, P - Pounds, Y - Yards, O - Other

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

rator Authorized Agent Name — Signature: Joseph Lee Schmidt — Shipment Date: 080293

TRANSPORTER

ck No. 76-32

Phone No. 616-375-9595

nsporter Name Terra Environmental

Driver Name (Print) Rod Brown

ress 5100 W. Michigan Ave.
Kalamazoo Mi 49007

Vehicle License No./State

Vehicle Certification

reby certify that the above named material was picked up he generator site listed above.

odney Brown — r Signature — Shipment Date: 080293

I hereby certify that the above named material was delivered without incident to the destination listed below.

Rod Brown — Driver Signature — Delivery Date: 080293

DESTINATION

Name — & C LANDFILL, 14800 P. DRIVE NORTH, MARSHALL, MI 49068, (616) 781-9742

Phone No. ___-_____

dress

reby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

e of Authorized Agent — Signature — Receipt Date: 080293

PASS CODE B12023

BE 009276

BFI260-72

Waste Systems™
NING-FERRIS INDUSTRIES

No. 729706

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

rator Name Benteler Ind.
ess 9000 E. Michigan Ave.
Galesburg, MI 49053
e No. 616-6654261

Generating Location
Address SAME
Phone No.

/aste Code MI 576 9407077 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
ON-Hazardous Soil	118	Y	01	T

Type: D - Drum, C - Carton, B - Bag, T - Truck, P - Pounds, Y - Yards, O - Other

hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable tate law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, lassified and packaged, and is in proper condition for transportation according to applicable regulations.

ator Authorized Agent Name — Signature — Shipment Date 080293

TRANSPORTER

k No. 78
sporter Name Terra Environmental
ess 5100 W. Michigan Ave
Kalamazoo, MI 49007

Phone No. 616-375-9595
Driver Name (Print) Thomas Burkett
Vehicle License No./State
Vehicle Certification

eby certify that the above named material was picked up e generator site listed above.

Signature — Shipment Date 080293

I hereby certify that the above named material was delivered without incident to the destination listed below.

Driver Signature — Delivery Date 080293

DESTINATION

Name J & C LANDFILL
14800 P. DRIVE NORTH
MARSHALL, MI 49068
(616) 781-9742
Phone No.
ess

eby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

of Authorized Agent — Signature — Receipt Date 080293

PASS CODE R12004

BFI260 720

BE 009277

Waste Systems™
WNING-FERRIS INDUSTRIES

No. 729707

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

erator Name Benteler Ind

Generating Location SAME

dress 9000 E. Michigan Ave.
Galesburg, MI 49053

Address

ne No. 616-6654261

Phone No.

Waste Code MI 576 940707 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
NON-Hazardous Soil	18	4	01	T

Type: D - Drum, C - Carton, B - Bag, T - Truck, P - Pounds, Y - Yards, O - Other

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

erator Authorized Agent Name — Joseph Lee Schmidt — Signature — 080293 — Shipment Date

TRANSPORTER

ck No. 67-

Phone No. 616-375-9595

nsporter Name Terra Environmental

Driver Name (Print) [illegible]

dress 5100 W. Michigan Ave.
Kalamazoo, MI 49007

Vehicle License No./State

Vehicle Certification

reby certify that the above named material was picked up he generator site listed above.

I hereby certify that the above named material was delivered without incident to the destination listed below.

r Signature — 080293 — Shipment Date

Driver Signature — 080293 — Delivery Date

DESTINATION

e Name — & C LANDFILL
14800 P. DRIVE NORTH
MARSHALL, MI 49068
(616) 781-9742

Phone No.

dress

ereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

ne of Authorized Agent — Signature — 080293 — Receipt Date

R12075

PASS CODE

6

BE 009278

BFI260 72

Waste Systems™
NING-FERRIS INDUSTRIES

No. 729754

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

ator Name Benteler IND

Generating Location

ss 9000 E. Michigan Ave.

Address SAME

Galesburg, MI 49053

No. 616-6654261

Phone No. -

aste Code MI 576 940707 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
ON-Hazardous Soil	--25	Y	01	T

Type: D - Drum, C - Carton, B - Bag, T- Truck, P - Pounds, Y - Yards, O - Other

ereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable ate law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, assified and packaged, and is in proper condition for transportation according to applicable regulations.

or Authorized Agent Name — Signature: Joseph Lu Schmidt — Shipment Date: 080393

TRANSPORTER

No. 76-32

Phone No. 616-375-9595

porter Name Terra Environmental

Driver Name (Print) Rod Brown

ss 5100 W. Michigan Ave.

Vehicle License No./State

Kalamazoo, MI 49007

Vehicle Certification

y certify that the above named material was picked up generator site listed above.

I hereby certify that the above named material was delivered without incident to the destination listed below.

Rodney Brown — Signature — Shipment Date: 080393

Rodney Brown — Driver Signature — Delivery Date: 080393

DESTINATION

ame

Phone No. -

ss

& C LANDFILL
14800 P. DRIVE NORTH
MARSHALL, MI 49068
(616) 781-9742

y certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

Authorized Agent — Signature: Jayer — Receipt Date: 080393

PASS CODE P12261

BFI260-720

BE 009279

Waste Systems™
WNING-FERRIS INDUSTRIES

No. 729753

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

erator Name Bentelei IND.
ress 9000 E. Michigan Ave.
Galesburg, MI
ne No. 616-6654261

Generating Location
Address SAME
Phone No. -

Waste Code MI 576 940707 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
NON-Hazardous Soil	23	Y	01	T

Type: D - Drum, C - Carton, B - Bag, T - Truck, P - Pounds, Y - Yards, O - Other

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

Bentelei Ind. — Stacy W. Deering — 080393
rator Authorized Agent Name — Signature — Shipment Date

TRANSPORTER

k No. 76-32
Phone No. 616-375-9595
nsporter Name Terra Environmental
Driver Name (Print) Rod Brown
ress 5100 W. Michigan Ave
Kalamazoo, MI 49007
Vehicle License No./State
Vehicle Certification

reby certify that the above named material was picked up he generator site listed above.

I hereby certify that the above named material was delivered without incident to the destination listed below.

dney Brown — 080393 — Rod Brown — 080393
r Signature — Shipment Date — Driver Signature — Delivery Date

DESTINATION

Name & G LANDFILL
14800 P. DRIVE NORTH
MARSHALL, MI 49068
(616) 781-9742
Phone No. -
ress

reby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

[signature] — [signature] — 080393
e of Authorized Agent — Signature — Receipt Date

PASS CODE B12223

BFI260-720

BE 009280

TRANSPORTER DETAIL

Waste Systems™
NING-FERRIS INDUSTRIES

No. 729752

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

rator Name Benteler IND

Generating Location

ess 9000 E. Michigan Ave.

Address SAME

Galesburg, MI 49053

e No. 616-6654261

Phone No.

Waste Code MI 576 940707 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
NON-Hazardous Soil	-25	Y	01	T

Type: D - Drum, C - Carton, B - Bag, T - Truck, P - Pounds, Y - Yards, O - Other

hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable tate law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

ator Authorized Agent Name — Signature: Joseph Lee Schmidt — Shipment Date: 080393

TRANSPORTER

k No. 76-32

Phone No. 616-375-9595

sporter Name Terra Environmental

Driver Name (Print) Rod Brown

ress 5100 W. Michigan Ave.

Vehicle License No./State

Kalamazoo, MI 49007

Vehicle Certification

eby certify that the above named material was picked up e generator site listed above.

I hereby certify that the above named material was delivered without incident to the destination listed below.

Rod Brown — Signature — Shipment Date: 080393

Rod Brown — Driver Signature — Delivery Date: 080393

DESTINATION

Name

Phone No.

ress

& C LANDFILL
14800 P. DRIVE NORTH
MARSHALL, MI 49068
(616) 781-9742

reby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

e of Authorized Agent — Signature — Receipt Date: 080393

PASS CODE B12189

BFI260-720

BE 009281

Waste Systems™
WNING-FERRIS INDUSTRIES

No. 729751

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

rator Name Bentelar INC.
ess 9000 E. Michigan Ave.
Galesburg, MI 49053
e No. 616-6654261

Generating Location SAME
Address
Phone No.

Waste Code MI 576 9407077 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
NON-Hazardous Soil	25	Y	01	T

Type: D - Drum, C - Carton, B - Bag, T - Truck, P - Pounds, Y - Yards, O - Other

hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

rator Authorized Agent Name — Signature — Shipment Date 080393

TRANSPORTER

k No. 76-32
Phone No. 616-375-9595
sporter Name Terra Environmental
Driver Name (Print) Rod Brown
ress 5100 W. Michigan Ave.
Vehicle License No./State
Kalamazoo, MI 49007
Vehicle Certification

eby certify that the above named material was picked up e generator site listed above.

r Signature — Shipment Date 080393

I hereby certify that the above named material was delivered without incident to the destination listed below.

Driver Signature — Delivery Date 080393

DESTINATION

Name
Phone No.
ress

J & C LANDFILL
14800 P. DRIVE NORTH
MARSHALL, MI 49068
(616) 781-9742

reby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

e of Authorized Agent — Signature — Receipt Date

PASS CODE R17152

BE 009282

BFI260 720

Waste Systems™
OWNING-FERRIS INDUSTRIES

No. 729763

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

nerator Name Benteler

Generating Location

dress 9000 E Michigan Ave

Address SAME

Galesburg MI 49053

one No. 616-6654261

Phone No.

Waste Code MI 576 940707 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
NON HAZARDOUS SOILS	18	Y	01	T

Type: D - Drum, C - Carton, B - Bag, T - Truck, P - Pounds, Y - Yards, O - Other

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

Benteler Inc — Steinberg — 080493

nerator Authorized Agent Name — Signature — Shipment Date

TRANSPORTER

uck No. 67

Phone No.

ansporter Name TERRA

Driver Name (Print) Robert Whites

ldress 5100 W Mich Ave

Vehicle License No./State

KAL MI

Vehicle Certification

ereby certify that the above named material was picked up the generator site listed above.

[signature] — 080493

ver Signature — Shipment Date

I hereby certify that the above named material was delivered without incident to the destination listed below.

[signature] — 080493

Driver Signature — Delivery Date

DESTINATION

te Name C & C LANDFILL 14800 P. DRIVE NORTH MARSHALL, MI 49068 (616) 781-9742

Phone No.

ldress

ereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate

[signature] — [signature] — 080493

me of Authorized Agent — Signature — Receipt Date

PASS CODE F12403

86

BE 009283

BFI260 7

Waste Systems™
'NING-FERRIS INDUSTRIES

No. 729757

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

rator Name Benteler

Generating Location

ess 9000 E Michigan Ave
Galesburg MI 49053

Address SAME

e No. 616-6654261

Phone No.

Vaste Code MI 576 940707 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
NON HAZARDOUS SOILS	18	Y	01	T

Type
D - Drum
C - Carton
B - Bag
T - Truck
P - Pounds
Y - Yards
O - Other

hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable tate law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, lassified and packaged, and is in proper condition for transportation according to applicable regulations.

Benteler Inc — Steven Berry — 080493

ator Authorized Agent Name — Signature — Shipment Date

TRANSPORTER

k No. 67

Phone No. 616-375-9595

sporter Name TERRA

Driver Name (Print) [illegible]

ress 5100 W Mich Ave
Kalamazoo MI 49007

Vehicle License No./State

Vehicle Certification

eby certify that the above named material was picked up e generator site listed above.

I hereby certify that the above named material was delivered without incident to the destination listed below.

[signature] — 080493 — [signature] — 080493

Signature — Shipment Date — Driver Signature — Delivery Date

DESTINATION

Name C&C LANDFILL

Phone No.

ress 14800 P Drive North

eby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

[signature] — [signature] — 080493

of Authorized Agent — Signature — Receipt Date

PASS CODE 7310379

BFI260-720

BE 009284

Waste Systems™
WNING-FERRIS INDUSTRIES

No. 729761

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

erator Name Bertelen

Generating Location

ress 9000 E Michigan Ave

Address SAme

Galesburg MI 49053

ne No. 616-6654261

Phone No. -

Waste Code MI 576 940707 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
NON HAZARDOUS Soils	18	Y	01	7

Type: D - Drum, C - Carton, B - Bag, T - Truck, P - Pounds, Y - Yards, O - Other

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

Bertelen Inc — Steven W [illegible] — 080493

rator Authorized Agent Name — Signature — Shipment Date

TRANSPORTER

ck No. 67

Phone No.

nsporter Name TERRA

Driver Name (Print) Robert [illegible]

dress 5100 W Mich Ave

Vehicle License No./State

Kal MI 49007

Vehicle Certification

reby certify that the above named material was picked up ne generator site listed above.

[signature] — 080493

r Signature — Shipment Date

I hereby certify that the above named material was delivered without incident to the destination listed below.

[signature] — 080493

Driver Signature — Delivery Date

DESTINATION

e Name C&C Landfill

Phone No. -

dress 14800 P Drive North

reby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

[signature] — [signature] — 080493

e of Authorized Agent — Signature — Receipt Date

PASS CODE B12333

6

BFI260-72

BE 009285

BFI Waste Systems™
OWNING-FERRIS INDUSTRIES

No. 729764

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

enerator Name Benteler
Generating Location
ldress 9000 E Mich Ave
Address Same
Galesburg MI 49053
one No. 616-6654261
Phone No.
l Waste Code MI 576 940707 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
NON HAZARDOUS SOILS	---25	Y	01	T

Type: D - Drum, C - Carton, B - Bag, T - Truck, P - Pounds, Y - Yards, O - Other

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

Benteler Ind. — Steven W. Drury — 080493
enerator Authorized Agent Name — Signature — Shipment Date

TRANSPORTER

ruck No. 76-32
Phone No. 616-375-9595
ransporter Name TERRA
Driver Name (Print) Rod Brown
ddress 5100 W Mich Ave
Vehicle License No./State
Kal MI
Vehicle Certification

hereby certify that the above named material was picked up the generator site listed above.

Rod Brown — 080493
iver Signature — Shipment Date

I hereby certify that the above named material was delivered without incident to the destination listed below.

Rod Brown — 080493
Driver Signature — Delivery Date

DESTINATION

ite Name C&C Landfill
Phone No.
ddress

hereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

Jayne — Jayne — 080493
ame of Authorized Agent — Signature — Receipt Date

PASS CODE B17451

0/86

BE 009286

BFI260-7

Waste Systems™
WNING-FERRIS INDUSTRIES

No. 729759

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

erator Name Benteler

Generating Location

dress 9000 E Michigan Ave
Galesburg MI 49053

Address Same

one No. 616-6654261

Phone No. ___-___

Waste Code M&I 576 940707 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
NON HAZARDOUS SOILS	---25	Y	01	T

Type
D - Drum
C - Carton
B - Bag
T - Truck
P - Pounds
Y - Yards
O - Other

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

Benteler Inc — erator Authorized Agent Name
Steven W. Curry — Signature
080493 — Shipment Date

TRANSPORTER

ck No. 76-32

Phone No. 616-375-9595

nsporter Name TERRA

Driver Name (Print) Rod Brown

dress 5100 W Mich Ave
Kalamazoo MI 49007

Vehicle License No./State

Vehicle Certification

ereby certify that the above named material was picked up the generator site listed above.

I hereby certify that the above named material was delivered without incident to the destination listed below.

Rod Brown — er Signature
080493 — Shipment Date
Rod Brown — Driver Signature
080493 — Delivery Date

DESTINATION

e Name C&C Landfill

Phone No. ___-___

dress 14800 P Drive North

ereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

ne of Authorized Agent
Signature
080493 — Receipt Date

PASS CODE B12374

36

BFI260-72

BE 009287

BFI® Waste Systems™
OWNING-FERRIS INDUSTRIES

No. 729760

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

enerator Name Benteler

Generating Location

ddress 9000 E Michigan Ave

Address same

Galesburg MI 49053

one No. 616-665 4261

Phone No.

l Waste Code MI 576 940707 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
NON HAZARDOUS SOILS	- - - 25	Y	01	T

Type
D - Drum
C - Carton
B - Bag
T - Truck
P - Pounds
Y - Yards
O - Other

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

Benteler Mc / Steven W [signature] 080493

enerator Authorized Agent Name — Signature — Shipment Date

TRANSPORTER

uck No. 76-32

Phone No. 616-375-9595

ansporter Name TERRA

Driver Name (Print) Rod Brown

ddress 5100 W Mich Ave

Vehicle License No./State

Kalamazoo MI 49007

Vehicle Certification

hereby certify that the above named material was picked up the generator site listed above.

Rod Brown 080493

iver Signature — Shipment Date

I hereby certify that the above named material was delivered with out incident to the destination listed below.

Rod Brown 08049-

Driver Signature — Delivery Date

DESTINATION

ite Name C&C Landfill

Phone No.

ddress 14800 P Drive North

hereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate

[signature] [signature] 08049

ame of Authorized Agent — Signature — Receipt Date

PASS CODE B12306

/86

BFI260

BE 009288

Waste Systems™
OWNING-FERRIS INDUSTRIES

No. 729756

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

nerator Name Benteler IND.

Generating Location

dress 9000 E. Michigan Ave.

Address SAME

Galesburg, MI 49053

one No. 616-6654261

Phone No. -

Waste Code MI 576 940707 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
Non-Hazardous Soil	25	Y	01	T

Type: D - Drum, C - Carton, B - Bag, T - Truck, P - Pounds, Y - Yards, O - Other

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

Benteler Ind — Steven W. [signature] — 080393

nerator Authorized Agent Name — Signature — Shipment Date

TRANSPORTER

uck No. 76-32

Phone No. 616-375-9595

ansporter Name Terra Environmental

Driver Name (Print) Rod Brown

ddress 5100 W. Michigan Ave.

Vehicle License No./State

Kalamazoo, MI 49007

Vehicle Certification

ereby certify that the above named material was picked up the generator site listed above.

I hereby certify that the above named material was delivered without incident to the destination listed below.

Rod Brown — 080393 — Rod Brown — 080393

ver Signature — Shipment Date — Driver Signature — Delivery Date

DESTINATION

[illegible] LANDFILL
14800 P. DRIVE NORTH
MARSHALL, MI 49068
(616) 781-9742

te Name

Phone No. -

ddress

ereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

[signature] — [signature] — 080493

me of Authorized Agent — Signature — Receipt Date

PASS CODE B12098

86

BFI260-7

BE 009289

Waste Systems™
/NING-FERRIS INDUSTRIES

No. 729755

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

rator Name Benteler IND

Generating Location

ess 9000 E Michigan Ave

Address SAME

Galesburg, MI 49053

e No. 616-6654261

Phone No. -

Waste Code MI 576 940707 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
Non Hazardous Soil	18	4	01	T

Type: D - Drum, C - Carton, B - Bag, T - Truck, P - Pounds, Y - Yards, O - Other

hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

Benteler Ind — Stac W Clery — 080393

ator Authorized Agent Name — Signature — Shipment Date

TRANSPORTER

k No. 67-71

Phone No. 616-375-9595

sporter Name Terra Environmental

Driver Name (Print)

ress 5100 W. Michigan Ave.

Vehicle License No./State

Kalamazoo, MI 49007

Vehicle Certification

eby certify that the above named material was picked up e generator site listed above.

I hereby certify that the above named material was delivered without incident to the destination listed below.

[signature] — 080993 — [signature] — 080493

r Signature — Shipment Date — Driver Signature — Delivery Date

DESTINATION

Name — Phone No. -

ress

- & C LANDFILL
4800 P. DRIVE NORTH
MARSHALL, MI 49068
(616) 781-9742

eby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

[signature] — [signature] — 080493

e of Authorized Agent — Signature — Receipt Date

PASS CODE B12277

BFI260-720

BE 009290

TRANSPORTER RETAIN

Waste Systems™
WNING-FERRIS INDUSTRIES

No. 729762

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

erator Name Benteler

Generating Location

ress 9000 E Michigan Ave

Address SAME

Galesburg MI 49053

ne No. 616-6654261

Phone No.

Waste Code MI 576 940707 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
NON HAZARDOUS SOILS	---18	Y	01	T

Type
D - Drum
C - Carton
B - Bag
T- Truck
P - Pounds
Y - Yards
O - Other

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

Benteler Inc — Steven Clery — 080493

erator Authorized Agent Name — Signature — Shipment Date

TRANSPORTER

ck No. 78

Phone No.

nsporter Name TERRA ENVIRONMENTAL

Driver Name (Print) Thomas Burkett

dress 5100 W Mich Ave

Kal MI

Vehicle License No./State

Vehicle Certification

reby certify that the above named material was picked up he generator site listed above.

Thomas Burkett — 080493

er Signature — Shipment Date

I hereby certify that the above named material was delivered without incident to the destination listed below.

Thomas Burkett — 080493

Driver Signature — Delivery Date

DESTINATION

e Name C&C Landfill

C & C LANDFILL
14800 P. DRIVE NORTH
MARSHALL, MI 49068
(616) 781-9742

Phone No.

dress

ereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

[signature] — [signature] — 080493

ne of Authorized Agent — Signature — Receipt Date

PASS CODE BID 469

6

BFI260-7

BE 009291

Waste Systems™
WNING-FERRIS INDUSTRIES

No. 729758

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

erator Name Benteler

Generating Location

ress 9000 E Mich Ave
Galesburg MI 49053

Address SAme

ne No. 616-6654261

Phone No.

Waste Code MI 576 940707 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
NON HAZARDOUS SOILS	---18	Y	01	T

Type: D - Drum, C - Carton, B - Bag, T - Truck, P - Pounds, Y - Yards, O - Other

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

Benteler Inc — Steven W Cury — 080493

erator Authorized Agent Name — Signature — Shipment Date

TRANSPORTER

ck No. 78

Phone No. 616-375-9595

nsporter Name TERRA

Driver Name (Print) Thomas Burkett

dress 5100 W Michigan Ave
Kalamazoo MI 49007

Vehicle License No./State

Vehicle Certification

ereby certify that the above named material was picked up he generator site listed above.

Thomas Burkett — 080493

er Signature — Shipment Date

I hereby certify that the above named material was delivered without incident to the destination listed below.

Thomas Burkett — 080493

Driver Signature — Delivery Date

DESTINATION

e Name C&C Landfill

Phone No.

dress 14800 P Drive North

ereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

[signature] — [signature] — 080493

ne of Authorized Agent — Signature — Receipt Date

PASS CODE B10359

BFI260 7.

BE 009292

Waste Systems™
WNING-FERRIS INDUSTRIES

No. 729767

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

erator Name Benteler IND

Generating Location

ress 9000 E Michigan Ave

Address Same

Galesburg MI 49053

ne No. 616-6654261

Phone No. ___-___

Waste Code MI 576 940707 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
NON HAZARDOUS SOILS	--25	Y	01	T

Type: D - Drum, C - Carton, B - Bag, T- Truck, P - Pounds, Y - Yards, O - Other

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

rator Authorized Agent Name — Signature: Joseph L. Schmidt — Shipment Date: 080553

TRANSPORTER

ck No. 76-37

Phone No. 616-375-9595

nsporter Name TERRA

Driver Name (Print) Rod Brown

ress 5100 W Mich Ave

Vehicle License No./State

KAL MI

Vehicle Certification

reby certify that the above named material was picked up ne generator site listed above.

I hereby certify that the above named material was delivered without incident to the destination listed below.

r Signature: Rod Brown — Shipment Date: 080593

Driver Signature: Rod Brown — Delivery Date: 080593

DESTINATION

Name C&C landfill

Phone No. ___-___

dress

reby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

e of Authorized Agent: Jay W. — Signature: Jay W — Receipt Date: 080595

PASS CODE B12517

BFI260-720

BE 009293

Waste Systems™
WNING-FERRIS INDUSTRIES

No. 729769

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

erator Name: Benteler IND
Generating Location:
ress: 9000 E Mich Ave
Address: Same
Galesburg MI 49053
ne No.: 616-6654261
Phone No.:
Waste Code: MI 576 940707 206866-001

Description of Waste	Quantity	Units	Containers No.	Containers Type
NON HAZARDOUS SOILS	25	Y	01	T

Type: D - Drum, C - Carton, B - Bag, T - Truck, P - Pounds, Y - Yards, O - Other

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

erator Authorized Agent Name: Joseph L. Schmidt
Signature:
Shipment Date: 080593

TRANSPORTER

ck No.: 76-32
Phone No.:
nsporter Name: TERRA
Driver Name (Print): Rod Brown
dress: 5100 W Mich AVE
Kal MI
Vehicle License No./State:
Vehicle Certification:

reby certify that the above named material was picked up he generator site listed above.

er Signature: Rod Brown
Shipment Date: 080593

I hereby certify that the above named material was delivered without incident to the destination listed below.

Driver Signature: Rod Brown
Delivery Date: 080593

DESTINATION

e Name: LANDFILL 14800 P. DRIVE NORTH MARSHALL, MI 49068 (616) 781-9742
Phone No.:
dress:

ereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

ne of Authorized Agent:
Signature:
Receipt Date: 080593

PASS CODE: B12552

6

BE 009294

BFI260-72

Waste Systems™
WNING-FERRIS INDUSTRIES

No 729766

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

ierator Name Benteler IND
Generating Location
lress 9000 E Michigan
Address Same
Galesburg 49053
ne No. 616-6654261
Phone No. ___-___

Waste Code MI 576 940707 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
NON HAZARDOUS SOILS	25	Y	01	T

Type
D - Drum
C - Carton
B - Bag
T - Truck
P - Pounds
Y - Yards
O - Other

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

ierator Authorized Agent Name
Signature
Shipment Date 080593

TRANSPORTER

ck No.
Phone No 616-375-9595
nsporter Name TERRA
Driver Name (Print) Rod Brown
dress 5100 W Mich Ave
Vehicle License No./State
KAL MI 49007
Vehicle Certification

ereby certify that the above named material was picked up the generator site listed above.

ver Signature
Shipment Date 080593

I hereby certify that the above named material was delivered without incident to the destination listed below.

Driver Signature
Delivery Date 080593

DESTINATION

e Name C&C Landfill
Phone No. ___-___
dress
C & C LANDFILL
14800 P. DRIVE NORTH
MARSHALL, MI 49068
(616) 781-9742

ereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate

me of Authorized Agent
Signature
Receipt Date 080593

PASS CODE R12471

86
BFI260 7'

BE 009295

Waste Systems™
WNING-FERRIS INDUSTRIES

No. 729770

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

erator Name Benteler IND
ress 9000 E Mich Ave
Galesburg MI 49053
ne No. 616-6654261

Generating Location
Address Same
Phone No.

Waste Code MI 576 940707 20686 G-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
NON HAZARDOUS SOILS	--25	Y	01	T

Type: D - Drum, C - Carton, B - Bag, T- Truck, P - Pounds, Y - Yards, O - Other

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

rator Authorized Agent Name — Signature: Joseph L. Schmidt — Shipment Date: 080593

TRANSPORTER

ck No. 76-37
nsporter Name TEDDA ENVIRON
dress 5100 W Mich Ave
KAL MI 49007

Phone No. 616-375-9595
Driver Name (Print) Rod Brown
Vehicle License No./State
Vehicle Certification

reby certify that the above named material was picked up ne generator site listed above.

od Brown — r Signature — Shipment Date: 080593

I hereby certify that the above named material was delivered without incident to the destination listed below.

Rod Brown — Driver Signature — Delivery Date: 080593

DESTINATION

Name C&C / AN
dress

C&C LANDFILL
14800 P. DRIVE NORTH
MARSHALL, MI 49068
(616) 781-9742

Phone No.

reby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

e of Authorized Agent — Signature — Receipt Date: 080593

PASS CODE B10587

BFI260-72

BE 009296

TRANSPORTER RETAIN

Waste Systems™
OWNING-FERRIS INDUSTRIES

No. 729768

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

Generator Name: Benteler IND
Generating Location:
Address: 9000 E Michigan ave
Galesburg MI 49053
Address: Same
Phone No.: 616-6654261
Phone No.:

Waste Code: MI 576 940707 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
NON HAZARDOUS SOILS	---18	Y	01	T

Type: D - Drum, C - Carton, B - Bag, T - Truck, P - Pounds, Y - Yards, O - Other

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

Generator Authorized Agent Name: Joseph Lee Schmidt — Signature: — Shipment Date: 080593

TRANSPORTER

Truck No.: 78
Phone No.:
Transporter Name: TERRA
Driver Name (Print): BRIAN WEAVER
Address: 5100 W mich AVE
Kalamazoo MI 49007
Vehicle License No./State:
Vehicle Certification:

I hereby certify that the above named material was picked up the generator site listed above.

Driver Signature: [signature] — Shipment Date: 080593

I hereby certify that the above named material was delivered without incident to the destination listed below.

Driver Signature: [signature] — Delivery Date: 080593

DESTINATION

Name: C&C landfill
Phone No.:
Address:

C & C LANDFILL
4800 P. DRIVE NORTH
MARSHALL, MI 49068
(616) 781-9742

I hereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate

Name of Authorized Agent: [signature] — Signature: [signature] — Receipt Date: 080593

PASS CODE: B10530

BE 009297

BFI260-

Waste Systems™
OWNING-FERRIS INDUSTRIES

No. 729771

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

nerator Name Bentelor IND

Generating Location

dress 9000 E Michigan Ave
Galesburg MI 49053

Address Same

one No. 616-6654261

Phone No. -

Waste Code MI 576 940707 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
NON HAZARDOUS SOILS	00018	Y	01	Y

Type: D - Drum, C - Carton, B - Bag, T- Truck, P - Pounds, Y - Yards, O - Other

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

nerator Authorized Agent Name — Signature: Joseph Lee Schmidt — Shipment Date: 080593

TRANSPORTER

uck No. 78

Phone No.

ansporter Name TERRA

Driver Name (Print) BRIAN WEAVER

dress 5100 W Mich Ave
KAL MI

Vehicle License No./State

Vehicle Certification

ereby certify that the above named material was picked up the generator site listed above.

I hereby certify that the above named material was delivered without incident to the destination listed below.

er Signature — Shipment Date: 080593

Driver Signature — Delivery Date: 080593

DESTINATION

e Name C&C LANDFILL
14800 P. DRIVE NORTH
MARSHALL, MI 49068
(616) 781-9742

Phone No. -

dress

ereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate

me of Authorized Agent — Signature — Receipt Date: 080595

PASS CODE B10563

36

BFI260-7

BE 009298

Waste Systems™
WNING-FERRIS INDUSTRIES

No. 729772

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

ıerator Name Benteler IND

Generating Location

lress 9000 F Mich Ave
Galesburg MI 49053

Address SAME

ne No. 616-6655481

Phone No.

Waste Code MI 576 940709 206866-004

Description of Waste	Quantity	Units	Containers No.	Type
NON HAZARDOUS soils	15	Y	01	T

Type: D - Drum, C - Carton, B - Bag, T- Truck, P - Pounds, Y - Yards, O - Other

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

erator Authorized Agent Name — Signature: Joseph Lee Schmidt — Shipment Date: 080593

TRANSPORTER

ck No. 67

Phone No. 616-375-9595

nsporter Name TERRA

Driver Name (Print)

dress 5100 W Mich Ave
KAl MI 49007

Vehicle License No./State

Vehicle Certification

ereby certify that the above named material was picked up he generator site listed above.

er Signature — Shipment Date: 080593

I hereby certify that the above named material was delivered without incident to the destination listed below.

Driver Signature — Delivery Date: 080593

DESTINATION

e Name C&C /Art 4800 P. DRIVE NORTH
C & C LANDFILL
MARSHALL, MI 49068
(616) 781-9742

Phone No.

dress

ereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

ne of Authorized Agent — Signature — Receipt Date: 080593

PASS CODE B12567

6

BFI260-72

BE 009299

Waste Systems™
WNING-FERRIS INDUSTRIES

No. 729765

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

erator Name Benteler IND

Generating Location

ress 9000 E Michigan Ave

Address Same

Galesburg MI 49053

ne No. 616-6654261

Phone No.

Waste Code MI 576 940707 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
NON HAZARDOUS Soils	18	Y	01	T

Type: D - Drum, C - Carton, B - Bag, T - Truck, P - Pounds, Y - Yards, O - Other

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

erator Authorized Agent Name — Signature — Shipment Date 080593

TRANSPORTER

ck No. 78

Phone No. 616-375-9595

nsporter Name TERRA

Driver Name (Print) BRIAN WEAVER

dress 5100 W Mich Ave

Vehicle License No./State

KAl MI

Vehicle Certification

reby certify that the above named material was picked up he generator site listed above.

r Signature — Shipment Date 080593

I hereby certify that the above named material was delivered without incident to the destination listed below.

Driver Signature — Delivery Date 080593

DESTINATION

e Name C&C landfill

C & C LANDFILL
14800 P. DRIVE NORTH
MARSHALL, MI 49068
(616) 781-9742

Phone No.

dress

reby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

e of Authorized Agent — Signature — Receipt Date 080593

PASS CODE B19496

6

BE 009300

BFI260-7

Waste Systems™
/NING-FERRIS INDUSTRIES

No. 729781

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

rator Name Bentelec Ind.
ess 9000 E. Michigan

Generating Location
Address Same

e No. 616-6654261
Phone No. -

Vaste Code MI 576 940707 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
NON HAZARDOUS SOILS	18	Y	01	T

Type
D - Drum
C - Carton
B - Bag
T - Truck
P - Pounds
Y - Yards
O - Other

hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

rator Authorized Agent Name — Signature: Joseph Lee Schmidt — Shipment Date: 080693

TRANSPORTER

k No. 78
Phone No. 616-375-9595

sporter Name TERRA ENVIRONMENTAL
Driver Name (Print) Thomas Burkett

ress 5100 W Michigan Ave
Kalamazoo MI 49007
Vehicle License No./State
Vehicle Certification

eby certify that the above named material was picked up e generator site listed above.

Thomas Burkett — Signature — Shipment Date: 080693

I hereby certify that the above named material was delivered without incident to the destination listed below.

Thomas Burkett — Driver Signature — Delivery Date: 080693

DESTINATION

Name
ress

[illegible] LANDFILL
14800 P. DRIVE NORTH
MARSHALL, MI 49068
(616) 781-9742

Phone No. -

reby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

e of Authorized Agent — Signature — Receipt Date: 080693

PASS CODE RD650

BFI260-7

BE 009301

Waste Systems™
/NING-FERRIS INDUSTRIES

No. 729779

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

rator Name Bentelec

Generating Location

ess 9000 E. Michigan Ave
Galesburg MI 49053

Address Same

e No. 616-6654261

Phone No. ___-___

Vaste Code MI 576 940707 206865-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
NON HAZARDOUS SOIL	18	Y	01	T

Type: D - Drum, C - Carton, B - Bag, T - Truck, P - Pounds, Y - Yards, O - Other

hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable tate law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, lassified and packaged, and is in proper condition for transportation according to applicable regulations.

ator Authorized Agent Name _____ Signature [signature] Shipment Date 080693

TRANSPORTER

k No. 78

Phone No.

sporter Name TERRA ENVIRONMENTAL

Driver Name (Print) Thomas Burkett

ress 5100 W Michigan Ave
Kalamazoo MI 49007

Vehicle License No./State

Vehicle Certification

eby certify that the above named material was picked up e generator site listed above.

Thomas Burkett 080693
Signature Shipment Date

I hereby certify that the above named material was delivered without incident to the destination listed below.

Thomas Burkett 080693
Driver Signature Delivery Date

DESTINATION

Name C&C Landfill — & G LANDFILL 14800 P. DRIVE NORTH MARSHALL, MI 49068 (616) 781-9742

Phone No. ___-___

ress

eby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

of Authorized Agent [signature] Signature [signature] 080693
Receipt Date

PASS CODE B10657

BFI260-720

BE 009302

Waste Systems™
/NING-FERRIS INDUSTRIES

No. 729776

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

rator Name BenTeler Inc
ess 9000 E. Michigan Ave

Generating Location
Address Same

e No. 616-6654261

Phone No.

Waste Code MI 576 940707 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
NON-HAZARDOUS SOIL	18	Y	01	T

Type
D - Drum
C - Carton
B - Bag
T - Truck
P - Pounds
Y - Yards
O - Other

hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable tate law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, lassified and packaged, and is in proper condition for transportation according to applicable regulations.

ator Authorized Agent Name — Signature: Joseph W. Schmidt — Shipment Date: 080693

TRANSPORTER

k No. 78

Phone No.

sporter Name TERRH

Driver Name (Print) Thomas Burkett

ess K-200 IN.

Vehicle License No./State

Vehicle Certification

eby certify that the above named material was picked up e generator site listed above.

Signature: Thomas Burkett — Shipment Date: 080693

I hereby certify that the above named material was delivered without incident to the destination listed below.

Driver Signature: Tom Burkett — Delivery Date: 080395

DESTINATION

Name C&C Landfill

C & C LANDFILL
14800 P. DRIVE NORTH
MARSHALL, MI 49068
(616) 781-9742

Phone No.

ess

eby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

of Authorized Agent — Signature — Receipt Date: 080693

PASS CODE P12623

BFI260-720

BE 009303

Waste Systems™
OWNING-FERRIS INDUSTRIES

No. 729773

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

nerator Name Benteler IND
Generating Location
dress 9000 E Mich Ave
Address Same
Galesburg MI 49053
one No. 616-6655461
Phone No. -

Waste Code MI 576 940707 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
NON HAZARDOUS SOILS	18	4	01	T

Type: D - Drum, C - Carton, B - Bag, T - Truck, P - Pounds, Y - Yards, O - Other

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

erator Authorized Agent Name — Signature: Joseph Lee Schmidt — Shipment Date: 080493

TRANSPORTER

ck No. 78
Phone No.
nsporter Name Terra
Driver Name (Print) Thomas Burkett
dress 5100 W Mich Ave
Vehicle License No./State
Kalamazoo MI 49007
Vehicle Certification

ereby certify that the above named material was picked up he generator site listed above.

Thomas Burkett — er Signature — Shipment Date: 080693

I hereby certify that the above named material was delivered without incident to the destination listed below.

Thomas Burkett — Driver Signature — Delivery Date: 080693

DESTINATION

e Name C & C LANDFILL 14800 P. DRIVE NORTH MARSHALL, MI 49068 (616) 781-9742
Phone No. -
dress

ereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

ne of Authorized Agent — Signature — Receipt Date: 080693

PASS CODE B12596

86 BFI260-7

BE 009304

TRANSPORTER RETAIN

Waste Systems™
WNING-FERRIS INDUSTRIES

No. 729775

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

erator Name Benteler IND
ress 9000 E mkh AVE
Galesburg MI 49053
ne No. 616-6655461

Generating Location
Address same
Phone No.

Waste Code MI 576 940707 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
NON HAZARDOUS SOILS	1-1-15	Y	01	T

Type: D - Drum, C - Carton, B - Bag, T - Truck, P - Pounds, Y - Yards, O - Other

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

rator Authorized Agent Name — Signature — Shipment Date 080593

TRANSPORTER

k No. 79
sporter Name TERRA
ress 5100 W mkh AVE
KAL MI 49007

Phone No. 616 375 9595
Driver Name (Print) [illegible]
Vehicle License No./State
Vehicle Certification

eby certify that the above named material was picked up e generator site listed above.

r Signature — Shipment Date 080593

I hereby certify that the above named material was delivered without incident to the destination listed below.

Driver Signature — Delivery Date 080693

DESTINATION

Name C&C landfill
ress

C & C LANDFILL
14800 P. DRIVE NORTH
MARSHALL, MI 49068
(616) 781-9742

Phone No.

reby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

e of Authorized Agent — Signature — Receipt Date 080693

PASS CODE P12612

BFI260-720

BE 009305

TRANSPORTER RETAIN

Waste Systems™
WNING-FERRIS INDUSTRIES

No. 729778

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

erator Name Bertler IND
ess 9000 E Mich Ave
Galesburg MI 49053
e No. 616-6654267

Generating Location
Address SAME
Phone No.

Waste Code MI 576 940707 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
NON HAZARDOUS SOILS	0-18	Y	01	T

Type: D - Drum, C - Carton, B - Bag, T - Truck, P - Pounds, Y - Yards, O - Other

hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable tate law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, lassified and packaged, and is in proper condition for transportation according to applicable regulations.

ator Authorized Agent Name — Signature — Shipment Date 080693

TRANSPORTER

k No. 79
sporter Name TERRA
ess 5100 W Michigan Ave
Kalamazoo MI 49007

Phone No.
Driver Name (Print)
Vehicle License No./State
Vehicle Certification

eby certify that the above named material was picked up e generator site listed above.

Signature — Shipment Date 080693

I hereby certify that the above named material was delivered without incident to the destination listed below.

Driver Signature — Delivery Date 080693

DESTINATION

Name C&C Landfill
ress

C & C LANDFILL
14800 P. DRIVE NORTH
MARSHALL, MI 49068
(616) 781-9742

eby certify that the above named material was accepted and to the best of my knowledge the foregoing is true and accurate.

of Authorized Agent — Signature — Receipt Date 080693

PASS CODE B12643

BFI260-720

BE 009306

Waste Systems™
WNING-FERRIS INDUSTRIES

No. 729777

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

erator Name: Benteler IND
Generating Location:
ress: 9000 E Mich AVE
Address: Same
GALESBURG MI 49053
ne No.: 616-6655421
Phone No.:

Waste Code: MI 576 940707 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
NON HAZARDOUS SOIL	25	Y	01	T

Type: D - Drum; C - Carton; B - Bag; T - Truck; P - Pounds; Y - Yards; O - Other

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

erator Authorized Agent Name: Joseph L. Schmidt — Signature — Shipment Date: 080693

TRANSPORTER

ck No.: 71-32
Phone No.: 616-375-9595
nsporter Name: TERRA
Driver Name (Print): Rod Brown
dress: 5100 W Mich AVE
Vehicle License No./State:
KAL MI 49007
Vehicle Certification:

reby certify that the above named material was picked up he generator site listed above.

er Signature: Rod Brown — Shipment Date: 080693

I hereby certify that the above named material was delivered without incident to the destination listed below.

Driver Signature: Rod Brown — Delivery Date: 080693

DESTINATION

e Name: C&C LANDFILL
Phone No.:
dress:

C&C LANDFILL
14300 P. DRIVE NORTH
MARSHALL, MI 49068
(616) 781-9342

ereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

ne of Authorized Agent: Joyce — Signature: Joyce — Receipt Date: 080693

PASS CODE: P12677

6 BFI260-720

BE 009307

Waste Systems™
WNING-FERRIS INDUSTRIES

No. 729774

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

erator Name Bentelen IND
Generating Location
ress 9000 E Mich Ave
Address Same
Galesburg MI 49053
ne No. 616-6655461
Phone No.
Waste Code MI 576 940707 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
NON HAZARDOUS soils	---25	Y	01	T

Type: D - Drum, C - Carton, B - Bag, T- Truck, P - Pounds, Y - Yards, O - Other

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

rator Authorized Agent Name — Signature: Joseph Lee Schmidt — Shipment Date: 080593

TRANSPORTER

k No. 76-32
Phone No. 616-375-9595
nsporter Name TERRA
Driver Name (Print) Rod Brown
ress 5100 W Mich Ave
Vehicle License No./State
Kalamazoo MI 49007
Vehicle Certification

reby certify that the above named material was picked up he generator site listed above.

Rod Brown — r Signature — Shipment Date: 080593

I hereby certify that the above named material was delivered without incident to the destination listed below.

Rod Brown — Driver Signature — Delivery Date: 080593

DESTINATION

Name C&C Landfill
Phone No.
C LANDFILL
14800 P. DRIVE NORTH
MARSHALL, MI 49068
(616) 781-9742
ress

reby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

Jay W. — e of Authorized Agent — Signature: Jay W. — Receipt Date: 080673

PASS CODE B12603

BFI260-72

BE 009308

Waste Systems™
WNING-FERRIS INDUSTRIES

No. 729780

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

erator Name Benteler IND
Generating Location
ess 9000 E Michigan Ave
Address SAME
Galesburg
ne No. 616-6654261
Phone No.
Waste Code MI 576 940707 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
NON HAZARDOUS Soils	--25	Y	01	T

Type: D - Drum, C - Carton, B - Bag, T - Truck, P - Pounds, Y - Yards, O - Other

hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

ator Authorized Agent Name — Signature: Joseph Lee Schmidt — Shipment Date: 080693

TRANSPORTER

k No. 76
Phone No
sporter Name TERRA
Driver Name (Print) Rod Brown
ress 5100 W Mich Ave
Vehicle License No./State
KALAMAZOO MI
Vehicle Certification

eby certify that the above named material was picked up e generator site listed above.

I hereby certify that the above named material was delivered without incident to the destination listed below.

Signature: Rod Brown — Shipment Date: 080693
Driver Signature: Rod Brown — Delivery Date: 080693

DESTINATION

Name C&C Landfill
Phone No.
ress
C&C LANDFILL
14800 P. DRIVE NORTH
MARSHALL, MI 49068
(616) 781-9742

eby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

e of Authorized Agent — Signature — Receipt Date: 080693

PASS CODE B12674

BFI260-720

BE 009309

Waste Systems™
BROWNING-FERRIS INDUSTRIES

No. 729748

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

Generator Name: Bentelar Ind.
Address: 9000 E. Michigan Ave.
Galesburg, MI 49053
Phone No. 616-6654261

Generating Location: SAME
Address:
Phone No.

BFI Waste Code: MI 576 940707 206866-004

Description of Waste	Quantity	Units	Containers No.	Containers Type
Non-Hazardous Soil	15	Y	01	T

Type: D - Drum, C - Carton, B - Bag, T - Truck, P - Pounds, Y - Yards, O - Other

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

Generator Authorized Agent Name: Joseph L. Schmidt
Signature
Shipment Date: 081493

TRANSPORTER

Truck No. 85-71
Transporter Name: Terra Environmental
Address: 5100 W. Michigan Ave
Kalamazoo, MI 49007

Phone No.
Driver Name (Print): Don Salsbury
Vehicle License No./State: RH 7205
Vehicle Certification

I hereby certify that the above named material was picked up at the generator site listed above.

Driver Signature: Don Salsbury
Shipment Date: 081493

I hereby certify that the above named material was delivered without incident to the destination listed below.

Driver Signature: Don Salsbury
Delivery Date: 081493

DESTINATION

Site Name: [illegible] DRIVE NORTH
MARSHALL, MI 49068
(616) 781-9742
Phone No.
Address

I hereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate

Name of Authorized Agent: [illegible]
Signature: [illegible]
Receipt Date: 081493

PASS CODE: R15307

0/86

BFI260

BE 009310

NON-HAZARDOUS SPECIAL WASTE MANIFEST

10528

Section I. GENERATOR (Generator completes all of Section I)

Generator Name: Bentelen Ind.

Address: 9000 E. Michigan Ave
Calhoun, MI 49043

Phone No.: 616-665-4261

b. Generating Location:

d. Address: Same

f. Phone No.:

If owner of the generating facility differs from the generator, provide:

Owner's Name:

h. Owner's Phone No.:

BFI WASTE CODE MI - 576 - 940707 - 206566 - 004

Description of Waste Non-Hazardous Soil

k. Quantity: 2 Units: Y TYPE: TR

TYPE
DM - METAL DRUM
DP - PLASTIC DRUM
DF - FIBRE DRUM
B - BAG
TR - TRUCK
O - OTHER

UNITS
P - POUNDS
Y - YARDS
T - TONS
Y3 - CUBIC YARDS
O - OTHER

GENERATOR'S CERTIFICATION: I hereby certify that the above named material is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations: AND, if the waste is a treatment residue of a previously restricted hazardous waste subject to the Land Disposal Restrictions, I certify and warrant that the waste has been treated in accordance with the requirements of 40 CFR Part 268 and is no longer a hazardous waste as defined by 40 CFR Part 261.

Generator Authorized Agent Name: [signature] Signature: [signature] Shipment Date: 091093

Section II TRANSPORTER

TRANSPORTER I

Name: Terra Environmental

Address: 5100 W. Michigan Ave.
Kalamazoo, MI 49007

Driver Name/Title: D. O. Sherwood
PRINT/TYPE

Phone No.: 616-375-8595 e. Truck No.: 85

Vehicle License No./State: RH7203

Acknowledgement of Receipt of Materials.

Driver Signature: [signature] Shipment Date: 091093

TRANSPORTER II

h. Name:

i. Address:

j. Driver Name/Title:
PRINT/TYPE

k. Phone No.: l. Truck No.:

m. Vehicle License No./State:

Acknowledgement of Receipt of Materials.

n. Driver Signature: Shipment Date:

Section III DESTINATION

Site Name:

c. Phone No.:

Physical Address:

d. Mailing Address:

LANDFILL
14800 P. DRIVE NORTH
MARSHALL, MI 49068
(616) 781-9742

TICKET No.: 815 (66)

I hereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

Name of Authorized Agent: [signature] Signature: [signature] Receipt Date: 091093

TRANSPORTER RETAIN

BE 009311

NON-HAZARDOUS SPECIAL WASTE MANIFEST

10527

Section I. GENERATOR (Generator completes all of Section I)

a. Generator Name: Bentaler Ind.

b. Generating Location:

c. Address: 9000 E. Michigan Ave.
Galesburg, MI 49033

d. Address: SAME

e. Phone No.: 616-665-4211

f. Phone No.:

If owner of the generating facility differs from the generator, provide:

g. Owner's Name:

h. Owner's Phone No.:

i. BFI WASTE CODE MI - 576 - 946707 - 201866 - 004

j. Description of Waste Non Hazardous Soils

k. Quantity: - - - 20 | Units: Y | TYPE: TR

TYPE
DM - METAL DRUM
DP - PLASTIC DRUM
DF - FIBRE DRUM
B - BAG
TR - TRUCK
O - OTHER

UNITS
P - POUNDS
Y - YARDS
T - TONS
Y3 - CUBIC YARDS
O - OTHER

GENERATOR'S CERTIFICATION: I hereby certify that the above named material is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations: AND, if the waste is a treatment residue of a previously restricted hazardous waste subject to the Land Disposal Restrictions, I certify and warrant that the waste has been treated in accordance with the requirements of 40 CFR Part 268 and is no longer a hazardous waste as defined by 40 CFR Part 261.

Bentaler Ind. | [signature] | 091093

Generator Authorized Agent Name | Signature | Shipment Date

Section II. TRANSPORTER

TRANSPORTER I

a. Name: Terra Environmental

b. Address: 5100 W. Michigan Ave.
Kalamazoo, MI 49007

c. Driver Name/Title: Don Hass
PRINT/TYPE

d. Phone No.: 616-375-9555 e. Truck No.: 77-39

Vehicle License No./State: RH 0639

Acknowledgement of Receipt of Materials.

Don Hass | 091093

Driver Signature | Shipment Date

TRANSPORTER II

h. Name:

i. Address:

j. Driver Name/Title:
PRINT/TYPE

k. Phone No.: l. Truck No.:

m. Vehicle License No./State:

Acknowledgement of Receipt of Materials.

n.

Driver Signature | Shipment Date

Section III. DESTINATION

a. Site Name: C + C Landfill

b. Physical Address:

c. Phone No.: 14800 P. DRIVE NORTH MARSHALL, MI 49068 (616) 781-9742

d. Mailing Address:

e. TICKET No.: R15661

I hereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

[signature] | [signature] | 091093

Name of Authorized Agent | Signature | Receipt Date

BE 009312

TRANSPORTER RETAIN

Document 11

United States Court of Appeals,
Sixth Circuit.

KALAMAZOO RIVER STUDY GROUP,
Plaintiff-Appellant,
v.
ROCKWELL INTERNATIONAL CORPORATION; Eaton Corporation; Wells Aluminum
Corporation; Hercules, Inc.; Menasha Corporation; The Upjohn Company; Rock-Tenn Company, Mill Division, Inc.; and Benteler Industries, Inc., Defendants-Appellees.

No. 97-1964.

Argued Sept. 25, 1998.
Decided March 26, 1999.

Association of paper companies brought action against automotive parts manufacturer and other companies under Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and Michigan Natural Resources and Environmental Protection Act (NREPA), seeking contribution for response costs incurred in responding to releases of polychlorinated biphenyls (PCBs) into river. The United States District Court for the Western District of Michigan, Robert Holmes Bell, J., 3 F.Supp.2d 815, granted summary judgment for manufacturer, and association appealed. The Court of Appeals, Siler, Circuit Judge, held that association failed to establish requisite causal link between release of PCBs by manufacturer in ditch and response costs incurred in cleaning up river.

Affirmed.

West Headnotes

[1] Federal Courts ⚷802
170Bk802 Most Cited Cases

On appeal from grant of summary judgment, Court of Appeals must review the evidence in the light most favorable to the nonmoving party; credibility determinations, the weighing of the evidence, and the drawing of legitimate inferences from the facts are jury functions, not those of judge, and the evidence of the nonmovant is to be believed, and all justifiable inferences are to be drawn in his favor. Fed.Rules Civ.Proc.Rule 56, 28 U.S.C.A.

[2] Federal Civil Procedure ⚷2539
170Ak2539 Most Cited Cases

Nonmoving party must present more than a mere scintilla of evidence in support of her position to withstand motion for summary judgment; the nonmoving party must present evidence on which the jury could reasonably find for that party. Fed.Rules Civ.Proc.Rule 56, 28 U.S.C.A.

[3] Environmental Law ⚷437
149Ek437 Most Cited Cases
(Formerly 199k25.5(5.5) Health and Environment)

Purpose of CERCLA is to facilitate the prompt cleanup of hazardous waste sites by placing the ultimate financial responsibility for cleanup on those responsible for hazardous wastes. Comprehensive Environmental Response, Compensation, and Liability Act of 1980, § 101 et seq., 42 U.S.C.A. § 9601 et seq.

[4] Environmental Law ⚷438
149Ek438 Most Cited Cases
(Formerly 199k25.5(5.5) Health and Environment)

In order to establish a prima facie case of CERCLA liability in response to cost recovery action, plaintiff must establish that: (1) there was a release or threatened release of a hazardous substance; (2) the site of the release or threatened release is a facility as that term is defined the statute; (3) the release or threatened release has caused plaintiff to incur response costs; and (4) defendant is among a statutorily-defined group of persons, which includes the owner or operator of an owner or operator of a facility. Comprehensive Environmental Response, Compensation, and Liability Act of 1980, § 107(a), 42 U.S.C.A. § 9607(a).

[5] Environmental Law ⚷445(1)
149Ek445(1) Most Cited Cases
(Formerly 199k25.5(5.5) Health and Environment)

In a "two-site" case, where hazardous substances are released at one site and allegedly travel to a

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second site, in order to make out a prima facie case of liability in response cost recovery action under CERCLA, the plaintiff must establish a causal connection between the defendant's release of hazardous substances and the plaintiff's response costs incurred in cleaning them up. Comprehensive Environmental Response, Compensation, and Liability Act of 1980, § 101 et seq., 42 U.S.C.A. § 9601 et seq.

[6] Environmental Law ⚷445(1)
149Ek445(1) Most Cited Cases
(Formerly 199k25.5(5.5) Health and Environment)

Association of paper companies failed to establish requisite causal link between release of polychlorinated biphenyls (PCBs) by automotive parts manufacturer in ditch on manufacturer's property and response costs incurred in cleaning up contamination at river, so as to impose liability on manufacturer under CERCLA or Michigan Natural Resources and Environmental Protection Act (NREPA), absent sufficient evidence that any PCBs from manufacturer's property could have migrated down the ditch to lake and then river, notwithstanding expert testimony as to such migration. Comprehensive Environmental Response, Compensation, and Liability Act of 1980, § 101 et seq., 42 U.S.C.A. § 9601 et seq.; M.C.L.A. § 324.20101 et seq.

***1066** Alan C. Bennett (briefed), Law, Weathers & Richardson, Grand Rapids, MI; Jerome T. Wolf (argued), James L. Moeller (briefed), J. Bradley Leitch (briefed), Amy E. Bauman (briefed), Sonnenschein Nath & Rosenthal, Kansas City, MO, for Kalamazoo River Study Group.

Joseph C. Basta, Dykema Gossett, Detroit, MI, for Rockwell International Corporation and Eaton Corporation.

Dustin P. Ordway, Dickinson, Wright, Moon, VanDusen & Freeman, Grand Rapids, MI, for Menasha Corporation.

Daniel P. Perk (argued), Joseph M. Ammar (briefed), Miller, Johnson, Snell & Cummiskey, Grand Rapids, MI, for Benteler Industries, Inc.

Before: MERRITT, SILER, and GILMAN, Circuit Judges.

SILER, Circuit Judge.

The Kalamazoo River Study Group ("KRSG"), the plaintiff, appeals the district court's grant of summary judgment in favor of Benteler Industries, Inc. ("Benteler"), the defendant, in this response cost recovery action brought pursuant to the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. § 9601 *et seq.,* and the Michigan Natural Resources and Environmental Protection Act ("NREPA"), M.C.L.A. § 324.20101, *et seq.*

BACKGROUND

In 1990, after nearly 20 years of investigating polychorinated biphenyl (PCB) contamination in the Kalamazoo River, the Michigan Department of Natural Resources ("MDNR") [FN1] determined that a three-mile portion of Portage Creek from Cork Street to the Kalamazoo River, and a 35-mile portion of the Kalamazoo River from this confluence downstream to the Allegan City Dam (the "Site") were heavily concentrated with PCBs. Consequently, the MDNR listed the Site as an environmental contamination site under the Michigan Environmental Response Act, M.C.L.A §§ 299.601 *et seq.* (repealed and replaced by NREPA, M.C.L.A. § 324.20101, *et. seq.*) and the United States Environmental Protection Agency ("EPA") listed the Site on the National Priority List ("NPL") as a Superfund Site pursuant to CERCLA § 105, 42 U.S.C. § 9605. [FN2] The MDNR and the EPA authorized the MDNR to conduct an Endangerment/Risk Assessment (E/RA) for the Site.

FN1. The MDNR is now known as the Michigan Department of Environmental Quality ("MDEQ").

FN2. The Site is known as the "Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund (National Priorities List) Site."

Following the E/RA, MDNR identified three paper mills--HM Holdings, Inc., ***1067** Georgia-Pacific Corporation and Simpson Plainwell Paper Company--with facilities located on or near the

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Kalamazoo River as potentially responsible parties ("PRPs") for the PCB contamination. All three companies entered into an Administrative Order by Consent ("AOC") which required them to perform a Remedial Investigation and Feasibility Study ("RI/FS") at the Site. Subsequently, James River Company, which voluntarily agreed to pay a portion of the RI/FS costs, joined with the other three companies to form an unincorporated association called the Kalamazoo River Study Group ("KRSG").

Benteler is engaged in the manufacture of automotive parts. It purchased the manufacturing facility at issue in this case in 1989. [FN3] The facility is located about 3200 feet north of the far southeastern boundary of Morrow Lake, which is an impoundment of the Kalamazoo River located upstream from the Site. Located on Benteler's property is a 3200-foot drainage ditch that runs north to south toward Morrow Lake. At the north end of the ditch next to the Benteler parking lot is a headwall with a drain that discharges storm water run-off and floor drainage from the plant into the ditch. [FN4] This ditch is at the center of the controversy.

FN3. General Signal Corporation and ICM Acquisitions had previously owned and operated the facility.

FN4. The ditch was built in the 1950s. Approximately 430 feet south of the headwall there is an oil skimmer and a 4-foot concrete dam that was built in 1971. At the 2700-foot point there is an earthen mound barrier used by farmers for crossing the ditch. Beyond the barrier, the ditch loses its distinctive features. The land surface slopes downward toward Morrow Lake and the ditch flattens out and blends into the wet wooded area along the shore of the lake.

When Benteler purchased the facility, it contained transformers and capacitors that contained PCBs. In 1989, while Benteler was preparing the facility for use, one of the transformers was damaged and leaked PCBs. In the process of responding to this leak, Benteler discovered PCBs throughout the plant, in the drain lines leading toward the ditch, and in the ditch itself near the headwall. In response, Benteler, with the assistance of environmental consultants, undertook testing and investigating to determine the extent of PCB contamination in the ditch.

In 1993, pursuant to a Remedial Action Work Plan prepared by the environmental consultants and approved by MDNR, Benteler undertook remedial actions to remove PCBs from the ditch, which included the excavation of approximately 800 cubic yards of soil from the first 600 feet of the ditch and the remediation of the storm sewer lines that emptied into the ditch. All remediation activities were completed by October 11, 1993. Further verification samples were taken in 1994 and 1996. On October 16, 1996, the MDNR issued Benteler a clean closure letter.

In 1995, **KRSG** filed the underlying action against eight corporations, including **Benteler,** with facilities on or near the Kalamazoo River, alleging that they contributed to the **PCB** contamination at the Site and should be responsible for some of the cleanup costs. KRSG alleged that Benteler's facility discharged oil-containing wastewater, storm water and cooling water from its plant, through the plant's drainage pipes and into this drainage ditch. The discharged water, according to KRSG, then transported PCB- contaminated soil and sediment from the ditch and released it to Morrow Lake, then to the Kalamazoo River and downstream to the Site. **Benteler** moved for summary judgment, arguing that **KRSG** could not prove that **Benteler** had contributed **PCBs** to the Site. In its response, **KRSG** included the affidavit of Dr. Mark Brown who concluded that **Benteler** had in fact discharged water and **PCBs** to the Kalamazoo River and thus downstream to the Site. The district court granted summary judgment in favor of Benteler, finding that Dr. Brown's conclusion rested on an unreliable foundation.

***1068 STANDARD OF REVIEW**

This court reviews the district court's grant of summary judgment *de novo. Morris v. Crete Carrier Corp.,* 105 F.3d 279, 280 (6th Cir.1997). Summary judgment is appropriate only when there is no genuine issue of material fact and the moving party is entitled to judgment as a matter of law.

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Celotex Corp. v. Catrett, 477 U.S. 317, 322-23, 106 S.Ct. 2548, 91 L.Ed.2d 265 (1986). The initial burden is on the moving party to demonstrate that an essential element of the non-moving party's case is lacking. *Id.* The burden then shifts to the non-moving party to come forward with specific facts, supported by evidence in the record, upon which a reasonable jury could return a verdict for the non-moving party. *Anderson v. Liberty Lobby, Inc.,* 477 U.S. 242, 248, 106 S.Ct. 2505, 91 L.Ed.2d 202 (1986).

[1][2] This court must review the evidence in the light most favorable to the non-moving party. *Matsushita Elec. Indus. Co., Ltd. v. Zenith Radio Corp.,* 475 U.S. 574, 587, 106 S.Ct. 1348, 89 L.Ed.2d 538 (1986). In addition, "[c]redibility determinations, the weighing of the evidence, and the drawing of legitimate inferences from the facts are jury functions, not those of judge. The evidence of the non-movant is to be believed, and all justifiable inferences are to be drawn in his favor." *Schaffer v. A.O. Smith Harvestore Products, Inc.,* 74 F.3d 722, 727 (6th Cir.1996) (quoting *Anderson,* 477 U.S. at 255, 106 S.Ct. 2505). Nevertheless, the non-moving party must present more than a mere scintilla of evidence in support of her position; the non-moving party must present evidence on which the jury could reasonably find for the plaintiff. *Hartsel v. Keys,* 87 F.3d 795, 799 (6th Cir.1996) (citing *Anderson,* 477 U.S. at 252, 106 S.Ct. 2505).

DISCUSSION

[3][4][5] The purpose of CERCLA is "to facilitate the prompt cleanup of hazardous waste sites by placing the ultimate financial responsibility for cleanup on those responsible for hazardous wastes." *United States v. R.W. Meyer,* 889 F.2d 1497, 1500 (6th Cir.1989). In order to establish a prima facie case of CERCLA liability against Benteler, KRSG must establish that: (1) there was a release or threatened release of a hazardous substance; (2) the site of the release or threatened release is a "facility" as that term is defined the statute; (3) the release or threatened release has caused KRSG to incur response costs; and (4) Benteler is among a statutorily- defined group of persons, which includes the owner or operator of an owner or operator of a facility. *See* CERCLA § 107, 42 U.S.C. § 9607(a). Benteler only challenges KRSG's ability to establish the third element, causation. In a "two-site" case such as this, where hazardous substances are released at one site and allegedly travel to a second site, in order to make out a prima facie case, the plaintiff must establish a causal connection between the defendant's release of hazardous substances and the plaintiff's response costs incurred in cleaning them up. *Thomas v. FAG Bearings Corp.,* 846 F.Supp. 1382, 1387 (W.D.Mo.1994).

[6] Benteler does not deny that there has been PCB contamination in its facility and in the ditch during its ownership of the facility; however, Benteler contends that the conditions of the ditch are such that PCBs from its facility have not and could not have migrated all the way down the ditch to Morrow Lake and into the Kalamazoo River during its ownership of the facility. Benteler has offered a variety of evidence in support of this position.

Benteler's Evidence

Benteler has presented evidence that the PCBs in the ditch were confined to the northern part of the ditch near the headwall. In conjunction with the Remedial Action Work Plan prepared by Benteler's environmental consultants in 1993, the MDNR only required remediation activities ***1069** in the ditch to a distance of approximately 600 feet from the headwall. MDNR did not require Benteler to remediate the remaining 2600 feet of the ditch because there were either no PCBs detected or no PCBs detected in excess of Michigan's most stringent clean-up criteria. The soil studies from 1989, 1990, 1991 and 1993 reveal that the highest concentrations of PCBs were within the first 325 feet of the ditch (ranging from 120 mg/kg to 6.18 mg/kg). Between 325-600 feet, the highest concentration was 6.6 mg/kg. Beyond 600 feet the concentration of PCBs declined significantly. At 625 feet the concentration was 0.9 mg/kg. From 720 to 1250 feet the highest concentration was 0.112 mg/kg. At 1400, 1425, 1450, and 1596 feet, there was no detection of PCBs. [FN5]

FN5. To put the PCB levels in perspective, MDNR's cleanup criteria developed pursuant to Michigan NREPA, M.C.L.A. § 324.20120a, is 21 mg/kg for the industrial category and 2.3 mg/kg for the residential

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category, the most stringent category.

Benteler conducted further testing in August 1996. In addition to samples taken at 500 and 1000 feet, samples were taken further down the ditch at 1500, 2000, 2500 and 2700 feet from the headwall. No PCBs were detected at any of these locations with the exception of the 1500-foot point where there was a PCB reading of 0.43 mg/kg. When the same sample from the 1500-foot point was retested, it produced a non-detectable result consistent with the other samples. On the basis of this information, Benteler claims that the ditch contains no scientifically detectable PCB levels beyond 1500 feet, or stated another way, the remaining 1700 feet of the ditch do not contain any PCBs.

Additionally, Benteler has provided hydrogeological evidence that demonstrates that the ditch could not have acted as a conduit of PCBs to the Kalamazoo River. Due to the depth of the water table and the permeability of soil in this area, Benteler's experts contend that any water discharged to the ditch during Benteler's ownership would have been absorbed within 600-800 feet of the headwall. Specifically, in August 1996, one of Benteler's experts, Lawrence M. Austin, a Certified Professional Geologist (CPG), performed an analysis of whether, during Benteler's ownership of the facility, a sufficient amount of water was or could be discharged to allow PCBs to be carried down the ditch to Morrow Lake. The analysis of streamflow was completed using an approximation of 100-400 gallons per day of non-contact cooling water discharged by Benteler into the ditch since 1989, and a 3.5-inch rainfall event in a 24-hour period over the entire parking lot and building area. Assuming all of the water runs off of the paved and roofed surfaces, this would generate, according to Austin, a 200,000 cubic feet flow in a 24-hour period. The results of Austin's modeling show the stream flow in the ditch declines to a no-flow condition within 600 to 800 feet of the north headwall due to absorption into the soil. [FN6] Consequently, Austin concluded that the ditch lacked sufficient waterflow to carry PCBs the length of the ditch and into Morrow Lake.

FN6. Austin also analyzed the streamflow by doubling the rainfall amount to 7 inches in a 24-hour period (which has not occurred in Michigan in the last 40 years). This led to a no-flow condition within 1300 feet from the headwall, far short of flowing into Morrow Lake.

To further demonstrate that the ditch did not act as a passageway for PCBs, Benteler has presented evidence, through the affidavit of Dr. Lawrence Halfen, that the soil and vegetation in the ditch is not consistent with a continuous flowing stream, an intermittent stream, or even with occasional discharges of sufficient magnitude to carry water down the ditch to Morrow Lake.

On the basis of this evidence, Benteler has adequately demonstrated that any PCBs from its property could not have migrated down the ditch to Lake Morrow and the Kalamazoo River. Therefore, the ***1070** burden shifts to **KRSG** to come forward with sufficient facts that would allow a reasonable jury to find that **Benteler** caused **PCB** contamination at the Site. *Anderson,* 477 U.S. at 248, 106 S.Ct. 2505.

KRSG's evidence

As previously stated, **KRSG** relies, in large part, on the affidavit of its expert, Dr. Brown, who opines that "[a] logical interpretation of the facts leads to the conclusion that the ditch has discharged water and **PCBs** to the Kalamazoo River and, therefore, **PCBs** from **Benteler's** facility are within the borders of the National Priorities List site." His conclusion is based upon four categories of information: a U.S. Geological Society Survey ("USGS") map, soil samples showing detectable PCB levels at 18 feet and 3 feet from Morrow Lake, stormwater and wastewater discharge documents prepared by Benteler's own environmental consultants showing Morrow Lake as the discharge point for the ditch, and challenges to the conclusions of Benteler's experts.

The USGS map shows a solid blue line running from Benteler's facility through the drainage ditch to Morrow Lake. The line, according to Dr. Brown, indicates the ditch has been a continuously running waterway flowing to Morrow Lake. He opined that the USGS map established that water from Benteler's facility flowed to Morrow Lake via

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the ditch. [FN7]

FN7. The map was originally created in 1961 with a photo revised date of 1985. Benteler alleges that it is outdated, that there is no evidence to show that the map accurately reflects the conditions of the waterway since Benteler purchased the property in 1989, and that therefore the map was an unreliable factual basis for Brown's opinion. The district court agreed.

Dr. Brown also relies heavily on analytical test results to support his opinion that PCBs were discharged from Benteler's facility to Morrow Lake. He points to two soil samples taken by KRSG's consultants in 1994 which identified PCBs in the ditch eighteen feet and three feet from the shore of Morrow Lake, with concentration levels of 0.93 mg/kg and 0.43 mg/kg, respectively. Dr. Brown opined that the higher concentration of PCBs detected at 18 feet and the lower PCB concentration at 3 feet, coupled with the detection of PCB levels at 1700 feet from Morrow Lake, [FN8] supported his conclusion that the ditch was the source of PCBs in Morrow Lake. [FN9]

FN8. KRSG did not take any other samples except those at the 3- and 18-feet points. Dr. Brown relies on the soil sample taken by Benteler's consultants in August 1996 to support his assertion that PCBs have been detected at 1700 feet from Morrow Lake, i.e., 1500 feet from the north headwall. But according to Benteler's experts, this 1996 sample was retested and produced a non-detectable result. *See supra,* pgs. 1068-69. Further, it should be noted that the 1500-foot sample relied upon by Dr. Brown had a PCB-concentration of 0.43 mg/kg, a lower concentration than that found at 18 feet, seemingly thwarting Dr. Brown's implication that there should be higher concentrations toward the top of the ditch and lower concentrations at the bottom end of the ditch.

FN9. Benteler's experts, Dr. Halfen and Mr. Austin, contend that these two samples were taken from an area that is subject to periodic flooding from Morrow Lake. In fact, they claim that the entire area 200 feet in from the shore of Morrow Lake is what is known as a "riverine wetland" and has been and continues to be periodically inundated with waters from Morrow Lake. Thus, they concluded that the PCB levels found at 3 feet and 18 feet "more likely" could be attributed to flooding of Morrow Lake. The district court agreed, stating that "because there is no evidence of PCBs between the 1500-foot mark and 18 feet from the lake, a distance of approximately 1700 feet, the lake is *more probably* the source of the PCBs."

Further evidence relied upon by Brown include documents in which Benteler's environmental consultants allegedly acknowledge that wastewater and stormwater runoff from Benteler's facility discharges to the drainage ditch and flows into Morrow Lake. One such document is a 1989 report prepared by an environmental consultant at Benteler's request. That report states that the drainage ditch "ultimately discharges into the Kalamazoo River." Of ***1071** particular importance is a draft 1993 Stormwater Discharge Permit Application ("Application") prepared by an environmental consulting firm at Benteler's request. In the Application, the consultant stated that "Morrow Lake (part of the Kalamazoo River) is the discharge point for the drainage ditch leaving Benteler property." Moreover, the same consulting firm that prepared the 1993 Application stated in a 1995 report that "the drainage ditch during periods of high flow *can* discharge to Morrow Lake...." [FN10]

FN10. In this same 1995 report, the consultant stated that "[t]he drainage ditch beyond 600 feet is normally dry. Only during periods of extremely high flow, the water will flow all the way to Morrow Lake. During normal flow conditions, water in the drainage ditch infiltrates to the groundwater on Benteler Industries property...."

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Brown also emphasizes two letters sent by MDNR to Benteler in the early 1990's. Both letters address discharges from the ditch to the Kalamazoo River. In a September 1990 letter the MDNR demanded that "[a]ll discharges to the ditch, including stormwater, must be ceased. This is due to the possibility that large stormwater flows *could* transport PCBs in the ditch to the Kalamazoo River." [FN11] In a June 1991 letter, MDNR again demanded that Benteler "cease discharges to the ditch due to the *possibility* that contaminants *could* spread to the Kalamazoo River...." KRSG claims that Dr. Brown reasonably relied on these documents, and representations contained therein, to justify his opinion that wastewater discharged to Morrow Lake and the Kalamazoo River via the drainage ditch. [FN12]

FN11. Earlier in this same letter, MDNR states that "[a]lthough Benteler Industries continues to discharge wastewater to the ditch, the discharge does not reach the Kalamazoo River under normal conditions. The potential does exist, although it does not appear likely, that the discharge could reach the river during significant storm events."

FN12. Benteler argues that Brown's reliance on these documents is based on a "gross mischaracterization of the referenced documents." Benteler contends that there is nothing in the referenced documents that "remotely" suggests that discharges into the ditch during Benteler's ownership were ever sufficient to carry water to Morrow Lake or that discharges into the ditch during Benteler's ownership ever carried PCBs to Morrow Lake. The district court agreed. It stated that in regard to the referenced documents "KRSG has overstated the evidence.... In the documents since Benteler purchased the facility, Benteler and MDNR speak only in terms of the possibility or risk of discharges reaching Morrow Lake."

In the course of reaching his conclusion that Benteler was a source of PCB contamination, Dr. Brown challenges the conclusions of Benteler's experts. Of particular importance is his criticism of Austin's streamflow study in which Austin concluded that any water flow in the ditch would be absorbed into the soil within 600-800 feet of the headwall. [FN13] Brown's critique is based on the "Application" discussed above. In addition to the representations contained therein, it also contained an analysis of non-storm water discharges to the ditch from the Benteler facility. The analysis was based on visual inspection at the time the consultant visited the facility. It identified two non-storm water flows:

FN13. *See supra,* pg. 1069.

(1) Non-contact cooling waters from two unit man coolers which discharge approximately *100 gpm (gallons per minute)* during cooling months; and
(2) Non-contact cooling water from an air compressor which discharges approximately *50 gpm* year round.

Using these figures, Dr. Brown calculated that Benteler was discharging non- storm water between 72,000 and 210,000 gallons per day to the ditch. These figures stand in stark contrast to the figures used by Mr. Austin in his streamflow analysis in which he assumed non-storm water discharge between 100 and 400 gallons per day. [FN14] Moreover, in addition to insufficient ***1072** water flow, Brown contends that Austin underestimated the discharge rate, the rainfall, and the drainage area served by the ditch. Brown also contends that Austin improperly assumed that the runoff would be evenly distributed over a 24-hour period and that he failed to consider that the groundwater table will rise during periods of high runoff.

FN14. Austin does not dispute Dr. Brown's calculations regarding the amounts of non-storm discharge; however, he claims that "this volume [of non-storm] discharge has no significant impact on the findings nor on my opinion. Translated into terms consistent with other volumes discussed herein this discharge amounts to 29,000 ft. Adding approximately 1% to the worst case [assumed to be 200,000 ft] in this discussion does not affect the outcome."

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> The district court agreed, stating "[a]lthough Dr. Brown argues that Defendant's estimate of water flow is too low, he has no facts to show that the discharge into the ditch was ever high enough during Benteler's ownership of the facility to achieve sufficient flow to the river."

Finally, Brown challenges Dr. Halfen's opinions on the basis that his soil samples were taken after the remediation of the ditch; he failed to consider the level of non-storm water discharges; he improperly attempted to write off the PCB finding at the 1500-foot mark as anomalous; he ignored the underestimating bias associated with his "composite" samples; and he failed to recognize that the lack of obligate hydrophotic plant species is not inconsistent with the function of the ditch as an intermittent stream and conveyance for stormwater from the facility to Morrow Lake.

KRSG asserts that Dr. Brown's Affidavit has a strong factual basis and creates, at a minimum, a classic "battle of the experts" concerning whether **PCBs** from **Benteler's** property contributed to **PCB** contamination at the Site. Thus, KRSG contends that the district court overstepped its discretionary bounds on a motion for summary judgment by resolving credibility judgements in favor of Benteler's experts. KRSG is correct when it argues that credibility determinations, the weighing of evidence, and the drawing of legitimate inferences from the facts are jury functions, not those of the judge, *see Anderson,* 477 U.S. at 255, 106 S.Ct. 2505; however, contrary to KRSG's contention, the district court did not "choose sides" to resolve a battle of the experts. Instead, the court focused on the factual underpinnings of Dr. Brown's conclusions. Citing *Daubert v. Merrell Dow Pharmaceuticals, Inc.,* 509 U.S. 579, 113 S.Ct. 2786, 125 L.Ed.2d 469 (1993), the court stated that it "may, indeed must, look beyond the conclusions [of the experts] to determine whether the expert testimony rests on a reliable foundation." When the court did so, it found that Dr. Brown's conclusion was based on "speculation, conjecture, and possibility" and that "the inadequate factual basis makes Dr. Brown's affidavit scientifically unreliable." Therefore, the court held:

> KRSG has created, at most, a question of fact as to whether or not there was a *possibility* that water flowed all the way down the ditch to Morrow Lake.... KRSG's entire theory of liability on behalf of Benteler is based upon the assumption that water flowed down the ditch to Morrow Lake. This assumption, however, is based solely on speculation and possibility. The existence of a possibility does not create a material issue of fact for trial because **KRSG** bears the burden of proof to show that **Benteler** did contribute to **PCBs** in the Kalamazoo River, not that it is possible that it might have contributed to the **PCBs.**

We agree. This court has stated that "although judges should respect scientific opinion and recognize their own limited scientific knowledge, nevertheless courts have a duty to inspect the reasoning of qualified scientific experts to determine whether a case should go to the jury." *Turpin v. Merrell Dow Pharmaceuticals, Inc.,* 959 F.2d 1349, 1350 (6th Cir.1992). Taken in the light most favorable to **KRSG,** the scientific evidence that provides the foundation for Dr. Brown's opinion on causation is not sufficient to allow a jury to find that it is more probable than ***1073** not that **Benteler** caused **PCB** contamination at the Site.

In particular, KRSG alleges that there was sufficient waterflow to carry PCBs through the entire 3200-foot length of the ditch and into Morrow Lake. But this allegation is based on nothing more than Dr. Brown's critique of Austin's streamflow analysis, in which he criticized Austin's model for underestimating the number of gallons of non-contact cooling water per day flowing into the ditch. Yet he fails to produce any affirmative evidence that this increased amount of water is sufficient to carry PCBs down the ditch and into the lake. Moreover, assuming KRSG's contention regarding waterflow to be true, one would reasonably expect to find detectable PCB levels throughout the length of the ditch. Yet, it is undisputed that there exists a nearly 1700-foot gap where no PCBs have been detected. KRSG relies on the two samples containing detectable PCB levels at 18 feet and 3 feet from the shore of Morrow Lake without producing any affirmative evidence to explain the absence of PCBs in the preceding 1700 feet of the ditch. In *Turpin,* this court stated that "[t]he analytical gap between the evidence presented and the inferences to be drawn ... is too wide. Under such circumstances, a jury

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should not be asked to speculate on the issue of causation." *Id.* at 1360-61 (emphasis added). Similarly, in this case, the evidence presented leaves a "gap" that is simply too wide to allow a jury to speculate on the ultimate issue of causation. We therefore affirm the district court's grant of summary judgment in favor of Benteler.

AFFIRMED.

171 F.3d 1065, 48 ERC 1289, 29 Envtl. L. Rep. 21,003, 1999 Fed.App. 0115P

END OF DOCUMENT

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Document 12

Submitted to DNR

A Site Investigation

of

Sewage Treatment Plant
Butler Building
Drainage Ditch
Sanitary Sewer Drain Line

Submitted to

BENTELER

Benteler Industries

August, 1991

WW Engineering & Science

MILLER, JOHNSON, SNELL & CUMMISKEY

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September 6, 1991

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**RE: BENTELER INDUSTRIES, INC. -
APPLICATION FOR GROUNDWATER DISCHARGE PERMIT
GALESBURG, MICHIGAN FACILITY**

Dear Mr. Kempainen:

Enclosed is a copy of the Site Investigation Report dated August, 1991, prepared by WW Engineering & Science. As indicated in my letter to you dated July 23, 1991, this report supports the fact that PCB contamination in Benteler's drainage ditch is limited to one small area above an operating oil skimmer. Analytical results contained in the report show that PCB contamination above Act 307 Type B levels are not present below the oil skimmer, and PCBs are non-detectable 1000 feet downstream of the oil skimmer.

WW Engineering will be proposing a work plan to correct those problems revealed by the report, including the small area of PCB contaminated soils in the ditch. We will provide you with a copy of this work plan and a schedule for the completion of work plan activities as soon as possible.

Please call if you have any questions.

Sincerely,

MILLER, JOHNSON, SNELL & CUMMISKEY

By Alan C. Schwartz
Alan C. Schwartz

ACS/kl
Enclosure

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A Site Investigation

of

Sewage Treatment Plant
Butler Building
Drainage Ditch
Sanitary Sewer Drain Line

Submitted to

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August, 1991

WW Engineering & Science

A Site Investigation

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Sewage Treatment Plant
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Submitted to

Benteler Industries
Kalamazoo Plant

Prepared by

WW ENGINEERING & SCIENCE
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August, 1991
PROJECT #21981

Reviewed by:

William W. Beaton

William W. Beaton
Manager, Field Services

for Jeffrey C. Sutherland /WWB

Jeffrey C. Sutherland, Director
Quality Assurance and Health & Safety

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EXECUTIVE SUMMARY

WW Engineering & Science (WWES) conducted a site investigation at Benteler Industries, Kalamazoo Plant, in Galesburg, Michigan. The purpose of the study was to define the extent of contamination if any from Polychlorinated Biphenyls (PCBs) in four areas of the plant site (see Figure 1.0).

The report is organized according to each of the areas investigated: The Sewage Treatment Plant, the Butler Building, Drainage Ditch, and the Sanitary Sewer and Floor Drain Line Network. Each section contains background information, sampling methodology, findings and conclusions. The intent of this investigative report is to discuss WWES' findings and to determine the appropriate conclusions based upon the data.

The investigation was conducted according to WWES Standard Operating Procedures as appropriate for field operations. WWES laboratory quality assurance procedures were followed with regard to laboratory sample protocol, analytical methods and generally accepted practices in the industry. Equipment blanks and trip blanks were analyzed and reported according to the same procedures.

The analytical data have been evaluated through comparison to applicable, appropriate and relevant standards or criteria for cleanup (depending upon affected media). Data from PCB wipe analyses have been compared to criteria established under the Toxic Substances Control Act (TSCA). Data from samples collected from the drainage ditch area have been compared to Type A and/or B criteria established under the administrative rules to Act 307, Michigan's Environmental Response Act. The applicability of Type C criteria may have relevance, and it will be more fully examined in a work plan to be developed later.

1.0 SEWAGE TREATMENT PLANT

1.1 BACKGROUND

The Sewage Treatment Plant is believed to have ceased operation in 1973 when the sanitary sewer network was connected to the municipal sewer service. Up to 1973, all sanitary waste from the plant apparently passed through this treatment system. The system consists of a primary and final clarifier, a trickling filter, boiler room and a digester. Figure 1.1 illustrates the components of the Sewage Treatment Plant, and its location.

1.2 SAMPLE PLAN

The purpose of this investigation was to determine levels, if any, of Polychlorinated Biphenyls (PCBs) in the Sewage Treatment Plant. The sampling plan consists of collecting three sludge/sediment samples in three locations. One sludge sample was collected in the digester and the other two samples were collected in the primary and final clarifier. Figure 1.1 shows the locations of the three samples from the Sewage Treatment Plant. The samples were collected at the base of the unit to obtain the most representative material of the waste in the treatment plant. Appendix A contains site photographs of the actual sampling locations.

A sampling trier/auger was used to collect the sample from the digester. Access was obtained via a metal grate on the top of the digester. Both mechanical and hand augers were used to collect sludge/sediment samples from the primary and final clarifiers. Dedicated equipment was used to perform the sampling. Decontamination was accomplished with the use of a high pressure wash system prior to initiating on-site activities. A separate pair of chemical resistant gloves was used to collect each of the individual samples.

The samples were collected in clean glass containers that were labeled with the appropriate sampling information including the sample location, time, date, sampler's initials and project identification.

A geophysical investigation was performed in the area immediately north of the Sewage Treatment Plant. Ground Penetrating Radar (GPR) was used to determine the number and size of any underground storage tanks which may be present.

GPR operates on the principle that high-frequency electromagnetic waves transmitted into the subsurface by broad band VHF antennas will be partially reflected by a buried object and detected at a receiver antenna. The propagation of this electromagnetic energy through the subsurface is controlled by the electrical properties of the subsurface materials. When the electromagnetic wave encounters a variation in the electrical

properties of the subsurface, a portion of the electromagnetic energy is reflected back up to the surface while the remainder of the energy continues to propagate downwards.

The electrical properties of the surface are dependent on a number of factors, including variations in moisture content, changes in subsurface materials and the amount of clay present in subsurface materials.

The radar signal reflected upward from subsurface interfaces is amplified, transformed to the audio frequency range, and recorded on a paper strip chart. A series of transmitted and reflected pulses or scans is called a record and will reveal the presence of conductive objects.

A GSSI SIR System 3 ground penetrating radar unit which can be operated by one person was used for the GPR survey It is comprised of a semi-portable signal generating unit and a portable transducer/receiver (antenna), which is drawn along the ground in order to both transmit electromagnetic pulses and to receive reflections from subsurface interfaces.

Prior to implementing (GPR), the area was gridded to aid in referencing collected data with site locations. As shown in Figure 1.2, a (0,0) point or origin was established at a fence corner on the northern side of the former sewage treatment plant. The grid was completed by inserting wire flags into the ground, positioned at 5-foot intervals. Grid coordinates represent the distance in feet north and east of the grid origin. All measurements were made by a WWES geophysicist using a 200-foot fiberglass tape. An in-depth discussion pertaining to GPR surveys is contained in Appendix B.

The GPR survey was performed by first calibrating the unit. Calibration included setting the GPR to a range of either 40 or 50 nanoseconds (ns), and setting filters to a band pass between 10 and 50 cycles per scan. Surface, middle and deep gains were adjusted to give optimum response over the entire range for which the instrument was set. Subsequent to system calibration GPR transects of varying lengths were completed along established grid lines, using a 500 megahertz (Mhz) transducer/receiver. Appendix C describes in more detail GPR surveys and the interpretation of the results.

1.3 FINDINGS

Digester

The digester is an enclosed concrete vault varying in height from 15 to 18 feet deep in its deepest point. There is a sludge at the base of the digester approximately eight inches thick. There is very little water in the digester, and it is void of soil or other solid material. The piping into and out of the digester is visible from above through a small opening that is covered by metal grating. The overall integrity of the digester appears good with no apparent cracks or fractures in the structure.

Final Clarifier

Directly north of the digester is the final clarifier which appears to have been connected to the digester via underground piping. The final clarifier is an open top concrete structure adjacent to the digester and boiler room. Sand and gravel soils fill this vault to a depth of 12 to 14 feet. There is a black sludge approximately one foot thick at the base of the final clarifier below the granular fill. The water level is between six and seven feet below grade within the clarifier (ground water is reported to be 13 to 15 below the surface in that area).

Boiler Room

The boiler room is accessible via a door and stairway. There is water within the boiler room starting at a depth about 10 feet below grade. There is no evidence of any sludge or visible contamination in the boiler room.

Primary Clarifier

The primary clarifier is located immediately adjacent to the boiler room, and it is similar in size to the final clarifier. It is a concrete structure that appears to have sand and gravel soils placed within this open top unit. The soils extend to a depth of six to seven feet below grade before encountering a water layer. The soils are wet to a total depth of 13 to 15 feet. There is a one foot layer of sludge on top of a concrete surface at the base of the clarifier below the granular fill at a depth of 15 feet.

Trickling Filter

The trickling filter is located along the east side of the Sewage Treatment Plant. Samples were not collected in this unit based upon the unlikely possibility of collecting a representative sample in this area. The trickling filter is an open-ended unit having an outer concrete structure containing gravel and small stones. There is no visible evidence of staining, sludge or waste material in this location.

Underground Storage Tank

The GPR survey conducted in a grassy area north of the former Sewage Treatment Plant was successful in locating an apparent underground tank. Two GPR records, Figures 1.3 and 1.4, contain reflections of the tank. Figure 1.3 was obtained during the completion of transect 1, which was oriented in a direction perpendicular to the long axis of the tank. Figure 1.4 is the record obtained from transect 2, which was oriented in a direction parallel to the long axis of the tank. As shown in figure 1.2, transect 1 was conducted from west to east along grid line 18N. Transect 2 was conducted from south to north along grid line 12E.

The hyperbolic reflection shown in Figure 1.3 is interpreted to be a reflection of the curved surface of the tank along its short dimension. The strong electrical contrast between the tank and the surrounding soils also produces the multiple reflections of the tank surface. The relatively flat reflection shown in Figure 1.4 is the top of the long dimension of the tank.

The reflections indicate that the tank is approximately 6 to 6.5 feet long and 4 to 4.5 feet wide. Based on a two way travel time of approximately 4.5 nanoseconds per foot for electromagnetic waves traveling through dry, sandy soil, the top of the tank is approximately 1.5 feet below the ground surface.

A portion of the GPR record from Figure 1.4, immediately to the left of the tank reflection contains a curved reflector with a blank zone below it. This may be due to an area of uniform fill with a surface layer of topsoil.

In summary, the Sewage Treatment Plant investigation found a sludge material in the digester, primary and final clarifier. A general inspection of the Plant showed no obvious signs of cracks, decay or demolition. It appears that the Plant is accessible to precipitation and not likely in contact with the ground water.

1.4 DISCUSSION AND CONCLUSIONS

Table 1.1 represents the analytical results of the three samples collected from the digester, and primary and final clarifiers. The samples were a dark sludge and appeared to be representative of the waste material in the Sewage Treatment Plant. The samples appeared to have an oily sheen and a hydrocarbon odor. The analytical results show detectable concentrations of PCB in only one of the three samples. The sample from the digester contained .046 mg/kg (ppm) of Aroclor 1260 PCB while the primary and final clarifier were non-detectable for PCB. The analytical sheets are presented in Appendix C, and the accompanying chain-of-custody sheets appear in Appendix D.

The data suggest that there is minimal PCB contamination in the Sewage Treatment Plant. Because of the insignificant PCB concentration, there is a high probability that the Sewage Treatment Plant would be classified as non-PCB for remediation purposes.

Based upon the higher water level (6-7 feet below grade) inside the clarifiers than the surrounding area (15 feet below grade), precipitation is likely pooling inside both the primary and secondary clarifiers, as opposed to leaking out of the concrete structure to the ground water table below. Also, based upon the minimal amount of water in the digester, it appears that the concrete floor and sidewalls are preventing ground water infiltration into the digester.

As a result of the findings from the GPR survey, we believe that there is one underground storage tank, 6 feet long by 4 feet wide, located at the site Sewage

Treatment Plant. The location of the tank is shown in Figure 1.3. The top of the tank is approximately 1.5 feet below the ground surface and it is oriented in the north-south direction. Due to the "white out" or significant decrease in amplitude of the reflected electromagnetic wave this area needs to be further investigated.

2.0 BUTLER BUILDING

2.1 BACKGROUND

The Butler Building is a small (approximately 10,600 square feet) annex located at the southwest corner of the main building. The building is primarily used as a storage area. Figure 2.1 is a schematic of the Butler Building and the adjacent drain lines.

2.2 SAMPLE PLAN

The purpose of this phase is to determine the extent of PCB contamination on the concrete floor, and the presence of any contaminants in the adjacent drain lines. The sampling consists of seven wipe samples in the areas designated on Figure 2.1, and two grab samples in the sumps on the north and east side of the building.

The wipe samples were collected according to WWES Standard Operating Procedure as shown in Appendix E. The procedure calls for wiping a pre-determined $100cm^2$ area with a hexane-soaked gauze pad. Stainless steel forceps are used to remove the gauze from the container, collect the sample and return it to the container. The forceps are decontaminated with hexane between sample collection. An equipment blank is analyzed at the completion of the sampling activities to determine if any cross-contamination could have occurred during sampling. In addition, a trip blank is analyzed upon submittal of the samples to the laboratory to insure that cross-contamination did not occur between the samples during the transfer from the field to the laboratory.

The sample plan directed that a sediment sample be collected from each of the two sumps. The two grab samples were collected in clean glass containers that are labeled with appropriate sampling information including the sample location, time, date, sampler's initials and project identification.

2.3 FINDINGS

The Butler Building contained numerous pieces of equipment and surplus articles that were not being used for production. The area was used for storage only, as the production areas are located in the main plant immediately to the north. The surface of the floor is concrete, and it appears to be slightly coated with dirt and oil. The visual appearance of the concrete is good with no apparent cracks or holes observed during the field investigation. A review of the area resulted in identifying only one covered manhole in the north central portion of the Butler Building that appeared to be connected to the sanitary sewer/floor drains of the main plant to the north. However, there are two sumps located immediately adjacent to the building.

The outside sump on the southeast corner of the Butler Building contained a combination of liquid and sediments. The inside sump in the northwest corner of the building was sediment-free. The liquids in both sumps were dark in color, but had the viscosity more similar to water than oil. The sediments in the southeast corner were also dark in color with no unusual odor or sheen in the sample. The sediments were collected from the base of the southeast sump as directed in the sample plan.

2.4 DISCUSSION AND CONCLUSIONS

The analytical results of the sampling within the Butler Building indicated detectable levels of PCB in various locations on the floor and within one sump. Figure 2.1 shows the sampling locations, and Table 2.1 presents the corresponding analytical data. Each of the wipe samples had detectable concentrations of PCB except sample 3A which had elevated detection levels. The maximum PCB concentrations in the five wipe sampling locations were below 30 ug/100 cm^2. The trip blank and the equipment blank were both non-detectable for PCB as shown on actual laboratory sheets in Appendix C. The analytical sheets are presented in Appendix C, and the accompanying chain-of-custody records appear in Appendix D.

The sump in the northwest corner of the Butler Building had .003 mg/l (ppm) of PCB Aroclor 1260 in the water (sediment-free) phase. This location is believed to be contained within a concrete structure and not directly accessible to the environment.

The outside sump near the southeast corner of the Butler Building had no detectable concentrations of PCB in the sediments.

In summary, the Butler Building was investigated for PCB contamination in the two sumps and in five locations on the concrete floor. The results of the analyses indicated minimal PCB contamination in the Butler Building. There appears to be a thin layer of dirt and oil on the concrete floor with numerous articles being stored in the area. The two sumps are accessible to liquids spilled in the area. The southeast sump has a combination of liquid and sediments while the northwest sump contained only liquids.

3.0 DRAINAGE DITCH AND AREA

ADJACENT TO THE ELECTRICAL SUBSTATION

3.1 BACKGROUND

The drainage ditch extends southeast of the main plant from a headwall abutment at the northern end (see Figure 3.1) to a weir and skimming device to the south. Water from the facility was discharged to the ditch from floor and storm water drains on the north end and sanitary drain lines to the south at the Sewage Treatment Plant near the oil skimmer. The oil skimmer and weir were installed in 1971. In 1973 the Sewage Treatment Plant was disconnected, and the sanitary waste water was routed to the municipal system that by-passed the ditch.

A preliminary investigation of the drainage ditch in October 1989 revealed PCB contamination in the sediments of the ditch. A total of five sediment samples were collected and analyzed for PCB. The concentrations ranged from 1.6 to 120 mg/kg.

3.2 SAMPLE PLAN

The sampling plan was designed to further define the extent of any PCB contamination in the ditch and the surface soils adjacent to the Consumers Power electrical substation that is immediately north of the ditch (see Figure 3.2). In addition, a total of four samples were collected and analyzed for volatile organic compounds (VOC's) and the Michigan 10 metals. The area of investigation includes the ditch from the electrical substation to a point 1,450 feet south. The sampling locations were determined with guidance from the October 25, 1990 MDNR draft document, "Verification of Soil Remediation".

Uniformly spaced surface soil and sediment samples (see Figure 3.1) were collected from the sidewalls and the bottom of the ditch. The samples were a composite of the surface to a 0.5 foot depth. The samples were collected with a stainless steel spatula that was decontaminated with a high pressure wash prior to initiating the sampling activities. A new instrument was used for each sample location. A separate pair of chemical resistant gloves was used to collect each of the individual samples.

The samples were collected in clean glass containers that were labeled with the appropriate sampling information including the sample location, time, date, sampler's initials and project identification.

3.3 FINDINGS

The ditch is approximately 7 feet deep and 4 to 5 feet wide at its base. Surface water varying in depth from 1 to 2 feet was observed to flow freely from the north concrete abutment to the weir and skimmer to the south at the time of sample collection. The

sediments in the center of the ditch above the weir displayed an organic odor and appeared to be stained with oil or another dark material. The soil samples on the sidewalls of the ditch were mainly sand and top soil.

Surface water is entering the ditch from the north via a 24-inch drainline at the concrete abutment near the electrical substation. It appears that the surface water flow essentially terminates at the weir/skimmer with very little surface flow beyond that point. The ditch is less defined as it passes south of the Sewage Treatment Plant due to the greater vegetation and shallower center-line depth of the ditch.

At distances 450 feet or greater from the concrete abutment at the north end of the ditch, the soil/sediment samples were not visibly stained, nor did the samples exhibit any unusual odors. The soil in the center of the ditch beyond the weir/skimmer is damp, although it did not contain any standing or flowing water at the time of the field investigation.

The following sections detail results of analytical data on soils collected from the drainage ditch and areas adjacent to the electrical substation (see Figure 3.1). Analytical data have been compared to Type B criteria, when available, as calculated according to the administrative rules for Act 307.

3.3.1 PCB ANALYSES

Analytical data from drainage ditch soil samples analyzed for PCBs are presented in Table 3.1. PCBs were detected in nine (9) samples. Soil from sample 1+15 was found to contain 84 mg/kg (ppm) of PCB Aroclor 1248, which exceeds the Michigan Act 307 Type B criteria (based on direct human contact) or for PCBs in soils (1 mg/kg). It is possible that matrix interferences may have resulted in the elevated detection limits for other PCB aroclors in sample 1+15. No other samples were found to contain PCBs at concentrations exceeding Type B criteria.

Three (3) consecutive soil samples were collected at distances of 1400, 1425 and 1450 feet south of the concrete abutment at the north end of the ditch. The samples were analyzed for PCB, and the results indicated that the samples were non-detectable for PCBs. No additional samples were collected and analyzed beyond the three (3) samples.

3.3.2 VOLATILE ORGANIC ANALYSES

Four (4) soil samples taken from the drainage ditch were analyzed for volatile organic compounds. The results of these analyses are presented in Table 3.2. Certain volatile chemicals were detected in some of the soil samples, including low levels of chlorobenzene, ethylbenzene, toluene, xylene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, and 1,4-dichlorobenzene. Soil sample 1+15 (drainage ditch) was the only sample which contained levels of 1,4-dichlorobenzene that exceed relevant Act 307 Type B soil

criterion. No other VOCs detected in the soil samples were found to exceed Type B soil criteria.

3.3.3 INORGANIC ANALYSES

Four soil samples taken from the drainage ditch area were analyzed for inorganics. As indicated in Table 3.3, most samples contained levels of inorganic constituents that exceed Act 307 Type B soil criteria, (although no Type B criteria are currently available for barium, copper, or lead). Act 307 Type A criteria may also need to be considered for these constituents.

3.4 DISCUSSION AND CONCLUSIONS

One (1) soil sample from the drainage ditch area above the weir (sample 1+15) was found to contain PCB Aroclor 1248 and 1,4-dichlorobenzene at levels exceeding relevant Type B soil criteria. The limited downstream extent of PCB contamination in the ditch was defined by three (3) consecutive soil samples which were found to be non-detectable for PCBs. Several inorganic parameters were also found to exceed Type B soil criteria in four (4) ditch soil samples. Because the inorganic constituents occur naturally in soils, they are more appropriately compared to Type A criteria based on naturally-occurring local background.

4.0 SANITARY SEWER AND FLOOR DRAIN LINE NETWORK

4.1 BACKGROUND

The sanitary sewer line is located beneath the main building and extends out of the main building to the south (Figure 1.0). The sanitary sewer is a potential environmental concern.

4.2 SAMPLE PLAN

The purpose of this phase was to determine if there is PCB contamination in the sanitary sewer and floor drain line network of the facility. The overall flow is from north within the main plant to the south towards the former Sewage Treatment Plant. The sampling plan consisted of collecting sediment/water samples from six (6) manholes in the exterior and interior of the south end of the main building. The sampling locations were identified (SS-1 to SS-6) and are shown on Figure 1.0. The sampling plan specified that the sediments at the base of the manholes be collected for analysis. In the absence of sediments a composite water sample is collected.

A sampling trier\auger was used to collect the sample from each of the manholes except in SS-5 where a stainless steel bailer was used. Access was obtained by removing the top cover and lowering the sampling instrument into the manholes. The sampling equipment was decontaminated with a soapy water and hexane rinse between sample locations. A separate pair of chemical resistant gloves was used to collect each of the individual samples.

In addition, two (2) wipe samples (W-1A and W-2A) were collected outside of the south entrance to the main building (see Figure 1.0).

The samples were collected in clean glass containers that were labeled with the appropriate sampling information including the sample location, time, date, sampler's initials and project identification.

4.3 FINDINGS

The Sanitary Sewer and Floor Drain Line Network investigation included a visual evaluation of the material in the subsurface locations. In five of the six sample locations there were sufficient sediments for sample collection. SS-5 (see Figure 1.0) did not contain any sediments, and it was sampled for liquids only. In all six sample locations the water was dark and there was a sheen of oil on the surface of the liquid. The

sediments were also dark and there was a distinguishable organic odor within the samples. The manholes were approximately four feet wide and eight feet deep. There appeared to be subsurface piping that connected the manholes together into one or two common systems. All of the manholes were covered and there was a film of epoxy coating over the lids of the manholes.

The analytical results of the six manholes and the two wipe samples indicated detectable concentrations of PCB in six of the eight samples. The sediment samples from the five manholes contained between .159 and 13.366 mg/kg (ppm) of PCB. The water sample from SS-5 was non-detectable for PCB. One of the two wipe samples collected from the entrance on the south end of the plant near the truck bay and manhole SS-1 had 44 ug/100cm^2 of PCB and the other sample was non-detectable.

4.4 DISCUSSION AND CONCLUSIONS

Table 4.1 presents the analytical results of the samples collected and analyzed in the Sanitary Sewer and Drain Line Network. PCB was detected in the sediments of the five (5) manholes at concentrations (<50 ppm). The analytical result from the water sample collected from SS-5 was non-detectable. It appears that the water contains an oily material based on visual observations. The concentration of the one wipe sample that detected PCB was below 50 ug/100cm^2.

The analytical sheets are presented in Appendix C, and the accompanying chain-of-custody records appear in Appendix D.

APPENDICES

APPENDIX A

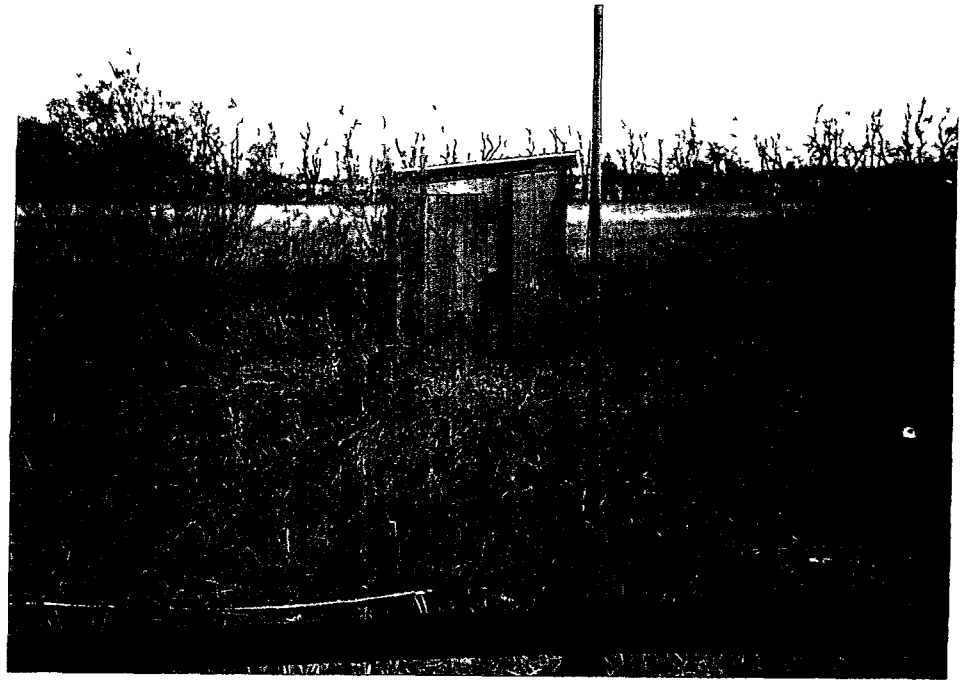
SITE PHOTOGRAPHS

Client	Benteler	
Project No.:	21981	
Date:	June 21, 1991	

WW Engineering & Science
5555 Glenwood Hills Parkway, SE • PO Box 874
Grand Rapids, MI 49588-0874 (616) 942-9600
a member of Summit Environmental Group, Inc

Photographic Log

Comments: Sewage Treatment Building, Ground Penetrating Radar



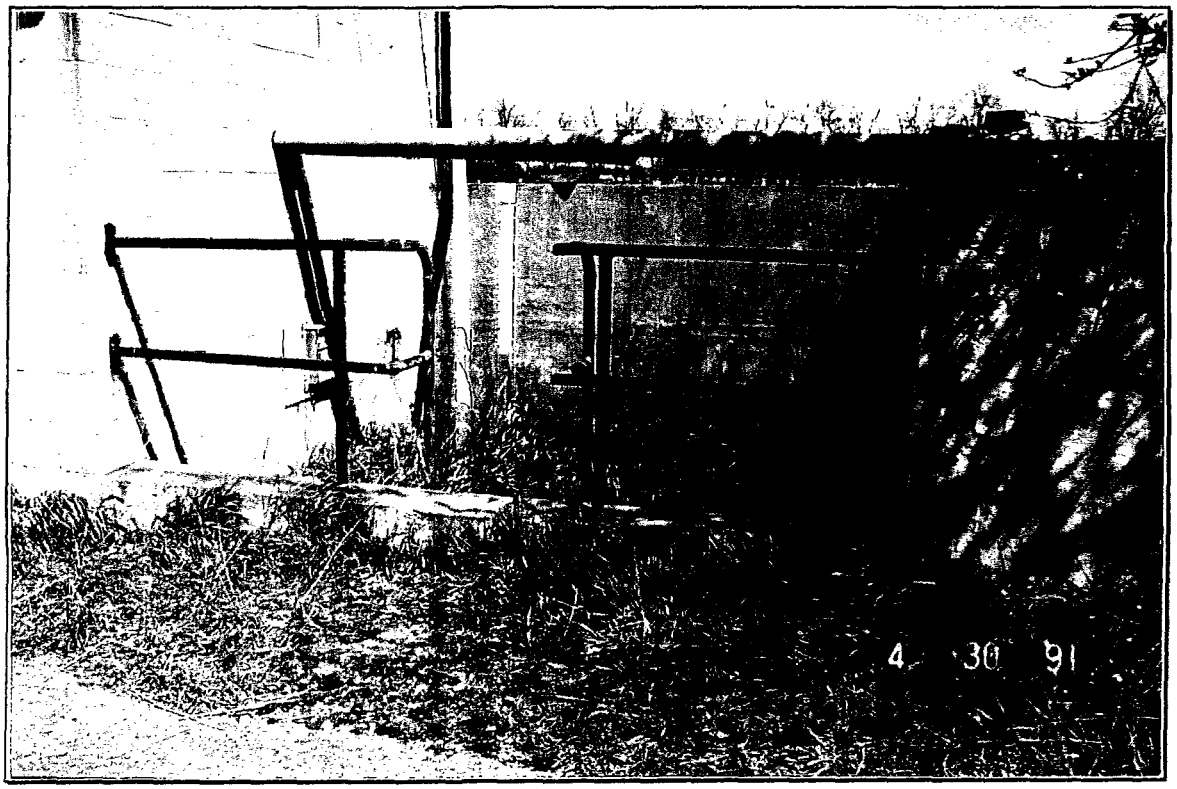
Comments: Sewage Treatment Building, Ground Penetrating Radar

Client	Benteler
Project No.:	21981
Date:	June 21, 1991

WW Engineering & Science
5555 Glenwood Hills Parkway, SE • PO Box 874
Grand Rapids, MI 49588-0874 (616) 942-9600
a member of Summit Environmental Group, Inc.

Photographic Log

Comments: **Sewage Treatment Plant, Digester Right Background**



Comments: **Sewage Treatment Building, Final Clarifier**

Client	Benteler
Project No.:	21981
Date:	June 21, 1991

WW Engineering & Science
5555 Glenwood Hills Parkway, SE • PO Box 874
Grand Rapids, MI 49588-0874 (616) 942-9600
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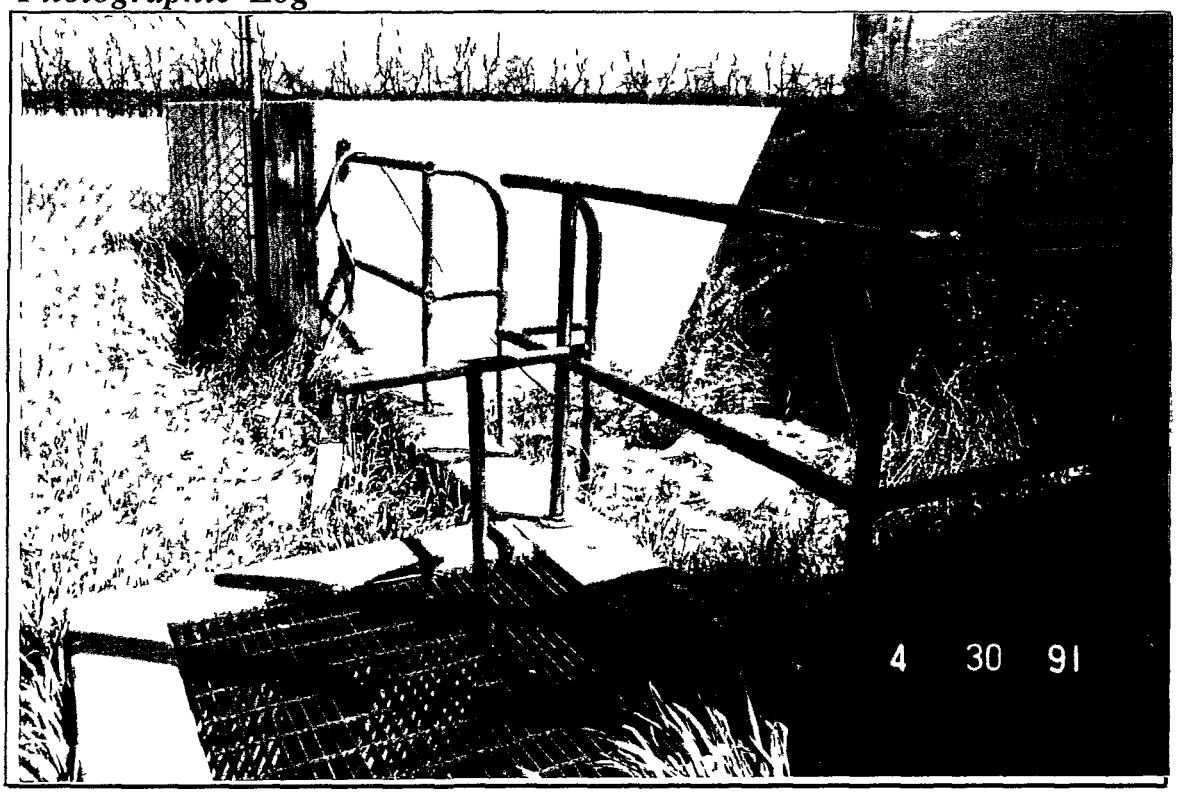

Comments: **Sewage Treatment Building, Primary Clarifier**

Client	Benteler	
Project No.:	21981	
Date:	June 21, 1991	

WW Engineering & Science
5555 Glenwood Hills Parkway, SE • PO Box 874
Grand Rapids, MI 49588-0874 (616) 942-9600
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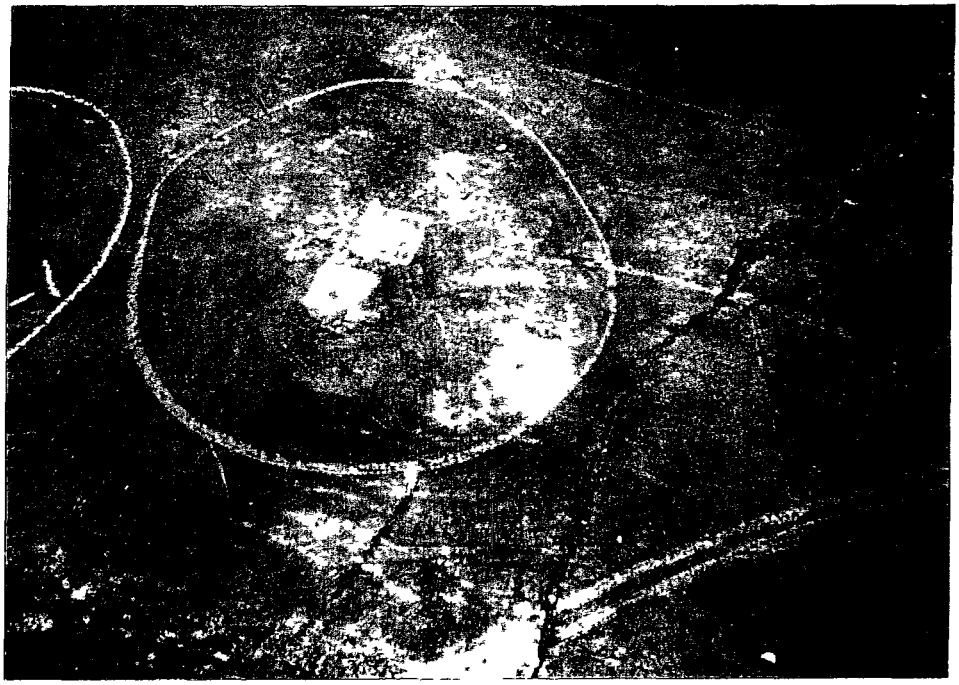
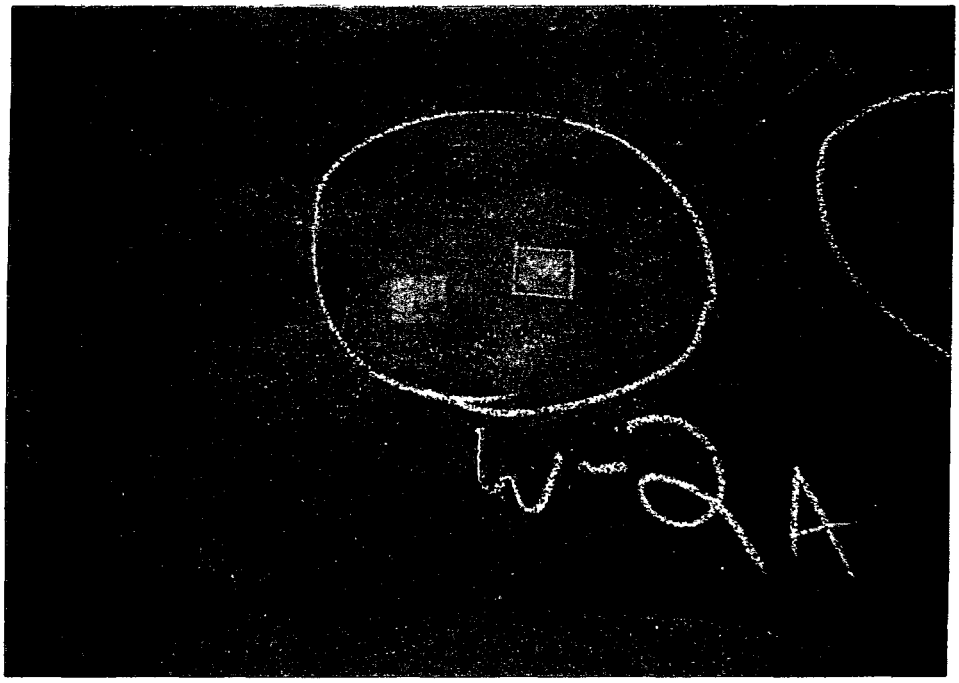
Photographic Log



Comments: Wipe Sample #1A, Sanitary Sewer and Floor Drain Line Network



Comments: Wipe Sample #2A, Sanitary Sewer and Floor Drain Line Network

Client	Benteler	
Project No.:	21981	
Date:	June 21, 1991	

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5555 Glenwood Hills Parkway, SE • PO Box 874
Grand Rapids, MI 49588-0874 (616) 942-9600
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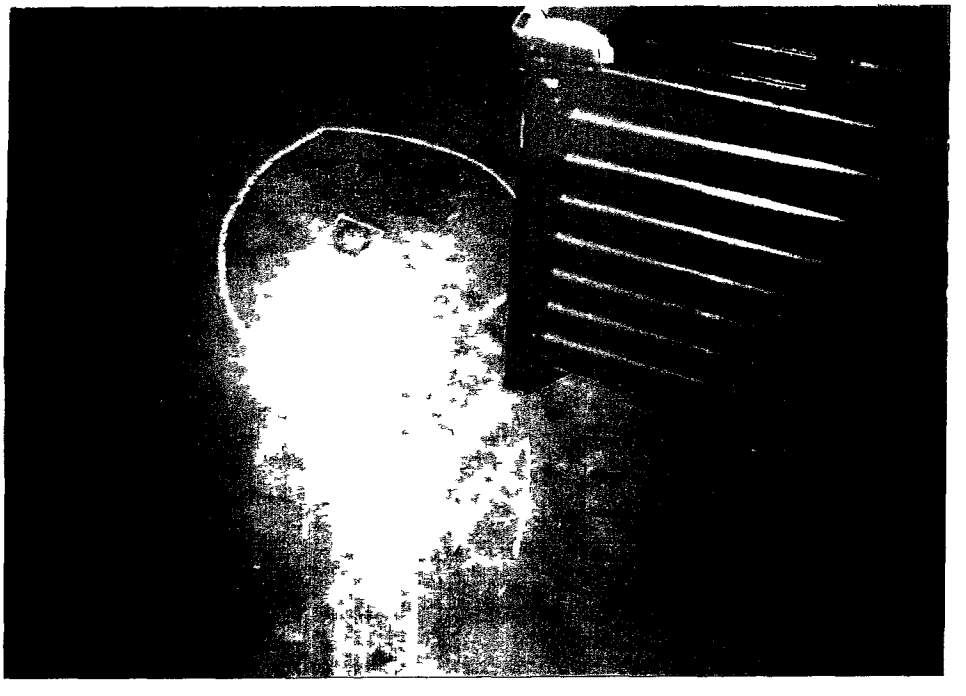
Photographic Log

Comments: **Sump Sample #8, Next to Butler Building, Outside**



Comments: **Butler Building, Wipe Sample #3A**

Client	Benteler	
Project No.:	21981	
Date:	June 21, 1991	

WW Engineering & Science
5555 Glenwood Hills Parkway, SE • PO Box 874
Grand Rapids, MI 49588-0874 (616) 942-9600
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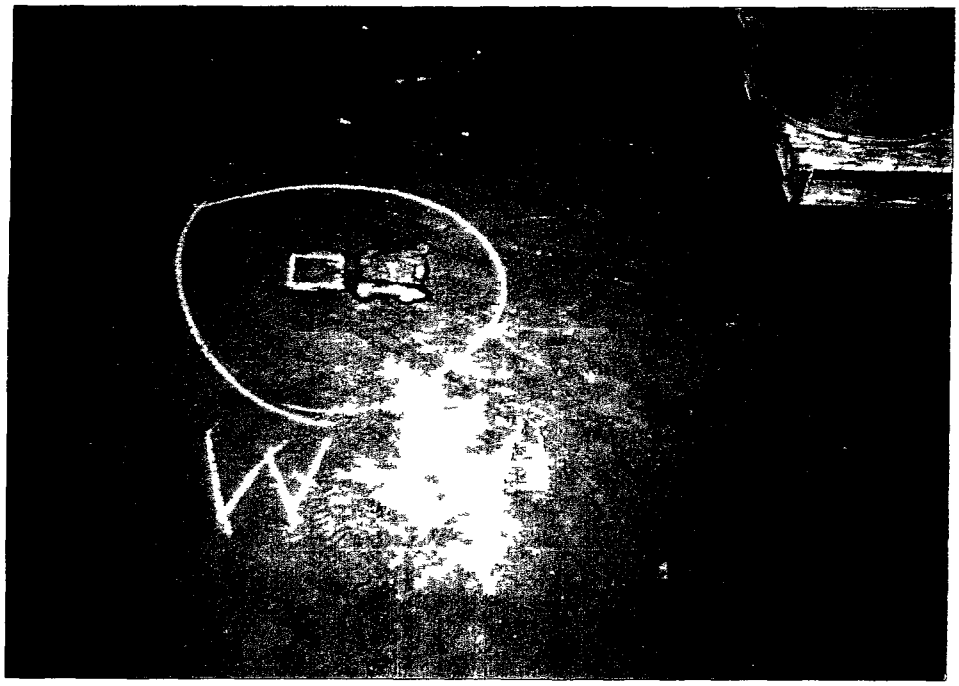

Comments: **Butler Building, Wipe Sample #5A**

Comments: **Butler Building, Wipe Sample #6A**

Client	Benteler	
Project No.:	21981	
Date:	June 21, 1991	

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Grand Rapids, MI 49588-0874 (616) 942-9600
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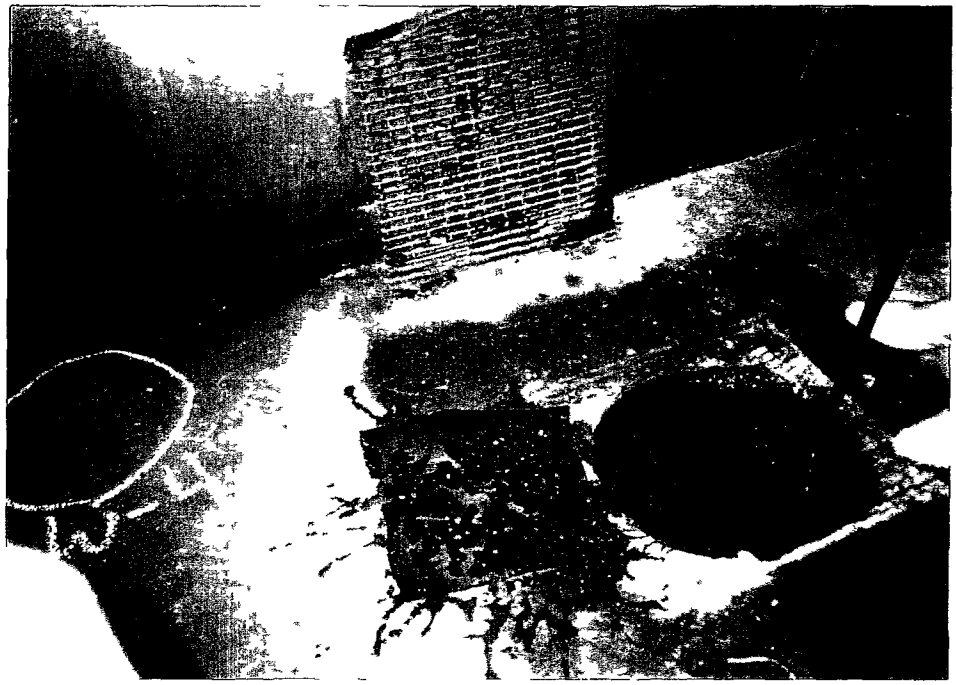
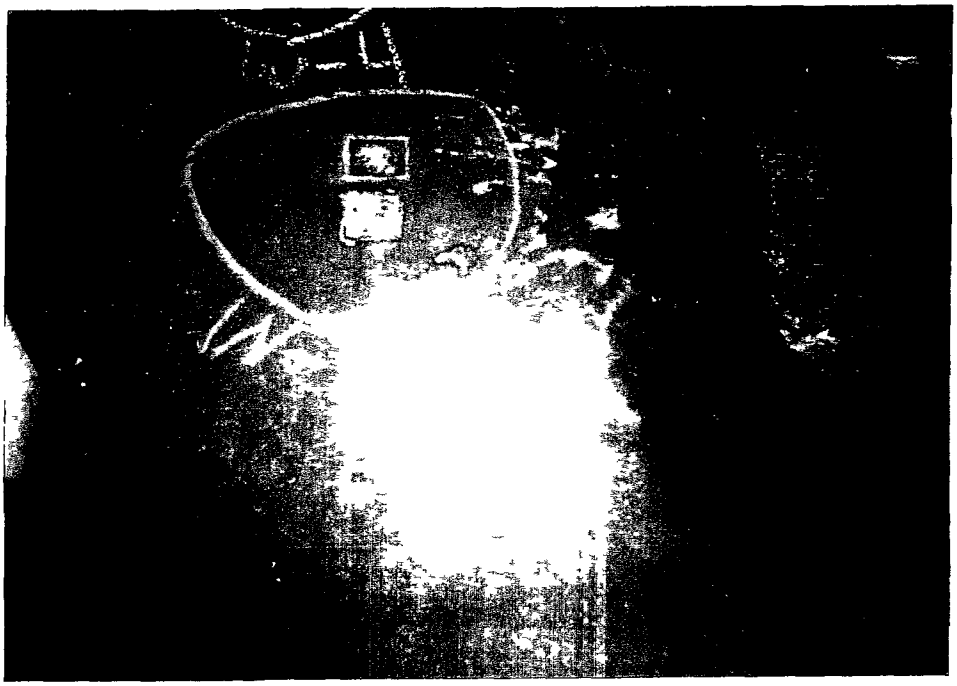
Photographic Log



Comments: **Sump Sample #7, Inside Butler Building**



Comments: **Butler Building, Wipe Sample #4A**

Client	Benteler
Project No.:	21981
Date:	June 21, 1991

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Grand Rapids, MI 49588-0874 (616) 942-9600
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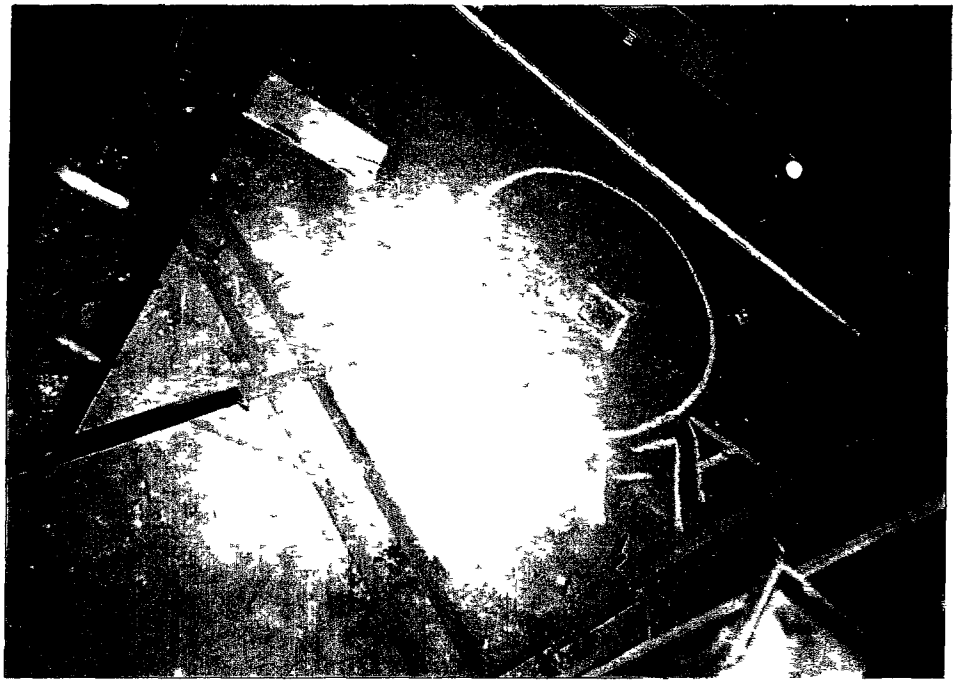
Photographic Log



Comments: **Butler Building, Wipe Sample #7A**

Client	Benteler	
Project No.:	21981	
Date:	June 21, 1991	

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5555 Glenwood Hills Parkway, SE • PO Box 874
Grand Rapids, MI 49588-0874 (616) 942-9600
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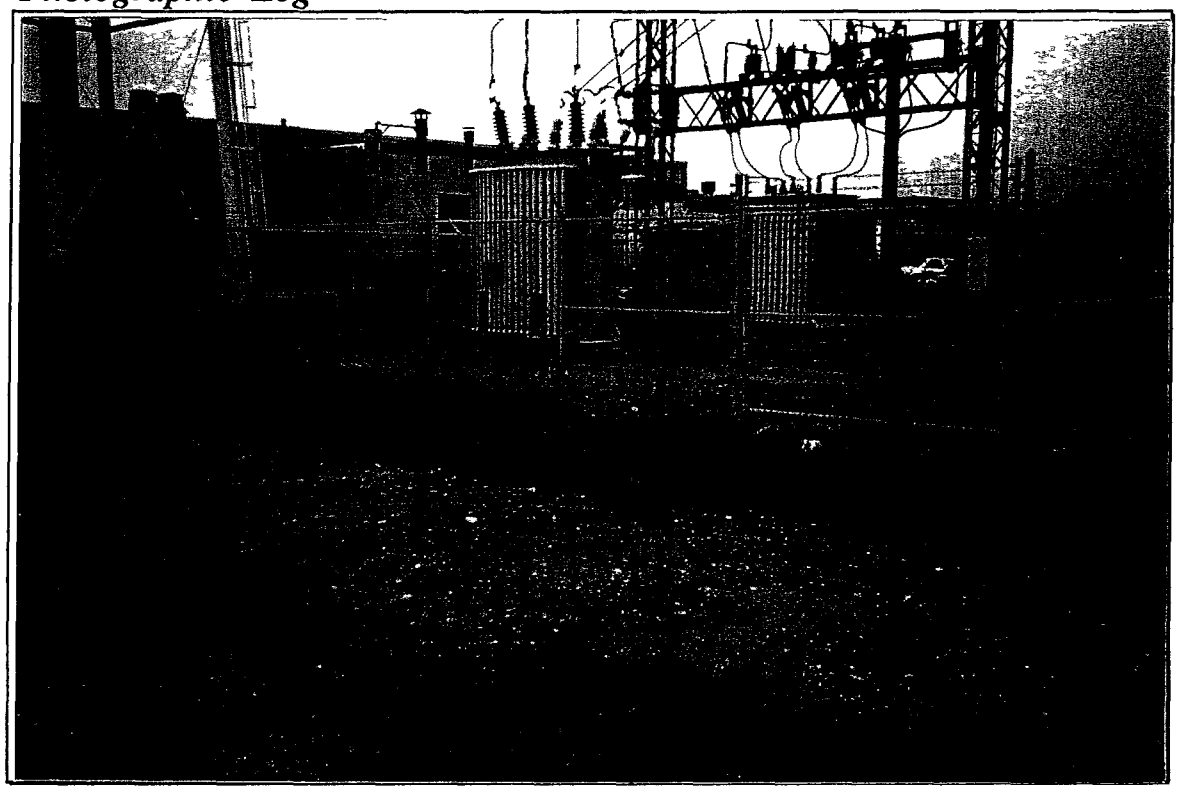
Photographic Log



Comments: **Electric Station, East and West Sample Locations**

Comments: **Station 0+63, West Sidewall**

Client	Benteler	
Project No.:	21981	
Date:	June 21, 1991	

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5555 Glenwood Hills Parkway, SE • PO Box 874
Grand Rapids, MI 49588-0874 (616) 942-9600
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Comments: Station 1+15, Centerline Ditch

Comments: Station 1+46, East Sidewall

Client	Benteler
Project No.:	21981
Date:	June 21, 1991

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Comments: Station 2+30, East and West Sidewall

Comments: Station 3+25 Centerline Ditch

Client	Benteler
Project No.:	21981
Date:	June 21, 1991

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Grand Rapids, MI 49588-0874 (616) 942-9600
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Comments: **Station 4+38, West Sidewall**

Comments: **Station 5+20, East and West Sidewall**

Client	Benteler	
Project No.:	21981	
Date:	June 21, 1991	

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5555 Glenwood Hills Parkway, SE • PO Box 874
Grand Rapids, MI 49588-0874 (616) 942-9600
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Photographic Log

Comments: Station 6+25, Centerline Ditch

Comments: Station 7+25, Ditch Centerline and West Sidewall
Station 7+20, East Sidewall

Client	Benteler	
Project No.:	21981	
Date:	June 21, 1991	

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Comments: Station 8+75, Centerline Ditch

Comments: Station 10+00, Centerline Ditch

Client	Benteler	
Project No.:	21981	
Date:	June 21, 1991	

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Grand Rapids, MI 49588-0874 (616) 942-9600
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Comments: Station 11+25, Centerline Ditch

Comments: Station 12+50 Centerline Ditch

Client	Benteler
Project No.:	21981
Date:	June 21, 1991

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5555 Glenwood Hills Parkway, SE • PO Box 874
Grand Rapids, MI 49588-0874 (616) 942-9600
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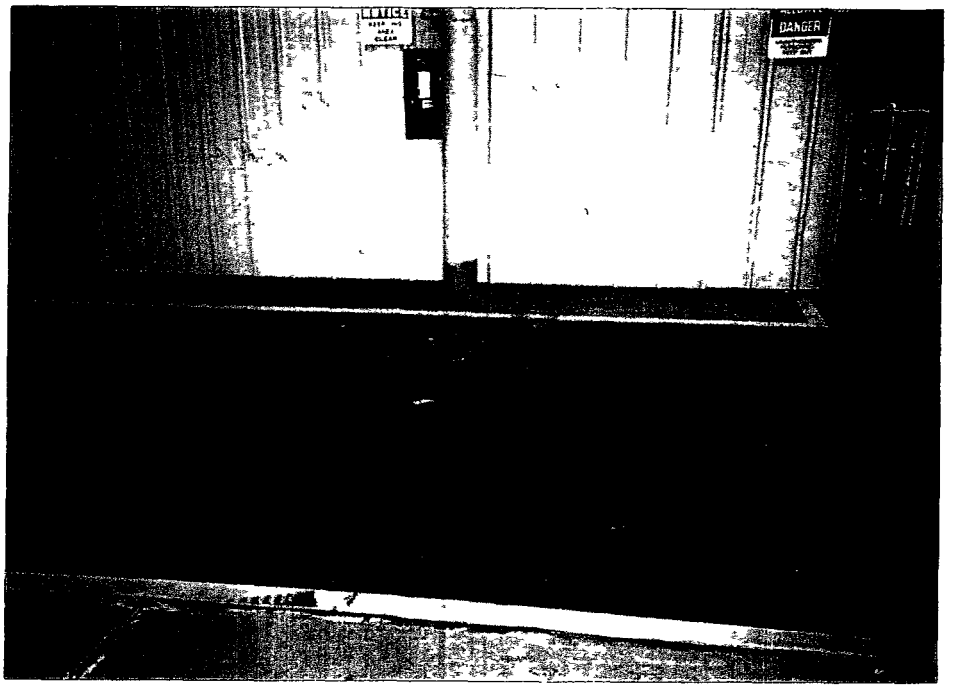
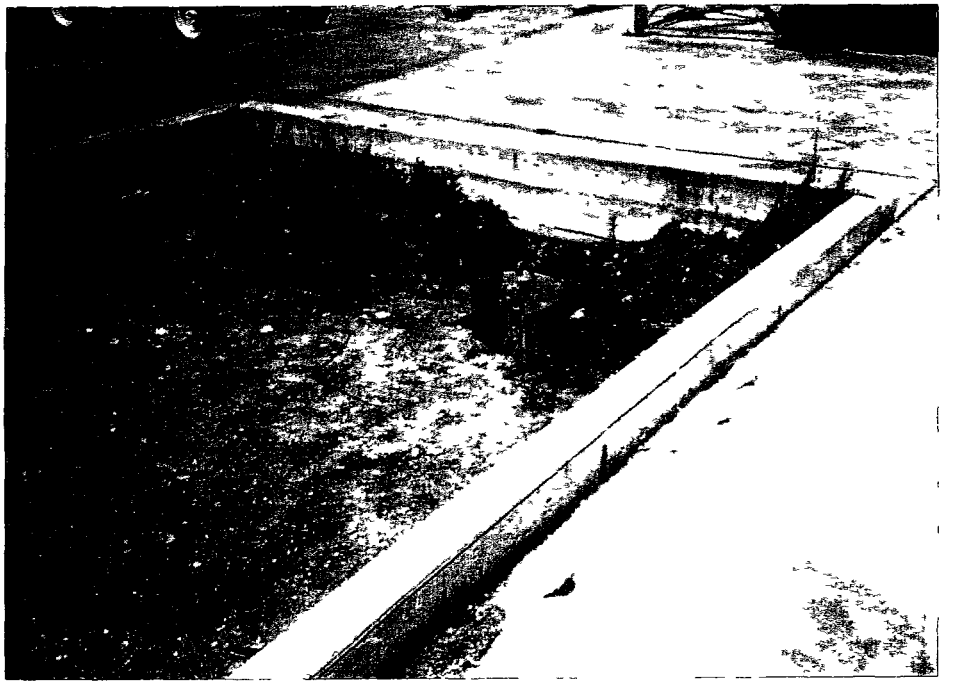
Photographic Log



Comments: **Sewer Sample #6, Inside Plant**



Comments: **Sewer Sample #1, Outside Plant**

Client	Benteler	
Project No.:	21981	
Date:	June 21, 1991	

WW Engineering & Science
5555 Glenwood Hills Parkway, SE • PO Box 874
Grand Rapids, MI 49588-0874 (616) 942-9600
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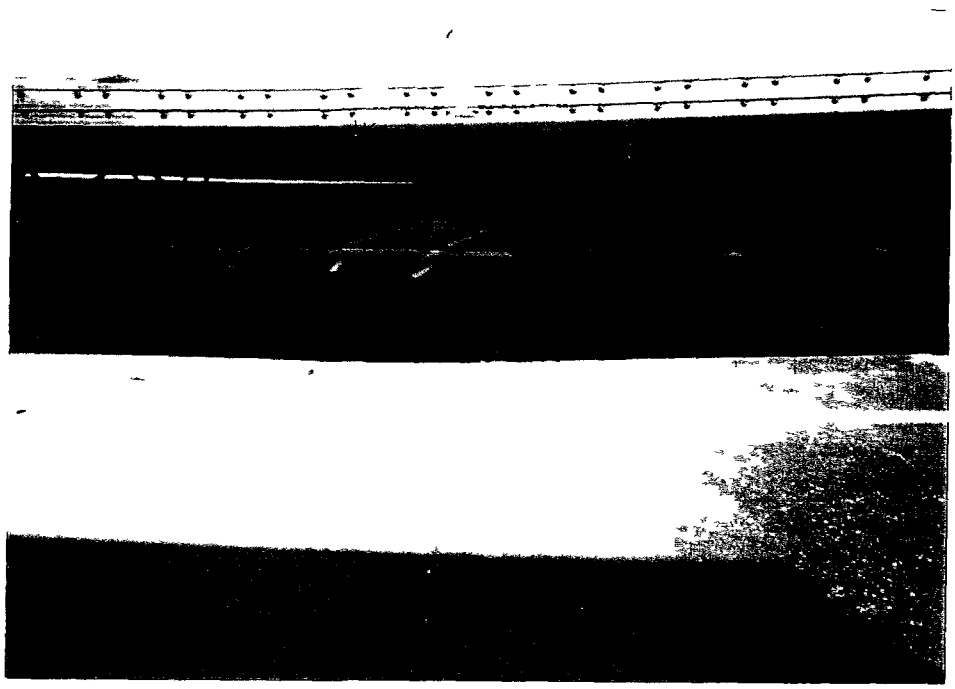
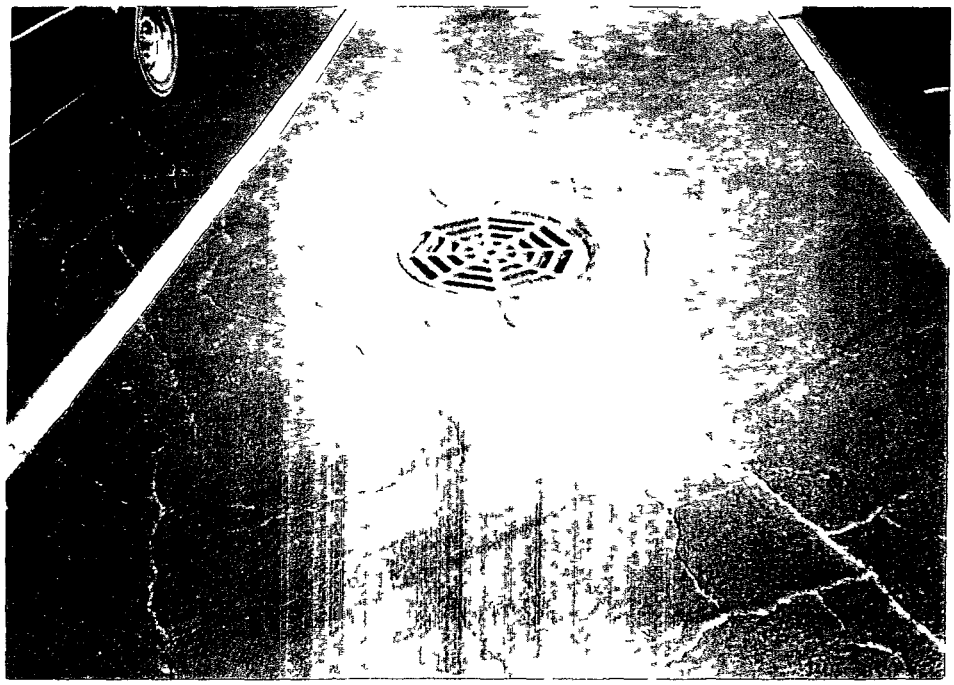


Comments: **Sewer Sample #2, Truck Loading Bay Outside**



Comments: **Sewer Sample #3, Parking Lot**

Client	Benteler
Project No.:	21981
Date:	June 21, 1991

WW Engineering & Science
5555 Glenwood Hills Parkway, SE • PO Box 874
Grand Rapids, MI 49588-0874 (616) 942-9600
a member of Summit Environmental Group, Inc.

Photographic Log

Comments: **Sewer Sample #4, Between headwall and Power Station**

Client	Benteler	
Project No.:	21981	
Date:	June 21, 1991	

WW Engineering & Science
5555 Glenwood Hills Parkway, SE • PO Box 874
Grand Rapids, MI 49588-0874 (616) 942-9600
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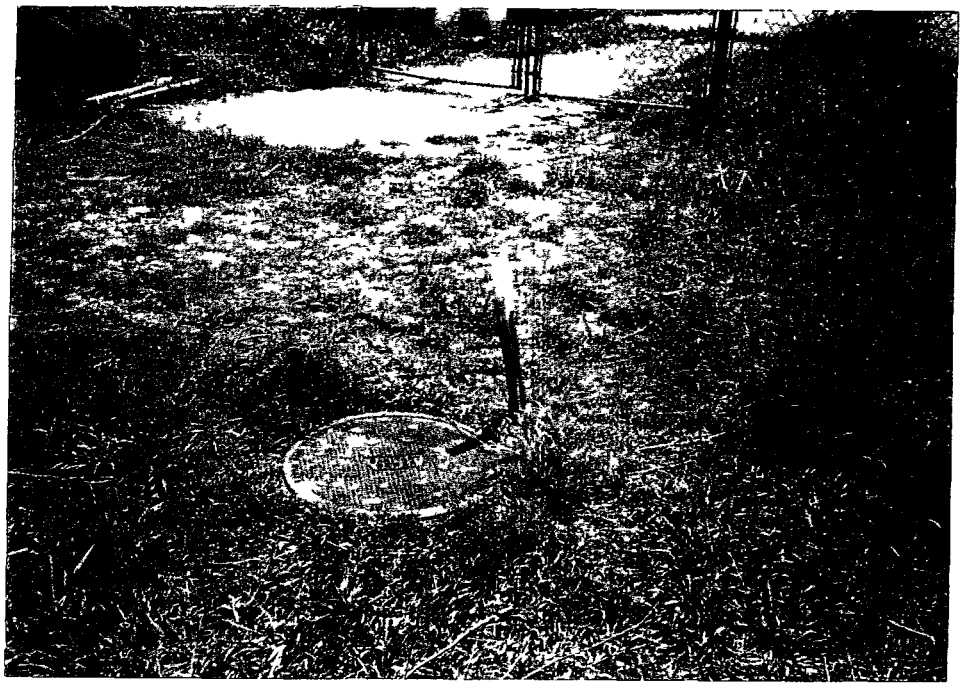
Photographic Log

Comments: **Sewage Treatment Building Storm Water Sewer**



Comments: **Sewer Sample #5, Outside Plant**

APPENDIX B

GROUND PENETRATING RADAR SURVEYS

GROUND PENETRATING RADAR SURVEYS

GENERAL

Ground Penetrating Radar (GPR) instruments transmit, receive, and record subsurface electromagnetic signals at frequencies ranging from 80 MHz to over 1000 MHz. They function very much like conventional radar; conductive objects below the surface reflect the transmitted electromagnetic signal, and a receiver detects the reflected signal which is recorded or stored by the instrument. The signal is recorded using a strip chart recording unit, and the result is a continuous profile of the radar signal.

The depth of investigation of the GPR is dependent upon the depth of penetration of the emitted radar signal. The penetration depth of the radar signal is limited in areas of high near-surface conductivity. This typically includes areas which have near-surface materials containing a large percentage of clay and/or silt, as well as highly saline ground water. The penetration depth of the GPR is generally unaffected by concrete slabs unless a large amount of closely spaced steel reinforcement is present.

BURIED OBJECTS

Since metallic objects present in the subsurface represent a substantial change in conductivity relative to typical soils, radar signals are strongly reflected from buried metallic objects. The size and shape of the reflected radar signal are used to evaluate the type of object causing the reflection. Buried underground storage tanks (UST's) usually generate a very diagnostic hyperbolic-shaped radar reflection when surveyed perpendicular to the long axis of the UST. The time required for the radar to travel to the UST and back allows an estimate to be made of the depth of burial of the UST.

STRATIGRAPHIC APPLICATION

The GPR can also be used to map subsurface stratigraphy, bedrock, fill zones, and depth to water table. Changes in subsurface conductivity which are related to stratigraphy can be imaged by the GPR yielding a cross section of subsurface conductivity variation. Typical stratigraphic related conductivity variations include the degree of water saturation and salinity, and clay content. The GPR has also been used to successfully map subsurface contaminant plumes such as hydrocarbons floating on the water table.

DATA INTERPRETATION

Interpretation of the recorded data utilizes time-distance relationships between the ground surface and subsurface changes in conductivity which reflect the radar signal. In general, the greater the time interval between transmission and reception of the radar signal, the greater the depth of the conductivity change or reflector.

INSTRUMENT DESCRIPTION

The GSSI SIR System 3 Radar consists of a transducer (transmitter/receiver), a console/recorder, a control cable and a remote marker. The recorder is approximately 18" by 18" by 9" and weighs about 40 pounds. The console consists of the electronic controls for generating the radar signal and for filtering, amplifying, and recording the data.

The transducers vary in size and shape. The units are small enough to be moved by one person. Some are dragged across the ground surface, others roll on wheels. The transducer is connected to the control unit using a 100-foot cable.

INITIAL SET-UP AND CALIBRATION

- Connect power cable and control cable to the console.
- Connect the control cable to the transducer and attach the remote marker to the transducer.
- Set the instrument switch positions as follows:

Power	OFF
Print Polarity	±
Paper Take-Up	AUTO
Lines/Inch	100
Scans/Sec	16
Surface	Adjust to site conditions
Center	Adjust to site conditions
Deep	Adjust to site conditions
Range	Adjust to survey objectives
Calibrator/Marker	CENTER POSITION
Range 100/1000	Adjust to survey objectives
Radar Speed	X1
Marker	FULL
Scale Lines	ON
Threshold	50%
Filters	10, 50
Auto/Manual	AUTO
XMIT Rate	50
Mode	RADAR
Clock	INT
Print/Stby/Remote	STBY

- Turn the power on.
- Locate the transducer at the survey area and adjust the gain settings using the procedure outlined in the manual.
- Switch the calibrator/marker switch up, and record the calibrator signal.

DATA COLLECTION

Data are collected by walking the transducer at a relatively constant speed over chosen profile lines at the site. Each of the records must be labeled, and the location of the profile noted. Marks should be placed on the record at a minimum of 10-foot intervals.

Survey locations will be gridded in the field. Specific areas of interest may be surveyed in greater detail. A set of field parameters must be defined, and those settings should be used at all locations.

DOCUMENTATION

The instrument generates analog paper records. These records will be marked and any notes will be copied to each individual record. Daily notes will also be gathered.

APPENDIX C

ANALYTICAL SHEETS

WW ENGINEERING & SCIENCE
ENVIRONMENTAL LABORATORY DIVISION

CLIENT: BENTELER INDUSTRIES, INC.
PROJECT NO.: 26363
LOCATION:
SAMPLED BY: E. MEYERS/D. PIERCE
DESCRIPTION: PCB ANALYSIS

DATE SAMPLED: 05/03/91 TIME:
DATE RECEIVED: 05/03/91 TIME: 2:55 PM
DATE COMPLETED: 05/28/91
SCHEDULED COMPLETION: 05/24/91
ANALYST: GW
QUALITY CONTROL REVIEW BY: WH
WORKSHEET NO: 4

	PRIMARY CLARIFIER	#8 SE OF BUILDING	DETECTION LIMIT	UNITS
LAB SAMPLE NO:	64359	64360		
PCB: AROCLOR 1242	<33	<33	33	ug/kg
PCB: AROCLOR 1248	<33	<33	33	ug/kg
PCB: AROCLOR 1254	<33	<33	33	ug/kg
PCB: AROCLOR 1260	<33	<33	33	ug/kg
TIME SAMPLED:	10:40 AM	12:25 PM		

WW ENGINEERING & SCIENCE
ENVIRONMENTAL LABORATORY DIVISION

CLIENT: BENTELER INDUSTRIES, INC.
PROJECT NO.: 26363
LOCATION:
SAMPLED BY: E. MEYERS/D. PIERCE
DESCRIPTION: PCB ANALYSIS

DATE SAMPLED: 05/03/91 TIME: 12:15 PM
DATE RECEIVED: 05/03/91 TIME: 2:55 PM
DATE COMPLETED: 05/28/91
SCHEDULED COMPLETION: 05/24/91
ANALYST: MK
QUALITY CONTROL REVIEW BY: WH
WORKSHEET NO: 5

	#7 NW SUMP	DETECTION LIMIT	UNITS
LAB SAMPLE NO:	64361		
PCB: AROCLOR 1242	<2.0	2.0	ug/l
PCB: AROCLOR 1248	<2.0	2.0	ug/l
PCB: AROCLOR 1254	<2.0	2.0	ug/l
PCB: AROCLOR 1260	3.0	2.0	ug/l

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ENVIRONMENTAL LABORATORY DIVISION

CLIENT: BENTELER INDUSTRIES, INC.
PROJECT NO.: 26363
LOCATION:
SAMPLED BY: E. MEYERS/D. PIERCE
DESCRIPTION: PCB ANALYSIS

DATE SAMPLED: 05/02/91 TIME:
DATE RECEIVED: 05/03/91 TIME: 8:00 AM
DATE COMPLETED: 05/28/91
SCHEDULED COMPLETION: 05/24/91
ANALYST: MK,GW
QUALITY CONTROL REVIEW BY: WH
WORKSHEET NO: 9

	SS #1	SS #2 TRUCK BAY	SS #3 PARK LOT	SS #4 POWER ST.	DETECTION LIMIT	UNITS
LAB SAMPLE NO:	64234	64235	64236	64237		
PCB: AROCLOR 1242	<33	<4,100	<33	<33	varies	ug/kg
PCB: AROCLOR 1248	11,000	<4,100	<33	12,000	varies	ug/kg
PCB: AROCLOR 1254	<33	<33	<33	<33	33	ug/kg
PCB: AROCLOR 1260	2,300	4,400	60	1,100	varies	ug/kg
TIME SAMPLED:	1:45 PM	2:10 PM	2:30 PM	3:00 PM		

WW ENGINEERING & SCIENCE
ENVIRONMENTAL LABORATORY DIVISION

CLIENT: BENTELER INDUSTRIES, INC.
PROJECT NO.: 26363
LOCATION:
SAMPLED BY: E. MEYERS/D. PIERCE
DESCRIPTION: PCB ANALYSIS

DATE SAMPLED: 00/00/00 TIME:
DATE RECEIVED: 05/03/91 TIME: 8:00 AM
DATE COMPLETED: 05/28/91
SCHEDULED COMPLETION: 05/24/91
ANALYST: MK
QUALITY CONTROL REVIEW BY: WH
WORKSHEET NO: 10

	SS #6 IN BLDG.	FINAL CLARIFIER	DIGESTER SLUDGE	DETECTION LIMIT	UNITS
LAB SAMPLE NO:	64238	64239	64241		
PCB: AROCLOR 1242	<33	<33	<240	varies	ug/kg
PCB: AROCLOR 1248	130	<33	<240	varies	ug/kg
PCB: AROCLOR 1254	<33	<33	<33	33	ug/kg
PCB: AROCLOR 1260	310	<33	46	33	ug/kg
DATE SAMPLED:	5/2/91	5/2/91	4/30/91		
TIME SAMPLED:	4:00 PM	4:50 PM	11:00 AM		

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ENVIRONMENTAL LABORATORY DIVISION

CLIENT: BENTELER INDUSTRIES, INC.
PROJECT NO.: 26363
LOCATION:
SAMPLED BY: E. MEYERS/D. PIERCE
DESCRIPTION: PCB ANALYSIS

DATE SAMPLED: 05/02/91 TIME: 3:10 PM
DATE RECEIVED: 05/03/91 TIME: 8:00 AM
DATE COMPLETED: 05/28/91
SCHEDULED COMPLETION: 05/24/91
ANALYST: MK
QUALITY CONTROL REVIEW BY: WH
WORKSHEET NO: 11

	SS #5 PLANT	DETECTION LIMIT	UNITS
LAB SAMPLE NO:	64240		
PCB: AROCLOR 1242	<1,000	1,000	ug/l
PCB: AROCLOR 1248	<1,000	1,000	ug/l
PCB: AROCLOR 1254	<1,000	1,000	ug/l
PCB: AROCLOR 1260	<1,000	1,000	ug/l

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ENVIRONMENTAL LABORATORY DIVISION

CLIENT: BENTELER INDUSTRIES, INC.
PROJECT NO.: 26363
LOCATION:
SAMPLED BY: DUDLEY PIERCE
DESCRIPTION: SOIL ANALYSIS

DATE SAMPLED: 05/07/91 TIME:
DATE RECEIVED: 05/08/91 TIME: 4:20 PM
DATE COMPLETED: 05/30/91
SCHEDULED COMPLETION: 05/30/91
ANALYST: MK,GW
QUALITY CONTROL REVIEW BY: KVH
WORKSHEET NO: 15

	0+62 W. WALL	1+46 E. WALL	2+30 W. WALL	2+30 E. WALL	DETECTION LIMIT	UNITS
LAB SAMPLE NO:	64634	64635	64636	64637		
PCB: AROCLOR 1242	<33	<33	<33	<33	33	ug/kg
PCB: AROCLOR 1248	<33	<33	<33	<33	33	ug/kg
PCB: AROCLOR 1254	<33	<33	<33	<33	33	ug/kg
PCB: AROCLOR 1260	<33	<33	<33	40	33	ug/kg
TIME SAMPLED:	2:35 PM	2:45 PM	3:05 PM	2:55 PM		

WW ENGINEERING & SCIENCE
ENVIRONMENTAL LABORATORY DIVISION

CLIENT: BENTELER INDUSTRIES, INC.
PROJECT NO.: 26363
LOCATION:
SAMPLED BY: DUDLEY PIERCE
DESCRIPTION: SOIL ANALYSIS

DATE SAMPLED: 00/00/00 TIME:
DATE RECEIVED: 05/08/91 TIME: 4:20 PM
DATE COMPLETED: 05/30/91
SCHEDULED COMPLETION: 05/30/91
ANALYST: MK,GW
QUALITY CONTROL REVIEW BY: KVH
WORKSHEET NO: 16

	3+25 E. DITCH	4+38 W. WALL	7+25 W. WALL	7+25 E. DITCH	DETECTION LIMIT	UNITS
LAB SAMPLE NO:	64638	64639	64640	64641		
PCB: AROCLOR 1242	<120	<33	<33	<120	varies	ug/kg
PCB: AROCLOR 1248	190	<33	<33	<120	varies	ug/kg
PCB: AROCLOR 1254	<120	<33	<120	<33	varies	ug/kg
PCB: AROCLOR 1260	180	<33	<33	112	varies	ug/kg
DATE SAMPLED:	5/7/91	5/7/91	5/8/91	5/8/91		
TIME SAMPLED:	3:10 PM	3:20 PM	9:15 AM	9:20 AM		

WW ENGINEERING & SCIENCE
ENVIRONMENTAL LABORATORY DIVISION

CLIENT: BENTELER INDUSTRIES, INC.
PROJECT NO.: 26363
LOCATION:
SAMPLED BY: DUDLEY PIERCE
DESCRIPTION: SOIL ANALYSIS

DATE SAMPLED: 05/08/91 TIME:
DATE RECEIVED: 05/08/91 TIME: 4:20 PM
DATE COMPLETED: 05/30/91
SCHEDULED COMPLETION: 05/30/91
ANALYST: MK
QUALITY CONTROL REVIEW BY: KVH
WORKSHEET NO: 17

	7+20 E. WALL	8+25 E. DITCH	10+00 E. DITCH	11+25 E. DITCH	DETECTION LIMIT	UNITS
LAB SAMPLE NO:	64642	64643	64644	64645		
PCB: AROCLOR 1242	<33	<120	<400	<33	varies	ug/kg
PCB: AROCLOR 1248	<33	<120	<400	<33	varies	ug/kg
PCB: AROCLOR 1254	<33	<33	<60	<33	varies	ug/kg
PCB: AROCLOR 1260	<33	33	90	60	varies	ug/kg
TIME SAMPLED:	9:25 AM	9:43 AM	9:48 AM	9:50 AM		

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ENVIRONMENTAL LABORATORY DIVISION

CLIENT: BENTELER INDUSTRIES, INC.
PROJECT NO.: 26363
LOCATION:
SAMPLED BY: DUDLEY PIERCE
DESCRIPTION: SOIL ANALYSIS

DATE SAMPLED: 05/08/91 TIME:
DATE RECEIVED: 05/08/91 TIME: 4:20 PM
DATE COMPLETED: 05/30/91
SCHEDULED COMPLETION: 05/30/91
ANALYST: GW
QUALITY CONTROL REVIEW BY: KVH
WORKSHEET NO: 18

	12+50 E. DITCH	TRAN. AREA E. SAMPLE	TRAN. AREA W. SAMPLE	DETECTION LIMIT	UNITS
LAB SAMPLE NO:	64646	64647	64648		
PCB: AROCLOR 1242	<120	<33	<33	varies	ug/kg
PCB: AROCLOR 1248	<120	<33	<33	varies	ug/kg
PCB: AROCLOR 1254	<33	<33	<33	33	ug/kg
PCB: AROCLOR 1260	110	<33	<33	varies	ug/kg
TIME SAMPLED:	9:55 AM	10:20 AM	10:25 AM		

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ENVIRONMENTAL LABORATORY DIVISION

CLIENT: BENTELER INDUSTRIES, INC.
PROJECT NO.: 26363
LOCATION:
SAMPLED BY: DUDLEY PIERCE
DESCRIPTION: SOIL ANALYSIS

DATE SAMPLED: 00/00/00 TIME:
DATE RECEIVED: 05/08/91 TIME: 4:20 PM
DATE COMPLETED: 05/30/91
SCHEDULED COMPLETION: 05/30/91
ANALYST: CCH,MK,GR,SAT,JW
QUALITY CONTROL REVIEW BY: KVH,CS
WORKSHEET NO: 19

	1+15 E. DITCH	5+20 E. WALL	5+20 W. WALL	6+25 E. DITCH	DETECTION LIMIT	UNITS
LAB SAMPLE NO:	64649	64650	64651	64652		
MDNR SCAN 1 & 2	ENCLOSED	ENCLOSED	ENCLOSED	ENCLOSED		
PCB: AROCLOR 1242	<13,000	<33	<33	<250	varies	ug/kg
PCB: AROCLOR 1248	84,000	<33	<33	<250	varies	ug/kg
PCB: AROCLOR 1254	<13,000	<33	<33	<250	varies	ug/kg
PCB: AROCLOR 1260	<13,000	<33	<33	900	varies	ug/kg

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ENVIRONMENTAL LABORATORY DIVISION

CLIENT: BENTELER INDUSTRIES, INC.
PROJECT NO.: 26363
LOCATION:
SAMPLED BY: WILL BEATON
DESCRIPTION: PCB ANALYSIS

DATE SAMPLED: 05/10/91 TIME:
DATE RECEIVED: 05/10/91 TIME: 4:25 PM
DATE COMPLETED: 05/31/91
SCHEDULED COMPLETION: 05/31/91
ANALYST: MK,CCH
QUALITY CONTROL REVIEW BY: KVH
WORKSHEET NO: 20

	#1A	#2A	#3A	#4A	DETECTION LIMIT	UNITS
LAB SAMPLE NO:	64864	64865	64866	64867		
PCB: AROCLOR 1242	<10	<20	<6.0	<4.0	varies	ug
PCB: AROCLOR 1248	<10	<20	<6.0	<4.0	varies	ug
PCB: AROCLOR 1254	<10	<40	<8.0	<4.0	varies	ug
PCB: AROCLOR 1260	14	<40	<8.0	6.5	varies	ug
TIME SAMPLED:	11:45 AM	11:30 AM	12:05 PM	11:50 AM		

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WW ENGINEERING & SCIENCE
ENVIRONMENTAL LABORATORY DIVISION

CLIENT: BENTELER INDUSTRIES, INC.
PROJECT NO.: 26363
LOCATION: .
SAMPLED BY: WILL BEATON
DESCRIPTION: PCB ANALYSIS

DATE SAMPLED: 05/10/91 *TIME:*
DATE RECEIVED: 05/10/91 *TIME:* 4:25 PM
DATE COMPLETED: 05/31/91
SCHEDULED COMPLETION: 05/31/91
ANALYST: CCH,MK
QUALITY CONTROL REVIEW BY: KVH
WORKSHEET NO: 21

	#5A	#6A	#7A	EQUIP. BLANK	DETECTION LIMIT	UNITS
LAB SAMPLE NO:	64868	64869	64870	64871		
PCB: AROCLOR 1242	5.0	7.0	5.0	<1.0	varies	ug
PCB: AROCLOR 1248	<4.0	<4.0	<2.0	<1.0	varies	ug
PCB: AROCLOR 1254	<4.0	<4.0	<2.0	<1.0	varies	ug
PCB: AROCLOR 1260	12	14	4.0	<1.0	varies	ug
TIME SAMPLED:	12:20 PM	12:15 PM	12:25 PM	12:30 PM		

WW ENGINEERING & SCIENCE
ENVIRONMENTAL LABORATORY DIVISION

CLIENT: BENTELER INDUSTRIES, INC.
PROJECT NO.: 26363
LOCATION:
SAMPLED BY: WILL BEATON
DESCRIPTION: PCB ANALYSIS

DATE SAMPLED: 05/10/91 TIME:
DATE RECEIVED: 05/10/91 TIME: 4:25 PM
DATE COMPLETED: 05/31/91
SCHEDULED COMPLETION: 05/31/91
ANALYST: MK
QUALITY CONTROL REVIEW BY: KVH
WORKSHEET NO: 22

	TRIP BLANK	DETECTION LIMIT	UNITS
LAB SAMPLE NO:	64872		
PCB: AROCLOR 1242	<1.0	1.0	ug
PCB: AROCLOR 1248	<1.0	1.0	ug
PCB: AROCLOR 1254	<1.0	1.0	ug
PCB: AROCLOR 1260	<1.0	1.0	ug

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ENVIRONMENTAL LABORATORY DIVISION

CLIENT: BENTELER INDUSTRIES, INC.
PROJECT NO.: 26363
LOCATION:
SAMPLED BY: DUDLEY PIERCE
DESCRIPTION: SOIL ANALYSIS

DATE SAMPLED: 00/00/00 TIME:
DATE RECEIVED: 05/08/91 TIME: 4:20 PM
DATE COMPLETED: 05/30/91
SCHEDULED COMPLETION: 05/30/91
ANALYST: CCH,MK,GR,SAT,JW
QUALITY CONTROL REVIEW BY: KVH,CS
WORKSHEET NO: 23

	1+15 E. DITCH	5+20 E. WALL	5+20 W. WALL	6+25 E. DITCH	DETECTION LIMIT	UNITS
LAB SAMPLE NO:	64649	64650	64651	64652		
ARSENIC,TOTAL	5,380	5,750	2,110	4,750	25	ug/kg
BARIUM,TOTAL	219	24	16	86	0.40	mg/kg
CADMIUM,TOTAL	9,170	93	95	8,630	40	ug/kg
CHROMIUM,TOTAL	145	5.4	4.7	447	0.40	mg/kg
COPPER,TOTAL	590	8.5	7.2	457	0.60	mg/kg
LEAD,TOTAL	588	11	6.4	376	1.0	mg/kg
MERCURY,TOTAL	780	<50	<50	566	50	ug/kg
SELENIUM,TOTAL	217*	<50	<50	729	50	ug/kg
SILVER,TOTAL	1,700	34	32	4,400	0.20	ug/kg
ZINC,TOTAL	598	15	15	1,880	0.40	mg/kg
DATE SAMPLED:	5/7/91	5/7/91	5/7/91	5/8/91		
TIME SAMPLED:	2:40 PM	3:25 PM	3:30 PM	9:05 AM		

*QUALITY CONTROL PERFORMANCE CRITERIA NOT MET FOR THIS PARAMETER, ALL OTHER PARAMETERS FELL WITHIN ACCEPTABLE QUALITY CONTROL LIMITS.

WW ENGINEERING & SCIENCE
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: BENTELER INDUSTRIES, INC.
PROJECT NO.: 26363
SAMPLE: 1+15 E. DITCH

DATE SAMPLED: 05/07/91 TIME: 2:40 PM
DATE RECEIVED: 05/08/91 TIME: 4:20 PM
DATE COMPLETED: 05/23/91

SAMPLE NO. 64649

COMPOUND	RESULT (ug/kg)	D.L.	COMPOUND	RESULT (ug/kg)	D.L.
BENZENE	*	10	TRANS-1,2-DICHLOROETHYLENE	*	10
BROMODICHLOROMETHANE	*	10	1,2-DICHLOROPROPANE	*	10
BROMOFORM	*	10	CIS-1,3-DICHLOROPROPYLENE	*	10
BROMOMETHANE	*	10	TRANS-1,3-DICHLOROPROPYLENE	*	10
CARBON TETRACHLORIDE	*	10	ETHYL BENZENE	98	10
CHLOROBENZENE	500	10	METHYLENE CHLORIDE	*	10
CHLORODIBROMOMETHANE	*	10	1,1,2,2-TETRACHLOROETHANE	*	10
CHLOROETHANE	*	10	TETRACHLOROETHYLENE	*	10
2-CHLOROETHYLVINYL ETHER	---	---	TOLUENE	31	10
CHLOROFORM	*	10	1,1,1-TRICHLOROETHANE	*	10
CHLOROMETHANE	---	---	1,1,2-TRICHLOROETHANE	*	10
1,1-DICHLOROETHANE	*	10	TRICHLOROETHYLENE	*	10
1,2-DICHLOROETHANE	*	10	TRICHLOROFLUOROMETHANE	*	10
1,1-DICHLOROETHYLENE	*	10	VINYL CHLORIDE	*	10

*COMPOUND NOT PRESENT AT DETECTION LIMIT

WW ENGINEERING & SCIENCE
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: BENTELER INDUSTRIES, INC.
PROJECT NO.: 26363
SAMPLE: 1+15 E. DITCH

DATE SAMPLED: 05/07/91 TIME: 2:40 PM
DATE RECEIVED: 05/08/91 TIME: 4:20 PM
DATE COMPLETED: 05/23/91

SAMPLE NO. 64649

COMPOUND	RESULT (ug/kg)	D.L.
XYLENE	400	10
CIS-1,2 DICHLORO-ETHYLENE	<10	10
1,2 DICHLOROBENZENE	780	10
1,3 DICHLOROBENZENE	240	10
1,4 DICHLOROBENZENE	410	10

WW ENGINEERING & SCIENCE
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: BENTELER INDUSTRIES, INC.
PROJECT NO.: 26363
SAMPLE: 5+20 E. SIDEWALL

DATE SAMPLED: 05/07/91 TIME: 3:25 PM
DATE RECEIVED: 05/08/91 TIME: 4:20 PM
DATE COMPLETED: 05/18/91

SAMPLE NO. 64650

COMPOUND	RESULT (ug/kg)	D.L.	COMPOUND	RESULT (ug/kg)	D.L.
BENZENE	*	10	TRANS-1,2-DICHLOROETHYLENE	*	10
BROMODICHLOROMETHANE	*	10	1,2-DICHLOROPROPANE	*	10
BROMOFORM	*	10	CIS-1,3-DICHLOROPROPYLENE	*	10
BROMOMETHANE	*	10	TRANS-1,3-DICHLOROPROPYLENE	*	10
CARBON TETRACHLORIDE	*	10	ETHYL BENZENE	*	10
CHLOROBENZENE	*	10	METHYLENE CHLORIDE	*	10
CHLORODIBROMOMETHANE	*	10	1,1,2,2-TETRACHLOROETHANE	*	10
CHLOROETHANE	*	10	TETRACHLOROETHYLENE	*	10
2-CHLOROETHYLVINYL ETHER	---	---	TOLUENE	*	10
CHLOROFORM	*	10	1,1,1-TRICHLOROETHANE	*	10
CHLOROMETHANE	---	---	1,1,2-TRICHLOROETHANE	*	10
1,1-DICHLOROETHANE	*	10	TRICHLOROETHYLENE	*	10
1,2-DICHLOROETHANE	*	10	TRICHLOROFLUOROMETHANE	*	10
1,1-DICHLOROETHYLENE	*	10	VINYL CHLORIDE	*	10

*COMPOUND NOT PRESENT AT DETECTION LIMIT

WW ENGINEERING & SCIENCE
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: BENTELER INDUSTRIES, INC.
PROJECT NO.: 26363
SAMPLE: 5+20 E. SIDEWALL

DATE SAMPLED: 05/07/91 TIME: 3:25 PM
DATE RECEIVED: 05/08/91 TIME: 4:20 PM
DATE COMPLETED: 05/18/91

SAMPLE NO. 64650

COMPOUND	RESULT (ug/kg)	D.L.
XYLENE	<10	10
CIS-1,2 DICHLORO-ETHYLENE	<10	10

WW ENGINEERING & SCIENCE
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: BENTELER INDUSTRIES, INC.
PROJECT NO.: 26363
SAMPLE: 5+20 W. SIDEWALL

DATE SAMPLED: 05/07/91 TIME: 3:30 PM
DATE RECEIVED: 05/08/91 TIME: 4:20 PM
DATE COMPLETED: 05/18/91

SAMPLE NO. 64651

COMPOUND	RESULT (ug/kg)	D.L.	COMPOUND	RESULT (ug/kg)	D.L.
BENZENE	*	10	TRANS-1,2-DICHLOROETHYLENE	*	10
BROMODICHLOROMETHANE	*	10	1,2-DICHLOROPROPANE	*	10
BROMOFORM	*	10	CIS-1,3-DICHLOROPROPYLENE	*	10
BROMOMETHANE	*	10	TRANS-1,3-DICHLOROPROPYLENE	*	10
CARBON TETRACHLORIDE	*	10	ETHYL BENZENE	*	10
CHLOROBENZENE	*	10	METHYLENE CHLORIDE	*	10
CHLORODIBROMOMETHANE	*	10	1,1,2,2-TETRACHLOROETHANE	*	10
CHLOROETHANE	*	10	TETRACHLOROETHYLENE	*	10
2-CHLOROETHYLVINYL ETHER	---	---	TOLUENE	*	10
CHLOROFORM	*	10	1,1,1-TRICHLOROETHANE	*	10
CHLOROMETHANE	---	---	1,1,2-TRICHLOROETHANE	*	10
1,1-DICHLOROETHANE	*	10	TRICHLOROETHYLENE	*	10
1,2-DICHLOROETHANE	*	10	TRICHLOROFLUOROMETHANE	*	10
1,1-DICHLOROETHYLENE	*	10	VINYL CHLORIDE	*	10

*COMPOUND NOT PRESENT AT DETECTION LIMIT

WW ENGINEERING & SCIENCE
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: BENTELER INDUSTRIES, INC.
PROJECT NO.: 26363
SAMPLE: 5+20 W. SIDEWALL

DATE SAMPLED: 05/07/91 TIME: 3:30 PM
DATE RECEIVED: 05/08/91 TIME: 4:20 PM
DATE COMPLETED: 05/18/91

SAMPLE NO. 64651

COMPOUND	RESULT (ug/kg)	D.L.
XYLENE	<10	10
CIS-1,2 DICHLORO-ETHYLENE	<10	10

WW ENGINEERING & SCIENCE
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: BENTELER INDUSTRIES, INC.
PROJECT NO.: 26363
SAMPLE: 6+25 E. DITCH

DATE SAMPLED: 05/08/91 TIME: 9:05 AM
DATE RECEIVED: 05/08/91 TIME: 4:20 PM
DATE COMPLETED: 05/23/91

SAMPLE NO. 64652

COMPOUND	RESULT (ug/kg)	D.L.	COMPOUND	RESULT (ug/kg)	D.L.
BENZENE	*	10	TRANS-1,2-DICHLOROETHYLENE	*	10
BROMODICHLOROMETHANE	*	10	1,2-DICHLOROPROPANE	*	10
BROMOFORM	*	10	CIS-1,3-DICHLOROPROPYLENE	*	10
BROMOMETHANE	*	10	TRANS-1,3-DICHLOROPROPYLENE	*	10
CARBON TETRACHLORIDE	*	10	ETHYL BENZENE	16	10
CHLOROBENZENE	*	10	METHYLENE CHLORIDE	*	10
CHLORODIBROMOMETHANE	*	10	1,1,2,2-TETRACHLOROETHANE	*	10
CHLOROETHANE	*	10	TETRACHLOROETHYLENE	*	10
2-CHLOROETHYLVINYL ETHER	---	---	TOLUENE	*	10
CHLOROFORM	*	10	1,1,1-TRICHLOROETHANE	*	10
CHLOROMETHANE	---	---	1,1,2-TRICHLOROETHANE	*	10
1,1-DICHLOROETHANE	*	10	TRICHLOROETHYLENE	*	10
1,2-DICHLOROETHANE	*	10	TRICHLOROFLUOROMETHANE	*	10
1,1-DICHLOROETHYLENE	*	10	VINYL CHLORIDE	*	10

*COMPOUND NOT PRESENT AT DETECTION LIMIT

WW ENGINEERING & SCIENCE
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: BENTELER INDUSTRIES, INC.
PROJECT NO.: 26363
SAMPLE: 6+25 E. DITCH

DATE SAMPLED: 05/08/91 TIME: 9:05 AM
DATE RECEIVED: 05/08/91 TIME: 4:20 PM
DATE COMPLETED: 05/23/91

SAMPLE NO. 64652

COMPOUND	RESULT (ug/kg)	D.L.
XYLENE	<10	10
CIS-1,2 DICHLORO-ETHYLENE	<10	10

WW ENGINEERING & SCIENCE
ENVIRONMENTAL LABORATORY DIVISION

CLIENT: BENTELER INDUSTRIES, INC.
PROJECT NO.: 26363
LOCATION:
SAMPLED BY: WILLIAM BEATON
DESCRIPTION: PCB ANALYSIS

DATE SAMPLED: 08/08/91 TIME:
DATE RECEIVED: 08/08/91 TIME: 3:20 PM
DATE COMPLETED: 08/09/91
SCHEDULED COMPLETION: 08/09/91
ANALYST: CCH
QUALITY CONTROL REVIEW BY: WH
WORKSHEET NO: 1

	1400'	1425'	1450'	DETECTION LIMIT	UNITS
LAB SAMPLE NO:	70735	70736	70737		
PCB: AROCLOR 1242	<0.033	<0.033	<0.033	0.033	mg/kg
PCB: AROCLOR 1248	<0.033	<0.033	<0.033	0.033	mg/kg
PCB: AROCLOR 1254	<0.033	<0.033	<0.033	0.033	mg/kg
PCB: AROCLOR 1260	<0.033	<0.033	<0.033	0.033	mg/kg
TIME SAMPLED:	11:25 AM	11:30 AM	11:55 AM		

ALL RESULTS ARE CALCULATED ON A "WET WEIGHT" BASIS

5555 GLENWOOD HILLS PARKWAY SE • PO BOX 874 • GRAND RAPIDS MI 49588-0874 • (616) 942-9600 FX (616) 942-6499

APPENDIX D

CHAIN OF CUSTODY RECORD

WW Engineering & Science, Inc.
Environmental Laboratory Division
[illegible] Glenwood Hills Pkwy SE • PO Box [illegible]
Grand Rapids, Michigan [illegible]

Chain of Custody Record

№ 20724

Project No.: 21981
Project Name: BENTELER
Samplers (signature): William W. Beaton

Date	Time	Matrix*	Comp	GRAB	Sample I.D.	No. of Containers	Container Type & Volume	Preservation Method	Analysis Required/Comments
5/10/91	11:45A	HW		X	WIPE #1A	1	125 ML	HEXANE	PCB (AROCLORS 1242, 1248, 1254, 1260)
5/10/91	11:30A	HW		X	WIPE #2A	1	125 ML	HEXANE	"
5/10/91	12:00P	HW		X	WIPE #3A	1	125 ML	HEXANE	"
5/10/91	11:50A	HW		X	WIPE #4A	1	125 ML	HEXANE	"
5/10/91	12:20P	HW		X	WIPE #5A	1	125 ML	HEXANE	"
5/10/91	12:15P	HW		X	WIPE #6A	1	125 ML	HEXANE	"
5/10/91	12:25P	HW		X	WIPE #7A	1	125 ML	HEXANE	"
5/9/91	8:10	HW		X	TAIP BLANK	1	125 ML	HEXANE	"
5/10/91	12:30P	HW		X	EQUIPMENT BLANK	1	125 ML	HEXANE	"

Relinquished by: (signature)	Date / Time	Received by:	Relinquished by:	Date / Time	Received by: (signature)
William W. Beaton	5/10/91 4:25				

Dispatched by: (signature)	Date / Time	Carrier:	Received to lab by:	Date / Time	Logged in by:	Date/Time
			K. Hoover	5/10/91 4:25		

* MATRIX: WATER (WTR), WASTEWATER (WW), SOIL (SOL), SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

03 EDI/Chain of Cust-Disk Files

WW Engineering & Science, Inc.
Environmental Laboratory Division
8855 Glenwood Hills Pkwy SE • PO Box 874
Grand Rapids, Michigan 49588-0874

Chain of Custody Record

№ 20499

Project No.	Project Name
21981	Bantler

Samplers (signature): Eric Meyers / Dudley Pierce

Date	Time	Matrix*	Comp	GRAB	Sample I.D.	No. of Containers	Container Type & Volume	Preservation Method	Analysis Required/Comments
5/3/91	12:15 pm			X	SS# 7 N-W. SUMP INSIDE BUTLER	2	1000 ML AMB		
5/3/91	12:25 pm			X	SS# 8 S.E. OF BUTLER BUILDING OUTSIDE	1	250 ML AMB.		

Relinquished by: (signature)	Date / Time	Received by:	Relinquished by:	Date / Time	Received by: (signature)
Dudley Pierce	5-3-91 2:50 Pm				
Dispatched by: (signature)	**Date / Time**	**Carrier:**	**Received to lab by:**	**Date / Time**	**Logged in by:** / **Date/Time**
			K. Hoover	2:55 P 5/3/91	

* MATRIX: WATER (WTR), WASTEWATER (WW), SOIL (SOL), SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

03 EDI/Chain of Cu

WW Engineering & Science, Inc.
Environmental Laboratory Division
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Grand Rapids, Michigan 49588-0874

Chain of Custody Record

№ 20628

Project No. 24481

Project Name Bentele

Samplers (signature) [signature] [signature]

Date	Time	Matrix*	Comp	GRAB	Sample I.D.	No. of Containers	Container Type & Volume	Preservation Method	Analysis Required/Comments
5/3/91	10:40 AM			X	Primary Cavities	1	250 ML AMB		
5/3/91	11:10 AM			X	WIPE #1 Concrete outside	1	125 ML AMB		100 CM
5/3/91	11:20 AM			X	WIPE #2 Concrete Outside	1	125 ML AMB		
5/3/91	11:24 AM			X	EQUIPMENT BLANK OUTSIDE Butler Building	1	125 ML AMB		
5/3/91	11:32 AM			X	WIPE #3 S.W. CORNER BUTLER BUILDING	1	125 AMB		
	11:35 AM			X	WIPE #4 N.W. CORNER BUTLER BUILDING	1	125 AMB		
	11:40 AM				EQUIPMENT BLANK	1	125 AMB		
	11:45 AM				WIPE #5 N.E. CORNER BUTLER BUILDING	1	125 ML AMB		
	11:50 AM				WIPE #6 S.E. CORNER BUTLER BUILDING	1	125 ML AMB		
	11:56 AM				WIPE #7 CENTER OF BUTLER BUILDING	1	125 ML AMB		

Relinquished by: (signature)	Date / Time	Received by:	Relinquished by:	Date / Time	Received by: (signature)
[signature]	5-3-91 2:50 Pm				

Dispatched by: (signature)	Date / Time	Carrier:	Received to lab by:	Date / Time	Logged in by:	Date/Time
			K. Hoover	2:55P 5/3/91		

* MATRIX: WATER (WTR), WASTEWATER (WW), SOIL (SOL), SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

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Environmental Laboratory Division
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Grand Rapids, Michigan 49588-0874

Chain of Custody Record

№ 20627

Project No. 21981
Project Name Benteler
Samplers (signature) Eric Meyers / Dudley Pierce

Date	Time	Matrix*	Comp	GRAB	Sample I.D.	No. of Containers	Container Type & Volume	Preservation Method	Analysis Required/Comments
5/2/91	1:45pm			X	SS#1	1	250 ML AMB		
5/2/91	2:14pm			X	SS#2 Truck Box	1	250 ML AMB		
5/2/91	2:30pm			X	SS#3 Parking lot	1	250 ML AMB		
5/2/91	3:00pm			X	SS#4 Power Station - Head wall	1	250 ML AMB		
5/2/91	3:14pm			X	SS#5 By Treatment Plant	2	1000 ML AMB		
5/2/91	4:00pm			X	Inside Building SS#6	1	250 ML AMB		
5/2/91	4:50pm			X	Final Clarifier	1	250 ML AMB		

Relinquished by: (signature)	Date / Time	Received by:	Relinquished by:	Date / Time	Received by: (signature)
Dudley Pierce	8:00AM 5-3-91				[illegible]
Dispatched by: (signature)	**Date / Time**	**Carrier:**	**Received to lab by:**	**Date / Time**	**Logged in by:** / **Date/Time**

* MATRIX: WATER (WTR), WASTEWATER (WW), SOIL (SOL), SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

03 EDI/Chain of Cust-Disk Files

WW Engineering & Science, Inc.
Environmental Laboratory Division
[illegible] Glenwood Hills Pkwy SE • PO Box [illegible]
Grand Rapids, Michigan [illegible]

Chain of Custody Record

№ 19087

307

Project No.	Project Name
21981	BENTELER PRODUCTS

Samplers (signature)

Date	Time	Matrix*	Comp	GRAB	Sample I.D.	No. of Containers	Container Type & Volume	Preservation Method	Analysis Required/Comments
5/7/91	235p	SOL		✓	0+62 W S10 EWALL	1			4 PCB AROCLORS
"	240p	"		/	1+15 ℄ DIT CH	2	/		4 PCB AROCLORS MDNR SCAN 1 & 2 MI 10 METALS
"	245p	"		✓	1+46 E S10 EWALL	1			4 PCB AROCLORS
"	305p	"		✓	2+30 W S10 EWALL	1			
"	255p	"		✓	2+30 E S10 EWALL	1			
"	310p	"		✓	3+25 ℄ DIT CH	1			
"	320p	"		✓	4+38 W S10 EWALL	1			
"	325p	"		✓	5+20 E S10 EWALL	2	✓		4 PCB AROCLOR MDNR SCAN 1 & 2 MI 10 METALS
"	330p	"		✓	5+20 W S10 EWALL	2	✓		4 PCB AROCLOR MDNR SCAN 1 & 2 MI 10 METALS

Relinquished by: (signature)	Date / Time	Received by:	Relinquished by:	Date / Time	Received by: (signature)
[signature]	5-8-91 4:15 pm				

Dispatched by: (signature)	Date / Time	Carrier:	Received to lab by:	Date / Time	Logged in by:	Date/Time
			K. Hoover	4:20P 5/8/91	[signature]	10:00 5/9/91

* MATRIX: WATER (WTR), WASTEWATER (WW), SOIL (SOL), SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

[illegible]/Chain of Cust Disk Files

WW Engineering & Science, Inc.
Environmental Laboratory Division
4800 Glenwood Hills Pkwy SE • PO Box 974
Grand Rapids, Michigan 49509-0974

Chain of Custody Record

№ 20295

307

Project No.	Project Name
21981	Benteler

Samplers (signature): Dudley Pieri

Date	Time	Matrix*	Comp	GRAB	Sample I.D.	No. of Containers	Container Type & Volume	Preservation Method	Analysis Required/Comments
5-8-91	9:05 ~~8:40~~	Sol			6+25 ℄ Ditch	2 ✓	1-250 ML Amber 1-125 ML Clear	Cooler	4 PCB AROCLORS MDNR SCAN 1 & 2 MI 10 METALS
"	9:15	"			7+25 W-Sidewall	1	1-250 ML	"	4 PCB AROCLORS
"	9:20	"			7+25 ℄ Ditch	1	"	"	
"	9:25	"			7+20 E-Sidewall	1	"	"	
"	9:43	"			8+75 ℄ Ditch	1	"	"	
"	9:48	"			10+00 ℄ Ditch	1	"	"	
"	9:50	"			11+25 ℄ Ditch	1	"	"	
"	9:55	"			12+50 ℄ Ditch	1	"	"	
"	10:20	"			TRANS. AREA East Sample	1	"	"	
"	10:25	"			Trans. Area West Sample	1	"	"	

Relinquished by: (signature)	Date / Time	Received by:	Relinquished by:	Date / Time	Received by: (signature)
Dudley Pieri	5-8-91 4:15 AM				

Dispatched by: (signature)	Date / Time	Carrier:	Received to lab by:	Date / Time	Logged in by:	Date/Time
			K Hoover	5/8/91 4:20 P	[signature]	10:00 5/9/91

* MATRIX: WATER (WTR), WASTEWATER (WW), SOIL (SOL), SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

03 EDI/Chain of Cust Disk Files

WW Engineering & Science, Inc.
Environmental Laboratory Division
4444 Glenwood Hills Pkwy SE • PO Box 636
Grand Rapids, Michigan 49509-0636

Chain of Custody Record

№ 27166

Project No. 21981

Project Name: BENTELER

Samplers (signature): William Beaton

Date	Time	Matrix*	Comp	GRAB	Sample I.D.	No. of Containers	Container Type & Volume	Preservation Method	Analysis Required/Comments
8/8/91	11:25A	SOIL ~~HW~~		X	1400	1	125ML	NA	PCB 1242 1248 1254 1260 24HR
	11:30A	SOIL		X	1425	1	125ML	NA	24 HR TURN
	11:55A	SOIL		X	1450	1	125ML	NA	24 HR TURN
	12:00P	SOIL		X	1550	1	125ML	NA	HOLD
	12:05P	SOIL		X	1575	1	125ML	NA	
	12:10P	SOIL		X	1600	1	125ML	NA	
	12:15P	SOIL		X	1700	1	125ML	NA	
	12:18P	SOIL		X	1725	1	125ML	NA	
	12:25P	SOIL		X	1750	1	125ML	NA	
	12:30P	SOIL		X	1850	1	125ML	NA	

Relinquished by: (signature)	Date / Time	Received by:	Relinquished by:	Date / Time	Received by: (signature)
William Beaton	8/8 320				

Dispatched by: (signature)	Date / Time	Carrier:	Received to lab by:	Date / Time	Logged in by:	Date/Time
			[illegible]	8/8/91 3:20		

* MATRIX: WATER (WTR), WASTEWATER (WW), SOIL (SOL), SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

03 EDI/Chain of Cust Disk Files

APPENDIX E

PCB WIPE SAMPLE PROCEDURE

WIPE SAMPLES

GOAL:

To obtain a sample from the surface of a relatively impermeable surface to determine if contamination exists on that surface.

Wipe samples are typically taken from surfaces such as metal, concrete, brick, or some other similar media. This method is particularly useful when it is impractical to obtain a sample of the media.

TASK SPECIFIC EQUIPMENT NEEDED:

- wipe sampling kit, supplied by the lab
- safety glasses with side shields
- stainless steel tongs
- metric measuring device

PROCEDURE:

The wipe sampling kit normally contains a 125 ml amber glass bottle with a sterile gauze pad containing approximately 60 ml of liquid solvent. The liquid solvent is able to preserve the suspected contaminant in solution (e.g., hexane, nitric acid). Stainless steel tongs are used to handle the gauze during the sampling procedure.

1. Set up the sampling container in a convenient location.

2. Put on appropriate protective gloves and OSHA approved glasses with side shields.

3. Identify the actual wipe area by outlining a 10x10 centimeter area.

4. Use the stainless steel tongs to extract the gauze pad from the bottle.

5. Wipe the entire marked area with the gauze pad.

6. Return the gauze pad to the sample bottle.

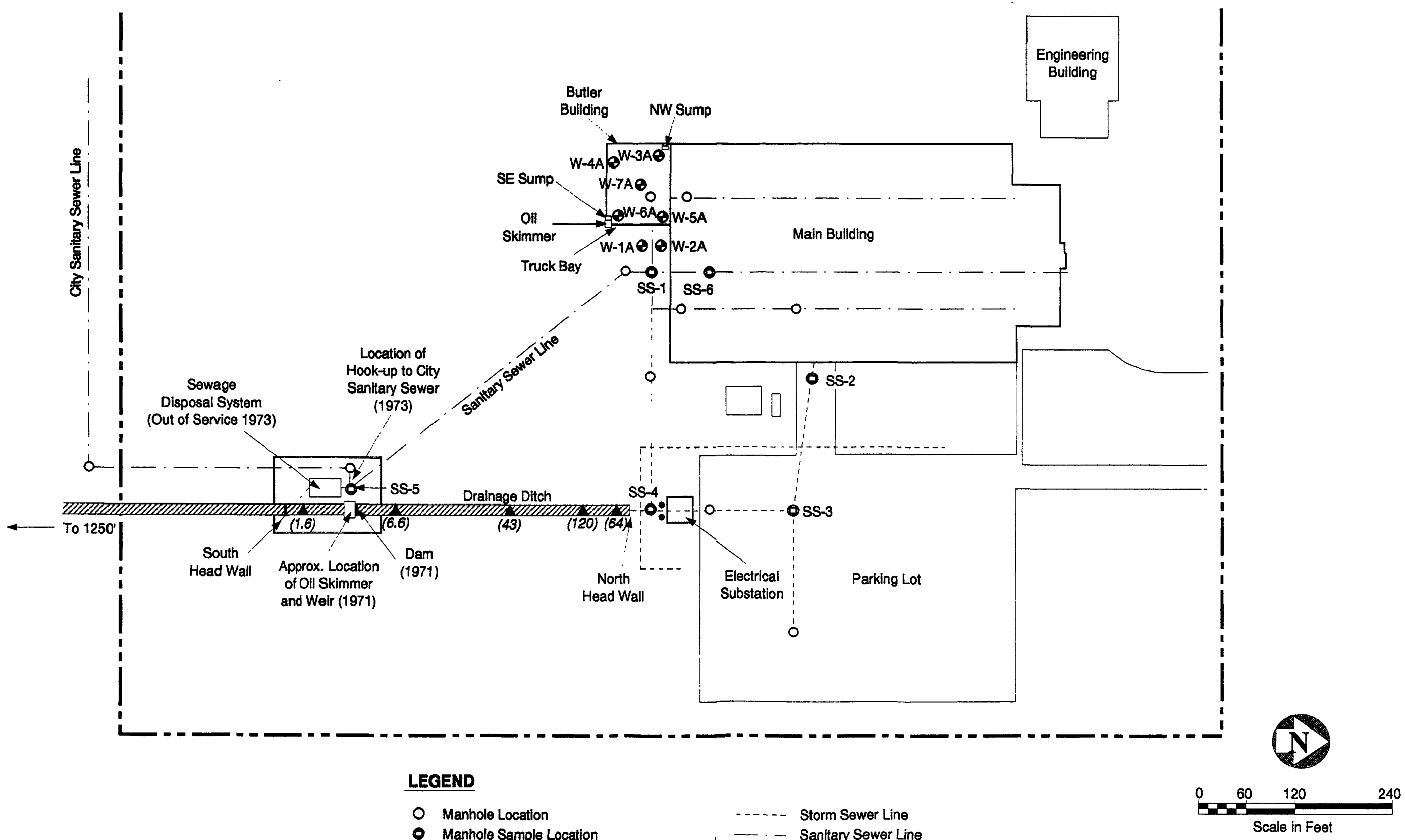
7. Seal the sample container.

8. Secure the properly labeled tag to the sample bottle.

9. Complete the chain-of-custody, noting that the wipe area is 100 square centimeters.

FIGURES

21981/0691/05 SM



LEGEND

- Manhole Location
- Manhole Sample Location
- Wipe Sample Location
- Surface Soil Sample Location
- (6.6) Approximate Location of Previous Sample (10/2/89) with Concentration of Total PCB's (mg/kg/)
- Storm Sewer Line
- Sanitary Sewer Line
- Area Illustrated on Figure 1.2
- Area Illustrated on Figure 2.1
- Area Illustrated on Figure 3.1

Figure 1.0

Site Map

Benteler Industries
Galesburg, Michigan

June, 1991 21981

WW Engineering & Science

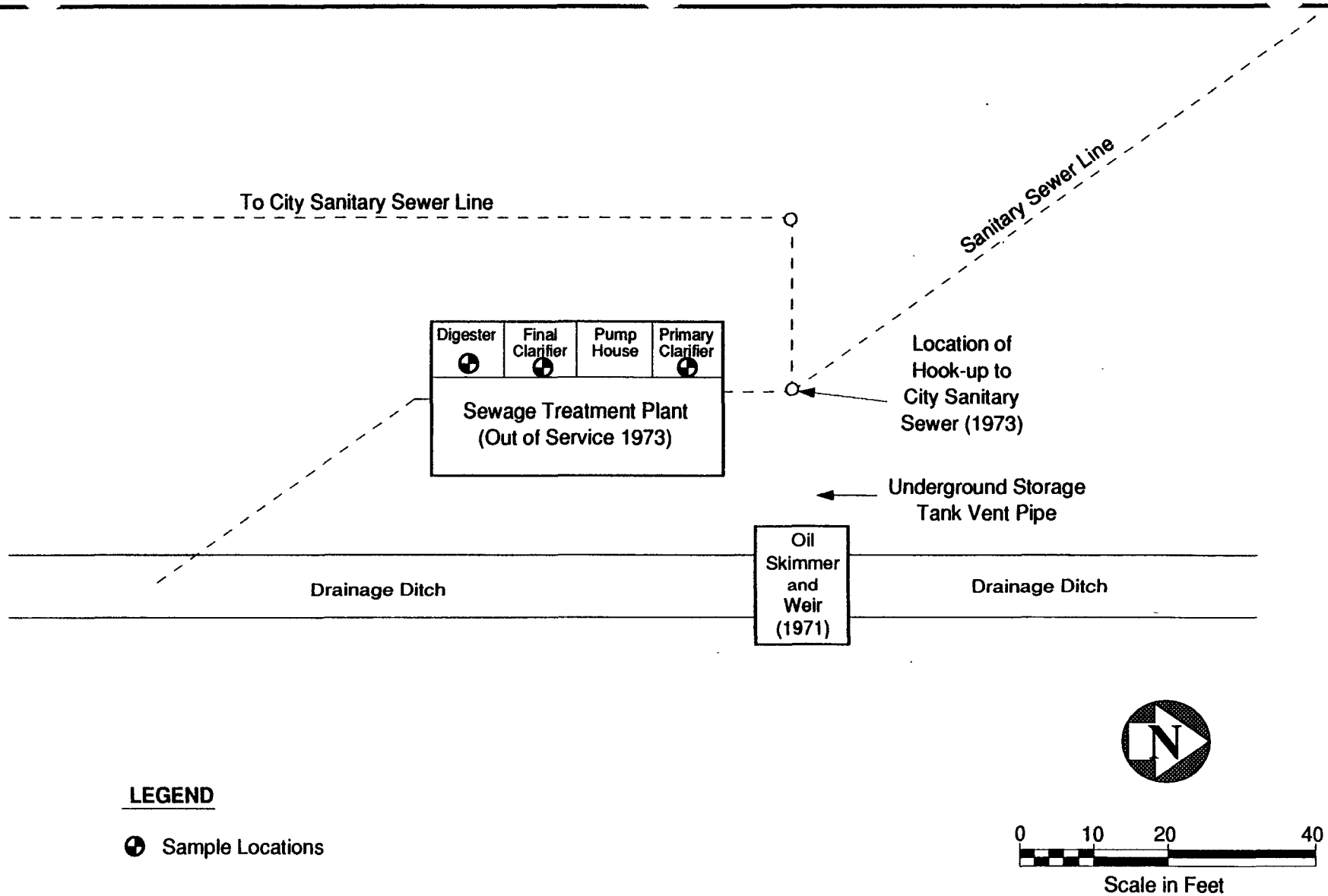


Figure 1.1

Sewage Treatment Plant

Benteler Industries
Galesburg, Michigan

June, 1991

21981

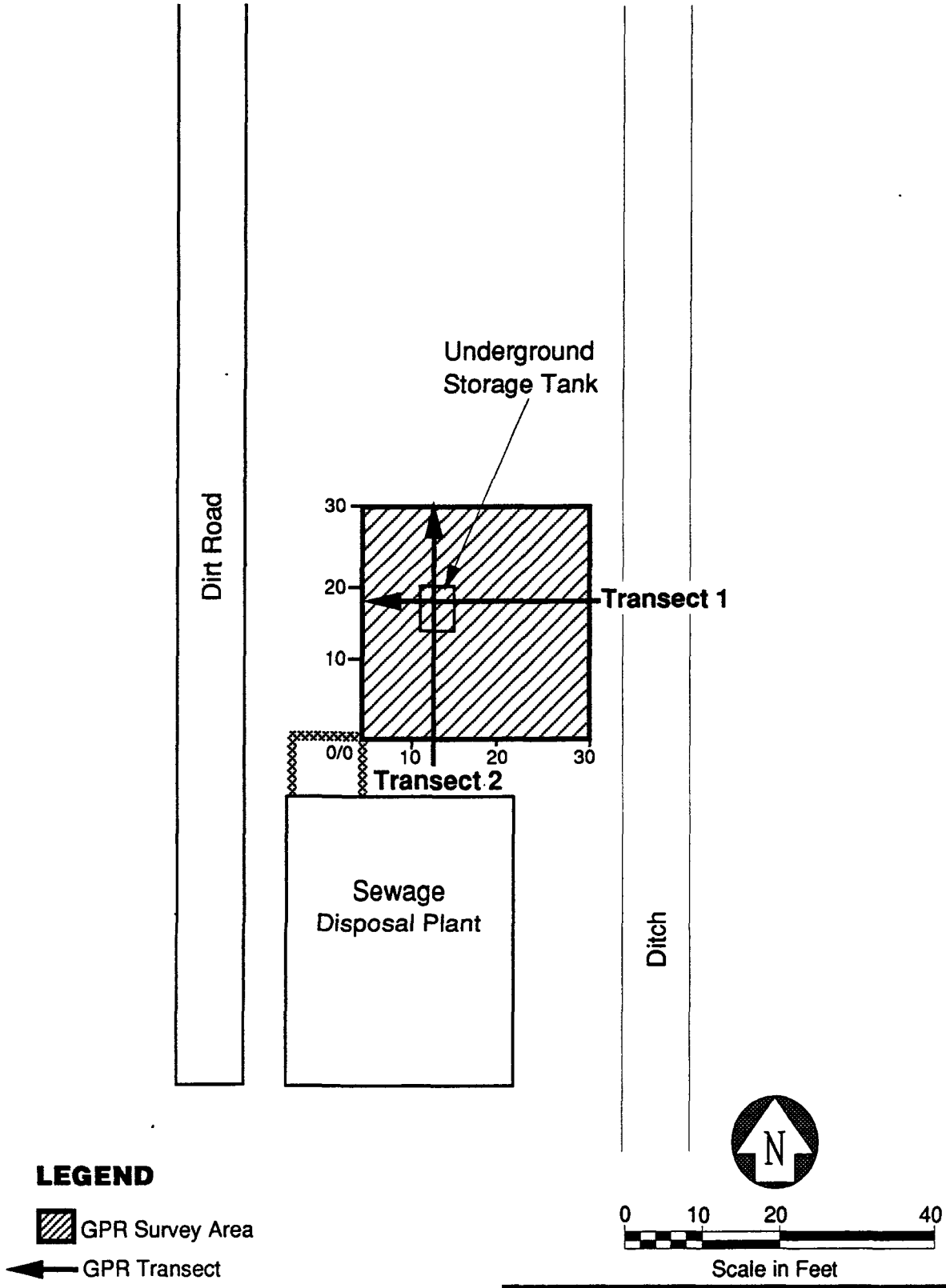


Figure 1.2
Site Map
Benteler Industries
Galesburg, Michigan

June 1991 21981

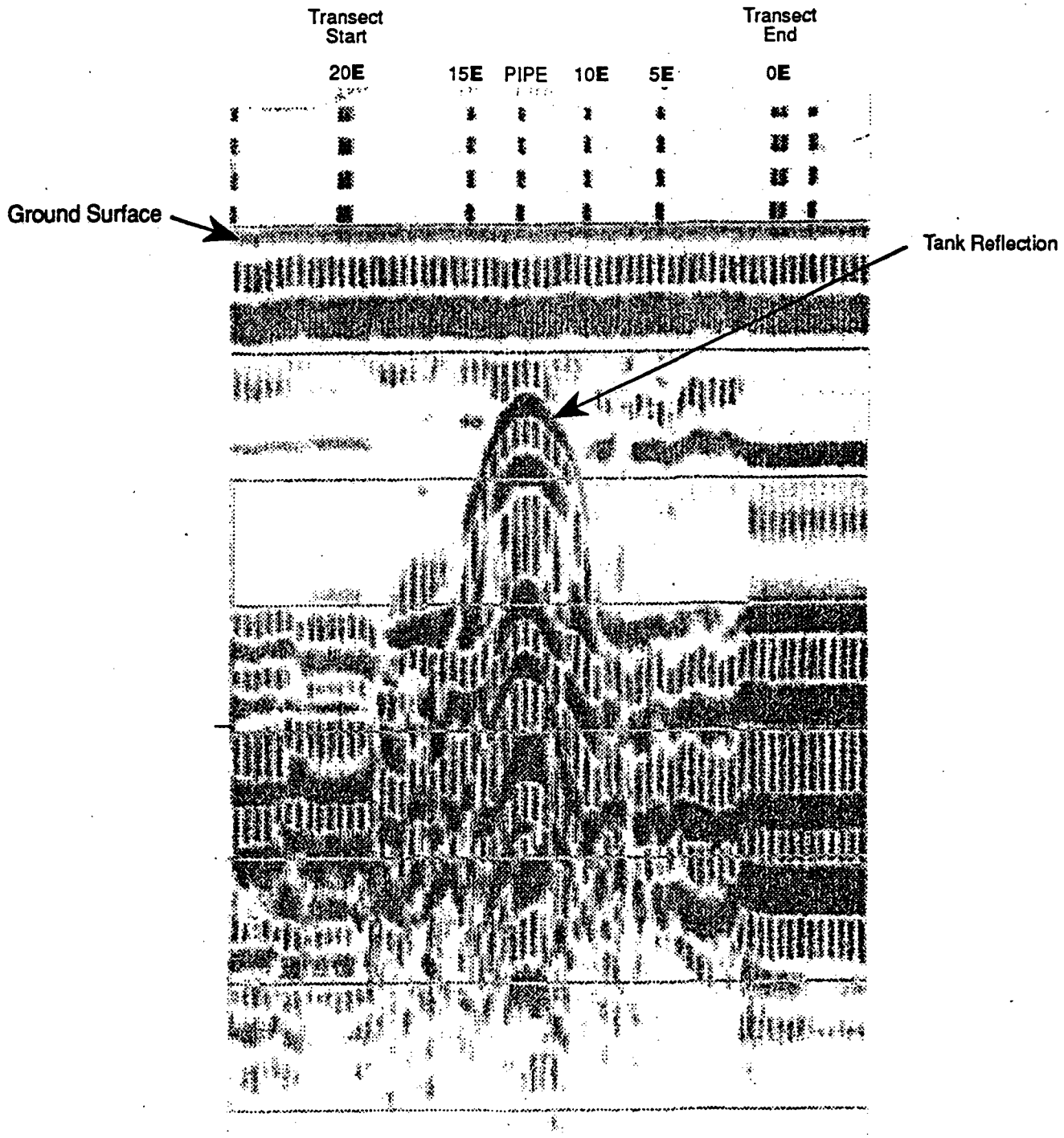


Figure 1.3
GPR Transect 1
⊥ to Long Axis of Tank, Start = 18N,20E End = 18N, 0E
Benteler Industries
Galesburg, Michigan

June 1991 21981

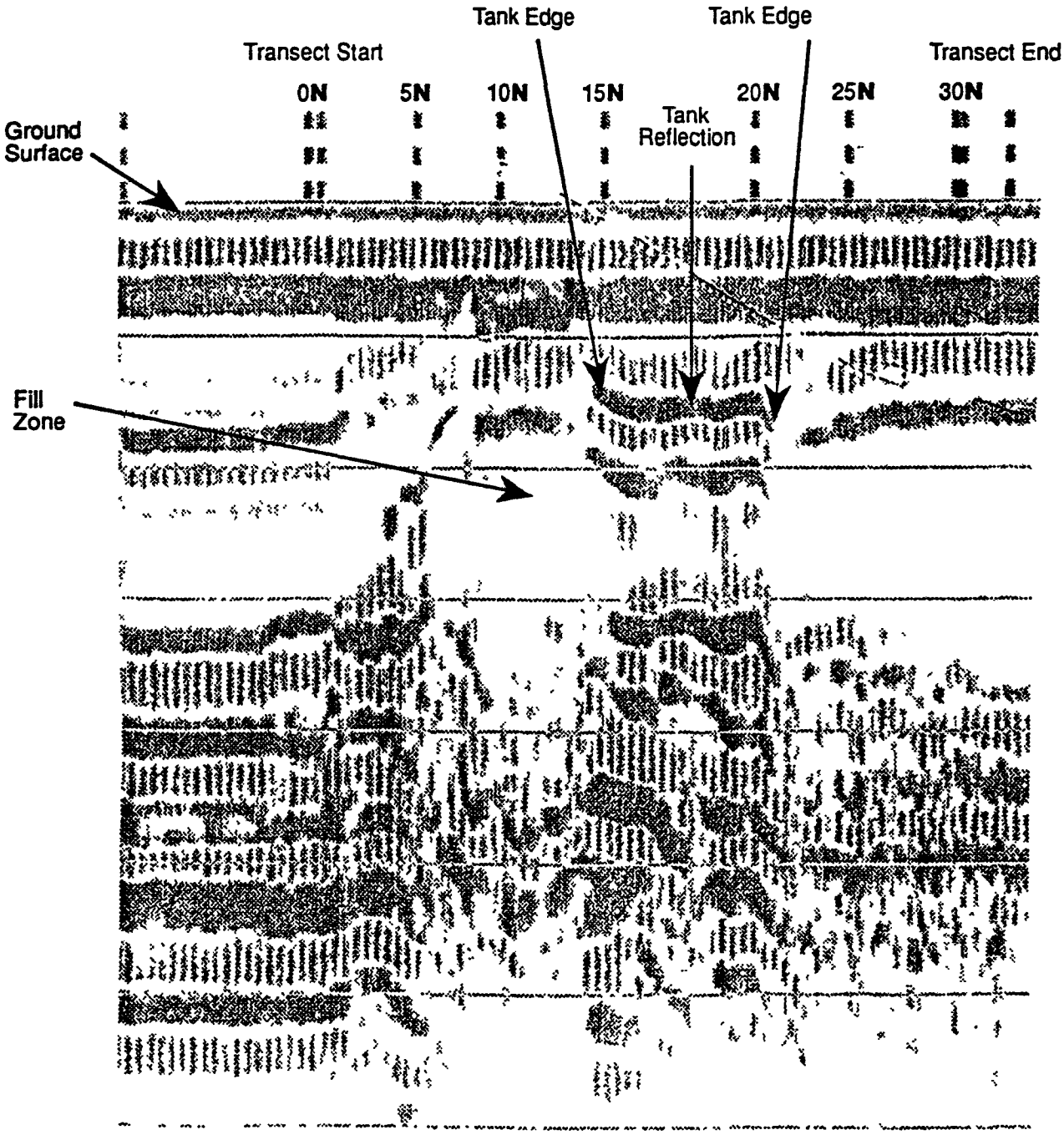
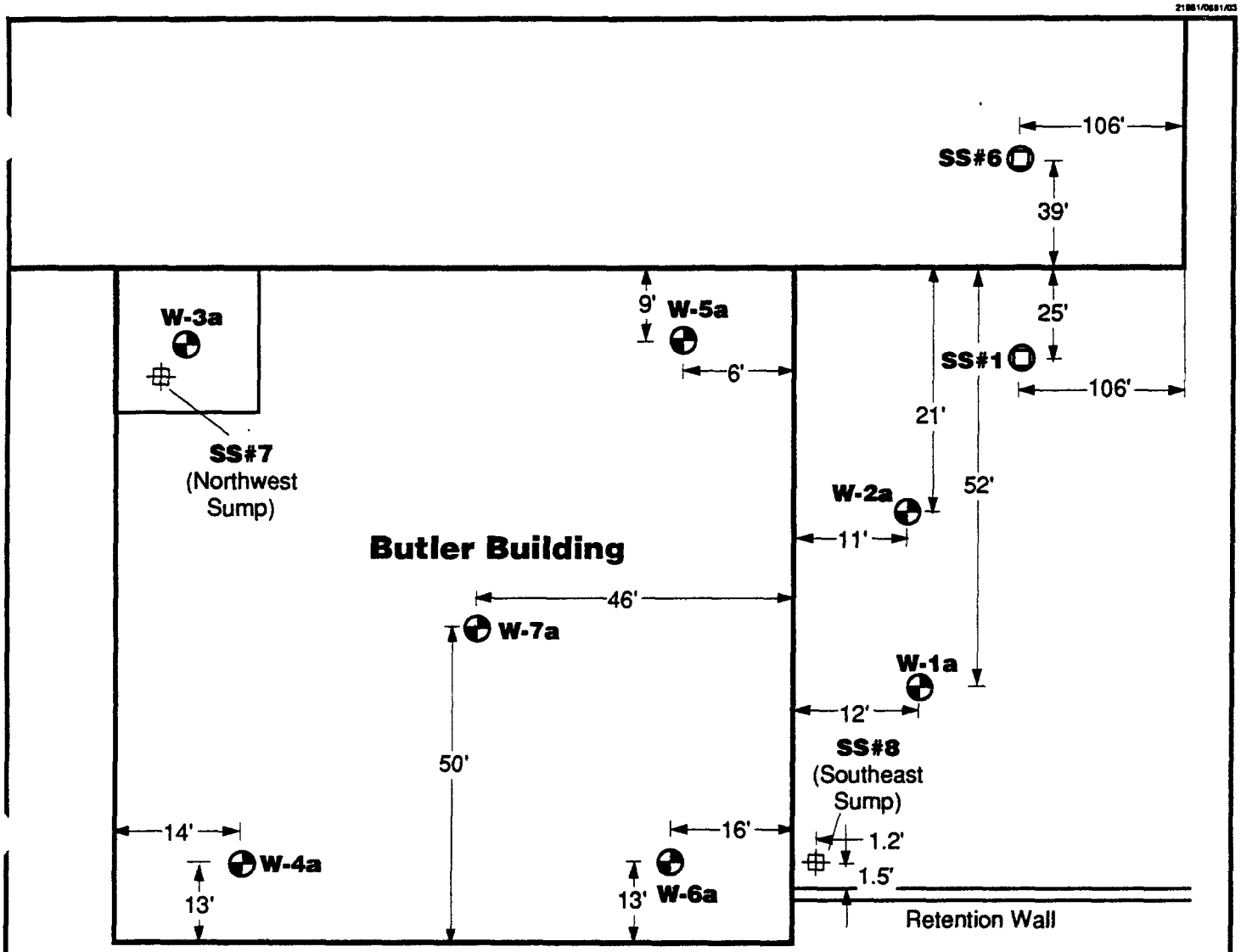


Figure 1.4
GPR Transect 2
// to Long Axis of Tank, Start = 0N,12E End = 30N, 12E
Benteler Industries
Galesburg Michigan

June 1991 21981



Legend

- Wipe Sample Location
- Manhole Sample Location
- Sump Sample

N

Not to Scale

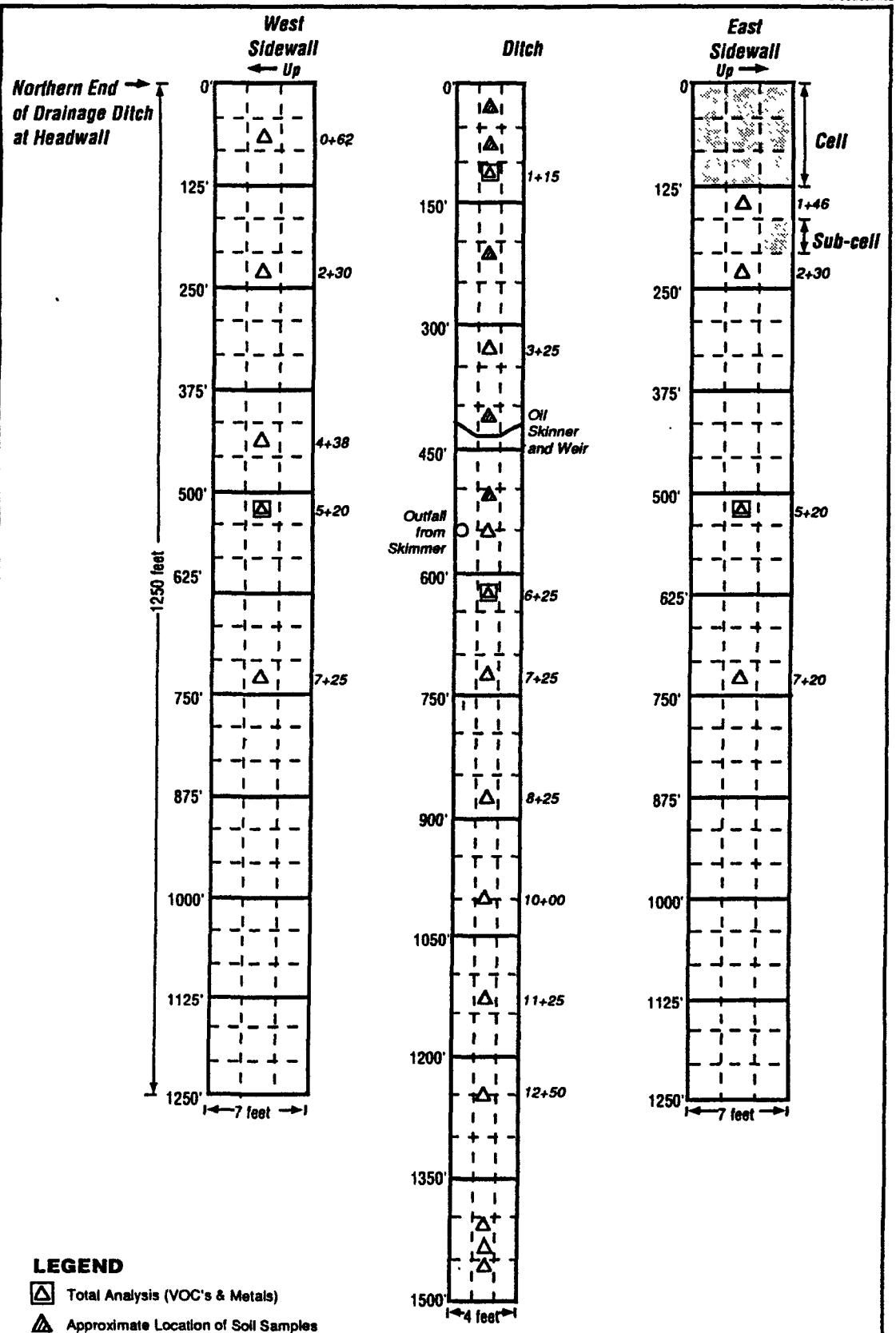
Figure 2.1

Butler Building Sample Locations

Benteler Industries
Galesburg, Michigan

June, 1991 21981

WW Engineering & Science



LEGEND

- Total Analysis (VOC's & Metals)
- Approximate Location of Soil Samples Collected 10/02/89
- Soil Sample Locations at 0 to 0.5 Foot Depth

Figure 3.1

Drainage Ditch Sample Locations

BENTELER INDUSTRIES

Galesburg, Michigan

June, 1991

21981

WW Engineering & Science

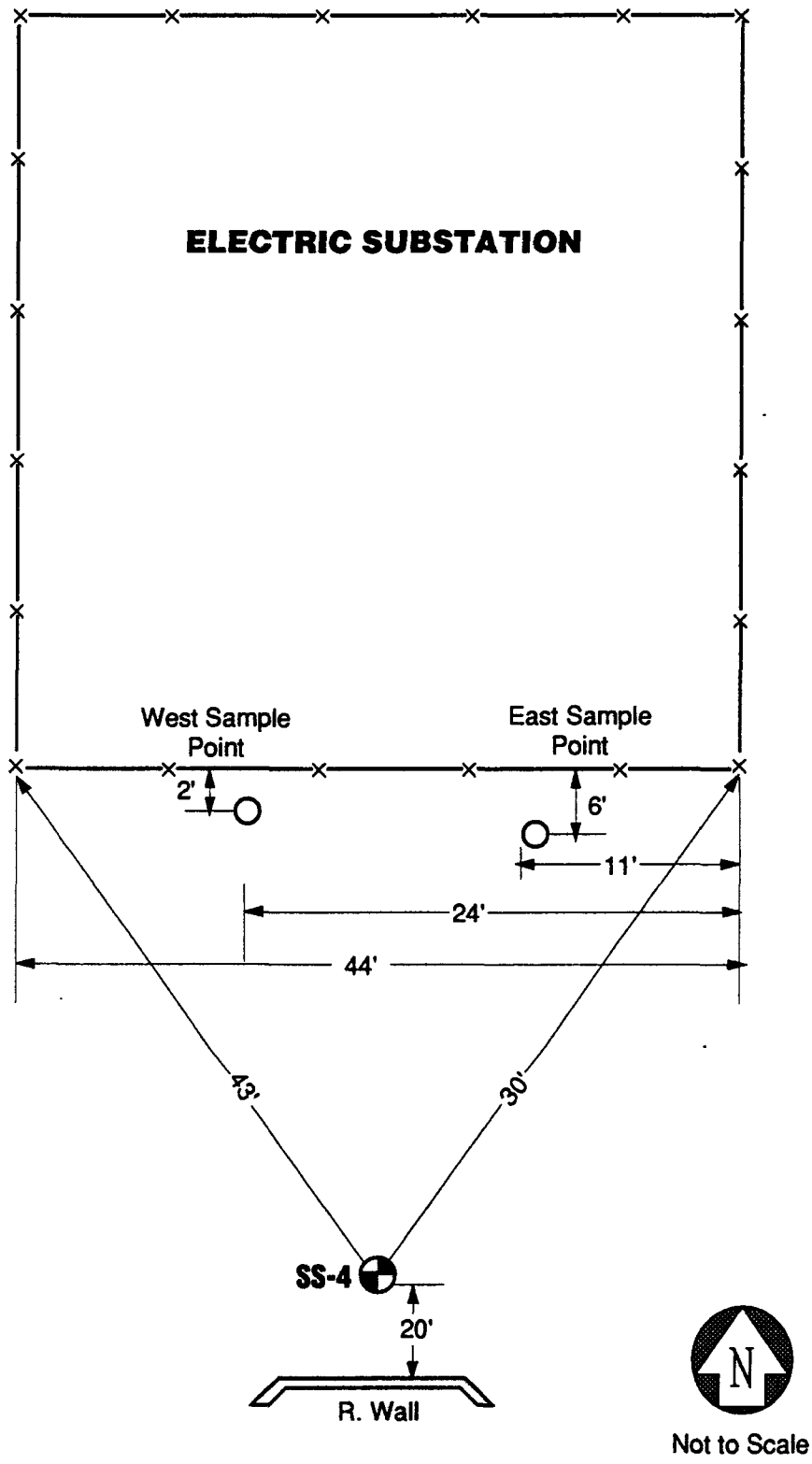


Figure 3.2

Soil Sample Locations

Benteler Industries
Galesburg, Michigan

June, 1991 21981

Tables

Table 1.1
Sewage Treatment Plant
Analytical Results for Sludge Samples
(Units in ug/kg)

Site Name: Sample Date: Sample Id:	Final Clarifier 05/02/91 E64239		Digester Sludge 04/30/91 E64241		Primary Clarifier 05/03/91 E64359	
Parameter	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit
PCB: Aroclor 1242	ND	33	ND	240	ND	33
PCB: Aroclor 1248	ND	33	ND	240	ND	33
PCB: Aroclor 1254	ND	33	ND	33	ND	33
PCB: Aroclor 1260	ND	33	46	33	ND	33

ND = Non Detectable

Table 2.1
Butler Building
Analytical Results for PCB Samples
(Units as indicated)

Site Name:	#3A		#4A		#5A		#6A		#7A	
Sample Date:	05/10/91		05/10/91		05/10/91		05/10/91		05/10/91	
Sample Id:	E64866		E64867		E64868		E64869		E64870	
Sample Type:	PCB Wipe		PCB Wipe		PCB Wipe		PCB Wipe		PCB Wipe	
Units:	ug/100cm2		ug/100cm2		ug/100cm2		ug/100cm2		ug/100cm2	
Parameter	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit
PCB: Aroclor 1242	ND	6.0	ND	4.0	5.0	4.0	7.0	4.0	5.0	2.0
PCB: Aroclor 1248	ND	6.0	ND	4.0	ND	4.0	ND	4.0	ND	2.0
PCB: Aroclor 1254	ND	8.0	ND	4.0	ND	4.0	ND	4.0	ND	2.0
PCB: Aroclor 1260	ND	8.0	6.5	4.0	12	4.0	14	4.0	4.0	2.0

Site Name:	Equipment Blank		Trip Blank		#8 SE SUMP		#7 NW SUMP	
Sample Date:	05/10/91		05/10/91		05/03/91		05/03/91	
Sample Id:	E64871		E64872		E64360		E64361	
Sample Type:	PCB Wipe		PCB Wipe		Grab Sample		Grab Sample	
Units:	ug/100cm2		ug/100cm2		ug/kg		ug/L	
Parameter	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit
PCB: Aroclor 1242	ND	1.0	ND	1.0	ND	33	ND	2.0
PCB: Aroclor 1248	ND	1.0	ND	1.0	ND	33	ND	2.0
PCB: Aroclor 1254	ND	1.0	ND	1.0	ND	33	ND	2.0
PCB: Aroclor 1260	ND	1.0	ND	1.0	ND	33	3.0	2.0

ND = Non Detectable

Table 3.1
Drainage Ditch & Areas Adjacent to
the Electrical Substation
Analytical Results for PCB's in Soil Samples
(Units in ug/kg)

Site Name:	M.I.	0+62		2+30		4+38		5+20		7+23		1+15		3+25		6+23		7+23		8+25		10+00	
Location:	ACT 307	W. Wall		W. Wall		W. Wall		W. Wall		W. Wall		Ditch		Ditch		Ditch		Ditch		Ditch		Ditch	
Sample Date:	Type B	05/07/91		05/07/91		05/07/91		05/07/91		05/08/91		05/07/91		05/07/91		05/08/91		05/08/91		05/08/91		05/08/91	
Sample Id:	Criteria	E64634		E64636		E64639		E64651		E64640		E64649		E64638		E64652		E64641		E64643		E64644	
Parameter		Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit
PCB: Aroclor 1242	1000	ND	33	ND	33	ND	33	ND	33	ND	33	ND	13000	ND	120	ND	250	ND	120	ND	120	ND	400
PCB: Aroclor 1248	1000	ND	33	ND	33	ND	33	ND	33	ND	33	84000	13000	190	120	ND	250	ND	120	ND	120	ND	400
PCB: Aroclor 1254	1000	ND	33	ND	33	ND	33	ND	33	ND	120	ND	13000	ND	120	ND	250	ND	33	ND	33	ND	60
PCB: Aroclor 1260	1000	ND	33	ND	33	ND	33	ND	33	ND	33	ND	13000	180	120	900	250	112	33	33	33	90	60

Site Name:	M.I.	11+25		12+50		14+00		14+25		14+50		1+46		2+30		5+20		7+20		Tran. Area		Tran. Area	
Location:	ACT 307	Ditch		Ditch		Ditch		Ditch		Ditch		E. Wall		E. Wall		E. Wall		E. Wall		W. Sample		E. Sample	
Sample Date:	Type B	05/08/91		05/08/91		08/08/91		08/08/91		08/08/91		05/07/91		05/07/91		05/07/91		05/08/91		05/08/91		05/08/91	
Sample Id:	Criteria	E64645		E64646		E70735		E70736		E70737		E64635		E64637		E64650		E64642		E64648		E64647	
Parameter		Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit
PCB: Aroclor 1242	1000	ND	33	ND	120	ND	33	ND	33	ND	33	ND	33	ND	33	ND	33	ND	33	ND	33	ND	33
PCB: Aroclor 1248	1000	ND	33	ND	120	ND	33	ND	33	ND	33	ND	33	ND	33	ND	33	ND	33	ND	33	ND	33
PCB: Aroclor 1254	1000	ND	33	ND	33	ND	33	ND	33	ND	33	ND	33	ND	33	ND	33	ND	33	ND	33	ND	33
PCB: Aroclor 1260	1000	60	33	110	33	ND	33	ND	33	ND	33	ND	33	40	33	ND	33	ND	33	ND	33	ND	33

Value exceeds Type B Criteria

ND = Non Detectable

Table 3.2
Drainage Ditch & Areas Adjacent to the Electrical Substation
Analytical Results for Volatile Organic Compounds in Soil Samples
(Units in ug/kg)

Site Name: Location: Sample Date: Sample Id:	M.I. ACT 307 Type B Criteria *	Detection Limit	5+20 W. Sidewall 05/07/91 E64651	1+15 Ditch 05/07/91 E64649	6+25 Ditch 05/08/91 E64652	5+20 E. Sidewall 05/07/91 E64650
Parameter						
Benzene		10	ND	ND	ND	ND
Bromodichloromethane		10	ND	ND	ND	ND
Bromoform		10	ND	ND	ND	ND
Bromomethane		10	ND	ND	ND	ND
Carbon tetrachloride		10	ND	ND	ND	ND
Chlorobenzene	2000	10	ND	500	ND	ND
Chlorodibromomethane		10	ND	ND	ND	ND
Chloroethane		10	ND	ND	ND	ND
Chloroform		10	ND	ND	ND	ND
1,1-Dichloroethane		10	ND	ND	ND	ND
1,2-Dichloroethane		10	ND	ND	ND	ND
1,1-Dichloroethylene		10	ND	ND	ND	ND
trans-1,2-Dichloroethylene		10	ND	ND	ND	ND
1,2-Dichloropropene		10	ND	ND	ND	ND
cis-1,3-Dichloropropylene		10	ND	ND	ND	ND
trans-1,3-Dichloropropylene		10	ND	ND	ND	ND
Ethyl benzene	600	10	ND	98	16	ND
Methylene chloride		10	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane		10	ND	ND	ND	ND
Tetrachloroethylene		10	ND	ND	ND	ND
Toluene	800	10	ND	31	ND	ND
1,1,1-Trichloroethane		10	ND	ND	ND	ND
1,1,2-Trichloroethane		10	ND	ND	ND	ND
Trichloroethylene		10	ND	ND	ND	ND
Trichlorofluoromethane		10	ND	ND	ND	ND
Vinyl chloride		10	ND	ND	ND	ND
Xylene	400	10	ND	400	ND	ND
cis-1,2-Dichloroethylene		10	ND	ND	ND	ND
1,2-Dichlorobenzene	10000	10	--	780	--	--
1,3-Dichlorobenzene	NA	10	--	240	--	--
1,4-Dichlorobenzene	20	10	--	410	--	--

ND = Non Detectable

**** = Provided for detected chemicals only***

NA = Not available

-- = Not analyzed

Value exceeds Type B Criteria

Table 3.3
Drainage Ditch & Areas Adjacent to
the Electrical Substation
Analytical Results for Inorganics in Soil Samples
(Units in mg/kg)

Site Name: Location: Sample Date: Sample Id:	M.I. ACT 307 Type B Criteria	Detection Limit	5+20 W. Sidewall 05/07/91 E64651	1+15 Ditch 05/07/91 E64649	6+25 Ditch 05/08/91 E64652	5+20 E. Sidewall 05/07/91 E64650
Parameter						
Arsenic, total	0.0004	0.025	2.11	5.38	4.75	5.75
Barium, total	NA	0.40	16	219	86	24
Cadmium, total	0.08	0.040	0.095	9.17	8.63	0.093
Chromium, total	0.6	0.40	4.7	145	447	5.4
Copper, total	NA	0.60	7.2	590	457	8.5
Lead, total	NA	1.0	6.4	588	376	11
Mercury, total	0.04	0.05	ND	0.78	0.566	ND
Selenium, total	0.2	0.05	ND	0.217*	0.729	ND
Silver, total	0.4	0.0002	0.032	1.7	4.4	0.034
Zinc, total	20	0.40	15	598	1880	15

Value exceeds Type B Criteria

ND = Non Detectable
NA = Not available
** = Quality control performance criteria not met for this parameter, all other parameters fell within acceptable quality control limits.*

Table 4.1
Sanitary Sewer & Floor Drain Line Network
(Units as indicated)

Site Name:	SS #1		SS #2		SS #3		SS #4		SS #6	
Location:			Truck Bay		Park Lot		Power St.		In Bldg.	
Sample Date:	05/02/91		05/02/91		05/02/91		05/02/91		05/02/91	
Sample Id:	E64234		E64235		E64236		E64237		E64238	
Sample Type:	Sludge		Sludge		Sludge		Sludge		Sludge	
Units:	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg	
Parameter	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit
PCB: Aroclor 1242	ND	33	ND	4100	ND	33	ND	33	ND	33
PCB: Aroclor 1248	11000	33	ND	4100	ND	33	12000	33	130	33
PCB: Aroclor 1254	ND	33	ND	33	ND	33	ND	33	ND	33
PCB: Aroclor 1260	2300	33	4400	33	60	33	1100	33	310	33

Site Name:	SS #5		#1A		#2A	
Location:	Plant					
Sample Date:	05/02/91		05/10/91		05/10/91	
Sample Id:	E64240		E64864		E64865	
Sample Type:	Water		PCB Wipe		PCB Wipe	
Units:	ug/L		ug/100cm2		ug/100cm2	
Parameter	Result	Detect Limit	Result	Detect Limit	Result	Detect Limit
PCB: Aroclor 1242	ND	1000	ND	10	ND	20
PCB: Aroclor 1248	ND	1000	ND	10	ND	20
PCB: Aroclor 1254	ND	1000	ND	10	ND	40
PCB: Aroclor 1260	ND	1000	14	10	ND	40

ND = Non Detectable

Document 13

HYDRECO/KALAMAZOO
ON-ROLL SALARIED EMPLOYEES
AT DATE OF ACQUISITION
SEPT. 7, 1987

NAME	POSITION
Bailey, Marilyn J.	Parts/Serv. Coordinator
Bailey, William A. Jr.	Product Mgr. Pumps & Motors
Beachy, Henry L.	Advertising Mgr.
Beaudoin, Jason H.	Service Engineer
Becker, Lanson	Vice Pres Engineering
Blum, Amy	Purchasing Clerk
012 - Bohne, Fred H.	Foreman
Boulis, John R.	Vice President Emp. Rel.
Bowden, Charles	Project Engineer
002 - Brignace, Norman L.	Quality Auditor
Burket, Conrad S.	Production Mgr.
Burrus, Cynthia L.	Sales Correspondent
Buys, Joyce A.	Asst. Sales Administrator
027 - Calloway, Allen J.	Liaison Engineer
Campbell, Ernest A.	Shipping Coordinator
028 - Casterline, Douglas F.	Asst. Production Mgr.
Clark, Albert C.	Lab Technician
Cody, Brenda S.	Plant Services Coordinator
Crill, Steven P.	Lab Technician
Cummings, Rex W.	Foreman
025 - Cuyler, Gerald F.	Vice Pres. Manufacturing
026 - Cuyler, Verne C.	Quality Control Manager
Decker, Albert E.	Parts Supervisor
Emswiler, Jerry D.	Manager Cost Accounting
Fair, Patricia A.	Financial Secretary
Franks, Rose E.	Personnel Assistant
Fuller, Bryan S.	Inventory Contr. Coord.
Fuller, Ronald L.	Scheduler/Expediter
030 - Hammond, John A.	Ship/Rec Mgr.
Hammontree, Theo V.	Lab Expediter
Hanson, Karen L.	Data Processing Supv.
Harris, Darlene D.	Admin. Assist/Sal Ben. Admin.
Hartmen, Dennis	Accountant
Heldt, Richard P.	Labor Reporter
Hewitt, Clair L.	Lab Technician
Ho, Kenneth C.	Asst. Proj. Engineer
Hoffman, Steven W.	Regional Sales Mgr.
Huffman, Jeffery L.	Marketing Mgr.
Jackson, Henry (Warn)	Sales Engineer Trainee
Jackson, Mitchell H.	Production Control Mgr.
009 - Johnson, Robert K.	Accts. Receivable Supv.

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000784

Kelley, Ronald	Project Engr. Electronics
Kominek, Mary M.	Data Entry Clerk
Lebo, Steven W.	Layout Drafter
Lemon, Joseph	Asst. Chief Engineer
Macejkovic, Daniel R.	Product Engineer Controls
Massey, Linda	Engr. Records Clerk
Merkel, Ted	Regional Sales Mgr.
Miller, Christine	Layout Drafter
Minor, Richard	Lab Technician
ox 7 -Morris, William A.	Electronics Technician
Mortensen, Larry N.	Service Representative
Parrish, Lyle E.	Designer & Checker
Rafferty, David L.	Asst. Sales Administrator
Rapp, Patricia J.	Manufacturing Asst.
Rentschler, David V.	Gen. Acctg. Supervisor
Rose, Susan J.	JR. Accountant
Rutger, Marvin D.	Sales Administration Mgr.
Schier, John W.	Mgr.Engineering Services
Schow, Eric G.	Project Engineer
Schutter, Jeffrey P.	Product Mgr. Trans.
Sinicki, Eileen F.	DP Programer
Sokolowski, Stanley T.	Vice Pres. Marketing
Stewart, Glenn C.	Service Mgr.
Tabron, Gale O.	Computer Oper. Trainee
Tanner, Chris M.	Acct. Recv. Clerk
Terry, Elizabeth A.	Marketing Secretary
Torres, Robert P.	Lab Technician
Tungate, Donald E.	Asst. Mgr. Manufacturing
Tupper, Pauline A.	Accounts Payable Coord.
Underwood, Tammy	Switchboard Opr/Recep.
oxc - Van De Laare, Charles M.	Manufacturing Engineer
Wagaman, Leonard E.	Buyer
Wagner, Edna A.	Engineering Assist.
Wood, Robert	Manufacturing Engineer
Young, Jon	QC Foreman

Document 14

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
WATER RESOURCES COMMISSION

IN THE MATTER OF

NPDES PERMIT NO. MI 0005126

General Signal Corporation
Hydreco
_____/

PERMIT TERMINATION NO. T91-007

PERMIT TERMINATION

TO: 9000 East Michigan
Kalamazoo, Michigan 49003

By letter dated March 23, 1989, Charles VanDeLaare of General Signal Corporation, Hydreco, stated that all surface water discharges from the facility located at 9000 East Michigan, Kalamazoo, Michigan 49003, have been eliminated and has requested that NPDES permit number MI 0005126 be terminated. They have sold the plant and the new company is not discharging to the surface water. Staff of the Michigan Department of Natural Resources, Surface Water Quality Division has confirmed that all discharges previously directed to surface waters have been eliminated and has recommended that the permit be terminated. General Signal Corporation, Hydreco, has been sent a notice by certified mail of the scheduled presentation of this termination to the Commission for adoption.

Therefore, NPDES Permit No. MI 0005126 is hereby terminated. There shall be no surface water discharge from this facility without applying for and obtaining a new NPDES permit.

This permit is terminated this 15th day of November, 1990, by the Michigan Water Resources Commission, to be signed on behalf of the Commission by the Executive Secretary.

MICHIGAN WATER RESOURCES COMMISSION

Paul D. Zugger
Executive Secretary

BE 005951

220297

Document 15

File

STATE OF MICHIGAN

NATURAL RESOURCES COMMISSION
THOMAS J ANDERSON
E R CAROLLO
MARLENE J FLUHARTY
STEPHEN F MONSMA
O STEWART MYERS
RAYMOND POUPORE
HARRY H WHITELEY

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T MASON BUILDING
BOX 30028
LANSING, MI 48909

Gordon E. Guyer, Director

RECEIVED
DEC 15 1986

December 10, 1986 SWQD-Plainwell

CERTIFIED MAIL

General Signal Corporation
Hydreco-Unit
9000 East Michigan Avenue
Kalamazoo, Michigan 49003

Re: NPDES Permit No. MI 0005126

Dear Gentlemen:

Your National Pollutant Discharge Elimination System (NPDES) Permit has been processed in accordance with appropriate state and federal regulations.

It contains the requirements necessary for you to comply with state and federal water pollution control laws.

REVIEW THE PERMIT EFFLUENT LIMITS AND PERFORMANCE SCHEDULES CAREFULLY. These are subject to the criminal and civil enforcement provisions of both state and federal law. Permit violations are audited by the United States Environmental Protection Agency and may appear in a published quarterly noncompliance report made available to agencies and the public.

Your monitoring and reporting responsibilities must be complied with in accordance with this permit. If applicable, monthly operating report forms will be transmitted to you in the near future. These reports are to be submitted monthly or otherwise as required by your NPDES permit.

Any reports, notifications, and questions regarding the attached permit or NPDES program should be sent to the following address:

Fred Morley, District Supervisor
621 North Tenth Street
P.O. Box 355
Plainwell, Michigan 49080
Telephone: (616) 685-9886

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BE 005952

R1026

NOTE: All references within this permit made to the Water Quality Division or Chief of the Water Quality Division are to refer to the Surface Water Quality Division or Chief of the Surface Water Quality Division, respectively.

Sincerely,

William E. McCracken

William E. McCracken, P.E.
Chief, Permits Section
Surface Water Quality Division
517-373-8088

Enclosure: Permit

cc: EPA-Region V (2)
Files
Steve Buda, Planning and Special Programs Section
Compliance Section #1
Fred Morley - Plainwell District
Land Application Unit
208 Agency - South Central Michigan Planning Council
Data Entry, SWQD
Point Source Studies, Compliance #1, Grand Rapids Office

Permit No. MI 0005126

MICHIGAN WATER RESOURCES COMMISSION
AUTHORIZATION TO DISCHARGE UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provision of the Federal Water Pollution Control Act, as amended, (33, U.S.C. 1251 et seq; the "Act"), and the Michigan Water Resources Commission Act, as amended, (Act 245, Public Acts of 1929, as amended, the "Michigan Act"),

General Signal Corporation
Hydreco Unit

is authorized to discharge from a facility located at

9000 East Michigan Avenue
Kalamazoo, Michigan 49003

designated as General Signal-Hydreco
to receiving water named Kalamazoo River via drainage ditch

in accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts I and II hereof.

This permit takes effect immediately upon the date of issuance. Any person who feels aggrieved by this permit may file a sworn petition with the Commission, setting forth the conditions of the permit which are being challenged and specifying the grounds for the challenge. The Commission may reject any petition filed more than 60 days after issuance as being untimely. Upon granting of a contested case to the applicant, the Commission shall review the permit to determine which contested terms shall be stayed until the Commission takes its final action. All other conditions of the permit remain in full effect. If the contested condition is a modification of a previous permit condition and the Commission determines the contested condition shall be stayed, then such previous condition remains in effect until the Commission takes final action. During the course of any administrative proceeding brought by a person other than the applicant, the conditions of this permit will remain in effect, unless the Commission determines otherwise.

This permit and the authorization to discharge shall expire at midnight October 1, 1990 In order to receive authorization to discharge beyond the date of expiration, the permittee shall submit such information and forms as are required by the Michigan Water Resources Commission no later than 180 days prior to the date of expiration.

This permit is based on an application dated May 25, 1985, and shall supersede any and all Orders of Determination, Stipulation, Final Orders of Determination, or NPDES Permits previously adopted by the Michigan Water Resources Commission.

Issued this 20th day of November 1986, by the Michigan Water Resources Commission superseding NPDES Permit No. MI 0005126, expiring February 29, 1984.

Paul D. Zugger
Executive Secretary

Reissue

BE 005954

220300

PART I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. Final Effluent Limitations

During the period beginning upon the issuance date of this permit and lasting until the expiration date of this permit, the permittee is authorized to discharge a maximum of six hundred thousand (600,000) gallons per day of noncontact cooling water from air conditioners and test stand oil coolers , and an unspecified quantity of stormwater from outfall 001 to the Kalamazoo River. Such discharge shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations kg/day (lbs/day) Monthly Average	Daily Maximum	Other Limitations Monthly Average	Daily Maximum	Monitoring Requirement Measurement Frequency	Sample Type
Flow, M^3/Day (MGD)					Weekly	Total daily flow
Oil and Grease				10 mg/l	Weekly	Grab
Temperature (^oF)					Weekly	Readin
Outfall Observation*					Daily	Visual

*Any unusual characteristics of the discharge (i.e., unnatural turbidity, color, oil film, floating solids, foams, settleable solids, or deposits) shall be reported immediately to the District Office of the Surface Water Quality Division followed with a written report within 5 days detailing the findings of the investigation and the steps taken to correct the condition.

The term noncontact cooling water shall mean water used for cooling which does not come into direct contact with any raw material, intermediate product, by-product, waste product, or finished product.

a. The pH shall not be less than 6.0 nor greater than 9.0 . The pH shall be monitored as follows: monthly; grab.

b. The receiving stream shall contain no unnatural turbidity, color, oil film, floating solids, foams, settleable solids, or deposits as a result of this discharge.

c. Samples, measurements, and observations taken in compliance with the monitoring requirements above shall be taken at outfall 001 prior to discharge to drainage ditch going to the Kalamazoo River.

d. In the event the permittee shall require the discharge of water treatment additives, the permittee shall notify the Chief of the Surface Water Quality Division. The permittee shall obtain written approval from the Chief of the Surface Water Quality Division to discharge such additives at a specified level. The permit may be modified in accordance with the requirements of Part II, Section B-4 if a constituent of the additive or additives requires limiting.

2. Special Condition - Reopener Clause

This permit may be modified or, alternatively, revoked and reissued to comply with any applicable standard(s) or limitation(s) promulgated under Section 301(b)(2)(c)(d), 304(b)(2) and 307(a)(2) of the Act, if the effluent standard(s) or limitation(s) so promulgated:

a. is(are) either different in condition or more stringent than any effluent limitation in the permit; or

b. control(s) any pollutant not limited in the permit.

3. Special Condition - Notification Requirement

The discharger shall notify the Chief of the Surface Water Quality Division, in writing, within 10 days of knowing, or having reason to believe, that a change in facility operation, maintenance, or construction has resulted or will result in the discharge of:

a. Detectable levels* of chemicals on the current Michigan Critical Materials Register or priority pollutants or hazardous substances set forth in 40 CFR 122.21, Appendix D, which were not acknowledged in the application** or listed in the application at less than detectable levels.

b. Detectable levels* of any other chemical not listed in the application or listed at less than detection, for which the application specifically requested information.

c. Any chemical at levels greater than five times the average level reported in the application**.

Any other monitoring results obtained as a requirement of this permit shall be reported in accordance with the schedule of compliance.

*The detectable level shall be defined as the Method Detection Limit (MDL) as given in Appendix B to Part 136, Federal Register, Vol. 49, No. 209, October 26, 1984, pp. 43430-31.

**The application dated May 24, 1985.

PART I

B. MONITORING AND REPORTING

1. Representative Sampling

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge.

2. Reporting: [A] = applicable to your facility; [NA] = not applicable to your facil

[A] a. MOR Submittal Requirements - The permittee shall submit Monthly Operating Report (MOR) forms to the Surface Water Quality Division, Data Entry, of the Michigan Department of Natural Resources for each calendar month of the authorized discharge period(s). The MOR's shall be postmarked no later than the 10th day of the month following each month of the authorized discharge period(s).

[NA] b. Retained Self-Monitoring Requirements - The permittee shall maintain a year-to-date log of retained self-monitoring results and provide such log for inspection to the staff of the

- ☐ (1.) Surface Water Quality Division of the Michigan Department of Natural Resources.
- ☐ (2.) Environmental Health Services Division, Michigan Department of Public Health
- ☐ (3.) Northern Peninsula Division, Michigan Department of Public Health
- ☐ (4.) Division of Health Facility Licensing & Certification, Michigan Department of Public Health

upon request.

The permittee shall certify, in writing, to the Chief of the Surface Water Quality Division of the Department of Natural Resources in accordance with the Schedule of Compliance Part I, C-NA, that;

(1.) all retained self-monitoring requirements have been complied with and a year-to-date log has been maintained.
(2.) the flow rate(s) (if part of retained self-monitoring results) from all outfalls have been substantially the same as the flow rate(s) authorized by this permit or if
(3.) the flow rate(s) (if part of retained self-monitoring results) is (are) substantially different from the flow rate(s) authorized by this permit and the permittee shall provide reasons for the difference in flow rates.

[NA] c. Groundwater Monitoring - The permittee shall submit Monthly Operating Report (MOR) forms to the Surface Water Quality Division, Data Entry, of the Michigan Department of Natural Resources in accordance with the monitoring requirements set forth in Part I, A-NA. The MOR's shall be postmarked no later than the 10th day of the Month following each completed report period.

[NA] d. First Permit - Existing or Proposed Facility - Upon issuance of the first permit for an existing or proposed facility the permittee is exempt from submitting MOR's for a period of ninety (90) days from the date the permit is issued.

[A] e. Permit Reissuance or Modification - For any parameter added to the monitoring requirements as a result of permit reissuance or modification of the current permit, the permittee will be exempt from submitting MOR data for that parameter for a period of nine (90) days from the date the permit is issued.

220303

3. Definitions

a. The monthly average discharge is defined as the total discharge by weight, or concentration if specified, during the reporting month divided by the number of days in the reporting month that the discharge from the production or commercial facility occurred. When less than daily sampling occurs, the monthly average discharge shall be determined by the summation of the measured daily discharges by weight, or concentration if specified, divided by the number of days during the reporting month when the samples were collected, analyzed and reported.

b. The daily maximum discharge means the total discharge by weight, or concentratior if specified, during any calendar day.

c. The Regional Administrator is defined as the Region V Administrator, U.S. EPA, located at 230 South Dearborn, 13th Floor, Chicago, Illinois 60604.

d. The Michigan Water Resources Commission is located in the STEVENS T. MASON BUILDING. The mailing address is Box 30028, Lansing, Michigan 48909.

4. Test Procedures

Test procedures for the analysis of pollutants shall conform to regulations published pursuant to Section 304(h) of the Act, under which such procedures may be required.

5. Recording Results

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

a. The exact place, date, and time of sampling;

b. The dates the analyses were performed;

c. The person(s) who performed the analyses;

d. The analytical techniques or methods used; and

e. The results of all required analyses.

6. Additional Monitoring by Permittee

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Monthly Operating Report. Such increased frequency shall also be indicated.

7. Records Retention

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed and calibration and maintenance of instrumentation and recordings from continuous monitoring instrumentation shall be retained for a minimum of three (3) years, or longer if requested by the Regional Administrator or the Michigan Water Resources Commission.

C. SCHEDULE OF COMPLIANCE

1. The permittee shall continue to operate the installed facilities to achieve the effluent limitations specified for outfall 001.

2. The permittee shall comply with the requirements of Section 10, Part II-A in accordance with the following:

a. Submit plans for approval to the Chief of the Surface Water Quality Division necessary to comply with the primary power provision of Section 10 in Part II on or before NA.

b. The permittee shall comply with the requirements of items 10a or 10b contained in Part II on or before NA. Notwithstanding the preceding sentence, the permittee shall at all times halt, reduce, or otherwise control production in order to protect the waters of the State of Michigan upon reduction or loss of the primary source of power.

3. No later than 14 calendar days following a date identified in the above schedule of compliance, the permittee shall submit either a report of progress or, in the case of specific actions being required by identified dates, a written statement of compliance or noncompliance. In the latter case, the statement shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement. Failure to submit the written statement is just cause to pursue enforcement action pursuant to the Commission Act and the Part 21 Rules.

PART II

A. MANAGEMENT REQUIREMENTS

1. Duty to Comply

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit.

It is the duty of the permittee to comply with all the terms and conditions of this permit. Any noncompliance with the Effluent Limitations, Special Conditions, or terms of this permit constitutes a violation of Public Acts 245 of 1929, as amended, and/or PL 92-500, as amended, and constitutes grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of an application for permit renewal.

2. Change of Conditions

Any anticipated facility expansion, production increases, or process modification which will result in new, different, or increased discharges of pollutants must be reported by submission of a new application or, if such changes will not violate the effluent limitations specified in this permit, by notice to the permit issuing authority of such changes. Following such notice, the permit may be modified to specify and limit any pollutant not previously limited.

3. Containment Facilities

The permittee shall provide facilities for containment of any accidental losses of concentrated solutions, acids, alkalies, salts, oils, or other polluting materials in accordance with the requirements of the Michigan Water Resources Commission Rules, Part 5. This requirement is included pursuant to Section 5 of the Michigan Water Resources Commission Act, 1929 PA 245, as amended and the Part 5 rules of the General Rules of the Commission.

4. Operator Certification

The permittee shall have the waste treatment facilities under direct supervision of an operator certified by the Michigan Water Resources Commission, as required by Section 6a of the Michigan Act.

5. Noncompliance Notification

If, for any reason, the permittee does not comply with or will be unable to comply with any daily maximum effluent limitation specified in this permit, the permittee shall provide the Chief of the Surface Water Quality Division with the following information, in writing, within five (5) days of becoming aware of such condition:

a. A description of the discharge and cause of noncompliance; and

b. The period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and the steps taken to reduce, eliminate and prevent recurrence of the noncomplying discharge.

6. Spill Notification

The permittee shall immediately report any spill or loss of any product, by-product, intermediate product, oils, solvents, waste material, or any other polluting substance which occurs to the surface waters or groundwaters of the state by calling the Department of Natural Resources 24-hour Emergency Response telephone number 1-800-292-4706; and the permittee shall within ten (10) days of the spill or loss, provide the state with a full written explanation as to the cause and discovery of the spill or loss, clean-up and recovery measures taken, preventative measures to be taken, and schedule of implementation. This requirement is included pursuant to Section 5 of the Michigan Water Resources Commission Act, 1929 PA 245, as amended.

7. Facility Operation

The permittee shall at all times properly operate and maintain all treatment or control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this permit.

8. Adverse Impact

The permittee shall take all reasonable steps to minimize any adverse impact to the surface or groundwaters of the state resulting from noncompliance with any effluent limitation specified in this permit including, but not limited to, such accelerated or additional monitoring as necessary to determine the nature and impact of the discharge in noncompliance.

9. By-Passing

Any diversion from or by-pass of facilities necessary to maintain compliance with the terms and conditions of this permit is prohibited, except (i) where unavoidable to prevent loss of life, personal injury, or severe property damage, or (ii) where excessive storm drainage or runoff would damage any facilities necessary for compliance with the effluent limitations and prohibitions of this permit. The permittee shall promptly notify the Michigan Water Resources Commission and the Regional Administrator, in writing, of such diversion or by-pa

10. Power Failures

BE 005961

In order to maintain compliance with the effluent limitations and prohibition of this permit, the permittee shall either:

a. Provide an alternative power source sufficient to operate facilities utilized by permittee to maintain compliance with the effluent limitations and conditions of this permit which provision shall be indicated in this permit by inclusion of a specific compliance date in each appropriate "Schedule of Compliance for Effluent Limitations".

220307

b. Upon the reduction, loss, or failure of one or more of the primary sources of power to facilities utilized by the permittee to maintain compliance with the effluent limitations and conditions of this permit, the permittee shall halt, reduce or otherwise control production and/or all discharge in order to maintain compliance with the effluent limitations and conditions of this permit.

11. Removed Substances

Solids, sludges, filter backwash, or other pollutants removed from or resulting from treatment or control of wastewaters shall be disposed of in a manner such as to prevent any pollutant from such materials from entering navigable waters, or the entry of toxic or harmful contaminants thereof onto the groundwaters in concentrations or amounts detrimental to the groundwater resource.

12. Upset Noncompliance Notification

If a process "upset" (defined as an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee) has occurred, the permittee who wishes to establish the affirmative defense of upset shall notify the Chief of the Surface Water Quality Division by telephone within 24 hours of becoming aware of such conditions and within five (5) days, provide in writing, the following information:

a. That an upset occurred and that the permittee can identify the specific cause(s) of the upset;

b. That the permitted wastewater treatment facility was, at the time, being properly operated;

c. That the permittee has specified and taken action on all responsible steps to minimize or correct any adverse impact in the environment resulting from noncompliance with his permit.

In any enforcement proceedings, the permittee is seeking to establish the occurrence of an upset, has the burden of proof.

13. Any requirement of this permit which is included under the unique terms of Michigan, the Water Resources Commission, Act 245, P.A. 1929, as amended, and rules promulgated thereunder, is not enforceable under the Federal Clean Water Act regulations.

B. RESPONSIBILITIES

1. Right of Entry

The permittee shall allow the Executive Secretary of the Michigan Water Resources Commission, the Regional Administrator and/or their authorized representatives, upon the presentation of credentials:

a. To enter upon the permittee's premises where an effluent source is located or in which any records are required to be kept under the terms and conditions of this permit; and

b. At reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit; to inspect any monitoring equipment or monitoring method required in this permit; and to sample any discharge of pollutants.

2. Transfer of Ownership or Control

In the event of any change in control or ownership of facilities from which the authorized discharge emanate, the permittee shall notify the succeeding owner or controller of the existance of this permit by letter, a copy of which shall be forwarded to the Michigan Water Resources Commission and the Regional Administrator.

3. Availability of Reports

Except for data determined to be confidential under Section 308 of the Act and Rule 2128 of the Water Resources Commission Rules, Part 21, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the State Water Pollution Control Agency and the Regional Administrator. As required by the Act, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the Act and Sections 7 and 10 of the Michigan Act.

4. Permit Modification

After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:

a. Violation of any terms or conditions of this permit;

b. Obtaining this permit by misrepresentation or failure to disclose fully, all relevant facts; or

c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

5. Toxic Pollutants

Notwithstanding Part II, B-4 above, if a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the Act for a toxic pollutant which is present in the discharge and such standard or prohibition is more stringent than any limitation for such pollutant in this permit, this permit shall be revised or modified in accordance with the toxic effluent standard or prohibition and the permittee so notified.

6. Civil and Criminal Liability

Except as provided in permit conditions on "By-Passing" (Part II, A-9) and "Power Failures" (Part II, A-10), nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance, whether or not such noncompliance is due to factors beyond his control, such as accidents, equipment breakdowns, or labor disputes.

7. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee may be subject under Section 311 of the Act except as are exempted by federal regulations.

8. State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation under authority preserved by Section 510 of the Act.

9. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize violation of any Federal, State or local laws or regulations, nor does it obviate the necessity of obtaining such permits or approvals from other units of government as may be required by law.

10. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstances, if held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

11. Notice to Public Utilities (Miss Dig)

The issuance of this permit does not exempt the permittee from giving notice to public utilities and complying with each of the requirements of Act 53 of the Public Acts of 1974, being sections 460.701 to 460.718 of the Michigan Compiled Laws, when constructing facilities to meet the terms of this permit.

Permit No. MI 0005126

MIXING ZONE

Facility: General Signal Corporation
Hydreco Unit
9000 E. Michigan Avenue
Kalamazoo, Michigan 49003

Outfall Number	Receiving Water	Discharge Location
001	Kalamazoo River	Section 23, T2S, R10W Kalamazoo Co.

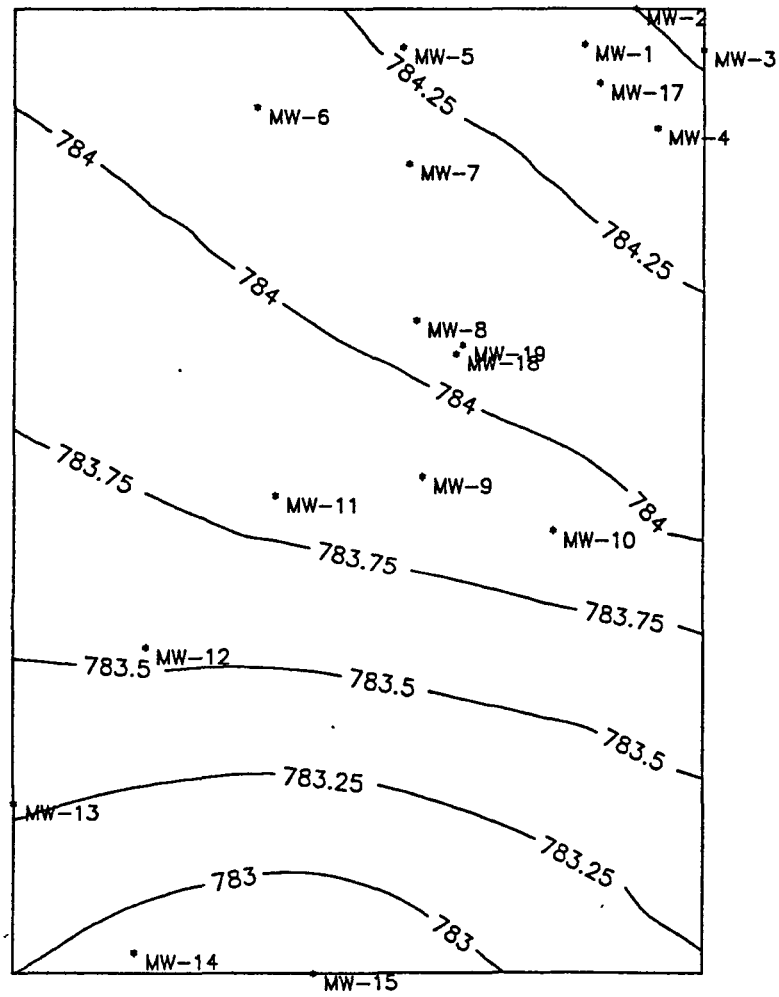
For toxic pollutants, the volume of receiving water used in assuring that effluent limitations are sufficiently stringent to meet Water Quality Standards is 25% of the design flow of the receiving stream.

For other pollutants, the volume of receiving water used in assuring that effluent limitations are sufficiently stringent to meet Water Quality Standards is the design flow of the receiving stream.

220311

BE 005965

Document 16



GENERAL SIGNAL

POTENTIOMETRIC SURFACE
OCTOBER 2, 1991

SCALE 1 inch = 139 6 feet

BE 006027

221111

Document 17

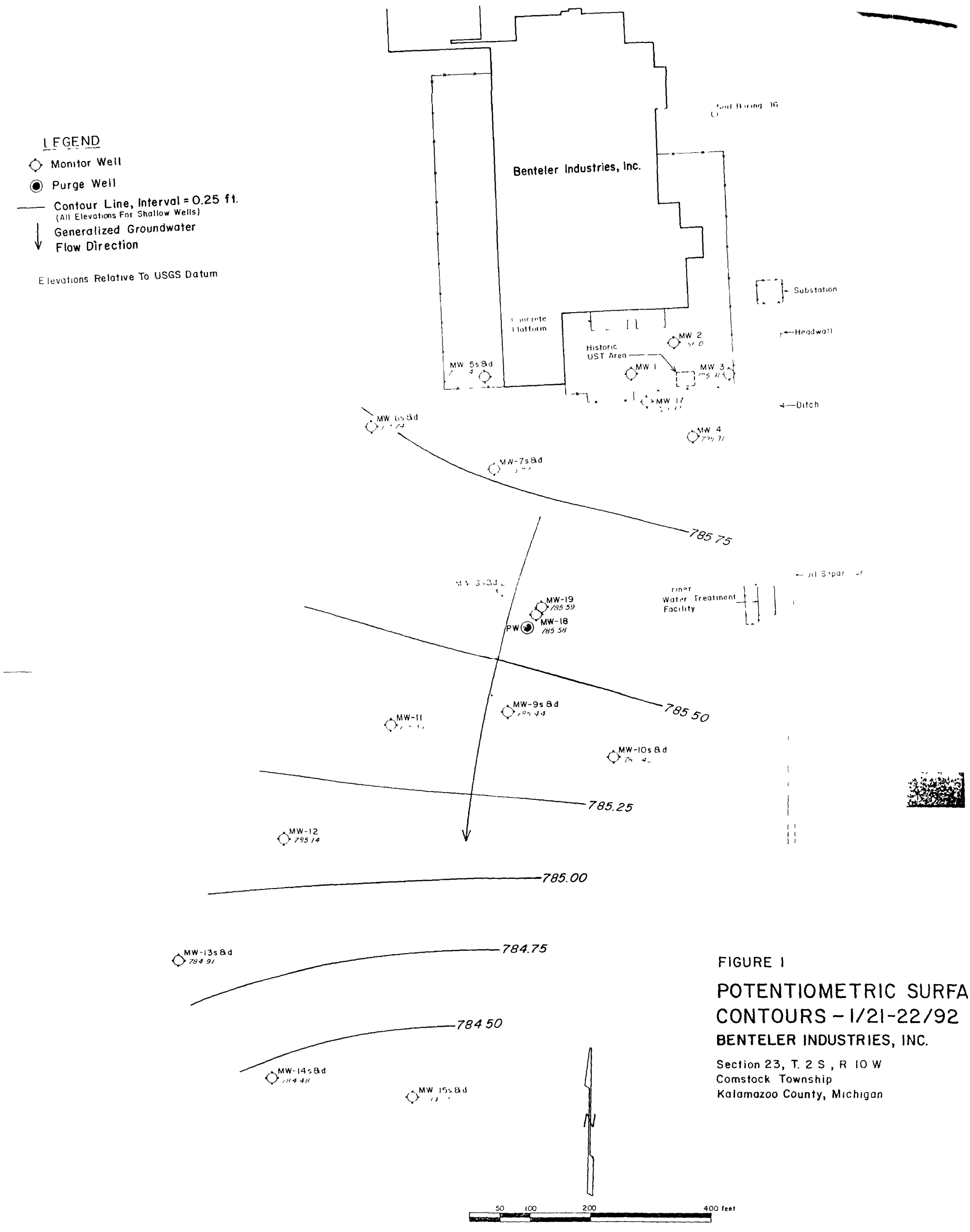


FIGURE 1

POTENTIOMETRIC SURFACE CONTOURS – 1/21-22/92

BENTELER INDUSTRIES, INC.

Section 23, T. 2 S., R. 10 W.
Comstock Township
Kalamazoo County, Michigan

220557

Compiled From Keck Consulting, Inc. Map And Delta Engineering, Inc. Survey

REC 2/11/92

1597

Document 18

3/3- 357-3372

APTUS

Aptus
Environmental Services
21750 Cedar Avenue
P.O. Box 550
Lakeville, MN 55044
(612) 469-3475
FAX (612) 469-5140

WESTINGHOUSE
108841
SAMPLE SHEET 09/19/89

PROJECT # _____

PCB ANALYSIS

COMPANY NAME _____

DATE RECEIVED _____

REPORT DATE _____

LAB #	PCB CONCENTRATIONS
001	2 ppm
002	2 mg
003	<1 mg
004	1 mg
005	9 mg
006	16 mg
007	10 mg
008	21 mg
009	174,000 mg
010	165,000 mg
011	310,000 mg
012	44,700 mg
013	65,400 mg
[redacted]	

BE 030681

005[illegible]

APTUS

WESTINGHOUSE ENG
108941
SAMPLE SHEET 09/26/89

PROJECT # _____

Aptus
Environmental Services
21750 Cedar Avenue
P.O. Box 550
Lakeville, MN 55044
(612) 469-3475
FAX (612) 469-5140

PCB ANALYSIS

COMPANY NAME _____

DATE RECEIVED _____

REPORT DATE _____

	LAB #		PCB CONCENTRATIONS
✓	001		136000 ug/100cm²
✓	002		142000 ug/100cm²
	003	✓	31700 ug/100cm²
	004	✓	26000 ug/100cm
✓	[illegible]		111 ug/100cm
✓	006		86000 ug/100cm
	007	–	7930 ug/100cm
	008	✓	340 ug/100cm
	009		840 ug/100cm
	010	–	3630 ug/100cm
	011	✓	11300 ug/100cm
✓	012		53000 ug/100cm
✓	013		66000 ug/100cm
	014	–	2900 ug/100cm
	015	✓	610 ug/100cm
*	016		< 1 ug/100cm
	017	✓	320 ug/100cm²
✓	018		260 ug/100cm
	019	X	2100 ug/100cm
	020	–	6000 ug/100cm²

LLQ0025.01

Technical Check _____

BE 030589

005600

APTUS

WESTINGHOUSE ENG
108941
SAMPLE SHEET 09/26/89

PROJECT # _____

Aptus
Environmental Services
21750 Cedar Avenue
P.O. Box 550
Lakeville, MN 55044
(612) 469-3478
FAX (612) 469-5140

PCB ANALYSIS

COMPANY NAME _____

DATE RECEIVED _____

REPORT DATE _____

LAB #	PCB CONCENTRATIONS
021 ✓	850 ug/100
022 ✗	2400 ug/10
023 —	5000 ug
024 ✓	470 ug/100
025 ✓	310 ug/100
— 026	86 ug/100
— 027	30 ug/100
028 ✓	430 ug/100
✓ 029	130 ug/100
030 ✓	670 ug/100
031 ✓	350 ug/100
032 ✓	460 ug/100
✓ 033	35000 ug/100
034 ✓	640 [illegible] ug/100
035 —	1700 ug/100
036 —	4100 ug/100
037 —	5580 ug/g
038 ✓	485 ug/g
[illegible]	

BE 030590

005610

LLQ0025.01

Technical Check

SAMPLE # BC92589-	LOCATION EAST-WEST	NORTH-SOUTH	REMARKS
001	1'3"E	8'0"N	
002	0'2"E	7'N	
3	4'0"E	10'0"N	
4	3'3"N	10'0"N	
5	1'5"N	5'0"N	ON PLATFORM COLUMN (EAST SIDE)
6	5'10"E	5'0"N	ON PLATFORM @ 7' HEIGHT
7	6'10"E	7'2"N	
8	12'10"E	9'0"N	
9	16'3"E	10'0"N	
010	4'6"E	15'0"N	
011	21'3"E	15'0"N	
12	2'0"E	15'0"N	
13	7'3"W	7'8"N	
14	4'6"W	4'6"N	
15	1'3"E	2'3"N	
16	6'5"E	2'3"N	
17	19'0"E	2'5"N	
18	23'0"E	16'3"N	

SAMPLE # BC92589-	LOCATION EAST-WEST	NORTH-SOUTH	REMARKS
019	17'0"E	14'6"N	
020	24'3"E	22'9"N	
021	5'10"W	25'7"N	
22	12'0"W	12'10"N	
23	23'2"W	0'3"S	
24	11'2"W	27'2"S	
25	11'0"W	44'0"S	
26	37'8"W	53'9"S	
27			BOTTOM OF STAIRWAY (SO SIDE)
28			UNDER NORTH SUBSTATION TRANSFORMER
029			UNDER EAST SUBSTATION TRANSFORMER
030	37'6"E	6'9"N	
031	26'10"E	13'3"N	
32	23'0"E	22'6"N	
33	11'10"E	24'9"N	
34	3'4"W	29'8"N	
35	6'4"W	11'0"N	
036	9'6"W	14'5"N	

0-0' 18 E-8

NOTE: ALL SAMPLE WIPES FROM FLOOR EXCEPT AS NOTED.

1. LOCATION DIMENTIONS BY R BELL
2. SAMPLE WIPES BY ARNIE CAIRNS
3. SAMPLE "PREP" BY J. RUD

DTE 643 R L Bell 9/26-27/6

S.V. GENERES A - J ETOW 30' C.TO.C.
1 - 11 NTOS 40' C.TO.C.

00561

BE 030591

SAMPLE # 92589-	LOCATION EAST-WEST	NORTH-SOUTH	REMARKS
001	1'3 E	8'0 N	
002	6'0"E	7' N	
3	4'0"E	10'3"N	
4	3'2"W	10'0"N	
5	1'5"W	5'0"N	ON PLATFORM COLUMN (EAST SIDE)
6	5'10"E	5'0"N	ON PLATFORM @ 7' HEIGHT
7	6'10"E	7'2"N	
8	12'10"E	9'0"N	
9	16'5"E	10'0"N	
010	4'6"E	15'0"N	
011	21'3"E	15'0"N	
12	2'0"E	15'0N	
13	7'3"W	7'8"N	
14	4'6"W	4'6"N	
15	1'3"E	2'5"N	
16	6'5"E	2'5"N	
17	19'0"E	2'5"N	
18	23'0"E	12'5"N	

SAMPLE # BC92589-	LOCATION EAST-WEST	NORTH-SOUTH	REMARKS
019	17'0"E	14'6"N	
020	24'0"E	22'9"N	
021	5'10"W	25'7"N	
22	12'0"W	12'10"N	
23	23'2"W	0'3"S	
24	11'7"W	27'2"S	
25	11'0"W	44'0"S	
26	37'8"W	53'9"S	
27			BOTTOM OF STAIRWAY (SO SIDE)
28			UNDER NORTH SUBSTATION TRANSFORMER
029			UNDER EAST SUBSTATION TRANSFORMER
030	37'6"E	6'9"N	
031	26'10"E	13'0"N	
32	23'0"E	22'6"N	
33	11'10"E	24'9"N	
34	3'4"W	22'8"N	
35	6'4"W	11'6"N	
036	9'6"W	14'6"N	

0'-0' 18 E-8

NOTE: ALL SAMPLE WIPES FROM FLOOR EXCEPT AS NOTED.

1. LOCATION DIMENTIONS BY R BELL
2. SAMPLE WIPES BY ARNIE CAIRNS
3. SAMPLE "PREP" BY J. RUD

DTE: 6-13 R L Bell 9/26-27/6

S.N GRNS E3 A - J ETOW 30' C.TO C.

1 - 11 NTS 40' C.TO C.

BE 030592

005612

SAMPLE

TESTS REQUIRED

DATE 9-26-89

PROJECT-LAB NUMBER	CUSTOMER NAME	LOCATION	CLIENT INFORMATION ON SAMPLE: SAMPLE ID	SERIAL NUMBER	PCB oil	GAS	KF	STD	PCB wipes					
108941-001	Westinghouse	Rush	BC-9-25-89-001						✓					
002	Engineering		BC-9-25-89-002											
003			BC-9-25-89-003											
004			BC-9-25-89-004											
005			BC-9-25-89-005											
006			BC-9-25-89-006											
007			BC-9-25-89-007											
008			BC-9-25-89-008											
009			BC-9-25-89-009											
010			BC-9-25-89-010											
011			BC-9-25-89-011											
012			BC-9-25-89-012											
013			BC-9-25-89-013											
014			BC-9-25-89-014											
015			BC-9-25-89-015											
016			BC-9-25-89-016											
017			BC-9-25-89-017											
018			BC-9-25-89-018											
019			BC-9-25-89-019											
020			BC-9-25-89-020						X					

BE 030593
005613
1989-09-28 14:02
023 P04

SAMPLE

DATE 9-26-89

TESTS REQUIRED

PROJECT-LAB NUMBER	CUSTOMER NAME	LOCATION	CLIENT INFORMATION ON SAMPLE: SAMPLE I	SERIAL NUMBER	PCB oil	GAS	KF	STD	PCB wipes	PCB Soil					
108941-021	Westinghouse	Rush	BC-9-25-89						X						
022	Engineering		BC-9-25-89-022												
023			BC-9-25-89-023												
024			BC-9-25-89-024												
025			BC-9-25-89-025												
026			BC-9-25-89-026												
027			BC-9-25-89-027												
028			BC-9-25-89-028												
029			BC-9-25-89-029												
030			BC-9-25-89-030												
031			[illegible]-9-25-89-031												
032			[illegible]-9-25-89-032												
033			[illegible]C-9-25-89-033												
034			BC-9-25-[illegible]34												
035			BC-9-2[illegible]35												
036			[illegible]-9-2[illegible]						X						
037			BC-9-[illegible]	Trust sample						X					
038			BC-9-2[illegible]	Trust Sample						X					

LL00079.02

BE 030594

005614

1989-09-28 14:03

APTUS

Aptus
Environmental Services

21750 Cedar Avenue
PO Box 550
Lakeville, MN 55044
(612) 469-3475
FAX (612) 469-5140

PROJECT # 108941

PCB ANALYSIS

COMPANY NAME Westinghouse Engineering
24700 West 11 Mile
Southfield, MI 48037

DATE RECEIVED 09/26/8
REPORT DATE 10/02/8

LAB #	SAMPLE IDENTIFICATION	SERIAL NUMBER	PCB CONCENTRATIONS
001	BC-9-25-89-001		136000 μg/100 cm^2
002	BC-9-25-89-002		142000 μg/100 cm^2
003	BC-9-25-89-003		31700 μg/100 cm^2
004	BC-9-25-89-004		26000 μg/100 cm^2
005	BC-9-25-89-005		111 μg/100 cm^2
006	BC-9-25-89-006		86000 μg/100 cm^2
007	BC-9-25-89-007		7930 μg/100 cm^2
008	BC-9-25-89-008		340 μg/100 cm^2
009	BC-9-25-89-009		840 μg/100 cm^2
010	BC-9-25-89-010		3630 μg/100 cm^2
011	BC-9-25-89-011		11300 μg/100 cm^2
012	BC-9-25-89-012		53000 μg/100 cm^2
013	BC-9-25-89-013		66000 μg/100 cm^2
014	BC-9-25-89-014		2900 μg/100 cm^2
015	BC-9-25-89-015		610 μg/100 cm^2
016	BC-9-25-89-016		< 1 μg/100 cm^2
017	BC-9-25-89-017		320 μg/100 cm^2
018	BC-9-25-89-018		260 μg/100 cm^2
019	BC-9-25-89-019		2100 μg/100 cm^2
020	BC-9-25-89-020		6000 μg/100 cm^2

APTUS

Aptus
Environmental Services
21750 Cedar Avenue
PO Box 550
Lakeville, MN 55044
(612) 469-3475
FAX (612) 469-5140

PROJECT # 108941

PCB ANALYSIS

COMPANY NAME Westinghouse Engineering
24700 West 11 Mile
Southfield, MI 48037

DATE RECEIVED 09/26/
REPORT DATE 10/02/8

LAB #	SAMPLE IDENTIFICATION	SERIAL NUMBER	PCB CONCENTRATIONS
021	BC-9-25-89-021		850 μg/100 cm^2
022	BC-9-25-89-022		2400 μg/100 cm^2
023	BC-9-25-89-023		5000 μg/100 cm^2
024	BC-9-25-89-024		470 μg/100 cm^2
025	BC-9-25-89-025		310 μg/100 cm^2
026	BC-9-25-89-026		86 μg/100 cm^2
027	BC-9-25-89-027		30 μg/100 cm^2
028	BC-9-25-89-028		430 μg/100 cm^2
029	BC-9-25-89-029		130 μg/100 cm^2
030	BC-9-25-89-030		670 μg/100 cm^2
031	BC-9-25-89-031		350 μg/100 cm^2
032	BC-9-25-89-032		460 μg/100 cm^2
033	BC-9-25-89-033		35000 μg/100 cm^2
034	BC-9-25-89-034		640 μg/100 cm^2
035	BC-9-25-89-035		1700 μg/100 cm^2
036	BC-9-25-89-036		4100 μg/100 cm^2
037	BC-9-25-89-101	Dust Sample	5800 μg/g
038	BC-9-25-89-102	Dust Sample	485 μg/g

DATE 9-19-89

TESTS REQU

PROJECT-LAB NUMBER	CUSTOMER NAME	LOCATION	CLIENT INFORMATION ON SAMPLE: SAMPLE ID	CLIENT INFORMATION ON SAMPLE: SERIAL NUMBER	PCB oil	GAS	KF	STD	PCB wind	PCB soil	
108841-001	Westinghouse	Rush	GE oil Circuit Breaker	K-6366698JY-1	X	(paperwork K					YK1)
002			Below Drain Valve 2-OCB Main Service	K6366693 KY-1					X		
003	(DTES 643)		2-OCB Left of Main -5'								
004			2-OCB Auxiary	K6366698YK1							
005			2-OCB Right of Auxilary -5'								
006			2-OCB Right Front of Drain Valve -5'								
007			2-OCB Left Front of Main								
008			2-OCB Front of Main 5'								
009			750 KVA South Sub	5'E-1's Drip Point							
010			750 KVA Sub South	5'E + 5'N							
011			750 KVA Sub South	5'E + 6'S							
012			750 KVA Sub South	0' + 1½'N							
013			750 KVA Sub South	10'E + 0'S					X		
				0'E+0'S							
108842-001	Park corp	Rush	Dirt							X	
108843-001	Burlington	2WK	#1		X						
-002		Rush	#2		X						
108844-001	Mille Lacs	Rush	Allis Transformer	4178380	X						

11 00029 02 Elec Coop

Aptus
Environmental Services

21750 Cedar Avenue
P.O. Box 550
Lakeville, MN 55044
612-469-3475
FAX 612-469-5140

APTUS

March 14, 1991

Mr. Ray Bell
Westinghouse Engineering
24700 West 11 Mile
Southfield, MI 48037

Dear Mr. Bell:

RE: Laboratory Project Number: 108941
Purchase Order Number: None

Enclosed you will find the laboratory analysis report for the samples we received from you previously on September 26, 1989. The results have been reviewed for completeness and technical merit. Analytical results are reported only from information recorded on bottle label.

All tests were performed in accordance with the methods specified in U.S. EPA SW-846, current ASTM methods or other recognized methodologies.

Please contact your Aptus Representative with any questions concerning this report.

Respectfully Submitted,

Robert C. Wong, Ph. D.
Laboratory Manager

Enclosures

RCW/ple

Westinghouse Engineering
24700 West 11 Mile
Southfield, MI 48037

DATE RECEIVED: 9/26/89
METHOD: Federal Register Vol. No. 63; April 2, 1987
PARAMETER: PCB
SAMPLE MATRIX: Surface Wipe
UNITS: $\mu g/100cm^2$

ATTN: Ray Bell

PROJECT # 108941

LAB ID	CLIENT ID	RESULT	MDL
-001	BC-9-25-89-001	136,000	100
-002	BC-9-25-89-002	142,000	100
-003	BC-9-25-89-003	31,700	10
-004	BC-9-25-89-004	26,000	10
-005	BC-9-25-89-005	111	1
-006	BC-9-25-89-006	86,000	100
-007	BC-9-25-89-007	7,930	10
-008	BC-9-25-89-008	340	1
-009	BC-9-25-89-009	840	1
-010	BC-9-25-89-010	3,630	10
-011	BC-9-25-89-011	11,300	10
-012	BC-9-25-89-012	53,000	100
-013	BC-9-25-89-013	66,000	100
-014	BC-9-25-89-014	2,900	10
-015	BC-9-25-89-015	610	1
-016	BC-9-25-89-016	<1	1
-017	BC-9-25-89-017	320	1
-018	BC-9-25-89-018	260	1
-019	BC-9-25-89-019	2,100	10
-020	BC-9-25-89-020	6,000	10

PCB concentrations resulting from surface wipe analyses should be reported as the quantity of PCB per the area sampled. Utilizing a 10cm by 10cm sampling area the result would be micrograms (μg) of PCB per 100cm.

BDL = Below Detection Limit
MDL = Method Detection Limit
N/A = Not Applicable
ND = Not Detected

Westinghouse Engineering
24700 West 11 Mile
Southfield, MI 48037

DATE RECEIVED: 9/26/89
METHOD: Federal Register Vol. No. 63; April 2, 1987
PARAMETER: PCB
SAMPLE MATRIX: Surface Wipe
UNITS: $\mu g/100cm^2$

ATTN: Ray Bell

PROJECT # 108941

LAB ID	CLIENT ID	RESULT	MDL
-021	BC-9-25-89-021	850	1
-022	BC-9-25-89-022	2,400	10
-023	BC-9-25-89-023	5,000	10
-024	BC-9-25-89-024	470	1
-025	BC-9-25-89-025	310	1
-026	BC-9-25-89-026	86	1
-027	BC-9-25-89-027	30	1
-028	BC-9-25-89-028	430	1
-029	BC-9-25-89-029	130	1
-030	BC-9-25-89-030	670	1
-031	BC-9-25-89-031	350	1
-032	BC-9-25-89-032	460	1
-033	BC-9-25-89-033	35,000	100
-034	BC-9-25-89-034	640	1
-035	BC-9-25-89-035	1,700	10
-036	BC-9-25-89-036	4,100	10

PCB concentrations resulting from surface wipe analyses should be reported as the quantity of PCB per the area sampled. Utilizing a 10cm by 10cm sampling area the result would be micrograms (μg) of PCB per 100cm.

BDL = Below Detection Limit
MDL = Method Detection Limit
N/A = Not Applicable
ND = Not Detected

Westinghouse Engineering
24700 West 11 Mile
Southfield, MI 48037

DATE RECEIVED: 9/26/89
METHOD: ASTM D3304
PARAMETER: PCB
SAMPLE MATRIX: Soil
UNITS: µg/g

ATTN: Ray Bell

PROJECT # 108941

LAB NO.	CLIENT ID	RESULT	MDL
-037	BC-9-25-89-101	5,800	10
-038	BC-9-25-89-102	485	1

BDL = Below Detection Limit
MDL = Method Detection Limit
N/A = Not Applicable
ND = Not Detected

Document 19

Aptus
Environmental Services

P.O Box 1328
Coffeyville, KS 67337
(316) 251-6380
(800) 292-2558
FAX (316) 251-7498
Sales FAX (316) 251-1095
Confidential FAX (316) 251-0091
Incinerator FAX (316) 251-0089

October 11, 1989

APTUS

Mr. Franz Prohaska
Westinghouse
P.O. Box 700/24700 West 11 Mi Rd
Southfield, MI 48037

DTES643

RE: Benteler Industries, Aptus Document No. 253PB

Dear Mr. Franz Prohaska:

Enclosed, please find your copy of the hazardous waste manifest indicating that your waste material has been received and accepted by Aptus, formerly National Electric Inc. Immediately following the disposal of all your material, you will receive a complete Certificate of Disposal from Aptus.

Once again, Aptus would like to express our appreciation to you as a valued customer.

Should you have any questions, please feel free to contact our Environmental Affairs personnel from 8:00 AM to 5:00 PM, Monday through Friday.

Sincerely,

Sheri Sanders

Environmental Affairs

Enclosure

cc: Generator (original manifest)

DNR
MICHIGAN DEPARTMENT OF NATURAL RESOURCES

DO NOT WRITE IN THIS SPACE
ATT. ☐ DIS. ☐ REJ. ☐ PR. ☐

Required under authority of Act 64, P.A. 1979, as amended and Act 136, P.A. 1969.

Failure to file is punishable under section 299.548 MCL or Section 10 of Act 136, P.A. 1969.

Please print or type.

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

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. M I D 0 4 3 7 7 2 4 9 0 — Manifest Document No. 2 5 3 P B

2. Page 1 of 1

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

3. Generator's Name and Mailing Address
~~Bentley~~ BENTELER Industries
9000 East Michigan Avenue
Galesburg, MI 49053

4. Generator's Phone (616) 665-42~~30~~ 61

A. State Manifest Document Number: MI 1674305

B. State Generator's ID

5. Transporter 1 Company Name: Aptus

6. US EPA ID Number: M N D 9 8 0 7 9 1 3 2 1

C. State Transporter's ID

D. Transporter's Phone: 612-469-3475

7. Transporter 2 Company Name

8. US EPA ID Number

E. State Transporter's ID: PTC 1972 MN

F. Transporter's Phone

9. Designated Facility Name and Site Address
Aptus
P.O. Box 1328/Hwy. 169 North
Coffeyville, KS 67337

10. US EPA ID Number: K S D 9 8 0 9 6 4 9 9 3

G. State Facility's ID

H. Facility's Phone: 316-251-6380

GENERATOR

	11. US DOT Description (including Proper Shipping Name, Hazard Class, and ID NUMBER).	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.	N/H
a.	RQ WASTE HAZARDOUS SUBSTANCE, SOLID, N.O.S., (POLYCHLORINATED BIPHENYLS) ORM-E NA 9188	03	DM	2800	P	026L	N
b.	RQ WASTE HAZARDOUS SUBSTANCE, SOLID, N.O.S., (POLYCHLORINATED BIPHENYLS) ORM-E NA 9188	05	DM	1300	P	026L	N
c.	RQ WASTE HAZARDOUS SUBSTANCE, LIQUID ~~OR SOLID~~ N.O.S., (POLYCHLORINATED BIPHENYLS) ORM-E NA 9188	01	DM	825	G	026L	N
d.							

J. Additional Descriptions for Materials Listed Above
a. transformers drained of askarel
b. ~~cap pack~~ DRUMS's containing ~~capacitors~~ DEBRIS
c. drums of askarel

K. Handling Codes for Wastes Listed Above
a/ s/
b/ s/
c/ s/
d/ /

15. Special Handling Instructions and Additional Information
See Enclosed Contingency Plan
Work Order #36549

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

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

Printed/Typed Name: DAVID F. CORBIN
Signature: David F. Corbin 11:45 PM
Date (Month Day Year): 09 27 89

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: LYNN BAILEY
Signature: Lynn Bailey
Date (Month Day Year): 09 27 89

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Date (Month Day Year)

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name
Signature
Date (Month Day Year)

ALL SPILLS MUST BE REPORTED TO THE MICHIGAN POLLUTION EMERGENCY ALERTING SYSTEM, IN MICHIGAN AT 1-800-292-4706 OR OUT OF STATE AT 517-373-7660 AND THE NATIONAL RESPONSE CENTER AT 1-800-424-8802 24 HOURS PER DAY.

BE 030699

005715

WESCO KALAMAZOO

C/O BENTELER INDUSTRIES

9000 EAST MICHIGAN
GALESBURG, MICHIGAN

REMOVAL OF PCB CAPACITORS

WESTINGHOUSE JOB NUMBER: DTES643

WESTINGHOUSE ELECTRIC CORPORATION
ENGINEERING AND INSTRUMENTATION SERVICES DIVISION
24700 ELEVEN MILE ROAD
SOUTHFIELD, MICHIGAN 48034
(313)357-7343

PREPARED BY: C.J. WINSLOW

005713

PURPOSE:

Removal of PCB capacitors.

PERSONS CONTACTED AND DATE OF VISIT:

Dave Corbin
Kieth Keipers - WESCO

On site: 10/13/89

APPARATUS IDENTIFICATION:

See attached list

TIME IN SERVICE AND APPLICATION:

Various power factor correction capacitors.

AS FOUND:

Capacitors had been disconnected but were still in place in the rafters.

ACTION TAKEN:

Capacitors were loaded into cap-pack for disposal. Cap-pack and switches that were removed were placed in temporary storage area.

Benteler Industries - October 13 1989

Line	Serial	Drum	Type	Class	Manufacturer	Tot/PCB wt	Notes
1	1159916		PFA-118E	-26022	CDE	75	60 KVAC 480 VAC
2	1159971		PFA-118E	-26022	CDE	75	60 KVAC 480 VAC
3	1159964	17	PFA-118E	-26022	CDE	75	60 KVAC 480 VAC
4	N 20115	1			GE	75	25 KVAC 480 VAC
5	57D17456	21	FP		W	50	15 KVAC 480 VAC
6	57C613B	22	FP		W	50	15 KVAC 480 VAC
7	57D3468E	23	FP		W	50	15 KVAC 480 VAC
8	57D3152D	24	FP		W	50	15 KVAC 480 VAC
9	57D2719F	25	FP		W	50	15 KVAC 480 VAC
10	57C3426U	26	FP		W	50	15 KVAC 480 VAC
11	57D3372Z	27	FP		W	50	15 KVAC 480 VAC
12	57D3143D	28	FP		W	50	15 KVAC 480 VAC
13	C53734	29			GE	50	15 KVAR 480 VAC
14	L53722	30			GE	50	15 KVAR 480 VAC
15	L53727	31			GE	50	15 KVAR 480 VAC
16	N25922	20			GE	50	15 KVAR 480 VAC
17	PF460-281F	18			CDE	75	25 KVAR 480 VAC
18	PF460-281F	19			CDE	75	25 KVAR 480 VAC
19	PF460-281F	32			CDE	75	25 KVAR 480 VAC
20	PF460-281F	33			CDE	75	25 KVAR 480 VAC
21	57C617B	7	FP		W	50	15 KVAR 480 VAC
22	57C3419U	8	FP		W	50	15 KVAR 480 VAC
23	57C3409U	9	FP		W	50	15 KVAR 480 VAC
24	57D3465E	10	FP		W	50	15 KVAR 480 VAC
25	57C5895N	11	FP		W	50	15 KVAR 480 VAC

Line	Serial	Drum	Type	Class	Manufacturer	Tot/PCB wt	Notes
26	57B4164M	12	FP		W	50	15 KVAR 480 VAC
27	57C3421U	13	FP		W	50	15 KVAR 480 VAC
28	57D1758G	14	FP		W	50	15 KVAR 480 VAC
29	N201019	34			GE	50	15 KVAR 480 VAC
30	57D3562H	2			W	50	15 KVAR 480 VAC
31	57C10611	3			W	50	15 KVAR 480 VAC
32	57D3466E	4			W	50	15 KVAR 480 VAC
33	57C3408U	5			W	50	15 KVAR 480 VAC
34	57C611B	6			W	50	15 KVAR 480 VAC

W E S C O

Westinghouse Electric Supply Company
3443 GEMBRIT CIRCL
KALAMAZOO MI 49001

REMIT TO
WESTINGHOUSE ELECTRIC SUPPLY COMPANY
21610 MEYERS RD.
DETROIT MI 48237

PAGE	1 OF
BRANCH CODE	3250
INVOICE NUMBER	518658
INVOICE DATE	01-26-90

PACKED IN	QUANTITY	WEIGHT
COILS		
REELS		
BUNDLES		
BOXES		

CUSTOMER ORDER NUMBER	SHIP DATE AND ROUTING	FOB	SHIPPING TERMS	NO OF INV	WESCO ORDER NO.	CUSTOMER NO.	B/L	INV REQ
P91444K	01-26-90 BEST WAY	P/S	PPD/NC	1	448270-02	05425-00	N	1

RETURN MATERIAL WILL NOT BE ACCEPTED WITHOUT AUTHORIZATION

LINE NO	QUANTITY SHIPPED	QUANTITY BALANCE DUE	IDENTIFICATION NUMBER	CATALOG NUMBER AND DESCRIPTION	SELLING PRICE UNIT PRICE	B/B	DISCOUNT TRADE	DISCOUNT CASH	EXTENSION
10	1		DS-0000-00000	FINAL BILLING FOR YOUR	56526.000	E			56526.00
			523-23	MI STATE TAX					2261.04
				PO P91444K INCLUDING					
				TRANSFORMER & CAPACITOR					
				DESTRUCTION, RIGGING,					
				CAPACITOR REMOVAL, OIL					
				TESTING AND ASSOCIATED					
				ACTIVITIES.					

Seller represents that with respect to the production of the articles and/or the performance of the services covered by this invoice, it has fully complied with the Fair Labor Standards Act of 1938, as amended.

TERMS: YOU MAY DEDUCT IF PAID WITHIN 10 DAYS NET 30

TOTAL 58787.04

SOLD TO
BENTELER INDUSTRIES INC.
320 HALL ST S.W.
GRAND RAPIDS MI 49507

SHIP TO
BENTELER INDUSTRIES INC.
320 HALL ST S.W.
GRAND RAPIDS MI 49507

PAST DUE ACCOUNTS SUBJECT TO SERVICE CHARGE OF 1½% PER MONTH OR MAXIMUM PERMITTED BY LAW.

PSC FBu 7282

WESCO 23265-4 PT (REV 3-86)

All sales are expressly conditional on Buyer's agreement to the standard terms and conditions on the front and back of this form

518658

M 16

BE 030716

005732

BE 030717

005733

W E S C O

Westinghouse Electric Supply Company

3443 GEMBRIT CIRCL

KALAMAZOO MI 49001

REMIT TO

WESTINGHOUSE ELECTRIC SUPPLY COMPANY
21610 MEYERS RD.
DETROIT MI 48237

PAGE	1 OF
BRANCH CODE	3250
INVOICE NUMBER	518659
INVOICE DATE	01-26-90

PACKED IN	QUANTITY	WEIGHT
COILS		
REELS		
BUNDLES		
BOXES		

CUSTOMER ORDER NUMBER	SHIP DATE AND ROUTING	FOB	SHIPPING TERMS	NO OF INV	WESCO ORDER NO.	CUSTOMER NO.	B/L	INV REQ
91690K	01-26-90 BEST WAY	P/S	PPD/NC	1	486289-01	05425-99	N	1

RETURN MATERIAL WILL NOT BE ACCEPTED WITHOUT AUTHORIZATION

LINE NO	QUANTITY SHIPPED	QUANTITY BALANCE DUE	IDENTIFICATION NUMBER	CATALOG NUMBER AND DESCRIPTION	SELLING PRICE UNIT PRICE	U/M	DISCOUNT TRADE	DISCOUNT CASH	EXTENSION
10	8		DS- -	ADDER FOR OVERPACK	97.000	E			776.00
80	2		DS- -	55 GALLON DRUMS FOR	80.000	E			160.00
100	1		DS- -	CHARGE FOR INCINERATON	2.550	E			2.55
170	1		DS- -	DISPOSAL OF SWITCHGEAR	6956.000	E			6956.00
				STEEL DRUMS FOR DISPOSAL					
				OF PCB FILLED NON-DOT					
				APPROVED DRUMS LESS					
				CREDIT FOR STD 55 GAL					

Seller represents that with respect to the production of the articles and/or the performance of the services covered by this invoice, it has fully complied with the Fair Labor Standards Act of 1938, as amended.

TERMS: YOU MAY DEDUCT IF PAID WITHIN 10 DAYS NET 30

TOTAL

SOLD TO

SHIP TO

PAST DUE ACCOUNTS SUBJECT TO SERVICE CHARGE OF 1½% PER MONTH OR MAXIMUM PERMITTED BY LAW.

PSC 186 7282

All sales are expressly conditional on Buyer's agreement to the standard terms and conditions on the front and back of this form

WESCO 23263-4 PT (REV 3 86)

518659

N 16

W E S C O

Westinghouse Electric Supply Company
3443 GEMBRIT CIRCL
KALAMAZOO MI 49001

REMIT TO
WESTINGHOUSE ELECTRIC SUPPLY COMPANY
21610 MEYERS RD.
DETROIT MI 48237

PAGE	2 OF
BRANCH CODE	3250
INVOICE NUMBER	518659
INVOICE DATE	01-26-90

PACKED IN	QUANTITY	WEIGHT
COILS		
REELS		
BUNDLES		
BOXES		

CUSTOMER ORDER NUMBER	SHIP DATE AND ROUTING	FOB	SHIPPING TERMS	NO OF INV	WESCO ORDER NO.	CUSTOMER NO.	B/L	INV REQ	
91690K	01-26-90 BEST WAY	P/S	PPD/NC	1	486289-01	05425-99	N	1	RETURN MATERIAL WILL NOT BE ACCEPTED WITHOUT AUTHORIZATION

LINE NO	QUANTITY SHIPPED	QUANTITY BALANCE DUE	IDENTIFICATION NUMBER	CATALOG NUMBER AND DESCRIPTION	SELLING PRICE UNIT PRICE	B/B	DISCOUNT TRADE	DISCOUNT CASH	EXTENSION
				DOT APPROVED DRUMS NOT REQUIRED. DEBRIS DISPOSAL. OF ABOVE DRUMS & DEBRIS NOTE: TRANSFORMER OIL NOT INCLUDED IN THIS AS IT WAS INCLUDED IN ORIG AMOUNT.					

Seller represents that with respect to the production of the articles and/or the performance of the services covered by this invoice, it has fully complied with the Fair Labor Standards Act of 1938, as amended.

TERMS: YOU MAY DEDUCT IF PAID WITHIN 10 DAYS NET 30

TOTAL

SOLD TO

SHIP TO

PAST DUE ACCOUNTS SUBJECT TO SERVICE CHARGE OF 1½% PER MONTH OR MAXIMUM PERMITTED BY LAW.

PSC FB6 7282

WESCO 23265-4 PT. (REV 3-86)

All sales are expressly conditional on Buyer's agreement to the standard terms and conditions on the front and back of this form

518659

0 16

005731

BE 030718

W E S C O

Westinghouse Electric Supply Company

3443 GEMBRIT CIRCL

KALAMAZOO MI 49001

REMIT TO

WESTINGHOUSE ELECTRIC SUPPLY COMPANY
21610 MEYERS RD.
DETROIT MI 48237

PAGE	3 OF
BRANCH CODE	3250
INVOICE NUMBER	518659
INVOICE DATE	01-26-90

PACKED IN	QUANTITY	WEIGHT
COILS		
REELS		
BUNDLES		
BOXES		

CUSTOMER ORDER NUMBER	SHIP DATE AND ROUTING	FOB	SHIPPING TERMS	NO OF INV	WESCO ORDER NO.	CUSTOMER NO.	B/L	INV REQ
91690K	01-26-90 BEST WAY	P/S	PPD/NC	1	486289-01	05425-99	N	1

RETURN MATERIAL WILL NOT BE ACCEPTED WITHOUT AUTHORIZATION

LINE NO	QUANTITY SHIPPED	QUANTITY BALANCE DUE	IDENTIFICATION NUMBER	CATALOG NUMBER AND DESCRIPTION	SELLING PRICE UNIT PRICE	B/B	DISCOUNT TRADE	DISCOUNT CASH	EXTENSION
				3 AIR CIR BRKRS & ASSOC EQUIPMENT.					

Seller represents that with respect to the production of the articles and/or the performance of the services covered by this invoice, it has fully complied with the Fair Labor Standards Act of 1938, as amended.

TERMS: YOU MAY DEDUCT IF PAID WITHIN 10 DAYS NET 30

TOTAL 7894.55

SOLD TO

BENTELER INDUSTRIES INC.
320 HALL ST S.W.
GRAND RAPIDS MI 49507

SHIP TO

BENTELER INDUSTRIES INC.
320 HALL ST S.W.
GRAND RAPIDS MI

PAST DUE ACCOUNTS SUBJECT TO SERVICE CHARGE OF 1½% PER MONTH OR MAXIMUM PERMITTED BY LAW.

WESCO 23265-4 PT (REV 3-86)

All sales are expressly conditional on Buyer's agreement to the standard terms and conditions on the front and back of this form

518659

P 16

BE 030719

0057

Document 20

K&D ENVIRONMENTAL WEST,
P.O. BOX 1505
OWOSSO, MI 48867

STATEMENT

CUSTOMER NO.	STATEMENT DATE
08179	10/31/89

BENTELER INDUSTRIES
GALESBURG, MI

NOV 27 1989

RECEIVED

PAGE NO. 1

TO
BENTELER INDUSTRIES
9000 EAST MICHIGAN AVENUE
GALESBURG, MI 49053

DATE	INVOICE NO.	CHARGES	CREDITS	REFERENCE	BALANCE
9/28/89	00008777	9,906.85	.00	91544-K	9,906.85
9/30/89	00008785	509.00	.00		509.00
10/31/89	00008820	227,087.00	.00		227,087.00

COMMENTS

BE 030253

CURRENT	30-60 DAYS PAST DUE	60-90 DAYS PAST DUE	90+ DAYS PAST DUE	SERVICE CHARGE	PLEASE PAY THIS AMOUNT
227,087.00	10,415.85	.00	.00	.00	005233 237,502.85

Original Proposal	$188,562.00
Less:	
378 tons vs. 329 tons	16,023.00cr
21 loads vs 23 loads	4,120.00db
Adjusted Proposal	$176,659.00
Plus:	
Sub Contract Loading Svcs	6,870.32
Sub Contract Cutting Svcs	6,882.00
Wesco Platform	646.00
Wesco Platform	360.00
Concrete Depth-6" vs 7-3/8"	3,669.96
Labor addt'l	1,598.00
Machine Footing	3,271.80
Dump Site Demurrage	1,045.00
Additional Boxes	600.00
Concrete Sampling	1,294.50
Delay Time (K&D, Diamond Drill,)	3,000.00
Transformer Platform	1,400.00
Backhoe Demurrage	2,500.00
	$209,796.58

Backhoe Demurrage, 10 days @ $250.00/day :

10/17, 10/18, 10/20 (½day), 10/21, 10/22, 10/23 (½day)
10/24, 10/27, 10/28, 10/29, 10/30

005239

INVOICE

DATE	NUMBER
10/31/89	882

PAGE 1

BENTELER INDUSTRIES
GALESBURG, MI

NOV 13 1989

RECEIVED

PLEASE MAKE CHECK PAYABLE TO:
K&D ENVIRONMENTAL WEST,
REMIT TO:
P.O. BOX 1505
OWOSSO, MI 48867

INVOICE TO
08179
BENTELER INDUSTRIES
9000 EAST MICHIGAN AVENUE
GALESBURG, MI 49053

JOB NUMBER	P.O. NUMBER	RELEASE NUMBER	TERMS
1331			NET 30

JOB DESCRIPTION

CUT CONCRETE TRANSPORT TO MODEL CITY, NEW YORK

DATE	JOB TICKET #	MANIFEST #	TYPE	CODE	QTY./HOURS	UNIT	RATE	AMOUNT
10/11/89	8304		MISC	MOBILIZATION				5,440.00
10/12/89	8298		MISC	CUT/REMOVE 6,900 SQ FT CONCRETE				16,256.00
10/13/89	8307		MISC	CUT/REMOVE 6000 ADD. SQ FT@ $5.00/F				30,000.00
10/14/89	8314		MISC	DISASSAMBLE TRANSFORMER PLATFORM				1,400.00
10/14/89	8315		MISC	DOWNTIME 5 HRS DIAMOND DRILLING				1,000.00
10/14/89	8317		MISC	DOWNTIME 5 HRS K & D				2,000.00
10/16/89	3027		EQUIP	DTR004	1.00	TC	2,060.000	2,060.00
10/16/89	3027		MISC	OFFLOADING DEMURRAGE, .25HRS				17.50
10/16/89	3027	8185248	DISP	SCAPCB	11	TN	327.000	3,597.00
10/16/89	8335		EQUIP	DTR002	1.00	TC	2,060.000	2,060.00
10/16/89	8335		MISC	OFFLOADING DEMURRAGE, 1.5HRS				105.00
10/16/89	8335	8185158	DISP	SCAPCB	15	TN	327.000	4,905.00
10/16/89	8341		EQUIP	RTR008	1.00	TC	2,060.000	2,060.00
10/16/89	8341		MISC	OFFLOADING DEMURRAGE, 1 HOUR				70.00
10/16/89	8341	8185266	DISP	SCAPCB	13	TN	327.000	4,251.00
10/16/89	34371		EQUIP	RTR004	1.00	TC	2,060.000	2,060.00
10/16/89	34371		MISC	OFFLOADING DEMURRAGE, .25HRS				17.50
10/16/89	34371	8185167	DISP	SCAPCB	13	TN	327.000	4,251.00
10/16/89	34650		EQUIP	RTR005	1.00	TC	2,060.000	2,060.00
10/16/89	34650	8185257	DISP	SCAPCB	13	TN	327.000	4,251.00
10/19/89	3030		EQUIP	DTR004	1.00	TC	2,060.000	2,060.00
10/19/89	3030	8185302	DISP	SCAPCB	19	TN	327.000	6,213.00
10/19/89	8339		EQUIP	DTR002	1.00	TC	2,060.000	2,060.00
10/19/89	8339		MISC	OFFLOADING DEMURRAGE, .75HRS				52.50
10/19/89	8339	8185347	DISP	SCAPCB	16	TN	327.000	5,232.00
10/19/89	8344		EQUIP	RTR008	1.00	TC	2,060.000	2,060.00
10/19/89	8344		MISC	OFFLOADING DEMURRAGE, 1 HOUR				70.00
10/19/89	8344	8185356	DISP	SCAPCB	15	TN	327.000	4,905.00
10/19/89	8404		MISC	REMOVE CONCRETE FOR SAMPLING				1,294.50
10/20/89	8382		MISC	CUT/LOAD 2 WESCO PLATFORMS				646.00
10/20/89	34198		EQUIP	RTR004	1.00	TC	2,060.000	2,060.00
10/20/89	34198	8185329	DISP	SCAPCB	15	TN	327.000	4,905.00
10/20/89	34654		EQUIP	RTR005	1.00	TC	2,060.000	2,060.00

EQUIPMENT	LABOR	DISPOSAL	SUPPLIES	MISC	PLEASE PAY THIS AMOUNT
					005213

BE 030233

INVOICE

DATE	NUMBER
10/31/89	8820

PAGE 2

PLEASE MAKE CHECK PAYABLE TO:
K&D ENVIRONMENTAL WEST, I
REMIT TO:
P.O. BOX 1505
OWOSSO, MI 48867

INVOICE TO
08179
BENTELER INDUSTRIES
9000 EAST MICHIGAN AVENUE
GALESBURG, MI 49053

JOB NUMBER	P.O. NUMBER	RELEASE NUMBER	TERMS
1331			NET 30

JOB DESCRIPTION
CUT CONCRETE TRANSPORT TO MODEL CITY, NEW YORK

DATE	JOB TICKET #	MANIFEST #	TYPE	CODE	QTY /HOURS	UNIT	RATE	AMOUNT
10/20/89	34654		MISC	OFFLOADING DEMURRAGE, 2.25HRS				157.50
10/20/89	34654		MISC	OFFLOADING DEMURRAGE, 2.25HRS				157.50
10/20/89	34654	8185338	DISP	SCAFCB	15	TN	327.000	4,905.00
10/23/89	8397		MISC	CUT WESCO PLATFORM				360.00
10/24/89	8386		EQUIP	DTR002	1.00	TC	2,060.000	2,060.00
10/24/89	8386		EQUIP	RTR008	1.00	TC	2,060.000	2,060.00
10/24/89	8386	8185365	DISP	SCAFCB	15	TN	327.000	4,905.00
10/24/89	8386	8185311	DISP	SCAFCB	15	TN	327.000	4,905.00
10/24/89	34176		EQUIP	RTR004	1.00	TC	2,060.000	2,060.00
10/24/89	34176		EQUIP	RTR006	1.00	TC	2,060.000	2,060.00
10/24/89	34176	8185284	DISP	SCAFCB	15	TN	327.000	4,905.00
10/24/89	34176	8185275	DISP	SCAFCB	15	TN	327.000	4,905.00
10/25/89	3033		EQUIP	DTR004	1.00	TC	2,060.000	2,060.00
10/25/89	3033	8185293	DISP	SCAFCB	15	TN	327.000	4,905.00
10/25/89	8424		MISC	CUT/REMOVE CONCRETE MACHINE FOOTING				6,685.50
10/27/89	3037		EQUIP	DTR004	1.00	TC	2,060.000	2,060.00
10/27/89	3037	8185419	DISP	SCAFCB	15	TN	327.000	4,905.00
10/27/89	8440		EQUIP	RTR008	1.00	TC	2,060.000	2,060.00
10/27/89	8440		MISC	OFFLOADING DEMURRAGE, 2 HOURS				140.00
10/27/89	8440	8185374	DISP	SCAFCB	15	TN	327.000	4,905.00
10/27/89	8444		EQUIP	DTR002	1.00	TC	2,060.000	2,060.00
10/27/89	8444		MISC	OFFLOADING DEMURRAGE, .25HRS				17.50
10/27/89	8444	8185401	DISP	SCAFCB	15	TN	327.000	4,905.00
10/27/89	34529		EQUIP	RTR009	1.00	TC	2,060.000	2,060.00
10/27/89	34529		MISC	OFFLOADING DEMURRAGE, .75 HRS				52.50
10/27/89	34529	8185428	DISP	SCAFCB	15	TN	327.000	4,905.00
10/30/89	8461		EQUIP	RTR008	1.00	TC	2,060.000	2,060.00
10/30/89	8461	8185455	DISP	SCAFCB	15	TN	327.000	4,905.00
10/30/89	8467		EQUIP	DTR002	1.00	TC	2,060.000	2,060.00
10/30/89	8467	8185446	DISP	SCAFCB	15	TN	327.000	4,905.00
10/30/89	8473		MISC	DEMURRAGE, BACKHOE 10/20-10/30				2,500.00
10/31/89	34666		EQUIP	RTR004	1.00	TC	2,060.000	2,060.00
10/31/89	34666		EQUIP	RTR005	1.00	TC	2,060.000	2,060.00

EQUIPMENT	LABOR	DISPOSAL	SUPPLIES	MISC.	PLEASE PAY THIS AMOUNT
					00521

BE 030234

INVOICE

DATE	NUMBER
10/31/89	8820

PAGE 3

PLEASE MAKE CHECK PAYABLE TO:
K&D ENVIRONMENTAL WEST, I
REMIT TO:
P.O. BOX 1505
OWOSSO, MI 48867

INVOICE TO
08179
BENTELER INDUSTRIES
9000 EAST MICHIGAN AVENUE
GALESBURG, MI 49053

JOB NUMBER	P.O. NUMBER	RELEASE NUMBER	TERMS
1331			NET 30

JOB DESCRIPTION
CUT CONCRETE TRANSPORT TO MODEL CITY, NEW YORK

DATE	JOB TICKET #	MANIFEST #	TYPE	CODE	QTY./HOURS	UNIT	RATE	AMOUNT
10/31/89	34666		MISC	OFFLOADING DEMURRAGE, 1.25HRS				87.50
10/31/89	34666	8185383	DISP	SCAPCB	15	TN	327.000	4,905.00
10/31/89	34666	8185437	DISP	SCAPCB	15	TN	327.000	4,905.00

BE 030235

005220

EQUIPMENT	LABOR	DISPOSAL	SUPPLIES	MISC.	PLEASE PAY THIS AMOUNT
47380.00		111180.00		68527.00	227087.00

DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

HAZARDOUS WASTE MANIFEST

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

Form Approved: OMB No. 2050-0039. Expires 9-30-88

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA No. NYB0877125 52 — Manifest Document No.

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

3. Generator's Name and Mailing Address
RECOVERY SPECIALISTS, INC.
P.O. BOX 255, SALINE, MI 48176

A. State Manifest Document No. NYA 818524 8

4. Generator's Phone (313) 483-2696

B. Generator's ID

5. Transporter 1 (Company Name) — 6. US EPA ID Number
K & D INDUSTRIAL SERVICES — NYD072795715

C. State Transporter's ID NY 3[illegible]

D. Transporter's Phone (716) 743-[illegible]

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

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address
CHM CHEMICAL SERVICES, INC.
1559 BAILEY RD.
NORTH CITY, NY 14107

10. US EPA ID Number — NYD049836679

G. State Facility's ID

H. Facility's Phone 716 754-[illegible]

11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. Waste Hazardous Substance, Solid, n.o.s. (PCB; RQ-10/4.54), DOT-E, NA 9188	001	CF		X	D007
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
A. PCB Soil & Debris
Accumulation Start Date: 10/17/89
DOA Waste Code: 2 09111 — Work Order: 15131 — P.O.#: 591012A
b. PLEASE PROVIDE CERTIFICATE OF DISPOSAL

K. Handling Codes for Wastes Listed Above
a. D-81 — b.

15. Special Handling Instructions and Additional Information
AVOID CONTACT WITH BARE SKIN - CONTAIN AND RECOVER ANY LIQUIDS - DO NOT WASH DOWN
CONTACT PARTIES LISTED ABOVE FOR INSTRUCTIONS

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

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

Printed/Typed Name: Glenn Lewis — Signature — Mo. Day Year

17. Transporter 1 (Acknowledgement of Receipt of Materials)
Printed/Typed Name — Signature — Mo. Day Year

18. Transporter 2 (Acknowledgement of Receipt of Materials)
Printed/Typed Name — Signature — Mo. Day Year

19. Discrepancy Indication Space Hand-Shake
Actual Quantity Received 2 3RD Drums

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

Printed/Typed Name: Donna Hill — Signature — Mo. Day Year: 10/10/89

GENERATOR — TRANSPORTER — FACILITY

In case of emergency or spill immediately call the National Response Center (800) 424-8802 and the N.Y. Department of Transportation (518) 457-7362

EPA Form 8700-22 (Rev. 9-86) Previous edition is obsolete.

BE 008529 005330

COPY 7 – Transporter copy – retained by tr

STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

HAZARDOUS WASTE MANIFEST

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

Form Approved. OMB No. 2050-0039. Expires 9-30-88

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA No. / Manifest Document No.: MID 0 0 6 7 2 2 6 5 2

2. Page 1 of 1

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

3. Generator's Name and Mailing Address
ENERGY SPECIALISTS, INC.
P.O. BOX 255, ENLINE, MI 49176

4. Generator's Phone 312) 483-3600

A. State Manifest Document No. NYA 818515 8

B. Generator's ID

5. Transporter 1 (Company Name): K & D INDUSTRIAL SERVICES

6. US EPA ID Number: M I D 0 7 2 7 9 0 7 1 0

C. State Transporter's ID 81 275

D. Transporter's Phone 616 243-6333

7. Transporter 2 (Company Name)

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address
CWI CHEMICAL SERVICES, INC.
1558 BAUMER RD.
NIAGARA CITY, NY 14127

10. US EPA ID Number: N Y D 0 4 9 8 3 6 6 7 9

G. State Facility's ID

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

11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	Waste No.
a. Waste Hazardous Substance, Solid, N.O.S. (PCB; RQ-10/4.34), ORM-E, NA 9193	001	DT	00008	Y	D007
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
TIME OUT
a. PCB Soil & Debris
Accumulation Start Date/
c. MI1653164
BCA WASTE CODE: E 89111 WORK ORDER: 152383 P.O. #: 891612A
b. *** PLEASE PROVIDE CERTIFICATE OF DISPOSAL ***

K. Handling Codes for Wastes Listed Above
a. D-81 L
b.
c.
d.

15. Special Handling Instructions and Additional Information
AVOID CONTACT WITH BARE SKIN — CONTAIN AND RECOVER ANY LIQUIDS — DO NOT MIX. DONT CONTACT PARTIES LISTED ABOVE FOR INSTRUCTIONS

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

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

Printed/Typed Name: GLENN LENSE — Signature — Mo. Day Year

17. Transporter 1 (Acknowledgement of Receipt of Materials)
Printed/Typed Name — Signature — Mo. Day Year

18. Transporter 2 (Acknowledgement of Receipt of Materials)
Printed/Typed Name — Signature — Mo. Day Year

19. Discrepancy Indication Space
Contains Quantity Error 5/7/16

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: Frank Villanueva — Signature — Mo. Day Year

GENERATOR — TRANSPORTER — FACILITY

In case of emergency or spill immediately call the National Response Center (800) 424-8802 and the N.Y. Department of Transportation (518) 457-7362.

NYA 818515 8

EPA Form 8700-22 (Rev. 9-86) Previous edition is obsolete.

COPY 7 – Transporter copy – retained by transp

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CT-230

STATE OF NEW YORK
...MENT OF ENVIRONMENTAL CONSERVATION
...VISION OF SOLID AND HAZARDOUS WASTE

...HAZARDOUS WASTE MANIFEST

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

Form Approved. OMB No. 2050-0039. Expires 9-30-88

...ALISTS, INC. ... SALINE, MI 48176 ... Phone 313 483-9600	1. Generator's US EPA No. MID000722652	Manifest Document No.
	2. Page 1 of 1	Information in the shaded areas is not required by Federal Law.
	A. State Manifest Document No. NYA 818526 6	
	B. Generator's ID	
...orter 1 (Company Name) ... INDUSTRIAL SERVICES	6. US EPA ID Number MID072790718	C. State Transporter's ID MI 275
		D. Transporter's Phone 616 343-0088
Transporter 2 (Company Name)	8. US EPA ID Number	E. State Transporter's ID
		F. Transporter's Phone
9. Designated Facility Name and Site Address CRM CHEMICAL SERVICES, INC. 1550 DALMER RD. MODEL CITY, NY 14107	10. US EPA ID Number NYD049836679	G. State Facility's ID
		H. Facility's Phone (716) 754-8231

11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	Waste No.
a. Waste Hazardous Substance, Solid, n.o.s. (PCB; RQ-10/4.54), ORM-E, NA 9188	001	CM	0008		8007
b.					
c.					
d.					

J. Additional Descriptions for Materials listed Above
a. PCB Soil & Debris
Accumulation Start Date: MI1653108
SCA WASTE CODE: E 89111 WORK ORDER: 152329 P.O. #: 891012A
b *** PLEASE PROVIDE CERTIFICATE OF DISPOSAL ***

K. Handling Codes for Wastes Listed Above
a D-81 SL
b
c
d

15. Special Handling Instructions and Additional Information
AVOID CONTACT WITH BARE SKIN - CONTAIN AND RECOVER ANY LIQUIDS - DO NOT WASH DOWN
CONTACT PARTIES LISTED ABOVE FOR INSTRUCTIONS

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and state laws and regulations.
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Printed/Typed Name	Signature	Mo. Day Year
Grant Lease	[signature]	10 14 89

17. Transporter 1 (Acknowledgement of Receipt of Materials)

Printed/Typed Name	Signature	Mo. Day Year
[illegible]	[signature]	10 14 89

18. Transporter 2 (Acknowledgement or Receipt of Materials)

Printed/Typed Name	Signature	Mo. Day Year
BASE PRICE		

19. Discrepancy Indication Space
[illegible]

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

Printed/Typed Name	Signature	Mo. Day Year
Ruth Villanueva	[signature]	10 14 89

GENERATOR

TRANSPORTER

FACILITY

In case of emergency or spill immediately call the National Response Center (800) 424-8802 and the N.Y. Department of Transport...

NYA 818526 6

EPA Form 8700-22 (Rev. 9-86) Previous edition is obsolete.

COPY 7 – Transporter copy – retained by tr
TOTAL

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005...

STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

HAZARDOUS WASTE MANIFEST

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

Please print or type

Form Approved OMB No. 2050-0039 Expires 9-30-88

UNIFORM HAZARDOUS WASTE MANIFEST

1 Generator's US EPA No.: MID088722652 — Manifest Document No.:

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

3 Generator's Name and Mailing Address: RECOVERY SPECIALISTS, INC. P.O. BOX 755, SALINE, MI 48176

4 Generator's Phone (313) 481-9688

A State Manifest Document No.: NY A 818516 7

B Generator's ID:

5 Transporter 1 (Company Name): K & D INDUSTRIAL SERVICES

6 US EPA ID Number: MID072798710

C State Transporter's ID: MI 276

D Transporter's Phone (616) 343-[illegible]

7 Transporter 2 (Company Name):

8 US EPA ID Number:

E State Transporter's ID:

F Transporter's Phone ( )

9 Designated Facility Name and Site Address: CWM CHEMICAL SERVICES, INC. 1550 BALMER RD. MODEL CITY, NY 14107

10 US EPA ID Number: NYD049836679

G State Facility's ID:

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

11 US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	12 Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a Waste Hazardous Substance, Solid, n.o.s. (PCB; RQ-10/4.54), ORM-K, NA 9188	001	CM	08	Y	[illegible]
b					
c					
d					

J Additional Descriptions for Materials listed Above

a. PCB Soil & Debris
Accumulation Start Date: [illegible] NM1653185
BCA WASTE CODE: E 89111 WORK ORDER: 152332 P.O. #: 0918124
*** PLEASE PROVIDE CERTIFICATE OF DISPOSAL ***

K Handling Codes for Wastes Listed Above

a D-01 L

b

c

d

15 Special Handling Instructions and Additional Information

AVOID CONTACT WITH BARE SKIN - CONTAIN AND RECOVER ANY LIQUIDS - DO NOT WASH DOWN
CONTACT PARTIES LISTED ABOVE FOR INSTRUCTIONS

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

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

17 Transporter 1 (Acknowledgement of Receipt of Materials)

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

18 Transporter 2 (Acknowledgement of Receipt of Materials)

Printed/Typed Name: — Signature: — Mo Day Year:

19 Discrepancy Indication Space: [illegible]

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

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

NY A 818516 7

EPA Form 8700-22 (Rev. 9-88) Previous edition is obsolete.

COPY 7 – Transporter copy – retained by tr

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STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

HAZARDOUS WASTE MANIFEST

P O Box 12820, Albany, New York 12212

Please print or type

Form Approved OMB No 2050-0039 Expires 9 30 88

UNIFORM HAZARDOUS WASTE MANIFEST

1 Generator's US EPA No: NYD988722652 — Manifest Document No:

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

3 Generator's Name and Mailing Address
RECOVERY SPECIALISTS, INC.
P.O. BOX 255, SALINE, MI 48176
4 Generator's Phone (313) 483-9688

A State Manifest Document No: NY A 818525 7
B Generator's ID: SAME

5 Transporter 1 (Company Name): K & D INDUSTRIAL SERVICES
6 US EPA ID Number: MID072790730
C State Transporter's ID: MI 275
D Transporter's Phone: 616 343-[illegible]

7 Transporter 2 (Company Name)
8 US EPA ID Number
E State Transporter's ID
F Transporter's Phone ( )

9 Designated Facility Name and Site Address
CHM CHEMICAL SERVICES, INC.
1550 BALMER RD.
MODEL CITY, NY 14107
10 US EPA ID Number: NYD049836679
G State Facility's ID
H Facility's Phone: (716) 754-8231

11 US DOT Description (Including Proper Shipping Name Hazard Class and ID Number)

	12 Containers No.	Type	13 Total Quantity	14 Unit Wt/Vol	Waste No.
a. Waste Hazardous Substance, Solid, N.O.S. (PCB; PO-10/4.54), ORM-E, NA 9188	001	CM	00100	Y	0007
b					
c					
d					

J Additional Descriptions for Materials listed Above
a. PCB Oil & Debris
~~Accumulation Start Date~~ 11/03/97
SCA WASTE CODE: Y 6.111 WORK ORDER: 152139 P.O. #: 091812A
*** PLEASE PROVIDE CERTIFICATE OF DISPOSAL ***

K Handling Codes for Wastes Listed Above
a. D-01 L
b.
c.
d.

15 Special Handling Instructions and Additional Information
AVOID CONTACT WITH BARE SKIN - CONTAIN AND RECOVER ANY LIQUIDS - DO NOT WASH DOWN
CONTACT PARTIES LISTED ABOVE FOR INSTRUCTIONS

16 GENERATOR'S CERTIFICATION. I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and state laws and regulations.
If I am a large quantity generator I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment OR if I am a small generator I have made a good faith effort to minimize my waste and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: Gerald Lisa — Signature: [signature] — Mo Day Year: 10 25 97

17 Transporter 1 (Acknowledgement of Receipt of Materials)
Printed/Typed Name: Joe Hart — Signature: [signature] — Mo Day Year: 10 25 97

18 Transporter 2 (Acknowledgement of Receipt of Materials)
Printed/Typed Name — Signature — Mo Day Year

19 Discrepancy Indication Space
Total Gally Wrong

20 Facility Owner or Operator Certification of receipt of Hazardous materials covered by this manifest except as noted in Item 19
Printed/Typed Name: [illegible] — Signature: [illegible] — Mo Day Year: 10 25 97

GENERATOR — TRANSPORTER — FACILITY

In case of emergency or spill immediately call the National Response Center (800) 424 8802 and the N.Y. Department of Transportation (518) 457-6811

EPA Form 8700 22 (Rev 9-88) Previous edition is obsolete

COPY 7 Transporter copy - retained by tran

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DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

HAZARDOUS WASTE MANIFEST

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

Please print or type.

Form Approved. OMB No. 2050-0039. Expires 9-30-88

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA No. MID000722657 — Manifest Document No.

2. Page 1 of 1

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

3. Generator's Name and Mailing Address
RECOVERY SPECIALISTS, INC.
P.O. BOX 255, SALINE, MI 48176

4. Generator's Phone (313) 483-9600

A. State Manifest Document No. NY.A 818530 2

B. Generator's ID SAME

5. Transporter 1 (Company Name) K & D INDUSTRIAL SERVICES

6. US EPA ID Number HID072799719

C. State Transporter's ID MI 275 325 374

D. Transporter's Phone (616) 343-7300

7. Transporter 2 (Company Name)

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone ( )

9. Designated Facility Name and Site Address
CRM CHEMICAL SERVICES, INC.
1550 PALMER RD.
MODEL CITY, NY 14107

10. US EPA ID Number NYD049836679

G. State Facility's ID

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

11. US DOT Description (including Proper Shipping Name, Hazard Class and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. Waste Hazardous Substance, Solid, n.o.s. (PCB; RQ-10/4.54), ORM-E, NA 9108	001	UT DT	015	Y	D007
b.					
c.					
d.					

J. Additional Descriptions for Materials listed Above
a. PCB Soil & Debris — MI1653112
~~Accumulation Start Date:~~
EPA WASTE CODE: F 89111 — WORK ORDER: 152340 — P.O. #: 891512 A
*** PLEASE PROVIDE CERTIFICATE OF DISPOSAL ***

K. Handling Codes for Wastes Listed Above
a. D-81 L — b. — c. — d.

15. Special Handling Instructions and Additional Information
AVOID CONTACT WITH BARE SKIN - CONTAIN AND RECOVER ANY LIQUIDS - DO NOT WASH DOWN
CONTACT PARTIES LISTED ABOVE FOR INSTRUCTIONS

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

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Printed/Typed Name: Michael Trapline — Signature: [signature] — Mo. Day Year: 10 18 89

17. Transporter 1 (Acknowledgement of Receipt of Materials)
Printed/Typed Name: MIKE EARLYWINE — Signature: [signature] — Mo. Day Year: 10 18 89

18. Transporter 2 (Acknowledgement of Receipt of Materials)
Printed/Typed Name — Signature — Mo. Day Year

19. Discrepancy Indication Space
Estimated Quantity Actual Rec'd 38400-P

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19.
Printed/Typed Name: Lynn Piechowski — Signature: [signature] — Mo. Day Year: 10 19 89

GENERATOR — TRANSPORTER — FACILITY

In case of emergency or spill immediately call the National Response Center (800) 424-8802 and the N.Y. Department of Transportation (518) 457-7362.

EPA Form 8700-22 (Rev. 9-86) Previous edition is obsolete.

COPY 5 – Generator-mailed by TSD facili

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STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

HAZARDOUS WASTE MANIFEST

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

Please print or type

Form Approved OMB No 2050-0039 Expires 9 30 88

UNIFORM HAZARDOUS WASTE MANIFEST

1 Generator's US EPA No. MID000722652 Manifest Document No

2 Page 1 of 1

Information in the shaded area is not required by Federal Law

3. Generator's Name and Mailing Address
RECOVERY SPECIALISTS, INC.
P.O. BOX 255, SALINE, MI 48176

4 Generator's Phone (313) 483-9600

A. State Manifest Document No NY A 818534 7

B Generator's ID

5. Transporter 1 (Company Name) R & D INDUSTRIAL SERVICES

6 US EPA ID Number MID072798710

C. State Transporter's ID MI-275-

D. Transporter's Phone (616) 343-[illegible]

7. Transporter 2 (Company Name)

8 US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone ( )

9 Designated Facility Name and Site Address
CHEMICAL SERVICES, INC.
1559 BAUER RD.
MOOPE CITY, NY 14197

10. US EPA ID Number NYD049836679

G. State Facility's ID

H. Facility's Phone (716) 754-0231

11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. Waste Hazardous Substance, Solid, n.o.s. (PCB; RQ-10/4.54), ORM-E, NA 9188	001		015	Y	B007
b					
c.					
d					

J. Additional Descriptions for Materials listed Above MI1653116

Accumulation Start Date: [illegible]

SCA WASTE CODE: E 89111 WORK ORDER: 152336 P.O. #: 891012 A

*** PLEASE PROVIDE CERTIFICATE OF DISPOSAL ***

K. Handling Codes for Wastes Listed Above

a. [illegible] c.

b. d.

15. Special Handling Instructions and Additional Information
AVOID CONTACT WITH PARTS [illegible] CONTAIN AND RECOVER ANY LIQUIDS - DO NOT WASH DOWN
CONTACT PARTIES LISTED ABOVE FOR INSTRUCTIONS

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Printed/Typed Name [illegible] Signature [signature] Mo Day Year

17 Transporter 1 (Acknowledgement of Receipt of Materials)

Printed/Typed Name Signature Mo Day Year

18 Transporter 2 (Acknowledgement or Receipt of Materials)

Printed/Typed Name Signature Mo Day Year

19 Discrepancy Indication Space [illegible]

ACTUAL QUANTITY [illegible] 32270 [illegible]

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

Printed/Typed Name [illegible] Signature [signature] Mo Day Year 10 19

In case of emergency or spill immediately call the National Response Center (800) 424-8802 and the N.Y. Department of Transportation (518) 457-7362.

EPA Form 8700-22 (Rev. 9-86) Previous edition is obsolete

COPY 5 – Generator mailed by TSF

BE 008535

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STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

HAZARDOUS WASTE MANIFEST

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

Please print or type

Form Approved OMB No 2050 0039 Expires 9 30 8

UNIFORM HAZARDOUS WASTE MANIFEST

1 Generator's US EPA No. MID000722652 Manifest Document No

2 Page 1 of 1 Information in the shaded arc is not required by Federal La

3. Generator's Name and Mailing Address
RECOVERY SPECIALISTS, INC.
P.O. BOX 255, SALINE, MI 48176

4 Generator's Phone (313) 483-9600

A State Manifest Document No. NY A 818535 6

B. Generator's ID

5. Transporter 1 (Company Name) K & D INDUSTRIAL SERVICES

6 US EPA ID Number MID072790710

C. State Transporter's ID MI 275

D Transporter's Phone (616) 343-[illegible]

7. Transporter 2 (Company Name)

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone ( )

9 Designated Facility Name and Site Address
CWM CHEMICAL SERVICES, INC.
1550 BALMER RD.
MODEL CITY, NY 14107

10. US EPA ID Number NYD049836679

G. State Facility's ID

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

11 US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a Waste Hazardous Substance, Solid, n.o.s. (PCB; PO-10/4.54), ORM-E, NA 9188	001		015	Y	B00
b					
c					
d					

J Additional Descriptions for Materials listed Above
a. PCB Soil & Debris
Accumulation Start Date: [illegible]
SCA WASTE CODE: E 89111 WORK ORDER: 152335 P.O. #: 891012 A
*** PLEASE PROVIDE CERTIFICATE OF DISPOSAL ***
c MI1653117

K. Handling Codes for Wastes Listed Above
a D-81 L
b
c
d

15 Special Handling Instructions and Additional Information
AVOID CONTACT WITH BARE SKIN - CONTAIN AND RECOVER ANY LIQUIDS - DO NOT WASH DOWN
CONTACT PARTIES LISTED ABOVE FOR INSTRUCTIONS

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Printed/Typed Name [illegible] Signature [signature] Mo Day Ye 10 18 8

17 Transporter 1 (Acknowledgement of Receipt of Materials)
Printed/Typed Name JOHN SPIKER Signature John Spiker Mo. Day Ye 10 18 8

18 Transporter 2 (Acknowledgement or Receipt of Materials)
Printed/Typed Name Signature Mo Day Ye

19 Discrepancy Indication Space
A TOTAL QUANTITY RECEIVED: 21520 lb

20 Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19
Printed/Typed Name JOSEPH P. MCGAHAN Signature [signature] Mo. Day Ye 10 19 8

In case of emergency or spill immediately call the National Response Center (800) 424-8802 and the N.Y. Department of Transportation (518) 457-7362.

EPA Form 8700-22 (Rev. 9-86) Previous edition is obsolete

COPY 5 – Generator-mailed by TSD BE 008536 005[illegible]

STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

HAZARDOUS WASTE MANIFEST

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

Please print or type.

Form Approved. OMB No 2050-0039 Expires 9 30 86

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA No. MID007226533 — Manifest Document No

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

3. Generator's Name and Mailing Address
RECOVERY SPECIALISTS, INC.
P.O. BOX 255, MALINE, MI 48176

4. Generator's Phone (313) 483-9659

A. State Manifest Document No. NY A 818532 9

B. Generator's ID

5. Transporter 1 (Company Name) K & D INDUSTRIAL SERVICES

6. US EPA ID Number MID072790710

C. State Transporter's ID MI 2557

D. Transporter's Phone (616) 343-0033

7. Transporter 2 (Company Name)

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone ( )

9. Designated Facility Name and Site Address
CWM CHEMICAL SERVICES, INC.
1550 BALMER RD.
MODEL CITY, NY 14107

10. US EPA ID Number NYD049836679

G. State Facility's ID

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

GENERATOR

11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. Waste Hazardous Substance, Solid, n.o.s. (PCB; RQ-10/4.54), ORM-E, NA 9198	001	CM	015	Y	B007
b.					
c.					
d					

J. Additional Descriptions for Materials listed Above
a. PCB Soil & Debris — c. MI1653114
Accumulation Start Date: /
SCA WASTE CODE: E 89111 — WORK ORDER: 152338 — P.O. #: 391912 A
*** PLEASE PROVIDE CERTIFICATE OF DISPOSAL ***

K. Handling Codes for Wastes Listed Above
a. D-81 L — c.
b. — d.

15. Special Handling Instructions and Additional Information
AVOID CONTACT WITH BARE SKIN - CONTAIN AND RECOVER ANY LIQUIDS - DO NOT WASH DOWN
CONTACT PARTIES LISTED ABOVE FOR INSTRUCTIONS

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Printed/Typed Name: Michael A. Inglin — Signature — Mo. Day Year

TRANSPORTER

17. Transporter 1 (Acknowledgement of Receipt of Materials)
Printed/Typed Name — Signature — Mo. Day Year

18. Transporter 2 (Acknowledgement or Receipt of Materials)
Printed/Typed Name — Signature — Mo. Day Year

FACILITY

19. Discrepancy Indication Space Same Same
Estimated Quantity Based Rec'd 39.100-P

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19
Printed/Typed Name: Lynn Piechowski — Signature — Mo. Day Year

In case of emergency or spill immediately call the National Response Center (800) 424-8802 and the N.Y. Department of Transportation (518) 457-7362.

EPA Form 8700-22 (Rev. 9-86) Previous edition is obsolete.

COPY 5 – Generator-mailed by T BE 008537 005553

STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

HAZARDOUS WASTE MANIFEST

P O Box 12820, Albany, New York 12212

Please print or type

Form Approved OMB No 2050 0039 Expires 9 30 88

UNIFORM HAZARDOUS WASTE MANIFEST

1 Generator s US EPA No: MID000732652 — Manifest Document No

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

3 Generator s Name and Mailing Address
RECOVERY SPECIALISTS, INC.
P.O. BOX 255, SALINE, MI 48176

4 Generator s Phone (313) 483-9600

A State Manifest Document No: NY A 818533 8

B Generator s ID

5 Transporter 1 (Company Name): F & D INDUSTRIAL SERVICES

6 US EPA ID Number: MID072790716

C State Transporter s ID: MI 275

D Transporter's Phone: (616) 343-0000

7 Transporter 2 (Company Name)

8 US EPA ID Number

E State Transporter s ID

F Transporter s Phone ( )

9 Designated Facility Name and Site Address
CWM CHEMICAL SERVICES, INC.
1550 BALMER RD.
MODEL CITY, NY 14107

10 US EPA ID Number: NYD049336679

G State Facility s ID

H Facility s Phone: (716) 754-8231

11 US DOT Description (Including Proper Shipping Name Hazard Class and ID Number)	12 Containers No	Type	13 Total Quantity	14 Unit Wt/Vol	I Waste No.
a Waste Hazardous Substance, Solid, n.o.s. (PCB; RQ-10/4.54), ORM-E, NA 9188	001	CM	015	Y	B007
b					
c					
d					

J Additional Descriptions for Materials listed Above

a. PCB Soil & Debris — c. MI1653115

~~Accumulation Start Date:~~ 10-12-87

SCA WASTE CODE: E 89111 — WORK ORDER: 152337 — P.O. #: 891912 A

*** PLEASE PROVIDE CERTIFICATE OF DISPOSAL ***

K Handling Codes for Wastes Listed Above

a D-81 L — c

b — d

15 Special Handling Instructions and Additional Information

AVOID CONTACT WITH BARE SKIN - CONTAIN AND RECOVER ANY LIQUIDS - DO NOT WASH DOWN
CONTACT PARTIES LISTED ABOVE FOR INSTRUCTIONS

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Printed/Typed Name: [illegible] — Signature: [illegible] — Mo Day Ye: 10 13 8[illegible]

17 Transporter 1 (Acknowledgement of Receipt of Materials)

Printed/Typed Name: Joe Hayes — Signature: [illegible] — Mo Day Ye: 10 13 8[illegible]

18 Transporter 2 (Acknowledgement or Receipt of Materials)

Printed/Typed Name — Signature — Mo Day Ye

19 Discrepancy Indication Space: Item B same [illegible] 30880-P

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

Printed/Typed Name: Lynn Piechowski — Signature: [illegible] — Mo Day Ye: 10 [illegible]

GENERATOR — TRANSPORTER — FACILITY

In case of emergency or spill immediately call the National Response Center (800) 424 8802 and the N Y Department of Transportation (518) 457 7362

EPA Form 8700 22 (Rev 9 86) Previous edition is obsolete

COPY 5 – Generator-mailed by TSD BE 008538 005[illegible]

STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

HAZARDOUS WASTE MANIFEST

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

Please print or type.

Form Approved OMB No 2050-0039 Expires 9 30

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA No. MID 988726526 — Manifest Document No.

2. Page 1 of 1 — Information in the shaded a is not required by Federal l

3. Generator's Name and Mailing Address
RECOVERY SPECIALISTS, INC.
P.O. BOX 255, SALINE, MI 48176

4. Generator's Phone (313) 483-9600

A. State Manifest Document No. NY A 818536

B. Generator's ID

5. Transporter 1 (Company Name) R & D INDUSTRIAL SERVICES

6. US EPA ID Number MID 727906718

C. State Transporter's ID MI 275

D. Transporter's Phone 616 343-09

7. Transporter 2 (Company Name)

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone ( )

9. Designated Facility Name and Site Address
CHEM CHEMICAL SERVICES, INC.
1558 BALMER RD.
MODEL CITY, NY 14107

10. US EPA ID Number NYD 049836673

G. State Facility's ID

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

GENERATOR

11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste N
a. Waste Hazardous Substance, Solid, n.o.s. (PCB; RQ-10/4.54), CW-E, NA 9189	001		015	Y	588
b					
c					
d					

J. Additional Descriptions for Materials listed Above
a. PCB Soil & Debris c. MI1653118
Accumulation Start Date: 10/15/89
SCA WASTE CODE: R 89111 WORK ORDER: 152306 P.O. #: 891812 A
*** PLEASE PROVIDE CERTIFICATE OF DISPOSAL. ***

K. Handling Codes for Wastes Listed Abo
a. D-81 L c.
b. d.

15. Special Handling Instructions and Additional Information
AVOID CONTACT WITH BARE SKIN - CONTAIN AND RECOVER ANY LIQUIDS - DO NOT WASH DOWN
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Printed/Typed Name [illegible] Signature [illegible] Mo Day

TRANSPORTER

17. Transporter 1 (Acknowledgement of Receipt of Materials)
Printed/Typed Name Signature Mo. Day

18. Transporter 2 (Acknowledgement of Receipt of Materials)
Printed/Typed Name Signature Mo. Day

FACILITY

19. Discrepancy Indication Space Item L - Same Item O - 30265T (MI)
(STAINED) Qty Note KC (D) 26-340 LD

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

Printed/Typed Name Keith Villanueve Signature [illegible] Villanueve Mo Day 12 18

In case of emergency or spill immediately call the National Response Center (800) 424-8802 and the N.Y. Department of Transportation (518) 457-7362.

EPA Form 8700-22 (Rev. 9-86) Previous edition is obsolete.

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STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

HAZARDOUS WASTE MANIFEST

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

Please print or type

Form Approved OMB No 2050 0039 Expires 9 30

UNIFORM HAZARDOUS WASTE MANIFEST

1 Generator's US EPA No: MID000732652 — Manifest Document No

2 Page 1 of 1 — Information in the shaded a is not required by Federal L

3 Generator's Name and Mailing Address: RECOVERY SPECIALISTS, INC. P.O. BOX 255, BALINE, MI 48176

4 Generator's Phone (313) 403-9600

A State Manifest Document No: NY A 818531 1

B Generator's ID

5 Transporter 1 (Company Name): K & D INDUSTRIAL SERVICES

6 US EPA ID Number: MID072790710

C State Transporter's ID: MI 275

D Transporter's Phone (616) 343-00

7 Transporter 2 (Company Name)

8 US EPA ID Number

E State Transporter's ID

F Transporter's Phone ( )

9 Designated Facility Name and Site Address: CWM CHEMICAL SERVICES, INC. 1550 BALMER RD. MODEL CITY, NY 14107

10 US EPA ID Number: MYD049836679

G State Facility's ID

H Facility's Phone (716) 754-8231

11 US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	12 Containers No.	Type	13 Total Quantity	14 Unit Wt/Vol	I Waste No
a Waste Hazardous Substance, Solid, n.o.s. (PCB; RQ-10/4.54), ORM-E, NA 9183	001		015	Y	880
b					
c					
d					

J Additional Descriptions for Materials listed Above

a. PCB Soil & Debris — MI1653113

Accumulation Start Date:

FCA WASTE CODE: R 89111 — WORK ORDER: 152339 — P.O. #: 891012 A

*** PLEASE PROVIDE CERTIFICATE OF DISPOSAL ***

K Handling Codes for Wastes Listed Abov

a D-81 L — c

b — d

15 Special Handling Instructions and Additional Information

AVOID CONTACT WITH BARE SKIN - CONTAIN AND RECOVER ANY LIQUIDS - DO NOT WASH DOWN
CONTACT PARTIES LISTED ABOVE FOR INSTRUCTIONS

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Printed/Typed Name: [illegible] — Signature: [illegible] — Mo Day Y

17 Transporter 1 (Acknowledgement of Receipt of Materials)

Printed/Typed Name — Signature — Mo. Day Y

18 Transporter 2 (Acknowledgement or Receipt of Materials)

Printed/Typed Name — Signature — Mo Day Y

19 Discrepancy Indication Space [illegible]

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

Printed/Typed Name [illegible] — Signature [illegible] — Mo Day Y

In case of emergency or spill immediately call the National Response Center (800) 424-8802 and the N.Y. Department of Transportation (518) 457-7362.

EPA Form 8700-22 (Rev. 9-86) Previous edition is obsolete

COPY 5—Generator-mailed by BE 008540

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STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

HAZARDOUS WASTE MANIFEST

P O Box 12820, Albany, New York 12212

Please print or type

Form Approved OMB No 2050 0039 Expires 9 30

UNIFORM HAZARDOUS WASTE MANIFEST

1 Generator s US EPA No: MID000722652 — Manifest Document No:

2 Page 1 of 1 — Information in the shaded a is not required by Federal L

3 Generator s Name and Mailing Address: RECOVERY SPECIALISTS, INC. P.O. BOX 255, SALINE, MI 48176

4 Generator s Phone (313) 483-9600

A State Manifest Document No: NY A 818528

B Generator s ID:

5 Transporter 1 (Company Name): F & D INDUSTRIAL SERVICES

6 US EPA ID Number: MID072790710

C State Transporter s ID: MI 275

D Transporter s Phone (616 343-03

7 Transporter 2 (Company Name):

8 US EPA ID Number:

E State Transporter s ID:

F Transporter's Phone ( )

9 Designated Facility Name and Site Address: CWM CHEMICAL SERVICES, INC. 1550 BALMER RD. MODEL CITY, NY 14107

10 US EPA ID Number: NYD049836679

G State Facility s ID:

H Facility s Phone (716) 754-8231

11 US DOT Description (Including Proper Shipping Name Hazard Class and ID Number)	12 Containers No	Type	13 Total Quantity	14 Unit Wt/Vol	I Waste No
a Waste Hazardous Substance, Solid, n.o.s. (PCB; PO-10/4.54), ORM-E, NA 9198	001		015	Y	800
b					
c					
d					

J Additional Descriptions for Materials listed Above

a. PCB Soil & Debris — c MI1653110

Accumulation Start Date: [illegible]

SCA WASTE CODE: P 89111 — WORK ORDER: 152342 — P.O. #: 891012 A

*** PLEASE PROVIDE CERTIFICATE OF DISPOSAL ***

K Handling Codes for Wastes Listed Above

a D-81 I — c

b — d

15 Special Handling Instructions and Additional Information

AVOID CONTACT WITH BARE SKIN - CONTAIN AND RECOVER ANY LIQUIDS - DO NOT WASH DOWN
CONTACT PARTIES LISTED ABOVE FOR INSTRUCTIONS

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Printed/Typed Name: [illegible] — Signature: [illegible] — Mo Day Y

17 Transporter 1 (Acknowledgement of Receipt of Materials)

Printed/Typed Name: [illegible] — Signature: [illegible] — Mo Day Y

18 Transporter 2 (Acknowledgement or Receipt of Materials)

Printed/Typed Name: — Signature: — Mo Day Y

19 Discrepancy Indication Space: HUMB SAME ITEM C-31883 M(MI)

[illegible]

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

Printed/Typed Name: [illegible] — Signature: [illegible] — Mo Day Y

In case of emergency or spill immediately call the National Response Center (800) 424-8802 and the N Y. Department of Transportation (518) 457 7362

EPA Form 8700 22 (Rev 9 86) Previous edition is obsolete

COPY 5 – Generator mailed by T

BE 008541

005[illegible]

STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

HAZARDOUS WASTE MANIFEST

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

Please print or type.

Form Approved OMB No 2050-0039 Expires 9 30

In case of emergency or spill immediately call the National Response Center (800) 424-8802 and the N.Y. Department of Transportation (518) 457-7362.

UNIFORM HAZARDOUS WASTE MANIFEST

1 Generator's US EPA No: MID980722652 — Manifest Document No

2. Page 1 of 1 — Information in the shaded a is not required by Federal L

GENERATOR

3 Generator's Name and Mailing Address
RECOVERY SPECIALISTS, INC.
P.O. BOX 255, SALINE, MI 48176

4 Generator's Phone (313) 403-9600

A State Manifest Document No. NY A 818527

B. Generator's ID

5 Transporter 1 (Company Name): K & D INDUSTRIAL SERVICES

6 US EPA ID Number: MID072790710

C. State Transporter's ID: NY 27

D Transporter's Phone (616) 343-

7 Transporter 2 (Company Name)

8 US EPA ID Number

E State Transporter's ID

F. Transporter's Phone ( )

9 Designated Facility Name and Site Address
CWM CHEMICAL SERVICES, INC.
1550 BALMER RD.
MODEL CITY, NY 14107

10 US EPA ID Number: NYD049836679

G. State Facility's ID

H Facility's Phone (716) 754-8231

11 US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	12 Containers No.	Type	13. Total Quantity	14 Unit Wt/Vol	I Waste N
a Waste Hazardous Substance, Solid, n.o.s. (PCB, RQ-1LB/4.54), ORM-E, NA 9188	001	CM	315	Y	800
b.					
c					
d					

J. Additional Descriptions for Materials listed Above
a. PCB Soil & Debris — c. MI1653189
~~Accumulation Start Date:~~
EPA WASTE CODE: F 39111 — WORK ORDER: 152343 — P.O. #: 391012 A
*** PLEASE PROVIDE CERTIFICATE OF DISPOSAL ***

K Handling Codes for Wastes Listed Abo
a D-81 L — c
b — d

15 Special Handling Instructions and Additional Information
AVOID CONTACT WITH DEAD SKIN - CONTAIN AND RECOVER ANY LIQUIDS - DO NOT WASH DOWN
CONTACT PARTIES LISTED ABOVE FOR INSTRUCTIONS

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

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

Printed/Typed Name: Michael J. Lepin — Signature — Mo Day

TRANSPORTER

17. Transporter 1 (Acknowledgement of Receipt of Materials)
Printed/Typed Name — Signature — Mo. Day

18 Transporter 2 (Acknowledgement or Receipt of Materials)
Printed/Typed Name — Signature — Mo Day

FACILITY

19 Discrepancy Indication Space HMS Same HMC-0053 R(MI)
[illegible] -P

20 Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19
Printed/Typed Name — Signature — Mo Day

EPA Form 8700-22 (Rev. 9-86) Previous edition is obsolete

COPY 5 – Generator-mailed by BE 008542 005543

STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

HAZARDOUS WASTE MANIFEST

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

Please print or type. Form Approved. OMB No. 2050-0039. Expir

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA No. N I D 0 0 7 2 2 5 5 2 — Manifest Document No.
2. Page 1 of 1 — Information in the sha is not required by Fed

3. Generator's Name and Mailing Address
RECOVERY SPECIALISTS, INC.
P.O. BOX 235, SALINE, MI 48176
4. Generator's Phone (313) 429-9600

A. State Manifest Document No. NY A [illegible]
B. Generator's ID

5. Transporter 1 (Company Name) — K & D INDUSTRIAL SERVICES
6. US EPA ID Number — N I D 0 7 2 7 9 0 7 2 0
C. State Transporter's ID [illegible]
D. Transporter's Phone (516) 343

7. Transporter 2 (Company Name)
8. US EPA ID Number
E. State Transporter's ID
F. Transporter's Phone ( )

9. Designated Facility Name and Site Address
CRM CHEMICAL SERVICES, INC.
1558 BANKER RD.
MODEL CITY, NY 14107
10. US EPA ID Number — N Y D 0 4 9 5 3 0 6 7 9
G. State Facility's ID
H. Facility's Phone (716) 754-9731

11. US DOT Description (including Proper Shipping Name, Hazard Class and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	Was
a. Waste Hazardous Substance, Solid, N.O.S. (PCBs RQ-10/4.54), ORM-E, NA 9188	0 0 1		0 1 5	Y	[illegible]
b.					
c.					
d.					

J. Additional Descriptions for Materials listed Above
[illegible]
SCA WASTE CRM, [illegible] — [illegible] — P.O. # [illegible]
PER PLANT [illegible] CERTIFICATE OF MATERIAL [illegible]

K. Handling Codes for Wastes Listed
a. D-[illegible]
b. [illegible] — d.

15. Special Handling Instructions and Additional Information
AVOID CONTACT WITH BARE SKIN - CONTAIN AND RECOVER ANY LIQUIDS - DO NOT WASH DOWN
CONTACT PARTIES LISTED ABOVE FOR INSTRUCTIONS

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

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Printed/Typed Name — Signature — Mo. Da

17. Transporter 1 (Acknowledgement of Receipt of Materials)
Printed/Typed Name — Signature — Mo. Da

18. Transporter 2 (Acknowledgement of Receipt of Materials)
Printed/Typed Name — Signature — Mo. Da

19. Discrepancy Indication Space
Estimated Quantity Actual Rec'd 24 300-P

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19.
Printed/Typed Name — Signature — Mo. Da

GENERATOR — TRANSPORTER — FACILITY

In case of emergency or spill immediately call the National Response Center (800) 424-8802 and the N.Y. Department of Transportation (518) 457-7362.

EPA Form 8700-22 (Rev. 9-88) Previous edition is obsolete.

BE 008543

COPY 7 – Transporter copy – retain

STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

HAZARDOUS WASTE MANIFEST

Please print or type. P.O. Box 12820, Albany, New York 12212 Form Approved. OMB No. 2050-0039. Expires 9-30-88

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA No. H I D 9 8 7 2 2 0 5 2 Manifest Document No.
2. Page 1 of 1 — Information in the shaded areas is not required by Federal Law.

3. Generator's Name and Mailing Address: RECOVERY SPECIALISTS, INC. P.O. BOX 255, DALINE, MI 48176
4. Generator's Phone (313) 483-9688

A. State Manifest Document No. NY A 818541 9
B. Generator's ID
C. State Transporter's ID MI 275
D. Transporter's Phone (616 343-5301

5. Transporter 1 (Company Name): K & D INDUSTRIAL SERVICES
6. US EPA ID Number: M I D 0 7 2 7 9 6 7 1 6
7. Transporter 2 (Company Name)
8. US EPA ID Number
E. State Transporter's ID
F. Transporter's Phone ( )

9. Designated Facility Name and Site Address: CWM CHEMICAL SERVICES, INC. 1550 BALMER RD. MODEL CITY, NY 14107
10. US EPA ID Number: N Y D 0 4 9 8 3 6 4 7 9
G. State Facility's ID
H. Facility's Phone: 716 754-8231

GENERATOR

11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. Waste Hazardous Substance, Solid, n.o.s. (PCB, RQ-10/4.54), ORM-E, NA 9188	0 0 1			P	B 2 7
b.					
c.					
d.					

J. Additional Descriptions for Materials listed Above
a. PCB [illegible] M1653[illegible] Accompanying [illegible] Data
b. PCB WASTE COMPLIANCE WORK ORDER [illegible] 8918128 [illegible] FOR PCB CERTIFICATE OF DISPOSAL [illegible]

K. Handling Codes for Wastes Listed Above
a. D-81 L c.
b. d.

15. Special Handling Instructions and Additional Information
AVOID CONTACT WITH BARE SKIN - CONTAIN AND RECOVER ANY LIQUIDS - DO NOT WASH DOWN CONTACT PARTIES LISTED ABOVE FOR INSTRUCTIONS

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

TRANSPORTER

17. Transporter 1 (Acknowledgement of Receipt of Materials)
Printed/Typed Name: [illegible] Signature: [illegible] Mo. Day Year

18. Transporter 2 (Acknowledgement of Receipt of Materials)
Printed/Typed Name Signature Mo. Day Year

FACILITY

19. Discrepancy Indication Space: Item B Same, Item 12 Type = DT
Estimated Quantity Actual Load 25x40lb
BE 008544

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: Pat Villanueva Signature: [illegible] Mo. Day Year 11 27 87

In case of emergency or spill immediately call the National Response Center (800) 424-8802 and the N.Y. Department of Transportation (518) 457-7362.

EPA Form 8700-22 (Rev. 9-88) Previous edition is obsolete.

005325

COPY 7 – Transporter copy – retained by transporter

48 14 1 (5/87)—71

STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

HAZARDOUS WASTE MANIFEST

P.O Box 12820, Albany, New York 12212

Please print or type

Form Approved OMB No 2050-0039 Expires 9 30-88

UNIFORM HAZARDOUS WASTE MANIFEST

1 Generator's US EPA No: MIDE8872265 — Manifest Document No

2 Page 1 of 1

Information in the shaded areas is not required by Federal Law

3 Generator's Name and Mailing Address
RECOVERY SPECIALISTS, INC.
P.O. BOX 255, SALINE, MI 48176

4 Generator's Phone (313) 483-9608

A State Manifest Document No: NYA 818537 4

B. Generator's ID

5 Transporter 1 (Company Name): K & D INDUSTRIAL SERVICES

6 US EPA ID Number: MTD072790710

C State Transporter's ID: MI 275

D Transporter's Phone (616) 343-6838

7 Transporter 2 (Company Name)

8 US EPA ID Number

E State Transporter's ID

F. Transporter's Phone ( )

9 Designated Facility Name and Site Address
CWM CHEMICAL SERVICES, INC.
1550 BALMER RD.
MODEL CITY, NY 14107

10 US EPA ID Number: NYD049836679

G. State Facility's ID

H Facility's Phone (716) 754-8231

11 US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)

12 Containers No | Type | 13. Total Quantity | 14 Unit Wt/Vol | Waste No.

a. Waste Hazardous Substance, Solid, n.o.s. (PCB: RQ-10/4.54), OSHA, NA 9188 — 001 | CA | 01008 | Y | D007

b

c

d

J Additional Descriptions for Materials listed Above
a. PCB Soil & Debris — MI1653123
Accumulation Start Date:
c
SCA WASTE CODE: E 85111 — WORK ORDER: — P.O. #: 0918128
b *** PLEASE PROVIDE CERTIFICATE OF DISPOSAL ***

K Handling Codes for Wastes Listed Above
a D-81 L
c
b
d

15 Special Handling Instructions and Additional Information
AVOID CONTACT WITH BARE SKIN - CONTAIN AND RECOVER ANY LIQUIDS - DO NOT WASH DOWN
CONTACT PARTIES LISTED ABOVE FOR INSTRUCTIONS

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

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Printed/Typed Name | Signature | Mo Day Year

17 Transporter 1 (Acknowledgement of Receipt of Materials)

Printed/Typed Name | Signature | Mo Day Year

18 Transporter 2 (Acknowledgement or Receipt of Materials)

Printed/Typed Name | Signature | Mo Day Year

19 Discrepancy Indication Space
Hand sample [illegible] (1/1)
Combined quantity [illegible] 27520 lb

BE 008545

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

Printed/Typed Name: Tim Villemure | Signature | Mo Day Year 10 27 8

GENERATOR — TRANSPORTER — FACILITY

In case of emergency or spill immediately call the National Response Center (800) 424 8802 and the N.Y. Department of Transportation (518) 457-7362.

NYA 818537 4

EPA Form 8700-22 (Rev 9-86) Previous edition is obsolete

005[illegible]

COPY 7 – Transporter copy – retained by transporter

48-14-1 (5/87)—71

STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

HAZARDOUS WASTE MANIFEST

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

Please print or type.

Form Approved. OMB No. 2050-0039. Expires 9-30-88

In case of emergency or spill immediately call the National Response Center (800) 424-8802 and the N.Y. Department of Transportation (518) 457-7362

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA No. NYD980722652 — Manifest Document No.

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

3. Generator's Name and Mailing Address
RECOVERY SPECIALISTS, INC.
P.O. BOX 255, BALIKE, MI 48176

4. Generator's Phone (313) 483-9600

A. State Manifest Document No. NY A 816540 1

B. Generator's ID

5. Transporter 1 (Company Name) X & D INDUSTRIAL SERVICES

6. US EPA ID Number NYD987279871C

C. State Transporter's ID NY 275

D. Transporter's Phone (616) 343-8859

7. Transporter 2 (Company Name)

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone ( )

9. Designated Facility Name and Site Address
CWM CHEMICAL SERVICES, INC.
1550 BALMER RD.
MODEL CITY, NY 14107

10. US EPA ID Number NYD049836679

G. State Facility's ID

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

GENERATOR

11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. Waste Hazardous Substance, Solid, n.o.s. (PCB; RQ-10/4.54), ORM-E, NA 9193	001		00015	P	B007
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
a. PCB Soil & Debris — M1653128
Accumulation Start Date:
EPA WASTE CODE: E 89111 — WORK ORDER: — P.O. #: 891812A
*** PLEASE PROVIDE CERTIFICATE OF DISPOSAL ***

K. Handling Codes for Wastes Listed Above
a. D-81 L

15. Special Handling Instructions and Additional Information
AVOID CONTACT WITH BARE SKIN - CONTAIN AND RECOVER ANY LIQUIDS - DO NOT WASH DOWN
CONTACT PARTIES LISTED ABOVE FOR INSTRUCTIONS

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

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Printed/Typed Name: Patrick [illegible] — Signature: [illegible] — Mo. Day Year: 10 22 87

TRANSPORTER

17. Transporter 1 (Acknowledgement of Receipt of Materials)
Printed/Typed Name: Clinnie T. [illegible] — Signature: [illegible] — Mo. Day Year: 10 22 87

18. Transporter 2 (Acknowledgement or Receipt of Materials)
Printed/Typed Name — Signature — Mo. Day Year

FACILITY

19. Discrepancy Indication Space Item 11, Item 12, Item 13 - DT Non-Conformance
Estimated Quantity actual was 2,840 lb

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

Printed/Typed Name: Pat Villeneuve — Signature: Pat Villeneuve — Mo. Day Year: 10 22 87

EPA Form 8700-22 (Rev. 9-86) Previous edition is obsolete.

COPY 7—Transporter copy—retained by tr

BE 008546

005847

STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

HAZARDOUS WASTE MANIFEST

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

Form Approved. OMB No. 2050-0039. Expires 9-30-88

HAZARDOUS WASTE MANIFEST

1. Generator's US EPA No. NID054722652 — Manifest Document No.

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

3. Generator's Name and Mailing Address
RECOVERY SPECIALISTS, INC.
P.O. BOX 255, BALINE, MI 49176

4. Generator's Phone (313) 483-9589

A. State Manifest Document No. NY A 818542 8

B. Generator's ID

5. Transporter 1 (Company Name) K & D INDUSTRIAL SERVICES

6. US EPA ID Number MID072790710

C. State Transporter's ID HI 275

D. Transporter's Phone (616) 343-[illegible]

7. Transporter 2 (Company Name)

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone ( )

9. Designated Facility Name and Site Address
CHEM CHEMICAL SERVICES, INC.
1550 BALMER RD.
MODEL CITY, NY 14107

10. US EPA ID Number NYD049836679

G. State Facility's ID

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

11. US DOT Description (including Proper Shipping Name, Hazard Class and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	Waste No.
a. Waste Hazardous Substance, Solid, n.o.s. (PCB; RQ-10/4.54), ORM-E, NA 9188	001			P	D007
b.					
c.					
d.					

J. Additional Descriptions for Materials listed Above
a. PCB Ball & Debris — NJ1653133
Accumulation Start Date:
SCA WASTE CODE: B 89111 — WORK ORDER [illegible] P.O. # 891012A
b. SCHEDULE PROVIDE CERTIFICATE OF DISPOSAL

K. Handling Codes for Wastes Listed Above
a. D-81 L
b
d

15. Special Handling Instructions and Additional Information
AVOID CONTACT WITH BARE SKIN - CONTAINS RED MIGHTY MY LIQUIDS - DO NOT WASH DRUMS
CONTACT PARTIES LISTED ABOVE FOR INSTRUCTIONS

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

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

TRANSPORTER

17. Transporter 1 (Acknowledgement of Receipt of Materials)
Printed/Typed Name [illegible] — Signature — Mo. Day Year

18. Transporter 2 (Acknowledgement of Receipt of Materials)
Printed/Typed Name — Signature — Mo. Day Year

FACILITY

19. Discrepancy Indication Space Have Discrepancy item C 31883 M (kit)
ESTIMATED QUANTITY NOT REC'd 24700 lb

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

Printed/Typed Name Faith Villanueva — Signature [illegible] — Mo. Day Year 102788

EPA Form 8700-22 (Rev. 9-86) Previous edition is obsolete.

COPY 7 – Transporter copy – retained by tr

BE 008547

005323

NY A 818542 8

GENERATOR — TRANSPORTER — FACILITY

In emergency or spill immediately call the National Response Center (800) 424-8802 and the N.Y. Department of Transportation (518) 457-7362

STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

CWM CHEMICAL

HAZARDOUS WASTE MANIFEST

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

Please print or type. Form Approved. OMB No. 2050-0039. Expires 9-30-88

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA No.: MID000722652 — Manifest Document No.:
2. Page 1 of 1 — Information in the shaded areas is not required by Federal Law.

3. Generator's Name and Mailing Address: RECOVERY SPECIALISTS, INC. P.O. BOX 255, SALINE, MI 48176
4. Generator's Phone: 313 - 483-9688

A. State Manifest Document No.: NY A 818544 6
B. Generator's ID:
C. State Transporter's ID: MI 275
D. Transporter's Phone: 616 343-0088
E. State Transporter's ID:
F. Transporter's Phone:
G. State Facility's ID:
H. Facility's Phone: 716 754-8231

5. Transporter 1 (Company Name): K & D INDUSTRIAL SERVICES
6. US EPA ID Number: MID072790710
7. Transporter 2 (Company Name): GULEK
8. US EPA ID Number:
9. Designated Facility Name and Site Address: CWM CHEMICAL SERVICES, INC. 1550 BALMER RD. MODEL CITY, NY 14107
10. US EPA ID Number: NYD049836679

11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	Waste No.
a. Waste Hazardous Substance, Solid, n.o.s. (PCB; RQ-10/4.54), ORM-E, NA 9188	001	DT	00008	Y	8007
b.					
c.					
d.					

GENERATOR

J. Additional Descriptions for Materials listed Above
a. PCB Soil & Debris MI1653129
Accumulation Start Date:
SCA WASTE CODE: E 89111 WORK ORDER: 1528-30 P.O. #: 891012A
*** PLEASE PROVIDE CERTIFICATE OF DISPOSAL

K. Handling Codes for Wastes Listed Above
a. D-81 L
b.
c.
d.

15. Special Handling Instructions and Additional Information
AVOID CONTACT WITH BARE SKIN - CONTAIN AND RECOVER ANY LIQUIDS - DO NOT WASH DOWN
CONTACT PARTIES LISTED ABOVE FOR INSTRUCTIONS

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Printed/Typed Name: DAVID [illegible] CHARGES TO BE [illegible] — Signature: [illegible] — Mo. Day Year: 10 27 87

TRANSPORTER

17. Transporter 1 (Acknowledgement of Receipt of Materials)
Printed/Typed Name: Martin J. [illegible] — Signature: [illegible] — Mo. Day Year: 10 27 87

18. Transporter 2 (Acknowledgement or Receipt of Materials)
Printed/Typed Name: SPOTTING [illegible] — Signature: — Mo. Day Year:

FACILITY

19. Discrepancy Indication Space: [illegible] 33024 M [illegible] 23980-P

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: [illegible] — Signature: [illegible] — Mo. Day Year: 10 27 87

In case of emergency or spill immediately call the National Response Center (800) 424-8802 and the N.Y. Department of Transportation (518) 457-7362.

NY A 818544 6

EPA Form 8700-22 (Rev. 9-86) Previous edition is obsolete.

COPY 7 – Transporter copy – retained

BE 008548

005340

STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

HAZARDOUS WASTE MANIFEST

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

Please print or type.

Form Approved. OMB No. 2050-0039. Expires 9-30-88

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA No.: MID000722652 — Manifest Document No.:
2. Page 1 of 1 — Information in the shaded areas is not required by Federal Law.

3. Generator's Name and Mailing Address: RECOVERY SPECIALISTS, INC. P.O. BOX 255, SALINE, MI 48176
4. Generator's Phone (313) 483-9600

A. State Manifest Document No.: NY A 818538 3
B. Generator's ID:

5. Transporter 1 (Company Name): K & D INDUSTRIAL SERVICES
6. US EPA ID Number: MID072798718

C. State Transporter's ID: MI 225
D. Transporter's Phone: (616) 343-0888

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

E. State Transporter's ID:
F. Transporter's Phone:

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

G. State Facility's ID:
H. Facility's Phone: (716) 754-8231

11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	Waste No.
a. Waste Hazardous Substance, Solid, n.o.s. (PCB; RQ-10/4.54), OBM-E, NA 9188	001		08	P	08667
b.					
c.					
d.					

J. Additional Descriptions for Materials listed Above
a. PCB Soil & Debris — MI1653126
Accumulation Start Date: [illegible]
SCA WASTE CODE: S 89111 — WORK ORDER: [illegible] — P.O. #: 891012A
*** PLEASE PROVIDE CERTIFICATE OF DISPOSAL

K. Handling Codes for Wastes Listed Above
a. D-81 L
b.
c.
d.

15. Special Handling Instructions and Additional Information
AVOID CONTACT WITH BARE SKIN - CONTAIN AND RECOVER ANY LIQUIDS - DO NOT WASH DOWN
CONTACT PARTIES LISTED ABOVE FOR INSTRUCTIONS

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and state laws and regulations.
If I am a large quantity generator, I certify that I have program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR if I am a small generator, I have made a good faith effort to minimize my waste and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: [illegible] — Signature: [illegible] — Mo. Day Year: 10 26 89

17. Transporter 1 (Acknowledgement of Receipt of Materials)
Printed/Typed Name: [illegible] — Signature: [illegible] — Mo. Day Year: 10 26 89

18. Transporter 2 (Acknowledgement or Receipt of Materials)
Printed/Typed Name: — Signature: — Mo. Day Year:

19. Discrepancy Indication Space
[illegible]

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: [illegible] — Signature: [illegible] — Mo. Day Year: 10 31 89

GENERATOR — TRANSPORTER — FACILITY

NY A 818538 3

EPA Form 8700-22 (Rev. 9-86) Previous edition is obsolete.

BE 008549 005350

COPY 7 – Transporter copy – retained !

... of spill immediately call the National Response Center (800) 424-8802 and the N.Y. Department of Transportation (518) 457-7362.

STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

HAZARDOUS WASTE MANIFEST

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

Form Approved. OMB No. 2050-0039. Expires 9-30-88

..or type.

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA No. MID 980722652 — Manifest Document No.
2. Page 1 of 1 — Information in the shaded areas is not required by Federal Law.

3. Generator's Name and Mailing Address
RECOVERY SPECIALISTS, INC.
P.O. BOX 255, EDLINE, MI 48176
4. Generator's Phone 313) 483-9600

A. State Manifest Document No. NY A 818543 7
B. Generator's ID

5. Transporter 1 (Company Name) — K & D INDUSTRIAL SERVICES
6. US EPA ID Number — MID 077790871
C. State Transporter's ID MI 845
D. Transporter's Phone 616 943-

7. Transporter 2 (Company Name)
8. US EPA ID Number
E. State Transporter's ID
F. Transporter's Phone ( )

9. Designated Facility Name and Site Address
CWM CHEMICAL SERVICES, INC.
1550 BALMER RD.
MODEL CITY, NY 14107
10. US EPA ID Number — NYD 049836579
G. State Facility's ID
H. Facility's Phone (716) 754-8231

11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. Waste Hazardous Solids, Solid, n.o.s. (PCB; RQ-10/4.54), ORM-E, NA 9189	001	CM	1000	Y	D007
b.					
c.					
d.					

J. Additional Descriptions for Materials listed Above
a. PCB Soil & Debris c. MC691126
Remediation Start Date: 11/1/87
EPA WASTE CODE: R 89111 WORK ORDER: 15225 P.O. #: 891812A
*** PLEASE PROVIDE CERTIFICATE OF DISPOSAL ***

K. Handling Codes for Wastes Listed Above
a. D-01 1 b. d.

15. Special Handling Instructions and Additional Information
AVOID CONTACT WITH BARE SKIN - CONTAIN AND RECOVER ANY LIQUIDS - DO NOT WASH DOWN
CONTACT PARTIES LISTED ABOVE FOR INSTRUCTIONS

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and state laws and regulations.
If I am a large quantity generator, I certify that I have program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR if I am a small generator, I have made a good faith effort to minimize my waste and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name — Signature — Mo. Day Year

17. Transporter 1 (Acknowledgement of Receipt of Materials)
Printed/Typed Name — Signature — Mo. Day Year

18. Transporter 2 (Acknowledgement of Receipt of Materials)
Printed/Typed Name — Signature — Mo. Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19.
Printed/Typed Name — Signature — Mo. Day Year

GENERATOR — TRANSPORTER — FACILITY

In case of emergency or spill immediately call the National Response Center (800) 424-8802 and the N.Y. Department of Transportation (518) 457-7362

NY A 818543 7

BE 008550

EPA Form 8700-22 (Rev. 9-86) Previous edition is obsolete.

48-14-1 (5/87)—71

STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

HAZARDOUS WASTE MANIFEST

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

Please print or type

Form Approved OMB No 2050-0039 Expires 9 30-88

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA No: MID008722652 — Manifest Document No:

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

3. Generator's Name and Mailing Address
RECOVERY SPECIALISTS, INC.
P.O. BOX 255, SALINE, MI 48176

4. Generator's Phone 313) 483-9600

A. State Manifest Document No. NY A 818545 5

B. Generator's ID

5. Transporter 1 (Company Name): K & D INDUSTRIAL SERVICES

6. US EPA ID Number: MID072792710

C. State Transporter's ID: MI 275

D. Transporter's Phone: 616 343-2528

7. Transporter 2 (Company Name):

8. US EPA ID Number:

E. State Transporter's ID:

F. Transporter's Phone:

9. Designated Facility Name and Site Address
CWM CHEMICAL SERVICES, INC.
1550 BALMER RD.
MODEL CITY, NY 14107

10. US EPA ID Number: NYD049836679

G. State Facility's ID:

H. Facility's Phone: 716 754-8231

11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	Waste No.
a. Waste Hazardous Substance, Solid, n.o.s. (PCB; RQ-10/4.54), ORM-E, NA 9108	001			Y	B007
b.					
c.					
d.					

J. Additional Descriptions for Materials listed Above

a. PCB Soil & Debris — c. MI1653130

Accumulation Start Date:

SCA WASTE CODE: E 89111 — WORK ORDER: — P.O. #: 091012A

*** PLEASE PROVIDE CERTIFICATE OF DISPOSAL ***

K. Handling Codes for Wastes Listed Above

a. D-81 L — c.

b. — d.

15. Special Handling Instructions and Additional Information

AVOID CONTACT WITH BARE SKIN - CONTAIN AND RECOVER ANY LIQUIDS - DO NOT WASH DOWN
CONTACT PARTIES LISTED ABOVE FOR INSTRUCTIONS

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

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

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

17. Transporter 1 (Acknowledgement of Receipt of Materials)

Printed/Typed Name: — Signature: — Mo. Day Year

18. Transporter 2 (Acknowledgement or Receipt of Materials)

Printed/Typed Name: — Signature: — Mo Day Year

19. Discrepancy Indication Space: [illegible] HI-3[illegible] Estimated Quantity [illegible] 2696 lb

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

Printed/Typed Name: [illegible] Villeneuve — Signature: [illegible] Villeneuve — Mo Day Year: 1 9 3 9 8 7

In case of emergency or spill immediately call the National Response Center (800) 424 8802 and the N.Y. Department of Transportation (518) 457-7362.

NY A 818545 5

EPA Form 8700-22 (Rev. 9-86) Previous edition is obsolete

COPY 7—Transporter copy—retained by tran

BE 008551

005352

RCS Regulatory Compliance Services

212 South Street
Greenville, MI 48838
(616) 754-8556

Post-It™ brand fax transmittal memo 7671	# of pages ▸ 8
To Dave Corbin	From Brad Smith
Co. Benteler, Goshen	Co Benteler Kalamazoo
Dept.	Phone #
Fax #	Fax #

December 27, 1990

Mr. Brad Smith
Benteler Industries, Inc.
9000 E. Michigan
Galesburg, Michigan 49053

Dear Mr. Smith:

On December 19, 1990 Regulatory Compliance Services (RCS) collected samples from the wastewater treatment plant located at the above address. The following samples were collected and sent to Canton Labs, Ypsilanti, Michigan:

Sample No.	Sample Area
12191	Final Clarifier
12192	Trickle Filter Trough Catch Basin
12193	Digester Manhole
12194	Digester Pipe
12195	Chlorine Contact Pit
12196	Tank Adjacent to Digester
12197	Sump Pit in Pump Room

An attempt was made to sample the Primary Clarifier, however, the hand auger could not penetrate a layer of suspected concrete rubble at approximately 4 feet below the surface.

It appeared that the Primary Clarifier, Final Clarifier and Chlorine Contact Chamber had been backfilled with concrete rubble and coarse sand. I was able to get through the rubble area in the Final Clarifier and Chlorine Contact Chamber (Chlorine Contact Pit) and collect samples near the bottom of both tanks. The only way to sample the bottom of the Primary Clarifier would be to either remove the backfill material or sample the outlet pipe located in the Pump Room.

005407

BE 008555

CAL
Canton Analytical Laboratory, Inc.
ENVIRONMENTAL ANALYSIS

January 7, 1991

BENTELER INDUSTRIES, INC.
9000 East Michigan Avenue
Galesburg, Michigan 49053

ATTENTION: Brad Smith

RE: CAL Report #11094 P.O.#P23263
7 samples received 12-21-90

Dear Mr. Smith:

The sample(s) we received from you has/have been analyzed as requested. The results are compiled in the enclosed report.

It is a pleasure to be of assistance to you. Please contact us if you have questions concerning any aspect of this work.

Very truly yours,

CANTON ANALYTICAL LABORATORY, INC.

Eric L. Flora

Eric L. Flora
QA/QC Coordinator

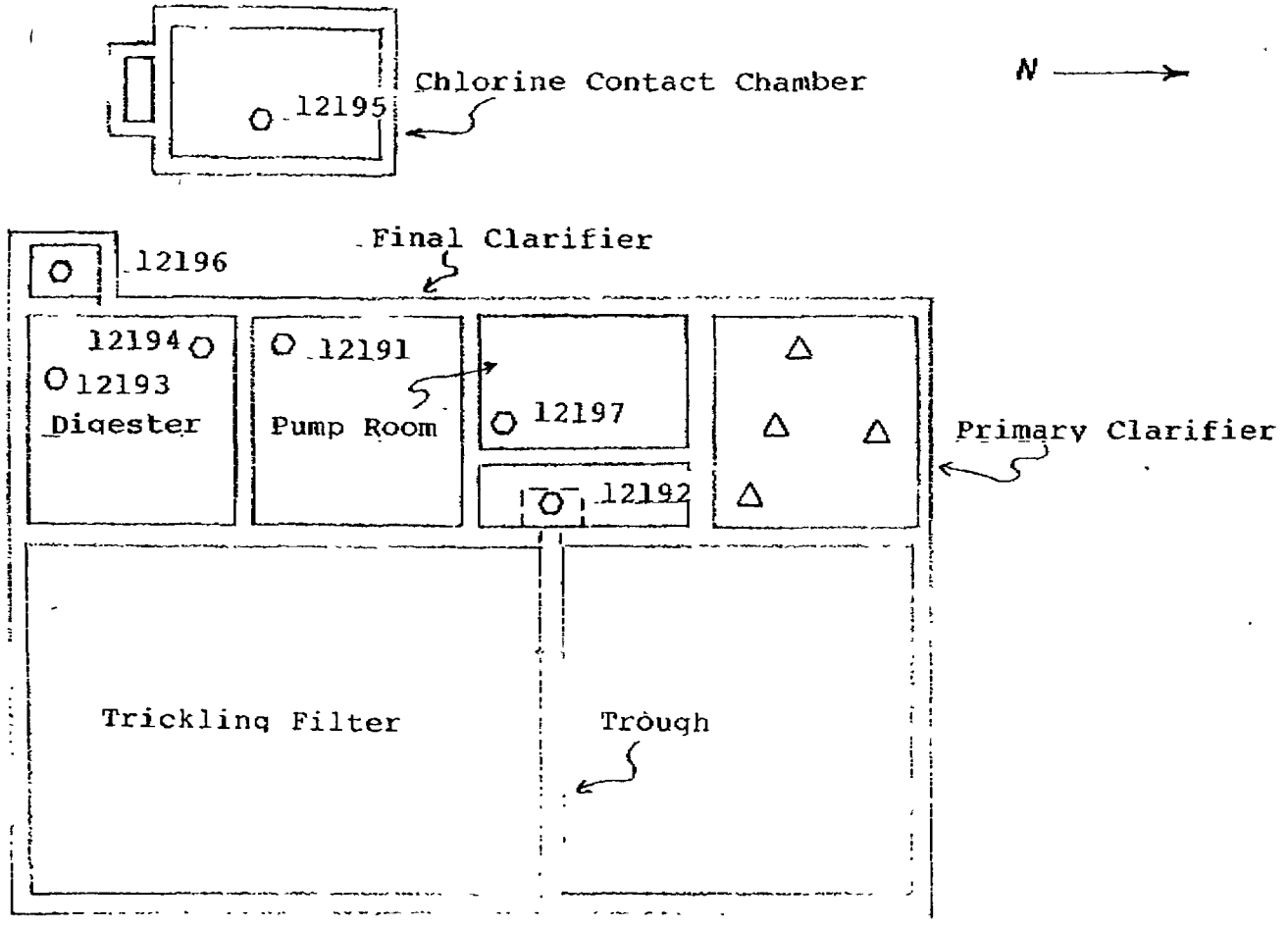
ELF/wh

cc: REGULATORY COMPLIANCE SERVICES-William H. Hilton

BE 008556

153 Elder Street Ypsilanti, Michigan 48197 (313) 483-7430 FAX (313) 545-1541

005408



○ PCB SAMPLE LOCATION
△ SAMPLE ATTEMPT

BENTELER INDUSTRIES
WASTEWATER TREATMENT PLANT PCP SAMPLES

NOT TO SCALE	APPROVED BY:	DRAWN BY W. HILTON
DATE: 12-27-90		REVISED

REGULATORY COMPLIANCE SERVICES
212 SOUTH ST., GREENVILLE, MI. 48838

DRAWING NUMBER

SOIL SAMPLE LIST

Sample No.	Sample Area
12191	Final Clarifier
12192	Trickle Filter Trough
12193	Digester Manhole
12194	Digester Pipe
12195	Chlorine Contact Pit
12196	Tank Adjacent to Digester
12197	Sump Pit

1-8-90

If you have any questions, please do not hesitate to contact me at (616) 754-8556.

Sincerely,

William H. Hilton, CPSS
Regulatory Compliance Specialist

WHH/mlh

Enclosures

December 20, 1990

Canton Labs
Attn: Materials Control
153 Elder St.
Ypsilanti, Michigan 48197

Dear Sir/Madam:

Please analyze the enclosed (7) soil and/or water samples for PCB content. A purchase order is forthcoming from Benteler Industries, Galesburg, Michigan.

Please send the original results to:

Mr. Brad Smith
Benteler Industries, Inc.
9000 E. Michigan
Galesburg, Michigan 49053

Please send a copy of the results to:

Mr. William H. Hilton
Regulatory Compliance Services
212 South St.
Greenville, Michigan 48838

The following is a list of the sample numbers and their sample locations. Please reference this information when reporting the results.

BE 008559

005411

I have enclosed a drawing indicating the locations that the samples were collected and a copy of the cover letter that was sent to Canton Labs with the samples.

I will call you as soon as I receive the analytical results from Canton Labs, however, if you have any questions before then please contact me at (616) 754-8556.

Sincerely,

William H. Hilton

William H. Hilton CPSS
Regulatory Compliance Specialist

WHH/mlr

Enclosures

REGULATORY COMPLIANCE SERVICES
CAL REPORT# 11094

SAMPLES RECEIVED 12/21/90

LAB# 9241484 BENTELER INDUST. INC. #12191 FINAL CLARIFIER
LAB# 9241485 BENTELER INDUST. INC. #12192 TRICKLE FILTER TROUGH
LAB# 9241486 BENTELER INDUST. INC. #12193 DIGESTER MANHOLE
LAB# 9241487 BENTELER INDUST. INC. #12194 DIGESTER PIPE
LAB# 9241488 BENTELER INDUST. INC. #12195 CHLORINE CONTACT PIT
LAB# 9241489 BENTELER INDUST. INC. #12196 TANK ADJACENT TO DIGESTER

LAB#	9241484	9241485	9241486	9241487	9241488	924
UNITS	mg/kg	mg/kg	ug/l	mg/kg	mg/kg	mg/l
PCB'S BY AROCHLOR						
PCB-1016	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	< 1.0
PCB-1221	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	< 1.0
PCB-1232	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	< 1.0
PCB-1242	1.3	< 0.5	< 0.5	< 0.5	< 1.0	< 1.0
PCB-1248	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	< 1.0
PCB-1254	< 0.5	0.72	0.94	< 0.5	< 1.0	< 1.0
PCB-1260	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	< 1.0
PCB-1262	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	< 1.0
PCB, Total	1.3	0.72	0.94	< 0.5	< 1.0	< 1.0

Canton Analytical Laboratory, Inc
(313) 483-7430 FAX (313) 545-1541

REGULATORY COMPLIANCE SERVICES
CAL REPORT# 11094

SAMPLES RECEIVED 12/21/90

LAB# 9241490 BENTELER INDUST. INC. #12197 SUMP PIT

LAB#	9241490
UNITS	mg/kg
PCB'S BY AROCHLOR	
PCB-1016	< 1.0
PCB-1221	< 1.0
PCB-1232	< 1.0
PCB-1242	< 1.0
PCB-1248	< 1.0
PCB-1254	< 1.0
PCB-1260	< 1.0
PCB-1262	< 1.0
PCB, Total	< 1.0

Canton Analytical Laboratory, Inc.
(313) 483-7430 FAX (313) 545-1541

Follow up of [illegible] 10/3/89 | FICE PCB Remediation | Sludge from A3 Pit Test Reports Received 10/17/89 [illegible]

Sample description - Solids
Benteler Indust.
Sample #F-390

Sample ID = 89-09-02-1
Parameter: Purgeables(8010/8020) Date analyzed: September 10, 1989

COMPOUND	Concentration mg/kg	Detection Limit mg/kg
Dichlorodifluoromethane	ND	10
Chloromethane	ND	40
Vinyl chloride	ND	45
Chloroethane	ND	40
Bromomethane	ND	35
1,1-Dichloroethene	ND	5
Methylene chloride	ND	5
t-1,2-Dichloroethene	ND	2
1,1-Dichloroethane	ND	4
c-1,2-Dichloroethene	ND	2
Chloroform	ND	3
1,1,1-Trichloroethane	ND	2
Carbon tetrachloride	ND	2
Benzene	ND	1
1,2-Dichloroethane	ND	2
Trichloroethene	ND	3
1,2-Dichloropropane	ND	2
Bromodichloromethane	ND	5
2-Chloroethylvinyl ether	ND	5
t-1,3-Dichloropropene	ND	10
Toluene	ND	1
c-1,3-Dichloropropene	ND	15
1,1,2-Trichloroethane	ND	3
Tetrachloroethene	160	3
Dibromochloromethane	ND	10
Chlorobenzene	ND	2
Ethylbenzene	ND	1
m+p-Xylene	3.7	1
o-Xylene	1.8	1
Bromoform	ND	10
1,1,2,2-Tetrachloroethane	ND	4
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5

See PCB page 2

Analyst: E. S. Lynch

BE 008552

005353

DIHYDRO ANALYTICAL SERVICES
Dihydro Analytical Services 4541 Fletcher Wayne MI (313) 595-0335
A Division of DIHYDRO

DIHYDRO ANALYTICAL REPORT

CLIENT: K & D Industries West, Inc.

REPORT#: L-89-09-02

DATE RECEIVED: 9-1-89

SAMPLING SITE(S): Benteler Indust.

PARAMETERS	RESULTS	LIMITS
Matrix:	*Waste*	
Sample(s) Description:	*Solids - Sample #K-390*	
IGNITABILITY:		
Flash Point, Closed Cup °F	>200	>140
CORROSIVITY:		
pH, S.U.	8.96	≤2 and ≥12.5
REACTIVITY:		
Cyanide	<0.05	—
Sulfide	<2.5	—
PCBs, total	380	—
Nickel, total	230	—
Thallium, total	3.8	—
EP Toxicity: mg/l extract level		
Arsenic	<0.005	<5.0
Barium	<0.20	<100
Cadmium	0.06	<1.0
Chromium	<0.04	<5.0
Copper	0.14	<100
Lead	0.16	<5.0
Mercury	<0.002	<0.2
Nickel	0.38	—
Selenium	<0.005	<1.0
Silver	0.02	<5.0
Zinc	18	<500

All results are expressed as mg/kg (ppm) as received except as noted.

Fred Hoitash

Fred Hoitash
Director of Environmental Services

pc: Ms. Ardis DiCicco
K & D Industrial Services, Inc.

BE 008553

Sample description - Solids
Benteler Indust.
Sample #K-390

Sample ID = 89-09-02-1
Parameter: Purgeables(8010/8020) Date analyzed: September 10, 1989

COMPOUND	Concentration mg/kg	Detection Limit mg/kg
Dichlorodifluoromethane	ND	10
Chloromethane	ND	40
Vinyl chloride	ND	45
Chloroethane	ND	40
Bromomethane	ND	35
1,1-Dichloroethene	ND	5
Methylene chloride	ND	5
t-1,2-Dichloroethene	ND	2
1,1-Dichloroethane	ND	4
c-1,2-Dichloroethene	ND	2
Chloroform	ND	3
1,1,1-Trichloroethane	ND	2
Carbon tetrachloride	ND	2
Benzene	ND	1
1,2-Dichloroethane	ND	2
Trichloroethene	ND	3
1,2-Dichloropropane	ND	2
Bromodichloromethane	ND	5
2-Chloroethylvinyl ether	ND	5
t-1,3-Dichloropropene	ND	10
Toluene	ND	1
c-1,3-Dichloropropene	ND	15
1,1,2-Trichloroethane	ND	3
Tetrachloroethene	160	3
Dibromochloromethane	ND	10
Chlorobenzene	ND	2
Ethylbenzene	ND	1
m+p-Xylene	3.7	1
o-Xylene	1.8	1
Bromoform	ND	10
1,1,2,2-Tetrachloroethane	ND	4
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5

Analyst: E. S. Lynch

BE 008554

005355

Document 21

AMERICAN HYDROGEOLOGY CORP.

4000 Portage Road, Suite A
Kalamazoo, Michigan 49001
616 343-9800

December 5, 1989

FILE COPY
faxed & mailed
12/5/89

Mr. Dave Corbin
Benteler Industries, Inc.
Kalamazoo Plant
9000 East Michigan Avenue
Galesburg, Michigan 49053-9772

Dear Dave:

Please find enclosed a copy of the analytical data from the core sampling at the Benteler facility.

If you have any questions or comments, please do not hesitate to contact our office.

Sincerely,

AMERICAN HYDROGEOLOGY CORPORATION

Paul D. French
Senior Geologist

PDF/jss

Enclosure

220204

Ann Arbor Technical Services, Inc.
6540 Jackson Road • Ann Arbor, Michigan 48103 • 313-995-0995

DATA SUMMARY SHEET

278

For: MR. MICK LYNCH
AMERICAN HYDROGEOLOGY, CORP.
4000 PORTAGE RD., SUITE A
KALAMAZOO, MI 49001

Project HYDRECO #69025

Received by ATS 10/12/89

Sample I.D. / Sample Date

Parameter	Units	CORE #1 0"-1" 10/11/89	CORE #1 1"-2" 10/11/89	CORE #1 2"-3" 10/11/89		CORE #2 0"-1" 10/11/89	CORE #2 1"-2" 10/11/89	CORE #2 2"-3" 10/11/89
AROCLOR 1221	mg/kg	<5	<1	<1		<1	<1	<1
AROCLOR 1232	mg/kg	<5	<1	<1		<1	<1	<1
AROCLOR 1242	mg/kg	<5	<1	<1		<1	<1	<1
AROCLOR 1248	mg/kg	<5	<1	<1		<1	<1	<1
AROCLOR 1254	mg/kg	<5	<1	<1		<1	<1	<1
AROCLOR 1260	mg/kg	92	<1	1		6	<1	<1
TOTAL PCB	mg/kg	92	<10	1		6	<10	<10

220205

BE 005934

Ann Arbor Technical Services, Inc.
6540 Jackson Road • Ann Arbor, Michigan 48103 • 313-995-0995

DATA SUMMARY SHEET

For: MR. MICK LYNCH
AMERICAN HYDROGEOLOGY, CORP.
4000 PORTAGE RD., SUITE A
KALAMAZOO, MI 49001

Project HYDRECO #69025

Received by ATS 10/12/89

Sample I.D. / Sample Date

Parameter	Units	CORE #3 0"-1" 10/11/89	CORE #3 1"-2" 10/11/89	CORE #3 2"-3" 10/11/89		CORE #4 0"-1" 10/11/89	CORE #4 1"-2" 10/11/89	CORE #4 2"-3" 10/11/89
AROCLOR 1221	mg/kg	<10	<1	<1		<1	<1	<1
AROCLOR 1232	mg/kg	<10	<1	<1		<1	<1	<1
AROCLOR 1242	mg/kg	<10	<1	<1		<1	<1	<1
AROCLOR 1248	mg/kg	<10	<1	<1		<1	<1	<1
AROCLOR 1254	mg/kg	<10	<1	<1		<1	<1	<1
AROCLOR 1260	mg/kg	430	<1	<1		5	<1	<1
TOTAL PCB	mg/kg	430	<10	<10		5	<10	<10

220206

BE 005935

Ann Arbor Technical Services, Inc.
6540 Jackson Road • Ann Arbor, Michigan 48103 • 313-995-0995

DATA SUMMARY SHEET

For: MR. MICK LYNCH
AMERICAN HYDROGEOLOGY, CORP.
4000 PORTAGE RD., SUITE A
KALAMAZOO, MI 49001

Project HYDRECO #69025

Received by ATS 10/12/89

Sample I.D. / Sample Date

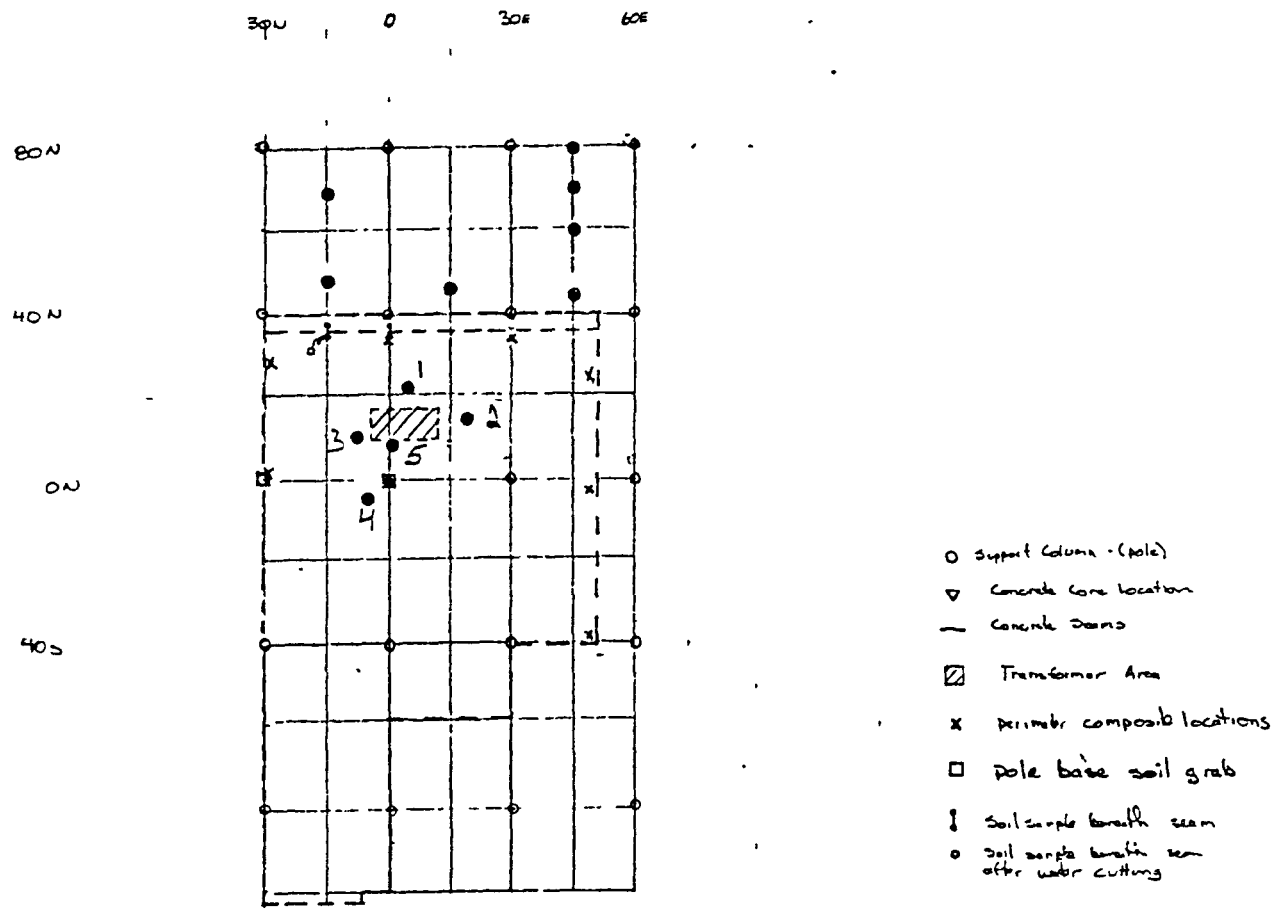
Parameter	Units	CORE #5 0"-1" 10/11/89	CORE #5 1"-2" 10/11/89	CORE 35 2"-3" 10/11/89				
AROCLOR 1221	mg/kg	<10	<1	<1				
AROCLOR 1232	mg/kg	<10	<1	<1				
AROCLOR 1242	mg/kg	<10	<1	<1				
AROCLOR 1248	mg/kg	<10	<1	<1				
AROCLOR 1254	mg/kg	<10	<1	<1				
AROCLOR 1260	mg/kg	530	<1	1				
TOTAL PCB	mg/kg	530	<10	1				

220207

BE 005936

4x8

8x16



BE 005937

220208

Document 22

24-136
(Corrsa)

3-10-92

Mick,

Enclosed is a copy of all our PCB data from our file.

Also, the hand-written list Ed put together on 8-6-91 still seems to apply.

Call if you have any questions.

Beth

BE 003060

222276

RECEIVED
MAR 11 1992
AMERICAN HYDROGEOLOGY CORPORATION

#69035

8/6/91

Hydreco #69025 PCB Sample Summary

Sample Set	Status
1	5 cement cores dated 10/11/89 cut into 15 samples: Strip Chart chro.'s,* extracts in cooler. IJ*
2.	6 cement cores dated 10/16/89: Not analyzed, do not know if we still have samples.
3.	37 PCB wipes of 1/24/90: 26 were analyzed, Maxima chro's, on tape, samples are in walk-in IJ.
4.	3 cement cores 1/26/90: Not analyzed, samples are in walk in VI H. ✓
5.	1 wipe of 3/21/90: Strip Chart chro.'s, can't find extract
6.	4 waters (looks like 4 soils + 1 water from our data sheet) and 1 soil of 7/11/90: Maxima chro.'s, on "lost" tape, extracts in IJ, cannot find soil.

222277

Hydreco #69025 PCB 8/6/91 Summary pg 2

* Note: This is a summary only. It was not determined that every chromatogram and every extract is present only the most are present.

BE 003062

222278

Ann Arbor Technic Services, Inc.
6540 Jackson Road • Ann Arbor, Michigan 48103 • 313-995-0995

DATA SUMMARY SHEET

For: MR. MICK LYNCH
AMERICAN HYDROGEOLOGY, CORP.
4000 PORTAGE RD., SUITE A
KALAMAZOO, MI 49001

Project HYDRECO #69025

Received by ATS 10/12/89

Sample I.D. / Sample Date

Parameter	Units	CORE #1 0"-1" 10/11/89	CORE #1 1"-2" 10/11/89	CORE #1 2"-3" 10/11/89		CORE #2 0"-1" 10/11/89	CORE #2 1"-2" 10/11/89	CORE #2 2"-3" 10/11/89
AROCLOR 1221	mg/kg	<5	<1	<1		<1	<1	<1
AROCLOR 1232	mg/kg	<5	<1	<1		<1	<1	<1
AROCLOR 1242	mg/kg	<5	<1	<1		<1	<1	<1
AROCLOR 1248	mg/kg	<5	<1	<1		<1	<1	<1
AROCLOR 1254	mg/kg	<5	<1	<1		<1	<1	<1
AROCLOR 1260	mg/kg	92	<1	1		6	<1	<1
TOTAL PCB	mg/kg	92	<10	1		6	<10	<10

BE 003063

222279

Ann Arbor Technical Services, Inc.
8540 Jackson Road • Ann Arbor, Michigan 48103 • 313-995-0995

DATA SUMMARY SHEET

For: MR. MICK LYNCH
AMERICAN HYDROGEOLOGY, CORP.
4000 PORTAGE RD., SUITE A
KALAMAZOO, MI 49001

Project HYDRECO #69025

Received by ATS 10/12/89

Sample I.D. / Sample Date

Parameter	Units	CORE #3 0"-1" 10/11/89	CORE #3 1"-2" 10/11/89	CORE #3 2"-3" 10/11/89		CORE #4 0"-1" 10/11/89	CORE #4 1"-2" 10/11/89	CORE #4 2"-3" 10/11/89
AROCLOR 1221	mg/kg	<10	<1	<1		<1	<1	<1
AROCLOR 1232	mg/kg	<10	<1	<1		<1	<1	<1
AROCLOR 1242	mg/kg	<10	<1	<1		<1	<1	<1
AROCLOR 1248	mg/kg	<10	<1	<1		<1	<1	<1
AROCLOR 1254	mg/kg	<10	<1	<1		<1	<1	<1
AROCLOR 1260	mg/kg	430	<1	<1		5	<1	<1
TOTAL PCB	mg/kg	430	<10	<10		5	<10	<10

BE 003064

222280

Ann Arbor Technical Services, Inc.
6540 Jackson Road • Ann Arbor, Michigan 48103 • 313-995-0995

DATA SUMMARY SHEET

For: MR. MICK LYNCH
AMERICAN HYDROGEOLOGY, CORP.
4000 PORTAGE RD., SUITE A
KALAMAZOO, MI 49001

Project HYDRECO #69025

Received by ATS 10/12/89

Sample I.D. / Sample Date

Parameter	Units	CORE #5 0"-1" 10/11/89	CORE #5 1"-2" 10/11/89	CORE 35 2"-3" 10/11/89				
AROCLOR 1221	mg/kg	<10	<1	<1				
AROCLOR 1232	mg/kg	<10	<1	<1				
AROCLOR 1242	mg/kg	<10	<1	<1				
AROCLOR 1248	mg/kg	<10	<1	<1				
AROCLOR 1254	mg/kg	<10	<1	<1				
AROCLOR 1260	mg/kg	530	<1	1				
TOTAL PCB	mg/kg	530	<10	1				

BE 003065

222281

Ann Arbor Technical Services, Inc.
6540 Jackson Road • Ann Arbor, Michigan 48103 • 313-995-0995

DATA SUMMARY SHEET

For: MR. MICK LYNCH
AMERICAN HYDROGEOLOGY CORP.
4000 PORTAGE RD., SUITE A
KALAMAZOO, MI 49001

Project HYDRECO #69025

Received by ATS 1/26/90

Sample I.D. / Sample Date

Parameter	Units	Field Blank #1 1/24/90	Wipe 1F 1/24/90	Wipe 3F 1/24/90	Wipe 4F 1/24/90	Wipe 5F 1/24/90	Wipe 7F 1/24/90	Wipe 8F 1/24/90
AROCLOR 1221	ug/ 100cm2	<5	<5	<5	<5	<5	<5	<5
AROCLOR 1232	ug/ 100cm2	<2	<2	<2	<2	<2	<2	<2
AROCLOR 1242	ug/ 100cm2	<2	<2	<2	<2	<2	<2	<2
AROCLOR 1248	ug/ 100cm2	<2	<2	<2	<2	<2	<2	<2
AROCLOR 1254	ug/ 100cm2	<2	<2	<2	<2	<2	<2	<2
AROCLOR 1260	ug/ 100cm2	<2	11	13	17	17	5	9
TOTAL PCB	ug/ 100cm2	<20	11	13	17	17	5	9

BE 003066

222282

Ann Arbor Technical Services, Inc.
6540 Jackson Road • Ann Arbor, Michigan 48103 • 313-995-0995

DATA SUMMARY SHEET

For: MR. MICK LYNCH
AMERICAN HYDROGEOLOGY CORP.
4000 PORTAGE RD., SUITE A
KALAMAZOO, MI 49001

Project HYDRECO #69025

Received by ATS 1/26/90

Sample I.D. / Sample Date

Parameter	Units	Wipe 11F 1/24/90	Wipe 12F 1/24/90	Field Blank #2 1/24/90	Wipe 13F 1/24/90	Wipe 15F 1/24/90	Wipe 19F 1/24/90	Wipe 20F 1/24/90
AROCLOR 1221	ug/ 100cm2	<5	<5	<5	<5	<5	<5	<5
AROCLOR 1232	ug/ 100cm2	<2	<2	<2	<2	<2	<2	<2
AROCLOR 1242	ug/ 100cm2	<2	<2	<2	<2	<2	<2	<2
AROCLOR 1248	ug/ 100cm2	<2	<2	<2	<2	<2	<2	<2
AROCLOR 1254	ug/ 100cm2	<2	<2	<2	<2	<2	<2	<2
AROCLOR 1260	ug/ 100cm2	5	7	<2	20	10	7	7
TOTAL PCB	ug/ 100cm2	5	7	<20	20	10	7	7

BE 003067

222283

Ann Arbor Technical Services, Inc.
6540 Jackson Road • Ann Arbor, Michigan 48103 • 313-995-0995

DATA SUMMARY SHEET

For: MR. MICK LYNCH
AMERICAN HYDROGEOLOGY CORP.
4000 PORTAGE RD., SUITE A
KALAMAZOO, MI 49001

Project HYDRECO #69025

Received by ATS 1/26/90

Sample I.D. / Sample Date

Parameter	Units	Wipe 22F 1/24/90	Wipe 23F 1/24/90	Wipe 24F 1/24/90	Wipe 25F 1/24/90	Field Blank #3 1/24/90	Wipe 26F 1/24/90	Wipe 27F 1/24/90
AROCLOR 1221	ug/ 100cm2	<5	<5	<5	<5	<5	<5	<5
AROCLOR 1232	ug/ 100cm2	<2	<2	<2	<2	<2	<2	<2
AROCLOR 1242	ug/ 100cm2	<2	<2	<2	<2	<2	<2	<2
AROCLOR 1248	ug/ 100cm2	<2	<2	<2	<2	<2	<2	<2
AROCLOR 1254	ug/ 100cm2	<2	<2	<2	<2	<2	<2	<2
AROCLOR 1260	ug/ 100cm2	6	16	7	2	<2	13	9
TOTAL PCB	ug/ 100cm2	6	16	7	2	<20	13	9

BE 003068

222284

Ann Arbor Technic Services, Inc.
6540 Jackson Road • Ann Arbor, Michigan 48103 • 313-995-0995

DATA SUMMARY SHEET

For: MR. MICK LYNCH
AMERICAN HYDROGEOLOGY CORP.
4000 PORTAGE RD., SUITE A
KALAMAZOO, MI 49001

Project HYDRECO #69025

Received by ATS 1/26/90

Sample I.D. / Sample Date

Parameter	Units	Wipe 28F 1/24/90	Wipe 29F 1/24/90	Wipe 31F 1/24/90	Wipe 32F 1/24/90	Wipe 33F 1/24/90		
AROCLOR 1221	ug/ 100cm2	<5	<20	<20	<10	<20		
AROCLOR 1232	ug/ 100cm2	<2	<10	<10	<5	<10		
AROCLOR 1242	ug/ 100cm2	<2	<10	<10	<5	<10		
AROCLOR 1248	ug/ 100cm2	<2	<10	<10	<5	<10		
AROCLOR 1254	ug/ 100cm2	<2	<10	<10	<5	<10		
AROCLOR 1260	ug/ 100cm2	16	180	300	100	240		
TOTAL PCB	ug/ 100cm2	16	180	300	100	240		

BE 003069

222285

Ann Arbor Technical Services, Inc.
6540 Jackson Road • Ann Arbor, Michigan 48103 • 313-995-0995

DATA SUMMARY SHEET

For: Mr. Mick Lynch
American Hydrogeology Corp.
4000 Portage St., Suite 108
Kalamazoo, MI 49001

Project Hydreco/General Signal #69025

Received by ATS 3/27/90

Sample I.D. / Sample Date

Parameter	Units		Cable Box 3/21/90					
Aroclor 1221	ug/ 100cm2		<5					
Aroclor 1232	ug/ 100cm2		<2					
Aroclor 1242	ug/ 100cm2		<2					
Aroclor 1248	ug/ 100cm2		<2					
Aroclor 1254	ug/ 100cm2		<2					
Aroclor 1260	ug/ 100cm2		<2					
Total PCB	ug/ 100cm2		<20					

BE 003070

 222286

Ann Arbor Technic Services, Inc.
6540 Jackson Road • Ann Arbor, Michigan 48103 • 313-995-0995

DATA SUMMARY SHEET

For: Mr. Mick Lynch
American Hydrogeology Corp.
4000 Portage St., Suite 108
Kalamazoo, MI 49001

Project Hydreco/General Signal #69025

Received by ATS 7/13/90

Sample I.D. / Sample Date

Parameter	Units		Barrel #1 7/11/90	Barrel #2 7/11/90	Barrel #3 7/11/90	Barrel #4 7/11/90		
Aroclor 1221	mg/kg		<2	<2	<5	<2		
Aroclor 1232	mg/kg		<0.5	<0.5	<1	<0.5		
Aroclor 1242	mg/kg		<0.5	<0.5	<1	<0.5		
Aroclor 1248	mg/kg		<0.5	<0.5	<1	<0.5		
Aroclor 1254	mg/kg		<0.5	<0.5	<1	<0.5		
Aroclor 1260	mg/kg		5.6	11	42	3.4		
Total PCB	mg/kg		5.6	11	42	3.4		

BE 003071

Note: Units are expressed on a dry weight basis.

222287

Ann Arbor Technic Services, Inc.
6540 Jackson Road • Ann Arbor, Michigan 48103 • 313-995-0995

DATA SUMMARY SHEET

For: Mr. Mick Lynch
American Hydrogeology Corp.
4000 Portage St., Suite 108
Kalamazoo, MI 49001

Project Hydreco/General Signal #69025

Received by ATS 7/13/90

Sample I.D. / Sample Date

Parameter	Units		Barrel #5 7/11/90					
Aroclor 1221	ug/L		<2					
Aroclor 1232	ug/L		<0.5					
Aroclor 1242	ug/L		<0.5					
Aroclor 1248	ug/L		<0.5					
Aroclor 1254	ug/L		<0.5					
Aroclor 1260	ug/L		<0.5					
Total PCB	ug/L		<10					

BE 003072

222288

Ann Arbor Technic Services, Inc.
6540 Jackson Road • Ann Arbor, Michigan 48103 • 313-995-0995

DATA SUMMARY SHEET

For: Mr. Mick Lynch
American Hydrogeology Corporation
6869 Sprinkle Road
Portage, MI 49002

Project General Signal #69025

Received by ATS 7/16/91

Sample I.D. / Sample Date

Parameter	Units		Drainage Ditch 5/7/91					
Aroclor 1221	mg/Kg		<5					
Aroclor 1232	mg/Kg		<1					
Aroclor 1242	mg/Kg		<1					
Aroclor 1248	mg/Kg		54					
Aroclor 1254	mg/Kg		<1					
Aroclor 1260	mg/Kg		<1					
Total PCB	mg/Kg		54					
								BE 003073

Note: Units are expressed on a dry weight basis.

222289

Ann Arbor
Technical Services, Inc.
290 South Wagner Road • Ann Arbor, Michigan 48103 • 313-995-0995

USEPA METHODS 601 AND 602 DATA SUMMARY SHEET

For: Mr Joe Doornbos
Day International
111 Day Drive
Three Rivers, MI 49093

Project: Day International / 27300
Sample ID: INFLUENT
Collection Date: 2/28/92
Received by ATS: 3/5/92

Volatile Organics (CAS#)	Units	Concentration	Detection Limit
Benzene (71-43-2)	mg/L	<0 001	0 001
Bromodichloromethane (75-27-4)	mg/L	<0 001	0 001
Bromoform (75-25-2)	mg/L	<0 002	0 002
Bromomethane (74-83-9)	mg/L	<0 005	0 005
Carbon Tetrachloride (56-23-5)	mg/L	<0 001	0 001
Chlorobenzene (108-90-7)	mg/L	<0 001	0 001
Chloroethane (75-00-3)	mg/L	<0 001	0 001
2-Chloroethyl Vinyl Ether (110-75-8)	mg/L	<0 001	0 001
Chloroform (67-66-3)	mg/L	<0 001	0 001
Chloromethane (74-87-3)	mg/L	<0 005	0 005
Dibromochloromethane (124-48-1)	mg/L	<0 001	0 001
1,1-Dichloroethane (75-34-3)	mg/L	<0 001	0 001
1 2-Dichloroethane (107-06-2)	mg/L	<0 001	0 001
1,1-Dichloroethene (75-35-4)	mg/L	<0 001	0 001
cis+trans-1,2-Dichloroethene	mg/L	<0 001	0 001
1 2-Dichloropropane (78-87-5)	mg/L	<0 001	0 001
cis-1 3-Dichloropropene (10061-01-5)	mg/L	<0 001	0 001
trans-1 3-Dichloropropene (10061-02-6)	mg/L	<0 001	0 001
Ethylbenzene (100-41-4)	mg/L	<0 001	0 001
Methylene Chloride (75-09-2)	mg/L	<0 001	0 001
1,1,2,2-Tetrachloroethane (79-34-5)	mg/L	<0 001	0 001
Tetrachloroethene (127-18-4)	mg/L	0 010	0 001
Toluene (108-88-3)	mg/L	0 002	0 001
1,1,1-Trichloroethane (71-55-6)	mg/L	<0 001	0 001
1,1,2-Trichloroethane (79-00-5)	mg/L	<0 001	0 001
Trichloroethene (79-01-6)	mg/L	0 004	0 001
Trichlorofluoromethane (75-69-4)	mg/L	<0 001	0 001
Vinyl Chloride (75-01-4)	mg/L	<0 001	0 001

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Ann Arbor
Technical Services, Inc.
290 South Wagner Road • Ann Arbor, Michigan 48103 • 313-995-0995

USEPA METHODS 601 AND 602 DATA SUMMARY SHEET

For: Mr. Joe Doornbos
Day International
111 Day Drive
Three Rivers, MI 49093

Project: Day International / 27300
Sample ID: T-1 Effluent
Collection Date: 2/28/92
Received by ATS: 3/5/92

Volatile Organics (CAS#)	Units	Concentration	Detection Limit
Benzene (71-43-2)	mg/L	<0 001	0 001
Bromodichloromethane (75-27-4)	mg/L	<0 001	0 001
Bromoform (75-25-2)	mg/L	<0 002	0 002
Bromomethane (74-83-9)	mg/L	<0 005	0 005
Carbon Tetrachloride (56-23-5)	mg/L	<0 001	0 001
Chlorobenzene (108-90-7)	mg/L	<0 001	0 001
Chloroethane (75-00-3)	mg/L	<0 001	0 001
2-Chloroethyl Vinyl Ether (110-75-8)	mg/L	<0 001	0 001
Chloroform (67-66-3)	mg/L	<0 001	0 001
Chloromethane (74-87-3)	mg/L	<0 005	0 005
Dibromochloromethane (124-48-1)	mg/L	<0 001	0 001
1,1-Dichloroethane (75-34-3)	mg/L	<0 001	0 001
1,2-Dichloroethane (107-06-2)	mg/L	<0 001	0 001
1,1-Dichloroethene (75-35-4)	mg/L	<0 001	0 001
cis + trans-1,2-Dichloroethene	mg/L	<0 001	0 001
1,2-Dichloropropane (78-87-5)	mg/L	<0 001	0 001
cis-1,3-Dichloropropene (10061-01-5)	mg/L	<0 001	0 001
trans-1,3-Dichloropropene (10061-02-6)	mg/L	<0 001	0 001
Ethylbenzene (100-41-4)	mg/L	<0 001	0 001
Methylene Chloride (75-09-2)	mg/L	<0 001	0 001
1,1,2,2-Tetrachloroethane (79-34-5)	mg/L	<0 001	0 001
Tetrachloroethene (127-18-4)	mg/L	<0 001	0 001
Toluene (108-88-3)	mg/L	0 002	0.001
1,1,1-Trichloroethane (71-55-6)	mg/L	<0 001	0 001
1,1,2-Trichloroethane (79-00-5)	mg/L	<0 001	0 001
Trichloroethene (79-01-6)	mg/L	<0 001	0 001
Trichlorofluoromethane (75-69-4)	mg/L	<0 001	0 001
Vinyl Chloride (75-01-4)	mg/L	<0 001	0 001

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222291

Document 23

KEK consulting services, inc.

6100 NEWPORT ROAD • KALAMAZOO, MI 49002 • (616) 327-4500

October 15, 1987

Mr. Edgar P. DeVylder, Jr.
Senior Attorney
General Signal
High Ridge Park
P.O. Box 10010
Stamford, CT 06904

Dear Mr. DeVylder,

As requested, I am providing to you an interim report covering the activities of our firm since the inception of our involvement in the Hydreco groundwater contamination project.

1. Prior to our retention, Hydreco, in cooperation with the Michigan Department of Natural Resources, removed approximately 910 cubic yards of unsaturated soil from the contamination source zone. This contaminated soil was dispatched to a landfill area recommended by the DNR. In spite of their recommendation, Mr. Link's request for a release from liability in perpetuity from the DNR will probably not be forthcoming. We shall, however, attempt to secure such a release at a time judged to be most opportune.

2. The enclosed map displays the approximate contaminated groundwater plume outline. The outline was derived from 12 boring sites at which monitoring wells are currently in place. Some sites contain two wells to permit monitoring of groundwater at variable depths. The water quality data and groundwater surface elevations were obtained and measured on August 28, 1987.

3. Analysis of the data obtained thus far provides guidance for prudent subsequent investigation. The primary concern at this juncture involves the determination of groundwater contamination migrating beyond the confines of Hydreco's property. This concern is amplified by the presence of a County supply well located adjacent to Hydreco's west property line. This property line separates the Hydreco property and a County park. Recently you approved the installation of another monitoring well immediately adjacent to the County supply well head. This well head will be approximately 20 feet from the new boring site that will be installed on Hydreco's side of the property line. The additional monitoring well at this site will not only serve to further define the dimensions of the problem, if any, but will also verify the presence and slope of the confining clay layer in the area and, therefore, help establish the direction and extent of the plume.

Often remedial actions such as purging and treatment of groundwater become long-term operating expenses.

In reference to the potential sale of the property, certain contractural agreements can be made for transfer of property ownership without the transfer of liability, however, this may need prior approval from the Michigan Department of Natural Resources. The seller would likely have to have a prepared work plan to address the situation. We strongly recommend that you consult an attorney familiar with this type of procedure prior to entering into any agreements.

Another avenue that you may investigate is insurance coverage. In some instances insurance carriers have covered all or a portion of the cost for investigation and remediation of this type of situation.

I will be pleased to meet with you and other Hydreco management to discuss the project and potential implications. In the interim, if you have any questions, please do not hesitate to contact me.

Very truly yours,

KECK CONSULTING SERVICES, INC.

Patrick M. Lynch
Project Manager

PML/dpe
Encls.

HYDRECO SOIL EXCAVATION REPORT

INTRODUCTION

Hunter/Keck, Inc. (HKI) has been retained by General Signal Corporation to oversee excavation of contaminated soils at the Hydreco Manufacturing Plant located at 9000 East Michigan Avenue in Comstock, Michigan. More specifically, the plant is located in the N 1/2 of Section 23, T.2.S., R.10.W., Comstock Township, Kalamazoo County, Michigan. A site location map is presented as Figure 1.

The need for excavating is a result of a release of waste oils southeast of the plant near an area formerly occupied by underground storage tanks. The primary objective of excavating was to remove soils which had potential for being a continual source of groundwater contamination. Excavation was also conducted to satisfy the partial closure requirements for the site as specified in .... .

SITE HISTORY

Prior to HKI's involvement, Hydreco Corporation had identified contaminated soils adjacent to underground waste oil tanks on the southeastern side of the plant. Those tanks were removed and approximately 900 cubic yards of contaminated soils surrounding the tanks were landfilled. The cavity left by the removal of the tanks and soils was left open pending inspection of the area.

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Hunter/Keck, Inc. has since conducted a series of hydrogeologic investigations at the Hydreco Plant. During those investigations, soil and groundwater samples were collected in areas within and adjacent to the excavation. Laboratory results of soil samples delivered to Ann Arbor Technical Services, Inc. for analysis have been presented in Appendix __. For the most part, those analyses indicated that soil contamination was still present in some areas at the site. The physical appearance and unnatural odors of some of those soils support those results.

Additional soils were removed from the storage tank area in July 1987 and stockpiled immediately west of the excavation for disposal. Laboratory analyses of those soils were conducted to satisfy the acceptance and disposal requirements of those soils at C & C Landfill near Marshall, Michigan. The soils were not disposed of at that time since a subsequent soil investigations was to be conducted to determine the extent of soil contamination at the site.

Groundwater contamination was also identified during the HKI investigations. Groundwater is present at the site at approximately 18 feet below ground level.

FIELD WORK

Field work for the current phase of investigation began on November 18, 1988 and was completed on January 13, 1989. The

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work consisted of the excavation of test pits, soil sampling and analysis, removal of contaminated soils, and restoration of the site. Taylor and Sons Excavating, of Vicksburg, Michigan provided equipment for soil excavation and was responsible for the coordination of hauling the spoils.

Test pit excavation and Soil Sampling

On November 18, 1988, test pits (TP) were dug at 17 locations south and east of the former storage tank area to estimate both the extent of soil contamination and the amount of soils which would need to be landfilled. The locations of those test pits with respect to the original excavation and concrete pad are shown on Figure 2. The pits were dug to a depth approximately 6 to 8 feet below ground level.

Soil samples from the base of each test pit were field screened using a Photo-vac Tip Meter (PTM). Those samples with PTM readings greater than background levels and/or suspect odors were delivered to an on-site HKI technician for analysis of volatile organic compounds using a portable gas chromatograph. PTM readings from test pit 1, 2, and 3 indicated the presence of volatiles at 17, 13 and 10 ppm respectively, while test pits 4, 5, and 6 were each near 5 ppm. PTM readings for soils in the remaining test pits showed no contamination to be present. However, soils collected from test pits 7 and 8 had a slight

"oily" odor similar to the odor of soils from test pits 1 and 2. Test pit 9 had a slight "sewery" odor.

Gas chromatograph analyses showed no volatile organic compounds in the 601/602 range, but, the scan did indicate the presence of heavy hydrocarbons in soils from test pits 1, 2 and 3. Concentrations of those heavy hydrocarbons could not be quantified due to the type of field analysis conducted.

Duplicate soil samples collected from test pits 1 and 2 were delivered to Ann Arbor Technical Services, Inc. for analysis of (mick has results. Discuss results)1. Ed Paulson sending all copies of Hydrocarbon Soil Results,

(talk with todd for results and number of) soil samples were also collected from the stockpile of soils which were excavated and stockpiled in July 1987. Those samples were field screened with the PTM and then analyzed using the on-site GC. Photo-vac tip and GC results from those soil samples showed no presence of volatile organic compounds.

Estimation of Volume of Contaminated Soils

Based on analytical and field results in the test pits, HKI estimated that approximately 5200 cubic yards of contaminated soils were present south of the former tank locations. That area consisted of soils within a 65 foot by 135 foot expanse south of the former tanks and concrete pad. The soils were suspected to

be contaminated to at least the depth of the present water table. The surficial 2 feet of soil was not included in the estimate since those soils showed no presence of contamination in any of the test pits. In some areas, however, the overlying 2 feet of soils were contaminated. Contaminated soils beneath the water table were not excavated because of the difficulty and economic infeasibility of removing the saturated soils.

Soil Excavation and Disposal

Soil excavation and removal began on November 22, 1988 near test pit 2. The contaminated soils were transported to C & C Landfill near Marshall, Michigan. C & C had previously agreed to accept and dispose of the soils. As excavating proceeded, soils on the perimeter walls of the excavation were continuously monitored with the photovac tip meter. Soils which appeared to be clean as indicated by both TPM readings and smell were stockpiled nearby for use as fill material. During times when trucks were not available for hauling, contaminated soils were also stockpiled near the perimeter of the excavation.

Excavating continued in all directions until PTM readings reached background levels in a given area. Soils in three areas, however, were not excavated due to the difficulty of access. Those areas were beneath the concrete pad, sanitary sewer line, and access road, respectively.

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Soils in which PTM readings were highest appeared to be gray in color with a silvery sheen and an "oily" odor. Clean soils were light brown and tan in color. Gray colored soils were present in a wedged shape form from the south side of the concrete pad and former excavation to the area near test pits 8 and 13. The thickness of those soils ranged from 16 feet near the concrete to approximately 2 feet on the south side of the excavation. Gray colored soils were thicker near test pit locations 3 and 13 than at location 8.

The appearance of surficial soils from test pit 1 to test pit 15 indicated that a ditch once existed between these two points. Aerial photographs taken in 1967 also indicate a trench in that area which reached from the former tank location area to at least south west of the oil separation facility. For the most part, soils below this apparent trench were gray in color from the area near TP 1 to TP 15. TPM readings diminished in soils south of TP 15.

Other aerials flown from 1964 to 1978 indicate that the general area where the present excavation is, was at one time a low area occasionally covered by standing water.

In areas where PTM readings reached background levels, excavation was halted and composite soil samples were collected. A total of seven composite soil samples representative of the excavation

perimeter were collected and sent to ATS for analysis. Those composite sampling locations are shown on Figure 3. Laboratory analytical results of those samples are presented in Appendix __. (RESULTS) The results indicate that total volatile organic compounds at any one composite location were at concentrations less than 0.07 mg/kg. These data suggested that no additional soils needed to be removed from those areas.

Completion of Excavation

On January 5, 1989, H/K personnel met with Mr. Frank Ballo of the MDNR at the Hydreco facility to discuss the progress of the excavating task. While at the site, Mr. Ballo inspected the excavation and reviewed the available soil quality data. Mr. Ballo agreed that there was no need for further excavation at the site. He also agreed that the soil which had been stockpiled in July 1987 which showed no contamination during the soil quality analyses could be used as fill material. All remaining contaminated soils were removed by January 11, 1989.

A total of 5145 cubic yards of contaminated soils were hauled to C & C Landfill from November 22, 1988 to January 11, 1989. By January 12, 1989, 6220 cubic yards of clean fill sand was hauled to the site and used to fill the excavation to normal grade. The difference of 1075 cubic yards accounts for the 900 cubic yards of soil which was previously hauled to C & C Landfill and the volume of the tanks. A small dozer was used to compact the

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surficial soils.

Site Restoration

Previous to excavating at the site, the Miss Dig network was notified. Plant workers were also asked about possible underground utilities which may have existed southeast of the plant. Neither, Miss Dig nor the plant workers were aware of any utilities in the vicinity of the excavation area with exception of a sanitary sewer line, however, during the process of excavating, some features and utilities were disturbed. Those utilities/features included: a 220-volt power line and a 1 1/2 inch water service, both of which supplied the oil separator, and an intermittent, low flow condenser drain. 160 foot length of 6-foot security fencer was also temporarily removed. Those features/utilities were repaired during and/or after the excavating task was completed.

The 220-volt power line was disturbed when excavation test pit 17. Upon noticing that the line had been severed, Hydreco personnel were notified and an electrician was called to the site to make repairs to the line. When repairs had been completed, the test pit was backfilled. No additional test pits were dug in that area.

The fence which existed to the immediate south of the storage tank locations had to be removed in order to excavate soils

beneath it. That fence was repaired upon completion of backfilling and compaction of soils within the excavation. Farm-n-Garden, Inc. of Kalamazoo, Michigan was responsible for the repair work on the fence. Farm-n-Garden, Inc. suggested that before repairing the fence that the soils be allowed to undergo additional compaction since some surficial soils had frozen, however, plant personnel at Hydreco requested that the fence be repaired as quickly as possible.

During excavating, an obscure 3-inch low flow drain and a 1 1/2-inch water supply line were uncovered and severed. The location of those utilities are shown on Figures 2 and 3. The 3-inch drain which had only intermittent flow emptied into the ditch to the east of the excavation. Hydreco personnel who were present at the site indicated that the two lines did not contain hazardous substances and that a disruption of their service would not affect plant operations. Intermittent flow from the 3-inch drain could not be stopped, however, an attempt was made by Hydreco personnel to shut off flow to the water line. Since the valves to the water line were partially frozen open, total flow from that line could not be stopped. An estimated 200 gallons of water leaked into the excavation before the line was plugged. Since the transient interruption of service of either of those two lines would not affect plant operations nor cause any detrimental affects to the environment, a decision was made to continue excavating and repair the lines upon completion of the

project. The water line, however, was temporarily repaired before completion of the project in order that water could be used at the oil separation facility. The drain and water lines were repaired by HKI and Taylor and Sons Excavating personnel during backfilling of the excavation.

The sanitary sewer line shown in Figure 2 was also uncovered during excavating. Due to the potential for additional release of contaminants in to the excavation and the disruption of sewer service to the plant, the sewer line was not removed nor was sewer service interrupted during the excavating task.

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June 17, 1992

FILE COPY

Mr. James Innes
Michigan Department of Natural Resources
Plainwell District Office
621 N. 10th Street
Plainwell, MI 49080

RE: Investigation of Soil Contamination
General Signal Corporation/Benteler Industries
9000 East Michigan Ave., Galesburg, Michigan

Dear Mr. Innes:

The purpose of this letter is to inform you of the scheduled date of the soil excavation at the above-referenced property. The work will be completed as outlined in the AHC's report entitled "Investigation of Soils Contamination and Work Plan" dated January 24, 1992. AHC received approval for this work by the MDNR by letter dated April 16, 1992.

On May 11, 1992, American Hydrogeology Corporation (AHC) met with representatives of Benteler Industries to discuss the workplan and to agree upon a mutually convenient time to schedule the work. The excavation is tentatively scheduled for July 22, 1992. This is during the plant closing the week of July 27, 1992.

Please call if you have any questions or comments.

Very truly yours

AMERICAN HYDROGEOLOGY CORPORATION

Linda G. Jones
Senior Geologist

LGJ/LGJ/24-1136

cc: Charlie Denton, Varnum, Riddering, Schmidt & Howlett
Dave Preston, Varnum, Riddering, Schmidt & Howlett
Dan McGrade, General Signal Corporation
Patrick Lynch, AHC

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Document 24

REMEDIAL ACTION PLAN
GENERAL SIGNAL CORP./BENTELER AUTOMOTIVE CORP.
9000 EAST MICHIGAN AVENUE
GALESBURG, MICHIGAN

JULY 20, 2001

AMERICAN HYDROGEOLOGY CORP.

REMEDIAL ACTION PLAN
GENERAL SIGNAL CORP./BENTELER AUTOMOTIVE CORP.
9000 EAST MICHIGAN AVENUE
GALESBURG, MICHIGAN

Prepared for:

General Signal Corporation
700 Terrace Point Drive
P.O. Box 3301
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Prepared by:

American Hydrogeology Corporation
6869 Sprinkle Road
Portage, MI 49002

July 20, 2001

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EXECUTIVE SUMMARY

American Hydrogeology Corporation has been retained by General Signal Corporation to conduct environmental investigative and response activities at a property located at 9000 E. Michigan Avenue, Galesburg, Michigan now operated by Benteler Automotive. Hydrogeologic investigation at the facility was initiated in 1987 after soil in the vicinity of the former underground storage tank was found to contain oil residues. The investigation found that a hydrocarbon plume extended south from the former underground storage tank. The activities have been conducted in accordance with Part 201 of the Michigan Natural Resources and Environmental Protection Act, Act 451, of 1994, as amended and with work plans approved by the Michigan Department of Environmental Quality.

Two compounds, tetrachloroethene and vinyl chloride, are currently detected in the groundwater contaminant plume at concentrations which exceed the generic residential drinking water value. Due to the proximity of the site to the Morrow Lake, the concentrations of the detected compounds have also been compared to the groundwater/surface water interface values. Tetrachloroethene exceeds the groundwater/surface water interface value at one location which is approximately 3,150 feet hydraulically upgradient of Morrow Lake. There has never been an exceedance above the GSI at the monitor wells closest to Morrow Lake.

Based on available site data, the contaminant plume appears to have reached equilibrium with regard to future downgradient migration and will not migrate to an off-site drinking water well, surface water body, or off-site property at concentrations exceeding the residential drinking water criteria. Further evaluation shows that the concentrations within the plume are not predicted to exceed the generic residential drinking water criteria at the property line. Since the groundwater/surface water interface values are higher than the residential drinking water values and Morrow Lake is about 750 feet downgradient from the property line, satisfying the residential drinking water criteria ensures that at the property boundary the concentrations at the groundwater/surface water interface would also be satisfied.

The proposed remedial action for the Benteler Automotive facility contemplates a limited residential closure as described under Section 20120a(1)(f) of Part 201. To eliminate potential residential drinking water exposures, this closure will involve a resource use restriction which will be described in a restrictive covenant to be recorded with the registrar of deeds for Kalamazoo County. The restrictive covenant restricts the use of the groundwater in the upper aquifer beneath portions of the Benteler Automotive site. The restrictive covenant also sets guidelines that must be followed if a well is installed into the lower aquifer within the area of restriction.

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1.0 INTRODUCTION

American Hydrogeology Corporation (AHC) has been retained by General Signal Corporation (General Signal) to conduct investigative and response activities to address a groundwater contamination plume containing volatile organic compounds (VOCs) originating from a former underground storage tank (UST) located south of the plant building. The activities have been conducted in accordance with Part 201 of the Michigan Natural Resources and Environmental Protection Act (NREPA), Act 451, of 1994, as amended and with work plans approved by the MDEQ. This Remedial Action Plan (RAP) is specific to the release from the former UST system which was located to the south of the plant building.

In 1993, AHC prepared a RAP that proposed to pump and treat the contaminated groundwater as the most feasible treatment technology. This RAP was subsequently approved by the MDEQ and groundwater remediation was initiated in 1996. Changes in regulatory cleanup requirements and downward trends in contaminant concentrations have warranted a re-evaluation of the RAP. Described in this report are the results of a final risk-based corrective action assessment, a feasibility analyses, and the final remedial action plan.

1.1 Location

The site is located at 9000 East Michigan Avenue, Galesburg in Section 23, Township 2 South, Range 10 West, Comstock Township, Kalamazoo County, Michigan. The site location is shown on Figure 1 in Appendix A. The area around the site is generally open. A county park, River Oaks Park, lies immediately to the west of the site, and the land to the east has been recently developed into residential housing immediately south of the plant buildings, the land consists of farmed fields. Farther to the south, between the site and Morrow Lake, the ground elevation drops and swampy conditions are found. Dense vegetation is prevalent and standing water is found at the ground surface in several locations. A Consumers Power Company right-of-way extends from north to south along the eastern edge of the property.

1.2 Overview of past and current use of properties, and hazardous substances

The site was reportedly developed in the late 1930's as a manufacturing facility related to the automobile industry. Ownership of the facility has changed through time; however, the site use for manufacturing has continued. General Signal owned the facility between approximately 1967 and 1989 when they sold it to Hydreco. Between 1987 and 1989, Hydreco, a unit of General Signal, occupied the facility. In 1989, Benteler bought the property from Hydreco and is currently the owner of the facility.

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According the "Spill Prevention Control and Countermeasures Plan and Pollution Incident Prevention Plan" dated October 1985, which was prepared for Hydreco, portions of the in-plant trench system drained to an oily sump located in the plant. Waste, which included waste oil, water, and coolant, was pumped from a sump to the 6,000 gallon underground storage tank (UST) located approximately 100 feet outside the southeast corner of the plant building. This 6,000 gallon UST was subsequently excavated and removed from the site in 1987. Reference Sections 2.1.1 and 2.1.4 for additional details.

1.3 Evidence property is "facility"

The laboratory results of the groundwater samples collected during the last four years indicate the presence of four compounds above the method detection limits (MDLs): vinyl chloride, trichloroethene, cis-1,2-dichloroethene, and tetrachloroethene. A comparison of the data on Tables 1A and 1B in Appendix B to the Part 201 generic residential drinking water (RDW) values indicates that two compounds exceed their respective residential value: tetrachloroethene and vinyl chloride. Due to the proximity of the site to the Morrow Lake, the concentrations of the detected compounds have also been compared to the Groundwater/Surface Water Interface (GSI) values. Tetrachloroethene exceeds the GSI value at one location. These compound concentrations in excess of the Part 201 residential cleanup criteria for these two potential exposure pathways cause the area to be classified as a Facility as defined by Section 2010(1)(0) of the NREPA.

1.4 Purpose and scope: criteria category(ies) plan satisfies

Based on the results of the analysis and evaluation described below, the proposed remedial action for the Benteler Automotive facility contemplates a limited residential closure as described under Section 20120a(1)(f) of Part 201. This closure will involve a resource use restriction which will be described in a restrictive covenant to be recorded with the registrar of deeds for Kalamazoo County.

2.0 FACILITY CHARACTERIZATION, ANALYSIS, AND REMEDIAL ACTIONS

2.1 Facility Characterization

2.1.1 *Background*

Hydrogeologic investigation at the facility was initiated in 1987 after Hydreco personnel discovered that soil in the vicinity of a former UST south of the plant building contained oil residues. The former UST had reportedly been used to store waste oil, waste, and coolant. Laboratory analyses of soil collected by Hydreco personnel at the base of the excavation subsequent to tank removal indicated the presence of VOCs.

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In response to this finding, Keck Consulting Services, Inc. (Keck) investigated the soil and groundwater quality in the immediate area of the former UST and subsequently expanded the investigation downgradient of the UST area. Details of their investigation are contained in a report prepared by Keck dated April 4, 1988, and titled "Report of Hydrogeologic Investigation, Hydreco Manufacturing Galesburg Facility, Section 23, Comstock Township, Kalamazoo County, Michigan." Reference Section 2.1.4 for additional details regarding Keck's soil investigation.

Twenty-seven monitor wells were installed by Keck at varying depths across the site in order to measure groundwater potentials and to evaluate groundwater flow direction, aquifer thickness and water quality. The aquifer was vertically profiled for groundwater quality during the drilling activities. In addition, Keck installed a 4-inch diameter test/purge well, designated PW-A. The locations of the monitor wells and PW-A are shown on Figure 2. Groundwater flow was determined to be generally south, toward Morrow Lake which is located approximately 3,100 feet south of the plant building. Investigation indicated that a plume containing VOCs extended downgradient of the former UST location and was approximately 600 feet wide at the MW-15 location (1,200 feet south of the former UST).

In 1989, General Signal retained AHC to continue the hydrogeologic investigation at the site. In 1993, AHC installed eight monitor wells to evaluate the groundwater quality in the southern portion of the site and installed purge well PW-B near the source area. Details of these activities are presented in two reports prepared by AHC entitled "Status Report of Extended Effluent Characterization, June 21, 1991" and "Status Report of Hydrogeologic Investigation, September 16, 1993 ." The "RAP for Interim Response Measures" dated May 1993 was the basis of the groundwater remediation project. The September 16, 1993 Status Report revised some of the remedial strategies presented in the May 1993 RAP based on the results of the additional downgradient hydrogeologic investigation. Numerous status reports presenting the results and a complete evaluation of the quarterly monitoring results have been submitted to the MDEQ on a regular basis. A Preliminary Assessment to Support Groundwater Purge and Treatment System Shut- off was submitted on June 9, 1998 by AHC. Copies of these reports can be obtained from either AHC or the MDEQ Environmental Response Division, Kalamazoo Field Office.

Groundwater purge and treat was initiated in May 1996 using PW-A and PW-B. The groundwater remediation system operated through March 1998 treating approximately 38,295,867 gallons of groundwater and preventing downgradient migration of the highest concentrations of VOCs located in the source area. A groundwater treatment system operation summary is included in Appendix C.

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Table 2 in Appendix B summarizes the groundwater treatment system analytical data and Graphs 1 and 2 in Appendix D are total VOC concentrations versus time from PW-A and PW-B. Appendix D also includes graphs of total VOC concentrations versus time for select monitor wells at the site. A significant reduction in VOC concentrations is apparent. The groundwater quality data indicate that further operation of the groundwater treatment system is not warranted even though certain constituents are present in the groundwater exceeding the generic criteria for protection of drinking water and surface water exposures. Review of the operational and analytical data indicate that further operation of the pump and treat system will likely have little effect on the progress of cleanup.

This RAP briefly summarizes some key findings presented in previously submitted reports for ease of review and includes pertinent data gathered since that time. References are made to previously submitted reports, as appropriate, to avoid repetition of some data. The site hydrogeology, geology, soil quality, and groundwater quality are described briefly here to form a basis for understanding the proposed remedial action.

2.1.2 *Site Geology*

Regional topography indicates that the site lies within the confines of the Kalamazoo River Valley. Ground surface elevations in the area range from 870+ feet mean sea level (msl) approximately one mile north of the site to 780 feet msl near the shoreline of Morrow Lake. A distinct change in topography is evident just north of the site where the Kalamazoo River valley meets the upland area. Site topographical surface is relatively flat and slopes gently to the south and southwest. Elevations at the site range from about 810 feet msl along Michigan Avenue to less than 780 feet msl at Morrow Lake. The land surface slopes gently from north to south to an area about 600 feet north of Morrow Lake at an average slope of 0.0067 ft./ft. In that area, the slope increases to approximately 0.050 ft./ft. for about 200 feet before again decreasing towards the shoreline of Morrow Lake. The topographic map presented in Figure 1 shows these features, and also depicts a marsh/wetland area along the shore of Morrow Lake.

According to the Hydrogeologic Atlas of Michigan, (Western Michigan University, 1981), the surficial sediments in the area consist of unconsolidated glacial drift between 101 and 200 feet in thickness. The surficial deposits in this area, as described by Monaghan and Larson, 1983, are classified as part of the "Glacial Kalamazoo - Gun Plain Outwash Deposits." The sediments within this unit are comprised of "mostly medium to coarse sand and gravel. Beds of clayey soil occur locally. Small scale crossbeds common. Some planar beds, current bedding and current ripples are

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common. Several terrace scarps are evident. Deposits form a deeply incised valley train system." Domestic well logs from the area indicate subsurface conditions similar to those described in the on-site soil boring logs (Appendix E). Bedrock underlying the site is identified as the Coldwater shale of Mississippian Age.

Data obtained from field activities provide a characterization of the subsurface geologic conditions similar to those described above. The soil boring logs, in general, show 0 to 3.5 feet of topsoil underlain by 53.5 feet of sand and/or gravel. Keck reported that the unsaturated portion of the sand and gravel unit observed on the former UST excavation sidewalls was composed of cross-bedded stratified sand beds less than one foot in thickness. Several boring logs at the site indicate that the sand and gravel unit coarsens with depth (Appendix E).

All of the deeper soil borings installed at the site encountered a dense grey clay ranging from approximately 57 feet bgl (749 feet above msl) at SB-16 to 36 feet bgl (763.6 feet above msl) at MW-11. The thickness of the clay layer at SB-16, which is near Benteler's production wells, is greater than 28 feet. The apparent continuity and thickness of the clay suggests that it provides protection to the underlying aquifer where Benteler's production wells are screened. The logs also indicate that silt is present above the clay layer in areas where the clay was identified at greater depths. The surface of the clay layer on-site appears to dip generally to the north and rise toward the south. Figure 2 is a top of clay surface map. A northeast to southwest stratigraphic cross section across the site is shown on Figure 3. An east to west stratigraphic cross section is shown on Figure 4. The cross section locations are shown on Figure 2.

2.1.3 *Site Hydrogeology*

The saturated portion of the sand and/or gravel underlying the site constitutes a water table aquifer with water table elevations across the site ranging from 783 to 786 feet above msl decreasing to the south towards Morrow Lake which has an average water level of 776 feet above msl. Based on measured groundwater potentials, groundwater migrating within the water table aquifer appears to discharge to Morrow Lake. Morrow Lake has been formed by a dam across the Kalamazoo River and is located approximately 3,150 feet south and hydraulically downgradient of the former source area. The general direction of groundwater flow is to the south at a gradient of 2.63×10^{-3} ft/ft which was calculated using the average gradient from south of the plant building (MW-2) downgradient to MW-21s. An analysis of the data obtained from an extended aquifer performance test utilizing an on-site well showed a value for transmissivity of approximately 190,000 gpd/ft. For

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a saturated thickness of 25 feet, the corresponding rate for hydraulic conductivity was 7,600 gpd/ft^2 or 1,016 ft/day or 3.6 x 10^{-3} m/sec.

The vertical potential between the wells screened at different depths within the water table aquifer is negligible. However, there is likely an upward hydraulic potential documented between the upper and lower aquifers at and in the vicinity of the site (reference Section 2.2.2).

Table 3 summarizes water level data measured at the site since October 1988. Figure 5 shows the potentiometric surface contour map for the site based on water levels measured on December 18, 1998. Groundwater flow direction in the northern part of the study area is toward the southwest, while in the southern part of the study area groundwater flow is to the south. This is consistent with previous data collected during non-pumping conditions.

Graph 25 in Appendix D shows monitor well hydrographs. The hydrographs suggest that the water levels in the wells respond similarly suggesting that they are likely to be in good hydraulic communication.

Figure 6 shows contours under pumping conditions for water levels measured on October 2, 1997. At the time the water levels were measured, PW-A was pumping at approximately 83.2 gpm and PW-B was pumping at 61.1 gpm. The capture zones for each purge well and the mounding around the injection well were estimated using the water level data and the DREAM (Drawdown-Streamline) computer model. Reference AHC's Quarterly Monitoring and Status Report dated March 3, 1998 for a summary of the input parameters.

2.1.4 *Soil Quality*

Soil testing conducted by Hydreco personnel at the site from December 1986 through February 1987 showed that soil in an area previously occupied by the subject UST contained VOCs. The UST removal and soil testing was completed by Hydreco. During the removal of the UST, some of the contaminated soils were removed and landfilled in accordance with the Michigan Department of Natural Resources (MDNR). The plan was to remove the remaining contamination soils after conducting an investigation to determine the extent of contamination.

A field investigation was completed after the UST removal in 1987 by Keck to address the soil contamination in the vicinity of the former UST. On March 2, 1987, Keck installed a temporary well in the open excavation for collection of a sample of the oil and water at the base of the pit for

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analyses of VOCs. The results showed the presence of high concentrations of trans-1,2-dichloroethene (530,000 µg/L - oil and 20,000 µg/L - water), ethylbenzene (1,400,000 µg/L - oil and 7,900 µg/L - water), and toluene (7,200,000 µg/L - oil and 1,400 µg/L- water). The results of the soil analyses for soil samples collected around the former UST between March 1987 and December 1988 are summarized on Table 4B.

On March 25, 1987, four soil borings were placed around the UST excavation to evaluate horizontal and vertical soil quality around the former UST. Upon completion of the soil borings, Monitor Wells 1, 2, 3, and 4 were installed to evaluate groundwater quality. Soil samples were collected at 2-foot intervals with a split spoon sampler from the soil borings and subjected to headspace analysis for an evaluation of soil quality in the field under less stringent QA/QC procedures. Selected soil samples were then submitted to the laboratory for analyses of VOCs using all appropriate QA/QC procedures for confirmation of the field results when there were detections greater than 1 µg/kg. Six compounds were detected in these soil samples: trans-1,2-dichloroethene, tetrachloroethene, trichloroethene, toluene, ethylbenzene, and total xylenes.

Further investigation in the immediate area of the UST excavation took place in July 1987 which included three pit borings. The pit borings, designated PB-1, PB-2, and PB-3, were installed within the former UST area, directly to the west of the initial excavation using a drill rig. A total of fifteen soil samples were collected with a split spoon sampler from depths ranging between 0 and 21 feet bgl for analyses of VOCs. The results indicated the presence of five VOCs: 1,1 dichloroethane, trans-1,2-dichloroethene, tetrachloroethene, 1,1,1-trichloroethane, and vinyl chloride. The concentrations of the detected compounds were relatively low. The contaminated soil in this area was subsequently removed as shown on Figure 7.

In August 1987, the investigation expanded to the collection of composite soil samples from the excavation. One composite soil sample collected from the sidewall and pit bottom subsurface was analyzed for base neutral and acid extractable compounds. There were no detections of these compounds. Two composite soil samples from the base and pit bottom and an oil saturated soil sample were analyzed for VOCs and subjected to U.S. EPA toxicity leachate testing for analysis of eight metals. Seven VOCs were detected in these samples. The EPA toxicity testing for metals indicated no exceedances for the composite soil samples not saturated with oil. The cadmium leachate level of 6 µg/L in the oil saturated soil sample exceeds the present RDW protection criterion of 5.0 µg/L. The oily soil was excavated and there have been no indications of oil present on the

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groundwater table in the monitor well (MW-4) directly downgradient of the former excavation. The impacted soil in this area was excavated and removed from the site.

Test pits were dug at 18 locations in November and December 1988 to further evaluate the extent of impacted soil and to estimate the volume of soil which would need to be excavated. Keck and its successor company, Hunter/Keck, reported excavating about 5,145 cubic yards of soil between November 1988 and January 1989. The location of the excavation is shown on Figure 7. The excavation was reported to extend 18 feet below ground level over most of its area which is the approximate depth to groundwater. A small area of soil could not be removed along a sewer line as shown on Figure 7. On December 12-14, 1988, seven soil samples representative of the excavation perimeter were collected by Hunter/Keck and sent to a laboratory for analyses. The soil samples for lab analyses were chosen based on field screening results and visual observations. On January 5, 1989, a Keck representative met with Mr. Frank Ballo of the MDNR at the Hydreco facility to inspect the excavation and to review the soil quality data. Mr. Ballo was reportedly satisfied that no further excavation was necessary. Upon his concurrence, the excavation was then backfilled with clean sand and gravel.

In summary, a total of about 5,145 cubic yards of soil were excavated from the former UST area and transported to C & C Landfill for disposal. Figure 7 shows that the horizontal and lateral extent of the final excavation. Most of the contamination extended to the south of the former UST. The perimeter of the impacted soil was generally defined by field testing, visual observations, and laboratory analyses and was visually inspected by the MDNR who confirmed the actions as acceptable. A comparison to the data on Tables 4A and 4B indicates that there are no detections exceeding any of the applicable cleanup criteria in the soil that remained (reference Section 3.0). There was only one exceedence in the soil above the RDW criterion in the sample collected from PB-3 at 9 - 11 feet which indicated 330 µg/kg of tetrachloroethene. The groundwater quality data shows declining concentrations of the detected volatile organic concentrations supporting conclusion that the source of VOCs is no longer present.

2.1.5 *Groundwater Quality*

A quarterly groundwater quality monitoring program was initiated in July 1991. Prior to the quarterly program, samples sets had been collected in October 1987 and in October 1990. Table 1B in Appendix B summarizes the groundwater quality data.

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The laboratory results of the groundwater samples collected during the last two years indicate the presence of four compounds above the method detection limits (MDLs): vinyl chloride, trichloroethene, cis-1,2-dichloroethene, and tetrachloroethene. A comparison of the data on Tables 1A and 1B in Appendix B to the RDW criteria values indicate that only two compounds exceed their respective RDW value: tetrachloroethene (in MW-1, MW-2, MW-3, MW-8s, MW-8d, MW-9s, MW-9d, MW-15s, and MW-15d) and vinyl chloride (in MW-4). The water quality data for the April 1998 and December 1998 sampling rounds are presented on Figure 5 in Appendix A along with isoconcentration contours of tetrachloroethene concentrations based on these data.

Due to the proximity of the site to Morrow Lake, the concentrations of the detected compounds are also compared to the generic GSI values. Concentrations of the detected compounds satisfy the GSI values at all monitor wells except MW-1. The April and December 1998 sampling rounds indicated a detection of tetrachloroethene of 220 µg/L, which exceeds the GSI value of 45 µg/L. Monitor well MW-1 is located approximately 3,150 feet upgradient of Morrow Lake. Based on this distance and available downgradient groundwater quality data, the concentration of PCE in this well should not exceed the generic criteria at the GSI due to natural attenuation.

On May 10, 2001, groundwater samples were collected from 18 monitor wells to establish current water quality prior to the submission of this report. Where there were detections of VOCs, the results showed downward trends at all but one location (there was a 0.1 µg/L increase of VOCs at MW-12). The most significant decline in VOCs was at MW-1, located in the source area, with total VOCs in December 1998 of 223 µg/L to 111 µg/L in May 2001.

Select time versus concentration graphs are presented in Appendix D. The water quality data at most monitor wells indicate a general decline in VOC concentrations. At the wells where there is no obvious downward trend in VOC concentrations, the compounds detected are below the generic RDW criteria. Based on review of the groundwater quality data, it appears that the groundwater contaminant plume is either stable or diminishing in length and concentration.

2.2 Facility Analysis/Conditions Evaluation

2.2.1 *Control of hazardous substance sources*

As described in Section 2.1.4, the primary source (former UST) has been excavated and removed from the site and the secondary source, impacted soil, has been addressed. A comparison to the soil data on Table 4A to the applicable remediation criteria indicates that there are no exceedences in any of the soil samples collected in the former UST area.

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As discussed in Section 2.1.5, the groundwater quality data support the conclusion that little to no impacted soil remains in the vicinity and downgradient of the former excavation. The groundwater quality data shows declining concentrations of the detected volatile organic concentrations indicating absence of a source in the former UST area. The groundwater contaminant plume is either stable or diminishing in length and concentration.

2.2.2 *Groundwater contamination risks to drinking water uses*

Comparison of groundwater quality data from the last four years of groundwater sampling events to the RDW criteria indicates that only two compounds exceed their respective RDW value: tetrachloroethene and vinyl chloride (reference Table 1A and 1B in Appendix B).

AHC conducted a survey to identify the presence of private and municipal wells in the vicinity of the site. The area surrounding the site is serviced by municipal water which the City of Kalamazoo obtains from several well fields in the vicinity of Kalamazoo. The nearest municipal well is located approximately one mile south of the former source area on the south side of Morrow Lake (reference Figure 1). This well is outside the limits potentially affected by impacted groundwater emanating from the project site. Furthermore, according to the City of Kalamazoo, the project site and the area surrounding the site are not designated as part of a well head protection area for the City of Kalamazoo.

An investigation was conducted in an effort to identify private drinking water wells located within a radius of 1,000 feet surrounding the site. All addresses within this area were identified through a field search. These addresses were cross-referenced with a list of addresses billed to receive municipal water as provided by the City of Kalamazoo Water Department. Other than the project site, there was only one address identified within the 1,000-foot radius as not being billed for municipal water. That address was subsequently determined to be connected to the municipal water system.

In addition, a search for domestic well logs for the defined survey area was performed in April 1995 at the Kalamazoo County Health Department. No well logs were found within the survey area. However, it was learned that an operative water well was present at the adjacent River Oaks County Park along with three abandoned wells. This well was abandoned in September 2000, along with connection to city water. The River Oaks County Park well was located outside the 1,000 foot radius from the source area and was located side gradient from the plume. Even though the well did not appear to have the potential to be impacted by the plume, the well was chosen to be

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abandoned to eliminate it as a potential receptor. In addition, Benteler has reported the presence of two production wells on their property that are not used for drinking water purposes. Drinking water for the Benteler facility is provided by City of Kalamazoo. The locations of the production wells are shown on Figures 2 and 3 and described in more detail below.

Benteler Automotive Production Wells

There are no indications, past or present, that pumpage from Benteler's production well have any measurable impact on the groundwater contaminant plume. Since Benteler's production wells pump at an average rate of only 3.8 gpm, the presence of the groundwater plume at the site poses no foreseeable threat to their water quality.

Based on site hydrogeologic conditions, it would be unlikely that any of the compounds of concern remaining in the groundwater within the former source area would be detected in Benteler's production wells. These hydrogeologic conditions include a clay layer separating the water table aquifer from the lower unit, an upward hydraulic potential between the two hydraulic units, the high transmissivity of the water table aquifer, and the fact that Benteler's production wells are hydraulically upgradient of the source area.

As stated in Section 2.1.4, all of the deeper soil borings installed at the site during the hydrogeologic investigation encountered a dense gray clay ranging from 57 feet below ground level (749 feet above msl) at SB-16 to 36 feet below ground level (763.6 feet above msl) at MW-11. The thickness of the clay layer at SB-16, which is near Benteler's production wells, is greater than 28 feet. This clay should provide adequate protection to the underlying aquifer where Benteler's production wells are screened.

There is a strong upward hydraulic potential between the upper and lower aquifers at and in the vicinity of the site since the lower unit is under (non flowing) artesian conditions. In 1983, a hydrogeologic survey was performed by Ohio Drilling Company on the northeast side of Morrow Lake (approximately 2,000 feet east of Benteler's easternmost property boundary)and is briefly described here. The hydrogeologic survey focused on the potential to develop a City of Kalamazoo well field in this area. The hydrogeologic survey included an aquifer performance test using a 12-inch diameter well screened from 61 feet to 76 feet below ground level. The well was pumped at 410 gpm with drawdown being observed at three observation wells located at 45 feet, 145 feet, and 245 feet from the pumping well. There was a rapid spread of the cone of depression with stabilization occurring after about 200 minutes of pumping. The estimated storage coefficient

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(0.00237) and analyses of the drawdown data by Ohio Drilling indicated that the aquifer tested was under artesian conditions rather than water table conditions. Ohio Drilling concluded that the site would be suitable for a well field with three pumping wells having a combined safe yield of approximately 1.4 million gallons per day. This site was not chosen for use as a well field since a more desirable location on the south side of Morrow Lake was chosen. A conversation with a representative at the City of Kalamazoo indicated that the city has no plans for future development of this area as a well field.

Water samples have been collected on two occasions from Benteler's production wells for analyses of VOCs. The samples collected in March 1987 and September 1995 indicated no detectable concentrations of contaminants in any of the samples.

2.2.3 *Groundwater contamination risks from dermal (utility work) exposures*

Comparison of groundwater quality data from the last 2 years of groundwater sampling events to the residential Groundwater Contact criteria (GCC) indicates that there are no groundwater contamination risks from dermal (utility work) exposures (reference Tables 1A and 1B). Review of historic groundwater quality data indicates that only the vinyl chloride concentration at the MW-4 location has ever exceeded the residential groundwater contact criterion and that the concentration has not exceeded the criterion of 110 µg/L since January 1992. The most recent concentration of vinyl chloride in groundwater at MW-4 was 7.0 µg/L in December 1998.

2.2.4 *Groundwater contamination risks for indoor air hazards*

Comparison of groundwater quality data from the last 2 years of groundwater sampling events to the MDEQ residential indoor air inhalation criteria indicates that there are no groundwater contamination risks for indoor air hazards (reference Table 1A and 1B). Historic groundwater quality data indicates that only the vinyl chloride concentration at the MW-4 location has ever exceeded the residential groundwater indoor air criterion and that the concentration has not exceeded the criterion of 110 µg/L since January 1992.

Although the former UST area and groundwater contamination plume does not extend north beneath the Benteler building, the potential that vapors could migrate along utilities within the area of groundwater contamination and migrate along these pathways into the buildings must be considered even if it is unlikely. A vapor pathway survey was completed to evaluate for this potential. Reference Appendix F for a summary of the vapor migration survey recently completed for the site.

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There are three utility lines known to be present in the area of the former UST and area of impacted groundwater. Refer to Figure 8 for the location of the utilities in the study area. There are several catch basins and storm sewer lines, a sanitary sewer line, water lines, and electric lines identified in the area of impacted groundwater to the south of the Benteler building. Due to the high permeability of the surrounding subsurface soil, the potential for contaminant migration along the trenches for the utility lines is unlikely. This can be the case in some instances where a higher permeable fill material is used to backfill the utility lines during construction. In addition, the utility lines in the area of impacted groundwater are well above the water table. Therefore, they are not expected to act as conduits for contaminant migration outside of the remediation area.

Approximately 1,900 feet south of the former UST area, a 48-inch diameter sewer line runs east to west across the Benteler site. The top of the sewer line is approximately 12 feet below the ground surface. Therefore, a portion of this line is apparently beneath the water table. The VOC concentrations in the plume in this area are below the RDW criteria and GCC and therefore pose no threat for acting as a conduit for contaminant migration to the east or west of the site or direct contact by a utility worker. There is no evidence that this line is affecting the groundwater flow within this area based on the iso-concentration contours or potentiometric surface contours; most likely as a result of the high permeability of the surrounding aquifer materials in this area.

2.2.5 *Groundwater contamination risk of hazard to surface water resources*

As discussed in Section 2.1.5, concentrations of the detected compounds satisfy the GSI values at all monitor wells except MW-1. The April and December 1998 sampling rounds indicated a detection of tetrachloroethene of 220 µg/L, which exceeds the GSI value of 45 µg/L. The most recent water quality data collected from MW-1 on May 10, 2001 indicated a detection of tetrachloroethene of 110 µg/L. Monitor well MW-1 is located approximately 3,150 feet hydraulically upgradient of Morrow Lake (reference Figure 1). The water quality data for April 1998 and December 1998 are shown on Figure 5 along with the isochemical concentration contours of tetrachloroethene using the December 1998 water quality data. There have never been any exceedances above the GSI in the monitor wells closest to Morrow Lake. It is unlikely that the concentration of tetrachloroethene will exceed the GSI value at Morrow Lake as discussed below.

A general review of groundwater quality data shows that in the late 1980's and early 1990's, concentrations of the constituents of concern in the source area were much higher than they are now. Since the concentrations in the furthest downgradient wells never reached the generic residential drinking water or GSI criterion when concentrations in the source area were much higher, it is highly

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unlikely that they will ever exceed these values at the property line. Given an estimated 3.5 year groundwater travel time from the former source area to Morrow Lake based on the hydraulic gradient of 0.00076 near the former source area and a porosity of 0.25 percent, the 10 years of monitoring prior to start-up of the groundwater treatment system was adequate time for the plume to reach the river if the plume were expanding, even if the transport of VOCs was retarded by a factor of two. Rather, the monitoring data suggests that the plume reached equilibrium at a location several hundred feet upgradient of Morrow Lake.

Further evaluation presented in Appendix G has been performed and the results show that the concentrations within the plume are not likely to exceed the generic RDW criteria at the property line. Since the GSI values are higher than the generic RDW values and Morrow Lake is about 750 feet downgradient from the property line, satisfying the RDW criteria ensures that the GSI values would also be satisfied at the property boundary. Please note that the analysis included in Appendix G is based on the December 1998 water quality data. The May 2001 water quality data further supports this analysis since the VOC concentrations are lower.

2.2.6 *Soil contamination risks from direct contact exposures*

Comparison of soil quality data to the residential direct contact indicates that there are no soil contamination risks from direct contact exposures (reference Tables 4A and 4B). There were no detections of the analyzed compounds in any of the soil samples, including the excavated and verification samples, that exceed the direct contact criteria.

2.2.7 *Soil contamination risks from ambient air inhalation exposures*

Comparison of soil quality data to the residential infinite source volatile soil inhalation criteria indicates that there are no soil contamination risks from ambient air inhalation exposures (reference Tables 4A and 4B). There were no detections of the analyzed compounds in any of the soil samples, including the excavated and verification samples, that exceed the ambient air inhalation exposures criteria.

2.2.8 *Soil contamination risks from indoor air inhalation exposures*

Comparison of soil quality data to the soil volatilization to indoor air inhalation criteria indicates that there are no soil contamination risks from indoor air inhalation exposures (reference Tables 4A and 4B). There were no detections of the analyzed compounds in any of the soil samples, including the excavated and verification samples, that exceed the indoor air inhalation exposures criteria. Reference Section 2.2.4 for a discussion of the vapor migration pathway survey.

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2.2.9 *Soil contamination risks of injury to drinking water uses of groundwater*

Comparison of soil quality data to the residential drinking water protection criteria indicates that there is one detection of tetrachloroethene in the soil that may pose risk of injury to drinking water uses of groundwater (reference Tables 4A and 4B). The exceedence was located at 9-11 feet bgl in PB-3. The corrective action for the site will include a restriction on use of the water for drinking water purposes in the area of the former UST (refer to Section 3.0).

2.2.10 *Soil contamination risks for groundwaters to pose dermal contact hazard*

Comparison of soil quality data to the residential groundwater contact protection criteria indicates that there are no soil contamination risks for groundwaters to pose dermal contact hazard (reference Tables 4A and 4B). There were no detections of the analyzed compounds in any of the soil samples, including the excavated and verification samples, that exceed the groundwater contact protection criteria.

2.2.11 *Soil contamination risks for groundwaters to pose hazard to surface water*

Comparison of soil quality data to the residential GSI protection criteria indicates that there are no soil contamination risks for groundwaters to pose hazard to surface water (reference Tables 4A and 4B). There were no detections of the analyzed compounds in any of the soil samples collected for verification of soil remediation that exceed the groundwater surface water interface protection criteria. Reference Section 2.2.5 for additional discussion regarding protection of the downgradient surface water body.

2.2.12 *Risk of contaminated soils runoff to surface waters*

There is no risk of contaminated soils related to the UST release reaching the surface water. Because the release was related to an underground tank, the contamination was predominantly below the surface and was not exposed to stormwater runoff. In addition, the former contaminated soil area is more than 3,000 feet from the nearest surface water, Morrow Lake, and the stormwater runoff would seep into the highly permeable soils and the groundwater long before traveling 3,000 feet.

2.2.13 *Surface water sediment contamination risks*

There are no risks of surface water sediment contamination at the site. There are no data to suggest that surface water sediments may have been impacted by the UST release. The plume has not migrated, and is not expected to migrate, to a surface water body.

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2.2.14 *Acute toxic and physical hazard risks*

There are no data to suggest that there are acute toxic or physical hazard risks associated with the UST release.

2.2.15 *Ecological and aesthetic impacts*

There are no indications of ecological and aesthetic impacts remaining as a result of the UST release. Impacted surface materials, if ever present, were addressed through excavation.

2.2.16 *Any other hazardous substance risks at or posed by the facility*

There do not appear to be any other hazardous substance risks at or posed by the facility with respect to the release from the former UST.

2.3 Feasibility Analysis

The goal of the RBCA process is to minimize risk by preventing exposure to harmful levels of site constituents. The remedial program designed for the site has been targeted toward the exposure pathways found to exceed acceptable risk levels. Risk reduction has already been achieved by source removal, and remediation by interrupting contaminant transport mechanisms. Further risk reduction will be achieved by controlling activities at the point of exposure. By preventing exposure, each of these alternate exposure control strategies can provide permanent and effective protection for public health and the environment. The primary remedial design objective under RBCA is not mass reduction but risk reduction.

As described above, risk reduction at the site has been achieved by source removal and remediation by interrupting transport mechanisms, and will continue to be achieved by controlling activities at the point of exposure. Cost effective and efficient methods to reduce risk include restrictions on the use of groundwater to prevent drinking water exposures. Restriction of use of the groundwater beneath the site in the upper aquifer or an ordinance reliably restricting the use of groundwater would eliminate the potential for drinking water exposures.

Site restriction mechanisms are lower in cost relative to methods involving removal of compounds in the groundwater. A disadvantage is that if an ordinance restricting the use of groundwater cannot be established, or is otherwise unavailable, risk avoidance through the mechanism of an ordinance may not be feasible. However, the mechanism of a restrictive covenant is available. Since the restriction is necessary on only the Benteler property and the property owner Benteler has agreed to this approach, this is a feasible and appropriate mechanism.

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Two years of intermittent operation of the groundwater treatment system provided the data to indicate that continued operation of the pump and treat system was not a cost effective remedial strategy. Although the groundwater remediation system ran well, discharge of the treated groundwater into an injection well generated operational costs higher than originally anticipated due to the maintenance requirements associated with the precipitation of mineral deposits in the injection well and surrounding formation. Although costs for an NPDES discharge into Morrow Lake could have been less, access permission for a pipeline was not available. In addition, the groundwater quality data indicate that further operation of the groundwater treatment system was not warranted to prevent migration of constituents of concern to potential off-site exposure points. Review of the operational and analytical data indicates that continued running of the pump and treat system will have little effect on the progress of cleanup.

The following remedial action is predicated on Benteler agreement to the on-site restriction described above.

2.4 Proposed and Completed Remedial Actions

As discussed in Sections 2.1.4 and 2.2.1, the contaminated soil from the former UST area was excavated and removed from the site. In addition, groundwater remedial activities occurred between May 1996 and March 1998 (refer to Section 2.1.1).

3.0 IMPLEMENTATION DETAILS AND DOCUMENTATION (AS RELEVANT FOR THE TYPE OF REMEDIAL ACTIONS PROPOSED/IMPLEMENTED)

3.1 Documentation that Criteria are Appropriate for the Site

Based on available site data, the groundwater contaminant plume appears to have reached equilibrium with regard to future downgradient migration and will not migrate to an off-site drinking water well, surface water body, or an off-site property at concentrations exceeding the RDW criteria. Beneath the site, a portion of the contaminant plume exceeds MDEQ RDW criteria and the GSI criteria. Because the plume will not reach the GSI, these criteria are not applicable. To eliminate potential RDW exposures, a restrictive covenant for the subject property will be filed with the Kalamazoo County Registrar of Deeds, which restricts the use of the groundwater in the upper aquifer beneath portions of the Benteler site. The restrictive covenant also sets guidelines that must be followed if a well is installed into the lower aquifer within the area of restriction.

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3.2 Evidence of zoning

According to the Comstock Township Zoning Map, the site is zoned M-manufacturing. The proposed remedial actions implementing a limited residential land use closure leaves the site acceptable for all qualified types of land uses as long as a well is not placed in the upper aquifer within the restricted area and as long as an appropriately constructed well placed in the lower aquifer within the restricted area is sealed to prevent groundwater migration between the water bearing units.

3.3 Language for restrictive covenants/local ordinances/other institutional controls

The remedial action for the site will consist of the recording of a restrictive covenant with the Registrar of Deeds for Kalamazoo County. The restrictive covenant will serve to assure that there will be no water wells installed in the upper aquifer in the area designated on Figure 5. The restrictive covenant will also include procedures for installation of a well into the lower aquifer in the restricted area. A draft copy of "Declaration of Restrictive Covenant for On-Site" is attached as Appendix H. A draft of the required "Agreement for a Limited Remedy-Land Use" document is attached as Appendix I.

The site restrictions shall apply until the concentrations in the groundwater beneath the site no longer exceed the residential drinking water criteria, as approved by the MDEQ.

3.4 Monitoring plans

No performance monitoring is required since the corrective action implements a restrictive covenant for the property which addresses the present and projected future extent of impact. This has been verified directly by 12 years of groundwater quality monitoring data.

3.5 Operation and maintenance plans

All construction projects undertaken at the site must have the approval of the titleholder prior to proceeding. This will permit the titleholder to alert the appropriate parties of health and safety concerns associated with any proposed well construction activities so that all necessary precautions described in the restrictive covenant can be taken.

3.6 Specifications for permanent markers

The area of restriction has been surveyed by a professional land surveyor and defined by appropriate markers. The legal description is attached to the restrictive covenant in Attachment H.

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3.7 Proposed Financial Assurance Mechanism (FAM)

Since neither performance monitoring nor operation and maintenance are required to implement this plan, a financial assurance mechanism is not necessary.

3.8 Proposed legally enforceable agreement

A draft agreement is provided in Appendix I.

3.9 Plan for well abandonment

All groundwater monitoring wells installed as part of the corrective action activities at the site will be properly abandoned within 90 days after closure is granted. Abandonment will be completed in accordance with American Society of Testing Materials Standard D 5299-92. "Standard Guide for Decommissioning Groundwater Water Wells, Vadose Zone Monitoring Devices, Boreholes, and other Devices for Environmental Activities". Documentation of proper abandonment will be submitted to the MDEQ upon completion.

The objective of well decommissioning is to minimize the potential for fluid movement from the surface to the vadose zone, the surface to the groundwater, or the vertical movement of groundwater within the former borehole. Also, methods of decommissioning are required that will minimize interference with potential future site uses and activities. Both in-place decommissioning and overdrilling and complete removal of the well casing, well screens, well protectors, and grouting could be used to best accomplish these objectives. Benteler prefers that the method of over-drilling, removal, and grouting be used to decommission the wells.

3.10 Schedule

General Signal will abandon the monitor wells, purge wells, and injection well within 90 days of receipt of MDEQ approval of remedial action.

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APPENDIX A

FIGURES

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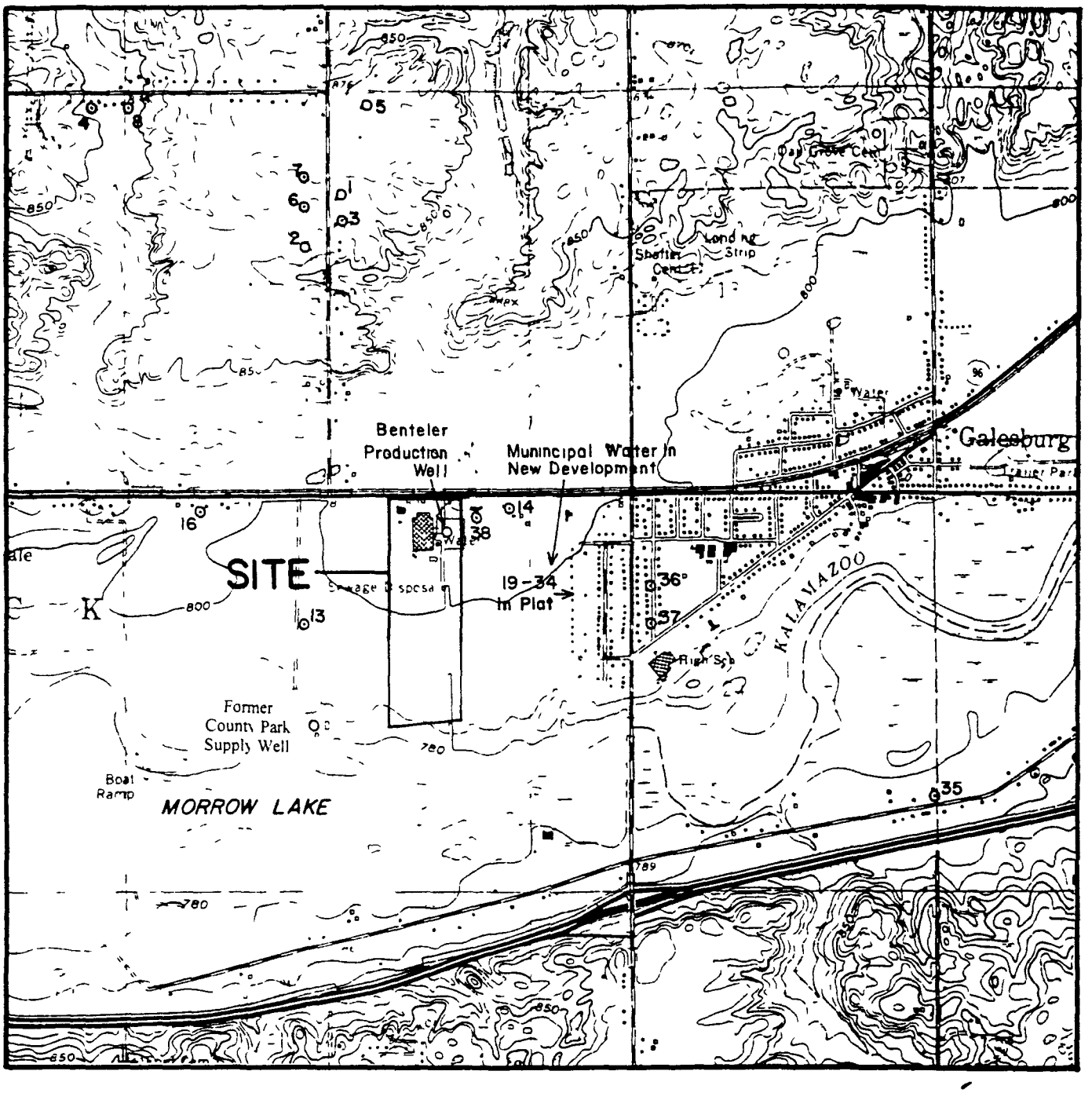
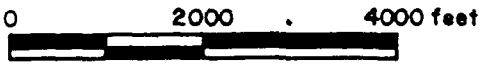


FIGURE I

SITE LOCATION MAP

BENTELER INDUSTRIES, INC.

Section 23, T. 2 S., R. 10 W.
Comstock Township
Kalamazoo County, Michigan



MAP LOCATION

Adapted From USGS 7.5' Topographic Quadrangle: Galesburg, 1961, P.R. 1985

AHC

A3094

Figs 2, 3, 4, 5, 6, 8

FIGURE 2

TOP OF SILT/CLAY CONTOURS AND CROSS SECTION LOCATIONS

BENTELER AUTOMOTIVE, INC.

Section 23, T. 2 S., R. 10 W.
Comstock Township
Kalamazoo County, Michigan

AMERICAN HYDROGEOLOGY CORP.

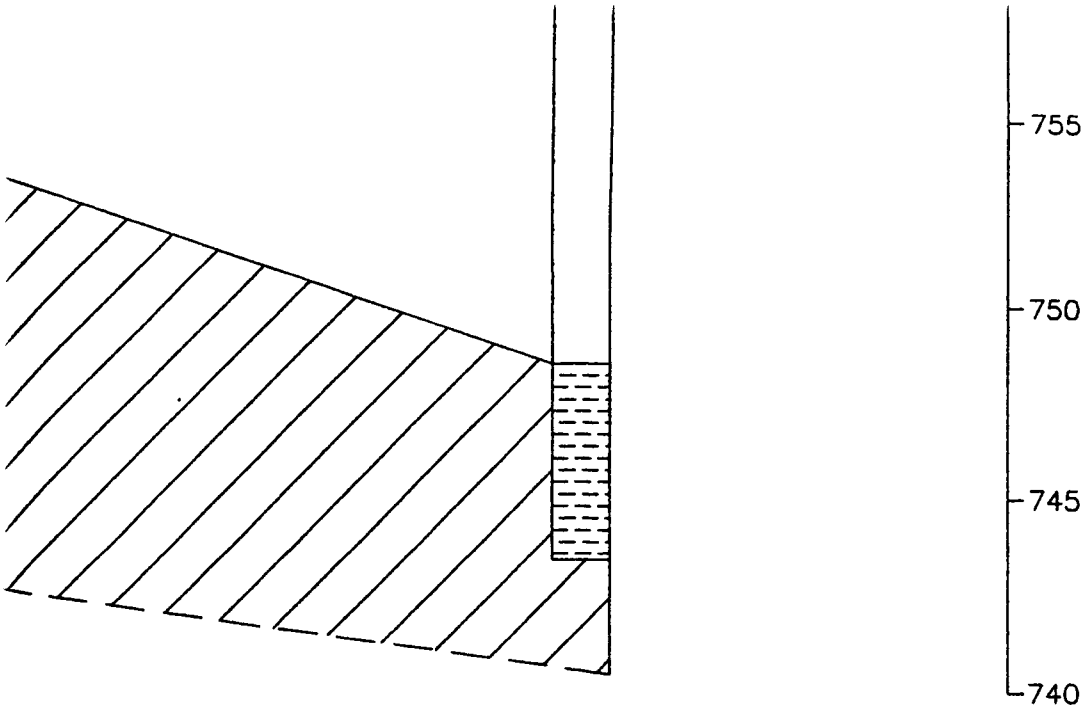


FIGURE 3
CROSS SECTION A TO A'
BENTELER AUTOMOTIVE, INC.
Section 23, T. 2 S., R. 10 W.
Comstock Township
Kalamazoo County, Michigan

AMERICAN HYDROGEOLOGY CORP.

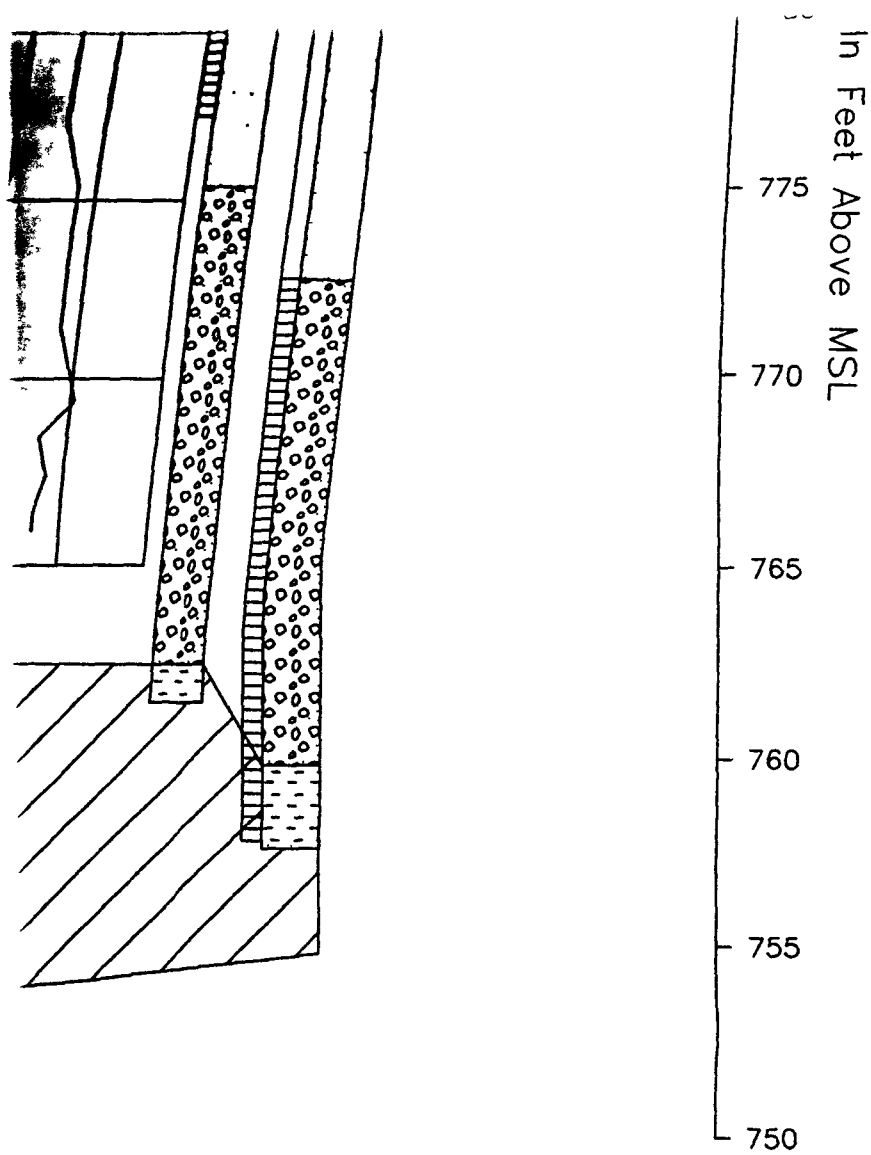


FIGURE 4
CROSS SECTION B TO B'
BENTELER AUTOMOTIVE, INC.
Section 23, T. 2 S., R. 10 W.
Comstock Township
Kalamazoo County, Michigan

AHC AMERICAN HYDROGEOLOGY CORP.

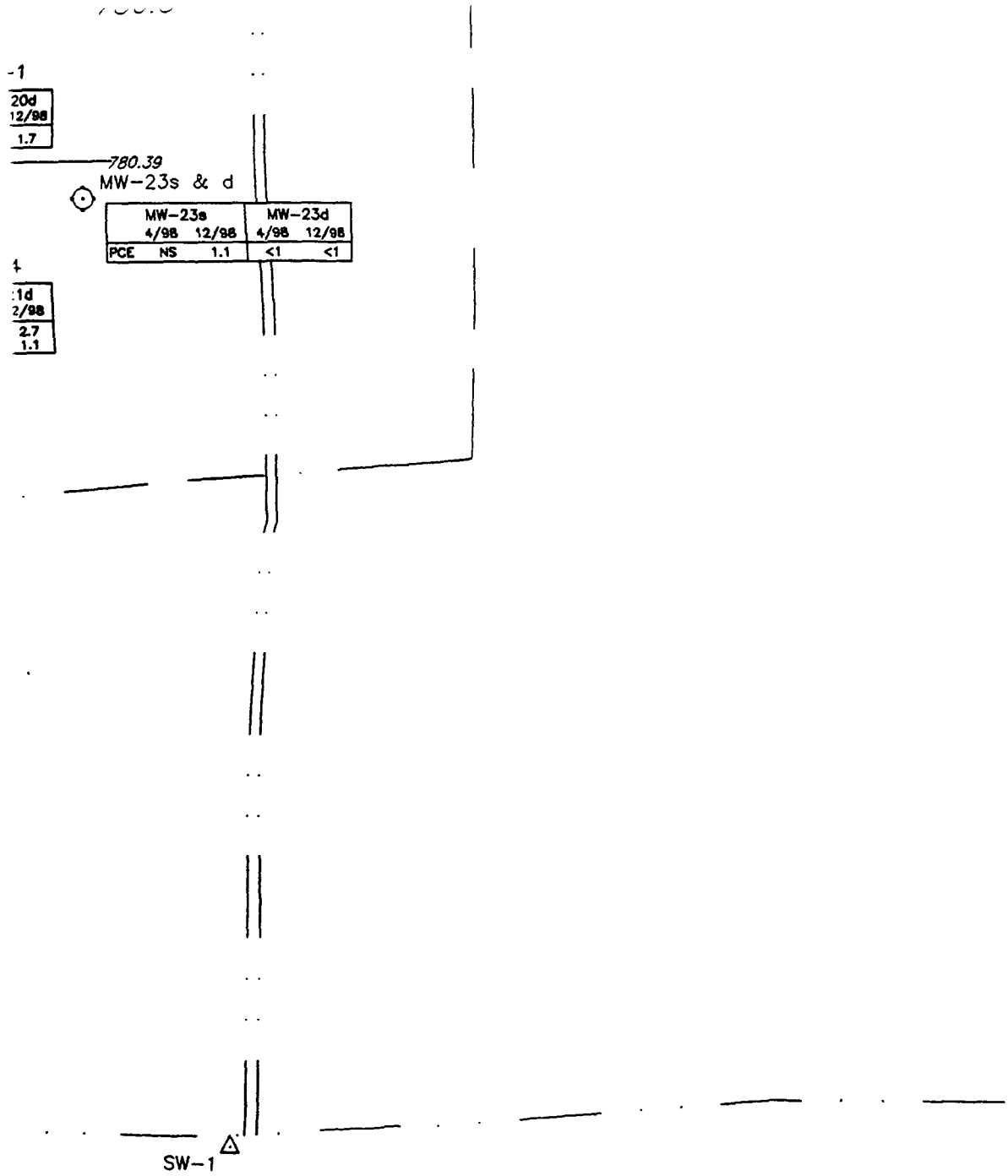


FIGURE 5

WATER QUALITY 4/98 & 12/98 AND ISOCHEMICAL CONCENTRATION CONTOURS OF TETRACHLOROETHENE

BENTELER AUTOMOTIVE, INC.

Section 23, T. 2 S., R. 10 W.
Comstock Township
Kalamazoo County, Michigan

AMERICAN HYDROGEOLOGY

FIGURE 6

POTENTIOMETRIC SURFACE CONTOURS, 10/2/97, PUMPING PW-A AT 83.2 GPM AND PW-B AT 61.1 GPM

BENTELER AUTOMOTIVE, INC.

Section 23, T. 2 S., R. 10 W.
Comstock Township
Kalamazoo County, Michigan

AMERICAN HYDROGEOLOGY CORP.

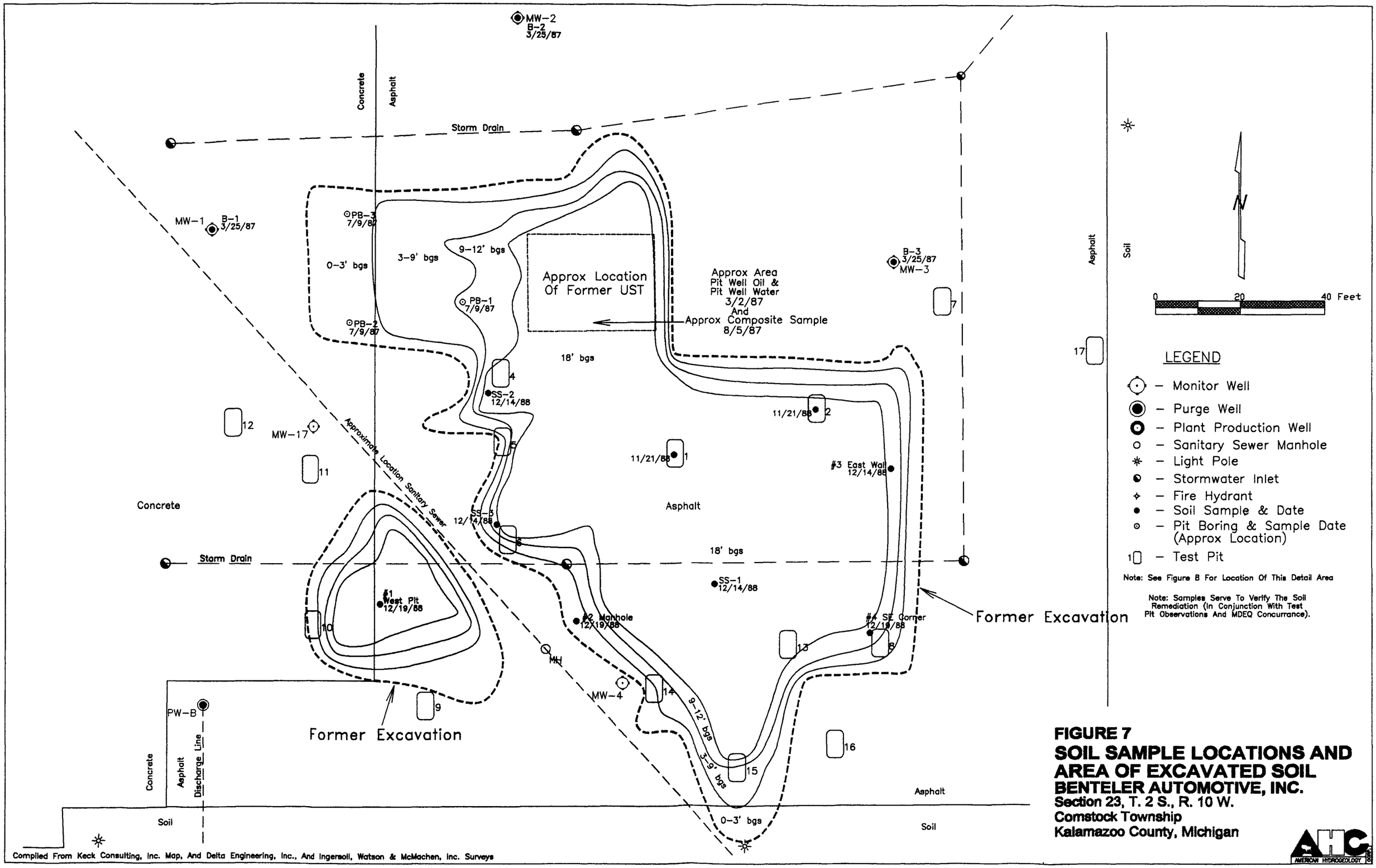


FIGURE 7
SOIL SAMPLE LOCATIONS AND AREA OF EXCAVATED SOIL
BENTELER AUTOMOTIVE, INC.
Section 23, T. 2 S., R. 10 W.
Comstock Township
Kalamazoo County, Michigan

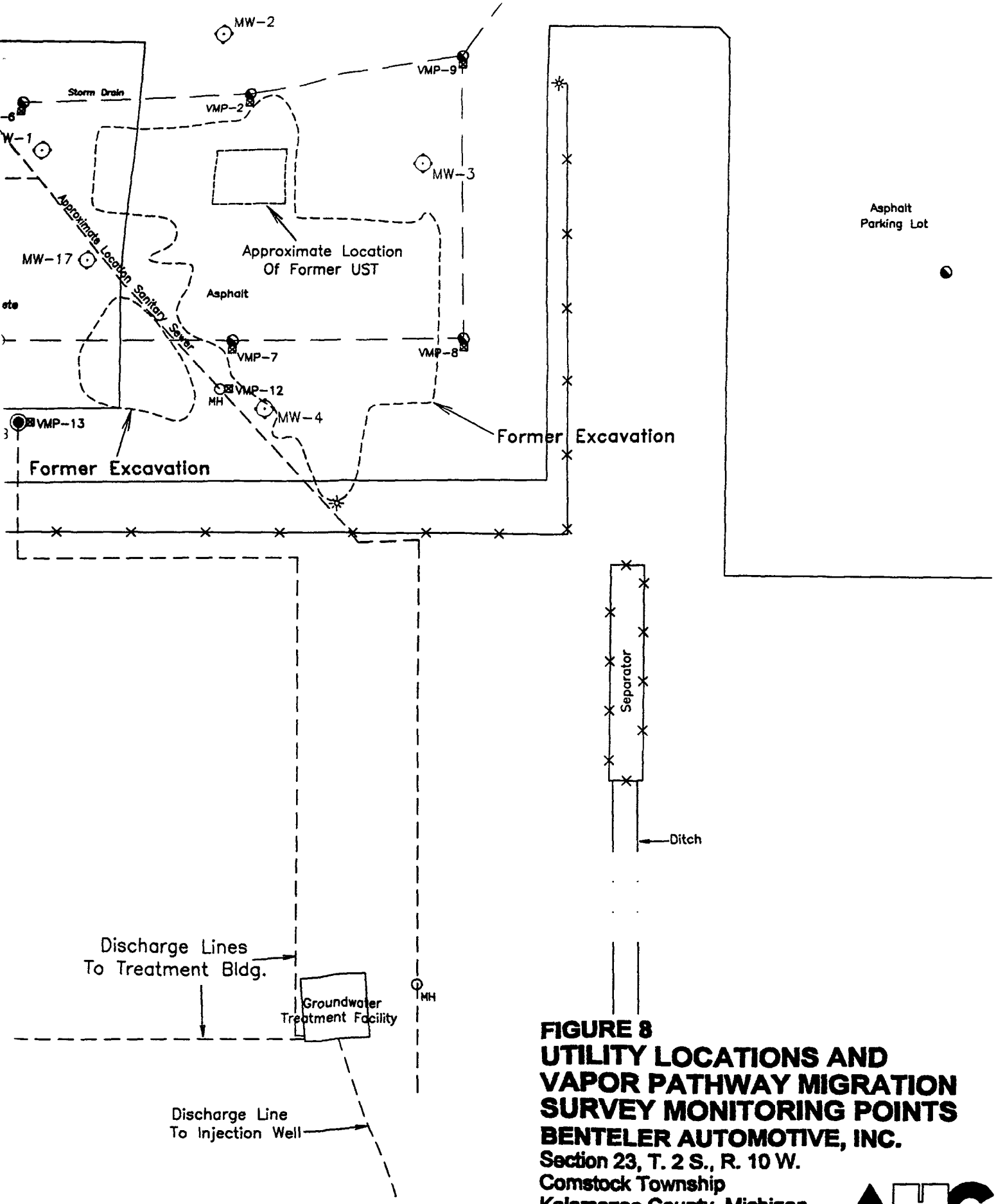


FIGURE 8
UTILITY LOCATIONS AND VAPOR PATHWAY MIGRATION SURVEY MONITORING POINTS
BENTELER AUTOMOTIVE, INC.
Section 23, T. 2 S., R. 10 W.
Comstock Township
Kalamazoo County, Michigan

AMERICAN HYDROGEOLOGY CORP.

APPENDIX B

TABLES

recycled paper

Table 1A
Comparision of Highest Detected Concentrations in Groundwater to Applicable Groundwater Criteria
General Signal Corporation/Benteler Automotive, Corp, #24-1136
9000 East Michigan Avenue, Galesburg, MI

Detected Compounds	Restriction Residential and Commerical I Drinking Water	Restriction Industrial and Commercial II, III & IV Drinking Water	Restriction Groundwater Surface water Interface Value	No Action Residential and Commerical I Groundwater Volatilization to Indoor Air	No Action Groundwater Contact Criteria	Applicable Remediation Criteria	Highest Detected Concentrations	(2) Highest Detected Concentrations in Last 3 Years
(1) MDEQ Scan 1 (µg/L)								
Bromoform	100	100	**ID**	480,000	140,000	ID	2	<1
Chlorobenzene	100	100	**47**	210,000	86,000	47	1	<1
Chloroform	100	100	**170**	470,000	150,000	170	2	<1
Dibromochloromethane	100	100	**ID**	15,000	18,000	ID	1	<1
1,1-Dichloroethane	880	2,500	**ID**	1,000,000	2,400,000	ID	2	<1
cis-1,2-Dichloroethene	70	70	**ID**	96,000	200,000	ID	11	1.0
trans-1,2-Dichloroethene	100	100	**ID**	85,000	220,000	ID	<1	<1
Tetrachloroethene	5.0	5.0	**45**	25,000	12,000	45	2,100	290
1,1,1-Trichloroethane	200	200	**200**	660,000	1,300,000	200	30	<1
Trichloroethene	5.0	5.0	**200**	15,000	37,000	200	48	4.1
Vinyl Chloride	2.0	2.0	**15**	110	570	15	220	7.0
MDEQ Scan 2 (µg/L)								
Benzene	5.0	5.0	**200**	5,600	11,000	200	1	<1
Toluene	790	790	**140**	530,000 (S)	530,000 (S)	140	2	<1
Ethylbenzene	74	74	**18**	170,000 (S)	170,000 (S)	18	15	<1
Total Xylenes	280	280	**35**	190,000 (S)	190,000 (S)	35	32	<1

ID = Inadequate data to develop criterion.
S = Water solubility.
(1) All other MDEQ Scan 1 compounds not detected above the method detection limits.
(2) Five sampling rounds performed between April 1997 and May 2001.
Applicable Groundater Criteria based on MDEQ June 7, 2000 Operational Memorandum #18. Shading indicates concentrations exceeding applicable remediation critera.

Revised 4/5/01

Summary of MDEQ Scan 1 and 2 Compounds in Groundwater
General Signal Corporation/Benteler Automotive Corp., #24-1136
9000 E. Michigan Avenue, Galesburg, MI

Sample ID	Date	* MDEQ Scan 1											MDEQ Scan 2				Total VOCs
		Bromo-form	Dibromo-chloro-methane	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	Chloro-benzene	Chloro-form	1,1,1-TCA	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
Units		µg/L															
GSI Value		NC	NC	NC	NC	NC	47	170	200	45	200	15	200	140	18	35	—
Generic Residential Value		100	100	880	70	100	100	100	200	5.0	5.0	2.0	5.0	790	74	280	—
MW-1	10/26/87	<1	<1	2	17		<1	<1	30	2,100	19	<1	<1	<1	<1	<1	2,168
	7/16/91	<1	<1	<1	14		<1	<1	6	690	14	<1	<1	<1	<1	<1	724
	10/4/91	<1	<1	<1	12		<1	<1	9	1,300	11	<1	<1	<1	<1	<1	1,332
	1/22/92	<1	<1	<1	4		<1	<1	3	730	6	<1	<1	<1	<1	<1	753
	4/14/92	<1	<1	<1	<1		<1	<1	<1	780	6	<1	<1	<1	<1	<1	786
	7/8/92	<1	<1	<1	3		<1	<1	1	860	6	<1	<1	<1	<1	<1	870
	1/5/93	<1	<1	<1	<1		<1	<1	1	770	7	<1	<1	<1	<1	<1	778
	4/6/93	<1	<1	<1	1		<1	<1	1	58	7	<1	<1	<1	<1	<1	67
	7/12/93	<1	<1	<1	1		<1	<1	1	570	5	<1	<1	<1	<1	<1	577
	10/28/93	<1	<1	<1	1		<1	<1	1	650	6	<1	<1	<1	<1	<1	658
	3/7/94	NA	NA	<1	<1		NA	<1	<1	650	4	<1	<1	<1	<1	<1	654
	5/19/94	NA	NA	<1	<1	—	NA	<1	1	490	4	<1	<1	<1	<1	<1	495
	10/18/94	<1	<1	<1	<1	<1	<1	<1	<1	640	1	<1	<1	<1	<1	<1	641
	1/16/95	NA	NA	<1	<1	<1	NA	<1	<1	480	5	<1	<1	<1	<1	<1	485
	4/5/95	NA	NA	<1	<1	<1	NA	<1	<1	420	3	<1	<1	<1	<1	<1	423
	9/15/95	<1	<1	<1	<1	<1	<1	<1	<1	470	4	<1	<1	<1	<1	<1	474
	1/5/96	NA	NA	<1	<1	<1	NA	<1	<1	460	4	<1	<1	<1	<1	<1	464
	4/4/96	NA	NA	<1	<1	<1	NA	<1	<1	510	4	<1	<1	<1	<1	<1	514
	7/9/96	<1	<1	<1	<1	<1	1	<1	<1	390	4	<1	<1	<1	<1	<1	395
	10/11/96	NA	NA	<1	<1	<1	NA	<1	<1	480	4	<1	<1	<1	<1	<1	484
	4/29/97	NA	NA	<1	<1	<1	NA	<1	<1	290	4.1	1.0	<1	<1	<1	** <1	295.1
	11/25/97	<1	<1	<1	<1	<1	<1	<1	<1	270	2.2	<1	<1	<1	<1	** <1	272.2
	4/10/98	NA	NA	<1	<1	<1	NA	<1	<1	220	3.8	<1	<1	<1	<1	** <1	223.8
	12/11/98	<1	<1	<1	<1	<1	<1	<1	<1	220	3.0	<1	<1	<1	<1	** <1	223
	5/10/01	<1	<1	<1	<1	<1	<1	<1	<1	110	1.0	<1	<1	<1	<1	<1-<2	111

* All other MDEQ Scan 1 compounds = <1 µg/L (With the exception of 5/10/01, Methylene Chloride <5).

** Analyzed as m/p-Xylene and o-Xylene, method detection limit listed is for each compound.

NA = Not analyzed; NC = No criteria established
ND = Not detected to method detection limits
Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Summary of MDEQ Scan 1 and 2 Compounds in Groundwater
General Signal Corporation/Benteler Automotive Corp., #24-1136
9000 E. Michigan Avenue, Galesburg, MI

Sample ID	Date	* MDEQ Scan 1											MDEQ Scan 2				Total VOCs
		Bromo-form	Dibromo-chloro-methane	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	Chloro-benzene	Chloro-form	1,1,1-TCA	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
Units		µg/L															
GSI Value		NC	NC	NC	NC	NC	47	170	200	45	200	15	200	140	18	35	---
Generic Residential Value		100	100	880	70	100	100	100	200	5.0	5.0	2.0	5.0	790	74	280	---
MW-2	10/26/87	<1	<1	<1	**100**		<1	<1	<1	**420**	**48**	<1	<1	<1	<1	<1	**568**
	10/11/90	<1	<1	<1	**110**		<1	<1	<1	**110**	**12**	<1	<1	<1	<1	<1	**232**
	7/3/91	<1	<1	<1	**70**		<1	<1	<1	**110**	**13**	<1	<1	<1	<1	<1	**193**
	10/4/91	<1	<1	<1	**320**		<1	<1	<1	**170**	**7**	<1	<1	<1	<1	<1	**497**
	1/22/92	<1	<1	<1	**59**		<1	<1	<1	**62**	**6**	<1	<1	<1	<1	<1	**127**
	4/14/92	<1	<1	<1	**110**		<1	<1	<1	**68**	**7**	<1	<1	<1	<1	<1	**185**
	7/8/92	<1	<1	<1	**23**		<1	<1	<1	**81**	**7**	<1	<1	<1	<1	<1	**111**
	10/15/92	<1	<1	<1	**4**		<1	<1	<1	**97**	**8**	<1	<1	<1	<1	<1	**109**
	1/5/93	<1	<1	<1	<1		<1	<1	<1	**3**	<1	<1	<1	<1	<1	<1	**3**
	4/6/93	<1	<1	<1	**53**		<1	<1	<1	**62**	**5**	<1	<1	<1	<1	<1	**120**
	7/12/93	<1	<1	<1	**28**		<1	<1	<1	**70**	**5**	<1	<1	<1	<1	<1	**103**
	10/28/93	<1	<1	<1	**6**		<1	<1	<1	**61**	**4**	<1	<1	<1	<1	<1	**71**
	3/7/94	NA	NA	<1	**2**		NA	<1	<1	**48**	**2**	<1	<1	<1	<1	<1	**52**
	5/19/94	NA	NA	<1	<1	---	NA	<1	<1	**35**	**1**	<1	<1	<1	<1	<1	**36**
	10/18/94	<1	<1	<1	<1	<1	<1	<1	<1	**9**	<1	<1	<1	<1	<1	<1	**9**
	1/16/95	NA	NA	<1	**1**	<1	NA	<1	<1	**25**	**1**	<1	<1	<1	<1	<1	**27**
	4/5/95	NA	NA	<1	<1	<1	NA	<1	<1	**23**	<1	<1	<1	<1	<1	<1	**23**
	9/15/95	<1	<1	<1	<1	<1	<1	<1	<1	**27**	**1**	<1	<1	<1	<1	<1	**28**
	1/5/96	NA	NA	<1	<1	<1	NA	<1	<1	**20**	**1**	<1	<1	<1	<1	<1	**21**
	4/4/96	NA	NA	<1	<1	<1	NA	<1	<1	**18**	<1	<1	<1	<1	<1	<1	**18**
	7/9/96	**2**	**1**	<1	<1	<1	<1	<1	<1	**23**	<1	<1	<1	<1	<1	<1	**26**
	10/11/96	NA	NA	<1	**1**	<1	NA	<1	<1	**23**	**1**	<1	<1	<1	<1	<1	**25**
	4/29/97	NA	NA	<1	<1	<1	NA	<1	<1	**23**	<1	<1	<1	<1	<1	** <1	**23**
	11/25/97	<1	<1	<1	<1	<1	<1	<1	<1	**24**	<1	<1	<1	<1	<1	** <1	**24**
	4/10/98	NA	NA	<1	<1	<1	NA	<1	<1	**23**	<1	<1	<1	<1	<1	** <1	**23**
	12/11/98	<1	<1	<1	**1.0**	<1	<1	<1	<1	**31**	**1.3**	<1	<1	<1	<1	** <1	**33.3**
	5/10/01	<1	<1	<1	<1	<1	<1	<1	<1	**22**	**2.7**	<1	<1	<1	<1	<1-<2	**24.7**

* All other MDEQ Scan 1 compounds = <1 µg/L.

** Analyzed as m/p-Xylene and o-Xylene, method detection limit listed is for each compound.

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Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Summary of MDEQ Scan 1 and 2 Compounds in Groundwater
General Signal Corporation/Benteler Automotive Corp., #24-1136
9000 E. Michigan Avenue, Galesburg, MI

Sample ID	Date	* MDEQ Scan 1											MDEQ Scan 2				Total VOCs
		Bromo-form	Dibromo-chloro-methane	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	Chloro-benzene	Chloro-form	1,1,1-TCA	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
Units		µg/L															
GSI Value		NC	NC	NC	NC	NC	47	170	200	45	200	15	200	140	18	35	—
Generic Residential Value		100	100	880	70	100	100	100	200	5.0	5.0	2 0	5.0	790	74	280	—
MW-3	10/26/87	<1	<1	<1	<1		<1	<1	<1	**1**	<1	<1	<1	<1	<1	<1	**1**
	10/3/90	<1	<1	<1	<1		<1	<1	<1	**2**	<1	**1**	<1	<1	<1	<1	**3**
	7/2/91	<1	<1	<1	<1		<1	<1	<1	**1**	**1**	<1	<1	<1	<1	<1	**2**
	10/4/91	<1	<1	<1	<1		<1	<1	<1	**2**	<1	<1	**1**	<1	<1	<1	**3**
	1/22/92	<1	<1	<1	<1		<1	<1	<1	**1**	<1	<1	<1	<1	<1	<1	**1**
	4/14/92	<1	<1	<1	<1		<1	<1	<1	**2**	**1**	<1	<1	<1	<1	<1	**3**
	7/7/92	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	10/15/92	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	1/5/93	<1	<1	<1	<1		<1	<1	<1	**2**	**1**	<1	<1	<1	<1	<1	**3**
	4/6/93	<1	<1	<1	<1		<1	<1	<1	**2**	**1**	<1	<1	<1	<1	<1	**3**
	7/12/93	<1	<1	<1	<1		<1	<1	<1	**2**	**1**	<1	<1	<1	<1	<1	**3**
	10/28/93	<1	<1	<1	<1		<1	<1	<1	**4**	<1	<1	<1	<1	<1	<1	**4**
	3/7/94	NA	NA	<1	<1		NA	<1	<1	**3**	<1	<1	<1	<1	<1	<1	**3**
	5/19/94	NA	NA	<1	<1	—	NA	<1	<1	**2**	<1	<1	<1	<1	<1	<1	**2**
	10/18/94	<1	<1	<1	<1	<1	<1	<1	<1	**1**	<1	<1	**1**	<1	<1	<1	**2**
	1/16/95	NA	NA	<1	<1	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	4/5/95	NA	NA	<1	<1	<1	NA	<1	<1	**2**	**1**	<1	<1	<1	<1	<1	**3**
	9/15/95	<1	<1	<1	<1	<1	<1	<1	<1	**8**	**1**	<1	<1	<1	<1	<1	**9**
	1/5/96	NA	NA	<1	<1	<1	NA	<1	<1	**2**	<1	<1	<1	<1	<1	<1	**2**
	4/4/96	NA	NA	<1	<1	<1	NA	<1	<1	**3**	**1**	<1	<1	<1	<1	<1	**4**
	7/9/96	<1	<1	<1	<1	<1	<1	<1	<1	**2**	<1	<1	<1	<1	<1	<1	**2**
	10/11/96	NA	NA	<1	<1	<1	NA	<1	<1	**4**	<1	<1	<1	<1	<1	<1	**4**
	4/29/97	NA	NA	<1	<1	<1	NA	<1	<1	**3.8**	<1	<1	<1	<1	<1	** <1	**3.8**
	11/25/97	<1	<1	<1	<1	<1	<1	<1	<1	**4.5**	<1	<1	<1	<1	<1	** <1	**4.5**
	4/10/98	NA	NA	<1	<1	<1	NA	<1	<1	**2.1**	<1	<1	<1	<1	<1	** <1	**2.1**
	12/11/98	<1	<1	<1	<1	<1	<1	<1	<1	**6.2**	<1	<1	<1	<1	<1	** <1	**6.2**
	5/10/01	<1	<1	<1	<1	<1	<1	<1	<1	**2.7**	<1	<1	<1	<1	<1	<1-<2	**2.7**

* All other MDEQ Scan 1 compounds = <1 µg/L.

** Analyzed as m/p-Xylene and o-Xylene, method detection limit listed is for each compound.

NA = Not analyzed, NC = No criteria established
ND = Not detected to method detection limits
Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Summary of MDEQ Scan 1 and 2 Compounds in Groundwater
General Signal Corporation/Benteler Automotive Corp., #24-1136
9000 E. Michigan Avenue, Galesburg, MI

Sample ID	Date	* MDEQ Scan 1											MDEQ Scan 2				Total VOCs
		Bromo-form	Dibromo-chloro-methane	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	Chloro-benzene	Chloro-form	1,1,1-TCA	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
Units		µg/L															
GSI Value		NC	NC	NC	NC	NC	47	170	200	45	200	15	200	140	18	35	—
Generic Residential Value		100	100	880	70	100	100	100	200	5.0	5.0	2.0	5.0	790	74	280	—
MW-4	10/26/87	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	**6**	<1	**6**
	10/11/90	<1	<1	<1	<1		<1	<1	<1	<1	<1	**3**	<1	<1	**1**	<1	**4**
	1/8/91	<1	<1	<1	<1		<1	<1	**1**	<1	<1	**3**	<1	<1	**1**	<1	**5**
	7/2/91	<1	<1	**1**	**120**		<1	<1	<1	<1	<1	**45**	<1	<1	**6**	**3**	**175**
	10/4/91	<1	<1	<1	**740**		<1	<1	<1	<1	<1	**230**	<1	**2**	**15**	**17**	**994**
	1/22/92	<1	<1	<1	**60**		<1	<1	<1	<1	<1	**160**	<1	**2**	**6**	**28**	**256**
	4/14/92	<1	<1	<1	**2**		<1	<1	<1	<1	<1	**16**	<1	**1**	**6**	**32**	**57**
	7/8/92	<1	<1	<1	<1		<1	<1	<1	<1	<1	**3**	<1	<1	**6**	**16**	**25**
	10/15/92	<1	<1	<1	<1		<1	<1	<1	<1	<1	**6**	**1**	<1	<1	<1	**7**
	1/5/93	<1	<1	<1	**2**		<1	<1	<1	<1	<1	**35**	<1	<1	<1	**2**	**39**
	4/6/93	<1	<1	<1	**21**		<1	<1	<1	<1	<1	**9**	<1	<1	<1	<1	**30**
	7/12/93	<1	<1	<1	**3**		<1	<1	<1	<1	<1	**5**	<1	<1	**7**	**4**	**27**
	10/28/93	<1	<1	<1	**1**		<1	<1	<1	<1	<1	**9**	<1	<1	**3**	**2**	**15**
	3/7/94	NA	NA	<1	**2**		NA	<1	<1	<1	<1	**8**	<1	<1	<1	**1**	**21**
	5/19/94	NA	NA	<1	<1	—	NA	<1	<1	<1	<1	**10**	<1	<1	<1	<1	**30**
	10/18/94	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	**2**	<1	<1	<1	<1	**6**
	1/16/95	NA	NA	<1	**11**	<1	NA	<1	<1	<1	<1	**[illegible]**	<1	<1	<1	<1	**86**
	4/5/95	NA	NA	<1	<1	<1	NA	<1	<1	<1	<1	**[illegible]**	<1	<1	<1	**1**	**41**
	9/15/95	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	**[illegible]**	<1	<1	<1	<1	**8**
	1/5/96	NA	NA	<1	<1	<1	NA	<1	<1	<1	<1	**[illegible]**	<1	<1	<1	<1	**12**
	4/4/96	NA	NA	<1	<1	<1	NA	<1	<1	<1	<1	**[illegible]**	<1	<1	<1	<1	**15**
	7/9/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	**[illegible]**	<1	<1	<1	<1	**55**
	10/11/96	NA	NA	<1	<1	<1	NA	<1	<1	<1	<1	**[illegible]**	<1	<1	<1	<1	**22**
	4/29/97	NA	NA	<1	<1	<1	NA	<1	<1	<1	<1	**[illegible]**	<1	<1	<1	** <1	**5.7**
	11/25/97	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	**[illegible]**	<1	<1	<1	** <1	**4.0**
	4/10/98	NA	NA	<1	<1	<1	NA	<1	<1	<1	<1	**[illegible]**	<1	<1	<1	** <1	**7.0**
	12/18/98	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	**[illegible]**	<1	<1	<1	** <1	**4.3**

* All other MDEQ Scan 1 compounds = <1 µg/L.

** Analyzed as m/p-Xylene and o-Xylene, method detection limit listed is for each compound.

NA = Not analyzed; NC = No criteria established
ND = Not detected to method detection limits
Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Summary of MDEQ Scan 1 and 2 Compounds in Groundwater
General Signal Corporation/Benteler Automotive Corp., #24-1136
9000 E. Michigan Avenue, Galesburg, MI

Sample ID	Date	* MDEQ Scan 1											MDEQ Scan 2				Total VOCs
		Bromo-form	Dibromo-chloro-methane	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	Chloro-benzene	Chloro-form	1,1,1-TCA	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
Units		µg/L															
GSI Value		NC	NC	NC	NC	NC	47	170	200	45	200	15	200	140	18	35	---
Generic Residential Value		100	100	880	70	100	100	100	200	5.0	5.0	2.0	5.0	790	74	280	---
MW-5s	10/26/87	<1	<1	<1	<1		<1	<1	<1	1	<1	<1	<1	<1	<1	<1	1
	10/3/90	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	7/1/91	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	10/2/91	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	1/21/92	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	4/13/92	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	7/7/93	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	10/18/94	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	9/14/95	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	7/8/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
MW-5d	10/26/87	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	10/3/90	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	7/1/91	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	10/2/91	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	1/21/92	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	4/13/92	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	7/7/93	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	10/18/94	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	9/14/95	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	7/8/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND

* All other MDEQ Scan 1 compounds = <1 µg/L.

** Analyzed as m/p-Xylene and o-Xylene, method detection limit listed is for each compound.

NA = Not analyzed; NC = No criteria established
ND = Not detected to method detection limits
Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Summary of MDEQ Scan 1 and 2 Compounds in Groundwater
General Signal Corporation/Benteler Automotive Corp., #24-1136
9000 E. Michigan Avenue, Galesburg, MI

Sample ID	Date	* MDEQ Scan 1											MDEQ Scan 2				Total VOCs
		Bromo-form	Dibromo-chloro-methane	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	Chloro-benzene	Chloro-form	1,1,1-TCA	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
Units		µg/L															
GSI Value		NC	NC	NC	NC	NC	47	170	200	45	200	15	200	140	18	35	---
Generic Residential Value		100	100	880	70	100	100	100	200	5.0	5.0	2.0	5.0	790	74	280	---
MW-6s	10/26/87	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	10/3/90	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	7/1/91	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	10/2/91	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	1/21/92	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	4/13/92	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	7/7/93	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	10/17/94	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	9/14/95	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	7/8/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	12/9/98	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
MW-6d	10/3/90	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	7/1/91	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	10/2/91	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	1/21/92	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	4/13/92	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	7/7/93	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	10/17/94	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	9/14/95	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	7/8/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	12/9/98	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND

* All other MDEQ Scan 1 compounds = <1 µg/L.

** Analyzed as m/p-Xylene and o-Xylene, method detection limit listed is for each compound.

NA = Not analyzed; NC = No criteria established
ND = Not detected to method detection limits
Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Summary of MDEQ Scan 1 and 2 Compounds in Groundwater
General Signal Corporation/Benteler Automotive Corp., #24-1136
9000 E. Michigan Avenue, Galesburg, MI

Sample ID	Date	* MDEQ Scan 1											MDEQ Scan 2				Total VOCs
		Bromo-form	Dibromo-chloro-methane	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	Chloro-benzene	Chloro-form	1,1,1-TCA	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
Units		µg/L															
GSI Value		NC	NC	NC	NC	NC	47	170	200	45	200	15	200	140	18	35	---
Generic Residential Value		100	100	880	70	100	100	100	200	5.0	5.0	2.0	5.0	790	74	280	---
MW-7s	10/26/87	<1	<1	<1	**4**		<1	<1	<1	<1	**2**	<1	<1	<1	<1	<1	**6**
	10/3/90	<1	<1	<1	**1**		<1	<1	<1	**1**	**1**	<1	<1	<1	<1	<1	**3**
	1/8/91	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	7/2/91	<1	<1	<1	**1**		<1	<1	<1	**1**	**1**	<1	<1	<1	<1	<1	**3**
	10/2/91	<1	<1	<1	<1		<1	<1	<1	**3**	**1**	<1	<1	<1	<1	<1	**4**
	1/21/92	<1	<1	<1	<1		<1	<1	<1	**1**	**1**	<1	<1	<1	<1	<1	**2**
	4/13/92	<1	<1	<1	<1		<1	<1	<1	**2**	**1**	<1	<1	<1	<1	<1	**3**
	7/7/92	<1	<1	<1	<1		<1	<1	<1	**1**	**1**	<1	<1	<1	<1	<1	**2**
	10/14/92	<1	<1	<1	<1		<1	<1	<1	**1**	**1**	<1	<1	<1	<1	<1	**2**
	1/6/93	<1	<1	<1	<1		<1	<1	<1	**2**	**1**	<1	<1	<1	<1	<1	**3**
	4/5/93	<1	<1	<1	<1		<1	<1	<1	**2**	**1**	<1	<1	<1	<1	<1	**3**
	7/7/93	<1	<1	<1	<1		<1	<1	<1	**1**	**1**	<1	<1	<1	<1	<1	**2**
	10/27/93	<1	<1	<1	<1		<1	<1	<1	**1**	**1**	<1	<1	<1	<1	<1	**2**
	3/7/94	NA	NA	<1	<1		NA	<1	<1	**1**	<1	<1	<1	<1	<1	<1	**1**
	5/18/94	NA	NA	<1	<1	---	NA	<1	<1	**1**	**1**	<1	<1	<1	<1	<1	**2**
	10/17/94	<1	<1	<1	<1	<1	<1	<1	<1	<1	**1**	<1	<1	<1	<1	<1	**1**
	1/16/95	NA	NA	<1	<1	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	4/5/95	NA	NA	<1	<1	<1	NA	<1	<1	**1**	<1	<1	<1	<1	<1	<1	**1**
	9/14/95	<1	<1	<1	<1	<1	<1	<1	<1	**1**	<1	<1	<1	<1	<1	<1	**1**
	1/4/96	NA	NA	<1	<1	<1	NA	<1	<1	**1**	<1	<1	<1	<1	<1	<1	**1**
	4/4/96	NA	NA	<1	<1	<1	NA	<1	<1	**1**	<1	<1	<1	<1	<1	<1	**1**
	7/8/96	<1	<1	<1	<1	<1	<1	<1	<1	**1**	<1	<1	<1	<1	<1	<1	**1**
	10/10/96	NA	NA	<1	<1	<1	NA	<1	<1	**2**	<1	<1	<1	<1	<1	<1	**2**
	4/28/97	NA	NA	<1	<1	<1	NA	<1	<1	**1.0**	<1	<1	<1	<1	<1	** <1	**1.0**
	11/25/97	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	ND

* All other MDEQ Scan 1 compounds = <1 µg/L.

** Analyzed as m/p-Xylene and o-Xylene, method detection limit listed is for each compound.

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ND = Not detected to method detection limits
Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Summary of MDEQ Scan 1 and 2 Compounds in Groundwater
General Signal Corporation/Benteler Automotive Corp., #24-1136
9000 E. Michigan Avenue, Galesburg, MI

Sample ID	Date	* MDEQ Scan 1											MDEQ Scan 2				Total VOCs
		Bromo-form	Dibromo-chloro-methane	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	Chloro-benzene	Chloro-form	1,1,1-TCA	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
Units		µg/L															
GSI Value		NC	NC	NC	NC	NC	47	170	200	45	200	15	200	140	18	35	—
Generic Residential Value		100	100	880	70	100	100	100	200	5.0	5.0	2.0	5.0	790	74	280	—
MW-7d	10/3/90	<1	<1	<1	1		<1	<1	<1	1	1	<1	<1	<1	<1	<1	3
	7/2/91	<1	<1	<1	<1		<1	<1	<1	1	1	<1	<1	<1	<1	<1	2
	10/2/91	<1	<1	<1	<1		<1	<1	<1	3	1	<1	<1	<1	<1	<1	4
	1/21/92	<1	<1	<1	<1		<1	<1	<1	1	1	<1	<1	<1	<1	<1	2
	4/13/92	<1	<1	<1	<1		<1	<1	<1	2	1	<1	<1	<1	<1	<1	3
	7/7/92	<1	<1	<1	<1		<1	<1	<1	1	1	<1	<1	<1	<1	<1	2
	10/14/92	<1	<1	<1	<1		<1	<1	<1	1	<1	<1	<1	<1	<1	<1	1
	1/6/93	<1	<1	<1	<1		<1	<1	<1	1	1	<1	<1	<1	<1	<1	2
	4/5/93	<1	<1	<1	<1		<1	<1	<1	1	1	<1	<1	<1	<1	<1	2
	7/7/93	<1	<1	<1	<1		<1	<1	<1	1	1	<1	<1	<1	<1	<1	2
	10/27/93	<1	<1	<1	<1		<1	<1	<1	<1	1	<1	<1	<1	<1	<1	1
	10/17/94	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	1
	9/14/95	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	7/8/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	11/25/97	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	ND

* All other MDEQ Scan 1 compounds = <1 µg/L.

** Analyzed as m/p-Xylene and o-Xylene, method detection limit listed is for each compound.

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General Signal Corporation/Benteler Automotive Corp., #24-1136
9000 E. Michigan Avenue, Galesburg, MI

Sample ID	Date	* MDEQ Scan 1											MDEQ Scan 2				Total VOCs
		Bromo-form	Dibromo-chloro-methane	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	Chloro-benzene	Chloro-form	1,1,1-TCA	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
Units		µg/L															
GSI Value		NC	NC	NC	NC	NC	47	170	200	45	200	15	200	140	18	35	—
Generic Residential Value		100	100	880	70	100	100	100	200	5.0	5.0	2.0	5.0	790	74	280	—
MW-8s	10/26/87	<1	<1	<1	3		<1	<1	1	71	2	<1	<1	<1	<1	<1	77
	10/3/90	<1	<1	<1	1		<1	<1	1	53	1	1	<1	<1	<1	<1	57
	7/2/91	<1	<1	<1	<1		<1	<1	<1	37	1	<1	<1	<1	<1	<1	38
	10/4/91	<1	<1	<1	<1		<1	<1	<1	22	<1	<1	<1	<1	<1	<1	22
	1/21/92	<1	<1	<1	<1		<1	<1	<1	41	1	<1	<1	<1	<1	<1	42
	4/13/92	<1	<1	<1	<1		<1	<1	<1	29	1	<1	<1	<1	<1	<1	30
	7/7/92	<1	<1	<1	<1		<1	<1	<1	34	1	<1	<1	<1	<1	<1	35
	10/14/92	<1	<1	<1	<1		<1	<1	<1	44	1	<1	<1	<1	<1	<1	45
	1/6/93	<1	<1	<1	<1		<1	<1	<1	48	1	<1	<1	<1	<1	<1	49
	4/5/93	<1	<1	<1	1		<1	<1	<1	39	1	<1	<1	<1	<1	<1	41
	7/7/93	<1	<1	<1	<1		<1	<1	<1	36	1	<1	<1	<1	<1	<1	37
	10/27/93	<1	<1	<1	<1		<1	<1	<1	40	1	<1	<1	<1	<1	<1	41
	3/7/94	NA	NA	<1	<1		NA	<1	<1	33	<1	<1	<1	<1	<1	<1	31
	5/18/94	NA	NA	<1	<1	---	NA	<1	<1	31	<1	<1	<1	<1	<1	<1	31
	10/17/94	<1	<1	<1	<1	<1	<1	<1	<1	32	<1	<1	<1	<1	<1	<1	32
	1/16/95	NA	NA	<1	<1	<1	NA	<1	<1	25	<1	<1	<1	<1	<1	<1	25
	4/5/95	NA	NA	<1	<1	<1	NA	<1	<1	22	<1	<1	<1	<1	<1	<1	22
	9/14/95	<1	<1	<1	<1	<1	<1	<1	<1	26	<1	<1	<1	<1	<1	<1	26
	1/4/96	NA	NA	<1	<1	<1	NA	<1	<1	26	<1	<1	<1	<1	<1	<1	26
	4/4/96	NA	NA	<1	<1	<1	NA	<1	<1	28	<1	<1	<1	<1	<1	<1	28
	7/9/96	<1	<1	<1	<1	<1	<1	<1	<1	23	<1	<1	<1	<1	<1	<1	23
	10/10/96	NA	NA	<1	<1	<1	NA	<1	<1	26	<1	<1	<1	<1	<1	<1	26
	4/28/97	NA	NA	<1	<1	<1	NA	<1	<1	22	<1	<1	<1	<1	<1	** <1	22
	11/25/97	<1	<1	<1	<1	<1	<1	<1	<1	28	<1	<1	<1	<1	<1	** <1	28
	4/10/98	NA	NA	<1	<1	<1	NA	<1	<1	21	<1	<1	<1	<1	<1	** <1	21
	12/9/98	<1	<1	<1	<1	<1	<1	<1	<1	19	<1	<1	<1	<1	<1	** <1	19
	5/1/01	<1	<1	<1	<1	<1	<1	<1	<1	16	<1	<1	<1	<1	<1	<1-<2	16

* All other MDEQ Scan 1 compounds = <1 µg/L.

** *Analyzed as m/p-Xylene and o-Xylene, method detection limit listed is for each compound.*

NA = Not analyzed; NC = No criteria established
ND = Not detected to method detection limits
Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Summary of MDEQ Scan 1 and 2 Compounds in Groundwater
General Signal Corporation/Benteler Automotive Corp., #24-1136
9000 E. Michigan Avenue, Galesburg, MI

Sample ID	Date	* MDEQ Scan 1											MDEQ Scan 2				Total VOCs
		Bromo-form	Dibromo-chloro-methane	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	Chloro-benzene	Chloro-form	1,1,1-TCA	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
Units		µg/L															
GSI Value		NC	NC	NC	NC	NC	47	170	200	45	200	15	200	140	18	35	—
Generic Residential Value		100	100	880	70	100	100	100	200	5.0	5.0	2.0	5.0	790	74	280	—
MW-8d	10/26/87	<1	<1	<1	2		<1	<1	<1	70	8	<1	<1	<1	<1	<1	**80**
	10/3/90	<1	<1	<1	1		<1	<1	<1	34	5	<1	<1	<1	<1	<1	**40**
	7/2/91	<1	<1	<1	<1		<1	<1	<1	30	4	<1	<1	<1	<1	<1	**34**
	10/4/91	<1	<1	<1	<1		<1	<1	<1	20	3	<1	<1	<1	<1	<1	**23**
	1/21/92	<1	<1	<1	<1		<1	<1	<1	24	3	<1	<1	<1	<1	<1	**27**
	4/13/92	<1	<1	<1	<1		<1	<1	<1	28	4	<1	<1	<1	<1	<1	**32**
	7/7/92	<1	<1	<1	<1		<1	<1	<1	25	3	<1	<1	<1	<1	<1	**28**
	10/14/92	<1	<1	<1	<1		<1	<1	<1	26	3	<1	<1	<1	<1	<1	**29**
	1/6/93	<1	<1	<1	<1		<1	<1	<1	23	3	<1	<1	<1	<1	<1	**26**
	4/5/93	<1	<1	<1	<1		<1	<1	<1	20	3	<1	<1	<1	<1	<1	**23**
	7/7/93	<1	<1	<1	<1		<1	<1	<1	20	2	<1	<1	<1	<1	<1	**22**
	10/27/93	<1	<1	<1	<1		<1	<1	<1	19	3	<1	<1	<1	<1	<1	**22**
	10/17/94	<1	<1	<1	<1	<1	<1	<1	<1	15	2	<1	<1	<1	<1	<1	**17**
	9/14/95	<1	<1	<1	<1	<1	<1	<1	<1	9	1	<1	<1	<1	<1	<1	**10**
	7/9/96	<1	<1	<1	<1	<1	<1	<1	<1	11	2	<1	<1	<1	<1	** <1	**13**
	11/25/97	<1	<1	<1	<1	<1	<1	<1	<1	7.8	<1	<1	<1	<1	<1	** <1	**7.8**
	12/9/98	<1	<1	<1	<1	<1	<1	<1	<1	11	2.5	<1	<1	<1	<1	** <1	**13.5**

* All other MDEQ Scan 1 compounds = <1 µg/L.

** Analyzed as m/p-Xylene and o-Xylene, method detection limit listed is for each compound.

NA = Not analyzed; NC = No criteria established
ND = Not detected to method detection limits
Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Summary of MDEQ Scan 1 and 2 Compounds in Groundwater
General Signal Corporation/Benteler Automotive Corp., #24-1136
9000 E. Michigan Avenue, Galesburg, MI

Sample ID	Date	* MDEQ Scan 1											MDEQ Scan 2				Total VOCs
		Bromo-form	Dibromo-chloro-methane	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	Chloro-benzene	Chloro-form	1,1,1-TCA	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
Units		µg/L															
GSI Value		NC	NC	NC	NC	NC	47	170	200	45	200	15	200	140	18	35	—
Generic Residential Value		100	100	880	70	100	100	100	200	5.0	5.0	2.0	5.0	790	74	280	—
MW-9s	10/26/87	<1	<1	<1	24		<1	<1	<1	31	2	<1	<1	<1	<1	<1	57
	10/3/90	<1	<1	<1	4		<1	<1	<1	27	2	<1	<1	<1	<1	<1	33
	7/2/91	<1	<1	<1	<1		<1	<1	<1	39	1	<1	<1	<1	<1	<1	40
	10/4/91	<1	<1	<1	5		<1	1	1	62	2	<1	<1	<1	<1	<1	71
	1/21/92	<1	<1	<1	2		<1	<1	<1	43	2	<1	<1	<1	<1	<1	47
	4/13/92	<1	<1	<1	<1		<1	<1	<1	37	1	<1	<1	<1	<1	<1	38
	7/7/92	<1	<1	<1	1		<1	<1	<1	35	1	<1	<1	<1	<1	<1	37
	10/14/92	<1	<1	<1	1		<1	<1	<1	27	1	<1	<1	<1	<1	<1	29
	1/6/93	<1	<1	<1	2		<1	<1	<1	21	1	<1	<1	<1	<1	<1	24
	4/5/93	<1	<1	<1	1		<1	<1	<1	25	1	<1	<1	<1	<1	<1	27
	7/7/93	<1	<1	<1	<1		<1	<1	<1	32	1	<1	<1	<1	<1	<1	33
	10/27/93	<1	<1	<1	<1		<1	<1	<1	33	1	<1	<1	<1	<1	<1	34
	3/4/94	NA	NA	<1	<1		NA	<1	<1	32	1	<1	<1	<1	<1	<1	33
	5/18/94	NA	NA	<1	<1	—	NA	<1	<1	30	<1	<1	<1	<1	<1	<1	30
	10/18/94	<1	<1	<1	2	<1	<1	<1	<1	34	1	<1	<1	<1	<1	<1	37
	1/16/95	NA	NA	<1	1	<1	NA	<1	<1	22	<1	<1	<1	<1	<1	<1	23
	4/5/95	NA	NA	<1	<1	<1	NA	<1	<1	16	<1	<1	<1	<1	<1	<1	22
	9/14/95	<1	<1	<1	<1	<1	<1	<1	<1	22	<1	<1	<1	<1	<1	<1	22
	1/4/96	NA	NA	<1	<1	<1	NA	<1	<1	23	1	<1	<1	<1	<1	<1	24
	4/4/96	NA	NA	<1	<1	<1	NA	<1	<1	25	<1	<1	<1	<1	<1	<1	25
	7/9/96	<1	<1	<1	<1	<1	<1	<1	<1	24	<1	<1	<1	<1	<1	<1	24
	10/10/96	NA	NA	<1	<1	<1	NA	<1	<1	28	<1	<1	<1	<1	<1	<1	28
	4/28/97	NA	NA	<1	<1	<1	NA	<1	<1	19	<1	<1	<1	<1	<1	** <1	19
	11/25/97	<1	<1	<1	<1	<1	<1	<1	<1	19	<1	<1	<1	<1	<1	** <1	19
	4/10/98	NA	NA	<1	<1	<1	NA	<1	<1	10	<1	<1	<1	<1	<1	** <1	11
	12/11/98	<1	<1	<1	<1	<1	<1	<1	<1	11	<1	<1	<1	<1	<1	** <1	11
	5/10/01	<1	<1	<1	<1	<1	<1	<1	<1	7.5	<1	<1	<1	<1	<1	<1-<2	7.5

* All other MDEQ Scan 1 compounds = <1 µg/L.

** Analyzed as m/p-Xylene and o-Xylene, method detection limit listed is for each compound.

NA = Not analyzed; NC = No criteria established
ND = Not detected to method detection limits
Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Summary of MDEQ Scan 1 and 2 Compounds in Groundwater
General Signal Corporation/Benteler Automotive Corp., #24-1136
9000 E. Michigan Avenue, Galesburg, MI

Sample ID	Date	* MDEQ Scan 1											MDEQ Scan 2				Total VOCs
		Bromo-form	Dibromo-chloro-methane	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	Chloro-benzene	Chloro-form	1,1,1-TCA	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
Units		µg/L															
GSI Value		NC	NC	NC	NC	NC	47	170	200	45	200	15	200	140	18	35	---
Generic Residential Value		100	100	880	70	100	100	100	200	5.0	5.0	2.0	5.0	790	74	280	---
MW-9d	10/26/87	<1	<1	<1	2		<1	<1	<1	39	2	<1	<1	<1	<1	<1	43
	10/3/90	<1	<1	<1	<1		<1	<1	<1	37	2	<1	<1	<1	<1	<1	39
	7/2/91	<1	<1	<1	<1		<1	<1	<1	37	2	<1	<1	<1	<1	<1	39
	10/4/91	<1	<1	<1	5		<1	1	<1	66	3	<1	<1	<1	<1	<1	75
	1/21/92	<1	<1	<1	1		<1	<1	<1	48	2	<1	<1	<1	<1	<1	51
	4/13/92	<1	<1	<1	<1		<1	<1	<1	32	2	<1	<1	<1	<1	<1	34
	7/7/92	<1	<1	<1	<1		<1	<1	<1	33	2	<1	<1	<1	<1	<1	35
	10/14/92	<1	<1	<1	<1		<1	<1	<1	17	1	<1	<1	<1	<1	<1	18
	1/6/93	<1	<1	<1	<1		<1	<1	<1	18	2	<1	<1	<1	<1	<1	20
	4/5/93	<1	<1	<1	<1		<1	<1	<1	30	1	<1	<1	<1	<1	<1	31
	7/7/93	<1	<1	<1	<1		<1	<1	<1	29	1	<1	<1	<1	<1	<1	30
	10/27/93	<1	<1	<1	<1		<1	<1	<1	26	1	<1	<1	<1	<1	<1	27
	10/18/94	<1	<1	<1	<1	<1	<1	<1	<1	25	1	<1	<1	<1	<1	<1	26
	9/14/95	<1	<1	<1	<1	<1	<1	<1	<1	19	1	<1	<1	<1	<1	<1	20
	7/9/96	<1	<1	<1	<1	<1	<1	<1	<1	13	<1	<1	<1	<1	<1	<1	13
	11/25/97	<1	<1	<1	<1	<1	<1	<1	<1	6.9	<1	<1	<1	<1	<1	** <1	6.9
	12/11/98	<1	<1	<1	<1	<1	<1	<1	<1	9.8	<1	<1	<1	<1	<1	<1-<2	9.8

* All other MDEQ Scan 1 compounds = <1 µg/L.

** Analyzed as m/p-Xylene and o-Xylene, method detection limit listed is for each compound.

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Summary of MDEQ Scan 1 and 2 Compounds in Groundwater
General Signal Corporation/Benteler Automotive Corp., #24-1136
9000 E. Michigan Avenue, Galesburg, MI

Sample ID	Date	* MDEQ Scan 1											MDEQ Scan 2				Total VOCs
		Bromo-form	Dibromo-chloro-methane	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	Chloro-benzene	Chloro-form	1,1,1-TCA	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
Units		µg/L															
GSI Value		NC	NC	NC	NC	NC	47	170	200	45	200	15	200	140	18	35	—
Generic Residential Value		100	100	880	70	100	100	100	200	5.0	5.0	2.0	5.0	790	74	280	—
MW-10s	10/26/87	<1	<1	<1	<1		<1	<1	<1	**2**	<1	<1	<1	<1	<1	<1	**2**
	10/4/90	<1	<1	<1	<1		<1	**1**	<1	**3**	<1	<1	<1	<1	<1	<1	**4**
	7/2/91	<1	<1	<1	**2**		<1	<1	<1	**1**	<1	<1	<1	<1	<1	<1	**3**
	10/2/91	<1	<1	<1	<1		<1	<1	<1	**5**	<1	<1	<1	<1	<1	<1	**5**
	1/21/92	<1	<1	<1	**2**		<1	**2**	<1	**4**	<1	**1**	<1	<1	<1	<1	**9**
	4/13/92	<1	<1	<1	**5**		<1	**1**	<1	**4**	<1	**2**	<1	<1	<1	<1	**12**
	7/7/92	<1	<1	<1	<1		<1	<1	<1	**3**	<1	<1	<1	<1	<1	<1	**3**
	10/14/92	<1	<1	<1	<1		<1	<1	<1	**2**	<1	<1	<1	<1	<1	<1	**2**
	1/5/93	<1	<1	<1	<1		<1	<1	<1	**3**	<1	<1	<1	<1	<1	<1	**3**
	4/5/93	<1	<1	<1	**1**		<1	<1	<1	**3**	<1	**1**	<1	<1	<1	<1	**5**
	7/7/93	<1	<1	<1	**2**		<1	<1	<1	**2**	<1	<1	<1	<1	<1	<1	**4**
	10/27/93	<1	<1	<1	<1		<1	<1	<1	**3**	<1	<1	<1	<1	<1	<1	**3**
	3/4/94	NA	NA	<1	—	—	NA	<1	<1	**3**	<1	<1	<1	<1	<1	<1	**3**
	5/18/94	NA	NA	<1	<1	—	NA	<1	<1	**2**	<1	<1	<1	<1	<1	<1	**2**
	10/18/94	<1	<1	<1	<1	<1	<1	<1	<1	**2**	<1	<1	<1	<1	<1	<1	**2**
	1/16/95	NA	NA	<1	<1	<1	NA	<1	<1	**3**	<1	<1	<1	<1	<1	<1	**3**
	4/5/95	NA	NA	<1	<1	<1	NA	<1	<1	**3**	<1	<1	<1	<1	<1	<1	**3**
	9/14/95	<1	<1	<1	<1	<1	<1	<1	<1	**3**	<1	<1	<1	<1	<1	<1	**3**
	1/4/96	NA	NA	<1	<1	<1	NA	<1	<1	**3**	<1	<1	<1	<1	<1	<1	**3**
	4/4/96	NA	NA	<1	<1	<1	NA	<1	<1	**4**	<1	<1	<1	<1	<1	<1	**4**
	7/9/96	<1	<1	<1	<1	<1	<1	<1	<1	**3**	<1	<1	<1	<1	<1	<1	**3**
	10/10/96	NA	NA	<1	<1	<1	NA	<1	<1	**3**	<1	<1	<1	<1	<1	<1	**3**
	11/25/97	<1	<1	<1	<1	<1	<1	<1	<1	**1.9**	<1	<1	<1	<1	<1	** <1	**1.9**
	12/11/98	<1	<1	<1	<1	<1	<1	<1	<1	**2.2**	<1	<1	<1	<1	<1	** <1	**2.2**
	5/10/01	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1-<2	ND

* All other MDEQ Scan 1 compounds = <1 µg/L.

** Analyzed as m/p-Xylene and o-Xylene, method detection limit listed is for each compound.

NA = Not analyzed; NC = No criteria established
ND = Not detected to method detection limits
Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Summary of MDEQ Scan 1 and 2 Compounds in Groundwater
General Signal Corporation/Benteler Automotive Corp., #24-1136
9000 E. Michigan Avenue, Galesburg, MI

Sample ID	Date	* MDEQ Scan 1											MDEQ Scan 2				Total VOCs
		Bromo-form	Dibromo-chloro-methane	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	Chloro-benzene	Chloro-form	1,1,1-TCA	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
Units		µg/L															
GSI Value		NC	NC	NC	NC	NC	47	170	200	45	200	15	200	140	18	35	—
Generic Residential Value		100	100	880	70	100	100	100	200	5.0	5.0	2.0	5.0	790	74	280	—
MW-10d	10/26/87	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	10/4/90	<1	<1	<1	<1		<1	<1	<1	**2**	<1	<1	<1	<1	<1	<1	**2**
	7/2/91	<1	<1	<1	<1		<1	<1	<1	**1**	<1	<1	<1	<1	<1	<1	**1**
	10/2/91	<1	<1	<1	<1		<1	<1	<1	**3**	<1	<1	<1	<1	<1	<1	**3**
	1/21/92	<1	<1	<1	<1		<1	**1**	<1	**3**	<1	<1	<1	<1	<1	<1	**4**
	4/13/92	<1	<1	<1	<1		<1	<1	<1	**2**	<1	<1	<1	<1	<1	<1	**2**
	7/7/92	<1	<1	<1	<1		<1	<1	<1	**2**	<1	<1	**1**	<1	<1	<1	**3**
	10/14/92	<1	<1	<1	<1		<1	<1	<1	**1**	<1	<1	<1	<1	<1	<1	**1**
	1/5/93	<1	<1	<1	<1		<1	<1	<1	**2**	<1	<1	<1	<1	<1	<1	**2**
	4/5/93	<1	<1	<1	<1		<1	<1	<1	**2**	<1	<1	<1	<1	<1	<1	**2**
	7/7/93	<1	<1	<1	<1		<1	<1	<1	**1**	<1	<1	<1	<1	<1	<1	**1**
	10/27/93	<1	<1	<1	<1		<1	<1	<1	**1**	<1	<1	<1	<1	<1	<1	**1**
	10/18/94	<1	<1	<1	**1**	<1	<1	<1	<1	**1**	<1	<1	<1	<1	<1	<1	**2**
	9/14/95	<1	<1	<1	<1	<1	<1	<1	<1	**2**	<1	<1	<1	<1	<1	<1	**2**
	7/9/96	<1	<1	<1	<1	<1	<1	<1	<1	**2**	<1	<1	<1	<1	<1	<1	**2**
	4/28/97	<1	<1	<1	<1	<1	<1	<1	<1	**1.7**	<1	<1	<1	<1	<1	** <1	**1.7**
	11/25/97	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	ND
	4/10/98	NA	NA	<1	<1	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	** <1	ND
	12/11/98	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	ND

* All other MDEQ Scan 1 compounds = <1 µg/L.

** Analyzed as m/p-Xylene and o-Xylene, method detection limit listed is for each compound.

NA = Not analyzed; NC = No criteria established
ND = Not detected to method detection limits
Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Summary of MDEQ Scan 1 and 2 Compounds in Groundwater
General Signal Corporation/Benteler Automotive Corp., #24-1136
9000 E. Michigan Avenue, Galesburg, MI

Sample ID	Date	* MDEQ Scan 1											MDEQ Scan 2				Total VOCs
		Bromo-form	Dibromo-chloro-methane	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	Chloro-benzene	Chloro-form	1,1,1-TCA	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
Units		µg/L															
GSI Value		NC	NC	NC	NC	NC	47	170	200	45	200	15	200	140	18	35	—
Generic Residential Value		100	100	880	70	100	100	100	200	5.0	5.0	2.0	5.0	790	74	280	—
MW-11	10/26/87	<1	<1	<1	4		<1	<1	<1	2	17	<1	<1	<1	<1	<1	23
	10/3/90	<1	<1	<1	1		<1	<1	<1	1	9	<1	<1	<1	<1	<1	11
	7/3/91	<1	<1	<1	1		<1	<1	<1	<1	7	<1	<1	<1	<1	<1	8
	10/4/91	<1	<1	<1	<1		<1	<1	<1	2	5	<1	<1	<1	<1	<1	7
	1/22/92	<1	<1	<1	<1		<1	<1	<1	2	7	<1	<1	<1	<1	<1	9
	4/14/92	<1	<1	<1	<1		<1	<1	<1	2	5	<1	<1	<1	<1	<1	7
	7/7/92	<1	<1	<1	<1		<1	<1	<1	1	4	<1	<1	<1	<1	<1	5
	10/14/92	<1	<1	<1	<1		<1	<1	<1	1	3	<1	<1	<1	<1	<1	4
	1/5/93	<1	<1	<1	<1		<1	<1	<1	2	3	<1	<1	<1	<1	<1	5
	4/5/93	<1	<1	<1	<1		<1	<1	<1	2	4	<1	<1	<1	<1	<1	6
	7/7/93	<1	<1	<1	<1		<1	<1	<1	1	4	<1	<1	<1	<1	<1	5
	10/28/93	<1	<1	<1	<1		<1	<1	<1	1	3	<1	<1	<1	<1	<1	4
	3/4/94	NA	NA	<1	<1		NA	<1	<1	2	3	<1	<1	<1	<1	<1	5
	5/18/94	NA	NA	<1	<1	—	NA	<1	<1	1	2	<1	<1	<1	<1	<1	3
	10/17/94	<1	<1	<1	<1	<1	<1	<1	<1	2	3	<1	<1	<1	<1	<1	5
	1/16/95	NA	NA	<1	<1	<1	NA	<1	<1	1	2	<1	<1	<1	<1	<1	3
	4/5/95	NA	NA	<1	<1	<1	NA	<1	<1	1	1	<1	<1	<1	<1	<1	2
	9/15/95	<1	<1	<1	<1	<1	<1	<1	<1	2	2	<1	<1	<1	<1	<1	4
	1/4/96	NA	NA	<1	<1	<1	NA	<1	<1	2	2	<1	<1	<1	<1	<1	4
	4/4/96	NA	NA	<1	<1	<1	NA	<1	<1	2	2	<1	<1	<1	<1	<1	4
	7/8/96	<1	<1	<1	<1	<1	<1	<1	<1	2	1	<1	<1	<1	<1	<1	3
	10/10/96	NA	NA	<1	<1	<1	NA	<1	<1	2	2	<1	<1	<1	<1	<1	4
	4/28/97	NA	NA	<1	<1	<1	NA	<1	<1	1.4	1.3	<1	<1	<1	<1	** <1	2.7

* All other MDEQ Scan 1 compounds = <1 µg/L.

** Analyzed as m/p-Xylene and o-Xylene, method detection limit listed is for each compound.

NA = Not analyzed; NC = No criteria established
ND = Not detected to method detection limits
Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Summary of MDEQ Scan 1 and 2 Compounds in Groundwater
General Signal Corporation/Benteler Automotive Corp., #24-1136
9000 E. Michigan Avenue, Galesburg, MI

Sample ID	Date	* MDEQ Scan 1											MDEQ Scan 2				Total VOCs
		Bromo-form	Dibromo-chloro-methane	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	Chloro-benzene	Chloro-form	1,1,1-TCA	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
Units		µg/L															
GSI Value		NC	NC	NC	NC	NC	47	170	200	45	200	15	200	140	18	35	—
Generic Residential Value		100	100	880	70	100	100	100	200	5.0	5.0	2.0	5.0	790	74	280	—
MW-12	10/26/87	<1	<1	<1	1		<1	<1	<1	2	1	2	<1	<1	<1	<1	6
	10/3/90	<1	<1	<1	<1		<1	<1	<1	2	1	<1	<1	<1	<1	<1	3
	7/3/91	<1	<1	<1	<1		<1	<1	<1	1	<1	<1	<1	<1	<1	<1	1
	10/4/91	<1	<1	<1	<1		<1	<1	<1	4	1	<1	<1	<1	<1	<1	5
	1/22/92	<1	<1	<1	<1		<1	<1	<1	2	<1	<1	<1	<1	<1	<1	2
	4/14/92	<1	<1	<1	<1		<1	<1	<1	3	1	<1	<1	<1	<1	<1	4
	7/12/92	<1	<1	<1	<1		<1	<1	<1	2	<1	<1	<1	<1	<1	<1	2
	10/14/92	<1	<1	<1	<1		<1	<1	<1	2	1	<1	<1	<1	<1	<1	3
	1/5/93	<1	<1	<1	<1		<1	<1	<1	2	1	<1	<1	<1	<1	<1	3
	4/5/93	<1	<1	<1	<1		<1	<1	<1	3	1	<1	<1	<1	<1	<1	4
	7/7/93	<1	<1	<1	<1		<1	<1	<1	2	<1	<1	<1	<1	<1	<1	2
	10/28/93	<1	<1	<1	<1		<1	<1	<1	2	<1	<1	<1	<1	<1	<1	2
	3/4/94	NA	NA	<1	<1		NA	<1	<1	2	<1	<1	<1	<1	<1	<1	2
	5/18/94	NA	NA	<1	<1	—	NA	<1	<1	1	<1	<1	<1	<1	<1	<1	1
	10/17/94	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	1
	1/16/95	NA	NA	<1	<1	<1	NA	<1	<1	1	<1	<1	<1	<1	<1	<1	1
	4/5/95	NA	NA	<1	<1	<1	NA	<1	<1	2	<1	<1	<1	<1	<1	<1	2
	9/15/95	<1	<1	<1	<1	<1	<1	<1	<1	2	<1	<1	<1	<1	<1	<1	2
	1/4/96	NA	NA	<1	<1	<1	NA	<1	<1	2	1	<1	<1	<1	<1	<1	3
	4/4/96	NA	NA	<1	<1	<1	NA	<1	<1	2	<1	<1	<1	<1	<1	<1	2
	7/8/96	<1	<1	<1	<1	<1	<1	<1	<1	2	<1	<1	<1	<1	<1	<1	2
	10/10/96	NA	NA	<1	<1	<1	NA	<1	<1	2	<1	<1	<1	<1	<1	<1	2
	4/28/97	NA	NA	<1	<1	<1	NA	<1	<1	1.9	<1	<1	<1	<1	<1	** <1	1.9
	11/24/97	<1	<1	<1	<1	<1	<1	<1	<1	1.5	<1	<1	<1	<1	<1	** <1	1.5
	4/10/98	NA	NA	<1	<1	<1	NA	<1	<1	1.7	<1	<1	<1	<1	<1	** <1	1.7
	12/11/98	<1	<1	<1	<1	<1	<1	<1	<1	1.4	<1	<1	<1	<1	<1	** <1	1.4
	5/10/01	<1	<1	<1	<1	<1	<1	<1	<1	1.5	<1	<1	<1	<1	<1	<1-<2	1.5

* All other MDEQ Scan 1 compounds = <1 µg/L.

** Analyzed as m/p-Xylene and o-Xylene, method detection limit listed is for each compound.

NA = Not analyzed; NC = No criteria established
ND = Not detected to method detection limits
Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Summary of MDEQ Scan 1 and 2 Compounds in Groundwater
General Signal Corporation/Benteler Automotive Corp., #24-1136
9000 E. Michigan Avenue, Galesburg, MI

Sample ID	Date	* MDEQ Scan 1											MDEQ Scan 2				Total VOCs
		Bromo-form	Dibromo-chloro-methane	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	Chloro-benzene	Chloro-form	1,1,1-TCA	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
Units		µg/L															
GSI Value		NC	NC	NC	NC	NC	47	170	200	45	200	15	200	140	18	35	—
Generic Residential Value		100	100	880	70	100	100	100	200	5.0	5.0	2.0	5.0	790	74	280	—
MW-13s	10/4/90	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	7/2/91	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	10/2/91	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	1/21/92	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	4/13/92	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	7/7/92	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	7/7/93	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	10/17/94	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	9/14/95	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	7/8/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	11/24/97	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	ND
	12/9/98	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	ND
MW-13d	10/26/87	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	10/4/90	<1	<1	<1	<1		<1	<1	<1	1	1	<1	<1	<1	<1	<1	2
	7/2/91	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	10/2/91	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	1/21/92	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	4/13/92	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	7/7/92	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	7/7/93	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	10/17/94	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	9/14/95	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	7/8/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	ND
	11/24/97	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	ND
	12/9/98	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	ND

* All other MDEQ Scan 1 compounds = <1 µg/L.

** Analyzed as m/p-Xylene and o-Xylene, method detection limit listed is for each compound.

NA = Not analyzed; NC = No criteria established
ND = Not detected to method detection limits
Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Summary of MDEQ Scan 1 and 2 Compounds in Groundwater
General Signal Corporation/Benteler Automotive Corp., #24-1136
9000 E. Michigan Avenue, Galesburg, MI

Sample ID	Date	* MDEQ Scan 1											MDEQ Scan 2				Total VOCs
		Bromo-form	Dibromo-chloro-methane	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	Chloro-benzene	Chloro-form	1,1,1-TCA	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
Units		µg/L															
GSI Value		NC	NC	NC	NC	NC	47	170	200	45	200	15	200	140	18	35	—
Generic Residential Value		100	100	880	70	100	100	100	200	5.0	5.0	2.0	5.0	790	74	280	—
MW-14s	10/26/87	<1	<1	<1	<1		<1	<1	<1	**1**	**2**	<1	<1	<1	<1	<1	**3**
	10/4/90	<1	<1	<1	<1		<1	<1	<1	**1**	**1**	<1	<1	<1	<1	<1	**2**
	7/2/91	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	10/2/91	<1	<1	<1	<1		<1	<1	<1	**2**	**1**	<1	<1	<1	<1	<1	**3**
	1/21/92	<1	<1	<1	<1		<1	<1	<1	**2**	**1**	<1	<1	<1	<1	<1	**3**
	4/13/92	<1	<1	<1	<1		<1	<1	<1	**2**	**1**	<1	<1	<1	<1	<1	**3**
	7/7/92	<1	<1	<1	<1		<1	<1	<1	**1**	<1	<1	<1	<1	<1	<1	**1**
	10/14/92	<1	<1	<1	<1		<1	<1	<1	**1**	<1	<1	<1	<1	<1	<1	**1**
	1/5/93	<1	<1	<1	<1		<1	<1	<1	**1**	<1	<1	<1	<1	<1	<1	**1**
	4/5/93	<1	<1	<1	<1		<1	<1	<1	**1**	<1	<1	<1	<1	<1	<1	**1**
	7/7/93	<1	<1	<1	<1		<1	<1	<1	**1**	<1	<1	<1	<1	<1	<1	**1**
	10/27/93	<1	<1	<1	<1		<1	<1	<1	**1**	<1	<1	<1	<1	<1	<1	**1**
	10/17/94	<1	<1	<1	<1	<1	<1	<1	<1	<1	**1**	<1	<1	<1	<1	<1	**1**
	9/14/95	<1	<1	<1	<1	<1	<1	<1	<1	<1	**1**	<1	<1	<1	<1	<1	**1**
	7/8/96	<1	<1	<1	<1	<1	<1	<1	<1	**1**	<1	<1	<1	<1	<1	<1	**1**
	11/24/97	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	ND
	12/9/98	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	ND

* All other MDEQ Scan 1 compounds = <1 µg/L.

** Analyzed as m/p-Xylene and o-Xylene, method detection limit listed is for each compound.

NA = Not analyzed; NC = No criteria established
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Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Summary of MDEQ Scan 1 and 2 Compounds in Groundwater
General Signal Corporation/Benteler Automotive Corp., #24-1136
9000 E. Michigan Avenue, Galesburg, MI

Sample ID	Date	* MDEQ Scan 1											MDEQ Scan 2				Total VOCs
		Bromo-form	Dibromo-chloro-methane	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	Chloro-benzene	Chloro-form	1,1,1-TCA	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
Units		µg/L															
GSI Value		NC	NC	NC	NC	NC	47	170	200	45	200	15	200	140	18	35	—
Generic Residential Value		100	100	880	70	100	100	100	200	5.0	5.0	2.0	5.0	790	74	280	—
MW-14d	10/26/87	<1	<1	<1	<1		<1	<1	<1	1	2	<1	<1	<1	<1	<1	3
	10/4/90	<1	<1	<1	1		<1	<1	<1	1	2	<1	<1	<1	<1	<1	4
	7/2/91	<1	<1	<1	<1		<1	<1	<1	<1	2	<1	<1	<1	<1	<1	2
	10/2/91	<1	<1	<1	<1		<1	<1	<1	2	2	<1	<1	<1	<1	<1	4
	1/21/92	<1	<1	<1	1		<1	<1	<1	1	2	<1	<1	<1	<1	<1	4
	4/13/92	<1	<1	<1	1		<1	<1	<1	<1	3	<1	<1	<1	<1	<1	4
	7/7/92	<1	<1	<1	1		<1	<1	<1	<1	3	<1	<1	<1	<1	<1	4
	10/14/92	<1	<1	<1	<1		<1	<1	<1	<1	2	<1	<1	<1	<1	<1	2
	1/5/93	<1	<1	<1	1		<1	<1	<1	<1	2	<1	<1	<1	<1	<1	3
	4/5/93	<1	<1	<1	1		<1	<1	<1	<1	3	<1	<1	<1	<1	<1	4
	7/7/93	<1	<1	<1	<1		<1	<1	<1	<1	3	<1	<1	<1	<1	<1	3
	10/27/93	<1	<1	<1	1		<1	<1	<1	<1	2	<1	<1	<1	<1	<1	3
	3/4/94	NA	NA	<1	1		NA	<1	<1	<1	1	<1	<1	<1	<1	<1	2
	5/19/94	NA	NA	<1	1	—	NA	<1	<1	<1	1	<1	<1	<1	<1	<1	2
	10/17/94	<1	<1	<1	2	<1	<1	<1	<1	<1	2	<1	<1	<1	<1	<1	4
	1/16/95	NA	NA	<1	<1	<1	NA	<1	<1	<1	1	<1	<1	<1	<1	<1	1
	4/5/95	NA	NA	<1	<1	<1	NA	<1	<1	1	1	<1	<1	<1	<1	<1	2
	9/14/95	<1	<1	<1	<1	<1	<1	<1	<1	<1	2	<1	<1	<1	<1	<1	2
	1/4/96	NA	NA	<1	1	<1	NA	<1	<1	1	2	<1	<1	<1	<1	<1	4
	4/4/96	NA	NA	<1	1	<1	NA	<1	<1	<1	2	<1	<1	<1	<1	<1	3
	7/8/96	<1	<1	<1	1	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	2
	10/10/96	NA	NA	<1	1	<1	NA	<1	<1	1	2	<1	<1	<1	<1	<1	4
	4/28/97	NA	NA	<1	<1	<1	NA	<1	<1	<1	2.0	<1	<1	<1	<1	** <1	2.0

* All other MDEQ Scan 1 compounds = <1 µg/L.

** Analyzed as m/p-Xylene and o-Xylene, method detection limit listed is for each compound.

NA = Not analyzed; NC = No criteria established
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Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Summary of MDEQ Scan 1 and 2 Compounds in Groundwater
General Signal Corporation/Benteler Automotive Corp., #24-1136
9000 E. Michigan Avenue, Galesburg, MI

Sample ID	Date	* MDEQ Scan 1											MDEQ Scan 2				Total VOCs
		Bromo-form	Dibromo-chloro-methane	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	Chloro-benzene	Chloro-form	1,1,1-TCA	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
Units		µg/L															
GSI Value		NC	NC	NC	NC	NC	47	170	200	45	200	15	200	140	18	35	---
Generic Residential Value		100	100	880	70	100	100	100	200	5.0	5.0	2.0	5.0	790	74	280	---
MW-15s	10/26/87	<1	<1	<1	9		<1	<1	1	62	3	<1	<1	<1	<1	<1	75
	10/11/90	<1	<1	<1	<1		<1	<1	<1	24	3	<1	<1	<1	<1	<1	27
	7/2/91	<1	<1	<1	<1		<1	<1	<1	25	2	<1	<1	<1	<1	<1	27
	10/2/91	<1	<1	<1	<1		<1	<1	<1	12	2	<1	<1	<1	<1	<1	14
	1/21/92	<1	<1	<1	<1		<1	<1	<1	15	2	<1	<1	<1	<1	<1	17
	4/13/92	<1	<1	<1	<1		<1	<1	<1	11	2	<1	<1	<1	<1	<1	13
	7/7/92	<1	<1	<1	<1		<1	<1	<1	13	2	<1	<1	<1	<1	<1	15
	10/14/92	<1	<1	<1	<1		<1	<1	<1	13	1	<1	<1	<1	<1	<1	14
	1/5/93	<1	<1	<1	<1		<1	<1	<1	15	2	<1	<1	<1	<1	<1	17
	4/5/93	<1	<1	<1	<1		<1	<1	<1	10	2	<1	<1	<1	<1	<1	14
	7/7/93	<1	<1	<1	<1		<1	<1	<1	8	1	<1	<1	<1	<1	<1	10
	10/27/93	<1	<1	<1	<1		<1	<1	<1	11	1	<1	<1	<1	<1	<1	12
	10/17/94	<1	<1	<1	<1	<1	<1	<1	<1	11	2	<1	<1	<1	<1	<1	13
	9/14/95	<1	<1	<1	<1	<1	<1	<1	<1	9	1	<1	<1	<1	<1	<1	10
	7/8/96	<1	<1	<1	<1	<1	<1	<1	<1	6	1	<1	<1	<1	<1	<1	7
	11/24/97	<1	<1	<1	<1	<1	<1	<1	<1	6.3	<1	<1	<1	<1	<1	** <1	6.3
	12/9/98	<1	<1	<1	<1	<1	<1	<1	<1	6.7	<1	<1	<1	<1	<1	** <1	6.7
	5/10/01	<1	<1	<1	<1	<1	<1	<1	<1	5.9	<1	<1	<1	<1	<1	<1-<2	5.9

* All other MDEQ Scan 1 compounds = <1 µg/L.

** Analyzed as m/p-Xylene and o-Xylene, method detection limit listed is for each compound.

NA = Not analyzed; NC = No criteria established
ND = Not detected to method detection limits
Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Summary of MDEQ Scan 1 and 2 Compounds in Groundwater
General Signal Corporation/Benteler Automotive Corp., #24-1136
9000 E. Michigan Avenue, Galesburg, MI

Sample ID	Date	* MDEQ Scan 1											MDEQ Scan 2				Total VOCs
		Bromo-form	Dibromo-chloro-methane	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	Chloro-benzene	Chloro-form	1,1,1-TCA	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
Units		µg/L															
GSI Value		NC	NC	NC	NC	NC	47	170	200	45	200	15	200	140	18	35	---
Generic Residential Value		100	100	880	70	100	100	100	200	5.0	5.0	2.0	5.0	790	74	280	---
MW-15d	10/26/87	<1	<1	<1	4		<1	<1	1	68	6	<1	<1	<1	<1	<1	79
	10/11/90	<1	<1	<1	1		<1	<1	<1	30	4	<1	<1	<1	<1	<1	35
	7/2/91	<1	<1	<1	<1		<1	<1	<1	23	3	<1	<1	<1	<1	<1	26
	10/2/91	<1	<1	<1	<1		<1	<1	<1	13	2	<1	<1	<1	<1	<1	15
	1/21/92	<1	<1	<1	<1		<1	<1	<1	22	3	<1	<1	<1	<1	<1	25
	4/13/92	<1	<1	<1	<1		<1	<1	<1	15	3	<1	<1	<1	<1	<1	18
	7/7/92	<1	<1	<1	<1		<1	<1	<1	17	3	<1	<1	<1	<1	<1	20
	10/14/92	<1	<1	<1	<1		<1	<1	<1	16	2	<1	<1	<1	<1	<1	18
	1/5/93	<1	<1	<1	<1		<1	<1	<1	12	2	<1	<1	<1	<1	<1	14
	4/5/93	<1	<1	<1	<1		<1	<1	<1	18	3	<1	<1	<1	<1	<1	21
	7/7/93	<1	<1	<1	<1		<1	<1	<1	12	2	<1	<1	<1	<1	<1	14
	10/27/93	<1	<1	<1	<1		<1	<1	<1	12	2	<1	<1	<1	<1	<1	14
	3/4/94	NA	NA	<1	<1		NA	<1	<1	14	1	<1	<1	<1	<1	<1	15
	5/19/94	NA	NA	<1	<1	---	NA	<1	<1	12	2	<1	<1	<1	<1	<1	14
	10/17/94	<1	<1	<1	<1	<1	<1	<1	<1	9	2	<1	<1	<1	<1	<1	11
	1/16/95	NA	NA	<1	<1	<1	NA	<1	<1	9	1	<1	<1	<1	<1	<1	10
	4/5/95	NA	NA	<1	<1	<1	NA	<1	<1	9	1	<1	<1	<1	<1	<1	10
	9/14/95	<1	<1	<1	<1	<1	<1	<1	<1	11	1	<1	<1	<1	<1	<1	12
	1/4/96	NA	NA	<1	<1	<1	NA	<1	<1	11	2	<1	<1	<1	<1	<1	13
	4/4/96	NA	NA	<1	<1	<1	NA	<1	<1	9	2	<1	<1	<1	<1	<1	11
	7/8/96	<1	<1	<1	<1	<1	<1	<1	<1	9	1	<1	<1	<1	<1	<1	10
	10/10/96	NA	NA	<1	<1	<1	NA	<1	<1	9	2	<1	<1	<1	<1	<1	11
	4/28/97	NA	NA	<1	<1	<1	NA	<1	<1	8.4	1.7	<1	<1	<1	<1	** <1	10.1
	11/24/97	<1	<1	<1	<1	<1	<1	<1	<1	7.3	1.2	<1	<1	<1	<1	** <1	8.5
	4/10/98	NA	NA	<1	<1	<1	NA	<1	<1	6.7	1.2	<1	<1	<1	<1	** <1	7.9
	12/9/98	<1	<1	<1	<1	<1	<1	<1	<1	7.0	1.4	<1	<1	<1	<1	** <1	8.4
	5/10/01	<1	<1	<1	<1	<1	<1	<1	<1	7.0	<1	<1	<1	<1	<1	<1-<2	7.0

* All other MDEQ Scan 1 compounds = <1 µg/L.

** Analyzed as m/p-Xylene and o-Xylene, method detection limit listed is for each compound.

NA = Not analyzed; NC = No criteria established
ND = Not detected to method detection limits
Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Summary of MDEQ Scan 1 and 2 Compounds in Groundwater
General Signal Corporation/Benteler Automotive Corp., #24-1136
9000 E. Michigan Avenue, Galesburg, MI

Sample ID	Date	* MDEQ Scan 1											MDEQ Scan 2				Total VOCs
		Bromo-form	Dibromo-chloro-methane	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	Chloro-benzene	Chloro-form	1,1,1-TCA	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
Units		µg/L															
GSI Value		NC	NC	NC	NC	NC	47	170	200	45	200	15	200	140	18	35	---
Generic Residential Value		100	100	880	70	100	100	100	200	5.0	5.0	2.0	5.0	790	74	280	---
MW-17	10/11/90	<1	<1	<1	<1		<1	<1	<1	**3**	**2**	<1	<1	<1	<1	<1	**5**
	7/2/91	<1	<1	<1	<1		<1	<1	<1	<1	**1**	<1	<1	<1	<1	<1	**1**
	10/4/91	<1	<1	<1	<1		<1	<1	<1	<1	**1**	<1	<1	<1	<1	<1	**1**
	1/22/92	<1	<1	<1	<1		<1	<1	<1	<1	**1**	<1	<1	<1	<1	<1	**1**
	4/14/92	<1	<1	<1	<1		<1	<1	<1	<1	**1**	<1	<1	<1	<1	<1	**1**
	7/8/92	<1	<1	<1	<1		<1	<1	<1	<1	**1**	<1	<1	<1	<1	<1	**1**
	10/14/92	<1	<1	<1	<1		<1	<1	<1	<1	**1**	<1	<1	<1	<1	<1	**1**
	1/5/93	<1	<1	<1	<1		<1	<1	<1	<1	**1**	<1	<1	<1	<1	<1	**1**
	4/6/93	<1	<1	<1	<1		<1	<1	<1	<1	**1**	<1	<1	<1	<1	<1	**1**
	7/12/93	<1	<1	<1	<1		<1	<1	<1	<1	**1**	<1	<1	<1	<1	<1	**1**
	10/28/93	<1	<1	<1	<1		<1	<1	<1	<1	**1**	<1	<1	<1	<1	<1	**1**
	3/7/94	NA	NA	<1	<1		NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	5/18/94	NA	NA	<1	<1	---	NA	<1	<1	<1	**1**	<1	<1	<1	<1	<1	**1**
	10/18/94	<1	<1	<1	<1	<1	<1	<1	<1	<1	**1**	<1	<1	<1	<1	<1	**1**
	1/16/95	NA	NA	<1	<1	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	4/5/95	NA	NA	<1	<1	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	9/15/95	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	1/5/96	NA	NA	<1	<1	<1	NA	<1	<1	<1	**1**	<1	<1	<1	<1	<1	**1**
	4/4/96	NA	NA	<1	<1	<1	NA	<1	<1	<1	**1**	<1	<1	<1	<1	<1	**1**
	7/9/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	**1**	<1	<1	<1	<1	<1	**1**
	10/11/96	NA	NA	<1	<1	<1	NA	<1	<1	<1	**1**	<1	<1	<1	<1	<1	**1**
	4/29/97	NA	NA	<1	<1	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	** <1	ND
	11/25/97	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	ND
	4/10/98	NA	NA	<1	<1	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	** <1	ND
	12/11/98	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	ND
	5/10/01	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1-<2	ND

* All other MDEQ Scan 1 compounds = <1 µg/L.

** Analyzed as m/p-Xylene and o-Xylene, method detection limit listed is for each compound.

NA = Not analyzed; NC = No criteria established
ND = Not detected to method detection limits
Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Summary of MDEQ Scan 1 and 2 Compounds in Groundwater
General Signal Corporation/Benteler Automotive Corp., #24-1136
9000 E. Michigan Avenue, Galesburg, MI

Sample ID	Date	* MDEQ Scan 1											MDEQ Scan 2				Total VOCs
		Bromo-form	Dibromo-chloro-methane	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	Chloro-benzene	Chloro-form	1,1,1-TCA	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
Units		µg/L															
GSI Value		NC	NC	NC	NC	NC	47	170	200	45	200	15	200	140	18	35	—
Generic Residential Value		100	100	880	70	100	100	100	200	5.0	5.0	2.0	5.0	790	74	280	—
MW-18	10/11/90	<1	<1	<1	1		<1	<1	<1	27	1	<1	<1	<1	<1	<1	**29**
	7/3/91	<1	<1	<1	<1		<1	<1	<1	45	1	<1	<1	<1	<1	<1	**46**
	10/4/91	<1	<1	<1	5		<1	1	1	43	2	<1	<1	<1	<1	<1	**52**
	1/22/92	<1	<1	<1	1		<1	<1	<1	55	1	<1	<1	<1	<1	<1	**57**
	4/14/92	<1	<1	<1	<1		<1	<1	<1	36	1	<1	<1	<1	<1	<1	**37**
	7/8/92	<1	<1	<1	1		<1	<1	<1	42	1	<1	<1	<1	<1	<1	**44**
	10/14/92	<1	<1	<1	<1		<1	<1	<1	22	<1	<1	<1	<1	<1	<1	**23**
	1/6/93	<1	<1	<1	1		<1	<1	<1	28	<1	<1	<1	<1	<1	<1	**29**
	4/5/93	<1	<1	<1	<1		<1	<1	<1	36	<1	<1	<1	<1	<1	<1	**36**
	7/7/93	<1	<1	<1	<1		<1	<1	<1	31	<1	<1	<1	<1	<1	<1	**31**
	10/27/93	<1	<1	<1	<1		<1	<1	<1	26	<1	<1	<1	<1	<1	<1	**26**

* All other MDEQ Scan 1 compounds = <1 µg/L.

** Analyzed as m/p-Xylene and o-Xylene, method detection limit listed is for each compound.

NA = Not analyzed; NC = No criteria established
ND = Not detected to method detection limits
Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Summary of MDEQ Scan 1 and 2 Compounds in Groundwater
General Signal Corporation/Benteler Automotive Corp., #24-1136
9000 E. Michigan Avenue, Galesburg, MI

Sample ID	Date	* MDEQ Scan 1											MDEQ Scan 2				Total VOCs
		Bromo-form	Dibromo-chloro-methane	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	Chloro-benzene	Chloro-form	1,1,1-TCA	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
Units		µg/L															
GSI Value		NC	NC	NC	NC	NC	47	170	200	45	200	15	200	140	18	35	—
Generic Residential Value		100	100	880	70	100	100	100	200	5.0	5.0	2.0	5.0	790	74	280	—
MW-19	10/11/90	<1	<1	<1	1		<1	<1	<1	24	1	<1	<1	<1	<1	<1	26
	7/3/91	<1	<1	<1	1		<1	<1	<1	45	1	<1	<1	<1	<1	<1	47
	10/4/91	<1	<1	<1	8		<1	2	1	64	2	1	<1	<1	<1	<1	78
	1/22/92	<1	<1	<1	1		<1	<1	<1	51	1	<1	<1	<1	<1	<1	53
	4/14/92	<1	<1	<1	<1		<1	<1	<1	39	1	<1	<1	<1	<1	<1	40
	7/8/92	<1	<1	<1	2		<1	<1	<1	36	1	1	<1	<1	<1	<1	40
	10/14/92	<1	<1	<1	1		<1	<1	<1	20	1	1	<1	<1	<1	<1	23
	1/6/93	<1	<1	<1	1		<1	<1	<1	30	1	<1	<1	<1	<1	<1	32
	4/5/93	<1	<1	<1	<1		<1	<1	<1	33	<1	<1	<1	<1	<1	<1	33
	7/7/93	<1	<1	<1	<1		<1	<1	<1	28	<1	<1	<1	<1	<1	<1	28
	10/27/93	<1	<1	<1	<1		<1	<1	<1	35	<1	<1	<1	<1	<1	<1	35
	3/7/94	NA	NA	<1	1		NA	<1	<1	37	<1	<1	<1	<1	<1	<1	43
	5/18/94	NA	NA	<1	<1	—	NA	<1	<1	29	<1	<1	<1	<1	<1	<1	29
	10/18/94	<1	<1	<1	3	<1	<1	<1	<1	36	1	<1	<1	<1	<1	<1	40
	1/16/95	NA	NA	<1	<1	<1	NA	<1	<1	21	<1	<1	<1	<1	<1	<1	21
	4/5/95	NA	NA	<1	<1	<1	NA	<1	<1	25	<1	<1	<1	<1	<1	<1	25
	9/14/95	<1	<1	<1	<1	<1	<1	<1	<1	21	<1	<1	<1	<1	<1	<1	21
	1/4/96	NA	NA	<1	<1	<1	NA	<1	<1	20	<1	<1	<1	<1	<1	<1	20
	4/4/96	NA	NA	<1	<1	<1	NA	<1	<1	17	<1	<1	<1	<1	<1	<1	17
	7/9/96	<1	<1	<1	<1	<1	<1	<1	<1	11	<1	<1	<1	<1	<1	<1	11
	10/10/96	NA	NA	<1	<1	<1	NA	<1	<1	19	<1	<1	<1	<1	<1	<1	19
	4/28/97	NA	NA	<1	<1	<1	NA	<1	<1	13	<1	<1	<1	<1	<1	** <1	13
	11/25/97	<1	<1	<1	<1	<1	<1	<1	<1	4.4	<1	<1	<1	<1	<1	** <1	4.4
	4/10/98	NA	NA	<1	<1	<1	NA	<1	<1	6.5	<1	<1	<1	<1	<1	** <1	6.5
	12/11/98	<1	<1	<1	<1	<1	<1	<1	<1	9.4	<1	<1	<1	<1	<1	** <1	9.4

* All other MDEQ Scan 1 compounds = <1 µg/L.

** Analyzed as m/p-Xylene and o-Xylene, method detection limit listed is for each compound.

NA = Not analyzed; NC = No criteria established
ND = Not detected to method detection limits
Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Summary of MDEQ Scan 1 and 2 Compounds in Groundwater
General Signal Corporation/Benteler Automotive Corp., #24-1136
9000 E. Michigan Avenue, Galesburg, MI

Sample ID	Date	* MDEQ Scan 1											MDEQ Scan 2				Total VOCs
		Bromo-form	Dibromo-chloro-methane	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	Chloro-benzene	Chloro-form	1,1,1-TCA	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
Units		µg/L															
GSI Value		NC	NC	NC	NC	NC	47	170	200	45	200	15	200	140	18	35	—
Generic Residential Value		100	100	880	70	100	100	100	200	5.0	5.0	2.0	5.0	790	74	280	—
MW-20s	7/12/93	<1	<1	<1	<1		<1	<1	<1	**2**	**1**	<1	<1	<1	<1	<1	**3**
	8/11/93	<1	<1	<1	<1		<1	<1	<1	**3**	**2**	<1	<1	<1	<1	<1	**5**
	10/27/93	<1	<1	<1	<1		<1	<1	<1	**5**	**1**	<1	<1	<1	<1	<1	**6**
	3/4/94	NA	NA	<1	<1		NA	<1	<1	**2**	**1**	<1	<1	<1	<1	<1	**3**
	5/18/94	NA	NA	<1	<1	---	NA	<1	<1	**2**	**1**	<1	<1	<1	<1	<1	**3**
	10/17/94	<1	<1	<1	<1	<1	<1	<1	<1	**2**	**1**	<1	<1	<1	<1	<1	**3**
	1/16/95	NA	NA	<1	<1	<1	NA	<1	<1	**1**	**1**	<1	<1	<1	<1	<1	**2**
	4/5/95	NA	NA	<1	<1	<1	NA	<1	<1	**1**	**1**	<1	<1	<1	<1	<1	**2**
	9/14/95	<1	<1	<1	<1	<1	<1	<1	<1	**2**	**1**	<1	<1	<1	<1	<1	**3**
	1/4/96	NA	NA	<1	<1	<1	NA	<1	<1	**3**	**1**	<1	<1	<1	<1	<1	**4**
	4/4/96	NA	NA	<1	<1	<1	NA	<1	<1	**2**	**1**	<1	<1	<1	<1	<1	**3**
	7/8/96	<1	<1	<1	**4**	<1	<1	**3**	<1	**2**	**1**	<1	<1	<1	<1	<1	**10**
	10/10/96	NA	NA	<1	<1	<1	NA	<1	<1	**3**	**1**	<1	<1	<1	<1	<1	**4**
	4/28/97	NA	NA	<1	<1	<1	NA	<1	<1	**1.9**	<1	<1	<1	<1	<1	** <1	**1.9**
	11/24/97	<1	<1	<1	<1	<1	<1	<1	<1	**1.7**	<1	<1	<1	<1	<1	** <1	**1.7**
	4/10/98	NA	NA	<1	<1	<1	NA	<1	<1	**1.6**	<1	<1	<1	<1	<1	** <1	**1.6**
	12/9/98	<1	<1	<1	<1	<1	<1	<1	<1	**1.9**	<1	<1	<1	<1	<1	** <1	**1.9**
	5/11/01	<1	<1	<1	<1	<1	<1	<1	<1	**1.8**	<1	<1	<1	<1	<1	<1-<2	**1.8**

* All other MDEQ Scan 1 compounds = <1 µg/L.

** Analyzed as m/p-Xylene and o-Xylene, method detection limit listed is for each compound.

NA = Not analyzed; NC = No criteria established
ND = Not detected to method detection limits
Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Summary of MDEQ Scan 1 and 2 Compounds in Groundwater
General Signal Corporation/Benteler Automotive Corp., #24-1136
9000 E. Michigan Avenue, Galesburg, MI

Sample ID	Date	* MDEQ Scan 1											MDEQ Scan 2				Total VOCs
		Bromo-form	Dibromo-chloro-methane	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	Chloro-benzene	Chloro-form	1,1,1-TCA	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
Units		µg/L															
GSI Value		NC	NC	NC	NC	NC	47	170	200	45	200	15	200	140	18	35	—
Generic Residential Value		100	100	880	70	100	100	100	200	5.0	5.0	2.0	5.0	790	74	280	—
MW-20d	7/12/93	<1	<1	<1	<1		<1	<1	<1	**2**	**1**	<1	<1	<1	<1	<1	**3**
	8/11/93	<1	<1	<1	<1		<1	<1	<1	**2**	**2**	<1	<1	<1	<1	<1	**4**
	10/27/93	<1	<1	<1	<1		<1	<1	<1	**2**	**1**	<1	<1	<1	<1	<1	**3**
	3/4/94	<1	<1	<1	<1		<1	<1	<1	**2**	<1	<1	<1	<1	<1	<1	**2**
	5/18/94	<1	<1	<1	<1	—	<1	<1	<1	**2**	**1**	<1	<1	<1	<1	<1	**3**
	10/17/94	<1	<1	<1	<1	<1	<1	<1	<1	**1**	**1**	<1	<1	<1	<1	<1	**2**
	1/16/95	<1	<1	<1	<1	<1	<1	<1	<1	**1**	**1**	<1	<1	<1	<1	<1	**2**
	4/5/95	<1	<1	<1	<1	<1	<1	<1	<1	**1**	**1**	<1	<1	<1	<1	<1	**2**
	9/14/95	<1	<1	<1	<1	<1	<1	<1	<1	**2**	**1**	<1	<1	<1	<1	<1	**3**
	1/4/96	<1	<1	<1	<1	<1	<1	<1	<1	**2**	**1**	<1	<1	<1	<1	<1	**3**
	4/4/96	<1	<1	<1	<1	<1	<1	<1	<1	**2**	**1**	<1	<1	<1	<1	<1	**3**
	7/8/96	<1	<1	<1	<1	<1	<1	<1	<1	**2**	**1**	<1	<1	<1	<1	<1	**3**
	10/10/96	NA	NA	<1	<1	<1	NA	<1	<1	**2**	**1**	<1	<1	<1	<1	<1	**3**
	11/24/97	<1	<1	<1	<1	<1	<1	<1	<1	**1.4**	<1	<1	<1	<1	<1	** <1	**1.4**
	12/9/98	<1	<1	<1	<1	<1	<1	<1	<1	**1.7**	<1	<1	<1	<1	<1	** <1	**1.7**
	5/10/01	<1	<1	<1	<1	<1	<1	<1	<1	**1.6**	<1	<1	<1	<1	<1	<1-<2	**1.6**

* All other MDEQ Scan 1 compounds = <1 µg/L.

** Analyzed as m/p-Xylene and o-Xylene, method detection limit listed is for each compound.

NA = Not analyzed; NC = No criteria established
ND = Not detected to method detection limits
Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Summary of MDEQ Scan 1 and 2 Compounds in Groundwater
General Signal Corporation/Benteler Automotive Corp., #24-1136
9000 E. Michigan Avenue, Galesburg, MI

Sample ID	Date	* MDEQ Scan 1											MDEQ Scan 2				Total VOCs
		Bromo-form	Dibromo-chloro-methane	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	Chloro-benzene	Chloro-form	1,1,1-TCA	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
Units		µg/L															
GSI Value		NC	NC	NC	NC	NC	47	170	200	45	200	15	200	140	18	35	---
Generic Residential Value		100	100	880	70	100	100	100	200	5.0	5.0	2.0	5.0	790	74	280	---
MW-21s	7/12/93	<1	<1	<1	<1		<1	<1	<1	**3**	**1**	<1	<1	<1	<1	<1	**4**
	8/11/93	<1	<1	<1	<1		<1	<1	<1	**4**	**2**	<1	<1	<1	<1	<1	**6**
	10/27/93	<1	<1	<1	<1		<1	<1	<1	**4**	**1**	<1	<1	<1	<1	<1	**5**
	3/4/94	NA	NA	<1	<1		NA	<1	<1	**3**	**1**	<1	<1	<1	<1	<1	**4**
	5/18/94	NA	NA	<1	<1	---	NA	<1	<1	**2**	**1**	<1	<1	<1	<1	<1	**3**
	10/17/94	<1	<1	<1	<1	<1	<1	<1	<1	**3**	**1**	<1	<1	<1	<1	<1	**4**
	1/16/95	NA	NA	<1	<1	<1	NA	<1	<1	**2**	<1	<1	<1	<1	<1	<1	**2**
	4/5/95	NA	NA	<1	<1	<1	NA	<1	<1	**2**	<1	<1	<1	<1	<1	<1	**2**
	9/14/95	<1	<1	<1	<1	<1	<1	<1	<1	**4**	**1**	<1	<1	<1	<1	<1	**5**
	1/4/96	NA	NA	<1	<1	<1	NA	<1	<1	**3**	**1**	<1	<1	<1	<1	<1	**4**
	4/4/96	NA	NA	<1	<1	<1	NA	<1	<1	**3**	**1**	<1	<1	<1	<1	<1	**4**
	7/8/96	<1	<1	<1	<1	<1	<1	<1	<1	**3**	**1**	<1	<1	<1	<1	<1	**4**
	10/10/96	NA	NA	<1	<1	<1	NA	<1	<1	**4**	**1**	<1	<1	<1	<1	<1	**5**
	4/28/97	NA	NA	<1	<1	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	** <1	ND
	11/24/97	<1	<1	<1	<1	<1	<1	<1	<1	**2.8**	<1	<1	<1	<1	<1	** <1	**2.8**
	4/10/98	NA	NA	<1	<1	<1	NA	<1	<1	**1.6**	<1	<1	<1	<1	<1	** <1	**1.6**
	12/9/98	<1	<1	<1	<1	<1	<1	<1	<1	**2.4**	<1	<1	<1	<1	<1	** <1	**2.4**
	5/10/01	<1	<1	<1	<1	<1	<1	<1	<1	**2.0**	<1	<1	<1	<1	<1	<1-<2	**2.0**
MW-21d	7/12/93	<1	<1	<1	<1		<1	<1	<1	**3**	**1**	<1	<1	<1	<1	<1	**4**
	8/11/93	<1	<1	<1	<1		<1	<1	<1	**3**	**2**	<1	<1	<1	<1	<1	**5**
	10/27/93	<1	<1	<1	<1		<1	<1	<1	**4**	**1**	<1	<1	<1	<1	<1	**5**
	10/17/94	<1	<1	<1	<1	<1	<1	<1	<1	**3**	**2**	<1	<1	<1	<1	<1	**5**
	9/14/95	<1	<1	<1	<1	<1	<1	<1	<1	**2**	**1**	<1	<1	<1	<1	<1	**3**
	7/8/96	<1	<1	<1	<1	<1	<1	<1	<1	**3**	**1**	<1	<1	<1	<1	<1	**4**
	11/24/97	<1	<1	<1	<1	<1	<1	<1	<1	**2.6**	**1.0**	<1	<1	<1	<1	** <1	**3.6**
	12/9/98	<1	<1	<1	<1	<1	<1	<1	<1	**2.7**	**1.1**	<1	<1	<1	<1	** <1	**3.8**
	5/10/01	<1	<1	<1	<1	<1	<1	<1	<1	**2.5**	<1	<1	<1	<1	<1	<1-<2	**2.5**

* All other MDEQ Scan 1 compounds = <1 µg/L.

** Analyzed as m/p-Xylene and o-Xylene, method detection limit listed is for each compound.

NA = Not analyzed; NC = No criteria established

ND = Not detected to method detection limits

Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Summary of MDEQ Scan 1 and 2 Compounds in Groundwater
General Signal Corporation/Benteler Automotive Corp., #24-1136
9000 E. Michigan Avenue, Galesburg, MI

Sample ID	Date	* MDEQ Scan 1											MDEQ Scan 2				Total VOCs
		Bromo-form	Dibromo-chloro-methane	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	Chloro-benzene	Chloro-form	1,1,1-TCA	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
Units		µg/L															
GSI Value		NC	NC	NC	NC	NC	47	170	200	45	200	15	200	140	18	35	---
Generic Residential Value		100	100	880	70	100	100	100	200	5.0	5.0	2.0	5.0	790	74	280	---
MW-22s	7/12/93	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	8/11/93	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	10/27/93	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	10/17/94	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	9/14/95	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	7/8/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	11/24/97	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	ND
	12/9/98	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	ND
	5/10/01	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1-<2	ND
MW-22d	7/12/93	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	8/19/93	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	10/27/93	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	10/17/94	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	9/14/95	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	7/8/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	11/24/97	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	ND
	12/9/98	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	ND
	5/10/01	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1-<2	ND
MW-23s	7/12/93	<1	<1	<1	<1		<1	<1	<1	**1**	<1	<1	<1	<1	<1	<1	**1**
	8/11/93	<1	<1	<1	<1		<1	<1	<1	**2**	<1	<1	<1	<1	<1	<1	**2**
	10/27/93	<1	<1	<1	<1		<1	<1	<1	**1**	<1	<1	<1	<1	<1	<1	**1**
	10/17/94	<1	<1	<1	<1	<1	<1	<1	<1	**1**	<1	<1	<1	<1	<1	<1	**1**
	9/14/95	<1	<1	<1	<1	<1	<1	<1	<1	**2**	<1	<1	<1	<1	<1	<1	**2**
	7/8/96	<1	<1	<1	<1	<1	<1	<1	<1	**1**	<1	<1	<1	<1	<1	<1	**1**
	11/24/97	<1	<1	<1	<1	<1	<1	<1	<1	**1.1**	<1	<1	<1	<1	<1	** <1	**1.1**
	12/9/98	<1	<1	<1	<1	<1	<1	<1	<1	**1.1**	<1	<1	<1	<1	<1	** <1	**1.1**
	5/10/01	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1-<2	ND

* All other MDEQ Scan 1 compounds = <1 µg/L.

** Analyzed as m/p-Xylene and o-Xylene, method detection limit listed is for each compound.

NA = Not analyzed; NC = No criteria established
ND = Not detected to method detection limits
Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Summary of MDEQ Scan 1 and 2 Compounds in Groundwater
General Signal Corporation/Benteler Automotive Corp., #24-1136
9000 E. Michigan Avenue, Galesburg, MI

Sample ID	Date	* MDEQ Scan 1											MDEQ Scan 2				Total VOCs
		Bromo-form	Dibromo-chloro-methane	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	Chloro-benzene	Chloro-form	1,1,1-TCA	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
Units		µg/L															
GSI Value		NC	NC	NC	NC	NC	47	170	200	45	200	15	200	140	18	35	—
Generic Residential Value		100	100	880	70	100	100	100	200	5.0	5.0	2.0	5.0	790	74	280	—
MW-23d	7/12/93	<1	<1	<1	<1		<1	<1	<1	1	<1	<1	<1	<1	<1	<1	1
	8/11/93	<1	<1	<1	<1		<1	<1	<1	1	<1	<1	<1	<1	<1	<1	1
	10/27/93	<1	<1	<1	1		<1	<1	<1	1	<1	<1	<1	<1	<1	<1	2
	3/4/94	NA	NA	<1	<1		NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	5/18/94	NA	NA	<1	1	—	NA	<1	<1	1	<1	<1	<1	<1	<1	<1	2
	10/17/94	<1	<1	<1	2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2
	1/16/95	NA	NA	<1	<1	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	4/5/95	NA	NA	<1	<1	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	9/14/95	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	1
	1/4/96	NA	NA	<1	1	<1	NA	<1	<1	1	<1	<1	<1	<1	<1	<1	2
	4/4/96	NA	NA	<1	<1	<1	NA	<1	<1	1	<1	<1	<1	<1	<1	<1	1
	7/8/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	10/11/96	NA	NA	<1	<1	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	ND
	4/28/97	NA	NA	<1	<1	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	** <1	ND
	11/24/97	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	ND
	4/10/98	NA	NA	<1	<1	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	** <1	ND
	12/9/98	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	ND
	5/10/01	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1-<2	ND

* All other MDEQ Scan 1 compounds = <1 µg/L.

** Analyzed as m/p-Xylene and o-Xylene, method detection limit listed is for each compound.

NA = Not analyzed; NC = No criteria established
ND = Not detected to method detection limits
Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Summary of MDEQ Scan 1 and 2 Compounds in Groundwater
General Signal Corporation/Benteler Automotive Corp., #24-1136
9000 E. Michigan Avenue, Galesburg, MI

Sample ID	Date	* MDEQ Scan 1											MDEQ Scan 2				Total VOCs
		Bromo-form	Dibromo-chloro-methane	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	Chloro-benzene	Chloro-form	1,1,1-TCA	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
Units		µg/L															
GSI Value		NC	NC	NC	NC	NC	47	170	200	45	200	15	200	140	18	35	---
Generic Residential Value		100	100	880	70	100	100	100	200	5.0	5.0	2.0	5.0	790	74	280	---
		EPA Method															Lab
	10/26/87	UA	UA	UA	UA	UA	UA	UA	UA	UA	UA	UA	UA	UA	UA	UA	UA
	10/3,4/90	601	601	601	601	601	601	601	601	601	601	601	602	602	602	602	ATS
	10/11/90	601	601	601	601	601	601	601	601	601	601	601	602	602	602	602	ATS
	1/8/91	UA	UA	UA	UA	UA	UA	UA	UA	UA	UA	UA	UA	UA	UA	UA	UA
	7/2,3/91	8010	8010	8010	8010	8010	8010	8010	8010	8010	8010	8010	8020	8020	8020	8020	ATS
	7/16/91	8010	8010	8010	8010	8010	8010	8010	8010	8010	8010	8010	8020	8020	8020	8020	ATS
	10/2,4/91	8010	8010	8010	8010	8010	8010	8010	8010	8010	8010	8010	8020	8020	8020	8020	ATS
	1/21,22/92	8010	8010	8010	8010	8010	8010	8010	8010	8010	8010	8010	8020	8020	8020	8020	ATS
	4/13,14/92	8010	8010	8010	8010	8010	8010	8010	8010	8010	8010	8010	8020	8020	8020	8020	ATS
	7/7,8/92	8010	8010	8010	8010	8010	8010	8010	8010	8010	8010	8010	8020	8020	8020	8020	ATS
	10/14,15/92	8010	8010	8010	8010	8010	8010	8010	8010	8010	8010	8010	8020	8020	8020	8020	ATS
	1/5,6/93	8010	8010	8010	8010	8010	8010	8010	8010	8010	8010	8010	8020	8020	8020	8020	ATS
	4/5,6/93	8010	8010	8010	8010	8010	8010	8010	8010	8010	8010	8010	8020	8020	8020	8020	ATS
	7/7,12/93	8010	8010	8010	8010	8010	8010	8010	8010	8010	8010	8010	8020	8020	8020	8020	ATS
	8/11,19/93	8010	8010	8010	8010	8010	8010	8010	8010	8010	8010	8010	8020	8020	8020	8020	ATS
	10/27,28/93	8010	8010	8010	8010	8010	8010	8010	8010	8010	8010	8010	8020	8020	8020	8020	ATS
	3/4,7/94	NA	NA	8010	8010	8010	NA	8010	8010	8010	8010	8010	8020	8020	8020	8020	ATS
	5/18,19/94	NA	NA	8010	8010	8010	NA	8010	8010	8010	8010	8010	8020	8020	8020	8020	ATS
	10/17,18/94	8010	8010	8010	8010	8010	8010	8010	8010	8010	8010	8010	8020	8020	8020	8020	ATS

* All other MDEQ Scan 1 compounds = <1 µg/L.
UA = Unavailable
ATS = Ann Arbor Technical Services, Inc.

NA = Not analyzed; NC = No criteria established
ND = Not detected to method detection limits
Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Summary of MDEQ Scan 1 and 2 Compounds in Groundwater
General Signal Corporation/Benteler Automotive Corp., #24-1136
9000 E. Michigan Avenue, Galesburg, MI

Sample ID	Date	* MDEQ Scan 1											MDEQ Scan 2				Total VOCs
		Bromo-form	Dibromo-chloro-methane	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	Chloro-benzene	Chloro-form	1,1,1-TCA	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
Units		µg/L															
GSI Value		NC	NC	NC	NC	NC	47	170	200	45	200	15	200	140	18	35	---
Generic Residential Value		100	100	880	70	100	100	100	200	5.0	5.0	2.0	5.0	790	74	280	---
		EPA Method															Lab
	1/16/95	NA	NA	8010	8010	8010	NA	8010	8010	8010	8010	8010	8020	8020	8020	8020	ATS
	4/5/95	NA	NA	8010	8010	8010	NA	8010	8010	8010	8010	8010	8020	8020	8020	8020	ATS
	9/14/95	8010	8010	8010	8010	8010	8010	8010	8010	8010	8010	8010	8020	8020	8020	8020	ATS
	1/4,5/96	NA	NA	8010	8010	8010	NA	8010	8010	8010	8010	8010	8020	8020	8020	8020	ATS
	4/4/96	NA	NA	8010	8010	8010	NA	8010	8010	8010	8010	8010	8020	8020	8020	8020	ATS
	7/8,9/96	8010	8010	8010	8010	8010	8010	8010	8010	8010	8010	8010	8020	8020	8020	8020	ATS
	10/10,11/96	NA	NA	8010	8010	8010	NA	8010	8010	8010	8010	8010	8020	8020	8020	8020	ATS
	4/28,29/97	NA	NA	8260	8260	8260	NA	8260	8260	8260	8260	8260	8260	8260	8260	8260	KAR
	11/24,25/97	8260	8260	8260	8260	8260	8260	8260	8260	8260	8260	8260	8260	8260	8260	8260	KAR
	*** 4/10/98	NA	NA	8021	8021	8021	NA	8021	8021	8021	8021	8021	8021	8021	8021	8021	KAR
	12/9&11/98	8260	8260	8260	8260	8260	8260	8260	8260	8260	8260	8260	8260	8260	8260	8260	KAR
	5/10/01	8260	8260	8260	8260	8260	8260	8260	8260	8260	8260	8260	8260	8260	8260	8260	KAR

* All other MDEQ Scan 1 compounds = <1 µg/L.
*** MWs 20s, 21s, and 23d EPA Method = 8260.
ATS = Ann Arbor Technical Services, Inc.
KAR = KAR Laboratories, Inc.

NA = Not analyzed; NC = No criteria established
ND = Not detected to method detection limits
Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Table 2 (Page 1 of 4)

Groundwater Treatment System Analytical Data

General Signal Corporation, #24-1136

9000 East Michigan Avenue, Galesburg, MI

(concentrations expressed as ug/L)

Sample ID	Date	* MDEQ Scan 1									MDEQ Scan 2				EPA Method	Lab
		1,1,1-TCA	1,1-DCA	Chloro-benzene	Chloro-form	Cis-1,2-DCE	Trans-1,2-DCE	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes		
PW-A	5/23/96	<1	<1	<1	<1	<1	<1	22	1.3	<1	<1	<1	<1	** <1	624	KAR
	5/24/96	<1	<1	<1	<1	<1	<1	15	1.0	<1	<1	<1	<1	** <1	8260	KAR
	5/28/96	<1	<1	<1	<1	<1	<1	17	<1	<1	<1	<1	<1	** <1	8260	KAR
	5/30/96	<1	<1	<1	<1	<1	<1	18	1.1	<1	<1	<1	<1	** <1	624	KAR
	6/3/96	<1	<1	<1	<1	<1	<1	16	<1	<1	<1	<1	<1	** <1	8260	KAR
	6/6/96	<1	<1	<1	<1	<1	<1	15	<1	<1	<1	<1	<1	** <1	624	KAR
	6/10/96	<1	<1	<1	<1	<1	<1	17	<1	<1	<1	<1	<1	** <1	624	KAR
	6/14/96	<1	<1	<1	<1	<1	<1	19	<1	<1	<1	<1	<1	** <1	624	KAR
	6/17/96	<1	<1	<1	<1	<1	<1	18	<1	<1	<1	<1	<1	** <1	624	KAR
	6/20/96	<1	<1	<1	<1	<1	<1	17	<1	<1	<1	<1	<1	** <1	624	KAR
	6/24/96	<1	<1	<1	<1	<1	<1	15	<1	<1	<1	<1	<1	** <1	624	KAR
	6/27/96	<1	<1	<1	<1	<1	<1	11	<1	<1	<1	<1	<1	** <1	624	KAR
	7/1/96	<1	<1	<1	<1	<1	<1	16	<1	<1	<1	<1	<1	** <1	624	KAR
	7/5/96	<1	<1	<1	<1	<1	<1	14	<1	<1	<1	<1	<1	** <1	624	KAR
	7/9/96	<1	<1	<1	<1	<1	<1	15	<1	<1	<1	<1	<1	** <1	624	KAR
	7/11/96	<1	<1	<1	<1	<1	<1	15	<1	<1	<1	<1	<1	** <1	624	KAR
	7/15/96	<1	<1	<1	<1	<1	<1	13	<1	<1	<1	<1	<1	** <1	624	KAR
	7/18/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	7/22/96	<1	<1	<1	<1	<1	<1	12	<1	<1	<1	<1	<1	** <1	624	KAR
	10/15/96	<1	<1	<1	<1	<1	<1	18	1.2	<1	<1	<1	<1	** <1	8260	KAR
	10/18/96	<1	<1	<1	<1	<1	<1	16	<1	<1	<1	<1	<1	** <1	624	KAR
	10/22/96	<1	<1	<1	<1	<1	<1	17	<1	<1	<1	<1	<1	** <1	624	KAR
	11/8/96	<1	<1	<1	<1	<1	<1	14	<1	<1	<1	<1	<1	** <1	624	KAR
	11/12/96	<1	<1	<1	<1	<1	<1	15	<1	<1	<1	<1	<1	** <1	8260	KAR
	11/19/96	<1	<1	<1	<1	<1	<1	12	<1	<1	<1	<1	<1	** <1	624	KAR
	11/22/96	<1	<1	<1	<1	<1	<1	11	<1	<1	<1	<1	<1	** <1	624	KAR
	11/25/96	<1	<1	<1	<1	<1	<1	13	<1	<1	<1	<1	<1	** <1	624	KAR
	12/2/96	<1	<1	<1	<1	<1	<1	9.1	<1	<1	<1	<1	<1	** <1	624	KAR
	12/10/96	<1	<1	<1	<1	<1	<1	11	<1	<1	<1	<1	<1	** <1	8260	KAR
	5/22/97	<1	<1	<1	<1	<1	<1	14	<1	<1	<1	<1	<1	** <1	624	KAR
	8/1/97	<1	<1	<1	<1	<1	<1	15	<1	<1	<1	<1	<1	** <1	624	KAR
	8/8/97	<1	<1	<1	<1	<1	<1	15	<1	<1	<1	<1	<1	** <1	624	KAR

KAR = KAR Laboratories, Inc.

* All other Scan 1 compounds = <1 ug/L.

** Analyzed as m/p-Xylene and o-Xylene, method detection limit for each = <1 ug/L.

Table 2 (Page 2 of 4)

Groundwater Treatment System Analytical Data

General Signal Corporation, #24-1136

9000 East Michigan Avenue, Galesburg, MI

(concentrations expressed as ug/L)

Sample ID	Date	* MDEQ Scan 1									MDEQ Scan 2				EPA Method	Lab
		1,1,1-TCA	1,1-DCA	Chloro-benzene	Chloro-form	Cis-1,2-DCE	Trans-1,2-DCE	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes		
PW-A (con't)	8/15/97	<1	<1	<1	<1	<1	<1	**12**	<1	<1	<1	<1	<1	** <1	624	KAR
	8/21/97	<1	<1	<1	<1	<1	<1	**12**	<1	<1	<1	<1	<1	** <1	624	KAR
	8/27/97	<1	<1	<1	<1	<1	<1	**9.3**	<1	<1	<1	<1	<1	** <1	624	KAR
	9/3/97	<1	<1	<1	<1	<1	<1	**11**	<1	<1	<1	<1	<1	** <1	624	KAR
	9/10/97	<1	<1	<1	<1	<1	<1	**11**	<1	<1	<1	<1	<1	** <1	624	KAR
	10/2/97	<1	<1	<1	<1	<1	<1	**11**	<1	<1	<1	<1	<1	** <1	624	KAR
	11/4/97	<1	<1	<1	<1	<1	<1	**8.3**	<1	<1	<1	<1	<1	** <1	624	KAR
	12/31/97	<1	<1	<1	<1	<1	<1	**9.2**	<1	<1	<1	<1	<1	** <1	624	KAR
	1/30/98	<1	<1	<1	<1	<1	<1	**8.0**	<1	<1	<1	<1	<1	** <1	624	KAR
	3/18/98	<1	<1	<1	<1	<1	<1	**11**	<1	<1	<1	<1	<1	** <1	624	KAR
PW-B	6/10/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	6/14/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	6/17/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	6/20/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	6/24/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	6/27/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	7/1/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	8260	KAR
	7/5/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	7/9/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	7/11/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	7/15/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	7/18/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	7/22/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	10/15/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	8260	KAR
	10/18/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	10/22/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	11/8/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	11/12/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	8260	KAR
	11/19/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	11/22/96	<1	<1	<1	<1	<1	<1	**1.1**	<1	<1	<1	<1	<1	** <1	624	KAR
	11/25/96	<1	<1	<1	<1	<1	<1	**1.4**	<1	<1	<1	<1	<1	** <1	624	KAR
	12/2/96	<1	<1	<1	<1	<1	<1	**1.3**	<1	<1	<1	<1	<1	** <1	624	KAR
	12/10/96	<1	<1	<1	<1	<1	<1	**1.8**	<1	<1	<1	<1	<1	** <1	8260	KAR
	8/15/97	<1	<1	**1.3**	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	8/21/97	<1	<1	<1	<1	<1	<1	**1.3**	<1	<1	<1	<1	<1	** <1	624	KAR

KAR = KAR Laboratories, Inc.

* All other Scan 1 compounds = <1 ug/L.

** Analyzed as m/p-Xylene and o-Xylene, method detection limit for each = <1 ug/L.

Table 2 (Page 3 of 4)

Groundwater Treatment System Analytical Data

General Signal Corporation, #24-1136

9000 East Michigan Avenue, Galesburg, MI

(concentrations expressed as ug/L)

Sample ID	Date	* MDEQ Scan 1									MDEQ Scan 2				EPA Method	Lab
		1,1,1-TCA	1,1-DCA	Chloro-benzene	Chloro-form	Cis-1,2-DCE	Trans-1,2-DCE	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes		
PW-B (con't)	8/27/97	<1	<1	<1	<1	<1	<1	**1.4**	<1	<1	<1	<1	<1	** <1	624	KAR
	9/3/97	<1	<1	<1	<1	<1	<1	**1.8**	<1	<1	<1	<1	<1	** <1	624	KAR
	9/10/97	<1	<1	<1	<1	<1	<1	**2.0**	<1	<1	<1	<1	<1	** <1	624	KAR
	10/2/97	<1	<1	<1	<1	<1	<1	**1.6**	<1	<1	<1	<1	<1	** <1	624	KAR
	11/4/97	<1	<1	<1	<1	<1	<1	**1.9**	<1	<1	<1	<1	<1	** <1	624	KAR
	3/18/98	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
EFFLUENT (Air Stripper)	5/23/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	8260	KAR
	5/28/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	8260	KAR
	5/30/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	6/3/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	6/6/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	6/10/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	6/14/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	6/17/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	6/20/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	6/24/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	6/27/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	7/1/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	7/5/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	7/9/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	7/11/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	7/15/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	7/18/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	7/22/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	10/15/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	10/18/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	10/22/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	10/25/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	11/8/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	11/12/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	11/15/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	11/19/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	11/22/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	11/25/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	11/27/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR

KAR = KAR Laboratories, Inc.

* All other Scan 1 compounds = <1 ug/L.

** Analyzed as m/p-Xylene and o-Xylene, method detection limit for each = <1 ug/L.

Table 2 (Page 4 of 4)

Groundwater Treatment System Analytical Data

General Signal Corporation, #24-1136

9000 East Michigan Avenue, Galesburg, MI

(concentrations expressed as ug/L)

Sample ID	Date	* MDEQ Scan 1									MDEQ Scan 2				EPA Method	Lab
		1,1,1-TCA	1,1-DCA	Chloro-benzene	Chloro-form	Cis-1,2-DCE	Trans-1,2-DCE	PCE	TCE	Vinyl Chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes		
EFFLUENT	12/2/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
(Air Stripper con't)	12/6/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	12/10/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	8260	KAR
	12/12/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	8260	KAR
	12/17/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	5/22/97	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	8/1/97	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	8/8/97	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	8/15/97	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	8/21/97	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	8/27/97	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	9/3/97	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	9/10/97	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	10/2/97	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	11/4/97	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	12/31/97	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	1/30/98	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	3/18/98	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR

KAR = KAR Laboratories, Inc.

* All other Scan 1 compounds = <1 ug/L.

** Analyzed as m/p-Xylene and o-Xylene, method detection limit for each = <1 ug/L.

Table 3 (Page 1 of 4)
Water Level Elevational Data
General Signal, #24-1136
9000 East Michigan Avenue, Galesburg, MI
(all measurements in feet)

Well ID	Screened Elevation (amsl)	Ground Elevation	Casing Height	Top of Casing Elevation	10/2/97		11/24/97		1/30/98		4/10/98	
					*Depth to Water	Water Level Elevation	*Depth to Water	Water Level Elevation	*Depth to Water	Water Level Elevation	*Depth to Water	Water Level Elevation
MW-1	787.0-780.0	803.8	-0.94	802.86	19.15	783.71	19.37	783.49	18.11	784.75	17.57	785.29
MW-2	784.5-779.5	804.0	-1.22	802.78	18.99	783.79	19.23	783.55	17.98	784.80	17.46	785.32
MW-3	784.3-779.3	803.7	-0.70	803.00	19.22	783.78	19.45	783.55	18.19	784.81	17.70	785.30
MW-4	783.8-778.8	803.6	-0.73	802.87	19.15	783.72	19.39	783.48	18.10	784.77	17.60	785.27
MW-5s	785.4-780.4	803.4	2.04	805.44	21.83	783.61	22.06	783.38	20.79	784.65	abandoned	----
MW-5d	758.4-755.4	803.4	2.88	806.28	22.66	783.62	22.88	783.40	21.62	784.66	abandoned	----
MW-6s	783.4-778.4	802.4	1.73	804.13	20.51	783.62	20.86	783.27	19.58	784.55	18.97	785.16
MW-6d	757.4-754.4	802.4	2.66	805.06	21.63	783.43	21.78	783.28	20.51	784.55	19.88	785.18
MW-7s	779.9-774.9	802.6	1.83	804.43	20.88	783.55	21.09	783.34	19.84	784.59	abandoned	----
MW-7d	752.6-749.6	802.6	2.58	805.18	21.61	783.57	21.84	783.34	20.60	784.58	abandoned	----
MW-8s	776.2-773.2	801.8	2.00	803.80	20.39	783.41	20.56	783.24	19.39	784.41	18.71	785.09
MW-8d	756.8-753.8	801.8	2.24	804.04	20.63	783.41	20.80	783.24	19.63	784.41	18.96	785.08
MW-9s	775.3-772.3	800.7	1.77	802.47	19.13	783.34	19.36	783.11	18.15	784.32	17.51	784.96
MW-9d	764.7-761.7	800.7	2.34	803.04	19.69	783.35	19.92	783.12	18.71	784.33	18.07	784.97
MW-10s	775.3-772.3	800.4	2.31	802.71	19.21	783.50	19.59	783.12	18.32	784.39	17.75	784.96
MW-10d	765.4-762.4	800.4	2.56	802.96	19.50	783.46	19.84	783.12	18.56	784.40	18.00	784.96
MW-11	774.1-771.1	799.6	1.93	801.53	18.20	783.33	----	----	----	----	----	----
MW-12	773.2-770.2	798.7	1.67	800.37	17.28	783.09	17.57	782.80	16.29	784.08	15.69	784.68
MW-13s	775.9-772.9	797.9	3.10	801.00	18.10	782.90	18.39	782.61	17.13	783.87	16.53	784.47
MW-13d	762.9-759.9	797.9	2.76	800.66	17.78	782.88	18.07	782.59	16.81	783.85	16.21	784.45

*from top of casing, elevations relative to USGS datum

Resurveyed by Ingersoll,Watson, McMachen, Inc. - 1/25/93

Table 3 (Page 2 of 4)
Water Level Elevational Data
General Signal, #24-1136
9000 East Michigan Avenue, Galesburg, MI
(all measurements in feet)

Well ID	Screened Elevation (amsl)	Ground Elevation	Casing Height	Top of Casing Elevation	10/2/97		11/24/97		1/30/98		4/10/98	
					*Depth to Water	Water Level Elevation	*Depth to Water	Water Level Elevation	*Depth to Water	Water Level Elevation	*Depth to Water	Water Level Elevation
MW-14s	775.0-772.0	797.0	2.48	799.48	16.86	782.62	17.19	782.29	15.96	783.52	15.39	784.09
MW-14d	763.0-760.0	797.0	2.23	799.23	16.74	782.49	----	----	----	----	----	----
MW-15s	775.2-772.2	797.2	3.06	800.26	17.76	782.50	18.10	782.16	16.90	783.36	16.37	783.89
MW-15d	766.3-763.3	797.2	2.53	799.73	17.21	782.52	17.59	782.14	16.38	783.35	15.85	783.88
MW-17	762.6-759.6	803.6	-0.33	803.27	19.57	783.70	19.78	783.49	18.49	784.78	17.98	785.29
MW-18	769.5-766.5	801.5	2.53	803.93	20.69	783.24	20.81	783.12	19.59	784.34	----	----
MW-19	769.6-766.6	801.6	2.88	804.48	21.11	783.37	21.26	783.22	20.04	784.44	19.41	785.07
MW-20s	781.2-778.2	794.0	2.99	796.99	15.72	781.27	16.14	780.85	15.07	781.92	14.61	782.38
MW-20d	774.6-771.6	794.0	3.46	797.46	16.19	781.27	16.62	780.84	15.54	781.92	15.09	782.37
MW-21s	781.1-778.1	792.7	1.97	794.67	14.08	780.59	14.53	780.14	13.54	781.13	13.10	781.57
MW-21d	768.7-765.7	792.7	2.74	795.44	14.83	780.61	15.28	780.16	14.28	781.16	13.85	781.59
MW-22s	779.6-776.6	791.7	3.24	794.94	15.01	779.93	15.53	779.41	14.32	780.62	13.77	781.17
MW-22d	776.5-773.5	791.7	3.46	795.16	15.22	779.94	15.75	779.41	14.52	780.64	13.97	781.19
MW-23s	781.1-778.1	794.7	1.64	796.34	15.27	781.07	15.72	780.62	14.70	781.64	14.26	782.08
MW-23d	756.7-753.7	794.7	2.63	797.33	16.21	781.12	16.68	780.65	15.65	781.68	15.23	782.10
PW-A	768.4-758.4	801.4	----	+801.28	19.93	781.35	18.13	783.15	19.11	782.17	16.23	785.05
Flow Rate					83.2 gpm		0 gpm		90 gpm		0 gpm	
PW-B	----	----	----	+803.55	21.45	782.10	20.20	783.35	18.85	784.70	18.39	785.16
Flow Rate					61.1 gpm		0 gpm		0 gpm		0 gpm	
PZ-1	----	----	----	802.33	18.18	784.15	19.16	783.17	17.53	784.80	17.36	784.97
Injection Well	----	----	----	+799.85	11.57	788.28	16.67	783.18	13.39	786.46	14.86	784.99

*from top of casing, elevations relative to USGS datum
Resurveyed by Ingersoll,Watson, McMachen, Inc. - 1/25/93
+Inner rim of manhole, PW-A northeast side, PW-B north side, and injection well south side.

Table 3 (Page 3 of 4)
Water Level Elevational Data
General Signal, #24-1136
9000 East Michigan Avenue, Galesburg, MI
(all measurements in feet)

Well ID	Screened Elevation (amsl)	Ground Elevation	Casing Height	Top of Casing Elevation	12/9/98		5/10/01	
					*Depth to Water	Water Level Elevation	*Depth to Water	Water Level Elevation
MW-1	787.0-780.0	803.8	-0.94	802.86	19.97	782.89	18.38	784.48
MW-2	784.5-779.5	804.0	-1.22	802.78	19.95	782.83	18.28	784.50
MW-3	784.3-779.3	803.7	-0.70	803.00	20.07	782.93	18.52	784.48
MW-4	783.8-778.8	803.6	-0.73	802.87	----	----	----	----
MW-5s	785.4-780.4	803.4	2.04	805.44	abandoned	----	abandoned	----
MW-5d	758.4-755.4	803.4	2.88	806.28	abandoned	----	abandoned	----
MW-6s	783.4-778.4	802.4	1.73	804.13	21.40	782.73	19.77	784.36
MW-6d	757.4-754.4	802.4	2.66	805.06	22.30	782.76	20.68	784.38
MW-7s	779.9-774.9	802.6	1.83	804.43	abandoned	----	abandoned	----
MW-7d	752.6-749.6	802.6	2.58	805.18	abandoned	----	abandoned	----
MW-8s	776.2-773.2	801.8	2.00	803.80	21.11	782.69	19.49	784.31
MW-8d	756.8-753.8	801.8	2.24	804.04	21.34	782.70	19.73	784.31
MW-9s	775.3-772.3	800.7	1.77	802.47	19.88	782.59	18.26	784.21
MW-9d	764.7-761.7	800.7	2.34	803.04	20.44	782.60	18.83	784.21
MW-10s	775.3-772.3	800.4	2.31	802.71	20.10	782.61	18.52	784.19
MW-10d	765.4-762.4	800.4	2.56	802.96	20.33	782.63	18.76	784.20
MW-11	774.1-771.1	799.6	1.93	801.53	----	----	----	----
MW-12	773.2-770.2	798.7	1.67	800.37	18.06	782.31	16.40	783.97
MW-13s	775.9-772.9	797.9	3.10	801.00	18.87	782.13	17.21	783.79
MW-13d	762.9-759.9	797.9	2.76	800.66	18.56	782.10	16.89	783.77

*from top of casing, elevations relative to USGS datum
Resurveyed by Ingersoll,Watson, McMachen, Inc. - 1/25/93

Table 3 (Page 4 of 4)
Water Level Elevational Data
General Signal, #24-1136
9000 East Michigan Avenue, Galesburg, MI
(all measurements in feet)

Well ID	Screened Elevation (amsl)	Ground Elevation	Casing Height	Top of Casing Elevation	12/9/98		5/10/01	
					*Depth to Water	Water Level Elevation	*Depth to Water	Water Level Elevation
MW-14s	775.0-772.0	797.0	2.48	799.48	17.62	781.86	16.01	783.47
MW-14d	763.0-760.0	797.0	2.23	799.23	----	----	----	----
MW-15s	775.2-772.2	797.2	3.06	800.26	18.52	781.74	16.95	783.31
MW-15d	766.3-763.3	797.2	2.53	799.73	18.01	781.72	16.43	783.30
MW-17	762.6-759.6	803.6	-0.33	803.27	20.38	782.89	18.78	784.49
MW-18	769.5-766.5	801.5	2.53	803.93	21.32	782.71	19.74	784.29
MW-19	769.6-766.6	801.6	2.88	804.48	21.79	782.69	20.19	784.29
MW-20s	781.2-778.2	794.0	2.99	796.99	16.43	780.56	15.12	781.87
MW-20d	774.6-771.6	794.0	3.46	797.46	16.90	780.56	15.60	781.86
MW-21s	781.1-778.1	792.7	1.97	794.67	14.75	779.92	13.64	781.03
MW-21d	768.7-765.7	792.7	2.74	795.44	15.49	779.95	14.38	781.06
MW-22s	779.6-776.6	791.7	3.24	794.94	15.69	779.25	14.49	780.45
MW-22d	776.5-773.5	791.7	3.46	795.16	15.91	779.25	14.69	780.47
MW-23s	781.1-778.1	794.7	1.64	796.34	15.95	780.39	14.71	781.63
MW-23d	756.7-753.7	794.7	2.63	797.33	----	----	15.67	781.66
PW-A	768.4-758.4	801.4	----	+801.28	----	----	16.97	784.31
Flow Rate					0 gpm		0 gpm	
PW-B	----	----	----	+803.55	19.20	784.35	----	----
Flow Rate					0 gpm		0 gpm	
PZ-1	----	----	----	802.33	19.63	782.70	18.11	784.22
Injection Well	----	----	----	+799.85	----	----	----	----

*from top of casing, elevations relative to USGS datum
Resurveyed by Ingersoll,Watson, McMachen, Inc. - 1/25/93
+Inner rim of manhole, PW-A northeast side, PW-B north side, and injection well south side.

Table 4A
Comparision of Highest Detected Concentrations Remaining in Soil to Applicable Soil Criteria
General Signal Corp./Benteler Automotive, #24-1136
9000 E. Michigan Ave., Galesburg, MI

Proposed Corrective Action: Residential and Commerical I Criteria	**Restriction**	**No Action**	**No Action**	**No Action**	**No Action**	**No Action**	**No Action**		
Detected Compounds	**Drinking Water Protection Criteria**	**GSI Protection Criteria**	**Groundwater Contact Protection Criteria**	**Soil Volatilization to Indoor Air Inhalation Criteria**	**Infinite Source Volatile Soil Inhalation Criteria**	**Direct Contact Criteria**	**Soil Saturation (C_{sat}) Value**	**Applicable Remediation Criteria**	**Highest Detected Concentration in Verification Samples**
Volatile Organic Compounds*									
1,1-Dichloroethane	18,000	ID	890,000	**230,000**	2,100,000	890,000	890,000	230,000	<1 - <10
cis-1,2-Dichloroethene	1,400	ID	640,000	**23,000**	180,000	640,000	640,000	23,000	20
trans-1,2-Dichloroethene	2,000	ID	1,400,000	**23,000**	280,000	1,400,000	1,400,000	23,000	32
Tetrachloroethene	100	**900**	88,000	11,000	180,000	88,000	88,000	900	330
1,1,1-Trichloroethane	4,000	**4,000**	460,000	250,000	3,800,000	460,000	460,000	4,000	<1 - <10
Trichloroethene	100	**4,000**	500,000	7,100	78,000	500,000	500,000	4,000	<1 - <10
Vinyl Chloride	40	300	11,000	**28**	440	4,000	490,000	28	4
Benzene	100	4,000	220,000	**1,600**	13,000	180,000	400,000	1,600	<1 - <10
Toluene	16,000	**2,800**	250,000	250,000	2,800,000	250,000	250,000	2,800	20
Ethylbenzene	1,500	**360**	140,000	140,000	9,500,000	140,000	140,000	360	10
Total Xylenes	5,600	**700**	150,000	150,000	46,000,000	150,000	150,000	700	<1

ID = Inadequate data to develop RBSL.

* All other volatile organic compounds not detected above the method detection limits.

Bolded criteria denote the lowest applicable remediation criteria with the appropriate restriction in place.

Applicable Soil Criteria based on MDEQ June 7, 2000 Operational Memorandum #18.

Table 4B (Page 1 of 5)
Summary of Analyzed Compounds in Soil
General Signal Corp./Benteler Automotive, #24-1136
9000 E. Michigan Ave., Galesburg, MI
(concentrations expressed in ug/kg)

Sample ID Depth	Applicable Remediation Criteria	B-1 0-2'	B-1 14-16'	B-2 0-2'	B-2 14-16'	B-3 0-2'	B-3 14-16'	EPA Method
Sample Date		3/25/87	3/25/87	3/25/87	3/25/87	3/25/87	3/25/87	3/25/87
Volatile Organic Compounds								
1,1-Dichloroethane	230,000	<1	<1	<1	<1	<1	<1	NR
cis+trans-1,2-Dichloroethene	23,000	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	23,000	<1	<1	<1	<1	<1	<1	NR
Tetrachloroethene	900	**17**	**20**	**1**	**5**	<1	<1	NR
1,1,1-Trichloroethane	4,000	<1	<1	<1	<1	<1	<1	NR
Trichloroethene	4,000	<1	<1	<1	<1	<1	<1	NR
Vinyl Chloride	28	<1	<1	<1	<1	<1	<1	NR
Benzene	1,600	<1	<1	<1	<1	<1	<1	NR
Toluene	2,800	<1	<1	<1	<1	<1	<1	NR
Ethylbenzene	360	<1	<1	<1	<1	<1	<1	NR
Xylenes, total	700	<1	<1	<1	<1	<1	<1	NR
Base-Neutral Extractables		NA	NA	NA	NA	NA	NA	NA
Acid Extractables		NA	NA	NA	NA	NA	NA	NA
Metals (EPA Toxicity Leachate) ug/L		NA	NA	NA	NA	NA	NA	NA
Arsenic	**50	---	---	---	---	---	---	---
Barium	**2,000	---	---	---	---	---	---	---
Chromium	**100	---	---	---	---	---	---	---
Cadmium	**5.0	---	---	---	---	---	---	---
Lead	**4.0	---	---	---	---	---	---	---
Mercury	**2.0	---	---	---	---	---	---	---
Selenium	**50	---	---	---	---	---	---	---
Silver	**34	---	---	---	---	---	---	---

NA= Not Analyzed; NR = Not Reported
Volatile organic compounds not listed are below the detection limit.
All samples were collected by Keck and analyzed by Ann Arbor Technological Services, Inc.
* The location of this sample was subsequently excavated and therefore, this analysis is not used for verification of soil remediation for comparison to applicable remediation criteria.
** The results of the leachate analysis are compared to the residential drinking water criteria.

Table 4B (Page 2 of 5)
Summary of Analyzed Compounds in Soil
General Signal Corp./Benteler Automotive, #24-1136
9000 E. Michigan Ave., Galesburg, MI
(concentrations expressed in ug/kg)

Sample ID Depth	Applicable Remediation Criteria	*PB-1 4'	*PB-1 4-6'	PB-1 9-11'	PB-1 14-16'	PB-1 19-21'	*PB-2 0-2'	PB-2 4-6'	PB-2 9-11'	PB-2 14-16'	PB-2 19-21'
Sample Date		7/9/87	7/9/87	7/9/87	7/9/87	7/9/87	7/9/87	7/9/87	7/9/87	7/9/87	7/9/87
Volatile Organic Compounds											
1,1-Dichloroethane	230,000	<1	<1	<1	<1	<1	**7**	<1	<1	<1	<1
cis+trans-1,2-Dichloroethene	23,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	23,000	<1	<1	**3**	**32**	<1	**11**	<1	<1	<1	<1
Tetrachloroethene	900	<1	<1	<1	**1**	**1**	**3**	**1**	**3**	**4**	**18**
1,1,1-Trichloroethane	4,000	<1	<1	<1	<1	<1	**63**	<1	<1	<1	<1
Trichloroethene	4,000	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Vinyl Chloride	28	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Benzene	1,600	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	2,800	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	360	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Xylenes, total	700	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Base-Neutral Extractables		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acid Extractables		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals (EPA Toxicity Leachate) ug/L		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	**50	---	---	---	---	---	---	---	---	---	---
Barium	**2,000	---	---	---	---	---	---	---	---	---	---
Chromium	**100	---	---	---	---	---	---	---	---	---	---
Cadmium	**5.0	---	---	---	---	---	---	---	---	---	---
Lead	**4.0	---	---	---	---	---	---	---	---	---	---
Mercury	**2.0	---	---	---	---	---	---	---	---	---	---
Selenium	**50	---	---	---	---	---	---	---	---	---	---
Silver	**34	---	---	---	---	---	---	---	---	---	---

NA= Not Analyzed; NR = Not Reported
Volatile organic compounds not listed are below the detection limit.
All samples were collected by Keck and analyzed by Ann Arbor Technological Services, Inc.
* The location of this sample was subsequently excavated and therefore, this analysis is not used for verification of soil remediation for comparison to applicable remediation criteria.
** The results of the leachate analysis are compared to the residential drinking water criteria.

Table 4B (Page 3 of 5)
Summary of Analyzed Compounds in Soil
General Signal Corp./Benteler Automotive, #24-1136
9000 E. Michigan Ave., Galesburg, MI
(concentrations expressed in ug/kg)

Sample ID Depth	Applicable Remediation Criteria	*PB-3 2-4'	PB-3 7-9'	PB-3 9-11'	PB-3 14-16'	PB-3 19-21'	(1) EPA Method
Sample Date		7/9/87	7/9/87	7/9/87	7/9/87	7/9/87	7/9/87
Volatile Organic Compounds							
1,1-Dichloroethane	230,000	<1	<1	<1	<1	<1	NR
cis+trans-1,2-Dichloroethene	23,000	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	23,000	<1	<1	<1	<1	**1**	NR
Tetrachloroethene	900	**1**	**31**	**330**	**11**	**86**	NR
1,1,1-Trichloroethane	4,000	<1	<1	<1	<1	<1	NR
Trichloroethene	4,000	<1	<1	<1	<1	<1	NR
Vinyl Chloride	28	**2**	**4**	<1	<1	<1	NR
Benzene	1,600	<1	<1	<1	<1	<1	NR
Toluene	2,800	<1	<1	<1	<1	<1	NR
Ethylbenzene	360	<1	<1	<1	<1	<1	NR
Xylenes, total	700	<1	<1	<1	<1	<1	NR
Base-Neutral Extractables		NA	NA	NA	NA	NA	NA
Acid Extractables		NA	NA	NA	NA	NA	NA
Metals (EPA Toxicity Leachate) ug/L		NA	NA	NA	NA	NA	NA
Arsenic	**50	---	---	---	---	---	---
Barium	**2,000	---	---	---	---	---	---
Chromium	**100	---	---	---	---	---	---
Cadmium	**5.0	---	---	---	---	---	---
Lead	**4.0	---	---	---	---	---	---
Mercury	**2.0	---	---	---	---	---	---
Selenium	**50	---	---	---	---	---	---
Silver	**34	---	---	---	---	---	---

NA= Not Analyzed; NR = Not Reported
Volatile organic compounds not listed are below the detection limit.
All samples were collected by Keck and analyzed by Ann Arbor Technological Services, Inc.
* The location of this sample was subsequently excavated and therefore, this analysis is not used for verification of soil remediation for comparison to applicable remediation criteria.
** The results of the leachate analysis are compared to the residential drinking water criteria.

Table 4B (Page 4 of 5)
Summary of Analyzed Compounds in Soil
General Signal Corp./Benteler Automotive, #24-1136
9000 E. Michigan Ave., Galesburg, MI
(concentrations expressed in ug/kg)

Sample ID Depth	Applicable Remediation Criteria	*Composite (sidewall and pit bottom subsurface)	*Sidewall Base Composite	*Pit Bottom Subsurface Composite	*Subsurface Oil Layer Composite	(1) EPA Method
Sample Date		**8/5/87**	**8/5/87**	**8/5/87**	**8/5/87**	**8/5/87**
Volatile Organic Compounds						
1,1-Dichloroethane	230,000	---	<1	<1	<1	NR
cis+trans-1,2-Dichloroethene	23,000	---	NA	NA	NA	NA
trans-1,2-Dichloroethene	23,000	---	**520**	**19**	**110**	NR
Tetrachloroethene	900	---	**19**	<1	**8**	NR
1,1,1-Trichloroethane	4,000	---	<1	<1	<1	NR
Trichloroethene	4,000	---	**5**	<1	**1**	NR
Vinyl Chloride	28	---	<1	<1	**1**	NR
Benzene	1,600	---	<1	<1	<1	NR
Toluene	2,800	---	**290**	<1	<1	NR
Ethylbenzene	360	---	**3,300**	<1	<1	NR
Xylenes, total	700	---	**350**	**14**	**50**	NR
Base-Neutral Extractables		<100-<10,000	NA	NA	NA	NA
Acid Extractables		<100-<1,000	NA	NA	NA	NA
Metals (EPA Toxicity Leachate) ug/L		NA				NA
Arsenic	**50	---	**1**	**1**	**2**	---
Barium	**2,000	---	**760**	**540**	**860**	---
Chromium	**100	---	<10	<10	<10	---
Cadmium	**5.0	---	<1	**1**	**6**	---
Lead	**4.0	---	<20	<20	<20	---
Mercury	**2.0	---	**0.4**	**1.4**	**1.2**	---
Selenium	**50	---	<1	<1	**2**	---
Silver	**34	---	**7**	**8**	**6**	---

NA= Not Analyzed; NR = Not Reported
Volatile organic compounds not listed are below the detection limit.
All samples were collected by Keck and analyzed by Ann Arbor Technological Services, Inc.
* The location of this sample was subsequently excavated and therefore, this analysis is not used for verification of soil remediation for comparison to applicable remediation criteria.
** The results of the leachate analysis are compared to the residential drinking water criteria.

Table 4B (Page 5 of 5)
Summary of Analyzed Compounds in Soil
General Signal Corp./Benteler Automotive, #24-1136
9000 E. Michigan Ave., Galesburg, MI
(concentrations expressed in ug/kg)

Sample ID Depth	Applicable Remediation Criteria	*#1 Test Pit	*#2 Test Pit	SS-1	SS-2	SS-3	#1 West Pit	#2 Manhole	#3 East Wall	#4 SE Corner	(2) EPA Method
Sample Date		**11/21/88**	**11/21/88**	**12/14/88**	**12/14/88**	**12/14/88**	**12/19/88**	**12/19/88**	**12/19/88**	**12/19/88**	**12/14-19/88**
Volatile Organic Compounds											
1,1-Dichloroethane	230,000	<10	<10	<10	<10	<10	<10	<1	<10	<1	NR
cis+trans-1,2-Dichloroethene	23,000	<10	<10	<10	<10	<10	<10	<1	**20**	<1	NR
trans-1,2-Dichloroethene	23,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	900	**10**	**40**	<10	<10	<10	<10	**2**	**30**	**1**	NR
1,1,1-Trichloroethane	4,000	<10	<10	<10	<10	<10	<10	<1	<10	<1	NR
Trichloroethene	4,000	<10	<10	<10	<10	<10	<10	<1	<10	<1	NR
Vinyl Chloride	28	<10	<10	<10	<10	<10	<10	<1	<10	<1	NR
Benzene	1,600	**900**	**850**	<10	<10	<10	<10	<1	<10	<1	NR
Toluene	2,800	**980**	**320**	<10	<10	**10**	**10**	**8**	**20**	<1	NR
Ethylbenzene	360	**1,700**	**970**	<10	<10	**10**	<10	**1**	<10	<1	NR
Xylenes, total	700	NA	NA	NA	NA	NA	NA	NA	NA	NA	NR
Base-Neutral Extractables		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acid Extractables		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals (EPA Toxicity Leachate) ug/L		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	**50	---	---	---	---	---	---	---	---	---	---
Barium	**2,000	---	---	---	---	---	---	---	---	---	---
Chromium	**100	---	---	---	---	---	---	---	---	---	---
Cadmium	**5.0	---	---	---	---	---	---	---	---	---	---
Lead	**4.0	---	---	---	---	---	---	---	---	---	---
Mercury	**2.0	---	---	---	---	---	---	---	---	---	---
Selenium	**50	---	---	---	---	---	---	---	---	---	---
Silver	**34	---	---	---	---	---	---	---	---	---	---

NA= Not Analyzed; NR = Not Reported

Volatile organic compounds not listed are below the detection limit.

All samples were collected by Keck and analyzed by Ann Arbor Technological Services, Inc.

* The location of this sample was subsequently excavated and therefore, this analysis is not used for verification of soil remediation for comparison to applicable remediation criteria.

** The results of the leachate analysis are compared to the residential drinking water criteria.

APPENDIX C

GROUNDWATER TREATMENT SYSTEM OPERATION SUMMARY

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AMERICAN HYDROGEOLOGY CORPORATION

GROUNDWATER TREATMENT SYSTEM OPERATION SUMMARY
General Signal Corporation
Benteler Automotive, Inc.
9000 E. Michigan Avenue, Galesburg, MI (24-1136)

GENERAL INFORMATION

System Start Date: PW-A May 23, 1996
PW-B June 10, 1996
Target Flow Rates: 90 gpm PW-A
60 gpm PW-B
Air Stripper Cleaning: March 6, 1998
Purge Well Development:
Injection Well Development: January 8, 1997, July 8-10, 1997, and December 29, 1997.
System Modifications: Telemetry system was added on July 18, 1996. The groundwater treatment system operated with secondary treatment between May 23, 1996 and July 26, 1996. Carbon units (secondary treatment) were taken off-line and the system was re-started on October 14, 1996 per MDEQ approval. The Frieje treatment unit was installed in the discharge line to the injection well on April 29, 1997.

MONTHLY SUMMARIES

Comments: The system has been off since March 23, 1998 and will remain off indefinitely.

April 1998:

Average Operational Flow Rate:	PW-A	N/A
	PW-B	N/A
Total Monthly Flow:	PW-A	0 gallons
	PW-B	319 gallons
Days/Month Running:	PW-A	<1 day
	PW-B	<1 day
Total Volume Treated to End of Month:	38,295,867 gallons	

Comments: The system was turned on briefly for collection of groundwater samples on April 28, 1998.

March 1998:

Average Operational Flow Rate:	PW-A	79.7 gpm
	PW-B	63.8 gpm
Total Monthly Flow:	PW-A	573,710 gallons
	PW-B	459,306 gallons
Days/Month Running:	PW-A	5 days
	PW-B	5 days
Total Volume Treated to End of Month:	38,295,548 gallons	

Comments: The air stripping trays and the flow meter for PW-B were cleaned on March 6, 1998. The system was restarted March 18, 1998, after the pressure relief valve in the injection well was cleaned. The system was shut down on March 23, 1998, due to a build up of calcium carbonate in the injection well. The sediment filters were replaced once this month. The average operational flow is averaged over 5 days.

AMERICAN HYDROGEOLOGY CORPORATION

GROUNDWATER TREATMENT SYSTEM OPERATION SUMMARY

General Signal Corporation
Benteler Automotive, Inc.
9000 E. Michigan Avenue, Galesburg, MI (24-1136)

February 1998:

Average Operational Flow Rate:	PW-A	87.2 gpm
	PW-B	0 gpm
Total Monthly Flow:	PW-A	878,540 gallons
	PW-B	0 gallons
Days/Month Running:	PW-A	6 days
	PW-B	0 days
Total Volume Treated to End of Month:	37,262,532 gallons	

Comments: The system was shut down on February 6, 1998 and will remain off until the air stripping trays are efficiently cleaned. On February 18 and 19, 1998, the double containment line from PW-B to the treatment system building was repaired. The average operational flow is averaged over 7 days.

January 1998:

Average Operational Flow Rate:	PW-A	87.4 gpm
	PW-B	0 gpm
Total Monthly Flow:	PW-A	3,900,469 gallons
	PW-B	0 gallons
Days/Month Running:	PW-A	31 days
	PW-B	0 days
Total Volume Treated to End of Month:	36,383,992 gallons	

Comments: PW-B will remain off until the double containment pipe line from the purge well to the groundwater treatment system building is repaired. The sediment filters were replaced four times this month.

December 1997:

Average Operational Flow Rate:	PW-A	86.3 gpm
	PW-B	0 gpm
Total Monthly Flow:	PW-A	106,199 gallons
	PW-B	0 gallons
Days/Month Running:	PW-A	1 day
	PW-B	0 days
Total Volume Treated to End of Month:	32,483,523 gallons	

Comments: The groundwater treatment system was off until completion of rehabilitation of the injection well (December 29, 1997). PW-B will remain off until the double containment pipe line from the purge well to the groundwater treatment system building is repaired. PW-A resumed operation on December 30, 1997. The sediment filters were replaced prior to start up.

AMERICAN HYDROGEOLOGY CORPORATION

GROUNDWATER TREATMENT SYSTEM OPERATION SUMMARY

General Signal Corporation

Benteler Automotive, Inc.

9000 E. Michigan Avenue, Galesburg, MI (24-1136)

November 1997:

Average Operational Flow Rate:	PW-A	81.3 gpm
	PW-B	57.7 gpm
Total Monthly Flow:	PW-A	2,223,560 gallons
	PW-B	1,080,619 gallons
Days/Month Running:	PW-A	19 days
	PW-B	13 days
Total Volume Treated to End of Month:	32,377,324 gallons	

Comments: The groundwater treatment system shut down on November 13, 1997 due to high pressure on the sediment filters. PW-A was restarted and PW-B was left off due to a leak in the inner containment pipe line that runs from PW-B to the groundwater treatment system building. On November 19, 1997 PW-A was shut down for injection well rehabilitation. The bag filters were replaced three times during this operational period.

October 1997:

Average Operational Flow Rate:	PW-A	81.2 gpm
	PW-B	60.5 gpm
Total Monthly Flow:	PW-A	3,623,670 gallons
	PW-B	2,701,330 gallons
Days/Month Running:	PW-A	31 days
	PW-B	31 days
Total Volume Treated to End of Month:	29,073,145 gallons	

Comments: The bag filters were replaced twice. The flow valve in the injection well was cleaned on October 7, 1997 and the total flow rate was increased to 143 gpm.

September 1997:

Average Operational Flow Rate:	PW-A	79.9 gpm
	PW-B	57.1 gpm
Total Monthly Flow:	PW-A	3,680,600 gallons
	PW-B	2,138,050 gallons
Days/Month Running:	PW-A	30 days
	PW-B	24 days
Total Volume Treated to End of Month:	22,748,145 gallons	

Comments: The bag filters were replaced on September 15, 1997. PW-B was down between September 26 and September 30, 1997 to await a fuse replacement.

AMERICAN HYDROGEOLOGY CORPORATION

GROUNDWATER TREATMENT SYSTEM OPERATION SUMMARY
General Signal Corporation
Benteler Automotive, Inc.
9000 E. Michigan Avenue, Galesburg, MI (24-1136)

August 1997:

Average Operational Flow Rate:	PW-A	60.9 gpm
	PW-B	53.7 gpm
Total Monthly Flow:	PW-A	2,366,560 gallons
	PW-B	1,236,805 gallons
Days/Month Running:	PW-A	27 days
	PW-B	16 days
Total Volume Treated to End of Month:	20,532,860 gallons	

Comments: The flow from PW-A was increased from 30 gpm to 40 gpm on August 1, 1997. The system was shut down on August 4, 1997 to await repairs to the transfer pump. PW-A was restarted on August 8, 1997 with the flow set at 40 gpm. The flow from PW-A was increased to 90 gpm on August 12, 1997. PW-B was started on August 15, 1997, with a flow of 60 gpm (PW-A on 8/15 approximately 84 gpm).

July 1997:

Average Operational Flow Rate:	PW-A	30* gpm
	PW-B	0 gpm
Total Monthly Flow:	PW-A	0* gallons
	PW-B	0 gallons
Days/Month Running:	PW-A	< 1* days
	PW-B	0 days
Total Volume Treated to End of Month:	16,929,495 gallons	

Comments: * PW-A started on July 31, 1997 at 3:30 pm. The injection well was redeveloped between July 8 and 10, 1997.

June 1997:

Average Operational Flow Rate:	PW-A	0 gpm
	PW-B	0 gpm
Total Monthly Flow:	PW-A	0 gallons
	PW-B	0 gallons
Days/Month Running:	PW-A	0 days
	PW-B	0 days
Total Volume Treated to End of Month:	16,929,495 gallons	

Comments: The system was off for the month of June.

AMERICAN HYDROGEOLOGY CORPORATION

GROUNDWATER TREATMENT SYSTEM OPERATION SUMMARY
General Signal Corporation
Benteler Automotive, Inc.
9000 E. Michigan Avenue, Galesburg, MI (24-1136)

May 1997:

Average Operational Flow Rate:	PW-A	50.3 gpm
	PW-B	24.3 gpm
Total Monthly Flow:	PW-A	797,270 gallons
	PW-B	140,045 gallons
Days/Month Running:	PW-A	11 days
	PW-B	4 days
Total Volume Treated to End of Month:	16,929,495 gallons	

Comments: The system was off for the month of April. Injection well rehabilitation using granular acid took place on May 15 and 16, 1997. The treatment system operated on both PW-A and PW-B between May 2-6, 1997, and on PW-A only May 20-27, 1997 before mechanical difficulties necessitated a shut down.

January - April 1997

System did not operate while undergoing modifications. The injection well was redeveloped between January 8 through January 10, 1997.

December 1996

Average Operational Flow Rate:	PW-A	92.9 gpm
	PW-B	58.9 gpm
Total Monthly Flow:	PW-A	2,542,600 gallons
	PW-B	1,610,550 gallons
Days/Month Running:	PW-A	16 days
	PW-B	16 days
Total Volume Treated to End of Month:	15,992,180 gallons	

Comments: The PW-B flow rate was increased to 50 gpm and 60 gpm on December 2 and 10, 1996, respectively. The system was shut down on December 16, 1996 due to high discharge pressure on the injection well. The average monthly flow rate was calculated over 19 days.

AMERICAN HYDROGEOLOGY CORPORATION

GROUNDWATER TREATMENT SYSTEM OPERATION SUMMARY
General Signal Corporation
Benteler Automotive, Inc.
9000 E. Michigan Avenue, Galesburg, MI (24-1136)

November 1996

Average Operational Flow Rate:	PW-A	85.9 gpm
	PW-B	38.0 gpm
Total Monthly Flow:	PW-A	3,091,850 gallons
	PW-B	1,369,110 gallons
Days/Month Running:	PW-A	25 days
	PW-B	25 days
Total Volume Treated to End of Month:	11,839,030 gallons	

Comments: The system was re-started on November 5, 1996 with PW-A operating at 60 gpm and PW-B at 40 gpm. The flow rate was adjusted to 90 gpm at PW-A and 30 gpm at PW-B on November 6, 1996. On November 15, 1996, the flow rate for PW-B was increased to 40 gpm.

October 1996

Average Operational Flow Rate:	PW-A	61.1 gpm
	PW-B	29.2 gpm
Total Monthly Flow:	PW-A	967,435 gallons
	PW-B	462,000 gallons
Days/Month Running:	PW-A	11 days
	PW-B	11 days
Total Volume Treated to End of Month:	7,378,070 gallons	

Comments: The groundwater treatment system was re-started on October 14, 1996 by- passing the carbon units with PW-A operating at 60 gpm and PW-B at 30 gpm. The flow rate for PW-A was increased on October 25, 1996 to 90 gpm. The system shut down on October 25, 1996 from high effluent pressure requiring several adjustments to accomodate the increase in flow rate.

July 1996:

Average Operational Flow Rate:	PW-A	54.8 gpm
	PW-B	32.2 gpm
Total Monthly Flow:	PW-A	2,129,935 gallons
	PW-B	1,252,440 gallons
Days/Month Running:	PW-A	27 days
	PW-B	27 days
Total Volume Treated to End of Month:	5,948,635 gallons	

Comments: The carbon units were backwashed on July 1, 1996. A telemonitoring system was installed on July 18, 1996 for remote monitoring. Binding of the carbon media resulted in high pressures and shut down of the system on July 26, 1996.

AMERICAN HYDROGEOLOGY CORPORATION
GROUNDWATER TREATMENT SYSTEM OPERATION SUMMARY
General Signal Corporation
Benteler Automotive, Inc.
9000 E. Michigan Avenue, Galesburg, MI (24-1136)

June 1996:

Average Operational Flow Rate:	PW-A	53.2 gpm
	PW-B	21.4 gpm
Total Monthly Flow:	PW-A	1,761,830 gallons
	PW-B	400,730 gallons
Days/Month Running:	PW-A	26 days
	PW-B	16 days
Total Volume Treated to End of Month:	2,566,260 gallons	

Comments: Groundwater recovery from PW-B began on June 10, 1996 at a pumping rate of approximately 10 gpm. The flow rate for PW-B was increased to approximately 20 gpm on June 17, 1996 and to approximately 30 gpm on June 24, 1996. The system was down for 4 days during the month due to high water levels in the purge well sump and high sediment filter pressure. Minor system adjustments were performed including installation of a drop pipe for the pressure relief valves and raising the float switch in the purge well sump. Sediment filters were replaced twice during the month.

May 1996:

Average Operational Flow Rate:	PW-A	56.1 gpm
	PW-B	0 gpm
Total Monthly Flow:	PW-A	403,700 gallons
	PW-B	0 gallons
Days/Month Running:	PW-A	5 days
	PW-B	0 days
Total Volume Treated to End of Month:	403,700 gallons	

Comments: Groundwater recovery from PW-A began on May 23, 1996. The system was down for 3 days during the month due to high water levels in the purge well sump.

APPENDIX D

GRAPHS

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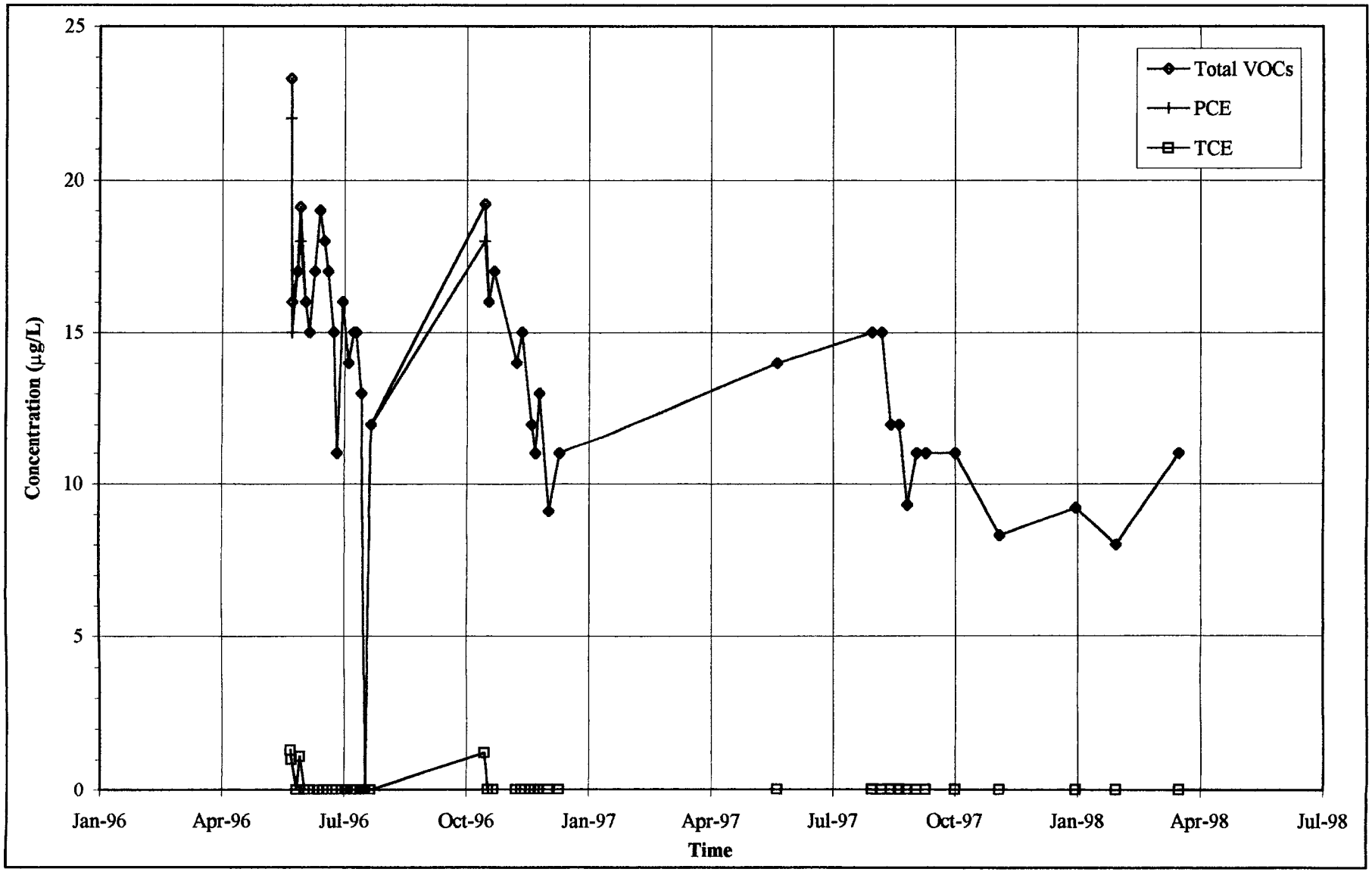
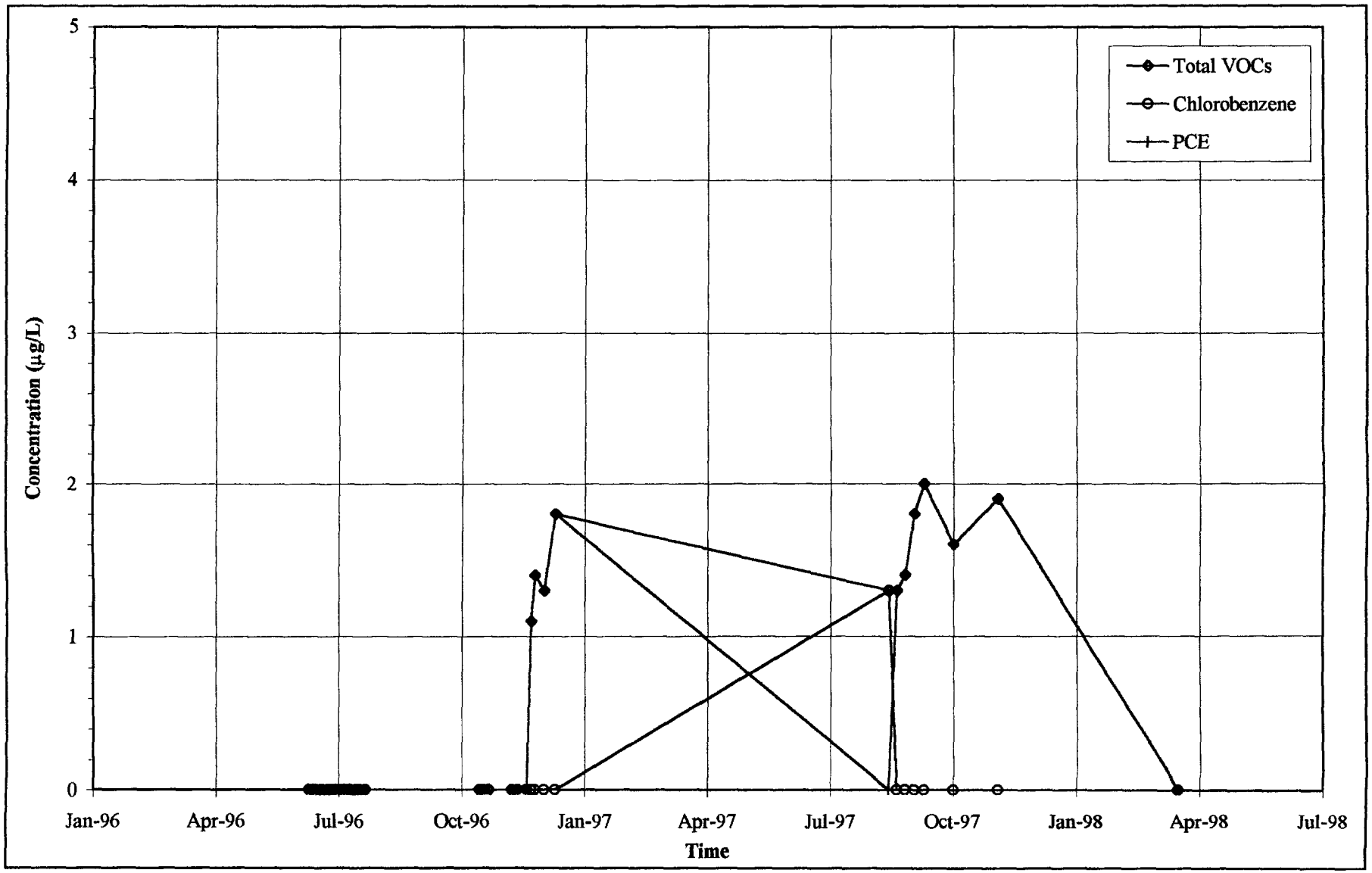
Graph 1
PW-A Effluent Concentrations vs. Time
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



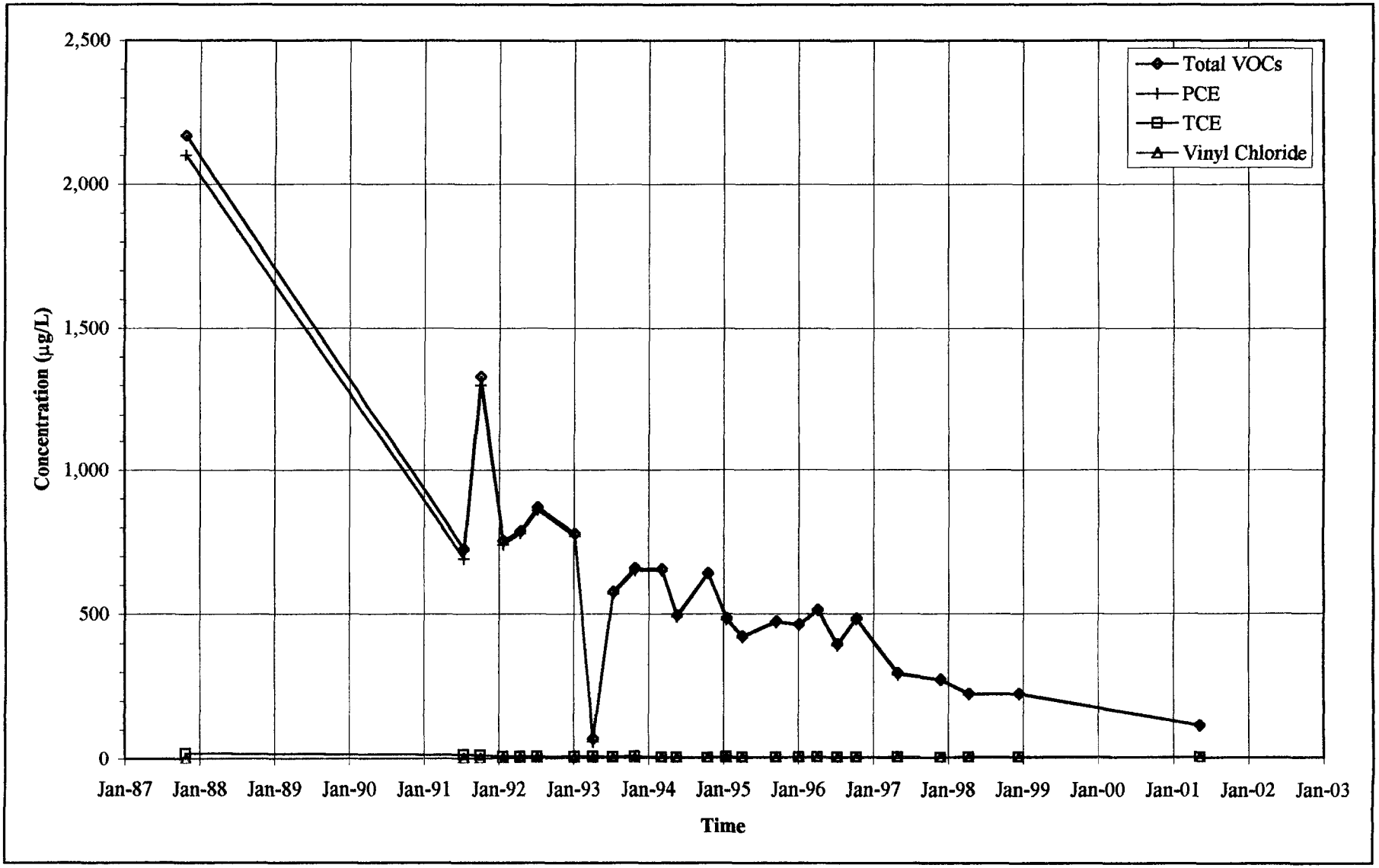
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 2
PW-B Effluent Concentrations vs. Time
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



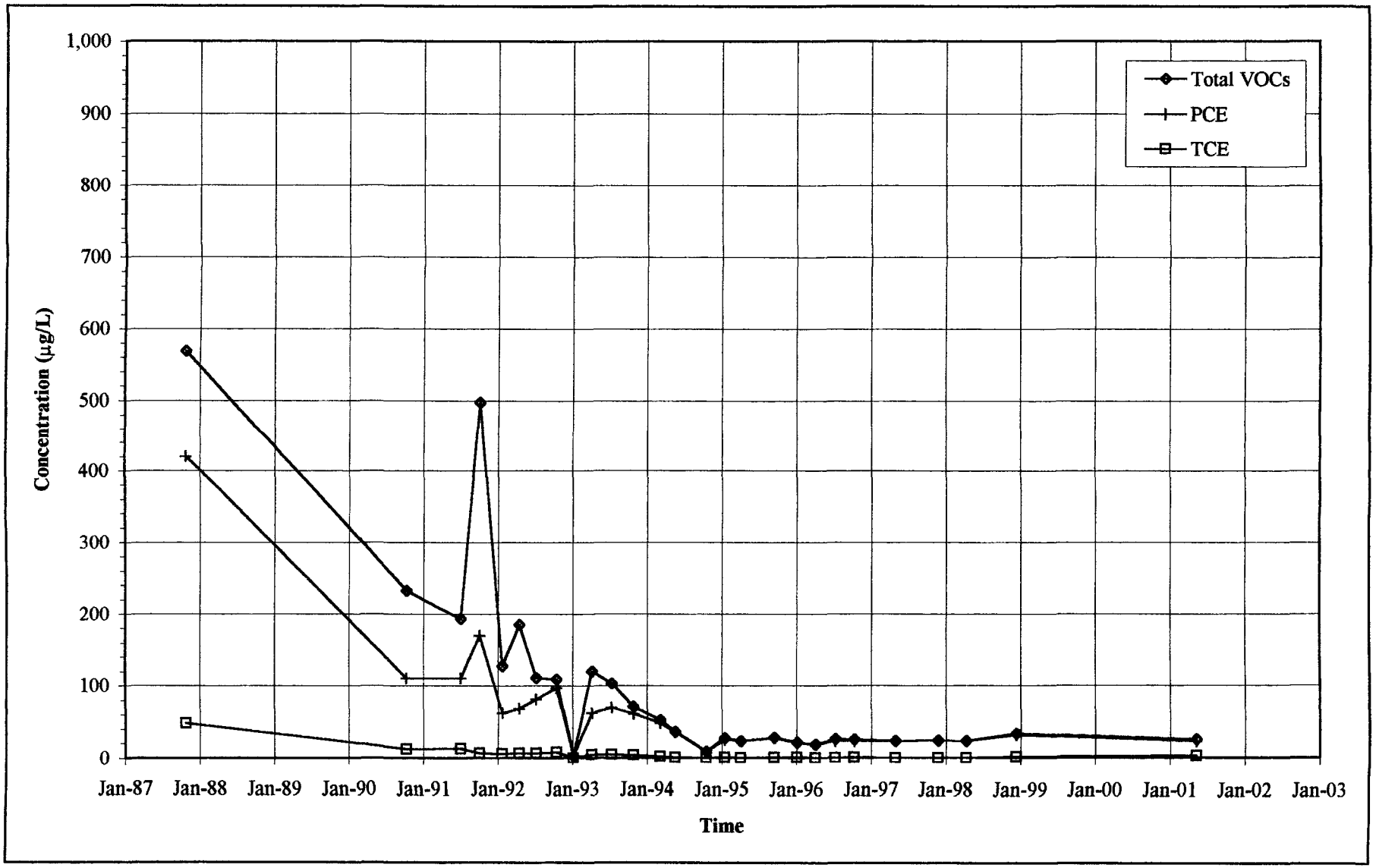
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 3
VOC Concentrations vs. Time - MW-1
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



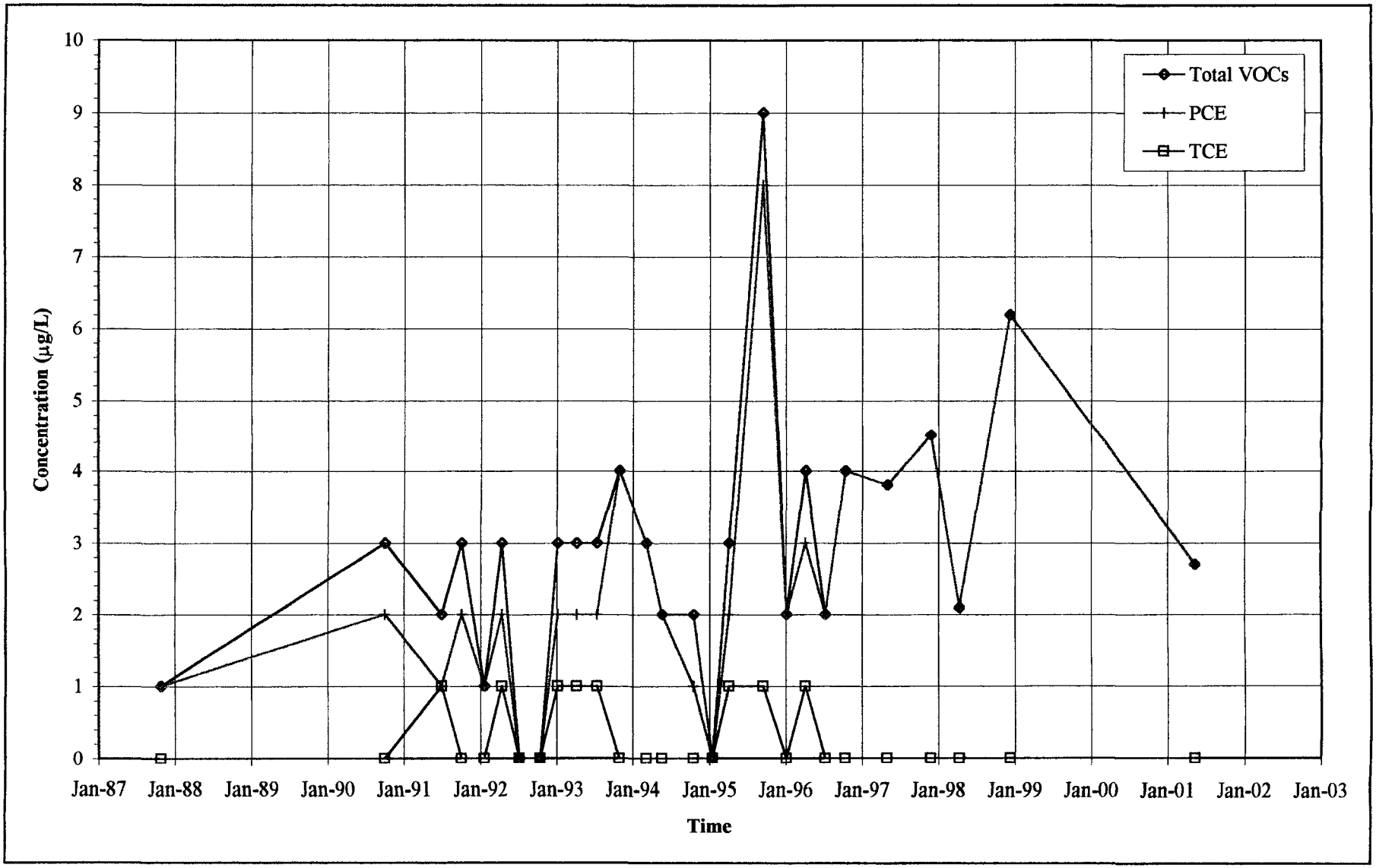
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 4
VOC Concentrations vs. Time - MW-2
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



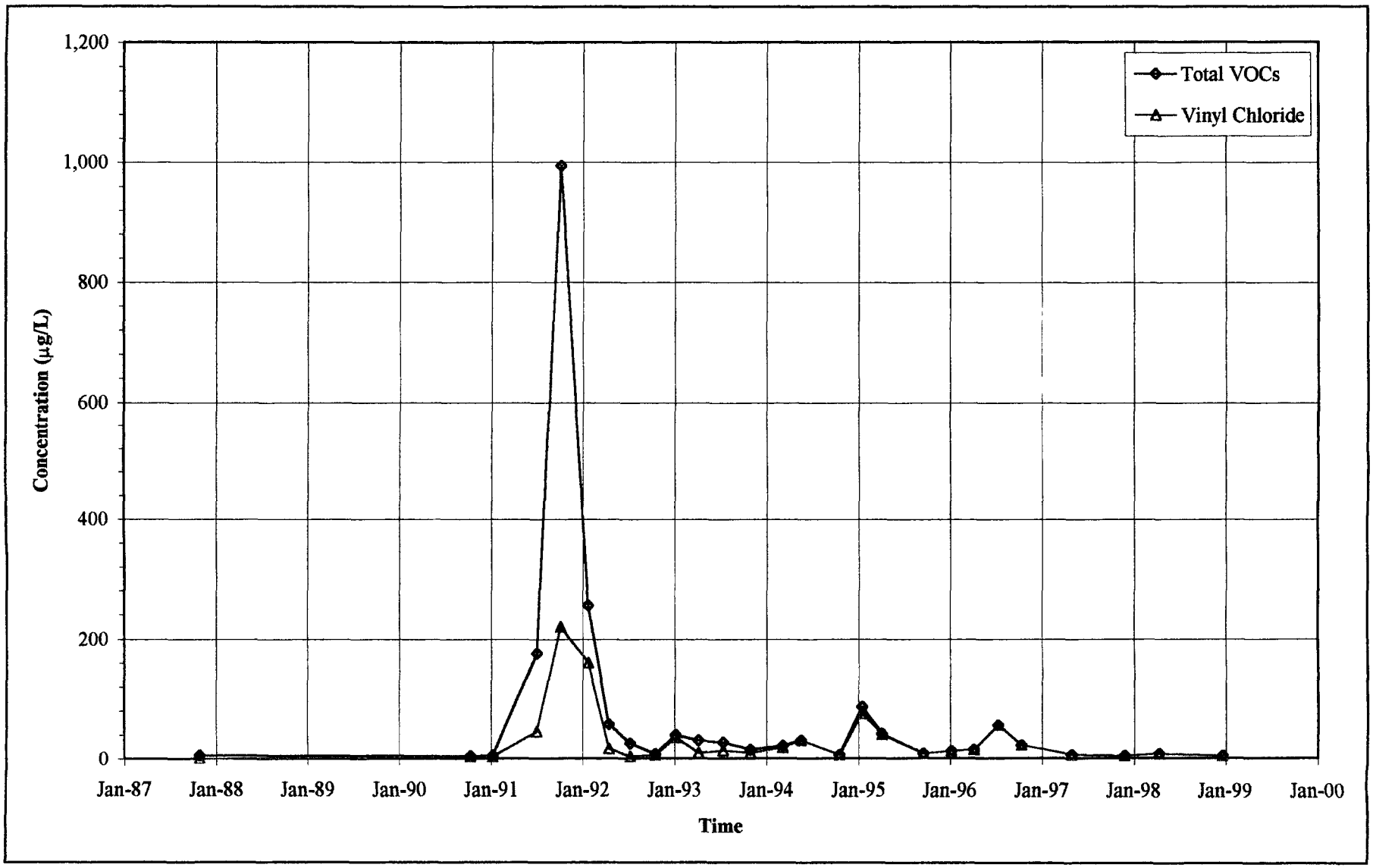
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 5
VOC Concentrations vs. Time - MW-3
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



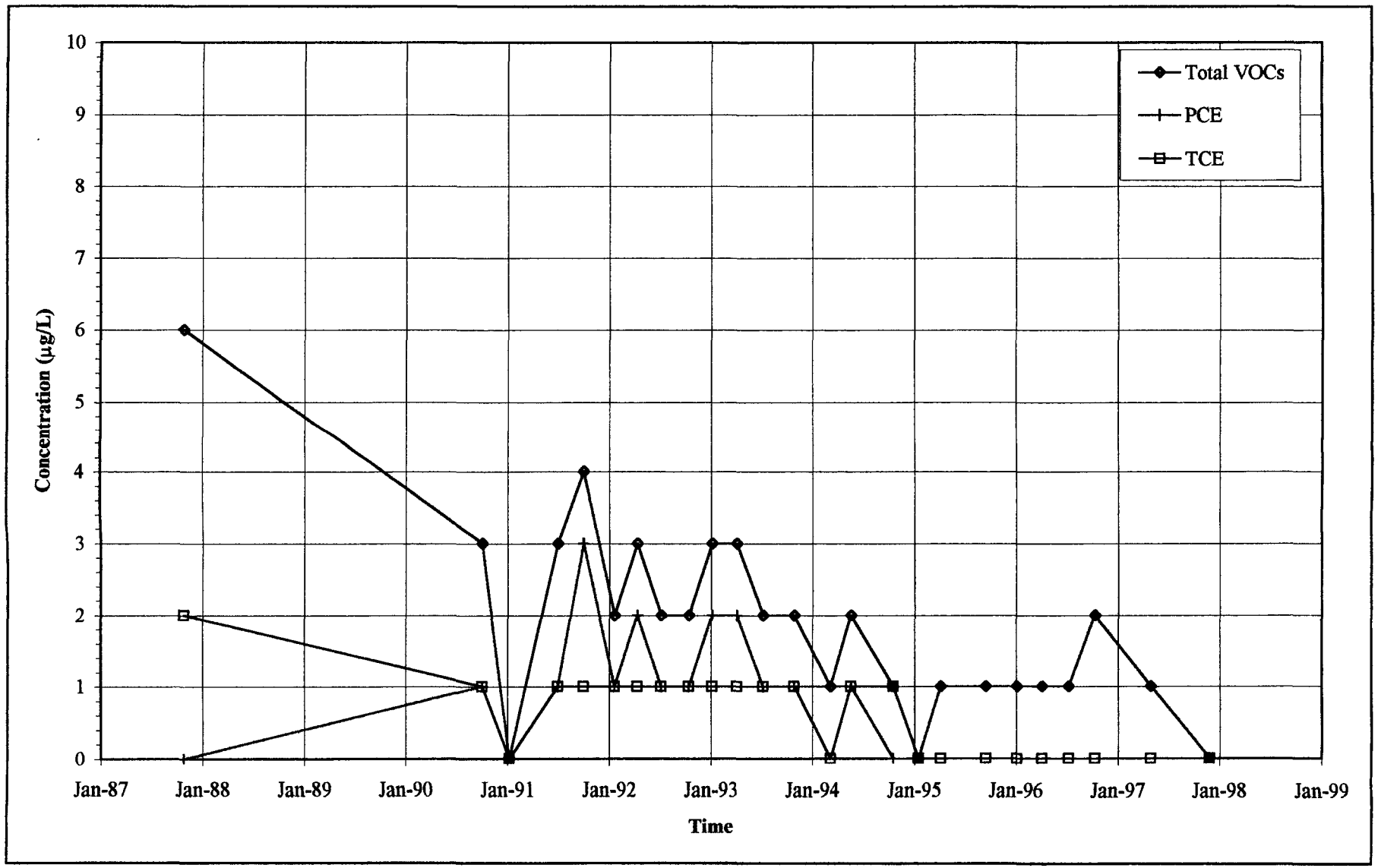
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 6
VOC Concentrations vs. Time - MW-4
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



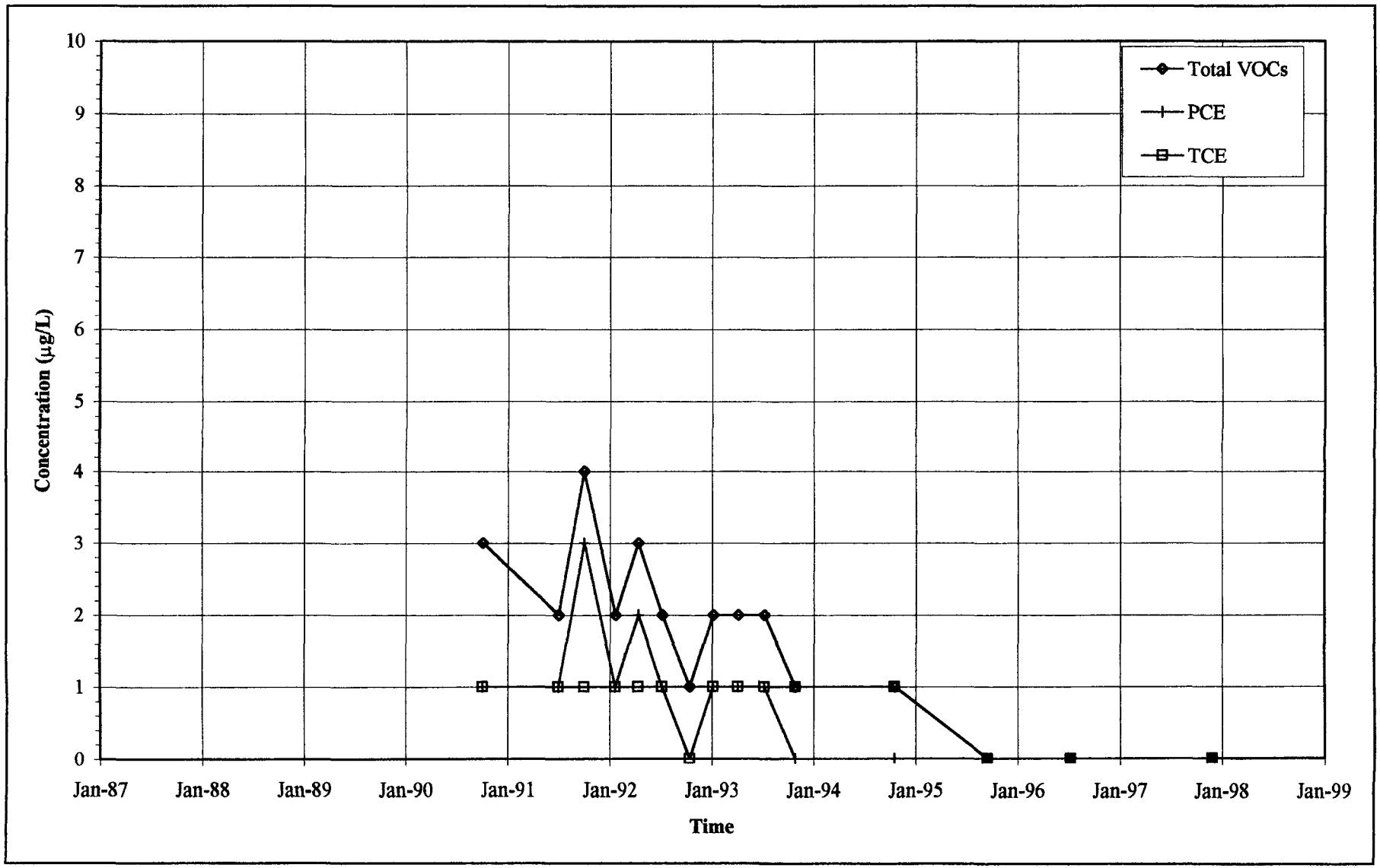
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 7
VOC Concentrations vs. Time - MW-7s
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



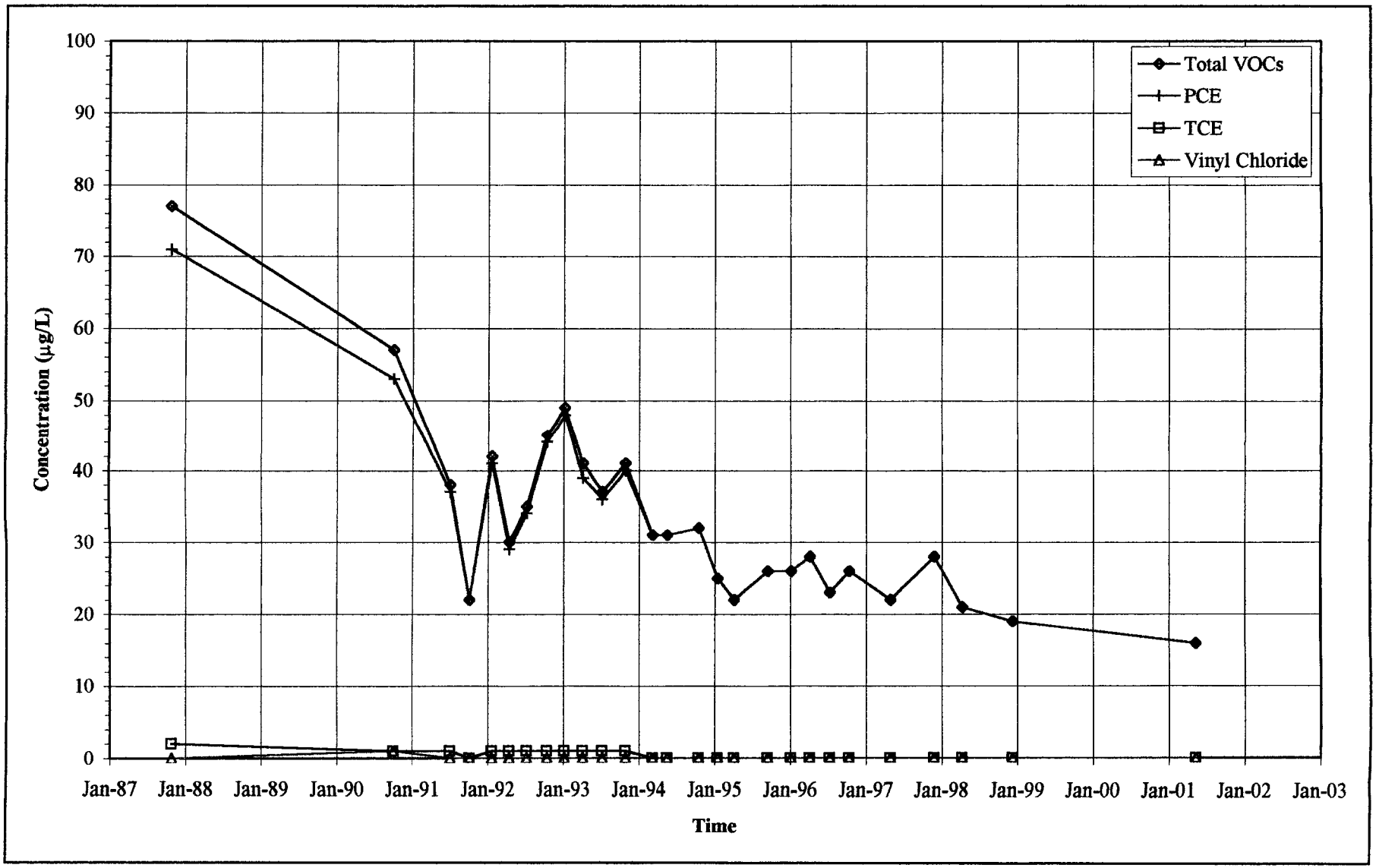
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 8
VOC Concentrations vs. Time - MW-7d
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



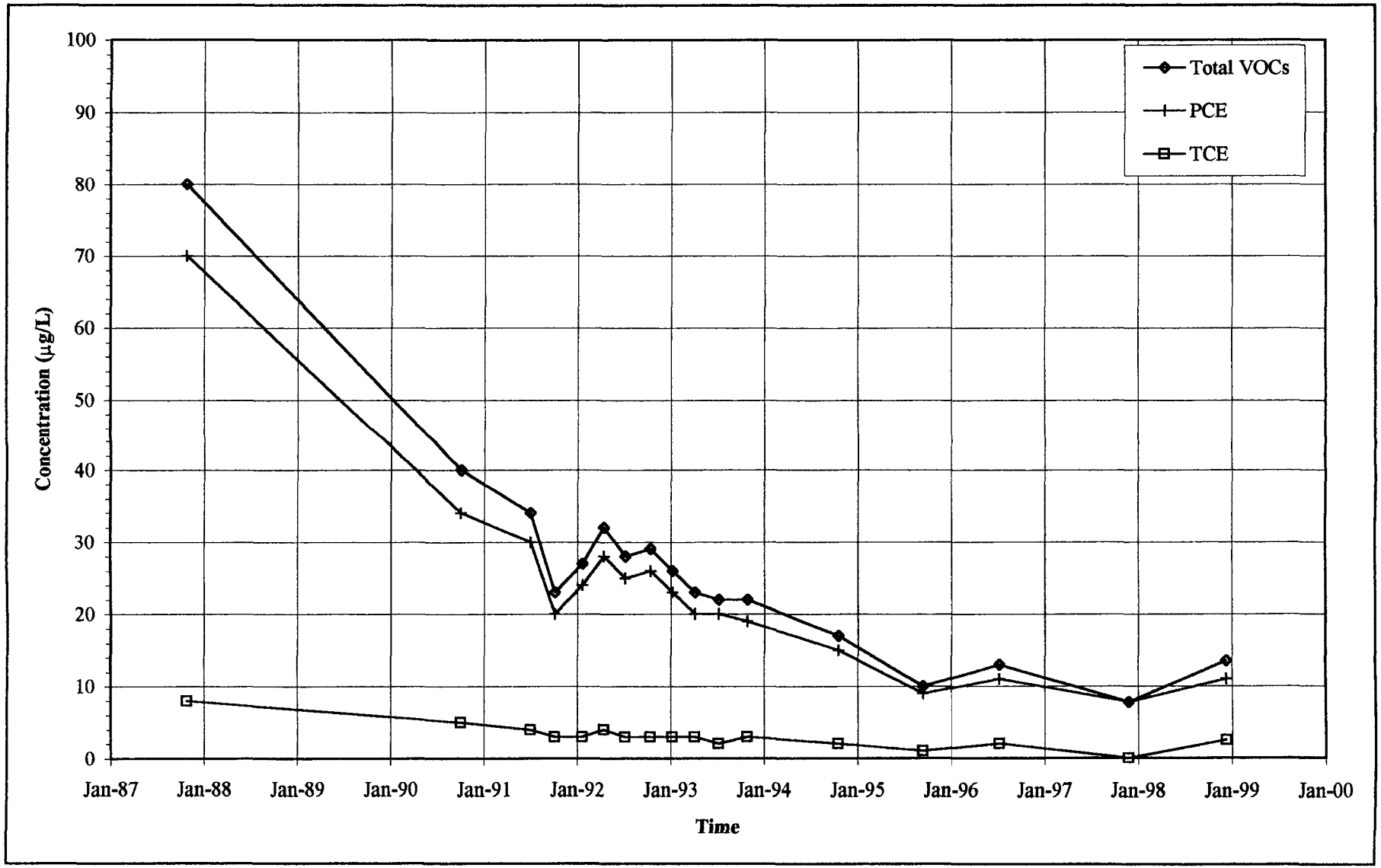
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 9
VOC Concentrations vs. Time - MW-8s
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



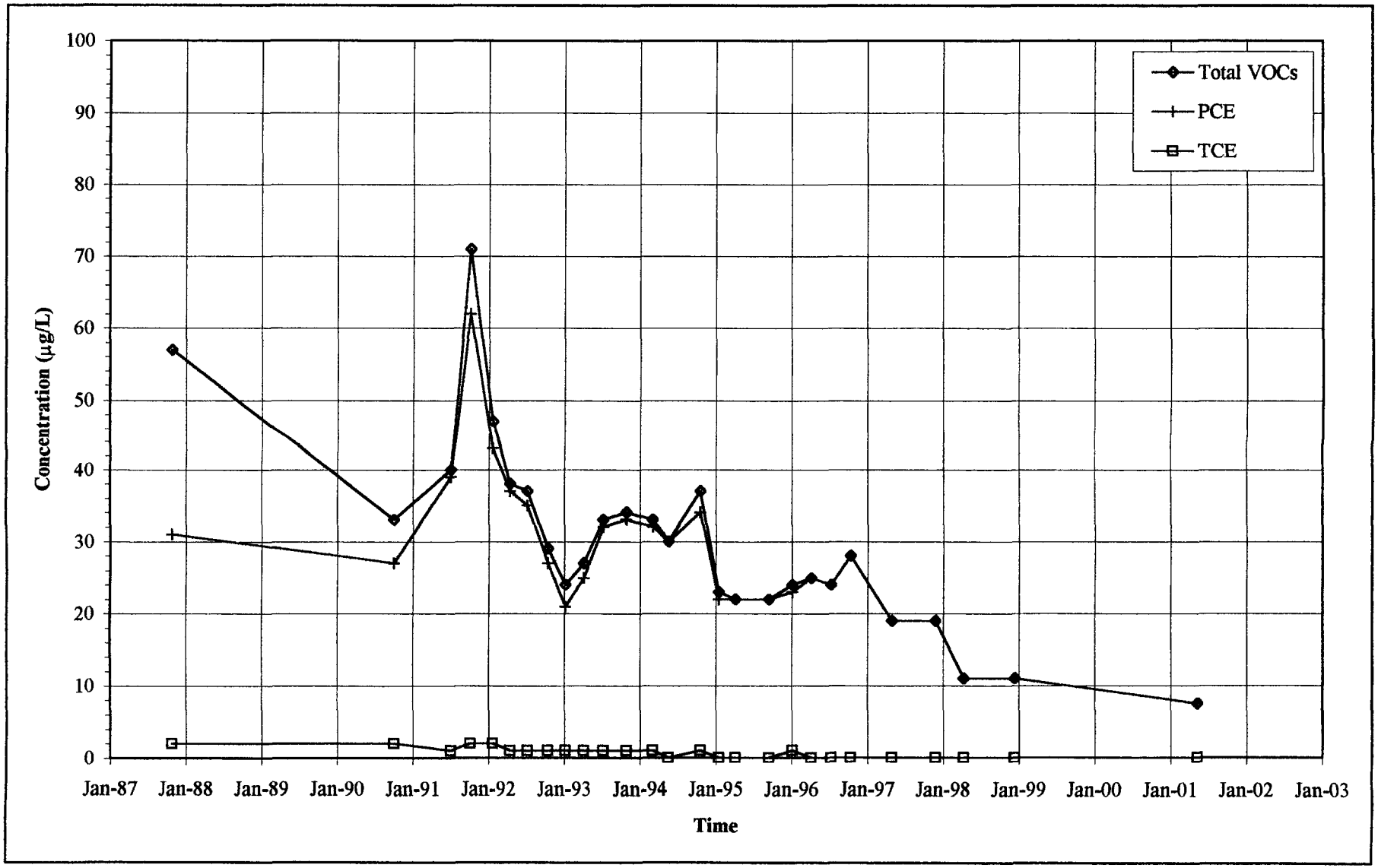
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 10
VOC Concentrations vs. Time - MW-8d
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



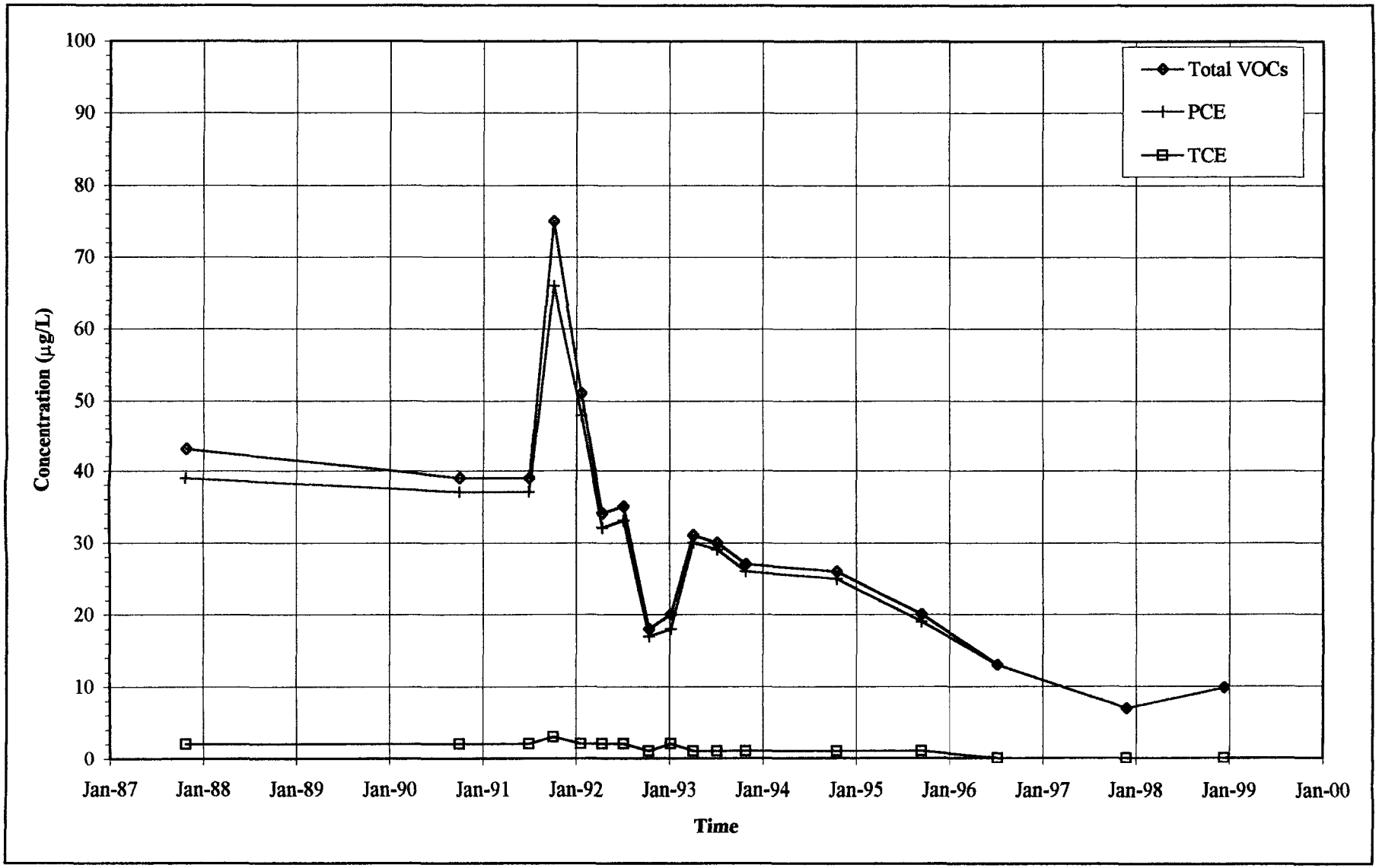
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 11
VOC Concentrations vs. Time - MW-9s
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



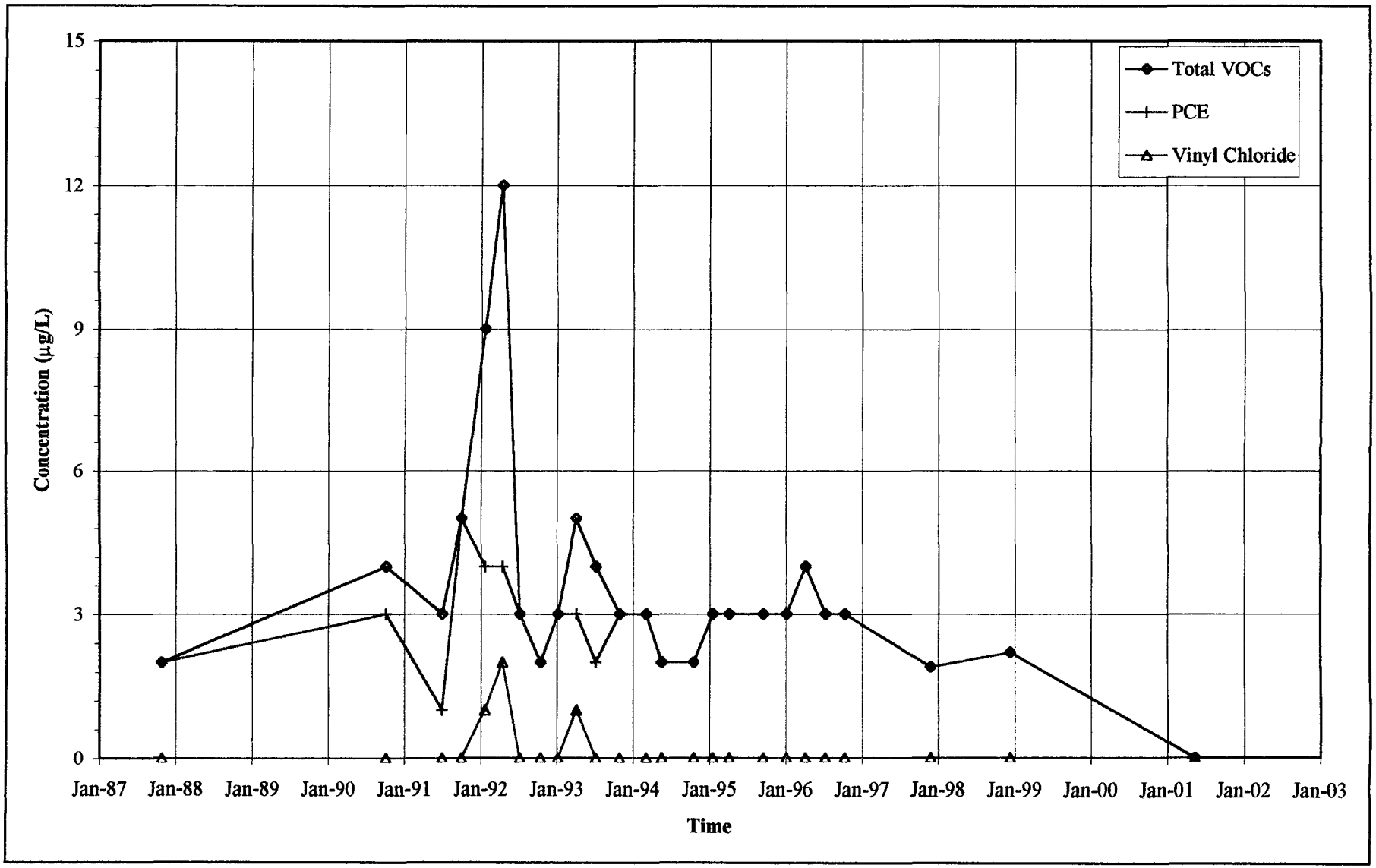
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 12
VOC Concentrations vs. Time - MW-9d
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



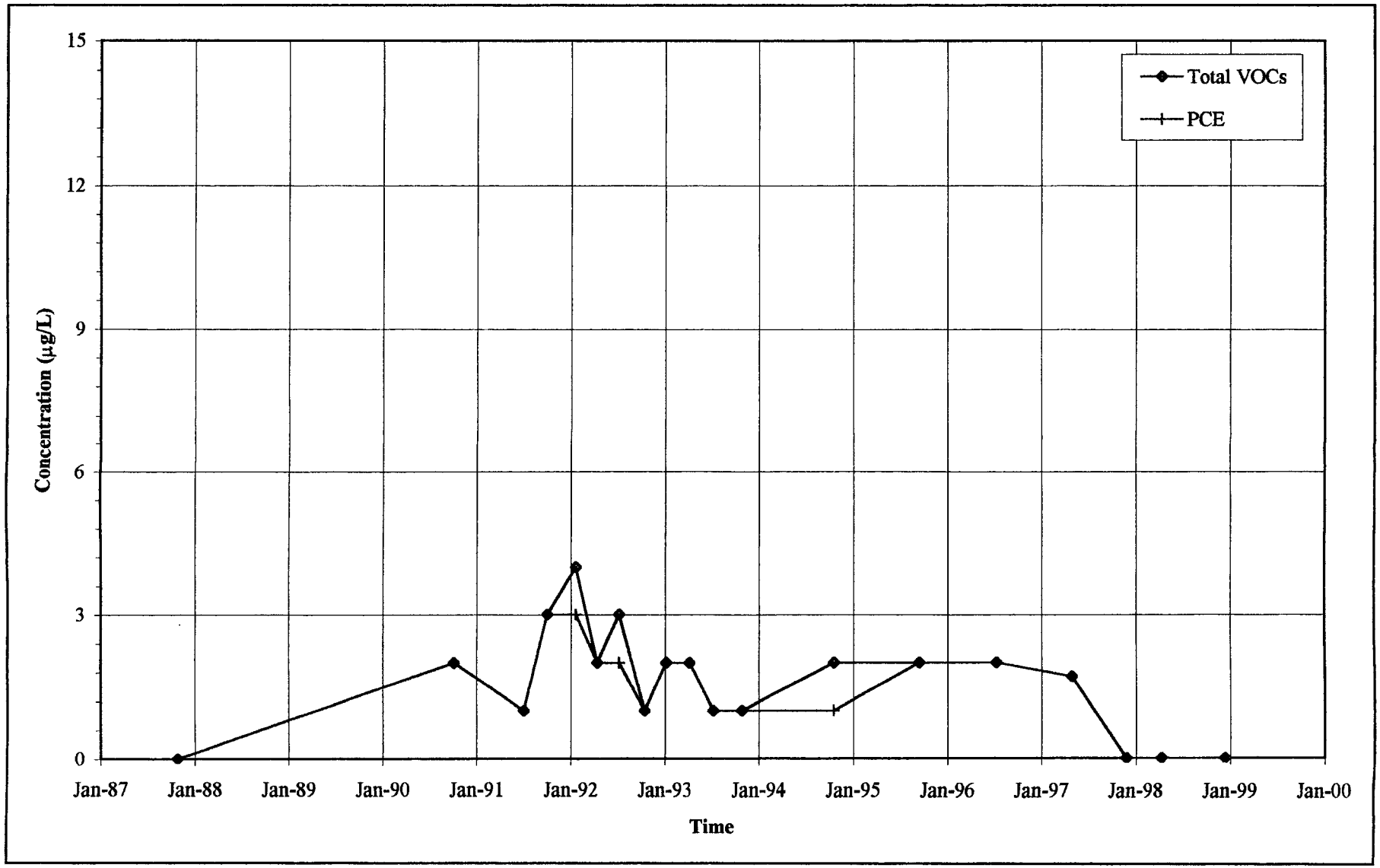
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 13
VOC Concentrations vs. Time - MW-10s
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



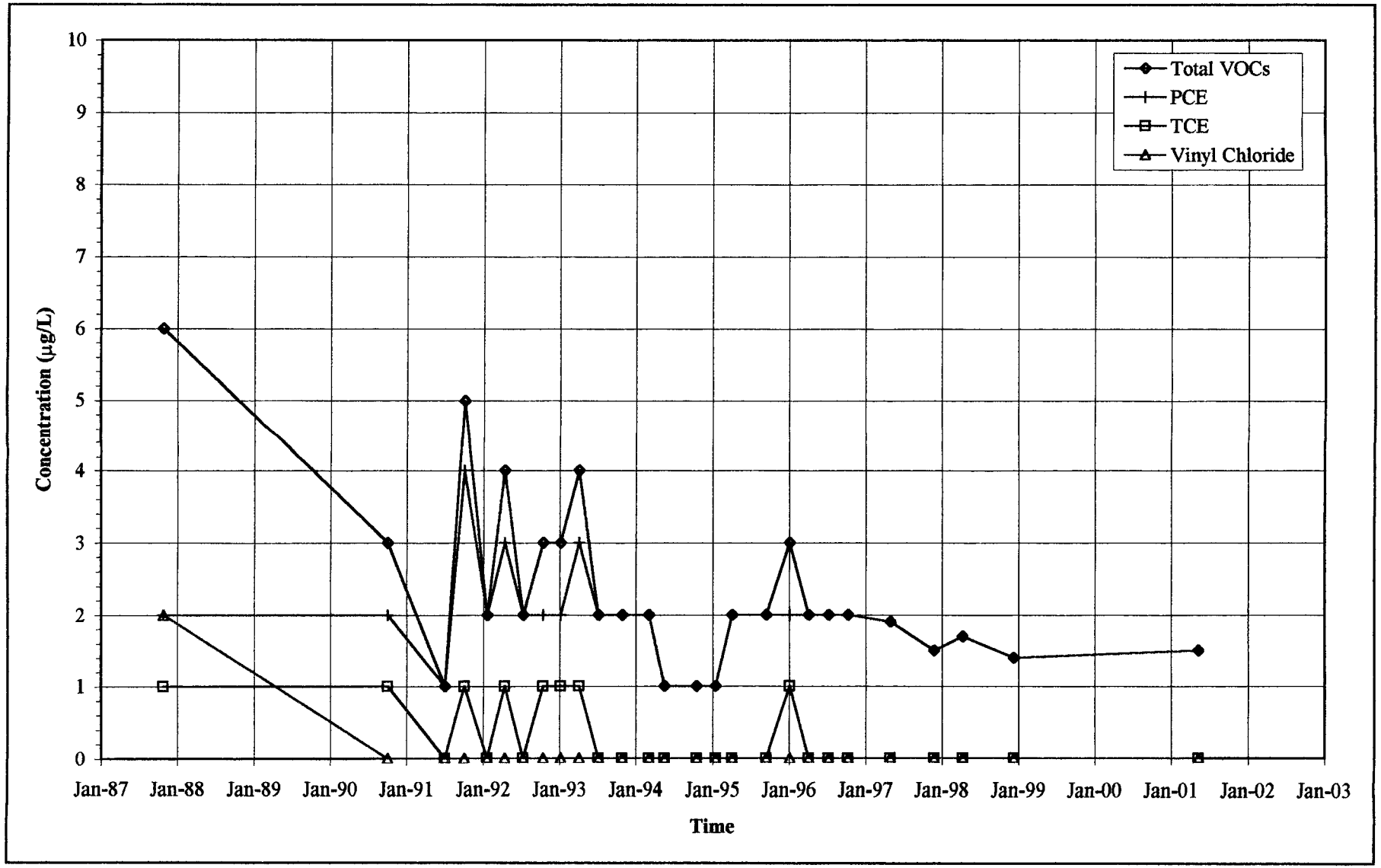
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 14
VOC Concentrations vs. Time - MW-10d
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



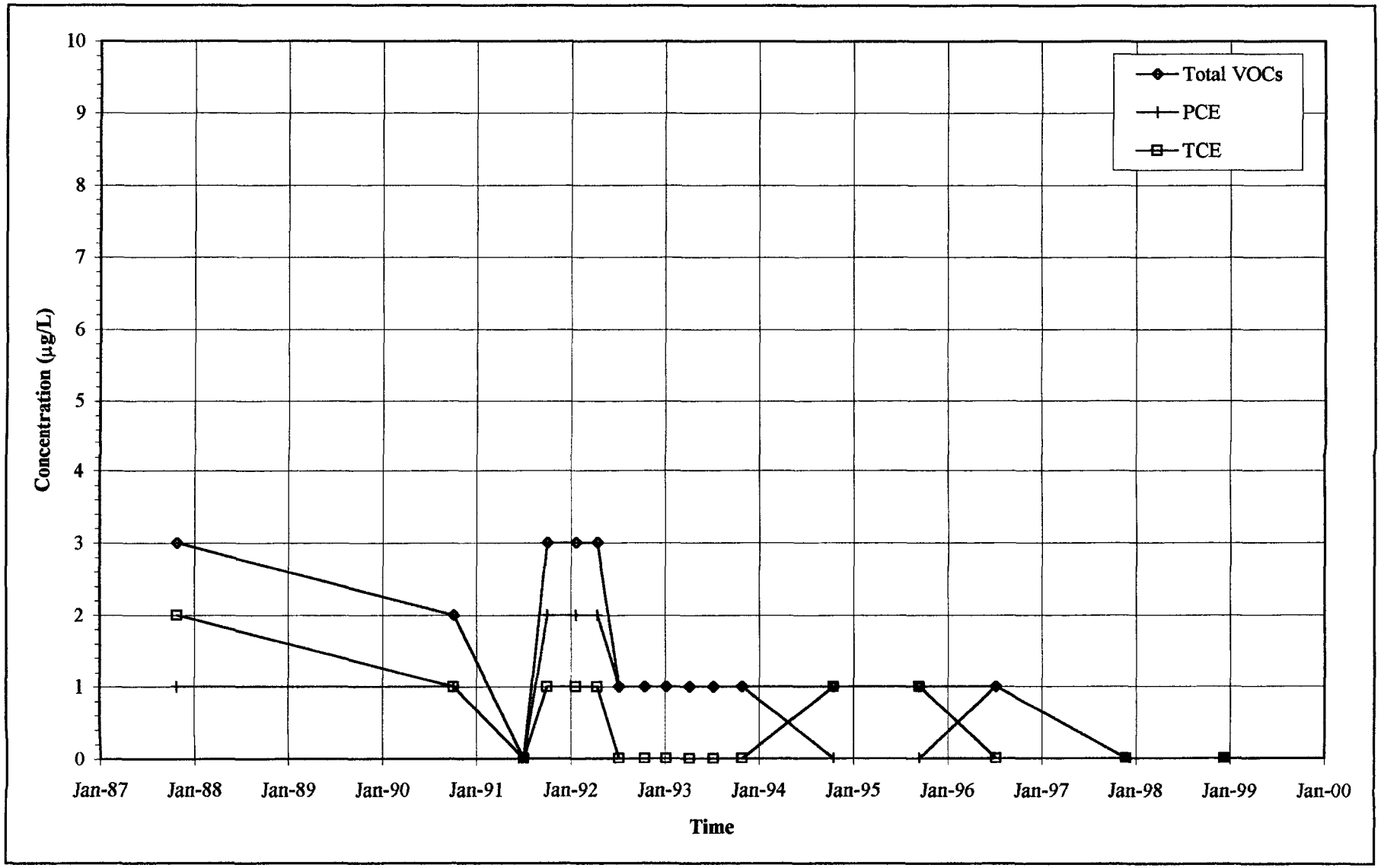
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 15
VOC Concentrations vs. Time - MW-12
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



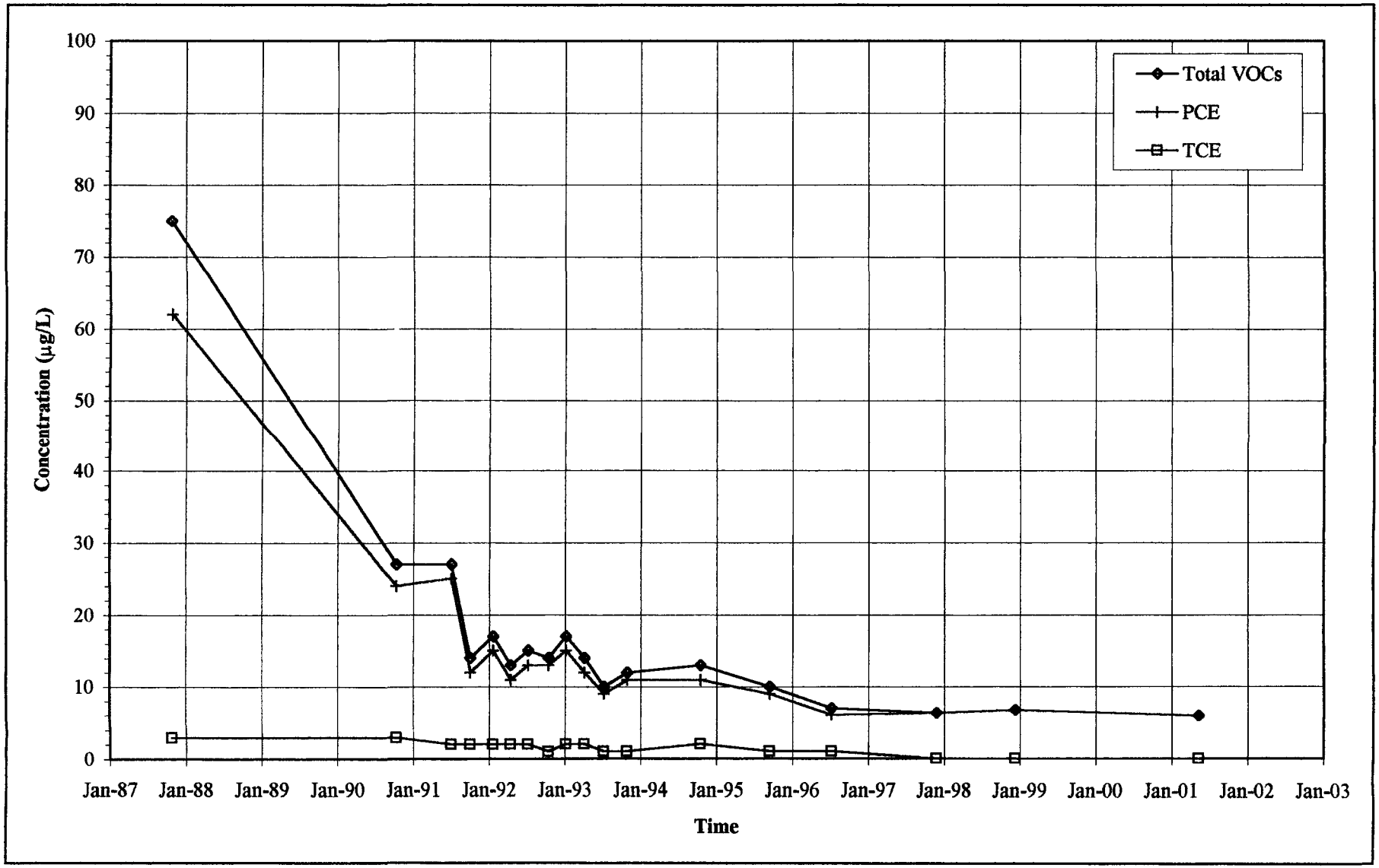
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 16
VOC Concentrations vs. Time - MW-14s
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



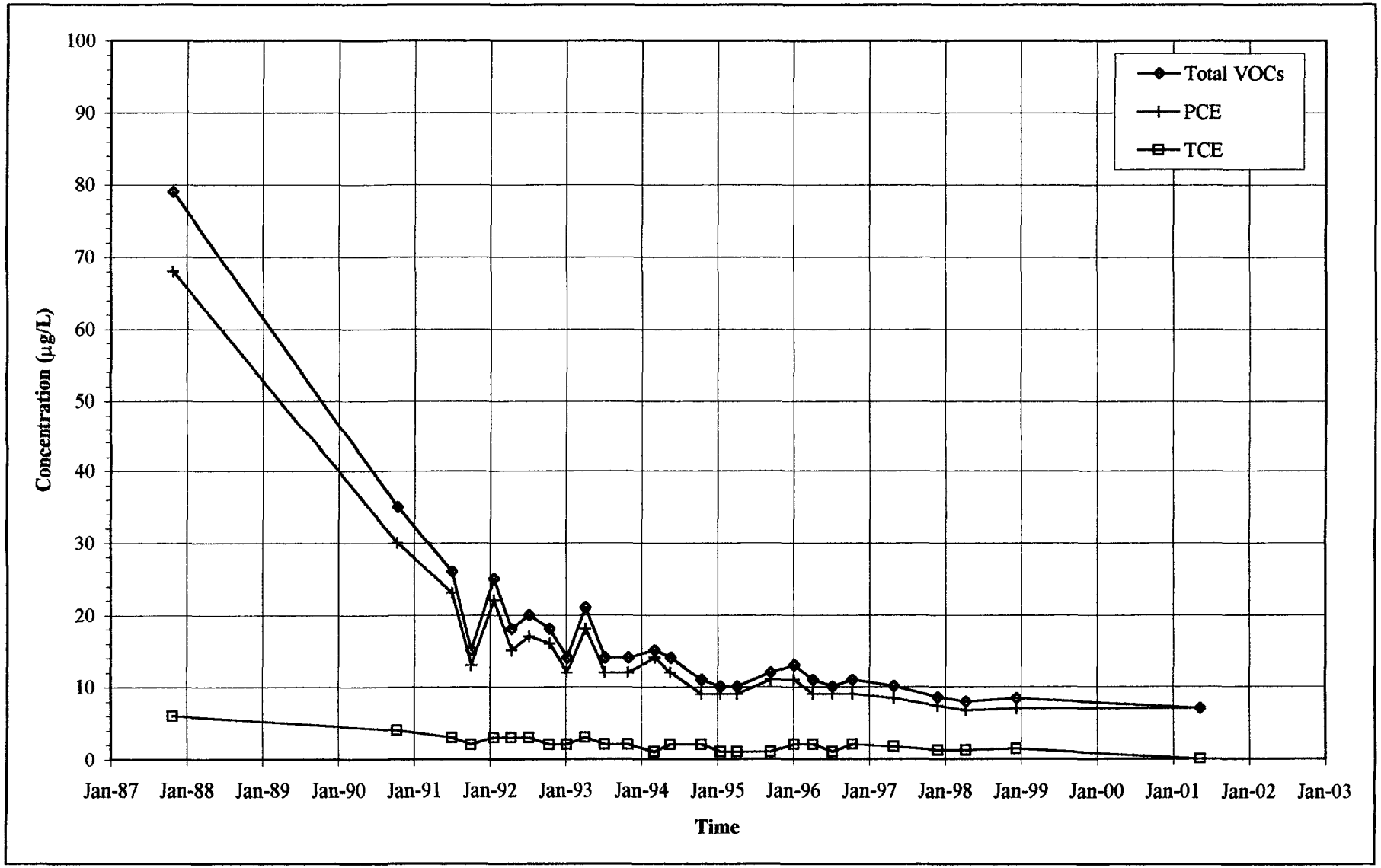
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 17
VOC Concentrations vs. Time - MW-15s
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



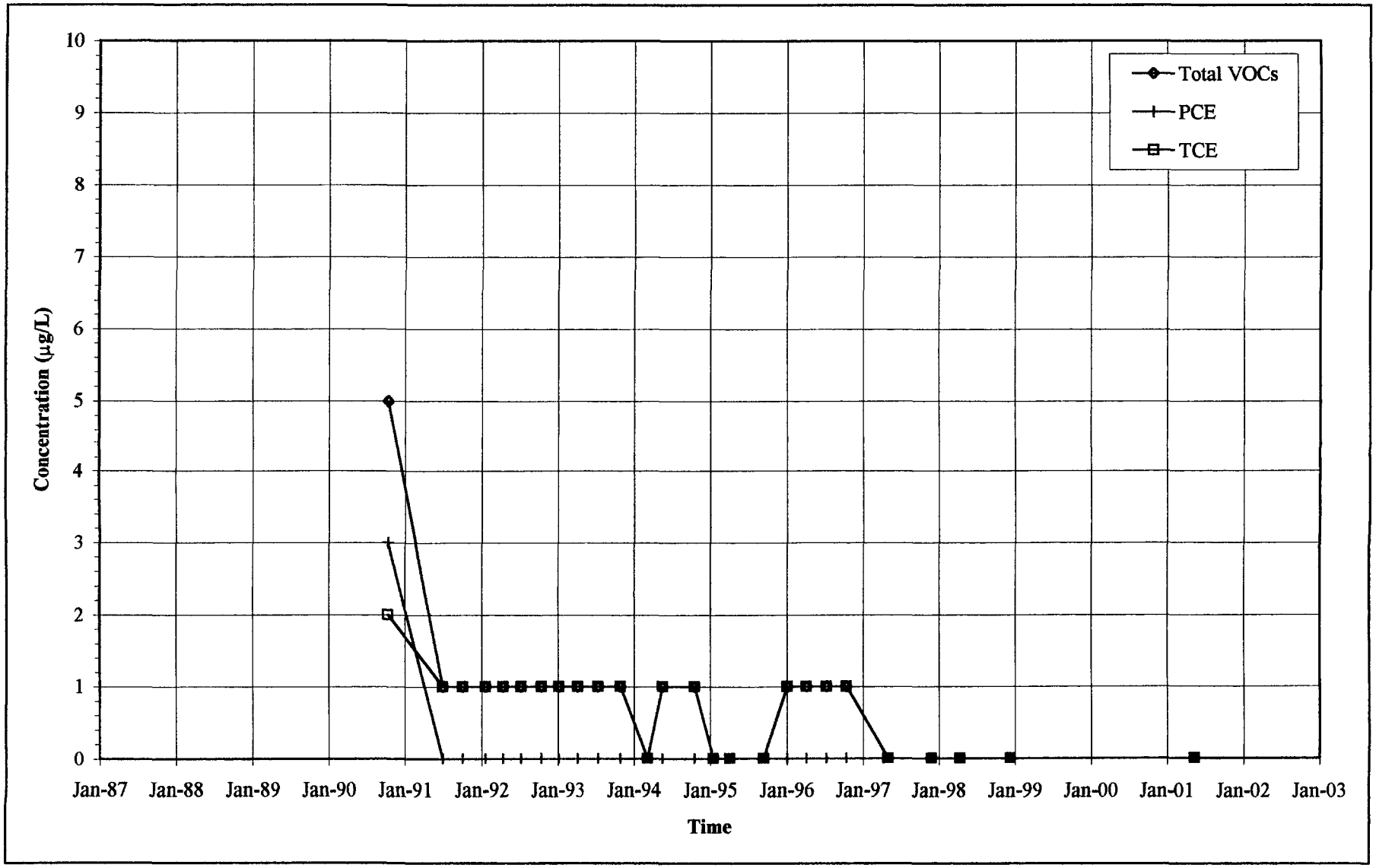
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 18
VOC Concentrations vs. Time - MW-15d
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



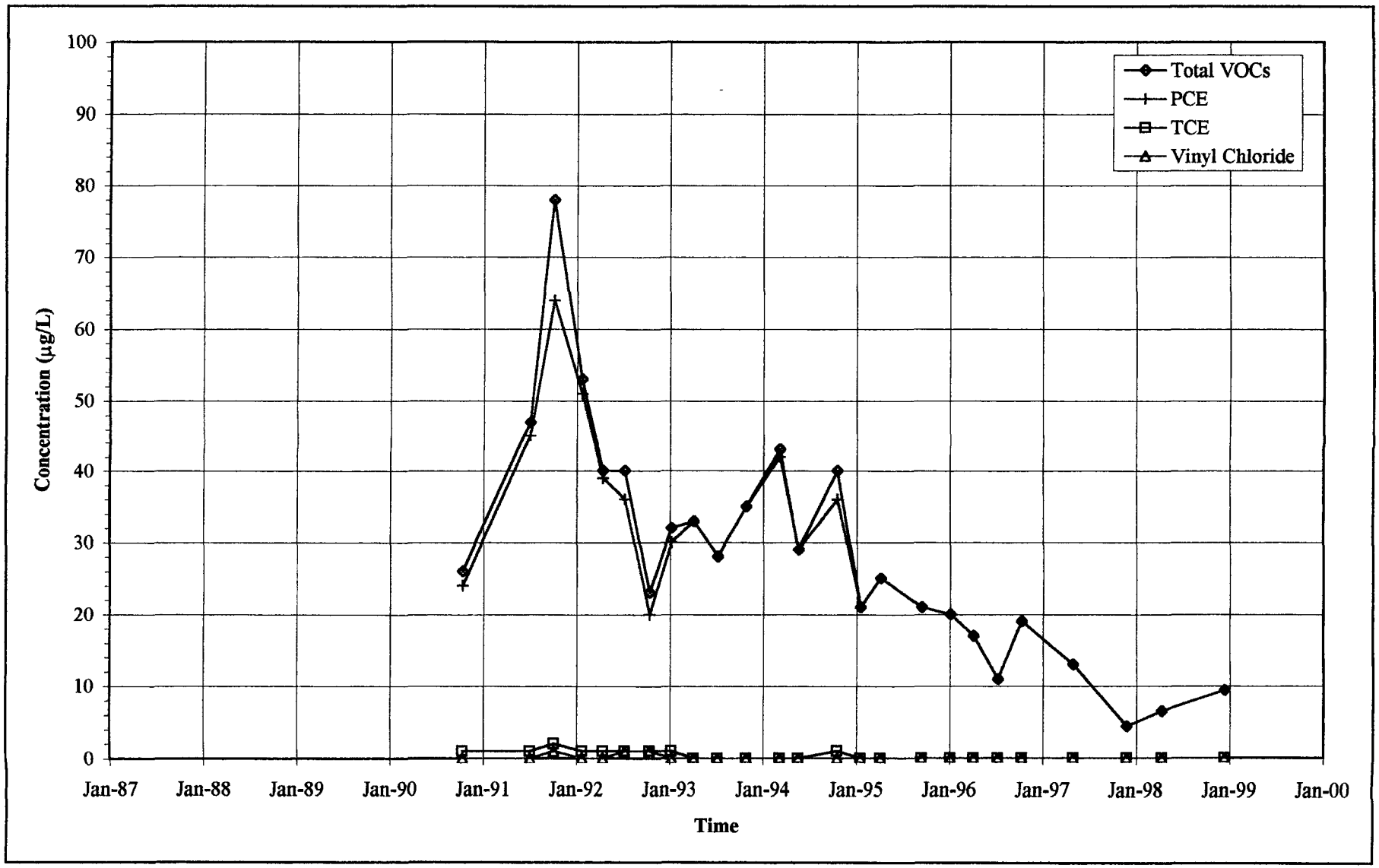
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 19
VOC Concentrations vs. Time - MW-17
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



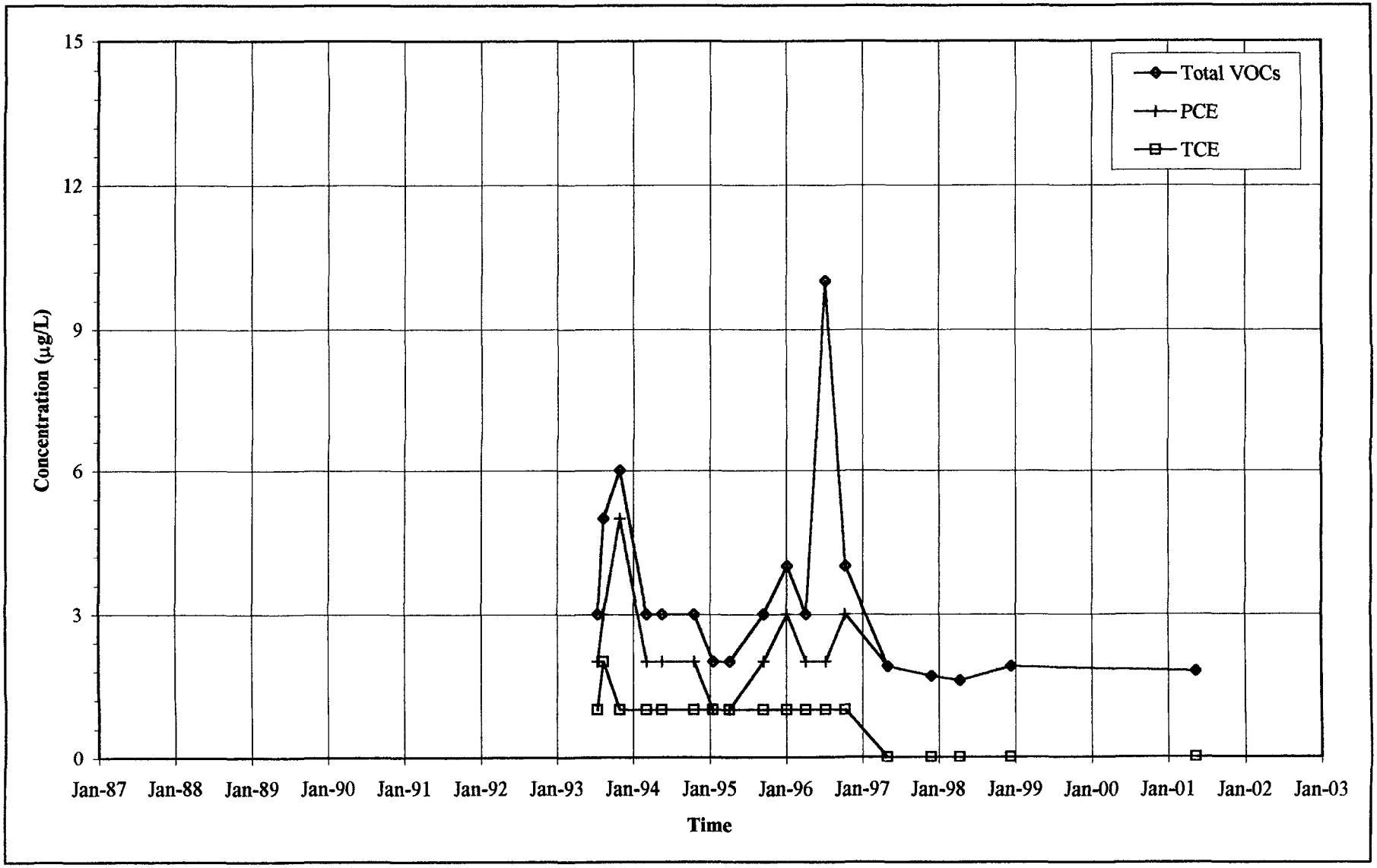
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 20
VOC Concentrations vs. Time - MW-19
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



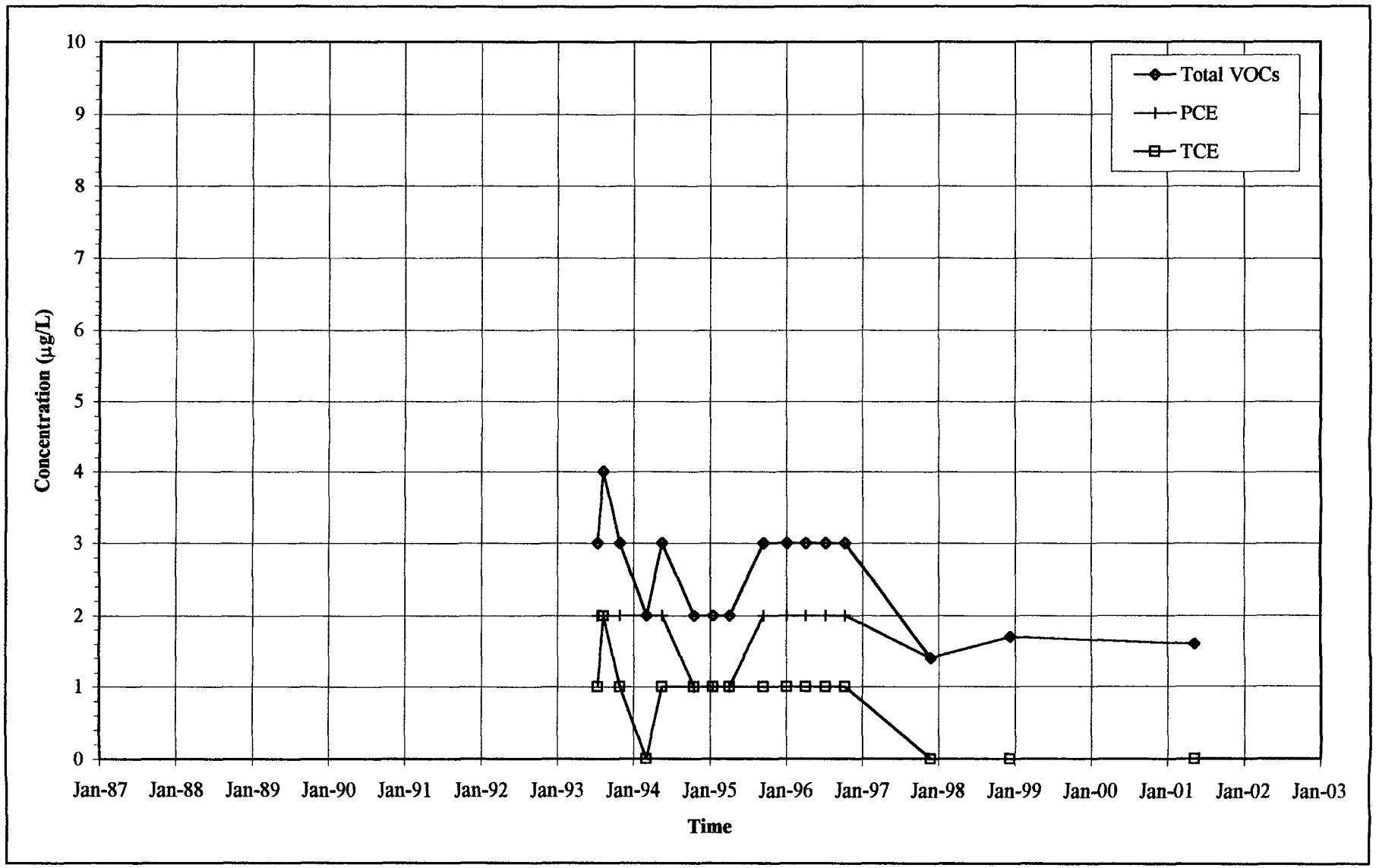
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 21
VOC Concentrations vs. Time - MW-20s
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



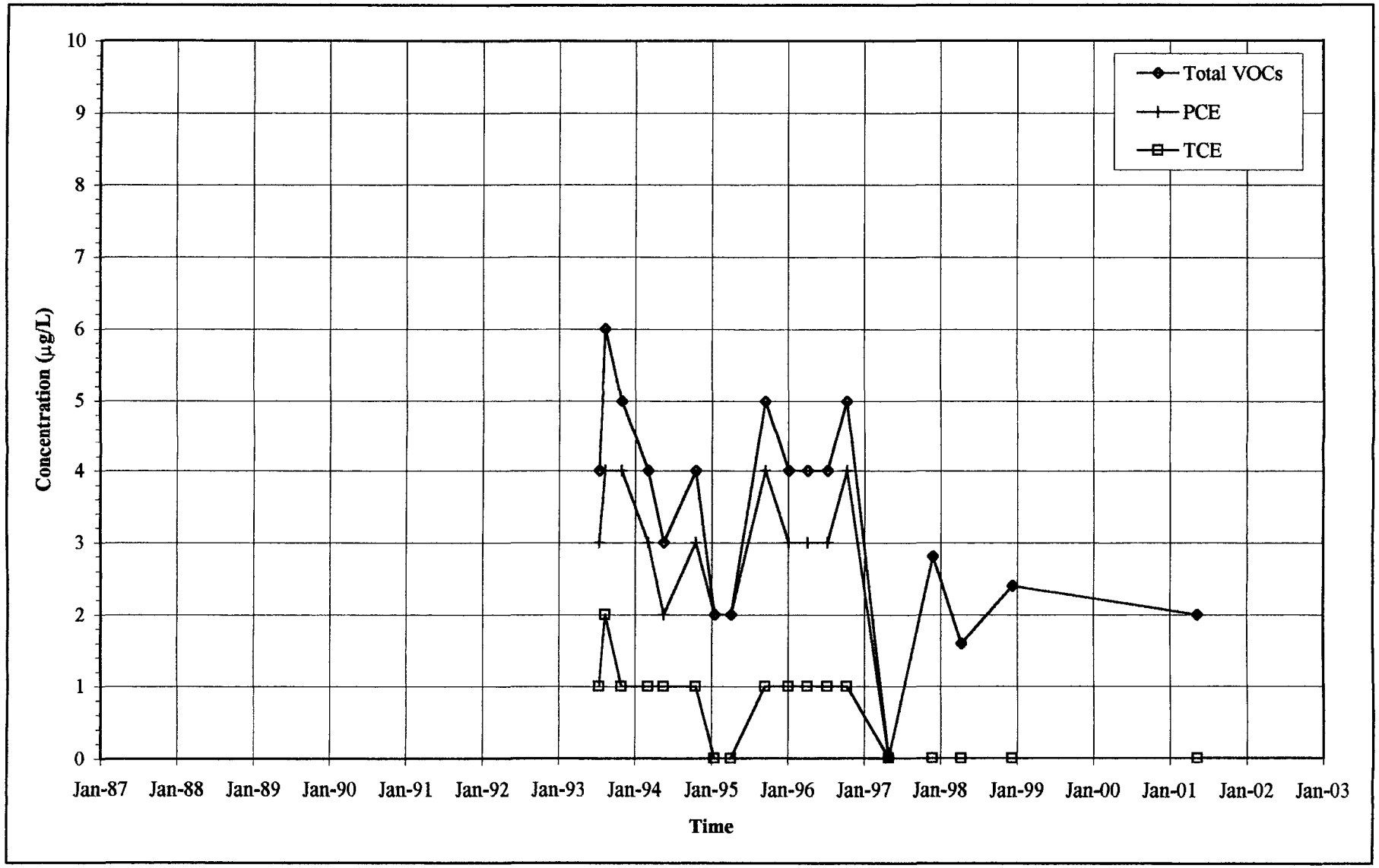
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 22
VOC Concentrations vs. Time - MW-20d
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



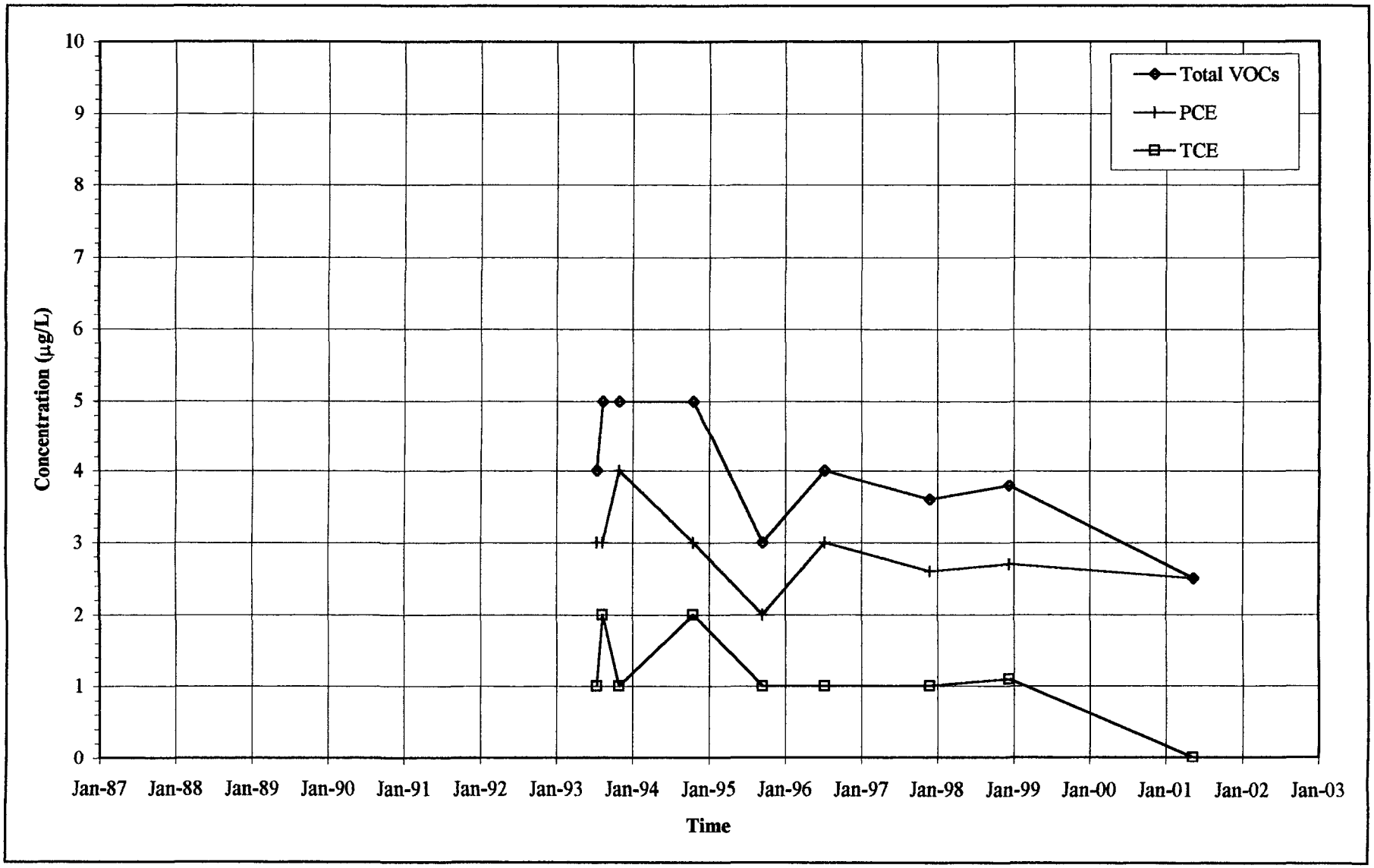
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 23
VOC Concentrations vs. Time - MW-21s
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



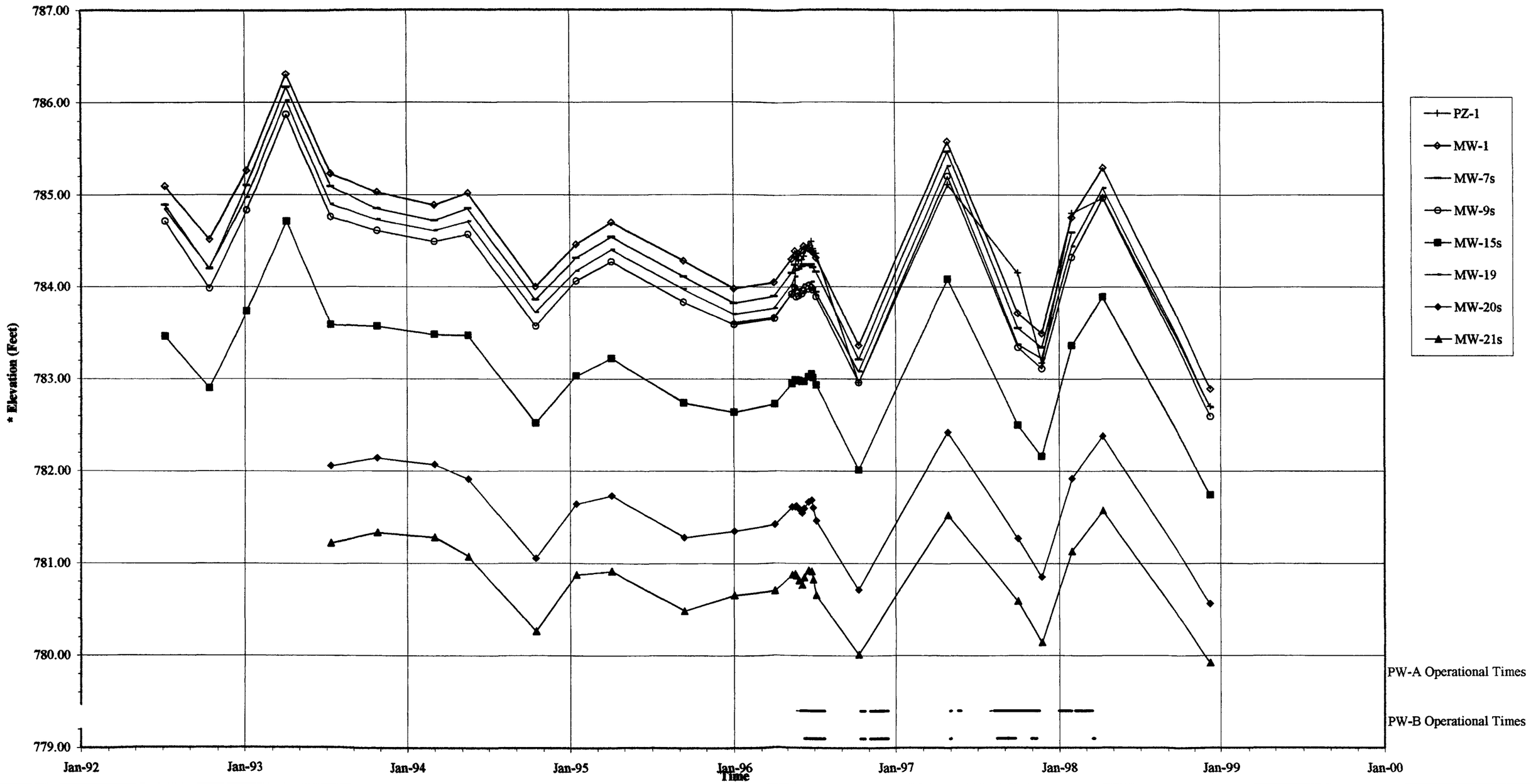
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 24
VOC Concentrations vs. Time - MW-21d
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 25
Monitor Well Hydrographs
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



* Elevations relative to USGS datum.

APPENDIX E

BORING/MONITOR WELL LOGS

JOB NUMBER #0191-1737 Hydreco DATE March 25, 1987

BORING NUMBER B-1 TOTAL DEPTH 26' S.W.L. (BGL)

Sample Number	From 0 to 26 Feet	Lithologic Description
	0 - 1.5	ASPHALT & GRAVEL FILL
	1.5 - 4	SAND; med.-coarse and fine gravel w/small amount of
		clay, somewhat moist, dk. brown-black
	4 - 6	SAND; med.-coarse and fine gravel, moist, brown
	6 - 8	SAND; fine-med. and some fine-coarse gravel, moist,
		lt. brown
	8 - 20	SAND; med.-coarse and fine grave, very moist, lt.
		brown
	20 - 26	SAND; coarse and fine-med. gravel, saturated, brown
		screened interval = 16.8 - 24.8 feet BGL
		8-foot #7 slot stainless steel screen
		17 feet of 2-inch galvanized casing
		bentonite slurry grout injected into borehole from
		approximately 15 feet BGL to surface
		Split-Spoon Samples
		#1; 0 - 2 feet BGL
		#2; 4 - 6 feet BGL
		#3; 9 - 11 feet BGL
		#4; 14 - 16 feet BGL
		#5; 19 - 21 feet BGL
		#6; 24 - 26 feet BGL

Piezometer: ☐ Screen _____ Pipe _____ Total Depth (BGL) 24.8'

JOB NUMBER #0191-1737 Hydreco DATE March 25, 1987 PAGE

BORING NUMBER B-2 TOTAL DEPTH 26' S.W.L. (BGL)

Sample Number	From 0 to 26 Feet	Lithologic Description
	0 - 0.3	ASPHALT
	0.3 - 3	CLAY & GRAVEL; fine-med., possibly fill material, dk.
		reddish brown
	3 - 14	SAND; fine-med. and occasional fine-med. gravel,
		moist to very moist, lt. brown
	14 - 26	SAND; coarse and fine-med. gravel, subrounded,
		materials are coarsening w/depth, moist to saturated,
		lt. brown, saturation noted in cuttings at approxi-
		mately 20 feet BGL
		screened interval = 19.5 - 24.5 feet BGL
		5-foot #7 slot stainless steel screen
		19 feet of 2-inch galvanized casing
		bentonite slurry grout injected into borehole from
		approximately 19 feet BGL to surface
		Split-Spoon Samples
		#1; 0 - 2 feet BGL
		#2; 4 - 6 feet BGL
		#3; 9 - 11 feet BGL
		#4; 14 - 16 feet BGL
		#5; 19 - 21 feet BGL
		#6; 24 - 26 feet BGL

Piezometer: ☐ Screen _____ Pipe _____ Total Depth (BGL) 24.5'

JOB NUMBER #0191-1737 Hydreco DATE [illegible]

BORING NUMBER B-3 TOTAL DEPTH 26' S.W.L. (BGL) _____

Sample Number	From 0 to 26 Feet	Lithologic Description
	0 - 3	CLAY; w/med. sand and some fine gravel, dk. brown,
		appears to have been the base to some sort of settling
		basin
	3 - 20	SAND; med.-fine and very fine-fine gravel w/occasional
		large gravel, moist, lt. brown, first foot was
		greenish-gray in color, saturation noted in cuttings
		at 20 feet BGL
	20 - 26	SAND; coarse and fine gravel, lt. brown
		screened interval = 19.4 - 24.4 feet BGL
		5-foot #7 slot stainless steel screen
		22.5 feet of 2-inch galvanized casing
		bentonite slurry grout injected into borehole from
		approximately 17 feet BGL to surface
		Split-Spoon Samples
		#1; 0 - 2 feet BGL
		#2; 4 - 6 feet BGL
		#3; 9 - 11 feet BGL
		#4; 14 - 16 feet BGL
		#5; 19 - 21 feet BGL
		#6; 24 - 26 feet BGL

Piezometer: ☐ Screen _____ Pipe _____ Total Depth (BGL) 24.4'

JOB NUMBER #0191-1737 Hydreco DATE March 25, 1987 PAGE

BORING NUMBER B-4 TOTAL DEPTH 26' S.W.L. (BGL)

Sample Number	From 0 to 26 Feet	Lithologic Description
	0 - 2	TOPSOIL; humus w/much fine sand and silt w/occasional
		fine gravel, moist, dk. brown
	2 - 3	SAND; coarse and fine gravel, moist, lt. brown
	3 - 20	SAND; very fine-med. w/occasional small gravel,
		sand coarsens w/depth, moist, lt. brown, saturation
		noted in cuttings at 20 feet BGL
	20 - 26	SAND; med.-coarse and very fine-med. gravel, brown
		screened interval = 19.8 - 24.8 feet BGL
		5-foot #7 slot stainless steel screen
		22 feet of 2-inch galvanized casing
		bentonite slurry grout injected into borehole from
		approximately 17 feet BGL to surface
		Split-Spoon Samples
		#1; 0 - 2 feet BGL
		#2; 4 - 6 feet BGL
		#3; 9 - 11 feet BGL
		#4; 14 - 16 feet BGL
		#5; 19 - 21 feet BGL
		#6; 24 - 26 feet BGL

Piezometer: ☐ Screen _____ Pipe _____ Total Depth (BGL) 24.8'

BORING/WELL LOG DATA

KECK CONSULTING SERVICES, INC.

PROJECT: #0191-1737 Hydreco	WELL/BORING No.: 5s&d
LOCATION: Galesburg, Michigan	DATE DRILLED: August 19, 1987
DRILLING METHOD: Screened Auger	CASING TYPE/DIA.: 2-inch I.D. galvanized
TOTAL DEPTH DRILLED: 50 feet BGL	TOTAL CASING: d - 21 feet s - 21 feet
GROUND ELEVATION: 100 feet	T.O.C. ELEVATION: d - 102.88 feet s - 102.04 feet
GROUT TYPE/QUANTITY: bentonite slurry/2 bags	SCREEN TYPE/LENGTH: d - #7 slot/3 feet SS s - #7 slot/5 feet SS
GROUT INTERVAL(S): 30 - 38 feet BGL and 15 feet BGL to surface	SCREENED INTERVAL: d - 45 - 48 feet BGL s - 18 - 23 feet BGL
DEPTH TO WATER: 19.2 feet BGL (9/3/87)	GRAVEL PACK TYPE: natural
WATER LEVEL ELEVATION: d - 80.75 feet (9/3/87) s - 80.75 feet (9/3/87)	GRAVEL PACK INTERVAL: d - 38 - 48 feet BGL s - 15 - 30 feet BGL
	STATIC WATER LEVEL: d - 22.13' s - 21.29' DATE: 9/3/87

REMARKS: Nested wells in same borehole.

LOGGED BY: Paul D. French	SIGNATURE:

DEPTH	H2O/SOIL SAMPLE	FORMATION DESCRIPTION
0-1.5		TOPSOIL; organc, sandy w/occasional med. gravel at 1.5 feet
1.5-2		CLAY; w/fine-med. gravel
2-8		SAND; fine-med. and fine-coarse gravel, subrounded to well rounded,
		moist, pale reddish-brown
8-48		SAND; med.-coarse w/abundant fines and fine-med. gravel, cobbles
		noted at 40 feet, coarsengin w/depth to very sand sand and fine
		gravel from 30 to 48 feet, saturated at 19 feet, lt. brown
48-50		CLAY; very tight w/coarse sand and fine gravel, gray
19-24	SAS#1	fair development
29-34	SAS#2	fair development - black very fine sand noted, excellent evacuation
		with 4-inch pump
38-43	SAS#3	excellent development - excellent evacuation with 4-inch pump

BORING/WELL LOG DATA

KECK CONSULTING SERVICES, INC.

PROJECT: #0191-1737 Hydreco	WELL/BORING No.: 6s&d
LOCATION: Galesburg, Michigan	DATE DRILLED: August 20, 1987
DRILLING METHOD: Screened Auger	CASING TYPE/DIA.: 2-inch I.D. galvanized
TOTAL DEPTH DRILLED: 48 feet BGL	TOTAL CASING: d - 48 feet s - 21 feet
GROUND ELEVATION: 99 feet	T.O.C. ELEVATION: d - 101.64 feet s - 100.74 feet
GROUT TYPE/QUANTITY: bentonite slurry/2 bags	SCREEN TYPE/LENGTH: d - #7 slot/3 feet SS s - #7 slot/5 feet SS
GROUT INTERVAL(S): 30 - 38 feet BGL and 15 feet BGL to surface	SCREENED INTERVAL: d - 45 - 48 feet BGL s - 19 - 24 feet BGL
DEPTH TO WATER: 18.4 feet BGL (9/3/87)	GRAVEL PACK TYPE: natural
WATER LEVEL ELEVATION: d - 80.60 feet (9/3/87) s - 80.65 feet (9/3/87)	GRAVEL PACK INTERVAL: d - 38 - 48 feet BGL s - 15 - 30 feet BGL
	STATIC WATER LEVEL: d - 21.04' s - 20.09' DATE: 9/3/87

REMARKS: Nested wells in same borehole.

LOGGED BY: Paul D. French	SIGNATURE:

DEPTH	H2O/SOIL SAMPLE	FORMATION DESCRIPTION
0-1		TOPSOIL; humus, dk, brown, sandy
1-3		CLAY; w/fine-coarse sand and fine-med. gravel
3-7		SAND; fine-coarse and fine-med. gravel, pale reddish-brown
7-45		SAND; fine-coarse and fine gravel, moist at 5 feet, cobbles noted
		at 39 feet, saturation at 18 feet, lt. brown
45-48		SAND; very coarse, fine gravel and cobbles, lt. brown
48-50		CLAY; very tight w/coarse sand and fine gravel, gray
19-24	SAS#1	excellent evacuation - developed with KCS pump
29-34	SAS#2	moderate development - excellent evacuation
39-44	SAS#3	poor development - poor evacuation - poor sample

BORING/WELL LOG DATA

KECK CONSULTING SERVICES, INC.

PROJECT: #0191-1737 Hydreco	WELL/BORING No.: 7s&d
LOCATION: Galesburg, Michigan	DATE DRILLED: August 21, 1987
DRILLING METHOD: Screened Auger	CASING TYPE/DIA.: 2-inch I.D. galvanized
TOTAL DEPTH DRILLED: 53 feet BGL	TOTAL CASING: d - 53 feet s - 21 feet
GROUND ELEVATION:	T.O.C. ELEVATION: d - 101.79 feet s - 101.04 feet
GROUT TYPE/QUANTITY: bentonite slurry/2 bags	SCREEN TYPE/LENGTH: d - #7 slot/3 feet SS s - #7 slot/5 feet SS
GROUT INTERVAL(S): 30 - 43 feet BGL and 14 feet to surface	SCREENED INTERVAL: d - 50 - 53 feet BGL s - 16 - 21 feet BGL
DEPTH TO WATER: 18.4 feet BGL (9/3/87)	GRAVEL PACK TYPE: natural
WATER LEVEL ELEVATION: d - 80.69 feet (9/3/87) s - 80.68 feet (9/3/87)	GRAVEL PACK INTERVAL: d - 43 - 53 feet BGL s - 14 - 30 feet BGL
	STATIC WATER LEVEL: d-21.10' s-20.36' DATE: 9/3/87

REMARKS: Nested wells in same borehole.

LOGGED BY: Paul D. French	SIGNATURE:

DEPTH	H2O/SOIL SAMPLE	FORMATION DESCRIPTION
0-1		TOPSOIL; humus, sandy, black
1-3		SILT & CLAY; w/fine gravel
3-47		SAND; fine-med. and fine gravel, sand coarsening w/depth to med.-
		very coarse and fine-med. gravel, cobbles noted at 40 feet, lt.
		brown
47-53		SILT; noted by drilling characteristics
53		CLAY
19-24	SAS#1	added water - develoepd with KCS pump
29-34	SAS#2	poor development - added water - poor evacuation
39-44	SAS#3	poor development - added water - used KCS pump

BORING/WELL LOG DATA

KECK CONSULTING SERVICES, INC.

PROJECT: #0191-1737 Hydreco	WELL/BORING No.: 8s&d
LOCATION: Galesburg, Michigan	DATE DRILLED: August 24, 1987
DRILLING METHOD: Screened Auger	CASING TYPE/DIA.: 2-inch I.D. galvanized
TOTAL DEPTH DRILLED: 49 feet BGL	TOTAL CASING: d - 48 feet s - 27 feet
GROUND ELEVATION: 98.6 feet	T.O.C. ELEVATION: d - 100.65 feet s - 100.41 feet
GROUT TYPE/QUANTITY: bentonite slurry/2 bags	SCREEN TYPE/LENGTH: d - #7 slot/3 feet SS s - #7 slot/3 feet SS
GROUT INTERVAL(S): 30 - 38 feet BGL and 15 feet to surface	SCREENED INTERVAL: d - 45 - 48 feet BGL s - 24 - 27 feet BGL
DEPTH TO WATER: 18 feet BGL (9/3/87)	GRAVEL PACK TYPE: natural
WATER LEVEL ELEVATION: d - 80.61 feet (9/3/87) s - 80.61 feet (9/3/87)	GRAVEL PACK INTERVAL: d - 38 - 48 feet BGL s - 15 - 30 feet BGL
	STATIC WATER LEVEL: d-20.04' s-19.80' DATE: 9/3/87

REMARKS: Nested wells in same borehole.

LOGGED BY: Paul D. French	SIGNATURE:

DEPTH	H2O/SOIL SAMPLE	FORMATION DESCRIPTION
1-1.5		TOPSOIL; humus, dk. brown
1.5-3		CLAY; w/fine gravel, brown
3-7.5		SAND; fine-med. w/small coarse fraction and fine gravel, pale
		reddish-brown
7.5-41		SAND; fine-coarse and fine-med. gravel, sand coarsening w/depth,
		saturated noted at 18 feet, cobbles noted at 30 feet and below 41
		feet
41-49		SAND; coarse and fine-med. gravel
49		CLAY
29-34	SAS#1	moderate to poor development

BORING/WELL LOG DATA

KECK CONSULTING SERVICES, INC.

PROJECT: #0191-1737 Hydreco	WELL/BORING No.: 9s&d
LOCATION: Galesburg, Michigan	DATE DRILLED: August 25, 1987
DRILLING METHOD: Screened Auger	CASING TYPE/DIA.: 2-inch I.D. galvanized
TOTAL DEPTH DRILLED: 39 feet BGL	TOTAL CASING: d - 39 feet s - 27 feet
GROUND ELEVATION: 97.2 feet	T.O.C. ELEVATION: d - 99.65 feet s - 97.07 feet
GROUT TYPE/QUANTITY: bentonite slurry/2 bags	SCREEN TYPE/LENGTH: d - #7 slot/3 feet SS s - #7 slot/3 feet SS
GROUT INTERVAL(S): 30 - 33 feet BGL and 15 feet to surface	SCREENED INTERVAL: d - 36 - 39 feet BGL s - 24 - 27 feet BGL
DEPTH TO WATER: 16.6 feet BGL	GRAVEL PACK TYPE: natural
WATER LEVEL ELEVATION: d - 80.51 feet (9/3/87) s - 80.50 feet (9/3/87)	GRAVEL PACK INTERVAL: d - 33 - 39 feet BGL s - 15 - 30 feet BGL
	STATIC WATER LEVEL: d-19-14' s-18.57' DATE: 9/3/87

REMARKS: Nested wells in same borehole.

LOGGED BY: Paul D. French	SIGNATURE:

DEPTH	H2O/SOIL SAMPLE	FORMATION DESCRIPTION
0-1.5		TOPSOIL; humus, sandy, dk. brown
1.5-2		CLAY; w/med. sand and fine gravel
2-6		SAND; fine-coarse and fine-med. gravel, pale reddish-brown
6-39		SAND; fine-coarse and fine-med. gravel w/occasional cobbles, lt.
		brown, sand coarsens w/depth
39		CLAY; gray, silty w/some coarse sand
29-34	SAS#1	poor development - poor evacuation - poor sample

BORING/WELL LOG DATA

KECK CONSULTING SERVICES, INC.

PROJECT: #0191-1737 Hydreco	WELL/BORING No.: 10s&d
LOCATION: Galesburg, Michigan	DATE DRILLED: August 26, 1987
DRILLING METHOD: Screened Auger	CASING TYPE/DIA.: 2-inch I.D. galvanized
TOTAL DEPTH DRILLED: 38 feet BGL	TOTAL CASING: d - 38 feet s - 27 feet
GROUND ELEVATION: 96.8 feet	T.O.C. ELEVATION: d - 99.56 feet s - 49.31 feet
GROUT TYPE/QUANTITY: bentonite slurry/2 bags	SCREEN TYPE/LENGTH: d - #7 slot/3 feet SS s - #7 slot/3 feet SS
GROUT INTERVAL(S): 30 - 32 feet BGL and 15 feet to surface	SCREENED INTERVAL: d - 35 - 38 feet BGL s - 24 - 27 feet BGL
DEPTH TO WATER: 16.2 feet BGL (9/3/87)	GRAVEL PACK TYPE: natural
WATER LEVEL ELEVATION: d - 80.55 feet (9/3/87) s - 80.55 feet (9/3/87)	GRAVEL PACK INTERVAL: d - 32 - 38 feet BGL s - 15 - 30 feet BGL
	STATIC WATER LEVEL: d-19.01' s-18.76' DATE: 9/3/87

REMARKS: Nested wells in same borehole.

LOGGED BY: Paul D. French	SIGNATURE:

DEPTH	H2O/SOIL SAMPLE	FORMATION DESCRIPTION
1-1.5		TOPSOIL; humus, sandy, dk. brown
1.5-6		SAND; fine-coarse and fine-med. gravel w/some silt, pale reddish-
		brown
6-38		SAND; fine-med. and fine gravel, sand and gravel fraction coarsening
		w/depth, large cobble at 35 feet
38		CLAY; gray w/some coarse sand and fine gravel
29-34	SAS#1	poor development - poor evacuation

BORING/WELL LOG DATA

KECK CONSULTING SERVICES, INC.

PROJECT: #0191-1737 Hydreco	WELL/BORING No.: 11
LOCATION: Galesburg, Michigan	DATE DRILLED: August 27, 1987
DRILLING METHOD: Screened Auger	CASING TYPE/DIA.: 2-inch I.D. galvanized
TOTAL DEPTH DRILLED: 36 feet BGL	TOTAL CASING: 27 feet
GROUND ELEVATION: 95.8 feet	T.O.C. ELEVATION: 98.13 feet
GROUT TYPE/QUANTITY: bentonite slurry/2 bags	SCREEN TYPE/LENGTH: #7 slot/ 3 feet SS
GROUT INTERVAL(S): surface to 15 feet BGL	SCREENED INTERVAL: 24 - 27 feet BGL
DEPTH TO WATER: 15.5 feet BGL (9/3/87)	GRAVEL PACK TYPE: natural
WATER LEVEL ELEVATION: 80.40 (9/3/87)	GRAVEL PACK INTERVAL: 15 - 36 feet BGL
	STATIC WATER LEVEL: 17.73 feet DATE: 9/3/87

REMARKS:

LOGGED BY: Paul D. French	SIGNATURE:

DEPTH	H2O/SOIL SAMPLE	FORMATION DESCRIPTION
0-1.5		TOPSOIL; humus, sandy, dk. brown
1.5-4		SAND; fine-med. w/small coarse fraction and fine-med. gravel, pale
		reddish-brown
4-5		CLAY; w/some med. sand and fine gravel, brown
5-19		SAND; fine-med. and fine-med. gravel and cobbles
19-36		SAND; coarse and fine gravel, occasional cobbles at 36 feet, well
		rounded gravel
36		CLAY
29-34		good development

BORING/WELL LOG DATA

KECK CONSULTING SERVICES, INC.

PROJECT: #0191-1737 Hydreco	WELL/BORING No.: 12
LOCATION: Galesburg, Michigan	DATE DRILLED: August 28, 1987
DRILLING METHOD: Screened Auger	CASING TYPE/DIA.: 2-inch I.D. galvanized
TOTAL DEPTH DRILLED: 40 feet BGL	TOTAL CASING: 27 feet
GROUND ELEVATION: 94.8 feet	T.O.C. ELEVATION: 96.98 feet
GROUT TYPE/QUANTITY: bentonite slurry/2 bags	SCREEN TYPE/LENGTH: #7 slot/3 feet SS
GROUT INTERVAL(S): surface to 15 feet BGL	SCREENED INTERVAL: 24 - 27 feet BGL
DEPTH TO WATER: 14.7 feet BGL (9/3/87)	GRAVEL PACK TYPE: natural
WATER LEVEL ELEVATION: 80.15 feet (9/3/87)	GRAVEL PACK INTERVAL: 15 - 40 feet BGL
	STATIC WATER LEVEL: 16.83 feet DATE: 9/3/87

REMARKS:

LOGGED BY: Paul D. French	SIGNATURE:

DEPTH	H2O/SOIL SAMPLE	FORMATION DESCRIPTION
0-1.5		TOPSOIL; humus, sandy, dk. brown
1.5-3		CLAY; w/fine sand, pale reddish-brown
3-19		SAND; fine-med. and fine-med. gravel
19-37		SAND; med.-coarse and fine-med. cobbles at 33 feet
37-40		SILT; noted by drilling characteristics
40		CLAY; gray w/some med. sand and fine gravel
29-34	SAS#1	developed with KCS pump

BORING/WELL LOG DATA

KECK CONSULTING SERVICES, INC.

PROJECT: #0191-1737 Hydreco	WELL/BORING No.: OW-13s&d
LOCATION: Galesburg, Michigan	DATE DRILLED: October 14, 1987
DRILLING METHOD: Screened Auger	CASING TYPE/DIA.: 2-inch I.D. galvanized
TOTAL DEPTH DRILLED: 39.5 feet BGL	TOTAL CASING: d - 39 feet s - 25 feet
GROUND ELEVATION: 94.60 feet	T.O.C. ELEVATION: d - 97.26 feet s - 97.57 feet
GROUT TYPE/QUANTITY: bentonite slurry/30 gal.	SCREEN TYPE/LENGTH: d - #7 slot/3 feet SS s - #7 slot/3 feet SS
GROUT INTERVAL(S): 0 - 18 feet BGL	SCREENED INTERVAL: d - 35 - 38 feet BGL s - 22 - 25 feet BGL
DEPTH TO WATER: 14 feet BGL	GRAVEL PACK TYPE: natural
WATER LEVEL ELEVATION: NA	GRAVEL PACK INTERVAL:
	STATIC WATER LEVEL: NA DATE:

REMARKS:

LOGGED BY: Jeffrey D. Pincumbe	SIGNATURE:

DEPTH	H2O/SOIL SAMPLE	FORMATION DESCRIPTION
0-2'		TOPSOIL; silty loam
2-3'		SAND; med.-coarse, brown w/gravel
3-5'		SAND; med., brown
5-38'		SAND; coarse w/gravel, brown
38-39.5'		CLAY; brown w/sand and gravel
29-24'	water	good development

BORING/WELL LOG DATA

KECK CONSULTING SERVICES, INC.

PROJECT: #0191-1737 Hydreco	WELL/BORING No.: OW-14s&d
LOCATION: Galesburg, Michigan	DATE DRILLED: October 14, 1987
DRILLING METHOD: Screened Auger	CASING TYPE/DIA.: 2-inch I.D. galvanized
TOTAL DEPTH DRILLED: 38 feet BGL	TOTAL CASING: d - 36 feet s - 25 feet
GROUND ELEVATION: 93.5 feet	T.O.C. ELEVATION: d - 95.85 feet s - 96.05 feet
GROUT TYPE/QUANTITY: bentonite slurry/30 gal	SCREEN TYPE/LENGTH: d - #7 slot/3 feet SS s - #7 slot/3 feet SS
GROUT INTERVAL(S): 0 - 18 feet BGL	SCREENED INTERVAL: d - 34 - 37 feet BGL s - 22 - 25 feet BGL
DEPTH TO WATER: 14 feet BGL	GRAVEL PACK TYPE: natural
WATER LEVEL ELEVATION: d - 79.43 feet (10/26/87) s - 79.40 feet (10/26/87)	GRAVEL PACK INTERVAL:
	STATIC WATER LEVEL: d - 16.42' s - 16.63' DATE: 10/26/87

REMARKS:

LOGGED BY: Jeffrey D. Pincumbe	SIGNATURE:

DEPTH	H2O/SOIL SAMPLE	FORMATION DESCRIPTION
0-3'		TOPSOIL; silty loam
3-37'		SAND; coarse w/gravel, brown
37-38'		CLAY; till, gray
27-32'	water	good development

BORING/WELL LOG DATA

KECK CONSULTING SERVICES, INC.

PROJECT: #0191-1737 Hydreco	WELL/BORING No.: OW-15s&d
LOCATION: Galesburg, Michigan	DATE DRILLED: October 16, 1987
DRILLING METHOD: Screened Auger	CASING TYPE/DIA.: 2-inch I.D. galvanized
TOTAL DEPTH DRILLED: 37 feet BGL	TOTAL CASING: d - 36 feet s - 25 feet
GROUND ELEVATION: 93.6 feet	T.O.C. ELEVATION: d - 96.89 feet s - 96.38 feet
GROUT TYPE/QUANTITY: bentonite slurry/30 gal.	SCREEN TYPE/LENGTH: d - #7 slot/3 feet SS s - #7 slot/3 feet SS
GROUT INTERVAL(S): 0 - 18 feet BGL	SCREENED INTERVAL: d - 33 - 36 feet BGL s - 22 - 25 feet BGL
DEPTH TO WATER: 14 feet BGL	GRAVEL PACK TYPE: natural
WATER LEVEL ELEVATION: d - 79.32 feet (10/26/87) s - 79.32 feet (10/26/87)	GRAVEL PACK INTERVAL:
	STATIC WATER LEVEL: d - 17.06' s - 17.57' DATE: 10/26/87

REMARKS:

LOGGED BY: Jeffrey D. Pincumbe	SIGNATURE:

DEPTH	H2O/SOIL SAMPLE	FORMATION DESCRIPTION
0-2'		TOPSOIL; silty loam
2-36'		SAND; med.-coarse, brown
36-37'		CLAY; till, gray
37-32'	water	good development

BORING/WELL LOG DATA

KECK CONSULTING SERVICES, INC.

PROJECT: Hydreco	WELL/BORING No.: OW-16
LOCATION: Galesburg, Michigan	DATE DRILLED: May 24, 1988
DRILLING METHOD: Hollow-Stem Augers	CASING TYPE/DIA.: NA
TOTAL DEPTH DRILLED: 85 Feet	TOTAL CASING: NA
GROUND ELEVATION:	T.O.C. ELEVATION: NA
GROUT TYPE/QUANTITY: NA	SCREEN TYPE/LENGTH: NA
GROUT INTERVAL(S): NA	SCREENED INTERVAL: NA
DEPTH TO WATER:	GRAVEL PACK TYPE: NA
WATER LEVEL ELEVATION:	GRAVEL PACK INTERVAL: NA
	STATIC WATER LEVEL: DATE:

REMARKS:

LOGGED BY: James W. Brode, Jr.	SIGNATURE:

DEPTH	Soil SAMPLE	FORMATION DESCRIPTION
0-3.5'		TOPSOIL; silty w/some fine-medium sand, brown, moist/dry, cobbles
		at 1 foot
3.5-40'		SAND; fine-medium-coarse and fine-medium-coarse gravel, medium brown,
		saturated at 19 feet, coarsens w/depth
40-57'		SAND; coarse-very coarse and fine-medium gravel
57-85'		CLAY; slightly silty, laminated, gray, stiff

BORING/WELL LOG DATA

KECK CONSULTING SERVICES, INC.

PROJECT: Hydreco	WELL/BORING No.: OW-17
LOCATION: Galesburg, Michigan	DATE DRILLED: May 24-25, 1988
DRILLING METHOD: Hollow-Stem Augers	CASING TYPE/DIA.:
TOTAL DEPTH DRILLED: 51 Feet	TOTAL CASING: 44 Feet
GROUND ELEVATION: 802.2 Feet	T.O.C. ELEVATION: 806.68 Feet
GROUT TYPE/QUANTITY: Bentonite	SCREEN TYPE/LENGTH: 936 #7 Slot
GROUT INTERVAL(S): Surface	SCREENED INTERVAL: 41 - 44 Feet BGL
DEPTH TO WATER:	GRAVEL PACK TYPE: Natural Materials
WATER LEVEL ELEVATION:	GRAVEL PACK INTERVAL:
	STATIC WATER LEVEL: DATE:

REMARKS:

LOGGED BY: Francis A. Breen, III	SIGNATURE:

DEPTH	Soil SAMPLE	FORMATION DESCRIPTION
0-2'		TOPSOIL; silty, fine sand, black
2-4'		SAND; fine-medium w/abundant clay
4-7'		SAND; some fine-medium gravel, black
7-9'		SAND; medium-fine w/some coarser sand and gravel, medium brown, moist
9-15'		SAND; medium-fine w/some coarser sand and gravel, medium brown, moist,
		w/coarser material, lighter brown color, dry
15-19'		SAND; fine-medium w/some gravel and trace coarse gravel
19-45'		SAND; poorly sorted w/gravel and small cobbles, saturation at 19 feet
45-47'		COBBLES
47-53'		CLAY
	51-53'	Split-Spoon Sample

BORING/WELL LOG DATA

KECK CONSULTING SERVICES, INC.

PROJECT: Hydreco	WELL/BORING No.: 18
LOCATION: Galesburg, Michigan	DATE DRILLED: September 23, 1988
DRILLING METHOD: Hollow-Stem Auger	CASING TYPE/DIA.: Galvanized/2-inch
TOTAL DEPTH DRILLED: 38 Feet	TOTAL CASING: 35 Feet
GROUND ELEVATION: --	T.O.C. ELEVATION: --
GROUT TYPE/QUANTITY: Bentonite	SCREEN TYPE/LENGTH: Stainless Steel #7 Slot/3-feet
GROUT INTERVAL(S): 14 - 0 Feet	SCREENED INTERVAL: 35 - 32 Feet
DEPTH TO WATER: 18 Feet	GRAVEL PACK TYPE: Natural
WATER LEVEL ELEVATION: ---	GRAVEL PACK INTERVAL: 35 - 14 Feet
	STATIC WATER LEVEL: -- DATE:

REMARKS:

LOGGED BY: Kenneth R. Manchester	SIGNATURE:

DEPTH	H2O/SOIL SAMPLE	FORMATION DESCRIPTION
0-1		TOPSOIL
1-6		SAND; medium to fine grained w/fine gravel and silt, light brown
6-20		SAND; medium grained, well sorted w/fine to medium gravel.
		Saturation at approximately 18 feet
20-38		SAND; medium to coarse grained w/fine to medium gravel

BORING/WELL LOG DATA

KECK CONSULTING SERVICES, INC.

PROJECT: Hydreco	WELL/BORING No.: 19
LOCATION: Galesburg, Michigan	DATE DRILLED: September 23, 1988
DRILLING METHOD: Hollow-Stem Augers	CASING TYPE/DIA.: Galvanized/2-inch
TOTAL DEPTH DRILLED: 37 Feet	TOTAL CASING: 35 Feet
GROUND ELEVATION: --	T.O.C. ELEVATION: --
GROUT TYPE/QUANTITY: Bentonite	SCREEN TYPE/LENGTH: Stainless Steel #7 Slot/3 feet
GROUT INTERVAL(S): 16.5 - 0 Feet	SCREENED INTERVAL: 35 - 32 Feet
DEPTH TO WATER: 18 Feet	GRAVEL PACK TYPE: Natural
WATER LEVEL ELEVATION: --	GRAVEL PACK INTERVAL: 35 - 16.5 Feet
	STATIC WATER LEVEL: --- DATE:

REMARKS:

LOGGED BY: Kenneth R. Manchester

SIGNATURE:

DEPTH	H2O/SOIL SAMPLE	FORMATION DESCRIPTION
0-1		TOPSOIL
1-6		SAND; fine to medium grained w/fine to medium gravel and silt, brown
6-23		SAND; medium grained w/gravel, light brown, saturation at
		approximately 18 feet
23-37		SAND; medium to coarse grained w/fine to medium gravel

BORING/WELL LOG DATA

KECK CONSULTING SERVICES, INC.

PROJECT:	Hydreco	WELL/BORING No.:	PW-1
LOCATION:	Galesburg	DATE DRILLED:	5/26/88
DRILLING METHOD:	Hollow-stem Auger	CASING TYPE/DIA.:	6" I D. Steel
TOTAL DEPTH DRILLED:	44 feet	TOTAL CASING:	36'
GROUND ELEVATION:	—	T.O.C. ELEVATION:	~
GROUT TYPE/QUANTITY:	Bentonite	SCREEN TYPE/LENGTH:	6" Stainless Steel #70 slot / 10'
GROUT INTERVAL(S):	18 - 0 Feet	SCREENED INTERVAL:	33 - 43 Feet
DEPTH TO WATER:	15 Feet	GRAVEL PACK TYPE:	Natural
WATER LEVEL ELEVATION:	—	GRAVEL PACK INTERVAL:	44 - 18'
		STATIC WATER LEVEL:	DATE:

REMARKS:

LOGGED BY: Frank Brown

SIGNATURE:

DEPTH	H2O/SOIL SAMPLE	FORMATION DESCRIPTION
0-2'		Topsoil with some cobbles, Black
2-9'		Sand fine-med w/some gravel, lt brown.
~~3-9~~		~~Sand, m~~
9-43		Sand fine-med w/some medium gravel & cobbles.
		dark brown.
43-44		Clay, grey

AMERICAN HYDROGEOLOGY CORPORATION
WELL/BORING LOG
PROJECT #: 24-1136

Project: General Signal Corporation/Benteler Industries
Location: 9000 East Michigan Ave., Galesburg, Michigan
Date (s) Drilled: January 24, 1996
Logged By: William K. Hunsberger
Drilling Co.: Ohio Drilling
Weather Conditions: Cool, cloudy

Well/Boring ID: IW-1
Page. 1 of 2
Boring Depth: 42.2'
Boring Diameter: 24"/16"
Drilling Method: Cable Tool
Drilling Equipment: Bucyrus Erie 60L
Top of Slots: 27.0' b.g.l.
Bottom of Slots: 42.0' b.g.l.

DEPTH feet (bgl)	SAMPLE: DEPTH	SAMPLE: BLOWS COUNTS	SAMPLE: RECOVERY	PID	STRATA	DESCRIPTION	WELL CONSTRUCTION DETAIL	ELEV. (feet)
						Soft black fine to medium SAND and CLAY (Topsoil), trace fine to medium Gravel Sand and gravel subrounded Slightly moist Organic		
						Soft brown CLAY, trace fine Sand, trace Silt Sand subrounded Slightly moist		
						Loose brown fine to coarse SAND, some fine to medium Gravel, some Silt/Clay Sand subrounded Slightly moist		
5						Loose brown fine to coarse SAND, some fine to coarse Gravel Sand and gravel subrounded Slightly moist	Cement/Bentonite Grout	794.6
10						Loose brown fine to medium SAND, some fine to medium Gravel, trace Silt/Clay Sand and gravel subrounded Slightly moist to saturated at ~16'		789.6
15							Bentonite Chips; Approximate Saturation	784.6
20						Fine to coarse SAND and GRAVEL Saturated	15.25 ID Black Steel Well Casing	779.6
						Loose brown fine to medium SAND, some fine to medium Gravel, trace Silt/Clay Sand and gravel subrounded Saturated		
						Black-brown mottled SAND, SILT, CLAY and PEAT Saturated		
25						Loose brown fine to coarse SAND, some fine to medium Gravel little Silt/Clay Sand and gravel subrounded Saturated	Natural Collapse	774.6
						Loose brown fine to coarse SAND and GRAVEL, trace fine to medium Cobbles, little Silt/Clay Sand, gravel and cobbles subrounded Saturated		
30							14" 30 Slot Stainless Steel Well Screen (5')	769.6
						Loose brown fine to coarse SAND and GRAVEL, some fine to coarse Cobbles, little Silt/Clay Sand, gravel and cobbles subrounded Saturated		
35								764.6

Notes:

AMERICAN HYDROGEOLOGY CORPORATION
WELL/BORING LOG
PROJECT #: 24-1136

Project: General Signal Corporation/Benteler Industries Well/Boring ID: IW-1

DEPTH feet (bgl)	SAMPLE: DEPTH	SAMPLE: BLOWS COUNTS	SAMPLE: RECOVERY	PID	STRATA	DESCRIPTION	WELL CONSTRUCTION DETAIL	ELEV. (feet)
							14" 100 Slot Stainless Steel Well Screen (10')	
40						Soft brown fine to coarse SAND, SILT, and CLAY, little fine to medium Gravel. Sand and gravel subrounded. Saturated.	Natural Collapse	759.6
45								754.6
50								749.6
55								744.6
60								739.6
65								734.6
70								729.6
75								724.6

Notes:

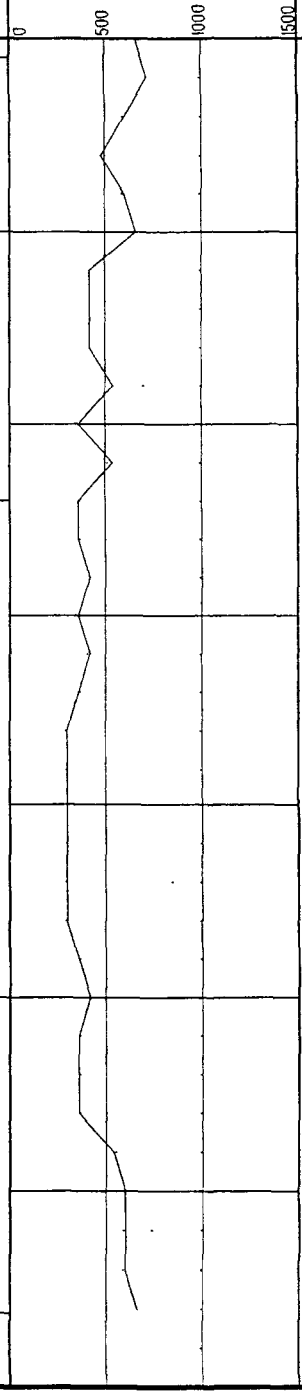
AMERICAN HYDROGEOLOGY CORPORATION
WELL/BORING LOG
PROJECT #: 24-1136

Project: General Signal
Location: Southwest corner trailer lot
Date (s) Drilled: 8-25-93
Logged By: Christopher L. Jacobs
Drilling Co.: Environmental Science and Engineer
Weather Conditions: ≈ 90° F, sunny

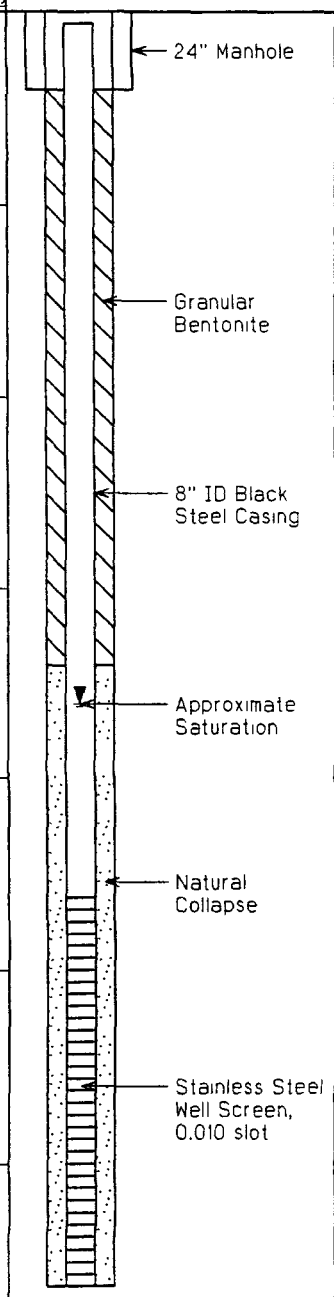
Well/Boring ID: PW-B
Page: 1 of 1
Boring Depth: 33.1'
Boring Diameter: ≈ 18"
Drilling Method: 12.25" Hollow Stem Auger
Drilling Equipment: Gus Pech
Top of Slots: 23.1' b.g.l.
Bottom of Slots: 33.1' b.g.l.

DEPTH feet (bgl)	SAMPLE: DEPTH	SAMPLE: BLOWS COUNTS	SAMPLE: RECOVERY	PID	STRATA	DESCRIPTION
						ASPHALT
						GRAVELY SAND-fine to medium grained, subangular to subrounded Gravel, very fine to coarse grained Sand, some Silt, poorly sorted, loose, slightly moist, medium brown.
5						SAND-fine to very coarse grained, subrounded, some Silt and fine subrounded Gravel, slightly cohesive, poorly sorted, loose, moist, gray/brown.
10						
						SAND-fine to medium grained, occasional coarse to very coarse grained, some fine to medium subrounded Gravel, moderately sorted, loose, moist to saturated at 18.0', light brown.
15						
20						
25						GRAVELY SAND-very fine to medium grained, subrounded Gravel, fine to medium subrounded Sand, coarse to very coarse grained, subangular to subrounded Sand, poorly sorted, loose, saturated, light brown mottled.
30						
35						

GAMMA LOG COUNTS PER MINUTE



WELL CONSTRUCTION DETAIL



ELEV. (feet)

Notes:

AMERICAN HYDROGEOLOGY CORPORATION
WELL/BORING LOG
PROJECT #: 24-1136

Project: General Signal
Well/Boring ID: PW-1

Location:
Boring Depth: 44.0'
Date (s) Drilled: May 26, 1988
Boring Diameter:
Logged By: Frank Breen
Drilling Method: HSA
Drilling Co.:
Drilling Equipment:
Weather Conditions:
Top of Slots: 33.0' b.g.l.
Bottom of Slots: 43.0' b.g.l.

DEPTH feet (bgl)	SAMPLE: DEPTH	SAMPLE: BLOWS COUNTS	SAMPLE: RECOVERY	PID	STRATA	DESCRIPTION	WELL CONSTRUCTION DETAIL	ELEV. (feet)
						TOPSOIL with some Cobbles, black	Topsoil	
						SAND-fine to medium, with some Gravel, light brown		
5							Bentonite Hole Plug	
						SAND-fine to medium with some medium Gravel and Cobbles dark brown		
10							4 ID Galvanized Steel Casing	
15								
20								
25							Natural Collapse	
30								
35								

Notes:

AMERICAN HYDROGEOLOGY CORPORATION
WELL/BORING LOG
PROJECT #: 24-1136

Project: General Signal Well/Boring ID: PW-1

DEPTH feet (bgl)	SAMPLE: DEPTH	SAMPLE: BLOWS COUNTS	SAMPLE: RECOVERY	PID	STRATA	DESCRIPTION	WELL CONSTRUCTION DETAIL	ELEV. (feet)
40							4 ID Stainless Steel Well Screen	
						CLAY grey		
45								
50								
55								
60								
65								
70								
75								

Notes:

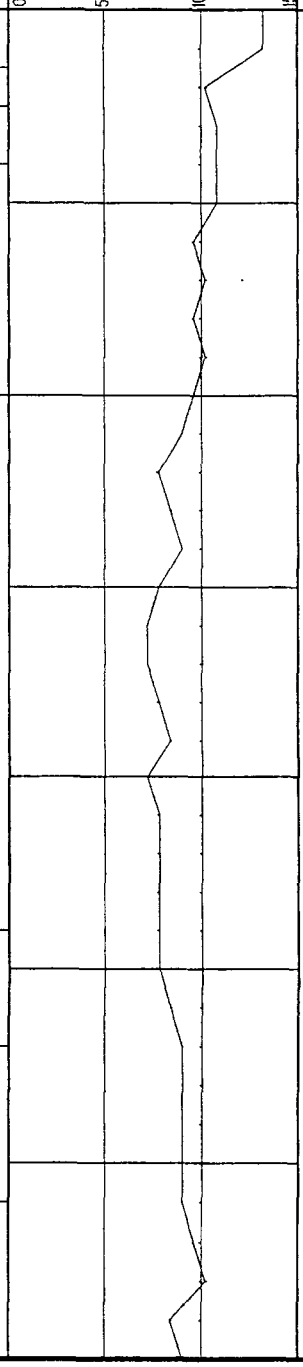
AMERICAN HYDROGEOLOGY CORPORATION
WELL/BORING LOG
PROJECT #: 24-1136

Project: General Signal
Location: Near proposed injection well location
Date (s) Drilled: December 19, 1995
Logged By: Donald J. Krug
Drilling Co.: Ohio Drilling
Weather Conditions: Clear, cold, windy

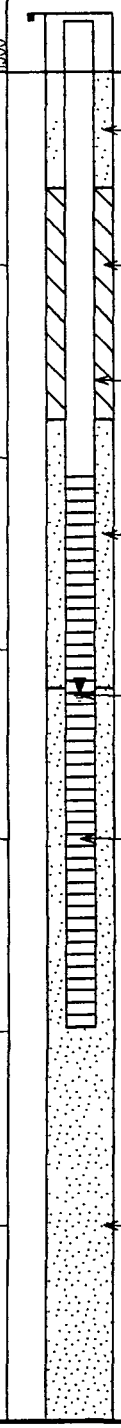
Well/Boring ID: PZ-1
Page: 1 of 2
Boring Depth: 41.0
Boring Diameter: 6"
Drilling Method: Cable Tool
Drilling Equipment: 22W Bucyrus Erie
Top of Slots: 10.5' b.g.l.
Bottom of Slots: 24.9' b.g.l.

DEPTH feet (bgl)	SAMPLE DEPTH	SAMPLE BLOWS COUNTS	SAMPLE RECOVERY	PID	STRATA	DESCRIPTION
				ND		Soft black fine to medium SAND and CLAY (Topsoil), trace fine to medium Gravel. Sand and gravel subrounded. Slightly moist. Organic.
				ND		
				ND		Soft brown CLAY, trace fine Sand, trace Silt. Sand subrounded. Slightly moist.
5						Loose brown fine to coarse SAND, some fine to medium Gravel, some Silt/Clay Sand subrounded. Slightly moist.
		DTS	~5'	ND		Loose brown fine to coarse SAND, some fine to coarse Gravel. Sand and gravel subrounded. Slightly moist.
10						Loose brown fine to medium SAND, some fine to medium Gravel, trace Silt/Clay. Sand and gravel subrounded. Slightly moist to saturated at ~16'. (19-20' interval - fine to coarse SAND and GRAVEL) (23.5-24' interval contained Sand/Silt/Clay and Peat, black-brown mottled, saturated.)
		DTS	~4'	ND		
15						
20		DTS	~4'			
25				ND		Loose brown fine to coarse SAND, some fine to medium Gravel, little Silt/Clay. Sand and gravel subrounded. Saturated.
		DTS	~4'	ND		Loose brown fine to coarse SAND and GRAVEL, trace fine to medium Cobbles, trace to little Silt/Clay. Sand, gravel and cobbles subrounded. Saturated.
30						Loose brown fine to coarse SAND and GRAVEL, some fine to coarse Cobbles, some to little Silt/Clay. Sand, gravel and cobbles subrounded. Saturated.
35		DTS	~4'	ND		

GAMMA LOG COUNTS PER MINUTE



WELL CONSTRUCTION DETAIL



ELEV. (feet)

Notes: DTS - driven tube sample.

AMERICAN HYDROGEOLOGY CORPORATION
WELL/BORING LOG
PROJECT #: 24-1136

Project: General Signal Well/Boring ID: PZ-1

DEPTH feet (bgl)	SAMPLE: DEPTH	SAMPLE: BLOWS COUNTS	SAMPLE: RECOVERY	PID	STRATA	DESCRIPTION	GAMMA LOG COUNTS PER MINUTE (0, 500, 1000, 1500)	WELL CONSTRUCTION DETAIL	ELEV. (feet)
40						Soft brown fine to coarse SAND/SILT/CLAY, little fine to medium Gravel Sand and gravel subrounded Saturated (Drillers observation Boulder at 41 in Clay/Silt, Did not move in attempt to drive sampling tube)			
45									
50									
55									
60									
65									
70									
75									

Notes: DTS - driven tube sample.

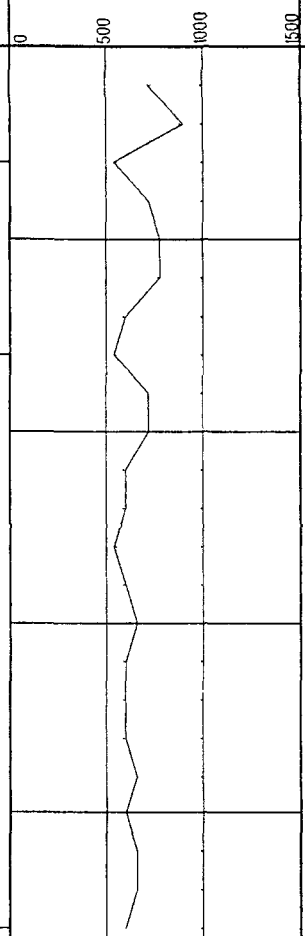
AMERICAN HYDROGEOLOGY CORPORATION
WELL/BORING LOG
PROJECT #: 24-1136

Project: General Signal
Location: 10' West of HPB-1
Date (s) Drilled: July 7, 1993
Logged By: Chrisopher L. Jacobs
Drilling Co.: Environmental Drilling and Services
Weather Conditions: Sunny, 85°

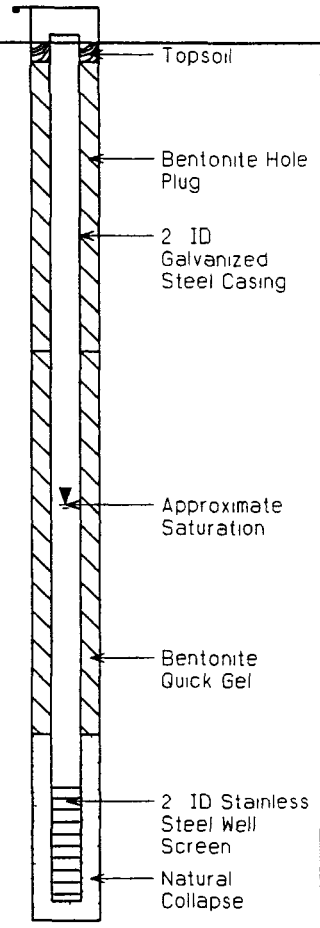
Well/Boring ID: MW-20d
Page: 1 of 1
Boring Depth: 23.0'
Boring Diameter: 8.25"
Drilling Method: HSA
Drilling Equipment: MD B-59
Top of Slots: 19.4' b.g.l.
Bottom of Slots: 22.4' b.g.l.

DEPTH feet (bgl)	SAMPLE DEPTH	SAMPLE BLOWS COUNTS	SAMPLE RECOVERY	PID	STRATA	DESCRIPTION
						TOPSOIL-SILTY SAND-fine to medium grained Sand, subrounded, some Clay and fine to medium subrounded Gravel, poorly sorted, loose, slightly cohesive, slightly moist medium brown
5						SAND-fine to medium grained, subrounded, occasional subangular, coarse to very coarse grained Sand, trace Silt and very fine subangular Gravel, moderately sorted very loose, slightly moist, red brown
10						SANDY GRAVEL-very fine to coarse subrounded to rounded Gravel, medium to very coarse grained subangular Sand, occasional cobbles, some Silt poorly sorted, very loose, moist to saturated at ≈ 12', red brown mottled
15						
20						
25						SILTY CLAY, occasional medium grained Sand, and very fine rounded Gravel, occasional plant fibers, somewhat plastic, medium stiff, moist, dark gray
30						
35						

GAMMA LOG COUNTS PER MINUTE



WELL CONSTRUCTION DETAIL



ELEV. (feet)

Notes: Located at HPB-1. Natural collapse occurred at 18.0', well developed by surging and bailing. Gamma Log was complete in the HPB-1 boring.

AMERICAN HYDROGEOLOGY CORPORATION
WELL/BORING LOG
PROJECT #: 24-1136

Project: General Signal
Location: 735' South of MW-15
Date (s) Drilled: July 7, 1993
Logged By: Chrisopher L. Jacobs
Drilling Co.: Environmental Drilling and Services
Weather Conditions: Sunny, 85° - 90°

Well/Boring ID: MW-21d
Page: 1 of 1
Boring Depth: 30.5'
Boring Diameter: 8.25"
Drilling Method: HSA
Drilling Equipment: MD B-59
Top of Slots: 24.0' b.g.l.
Bottom of Slots: 27.0' b.g.l.

DEPTH feet (bgl)	SAMPLE DEPTH	SAMPLE BLOWS COUNTS	SAMPLE RECOVERY	PID	STRATA	DESCRIPTION	GAMMA LOG COUNTS PER MINUTE (0, 500, 1000, 1500)	WELL CONSTRUCTION DETAIL	ELEV. (feet)
						SAND-very fine to medium grained subrounded, occasional coarse subangular, some Silt, trace very fine subrounded to subangular Gravel, poorly sorted, very loose, slightly moist, red brown		Topsoil; Bentonite Hole Plug	
5						SAND-fine to very coarse grained, subrounded to subangular, some fine subrounded Gravel, trace Silt, poorly sorted very loose, slightly moist, light brown		2 ID Galvanized Steel Casing	
						SANDY GRAVEL, very fine to medium subrounded Gravel with coarse Gravel, cobbles and stones at 9 0' very fine to very coarse subrounded to subangular Sand, some Silt, very pooly sorted, loose, moist to saturated at, light brown mottled			
10								Approximate Saturation	
15								Bentonite Quick Gel	
20									
25								2' ID Stainless Steel Well Screen; Natural Collapse	
30		27 52 105	0			CLAY Drilling observation			
35									

Notes: A Hydropunch sample was taken at 29'-30'. Well was developed by surging and bailing.

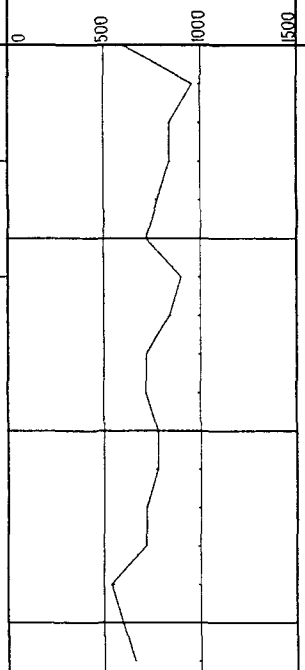
AMERICAN HYDROGEOLOGY CORPORATION
WELL/BORING LOG
PROJECT #: 24-1136

Project: General Signal
Location: 735' South of MW-15
Date (s) Drilled: July 7, 1993
Logged By: Chrisopher L. Jacobs
Drilling Co.: Environmental Drilling and Services
Weather Conditions: Sunny, 85° - 90°

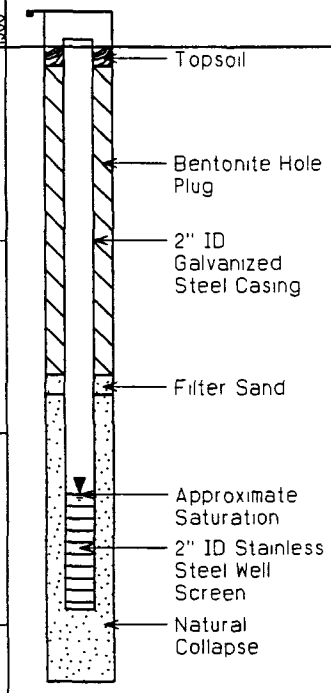
Well/Boring ID: MW-21s
Page: 1 of 1
Boring Depth: 16.5'
Boring Diameter: 8.25"
Drilling Method: HSA
Drilling Equipment: MD B-59
Top of Slots: 11.6' b.g.l.
Bottom of Slots: 14.6' b.g.l.

DEPTH feet (bgl)	SAMPLE: DEPTH	SAMPLE: BLOWS COUNTS	SAMPLE: RECOVERY	PID	STRATA	DESCRIPTION
						SAND-very fine to medium grained, subrounded, occasional coarse subangular, some Silt, trace very fine subrounded to subangular Gravel, poorly sorted, very loose, slightly moist, red brown.
5						SAND-fine to very coarse grained, subrounded to subangular, some fine subrounded Gravel, trace Silt, poorly sorted, very loose, slightly moist, light brown.
10						SANDY GRAVEL, very fine to medium subrounded Gravel, with coarse Gravel, cobbles and stones at 9.0', very fine to very coarse subrounded to subangular Sand, some Silt, very pooly sorted, loose, moist to saturated at 11.6', light brown mottled.
15						
20						
25						
30						
35						

GAMMA LOG COUNTS PER MINUTE



WELL CONSTRUCTION DETAIL



ELEV. (feet)

Notes: Well was driven an additional 1.1' after grouting to obtain a deeper screened interval. Developed by surging and bailing.

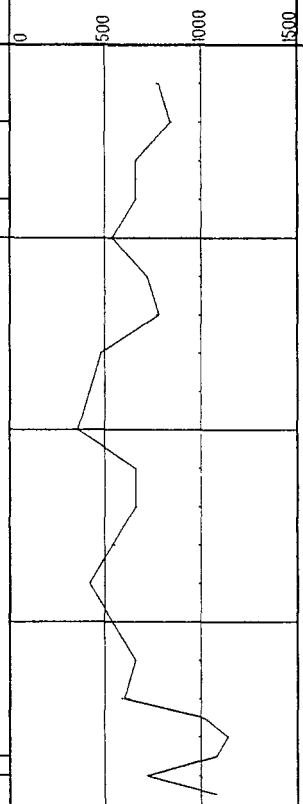
AMERICAN HYDROGEOLOGY CORPORATION
WELL/BORING LOG
PROJECT #: 24-1136

Project: General Signal
Location: ≈ 1000' South of MW-13
Date (s) Drilled: July 8, 1993
Logged By: Chrisopher L. Jacobs
Drilling Co.: Environmental Drilling and Services
Weather Conditions: Sunny, 85° - 90°

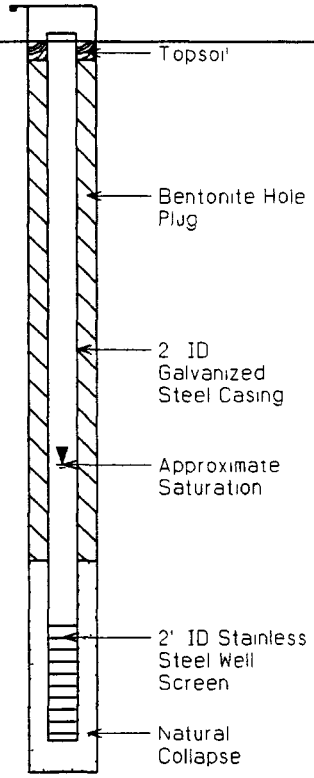
Well/Boring ID: MW-22d
Page: 1 of 1
Boring Depth: 19.0'
Boring Diameter: 8.25"
Drilling Method: HSA
Drilling Equipment: MD B-59
Top of Slots: 15.2' b.g.l.
Bottom of Slots: 18.2' b.g.l.

DEPTH feet (bgl)	SAMPLE DEPTH	SAMPLE BLOWS COUNTS	SAMPLE RECOVERY	PID	STRATA	DESCRIPTION
						TOPSOIL-SILTY SAND, very fine to medium grained subrounded, occasional fine subrounded Gravel, trace Clay somewhat cohesive loose, slightly moist, medium brown
						SAND-fine to medium grained, subrounded occasional coarse to very coarse grained, occasional very fine to fine subrounded Gravel, moderately sorted, very loose, dry, red brown
						SAND-very fine to medium grained, occasional coarse to very coarse grained, subrounded, occasional very fine to fine subrounded Gravel, some Silt poorly sorted, very loose, slightly moist, red brown
						SANDY GRAVEL, very fine to coarse subrounded Gravel, fine to coarse subrounded to subangular Sand, some cobbles some Silt very poorly sorted, medium dense, moist to saturated at 11.0', red brown mottled
20	X	7 20 35 41	1.0'			CLAY some Silt occasional fine to very coarse subrounded to subangular quartz Sand occasional very fine subrounded to subangular quartz Gravel, hard but plastic, moist dark gray

GAMMA LOG COUNTS PER MINUTE



WELL CONSTRUCTION DETAIL



ELEV. (feet)

Notes: Well was developed by surging and bailing

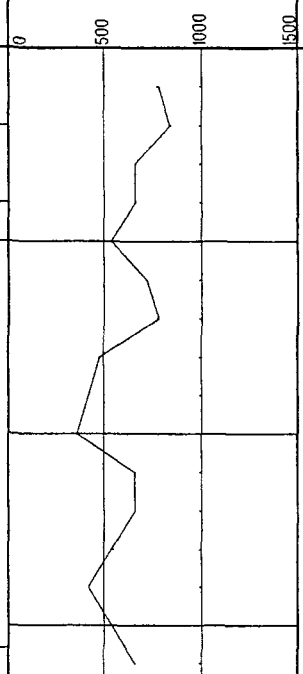
AMERICAN HYDROGEOLOGY CORPORATION
WELL/BORING LOG
PROJECT #: 24-1136

Project: General Signal
Location: ≈ 1000' South of MW-13
Date (s) Drilled: July 8, 1993
Logged By: Chrisopher L. Jacobs
Drilling Co.: Environmental Drilling and Services
Weather Conditions: Sunny, 85° - 90°

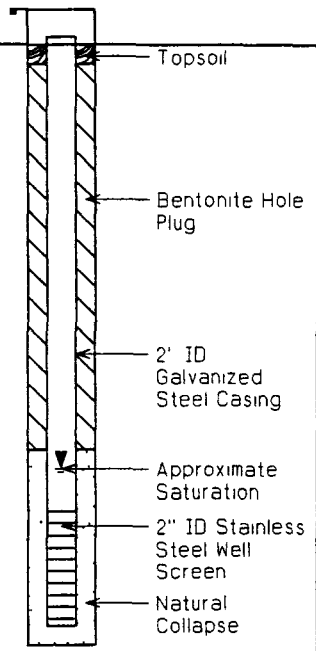
Well/Boring ID: MW-22s
Page: 1 of 1
Boring Depth: 15.6'
Boring Diameter: 8.25"
Drilling Method: HSA
Drilling Equipment: MD B-59
Top of Slots: 12.1' b.g.l.
Bottom of Slots: 15.6' b.g.l.

DEPTH feet (bgl)	SAMPLE: DEPTH	SAMPLE: BLOWS COUNTS	SAMPLE: RECOVERY	PID	STRATA	DESCRIPTION
						TOPSOIL-SILTY SAND, very fine to medium grained, subrounded, occasional fine subrounded Gravel, trace Clay, somewhat cohesive, loose, slightly moist, medium brown
						SAND-fine to medium grained, subrounded, occasional coarse to very coarse grained, occasional very fine to fine subrounded Gravel, moderately sorted, very loose, dry, red brown
						SAND-very fine to medium grained, occasional coarse to very coarse grained, subrounded, occasional very fine to fine subrounded Gravel, some Silt, poorly sorted, very loose, slightly moist, red brown
						SANDY GRAVEL, very fine to coarse subrounded Gravel, fine to coarse subrounded to subangular Sand, some cobbles, some Silt, very poorly sorted, medium dense, moist to saturated at 11.0', red brown mottled

GAMMA LOG COUNTS PER MINUTE



WELL CONSTRUCTION DETAIL



ELEV. (feet)

Notes: Well was developed by surging and bailing.

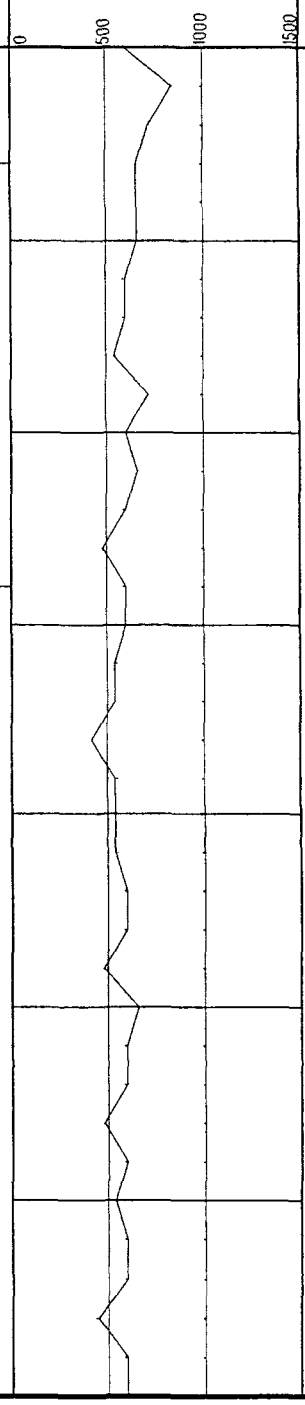
AMERICAN HYDROGEOLOGY CORPORATION
WELL/BORING LOG
PROJECT #: 24-1136

Project: General Signal
Location: 400' East of MW-21
Date (s) Drilled: July 8, 1993
Logged By: Chrisopher L. Jacobs
Drilling Co.: Environmental Drilling and Services
Weather Conditions: Sunny, 85° - 90°

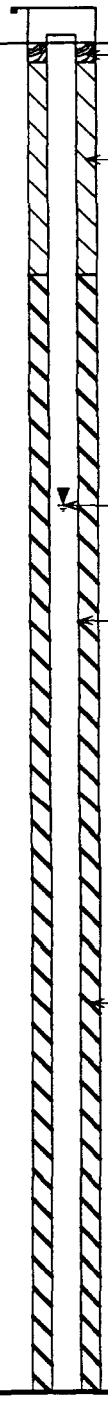
Well/Boring ID: MW-23d
Page: 1 of 2
Boring Depth: 44.0
Boring Diameter: 8.25"
Drilling Method: HSA
Drilling Equipment: MD B-59
Top of Slots: 36.9' b.g.l.
Bottom of Slots: 39.9' b.g.l.

DEPTH feet (bgl)	SAMPLE: DEPTH	SAMPLE: BLOWS COUNTS	SAMPLE: RECOVERY	PID	STRATA	DESCRIPTION
						TOPSOIL-SILTY SAND-very fine to medium grained, occasional coarse grained, subrounded, some very fine to fine subrounded Gravel, poorly sorted, very loose dry, light brown
						SAND-fine to medium grained, occasional coarse grained, subrounded, some very fine to coarse subrounded Gravel, some Silt, very poorly sorted very loose, moist to saturated at 12', medium brown mottled
						SANDY GRAVEL, fine to coarse grained, subrounded to subangular Sand, trace Silt and very fine to coarse subrounded Gravel trace coarse grained, very poorly sorted, medium dense, moist to saturated medium brown mottled

GAMMA LOG COUNTS PER MINUTE



WELL CONSTRUCTION DETAIL



ELEV. (feet)

Notes: Well was developed by surging and bailing.

AMERICAN HYDROGEOLOGY CORPORATION
WELL/BORING LOG
PROJECT #: 24-1136

Project: General Signal Well/Boring ID: MW-23d

DEPTH feet (bgl)	SAMPLE DEPTH	SAMPLE BLOWS COUNTS	SAMPLE RECOVERY	PID	STRATA	DESCRIPTION	GAMMA LOG COUNTS PER MINUTE (0, 500, 1000, 1500)	WELL CONSTRUCTION DETAIL	ELEV. (feet)
40								Natural Collapse; 2' ID Stainless Steel Well Screen; Filter Sand; Natural Collapse	
		84 44 100	1.0'			CLAYEY SILT, some very fine grained Sand, somewhat cohesive, dense to very dense, very moist, gray			
45		7 43 77 51	1.4'			SILTY CLAY, with occasional very coarse subrounded to subangular Sand and very fine subangular Gravel, plastic, sticky, very moist, gray			
50									
55									
60									
65									
70									
75									

Notes: Well was developed by surging and bailing.

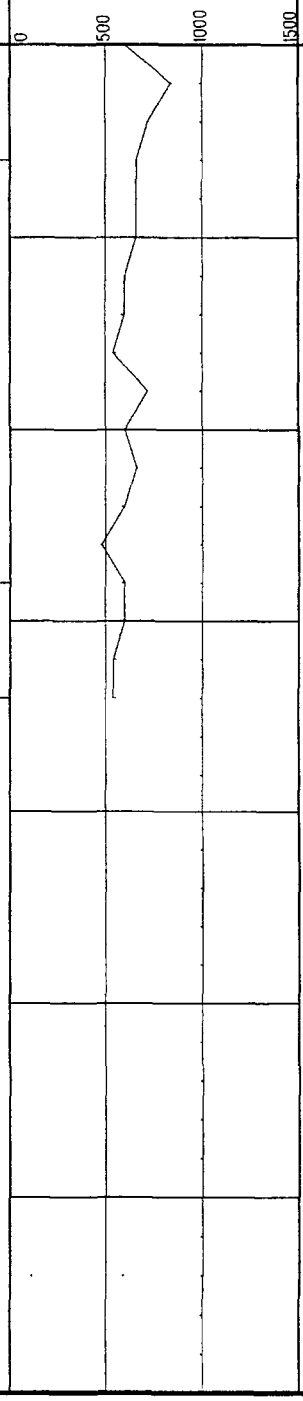
AMERICAN HYDROGEOLOGY CORPORATION
WELL/BORING LOG
PROJECT #: 24-1136

Project: General Signal
Location: 400' East of MW-21
Date (s) Drilled: July 9, 1993
Logged By: Chrisopher L. Jacobs
Drilling Co.: Environmental Drilling and Services
Weather Conditions: Sunny, 85° - 90°

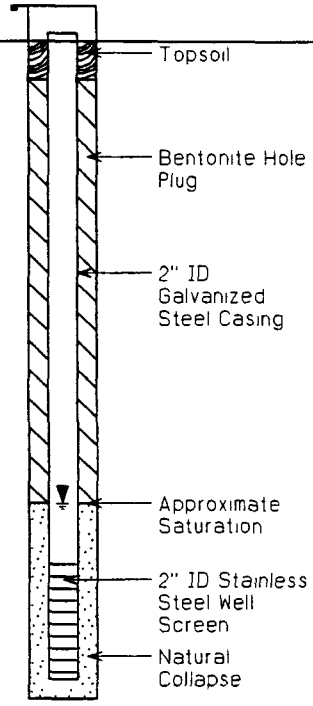
Well/Boring ID: MW-23s
Page: 1 of 1
Boring Depth: 17.0
Boring Diameter: 8.25"
Drilling Method: HSA
Drilling Equipment: MD B-59
Top of Slots: 13.6' b.g.l.
Bottom of Slots: 16.6' b.g.l.

DEPTH feet (bgl)	SAMPLE: DEPTH	SAMPLE: BLOWS COUNTS	SAMPLE: RECOVERY	PID	STRATA	DESCRIPTION
						TOPSOIL-SILTY SAND-very fine to medium grained, occasional coarse grained, subrounded, some very fine to fine subrounded Gravel, poorly sorted, very loose, dry, light brown.
5						SAND-fine to medium grained, occasional coarse grained, subrounded, some very fine to coarse subrounded Gravel, some Silt, very poorly sorted, very loose, moist to saturated at 12', medium brown mottled
10						
15						SANDY GRAVEL, fine to coarse grained, subrounded to subangular Sand, trace Silt and very fine to coarse subrounded Gravel, trace coarse grained, very poorly sorted, medium dense, moist to saturated, medium brown mottled.
20						
25						
30						
35						

GAMMA LOG COUNTS PER MINUTE



WELL CONSTRUCTION DETAIL



ELEV. (feet)

Notes: Well was developed by surging and bailing.

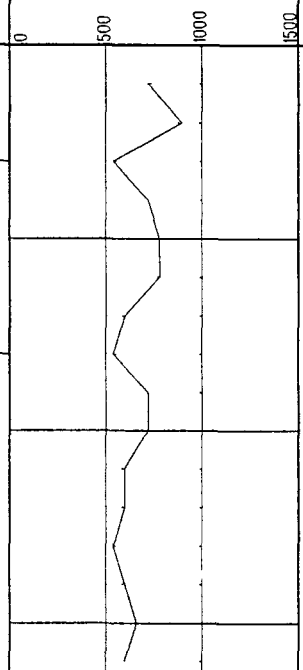
AMERICAN HYDROGEOLOGY CORPORATION
WELL/BORING LOG
PROJECT #: 24-1136

Project: General Signal
Location: 5' West of HPB-1
Date (s) Drilled: July 7, 1993
Logged By: Chrisopher L. Jacobs
Drilling Co.: Environmental Drilling and Services
Weather Conditions: Sunny, 85°

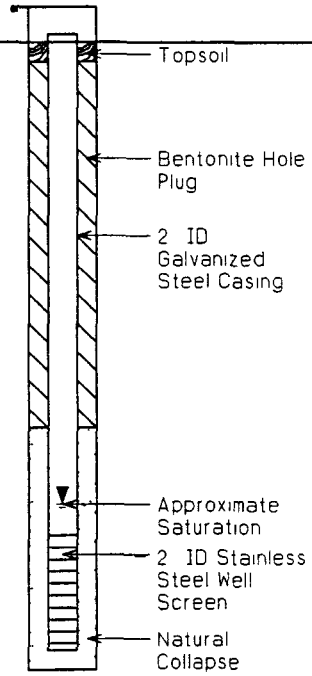
Well/Boring ID: MW-20s
Page: 1 of 1
Boring Depth: 16.3'
Boring Diameter: 8.25"
Drilling Method: HSA
Drilling Equipment: MD B-59
Top of Slots: 12.8' b.g.l.
Bottom of Slots: 15.8' b.g.l.

DEPTH feet (bgl)	SAMPLE DEPTH	SAMPLE BLOWS COUNTS	SAMPLE RECOVERY	PID	STRATA	DESCRIPTION
						TOPSOIL-SILTY SAND-fine to medium grained Sand, subrounded, some Clay and fine to medium subrounded Gravel, poorly sorted, loose, slightly cohesive, slightly moist, medium brown
5						SAND-fine to medium grained subrounded, occasional subangular, coarse to very coarse grained Sand, trace Silt and very fine subangular Gravel moderately sorted, very loose, slightly moist, red brown
10						SANDY GRAVEL-very fine to coarse subrounded to rounded Gravel, medium to very coarse grained subangular Sand, *occasional cobbles, some* Silt, poorly sorted very loose, moist to saturated at ≈ 12', red brown mottled
15						
20						
25						
30						
35						

GAMMA LOG COUNTS PER MINUTE



WELL CONSTRUCTION DETAIL



ELEV. (feet)

Notes: Located at HPB-1. Natural Collapse occurred at 10.0', well developed by surging and bailing. Gamma Log was completed in the HPB-1 boring.

AMERICAN HYDROGEOLOGY CORPORATION
WELL/BORING LOG
PROJECT #: 24-1136

Project: General Signal
Location: 490' South of MW-15
Date (s) Drilled: June 29, 1993
Logged By: Chrisopher L. Jacobs
Drilling Co.: Environmental Drilling and Services
Weather Conditions: Sunny, 85'

Well/Boring ID: HPB #1
Page: 1 of 1
Boring Depth: 25.0
Boring Diameter: 8.25"
Drilling Method: HSA
Drilling Equipment: MD B-59
Top of Slots: NA
Bottom of Slots: NA

DEPTH feet (bgl)	SAMPLE DEPTH	SAMPLE BLOWS COUNTS	SAMPLE RECOVERY	PID	STRATA	DESCRIPTION
						TOPSOIL-SILTY SAND-fine to medium grained Sand, subrounded, some Clay and fine to medium subrounded Gravel, poorly sorted, loose, slightly cohesive, slightly moist, medium brown
5						SAND-fine to medium grained, subrounded, occasional subangular, coarse to very coarse grained Sand, trace Silt and very fine subangular Gravel moderately sorted, very loose, slightly moist, red brown
10						SANDY GRAVEL-very fine to coarse subrounded to rounded Gravel, medium to very coarse grained subangular Sand occasional cobbles, some Silt, poorly sorted, very loose, moist to saturated at ≈ 12', red brown mottled
15						
20						
25		12 24 22 33	1.0'			SILTY CLAY, occasional medium grained Sand, and very fine rounded Gravel, occasional plant fibers, somewhat plastic, medium stiff, moist, dark gray
30						
35						

GAMMA LOG COUNTS PER MINUTE: 0, 500, 1000, 1500

WELL CONSTRUCTION DETAIL: Approximate Saturation

ELEV. (feet)

Notes: Hydropunch sample taken at 19'-20' bgl.

AMERICAN HYDROGEOLOGY CORPORATION
WELL/BORING LOG
PROJECT #: 24-1136

Project: General Signal
Location: 245' South of MW-15
Date (s) Drilled: June 29, 1993
Logged By: Chrisopher L. Jacobs
Drilling Co.: Environmental Drilling and Services
Weather Conditions: Sunny, 85°

Well/Boring ID: HPB #2
Page: 1 of 1
Boring Depth: 29.0'
Boring Diameter: 8.25"
Drilling Method: HSA
Drilling Equipment: MD B-59
Top of Slots: NA
Bottom of Slots: NA

DEPTH feet (bgl)	SAMPLE DEPTH	SAMPLE BLOWS COUNTS	SAMPLE RECOVERY	PID	STRATA	DESCRIPTION	GAMMA LOG COUNTS PER MINUTE (0, 500, 1000, 1500)	WELL CONSTRUCTION DETAIL	ELEV. (feet)
						TOPSOIL-SILTY SAND-very fine to medium grained Sand, subrounded, trace fine subrounded Gravel, loose, slightly cohesive, slightly moist, dark brown			
						SAND-fine to very coarse grained, subrounded, some Silt and very fine to medium subrounded Gravel, very loose, poorly sorted, slightly moist, medium brown			
5						SAND-fine to medium grained, subrounded occasional coarse to very coarse, trace Silt and very fine to medium subrounded Gravel, moderately sorted, very loose, moist, red brown grading into medium brown			
10								Approximate Saturation	
						SAND-very fine to coarse grained, occasional very coarse, subrounded, some Silt, occasional fine to coarse subrounded Gravel, poorly to moderately sorted, medium dense, saturated, medium brown			
15									
		10 16 10 27	.25'			SANDY GRAVEL-very fine to coarse subrounded to subangular Gravel, fine to very coarse subrounded Sand, some Silt poorly sorted, medium dense, saturated, brown/gray mottled			
20									
						SANDY GRAVEL-very fine to medium subrounded Gravel, very fine to very coarse subrounded to subangular Sand, trace Silt, poorly sorted, loose, saturated, red brown mottled			
25									
		12 30 45 75	.20'			SILTY CLAY, occasional medium to coarse grained Sand and very fine subrounded Gravel, some black organic matter, somewhat plastic, medium stiff, moist dark gray			
30									
35									

Notes: Hydropunch samples taken at: 18'-19', 20'-21', and 26'-27' bgl.

AMERICAN HYDROGEOLOGY CORPORATION
WELL/BORING LOG
PROJECT #: 24-1136

Project: General Signal
Location: 490' South, 235' West of MW-15
Date (s) Drilled: June 30, 1993
Logged By: Chrisopher L. Jacobs
Drilling Co.: Environmental Drilling and Services
Weather Conditions: Light rain, 75°

Well/Boring ID: HPB #3
Page: 1 of 1
Boring Depth: 26.0'
Boring Diameter: 8.25"
Drilling Method: HSA
Drilling Equipment: MD B-59
Top of Slots: NA
Bottom of Slots: NA

DEPTH feet (bgl)	SAMPLE DEPTH	SAMPLE BLOWS COUNTS	SAMPLE RECOVERY	PID	STRATA	DESCRIPTION	GAMMA LOG COUNTS PER MINUTE (0, 500, 1000, 1500)	WELL CONSTRUCTION DETAIL	ELEV. (feet)
						TOPSOIL-SILTY SAND-very fine to medium grained, occasional coarse to very coarse grained Sand, moderately sorted, very loose slightly moist, medium brown			
5						SAND-very fine to medium grained, occasional coarse grained Sand, some Silt and fine subrounded Gravel, moderately sorted, cohesive, very soft, moist, medium brown			
10						SAND-fine to medium grained, occasional coarse grained Sand, trace fine to medium subangular Gravel and Silt, moderately sorted, very loose, slightly moist, light brown			
15						SANDY GRAVEL very fine to coarse angular to subrounded Gravel, occasional cobbles very fine to very coarse subrounded Sand, trace Silt, poorly sorted, medium dense, saturated, brown mottled		Approximate Saturation	
20									
25		22 37 42 57	1.0'			SILTY CLAY, occasional irregular thin (.001') partings with fine grained Sand, occasional black organic matter, trace fine to very coarse subrounded Sand, hard, almost dry, light gray			
30									
35									

Notes: Hydropunch samples taken at: 14'-15', 20'-21', and 25'-26' bgl.

APPENDIX F

REPORT OF VAPOR MIGRATION PATHWAY SURVEY

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AMERICAN HYDROGEOLOGY CORPORATION
REPORT OF VAPOR MIGRATION PATHWAY SURVEY

General Signal Corporation/Benteler Automotive Corporation
9000 East Michigan Avenue, Galesburg, Michigan
24-1136

INTRODUCTION
On December 18, 1998, a vapor migration pathway survey was conducted by American Hydrogeology Corporation (AHC) in response to a release of volatile organic compounds at the above-referenced site.

The intent of this survey is to characterize potential vapor migration pathways and their potential to result in a hydrocarbon vapor exposure through volatilization and atmospheric dispersion, volatilization and enclosed space accumulation, and transport along utility corridors.

WEATHER CONDITIONS
The weather on site during the conduction of the vapor migration pathway was overcast with a light breeze. The temperature was approximately 32 degrees Fahrenheit. The temperature rose slightly during the course of the survey.

METHODS AND PROCEDURES
Based on the reported presence of volatile organic compounds in the soil and/or groundwater beneath the site, known and accessible utilities and other observed potential pathways for vapor migration were tested with a field photoionization detector (PID) and an explosimeter.

The field PID is equipped with a 10.0 or 10.6 ev lamp and calibrated to a benzene standard using a ≈100 ppm isobutylene gas. The PID was calibrated in the field immediately prior to conducting the survey. The PID provides relative hydrocarbon concentration data for a wide range of compounds that include benzene, toluene, ethylbenzene, xylenes, and other volatile organic compounds present in the groundwater at the site. The explosimeter reads the percent of the lower explosive limit for gasoline and is calibrated in accord with the manufacturers instructions.

In the field the two meters were held to each vapor monitoring point for a minimum of 10 seconds and the highest reading recorded on an AHC Ambient Vapor Monitoring Form. Each vapor monitoring point (VMP) is identified on the attached site plan for future reference (Figure 1).

MEASUREMENT LOCATIONS
Numerous locations around the project site were monitored for organic vapors (see attached figure). These locations are listed below and may include some or all of the following: edges of pavement, cracks in pavement, manholes, storm drains, around monitor wells and purge wells, and any other identified potential pathway where hydrocarbon vapors may migrate to the surface, or accumulate in enclosed spaces, creating a potential exposure hazard.

RESULTS OF VAPOR MIGRATION PATHWAY SURVEY
The results of monitoring with a PID and explosimeter are listed below next to a description of the monitoring location (See Figure 1). The results indicate no evidence of vapor migration within the accessible utilities.

AMBIENT VAPOR MONITORING

Monitoring Point	Description	PID Reading (ppm v/v)	L.E.L. Reading (%)
VMP-1	truck bay near MW-2	Background *	0
VMP-2	approximately 30' southeast of MW-2	Background *	0
VMP-3	truck bay east of Butler building	Background *	0
VMP-4	approximately 80' south of truck bay adjacent to Bulter building	Background *	0
VMP-5	approximately 40' northwest of PW-B	Background *	0
VMP-6	approximately 25' northwest of MW-1	Background *	0
VMP-7	approximately 10' west of MW-4	Background *	0
VMP-8	southeast corner of parking area	Background *	0
VMP-9	approximately 44' southeast of MW-3	Background *	0
VMP-10	approximately 28' southwest of corner of transformer station fence	Background *	0
VMP-11	approximately 27' south of transformer station fence	Background *	0
VMP-12	sanitary sewer near MW-4	7	
VMP-13	PW-B	Background *	0

* Background readings were between 1-4 ppm v/v.

APPENDIX G

TIER II EVALUATION FOR PROTECTION OF DOWNGRADIENT DRINKING WATER

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Tier II Evaluation for Protection of Downgradient Drinking Water

APPENDIX G

It is necessary to evaluate if the concentrations of the detected compounds in the groundwater will not exceed the Part 201 generic residential drinking water criteria off the Benteler Automotive site. As these criteria are lower than the GSI criteria, this assessment will conservatively evaluate protection of the GSI. In this manner, the assessment can also be used to evaluate protection of drinking water exposures downgradient of the Benteler Automotive site.

As stated in Section 2.25, there are presently only two compounds that exceed the generic residential drinking water criteria: vinyl chloride and tetrachloroethene. Review of the historic water quality data for vinyl chloride shows that the concentrations have exceeded the criterion of 2 µg/l only at the MW-4 location which is near the source area. Vinyl chloride has been detected at MW-4 since October 1990. Therefore, on this basis, it does not appear necessary to perform any additional calculations or evaluation for vinyl chloride. For tetrachloroethene, since the concentrations exceed the generic residential criterion of 5 µg/L at several downgradient monitor well locations, it is desired to estimate an acceptable concentration in groundwater at the source and at five downgradient monitor well locations (MW-8, MW-9, MW-15, MW-20, and MW-21) for protection of drinking water (and conservatively for surface water) at Benteler Automotive's southern property line.

Figure 2 illustrates the locations of the estimated source area and the estimated flow path. The source area is estimated to be approximately 170 feet in width and is estimated to occupy one half the thickness of the aquifer at the source. The distance from the source area to the property line is about 2,400 feet. The five monitor well locations are 500 feet, 680 feet, 1,360 feet, 1,850 feet, and 2,100 feet, respectively, downgradient of the estimated source area.

An aquifer performance test using PW-A as a withdrawal well indicates transmissivity is about 200,000 gpd/ft. Based on an estimated aquifer thickness of 28 feet, hydraulic conductivity is estimated at 7,143 gpd/ft^2. Hydraulic gradient near the source area is estimated at 0.00033 ft/ft. Based on the MDEQ default value for volumetric water content of the saturated zone of 25%, specific discharge is estimated at 1.26 ft/day.

The solution uses the equation:

$$C(x) = C_s \cdot \exp\left\{\frac{x}{2 \cdot \alpha_x}\left[1 - \sqrt{1 + \frac{4 \cdot \lambda \cdot \alpha_x}{\mu}}\right]\right\} \cdot erf\left(\frac{S_w}{4\sqrt{\alpha_y \cdot x}}\right) \cdot erf\left(\frac{S_d}{4\sqrt{\alpha_z \cdot x}}\right)$$

Where:

$C(x)$	=	the concentration at x = 5 µg/L for tetrachloroethene
C_s	=	the acceptable source concentration (in groundwater), µg/L
x	=	distance from the source = 2,400 feet
α_x	=	longitudinal dispersivity ≈ x/10 = 240 feet

$\propto_y$ = transverse dispersivity $\approx \propto_x /3 = 80$ feet
$\propto_z$ = vertical dispersivity $\approx \propto_x /100 = 2.4$ feet
λ = the first order degradation constant = 9.62×10^{-4} /day for tetrachloroethene
μ = specific discharge = 1.26 ft/day
S_w = source width = 170 feet
S_d = source depth = 14

$$5\ \mu g/L = C_s \cdot \exp\left\{\frac{2400}{2 \cdot 240}\left[1 - \sqrt{1 + \frac{4 \cdot 9.62 \times 10^{-4} \cdot 240}{1.26}}\right]\right\} \cdot erf\left(\frac{170}{4\sqrt{80 \cdot 2400}}\right) \cdot erf\left(\frac{14}{4\sqrt{2.4 \cdot 2400}}\right)$$

$5\ \mu g/L = C_s \bullet 0.205547 \bullet 0.109102 \bullet 0.05200$

C_s = 4,288 μg/L tetrachloroethene

Based on the above calculation, an acceptable source concentration for tetrachloroethene in groundwater should be about 4,288 μg/L. This concentration can then be projected downgradient to the five monitor well locations near the plume's centerline. Table 2 summarizes the results.

Table 2

Summary of Tier II Acceptable Tetrachloroethene Concentrations

Location	Distance From Source	Acceptable Concentrations	December 1998 Concentrations (1)
Source Area (MW-1)	0 Feet	4,288 μg/L	220 μg/L
MW-8s & d	500 Feet	357 μg/L	19 μg/L/11 μg/L
MW-9s & d	680 Feet	177 μg/L	11 μg/L/9.8 μg/L
MW-15s & d	1,360 Feet	29 μg/L	6.7 μg/L/7.0 μg/L
MW-20s & d	1,850 Feet	11.6 μg/L	1.9 μg/L(1)/1.7 μg/L(1)
MW-21s & d	2,100 Feet	7.8 μg/L	2.4 μg/L(1)/2.7 μg/L(1)
Property Boundary	2,400 Feet	5.0 μg/L	No Data

(1) Concentrations at these wells have never exceeded the generic residential drinking water criterion of 5 μg/L

Comparison of these values to the most recent water quality data indicate that concentrations in the source area are currently below acceptable levels (220 μg/L in MW-1 versus 4,288 μg/L acceptable source area). Other monitoring points along the plume centerline are also below acceptable levels.

Graph 23 shows the tetrachloroethene concentration versus time in MW-1 along with the best fitting trend line for the data. The regression coefficient is good; approximately 87% of the variation is attributable to time. Based on the trend line, average concentration in MW-1 should continue to decline without the assistance of groundwater purging.

recycled paper

APPENDIX H

DRAFT DECLARATION OF RESTRICTIVE COVENANT FOR ON-SITE

DRAFT

DECLARATION OF RESTRICTIVE COVENANT

MDEQ Reference No.:

This Restrictive Covenant has been recorded with the Kalamazoo County Register of Deeds for the purpose of protecting public health, safety and welfare and the environment.

Benteler-Kalamazoo, Inc. has received notice of approval from the Michigan Department of Environmental Quality (MDEQ) dated _____[date]_____, for a Remedial Action Plan (RAP) that includes land use-based cleanup criteria as defined and set forth in Section 20120a(l) of Part 201, of the Natural Resources and Environmental Protection Act (NREPA), 1994 PA 451, as amended, MCL 3 24.20101 et seq, for the environmental remediation associated with the property located in the City of Galesburg, County of Kalamazoo, more particularly described as:

See Attachment A for legal description of Property and property tax ID numbers of the Property (hereinafter the "Property").

See Attachment B for a survey of the property subject to the land-use restrictions described in this restrictive covenant.

As used herein, the term "Owner" shall mean at any given time the then current title holder of the Property.

NOW THEREFORE Benteler-Kalamazoo, Inc. 9000 East Michigan Avenue, Galesburg, Michigan 49053, pursuant to Section 20120b(4) of NREPA and the Limited Residential Criteria-Based Remedy Agreement entered by and between General Signal Corporation and the MDEQ (LANDUSE-ERD-00-000), hereby imposes restrictions on the Property and covenants and agrees that:

1. The Owner shall restrict the uses of the Property to those uses compatible with the limited residential land use-based category as defined in Section 20120a(l) of Part 201 of NREPA, as amended in June, 1995, and the RAP, or other use that is consistent with the assumptions and basis for the cleanup criteria established pursuant to Section 20120a(l). Cleanup criteria for land use-based remedial action plans are located in the Government Documents section of the State of Michigan Library.

2. The Owner shall restrict activities at the Property that may interfere with a remedial action, operation and maintenance, monitoring, or other measures necessary to assure the effectiveness and integrity of the remedial action.

3. The Owner shall restrict activities at the Property that may result in exposures above levels established in the RAP. The following restrictions shall apply:

a. Restrict the use of groundwater from the upper aquifer on the property identified in Figure 1, except for environmental investigation. The bottom of the upper aquifer (depth to clay) is included in Figure 1.

b. Restrict the installation of a well placed in the lower aquifer on the property identified in Figure 1, except when installation procedures are followed to prevent groundwater migration between the water bearing units. The proper installation procedures for a well in the lower aquifer shall be followed. Procedures are described in ASTM Standard D 5092-90 (Standard Practice for Design and Installation of Ground Water Monitoring Wells in Aquifers) and Michigan Department of Environmental Quality, Ground Water Supply Section "I – Water Supply System Specifications for Replacement Wells for Projects Funded by Part 201, Act 451, PA 1994". These documents are included in Attachment C.

4. The Owner shall provide notice to the MDEQ of the Owner's intent to convey any interest in the Facility 14 days prior to consummating the conveyance. A conveyance of title, an easement, or other interest in the Property shall not be consummated by the Property owner without adequate and complete provision for compliance with the terms and conditions of this Covenant.

5. The Owner shall grant to the MDEQ and its designated representatives the right to enter the Property at reasonable times for the purpose of determining and monitoring compliance with the RAP, including the right to take samples, inspect the operation of the remedial action measures and inspect records.

The state may enforce the restrictions set forth in this Restrictive Covenant by legal action in a court of appropriate jurisdiction.

The restrictions shall run with the Property and shall be binding upon all future owners, successors, lessees or assigns and their authorized agents, employees, or persons acting under their direction and control, and shall continue until the MDEQ or its successor approves modifications or rescission of this Restrictive Covenant. A copy of this Restrictive Covenant shall be provided to all future owners, heirs, successors, lessees, assigns and transferees by the person transferring the interest.

If any provision of this Restrictive Covenant is held to be invalid by any court of competent jurisdiction, the invalidity of such provision shall not affect the validity of any other provisions hereof. All such other provisions shall continue unimpaired in full force and effect.

The undersigned person executing this Restrictive Covenant is the Owner, or has the express written permission of the Owner, and represents and certifies that he or she is duly authorized and has been empowered to execute and deliver this Restrictive Covenant.

IN WITNESS WHEREOF, the said Owner of the above described Property has caused this Restrictive Covenant to be executed on this _____ day of _____, _____.

_____

Signed in the presence of:

_____ _____

Witness Witness

STATE OF MICHIGAN)
) ss.
COUNTY OF KALAMAZOO)

The foregoing instrument was acknowledged before me on _____, _____ by _____, a _____ corporation, on behalf of the corporation.

_____

Notary Public
Kalamazoo County, Michigan
Commission expires: _____

Prepared by: David E. Preston
Varnum, Riddering, Schmidt & HowlettLLP
Bridgewater Place
P.O. Box 352
Grand Rapids, MI 49501-0352
(616)336-6000

::ODMA\PCDOCS\GRR\371610\1

ATTACHMENT A – LEGAL DESCRIPTION

KALAMAZOO COUNTY TAX RECORD

CHARTER TOWNSHIP OF COMSTOCK
CITY OR TOWNSHIP

SCH. DIST.	NAME OF OWNER	FILE OR PARCEL NO.
33	BENTELER-KALAMAZOO INC (9000 EAST MICHIGAN)	3907-23-210-010

MAILING ADDRESS

BENTELER-KALAMAZOO INC
9000 EAST MICHIGAN AVENUE
GALESBURG MI 49053-

ADDITIONAL NAMES

SEC 23-2-10 COM AT N1/4 POST SEC 23 TH E ALG N LI SD SEC
495 FT TH S 0DEG 00MIN 30SEC E 64.18 FT TO PL OF BEG TH
S 2575.44 FT TO E-W1/4 LI SD SEC TH S 459.38 FT TH NELY
TO A PT 110 R E OF SD 1/4 LI & 3001.5 FT S OF SD N LI TH
N PAR TO & 110 R E OF SD 1/4 LI 3001.5 FT TO SD N LI TH W
THEREON TO BEG 92.43 ACRES
****REFER TO IFT ROLL****

ATTACHMENT A

3907-23-210-010
Cert 111348

ENTER 141081060

AFFIDAVIT FILED

WARRANTY DEED

HYDRECO, INC., a Delaware corporation, formerly known as ICM ACQUISITIONS, INC., of 122 South Michigan Avenue, Suite 1700, Chicago, Illinois 60603, ("Grantor"), CONVEYS and WARRANTS to BENTELER-KALAMAZOO, INC., a Delaware corporation, of 320 Hall Street, S.W., Grand Rapids, Michigan 49507, ("Grantee"), the following described premises located in the Township of Comstock, County of Kalamazoo, State of Michigan:

> Beginning on the North line of Section 23, Town 2 South, Range 10 West, at a point 30 rods East of the North quarter post thereof; thence South parallel to the North and South quarter line of said Section 3,099 feet; thence Northeasterly to a point 110 rods East of said quarter line and 3,001.8 feet South of said North line; thence North parallel to and 110 rods East of said quarter line 3,001.5 feet to said North line; thence West thereon 80 rods to the Place of Beginning,

subject to easements of record.

Dated this 12th day of May, 1989.

Signed in the Presence of:

[signature]
Victoria A. Baczek

HYDRECO, INC.
By [signature]
Its: Vice President
Wally P. Wasylowsky

'89 MAY 16 PM 1 07
REGISTER

STATE OF Illinois)
) ss
COUNTY OF Cook)

The foregoing instrument was acknowledged before me this 12th day of May, 1989, by Wally P. Wasylowsky, on behalf of HYDRECO, INC.

[signature]
Notary Public, Cook County
My commission expires: _____

This instrument drafted by:
Bruce E. Parsons
Miller, Johnson, Snell & Cummiskey
800 Calder Plaza Bldg.
Grand Rapids, MI 49503
(616) 459-6311
Permanent Parcel No.: 3907-23-210-010

" OFFICIAL SEAL "
MARC H. SCHWARTZ
NOTARY PUBLIC, STATE OF ILLINOIS
MY COMMISSION EXPIRES 10/24/92

AFTER RECORDING RETURN TO:
Eric J. Thorsen, Esq.
Miller, Johnson, Snell & C
800 Calder Plaza Building
Grand Rapids, Michigan 49

ATTACHMENT B – SURVEY

phone: 616-327-3532
fax: 616-327-7679

WIGHTMAN WARD, INC.
ENGINEERING • LAND SURVEYING
ARCHITECTURE • TESTING • ENVIRONMENTAL

E-mail:
wightmanward@ameritech.net

GARY D. HAHN, P.S.
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JOHN G. KAMER, P.S.
MICHAEL E. KIEWEL, P.E.
WAYNE A. KOCH, A.I.A.

9835 PORTAGE ROAD,
PORTAGE, MICHIGAN 49002

JAMIE J. DYER, P.E.
THOMAS M. RUSHLOW, P.E.
DARYL J. VELDMAN, P.E.
CHRISTOPHER J. BRAYAK, A.I.A.
MICHAEL A. FREEHLING, P.S.

JULY 10, 2001

LEGAL DESCRIPTION FOR AMERICAN HYDROGEOLOGY CORP. RESTRICTIVE COVENANT AREA AT BENTELER INDUSTRIES, INC.

PART OF THE NORTHEAST QUARTER OF SECTION 23, TOWN 2 SOUTH, RANGE 10 WEST, COMSTOCK TOWNSHIP, KALAMAZOO COUNTY, MICHIGAN, DESCRIBED AS: COMMENCING AT THE NORTH QUARTER POST OF SAID SECTION 23, THENCE EAST ON THE NORTH LINE OF SAID SECTION 23 A DISTANCE OF 1519.46 FEET; THENCE SOUTH PERPENDICULAR TO SAID NORTH SECTION LINE 671.69 FEET TO THE POINT OF BEGINNING OF THE LAND HEREIN DESCRIBED: THENCE SOUTH 01 DEGREES 17′ 02″ EAST 306.50 FEET; THENCE SOUTH 29 DEGREES 59′ 50″ WEST 540.75 FEET; THENCE SOUTH PERPENDICULAR TO SAID NORTH SECTION LINE 939.99 FEET; THENCE NORTH 89 DEGREES 15′ 11″ WEST 552.77 FEET; THENCE NORTH 03 DEGREES 11′ 08″ WEST 391.70 FEET; THENCE NORTH 03 DEGREES 07′ 26″ EAST 399.49 FEET; THENCE NORTH 27 DEGREES 00′ 37″ EAST 839.16 FEET; THENCE NORTH 40 DEGREES 34′ 00″ EAST 167.61 FEET; THENCE NORTH 77 DEGREES 50′ 16″ EAST 216.48 FEET; THENCE SOUTH 88 DEGREES 28′ 58″ EAST 114.50 FEET TO THE POINT OF BEGINNING.
CONTAINING 20.13 ACRES MORE OR LESS.

RECEIVED

JUL 16 2001

AMERICAN HYDROGEOLOGY
CORPORATION

ATTACHMENT C - SPECIFICATIONS

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
GROUND WATER SUPPLY SECTION

I - WATER SUPPLY SYSTEM SPECIFICATIONS FOR REPLACEMENT WELLS FOR PROJECTS FUNDED BY PART 201, ACT 451, PA 1994

PART ONE - GENERAL

1.1 SCOPE OF WORK

The work to be done shall consist of furnishing all labor, materials, and equipment necessary for the complete and satisfactory construction of a water well and installation of pumping equipment, pitless adapter, and other appurtenances as specified herein. The CONTRACTOR shall procure all permits required by law and shall comply with all federal, state, and local laws and ordinances relating to performance of the work. All work is to be done in accordance with the Michigan Water Well Construction and Pump Installation Code, Act 368, PA of 1978, Part 127, known as the Ground Water Quality Control Act, herein referred to as the "CODE", Michigan Safe Drinking Water Act, Act 399, PA of 1976, Administrative Rules adopted thereunder, and specifications described therein, where applicable.

The proposed water supply site is indicated on Schedule I (Water Supply System Specifications Summary Sheet). The site has been evaluated by the Michigan Department of Environmental Quality (herein referred to as the "DEPARTMENT") and the proposed location for the replacement well on the site has been determined. This information is found on the attached Water Supply Survey Form.

It is recommended that all bidders thoroughly examine the Technical Specifications for this work and make a personal examination of the site(s) of the proposed work. Failure by the CONTRACTOR to examine the site(s) prior to making his proposal shall not be considered as cause for an increase in the contract amount.

Obtaining a potable water supply on this site will require drilling through, and adequately sealing off, a water-bearing formation which may be contaminated. It is anticipated that a safe and suitable water supply can be developed on the site if the well is constructed in accordance with the depth and design specifications as described on Schedule I and herein, although the work may be stopped at a shallower depth or continued to greater depths as directed by the DEPARTMENT. Attached with these specifications are water well records for water supplies in the area that produce water of suitable quality.

All work shall be subject to the order of the DEPARTMENT representative who shall be kept informed at all times as to the status of the work. The DEPARTMENT representative must be on-site when work is performed unless the CONTRACTOR is given approval to perform work in his absence. Drilling which results in an unusable well or a dry hole will be reimbursed by the DEPARTMENT only when the practices outlined in these specifications or approved by the DEPARTMENT representative, have been followed. Unusable wells or dry holes which result from equipment failure, contractor error or negligence, or other factors which are not the fault of the DEPARTMENT will not be reimbursed.

Figures for depths of wells listed in Schedule I are estimates based on the information available to the DEPARTMENT. Determination of where a usable aquifer exists shall be the responsibility of the CONTRACTOR, with the assistance of the DEPARTMENT

representative. In all cases the final depth of the well shall be approved by the DEPARTMENT. The DEPARTMENT does not guarantee the depth of wells and where the depth of completion is different than estimated in the specifications, the unit price bid by the CONTRACTOR will prevail regardless of depth drilled.

1.2 REGISTRATION

The work shall be completed by a water well drilling contractor registered in the State of Michigan, who shall comply with all applicable rules, regulations, and guidelines published by the State of Michigan regarding the performance of the work.

1.3 UTILITIES FOR CONSTRUCTION

Unless otherwise provided for in these specifications, the CONTRACTOR shall furnish his own source of electricity, fuel, and water required to perform the work, and shall bear the cost of these services.

1.4 PROTECTION OF PROPERTY

The CONTRACTOR shall properly protect all surface and subsurface structures and surrounding areas from damage which may result from the methods employed in performing the work. The CONTRACTOR shall be responsible for any damages to such structures resulting from his operations. Damaged property shall be repaired or replaced to a condition which is equal to that which existed prior to damage. The DEPARTMENT shall have the right to approve these restoration measures.

1.5 NOTIFICATION OF UTILITIES

The CONTRACTOR shall comply with Act 53, PA of 1974, by notifying public utilities of the proposed drilling or excavating at least 48 hours prior to the commencement of such activities by contacting MISS DIG at 1-800-482-7171.

1.6 DISPOSAL OF WATER

The CONTRACTOR shall make all provisions necessary for conveying any water encountered in performing the work away from adjacent structures, and shall take measures necessary to prevent erosion and/or flooding of the site and adjacent properties. The CONTRACTOR shall also prevent discharge water from flowing over any adjacent wells and/or sewage disposal systems.

1.7 CLEAN-UP

The CONTRACTOR shall provide all material and labor to maintain the site in an orderly condition which is conducive to a safe work area. The CONTRACTOR shall keep the site free from accumulation of waste materials, rubbish, drill cuttings, and other debris resulting from the work.

1.8 SAFETY

The CONTRACTOR shall comply with all applicable laws and regulations governing the furnishing and use of safeguards, safety devices, and protection equipment. The CONTRACTOR shall take any necessary precautions to protect the life and health of employees and the public in the performance of the work.

2.6 ADDITIONAL WELL DEVELOPMENT

Payment for additional well development, where deemed necessary by the DEPARTMENT, shall be on the basis of the unit price per hour of actual development and shall include all equipment, equipment set-up, and labor necessary for complete development of the well.

2.7 ADDITIONAL WELL CAPACITY TEST

Payment for additional well capacity test, where deemed necessary by the DEPARTMENT, shall be on the basis of the unit price per hour measured for the time that the test pumping equipment is in operation, and shall include all equipment, equipment set-up, and labor.

2.8 DISINFECTION AND TESTING

Payment for disinfection and testing shall be on a lump sum basis and shall include all equipment, materials, and labor necessary to clean, disinfect, and pressure test the completed water system including the well, pump, drop pipe, service lines, tank, connection to existing water system, and any other equipment installed by the CONTRACTOR. The lump sum price shall include leak correction and subsequent additional disinfection as required to provide a satisfactory system.

2.9 PITLESS ADAPTER

Payment for pitless adapter(s) shall be on the basis of the unit price per each pitless adapter actually installed, and shall include the well cap and all other materials, equipment, and labor required.

2.10 SUBMERSIBLE PUMP

Payment for submersible pump(s) shall be on the basis of the unit price per each submersible pump actually installed and left in place, and shall include all materials and labor to install the pump and all electrical pump controls required.

2.11 EXISTING EQUIPMENT

Payment for the reinstallation of existing pumping equipment or pressure tank where specified by the DEPARTMENT shall be on the basis of the unit price per hour and shall include all material, equipment, and labor necessary to remove existing submersible pump from the well being replaced and disconnect existing pressure tank and reinstall pump and tank in the replacement water supply system.

2.12 SUBMERSIBLE PUMP CABLE

Payment for the submersible pump electrical cable shall be on the basis of the unit price per lineal foot of cable actually installed from the pump to the control box and from the control box to the existing household electrical system. The unit price shall include all materials, equipment, and labor to install the electrical cable.

2.13 PUMP DROP PIPE

Payment for submersible pump drop pipe shall be on the basis of the unit price per lineal foot of pipe installed and shall include all couplings and fittings required from the pump to the pitless adapter.

slots with sharp outer edges, widening inwardly so as to minimize clogging. All intake openings shall be free from jagged edges, irregularities or other defects that would hinder passage of sand during well development.

3.4 WELL SCREEN FITTINGS

The telescope size screen shall be provided with a minimum two foot long blank extension of the same size as the screen, a bottom plug to close the bottom of the screen, and a packer to provide a tight seal between the top of the screen and the well casing. The blank shall be of new, standard weight schedule 40 black or galvanized steel pipe. A neoprene-type figure K packer shall be installed at the top of the blank.

3.5 ROTARY DRILLING FLUID

The rotary drilling fluid shall consist of clean, chlorinated water in compliance with R325.1639, Rule 139(8), construction of wells, drilling water, and finely ground sodium bentonite meeting section 4 of API specification 13A. Any additives to the drilling fluid system shall be approved in compliance with R325.1640, Rule 1640, certification of water system components.

3.6 GROUT MATERIAL

Grout material for sealing the annular space between the casing and borehole shall be neat cement grout or neat cement plus bentonite. Neat cement grout shall consist of a mixture of 1 bag of cement (94 pounds) of Type I or Type IA (air-entraining) Portland cement to not more than 6 gallons of clean water in accordance with the CODE, R325.1603a(1), Rule 103a(1), definitions:N,O. Table 3.6 shall be used to determine the amount of bentonite, water requirements, and resulting slurry weights and volumes for neat cement/bentonite admixtures. Addition of bentonite shall not exceed 5% by weight of cement. The cement shall be mixed as a neat cement slurry prior to addition of any bentonite.

TABLE 3.6

CEMENT/BENTONITE SLURRY PROPERTIES

Percent Bentonite	Bentonite Req. lbs./bag	Water Req. gal./bag	Slurry Wgt. lbs./Gal	Slurry Vol. $ft.^3$ /bag
0	0	6.0	15.0	1.18
1	1	6.25	14.8	1.27
2	2	6.5	14.7	1.38
3	3	7.2	14.4	1.45
4	4	7.8	14.1	1.55
5	5	8.5	13.8	1.65

NOTE: Compliance with the slurry weight and volume properties requires mixing the cement prior to addition of any bentonite to the slurry unless the cement and bentonite are pre-mixed in dry form.

B. Three-Wire Systems - The three-wire pump controls shall be as specified for the two-wire system with the addition of a control box complete with terminal strip, starting relay, start and run capacitors, and lightning protection is not provided with the pump motor.

3.12 SUBMERSIBLE PUMP ELECTRICAL INSTALLATION

Electrical service shall be provided in accordance with the Electrical Administrative Act, Act No. 217, PA of 1956 as amended.

The location of the wiring entrance through the building wall shall be the same location as the existing wiring or as agreed upon by the DEPARTMENT and the property owner, and shall be made below grade where practical. Building wiring shall include connections to the existing pump power supply with a junction box, and to the pump controls. Where required by the electrical code, any wiring inside the building shall be installed in protective conduit.

3.13 PUMP DROP PIPE

The drop pipe and couplings shall be Schedule 80, polyvinyl chloride, PVC 1120/1220, shall meet specification ASTM D1785 and be approved by NSF for potable water use. Drop pipe shall be 1 inch I.D. Couplings shall be a PVC machined type with recessed, tapered threads or galvanized steel with tapered threads. Drop pipe and couplings shall bear manufacturer's markings that will identify the material as that which is specified. Where pump settings exceed 200 feet in depth, a rubber or neoprene torque arrestor shall be installed directly above the pump and cable guards shall be installed every 20 feet on the drop pipe.

3.14 PRESSURE TANK

A. Replacement Pressure Tank - The pressure tank shall be a pre-pressurized, diaphragm or bladder-type design with a minimum total capacity of 30 gallons. The tank shall be constructed of steel and coated with a corrosion resistant, zinc-based epoxy primer and enamel finish. Tank linings and diaphragm or bladder materials shall be approved by either FDA or NSF for contact with potable water. The rated maximum working pressure for the tank shall be at least 100 pounds per square inch. The tank shall provide a minimum available drawdown of 10 gallons at a 30-50 psi operating cycle. The pressure tank capacity information is provided for bidding purposes only. Actual tank size(s) will be determined based on well performance, existing tank capacity, and current supply needs.

OR

B. Existing Pressure Tank - The pressure tank used for the existing water supply has been determined by the DEPARTMENT to be adequate for the new well and pumping equipment. The existing tank shall be disconnected from the existing contaminated water supply and connected to the replacement water supply.

3.15 PRESSURE TANK FITTINGS

A new standard brass tank cross-tapped for a pressure switch, pressure gauge, pressure relief valve and sampling tap shall be provided. The pressure gauge shall have a range of 0-100 psi. The pressure relief valve shall be brass and have a pressure setting of 75 psi. The sampling tap shall consist of 3/4-inch brass boiler drain.

available for inspection on-site at the request of the DEPARTMENT. The CONTRACTOR shall be responsible for collecting and evaluating formation samples at each change of formation and at each five-foot interval above the water level and each two-foot interval below the water level. The completed water well record shall be submitted directly to the DEPARTMENT within 60 days of the completion of the well. Final approval and payment by the DEPARTMENT shall be withheld until the water well record has been submitted.

G. Temporary Capping - At all times during the progress of the work, the CONTRACTOR shall use reasonable precautions to prevent either tampering with the well or the entrance of foreign material into the well. Upon completion of the well, temporary capping shall be provided, in accordance the CODE, R325.1639, Rule 139(6), construction of wells, temporary capping.

H. Well Alignment - The completed well shall be sufficiently plumb and straight in accordance the CODE, R325.1639, Rule 139(7), construction of wells, well alignment.

I. Casing Termination - The CONTRACTOR shall terminate the well casing no less than 12 inches and no greater than 18 inches above final grade.

4.2 GROUTING

A. General Requirements

1. The annular space between the well casing and borehole shall be tightly sealed to prevent the entrance of surface water and the vertical migration of contaminants along the well casing and borehole.

2. The CONTRACTOR shall be responsible for determining the volume of grout required. The volume of dry cement or cement/bentonite grout available on-site shall be at least 25% greater than the calculated volume of dry grout required to fill the annulus. And in no case should the grout volume mixed be less than the calculated volume. Appendix V of the Michigan Water Well Construction and Pump Installation Code, Act 368, PA of 1978, Part 127, known as the Ground Water Quality Control Act and administrative rules may be used as a guide for casing and borehole sizes not listed in the following table.

TABLE 4.2

BAGS OF CEMENT REQUIRED

Casing size (inches)		4			5			6	
Borehole (inches)		8			9			10	
Depth (feet)/% Bentonite	0	2	5	0	2	5	0	2	5
25	5.6	4.8	4.1	6.5	5.6	4.7	7.4	6.4	5.3
30	6.7	5.8	4.8	7.8	6.7	5.6	8.9	7.7	6.4
50	11.1	9.5	8.0	13.0	11.2	9.3	14.8	12.7	10.6
100	22.2	19.0	15.9	25.9	22.2	18.6	29.6	25.4	21.2
150	33.3	28.5	23.9	38.9	33.3	27.9	44.4	38.0	31.8
200	44.4	38.0	31.8	51.8	44.3	37.1	59.2	50.7	42.4
300	66.6	57.0	47.7	77.7	66.5	55.6	88.8	76.0	63.6

contaminants in the borehole. The desander shall be operated either continuously while drilling or each time an additional drill rod is being added to the drill stem.

B. The CONTRACTOR shall be responsible for controlling critical drilling fluid properties such as density and viscosity to avoid excessive downhole pressure, recirculation of cuttings, and damage to the water bearing formation. Measurements of drilling fluid properties may be required at the discretion of the DEPARTMENT representative to determine if properties are within recognized industry standards.

C. After drilling through the contaminated formation, the drilling fluid may contain contaminants and require disposal as deemed necessary by the DEPARTMENT representative. A fresh batch of drilling fluid shall then be prepared and used to drill the remainder of the well.

4.4 CABLE TOOL WELL CONSTRUCTION

General Requirements - The following specifications shall apply to all wells constructed using the cable tool method.

A. A temporary outer casing shall be used with the cable tool method in order to prevent caving of the overburden material and maintain an open annular space around the casing for grout. The temporary outer casing shall extend from the surface to a minimum of three (3) feet into a confining formation. If no confining formation exists, the temporary casing shall extend the length of the permanent casing. The temporary casing shall be pulled back and removed as grouting proceeds in order to expose the grout to the borehole wall.

B. Dry granular bentonite shall be maintained around the temporary well casing while being driven. A funnel-shaped excavation approximately two times the casing diameter in depth and four times the casing diameter in width shall be provided around the top of the well casing. The excavation shall be for the purpose of containing the bentonite. The casing with drive shoe shall be placed in the funnel-shaped excavation and the bentonite poured around the casing until the excavation is full. The bentonite shall be replenished as the level drops in the funnel due to the casing being driven.

4.5 WELL DESIGN

THE DEPARTMENT WILL SPECIFY WHICH OF THE FOLLOWING DESIGNS MAY BE USED

A. Single-Cased Method - The borehole size shall be a minimum of 4 inches larger than the nominal casing size. The oversized borehole shall extend from ground surface to the top of the water-bearing formation for screened wells and at least 5 feet into the bedrock for rock wells. After casing is installed the well shall be grouted without delay unless approval is given by the DEPARTMENT to delay grouting.

B. Gravel-Packed Method - The borehole size shall be a minimum of 4 inches larger than the nominal casing size. The borehole shall extend from ground surface to the bottom of the portion to be screened. After casing and screen are installed, the annular space between the screen and borehole wall shall be backfilled with clean, chlorinated, filter-pack material of appropriate size to a point 5 feet above the top of the screen. The annular space between the borehole wall and casing from the top of the filter-pack to surface shall be grouted without delay, unless approval is given by the DEPARTMENT to delay grouting.

C. Telescoped Casing Method - The upper borehole shall be a minimum of 4 inches larger than the normal size of the outer casing. The outer casing shall extend from the surface to at least 3 feet into the confining formation above the artesian aquifer. A drive shoe or rotary shoe shall be attached to the outer casing and pressure applied to seat the casing. A lower borehole one inch smaller than the nominal outer casing size shall be drilled through the remainder of the confining formation and penetrate the water-bearing formation. The lower casing consisting of a blank extension and well screen shall be installed within the outer casing. The space between the screen blank extension and the well casing shall be sealed with a K-packer. The packer shall be installed no closer than two feet from the end of the outer casing. The annular space between the outer casing and borehole wall shall be grouted without delay.

4.6 WELL SCREEN PLACEMENT

Well screen placement shall be either 1) telescoped out the casing exposing not less than four feet to the formation or 2) attached directly to the casing where the filter-pack method is used. Additional screen length may be necessary as determined by the CONTRACTOR depending upon the nature and thickness of the water-bearing formation penetrated.

4.7 WELL DEVELOPMENT

A. General requirements - The well shall be developed to produce water free of sand, silt, or other material at the pumping rate of the permanent pump, in accordance with the CODE, R325.1621, Rule 121(2), location and construction of wells generally and R325.1639, Rule 139(1) and Rule 139(5), construction of wells; well screens; well pumping rate.

B. Chemical Development - Any chemicals used for well screen development shall be approved by the DEPARTMENT prior to use.

4.8 WELL CAPACITY TESTING

A. Design and Pumping Rate - The well shall be capable of sustaining a permanent pumping rate of 10 gallons per minute. If limiting geological conditions are present, the DEPARTMENT may authorize a lower final pumping rate. In such instances, additional storage capacity will be provided at the expense of the DEPARTMENT.

B. Initial Capacity Testing - Initial capacity testing shall be performed by pumping the well with compressed air, submersible pumping equipment, or a plunger. A discharge outlet shall be provided for measurement of flow rate with a 5-gallon pail and stop watch. Capacity testing shall be performed by pumping the well at 15 to 20 gpm or 1.5 to 2 times the pumping rate of the final pumping equipment, whichever is greater, for a period of one hour.

C. Additional Capacity Testing - Additional well capacity testing shall be performed at the pumping rate and length of time as specified by the DEPARTMENT representative.

4.9 PITLESS ADAPTER

The pitless adapter shall be installed on the well casing in accordance with the manufacturer's instructions and in accordance with the CODE, R325.1641, Rule 141, above grade well casing connections and R325.1642, Rule 142, below ground well casing connections. The pitless adapter shall be installed so that the discharge line is generally 84 inches below grade but in no case less than 42 inches, or as modified by the DEPARTMENT due to local climactic conditions. A 90° elbow directed downward at an angle approximately 45° shall be installed on the discharge saddle and the saddle shall be installed so that the

materials which have accumulated on structures or around the premises shall be removed. The CONTRACTOR may dispose of these materials on-site, with permission of the property owner and the DEPARTMENT.

4.21- FINAL BILLING

Upon completion of all work, the CONTRACTOR shall submit the following items to the DEPARTMENT.

1. Itemized bill for each well consistent with the items listed on the Itemized Bid Sheet.

2. Completed water well and pump records.

3. Completed well abandonment records (completed on water well record form).

The above items shall be mailed to the following address:

Jim Lahti
Ground Water Supply Section
Drinking Water and Radiological Protection Division
Michigan Department of Environmental Quality
PO Box 30630
Lansing, Michigan 48909-8130

Fig 1.

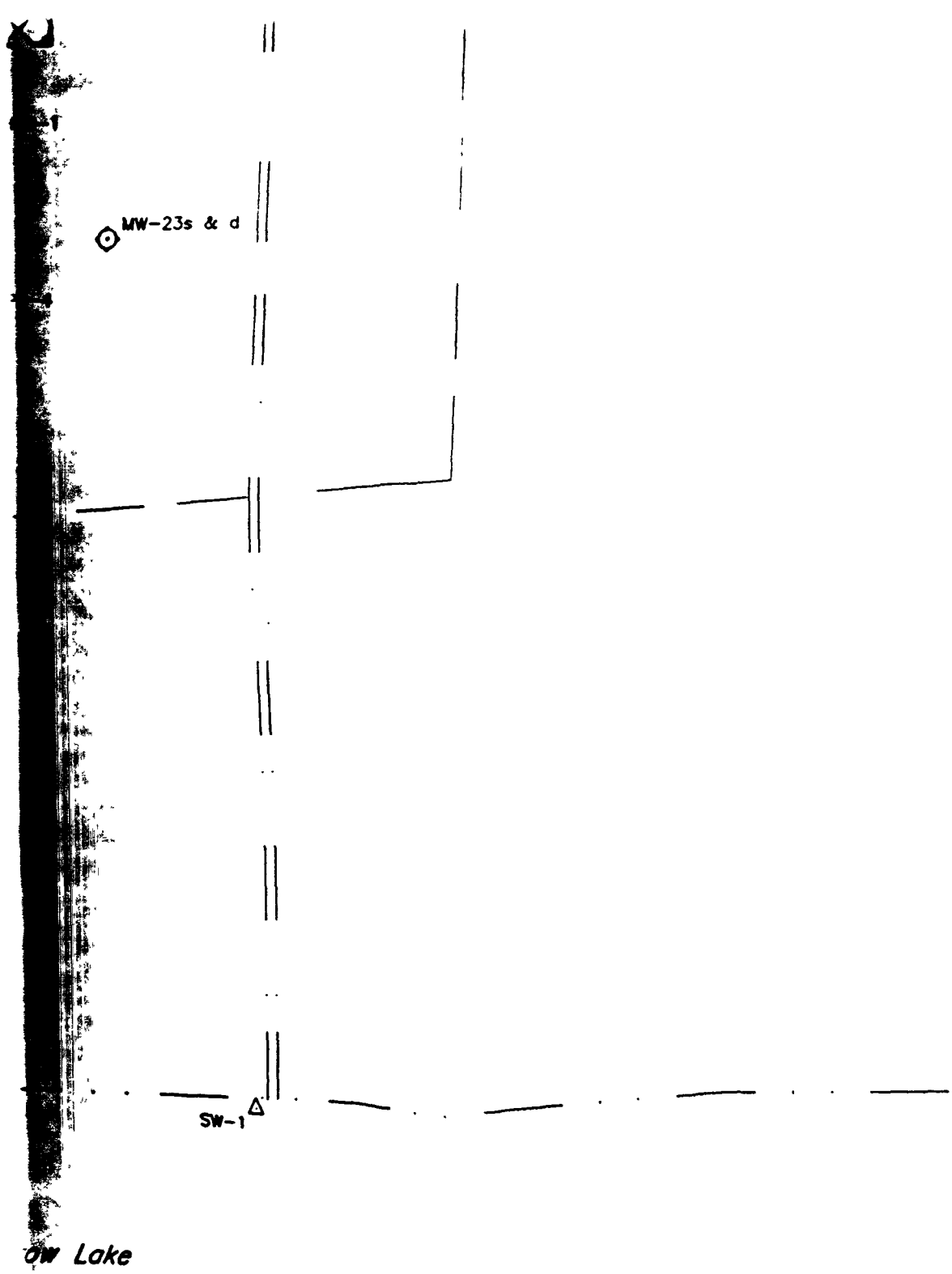

FIGURE 1

PROPOSED GROUNDWATER USE RESTRICTION AREA AND DEPTH TO CLAY

BENTELER AUTOMOTIVE, INC.

Section 23, T. 2 S., R. 10 W.
Comstock Township
Kalamazoo County, Michigan

AHC AMERICAN HYDROGEOLOGY CORP.

APPENDIX I

DRAFT AGREEMENT FOR LIMITED REMEDY-LANDUSE

recycled paper

DRAFT

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

In the Matter of:

_____, MDEQ Reference No.:
Kalamazoo County, Michigan

AGREEMENT FOR A LIMITED RESIDENTIAL
CRITERIA-BASED REMEDIAL ACTION

This Agreement for a Limited Residential Criteria-Based Remedial Action (hereinafter referred to as the "Agreement") is entered into voluntarily by and between the Michigan Department of Environmental Quality (MDEQ), Environmental Response Division and General Signal Corporation (General Signal) for the purpose of specifying the agreed upon conditions for a Limited Residential Criteria-Based Remedial Action Plan (RAP) approval at the Hydreco Site, located at 9000 East Michigan Avenue, Galesburg, Kalamazoo County, Michigan. By execution of this Agreement the MDEQ and General Signal stipulate and agree to be bound by all of the recitals, terms and conditions herein.

RECITALS

Whereas, any remedial action undertaken pursuant to Section 20120b(3) of Part 201 of the Natural Resources and Environmental Protection Act (NREPA), 1994 PA 451, as amended, MCL 324.20101 et seq, or the Part 201 Rules, 1990 AACS R 299.5101 et seq. which may include land use or resource use restrictions, monitoring, operation and maintenance, installation of permanent markers and continued financial responsibility, if determined by the MDEQ to be necessary, shall be stipulated in a legally enforceable agreement with the MDEQ; and

Whereas, this Agreement pertains to the Facility located in the City of Galesburg, County of Kalamazoo, State of Michigan, described in Attachment A and commonly known as the Hydreco Site; and

Whereas, the RAP for a Limited Residential Criteria-Based Remedial Action submitted by American Hydrogeology Corporation (AHC) on behalf of General Signal on _____ to the MDEQ, including its attachments and any MDEQ-approved modifications, complies with applicable requirements under Part 201 of the NREPA and the Part 201 administrative rules and will be considered approved through the execution of this Agreement; and

Whereas, this Agreement satisfies the requirements of Section 20120b(3) of the NREPA, as amended in June 1995.

Based on the foregoing Recitals, and in consideration of the MDEQ's approval of the RAP for a Limited Residential Criteria-Based Remedial Action, the MDEQ and General Signal hereby stipulate and agree as follows:

I. PARTIES BOUND

1.1 This Agreement shall apply to and be binding upon MDEQ and General Signal Corporation (hereinafter "the Company") and its successors and assigns. No change in ownership or corporate status of the Company shall in any way alter the Company's responsibilities under this Agreement. Any agreement assigning or transferring the rights, duties and benefits of this Agreement shall provide that the terms and conditions of this Agreement are binding upon the assignee or transferee.

1.2 The signatories to this Agreement certify that they are authorized to execute and legally bind the parties they represent.

II. DEFINITIONS

2.1 The term "MDEQ" shall mean the Michigan Department of Environmental Quality and any authorized representatives acting on its behalf.

2.2 The term "Remedial Action Plan," "Limited Land Use or Site-Specific, Criteria-Based Remedial Action Plan" or "RAP" means the Remedial Action Plan for the Hydreco Site prepared by AHC and submitted to MDEQ on _____, including any MDEQ-approved modifications to the RAP.

2.3 The term "State" means the State of Michigan, any of its agencies and any authorized representatives acting on its behalf.

III. IMPLEMENTATION

3.1 The Company agrees to implement and comply with the terms and conditions of the RAP. As approved, each component of each work plan and approved modifications thereto, shall be deemed incorporated into this Agreement and made an enforceable part of this Agreement.

3.2 Approval of the RAP and shall not be construed to mean that the MDEQ concurs with all conclusions, methods or statements in the RAP or warrants that the RAP comports with law.

3.3 Within ninety (90) days of obtaining MDEQ approval, the Company shall properly remove or plug all monitor wells that were installed as part of the response activity at or related to the Facility. The proper well abandonment procedures described in ASTM Standard D 5299-92 (Standard Guide for Decommissioning Ground Water Wells, Vadose Zone Monitoring Devices, Boreholes, and Other Devices for Environmental Activities) shall be used by the Company in plugging in wells.

3.4 The RAP may only be modified by written agreement between the Company's Project Coordinator and the MDEQ, ERD Division Chief or his or her representative.

IV. RESTRICTIVE COVENANT

4.1 The Company shall record with the Kalamazoo County Register of Deeds the Restrictive Covenant attached hereto as Attachment D within twenty-one (21) days of MDEQ approval of the RAP. The restrictive covenant shall comply with the requirements of Section 20120b(4) of Part 201 of the NREPA.

4.2 The Company shall provide a true copy of the recorded Restrictive Covenant to MDEQ within ten (10) days after the document is recorded and returned to the Company by the Kalamazoo County Register of Deeds. The copy provided to MDEQ shall include the liber and page number.

V. ACCESS TO PROPERTY AND RECORDS

5.1 Upon the Effective Date of this Agreement, MDEQ and its authorized employees and representatives shall have access at all reasonable times to the Property for the purpose of determining and monitoring compliance with the RAP, including the right to take samples, inspect the operation of remedial action measures and inspect records related to the RAP.

5.2 This Agreement does not restrict or limit any right that the MDEQ may have to enter the Property or other properties to which access is required for the protection of the public health, safety or the environment pursuant to specific statutory or regulatory authority. Consistent with the MDEQ's responsibilities under federal or state law, the MDEQ and its authorized representatives shall use their best efforts to minimize interference and whenever possible employ efforts that are the least intrusive to the operations and commercial activities on the Property. "Best efforts" shall not require MDEQ to incur any material cost increases in carrying out its responsibilities to protect the public health, safety or welfare or the environment.

VI. PAYMENT OF OVERSIGHT COSTS

The Company shall reimburse MDEQ for all costs lawfully incurred by the State in overseeing implementation of the Remedial Action Plan. Following each anniversary of the date of this Agreement, MDEQ will provide the Company with a summary of all oversight costs incurred during the preceding year. The Company shall pay oversight costs lawfully incurred by the State within thirty (30) days of receipt of the oversight cost summary.

VII. COVENANT NOT TO SUE THE STATE/INDEMNIFICATION

The Company hereby Covenants Not to Sue or take any civil, judicial or administrative action against the State, its agencies, MDEQ or their authorized representatives, for any claims arising from or connected with MDEQ's approval or implementation of the RAP, including the execution of this Agreement. The Company also agrees to indemnify the State of Michigan, its agencies, the MDEQ and their authorized representatives from any and all claims brought by others based upon, arising from or connected with the implementation the RAP or the execution of this Agreement.

VIII. REMEDIES FOR BREACH OF AGREEMENT

8.1 The Company and the MDEQ recognize and agree that this Agreement is a legally enforceable contract as required by Section 20120b(3) of Part 201 and may be enforced in a court of competent jurisdiction. For that purpose, the Company consents to the jurisdiction of the Ingham County Circuit Court in any action by the State to enforce this Agreement. The Company also recognizes and understands that the MDEQ's remedies in the event the Company breaches the terms and conditions of this Agreement may include, but are not limited to, specific performance, issuance of a unilateral administrative order under Sections 20114(1)(h) or 20119 of the NREPA, MCL 324.20114(1)(h), 324.20119, reimbursement of the State costs, or any other statutory or

common law remedy subject to the rights or defenses available to the Company under applicable law.

8.2 This Agreement shall not be construed as discharging the liability of any person or entity.

8.3 Nothing in this Agreement shall affect the duties and obligations the Company may have with respect to permits or other governmental approvals or waive the Company's duties and obligations under other applicable federal or state laws.

8.4 If provisions for any of the following, determined by the MDEQ to be applicable for the Facility, lapse or are not complied with as provided in this Agreement or RAP, MDEQ's approval of the RAP is void from the time of the lapse or violation, unless the lapse or violation is corrected to the satisfaction of MDEQ:

(a) Land Use or Resource-Use Restrictions
(b) Monitoring
(c) Permanent Markers

If the Company fails to correct the lapse or violation within thirty (30) days of written notification of such lapse, MDEQ, at its option, may perform the response activities that the Company has failed to perform. The Company shall reimburse the State for costs the State incurs to perform those response activities within thirty (30) days of the Company's receipt of a cost summary report.

8.5 In the event the MDEQ's approval of the RAP becomes void, all other terms of this Agreement shall remain in full force and effect.

IX. NOTICES

Whenever, under the terms of this Agreement, notice is required to be given or a report, sampling data, analysis or other document is required to be forwarded by one party to the other, such correspondence shall be directed to the following individuals at the specified addresses or at such other address as may subsequently be designated in writing:

As to MDEQ:
[Name]
Environmental Response Division
Telephone
Address

As to the Company:
[Project Coordinator]
Telephone
Address

X. MODIFICATIONS

This Agreement shall not be modified unless such modification is in writing and signed by the Company's Project Coordinator and the MDEQ, ERD Division Chief or his or her representative.

XI. RESERVATION OF RIGHTS

11.1 The parties reserve any and all rights available to them pursuant to Part 201 or any other applicable laws.

11.2 Nothing in this Agreement shall constitute or may be construed as a release or covenant not to sue by the State regarding any claim, cause of action, or demand in law or equity against any person, firm, trust, trustee, joint venture, partnership, corporation, or other entity, for any liability it may have arising out of or relating in any way to the generation, storage, treatment, handling, transportation, release, or disposal of any hazardous substances, hazardous wastes, pollutants, contaminants, or injurious substances found at, taken to, or taken from the Facility.

XII. APPLICABLE LAW

12.1 This Agreement shall be construed in accordance with the laws of the State of Michigan. All actions required to be taken pursuant to this Agreement shall be undertaken in accordance with the requirements of Part 201 of NREPA, the Part 201 and any other applicable laws.

12.2 All terms used in this Agreement which are defined in Part 201 of NREPA, MCL 324.20101 et seq and/or the Part 201 Rules, 1990 AACS R 299.5101 et seq, shall have the same meaning in this Agreement as in Part 201 of NREPA and the Part 201 Rules. If a conflict exists between the Rules and the statute, the statute prevails.

XIII. CERTIFICATION

13.1 When the Company determines that it has completed all the response activities required by this Agreement and the RAP, it shall submit to the MDEQ a Notification of Completion of Remedial Action (Notification) and a draft completion report. The draft completion report shall summarize all response activities performed under this Agreement and shall include or reference any supporting documentation.

13.2 Upon receipt of the Notification, the MDEQ will review the Notification, the draft completion report and any supporting documentation. Within ninety (90) days of receipt of the Notification, the MDEQ will determine whether the Company has satisfactorily completed all response activities described in the RAP, including, but not limited to long term monitoring and proper abandonment of all remaining monitor wells. If the MDEQ determines that all response activities have been completed the MDEQ will so notify the Company. Upon MDEQ's receipt of a "Final" completion report from the Company, MDEQ shall issue a Certification of Completion of Remedial Action.

XIV. SEVERABILITY

The provisions of this Agreement shall be severable, and if any provision is declared by a court of competent jurisdiction to be inconsistent with federal or state law and, therefore, unenforceable, the remaining provisions of this Agreement shall remain in full force and effect; except that such severance shall not be allowed if the severance of such provision causes the Agreement to fail in its essential purposes.

XV. SEPARATE DOCUMENTS

This Agreement may be executed in two (2) or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one instrument.

XVI. EFFECTIVE DATE

This Agreement shall become effective on the date it is fully executed by all parties to this Agreement.

_____ Dated: _____

Environmental Response Division
Michigan Department of Environmental Quality

_____ Dated: _____

Authorized Representative of General
Signal Corporation

::ODMA\PCDOCS\GRR\371613\3