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Rev 07/10/02

SPX Corporation
Charlotte, North Carolina

RESPONSE TO SEPTEMBER 8, 2003 CERCLA SECTION 104(e) INFORMATION REQUEST

Notebook 2 of 2

SPX Corporation
Charlotte, North Carolina

RESPONSE TO SEPTEMBER 8, 2003 CERCLA
SECTION 104(e) INFORMATION REQUEST

1. *Identify all persons consulted in the preparation of your responses to these Information Requests.*

RESPONSE:

Patrick M. Lynch
General Manager
American Hydrogeology Corporation
6869 South Sprinkle Road
Portage, MI 49002
Phone: (269) 329-1600

Charles E. Barbieri
Foster, Swift, Collins & Smith, P.C.
313 S. Washington Square
Lansing, MI 48933
Phone: (517) 371-8100

2. *Identify all documents consulted, examined, or referred to in the preparation of your responses to these Information Requests, and provide copies of all such documents. If, in lieu of or along with a textual response to any specific Request, you refer to a document that you believe contains information responsive to that Request, you must identify the specific location (page number, paragraph number) in the document where responsive information can be located.*

RESPONSE:

1. Americlean, 1989. Memorandum from Ken Squires (Americlean) Re: Fire at Former Hydreco Plant. June 17, 1989.

2. American Hydrogeology Corporation (AHC), 1990. PCB Analytical Results. October 22, 1990.

3. AHC, 1991a. Letter from AHC to Judie Gapp (MDNR) Re: General Signal Soils Investigation – Work Plan. March 20, 1991.

4. AHC, 1991b. Letter from AHC to Judie Gapp (MDNR) Re: General Signal Soils Investigation. June 17, 1991.

5. AHC, 1991c. PCB Analytical Results. July 16, 1991.

6. AHC, 1992a. Confidential & Privileged Letter from AHC to William Merrill (Varnum, Riddering, Schmidt & Howlett) Re: PCB Sampling Locations. February 19, 1992 and February 12, 1990 memorandum to Patrick Lynch.

7. AHC, 1992b. Confidential & Privileged Draft Letter Report prepared by AHC for Varnum, Riddering, Schmidt & Howlett Re: Consumers Power Substation. August 24, 1992.

8. AHC, 1992c. PCB Analytical Results from April 8 and 9, 1992 soil investigation. June 19, 1992.

9. AHC, 1993a. *Groundwater Remedial Action Plan*, prepared by American Hydrogeology Corporation for General Signal Corporation, May 1993. [Pertinent sections only.] [Renamed *Interim Response Measure* via letter from AHC to Mr. James Innes (MDNR). June 28, 1993.]

10. AHC, 1993b. Letter from Linda Jones (AHC) to James Innes (MDNR) Re: Results of Investigation of Soils Contamination. June 28, 1993.

11. AHC, 1994a. Letter from Linda Jones Zabik (AHC) to Fred Curtis (Browning Ferris Industries) Re: Disposal of soil and concrete at Benteler Industries. April 12, 1994.

12. AHC, 1994b. Industrial User Self-Monitoring Report. January 7, 1994.

13. AHC, 1989-1994. Various PCB Analytical Results.

14. AHC, 1996. Confidential & Privileged *Summary of Findings and Conclusions - PCB Data Review*, prepared by American Hydrogeology Corporation for General Signal Corporation, December 1996.

15. AHC, 1997. Industrial User Self-Monitoring Report. Prepared by AHC on behalf of General Signal. January 7, 1997.

16. AHC, 1998. Confidential & Privileged *Environmental Audit Report*, prepared by AHC for Foster, Swift, Collins & Smith, P.C. October 8, 1998.

17. AHC, 2001. *Remedial Action Plan.* Prepared by AHC on behalf of General Signal. June 20, 2001.

18. Aptus Environmental Services (Aptus), 1991. Letter from Sheri Sanders (Aptus) to Dan McGrade (General Signal) Re: Certificate of Disposal. March 6, 1991.

19. Benteler, 1990. Handwritten History. October 16, 1990. Provided to Varnum, Riddering, Schmidt & Howlett by MDNR in response to January 15, 1991 Freedom of Information Act Request.

20. Blasland, Bouck & Lee, Inc. (BBL), 1994. *Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site - PRP Case Study*, prepared by BBL on behalf of Kalamazoo River Study Group, May 1994.

21. Bohne, 1992. Benteler Industries, Inc. v. General Signal Corp. et al. Deposition transcript (excerpt). September 11, 1992.

22. Browning-Ferris Industries, 1994. Landfill tickets and Nonhazardous Special Waste Manifests (Nos. 10418 – 10425). May 17-18, 1994.

23. CSRA Testing and Engineering Co., PC (CSRA), 1990. PCB Analytical Results for New Equipment, Hydreco Plant – Tobacco Road. October 25, 1990.

24. Clifton Transformer Service Company (Clifton), 1967. Inspection report. April 28, 1967.

25. Consumers Power Company (Consumers Power), 1982. PCB Analysis results. July 29, 1982.

26. Consumers Power, 1989. Major Equipment Disposition, Serial No. 2695548. September 21, 1989.

27. Consumers Power, 1990. Letter from Bruce Rasher (Consumers Power) to Leon Hall (Benteler Industries) Re: Air Brake Substation. May 29, 1990.

28. Consumers Power, 1991. Handwritten memorandum from Charles Froser (Consumers Power) to William Merrill (Varnum, Riddering, Schmidt & Howlett) Re: Transformer No. 2695548. October 22, 1991.

29. Earth Tech, 1995. *Closure Report for the On-Site Drainage Ditch and Manhole #8 Area. Prepared by Earth Tech for Benteler Industries.* September 1995.

30. EDI Engineering & Science (EDI) 1985a. *Spill Prevention Control & Countermeasure/ Pollution Incident Prevention Plan* (SPCC Plan). October 1985.

31. EDI, 1985b. Letter from D. Stang (EDI) to Charles VanDeLaare (Hydreco) Re: Transmittal of draft SPCC Plan. October 28, 1985.

32. EDI, 1989. Letter from William Beaton (EDI) to John Wydick (Benteler Industries) Re: Analytical Data – Galesburg, MI. October 20, 1989.

33. General Signal Corporation (General Signal), 1981. Privileged Internal Memorandum from Edgar DeVylder (Counsel) to File Re: Hydreco (Kalamazoo) – Hazardous Wastes. May 21, 1981.

34. General Signal, 1986. Letter from Ed DeVylder (General Signal) to Janet Haff (USEPA – Region 5) Re: KL Avenue Landfill, Oshtemo Township. June 20, 1986.

35. General Signal, 1990. Letter from Daniel McGrade (General Signal) to Judy Knoble (Aptus) transmitting waste manifest. December 13, 1990.

36. General Signal, 1992. Benteler Industries, Inc. v. General Signal Corp. et al., *General Signal Corporation's Brief in Support of Motion for Summary Judgment on Count V.* Case No. 1:90 CV 959. December 1, 1992.

37. General Signal, 1993a. Benteler Industries, Inc. v. General Signal Corp. et al., *General Signal Corporation's Reply in Opposition to Plaintiff's Motion to Compel Discovery.* Case No. 1:90 CV 959. January 6, 1993.

38. General Signal, 1993b. Benteler Industries, Inc. v. General Signal Corp. et al., *Mediation Brief of General Signal Corporation.* Case No. 1:90 CV 959. January 8, 1993. [Pertinent sections only.]

39. General Signal. Expenses in Benteler Industries and MDNR "Act 307" Matters for former General Signal Hydreco Division. Date unknown.

40. Hydreco, 1977. Residuals and Residues Disposal and Storage Report. Prepared by Hydreco for the Michigan Water Resources Commission. 1977.

41. Hydreco, 1978. Letter from Jack Seage (Hydreco) to Modern Septic Tank Engineers, Inc. Re: Liquid Waste Composition. February 1, 1978.

42. Hydreco, 1979. Discharge Permit Application. January 19, 1979.

43. Hydreco, 1980. Interdepartmental Correspondence from Jack Link to Ed DeVylder Re: Privileged & Confidential Summary Environmental Questionnaire. August 29, 1980.

44. Hydreco, 1980 – 1989. Uniform Hazardous Waste Manifests.

45. Hydreco, 1985a. June 1985 Audit Report (excerpt). Kalamazoo Location.

46. Hydreco, 1985b. Application for Discharge Permit. Prepared by Charles VanDeLaare (Hydreco) for submittal to MDNR – Surface Water Quality Division. May 24, 1985.

47. Hydreco, 1985c. Hydreco Hydraulic Components catalogue. May 1985.

48. Hydreco, 1986a. Interdepartmental Correspondence from Henry Kovalcik to Jack Link Re: Department 24 Systems Relocation to Watertown. November 21, 1986.

49. Hydreco, 1986b. May 1986 Audit Report (excerpt). Kalamazoo and Augusta Locations.

50. Hydreco, 1988. Letter from Charles VanDeLaare (Hydreco) to Lynne Tomeny (General Signal) Re: Hydreco Environmental Soil and Ground Contamination. March 4, 1988.

51. Hydreco, 1993. Charter Township of Oshtemo v. American Cyanamid Company, et al., File No. 1:92-CV-843. WD Mich. 1993. *Defendant Hydreco's Responses and Objections to Plaintiff's First Set of Interrogatories and First Request for Production of Documents.*

52. Hydreco. List of equipment transferred from Hydreco Kalamazoo to Hydreco Augusta. Author, date unknown.

53. Keck Consulting Services, Inc. (Keck), 1988. Report of *Hydrogeologic Investigation, Hydreco Manufacturing Galesburg Facility, Section 23, Comstock Township, Kalamazoo County, Michigan.* April 4, 1988.

54. Link, 1992. Benteler Industries, Inc. v. General Signal Corp. et al. Deposition transcript (excerpt). April 13, 1992.

55. Listing A. Summary of known inspection, maintenance, or repair records, author and date unknown.

56. Listing B. Known records or testimony of leaks, author and date unknown.

57. Michigan Department of Environmental Quality (MDEQ), 1990. Environmental Response Division Incident Tracking Worksheet. November 13, 1990.

58. MDEQ, 1996. Letter from Lonnie Lee (MDEQ) to Daniel McGrade (General Signal) Re: Exemption Notification Form for Groundwater Remediation Activities. January 24, 1996.

59. MDEQ, 1997a. Letter from MDEQ to General Signal voiding Permit to Install No. 274-93. February 21, 1997.

60. MDEQ, 1997b. Permit Termination in the matter of General Signal – Galesburg. NPDES Permit No. MI 0059021. May 29, 1997.

61. Michigan Department of Health (MDPH), 1984. Letter from Sheryl Thelen, R.S. (MDPH) to Doug Casterline (Hydreco) Re: Water System Inspection. November 9, 1984.

62. Michigan Department of Natural Resources (MDNR), 1962. Waste Survey Report, New York Air Brake – Galesburg, Michigan. April 3-5, 1962.

63. MDNR, 1980a. Field notes prepared by Gene Hall (MDNR). October 16 and December 10-11, 1980.

64. MDNR, 1980b. Letter from Tomas Leep (MDNR) to Carl Trimble (Modern Septic Tank Engineers, Inc.) Re: Septage Disposal. January 21, 1980.

65. MDNR, 1990. Permit Termination in the matter of General Signal Corporation/Hydreco. NPDES Permit No. MI 0005126. November 15, 1990.

66. MDNR, 1993. Letter from Linn Duling (MDNR) to Daniel McGrade (General Signal) Re: Type B Closure for Soils Contamination. August 30, 1993.

67. MDNR, 1994. Wetlands Permit. Issued by the Land and Water Management Division, MDNR. May 27, 1994.

68. Michigan Water Resources Commission (MWRC), 1960. Industrial Sewage Treatment Plants – Operation and Maintenance. New York Air Brake Company. April 20, 1960.

69. MWRC, 1955 – 1985. Correspondence with and from Hydreco Re: Wastewater practices.

70. MWRC, 1974 – 1992. Authorization to Discharge Under the National Pollutant Discharge Elimination System. Permits issued to Hydreco Unit of General Signal and General Signal. 1974 – 1992.

71. Plexus Engineering Group, Ltd. (Plexus), 1991. Privileged and Confidential. Portion of Privileged Draft *PCB Remediation Cost Estimates*. Prepared by Plexus for Varnum, Riddering, Schmidt & Howlett. January 25, 1991.

72. Rowen & Blair Electric Company, 1967-1984. Transformer inspection records.

73. Terra Environmental Corporation (Terra), 1994. *Benteler Industries – Remediation of Storm Sewer and On-Site Ditch*. Prepared by Terra on behalf of Benteler Industries. February 9, 1994.

74. United States Environmental Protection Agency (USEPA), 1985. Letter to Mr. Roland DeVries (Hydreco) from USEPA Region 5 Waste Management Division Re: Clean Water Act of 1977 - Notice of Violation. July 23, 1985.

75. United States Environmental Protection Agency (USEPA), 1991a. Letter to General Signal from USEPA Re: Toxic Substances Control Act – Notice of Noncompliance. June 18, 1991.

76. USEPA, 1991b. Letter from John Connell (Chief, PCB Control Section, USEPA) to Lori Wood (Varnum, Riddering, Schmidt & Howlett). August 9, 1991.

77. VanDeLaare, 1992. Benteler Industries, Inc. v. General Signal Corp. et al. Deposition transcript (excerpt). September 1, 1992.

78. Westinghouse Electric Corporation (Westinghouse), 1989. *Removal of PCB Capacitors*. Prepared by Westinghouse for Benteler Industries, Inc. October 13, 1989.

79. WW Engineering & Science, Inc. (WWES), 1990. *Summary Report of Plant Floor Decontamination*. Prepared for Benteler Industries. March 1990.

80. WWES, 1991. *A Site Investigation of Sewage Treatment Plant, Butler Building, Drainage Ditch, Sanitary Sewer Drain Line.* Prepared by WWES on behalf of Benteler Industries. August 1991.

81. WWES, 1992. Analytical Report: Benteler Industries – Georgia. PCB Analysis of Wipes. January 1992.

Note: In providing some documents that are marked privileged and confidential, SPX Corporation does not waive those privileges insofar as they apply to other documents generated by or possessed by General Signal Corporation and SPX and related entities.

3. *If you have reason to believe that there may be any person able to provide a more detailed or complete response to any Information Request, or who may be able to provide additional responsive documents, identify any and all such persons.*

RESPONSE:

The current property owner, Benteler Automotive Corporation (Benteler), has conducted operations and production processes at the facility. Benteler also conducted PCB analyses of building materials and soils following a 1989 transformer fire and explosion and allegedly submitted several reports to governmental agencies.

In 1987, the Hydreco Division of General Signal Corporation and its assets were transferred to ICM Acquisitions, Inc., along with all documents located at the facility. In 1993, Hydreco personnel stated that those documents were in ICM's possession at its facility in Augusta, Georgia (Hydreco, 1993). SPX Corporation is unaware of any other such persons.

4. *Identify:*

   a. *The address of the facility;*
   b. *Past and present EPA ID numbers, RCRA numbers, and NPDES numbers for the facility; and*
   c. *The current owner of the facility.*

RESPONSE:

a. 9000 East Michigan Avenue
   Galesburg, MI 49053

b. NPDES Permit No. MI 0005126 (issued to General Signal - Hydreco Division)
   NPDES Permit No. MI 0052019 (issued to General Signal - Galesburg)
   EPA ID No. MID043772490
   EPA ID No. MIG000025890 (General Signal, 1990)

c. Benteler Automotive Corporation
9000 East Michigan Avenue
Galesburg, MI 49053

Benteler manufactures automotive parts and stampings at the Galesburg facility.

5. *Identify all prior owners and operators of the facility, and their dates of ownership and/or operation.*

RESPONSE:

- 1955-1967: Hydreco, Inc. (subsidiary of New York Air Brake Company). Industrial operations began at the facility in 1955, when the main manufacturing plant was constructed for Hydreco, Inc.

- 1967-September 11, 1987: General Signal Corporation (Hydreco Division).

- September 11, 1987 to May 12, 1989: ICM Acquisitions, Inc. (a/k/a Hydreco, Inc.)

- May 12, 1989-present: Benteler Industries, Inc.

6. *Provide copies of all local, state, and federal environmental permits ever granted for the facility or any part thereof (e.g., RCRA permits, NPDES permits, etc.)*

RESPONSE:

See items 60, 65, 66, 71, 73 and 76 referred to in response to Question 2, above. *NPDES Permits (MWRC, 1974 – 1992)*:

- NPDES Permit effective March 26, 1974 - February 28, 1979. Issued to Hydreco Unit - General Signal Corporation by Michigan Water Resources Commission.

- NPDES Permit No. MI 0005126, effective November 1, 1979 - February 29, 1984. Issued to Hydreco Unit - General Signal Corporation by Michigan Water Resources Commission.

- NPDES Permit No. MI 0005126, effective November 20, 1986 - October 1, 1990. Issued to Hydreco Unit - General Signal Corporation by Michigan Water Resources Commission.

- NPDES Permit No. MI 0052019, effective October 15, 1992 - October 1, 1997. Issued to General Signal Corporation by Michigan Water Resources Commission. General Signal originally obtained this permit in order to discharge treated groundwater from its

groundwater treatment system to the Kalamazoo River. However, with MDNR's approval, General Signal opted to reinject the treated groundwater rather than discharge under the NPDES permit (MDEQ, 1996). Thus, no water was discharged under this permit. General Signal relied on a groundwater exemption for the discharge/reinjection.

- Air Permit to Install No. 274-93. Issued to General Signal Corporation by MDNR, Air Quality Division, Permit Section on September 27, 1993 to operate air stripper as part of groundwater treatment system. Rev. October 12, 1993; Rev. January 31, 1994. Permit voided by MDEQ February 21, 1997 due to exemption for limited emissions (MDEQ, 1997a).

- Permit Termination – NPDES Permit No. MI 0005126 terminated at General Signal Corporation's request on November 15, 1990 by the Michigan Water Resources Commission (MDNR, 1990).

- Permit Termination – NPDES Permit No. MI 0052019 terminated at General Signal Corporation's request on May 29, 1997 by the Michigan Department of Environmental Quality (MDEQ, 1997b).

- MDNR Wetlands Permit No. 94 12 60, granted under the provisions of Inland Lakes and Streams Act, 1972 PA 346, as amended, and the Goemaere-Anderson Wetland Protection Act, 1979 PA 203, to construct groundwater intercept and treatment system discharge pipeline. Due to MDEQ-approved changes in groundwater treatment system discharge, General Signal Corporation did not perform any of activities described in this permit (MDNR, 1994).

7. *Identify and describe all types of monitoring reports, monitoring data, and documentation sent to or received by federal or state regulatory authorities regarding any materials containing hazardous substances used, generated, stored, treated or disposed at or from the facility.*

RESPONSE:

Water System Inspection: On October 29, 1984, personnel from the Michigan Department of Health (MDPH) performed an inspection of the Hydreco water system. The results of the inspection were presented in a letter from the MDPH to Hydreco dated November 9, 1984 (MDPH, 1984).

NPDES Discharge Monitoring Reports: In accordance with its NPDES monitoring and reporting requirements, General Signal submitted Monthly Operating Reports for Outfall 001 to the Michigan Department of Environmental Quality or (formerly) the Michigan Department of Natural Resources offices in Plainwell, Michigan. The analytical and

reporting frequency requirements are shown in the NPDES permits provided in this CERCLA 104(e) response (MWRC, 1974 – 1992). Additional correspondence between Hydreco and MWRC regarding Hydreco's operations and wastewater practices are appended to this submittal (MWRC, 1955 – 1985).

Clean Water Act – Notice of Violation: In July 1985 the USEPA cited Hydreco (Kalamazoo) for failure to have a spill prevention control and countermeasures plan (SPCC) plan (USEPA, 1985). The facility paid a $100 fine and engaged a consultant to prepare the SPCC Plan.

Toxic Substances Control Act – Notice of Noncompliance: In a letter dated June 18, 1991, USEPA provided notice to General Signal Corporation that it was in violation of 40 CFR 761.65(a) for failure to dispose of PCB waste within one year of its being placed into storage (USEPA, 1991a). This incident involved the disposal of core water, sweeper parts, and personal protective equipment generated during PCB sampling activities conducted at the Benteler Industries site in February 1990 following a facility transformer explosion and subsequent fire (AHC, 1992a; see AHC Internal Memorandum from PDF to PML). The drums containing the materials were received at the disposal facility on January 14, 1991 and properly disposed by February 17, 1991 (Aptus, 1991).

Hydrogeologic Investigation/UST Release: By 1986, Hydreco had implemented the recommendations contained in the Spill Prevention Control & Countermeasure/ Pollution Incident Prevention Plan (SPCC Plan) prepared by EDI Engineering & Science (EDI, 1985a). These activities included the removal of three underground storage tanks and, prior to finalizing the SPCC Plan, the in-place closing of one 10,000-gallon UST and one 20,000-gallon UST formerly used by Hydreco to store hydraulic and heating oil, respectively (EDI, 1985a). Due to their proximity to a high voltage underground power line and the potential for structural damage to the plant and boiler room foundation if removed, these tanks were instead abandoned in place by opening them and filling them with sand. During the removal, signs of tank releases were noted at the 6,000-gallon waste oil tank and the 3,000-gallon waste water and oil tank used in connection with the engineering test area. Hydreco removed a total of 910 cubic yards of contaminated soil from the area around the two tanks and, with MDNR's approval, disposed of the soils at a licensed landfill (Hydreco, 1988).

The soil removal near the 3,000-gallon tank resolved the spillage problem in that area (Hydreco, 1988). Visually impacted soils at the 6,000-gallon UST excavation were observed to be in contact with the water table (Hydreco, 1988). Analysis of soil samples identified VOC contamination in the soil excavation. Laboratory analysis of soil samples collected at the base of the excavation subsequent to UST removal indicated the presence of methylene chloride, cis-1,2-dichloroethene, trichloroethene, tetrachloroethene, ethylbenzene, toluene, and xylenes. In response to these findings, a hydrogeologic investigation at the facility was initiated by Keck Consulting Services, Inc. in 1987 on

behalf of General Signal. Details of Keck's investigation are contained in a report titled *Report of Hydrogeologic Investigation, Hydreco Manufacturing Galesburg Facility, Section 23, Comstock Township, Kalamazoo County, Michigan* (April 4, 1988) (Keck, 1988).

A total of approximately 5,145 cubic yards of soil were removed from the area surrounding the former 6,000-gallon UST location. Soil excavation began in November 1988 and was completed in January 1989. The soils were transported to the C & C Landfill in Marshall, MI for disposal. During the UST investigation and soil removal, no PCB analysis of soils was performed.

Groundwater monitoring was performed at the site from July 1991 to 1998. Shallow and deep wells were installed to explore the aquifers at the site. A total of 36 monitoring wells have been installed at the site to assess the groundwater condition related to the UST release. Two purge wells were installed to aid in remediation of the groundwater plume. AHC conducted extended effluent testing between January 8, 1991 and February 22, 1991 to collect baseline data pertinent to design of a treatment system.

As part of this effort, water quality samples were collected during the effluent testing for laboratory analysis of minerals, nutrients, carbonaceous oxygen demand, VOCs, SVOCs, pesticides, metals, and PCBs. A water sample collected on February 18, 1991 from PW-A, located within the contaminant plume, was analyzed for PCBs and found to be non-detect (AHC, 1993a). Consistent with prior sampling results, these analyses identified VOCs as the only contaminants of concern at the site. A water sample was also collected from PW-A on October 22, 1990 in which no PCBs were detected (AHC, 1990).

A groundwater treatment system was installed and recovered a total of 38,295,867 gallons of groundwater from May 1996 to March 1998. An air stripper was utilized to treat the recovered groundwater. The groundwater plume never reached Morrow Lake, and has not migrated beyond the boundaries of the site (AHC, 2001). Subsequent to shutting off the treatment system, plans were made for a restricted site closure.

The primary contaminants identified at the site as part of the investigation were vinyl chloride, trichloroethylene, tetrachloroethene, and cis-1,2-dichloroethene. No free product was identified during the course of the investigation. Details regarding the groundwater treatment system operation, historic water level elevation data, soil quality analytical, and groundwater quality data were presented to the MDEQ in a Remedial Action Plan dated July 20, 2001 (AHC, 2001).

The RAP provides for a limited site closure in the form of a groundwater restriction zone. Subsequent meetings with the MDEQ have resulted in additional tasks that must be completed before receiving MDEQ final approval of the closure:

- Quarterly sampling of specified groundwater monitoring wells for at least four additional quarters to further demonstrate decreasing concentrations to supplement the ten years of previous data.

- Abandonment of select monitoring wells no longer required for groundwater monitoring.

- Financial assurance if monitoring costs exceed $2,500.

- Publication of Public Notice of the Remedial Action Plan in a newspaper of general circulation in the area.

- An analysis of the easement holders that may cross the restricted groundwater zone established as part of the site closure.

- Provision of groundwater water quality contours over time for the contaminated area.

- Inclusion of the entire aquifer in the groundwater restriction zone, even though the contamination is confined to the upper aquifer.

It is expected that these tasks will be completed and submitted to the MDEQ within the next nine months resulting in final approval of the RAP and closure of the site.

Industrial User Self-Monitoring Reports: Industrial User Self-Monitoring Reports were submitted by AHC during the course of the 6,000-gallon UST investigation. Groundwater recovered as part of the investigation process, including sampling and testing of purge wells, was periodically discharged to the municipal sanitary sewer. The discharge also included initial discharge from the groundwater treatment system. General Signal monitored the discharge for VOCs. Groundwater sampling results for VOCs were submitted to the City of Kalamazoo POTW as part of the discharge process. City personnel periodically collected discharge samples for non-PCB analyses.

Loading Dock Soil/Concrete Investigation and Removal: Soil contamination was reportedly found adjacent to an exterior loading dock by Benteler Industries employees in November 1990. Visibly impacted soils were submitted for laboratory analysis of various parameters, including PCBs. No PCBs were detected (MDEQ, 1990). AHC performed follow-up investigations of the contamination on behalf of General Signal (AHC, 1991a and 1991b). Based on analytical results showing the presence of VOCs, General Signal Corporation excavated the loading dock concrete and soils for on-site staging and subsequently shipped the non-hazardous waste to the C & C Landfill in Marshall, Michigan (AHC, 1994b). General Signal removed approximately 228 cubic yards of oil-impacted waste from the facility during this remedial effort (Browning-Ferris Industries,

1994). AHC summarized these activities in a report submitted to the MDNR on June 28, 1993 (AHC, 1993b). An August 30, 1993 letter from the MDNR allowed a Type B closure of the soil contamination by the loading dock (MDNR, 1993).

Environmental Reports prepared on behalf of General Signal by Keck Consulting Services, Inc. or American Hydrogeology Corporation (AHC) and submitted to MDNR/ or MDEQ. Note: The following reports describe response activities to address soil and groundwater remediation related to the 6,000-gallon UST release. PCBs were not an issue in the UST investigation; thus, none of the reports contain any PCB data. Therefore, no copies of the following reports are provided with this submittal.

Prepared by AHC:

- Status Report of Extended Effluent Characterization. Provided to Ms. Judie Gapp (MDNR-ERD). June 21, 1991.
- Groundwater Contamination Investigation. Provided to Ms. Judie Gapp (MDNR-ERD). July 23, 1991.
- Groundwater Analytical Results from July and October 1991 monitoring rounds. Provided to Ms. Judie Gapp (MDNR-ERD). December 30, 1991.
- Investigation of Soils Contamination and Work Plan. Provided to Ms. Judie Gapp (MDNR-ERD). January 24, 1992.
- Groundwater Analytical Results from January 1992 Monitoring Event. Provided to Ms. Judie Gapp (MDNR-ERD). May 11, 1992.
- Groundwater Analytical Results from April 1992 Monitoring Event. Provided to Mr. James Innes (MDNR). July 7, 1992.
- Groundwater Analytical Results from June and October 1992 Monitoring Events. Provided to Mr. James Innes (MDNR). February 9, 1993.
- Groundwater Analytical Results from January 1993 Monitoring Event. Provided to Mr. James Innes (MDNR). April 12, 1993.
- Groundwater Analytical Results from April 1993 Monitoring Event. Provided to Mr. James Innes (MDNR). July 19, 1993.
- Soil Investigation Report. Provided to Mr. James Innes (MDNR). August 4, 1993.

- Status Report of Hydrogeological Investigation. Provided to Mr. James Innes (MDNR). September 16, 1993.

- October 1993 Groundwater Analytical Results. Provided to Mr. James Innes (MDNR-ERD). February 2, 1994.

- Basis of Design for a Groundwater Treatment System. Provided to Mr. Fred Eyer (MDNR-SWQD). February 25, 1994.

- February 1994 Quarterly Groundwater Analytical Results. Provided to Mr. James Innes (MDNR-ERD). May 13, 1994.

- May 1994 Quarterly Groundwater Analytical Results. Provided to Mr. James Innes (MDNR-ERD). August 31, 1994.

- January 1995 Groundwater Analytical Results. Provided to Ms. Carol Weaver (MDNR). April 20, 1995.

- Annual Evaluation Report. Provided to Ms. Carol Weaver (MDNR). March 2, 1995.

- Second Quarter 1995 Groundwater Monitoring Report. Provided to Ms. Carol Weaver (MDNR). May 30, 1995.

- Third Quarter 1995 Groundwater Monitoring Report. Provided to Ms. Carol Weaver (MDEQ). December 7, 1995.

- Quarterly Groundwater Monitoring & Status Report. Provided to Ms. Carol Weaver (MDEQ). April 9, 1996.

- Quarterly Groundwater & Status Report. Provided to Ms. Carol Weaver (MDEQ). July 10, 1996.

- Quarterly Monitoring & Status Report. Ms. Provided to Ms. Carol Weaver (MDEQ). October 31, 1996.

- Quarterly Monitoring & Status Report. Provided to Ms. Carol Weaver (MDEQ). January 31, 1997.

- Quarterly Monitoring & Status Report. Provided to Ms. Carol Weaver (MDEQ). May 1, 1997.

- Quarterly Monitoring & Status Report. Provided to Ms. Carol Weaver (MDEQ). October 17, 1997.

- Quarterly Monitoring & Status Report. Provided to Ms. Carol Weaver (MDEQ). March 3, 1998.

- A Preliminary Assessment to Support Groundwater Purge and Treat System Shut-off. June 9, 1998.

- RAP follow-up letter with supplemental information. Provided to Ms. Carol Weaver (MDEQ) by Varnum, Riddering, Schmidt & Howlett. July 18, 2003.

8. *Identify and describe the nature of all past and current operations and production processes at the facility. Identify, if available, all current and previous SIC codes associated with the facility.*

RESPONSE:

New York Air and Brake Company, Hydreco, Inc., and General Signal Corporation's Hydreco Division manufactured hydraulic equipment, including hydraulic valves, gear pumps, motor piston pumps, filters, and complete hydraulic systems for construction, farming, mining, and materials handling equipment at the facility until it was sold to Benteler Industries, Inc. (Hydreco, 1985a).

Hydreco conducted engineering research for mobile equipment hydraulic components, hydraulic gear pump manufacturing, testing, and painting, and sales activities at the 9000 East Michigan Avenue location. Hydreco used cutting coolants, hydraulic oil, solvents, and paints during the gear pump manufacturing process.

Machining was primarily of cast iron, during which soluble oil and semi-synthetics were used. Hydraulic oil was used during the testing procedure. Between 1979 and 1984, Hydreco also manufactured an aluminum pump and used an impregnation system in which trichlorothene and later perchloroethylene were used in a vapor degreaser (Hydreco, 1988).

Previous SIC codes:

- 3560 (Hydreco, 1985b)
- 3541 (Hydreco, 1980)
- 3811 (Hydreco, 1980)

9. *Identify each product produced at the facility. Further identify the mass quantity of each product produced on an annual basis.*

RESPONSE:

During its ownership of the facility from 1967 to 1987, General Signal Hydreco Division manufactured hydraulic pumps and other components. The particular pumps and valves manufactured at the Galesburg plant are described in the Hydreco catalogue attached to this submittal (Hydreco, 1985c).

10. *Identify and describe any and all activities or efforts to take production facilities out of operation, and include the dates of each such activity or effort.*

RESPONSE:

Following ICM's purchase of Hydreco in 1987 and prior to Benteler Industry's occupancy of the property, all manufacturing, sales, and engineering functions were consolidated into Hydreco's Augusta, Georgia facility. During the consolidation, machine tools and assembly and test equipment specifically for the smaller gear pumps (series 1400 and 1500) were moved from Kalamazoo, MI to IFP Hydraulics (an affiliated company). The facility was empty when it was acquired by Benteler Industries in May 1989 (Benteler, 1990).

The specific equipment transferred from Kalamazoo to Augusta is described in the materials appended to this submittal (Hydreco). In October 1990, CSRA Testing and Engineering Co. of Augusta, GA collected wipe samples from certain pieces of the Augusta equipment for laboratory analysis of PCBs. No PCBs were detected in any of the wipe samples, including those of equipment formerly used in Hydreco's Kalamazoo, MI plant (CSRA, 1990).

As part of the litigation surrounding Benteler Industries, Inc. v. General Signal Corp. et al., Benteler Industries arranged for WW Engineering & Science, Inc. (WWES) to sample equipment that had been located at Hydreco's Kalamazoo facility prior to the sale. The objective of the sampling event was to assess whether PCBs had been released at the Kalamazoo facility prior to Benteler Industry's June 1989 transformer fire. WWES and AHC collected split wipe samples of the former Kalamazoo equipment for PCB analysis on January 31, 1992. The equipment was in use at the time of sampling. WWES

analyzed 29 samples. No PCBs were detected in any of the samples (WWES, 1992). AHC samples were not analyzed.

Hydreco understood that certain other equipment associated with the Hydreco Systems business would be transferred to another General Signal facility in Watertown, New York in early January 1987 (Hydreco, 1986a). This transfer, presumably completed, included a small step down, "dry-type" transformer that contained no oil, PCB-containing or otherwise (General Signal, 1993a).

11. *Identify and provide any data, estimates, analyses or other information regarding any material used in the production processes at the facility that contained or may have contained PCBs. To the extent available, provide all such data, estimates, analyses or other information on an annual basis.*

RESPONSE:

PCBs were not contained in the materials used by General Signal's Hydreco Division in its production processes. To the best of SPX Corporation's knowledge, PCBs were present at the facility only in the dielectric fluid contained in the plant's electrical transformers and capacitors. Although General Signal believes that minor electrical equipment leaks might have occurred inside General Signal's facility (discussed in response to Information Request No. 13c), SPX denies that any PCBs were released from or during any of General Signal's operations into the environment.

1. General Signal's hydraulic equipment manufacturing processes did not require or use PCB-containing fluids:

The predominant PCB Aroclor mixture identified within the plant after the Benteler fire was Aroclor 1260. This mixture was used in the manufacture of certain hydraulic fluids and transformer dielectric fluids, but not in lubricants and cutting oils (Plexus, 1991). PCB Aroclors were not components of the ordinary hydraulic fluids used in General Signal's manufacturing processes. The small percentage of hydraulic fluids generally used by industries at the time that would have contained PCBs were those designed for use in high heat applications that required the flame-retardant properties for which PCBs were developed (Plexus, 1991). These applications would have included manufacturing processes involving die cast equipment, carbon arc furnaces, and metal-forming (Plexus, 1991). General Signal used no such manufacturing processes to produce its hydraulic equipment.

2. General Signal personnel employed at the Kalamazoo facility for more than 30 years have testified that no PCBs were used in plant manufacturing processes:

These facts are reflected in employee testimony regarding the lack of PCB use in Hydreco/General Signal industrial applications. During the litigation process, the parties took the depositions of several former General Signal employees who worked at the Kalamazoo facility from 1956 until 1987 or 1988. According to their testimony, the only hydraulic oils used in the plant were Texaco products (General Signal, 1992). There was no evidence that any hydraulic oils manufactured by Texaco contained PCBs. General Signal employees were not aware of any PCB source in the plant other than PCB-containing dielectric fluid in transformers, capacitors, or switches (General Signal, 1992). Jack Link, who served as Hydreco's unit President from 1971 to 1987, also asserted that Hydreco was not aware of any PCB source other than the PCB-containing dielectric fluid in transformers, switches, and capacitors (Link, 1992).

The fact that Hydreco did not use PCBs as part of its manufacturing processes is further documented in an internal Summary Environmental Questionnaire completed in 1980 by Hydreco employees for the Kalamazoo facility (Hydreco, 1980). In the questionnaire, Hydreco confirmed that no PCBs or certain other chemicals were contained in plant waste water, and stated that PCBs were not used in the plant processes (Hydreco, 1980).

Additionally, General Signal has documented the chemical content of the plant's liquid industrial waste and the results of RCRA EP testing (General Signal, 1981). Based on the results of employee surveys and laboratory analytical results, PCBs were not identified as constituents of the facility's hazardous wastes (General Signal, 1981).

3. Third parties hired to identify all potential sources of oils and hazardous materials for discharge prevention purposes found no potential PCB sources at the Kalamazoo facility other than electrical equipment:

In 1985, EDI Engineering & Science prepared a Spill Prevention Control & Countermeasure/ Pollution Incident Prevention Plan (SPCC/PIPP Plan) for General Signal (EDI, 1985a). The SPCC/PIPP Plan preparation relied on a thorough survey to identify oil and hazardous materials storage and use areas, manufacturing processes, treatment systems, and areas that received bulk shipments. Table 5 of the SPCC/PIPP Plan presents the resulting list of oils and hazardous materials stored at Hydreco. The only PCB-containing items identified were transformers, electrical switches, and capacitors (EDI, 1985a).

4. Despite General Signal's (former) lengthy manufacturing history at the Kalamazoo facility, USEPA never identified the plant processes as potential sources of PCBs subject to federal PCB regulation:

Indeed, as of 1991, USEPA's PCB Control Section had never performed a PCB compliance inspection at the Hydreco, General Signal, or Benteler Industries facility in Kalamazoo (USEPA, 1991b). A review of General Signal's corporate records indicates

that USEPA's sole concern regarding PCBs at the Kalamazoo facility involved General Signal's timely disposal of PPE generated during post-fire PCB sampling, after the facility was under Benteler Industry's ownership (USEPA, 1991a).

5. Not only were PCBs not used at the Kalamazoo facility, they were likewise not used (and therefore of no concern) at Hydreco's Augusta, Georgia facility, which produced hydraulic equipment using many of the same manufacturing processes and equipment used in Kalamazoo (Hydreco, 1986b).

As discussed in the response to Information Request No. 10, General Signal collected wipe samples from various pieces of manufacturing equipment at the Augusta facility for PCB analysis. These samples were collected in 1992, after ICM (a/k/a Hydreco) had acquired the Hydreco Division of General Signal and transferred the Kalamazoo equipment to the Augusta facility. ICM continued the hydraulic equipment manufacturing process following its purchase of Hydreco. The manufacturing equipment was in use at the time of the 1992 PCB sampling; thus, the wipe samples would almost certainly have reflected the presence of PCBs had they been used in the manufacturing process. No PCBs were detected in the equipment wipe samples.

Prior to General Signal's sampling event, CSRA Testing and Engineering Co. of Augusta, GA collected wipe samples from certain pieces of the Augusta equipment for laboratory analysis of PCBs. No PCBs were detected in any of the wipe samples, including those of equipment formerly used in Hydreco's Kalamazoo plant (CSRA, 1990).

12. *Identify any data, estimates, analyses or other information regarding the concentration of PCBs in any material used in the production processes at the facility. To the extent available, provide all such data, estimates, analyses or other information on an annual basis.*

RESPONSE:

See response to Information Request No. 11.

13. *To the extent not already provided in response to Request #11, provide the following information:*

    a. *The type and quantity, on an annual basis, of any oils or other lubricants used at the facility that are known or suspected to have contained PCBs;*

    RESPONSE:

    See response to Information Request No. 11. As noted below, Rowen & Blair Electric Company performed maintenance and inspection activities for the

facility's electrical equipment during General Signal's ownership. With the exception of one purchase requisition showing a New York Air Brake order for 55 gallons of #55 Transformer Oil from Texaco, SPX Corporation has no information regarding quantities or types of transformer oil used in the facility's electrical equipment (Rowen & Blair, 1967 – 1984).

b. *The number, handling and disposition of all transformers and conductors at the facility; and*

RESPONSE

The locations and capacities of PCB-containing transformers, capacitors, and switches present during General Signal's ownership of the Kalamazoo facility are shown on Figure 5 (Site Map) of the SPCC/PIPP Plan (EDI, 1985a).

Records from 1967 indicate Clifton Transformer Service Company of Three Rivers, Michigan performed periodic inspections of transformers located within the north and south substations and boiler room (Clifton, 1967). Thereafter, the transformers were serviced and maintained by Rowen & Blair Electric Company during General Signal's ownership of the property. A listing of known transformer inspection, maintenance, or repair records is appended to this submittal (author unknown; Listing A). Copies of transformer records contained in SPX Corporation's files are also included in the attached reference materials (Rowen & Blair, 1967 – 1984).

Benteler Industries was in charge of any transformer and capacitor disposition at the facility. It appears the capacitors were removed from the facility by Westinghouse Electric Corporation in October 1989 (Westinghouse, 1989).

In September 1989, one of the transformers was reportedly removed from the Consumers Power substation located to the south of the parking lot and east of the plant building (Consumers Power, 1989). This transformer, Serial No. 2695548 was removed to the Consumers Power District Office in Alma, Michigan (Consumers Power, 1991). Upon its removal, one transformer remained within the Consumers Power substation at the Benteler Industries property (Consumers Power, 1991).

c. *Data, analysis and other information regarding leaks, discharges or other releases from any transformer, conductor or other equipment using oils or lubricants at the facility.*

RESPONSE:

To the best of SPX Corporation's knowledge, PCBs were present at the facility only in the dielectric fluid contained in the plant's electrical transformers, capacitors, and switches. Information regarding transformer capacity and content is contained in transformer inspection and maintenance records compiled by Rowen & Blair Electric Company (Rowen & Blair, 1967 – 1984).

1. Leaks

Any minor electrical equipment leaks are documented on the Rowen & Blair inspection reports (Rowen & Blair, 1967 – 1984). Billing records from this time period include Rowen & Blair charges for miscellaneous fittings and merchandise, indicating that Rowen & Blair occasionally performed preventive maintenance to address observed minor leaks concurrently with their annual inspections or upon an as-needed basis at Hydreco's request. According to former General Signal personnel, Rowen & Blair would have repaired any reported leaks before leaving the facility after completing their annual inspections. A summary listing of known records or testimony of leaks is appended to this submittal (author unknown; Listing B). No leaks of any significant quantity are noted; furthermore, there is no evidence indicating that PCB fluid ever came into contact with the floor of this plant during General Signal's ownership. (General Signal, 1993b).

2. Discharges

- *Investigation of Potential Discharge from Consumers Power Substation*

As part of an effort to identify potential sources of PCBs to the drainage ditch soils at issue in the now-settled litigation of Benteler Industries, Inc. v. General Signal, et al., American Hydrogeology Corporation collected surface soil samples in the vicinity of the Consumers Power substation for PCB analysis on April 8 and 9, 1992.

Prior PCB analysis of transformer oil and a substation voltage regulator showed the equipment contained PCBs in the form of Aroclor 1260 at concentrations of 36 ppm and 13 ppm, respectively (Consumers Power, 1982 and 1990). During the 1992 AHC surface soil sampling event, PCBs were detected at three locations, all of which were located along an erosional drainage channel formed by surface water runoff draining from the substation. All detected PCBs were identified as Aroclor 1260 (AHC, 1992b).

In May 1991, WWES collected two soil samples south of the Consumers Power substation for PCB analysis. No PCBs were detected. WWES also collected a

sediment sample from manhole SS-4, located between the Consumers Power substation and the drainage ditch headwall, for PCB analysis. Analytical results showed the presence of Aroclors 1248 and 1260. WWES noted that water was flowing in the ditch during sample collection (WWES, 1991). This observation indicates that Benteler Industries was discharging wastewater to the ditch at the time of sample collection.

- *June 17, 1989 Transformer Fire & Explosion in Benteler Industries facility*

As noted previously, Benteler Industries took ownership of the facility in May 1989. The following month, Benteler hired a contractor to clean the interior of the plant with a high-pressure water spray and detergent. After the ceiling above the south transformer had been washed, a low voltage switch gear unit attached to the transformer exploded and the attached transformer caught fire (Americlean, 1989). The fire activated the automatic sprinkler system above the transformer (General Signal, 1993b).

Water from the sprinkler system and water from the contractor's cleaning operation accumulated on the concrete floor (General Signal, 1993b). Because the floor drains had not been sealed, some of the standing water was likely discharged to a drainage ditch along the east side of the property (General Signal, 1993b). The drainage ditch received non-contact cooling water, storm water, and floor drainage from the plant (AHC, 1996). The ditch extends south from the facility for a distance of approximately 3,100 feet to Morrow Lake (AHC, 1996).

In August 1989, Benteler personnel discovered that the fire-damaged transformer inside the facility was leaking. Benteler drained and removed the leaking transformer. Benteler then discovered high PCB levels on the floor around the damaged transformer and lower levels on other areas of the plant floor. At or about the same time, AHC, on behalf of General Signal, collected wipe and concrete core samples from the building interior (AHC, 1992a). Maximum PCB levels in the immediate vicinity of the damaged transformer were greater than the maximum PCB concentrations detected near the other plant transformers, thus indicating that PCBs had been released from the damaged transformer (General Signal, 1993b). Benteler completed floor decontamination activities on February 14, 1990 by power washing the building interior, removing certain flooring sections, and applying a sealant to other areas of the concrete floor (WWES, 1990).

Benteler's consultants also collected 20 soil samples from the drainage ditch for PCB analysis (WWES, 1991). On behalf of General Signal, AHC split one drainage ditch sample with WWES for PCB analysis. Laboratory analysis

identified the presence of Aroclor 1248 (AHC, 1991c). The results of ditch sampling conducted by Benteler and others are summarized in Section 4.0 of a document entitled *Summary of Findings and Conclusions – PCB Data Review* (AHC, 1996). Benteler reportedly remediated the ditch in 1993 by removing approximately 795 cubic yards of contaminated soil (AHC, 1996). Additionally, Benteler reportedly removed approximately 75 cubic yards of PCB-contaminated soils from "Manhole No. 8" on July 27 and 28, 1993 (Terra, 1994). Closure activities were documented in a report entitled *Closure Report for the On-Site Drainage Ditch and Manhole #8 Area* (Earth Tech, 1995).

14. *To the extent not already provided in response to Request #12, identify any data, estimates, analyses or other information regarding the concentration of PCBs in the materials identified in your response to Request #13.*

RESPONSE:

See response to Information Request No. 13c. EDI Engineering & Science (EDI) estimated the PCB concentrations in facility dielectric fluid to determine the proper response methods for inclusion in the facility's SPCC Plan. As part of this effort, EDI recommended that Hydreco have its dielectric fluid tested for actual PCB concentrations (EDI, 1985b). EDI's recommendation indicates that Hydreco had no data regarding dielectric PCB content prior to development of the SPCC Plan. SPX Corporation has no information indicating that Hydreco ever conducted the recommended analyses.

15. *Describe the procedures used by you or anyone on your behalf to test PCB concentrations in the materials identified in your response to Request #11 and #13, above. Include in your response test methods and dates.*

RESPONSE:

PCB analysis methods and dates are shown on the data sheets appended to this submittal or otherwise referenced in other information responses.

AHC PCB investigation methodology:

- EPA Verification of PCB Spill Cleanup by Sampling & Analysis – August 1985
- EPA Field Manual for Grid Sampling of PCB Spill Sites to Verify Cleanup – May 1986

SPX Corporation has no information regarding any methods used by Rowen & Blair to test PCB concentrations in electrical equipment transformer fluids.

16. *Describe the procedures followed by you, or anyone on your behalf, to prevent, mitigate or address the release or threat of release of any material identified in your response to Requests #11 and #13, above.*

RESPONSE:

See response to Information Request No. 13 for information regarding periodic transformer inspection and preventive maintenance activities. Additionally, see Response No. 13.c. for a discussion of remedial activities conducted by Benteler Industries to address PCB contamination that resulted from a June 1989 interior transformer explosion and fire.

General Signal's SPCC/PIPP Plan set forth PCB spill response procedures to address any spills associated with PCB use in the facility's electrical equipment (EDI, 1985a). These measures stressed the importance of preventing any PCB-containing oil from entering catch basins, floor drains, or manholes. The SPCC/PIPP Plan also included a form for the reporting of spill incidents. To the best of SPX Corporation's knowledge, no PCB spills requiring implementation of the SPCC/PIPP Plan preventive measures ever occurred within the facility during General Signal's ownership.

In addition to the regular transformer inspections performed by Rowen & Blair, Hydreco maintenance personnel inspected the transformers on a monthly basis beginning in 1987 or 1988 (VanDeLaare, 1992). Hydreco recorded the inspection results in monthly reports (VanDeLaare, 1992). SPX Corporation has no copies of these reports in its files. The reports were likely transferred to Hydreco's Augusta, Georgia facility when General Signal sold Hydreco to ICM Acquisitions in September 1987.

The facility transformers and related equipment were also inspected by General Signal's insurance representatives as part of their comprehensive facility evaluations for insurance purposes (Bohne, 1992).

17. *Provide a figure delineating the groundwater flow direction on your property.*

RESPONSE:

As shown on Figures 5 and 6 of the *Remedial Action Plan* (RAP), groundwater flow was generally to the south/southwest in December 1998 and October 1997, respectively (AHC, 2001). Historical water table elevation measurements are shown in Table 3 of the RAP (AHC, 2001).

18. *Identify the depth(s) to groundwater at your property.*

RESPONSE:

Based on water table elevation measurements collected from 36 monitoring wells and two purge wells, depths to shallow groundwater at the former General Signal facility ranged from approximately 13 to 23 feet below ground surface between October 1997 and May 2001 (AHC, 2001).

19. *Identify the type and amount of all raw process water sources used in the production processes at the facility. To the extent available, provide such information by month of operation.*

RESPONSE:

During General Signal's operation of the Kalamazoo plant, raw process waters used in facility production processes were obtained from two on-site wells. Hydreco utilized a 100,000-gallon storage tank in conjunction with the private wells. In 1985, Hydreco reported that the volume of water recovered from the private well source was 551,000 gpd (Hydreco, 1985b). Of this amount, Hydreco used approximately 500,000 gpd for non-contact cooling water and 51,000 gpd for sanitary water (Hydreco, 1985b).

20. *Identify and describe all information about the PCB content of the raw process water used in each production process at the facility. To the extent available, provide such information by month of operation.*

RESPONSE:

See response to Information Request No. 11.

Although PCBs were contained in on-site electrical transformers, PCBs were not used in the manufacture of hydraulic equipment. SPX Corporation therefore has no knowledge of any PCB presence in raw process waters used at the facility.

21. *Identify and describe what type of treatment, if any, was used to treat raw process water prior to its use in each production process at the facility.*

RESPONSE:

In 1984, Hydreco was treating a section of its water distribution system with acid to reduce lime deposits (MDPH, 1984). SPX Corporation has no additional information regarding any other treatment of raw process waters.

22. *For each production process at the facility, identify and describe each waste stream from its creation to final disposition.*

RESPONSE:

General – Please see SPCC/PIPP Plan, pages 4 – 9, for a discussion of waste streams and their disposition. Facility oils and cooling water used in test stand coolers were collected in trenches in the concrete floor of the plant. The trenches discharged to a sump. The oil was then separated and pumped to a 6,000-gallon UST. The remaining water was discharged to an open ditch that extended approximately 3,100 feet to Morrow Lake. Any residual oils in the discharge were recovered by an oil skimmer installed in the ditch and pumped to a 500-gallon UST. Test oils used in the facility's engineering building were directed through drains to a 3,000-gallon waste oil UST (EDI, 1985a). Hydreco removed the USTs during its implementation of the SPCC Plan recommendations and replaced the USTs with aboveground units.

Machining – In response to a 1977 Michigan Water Resources Commission questionnaire, Hydreco reported that it annually produced approximately 24,000 gallons of waste oil from machining operations. The waste oil was stored in an underground tank prior to its periodic removal and disposal by Modern Septic Tank Engineers, Inc., then located at 6475 East Michigan Avenue, Kalamazoo, MI 49001 (Hydreco, 1977). Modern Septic Tank was Hydreco's only industrial waste hauler during the period of 1968 – 1979 (General Signal, 1986). Hydreco used various industrial waste haulers between 1980 and 1989, as shown on waste manifests from this time period (Hydreco, 1980 – 1989).

In a letter to Modern Septic Tank Engineers, Inc. dated February 1, 1978, Jack Seage (Hydreco Facilities Engineer) noted that the composition of the liquid waste disposed by Modern Septic was 85 percent water, ten percent No. 10 motor oil, and five percent soluble oil (Hydreco, 1978).

Chip Storage Area – The Chip Storage Area was formerly located south of the main facility building and east of the Butler Building on a concrete pad. Scrap metal and leftover parts were disposed at this location prior to off-site disposal.

Historic Sand-Blasting Operations – For a period of two years (1962 – 1964), Hydreco disposed of water and sand from sand blast operations in a dry well located to the north of the facility (Hydreco, 1980). The quantity of waste disposed in the dry well was approximately 2,000 gallons per day (Hydreco, 1980).

Miscellaneous Wastes – Additional wastes generated at the facility were non-hazardous wastes from Hydreco's compactor, including cardboard, paper, floor sweepings, vending machine coffee waste, and shipping cartons. These materials were disposed by Superior

Disposal Service at the KL Landfill in Oshtemo Township, Kalamazoo County (General Signal, 1986). Metal scrap was sold to a local recycling business.

23. *Identify any data, estimates, analyses or other information about the presence of PCBs in each waste stream created at the facility. To the extent available, provide such information on an annual basis.*

RESPONSE:

See response to Information Request No. 11.

With the exception of PCB use in on-site electrical transformers, capacitors, and switches, PCBs were not used during the manufacture of hydraulic equipment. SPX Corporation therefore does not believe that PCBs were present in waste streams generated as a result of the manufacturing process by Hydreco or General Signal at the Kalamazoo facility.

At or about the time Benteler Industries purchased the property, Benteler reportedly examined Hydreco's "Spill Prevention Control" file and found that Hydreco had analyzed material from its oil skimmer for PCBs (AHC, 1992b). No PCBs were detected. The date of the oil skimmer sample collection and PCB analysis is not known, nor does SPX Corporation have a copy of this data.

24. *Identify any data, estimates, analyses or other information about the concentration of PCBs in each waste stream created at the facility. To the extent available, provide such information on an annual basis.*

RESPONSE:

See response to Information Request No. 11.

25. *Describe the procedures used by you, your predecessor(s), or anyone on behalf of you or a predecessor, to test the PCB concentration in each waste produced at, or at each waste handling process of, the facility. Include in your response test methods, media tested, and dates.*

RESPONSE:

See response to Information Request Nos. 13, 14, and 23.

26. *Identify each off-Site location at which wastes from the facility that contained or potentially contained PCBs were disposed. Further identify the dates of each such off-Site disposal, and the nature, quantity and PCB concentration of any such wastes.*

RESPONSE:

See response to Information Request No. 13 for information regarding transformer, capacitor, concrete flooring, and ditch soil removal/disposal by Benteler Industries.

General Signal generated waste core water, sweeper parts, and personal protective equipment during PCB sampling activities at the Benteler Industries site in February 1990 following the facility transformer explosion and subsequent fire. The drums containing the materials were received at the disposal facility on January 14, 1991 and properly disposed by February 17, 1991 (Aptus, 1991).

See response to Information Request No. 7 for information regarding soils/concrete removal as part of remediation of loading dock area.

27. *Identify and describe in detail each area of the facility used by you or any predecessor for the storage, treatment or disposal of any waste generated at the facility. Include in the description of each area information concerning the nature and volume of the waste(s) stored, treated or disposed there. To the extent available, provide such information on an annual basis.*

RESPONSE:

Holding Tank: Hydreco disposed their liquid wastes in a 6,000-gallon holding tank. According to facility correspondence, the facility generated approximately 24,000 gallons of liquid waste per year. The liquid waste generally consisted of 85 percent water, ten percent No. 10 motor oil, and five percent soluble oil. On October 16, 1980 and December 11, 1980, Gene Hall of the Oil and Hazardous Materials Control Section of the MDNR's Water Quality Division visited the Hydreco facility to collect samples of the liquid waste for analysis. Analytical results showed the presence of 1,1,1-trichloroethane and traces of styrene, toluene, perchloroethylene, and trichloroethene (MDNR, 1980a).

Compactor: Hydreco disposed of its general refuse, including cardboard, paper, floor sweepings, vending machine coffee waste, and shipping cartons, in an on-site compactor. Superior Disposal Service of Kalamazoo provided compactor service to the Hydreco facility (General Signal, 1986).

Dry Well: For a period of two years (1962 – 1964), Hydreco disposed of water and sand from sand blast operations in a dry well located to the north of the facility (Hydreco, 1980). The quantity of waste disposed in the dry well was approximately 2,000 gallons per day (Hydreco, 1980).

Sewage: In August 1955, the Michigan Water Resources Commission ordered the New York Air Brake Company to construct an on-site sewage treatment plant. The order

referenced New York Air Brake's estimate that the plant would receive approximately 25 gallons per minute (gpm) for treatment and disinfection prior to mixing with uncontaminated facility cooling water (MWRC, 1960).

Discharge: New York Air Brake discharged noncontact cooling water, industrial process waste, and treated human waste to the on-site drainage ditch. The drainage ditch extends south from the facility for a distance of approximately 3,100 feet to Morrow Lake (AHC, 1996). The discharge rate was approximately 200 gpm in winter and approximately 788 gpm during the summer months (MWRC, 1960).

Additional Waste Storage Areas: The SPCC/PIPP Plan for the Kalamazoo facility provides textual information and figures for oil and hazardous material storage locations (EDI, 1985a). See, e.g., pages 3 – 9.

28. *For each area of the facility identified in response to Request #27,*

    a. *Identify the PCB concentration of any wastes stored, treated or disposed there. To the extent available, provide such information by month of operation; and*

    b. *Describe the procedures and measures taken by you, or anyone on your behalf, to prevent, mitigate or address the release or threat of release of PCBs or other hazardous materials.*

RESPONSE:

a. See response to Information Request No. 11.

b. See responses to Information Request Nos. 7, 13, and 16.

29. *If any area identified in your response to Request #27 is no longer used by you to store, treat or dispose of wastes, describe in detail the current condition of the area. Further describe and provide data, estimates, analyses or other information regarding:*

RESPONSE:

General Signal sold the Kalamazoo facility to ICM Acquisitions in 1987.
SPX Corporation is unaware of current site conditions.

a. *Measures taken by you, or anyone on your behalf, to treat or dispose of any wastes previously stored, treated and disposed in each such area;*

RESPONSE

Holding Tank: Between 1968 and 1979, Modern Septic Tank Engineers periodically removed the tank contents and was responsible for disposition. The disposal company apparently used the waste oil for dust control on a gravel pit located on their property until the MDNR ordered Modern Septic to cease the applications in a letter dated January 21, 1980 (MDNR, 1980b). Hydreco used various haulers to dispose of its industrial wastes between 1980 and 1989 (Hydreco, 1980 – 1989).

b. *Any residual wastes remaining in each such area*;

RESPONSE:

AHC investigated the oil skimmer/discharge ditch area subsequent to a claim by Benteler Industries regarding a new identification of PCBs at the facility. On July 28, 1992 AHC collected oil and water samples from several locations at the facility, including the oil skimmer area, Butler Building loading dock, and drums in a containment area. AHC submitted the samples for PCB analysis. PCBs were identified in 14 of the 15 samples analyzed. Previous sampling data suggested the PCBs may have originated from Benteler's wastewaster discharge, or in any case, that any PCB contamination deposited at or downstream from previous sediment sample locations would have been caused by Benteler's activities (VRSH 1992). Benteler's wastewater was not discharged to Morrow Lake (AHC, 1998). Benteler Industries may have additional information regarding oil skimmer investigations.

SPX Corporation is unaware that any residual wastes from General Signal operations are currently located in former storage, treatment, or disposal areas.

c. *Measures taken by you, or anyone on your behalf, to prevent, mitigate or address the release or threat of release of the wastes previously stored, treated or disposed of in each area.*

RESPONSE:

See responses to Information Request Nos. 7, 13, and 16.

Underground Storage Tanks: By 1986, Hydreco had implemented the recommendations contained in the Spill Prevention Control & Countermeasure/ Pollution Incident Prevention Plan (SPCC Plan) prepared by EDI Engineering & Science (EDI, 1985a). These activities included the removal of three underground storage tanks and, prior to finalizing the SPCC Plan, the in-place closing of one 10,000-gallon UST and one 20,000-gallon UST formerly used by Hydreco to store

hydraulic and heating oil, respectively (EDI, 1985a). Due to their proximity to a high voltage underground power line and the potential for structural damage to the plant and boiler room foundation if removed, these tanks were instead abandoned in place by opening them and filling them with sand. As part of the 1986 tank removal effort, Hydreco excavated and disposed of over 910 cubic yards of contaminated soils surrounding the former USTs (Hydreco, 1988).

30. *Provide a figure drawn approximately to scale depicting any area of the facility used by you or a predecessor to store, treat or dispose of any waste generated at the facility. Include the location of the Kalamazoo River, tributaries of the Kalamazoo River, and Morrow Lake in your figure.*

RESPONSE:

Please see SPCC/PIPP Plan (EDI, 1985a) and RAP (AHC, 2001).

31. *For each area of the facility identified in response to Request #27, identify any data, estimates, analyses or other information regarding the nature and quantity of hazardous substances, including PCBs, released or threatened to be released from each such area. To the greatest extent possible, provide such information on an annual basis.*

RESPONSE:

See responses to Information Request Nos. 7, 13, and 16.

32. *For each area of the facility identified in response to Request #27, identify any data, estimates, analyses or other information regarding the release, or threat of release, of hazardous substances, including PCBs, to the Kalamazoo River, any tributary of the Kalamazoo River, Morrow Lake or any other area of the Site. To the greatest extent possible, provide such information on an annual basis.*

RESPONSE:

See responses to Information Request Nos. 7, 13, and 16.

33. *Identify any data, estimates, analyses or other information about the history of flooding from the Kalamazoo River, any tributary of the Kalamazoo River, or Morrow Lake at the facility. Further, identify any data, estimates, analyses or other information about any infiltration of water, or threat of infiltration of water, from the Kalamazoo River, any tributary of the Kalamazoo* River, or Morrow Lake into the areas identified in your response to Request #27.

RESPONSE:

Please see AHC, 1996.

34. *To the extent not provided in your response to Request #22, describe each wastewater stream, waste oil stream, and wastewater/waste oil mixture stream at the facility, from its creation in the production process to final discharge point. In your response include a complete description of the fate of any wastewater stream, waste oil stream, and wastewater/waste oil mixture stream produced at the facility (e.g. on-site treatment discharge to a POTW, discharge to a storm sewer outfall, direct discharge to a tributary of the Kalamazoo River, indirect discharge to Morrow Lake).*

RESPONSE:

According to a Waste Survey Report prepared by the Michigan Department of Natural Resources, in April 1962 New York Air Brake discharged two types of waste from the plant (MDNR, 1962). Sanitary sewage was contained in a separate system for treatment in the on-site sewage plant. Cooling water containing oil was discharged to the storm sewer system. The storm sewer terminated at the head of a ditch leading approximately 3,100 feet to the Kalamazoo River. The effluent from the sewage treatment plant entered the outfall ditch at a point below the entrance of the cooling waters (MDNR, 1962).

In 1961, New York Air Brake installed an oil/water separator in the outfall ditch above the entrance of the sanitary sewage effluent to intercept oil from the cooling waters. In 1973, Hydreco ceased using its on-site sewage plant and connected to the municipal sewer.

The SPCC/PIPP Plan provides waste stream descriptions and final discharge and/or storage points. See pages 1 – 12.

35. *To the extent not provided in response to Requests #22 and #34, identify the amount of all (a) wastewater, (b) waste oil, and (c) wastewater/waste oil mixture produced, on a monthly basis, from each production process at the facility.*

RESPONSE:

In April 1962, the MDNR conducted a survey to determine the effectiveness of the oil/water separator on discharges to the Kalamazoo River (MDNR, 1962). Within a 24-hour period between April 3 and April 4, 1962, 45,072 gallons of sanitary sewage effluent were discharged at an average flow of 31.3 gpm. Within the same period, 154,000 gallons of cooling water effluent were discharged at an average flow of 107 gpm (MDNR, 1962).

Within a 21-hour period between April 4 and April 5, 1962, 29,232 gallons of sanitary sewage effluent were discharged at an average flow of 23.2 gpm. Within the same period,

124,800 gallons of cooling water effluent were discharged at an average flow of 104 gpm (MDNR, 1962).

In May 1981, Hydreco was producing approximately 4,000 gallons of liquid industrial waste each month (General Signal, 1981). Those wastes consisted of a mixture of water, oil, and soluble coolant. They contained less than 37 gallons of xylene and less than 14 gallons of perchloroethylene. The soluble industrial coolant comprised approximately twenty percent of the monthly waste fluid (General Signal, 1981).

Please see waste manifests for information regarding waste oil disposal volumes between 1980 and 1989 (Hydreco, 1980 – 1989).

36. *To the extent not provided in response to Requests #23 and #24, identify any data, estimates, analyses or other information about the presence and/or concentration of PCBs in the wastewater, waste oil and wastewater/waste oil mixture produced from each production process at the facility. To the extent available, provide such information on a monthly basis.*

RESPONSE:

See response to Information Request No. 11.

37. *Identify any data, estimates, analyses or other information regarding the effectiveness of the treatment system(s) at the facility, if any, to remove PCBs from each wastewater stream, waste oil stream and wastewater/waste oil mixture stream at the facility.*

RESPONSE:

See response to Information Request No. 11.

38. *Identify any data, estimates, analyses or other information regarding procedures and measures taken by you, or by anyone on your behalf, to prevent, mitigate or address the release or threat of release of PCBs from wastewater, waste oils, or wastewater/waste oil mixtures to the Kalamazoo River, tributaries of the Kalamazoo River, or Morrow Lake.*

RESPONSE:

See responses to Information Request Nos. 7, 11, 13, and 16.

39. *For any POTW identified in response to Request #34, provide on a monthly basis all information regarding the amount of wastewater, waste oil, and wastewater/waste oil mixture discharged to the POTW, the concentration of PCBs in the wastewater, waste oil and wastewater/waste oil mixtures discharged to the POTW from the facility and, to the*

extent such information is available, the PCB concentration in the effluent from the POTW.

RESPONSE:

See response to Information Request No. 11.

Discharge from the site to the sanitary sewer system included recovered groundwater as part of the on-going VOC treatment system that General Signal operated from 1988 to 1998. During operation of the groundwater treatment system, AHC (on behalf of General Signal) submitted monthly status reports to the Kalamazoo POTW indicating discharge amounts. These amounts varied widely, ranging from 3,064,857 gallons in January 1990 to 50 gallons for the time period spanning January through July 1994. AHC collected water samples from the sump in the groundwater treatment system building on August 30, 1993 and November 22, 1996 for analysis of various parameters, including PCBs. PCBs were not detected (AHC, 1994b; 1997).

In 1973, the Hydreco facility was connected to City of Kalamazoo Sanitary Waste Line. Hydreco's discharge permit application indicates proposed discharge of sanitary wastewater to the Kalamazoo municipal sanitary sewer at a rate of 8,000 gallons per day (gpd) in 1979 (Hydreco, 1979). In its 1985 application, Hydreco indicated its intent to discharge 51,000 gpd to the sanitary waste line (Hydreco, 1985b).

40. *Identify each pipe, conduit, storm sewer, sewer line or other outfall that, directly or indirectly, terminates in Morrow Lake, the Kalamazoo River or its tributaries (past or present), into which treated, untreated or bypassed wastewater, waste oil, or any other waste (including wastewater/waste oil mixtures), from the facility was discharged. Include a figure identifying the source and location of each pipe, conduit, storm sewer, sewer line or other outfall.*

RESPONSE:

- Outfall 001: Former air conditioning cooling water, test stand oil cooling water, storm water, and floor drainage conveyance from the facility to Morrow Lake.

- Hydreco Outfalls 001 – 004: Discharge lines lead from facility to the ditch.

- Outfalls 001 – 003 discharged untreated storm and cooling water from the facility to the ditch.

- Outfall 004 extended to an on-site WWTP for treatment before discharge to the ditch south of the 001-003 outfalls.

The routes of the lines identified as Outfalls 001 – 004 are shown on SPCC Plan Figure 5. Also see Hydreco, 1985b.

41. *For each pipe, conduit, storm sewer, sewer line or other outfall identified in your response to Request #40, identify dates of use and each outfall's source at the facility. Further provide, on a monthly basis, the volume of wastewater, waste oil or other waste (including wastewater/waste oil mixtures) discharged from the facility into each pipe, conduit, storm sewer, sewer line or other outfall.*

RESPONSE:

- Pre-1973: Sanitary wastewater treated on-site and discharged to ditch. [In 1973, facility was connected to City of Kalamazoo Sanitary Waste Line.]
- 1974: Cooling water discharged to drainage ditch via storm sewer; oils removed by belt skimmer.
- 1979: Drainage ditch discharged to Kalamazoo River at a point approximately 2,500 feet south of the facility.
- 1985: Air conditioner cooling water, test stand oil cooling water, surface runoff discharged to ditch.
- 1989: Storm water and floor drainage from plant discharged to ditch.

(BBL, 1994).

- Outfall 004 was utilized to discharge treated sanitary waste to the ditch from approximately 1955 to 1973. In 1973 Hydreco connected to City of Kalamazoo Sanitary Waste Line. The discharge piping was disconnected immediately north of the on-site WWTP and redirected south to the municipal sanitary sewer line. After this re-direction, Outfall 004 no longer discharged to the ditch.

42. *For each pipe, conduit, storm sewer, sewer line or other outfall identified in response to Request #40, identify all influent and effluent quality data. Include, to the extent such information is available, the PCB concentration of all influent and effluent, on a monthly basis.*

RESPONSE:

Influent and effluent quality data for pH, temperature, and oil & grease are recorded on NPDES Monitoring Reports. The NPDES permits did not require PCB monitoring.

See response to Information Request #39. City of Kalamazoo personnel periodically collected samples from the groundwater treatment system discharge for analysis of VOCs and other parameters; however, no PCB analyses were conducted.

43. *For each pipe, conduit, storm sewer, sewer line or other outfall identified in response to Request #40, identify all bypasses or spills into Morrow Lake, the Kalamazoo River or its tributaries.*

RESPONSE:

Please see AHC, 1996 and AHC, 1998.

SPX Corporation is not aware of any bypasses or spills into Morrow Lake, the Kalamazoo River, or its tributaries from the Kalamazoo facility.

44. *Identify any data, estimates, analyses or other information regarding the mass quantity of PCBs disposed into Morrow Lake, the Kalamazoo River, or any tributary of the Kalamazoo River, as a result of wastewater, waste oil or wastewater/waste oil discharges from the production processes at the facility. To the extent available, provide such information on an annual basis.*

RESPONSE:

See response to Information Request No. 11.

45. *Identify any data, analyses or other information regarding the nature and quantity of hazardous substances, including PCBs, in the sediments, soil, groundwater and surface water at the facility. Identify the concentration levels of PCBs for all samples collected at the facility or at any property abutting the facility.*

RESPONSE:

- Please see responses to Information Request Nos. 7, 10, 11, 13c, 23, and 26.
- Additionally, please see Summary Table of PCB Analytical Results (AHC, 1998).
- Also see the most recent groundwater summary data contained in General Signal's *Remedial Action Plan* (AHC, 2001).
- See AHC, 1994b.

- See AHC, 1991c.
- See AHC, 1992c.
- See EDI, 1989.
- As part of Benteler's purchase of the facility, Dell Engineering, Inc. (Dell) prepared a Preliminary Environmental Assessment in April 1989, which focused primarily on the drainage ditch and facility drywells. Dell reported the presence of petroleum hydrocarbons in the drainage ditch. Dell's assessment reports indicate that two drywells, identified as "West" and "East," were located north of the facility engineering building. The drywells received runoff from building roof drains. Benzene, xylene, and Stoddard solvent constituents were identified in a soil sample collected from the East drywell. Dell installed three monitoring wells downgradient of the East drywell. Benzene and xylene were detected in groundwater samples collected from the monitoring wells. Approximately 175 cubic yards of soil were removed from the East drywell area on September 27-28, 1989. AHC collected confirmation soil samples for analysis of VOCs, polynuclear aromatic hydrocarbons, and total petroleum hydrocarbons. No analytes were detected.
- See MDEQ, 1990. This Incident Tracking Worksheet notes that WW Engineering and Science collected a sample for PCB analysis from oil-impacted soils located south of the plant building. No PCBs were detected in the sample.
- Additional PCB data were collected by Benteler Industries following the 1989 transformer fire and explosion. Benteler personnel may have complete data sets from the post-fire sampling events.

Chronological PCB Sampling by AHC (AHC, 1989-1994):

Date	Sample Size, Medium, Location	Aroclor	Detected Concentration Range
10/11/89	5 concrete cores, area of transformer fire	1260	1-92 mg/kg
1/22-26/90	26 wipes, concrete plant floor	1260	2-300 ug/100 cm^2
3/21/90	1 wipe of cable box	--	Non-detect
7/11/90	5 samples for barrel disposal	1260	3.4-42 mg/kg
10/22/90	1 water, groundwater treatment system effluent	--	Non-detect
2/18/91	1 water, groundwater treatment system effluent	--	Non-detect

5/7/91	1 soil from drainage ditch, split with WWES	1248	54 mg/kg
4/8/92	12 soils near Consumers Power substation	1260	0.005-0.11 mg/kg
7/21-22/92	22 (7 not analyzed) oil/water in drums	1260	2.3-73 ug/L (water) 4.6-30 mg/kg (oil)
9/10-11/92	10, wipes/cores from potential building expansion locations	1254 1260	Various
8/30/93	2, 1 water/1 soil for waste disposal	--	Non-detect
2/16/94	4 soil samples for disposal - NE,NW,SE,SW	1260	0.1 mg/kg
11/22/96	1 water, sump in groundwater treatment system	--	Non-detect

46. *Provide information regarding any environmental response activities involving or potentially involving PCBs or PCB-containing materials conducted at the facility, at Morrow Lake or on the Kalamazoo River, its tributaries, or other abutting property, at your direction or under your control. Indicate the date(s) on which such response activity was performed, what work was performed, the expenses incurred, the results of the response activity and, if it has not concluded, when the environmental response is expected to conclude.*

RESPONSE:

See responses to Information Request Nos. 7, 10, 11, 13c, 23, 26, 29b, 45, and 48.

47. *Identify all persons who you believe may have knowledge or information about the generation, transportation, treatment, disposal, release or other handling of waste materials, including hazardous substances, at the facility.*

RESPONSE:

Charles VanDeLaare
Former Chief Manufacturing Engineer
Hydreco
173 Pinehill
Galesburg, MI 49053
(269) 665-9809 (residence)

Benteler Industries
9000 East Michigan Avenue
Galesburg, MI 49053

48. *Have you incurred any costs associated with the investigation, remediation or other action to address contamination at the Site or any portion thereof? If yes, identify all costs incurred by you through the date of this Information Request.*

RESPONSE:

See General Signal. (As listed in response to Information Request No. 2.)

49. *Identify any data, estimates, analyses or other information regarding the relative contributions of PCBs to Lake Allegan by "facilities," as that term is defined in CERCLA.*

RESPONSE:

SPX Corporation has no information regarding the relative contributions of PCBs to Lake Allegan by area facilities.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted.

Based upon my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Dated: 18/6/03

By: Daniel McGrade

Daniel McGrade
Director, Environmental
SPX Corporation
13515 Ballantyne Corporate Place
Charlotte, NC 28277

S:\194\TMS\kalamazoo-ans3 doc

Squires
9-13-95
EXHIBIT NO. 148
M. HOWLAND

M E M O

313 North 21st Street
Battle Creek MI 49015
Phone: (616) 963-7844
June 20, 1989

From: Ken Squires, Night Supervisor, Americlean

To: Whom It May Concern

Subject: Fire at Former Hydreco Plant, 6/17/89

Some time after 5:00 AM I noticed that employee Donald West was operating the power washer in the vicinity of the power sub-station for the south third of the plant. Even though I had been given to believe that the sub-station had been deactivated, I cautioned Don not to let water spray into the apertures of the unit, reasoning that water could damage the circuitry.

At approximately 5:40 AM I was on a scaffold at the opposite side of the plant trying to secure a light fixture which had comelloose from its moorings when I heard an extremely loud, metallic BOOOM. This was followed by a second report a moment later. I looked down to see what was going on and saw people running toward the exit. A wider glance revealed a firestorm of sparks coming from the bottom of the sub-station, and there were further explosive reports. I exited the scaffold with more haste than grace and, after assuring myself that no one remained in the building, ran to the door. A hurried headcount confirmed that everyone had gotten out safely. All employees reported that they were uninjured, though some were badly shaken emotionally.

At that point—having learned earlier in the morning that the office with the telephone was locked—I sent one of the employees to find the nearest telephone and call the fire department. I also had all employees with cars parked near the fence move them to the far side of the parking lot as a precautionary measure. One or two employees sought to enter the building to retrieve personal belongings: I forbade this.

The fire department arrived within about ten minutes of the summons. Since I had no keys, they had to cut the chain on the main dock gate. After determining that I could be of no immediate help to the firefighters, I assembled the crew at a safe distance from the building. I asked what had happened, and was informed that the power washer had already been turned off because it had run out of gas before "that thing blew!" After dispatching an employee with the AT&T card to call Bill Neubaum, Americlean franchisee, I informed the crew that I didn't expect we would work that night; that we would make every effort to secure personal belongings for them; and that we would be in touch when we knew what the situation was. After being assured that Mr. Neubaum was on his way, I made sure that we had a telephone number for everyone, that everyone had a ride back to Battle Creek.

Two employees (Greg Farris and Leionel Warren) voluntarily waited with me for Mr. Neubaum. During that period I became ill, probably from a combination of smoke inhalation and stress. A firefighter administered oxygen, which relieved my distress. Mr. Neubaum arrived about 6:30-6:35. I told him what had happened and waited with him for some word from the fire department. At one point he had me go to the nearby public telephone and call Mrs. Neubaum to tell her to head off the day crew, which would be arriving in about an hour otherwise. I returned to the plant and awaited further instructions. At approximately 7:20 AM I gave a brief statement to the fire department lieutenant in charge, and then was dismissed.

I do not believe that Americlean, myself, or any employee acted in a reckless manner. Acting on the best information we had, we exercised due caution in performing our duties. I believe—and the plant electrician I talked to Monday seems to agree—that it was water dripping into the unit from the ceiling that caused the arcing and subsequent fire. We had been instructed to wash the ceiling; we had been told that it was unnecessary to cover the unit with plastic, as Mr. Neubaum had suggested; we had been told that it would be safe to work around the unit as long as we exercised normal care. We did: it wasn't.

Respectfully submitted,
Kenneth L. Squires

William C. Neubaum's Report of Accident
on June 17, 1989

Our home phone rang at approximately 6:05 AM Saturday June 17, 1989. I had just come down stairs when the phone rang is how I know the time. My alarm clock goes off at 5:50 AM. It was a call from Ken Squires our night foreman hired through Personal Pool of Battle Creek, He had sent Greg Farres a job group leader. Informing me (Bill Neubaum) that there had been an explosion resulting in a fire at the old Hydreco Plant at 9000 East Michigan, Galesburg, MI 49053 now owned by Bentler Industries of 320 Hill S.E. Grand Rapids, MI 49507. I dressed and went right over to the job sight, arriving at approximately 6:45 AM. Upon arriving at the plant, the fire departments from Agusta, and Galesburg along with Consumers Power Company were already on the sight. I was informed no one was hurt and that water had gotten into the sub-station located inside the plant resulting in the explosion and causing an electrical fire. I had wanted to tent the sub-station with 4 mil. plastic (which I had bought for covering such things) to prevent any water from getting into the sub-station, but was informed by the electrician working over there for Bentler Indûstries not to cover said sub-station (don't know if he figured the seals were in good enough condition as to keep any spray from power washing the ceiling around the sub-station out and the plastic would cause the sub-station to over heat), he did not give me a reason. Since he is a licensed electrician I figured he knew what was the correct manner of working around this sub-station and the safe way so we done as he told us to. We had already hand washed the sub-station so as not to get water inside of it. We were power washing a section of ceiling and over spray from ceiling cleaning is what must have gotten inside of the sub-station. As there was no direct spraying being done to the sub-station. Some how the seals were not able to keep the over spray from getting into the sub-station causing an explosion that created a hole in the side of the of the sub-station about the size of a dinner plate.

I remained at the scene until about 11:30 AM at which time I figured there was nothing more I could get accomplished there, so I left and returned home and called Jeff Buckenberger my insurance agent at home and informed him of the problem. Before leaving the sight I was told that some one of the executives from the Bentler Industries had been called at Grand Rapids and was on the way down to the Galesburg plant.

Bulman
S. 447
EXHIBIT NO. 13
M. HOWLAND

Since I had not heard anything from anyone connected with the Bentler Industries by Monday morning June 19, 1989. I went over to the Galesburg plant to see Earl Doig (he is the one that hired our company to do the job) at which time Mr Doig told me we could resume work starting with our night crew that night. After being told this I had my office manager (she is also my wife Etheleen Neubaum) call all the night shift and inform them that we would be working that night starting at 8:00PM -8:00AM. My night foreman Ken Squires called me and informed me that this night would be his last night. As the stress was too much for him since he had suffered a heart attack a year ago (a fact he had not informed us of nor had he informed Personal Pool of when he applied for the job) My office manager (Etheleen) called Personal Pool right away to see if they could find us a replacement. We told Personal Pool we would like for the new man to start that nigh if possible so as to get an idea as to what was expected of everyone on the job including himself. Personal Pool informed us that Ken had just called them and told them of his heart attack last year, they informed us they would never have sent him to us if they had known anything about his heart attack as he should not have been sent out on a job to work a 12 hour shift. This was a fact he omitted from the job application he filed with Personal Pool at the time he applied with them.

Personal Pool called our office back a short time later to inform us they had found a replacement and the gentleman name would be Norman Brown Jr. and that Norman would report to us that night in time to go to work.

On Tuesday June 20, 1989 Ken Squires brought over his report with the account of what had happened the night of the accident.

Jeff Buckenberger had called our office on Monday morning and suggested we have Ken and myself each write down what had happened the night of the accident while it was fresh in our minds.

After getting back to work one of the electricians on the job over at Galesburg told me to be sure to tell my insurance company to have an adjustor come over to the plant and check out the sub-station before anything be done on a claim as the electrician said the sub-station was so full of dust and dirt, that it had not been cleaned in quite a few years

He said it was a wonder the sub-station had not caught on fire before this even without any water getting into the sub-station. I wanted to be sure to have this in the report before giving it to the insurance company. This might be worth checking out before they replace the sub-station with a new one and this fact can not be proven. I will call Jeff in the morning and tell him this over the phone then take a copy of this report up to his office so he can keep it in his file. I will be keeping a copy of this report and the report turned over to me by Ken Squires in the report file on the accident.

I hope this report will be of some help to the accident report.

Compiled by William (Bill) Neubaum and dictated to my office manager (wife) Etheleen Neubaum.

KAR Laboratories, Inc.
4425 Manchester Road
Kalamazoo, MI 49002

(616) 381-9666

ANALYTICAL REPORT

To: American Hydrogeology Corp.
4000 Portage Rd., Suite 108
Kalamazoo, MI 49001

Attn: Mr. Paul French

Proj. No.:	902864
Client No.:	2869
Date Activated:	10/22/90
Date Promised:	11/12/90
Date Validated:	11/09/90
Date Reported:	11/12/90
PO#:	1104

Project Desc.: Analysis of effluent sample for General Signal, #1136.

Dear Client:

Attached you will find test results for Project No. 902864. Please refer to this Project No. if you have any questions regarding this work.

Respectfully submitted,
KAR Laboratories, Inc.

William H. Bouma

William H. Bouma, Ph.D.
Director

WHB/kb

RECEIVED NOV 13 1990

ANALYTICAL RESULTS

American Hydrogeology Corp.

Project No: 902864
Report Date: 11/12/90

Project Desc.: Analysis of effluent sample for General Signal, #1136.

Sample No.:902864-01 Sample type: aqueous Rec'd on: 10/22/90
ID: **"Purge well effluent, 10/22/90, 3:00"**

MDNR Scan 1 & 2	*See attached*
PCB, total	*<0.1 ug/L*
Cyanide, total	*<0.02 mg/L*
Petroleum hydrocarbons	*<1 mg/L*
Cadmium, total	*<0.01 mg/L*
Chromium, total	*<0.01 mg/L*
Copper, total	*<0.02 mg/L*
Lead, total	*0.003 mg/L*
Mercury, total	*<0.0005 mg/L*
Nickel, total	*<0.05 mg/L*
Zinc, total	*0.16 mg/L*

Unless otherwise noted, test results represent the sample(s) as they were received.

RECEIVED NOV 13 1990

KAR Laboratories, Inc.

To: American Hydrogeology Corp.

Project No.: 902864
Report Date: 11/12/90

PURGEABLE HYDROCARBON ANALYSIS - Michigan DNR Scan 1 and Scan 2

Sample No.: 902864-01 Rec'd on: 10/22/90
Proj. Desc.: Analysis of effluent sample for General Signal, #1136.
Sample ID: "Purge well effluent, 10/22/90, 3:00"

SCAN 1 - Purgeable Halocarbons

Bromodichloromethane	ND	trans-1,2-Dichloroethene	ND
Bromoform	ND	1,2-Dichloropropane	ND
Bromomethane	ND	cis-1,3-Dichloropropene	ND
Carbon tetrachloride	ND	trans-1,3-Dichloropropene	ND
Chlorobenzene	ND	Methylene chloride	ND
Chloroethane	ND	1,1,2,2-Tetrachloroethane	ND
oroform	ND	Tetrachloroethene	18
oromethane	ND	1,1,1-Trichloroethane	ND
Dibromochloromethane	ND	1,1,2-Trichloroethane	ND
1,1-Dichloroethane	ND	Trichloroethene	1.6
1,2-Dichloroethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethene	ND	Vinyl chloride	ND
cis-1,2-Dichloroethene	ND		

SCAN 2 - Purgeable Aromatic Hydrocarbons

Benzene	ND	m-and/or p-Xylene	ND
Ethyl benzene	ND	o-Xylene	ND
Toluene	ND		

Concentrations are expressed as ug/L.
"ND" means not detected. The limit of detection was 1 for all targets except Methylene chloride, which was 10

RECEIVED NOV 13 1990

FILE COPY

AMERICAN HYDROGEOLOGY CORP.

4000 Portage Road, Suite A
Kalamazoo, Michigan 49001
616 343-9800

March 20, 1991

Ms. Judie Gapp
Michigan Department of Natural Resources
Environmental Response Department
Groundwater Quality Division
District 12 Headquarters
621 N. 10th Street
Plainwell, Michigan 49080

Re: Benteler Facility

Dear Judie:

Enclosed please find a copy of the Work Plan for the initial investigation of soil contamination found just south of the Benteler Galesburg facility on January 8, 1991.

As we discussed, General Signal has retained us to perform this investigation.

Please call if you have any questions.

Very truly yours,

AMERICAN HYDROGEOLOGY CORPORATION

Pam Kruemm

for Mick
General Manager

PML/pak/24-1136

cc: Leon Hall, Benetler
Dan McGrade, General Signal w/ cost estimate

Introduction

American Hydrogeology Corporation has prepared the following work plan on behalf of the General Signal Corporation for a preliminary site investigation pertaining to soil contamination discovered at the Benteler Industries facility located in Galesburg, Michigan. The contamination was identified in a shallow excavation south of the plant within the fenced in area as shown on Figure 1.

AHC personnel conducted an inspection of the excavated area on January 8, 1991. A portion of the excavation had been reopened by Benteler personnel to expose part of the southern sidewall. Soils from approximately one to two feet below the surface were visibly stained although there was no evidence of free flowing product. Laboratory analyses of a grab sample from the stained soils indicated that the nature of the release substance was consistent with kerosene or fuel oil. The enclosed analyses also indicated detections of 1,1,2,2-tetrachlorethane, ethylbenzene and xylenes.

The objective of the proposed work is to begin delineation of the area of soils which may have been effected as a result of the release. To accomplish this goal, shallow soil borings will be installed near the perimeter of the excavated area. Selected soil samples from the borings will be submitted for laboratory analysis.

Soil Sampling

Soil borings will be installed at six to ten locations near the perimeter of the former excavation utilizing a portable hand auger. The location of the proposed borings are shown on Figure 1. Actual locations may be altered due to physical constraints or site features.

Soils brought to the surface at each location will be field screened with a photoionization detector (PID). One soil sample from each boring will be retained in Teflon sealed containers based on elevated PID responses and/or evidence of visible staining. An additional soil sample will be collected from a deeper interval if visible staining is no longer apparent or there are no

PID responses. Unless otherwise dictated by field conditions, the borings will extend to approximately 10 feet below ground level.

If no visible staining is evident and no PID responses are detected in soils from a boring location, then one soil sample will be collected from the boring. The interval from which that sample is collected will be based on the depth of apparent soil degradation observed in the preceding borings.

The portable hand auger and other sampling equipment will be thoroughly cleaned with a laboratory detergent wash and deionized water rinse after each use. The borings will be sealed with powdered bentonite and, in paved areas, capped with concrete.

Selected soil samples from the perimeter borings will be submitted to an analytical laboratory under chain-of-custody. Analyses will include MDNR Scans 1 and 2 and Total Petroleum hydrocarbon characterization. An additional soil sample composited from intervals of elevated PID responses may be submitted for waste characterization.

Report Preparation

Upon completion of the above outlined tasks, a report will be assembled and presented to General Signal for MDNR submittal. The report will outline procedures, and include a discussion of the results, conclusions, and recommendations. The report will identify areas of concern to be addressed by additional study and/or remedial action, if deemed necessary.

Time Table

The following time table is intended to be utilized as a guide for the completion of this work plan. Specific dates will be dependent upon MDNR review and approval.

Activity	Completion Days from MDNR Approval
Soil Sampling & Analysis	30 days
Final Report	75 days

ANALYTICAL RESULTS

To: American Hydrogeology Corp.

Project No: 910128
Report Date: 2/04/91

Project Desc.: Analysis of one soil sample from General Signal. Proj. #24-1136.

Sample No.:910128-01 Sample type: soil Received on: 1/21/91
ID: "Bentler Pit, 1/8/91, 10:00"

Purg. organic solvent scan See attached
Petroleum hydrocarbons 8060 mg/kg

Unless otherwise noted, test results represent the sample(s) as they were received.

RECEIVED FEB - 5 1991

KAR Laboratories, Inc.

ANALYTICAL REPORT

o: American Hydrogeology Corp.

Project No. : 910128
Report Date : 02/04/91
Sample Number : 910128-01

Re: **PURGEABLE ORGANIC SOLVENT SCAN - MICHIGAN DRN SCAN 1 AND SCAN 2 COMPOUNDS PLUS OTHER COMPOUNDS**

Sample I.D. : "Bentler Pit, 1/8/91, 10:00"

MDNR Scan 1	CONC.
Bromodichloromethane	<200
Bromoform	<200
Bromomethane	<200
Carbon tetrachloride	<200
Chlorobenzene	<200
Chloroethane	<200
Chloroform	<200
Chloromethane	<200
Dibromochloroemethane	<200
1,1-Dichloroethane	<200
1,2-Dichloroethane	<200
1,1-Dichloroethene	<200
cis-1,2-Dichloroethene	<200
trans-1,2-Dichloroethene	<200
1,2-Dichloropropane	<200
cis-1,3-Dichloropropane	<200
trans-1,3-Dichloropropene	<200
Methylene chloride	<200
1,1,2,2-Tetrachloroethane	810
Tetrachloroethene	<200
1,1,1-Trichloroethane	<200
1,1,2-Trichloroethane	<200
Trichloroethene	<200
Vinyl chloride	<200

Other Purgeable Compounds*	CONC.
C_9-C_{13} Aliphatic and Aromatic Petroleum Hydrocarbons chromatographic pattern consistent with kerosene or fuel oil, but had a narrower range of hydrocarbons	0.04%

MDNR Scan 2	
Benzene	<200
Ethyl benzene	520
Toluene	<200
m and/or p-Xylene	1100
o-Xylene	930

Concentrations are expressed as ug/kg dry weight

*Not all volatile organic compounds can be detected by this method. Identifications of "Other Purgeable Compounds" are tentative, and are limited to the 10 most abundant compounds.

RECEIVED FEB - 5 1991

General Signal Corporation
Benteler Plant
Soils Investigation
Cost Estimate

Soil Boring Installation

I. Equipment and Materials

A.	Portable Hand Auger 1 day at $30.00/day	$ 30.00
B.	Hole Plug 4 bags @ $11.00/bag	44.00
C.	Cement Mix 2 bags @ $$10.00/bag	20.00
D.	Jack Hammer 1 day @ $50.00/day	50.00
E.	Photoionization Detector 1 day @ $100.00/day	100.00
F.	Misc. Field Expense 1 day @ $25.00/day	25.00
G.	Mobilization 50 miles @ $.60/mile	30.00
	Subtotal I:	**$ 299.00**

II. Analytical Services

A.	MDNR Scans 1 and 2 10 soils samples @ $150.00 each	$ 1,500.00
B.	Total Petroleum Hydrocarbon Characterization 10 soil samples @ $172.00 each	1,720.00
C.	Waste Characterization (Disposal) Cost grouted by BFI @ $759.00	759.00
D.	Sample Shipment	100.00
	Subtotal II:	**$ 4,079.00**

AHC

III. Professional Survey

A.	Senior Geologist 8 hours @ $65.00/hour	$ 520.00
B.	Associate Geologist 8 hours @ $60.00/hour	480.00
C.	Senior Project Manager 2 hours @ $85.00/hour	170.00
	Subtotal III:	**$ 1,170.00**

Report Preparation/Project Administration

I. Professional Services

A.	Senior Project Manager 4 hours @ $85.00/hour	$ 340.00
B.	Senior Geologist 8 hours @ $65.00/hour	520.00
C.	Cartographer 4 hours @ $45.00/hour	180.00
D.	Word Processing 3 hours @ $30.00/hour	90.00
	Subtotal I:	**$ 1,130.00**
	Total Cost of Soils Investigation:	**$ 6,678.00**

File Hydro Kalamazoo

AMERICAN HYDROGEOLOGY CORPORATION

Environmental Consulting Services

Main Office
6869 Sprinkle Road
Portage, MI 49002
Phone: (616) 329-1600
Fax: (616) 329-2494

Lansing Area Office
2163 University Park Drive, Suite 165
Okemos, Michigan 48864
Phone: (517) 349-4955
Fax: (517) 349-7022

June 17, 1991

RECEIVED
JUN 21 1991
DANIEL McGRADE

Ms. Judie Gapp
Michigan Department of Natural Resources
District 12 Headquarters
621 N. 10th Street
Plainwell, MI 49080

Re: General Signal Soils Investigation

Dear Judie:

This letter serves to update you on the status of the recent investigation conducted by American Hydrogeology Corporation (AHC) regarding soils contamination at the above referenced project site. The objective of this investigation was to begin delineation of an area of soils which may have been affected as a result of the release discovered by Benteler personnel on the south side of the facility. The location of the release with respect to the Benteler facility is shown on Figure 1.

On April 3, 1991, eleven shallow soil borings (B-1 through B-9) were installed in the vicinity of the release area. The location of those borings are shown on Figure 1 (Detail Inset). A portable hand auger with a sample bucket was utilized during boring installation to bring soil cuttings to the surface. Each soil sample was screened with a photoionization detector (PID). Selected soil samples were retained in Teflon sealed containers and stored on ice. A summary of site activities and observations was maintained by an AHC geologist. Before proceeding to the next sampling interval, the auger bucket was cleaned with a phosphate-free detergent wash, rinsed with carbon filtered and deionized water, and allowed to dry. Upon reaching total depth, each boring was filled with granular bentonite.

For the most part, the shallow soils present within the study area consist of sand and gravel with silt. This unit rests above a very firm and cohesive clay layer containing sand and gravel which extends to a depth of approximately 2.5 feet. The clay layer is approximately 0.5 foot thick in the vicinity of the recessed concrete area. The thickness of the clay appears to increase away from the plant and foundation structures. A sand and gravel layer was encountered beneath the clay layer. Auger refusal was encountered near the surface of the underlying sand and gravel at

each boring location.

A zone of perched water (approximately 0.5 foot thick) was encountered above the clay layer at boring locations B-4a and B-4b. Therefore, the clay was not breached at those locations. The upper sand and gravel was very moist at the B-1 and B-4 locations and a slight seepage zone was evident above the clay layer at the B-7 location. Soils from the B-2 location were very moist from approximately 0.25 feet to at least 4 feet below ground level. The underlying clay was not evident at that location.

Logs from borings previously installed at the site during unrelated activities indicate that the clay layer may occur naturally from just below the surface to a depth of approximately three to five feet below ground level. The clay was not encountered at locations B-2 and B-3 which are adjacent to the platform footings. These data suggest that an upper portion of the clay may have been removed near areas where construction has occurred and the clay layer may be breached in areas adjacent to the footings.

PID readings were highest in the sand and gravel unit overlying the clay layer in those borings where a response was evident. The upper surface of the clay layer also showed a PID response at the B-4 boring location. Borings B-1 and B-6 showed the highest PID response at 20 parts per million (ppm) and 50 ppm respectively in the upper sand and gravel unit. No PID responses were detected in soils at locations B-3, B-5, B-8 and B-9. PID responses at the B-2, B-4 and B-7 locations ranged from 5 ppm to 9 ppm.

Soil samples selected for laboratory analysis were delivered KAR Laboratories, Inc. of Kalamazoo, Michigan for analysis of the parameters identified by MDNR Scans 1 and 2 and also for petroleum hydrocarbons. Results of those soil samples are included in Attachment A. Those data indicate the presence of ethylbenzene (12 and 180 ug/kg), toluene (39 and 30 ug/kg), xylene (178 and 1010 ug/kg) and petroleum hydrocarbons (330 and 3080 mg/kg) in the soil samples collected from borings B-2 and B-4 respectively. Due to auger refusal, the depth at which those compounds are present in soils at the B-2 location has not been determined. Low levels of petroleum hydrocarbons (30 mg/kg) were identified below the clay layer at the B-4 location. Those compounds were not identified in soil samples collected below the clay layer at boring locations B-1, B-3, B-5, B-7, B-8, and B-9. Xylene (89 ug/kg) and petroleum hydrocarbons (5550 mg/kg) were also detected in the soil samples collected from the B-7 location.

Based on this data, it is believed that the horizontal and vertical extent of the shallow soils contamination has been defined to the south and to the northwest of the area of concern. Soil samples collected from B-4 indicate the presence of volatile organic compounds (VOCs) and petroleum hydrocarbons in the 1.0-1.5 foot bgl interval but no VOCs and significantly lower petroleum hydrocarbon levels from soils at the 2.0-2.5 foot bgl interval. The soil sample collected from B-2 (2-3 feet bgl) indicates the persistence

of volatile organic compounds and petroleum hydrocarbons to at least the depth explored. Soil samples collected from B-7 indicate the presence of VOCs (xylenes only) and petroleum hydrocarbons at the 0.4 foot bgl level, but that neither the VOCs or the petroleum hydrocarbons persist to the 2.0-2.5 foot bgl interval.

To further define the extent of soils contamination with respect to this release, a minimum of four (4) to six (6) additional soil borings will be needed. These shallow soil borings will be conducted to a depth of 8-10 feet bgl continuously sampling the soils to the end of each boring. Soil borings will be advanced utilizing a drilling rig equipped with hollow stem augers. Soil samples will be collected using a clean split-spoon sampler which will be driven into undisturbed soils below the augers. All soil samples will be screened in the field with a photoionization detector configured with either a 10.0 or 10.2 eV lamp designed to detect an array of volatile organic compounds. Locations of soil borings will be approximately as indicated on the enclosed site map but actual locations may be modified depending on site specific field observations. All soil cuttings generated from drilling activities will be containerized and staged on-site for subsequent disposal. All boreholes will be backfilled with dry, granular bentonite to the ground surface.

Two samples from each boring will be selected based on PID response for laboratory analysis of the parameters identified in MDNR Scans 2, 7 and for Total Petroleum Hydrocarbons. One of the samples will be collected from the interval with the highest PID response while the other sample will be collected from deeper soils in which no PID response is observed. At locations where there is no soil contamination indicated based on PID response, only one soil sample will be collected.

Upon completion of these tasks, a report will be prepared describing field activities, presentation of laboratory analytical reports, along with conclusions and recommendations.

Please contact us upon your review of this report and work plan or if you have any questions or comments.

Sincerely,
AMERICAN HYDROGEOLOGY CORPORATION

Paul French

Paul D. French
Senior Geologist

Mick Lynch

Patrick M. Lynch
General Manager

PDF/pdf/24-1136

Enclosure

Ann Arbor
Technical 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					

Note: Units are expressed on a dry weight basis.

AMERICAN HYDROGEOLOGY CORPORATION

Environmental Consulting Services

Main Office
6869 Sprinkle Road
Portage, MI 49002
(616) 329-1600
Fax (616) 329 2494

Lansing Area Office
2163 University Park Drive, Suite 165
Okemos, Michigan 48864
(517) 349-4955
Fax (517) 349-7022

February 19, 1992

Mr. Bill Merrill
Varnum, Riddering, Schmidt & Howlett
171 Monroe Avenue, N. W.
Grand Rapids, MI 49503

RE: PCB sampling locations, Benteler Industries/General Signal, 9000 East Michigan Ave., Galesburg, Michigan

Dear Mr. Merrill:

This letter serves to provide you with a brief explanation of the attached figures showing sampling locations and PCB concentrations pertaining to the Benteler facility in October 1989. The PCB contamination was initially detected during Benteler's routine plant preparation activities in May 1989. The figures (1 through 6) were prepared by American Hydrogeology Corporation (AHC) and show sampling locations and PCB concentrations from each phase of the investigation and by each consultant involved.

Figure 1: PRE-CLEANUP - WESCO DATA. AROCLOR 1260 CONCENTRATIONS

Westinghouse/Aptus was contracted by Benteler to remove the PCB transformers. Sampling for PCBs is routinely conducted prior to and after transformer removal. The wipe sampling of the concrete floor was conducted in on September 26, 1989 by WESCO and indicated elevated concentrations of PCBs.

This figure shows the sampling location and results of PCB analysis. The results were received by Benteler on October 4, 1989. The sampling locations as depicted on this figure should be considered approximately only.

Figure 2: PRE-CLEANUP - EDI/ESD & WESCO DATA. Aroclor 1260 Concentrations.

Upon discovery of PCBs by WESCO, EDI/ESD was contracted by Benteler to determine the extent of the PCBs. The wipe sampling was completed between October 12-26, 1989. The locations and the results of the PCB analyses from EDI/ESD are presented on this figure. The sampling locations as shown on this figure were located by AHC based upon information provided by EDI/ESD. Some of the sampling location descriptions contained within the field notes were not precise. Therefore, some locations may not be accurate.

Figure 3: PRE-CLEANUP - AHC/ATS. Aroclor 1260 Concentrations.

Between January 22-26, 1990, AHC collected wipe samples for PCB analyses from the concrete floor prior to their cleanup inside the plant. This figure shows the sampling locations and concentrations of PCBs (Aroclor 1260).

Figure 4: POST-CLEANUP - ESD DATA. Aroclor 1260 Concentrations and Figure 5: POST-CLEANUP - ESD DATA. Aroclors 1248 and 1254 Concentrations.

Upon completion of the floor decontamination which took place between January 1-3, 1990, ESD collected wipe samples for PCB analyses. Samples were collected between January 24 and February 9, 1990. Please note that sampling locations shown on these figures should be considered approximate only.

Figure 6: AHC/ATS Concrete Core Analytical Results. Aroclor 1260 Concentrations.

AHC was contracted by General Signal to collect concrete core samples for PCB analysis. Five concrete core samples were collected by AHC on October 11, 1989 and analyzed by Ann Arbor Technical Services, Inc. (ATS). The core samples were analyzed for PCB content at three discrete depth intervals (0 to 1 inch, 1 to 2 inches and 2 to 3 inches). Figure 6 shows the sample locations and concentrations of Aroclor 1260 at each depth interval.

Please call if we can be of any further assistance.

Very truly yours,

AMERICAN HYDROGEOLOGY CORPORATION

Pam Krumm
for Patrick M. Lynch
General Manager

Linda G Jones
Linda G. Jones
Senior Geologist

PML/lgj/24-1136

cc: Dan McGrade, General Signal
Dave Preston, Varnum, Riddering Schmidt & Howlett
Charles Denton, Varnum, Riddering, Schmidt & Howlett
Glenn Kuntz, Plexus

2122190

MEMORANDUM

To: PML

From: PDF

Re: 2/19/90 Benteler/Hydreco site inspection and correspondence w/Dave Corbin 2:30 - 4:00 p.m.

Item 1: Drum Contents

The contents of drums which are set aside at the plant for our disposal are as follows:

Drum #1: Waste coring water (labeled as such)

Drum #2: Vacuum sweeper (labeled as such)

Drum #3: Tyvek suits, black gloves and visqueen. This drum is not labeled. Note: protective clothing used by AHC during last phase of sampling consisted of tyvek suits, yellow booties, clear protective inner gloves, and green outer gloves. We did not use black gloves nor visqueen. Our total usage of clothing could be fitted in a 5-gallon bucket. In fact I had it inside a bucket within one of our original drums and since the quantity was small I received permission from "floor cleaners" to add it to one of their drums.

While inspecting drums, Dave mentioned that he assumed it was ours since we did use protective clothing. I did not expound on the subject.

As for disposal of the drums, there is room in the third drum for the vacuum sweeper if necessary.

Item 2: Comments from Dave Corbin

1. Dave pointed out that after painting, high traffic areas were easily identified by the shine on floors due to roughness caused by traffic and pointed out some areas where new concrete floors had been installed. Ex: a small (~8 x 10) area approximately 60 feet southwest of location ON, OE where a pit was once located. He also wanted to make sure that we could pinpoint exactly where our samples were collected. He was concerned that some of our low concentration samples could have possibly been collected on new cement of beneath a piece of equipment out of high traffic areas. Also, it could indicate that their activities inside the plant could have caused tracking of contaminants onto new concrete areas.

2. While standing beneath the electric "cable boxes" where we collected the dioxane samples. I asked Dave if these "boxes" were new since they had not been painted. Dave said that they were there when the transformer fire had occurred and all had been washed after the fire except for one area where capacitors had protected it. That area appeared "charred".

3. Dave also volunteered that he had eye witness to vouch that doors to the SW annex building were closed during the fire and that recent wipe samples in that annex indicated PCB's above allowable maximum concentrations. He indicated that the annex would also need to be cleaned and painted.

4. Dave asked if General Signal had requested from us the plant layout from Hydreco's processing. He indicated that he had mapped out the processes of manufacturing (paths that each part went through from raw material - processing - to shipment) and he could show this to us via wipe sample data. He mentioned that process of one certain part started near the transformer area, went to high contaminant area, ~60 southwest of transformer (ON, OE) then to area south of mezzinine bordering isle and then out to shipment. I'm not sure what he was trying to pinpoint here since traffic patterns during all general plant activities would have criss-crossed those areas.

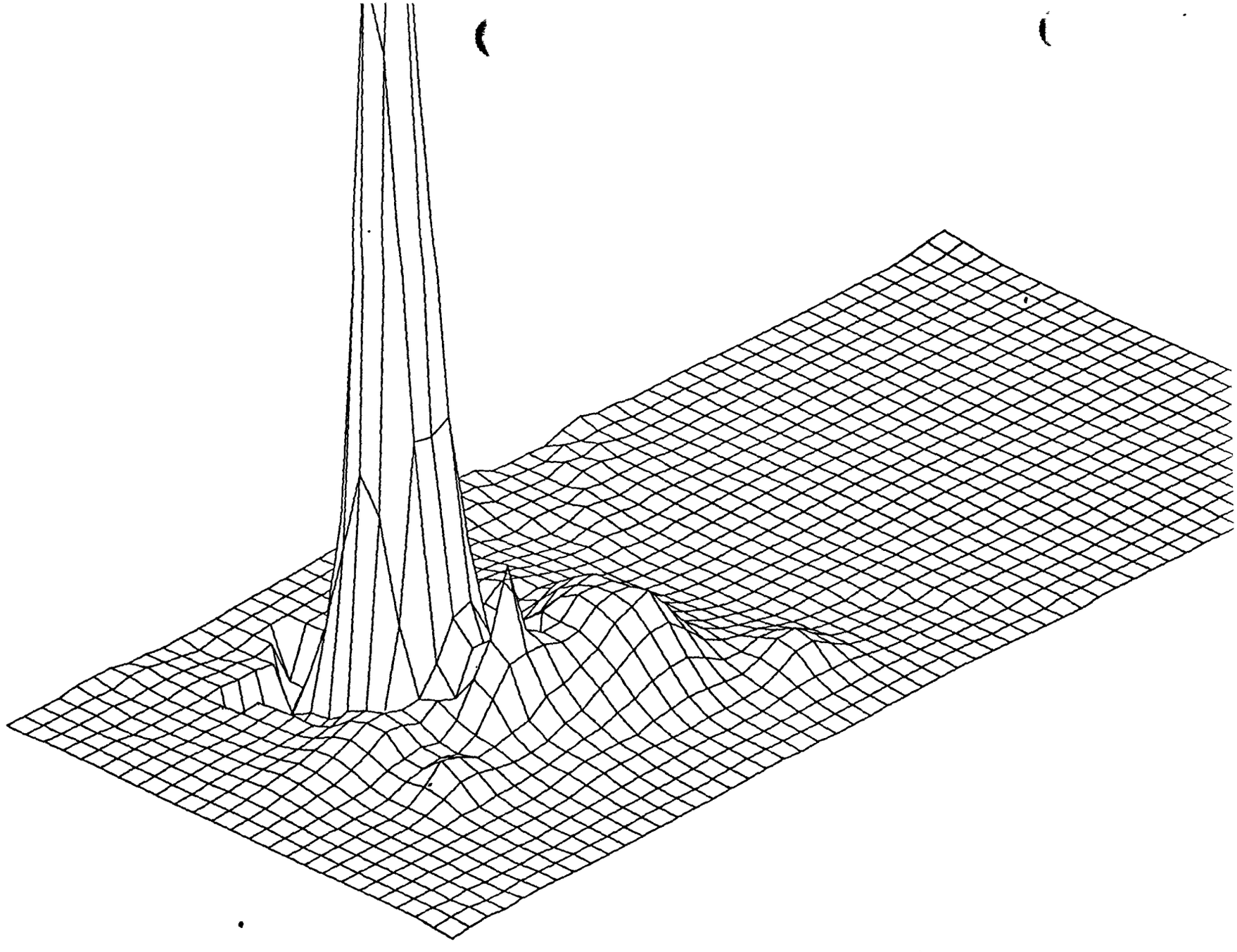
5. Dave also mentioned that floor cleaner used before painting was to be recycled and that recycling process reduces PCB levels to ~1 ppm before reuse of PCB's over the entire floor.

6. Dave mentioned that all would be smoother if General Signal would admit and just pay. He said that all is private now and would be public information if dragged into court and that he knew of several items that would not be good for General Signal if it were public, namely former workers health and home, transfer of equipment to other plants and auctioned equipment. He mentioned that he was aware of some equipment that was shipped out after he had taken over plant that was stained near base with PCB oils.

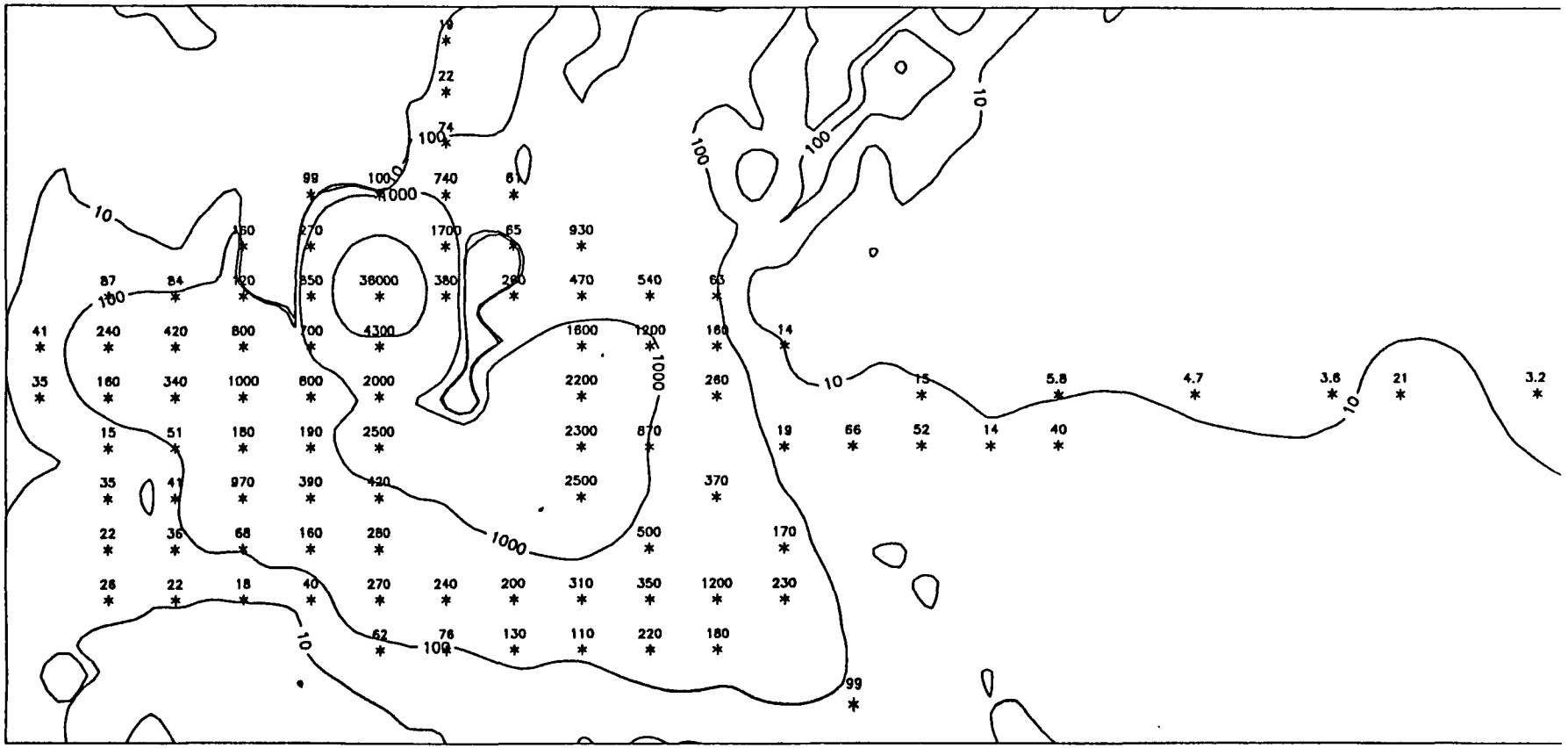
<u>Item 3: Floor Painting and Cleaning Process</u>

Entire main floor area has been painted, even areas of new concrete. Two areas are left:

1. southwest annex
2. room between boiler room and paint pit

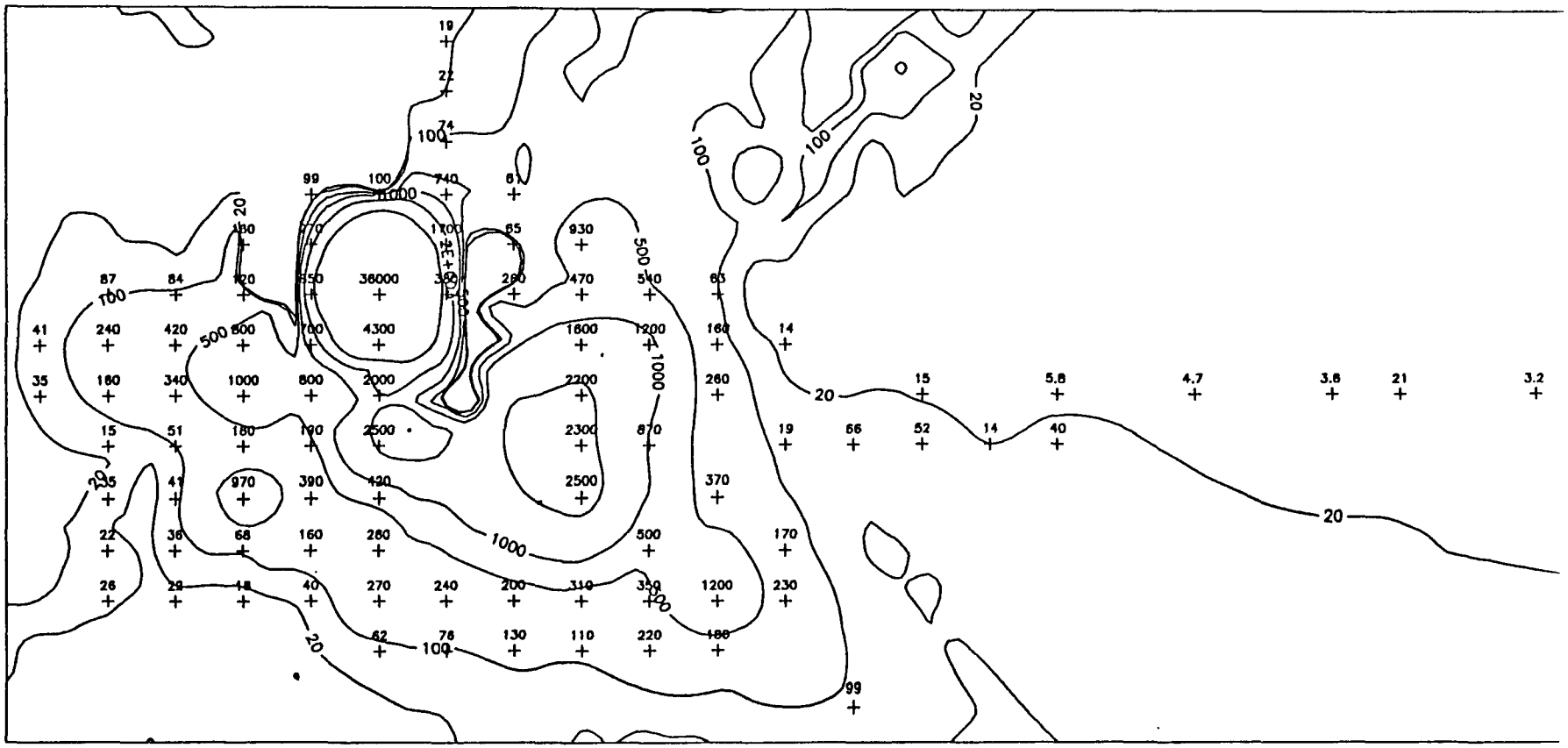


Benteler Aroclor 1260 Pre-cleanup

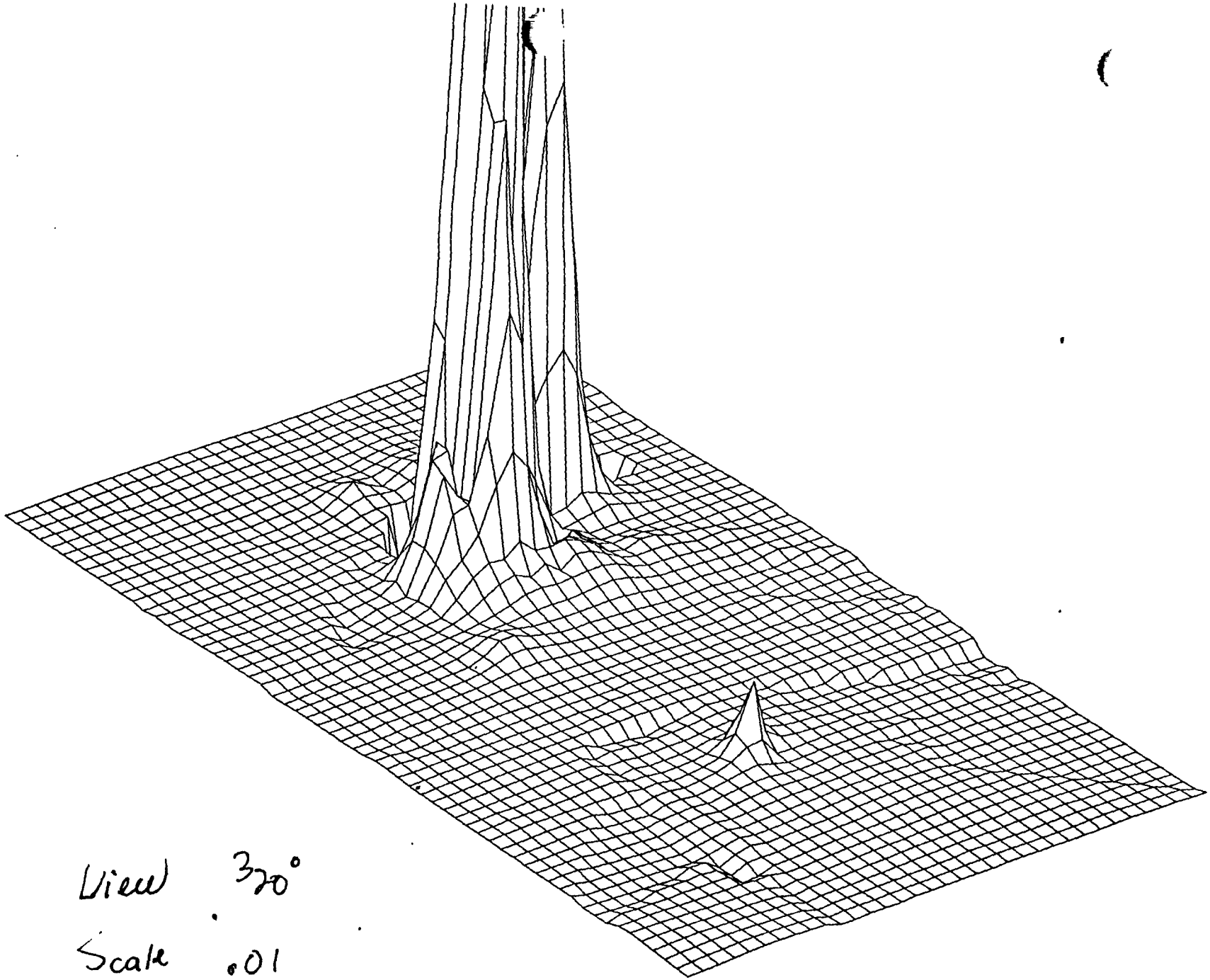


SCALE 1 inch = 50 Feet

Benteler Aroclor 1260 Pre-cleanup

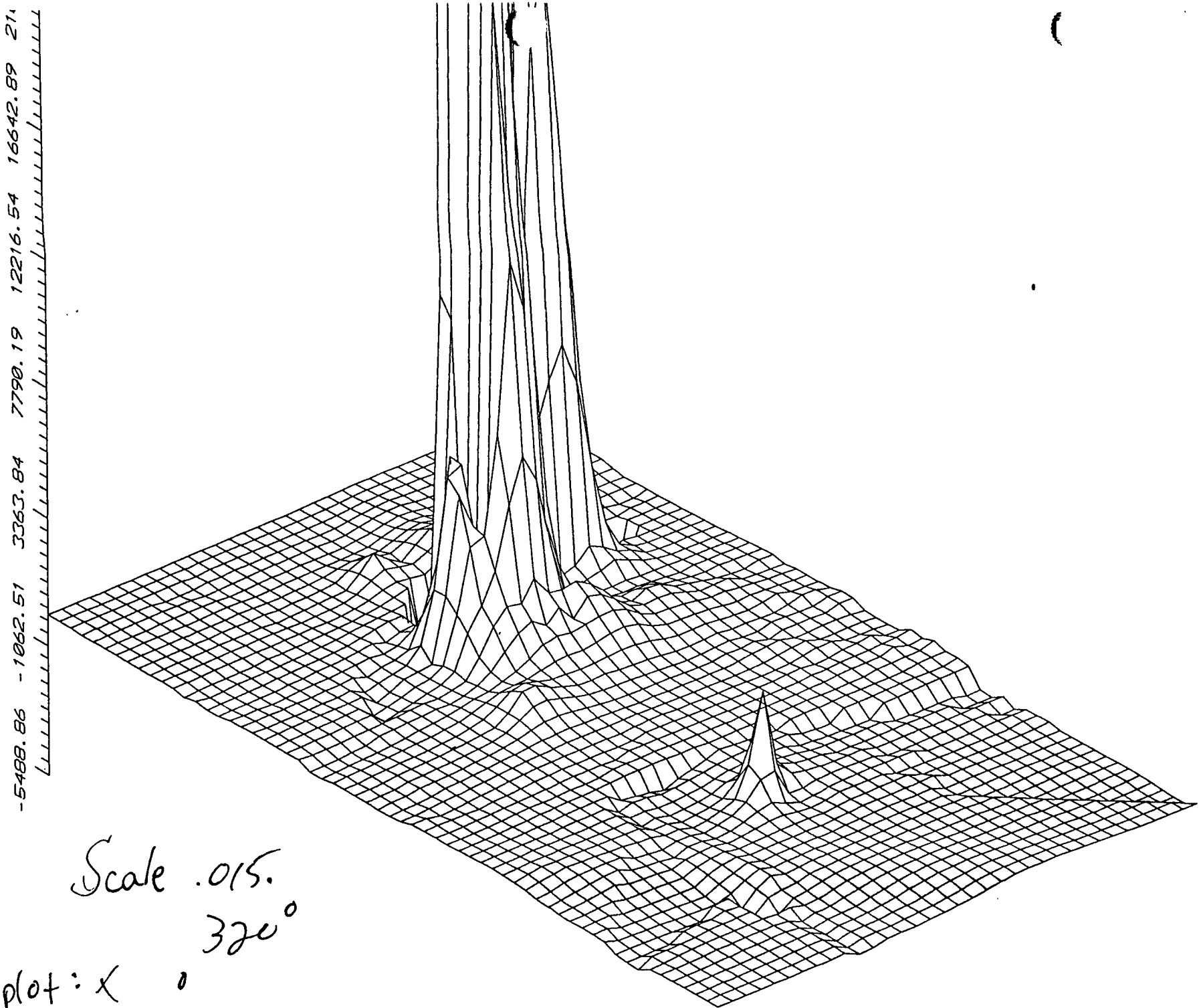


SCALE 1 inch = 50 Feet



View 370°

Scale .01

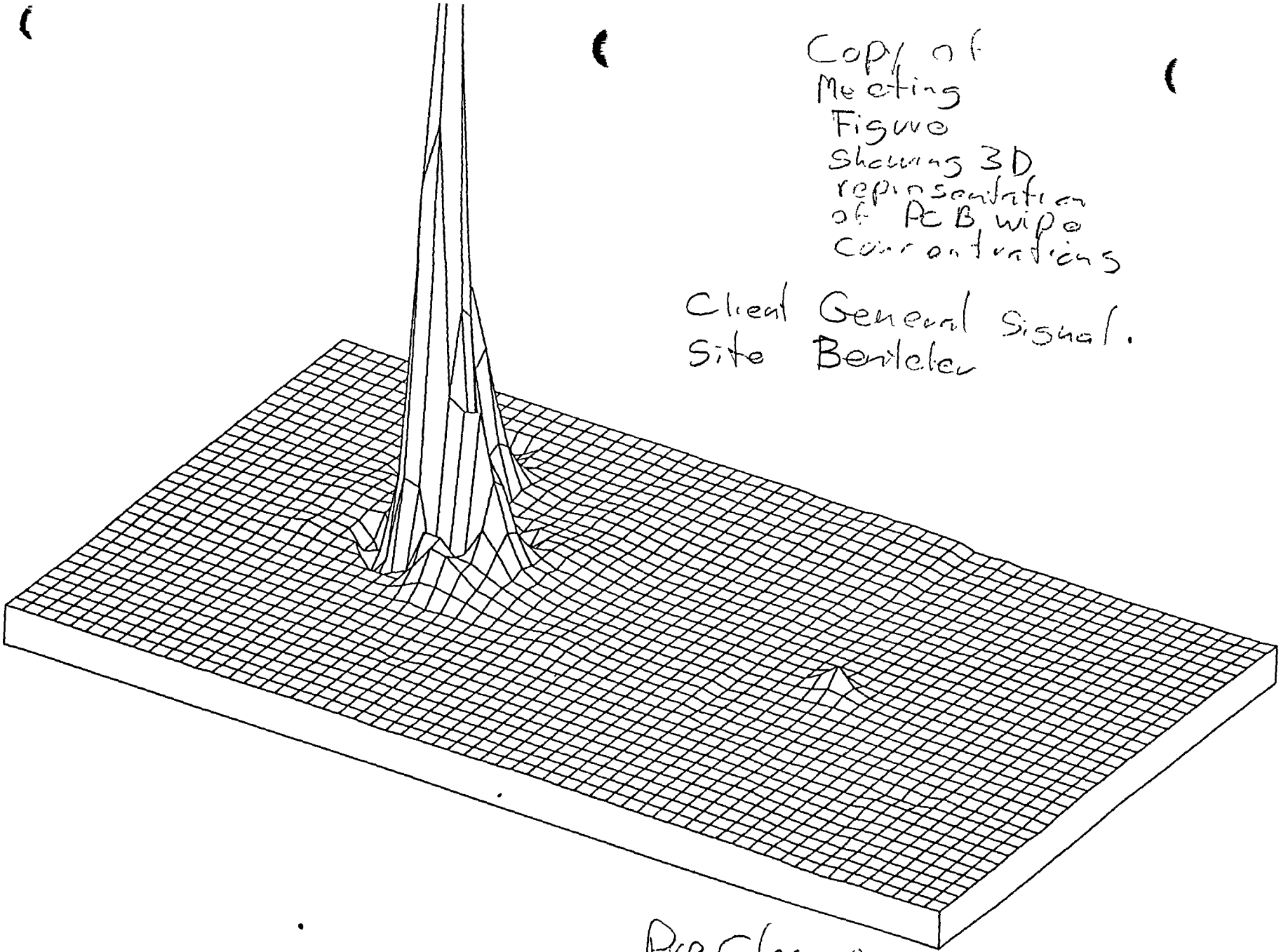


Scale .015.
320°

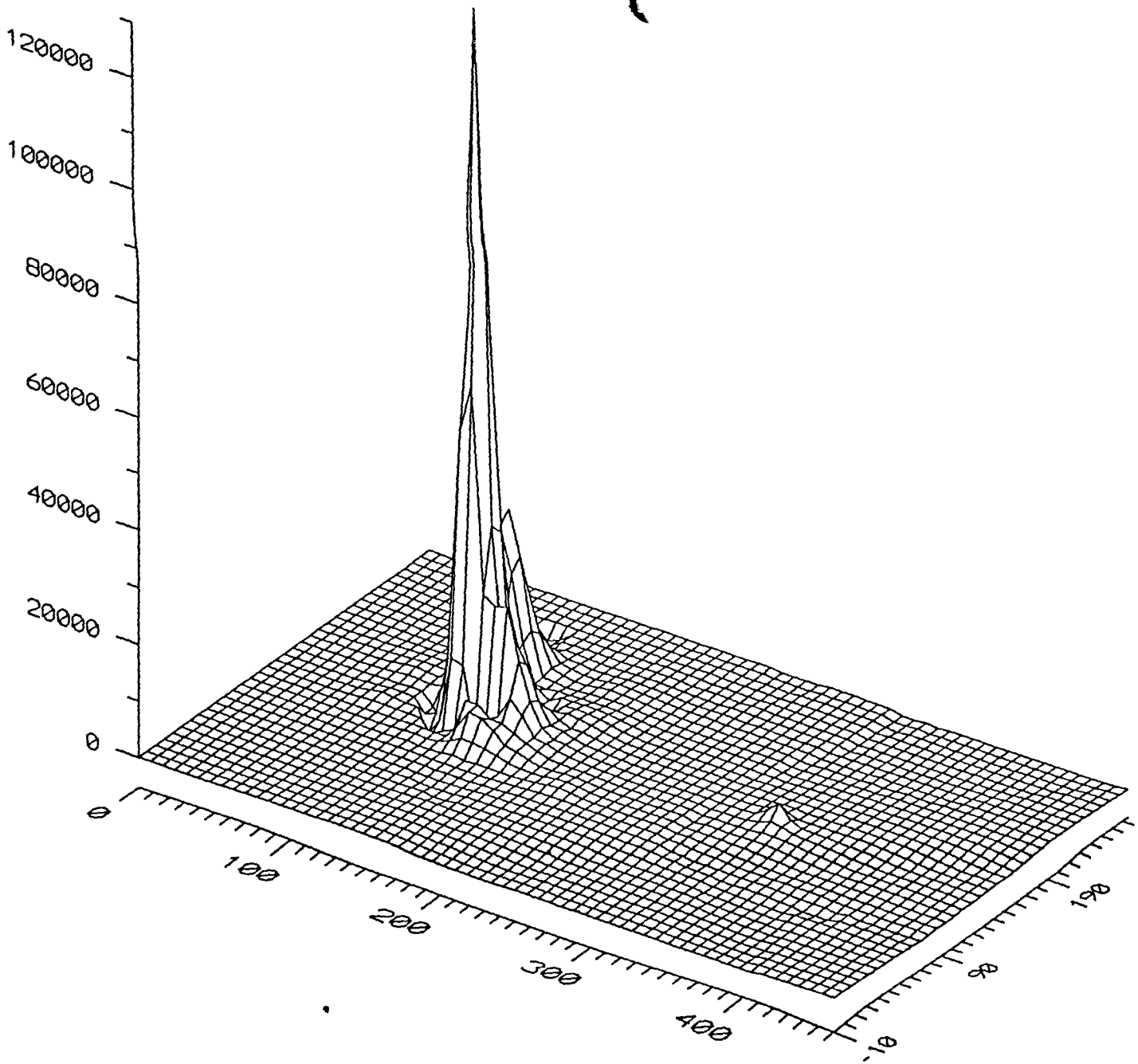
plot: X 0
Y -2

Copy of
Meeting
Figure
Showing 3D
representation
of PCB wipe
concentrations

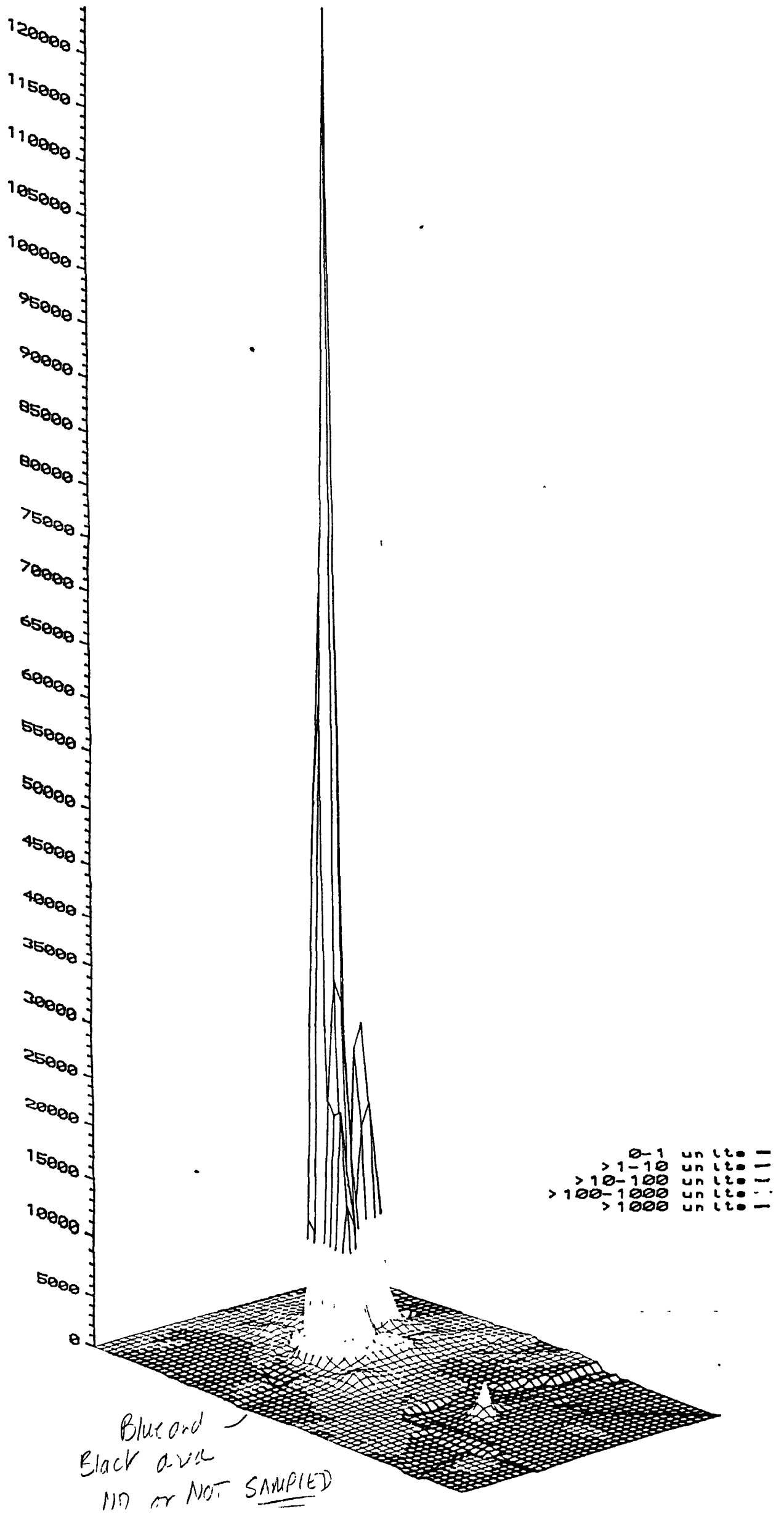
Client General Signal.
Site Berkeley



Pre Cleanup
Wescad TPI
results



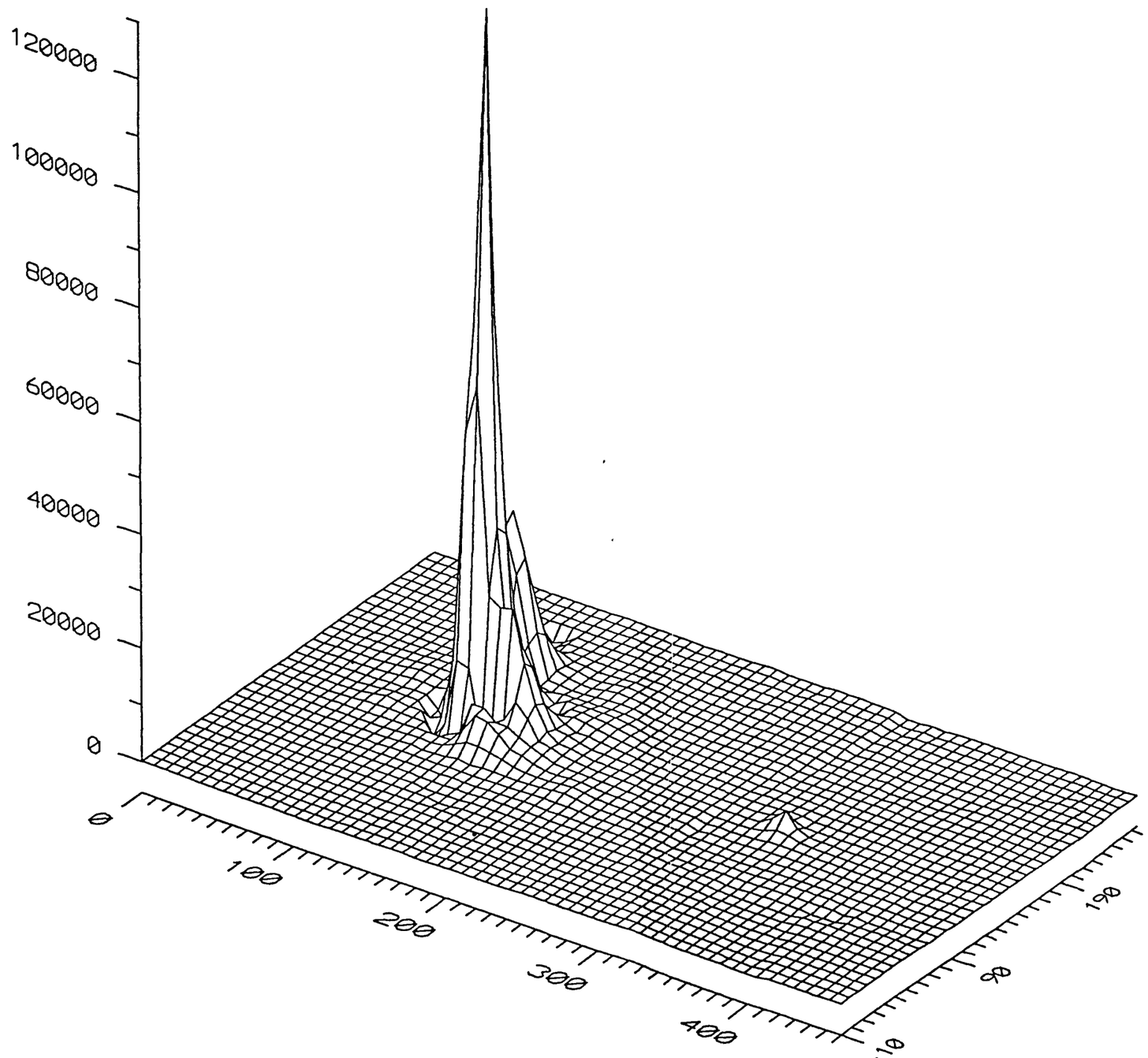
Benteler Aroclor 1260 Pre-Cleanup



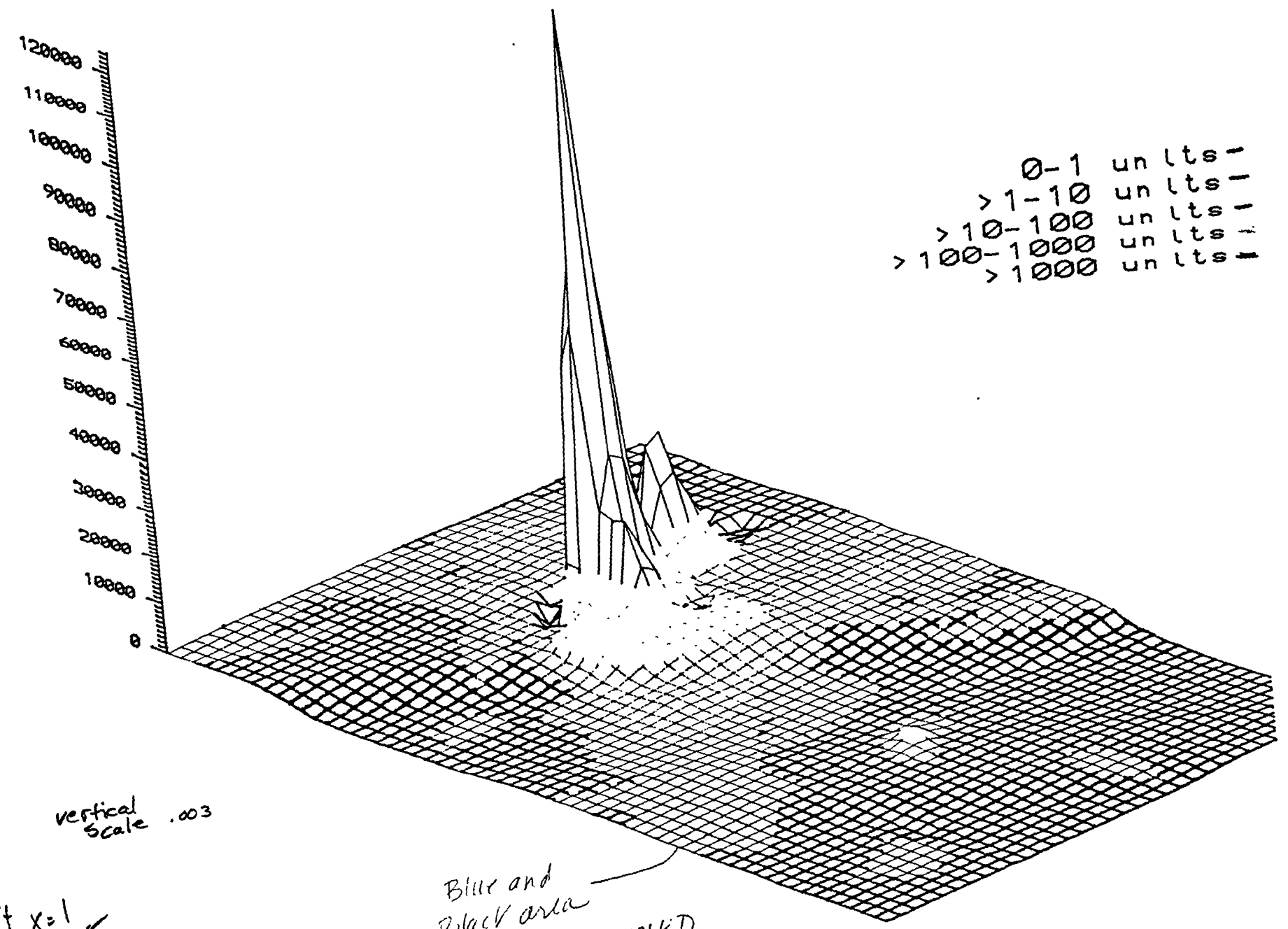
Vertical Scale .015

Blue and Black area ND or NOT SAMPLED

Shift plot X=1 Y=.5



Benteler Aroclor 1260 Pre-Cleanup



vertical scale .003

Blue and Black area ND OR NOT SAMPLED

shift plot X=1 Y=-.5

Scale X=1

AMERICAN HYDROGEOLOGY CORP.

4000 Portage Road, Suite A
Kalamazoo, Michigan 49001
616 343-9800

April 12, 1990

PROJECT
FILE COPY
Sent 4-12-90

Mr. Dan McGrade
Manager
Environmental Affairs
General Signal Corporation
P.O. Box 10010
Stamford, Connecticut 06904

Dear Dan:

Enclosed please find a copy of the Benteler, Galesburg PCB swab sample from the overhead "cable box". As you can see, no PCBs were identified at or above the detection limits in this sample.

As always, if you have any questions or comments, please don't hesitate to contact me.

Very truly yours,

AMERICAN HYDROGEOLOGY CORPORATION

Mick

Patrick M. Lynch
General Manager

PML/jss

Enclosure

cc: Mr. Charles M. Denton
Mr. Mike Dmyterko
Ms. Lynne Tomeny, Esq.

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					

CLIENT: BENTELER INDUSTRIES, INC.
PROJECT NO.: 26363
LOCATION: -
SAMPLED BY: K. OSTERMAN
DESCRIPTION: PCB WIPE SAMPLES

DATE SAMPLED: 02/07/90 TIME:
DATE RECEIVED: 02/08/90 TIME: 8:05 AM
DATE COMPLETED: 02/08/90
SCHEDULED COMPLETION: 02/09/90
ANALYST: GW,KVH
QUALITY CONTROL REVIEW BY: WH
WORKSHEET NO: 80

	E-11	E-12	OVERHEAD CRANE #1	OVERHEAD CRANE #2	DETECTION LIMIT	UNITS
LAB SAMPLE NO:	33250	33251	33252	33253		
PCB: AROCLOR 1242	<5.0	<0.80	<0.80	<0.80	varies	ug
PCB: AROCLOR 1248	<5.0	<0.80	0.84	1.5	varies	ug
PCB: AROCLOR 1254	<0.80	<0.80	<0.80	<0.80	0.80	ug
PCB: AROCLOR 1260	1.6	9.5	1.6	1.9	0.80	ug
TIME SAMPLED:	4:55 PM	4:45 PM	5:55 PM	6:00 PM		

CLIENT: BENTELER INDUSTRIES, INC.
PROJECT NO.: 26363
LOCATION:
SAMPLED BY: K. OSTERMAN
DESCRIPTION: PCB WIPE SAMPLES

DATE SAMPLED: 02/07/90 TIME:
DATE RECEIVED: 02/08/90 TIME: 8:05 AM
DATE COMPLETED: 02/08/90
SCHEDULED COMPLETION: 02/09/90
ANALYST: GW,KVH
QUALITY CONTROL REVIEW BY: WH
WORKSHEET NO: 81

	OVERHEAD CRANE #3	J-13	K-13	DETECTION LIMIT	UNITS
LAB SAMPLE NO:	33254	33255	33256		
PCB: AROCLOR 1242	<0.80	<0.80	<4.0	0.80	ug
PCB: AROCLOR 1248	<0.80	2.8	4.7	0.80	ug
PCB: AROCLOR 1254	<0.80	<0.80	<4.0	0.80	ug
PCB: AROCLOR 1260	0.89	6.0	9.7	0.80	ug
TIME SAMPLED:	6:05 PM	10:10 PM	10:05 PM		

Client: Bentelar Industries Inc Date: 2/7/90 2/8/90

Location: 9000 E Michigan, Galesburg, MI. Proj. No.: 63169

Work Description: Wipe test for PCB on Concrete floor.

Contractors: WW Engineering & Science and Environmental Group Inc.

Safety Precautions: Safty glasses, gloves.

Weather:

Sampling & Testing Locations & Methods: All Sample locations are on a Blue Print grid. See Will Beaton or Ted Kuecht for Location Information.

Visitors (title, company, purpose): Pete Flores, EGI, Project Manager
Kurt Osterman, WWES, Collect Samples

Principal Work Performed: After EGI Salvent washed and dryed Concrete floor, 1 wipe test was Collected within a 15 x 20' bay. The wipe sample was Collected in the middle of the bay in an area of 10cm x 10cm, that was marked off with a ruler & Chaulk, Safty glasses and gloves were worn for all sample Collection. A stainless steel forceps was used to handle the gauze which was soaking in Hexane. For Decon, a seperate jar of Hexane was used to Clean the forceps and a new pair of gloves were used after every 3 samples.
Wipe test samples that were taken are: E-12, E-11, Overhead crane #1, #2, #3, K-13, J-13, H-13, K-15

Note: overhead Crane #1(motor) #2(Fuse box) #3(Inside beam)

Incident Report or Significant Observation:
3 EGI Personnel was doing the Concrete wash. They would first do a application of Envirosol, then they would rinse then do another Envirosol and then a final rinse. After Concrete dryed a wipe test sample was taken. All EGI personnel were wearing respriators, hard hat, gloves, and clean guard suits & boots. All EGI personnel suited & unsuited on a Decon pad.

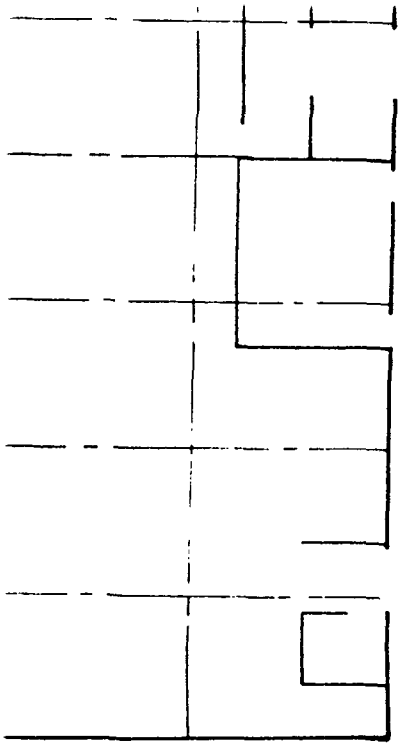


FIGURE 1

PRE-CLEANUP
WESCO DATA
AROCLOR 1260 CONCENTRATIONS
(Expressed As $\mu g/100\ cm^2$)
BENTELER INDUSTRIES, INC.

Section 23, T. 2 S., R. 10 W.
Comstock Township
Kalamazoo County, Michigan

9)

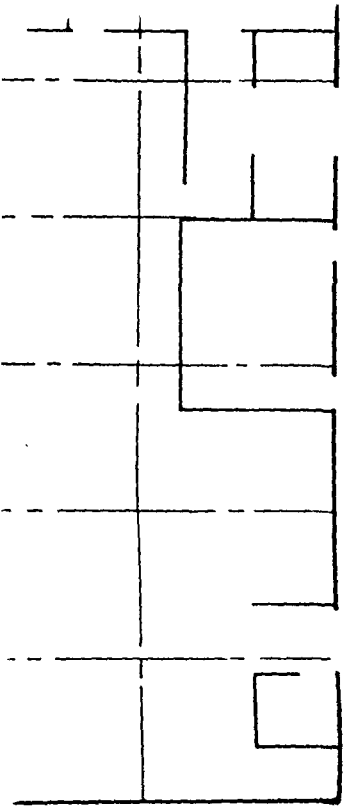


FIGURE 2

PRE-CLEANUP
EDI/ESD DATA
AROCLOR 1260 CONCENTRATIONS

(Expressed As $\mu g/100\ cm^2$)

BENTELER INDUSTRIES, INC.

Section 23, T. 2 S., R. 10 W.
Comstock Township
Kalamazoo County, Michigan

26, 1989)

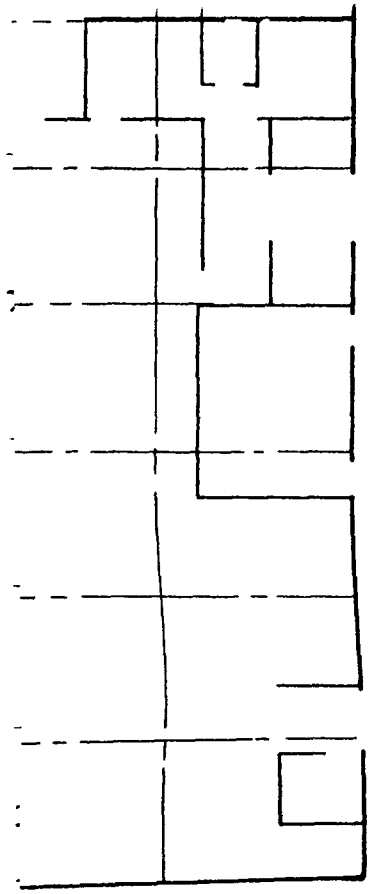


FIGURE 3

PRE-CLEANUP – AHC/ATS DATA AROCLOR 1260 CONCENTRATIONS

(Expressed As $\mu g/100\ cm^2$)

BENTELER INDUSTRIES, INC.

Section 23, T. 2 S., R. 10 W.
Comstock Township
Kalamazoo County, Michigan

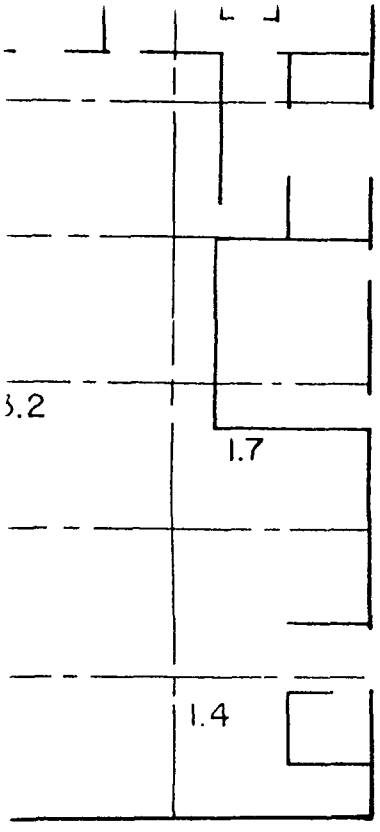


FIGURE 4

POST-CLEANUP – ESD DATA
AROCLOR 1260 CONCENTRATIONS
(Expressed As $\mu g/100\ cm^2$)

BENTELER INDUSTRIES, INC.

Section 23, T. 2 S., R. 10 W.
Comstock Township
Kalamazoo County, Michigan

uary 24-
ruary 9, 1990)

WEC 1/23/91 AH

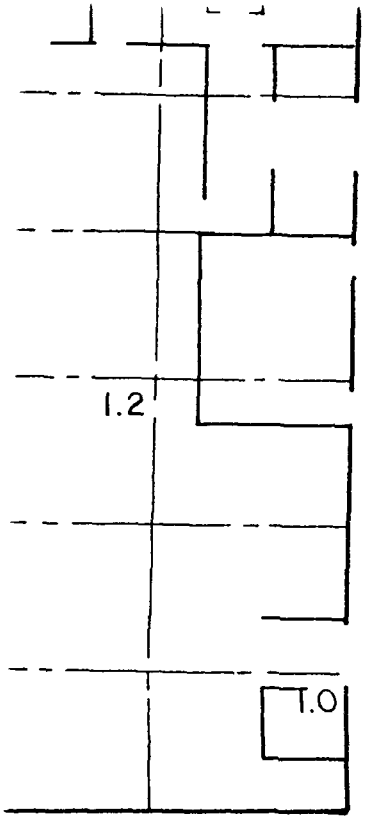


FIGURE 5

POST-CLEANUP – ESD DATA AROCLOR 1248 AND 1254 CONCENTRATIONS

(Expressed As $\mu g/100\ cm^2$)

BENTELER INDUSTRIES, INC.

Section 23, T. 2 S., R. 10 W.
Comstock Township
Kalamazoo County, Michigan

WEC 1/23/91 AH

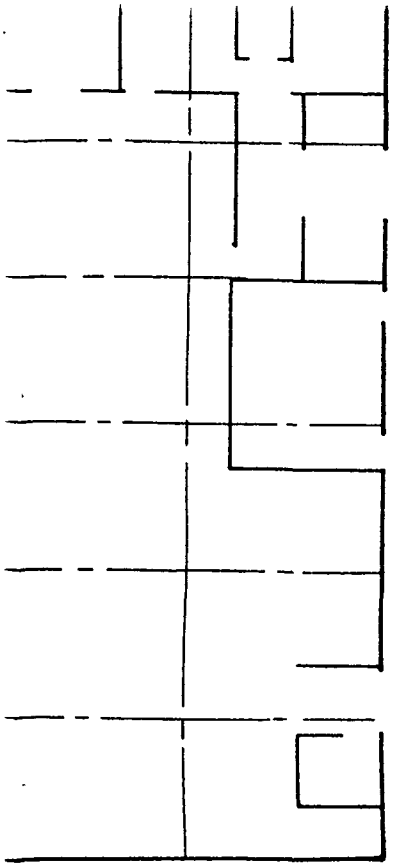


FIGURE 6

AHC/ATS CONCRETE CORE ANALYTICAL RESULTS AROCLOR 1260 CONCENTRATIONS

(Expressed As mg/kg)

BENTELER INDUSTRIES, INC.

Section 23, T. 2 S., R. 10 W.
Comstock Township
Kalamazoo County, Michigan

AMERICAN HYDROGEOLOGY CORPORATION

Environmental Consulting Services

Main Office
6869 Sprinkle Road
Portage, Michigan 49002
(616) 329-1600
Fax (616) 329-2494

Lansing Area Office
2163 University Park Drive, Suite 165
Okemos, Michigan 48864
(517) 349-4955
Fax (517) 349-7022

CONFIDENTIAL - ATTORNEY WORK PRODUCT
(Prepared at the direction of legal counsel in connection with litigation)

CONFIDENTIAL

August 24, 1992

DRAFT

Mr. David E. Preston
Varnum, Riddering, Schmidt & Howlett
171 Monroe Avenue, N. W., Suite 800
Grand Rapids, MI 49503-2634

RE: Consumers Power Substation, Benteler Facility, 9000 East Michigan Ave., Galesburg, Michigan

Dear Mr. Preston:

At your direction, American Hydrogeology Corporation (AHC) has prepared this summary of the information and events related to the Consumers Power substation and the drainage ditch located to the south of the substation at the Benteler Facility.

BACKGROUND - CONSUMERS POWER SUBSTATION

The Consumers Power substation is located to the south of the parking lot, east of the plant building. Refer to Figure 1 for the location of the substation and other pertinent site features. Review of aerial photographs for the site and available records indicate that this substation has existed at this location since between 1956 and 1960.

The substation is enclosed and protected by an approximately 8-foot tall chain link fence, 45 feet (east-west) by 40 feet (north-south). The headwall for the drainage ditch is located approximately 50 feet to the south and downgradient of the substation fence. Surface water runoff from the transformer substation drains southerly creating a shallow erosional channel which discharges in the drainage ditch. Prior to the soil sampling by EDI in May 1991, a portion of this erosional drainage channel had been reworked extensively during construction of a City of Kalamazoo underground water line.

In 1980, a voltage regulator which we believe may remain in service at the Consumers Power substation was reportedly tested by Consumers Power and found to contain 138 parts per million (ppm) (138,000 ppb) of polychlorinated biphenyls (PCBs). This classified the equipment as PCB Contaminated Electrical Equipment according to the USEPA PCB rules. The regulator was removed in September 1989 to reduce the PCB content. In January 1990, the voltage regulator was reportedly retested by Consumers Power and found to contain 13 ppm of PCBs (Aroclor

1260). This information is contained in a letter dated May 29, 1990 from Mr. Bruce Rasher of Consumers Power to Mr. Leon Hall, former Plant Manager, Benteler Industries, Inc. which clearly implied the subject voltage regulator remained in service as of that date. This letter is enclosed as Attachment 1.

In 1989, one of the transformers was removed from the substation. Prior to its removal, Consumers Power reportedly tested the transformer oil for PCB content and found it to contain 36 ppm (36,000 ppb) of PCBs (Aroclor 1260). A copy of the Consumers Power Company major equipment disposition for this transformer is provided in Attachment 2. The referenced PCB analytical result is reflected as Entry #1.

Photographs of Substation

Enclosed as Attachment 3, are five copies of photographs taken by an AHC representative of the subject Consumers Power substation. These photographs were taken prior to the installation of the water line at the Benteler Facility. A brief description of each photograph is provided below.

Photo #1. View from east to west of dark, discolored soil to the south of the substation.

Photo #2. View of the substation from approximately the south to the north. The Benteler plant is visible to the west.

Photo #3. View from north to south of sewage treatment plant and drainage ditch located to the south of the substation.

Photo #4. View of substation from approximately the northeast to the southwest.

Photo #5. View of substation from approximately the north to south. Photo was taken from the Benteler parking lot.

Photo #6. Identifying label on one of the transformers within the substation.

Photo #7. View to the southeast of the substation (outside fence) looking to the southwest. Erosional drainage channel which slopes from north to south towards the drainage ditch is visible. Areas of stressed vegetation and discolored soil are evident within the erosional channel.

Photo #8. Same approximate view as photo #7. The shallow drainage channel with discolored soil and stressed vegetation are apparent in this photograph. The manhole for the storm water drain line is located in the top right corner of the photograph.

WATER LINE INSTALLATION

On April 2, 1992, a representative of AHC obtained a plan (Figure 2) from Mark Stevens of the Engineering Division of the City of Kalamazoo Department of Public Utilities showing the location of the water line installed at Benteler Industries. This installation is believed to have disrupted the erosional drainage channel originating from the substation.

The AHC representative met with Chris Martins, Construction Engineer, for information relative to the installation of the water line to and determined the following:

1. Water service was connected to the facility on February 12, 1991.

2. The water supply line to the building is 12-inches in diameter.

3. City of Kalamazoo performed the work up to the meter box. The City's heavy equipment was used.

4. The bottom of the excavation and pipe is approximately five feet below ground level.

5. The City backfilled with existing material in the area south of substation.

6. The City started hauling pipe on January 4, 1991. Excavation began on January 16, 1991 and was completed on February 12, 1991. Work was performed during this time period intermittently. The City started along the street and then at the building. Excavation activities near the Consumers Power substation was most likely performed at the end of January to early February, 1991.

SAMPLING - MAY 1991 (EDI)

On May 8, 1991, EDI collected two samples of the soil from the south side of the Consumers Power substation. No PCBs were detected at or above the 33 ppb laboratory detection limit in either of the samples. Based upon AHC's recent findings, PCBs may not have been detected due to the detection limit and/or sample locations. These samples were not collected from the shallow erosional drainage channel originating from the substation. Consequently, a representative sample may not have been obtained from this area. The results of this sampling event and sample locations are provided as Attachment 4.

SAMPLING - APRIL 1992 (American Hydrogeology Corporation)

On April 8 and 9, 1992, representatives of AHC collected surficial soil samples around the Consumers Power substation. The samples were collected in areas that were not believed to be disturbed by the construction of the water line. Sample locations are summarized below and shown on Figure 1.

The following samples were collected:

Sample #	Time	Location	Description
April 8, 1992			
S-01	3:45 pm	13.5' W, 3.5' S of SE corner of Consumer Power substation fence	grass, stressed vegetation, topsoil
S-02	3:46 pm	13.5' W, 7.0' S of SE corner of Consumer Power substation fence	0-.05', mostly topsoil
S-03A	3:48 pm	13.8' W, 8.5' S of SE corner of Consumer Power substation fence	stressed vegetation, little topsoil
S-03B	3:50 pm	Same as S-03A	0-.05', mostly topsoil
S-04A	3:54 pm	14.0' W, .1' S (under fence) of SE corner of substation fence	stained gravel
S-04B	3:55 pm	Same as S-04A	.1-.2', gravel and sand
S-05A	3:59 pm	14.0' W, 4.5' S of SE corner of substation fence	.1-.2', grass, sand and gravel
S-05B	4:00 pm	14.0' W, 4.5' S of SE corner of substation fence	.2-.3', sand some gravel
S-06	4:03 pm	8.5' S of NW corner of substation fence. Sample collected under fence	0-.05', surface soil, topsoil, grass
S-07A	4:05 pm	29.8' W, .3' S of SE corner of substation fence	gravel (w/blue paint) and sand, topsoil
S-07B	4:06 pm	same as S-07A	.05-.08', topsoil, surface soil below gravel
S-08	4:10 pm	15.5' S, 10.8' W of sewer manhole	grass, surface soil, sand and gravel
S-09	4:16 pm	18.5' S, 10.8' W of sewer manhole	grass, surface soil, sand and gravel
S-10	4:27 pm	21.6' W of SE corner of substation fence (under fence)	grass, surface soil, little gravel
April 9, 1992			
S-11	9:59 am	3.0' E of sewer manhole	surficial soil, some discolored, grass
S-12	10:01 am	4' W of sewer manhole	surficial soil, some discolored, grass

Photo-documentation of Soil Sample Locations

Photographs documenting the substation and soil sample locations were taken on April 9, 1992. Copies of these photographs are included as Attachment 5 and include:

Photo #1. View from south to north towards substation. Soil sampling locations S-01, S-02, S-03A and B, S-04A and B and S-05A and B in foreground located in the erosional drainage channel. Samples S-01, S-4 and S-05B were found to contain PCBs (Aroclor 1260).

Photo #2. Picture from the north-northwest looking to the south-southeast towards the drainage ditch. Soil samples S-08 and S-09 in foreground.

Photo #3. Picture taken standing below headwall looking north towards the substation. Soil samples S-08 and S-09 visible in picture. Shallow drainage channel, discolored soil and stressed vegetation also visible in center to lower right corner of picture.

Photo #4. View from south to north towards substation. Storm sewer manhole in center with box set on it. Soil samples S-10 and S-11 on each side of manhole.

Photo #5. View from southwest looking slightly to the northeast towards the substation. Blue flagging indicates approximate area of water line running west to east to the south of the substation. Erosional drainage channel visible adjacent to substation fence. Discolored soil and stressed vegetation visible in area that was reworked by water line installation.

Photo #6. View from south to north looking into substation. Soil sample S-07 visible adjacent to fence.

Photo #7. View from southeast to northwest towards the Benteler plant. Picture taken on east side of Consumer Power substation. Black, discolored soil and grass in foreground. Discoloration inside substation under, and in the vicinity of, the grate near ladder and support beam.

Results of Sampling

The results of the PCB analyses indicated the presence of Aroclor 1260 at three locations: .11 mg/kg at S-01, .007 mg/kg at S-04B and .005 mg/kg at S-05A. The results of the analysis are presented on Figure 1 and Attachment 6. These sample locations are located along the erosional drainage channel formed by surface water runoff draining from the substation.

BACKGROUND - DRAINAGE DITCH AND SKIMMER

According to an October 16, 1989 memo from Dave Corbin (engineering consultant for Benteler Industries) to Mike Morin (Benteler Industries) (Attachment 7), in 1987, as part of the preparation of the Hydreco Spill Prevention Control Document, laboratory analysis for PCB content of water collected from the oil skimmer, located approximately 400 feet south of the headwall of the drainage ditch, revealed no detectable concentrations. The Spill Prevention Control Document was prepared by WW Engineering & Science.

According to the above-referenced memo, 9 ppm of PCBs were detected in 2 cubic yards of sludge removed from the skimmer. No date for the sampling was provided in this memo, however, the analytical results were claimed to have been received by Benteler on October 4, 1989 from K & D.

A preliminary investigation was conducted in October 1989 by EDI Science & Engineering. A total of five soil samples were collected from the drainage ditch. The highest concentrations of PCBs were reportedly detected in a sample from upgradient of the skimmer which was found to contain 64 ppm of Aroclor 1260 and 120 ppm of Aroclor 1248. This location was approximately 75 feet south of the headwall, while the lowest concentrations (1.6 ppm Aroclor 1260) were detected in a sample collected 500 feet south of the headwall (or approximately 50 feet south of the oil skimmer). This information was contained in a preliminary letter from EDI to Miller, Johnson, Snell & Cummiskey dated December 1, 1989 and also referenced in the Site Investigation Report dated July 1991 prepared by WW Engineering & Science. Refer to Attachment 8 for a copy of the December 1, 1989 report. Also within AHC's files was an analytical report dated October 2, 1990 for PCB sampling performed in the ditch by WW Engineering & Science. AHC has no correspondence within our files describing the sampling procedures or showing sampling locations. Refer to Attachment 9 for a copy of this laboratory report.

Another round of sampling was undertaken by WW Engineering & Science in May 1991 and included approximately 20 soil samples from the drainage ditch for PCB analyses. Soil samples were reportedly collected from the base of the ditch and the east and west sidewalls. Detections of both Aroclors 1260 and 1248 were reported. No Aroclor 1248 was detected south of the oil skimmer and no PCBs were detected in the samples collected from the sidewalls. Refer to Attachment 10 for a copy of this laboratory data and a plan showing the sample locations.

A sludge sample was collected by EDI from the sanitary sewer manhole (SS #4) between the Consumers Power substation and the headwall of the drainage ditch on May 2, 1991. Analyses revealed 12,000 ppb (120 ppm) of Aroclor 1248 and 1,100 ppb (11 ppm) of Aroclor 1260. Samples were also collected from the final clarifier and digester sludge for PCB analyses. No PCBs were detected in the final clarifier sample and 46 ppb (.046 ppm) of Aroclor 1260 was detected in the digester sludge. The results of the analyses and site plan showing sample location are enclosed in Attachment 11.

CONFIDENTIAL

DRAFT

Please call if we can be of any further assistance.

Very truly yours,

AMERICAN HYDROGEOLOGY CORPORATION

Linda G. Jones
Senior Geologist

LGJ/lgj/24-1136

Enclosures:

Figures

Figure 1 - Site Plan and Soil Sampling Locations
Figure 2 - City of Kalamazoo Plan

Attachments

Attachment 1 - May 29, 1990 Letter from Bruce Rasher (Consumers Power) to Leon Hall (Benteler Industries)
Attachment 2 - Consumers Power Company - Major Equipment Disposition
Attachment 3 - Photographs of Consumers Power Substation
Attachment 4 - Laboratory Results EDI - May 8, 1992 and Figure
Attachment 5 - Photographs of AHC Sampling Locations - April 9, 1992
Attachment 6 - Laboratory Results AHC - April 10, 1992
Attachment 7 - Memo dated October 16, 1989 from Dave Corbin to M. Morin (E. Thorsen)
Attachment 8 - Preliminary EDI Report dated December 1, 1989
Attachment 9 - Laboratory Results October 2, 1990 - EDI
Attachment 10- Laboratory Results May 1991 - EDI and Figures
Attachment 11- Laboratory Results May 1991 - EDI

cc: David Preston, Varnum, Riddering, Schmidt & Howlett
Terry Decker, Varnum, Riddering, Schmidt & Howlett
Patrick M. Lynch, AHC

ATTACHMENT 1

MAY 29, 1990 LETTER FROM BRUCE RASHER (CONSUMERS POWER)
TO LEON HALL (BENTELER INDUSTRIES)

recycled paper

Consumers Power
POWERING MICHIGAN'S PROGRESS
General Offices: 212 West Michigan Avenue, Jackson, MI 49201 • (517) 788-0550
Writer's direct dial (517) 788-0331

BWR 90-41
M905.4

May 29, 1990

Mr Leon Hall, Plant Manager
Benteler Industries, Inc
9000 E Michigan Ave
Galesburg, MI 49053-9772

Re: Air Brake Substation

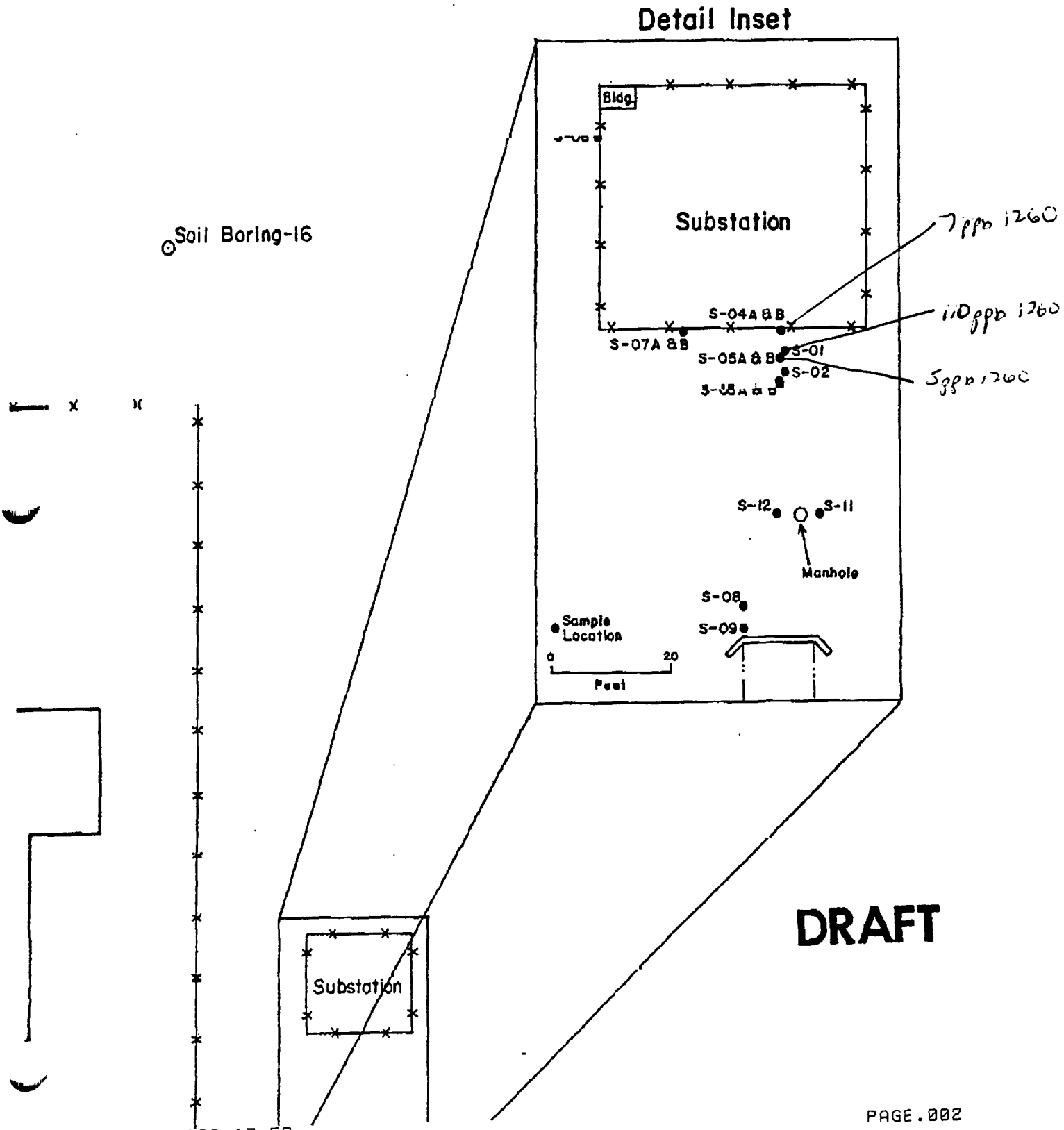
Dear Mr Hall:

This is in response to your inquiry regarding Consumers Power Company's spill cleanup program for electrical equipment in service at our Air Brake Substation.

Overview of Consumers' Spill Plans

In 1985, Consumers Power Company entered into a Polychlorinated Biphenyls (PCB) Spill Cleanup Agreement applicable to pole-mounted electrical equipment containing 50 ppm or more PCB with the US Environmental Protection Agency (US EPA). Also in 1985, the Michigan Department of Natural Resources (MDNR) approved Consumers' Pollution Incident Prevention Plan for PCBs applicable to electrical equipment. Consumers Power Company considers both spill plans to be applicable to its substations. These documents specify a number of actions required of the Company in the event of a spill incident involving equipment which contains 50 ppm or greater PCB, including sampling to verify that cleanup has been adequate.

In contrast, spills resulting from electrical equipment containing less than 50 ppm PCB (non-PCB) are covered by a separate Pollution Incident Prevention Plan for Oil Spills which was approved by the MDNR in 1983. This plan requires that Consumers remove all visible signs of oil released. There is no requirement for Consumers to sample following an oil spill cleanup.


Detail Inset
Bldg.
Substation
Soil Boring-16
S-04A & B
S-07A & B
S-05A & B
S-01
S-02
S-12
S-11
Manhole
S-08
S-09
Sample Location
0
20
Feet
Substation
7 ppb 1260
110 ppb 1260
5 ppb 1260
DRAFT

Ann Arbor Technical Services, Inc.
200 South Wagner 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 4/10/92

Sample I.D. / Sample Date

Parameter	Units		S-09 4/8/92	S-10 4/8/92	S-11 4/9/92	S-12 4/9/92		
Aroclor 1221	mg/Kg		<0.05	<0.05	<0.05	<0.05		
Aroclor 1232	mg/Kg		<0.005	<0.005	<0.005	<0.005		
Aroclor 1242	mg/Kg		<0.005	<0.005	<0.005	<0.005		
Aroclor 1248	mg/Kg		<0.005	<0.005	<0.005	<0.005		
Aroclor 1254	mg/Kg		<0.005	<0.005	<0.005	<0.005		
Aroclor 1260	mg/Kg		<0.005	<0.005	<0.005	<0.005		
Total PCB	mg/Kg		<0.1	<0.1	<0.1	<0.1		

Note: Units are expressed on a dry weight basis.

RECEIVED JUN 17 1992

Ann Arbor Technical Services, Inc.
200 South Wagner 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 4/10/92

Sample I.D. / Sample Date

Parameter	Units		S-05A 4/8/92	S-05B 4/8/92	S-06 4/8/92	S-07A 4/8/92	S-07B 4/8/92	S-08 4/8/92
Aroclor 1221	mg/Kg		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1232	mg/Kg		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Aroclor 1242	mg/Kg		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Aroclor 1248	mg/Kg		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Aroclor 1254	mg/Kg		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Aroclor 1260	mg/Kg		0.005	<0.005	<0.005	<0.005	<0.005	~~<0.005~~
Total PCB	mg/Kg		0.005	<0.1	<0.1	<0.1	<0.1	<0.1

Note: Units are expressed on a dry weight basis.

RECEIVED JUN 17 1992

Ann Arbor Technical Services, Inc.
290 South Wagner Road • Ann Arbor, Michigan 48103 • 313-995-0995

DATA SUMMARY SHEET

For: Mr. Mick Lynch
American Hydrogeology Corporation
6860 Sprinkle Road
Portage, MI 49002

Project General Signal #69025

Received by ATS 4/10/92

Sample I.D. / Sample Date

Parameter	Units		S-01 4/8/92	S-02 4/8/92	S-03A 4/8/92	S-03B 4/8/92	S-04A 4/8/92	S-04B 4/8/92
Aroclor 1221	mg/Kg		<0.05	<0.05	<5	<0.5	<0.5	<0.05
Aroclor 1232	mg/Kg		<0.005	<0.005	<0.5	<0.05	<0.05	<0.005
Aroclor 1242	mg/Kg		<0.005	<0.005	<0.5	<0.05	<0.05	<0.005
Aroclor 1248	mg/Kg		<0.005	<0.005	<0.5	<0.05	<0.05	<0.005
Aroclor 1254	mg/Kg		<0.005	<0.005	<0.5	<0.05	<0.05	<0.005
Aroclor 1260	mg/Kg		0.11	<0.005	<0.5	<0.05	<0.05	0.007
Total PCB	mg/Kg		0.11	<0.1	<10	<1	<1	0.007

Note: Units are expressed on a dry weight basis.

RECEIVED JUN 17 1992

GROUNDWATER REMEDIAL ACTION PLAN

General Signal Corporation/Benteler Industries

9000 East Michigan Avenue

Galesburg, Michigan

Prepared By:
American Hydrogeology Corporation
6869 Sprinkle Road
Kalamazoo, Michigan

May, 1993

AMERICAN HYDROGEOLOGY CORPORATION

Environmental Consulting Services

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6869 Sprinkle Road
Portage, Michigan 49002
(616) 329-1600
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100 Aniline Avenue
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June 2, 1993

Mr. James Innes
Michigan Department of Natural Resources
Environmental Response Division
District 12 Headquarters
1342 B M-89
Plainwell, MI 49080

Re: Groundwater Remedial Action Plan; General Signal Corporation/Benteler Industries, 9000 East Michigan Avenue, Galesburg, Michigan

Dear Mr. Innes:

Enclosed is a copy of the Remedial Action Plan prepared for the above referenced site. Please feel free to call the undersigned if you have any questions or comments.

Very truly yours,

AMERICAN HYDROGEOLOGY CORPORATION

Linda G. Jones
Project Manager

Patrick M. Lynch
General Manager

LGJ/pak/24-1136

Enclosures

cc: Mr. Dan McGrade, General Signal Corporation

recycled paper

AHC

Groundwater Remedial Action Plan
General Signal Corporation/Benteler Industries
9000 East Michigan Avenue
Galesburg, Michigan

May 1993

AMERICAN HYDROGEOLOGY CORP.

Groundwater Remedial Action Plan
General Signal Corporation/Benteler Industries
9000 East Michigan Avenue
Galesburg, Michigan

Prepared for:

General Signal Corporation
High Ridge Park
Box 10010
Stamford, CT 06904

Prepared by:

American Hydrogeology Corporation
6869 Sprinkle Road
Portage, MI 49002

May 1993

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Appendix F - Preliminary Operations and Maintenance Manual
Appendix G - Proposed Air Stripper Schematic
Appendix H - AHC Monitor Well Sampling Protocol

1.00 INTRODUCTION

This Remedial Action Plan provides the status of the environmental investigation at 9000 East Michigan Avenue, Galesburg, Michigan and sets forth the procedures and implementation schedule to be followed in remediation of the groundwater contamination plume located south of the building at the project site. This Remedial Action Plan was prepared in accordance with Act 307 of 1982 as amended, and regulations under the act.

Figure 1 shows the site location. 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 is presently open. Immediately south of the plant buildings, the land consists of unfarmed fields. Farther to the south, nearer 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.

2.00 BACKGROUND

Hydrogeologic investigation at the facility was initiated in 1987 after Hydreco personnel discovered that the soil in the vicinity of a former underground storage tank (UST) south of the plant building contained oil residues. The former UST had reportedly been used to store waste oil. Refer to Figure 2 for its location. Laboratory analyses of soil collected at the base of the excavation subsequent to tank removal indicated the presence of methylene chloride, cis-1,2-dichloroethene, trichloroethene, tetrachloroethene, ethylbenzene, toluene and xylene.

In response to this finding, Keck Consulting Services, Inc. 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 Consulting Services, Inc., dated April 4, 1988, and titled "Report of Hydrogeologic Investigation, Hydreco Manufacturing Galesburg Facility, Section 23, Comstock Township, Kalamazoo County, Michigan".

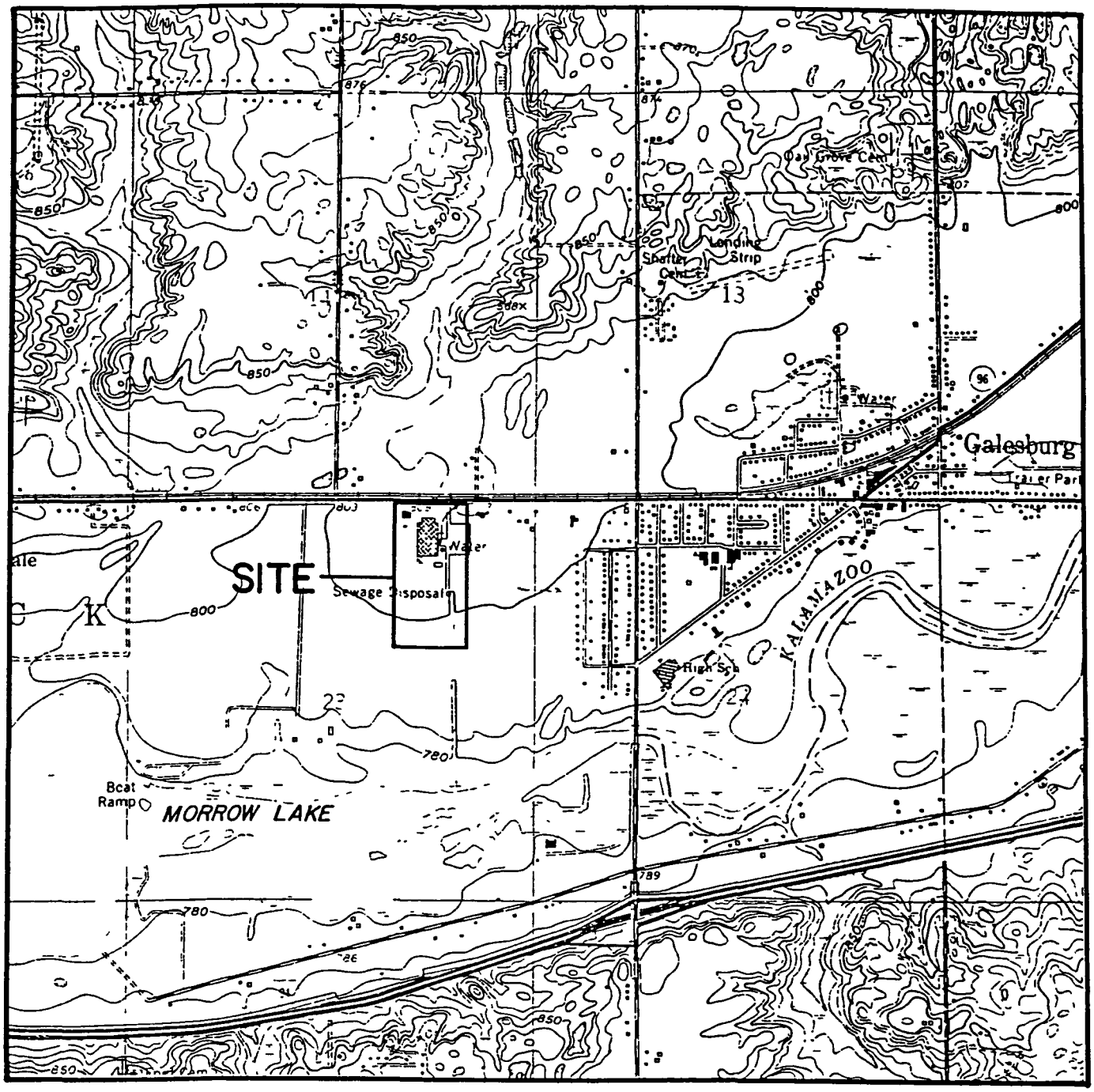
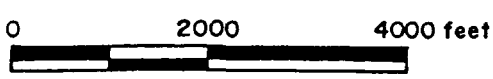


FIGURE I

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

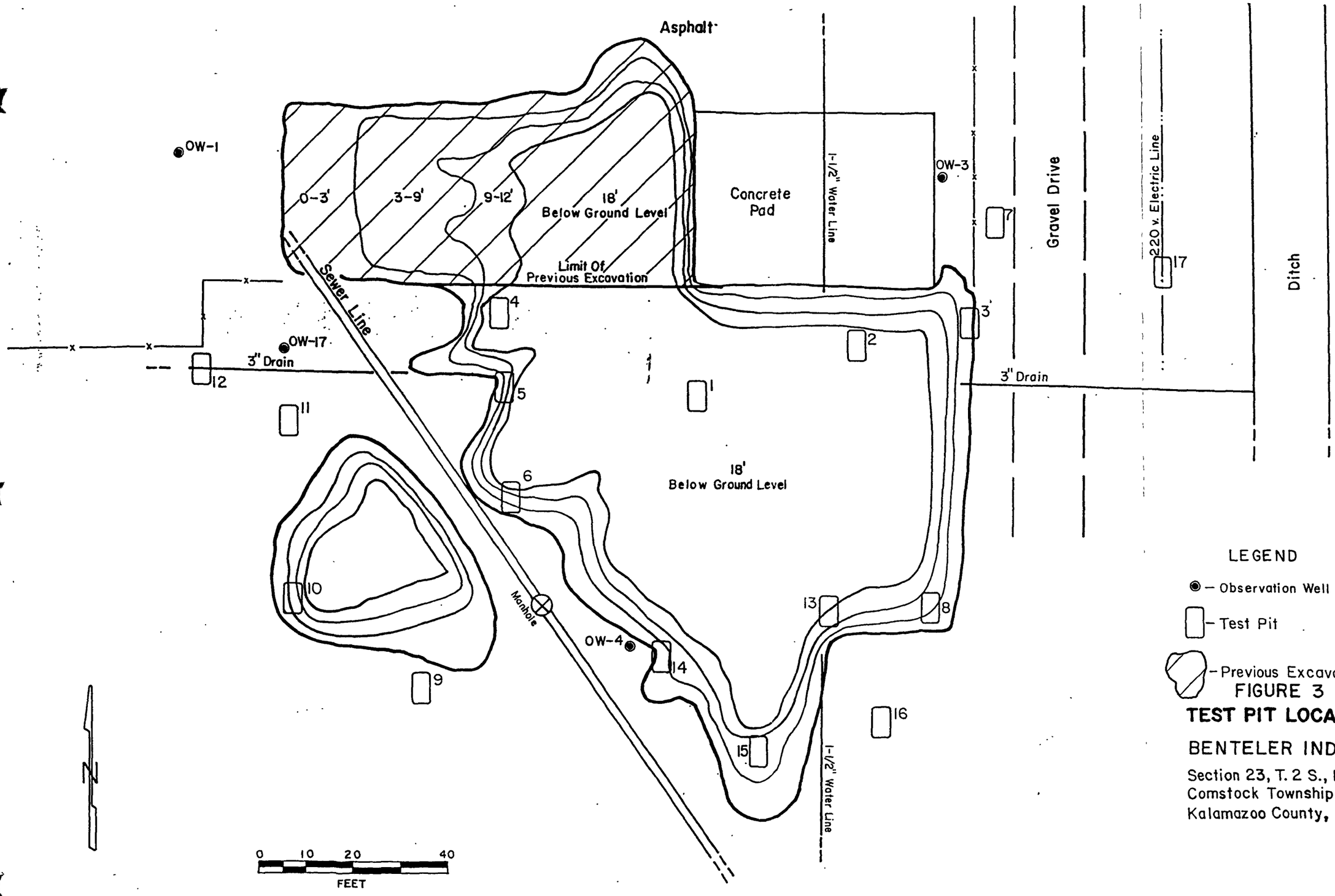
WEC 6/19/91 AHC

Keck installed test pits around the initial excavation area, collected soil samples, and installed a temporary monitor well at the base of the excavation. Refer to Figures 3 and 4 for the limits of the excavation and test pit and sampling locations. Based on the soil sampling results from the test pits, additional remediation was conducted. Keck and its successor company Hunter/Keck reported excavating about 5,145 cubic yards of soil between November 1988 and January 1989. The excavation map (Figure 3) indicates that the excavation extended to a depth of about 18 feet below ground level (bgl) over most of its area, and that a small area near a sewage line was not excavated.

The analytical results for the groundwater sample collected from the temporary monitor well indicated that the groundwater at the site had detectable concentrations of methylene chloride, cis-1,2-dichloroethene, trichloroethene, tetrachloroethene, ethylbenzene, toluene and xylene. These compounds had all been detected in soil beneath the former UST, in addition to trans-1,2-dichloroethene and vinyl chloride. Based on this information, additional investigations were conducted.

Twenty-seven monitor wells were installed at varying depths across the site in order to measure groundwater potentials and to evaluate groundwater flow direction, aquifer thickness and water quality. Appendix A presents the soil boring logs and monitor well construction details. Monitor well locations are shown on Figure 2. Groundwater flow was determined to be generally south toward Morrow Lake located approximately 3,100 feet south of the plant building. Keck's investigation indicated that a plume containing volatile organic compounds extended approximately 1,300 feet 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).

Groundwater samples were collected from the two plant supply wells at the site as part of Keck's hydrogeologic investigation. These wells are designated as the North Supply Well and South Supply Well and are believed to extend to approximately 63 feet below ground level (bgl). The locations of these wells are shown on Figure 2. Groundwater samples collected from these wells



LEGEND

◉ – Observation Well

▯ – Test Pit

– Previous Excavation

FIGURE 3

TEST PIT LOCATION MAP

BENTELER INDUSTRIES, INC.

Section 23, T. 2 S., R. 10 W.
Comstock Township
Kalamazoo County, Michigan

Map Compiled From Field Notes

8407

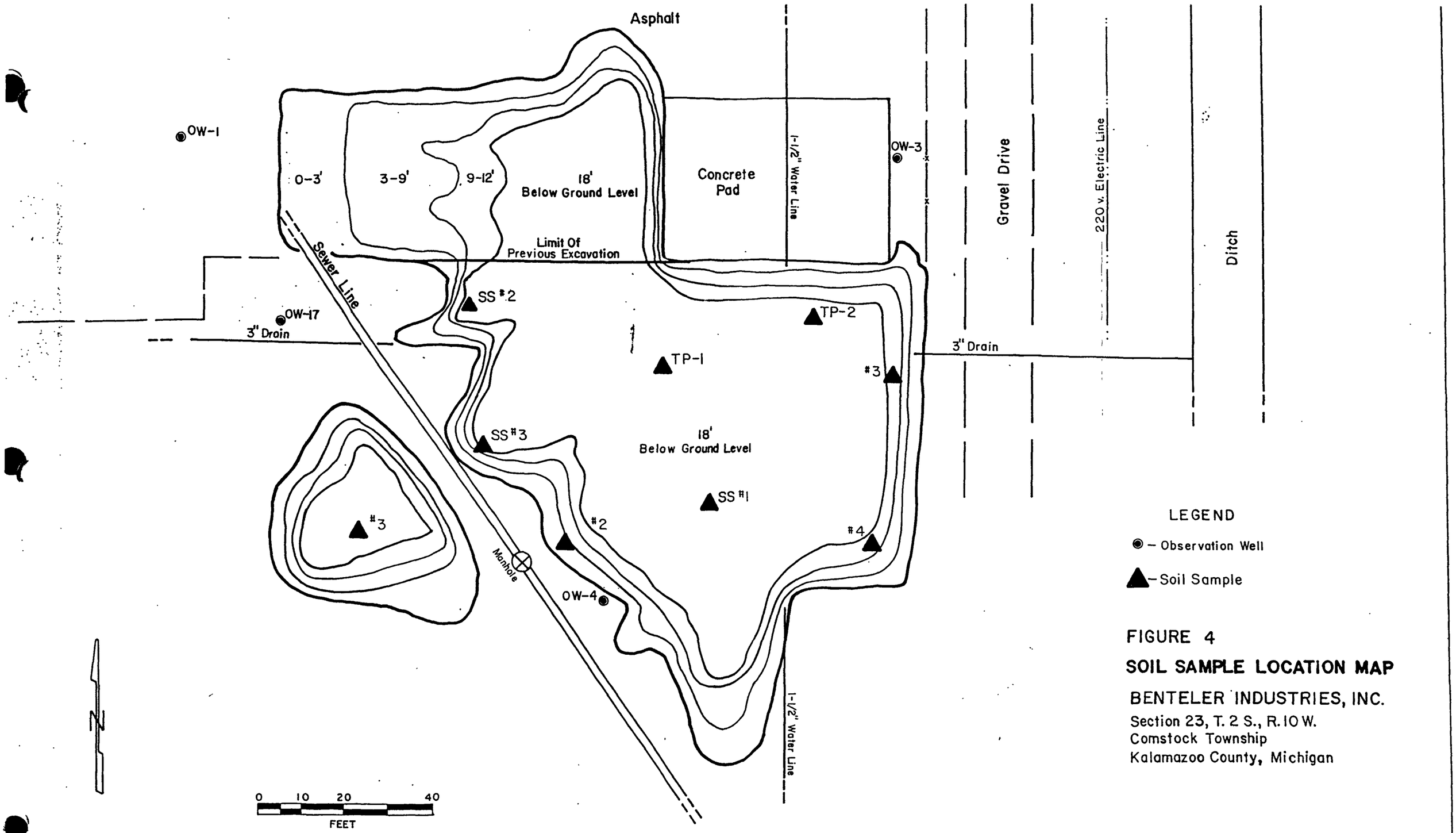


FIGURE 4

SOIL SAMPLE LOCATION MAP

BENTELER INDUSTRIES, INC.

Section 23, T. 2 S., R. 10 W.
Comstock Township
Kalamazoo County, Michigan

Map Compiled From Field Notes

B406

in March 1987 and analyzed for volatile organics indicated no detectable concentrations in either sample.

Two off-site water supply wells are located to the west of the site at River Oaks County Park. One well is located approximately 1,500 feet west of the site along Michigan Avenue (highway M-96). The well log for this well (No. 11 in Appendix B) shows it to be screened in a stratigraphic unit below the affected aquifer. The second well is located near the west side of the site, approximately 37 feet west southwest of MW-13s and d. There is no well log available for this well. Testing of the groundwater from the park supply wells in the 1980's for VOCs did not indicate detectable concentrations of these compounds. Review of the Kalamazoo County Health Department files indicates no testing results from these wells since 1982. Laboratory testing of groundwater from monitor well MW-13s has historically indicated no detectable concentrations of volatile organic compounds. Monitor well MW-13d has indicated no detectable concentrations since July 1991.

In addition to the above tasks, Keck installed a 4-inch diameter test/purge well, designated PW-A. The test purge well is screened between 32 and 42 feet below ground level (bgl). The log for PW-A is included in Appendix A. Its location is shown on Figure 2.

In 1989, General Signal Corporation retained American Hydrogeology Corporation (AHC) to continue efforts toward site remediation. AHC began efforts to secure an electric supply for the test purge well's operation. An electrical fire occurring within the plant building, however, resulted in a delayed installation of the electric supply. AHC's work at the site has included extended testing of PW-A, application for an NPDES discharge permit, routine monitoring of the contamination at the site, additional remediation, and preliminary design of a treatment system. These tasks are discussed in the following sections.

3.00 REGIONAL AND SITE GEOLOGY AND HYDROGEOLOGY

The study area lies approximately 2,000 to 3,000 feet north of Morrow Lake and the Kalamazoo River as shown on Figure 1. Local topography is relatively flat and slopes gently to the south and southwest. Regional topography indicates that the site lies within the confines of the

Kalamazoo River Valley. The study area is approximately 800 feet in elevation above mean sea level. The average water level of Morrow Lake is approximately 776 feet above mean sea level. Water table elevations at the site range from 783 to 786 feet above sea level.

According to the Hydrogeologic Atlas of Michigan, (Western Michigan University, 1981) the surficial sediments in the area consist of unconsolidated glacial drift between 50 and 110 feet in thickness. These surficial sediments are reportedly composed of sand and gravel deposited as glacial outwash, post-glacial alluvium and lake sediments. Domestic well logs from the area indicate soil conditions similar to those described on the on-site boring logs. However, logs from several wells located within a 3/4 mile radius of the site suggest that a lower clay unit identified at the site may dip toward the north with respect to the site. Refer to Figure 5 for approximate locations of area wells and Appendix B for the well logs. Bedrock underlying the site is identified as the Coldwater shale of Mississippian Age.

For the most part, soils at the site include a shallow clay layer averaging two to three feet in thickness underlying a sandy topsoil. In some areas, the clay contains abundant fine to medium gravel. Soils below the clay layer consist of fine to coarse sand and gravel to an average depth of approximately 40 to 43 feet bgl. Groundwater was encountered at approximately 16 to 18 feet bgl across the site. 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.

All of the deeper soil borings installed at the site encountered a dense grey clay ranging from 57 feet bgl at SB-16 to 36 feet bgl at MW-11. Table 1 summarizes the depth to clay in those borings encountering clay.

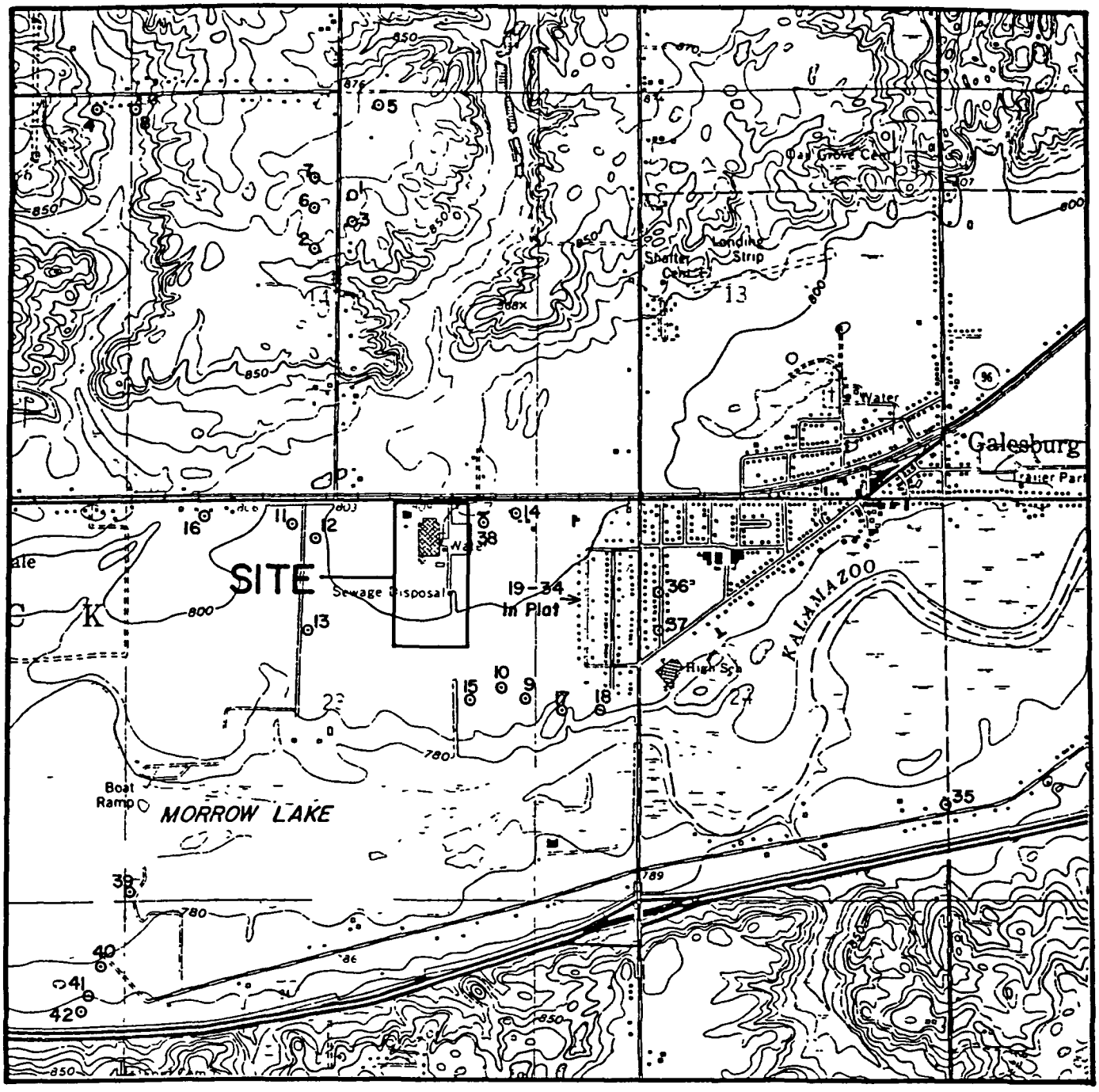
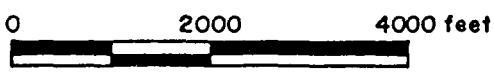


FIGURE 5

WELL LOG LOCATIONS

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

WEC 8/12/92 AHC

Table 1
Depth to Clay Summary

Well	Depth to Clay (ft)	Depth Penetrated (ft)
MW-5d	48	>2
MW-6d	48	>2
MW-7d	53	*
MW-8d	49	*
MW-9d	39	*
MW-10d	38	*
MW-11	36	*
MW-12	40	*
MW-13d	38	>1.5
MW-14d	37	>1
MW-15d	36	>1
SB-16	57	>28
MW-17	47	>6

* Clay identified but not penetrated to significant depth.

The thickness of the clay layer in the vicinity of SB-16 is greater than 28 feet. The logs also indicate that silt is present above the clay layer in areas where the clay was identified at greater depths. The clay layer on site appears to dip generally to the north and rise toward the south. The clay layer is approximately 8 feet lower at the SB-16 location compared to MW-17 located approximately 500 feet south of SB-16. The clay is 4.6 feet higher at the MW-15 location about 1,200 feet south of MW-17. Figure 6 is a top of clay surface map. A northeast to southwest stratigraphic cross section across the site is shown on Figure 7. East to west stratigraphic cross sections are shown on Figure 8.

Table 2 summarizes representative water level data measured at the site since October 1988. Figure 9 shows the most recent potentiometric surface contour map for the site dated July 7, 1992. It can be seen that, based on these data, groundwater flow direction is generally to the south. In the northern part of the study area groundwater flow is toward the southwest, while in the southern part of the study area groundwater flow is to the south. Figures 10 and 11 show

T 2
MONITOR WELL ELEVATIONAL DATA
(all measurements in feet)

Job Number: 24-1136 Job Name: General Signal Location: 9000 E. Michigan Avenue, Galesburg, Michigan

					October 8, 1988		January 8, 1991		February 22, 1991			
Well #	Ground Elevation	Casing Height	Casing * Elevation	Well Well Length	Depth * to Water	Water Table Elevation	Depth * to Water	Water Table Elevation	Depth * to Water	Water Table Elevation	Depth * to Water	Water Table Elevation
PW	801.10	4.06	805.16	-----	ND	----	ND	----	ND	----		
MW-1	ND	ND	ND	23	ND	----	ND	----	ND	----		
MW-2	804.00	-.69	803.31	24	ND	----	17.46	785.85	18.10	785.21		
MW-3	803.70	2.95	806.65	28	ND	----	20.80	785.85	21.45	785.20		
MW-4	803.60	1.74	805.34	27	21.25	784.09	19.57	785.77	20.24	785.10		
MW-5s	803.40	2.04	805.44	26	21.44	784.00	19.75	785.69	20.41	785.03		
MW-5d	803.40	2.88	806.28	51	22.26	784.02	20.58	785.70	21.25	785.03		
MW-6s	802.40	1.73	804.13	29	20.27	783.86	18.56	785.57	19.21	784.92		
MW-6d	802.40	2.66	805.06	51	21.19	783.87	19.47	785.59	20.14	784.92		
MW-7s	802.60	1.83	804.43	29	20.50	783.93	18.81	785.62	19.50	784.93		
MW-7d	802.60	2.58	805.18	56	21.26	783.92	19.56	785.62	20.26	784.92		
MW-8s	801.80	2.00	803.80	31	19.99	783.81	18.29	785.51	19.11	784.69		
MW-8d	801.80	2.24	804.04	51	20.22	783.82	18.54	785.50	19.35	784.69		
MW-9s	800.70	1.77	802.47	30	18.81	783.66	17.11	785.36	17.92	784.55		
MW-9d	800.70	2.34	803.04	39	19.37	783.67	17.69	785.35	18.48	784.56		
MW-10s	800.40	2.31	802.71	30	19.05	783.66	17.36	785.35	18.14	784.57		
MW-10d	800.40	2.56	802.96	41	19.29	783.67	17.60	785.36	18.38	784.58		
MW-11	799.60	1.93	801.53	30	17.93	783.60	16.21	785.32	16.95	784.58		
MW-12	798.70	1.67	800.37	30	17.02	783.35	15.28	785.09	15.98	784.39		
MW-13s	797.90	3.10	801.00	28	17.86	783.14	16.12	784.88	16.81	784.19		
MW-13d	797.90	2.76	800.66	41	17.53	783.13	15.80	784.86	16.48	784.18		
MW-14s	797.00	2.48	799.48	28	16.66	782.82	14.98	784.50	15.68	783.80		
MW-14d	797.00	2.23	799.23	48	16.41	782.82	14.73	784.50	15.44	783.79		
MW-15s	797.20	3.06	800.26	28	17.58	782.68	15.94	784.32	16.68	783.58		
MW-15d	797.20	2.53	799.73	39	17.07	782.66	15.42	784.31	16.15	783.58		
MW-17	803.60	2.97	806.57	47	22.47	784.10	20.80	785.77	21.45	785.12		
MW-18	801.50	2.53	804.03	38	20.23	783.80	18.55	785.48	19.48	784.55		
MW-19	801.60	2.88	804.48	38	20.67	783.81	18.99	785.49	19.89	784.59		

ND = No Data
* = from top of casing

AHC

Table 2 (Cont[illegible]d Page 2 of 3)
MONITOR WELL [illegible]VATIONAL DATA
(all measurements in feet)

Job Number: 24-1136 Job Name: General Signal Location: 9000 E. Michigan Avenue, Galesburg, Michigan

					July 1, 1991		October 2, 1991		January 22, 1992		April 13, 1992	
Well #	Ground Elevation	Casing Height	Casing * Elevation	Well Well Length	Depth * to Water	Water Table Elevation	Depth * to Water	Water Table Elevation	Depth * to Water	Water Table Elevation	Depth * to Water	Water Table Elevation
PW	801.10	4.06	805.16	-----	ND	-----	-----	-----	-----	-----	-----	-----
MW-1	ND	ND	ND	23	ND	-----	18.96	-----	17.44	-----	17.77	-----
MW-2	804.00	-.69	803.31	24	ND	-----	18.80	784.51	17.29	786.02	17.64	785.67
MW-3	803.70	2.95	806.65	28	ND	-----	22.13	784.52	20.74	785.91	20.98	785.67
MW-4	803.60	1.74	805.34	27	ND	-----	20.91	784.43	19.53	785.81	19.76	785.58
MW-5s	803.40	2.04	805.44	26	19.88	785.56	21.17	784.27	19.60	785.84	19.94	785.50
MW-5d	803.40	2.88	806.28	51	20.71	785.57	22.00	784.28	20.43	785.85	20.78	785.50
MW-6s	802.40	1.73	804.13	29	18.70	785.43	20.00	784.13	18.39	785.74	18.75	785.38
MW-6d	802.40	2.66	805.06	51	19.62	785.44	20.92	784.14	19.32	785.74	19.67	785.39
MW-7s	802.60	1.83	804.43	29	18.88	785.55	20.23	784.20	18.66	785.77	19.00	785.43
MW-7d	802.60	2.58	805.18	56	19.63	785.55	20.98	784.20	19.41	785.77	19.76	785.42
MW-8s	801.80	2.00	803.80	31	18.41	785.39	19.74	784.06	18.17	785.63	18.51	785.29
MW-8d	801.80	2.24	804.04	51	18.64	785.40	19.97	784.07	18.45	785.59	18.75	785.29
MW-9s	800.70	1.77	802.47	30	17.27	785.20	18.56	783.91	17.03	785.44	17.34	785.13
MW-9d	800.70	2.34	803.04	39	17.83	785.21	19.13	783.91	17.59	785.45	17.91	785.13
MW-10s	800.40	2.31	802.71	30	18.51	784.20	18.81	783.90	17.29	785.42	17.63	785.08
MW-10d	800.40	2.56	802.96	41	17.75	785.21	19.06	783.90	17.55	785.41	17.86	785.10
MW-11	799.60	1.93	801.53	30	ND	-----	17.71	783.82	16.15	785.38	16.45	785.08
MW-12	798.70	1.67	800.37	30	ND	-----	16.82	783.55	15.23	785.14	15.54	784.83
MW-13s	797.90	3.10	801.00	28	16.50	784.50	17.72	783.28	16.09	784.91	16.40	784.60
MW-13d	797.90	2.76	800.66	41	16.17	784.49	17.39	783.27	15.77	784.89	16.08	784.58
MW-14s	797.00	2.48	799.48	28	15.45	784.03	16.57	782.91	15.00	784.48	15.29	784.19
MW-14d	797.00	2.23	799.23	48	15.19	784.04	16.32	782.91	14.76	784.47	15.05	784.18
MW-15s	797.20	3.06	800.26	28	16.44	783.82	17.52	782.74	16.01	784.25	16.28	783.98
MW-15d	797.20	2.53	799.73	39	15.91	783.82	17.00	782.73	15.48	784.25	15.76	783.97
MW-17	803.60	2.97	806.57	47	ND	-----	22.26	784.31	20.65	785.92	20.98	785.59
MW-18	801.50	2.53	804.03	38	ND	-----	19.98	784.05	18.45	785.58	18.77	785.26
MW-19	801.60	2.88	804.48	38	ND	-----	20.41	784.07	18.89	785.59	19.21	785.27

ND = No Data
* = from top of casing

AHC

Table 2 (Cont[illegible]d Page 3 of 3)
MONITOR WELL [illegible]EVATIONAL DATA
(all measurements in feet)

Job Number: 24-1136 Job Name: General Signal Location: 9000 E. Michigan Avenue, Galesburg, Michigan

					July 7, 1992							
Well #	Ground Elevation	Casing Height	Casing * Elevation	Well Well Length	Depth * to Water	Water Table Elevation	Depth * to Water	Water Table Elevation	Depth * to Water	Water Table Elevation	Depth * to Water	Water Table Elevation
MW-1	803.80		803.48	23	18.39	785.09						
MW-2	804.00	-.69	803.31	24	18.32	784.99						
MW-3	803.70	2.95	806.65	28	21.72	784.93						
MW-4	803.60	1.74	805.34	27	20.38	784.96						
MW-5s	803.40	2.04	805.44	26	20.51	784.93						
MW-5d	803.40	2.88	806.28	51	21.34	784.94						
MW-6s	802.40	1.73	804.13	29	19.27	784.86						
MW-6d	802.40	2.66	805.06	51	20.20	784.86						
MW-7s	802.60	1.83	804.43	29	19.54	784.89						
MW-7d	802.60	2.58	805.18	56	20.29	784.89						
MW-8s	801.80	2.00	803.80	31	18.97	784.83						
MW-8d	801.80	2.24	804.04	51	19.22	784.82						
MW-9s	800.70	1.77	802.47	30	17.76	784.71						
MW-9d	800.70	2.34	803.04	39	18.32	784.72						
MW-10s	800.40	2.31	802.71	30	17.94	784.77						
MW-10d	800.40	2.56	802.96	41	18.19	784.77						
MW-11	799.60	1.93	801.53	30	16.92	784.61						
MW-12	798.70	1.67	800.37	30	16.05	784.32						
MW-13s	797.90	3.10	801.00	28	16.96	784.04						
MW-13d	797.90	2.76	800.66	41	16.63	784.03						
MW-14s	797.00	2.48	799.48	28	15.84	783.64						
MW-14d	797.00	2.23	799.23	48	15.59	783.64						
MW-15s	797.20	3.06	800.26	28	16.80	783.46						
MW-15d	797.20	2.53	799.73	39	16.27	783.46						
MW-17	803.60	2.97	806.57	47	21.60	784.97						
MW-18	801.50	2.53	804.03	38	19.20	784.83						
MW-19	801.60	2.88	804.48	38	19.64	784.84						
PW-A	801.40	4.06	805.16									

ND = No Data
* = from top of casing

AHC

groundwater flow based on groundwater potentials measured in October 1988 and January 8, 1991, respectively. Based on these data, groundwater flow for both dates is generally consistent with the July 1992 data. Note, however, that the hydraulic gradient in the northern part of the site is somewhat steeper in both 1988 and 1991, compared to July 1992.

Using the data collected on July 7, 1992, the potentiometric surface has a hydraulic gradient of 0.0006 feet/foot in the northern portion of the study area and a gradient of 0.002 feet/foot in the southern portion of the site. Part of the increase in hydraulic gradient to the south is attributable to a decrease in aquifer thickness. The saturated portion of the sand and gravel unit is about 30 feet thick in the vicinity of MWs 6d and 7d and about 23 or 24 feet thick in the vicinity of MWs 14d and 15d. There might also be a decrease in hydraulic conductivity of the aquifer material in the southern part of the site which could account for the remainder of the increase in hydraulic gradient.

4.00 QUARTERLY GROUNDWATER MONITORING PROGRAM

A quarterly sampling program was initiated in July 1991. Results have been submitted to the MDNR on a regular basis. Prior to the quarterly sampling program, a set of groundwater samples had been collected in October 1987 and again in October 1990. The most recent Status Report was submitted to the MDNR on April 12, 1993 Groundwater samples have been analyzed via EPA Methods 601 (purgeable halocarbons) and 602 (purgeable aromatics) by Ann Arbor Technical Services (ATS).

Refer to Table 3 for a historical summary of the analytical data from major sampling events. Selected computer plots are included as Appendix B showing time versus concentration of total volatile organics. The VOC concentrations from the January and April 1992 sampling rounds are presented on Figure 12. The VOC concentrations appear to decrease in monitor wells close to the area of the former UST. Total VOC concentrations in two wells (MW-1 and MW-2) have declined from about 2.2 to 0.79 mg/l and 0.57 to 0.18 mg/l, respectively. Farther downgradient, at the MW-9s and MW-15s locations, total VOC concentrations have declined less dramatically, from 0.057 to 0.038 mg/l and from 0.075 to 0.013 mg/l, respectively. This

Table 3
Historical Summary of Groundwater Analyses
General Signal Corporation
9000 East Michigan Avenue
Galesburg, Michigan

COMPOUND (mg/L)	MW-1	MW-2	MW-3	MW-4	MW-5S	MW-5D	MW-6S	MW-6D	MW-7S	MW-7D	MW-8S	MW-8D	MW-9S	MW-9D	MW-10S	MW-10D	MW-11	MW-12	MW-13S	MW-13D	MW-14S	MW-14D	MW-15S	MW-15D	MW-17	MW-18	MW-19
10/87								NS		NS															WELLS NOT INSTALLED		
C+t-1,2-DCE	0.017	0.1	ND	ND	ND	ND	ND		0.004		0.003	0.002	0.024	0.002	ND	ND	0.004	0.001	ND	ND	ND	ND	0.009	0.004			
PCE	2.1	0.42	0.001	ND	0.001	ND	ND		ND		0.071	0.07	0.031	0.039	0.002	ND	0.002	0.002	ND	ND	0.001	0.001	0.062	0.068			
TCE	0.019	0.048	ND	ND	ND	ND	ND		0.002		0.002	0.008	0.002	0.002	ND	ND	0.017	0.001	ND	ND	0.002	0.002	0.003	0.006			
VC	ND	ND	ND	ND	ND	ND	ND		ND		ND	ND	ND	ND	ND	ND	ND	0.002	ND	ND	ND	ND	ND	ND			
1,1-DCA	0.002	ND	ND	ND	ND	ND	ND		ND		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
1,1,1-TCA	0.03	ND	ND	ND	ND	ND	ND		ND		0.001	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.001	0.001			
EB	ND	ND	ND	0.006	ND	ND	ND		ND		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
total:	2.168	0.568	0.001	0.006	0.001				0.006		0.077	0.08	0.057	0.043	0.002		0.023	0.006			0.003	0.003	0.075	0.079			
10/90	NS																										
C+t-1,2-DCE		0.11	ND	ND	ND	ND	ND	ND	0.001	0.001	0.001	0.001	0.004	ND	ND	ND	0.001	ND	ND	ND	ND	0.001	ND	0.001	ND	0.001	0.001
PCE		0.11	0.002	ND	ND	ND	ND	ND	0.001	0.001	0.053	0.034	0.027	0.037	0.003	0.002	0.001	0.002	ND	0.001	0.001	0.001	0.024	0.03	0.003	0.027	0.024
TCE		0.012	ND	ND	ND	ND	ND	ND	0.001	0.001	0.001	0.005	0.002	0.002	ND	ND	0.009	0.001	ND	0.001	0.001	0.002	0.003	0.004	0.002	0.001	0.001
VC		ND	0.001	0.003	ND	ND	ND	ND	ND	ND	0.001	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-DCA		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-TCA		ND	ND	ND	ND	ND	ND	ND	ND	ND	0.001	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND
EB		ND	ND	0.001	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.001	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
total:		0.232	0.003	0.004					0.003	0.003	0.057	0.04	0.033	0.039	0.004	0.002	0.011	0.003		0.002	0.002	0.004	0.027	0.035	0.005	0.029	0.02

Notes: ND = None Detected
NS = Not Sampled
Refer to ATS Laboratory reports for detection Limits

Table 3 (Page 2)
Historical Summary of Groundwater Analyses
General Signal Corporation
9000 East Michigan Avenue
Galesburg, Michigan

COMPOUND (mg/L)	MW-1	MW-2	MW-3	MW-4	MW-5S	MW-5D	MW-6S	MW-6D	MW-7S	MW-7D	MW-8S	MW-8D	MW-9S	MW-9D	MW-10S	MW-10D	MW-11	MW-12	MW-13S	MW-13D	MW-14S	MW-14D	MW-15S	MW-15D	MW-17	MW-18	MW-19
7/91																											
C+t-1,2-DCE	0.014	0.07	ND	0.12	ND	ND	ND	ND	0.001	ND	ND	ND	ND	ND	0.002	ND	0.001	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.001
PCE	0.69	0.11	0.001	ND	ND	ND	ND	ND	0.001	0.001	0.037	0.03	0.039	0.037	0.001	0.001	ND	0.001	ND	ND	ND	ND	0.025	0.023	ND	0.045	0.045
TCE	0.014	0.013	0.001	ND	ND	ND	ND	ND	0.001	0.001	0.001	0.004	0.001	0.002	ND	ND	0.007	ND	ND	ND	ND	0.002	0.002	0.003	0.001	0.001	0.001
VC	ND	ND	ND	0.045	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-DCA	ND	ND	ND	0.001	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-TCA	0.006	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EB	ND	ND	ND	0.006	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	ND	ND	ND	0.003	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
total:	0.724	0.193	0.002	0.175					0.003	0.002	0.038	0.034	0.04	0.039	0.003	0.001	0.008	0.001				0.002	0.027	0.026	0.001	0.046	0.047
10/91																											
C+t-1,2-DCE	0.012	0.32	ND	0.74	ND	ND	ND	ND	ND	ND	ND	ND	0.005	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.005	0.008
PCE	1.3	0.17	0.002	ND	ND	ND	ND	ND	0.003	0.003	0.022	0.02	0.062	0.066	0 005	0.003	0.002	0.004	ND	ND	0.002	0.002	0.012	0.013	ND	0.043	0.064
TCE	0.011	0.007	ND	ND	ND	ND	ND	ND	0.001	0.001	ND	0.003	0.002	0.003	ND	ND	0.005	0.001	ND	ND	0.001	0.002	0.002	0.002	0.001	0.002	.002
VC	ND	ND	ND	0.22	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.001
1,1-DCA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-TCA	0.009	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.001	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.001	0.001
EB	ND	ND	ND	0.015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	ND	ND	ND	0.017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	0.001	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	0.002	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.001	0.001	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.001	0.002
total:	1.332	0.497	0.003	0.994					0.004	0.004	0.022	0.023	0.071	0.075	0.005	0.003	0.007	0.005			0.003	0.004	0.014	0.015	0.001	0.052	0.078

Notes: ND = None Detected
NS = Not Sampled

Table 3 (Page 3)
Historical Summary of Groundwater Analyses
General Signal Corporation
9000 East Michigan Avenue
Galesburg, Michigan

COMPOUND (mg/L)	MW-1	MW-2	MW-3	MW-4	MW-5S	MW-5D	MW-6S	MW-6D	MW-7S	MW-7D	MW-8S	MW-8D	MW-9S	MW-9D	MW-10S	MW-10D	MW-11	MW-12	MW-13S	MW-13D	MW-14S	MW-14D	MW-15S	MW-15D	MW-17	MW-18	MW-19
1/92																											
C+t-1,2-DCE	0.004	0.059	ND	0.06	ND	ND	ND	ND	ND	ND	ND	ND	0.002	0.001	0.002	ND	ND	ND	ND	ND	ND	0.001	ND	ND	ND	0.001	0.001
PCE	0.74	0.062	0.001	ND	ND	ND	ND	ND	0.001	0.001	0.041	0.024	0.043	0.048	0.004	0.003	0.002	0.002	ND	ND	0.002	0.001	0.015	0.022	ND	0.055	.051
TCE	0.006	0.006	ND	ND	ND	ND	ND	ND	0.001	0.001	0.001	0.003	0.002	0.002	ND	ND	0.007	ND	ND	ND	0.001	0.002	0.002	0.003	0.001	0.001	0.001
VC	ND	ND	ND	0.16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.001	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-DCA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-TCA	0.003	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EB	ND	ND	ND	0.006	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	ND	ND	ND	0.028	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	0.002	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.002	0.001	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
total:	0.753	0.127	0.001	0.256					0.002	0.002	0.042	0.027	0.047	0.051	0.009	0.004	0.009	0.002			0.003	0.004	0.017	0.025	0.001	0.057	0.053
4/92																											
C+t-1,2-DCE	ND	0.11	ND	0.002	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.005	ND	ND	ND	ND	ND	ND	0.001	ND	ND	ND	ND	ND
PCE	0.78	0.068	0.002	ND	ND	ND	ND	ND	0.002	0.002	0.029	0.028	0.037	0.032	0.004	0.002	0.002	0.003	ND	ND	0.002	ND	0.011	0.015	ND	0.036	0.039
TCE	0.006	0.007	0.001	ND	ND	ND	ND	ND	0.001	0.001	0.001	0.004	0.001	0.002	ND	ND	0.005	0.001	ND	ND	0.001	0.003	0.002	0.003	0.001	0.001	0.001
VC	ND	ND	ND	0.016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.002	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EB	ND	ND	ND	0.006	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	ND	ND	ND	0.032	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	0.001	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.001	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
total:	0.786	0.185	0.003	0.057					0.003	0.003	0.03	0.032	0.038	0.034	0.012	0.002	0.007	0.004			0.003	0.004	0.013	0.018	0.001	0.037	0.04

Notes: ND = None Detected
NS = Not Sampled
Refer to ATS Laboratory reports for detection Limits

ATC

decrease is attributed to the source remediation taking place during 1988 and 1989. The above mentioned wells are all along the plume's central axis. Along the plume's western edge, concentrations of total VOCs have generally remained low. MWs 5s, 6s, and 15s have generally shown no detectable concentrations, while monitor wells MW-7s, 12, and 14s continue to show low concentrations of total VOCs (up to 0.006 mg/l). Along the plume's eastern edge, total VOC concentrations have tended to increase. At MW-4, total VOCs were low at the beginning of the study in 1987 (0.004 to 0.006 mg/l). Since that time, they have risen to as much as 0.994 mg/l before declining to their most recent level of 0.057 mg/l. Similarly, at MW-10s, a total VOC concentration of 0.002 mg/l in 1987 has increased to 0.012 mg/l in the most recent sampling. Figure 13 shows an isoconcentration contour plot for total VOCs in April 1992.

5.00 ADDITIONAL REMEDIATION

Between August 1992 and February 1993, AHC personnel conducted additional remediation to the northwest of the historic UST area in the vicinity of the loading dock. Organic compounds were discovered in soils in this area. At the conclusion of the excavation activity, soil samples were collected and submitted to KAR Laboratories, Inc. for analysis. AHC plans to discuss this remediation activity more fully upon completion of additional investigation in this area.

6.00 EXTENDED EFFLUENT CHARACTERIZATION

AHC prepared a report entitled "Status Report Extended Effluent Characterization" dated June 21, 1991. The purpose of that report was to document work performed by AHC to bring the test purge well into operation, to present the results of the remedial investigation and to present the results of the extended effluent characterization. The baseline characterization sampling and effluent characterization were necessary for the design of the on site treatment system outlined in Section 6.30 below. The results of that 1991 status report are summarized in this section.

6.10 Aquifer Performance Testing

An evaluation of the effect of pumpage from PW-A on the plume capture was addressed in this study. Prior to initiating the aquifer performance test, it was necessary for AHC to secure an electric supply for the purge well, repair the pump, collect effluent characteristic samples for laboratory analyses prior to discharge, obtain permission for a temporary discharge from the

City of Kalamazoo (Administrative Order), and perform effluent characterization as well as routine groundwater quality monitoring.

6.11 Electric Supply

Efforts by AHC to secure a permanent electric supply began in May 1989. Benteler plant management had agreed to allow General Signal Corporation to connect a separately metered electric service to their plant to power the purge well. A fire within the plant, however, delayed the installation. Electric power was furnished in September 1990.

6.12 Groundwater Monitoring

In early October 1990 a set of groundwater samples was collected from the monitor wells at the site. All wells were sampled except MW-1 which was temporarily inaccessible. Samples were submitted to Ann Arbor Technical Services (ATS) for analyses of parameters set forth in USEPA methods 601 and 602 plus xylene. The results are included in the summary presented on Table 3.

6.13 Discharge Authorization

Once the power was connected, a short term test was conducted on October 22, 1990 during which 1,500 gallons of effluent were pumped from the well to a portable holding tank provided by AHC. A groundwater sample was collected for characterization. After receipt of the laboratory analyses and receiving permission to discharge into the sanitary sewer, the testing was begun.

6.20 Extended Effluent Testing

A period of extended effluent testing took place between January 8, 1991 and February 22, 1991. The purge well PW-A was pumped at an average rate of 93.2 gallons per minute. The purpose of this extended effluent characterization was to collect data pertinent to the design of an on-site treatment system capable of effectively treating the groundwater from the VOC plume and to begin operation of the on-site purge well (PW-A). Water quality samples were

periodically collected during the test and sent to Ann Arbor Technical Services, Inc. for baseline characterization analyses. The results of the analyses are presented as Appendix E.

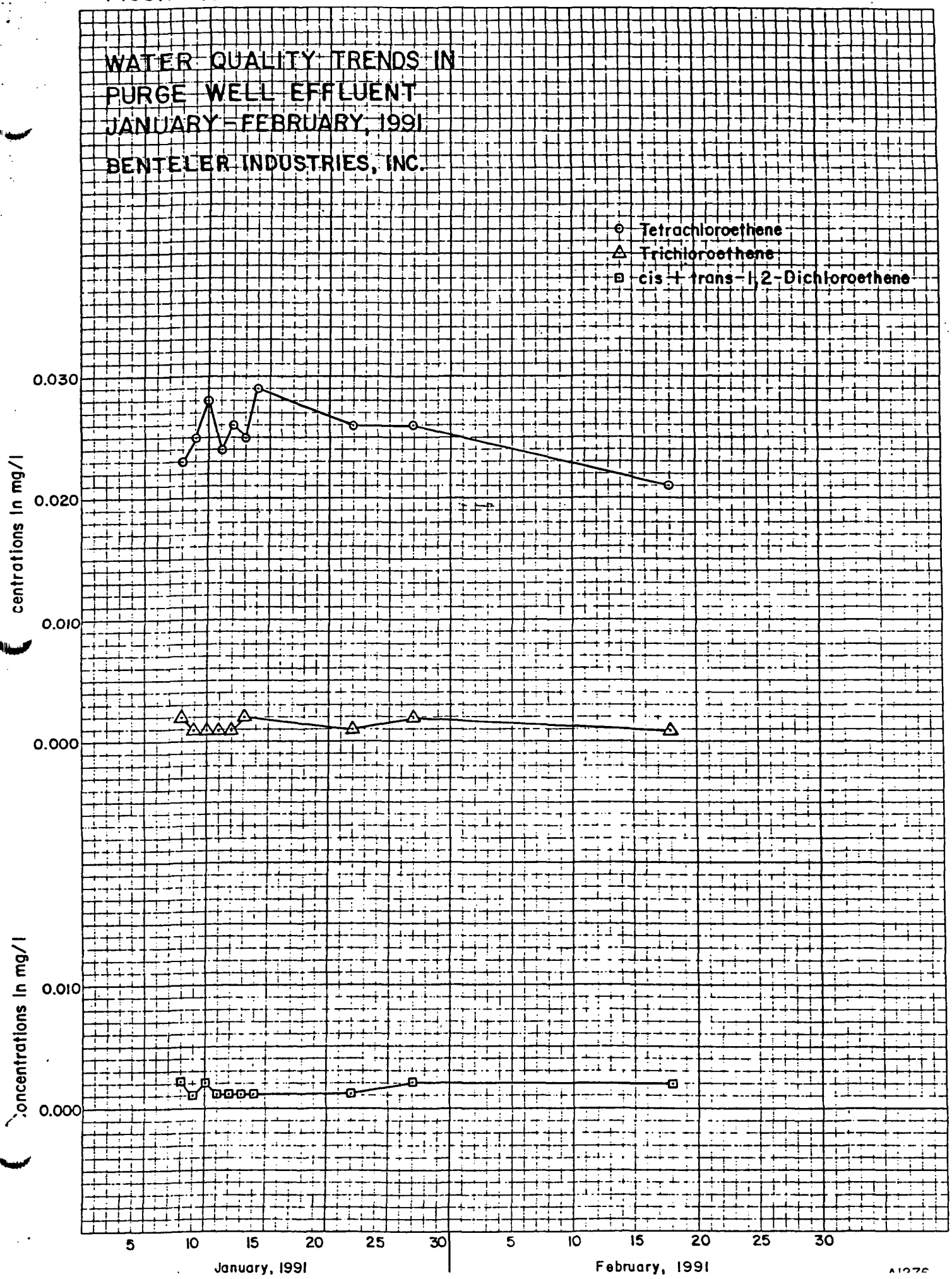
Figure 11 shows the potentiometric surface immediately prior to the extended effluent testing. It has previously been noted that the flow direction is similar to that reported for other sampling dates at the site (refer to Section 4.00). In the northern portion of the study area, groundwater flow is to the southwest at a hydraulic gradient of 0.00078 feet/foot. In the southern portion of the study area, groundwater flow changes to the south at a hydraulic gradient of 0.0016 feet/foot.

Figure 14 shows the potentiometric surface and estimated capture zone after 44 days of pumping. Based on the results of aquifer performance testing at the site, the purge well, when pumping at a rate of 93.2 gallons per minute, appears to have a capture zone about 450 feet wide 100 feet north of the purge well. Groundwater flow from the former UST area located south of the building can be intercepted by operation of the purge well.

Static water levels in the on-site monitoring wells were measured on several occasions prior to and after the aquifer performance test. Those data are presented with the test data in Appendix D.

During the period of extended pumping, water quality samples were collected from the purge well for the analysis of USEPA Methods 601 and 602 parameters plus xylenes. Only three constituents, tetrachloroethene (PCE), trichloroethene (TCE) and cis + trans-1,2-dichloroethene (DCE) were detected in the purge water. All the concentrations remained relatively constant during the test, demonstrating that the purge well had reached equilibrium by the time the baseline sample was collected. Figure 15 summarizes the time-trend data for these three parameters. It can be seen that the PCE concentration held relatively constant, remaining between 0.020 and 0.030 mg/L during the test period. TCE and DCE concentrations have also remained relatively constant, between 0.001 and 0.002 mg/L.

FIGURE 15


WATER QUALITY TRENDS IN
PURGE WELL EFFLUENT
JANUARY-FEBRUARY, 1991
BENTELER INDUSTRIES, INC.
Tetrachloroethene
Trichloroethene
cis + trans-1,2-Dichloroethene
0.030
0.020
0.010
0.000
centrations in mg/l
0.010
0.000
oncentrations in mg/l
5
10
15
20
25
30
5
10
15
20
25
30
January, 1991
February, 1991

These data indicate that the purge well had reached equilibrium by the time the baseline sample was collected. Therefore, the data can be used to reliably estimate treatment costs.

6.30 Baseline Characterization

The baseline sample was analyzed for six classes of constituents:

- Minerals
- Nutrients
- Carbonaceous Oxygen Demand
- Toxic Transition Metals
- Toxic Purgeable Organics
- Toxic Extractable Organics

Results of the analysis indicate that the mineral content of the purge water is considered moderate and should not constitute a barrier to obtaining either a surface water, groundwater, or POTW discharge permit.

Nutrient and carbonaceous demand levels are considered low. Consequently, the potential for complications due to biological fouling is small. Similarly, the low concentration in these two classes indicate that the potential for bio-stimulation in the water body receiving the discharge is minimal.

The transition metal content of the purge water is low with the exception of cadmium and zinc which should present no obstacle to either surface water or groundwater discharge. However, cadmium and zinc concentrations are slightly elevated which could be attributed to well construction materials. If the zinc and cadmium levels are attributable to the galvanized steel casing, then the concentrations should decrease over time. This will have to be addressed with continued monitoring upon operation of the system.

Except for those compounds listed in Section 6.20, no purgeable organics were detected in the effluent from PW-A. No extractable organic compounds were detected in the purge water sample.

7.00 REMEDIAL ACTION PLAN

7.10 Proposed Remedial System

Based upon the results of the extended effluent characterization and baseline treatability study (Section 6.00), it appears that air stripping will be the most cost effective remedial technology for the site. The baseline organics data suggests high efficiency air stripping as the treatment technology, particularly if the purge system will be operated to pump greater than 90 gpm. The low iron content would permit aqueous carbon absorption for treatment but the moderate levels of hardness and alkalinity might cause binding of the carbon media before its capacity is fully used. Consequently, carbon treatment compared to air stripping would be more expensive given the contaminant concentrations and purge system flow rates. It is unlikely that any other currently available treatment method will be able to approach the cost/benefit ratio of air stripping for this particular waste stream.

Since this treatment option will necessitate the disposal of the treated groundwater, an NPDES permit was submitted to the MDNR Surface Water Division in February 1992 to discharge treated water via a discharge line to Morrow Lake. The NPDES permit was received in October 1992 for this discharge. Figure 16 shows two potential locations for the proposed discharge route to Morrow Lake and the proposed groundwater treatment system location. The easternmost location is intended to follow or parallel the Consumer's Power right-of-way. This alternative is preferred since it is likely to be less expensive. Alternative "B" is a second choice in the event that location "A" proves to be infeasible. A survey was performed on July 2, 1992 to establish elevations for both proposed discharge routes from the treatment system to Morrow Lake. The resulting sections are shown on Figure 17.

An Air Use Permit Application was prepared and submitted to the MDNR Air Quality Division on February 25, 1993.

7.20 Hydraulic Control/Plume Capture

On behalf of General Signal Corporation, a two purge well system is recommended. The location of the existing and proposed purge wells are shown on Figure 2. This system will be designed to capture the highest concentrations of contamination in the source area and to control

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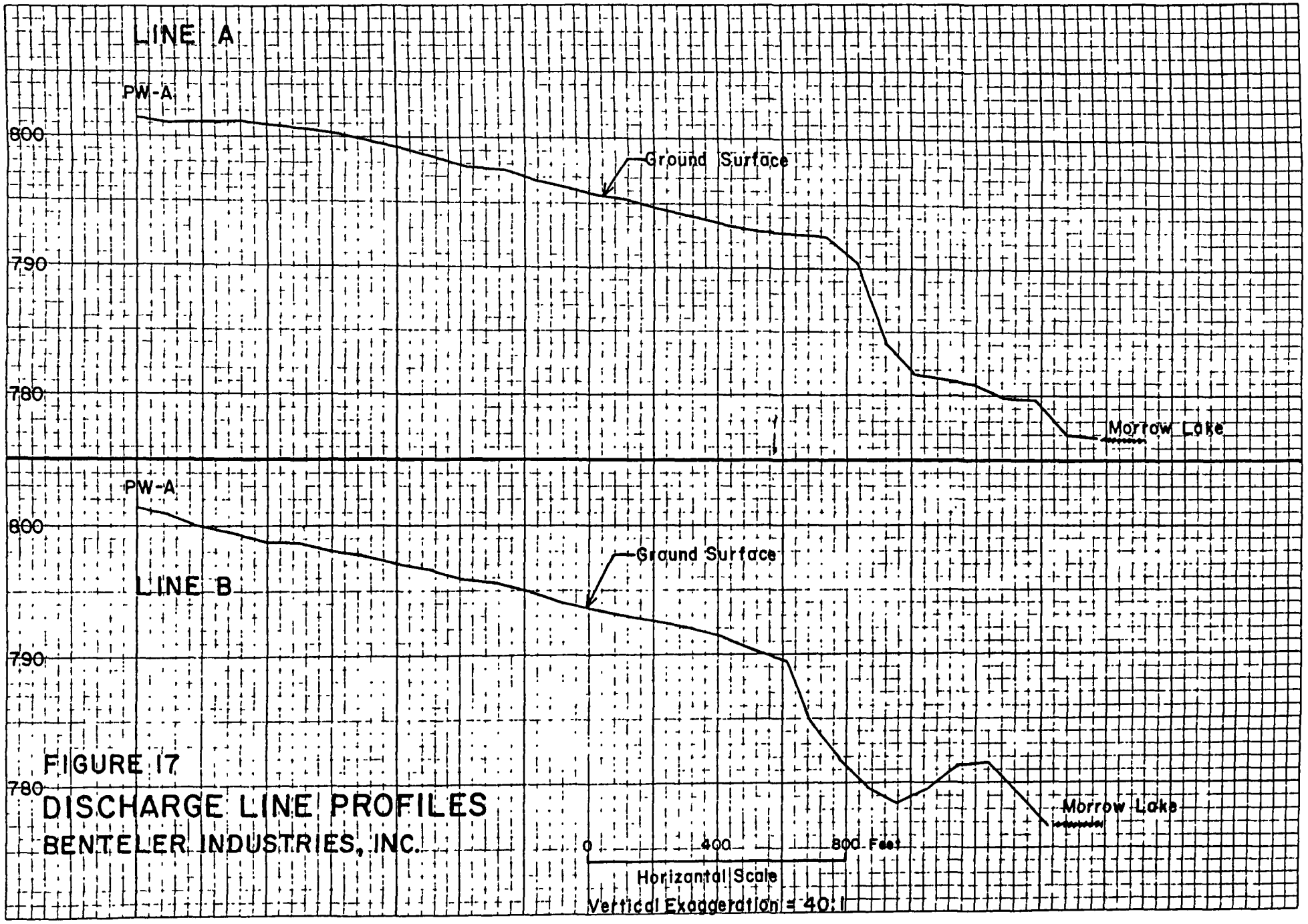

FIGURE 17
DISCHARGE LINE PROFILES
BENTELER INDUSTRIES, INC.

downgradient migration of the plume. The existing purge well (PW-A) will be pumped at a rate of about 90 gallons per minute to capture the width of the plume in this area and to prevent downgradient migration of the contamination from the source area. The proposed purge well (PW-B) will be installed near the location of monitor well MW-17. The location of PW-B was selected based upon groundwater quality data with the objective of capturing the contamination in the area of the highest concentrations. This well will be eight inches in diameter and is expected to be pumped at a lower rate than PW-A. It is recommended that the proposed purge well PW-B should have a screen ten feet in length placed between five and 15 feet below the water table surface. The apparent high aquifer transmissivity in the area suggests that a relatively shallow well should be able to sustain a relatively high pumpage, and a purge well screened at a more shallow depth should provide more direct plume capture. PW-B is intended to supplement PW-A. The recommended purge rate for PW-B has not yet been established and will depend on results of an aquifer performance test and the maximum hydraulic and contaminant load which the treatment system can accommodate. A 24-hour aquifer performance test will be conducted in order to evaluate capture zones at various pumping rates.

7.30 Treatment System Design Specifications

Based on the work completed to date, AHC proposes construction of an air stripper type treatment system at the site. The system will be capable of treating up to 200 gallons per minute total flow. Two purge wells will extract contaminated groundwater from the site and will be used to supply the treatment system. Parameter concentrations have been estimated either from the extended effluent characterization (PW-A) or from historic water quality data (PW-B). Table 4 below summarizes the estimated water quality at each purge well.

Table 4
Estimated Concentrations at the Purge Wells

Parameters	PW-A (μg/l)	PW-B (μg/l)
Trichloroethene	1.3	4
Trans-1,2-Dichloroethene	1.4	226
Tetrachloroethene	24.8	290
Vinyl Chloride	0.00	41.0
1,1,1-Trichloroethane	0.00	2.0

The air stripper tower project is comprised of two elements: 1) The air stripper tower (and its related installation); and 2) an auxiliary building to house certain equipment and instrumentation for the tower, and provide an amount of storage. Refer to Appendix F for the preliminary Operations and Maintenance Manual for the air stripper.

The building for the air stripper is proposed to be a pre-engineered steel building with metal roof and siding. A Behlen-type building of 20-feet by 30-feet in floor area is assumed. At a minimum, about one third of the building will be available for storage. There are no windows planned for the building, other than those in the two entry doors. Access to the storage area will be by an 8-foot wide by 9-foot high metal panel door. The height inside the building will be ten feet. The roof pitch will be minimal. The interior walls of the building will be insulated with fiberglass batts with a vapor barrier. A schematic drawing (Figure B-1) of the proposed system is included in Appendix G.

The building floor is a flat, non-drained, 6-inch thick concrete floor on concrete footings and foundations. The building electrical is comprised of two exterior light fixtures and sufficient interior fluorescent light fixtures to meet the needs of the operation. No other electrical service, other than that required for equipment operation, is planned. Building heat will be provided to maintain a minimum interior winter time temperature of 45°F. The heat source will be either from electrical unit heaters or propane-fired unit heaters depending on the site access. The three doors will have exterior concrete pads.

The air stripper equipment includes the approximately 3-feet diameter by 30-feet high FRP tower with high efficiency polypropylene packing, two air supply blowers (one is a standby), two louvered wall mounted intake housings, a small pressure pump for humidifying the air stream, and a cartridge filter for the pressure pump.

Piping for the equipment includes PVC piping and some small amount of FRP air supply duct. Figure PI-1 in Appendix F shows a preliminary piping and instrumentation drawing for the proposed system. There are fifteen valves required in sizes from 1/2-inch to 12-inches. In addition to the piping, the installation is fairly heavily instrumented to monitor flow conditions,

to telemeter (by telephone) any upset conditions as they occur, and to automatically shut down the flow of water to the tower upon failure of power to the tower system. Power failure also automatically drains the air stripper sump to avoid freezing problems in the winter. Six failure conditions will signal a remote operator via telephone lines. These failure conditions include loss of water flow to the tower, loss of amperage draw by the blower motors, loss of pressure from the pressure pump, high level in the tower sump, very high level in the tower sump, and loss of air pressure to the shutdown valve actuators.

Figure A-1 in Appendix F shows the elevation of the proposed building and air stripper tower.

7.40 Monitoring and Reporting Requirements

Appendix F (Operation and Maintenance Manual) contains the influent and effluent limitations and monitoring requirements as outlined in the NPDES permit (MI0052019) issued for the site.

In order to evaluate the effectiveness of the treatment system, AHC proposes to monitor flow rates, water levels, and concentrations of VOCs from the influent of each purge well and monitor wells. A description of each monitoring program is described below.

Flow rates from each purge well will be recorded on the Operating Log form. Log forms will be maintained in a three ring binder in the treatment facility building.

The quarterly monitoring program will be continued at the site during the first year of operation of the remedial system or until a remediation criteria is established. Once the remediation criteria is selected, all monitor wells will be sampled semi-annually and water levels will be continued to be obtained from all monitor wells on a quarterly basis throughout the duration of the remediation process. The samples will be submitted to the laboratory for analyses of the following target parameters:

Benzene
Toluene
Xylenes
Ethylbenzene
cis-1,2-Dichloroethene
Trichloroethene

trans-1,2-Dichloroethene
Tetrachloroethane
1,1,1-Trichloroethane
1,1-Dichloroethane
Chloroform

On a quarterly basis, the following monitor wells will be sampled for the target list of parameters: MW-1, MW-2, MW-3, MW-4, MW-7s, MW-8s, MW-9s, MW-10s, MW-11, MW-12, MW-14s, MW-15s, MW-17, MW-18 and MW-19. In addition to these wells, monitor wells MW-7d, MW-8d, MW-9d, MW-10d, MW-14d and MW-15d will be sampled semi-annually. Once per year, groundwater samples will be collected and analyzed from all monitor wells on site. The proposed sampling program has been determined on the basis of currently available water quality and hydrogeology data for the site. This program may be modified by specific conditions such as physical location of a well or a change in the water quality.

Groundwater samples will be obtained according to AHC's Monitor Well Sampling Protocol. AHC has designed this protocol with the intent of establishing procedures which will result in the collection of representative samples with proper quality control. These procedures are sufficiently practical that they can be maintained despite the presence of rigorous field conditions. AHC Monitoring Well Sampling Protocol is attached as Appendix H.

Quarterly reports will be prepared and submitted to the MDNR discussing the results of the groundwater monitoring program. Each report will contain static water levels from all monitor wells, updated potentiometric surface map, laboratory data, selected computer plots of time-trend analyses and a evaluation of the effectiveness of the remedial system. Any problems with the system or necessary alterations will also be addressed in each quarterly report and in an annual evaluation report.

7.50 Remediation Criterion

It is proposed that the remedial system for groundwater described in this report will be operated for an initial period of at least one year prior to identification and selection of criteria for identifying when remediation has been achieved for the target list of volatile organic compounds listed in Section 7.40. During the one year period of initial system operation, groundwater

sample analysis results will be compiled and reviewed. Following the end of the first year of system operation, impacts of groundwater removal on groundwater quality will be assessed and trends of organic contaminant reduction will be identified. Site-specific risks associated with reasonably achievable contaminant concentrations will be identified. Based on these evaluations, remediation criteria will be proposed in the context of the range of cleanup alternatives available under the Michigan Environmental Response Act, Act 307. The remediation criteria proposed for evaluation of the success of groundwater remediation measures implemented at this site will take into consideration site-specific risks presented by residual contamination concentrations expected to be reasonably achievable through operation of the proposed remedial system. The remediation criteria will take into account reasonably foreseeable future uses of the site and be protective of human health and the environment. The proposed remediation criteria will be submitted to MDNR after the end of the first year to up to 18 months of system operation for review and approval.

When contaminant concentrations and/or measures which satisfy the proposed remediation criteria (or background contaminant concentrations) have been achieved and/or implemented, remediation will be considered complete and the operation of the groundwater remedial system will be terminated. If conditions become asymptotic at concentrations above the cleanup criteria (or background, whichever is higher) a revised cleanup goal and, as appropriate, associated remediation criteria will be presented to MDNR for review and approval.

8.00 IMPLEMENTATION SCHEDULE

AHC will implement the tasks according to the following timetable. This schedule is based upon the MDNR approval of this remedial action plan.

Activity	Number of Days from MDNR Approval of RAP
NPDES Permit	received
Baseline Data Evaluation	completed
Aquifer Performance Test and Extended Effluent Characterization	completed
Air Use Permit Application	submitted
Interim Design and Preliminary Design for Treatment System	completed
Install Proposed Purge Well (PW-B)	30 days

Final O & M Manual	90 days
Receive Air Use Permit (estimated)	150 days
Begin Construction of Treatment System *	150 days
Initiation of Monitoring Schedule	ongoing

* Dependent upon weather conditions conducive to construction activities

The MDNR will be kept apprised of the status of the project and remediation activities through brief quarterly reports and an annual evaluation report. The reports will include laboratory analyses from the quarterly sampling, updated potentiometric surface maps and calculations and a water quality summary. The reports will also include recommendations for changes or modifications in the remediation system.

APPENDIX E

EXTENDED EFFLUENT AND BASELINE CHARACTERIZATION DATA

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USEPA METHOD 6
DATA SUMMARY SHEI

For: Mr. Mick Lynch
American Hydrogeology Corporation
4000 Portage Rd., Suite A
Kalamazoo, MI 49001

Project: General Signal / 69
Sample ID: PW-A
Collection Date: 2/18/91
Received by ATS: 2/19/91

Acid Extractables (CAS#)	Units	Concentration	Detection Limit
4-Chloro-3-methylphenol (59-50-7)	mg/L	<0.01	0.01
2-Chlorophenol (95-57-8)	mg/L	<0.01	0.01
2,4-Dichlorophenol (120-83-2)	mg/L	<0.01	0.01
2,4-Dimethylphenol (105-67-9)	mg/L	<0.01	0.01
4,6-Dinitro-2-methylphenol (534-52-1)	mg/L	<0.05	0.05
2,4-Dinitrophenol (51-28-5)	mg/L	<0.1	0.1
2-Nitrophenol (88-75-5)	mg/L	<0.01	0.01
4-Nitrophenol (100-02-7)	mg/L	<0.01	0.01
Pentachlorophenol (87-86-5)	mg/L	<0.01	0.01
Phenol (108-95-2)	mg/L	<0.01	0.01
2,4,6-Trichlorophenol (88-06-2)	mg/L	<0.01	0.01

Pesticide Extractables (CAS#)	Units	Concentration	Detection Limit
Aldrin (309-00-2)	mg/L	<0.001	0.001
alpha-BHC (319-84-6)	mg/L	<0.001	0.001
beta-BHC (319-85-7)	mg/L	<0.001	0.001
delta-BHC (319-86-8)	mg/L	<0.001	0.001
gamma-BHC (58-89-9)	mg/L	<0.001	0.001
Chlordane (57-74-9)	mg/L	<0.01	0.01
4,4'-DDD (72-54-8)	mg/L	<0.01	0.01
4,4'-DDE (72-55-9)	mg/L	<0.002	0.002
4,4'-DDT (50-29-3)	mg/L	<0.01	0.01
Dieldrin (60-57-1)	mg/L	<0.001	0.001
Endosulfan I (959-98-8)	mg/L	<0.002	0.002
Endosulfan II (33213-65-9)	mg/L	<0.002	0.002
Endosulfan Sulfate (1031-07-8)	mg/L	<0.01	0.01
Endrin (72-20-8)	mg/L	<0.002	0.002
Endrin Aldehyde (7421-93-4)	mg/L	<0.01	0.01
Heptachlor (76-44-8)	mg/L	<0.001	0.001
Heptachlor Epoxide (1024-57-3)	mg/L	<0.01	0.01
PCB-1016 (12674-11-2)	mg/L	<0.01	0.01
PCB-1221 (11104-28-2)	mg/L	<0.01	0.01
PCB-1232 (11141-16-5)	mg/L	<0.01	0.01
PCB-1242 (53469-21-9)	mg/L	<0.01	0.01
PCB-1248 (12672-29-6)	mg/L	<0.01	0.01
PCB-1254 (11097-69-1)	mg/L	<0.01	0.01
PCB-1260 (11096-82-5)	mg/L	<0.01	0.01
Toxaphene (8001-35-2)	mg/L	<0.1	0.1

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JUN 21 1991
AMERICAN HYDROGEOLOGY CORPORATION

June 17,1991

Mr. Patrick M. Lynch
AMERICAN HYDROGEOLOGY CORPORATION
6869 Sprinkle Road
Portage, MI 49002

RE: General Signal-Bentler

Dear Mick:

At your request, we have performed a baseline characterization of purged groundwater from the above-referenced site, in conjunction with a long-term aquifer performance test. The objective of this baseline was to characterize this groundwater sufficiently to provide guidance in the selection of groundwater treatment and discharge alternatives. Nine samples were collected over the course of the pump test for analysis of primary contaminant concentrations. Data from these samples were used to determine whether steady state conditions were reached in terms of groundwater quality. Once the purge well was at steady state chemically and hydraulically, a final large-volume sample was collected for a comprehensive analysis of both primary contaminants and secondary matrix constituents.

Based on the ten samples collected during the pump test, the target contaminants for groundwater treatment are cis+trans-1,2-dichloroethene (1,2-DCE), trichloroethene (TCE), and tetrachloroethene (PCE). Concentrations of these constituents ranged as follows (all units ug/l):

Date	1,2-DCE	TCE	PCE
01/09/91	0.002	0.002	0.023
01/10/91	0.001	0.001	0.025
01/11/91	0.002	0.001	0.028
01/12/91	0.001	0.001	0.024
01/13/91	0.001	0.001	0.026
01/14/91	0.001	0.001	0.025
01/15/91	0.001	0.002	0.029
01/16/91	0.001	0.001	0.026
01/17/91	0.002	0.002	0.026
02/18/91	<0.005	<0.005	0.020

Mean	0.001	0.001	0.025
Std.Dev.	0.0005	0.0005	0.0025

Concentrations of these target contaminants remained relatively constant throughout the duration of the test, indicating that the purge well had reached equilibrium by the time the baseline sample was collected. As a consequence, we can use these data to reliably estimate treatment requirements and costs.

The baseline sample was analyzed for six classes of constituents:

Minerals
Nutrients
Carbonaecous Oxygen Demand
Toxic Transition Metals
Toxic Purgeable Organics
Toxic Extractable Organics

Information on constituents in each of these classes provides a basis for evaluating treatment options and discharge alternatives. In the case of this PW-A purge water, the nutrient (carbon, nitrogen, phosphorus) and carbonaecous oxygen demand levels are relatively low, which means that whatever treatment option is chosen, the potential for complications due to biological fouling is small. Similarly, the low concentrations in these two classes mean that the potential for biostimulation in a water body receiving the discharge (surface water, groundwater, etc.) is minimal. Mineral content of the purge water is moderate, and should not constitute a barrier to obtaining either a surface water, groundwater, or POTW discharge permit.

Similarly, the transition metal content of this purge water is low and, with the possible exceptions of cadmium and zinc, should present no obstacle to either a surface water or groundwater discharge. Both cadmium and zinc are slightly elevated in the baseline sample from PW-A (1.1 and 39 ug/l, respectively), though this may be due entirely to the materials of construction for the well. Both the inner and outer casings are galvanized steel, which can impart the levels of both these toxic metals seen in this sample. If these metals are derived from the well casings, their concentrations would be expected to decline as the purge well is operated and the galvanized coating ages. If their concentrations do not decline with operation, these metals could complicate obtaining a discharge permit, particularly for a groundwater discharge where the allowances for contaminant concentrations are typically very low.

No extractable organic compounds were evident in the PW-A baseline sample, to the analytical limits of detection. In addition, except for the three compounds listed above, no purgeable organics were detected. Taken together, the baseline organics data strongly suggest high-efficiency air stripping as the treatment technology. This is especially true if the pump test flow rate of approximately 90 gallons per minute is representative of actual purge well operating conditions. While the relatively low iron content of the purge water (0.03 mg/l) would allow the use of aqueous carbon adsorption for treatment, the moderate hardness and alkalinity of the water would likely result in blinding of the carbon media before its capacity was fully utilized. This would adversely effect the

economics of treatment by this method, which is already more expensive than air stripping given the contaminant concentrations and purge system flow rates.

Normally at this point in the evaluation process, we would recommend to you and your client that a treatability study be conducted on the purge water itself, looking at the most feasible (economically and technically) treatment alternatives. However, for this particular groundwater, I believe we can reasonably narrow the focus of such a treatability study to just the air stripping technology. It is very unlikely that any other currently available treatment method will be able to approach the cost/benefit ratio of air stripping for this particular waste stream. By focusing the treatability study to this one technology, we can reduce the cost of the study without compromising the integrity of our final decision on treatment for the site.

As always, if you have any questions concerning the information we have presented here, please do not hesitate to contact Mary Bennett or myself.

Very truly yours,

ANN ARBOR TECHNICAL SERVICES, INC.

Philip B. Simon

Philip B. Simon
Director of Chemistry

PBS: jag

Enclosure

#69025

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June 28, 1993

Mr. James Innes
Environmental Response Division
Michigan Department of Natural Resources
District 12 Headquarters
P.O. Box 355
Plainwell, MI 49080

FILE COPY

Re: Results of Investigation of Soils Contamination
Benteler Industries facility, Galesburg, Michigan

Dear Mr. Innes:

This letter reports the work performed, procedures, results and conclusions of the field investigation and laboratory analyses of the soil contamination at the above referenced property. This scope of work was described in American Hydrogeology Corporation's (AHC) work plan dated January 24, 1992. Consistent with the Michigan Department of Natural Resources' (MDNR) approval letter dated April 6, 1992, closure samples were collected consistent with the MDNR's "Verification of Soil Remediation" document.

Based upon the results of previous investigations in this area, as described in AHC's January 24, 1992 report and work plan, the extent of the affected soils was evaluated. The highest concentrations of contaminants were located at, and in the vicinity of, the Benteler pit. AHC recommended excavation of the soil in the immediate area of the pit. Upon excavation, a series of closure samples around the perimeter would be collected to evaluate if the soil remaining in the sidewalls is within acceptable Type B criteria for the targeted parameters. As discussed in the work plan, the size of the excavation would be limited due to the existence of subsurface utilities, the presence of a concrete loading platform and indications that the source does not appear to be vertically or laterally extensive.

Soil Removal and Confirmatory Sampling

On July 24, 1992, AHC initiated the remedial actions specified in the work plan which consisted of excavation with a backhoe of the area as outlined on Figure 1. Anson Enterprises were contacted to provide backhoe and concrete cutting services. The area excavated was slightly larger than the area proposed in the work plan.

Prior to excavation, approximately 300 square feet of the concrete loading platform were cut and removed. This allowed excavation of soils beneath this area that previously tested above the Type B criteria. Soil samples collected from the excavation were field screened with a photoionization detector and submitted to KAR Laboratories, Inc. for the compounds listed under MDNR Scans 2 and 7. The soil sample collected from beneath the former Benteler pit was also submitted to the laboratory for MDNR Scan 1 compounds since 1,1,2,2-tetrachloroethene (810 μg/L) was previously detected in the Benteler pit.

All soil from the excavation was staged on, and covered with, two layers of 0.40 mil plastic secured with sand bags. The concrete removed from the eastern portion of the excavation was also staged and covered with plastic. The staging area is located approximately 500 feet to the south of the Benteler building.

Below is a general description of the soil encountered within the excavation.

Depth (bgl)	Description
0-0.5'	Asphalt and/or concrete
0.5-1.5'	SAND-medium to coarse, some fine Gravel
1.5-3.0'	CLAY and SAND-fine to medium, some silt, grey-black, some coarse Sand, red-brown, moist, compact. Thickness of this layer ranged between 1 and 2 feet.
3.0-6.0'	SAND-medium to coarse, little fine Gravel, iron staining, slightly moist.

Due to the variable stratigraphy, the samples from each side wall were collected from both the sandy clay layer (1.5 to 3.0 feet) and sand layer (3.0 to 6.0 feet) below. The horizontal extent and depth of the excavation were limited due to the presence of numerous subsurface utilities including a 15-inch diameter storm sewer pipe and manhole, a water line (for fire protection), a PIV (pressure indicated valve) support and a 2-inch diameter steel pipe. The locations of all samples collected and subsurface utilities within the excavation are shown on Figure 1. Refer to Table 1 and 2 for a summary of the analytical results and Attachment A for the analytical data sheets.

Analytical Results - July 24, 1992 Closure Samples

No MDNR Scan 1 compounds were detected in the sample collected beneath the former Benteler pit at 6.0 feet, the bottom west sample or within the sand layer beneath the clayey sand layer at 1.5 and 3.0 feet bgl. Concentrations of MDNR Scan 2 compounds were detected in all but one sample (S-07, southeast wall at 2.5 feet) collected from the clayey sand layer and from adjacent to the sewer manhole. However, none of the compounds detected exceeded its respective Type B criteria soil clean-up criterion or the direct contact values (reference Table 1).

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Table 1

Summary of Analytical Results of Soil Samples from Soil Excavation MDNR Scan 2 Compounds 9,000 East Michigan Avenue, Galesburg, Michigan

(concentrations expressed as µg/kg)

Sample Location	Benzene	Ethylbenzene	Toluene	m-and/or p-xylene	o-xylene
Sampled Date - July 24, 1992					
East wall at 3.0'	ND	ND	ND	ND	16
East wall at 4.0'	ND	ND	ND	ND	ND
Bottom East at 6.5'	ND	ND	ND	ND	ND
North East Wall at 3.0'	ND	310	ND	1,100	400
North East Wall at 4.5'	ND	ND	ND	ND	ND
Adjacent to Storm Sewer Manhole	ND	30	ND	150	80
South East wall at 2.5'	ND	ND	ND	ND	ND
South East wall at 3.5'	ND	ND	ND	ND	ND
Under former Bentsler Pit at 6.0'	ND	ND	ND	ND	ND
Northwest Wall at 2.5'	ND	94	190	180	260
Northwest Wall at 3.5'	ND	ND	ND	ND	ND
West Wall at 3.0'	ND	37	12	140	60
West Wall at 4.5'	ND	ND	ND	ND	ND
Southwest Wall at 2.0'	ND	180	62	880	560
Southwest Wall at 4.0'	ND	ND	ND	ND	ND
Underformer B-4 at 3.0'	ND	ND	ND	ND	ND
Type B Criteria	–	1,000	20,000	6,000[1]	6,000[1]
Direct Contact Value	10,000	8E+6	2E +7	2E + 8[2]	2E + 8[2]

NOTES: None Detected - Detected limit 10 µg/kg
[1] Type B Criteria for total Xylenes
[2] Direct Contact Value for Total Xylenes

AHC

Table 2

Summary of Analytical Results from Excavation Samples with Detections of MDNR Scan 7 Compounds 9,000 East Michigan Avenue, Galesburg, Michigan

(Concentrations expressed as µg/kg, except where noted)

Sample Location	Adjacent to Storm Sewer Manhole	Northwest Wall between 2.0 - 2.5'	West Wall between 1.5 - 3.0'	Southwest Wall between 1.5 - 2.0'	Type B Criteria	Acceptable Method Detection Limit	Direct Contact Value
Sample Date - July 24, 1992							
Acenaphthene	ND	2,100	2,300	480	8,000	330	2E+7
Acenaphthylene	ND	ND	ND	ND	—	330	—
Anthracene	ND	2,200	5,900	440	40,000	330	8E+7
Benzo(a)anthracene	ND	2,600	6,900	340	M	330	200
Benzo(b)fluoranthene	ND	2,900	3,200	ND	M	330	200
Benzo(k)fluoranthene	ND	2,800	3,300	ND	M	330	200
Benzo(ghi)perylene	ND	1,100	1,900	ND	—	330	—
Benzo(a)pyrene	ND	2,700	8,300	ND	M	330	200
Chrysene	ND	3,300	9,900	370	M	330	200
Dibenzo(a,h)anthracene	ND	470	750	ND	M	330	200
Fluoranthene	ND	3,400	8,500	670	6,000	330	1E+7
Fluorene	ND	1,300	2,500	770	6,000	330	1E+7
Indeno(1,2,3-cd)pyrene	ND	1,200	2,300	ND	M	330	200
Naphthalene	ND	ND	1,200	ND	600	330	1E+6
Phenanthrene	850	8,100	14,000	1,900	—	330	—
Pyrene	ND	16,000	40,000	590	4,000	330	6E+6

ND = None Detected
M = Chemical not expected to leach through soil. Direct contact criterion assumed to be protective of groundwater.

AHC

Concentrations of MDNR Scan 7 compounds were detected in four of the samples collected. Several of these compounds were above the Type B criteria. Refer to Table 2 for a summary of soil samples with detections of MDNR Scan 7 compounds and a comparison to the Type B criteria for each.

Analytical Results - September 3, 1992

Since the analytical results for three closure samples indicated concentrations of regulated parameters above the Type B clean-up criteria, additional samples were collected at approximately the same locations for MDNR Scan 7 analyses and ASTM neutral leachate procedure for the same compounds. The samples were collected on September 3, 1992 from the following locations: Northwest Wall at 2.5 feet bgl, West Wall at 2.5-3.0 feet bgl, and southwest Wall at 1.5-2.0 feet bgl (reference Figure 1). Each sample was obtained from within the clay and sand layer between 1.5 and 3.0 feet bgl. No sample could be collected from adjacent to the storm sewer manhole since all soil was removed from this area during excavation. No MDNR Scan 7 compounds were detected in any of the three samples.

Analytical Results - March 9, 1993

Based upon these findings and with MDNR concurrence, AHC resampled the three areas where concentrations of MDNR Scan 7 compounds above the Type B criteria were previously found to be present. These samples were collected on March 9, 1993 from approximately the same locations as the samples collected during the excavation activities on July 24, 1992 and on September 3, 1992. Samples were analyzed for MDNR Scan 7 compounds and ASTM neutral leachate procedures were performed followed by analyses for the same compounds. Every attempt was be made to reproduce the results of the initial testing. The results are summarized on Table 3 and presented in Attachment C.

No MDNR Scan 7 compounds were detected in the sample collected from between 1.5 and 3.0 feet at the west wall. Only two MDNR Scan 7 compounds were detected from the southwest wall between 1.5 and 2.0 feet bgl. These compounds are below their respective direct contact values. The highest concentrations were detected in the sample collected from the northwest wall between 2.0 and 2.5 feet bgl. Eleven of these compounds were above the MDNR Type B criterion and/or direct contact values.

No MDNR Scan 7 compounds were detected in the sample collected from the west wall and none of these compounds were detected in the extract from the same sample. Naphthalene was detected in the extract from the sample collected from the southwest wall (5.0 μg/L) and the northwest wall (7.0 μg/L). Phenanthrene was detected in the sample from the northwest wall at a concentration of 6.0 μg/L. These detections are all below the MDNR Type B criterion for groundwater.

Table 3

Summary of Analytical Results from Excavation Samples with Detections of MDNR Scan 7 Compounds 9,000 East Michigan Avenue, Galesburg, Michigan

(Concentrations expressed as µg/kg, except where noted)

Sample Location	Northwest Wall between 2.0 - 2.5'	West Wall between 1.5 - 3.0'	Southwest Wall between 1.5 - 3.0'	Type B Criteria (Soil)	Acceptable Method Detection Limit	Direct Contact Value
Sample Date - March 9, 1993						
Acenaphthene	4,300	ND	ND	8,000	330	2E+7
Acenaphthylene	ND	ND	ND	500	330	920,000
Anthracene	8,500	ND	ND	40,000	330	8E+7
Benzo(a)anthracene	20,000	ND	ND	M	330	200
Benzo(b)fluoranthene	12,000	ND	ND	M	330	200
Benzo(k)fluoranthene	11,000	ND	ND	M	330	200
Benzo(ghi)perylene	2,900	ND	ND	500	330	920,000
Benzo(a)pyrene	14,000	ND	ND	M	330	200
Chrysene	14,000	ND	ND	M	330	200
Dibenzo(a,h)anthracene	ND	ND	ND	M	330	200
Fluoranthene	30,000	ND	ND	6,000	330	1E+7
Fluorene	3,900	ND	ND	6,000	330	1E+7
Indeno(1,2,3-cd)pyrene	5,100	ND	ND	M	330	200
Naphthalene	1,300	ND	1,400	600	330	1E+7
Phenanthrene	26,000	ND	400	500	330	920,000
Pyrene	27,000	ND	ND	4,000	330	6E+6
ASTM EXTRACT ANALYSES (Concentrations expressed as µg/L)						
Sample Date - March 9, 1993				Type B Criteria Groundwater		
Naphthalene	7.0	ND	5.0	30	5	NA
Phenanthrene	6.0	ND	ND	25	5	NA

ND = None Detected

M = Chemical not expected to leach through soil. Direct contact criterion assumed to be protective of groundwater.

AHC

Proposed Additional Work

The Scan 7 analytical results for the extracts from all samples were below the MDNR Type B criterion for groundwater. Several of the compounds detected in the soil are at concentrations exceeding the direct contact values. On the basis of this comparison, AHC proposes excavation and removal of additional soil beyond the northwest wall. Since two of the three samples collected from the west wall and southwest wall were either nondetect or below direct contact values, no additional excavation or sampling in these areas is proposed. The goal of this additional excavation will be to achieve Type B clean up limits for the soils in the northwest area of the excavation. Soil samples will be collected from the same depth interval and stratigraphic layer as previous samples for analyses of MDNR Scan 7 compounds. Results of the soil analyses will be compared to both the Type B clean-up criteria and direct contact values. The area of the proposed additional investigation is shown on Figure 1. Upon completion of this additional work, AHC will prepare a report presenting the results and conclusions.

As always, please feel free to call either me or Mick Lynch if you have any questions or comments.

Very truly yours,

AMERICAN HYDROGEOLOGY CORPORATION

Linda G. Jones

Linda G. Jones
Senior Geologist

LGJ/pak/24-1136

cc: Dan McGrade, General Signal Corporation
Mick Lynch, AHC

Enclosures

Figures
Figure 1 - Proposed Excavation Location

Attachments
Attachment A - Analytical Results (July 24, 1992)
Attachment B - Analytical Results (September 3, 1992)
Attachment C - Analytical Results (March 9, 1993)

AMERICAN HYDROGEOLOGY CORPORATION

Environmental Consulting Services

Home Office
6869 Sprinkle Road
Portage, Michigan 49002
(616) 329-1600
Fax (616) 329-2494

Field Office
100 Aniline Avenue
Holland, Michigan 49424
(616) 394-9140
Fax (616) 394-9190

April 12, 1994

Mr. Fred Curtis, Landfill Sales Representative
Browning Ferris Industries
C & C Landfill
14800 P Drive North
Marshall, MI 49068

FILE COPY

RE: Disposal of soil and concrete at Benteler Industries,
9000 E. Michigan Ave., Galesburg, MI

Dear Mr. Curtis:

The purpose of this letter is to provide you with the details of American Hydrogeology Corporation's (AHC's) sampling procedures and results of the PCB sampling of the former concrete loading platform at the above referenced site. As you know, General Signal Corporation wishes to dispose of the soil and concrete at C & C Landfill.

Previous investigations performed at the Benteler Facility in the loading dock area indicated that PCBs may be present on the surface of the concrete. Based upon this information and history, AHC conducted sampling of the concrete in the loading dock area for PCBs. The concrete sampled was removed from the loading dock in order to access potentially contaminated soil for laboratory analyses and subsequent disposal. The source of the PCBs is from a spill that occurred within the plant. Spreading through various mechanisms from the spill area occurred in isolated areas which appears to have included the loading dock area.

Two EPA Guidance documents were reviewed: "Field Manual for Grid Sampling of PCB Sites to Verify Cleanup" and "Verification of PCB Spill Cleanup by Sampling and Analysis". The purpose of this review was to identify the most applicable sampling plan to obtain the most representative results. Conversations with representatives of the EPA concluded that there are no directly applicable rules or regulations that apply to this sampling scenario.

Based upon AHC's review of the appropriate documents, the following sampling plan was established to obtain representative samples of the concrete for PCB content:

recycled paper

AHC

The concrete pile was segmented into quadrants and then sampled at several locations by chipping the concrete using a chisel from slabs with at least of part of the sample from the former surface. Reference Figure 1 for the location of concrete samples. A destructive method was used to collecte the samples rather than obtaining a wipe sample which is generally used in spill situations. This method was chosen since the objective of this sampling program was to determine the PCB content within the volume of concrete not just on the surface.

Five samples were obtained from each quadrant. A tape measure was used to locate each sample location. Each sample was placed in a glass jar, labeled, placed in a cooler with ice and handled using chain of custody procedures.

The tools used to obtain each sample were decontaminated using a disposable towel soaked in hexane. The saturated towel was used to wipe any equipment in contact with the sample. The five samples collected within each quadrant were composited by the laboratory. A copy of the laboratory report is attached and the results are summarized below.

No PCBs were detected in the composite samples collected form the northeast, northwest of southeast quadrants of the concrete pile. In the composite sample collected from the southwest quadrant, 0.1 mg/kg of Aroclor 1260 was detected.

Upon your review and approval, please call to finalize paperwork and schedule a removal date.

Sincerely,

AMERICAN HYDROGEOLOGY CORPORATION

Linda Jones Zabik
Hydrogeologist

LJZ/ljz/24-1136

Enclosures: Figure 1 - Concrete Sample Locations
Laboratory Results

cc: Dan McGrade, General Signal Corporation
Mick Lynch, American Hydrogeology Corporation

F:\24-1136\FCURTIS.LET

Ann Arbor Technical Services, Inc.
290 South Wagner Road • Ann Arbor, Michigan 48103 • 313-995-0995

DATA SUMMARY SHEET

For: Mr. Mick Lynch
American Hydrogeology Corporation
6869 Sprinkle Rd.
Portage, MI 49002

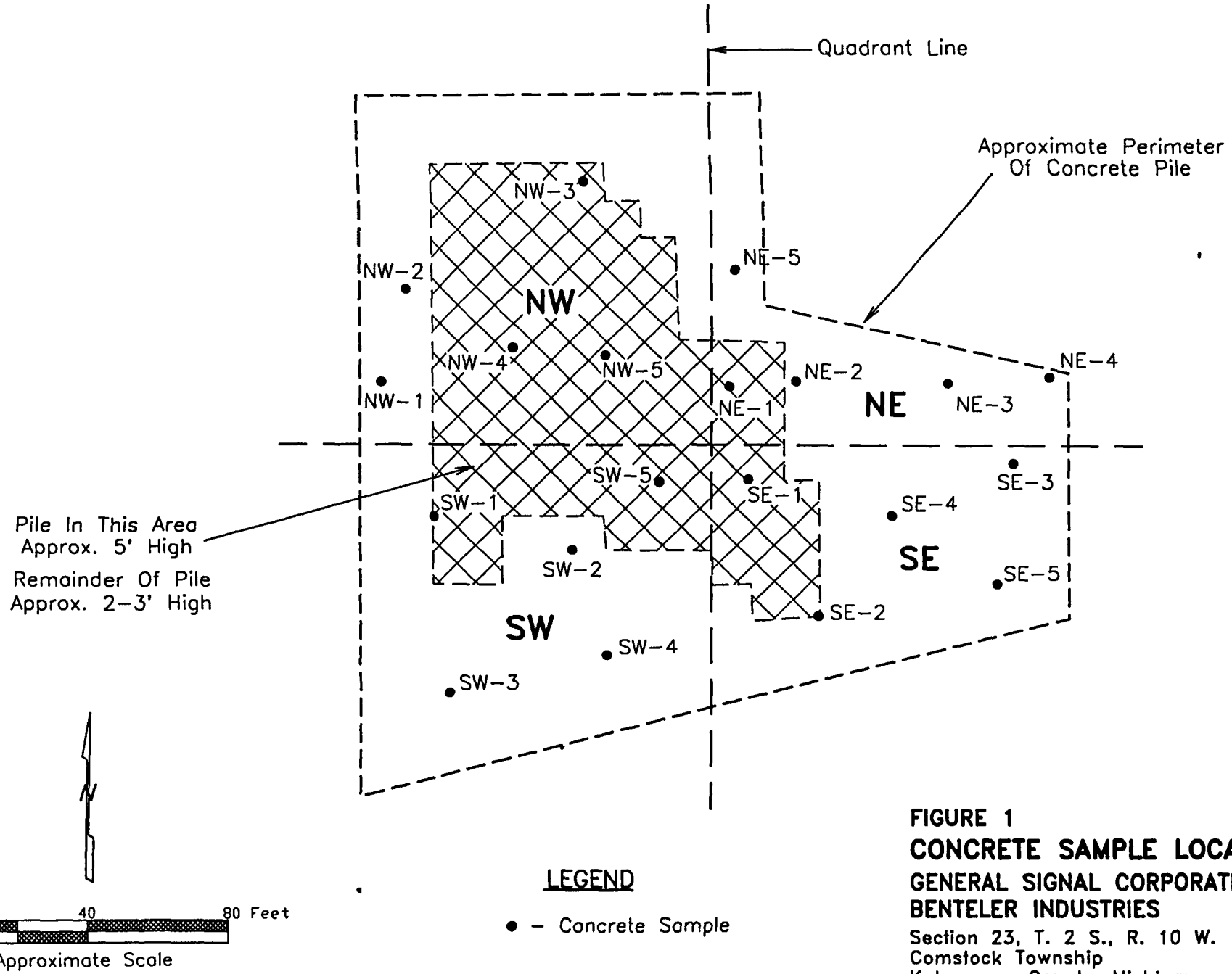
Project: General Signal #69025

Report Date: 3/10/94

Sample I.D. / Sample Date

Parameter	Units		NE Composite 2/16/94	NW Composite 2/16/94	SE Composite 2/16/94	SW Composite 2/16/94		
Aroclor 1221	mg/kg		<0.5	<0.5	<0.5	<0.5		
Aroclor 1232	mg/kg		<0.1	<0.1	<0.1	<0.1		
Aroclor 1242	mg/kg		<0.1	<0.1	<0.1	<0.1		
Aroclor 1248	mg/kg		<0.1	<0.1	<0.1	<0.1		
Aroclor 1254	mg/kg		<0.1	<0.1	<0.1	<0.1		
Aroclor 1260	mg/kg		<0.1	<0.1	<0.1	0.1		
Total PCB USEPA 8080	mg/kg		<1	<1	<1	0.1		

RECEIVED
MAR 18 1994
AMERICAN HYDROGEOLOGY CORPORATION



Base Map Compiled From Field Notes

FIGURE 1

CONCRETE SAMPLE LOCATIONS

GENERAL SIGNAL CORPORATION/ BENTELER INDUSTRIES

Section 23, T. 2 S., R. 10 W.
Comstock Township
Kalamazoo County, Michigan

A2305F 3/31/94

AMERICAN HYDROGEOLOGY CORPORATION

Environmental Consulting Services

Home Office
6869 Sprinkle Road
Portage, Michigan 49002
(616) 329-1600
Fax (616) 329-2494

Field Office
100 Aniline Avenue
Holland, Michigan 49424
(616) 394-9140
Fax (616) 394-9190

January 7, 1994

Ms. Rebecca Gnatuk
Industrial Services Records Specialist
Kalamazoo Water Reclamation Plant
1415 N. Harrison
Kalamazoo, MI 49007-2565

RE: General Signal Corporation Industrial User Self-Monitoring Report

Dear Ms. Gnatuk:

Enclosed is the Kalamazoo Water Reclamation Industrial User Self-Monitoring Report for the period between July 1, 1993 and December 31, 1993. Discharges of purge water from several monitor wells into the sewer system occurred in July and October 1993 during the quarterly sampling rounds. As usual, approximately 100 gallons of purge water was discharged into the sewer manhole each sampling round per previous arrangements with Kent Mottinger.

A discharge of approximately 2,500 gallons of development water from the installation of an on-site purge well also occurred on September 23, 1993 with prior approval from Kent Mottinger. A sample of the development water was collected on August 30, 1993 from the holding tank and analyzed for the required parameters as outlined in the Administrative Order for this site. A copy of the laboratory report is attached.

Please call either Mick Lynch or me if you have any questions.

Very Truly Yours,
AMERICAN HYDROGEOLOGY CORPORATION

Linda Jones Zabik
Hydrogeologist

LJZ/pak/24-1136

Enclosures

cc: Dan McGrade, General Signal Corporation
Mick Lynch, American Hydrogeology Corporation

INDUSTRIAL USER SELF-MONITORING REPORT

(1) Facility: General Signal Corporation (Hydreco)
High Ridge Park, PO Box 10010
Stamford, Connecticut 06904

(2) Due Date: January 10, 1994

(3) Sample Point Code: GSC

(4) Location: Sample point off wellhead south of Benteler Industries, 9000 East Michigan Ave., Galesburg.

(5) Purpose for Sampling:
✓ Routine periodic report. Period: July 1, 1993 - December 31, 1993
☐ Violation Resampling
☐ Other: _____

(6) Sampling Method: Fill appropriate sample containers using a clean bailer lowered into holding tank

(7) Date and Time of Composite Samples: Start: NA End: NA

(8) Date and Time of Grab Samples: 8/30/93 at 3:30 p.m.

(9) RESULTS

Parameter	Value	Units	Sample Type*
Cadmium, T	<0.005	mg/L	G
Chromium, T	<0.01	mg/L	G
Copper, T	<0.01	mg/L	G
Lead, T	<0.002	mg/L	G
Nickel, T	<0.02	mg/L	G
Zinc, T	<0.01	mg/L	G

Parameter	Value	Units	Sample Type*
Mercury, T	<0.0005	mg/L	G
Cyanide, T	<0.02	mg/L	G
pH	6.75	S.U.	G

MDNR Scans 1 & 2 (Attach Results)

all parameters below the detection limit of 1 ug/L

PCBs - all aroclors below detection limit of <0.1 ug/L

* Sample Type: G = Grab sample C = Composite Sample

(10) Name of Laboratory KAR Laboratories (Attach copies of Laboratory Results)

(11) Flow: Average Daily N/A* Maximum Daily 2,500 gallons (one time discharge)
Three isolated discharge events totaling approximately 2,700 gallons for this reporting period.

(12) I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or person who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: [signature] Title: Director Env. Affairs Date: 1/17/94

Mail to: INDUSTRIAL SERVICES RECORDS SPECIALIST
Kalamazoo Water Reclamation Plant
1415 N. Harrison
Kalamazoo, MI 49007-2565

*The purge water is an approved discharge by the City of Kalamazoo.
No laboratory analyses for these discharges during the reporting period.

KAR Laboratories, Inc.

PURGEABLE HYDROCARBON ANALYSIS - Michigan DNR Scan 1 and/or 2

To: American Hydrogeology Corp.

Project No.: 932330
Report Date: 9/14/93

Proj. Desc.:Analysis of two samples from General Signal (AHC #24-1136).

Sample No.:932330-01 Type:aqueous Rec'd: 8/30/93

Sampled: 8/30/93 3:30pm By:CJ of AHC

Sample ID: **"Water Tanks"**

SCAN 1 - Purgeable Halocarbons

Bromodichloromethane	<1	*trans-1,2-Dichloroethene*	<1
Bromoform	<1	*1,2-Dichloropropane*	<1
Bromomethane	<1	*cis-1,3-Dichloropropene*	<1
Carbon tetrachloride	<1	*trans-1,3-Dichloropropene*	<1
Chlorobenzene	<1	*Methylene chloride*	<1
Chloroethane	<1	*1,1,2,2-Tetrachloroethane*	<1
Chloroform	<1	*Tetrachloroethene*	<1
Chloromethane	<1	*1,1,1-Trichloroethane*	<1
Dibromochloromethane	<1	*1,1,2-Trichloroethane*	<1
1,1-Dichloroethane	<1	*Trichloroethene*	<1
1,2-Dichloroethane	<1	*Trichlorofluoromethane*	<1
1,1-Dichloroethene	<1	*Vinyl chloride*	<1
cis-1,2-Dichloroethene	<1		

SCAN 2 - Purgeable Aromatic Hydrocarbons

Benzene	<1	*m-and/or p-Xylene*	<1
Ethyl benzene	<1	*o-Xylene*	<1
Toluene	<1		

Concentrations are expressed as ug/L.
--- indicated not analyzed.
< (less than) indicates NOT DETECTED, followed by the limit of detection.

EPA Method 8260

KAR Laboratories, Inc.

ANALYTICAL REPORT

To: American Hydrogeology Corp.
6869 Sprinkle Road
Kalamazoo, MI 49002

Attn: Lisa K.J. Phillips

Project No.:	932330
Client No.:	2997
Project Date:	8/30/93
Date Promised:	9/14/93
Date Reported:	9/14/93
PO#:	4005

Project Desc.: Analysis of two samples from General Signal (AHC #24-1136).

Sample No.:932330-01 Type:aqueous Rec'd: 8/30/93
Sampled: 8/30/93 3:30pm By:CJ of AHC
ID: "Water Tanks"

Cadmium, total	<0.005	mg/L
Chromium, total	<0.01	mg/L
Copper, total	<0.01	mg/L
Lead, total	<0.002	mg/L
Mercury, total	<0.0005	mg/L
Nickel, total	<0.02	mg/L
Zinc, total	<0.01	mg/L
Cyanide, total	<0.02	mg/L
MDNR Scan 1 & 2	See attached	
PCB Aroclor 1016	<0.1	ug/L
PCB Aroclor 1221	<0.1	ug/L
PCB Aroclor 1232	<0.1	ug/L
PCB Aroclor 1242	<0.1	ug/L
PCB Aroclor 1248	<0.1	ug/L
PCB Aroclor 1254	<0.1	ug/L
PCB Aroclor 1260	<0.1	ug/L
PCB Aroclors, total	NA	ug/L

Unless otherwise noted, test results represent the sample(s) as they were received.

SEP 16 1993

AMERICAN HYDROGEOLOGY CORP.

4000 Portage Road, Suite A
Kalamazoo, Michigan 49001
616 343-9800

December 1, 1989

FILE COPY
sent 12/1/89

Mr. Dan McGrade
Manager
Environmental Affairs
General Signal Corporation
High Ridge Park
P.O. Box 10010
Stamford, Connecticut 06904

Re: Hydreco/Benteler
Core Sample Results

Dear Mr. McGrade:

Enclosed please find a copy of laboratory analytical results for the core samples #1 through #5 which were collected at the above referenced project site on October 12, 1989. Please note that these are the same results that were provided at our October 24, 1989 meeting.

Upon your review, please contact us regarding approval to forward a copy to Mr. Dave Corbin at Benteler's Galesburg facility. We will not release any information without your prior approval.

As always, if you have any questions or comments regarding these results or the project in general, please feel free to contact our office.

Sincerely,

AMERICAN HYDROGEOLOGY CORPORATION

Patrick M. Lynch (jss)

Patrick M. Lynch
General Manager

PML/jss

Enclosure

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 #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

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

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				

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. MIG000025890 Manifest Document No. 001

2. Page 1 of 1

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

3. Generator's Name and Mailing Address
General Signal
High Ridge Park/PO Box 10010
Stamford, CT. 06904

4. Generator's Phone ( ) 203-357-8800 - Dan McGrade

A. State Manifest Document Number MI 2226923

B. State Generator's ID

5. Transporter 1 Company Name: Tri-State Motor Transit

6. US EPA ID Number: MOD095038999

C. State Transporter's ID

D. Transporter's Phone 417-624-3131

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
Aptus Environmental Services
Highway 169 North
Coffeyville, KS 67337

10. US EPA ID Number: KSD980916493

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). HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.	N/H
a.	X	RQ, Hazardous substance (solid) n.o.s./ORM-E-NA9188 (polychlorinated biphenyls)	001	DM	EST. 1100	K	D026	N
b.	X	RQ, Hazardous substance (solid (n.o.s./ORM-E NA9188 (polychlorinated biphenyls)	001	DM	EST. 75	K	D026	N
c.	X	RQ, Hazardous substance ((solid) n.o.s./ORM-E NA9188 (polychlorinated biphenyls)	001	DM	EST. 75	K	D026	N
d.	X	RQ, HAZARDOUS SUBSTANCE (LIQUID) N.O.S. ORM-E-NA9188 (POLYCHLORINATED BIPHENYLS)	001	DM	EST. 1100	K	D026	N

J. Additional Descriptions for Materials Listed Above
a. Core water/oil dry - Storage Date Feb. 1990
b. Sweeper parts - Storage Date Feb. 1990
c. Protective clothing and visqueen - Storage Date Feb. 1990.
d CORE WATER
Emergency contact: 1-800-292-2558

K. Handling Codes for Wastes Listed Above (S)
a/S/
b/S/
c/S/
d/S/

15. Special Handling Instructions and Additional Information
Work Order #68938/Pick-up spot - Bentler Industries 9000 E. Michigan/Galesburg MI Contact: Leon Hall Contact: Lee Ingram 616-343-9800

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: DANIEL McGRADE Signature: Daniel McGrade Date (Month Day Year): 12/13/90

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: R. BRANAM Signature: R. Branam Date (Month Day Year): 01/02/91

18. Transporter 2 Acknowledgement or 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 CERTIFICATIONS MUST BE REPORTED TO THE MICHIGAN POLLUTION EMERGENCY ALERTING SYSTEM, IN MICHIGAN AT 1-800-292-4706 OR OUT OF STATE AT 517-373-9160 AND THE NATIONAL RESPONSE CENTER AT 1-800-424-8802 24 HOURS PER DAY.

EPA Form 8700-22 (Rev. 9/88) To be mailed by Generator to Michigan DNR Box 30038

PR 5110 Rev. 4/90

BEFORE COMPLETING THIS FORM.

Federal regulations re[illegible] rators and transporters of hazardous waste and owners and operators of hazardous waste treatm[illegible] rage, and disposal facilities to use this form (8700-22) for both inter and intrastate transportation.

State regulations require this manifest to be used for the transportation of: (1) all hazardous waste managed under the Hazardous Waste Management Act (Act 64, P.A. 1979, as amended) and (2) all liquid industrial waste (including those reclaimed, or recycled) under the Liquid Industrial Waste Act (Act 136, P.A. 1969).

Forms can be obtained by calling Michigan Department of Natural Resources (MDNR) Waste Management Division at (517) 373-2730.

GENERATOR INSTRUCTIONS

Item 1. For shipments of regulated quantities of hazardous waste enter your U.S. EPA twelve digit identification number. To receive an EPA ID number, a notification of hazardous waste activity, EPA Form 8700-12, must be submitted to the EPA.

Enter a unique, five digit number in the manifest document number space. (We suggest that you start with 00001 and progress to 99999.)

For an Act 136 liquid industrial waste only, a Michigan ID number may be used in place of the EPA ID number. To obtain a Michigan ID number call MDNR Waste Management Division at (517) 373-2730. The Michigan ID Number cannot be used by generators of RCRA hazardous wastes.

Item 2. If a continuation sheet is used, enter the total number of sheets here. A continuation sheet is used only when three or more transporters are utilized to transport the shipment. In all other cases, enter page 1 of 1.

Item 3. Enter your name and mailing address. The address should be the location that will manage the returned manifest forms.

Item 4. Enter a telephone number where your authorized agent may be reached 24-hours-a-day in the event of an emergency.

Item 5. Enter the company name of the first transporter who will transport the waste.

Item 6. Enter the U.S. EPA or Michigan twelve digit identification number of the first transporter identified in Item 5. If the shipment is hazardous waste, only a U.S. EPA ID number may be used.

Item 7. Enter the company name of the second transporter who will transport the waste, if applicable.

Item 8. Enter the U.S. EPA or Michigan twelve digit identification number of the second transport identified in Item 7.

If three or more transporters are used, you must use an EPA form 8700-22A continuation sheet to identify all additional transporters. This is the only situation where a continuation sheet is to be used. You must indicate the transporter's company name and U.S. EPA or Michigan twelve digit identification number in Items 24-27 on the continuation sheet.

Photo copy the continuation sheet and distribute copies just as you do the manifest. Also place the manifest document number from Item A of page 1, in Item L of the continuation sheet. In addition to proper signatures where needed, these are the only items to be completed on the continuation sheets.
NOTE: Every transporter used between the generator and the designated facility must be listed.

Item 9. Enter the company name and site address of the facility designated to receive the waste listed on this manifest. The address must be the site address, which may differ from the company mailing address.

Item 10. Enter the U.S. EPA or Michigan twelve digit identification number of the designated facility identified in Item 9.

Item 11. Enter an X in the HM box if the waste is a hazardous material regulated by U.S. DOT (see 49 CFR 172 201).

Enter the U.S. DOT Proper Shipping Name, Hazard Class, and the DOT ID (UN/NA) number for each waste as identified in 49 CFR 171 through 177, and (RQ) when required.

If you need space to list additional waste types, use extra manifests to complete the waste listings for your shipment. Each manifest used should be completed in its entirety. You may not use continuation sheets to list additional waste shipments.

WASTE BEING TRANSPORTED TO AN OUT-OF-STATE FACILITY MUST BE PROPERLY CHARACTERIZED TO DETERMINE IF IT IS A HAZARDOUS WASTE IN THAT STATE. ANY WASTE WHICH IS DETERMINED TO BE A HAZARDOUS WASTE IN THE RECEIVING STATE MUST BE APPROPRIATELY IDENTIFIED IN ITEM J.

Item 12. Enter the number of containers for each waste and the appropriate abbreviation for the type of container:

DM = Metal drums, barrels, kegs
DW = Wooden drums, barrels kegs
DF = Fiberboard or plastic drums, barrels, kegs
TP = Tanks portable
TT = Cargo tanks (tank trucks)
TC = Tank cars (railroad cars)
DT = Dump truck
CY = Cylinders
CM = Metal boxes, cartons, cases (including roll-offs)
CW = Wooden boxes, cartons, cases
CF = Fiber or plastic boxes, cartons, cases
BA = Burlap, cloth, paper or plastic bags

Item 13. Enter the total quantity of waste de[illegible] on each line. Use whole numbers only, do not use decimal numbers or fractions.

Item 14. Enter the appropriate abbreviation for the unit of measure:

G = Gallons (liquids only)
P = Pounds
T = Tons (2000 lbs.)
Y = Cubic yards
L = Liters (liquids only)
K = Kilograms
M = Metric tons (1000 kg)
N = Cubic meters

Item 15. Indicate any special transportation, Bill of Lading, treatment, storage, or disposal information. For shipments of hazardous waste from the U.S., destined for treatment, storage, or disposal outside the jurisdiction of the United States, generators must enter the point of departure (City and State).

Item 16. The generator must read, sign (by hand), and date the certification statement. If a mode other than highway is used, the word "highway" should be lined out and the appropriate mode (rail, water, or air) inserted directly below the lined out word. If another mode in addition to the highway mode is used, enter the appropriate additional mode (e.g., and rail) in the same location.

Item A. Michigan has preprinted the State manifest document numbers to assure a unique number for each manifest.

Items B — H. Not required to be completed under Michigan law. This information may be required by the generator state, if the waste was generated in a state other than Michigan.

Item I. For hazardous wastes, enter the hazardous waste number R299.9212 and R299.9213 of the Michigan Administrative Code, or 40 CFR 261. If more than one waste number is required to adequately identify the waste, enter additional numbers in Item J. For liquid industrial wastes which are not regulated by RCRA or Act 64, enter the most appropriate waste numbers from Table 1 listed in these instructions.

N/H Column

For each waste listed, put an N in this column if the waste is a non-hazardous liquid industrial waste or a non-regulated hazardous waste. Put an H in this column if the waste is a regulated hazardous waste under RCRA or Act 64.

Item J. Include any safety precautions and/or specific properties of the waste not identified by DOT hazard class. Include all additional hazardous waste numbers applicable to the wastes listed in Item I1, lots a — d (i.e., if a waste is a mixture of several listed hazardous wastes, list the hazardous waste number of each component). Also include treatment standards for restricted wastes listed in Item 11, lots a — d.

Item K. For each hazardous waste in Item 11, identify any specific items that would fall in the following categories by listing the letter preceding the lot (a — d) and the appropriate code from this list in the small, lightly lined area on the right side of this box. For instance, if the lot on line c is a small quantity, list c. S., in the corresponding lines in the right hand side of Item K.

S — Small Quantity
R — Recycled, Reclaimed, Used, or Reused
C — Conditionally Exempt Small Quantity Generator
H — Household Wastes
M — Mix, Combined, Commingled

Distribution of Manifest

Before removing any copies, verify that all necessary information has been filled out and the necessary signatures affixed.

After the transporter signs and dates the manifest to certify receipt of the waste, remove the top (white) and bottom (goldenrod) copies of the manifest and give the balance of the manifest to the transporter. If more than one transporter will be used, you must provide a photo copy of the manifest for each additional transporter.

Where more than two transporters have been used, the continuation sheet(s) must be signed. A copy of each continuation sheet must accompany each copy of the manifest and be distributed in accordance with these instructions.

Send the white copy to the DNR no later than the 10th day of the month following the shipment. The blue copy signed by the disposal facility and returned to you must be retained for three years.

For shipments from non-Michigan generators, the generator must send a photo copy of the manifest to the regulatory agency of the generator state when so required. An additional copy must also be provided to the transporter for submittal by the TSDF to the regulatory agency of the generator state when so required by the generator state.

Nondeliverable Wastes

If an emergency prevents a transporter from delivering the generator's shipment to the designated treatment, storage, or disposal facility, the transporter will call the generator asking for information on an alternate facility that can accept the waste. The generator shall either designate another facility or instruct the transporter to return the waste.

TABLE 1 (For use with Act 136 wastes only)

Liquid wastes which have been evaluated and found to fall outside [illegible] or Act 64 regulations should be manifested using these numbers:

Waste	Waste No.	Waste	Waste No.
Acid Solution	001L	Crankcase Oil	017L
Alkaline Solution	002L	Cutting Oil	018L
Etching Fluids	003L	Coolants and Water Soluble Oil	019L
Plating Wastes	004L	Lubricating Oil	020L
Halogenated Solvents	005L	Other Oil	021L
Non-Halogenated Solvents	006L	Brine	022L
Mixed Solvents	007L	Drilling Muds (Gas and Oil Operations)	023L
Peroxides	008L	Oil Field Tank Bottoms	024L
Papermill Wastes	009L	Mixed Oil Residue	025L
Ink Residues	010L	PCB, PBB contaminated Materials	026L
Paint and Pigments Residue	011L	Radioactive Residues	027L
Pesticide Residues	012L	Food Processing Wastes	028L
Herbicide Residues	013L	Other Wastes (Describe in Item J)	029L
Pharmaceutical Wastes	014L		
Lacrimators, Amides, Mercaptans	015L		
Plasticizers, Resins, Monomers, Elastomers	016L		

TRANSPORTER INSTRUCTIONS

Item 17. Print the name of the person accepting the waste on behalf of the first transporter. That person must acknowledge acceptance of the waste described on the manifest by signing and entering the date of receipt.

Item 18. Print, if applicable, the name of the person accepting the waste on behalf of the second transporter. That person must acknowledge acceptance of the waste described on the manifest by signing and entering the date of receipt.

International Shipments

Exports — You must sign and enter the date the waste left the United States in Item 15.

Imports — Shipments of hazardous waste regulated by RCRA and transported into the United States from another country must, upon entry, be accompanied by the U.S. EPA Uniform Hazardous Waste Manifest.

If you transport hazardous waste into the United States from another country you are responsible for completing the generator portion of the manifest (40 CFR 263.10(c)(1)).

Distribution of Manifest

Upon delivery of the shipment to the TSDF, give the remaining copies of the manifest to the TSDF representative. The TSDF representative must sign and date the manifest upon acceptance of the waste and return the canary copy of the manifest to you.

Nondeliverable Waste

When an emergency prevents delivery of the waste to the designated facility, the transporter may call the generator to obtain the name of an alternate TSDF. The generator shall either designate another facility or instruct the transporter to return the waste.

The transporter shall legibly print the name and phone number of the person at the generator facility who provided information to the transporter, in the comments section.

TREATMENT, STORAGE, OR DISPOSAL FACILITY INSTRUCTIONS

Item 19. An authorized representative of the designated (or alternate) facility must note in this space any significant discrepancy in the waste shipment as defined in 40 CFR 264.72.

If significant discrepancies cannot be resolved within 15 days of receiving the waste, you must submit [illegible] your U.S. EPA Regional Administrator, a letter with a copy of the manifest at issue describing th[illegible] discrepancy and attempts to reconcile it (40 CFR 264.72 and 265.72). A copy of this letter should also b[illegible] submitted to the Michigan Department of Natural Resources to the address in these instructions.

Item 20. Print or type the name of the person accepting the waste on behalf of the TSDF. That perso[illegible] must acknowledge acceptance of the waste described on the manifest by signing and entering the date [illegible] receipt.

Distribution of Manifest

Return the canary copy of the manifest to the transporter, send the blue copy to the generator, and th[illegible] pink copy to the MDNR (no later than the 10th day of the month following shipment). Retain the green co[illegible] for your records.

A photo copy may be required by the regulatory agency of an out-of-state generator.

Rejected shipments — retain the unsigned green copy and return the remaining copies of the ma[illegible] manifest to the transporter.

ADDRESS ALL MDNR MANIFEST COPIES TO:

Michigan Department of Natural Resources
Waste Management Division
P.O. Box 30038
Lansing, Michigan 48909 (517) 373-2730

Public reporting burden for this collection of information is estimated to average: 37 minutes for generators, 15 minutes for transporters, and 10 minutes for treatment, storage and disposal facilities. This includes time for reviewing instructions, gathering data, and completing and reviewing the form. Send comments regarding the burden estimate, including suggestions for reducing this burden, to: Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, D.C. 20503.

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

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KALAMAZOO, MI 49001

Project HYDRECO #69025

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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

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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

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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		

AMERICAN HYDROGEOLOGY CORP.

4000 Portage Road, Suite A
Kalamazoo, Michigan 49001
616 343-9800

April 12, 1990

PROJECT
FILE COPY
Sent 4-12-90

Mr. Dan McGrade
Manager
Environmental Affairs
General Signal Corporation
P.O. Box 10010
Stamford, Connecticut 06904

Dear Dan:

Enclosed please find a copy of the Benteler, Galesburg PCB swab sample from the overhead "cable box". As you can see, no PCBs were identified at or above the detection limits in this sample.

As always, if you have any questions or comments, please don't hesitate to contact me.

Very truly yours,

AMERICAN HYDROGEOLOGY CORPORATION

Mick

Patrick M. Lynch
General Manager

PML/jss

Enclosure

cc: Mr. Charles M. Denton
Mr. Mike Dmyterko
Ms. Lynne Tomeny, Esq.

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					

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 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		

Note: Units are expressed on a dry weight basis.

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DATA SUMMARY SHEET

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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					

Ann Arbor
Technical Services, Inc.
290 South Wagner 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 4/10/92

Sample I.D. / Sample Date

Parameter	Units		S-01 4/8/92	S-02 4/8/92	S-03A 4/8/92	S-03B 4/8/92	S-04A 4/8/92	S-04B 4/8/92
Aroclor 1221	mg/Kg		<0.05	<0.05	<5	<0.5	<0.5	<0.05
Aroclor 1232	mg/Kg		<0.005	<0.005	<0.5	<0.05	<0.05	<0.005
Aroclor 1242	mg/Kg		<0.005	<0.005	<0.5	<0.05	<0.05	<0.005
Aroclor 1248	mg/Kg		<0.005	<0.005	<0.5	<0.05	<0.05	<0.005
Aroclor 1254	mg/Kg		<0.005	<0.005	<0.5	<0.05	<0.05	<0.005
Aroclor 1260	mg/Kg		0.11	<0.005	<0.5	<0.05	<0.05	0.007
Total PCB	mg/Kg		0.11	<0.1	<10	<1	<1	0.007

Note: Units are expressed on a dry weight basis.

RECEIVED JUN 1 7 1992

Ann Arbor
Technical Services, Inc.
290 South Wagner 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 4/10/92

Sample I.D. / Sample Date

Parameter	Units		S-05A 4/8/92	S-05B 4/8/92	S-06 4/8/92	S-07A 4/8/92	S-07B 4/8/92	S-08 4/8/92
Aroclor 1221	mg/Kg		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1232	mg/Kg		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Aroclor 1242	mg/Kg		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Aroclor 1248	mg/Kg		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Aroclor 1254	mg/Kg		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Aroclor 1260	mg/Kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Total PCB	mg/Kg		0.005	<0.1	<0.1	<0.1	<0.1	<0.1

Note: Units are expressed on a dry weight basis.

RECEIVED JUN 1 7 1992

Ann Arbor
Technical Services, Inc.
290 South Wagner 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 4/10/92

Sample I.D. / Sample Date

Parameter	Units		S-09 4/8/92	S-10 4/8/92	S-11 4/9/92	S-12 4/9/92		
Aroclor 1221	mg/Kg		<0.05	<0.05	<0.05	<0.05		
Aroclor 1232	mg/Kg		<0.005	<0.005	<0.005	<0.005		
Aroclor 1242	mg/Kg		<0.005	<0.005	<0.005	<0.005		
Aroclor 1248	mg/Kg		<0.005	<0.005	<0.005	<0.005		
Aroclor 1254	mg/Kg		<0.005	<0.005	<0.005	<0.005		
Aroclor 1260	mg/Kg		<0.005	<0.005	<0.005	<0.005		
Total PCB	mg/Kg		<0.1	<0.1	<0.1	<0.1		

Note: Units are expressed on a dry weight basis.

RECEIVED JUN 1 7 1992

KAR Laboratories, Inc.
4425 Manchester Road
Kalamazoo, MI 49002

(616) 381-9666

ANALYTICAL REPORT

To: American Hydrogeology Corp.
6869 Sprinkle Road
Kalamazoo, MI 49002

Attn: Lisa K.J. Phillips

Project No.:	921713
Client No.:	2997
Project Date:	7/28/92
Date Promised:	8/19/92
Date Reported:	8/19/92
PO#:	2731

Project Desc.: Analysis of samples from General Signal (AHC #24-1136).

Dear Client:

Attached you will find test results for Project No. 921713. Please refer to this Project No. if you have any questions regarding this work.

Respectfully submitted,
KAR Laboratories, Inc.

William H. Bouma

William H. Bouma, Ph.D.
Director

WHB/kb

RECEIVED SEP 4 1992

KAR Laboratories, Inc.

ANALYTICAL REPORT

: American Hydrogeology Corp.
6869 Sprinkle Road
Kalamazoo, MI 49002

Attn: Lisa K.J. Phillips

Project No.: 921713
Client No.: 2997
Project Date: 7/28/92
Date Promised: 8/19/92
Date Reported: 8/18/92
PO#: 2731

Project Desc.: Analysis of samples from General Signal (AHC #24-1136).

Sample No.:921713-01 Type:aqueous Rec'd: 7/28/92 Sampled: 7/21/92
ID: "H2O #2, 2:40p"

PCB, total 41 ug/L
Identified and quantified as Aroclor 1260.

Sample No.:921713-02 Type:aqueous Rec'd: 7/28/92 Sampled: 7/21/92
ID: "H2O #3, 2:52p"

PCB, total 42 ug/L
Identified and quantified as Aroclor 1260.

Sample No.:921713-03 Type:aqueous Rec'd: 7/28/92 Sampled: 7/21/92
ID: "H2O #6, 3:45p"

MDNR Scan 1 & 2 See attached
PCB, total 56 ug/L
Identified and quantified as Aroclor 1260.

Sample No.:921713-04 Type:oil Rec'd: 7/28/92 Sampled: 7/21/92
ID: Oil Layer from "H2O #6, 3:45p"

MDNR Scan 1 & 2 See attached
PCB in oil, total 30 mg/kg
Identified and quantified as Aroclor 1260.

Sample No.:921713-05 Type:aqueous Rec'd: 7/28/92 Sampled: 7/21/92
ID: "H2O #7, 4:10p"

MDNR Scan 1 & 2 See attached
PCB, total 73 ug/L
Identified and quantified as Aroclor 1260.

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KAR Laboratories, Inc.

ANALYTICAL REPORT

o: American Hydrogeology Corp.
6869 Sprinkle Road
Kalamazoo, MI 49002

Attn: Lisa K.J. Phillips

Project No.: 921713
Client No.: 2997
Project Date: 7/28/92
Date Promised: 8/19/92
Date Reported: 8/18/92
PO#: 2731

Project Desc.: Analysis of samples from General Signal (AHC #24-1136).

Sample No.:921713-06 Type:oil Rec'd: 7/28/92 Sampled: 7/21/92
ID: Oil Layer from "H2O #7, 4:10p"

PCB in oil, total 4.6 mg/kg
Identified and quantified as Aroclor 1260.

Sample No.:921713-07 Type:sludge Rec'd: 7/28/92 Sampled: 7/21/92
ID: "Sludge #5, 3:59p"

MDNR Scan 1 & 2 See attached
PCB, total <5 mg/kg

Sample No.:921713-08 Type:aqueous Rec'd: 7/28/92 Sampled: 7/22/92
ID: "Drum #1, 9:20a"

PCB, total NOT ANALYZED

Sample No.:921713-09 Type:oil Rec'd: 7/28/92 Sampled: 7/22/92
ID: Oil Layer from "Drum #1, 9:20a"

PCB in oil, total 14 mg/kg
Identified and quantified as Aroclor 1260.

Sample No.:921713-10 Type:aqueous Rec'd: 7/28/92 Sampled: 7/22/92
ID: "Drum #2, 9:29a"

PCB, total NOT ANALYZED

Sample No.:921713-11 Type:oil Rec'd: 7/28/92 Sampled: 7/22/92
ID: Oil Layer from "Drum #2, 9:29a"

PCB in oil, total 25 mg/kg
Identified and quantified as Aroclor 1260.

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KAR Laboratories, Inc.

ANALYTICAL REPORT

To: American Hydrogeology Corp.
6869 Sprinkle Road
Kalamazoo, MI 49002

Attn: Lisa K.J. Phillips

Project No.: 921713
Client No.: 2997
Project Date: 7/28/92
Date Promised: 8/19/92
Date Reported: 8/18/92
PO#: 2731

Project Desc.: Analysis of samples from General Signal (AHC #24-1136).

Sample No.:921713-12 Type:aqueous Rec'd: 7/28/92 Sampled: 7/22/92
ID: "Drum #3, 9:39a"

PCB, total NOT ANALYZED

Sample No.:921713-13 Type:oil Rec'd: 7/28/92 Sampled: 7/22/92
ID: Oil Layer from "Drum #3, 9:39a"

PCB in oil, total 28 mg/kg
Identified and quantified as Aroclor 1260.

Sample No.:921713-14 Type:aqueous Rec'd: 7/28/92 Sampled: 7/22/92
ID: "Drum #4, 9:49a"

PCB, total 2.3 ug/L
Identified and quantified as Aroclor 1260.

Sample No.:921713-15 Type:aqueous Rec'd: 7/28/92 Sampled: 7/22/92
ID: "Drum #5, 9:59a"

PCB, total NOT ANALYZED

Sample No.:921713-16 Type:oil Rec'd: 7/28/92 Sampled: 7/22/92
ID: Oil Layer from "Drum #5, 9:59a"

PCB in oil, total 16 mg/kg
Identified and quantified as Aroclor 1260.

Sample No.:921713-17 Type:aqueous Rec'd: 7/28/92 Sampled: 7/22/92
ID: "Drum #6, 10:09a"

PCB, total 34 ug/L
Identified and quantified as Aroclor 1260.

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KAR Laboratories, Inc.

ANALYTICAL REPORT

o: American Hydrogeology Corp.
6869 Sprinkle Road
Kalamazoo, MI 49002

Attn: Lisa K.J. Phillips

Project No.: 921713
Client No.: 2997
Project Date: 7/28/92
Date Promised: 8/19/92
Date Reported: 8/18/92
PO#: 2731

Project Desc.: Analysis of samples from General Signal (AHC #24-1136).

Sample No.:921713-18 Type:oil Rec'd: 7/28/92 Sampled: 7/22/92
ID: Oil Layer from "Drum #6, 10:09a"

PCB in oil, total NOT ANALYZED

Sample No.:921713-19 Type:aqueous Rec'd: 7/28/92 Sampled: 7/22/92
ID: "Drum #7, 10:43a"

PCB, total NOT ANALYZED

Sample No.:921713-20 Type:oil Rec'd: 7/28/92 Sampled: 7/22/92
ID: Oil Layer from "Drum #7, 10:43a"

PCB in oil, total 14 mg/kg
Identified and quantified as Aroclor 1260.

Sample No.:921713-21 Type:aqueous Rec'd: 7/28/92 Sampled: 7/22/92
ID: "Drum #8, 10:55a"

PCB, total 12 ug/L
Identified and quantified as Aroclor 1260.

Sample No.:921713-22 Type:oil Rec'd: 7/28/92 Sampled: 7/22/92
ID: Oil Layer from "Drum #8, 10:55a"

PCB in oil, total NOT ANALYZED

Unless otherwise noted, test results represent the sample(s) as they were received.

RECEIVED SEP 4 1992

KAR Laboratories, Inc.

ANALYTICAL REPORT

To: American Hydrogeology Corp.

Project No. : 921713
Report Date : 8/18/92

Re: **VOLATILE HYDROCARBON ANALYSIS - MICHIGAN DNR SCAN 1 and 2**

Sample I.D. : "H2O #7, 4:10p"

SCAN 1 - Purgeable Halocarbons

	CONC.		CONC.
Bromodichloromethane	<1	trans-1,2-Dichloroethene	<1
Bromoform	<1	1,2-Dichloropropane	<1
Bromomethane	<1	cis-1,3-Dichloropropene	<1
Carbon Tetrachloride	<1	trans-1,3-Dichloropropene	<1
Chlorobenzene	<1	Methylene chloride	7.6
Chloroethane	<1	1,1,2,2-Tetrachloroethane	<1
Chloroform	<1	Tetrachloroethene	<1
Chloroemethane	<1	1,1,1-Trichloroethane	<1
Dibromochloroemethane	<1	1,1,2-Trichloroethane	<1
1,1-Dichloroethane	<1	Trichloroethene	<1
1,2-Dichloroethane	<1	Trichlorofluoromethane	<1
1,1-Dichloroethene	<1	Vinyl chloride	<1
cis-1,2-Dichloroethene	<1		

SCAN 2 - Purgeable Aromatic Hydrocarbons

	CONC.		CONC.
Benzene	<1	m-and/or p-Xylene	<1
Ethyl benzene	<1	o-Xylene	<1
Toluene	<1		

"Improper sample container: data is approximate."

Concentrations are expressed as ug/L.
--- indicates not analyzed.
< (less than) indicates NOT DETECTED, followed by the limit of detection.

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KAR Laboratories, Inc.

PURGEABLE HYDROCARBON ANALYSIS - MICHIGAN DNR SCAN 1 and/or 2

To: American Hydrogeology Corp.

Project No. : 921713
Report Date : 8/18/92

Proj. Desc.: Analysis of samples from General Signal (AHC #24-1136).

Sample No.:921713-05 Type:aqueous Rec'd: 7/28/92 Sampled: 7/21/92

Sample ID: **"H20 #7, 4:10p"**

SCAN 1 - Purgeable Halocarbons

Bromodichloromethane	<1	trans-1,2-Dichloroethene	<1
Bromoform	<1	1,2-Dichloropropane	<1
Bromomethane	<1	cis-1,3-Dichloropropene	<1
Carbon Tetrachloride	<1	trans-1,3-Dichloropropene	<1
Chlorobenzene	<1	Methylene chloride	7.6
Chloroethane	<1	1,1,2,2-Tetrachloroethane	<1
Chloroform	<1	Tetrachloroethene	<1
Chloromethane	<1	1,1,1-Trichloroethane	<1
Dibromochloromethane	<1	1,1,2-Trichloroethane	<1
1,1-Dichloroethane	<1	Trichloroethene	<1
1,2-Dichloroethane	<1	Trichlorofluoromethane	<1
1,1-Dichloroethene	<1	Vinyl chloride	<1
cis-1,2-Dichloroethene	<1		

SCAN 2 - Purgeable Aromatic Hydrocarbons

Benzene	<1	m-and/or p-Xylene	<1
Ethyl benzene	<1	o-Xylene	<1
Toluene	<1		

"Improper sample container: data is approximate.

Concentrations are expressed as ug/L.
--- indicated not analyzed.
< (less than) indicates NOT DETECTED, followed by the limit detection.

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RECEIVED SEP 8 1992

KAR Laboratories, Inc.
4425 Manchester Road
Kalamazoo, MI 49002

(616) 381-9666

ANALYTICAL REPORT

To: American Hydrogeology Corp.
6869 Sprinkle Road
Kalamazoo, MI 49002

Attn: Lisa K.J. Phillips

Proj. No.:	922217
Client No.:	2997
Date Activated:	9/22/92
Date Promised:	10/12/92
Date Reported:	10/12/92
PO#:	

Project Desc.: Analysis of ten samples from General Signal (AHC: 24-1136).

Dear Client:

Attached you will find test results for Project No. 922217. Please refer to this Project No. if you have any questions regarding this work.

Respectfully submitted,
KAR Laboratories, Inc.

William H. Bouma

William H. Bouma, Ph.D.
Director

RECEIVED OCT 14 1992

ANALYTICAL RESULTS

: American Hydrogeology Corp.

Project No: 922217
Report Date: 10/12/92

Project Desc.: Analysis of ten samples from General Signal (AHC: 24-1136).

Sample No.:922217-01 Type:wipe Rec'd: 9/21/92 Sampled: 9/09/92
ID: **"Wipe #1, 10:00am"**

PCB, total, low level *87 micrograms* *Identified and quantified as Aroclor 1260.*

Sample No.:922217-02 Type:wipe Rec'd: 9/21/92 Sampled: 9/09/92
ID: **"Wipe #2, 10:45am"**

PCB, total, low level *130 micrograms* *Identified and quantified as Aroclor 1260.*

Sample No.:922217-03 Type:soil Rec'd: 9/21/92 Sampled: 9/10/92
ID: **"Core - 1, 12:00pm"**

'B, total, low level *0.76 mg/kg* *Identified and quantified as Aroclor 1254.*

Sample No.:922217-04 Type:soil Rec'd: 9/21/92 Sampled: 9/10/92
ID: **"Core - 2, 3:00pm"**

PCB, total, low level *0.17 mg/kg* *Identified and quantified as Aroclor 1254.*

Sample No.:922217-05 Type:solid Rec'd: 9/21/92 Sampled: 9/10/92
ID: **"Core - 2, Concrete 0"-4", 2:30pm"**

PCB, total, low level *0.01 mg/kg* *Identified and quantified as Aroclor 1254.*

Sample No.:922217-06 Type:solid Rec'd: 9/21/92 Sampled: 9/10/92
ID: **"Core - 2, Concrete 4"-6", 2:30pm"**

PCB, total, low level *0.02 mg/kg* *Identified and quantified as Aroclor 1254.*

RECEIVED OCT 1 4 1992

ANALYTICAL RESULTS

: American Hydrogeology Corp.

Project No: 922217
Report Date: 10/12/92

Project Desc.: Analysis of ten samples from General Signal (AHC: 24-1136).

Sample No.:922217-07 Type:solid Rec'd: 9/21/92 Sampled: 9/10/92
ID: **"Core - 2, Concrete 6"-8", 2:30pm"**

PCB, total, low level	0.01 mg/kg	Identified and quantified as Aroclor 1254.

Sample No.:922217-08 Type:solid Rec'd: 9/21/92 Sampled: 9/10/92
ID: **"Core - 1, Asphalt 0-1 3/4", 1:00pm"**

PCB, total, low level	0.10 mg/kg	Identified and quantified as Aroclor 1254.

Sample No.:922217-09 Type:solid Rec'd: 9/21/92 Sampled: 9/10/92
ID: **"Core - 1, Asphalt 1 3/4"-2 3/4", 1:00pm"**

CB, total, low level	<0.33 mg/kg	High detection limit was due to sample matrix interference.

Sample No.:922217-10 Type:solid Rec'd: 9/21/92 Sampled: 9/10/92
ID: **"Core - 1, Asphalt 2 3/4"- 3 5/8", 1:00pm"**

PCB, total, low level	0.07 mg/kg	Identified and quantified as Aroclor 1254.

Unless otherwise noted, test results represent the sample(s) as they were received.

RECEIVED OCT 1 4 1992

KAR Laboratories, Inc.
4425 Manchester Road
Kalamazoo, MI 49002

(616) 381-9666

ANALYTICAL REPORT

To: American Hydrogeology Corp.
6869 Sprinkle Road
Kalamazoo, MI 49002

Attn: Lisa K.J. Phillips

Proj. No.:	932330
Client No.:	2997
Date Activated:	8/30/93
Date Promised:	9/14/93
Date Reported:	9/14/93
PO#:	4005

Project Desc.: Analysis of two samples from General Signal (AHC #24-1136).

Dear Client:

Attached you will find test results for Project No. 932330. Please refer to this Project No. if you have any questions regarding this work. Unless noted otherwise all tests were performed within the maximum U.S. EPA allowable holding times.

Respectfully submitted,
KAR Laboratories, Inc.

Michael J. Jaeger
Director of Laboratories

RECEIVED SEP 16 1993

KAR Laboratories, Inc.

ANALYTICAL REPORT

To: American Hydrogeology Corp.
6869 Sprinkle Road
Kalamazoo, MI 49002

Attn: Lisa K.J. Phillips

Project No.:	932330
Client No.:	2997
Project Date:	8/30/93
Date Promised:	9/14/93
Date Reported:	9/14/93
PO#:	4005

Project Desc.: Analysis of two samples from General Signal (AHC #24-1136).

Sample No.:932330-01 Type:aqueous Rec'd: 8/30/93
Sampled: 8/30/93 3:30pm By:CJ of AHC
ID: "Water Tanks"

Cadmium, total	<0.005 mg/L
Chromium, total	<0.01 mg/L
Copper, total	<0.01 mg/L
Lead, total	<0.002 mg/L
Mercury, total	<0.0005 mg/L
Nickel, total	<0.02 mg/L
Zinc, total	<0.01 mg/L
Cyanide, total	<0.02 mg/L
MDNR Scan 1 & 2	See attached
PCB Aroclor 1016	<0.1 ug/L
PCB Aroclor 1221	<0.1 ug/L
PCB Aroclor 1232	<0.1 ug/L
PCB Aroclor 1242	<0.1 ug/L
PCB Aroclor 1248	<0.1 ug/L
PCB Aroclor 1254	<0.1 ug/L
PCB Aroclor 1260	<0.1 ug/L
PCB Aroclors, total	NA ug/L

Sample No.:932330-02 Type:soil Rec'd: 8/30/93
Sampled: 8/30/93 2:15pm By:CJ of AHC
ID: "Main Soil Pile Composite"

TCLP report	See attached
PCB Aroclor 1016	<330 ug/kg
PCB Aroclor 1221	<330 ug/kg
PCB Aroclor 1232	<330 ug/kg
PCB Aroclor 1242	<330 ug/kg
PCB Aroclor 1248	<330 ug/kg
PCB Aroclor 1254	<330 ug/kg
PCB Aroclor 1260	<330 ug/kg
PCB Aroclors, total	NA ug/kg

Unless otherwise noted, test results represent the sample(s) as they were received.

RECEIVED SEP 16 1993

KAR Laboratories, Inc.

PURGEABLE HYDROCARBON ANALYSIS - Michigan DNR Scan 1 and/or 2

To: American Hydrogeology Corp.

Project No.: 932330
Report Date: 9/14/93

Proj. Desc.:Analysis of two samples from General Signal (AHC #24-1136).

Sample No.:932330-01 Type:aqueous Rec'd: 8/30/93

Sampled: 8/30/93 3:30pm By:CJ of AHC

Sample ID: **"Water Tanks"**

SCAN 1 - Purgeable Halocarbons

Bromodichloromethane	<1	*trans-1,2-Dichloroethene*	<1
Bromoform	<1	*1,2-Dichloropropane*	<1
Bromomethane	<1	*cis-1,3-Dichloropropene*	<1
Carbon tetrachloride	<1	*trans-1,3-Dichloropropene*	<1
Chlorobenzene	<1	*Methylene chloride*	<1
Chloroethane	<1	*1,1,2,2-Tetrachloroethane*	<1
Chloroform	<1	*Tetrachloroethene*	<1
Chloromethane	<1	*1,1,1-Trichloroethane*	<1
Dibromochloromethane	<1	*1,1,2-Trichloroethane*	<1
1,1-Dichloroethane	<1	*Trichloroethene*	<1
1,2-Dichloroethane	<1	*Trichlorofluoromethane*	<1
1,1-Dichloroethene	<1	*Vinyl chloride*	<1
cis-1,2-Dichloroethene	<1		

SCAN 2 - Purgeable Aromatic Hydrocarbons

Benzene	<1	*m-and/or p-Xylene*	<1
Ethyl benzene	<1	*o-Xylene*	<1
Toluene	<1		

Concentrations are expressed as ug/L.
--- indicated not analyzed.
< (less than) indicates NOT DETECTED, followed by the limit of detection.

*SEPA Method 8260

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TOXICITY CHARACTERISTIC LEACHING PROCEDURE EVALUATION OF

A General Signal Sample (AHC #24-1136)

FOR

American Hydrogeology Corp.

KAR Project No.: 932330

September 14, 1993

Performed by:

KAR Laboratories, Inc.
4425 Manchester Road
Kalamazoo, MI 49002

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"AR PROJECT NO.: 932330

INTRODUCTION

On August 30, 1993 one soil sample (AHC #24-1136) was submitted by Lisa K.J. Phillips for TCLP evaluation and analysis. The sample was received in containers labelled "Main Soil Pile Composite." The Toxicity Characteristic Leaching Procedure (TCLP) was performed, followed by extract analysis for the requested constituents. The following tables of this report display the extraction data and analytical results.

METHODS

"Appendix I - Toxicity Characteristic Leaching Procedure" (40 CFR 268) was the method employed for the extraction. Subsequent analysis of the extract were performed according to "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods," SW-846, 2nd edition, U.S. EPA.

SUMMARY OF PROCEDURE

A waste sample is first subjected to some preliminary tests. These may include selection of the appropriate extraction fluid, a solids determination, and whether or not particle size reduction will be needed. A 100.0 gram representative subsample is then obtained, and any free liquids present are separated and stored for later analysis. The solid portion of the waste is combined with 20 times its weight of extraction fluid and rotated end-over-end for 18 ± 2 hours. The aqueous extract is then separated from the solids by filtration, combined with any free liquid separated earlier and analyzed for the requested parameters. The TCLP for volatile organic constituents is performed in the Zero Headspace Extractor (ZHE), a device which minimizes the loss of volatile organic compounds during agitation and filtration.

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TABLE 1

TCLP EXTRACTION DATA

KAR I.D. NO.: 932330-02

CLIENT I.D. : Main Soil Pile Composite

SAMPLE DESCRIPTION: Brown sandy organic soil.

SOLIDS DETERMINATION

Total solids:	93.17 % by weight
Volatile solids:	2.08 % by weight
Fixed solids:	91.09 % by weight

EXTRACTION DATA

	For Non-volatiles	For volatiles
extraction fluid used:	#1	#1
particle size reduction:	Not Required	Not Required
sample weight:	100.0 g	25.4 g
weight of filtered liquid:	0.0 g	0.0 g
weight of solid extracted:	100.0 g	25.4 g
volume of extraction fluid:	2000 mL	508 mL
final pH:	5.9 s.u.	

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TABLE 2

KAR I.D. No.: 932330-02
CLIENT I.D. : Main Soil Pile Composite

RESULTS OF ANALYSES PERFORMED
ON TCLP EXTRACT

(Concentrations are expressed as mg/L)

Parameter	TCLP Extract Concentration	Regulatory Limit*
Arsenic	<0.001	5.0
Barium	0.58	100.0
Cadmium	0.0026	1.0
Chromium	0.006	5.0
Lead	<0.003	5.0
Mercury	<0.0002	0.2
Selenium	<0.01	1.0
Silver	0.0019	5.0

CONCLUSION

This material does not exhibit the Toxicity Characteristic with respect to the eight RCRA metals.

*Established by the U.S. EPA and/or Michigan DNR

"---" indicates not analyzed

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TABLE 3

RESULTS OF ANALYSES PERFORMED ON TCLP EXTRACT

KAR I.D. No.: 932330-02

CLIENT I.D. : Main Soil Pile Composite

(Concentrations are expressed as mg/L

SCAN 1 - Purgeable Halocarbons

	CONC.		CONC.
Bromodichloromethane	<0.001	trans-1,2-Dichloroethene	<0.001
Bromoform	<0.001	1,2-Dichloropropane	<0.001
Bromomethane	<0.001	cis-1,3-Dichloropropene	<0.001
Carbon tetrachloride	<0.001	trans-1,3-Dichloropropene	<0.001
Chlorobenzene	<0.001	Methylene chloride	<0.001
Chloroethane	<0.001	1,1,2,2-Tetrachloroethane	<0.001
Chloroform	<0.001	Tetrachloroethene	<0.001
Chloroemethane	<0.001	1,1,1-Trichloroethane	<0.001
Dibromochloroemethane	<0.001	1,1,2-Trichloroethane	<0.001
1,1-Dichloroethane	<0.001	Trichloroethene	<0.001
1,2-Dichloroethane	<0.001	Trichlorofluoromethane	<0.001
1,1-Dichloroethene	<0.001	Vinyl chloride	<0.001
cis-1,2-Dichloroethene	<0.001		

SCAN 2 - Purgeable Aromatic Hydrocarbons

	CONC.		CONC.
Benzene	<0.001	m-and/or p-Xylene	<0.001
Ethyl benzene	<0.001	o-Xylene	<0.001
Toluene	<0.001		

--- indicates not analyzed.
< (less than) indicates NOT DETECTED, followed by the limit of detection.
USEPA Method 8260

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Ann Arbor
Technical Services, Inc.
290 South Wagner Road • Ann Arbor, Michigan 48103 • 313-995-0995

DATA SUMMARY SHEET

For: Mr. Mick Lynch
American Hydrogeology Corp.
6869 Sprinkle Rd.
Portage, MI 49002

Project: General Signal #69025

Report Date: 3/10/94

Sample I.D. / Sample Date

Parameter	Units		NE Composite 2/16/94	NW Composite 2/16/94	SE Composite 2/16/94	SW Composite 2/16/94		
Aroclor 1221	ug/L		<0.5	<0.5	<0.5	<0.5		
Aroclor 1232	ug/L		<0.1	<0.1	<0.1	<0.1		
Aroclor 1242	ug/L		<0.1	<0.1	<0.1	<0.1		
Aroclor 1248	ug/L		<0.1	<0.1	<0.1	<0.1		
Aroclor 1254	ug/L		<0.1	<0.1	<0.1	<0.1		
Aroclor 1260	ug/L		<0.1	<0.1	<0.1	0.1		
Total PCB USEPA 8080	ug/L		<1	<1	<1	0.1		

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MAR 22 1994
AMERICAN HYDROGEOLOGY CORPORATION

Summary of Findings and Conclusions
PCB Data Review

Benteler Industries, Inc.
9000 East Michigan Avenue
Galesburg, Michigan

Prepared by:

American Hydrogeology Corporation
6869 Sprinkle Road
Portage, Michigan 49002

December 31, 1996

recycled paper

AHC

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Appendix A - Letter From Mr. Gregory Danneffel, P.E.
Appendix B - Computer Simulations of Groundwater Mounding

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EXECUTIVE SUMMARY

Former occupants of a manufacturing facility located at 9000 East Michigan Avenue, Galesburg, Michigan include Hydreco, Inc. and General Signal Corporation. The current occupant is Benteler Industries, Inc. The manufacturing operations performed by each of the occupants resulted in the discharge of non-contact cooling water and storm water into a man-made ditch. The ditch extends south from the facility for a distance of approximately 3,100 feet to Morrow Lake.

The Kalamazoo River Study Group has identified Benteler Industries, Inc. as a contributor of PCBs to the Kalamazoo River Superfund Site based upon the detections of low levels of PCBs in two sediment samples collected in the drainage ditch at 3 and 18 feet from the shoreline of Morrow Lake. While identification of the Aroclors, predominantly 1254, was made at concentrations below the detection limit, the results are consistent with analyses of other sediment samples from the bottom of Morrow Lake.

Studies conducted on the drainage ditch at the Benteler facility have documented the presence of PCBs, Aroclors 1248 and 1260, in the upper reach between the headwall and a point 1,260 feet from the headwall. The source of the PCBs has been determined to be from a transformer that caught on fire during cleaning operations by Benteler on June 17, 1989. There were no PCBs identified in the soil samples collected in the ditch at distances of 1,400 feet, 1,425 feet, and 1,450 feet from the headwall demonstrating a clear discontinuity between the PCB detections in the upper reaches of the ditch 1,260 feet from the headwall and those near the shoreline at Morrow Lake.

Additional studies on the physical condition of the ditch including its hydraulic, geologic, and hydrogeologic characteristics strongly indicate that the ditch functioned more like an infiltration basin rather than a stream. The infiltration capacity of the soil underlying the ditch is very high. Calculations and models support the conclusion that water discharged into the ditch could easily infiltrate the ditch bottom within approximately 1,450 feet from the headwall. Visual observations made since 1989 support this condition.

Based on an absence of identifiable transport mechanisms, and the lack of correlation between the PCB Aroclors detected in the upper reaches of the ditch and those found in sediments from the ditch near, or in, Morrow Lake, the manufacturing facility at 9000 East Michigan Avenue is not the source of the PCBs found in Morrow Lake and in the Kalamazoo River downstream of the Lake.

1.0 INTRODUCTION

Historically, Hydreco, Inc. and General Signal Corporation formerly occupied a manufacturing facility located at 9000 East Michigan Avenue, Galesburg, Michigan. Currently, the site is owned and occupied by Benteler Industries, Inc, which purchased the plant in May 1989. Throughout the existence of the facility, its occupants have discharged noncontact cooling water and storm water into a man-made ditch which has its origin near the southeast corner of the facility. The ditch extends to Morrow Lake which is located approximately 3,100 feet south of the facility. Concern has been expressed allegedly by the Kalamazoo River Study Group and in turn Benteler that polychlorinated biphenyls (PCBs) may have been discharged into the ditch and transported to Morrow Lake and the Kalamazoo River downstream of the lake. It should be noted that the area of concern identified by the Michigan Department of Environmental Quality is actually downgradient of the Morrow Lake dam.

In an effort to determine the validity of the group concerns, American Hydrogeology Corporation (AHC) has reviewed several sources of site data. AHC has also conducted a detailed hydrogeologic investigation at the site and is providing the details, where applicable, to support the conclusions presented herein. This report presents the results of the data review and site investigations.

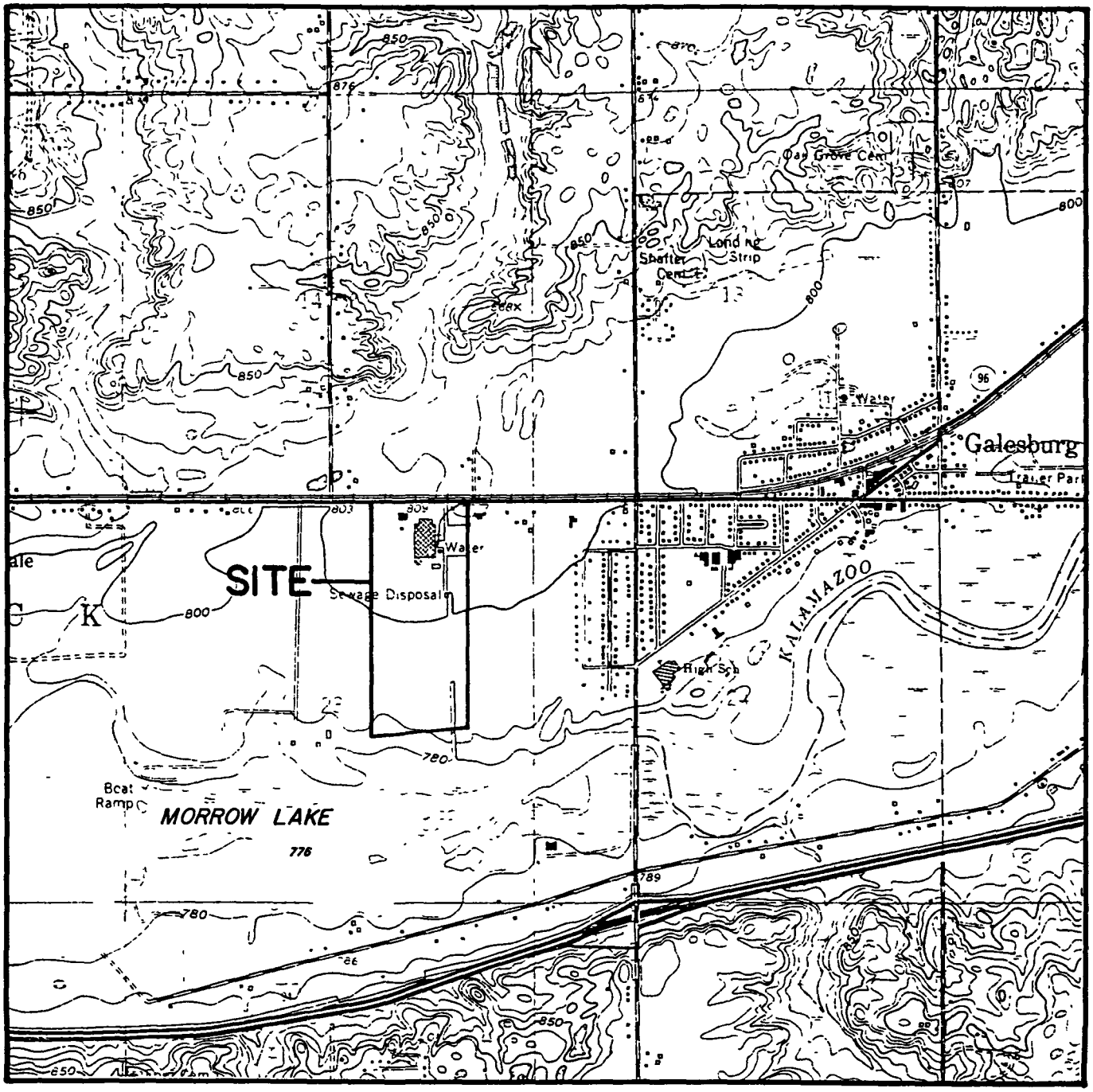
2.0 BACKGROUND

2.1 Location and Surface Topography

The facility at 9000 East Michigan Avenue is located in the NE 1/4, Section 23, T. 2 S., R. 10 W., Comstock Township, Kalamazoo County, Michigan as shown on Figure 1. Ground surface elevations in the area range from 870+ feet mean sea level (msl) approximately 1 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. 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.

2.2 Surface Drainage

In the vicinity of the manufacturing facility, there is a conspicuous absence of surface drainage. The topographic map for the area shows a small surface stream about 0.5 miles north of the site which disappears as it flows out of the upland area and enters the historic flood plain. The map also shows



Contour Interval = 10 feet

FIGURE I

SITE LOCATION MAP

BENTELER INDUSTRIES, INC.

Section 23, T. 2 S., R. 10 W.
Comstock Township
Kalamazoo County, Michigan

MAP LOCATION

N

0 2000 4000 feet

Adapted From USGS 7.5' Topographic Quadrangle: Galesburg, 1961, P.R. 1985

WEC 6/19/91 AHC

an intermittent stream flowing from north to south entering Morrow Lake about 1 mile west of the site. The primary surface water drainage features in the area are the Kalamazoo River and Morrow Lake. Morrow Lake was created in the early to mid-1940s by damming the Kalamazoo River. The top-of-spillway elevation is 776 feet above msl. Lake level fluctuations at the spillway reportedly range between 775.75 and 776.60 feet above msl with the higher water levels occurring during the winter months.

2.3 Soils

The soils in the vicinity of the manufacturing facility (N1/2, NE1/4 of Section 23) have been classified as SaA-Schoolcraft loam, 0 to 2 percent slopes. The Schoolcraft loam is described as nearly level, well drained soil on flat plains, with moderate permeability and slow surface runoff. The substratum to a depth of about 60 inches is dark yellowish brown and yellowish brown sand. The stated permeability of the 38-60 inch depth interval is 6.0 to 20 inches/hour. South of the facility where the ground surface elevations begin to decrease towards Morrow Lake, the soil is classified as OsB-Oshtemo sandy loam, 1 to 6 percent slopes. This nearly level and undulating, well drained soil is on sandy upland plains. Permeability is moderately rapid, and surface runoff is low. The subsoil is about 50 inches thick, the lower part of which is a yellowish brown sand with bands of dark brown loamy sand. The permeability of the 42-69 inch depth interval is listed as >20 inches/hour. Both the Schoolcraft and Oshtemo soils are formed in glacial outwash.

The term permeability, as used to describe water movement in unsaturated soils, equates to the term infiltration. It is the process by which water enters a soil. The maximum rate at which water enters a soil is the infiltration capacity. The Soil Conservation Service has classified soils on the basis of infiltration rates and transmission rates (U.S. EPA et al, 1977). The 6.0 to 20 inches/hour for the Schoolcraft soil would be classified as "rapid." The over 20 inches/hour permeability for the Oshtemo soil would be classified as "very rapid." When a soil is continuously wetted, the infiltration rate (permeability) is initially high but decreases steadily with time, approaching an asymptotic value. The asymptotic value is approximately that of the saturated hydraulic conductivity of the soil.

2.4 Surficial Geology

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 are common. Some planar beds, current bedding and current ripples are 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.

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 16.5 to 53.5 feet of sand and/or gravel. A clay layer was encountered beneath the sand and/or gravel in all the deeper borings. The thickness of the clay layer in the vicinity of the facility is at least 28 feet. A cross section of subsurface conditions along the axis of the discharge ditch is presented in Figure 2.

2.5 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. This portion decreases to the south towards Morrow Lake which has an average water level of 776 feet above msl. Groundwater migrating within the water table aquifer discharges to Morrow Lake. The general direction of groundwater flow is to the south at an average gradient of 2.63×10^{-3} ft/ft. Saturated thickness ranges from about 20 feet just south of the facility to approximately 23 feet near the southeastern corner of the property. 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. The corresponding rate for hydraulic conductivity was 7,600 gpd/ft^2 or 1,016 ft/day or 3.6×10^{-3} m/sec for a saturated thickness of 25 feet.

2.6 Drainage Ditch

2.6.1 Physical Characteristics

The ditch is located near the east property line as shown on Figure 3. Its length is approximately 3,100 feet from the headwall to Morrow Lake. The original character of the portion of the ditch near the manufacturing plant was altered between May and October 1993 by Benteler Industries. Reference Section 4.1 for additional details.

At a point approximately 400 feet south of the headwall, the ditch is bisected by a concrete weir which extends from the ditch bottom to near ground level. Figure 3 shows a survey of the base of the ditch and five profiles at selected locations through the ditch from the headwall to approximately 90 feet from the shoreline of Morrow Lake. Between the headwall and the weir, the width of the ditch is about 32 feet at ground surface decreasing to between 2 and 8 feet along the bottom. Depth varies from about 6 feet at the headwall to about 8 feet at a distance of 220 feet from the headwall.

The ditch becomes more shallow downgradient of the weir. At approximately 1,200 feet from the headwall, the ditch is approximately 29 feet wide at ground surface and about 5 feet deep. At approximately 2,500 feet from the headwall, the ditch is shallower, less than 1 foot deep, and appears to end at a tree line which slopes to a wetlands area. In the wetlands area, the ditch is very flat and shallow. A profile in this area indicates that there is no discernible ditch that would be able to convey water to Morrow Lake. The wetlands appear to be in the area where the water table intersects the ground surface. Periods of high water level elevations in Morrow Lake could also contribute to the presence of the wetland. There is discernible debris from Morrow Lake in the wetland area between approximately 110 and 210 feet from the shoreline. The existence of the debris line is consistent with observations reported by a River Oaks Park employee. River Oaks Park is located adjacent to and west of the facility. According to the River Oaks Park employee, during periods of high lake levels, which occur primarily during the winter months, the water edge approaches the parking lot approximately 150- 200 feet inland from the shoreline of normal lake level.

The elevation of Morrow Lake near the ditch location at the time of the survey (September 28, 1996) was 776.66 feet above msl. A staff gauge set in the lake indicated a high water mark at 777.36 feet above msl. Projection of the 777.36 foot Morrow Lake elevation onto the ground surface indicates that the water in Morrow Lake encroaches onto the shoreline by at least 150 feet. This correlates well with the debris line observed between 110 and 220 feet from the shoreline of Morrow Lake.

The depth to groundwater beneath the ditch varies between about 11.5 feet near the headwall to about 6.5 feet at a point 1,300 feet to the south. This relationship can be seen in the cross section in Figure 2. The average saturated thickness along this ditch segment is at least 22 feet. Observations made of the exposed ditch sidewalls and base show the material to consist of sand and/or gravel with some cobbles. As discussed previously, the infiltration rate for this material is classified as rapid to very rapid (6.0 to over 20 inches/hour or 12.0 to over 40 feet/day).

2.6.1 Historic Use

As stated in the introduction, a ditch was constructed sometime prior to 1974 to convey non-contact cooling water and storm water away from the facility. A National Pollutant Discharge Elimination System (NPDES) permit authorized this discharge. In March 1989, General Signal notified the MDNR that all surface water discharges had been eliminated by General Signal due to the closing of the plant. Benteler purchased the property in May 1989 and apparently continued to discharge noncontact cooling water, stormwater, boiler blowdown water, and liquids into the drainage ditch. On several occasions, water was observed beyond the weir. However, at least since the Spring 1989, there is no

evidence that this wastewater discharged into the ditch ever made it to Morrow Lake. Data provided in Sections 3.0 and 4.0 support this conclusion.

A letter dated September 27, 1990 to Benteler Industries from Mr. Gregory Danneffel, P.E., Surface Water Quality Division of the MDNR, also suggests that the potential for water in the ditch reaching Morrow Lake is minimal. His primary concern was the fact that PCBs had recently been identified in the ditch and that Benteler was continuing to discharge wastewater to the ditch. In his letter, Mr. Danneffel recommended termination of NPDES Permit No. MI0005126 since the water never reaches Morrow Lake, rather it infiltrates directly into the ground. The key points of the letter are summarized below:

> ...Although 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.
>
> Due to the fact that it appears that the discharge is a groundwater discharge, we intend to proceed with the termination of NPDES Permit No. MI0005126. Benteler Industries will need to request a permit exemption for the discharge of noncontact cooling water to the ground....

A copy of this letter is located in Appendix A.

A recent inquiry to the MDEQ has revealed that Benteler Industries, Inc. is currently operating under a general exemption for the discharge of non-contact cooling water to the groundwater of the State. The maximum volume of water authorized for discharge is 86,000 gallons per day. The original application for exemption was filed in October 1991. The exemption was approved in September 1992.

3.0 INFILTRATION RATE AND MOUNDING CALCULATIONS

Observations by AHC during the period of study (since August 1989 to present) show that water discharged into the ditch infiltrates into the underlying soils. This opinion is supported by two analytical methods: infiltration rate calculations and the use of a model to predict the mounding beneath the ditch. The hydraulic conductivity calculated for the water table aquifer based on the data obtained during an extended performance test was 1,016 ft/day. This value was used in the analytical

methods since it is representative of saturated flow and therefore conservative with respect to infiltration (see Section 2.3 - Soils).

3.1 Infiltration Rate

To calculate the infiltration characteristics of the ditch, the ditch was modeled as a constant head permeameter. This device is used in the laboratory to measure the hydraulic conductivity of saturated soils by maintaining a constant head of water on top of the material. The flow through the saturated soil column is measured and the hydraulic conductivity is calculated using Darcy's Law.

A discharge volume for the model was selected from the most recent NPDES permit that authorized discharge of 500 gpm, except that an additional flow volume was added to account for possible rainfall and for other surface runoff. The actual volume discharged by Benteler is not known but is believed to be much less than the authorized volume based upon site observations. By reviewing site maps and measuring the paved area of the site that might contribute runoff to the ditch, it was estimated that 0.9 acres might contribute runoff. It was then assumed that rain falls at a steady rate of 1 inch per hour, which is considered heavy for this area. Such a rainfall over an 0.9 acre area would contribute about 400 gallons per minute to the discharge volume. Thus, a total discharge of 900 gpm was used in the model simulation. The ditch bottom is generally about 4 feet wide.

The calculations show that the 500 gpm permitted discharge plus 400 gpm of runoff could easily infiltrate through the soils along a 1,300 foot segment of the ditch. The value for hydraulic conductivity was 1,016 gpd/ft and the head was 0.25 ft (three inches). Since discharge to the ditch is from a point source at the headwall, the water level will be the highest in that area and will decrease downstream.

3.2 Mounding Calculations

As stated previously, the thickness of the unsaturated soils beneath the ditch ranges from about 11.5 feet near the headwall to about 6.5 feet at a distance of about 1,300 feet from the headwall. When water infiltrates the unsaturated zone and reaches the underlying water table, there is a potential for the water table to rise. Whether or not this actually occurs and the degree to which this occurs depends upon the volume of water reaching the water table over time and the transmissivity of the aquifer. Were mounding to be severe, saturation could occur to the point where the mounded water table rises above the ground surface. Were such a condition to occur along the discharge ditch, then water could flow as surface water towards Morrow Lake.

A computer program called MOUNDHT was used to calculate the potential for mounding beneath the ditch (reference Groundwater, January 1995, pg 139-143). MOUNDHT uses the Hantush method to perform the calculations.

Three possible scenarios were modeled:

RUN #1: length of recharge basin (L) = 400 feet assumes all discharge infiltrates the ditch between the headwall and the weir. Recharge basin area = 1,600 square feet.

RUN #2: Length of recharge basin (L) = 900 feet assumes all discharge infiltrates the ditch within 900 feet downstream of the weir. Recharge basin area = 3,600 square feet.

RUN #3: Length of recharge basin (L) = 1,300 feet assumes that all discharge occurs between the headwall and a point 1,300 feet downstream. Recharge basin area = 5,200 square feet.

The other input parameters used in the model were:

1. width of recharge basin (W) = 4 feet
2. saturated thickness of aquifer (H) = 22 feet (average)
3. specific yield of aquifer (S_y) = 0.25
4. hydraulic conductivity of aquifer (K) = 1,016 feet/day
5. constant rate of recharge (I) = 900 gpm (1,296,000 gpd)
7. time period (T) = 1 year

Results of the model simulation are presented as Appendix B. Based on the MOUNDHT simulation model, mounding would not exceed:

1. RUN #1 (L = 400 feet) = 5.29 feet
2. RUN #2 (L = 900 feet) = 4.47 feet
3. RUN #3 (L = 1,300 feet) = 4.08 feet

Since the thickness of the unsaturated zone underlying the ditch bottom ranges between 6.5 feet and 11.5 feet, the rise in the water table or mounding beneath the ditch would not intersect the ground surface and would not contribute to surface water flow.

Based on the MOUNDHT simulation model, mounding would not exceed 5.29 feet after 1 year of constant discharge at 900 gpm to a 400 foot long stream segment. For a discharge of 900 gpm to a 1,300 foot long stream segment, mounding would not exceed 4.08 feet after 1 year.

4.0 SAMPLING AND ANALYSES

4.1 Drainage Ditch

On June 17, 1989 Benteler was performing cleaning operations and water from power washing gained entry into the transformer circuitry causing a short which resulted in an explosion and fire. After the fire, Benteler continued with their cleaning operations. Reportedly, the water in the plant made its way into the floor drains and outside the plant facility with some of the water ultimately draining into the ditch.

Subsequent to the transformer fire and explosion, Benteler personnel observed a leak from the same transformer. Sampling and analyses for PCBs were initiated on August 3, 1989. The leaking fluid was sampled by WESCO and determined to contain PCBs identified as Aroclor 1260. WESCO also collected floor wipe samples on the concrete floor around the leaking transformer for analyses of PCBs. Laboratory analyses of the floor wipe samples indicated PCBs identified as Aroclor 1260.

These events, that occurred after General Signal sold the property to Benteler, initiated further investigation relative to PCBs at the plant. The results and conclusions of the sampling are summarized in following sections.

4.1.1 Historic Soil Quality Data From the Drainage Ditch

In 1991, WW Engineering & Science (WWES) collected samples from several locations at the site, including 20 sediment samples from the base and sidewalls of the drainage ditch (reference "A Site Investigation of Sewage Treatment Plant, Butler Building, Drainage Ditch, Sanitary Sewer Drain Line", WW Engineering and Science, July, 1991). Eleven base samples were collected, five samples were collected from the west sidewall, and four samples were collected from the east sidewall. Figure 4 shows the sampling locations within the ditch. Figure 2 presents a graph of the PCB concentrations versus distance along the ditch.

These soil samples were analyzed for Aroclor 1242, Aroclor 1248, Aroclor 1254, and Aroclor 1260. Along the base of the ditch, seven of the eleven samples contained Aroclor 1248 and Aroclor 1260; there were no detections of Aroclor 1242 or Aroclor 1254. The highest concentration of PCB (84 mg/kg, Aroclor 1248) was found in the sample collected 110 feet south from the headwall. No PCBs were detected (to method detection limits) in any of the five west sidewall samples. Only one of the

four east sidewall samples contained detectable levels of PCBs. That sample was collected 230 feet south of the headwall and contained 0.04 mg/kg of Aroclor 1248.

Several soil samples were also collected by WWES and AHC from between the Consumers Power electric substation and the headwall of the drainage ditch and analyzed for PCBs as a result of observations of stressed vegetation and discolored soil in this area. Some runoff from the substation area drains into the ditch. Three soil samples indicated PCB concentrations ranging between 0.005 and 0.110 mg/kg identified as Aroclor 1260. The soil sample locations are shown on Figure 4.

Analyses of other base samples collected at distances of 1,400 feet, 1425 feet, and 1450 feet south of the headwall showed no PCBs to method detection limits. The decline in PCB concentrations downstream in the ditch is consistent with the concept that subsequent to the release of PCBs into the ditch (after May 1989), water discharging from the plant into the ditch infiltrated into the subsurface and never reached Morrow Lake. Note that the distance along the ditch from the southernmost downgradient detection of PCBs to the shoreline of Morrow Lake is about 1,650 feet.

4.1.2 Remediation of Drainage Ditch

According to a report prepared by Terra Environmental, Corporation entitled "Benteler Industries Remediation of Storm Sewer and On Site Ditch, Final Report, February 9, 1994" a total of 795 cubic yards of contaminated soil were removed from the ditch and approximately 75 cubic yards of soil were removed from around the manhole for storm sewer no. 8 as part of the remediation project. These remedial activities were performed between May and October 1993 by Benteler Industries.

4.2 GZA/Donohue Morrow Lake Study (September 1988)

The report entitled "Technical Memoranda Sampling for PCB Contamination, Kalamazoo River: Morrow Lake, Comstock, Michigan" prepared by GZA/Donohue, September 9, 1988 presented the results of surface sediment samples collected from 18 locations in Morrow Lake.

Eighteen sediment samples were collected by GZA/Donohue from Morrow Lake. All Aroclors detected in the lake sediment were identified as Aroclor 1254. The highest concentration identified was 2.4 mg/kg and the lowest was 0.029 mg/kg.

Four core samples were collected from the sediments of Morrow Lake. All core samples showed a decline in PCB concentrations to less than the detection limits at depths greater than 2 feet. The concentrations in the upper 1 foot of the cores compared with the concentrations observed in the

sediment samples. The cores with the highest concentrations of PCBs are located in the same general area as the sediment samples that contained the highest concentrations of PCBs.

4.3 Blasland, Bouck and Lee Study (May 1994)

The PCB sampling information summarized in the May 1994 report entitled "Allied Paper Inc./Portage Creek/Kalamazoo River Superfund Site PRP Case Study, Benteler Industries Inc., Galesburg, MI" prepared by Blasland Bouck & Lee (BBL) indicates detections of PCBs in two sediment cores located within 3 and 18 feet from Morrow Lake.

The results of the core samples were as follows. Please note that all of these detections of the Aroclors were estimated by the laboratory since they were below the method detection limit of 1 mg/kg. Please note also that there was no information provided in this report regarding sampling and decontamination procedures.

Distance From Morrow Lake	Sample Depth	*Estimated* Concentrations (mg/kg)
18 feet	0-0.5 feet	1.1 total PCBs 0.93 Aroclor 1254 0.20 Aroclor 1260
	0.5-1.0 feet	0.23 total PCBs (Quantified as Aroclor 1254) Duplicate 0.55 total PCBs 0.43 (Aroclor 1254) 0.12 (Aroclor 1260)
	1.0-1.6 feet	0.37 total PCBs (Quantified as Aroclor 1254)
3.0 feet	0-0.5 feet	0.051 total PCBs (Quantified as Aroclor 1254)
	0.5-1 feet	0.031 total PCBs (Quantified as Aroclor 1248)
	1-1.8 feet	below the detection limit

The rather small PCB concentrations and Aroclors that were detected in the ditch 3 and 18 feet from the shoreline of Morrow Lake are consistent with the concentrations and identified Aroclors found in Morrow Lake. All concentrations were below the generic residential direct contact value of 2.3 mg/kg set for PCBs for soil. There were no detections of Aroclors 1248 and 1260 in Morrow Lake above the detection limit of 0.2 ppm. The concentrations of Aroclors 1248 and 1260 in the ditch samples collected by BBL were at or were below the 0.2 ppm detection limit. There were no detections of

Aroclor 1254 in the ditch at the Benteler facility. The detections of Aroclor 1254 inside the Benteler building (two concrete core samples and one wipe sample) were questionable based on low detection levels, inconsistent Aroclors, and the possibility of matrix interferences. With the exception of two detections of Aroclor 1248, only Aroclor 1260 was detected in the drainage ditch at the Benteler facility. These detections in the ditch at Benteler do not correlate with the detections along the shore of Morrow Lake where there were higher concentrations and more frequent detections of Aroclor 1254.

The lack of any PCBs detected at depths greater than 1 foot in the sample collected within 3 feet from the shore of Morrow Lake provides evidence that minimal levels of PCBs may have been deposited more recently by flooding and resedimentation in Morrow Lake.

5.0 CONCLUSIONS

Based upon the information and data obtained and reviewed during the course of this investigation, we are of the opinion that the facility located at 9000 East Michigan Avenue in Galesburg, Michigan, currently occupied by Benteler Industries, Inc. has not been a source of PCBs found in Morrow Lake and the Kalamazoo River downstream of the lake. The following conclusions support that opinion:

- The presence of PCBs in the ditch at a location considerably upgradient of Morrow Lake is attributable to the transformer that caught fire on June 17, 1989. It is extremely unlikely that any PCBs emitted from that event were transported via the drainage ditch to Morrow Lake since that time because no transport mechanism has been identified which was capable of carrying PCBs from the upper segment of the drainage ditch to Morrow Lake. The infiltration capacity of the soil underlying the ditch is very high. Water discharged into the ditch could easily infiltrate the ditch bottom within approximately 1,450 feet +/- of the headwall. Furthermore, the potential for mounding of the water table was modeled using data representative of on-site conditions. Mounding, even under extreme conditions, was insufficient to cause the water table to rise above the ditch bottom. Therefore, there would be no surface water flow in the ditch due to mounding;

- The primary form of PCB identified in sediment samples collected in the ditch at distances of 3 and 18 feet from the normal Morrow Lake shoreline was Aroclor 1254. This Aroclor is more consistent with the PCB Aroclor detections found in sediments from other locations in Morrow Lake. The PCB concentrations found on the shoreline are rather minimal;

- There are documented sources of PCBs in the Kalamazoo River upstream of Morrow Lake and in the sediments within Morrow Lake;

- Both physical evidence and personal observations demonstrate that during periods of high water levels in Morrow Lake, the water's edge encroaches approximately 110-220 feet on the shore which encompasses the area sampled by Blasland, Bouck & Lee. Therefore, the PCBs along the shoreline and in the low area of the ditch within 18 feet from Morrow Lake are attributable to redistribution and deposition of sediments and organics during periods of high lake levels and not due to the Benteler site;

- No PCBs were detected in the soil samples from the ditch greater than 1,400 feet from the headwall. The three soil samples collected from the ditch bottom at approximate distances of 1,400 feet, 1,425 feet, and 1,450 feet from the headwall contained no detectable concentrations of PCBs to method detection limits demonstrating no PCBs were ever transported beyond this point.

In summary, the investigation concludes that based on an absence of identifiable transport mechanisms, and the lack of correlation between the PCB Aroclors detected in the upper reaches of the ditch and those found in sediments from the ditch near or in Morrow Lake, the current Benteler manufacturing facility, which was previously occupied by a General Signal predecessor, has not been the source of the PCBs found in Morrow Lake and in the Kalamazoo River downstream of Morrow Lake.

Appendix A

Letter From Mr. Gregory Danneffel, P.E.

GR/i

STATE OF MICHIGAN

NATURAL RESOURCES COMMISSION
THOMAS J. ANDERSON
MARLENE J. FLUHARTY
KERRY KAMMER
O. STEWART MYERS
DAVID D. OLSON
RAYMOND POUPORE

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

DAVID F. HALES, Director

District 12 Headquarters
P.O. Box 355, Plainwell, Michigan 49080

September 27, 1990

RECEIVED
OCT 02 1990
WASTE MANAGEMENT DIVISION
GRAND RAPIDS

Mr. Dave Corbin
Benteler Industries, Inc.
9000 East Michigan
Galesburg, Michigan 49053

Dear Mr. Corbin:

SUBJECT: NPDES Discharge Permit No. MI0005126

The purpose of this letter is to follow up our recent discussions regarding Benteler Industries' discharge to the ditch west of the plant building.

The subject permit was issued to General Signal Corporation, Hydreco Unit, on November 20, 1986. The permit authorized the discharge of noncontact cooling water and stormwater to the Kalamazoo River. A March 23, 1989 Letter from Mr. Charles VanDeLaare of Hydreco stated that the NPDES permit would "no longer be required" due to the closing of the plant.

Although 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.

Due to the fact that it appears that the discharge is a groundwater discharge, we intend to proceed with the termination of NPDES Permit No. MI0005126. Benteler Industries will need to request a permit exemption for the discharge of noncontact cooling water to the ground. A form is enclosed for your use in making this request.

In addition, the following steps need to be taken by Benteler Industries to address the potential discharges to the ground and/or surface water:

1. All discharges to the ditch, including stormwater, must be ceased. This is due to the possibility that large stormwater flows could transport PCB's in the ditch to the Kalamazoo River.

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2. The boiler blowdown water should be rerouted to the sanitary sewer. Please contact Mr. Bruce Merchant, Industrial Services Supervisor, Kalamazoo Water Reclamation Plant, for information regarding their regulations. His telephone number is 385-8157.

3. The outlets of all floor drains in the plant have not been identified. All potential floor drain discharges to the groundwater or surface water must be eliminated.

Please provide this office with a plan and schedule, no later than November 1, 1990, that will address these issues. A copy of the plan should also be submitted to Ms. Mary Douglas, Plainwell District, Waste Management Division.

In addition, we would like to be kept informed of the status of the investigation being planned to identify the extent of PCB contamination in the ditch. We are especially concerned that the investigation and subsequent remediation will address all areas that may be potential sources of PCB's to the Kalamazoo River.

Please feel free to contact me if you have any questions regarding this letter.

Sincerely,

Gregory A. Danneffel, P.E.
Surface Water Quality Division
616-685-8886

GD:clw

Enclosure

cc: Mary Douglas, Plainwell District, WMD
Judie Gapp, Plainwell District, ERD
Eric Van Riper, Grand Rapids District, WMD
JoAnn Kalemkiewicz, Permits Section, SWQD
Bruce Merchant, Kalamazoo Water Reclamation Plant

Appendix B

Computer Simulations of Groundwater Mounding

Accurately computes the maximum height of a ground-water mound forming on an extensive and initially near-horizontal saturated aquifer beneath a rectangular recharge area. Uses the method of Hantush (Water Res. Research, vol. 3, no. 1, 1967, pp. 227-234) (see Ground Water journal, vol. __, no. _, 1994, pp. _____)

Originally developed in 1992-93 by
Professor E. John Finnemore
Department of Civil Engineering
Santa Clara University
Santa Clara, California 95053
Tel: 408-554-4924, Fax: 408-554-5474

Assisted in programming by Jennifer Fong

Caution: Such prediction methods need to be used with judgement by experienced engineers who are aware of their limitations.
** No guarantees are expressed or implied **

Run 1

DATA ENTERED:

Recharge area width,	W =	4.0	ft
Recharge area length,	L =	400.0	ft
Saturated depth of aquifer,	H =	22.0	ft (no mound)
Specific yield of aquifer,	Sy =	.250	
Aquifer hydraulic conductivity,	K =	1016.000	ft/day
Constant rate of recharge,	I =	108.3000	ft/day
Input mound-growth time,	TYR =	1.00	years
Name of file written	=	final.dat	

COMPUTED RESULTS:

Example of calculation accuracy:

NO. OF N-R ITERATION	LAST HEIGHT CORRECTION (FT)	MAX MOUND HEIGHT (FT)
1	99.0000000000	5.85969
2	.5671883277	5.29250
3	-.0005278933	5.29303
4	-.0000000004	5.29303

Mound height results:

YEARS	MAX MOUND HEIGHT (FT)	# N-R ITERS	Z/H	ACCURACY RANGE
1.0	5.293	4	.24059	1

Accuracy ranges:

RANGE	Z/H	SOURCE	ACCURACY

1	0 - 0.5	Rao & Sarma (1980)	To 2%
"	"	Hantush (1967b)	To 6%
2	0.5 - 3.3	Rao & Sarma (1980)	To 2%

Accurately computes the maximum height of a ground-water mound forming on an extensive and initially near-horizontal saturated zone beneath a rectangular recharge area. Uses the method of Hantush (Water Res. Research, vol. 3, no. 1, 1967, pp. 227-234) (see Ground Water journal, vol. __, no. _, 1994, pp. _____)

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** No guarantees are expressed or implied **

Run 2

DATA ENTERED:

Recharge area width,	W =	4.0	ft
Recharge area length,	L =	900.0	ft
Saturated depth of aquifer,	H =	22.0	ft (no mound)
Specific yield of aquifer,	Sy =	.250	
Aquifer hydraulic conductivity,	K =	1016.000	ft/day
Constant rate of recharge,	I =	48.1300	ft/day
Input mound-growth time,	TYR =	1.00	years
Name of file written	=	final3.dat	

COMPUTED RESULTS:

Example of calculation accuracy:

NO. OF N-R ITERATION	LAST HEIGHT CORRECTION (FT)	MAX MOUND HEIGHT (FT)
1	99.0000000000	4.86443
2	.3946704956	4.46976
3	-.0002193710	4.46998
4	-.0000000001	4.46998

Mound height results:

YEARS	MAX MOUND HEIGHT (FT)	# N-R ITERS	Z/H	ACCURACY RANGE
1.0	4.470	4	.20318	1

Accuracy ranges:

RANGE	Z/H	SOURCE	ACCURACY

1	0 - 0.5	Rao & Sarma (1980)	To 2%
"	"	Hantush (1967b)	To 6%
2	0.5 - 3.3	Rao & Sarma (1980)	To 2%
3*	> 3.3	None	No claims

Ver. 1.1 MOUNDHT April 1994

Accurately computes the maximum height of a ground-water mound forming on an extensive and initially near-horizontal saturated ne beneath a rectangular recharge area. Uses the method of ntush (Water Res. Research, vol. 3, no. 1, 1967, pp. 227-234) (see Ground Water journal, vol. __, no. _, 1994, pp. _____)

Originally developed in 1992-93 by
Professor E. John Finnemore
Department of Civil Engineering
Santa Clara University
Santa Clara, California 95053
Tel: 408-554-4924, Fax: 408-554-5474

Assisted in programming by Jennifer Fong

Caution: Such prediction methods need to be used with judgement by experienced engineers who are aware of their limitations.
** No guarantees are expressed or implied **

Run 3

DATA ENTERED:

Recharge area width,	W =	4.0	ft
Recharge area length,	L =	1300.0	ft
Saturated depth of aquifer,	H =	22.0	ft (no mound)
Specific yield of aquifer,	Sy =	.250	
Aquifer hydraulic conductivity,	K =	1016.000	ft/day
Constant rate of recharge,	I =	33.3000	ft/day
Input mound-growth time,	TYR =	1.00	years
Name of file written	=	final2.dat	

COMPUTED RESULTS:

Example of calculation accuracy:

NO. OF N-R ITERATION	LAST HEIGHT CORRECTION (FT)	MAX MOUND HEIGHT (FT)
1	99.0000000000	4.40967
2	.3247291015	4.08494
3	-.0001359666	4.08508
4	.0000000000	4.08508

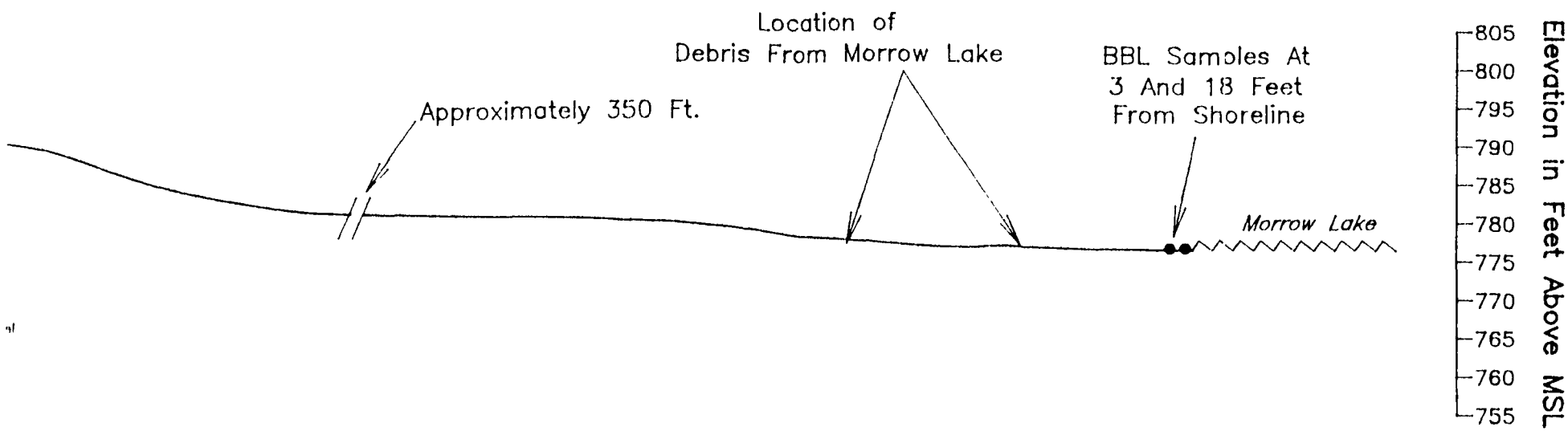
Mound height results:

YEARS	MAX MOUND HEIGHT (FT)	# N-R ITERS	Z/H	ACCURACY RANGE
1.0	4.085	4	.18569	1

Accuracy ranges:

RANGE	Z/H	SOURCE	ACCURACY

1	0 - 0.5	Rao & Sarma (1980)	To 2%
"	"	Hantush (1967b)	To 6%
2	0.5 - 3.3	Rao & Sarma (1980)	To 2%



LEGEND

WWES PCB Sample Locations And Concentration (May, 1991)
BBL PCB Sample Locations (March, 1994)

FIGURE 2
CROSS SECTION
BENTELER INDUSTRIES, INC.
9000 East Michigan Ave.
Galesburg, Michigan

D3996F

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Injection Well (IW)
Power Pole (PP)
Manhole (MH)

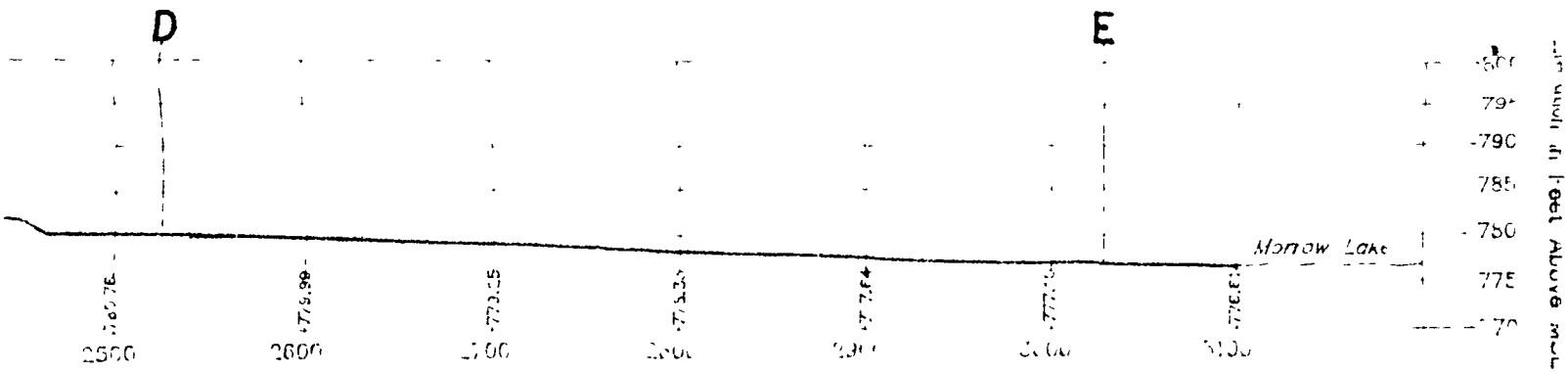

FIGURE 3

DITCH PROFILE AND PLAN

BENTELER INDUSTRIES, INC.

Section 23, T. 2 S., R. 10 W.
Comstock Township
Kalamazoo County, Michigan

AMERICAN HYDROGEOLOGY

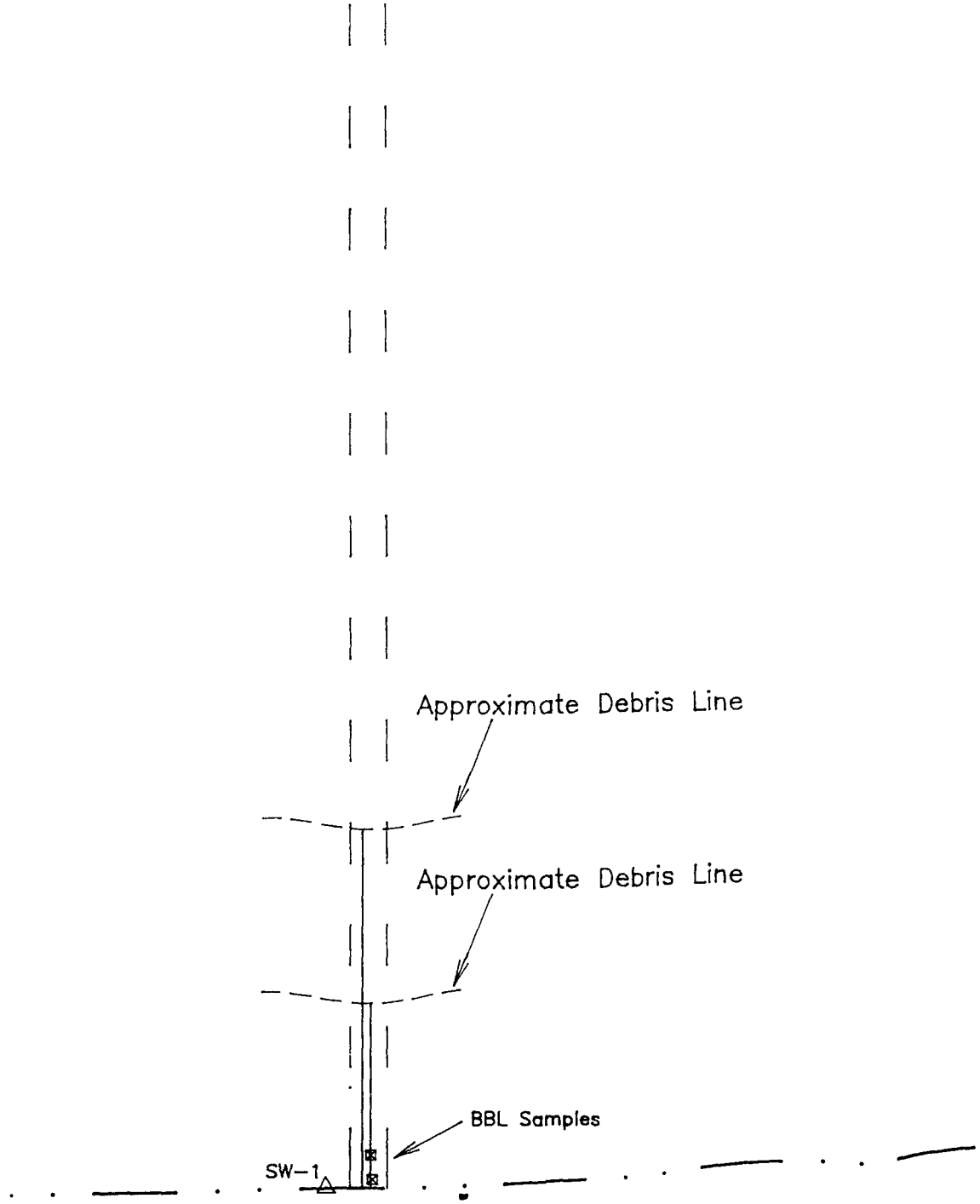

FIGURE 4

PCB SAMPLING LOCATIONS

BENTELER INDUSTRIES, INC.

Section 23, T. 2 S., R. 10 W.
Comstock Township
Kalamazoo County, Michigan

D3950 6/26/96

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AMERICAN HYDROGEOLOGY CORPORATION

Environmental Consulting Services

Michigan Office
6869 Sprinkle Road
Kalamazoo, Michigan 49001
(616) 329-1600
Fax (616) 329-2494

Indiana Office
422 Washington Street • P.O. Box 911
Columbus, Indiana 47202-0911
(812) 372-1100
Fax (812) 372-0999

January 7, 1997

FILE COPY

Mr. Robert O'Day
Public Services Department
Water Reclamation Plant
1415 N. Harrison
Kalamazoo, MI 49007-2565

Re: Industrial User Self-Monitoring Report
General Signal Corporation/Benteler Automotive, 9000 East Michigan Avenue, Galesburg

Dear Mr. O'Day:

Attached please find the Industrial User Self-Monitoring Report for the above referenced facility for the period of July 1, 1996 to December 31, 1996.

Please contact me at 329-1600 with any questions or comments you may have.

Very truly yours,

AMERICAN HYDROGEOLOGY CORPORATION

Judith L Smith

Judith L. Smith
Associate Scientist

JLS/jls/24-1136

Enclosure: Industrial User Self-Monitoring Report

cc: Mr. Daniel McGrade, General Signal Corporation
Ms. Linda Jones Zabik, American Hydrogeology Corporation

C:\AHC\WPFILES\24-1136\SLFMONRP.197

KALAMAZOO WATER RECLAMATION PLANT

INDUSTRIAL USER SELF-MONITORING REPORT

Facility: General Signal Corporation
1 Highridge Park
PO Box 10010
Stanford CT 06904

Due: January 10, 1997

Reporting Period: July 1, 1996 - December 31, 1996

Sample Code: GSC

Location: Sump in the northeast corner of the treatment building.

Monitoring Requirements:

Pollutants	Daily Max.	Monthly Avg. Max.	Unit	Results	Sample Type
BETX	15		mg/l	<0.001	GRAB
CADMIUM	40		ug/l	<5	GRAB
COPPER	2230		ug/l	<20	GRAB
CYANIDE	250		ug/l	<5	GRAB
LEAD	110		ug/l	<50	GRAB
MDEQ Scan # 1			ug/l	<1	GRAB
MERCURY	0		ug/l	<0.5	GRAB
NICKEL	1590		ug/l	<20	GRAB
PCBs	0		ug/l	<0.1	GRAB
TOTAL CHROMIUM	4670		ug/l	<10	GRAB
TOTAL PETROLEUM HYDROCARBON	100		mg/l	1	GRAB
ZINC	5300		ug/l	24	GRAB
pH	6.2 - 9.8		S.U.	8.2	GRAB

N/R indicates Not Required

PLEASE ATTACH COPIES OF LABORATORY RESULTS

Flow Information: 55.6 Average Daily (GPD) 208.8 Maximum Daily (GPD)

Date and Time of Sampling:

Composite: _____

Grab: 11/22/96 ; 2:00 pm

Note: If more than one batch is discharged on the day of sampling, please sample each batch and composite the samples prior to analysis.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Contact: Linda Zabik

Linda Zabik

1/7/97
Date

Title: Project Manager/Hydrogeologist

L2/T5/K

KAR *Laboratories, Inc.*

4425 Manchester Road
Kalamazoo, MI 49001
Phone 616 381-9666
Fax 616 381-9698

American Hydrogeology Corp.
6869 Sprinkle Road
Kalamazoo, MI 49002

KAR Project No. :	*963257*
Date Reported :	*12/09/96*
Date Activated :	*11/22/96*
Date Due :	*12/09/96*
Date Validated :	*12/07/96*

Attn : *Ms. Lisa K.J. Phillips*

Project Description : *Analysis of one IPP Monitoring sample from General Signal (AHC #1136).*

Dear Client,

Your laboratory data is presented to you in this report. Unless otherwise stated under the "Comments" heading, all tests were performed within the maximum allowable holding times, have met or exceeded QC requirements and the result represents the sample as it was received.

If you wish to contact us about this work please mention KAR Project No. 963257. To arrange additional sampling or testing please contact our Client Services Department. If you have a question regarding quality assurance please contact William Rauch.

Thank you for the opportunity to serve you. Please do not hesitate to call if we can provide additional assistance.

Respectfully submitted,

Michael J. Jaeger
Director of Laboratories

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KAR Laboratories, Inc. maintains Full Certification status for Bacteriology, Inorganics, Regulated Organics and Synthetic Organics through Michigan Department of Public Health and USEPA. This report may only be reproduced in full and not without the written consent of American Hydrogeology Corp..

KAR Laboratories, Inc. Service

LABORATORY REPORT

KAR Project No. : *963257*
Date Reported : *12/09/96*

Client: *American Hydrogeology Corp.*

Project Description : *Analysis of one IPP Monitoring sample from General Signal (AHC #1136).*

Sample ID : *"Sump"*
Sampled By : *TM of AHC*
Sample Date : *11/22/96*
Sample Time : *2:00pm*
Date Received : *11/22/96*
Sample Type : *aqueous*
KAR Sample No. : *963257-01*

Test	Result	Units of Measure	Method	Analyzed	Analyst	Comments
Prep, Hg	Completed		EPA 245.2	12/2/96	MTM	
Prep, metals	Completed		EPA 30xx,200.x	11/25/96	DBL	
Cadmium, total	<5	ug/L	EPA 200.7	12/3/96	DBL	
Chromium, total	<10	ug/L	EPA 200.7	12/3/96	DBL	
Copper, total	<20	ug/L	EPA 200.7	12/3/96	DBL	
Lead, total, by ICP	<50	ug/L	EPA 200.7	12/3/96	DBL	
Mercury, total	<0.5	ug/L	EPA 7471A	12/3/96	MTM	
Nickel, total	<20	ug/L	EPA 200.7	12/3/96	DBL	
Zinc, total	24	ug/L	EPA 200.7	12/3/96	DBL	
Cyanide, total	<5	ug/L	EPA 335.2	12/3/96	PML	
PH	8.2	S.U.	EPA 150.1	11/22/96	KAC	
TPH (Gravimetric Method)	1	mg/L	EPA 413.1 mod.	12/4/96	PML	
MDNR Scan 1 & 2	See below		EPA 8260	11/27/96	JAR	
Prep, VOA	Completed		EPA 5030	11/27/96	JAR	
1,1,1-Trichloroethane	<1	ug/L	EPA 8260	11/27/96	JAR	
1,1,2,2-Tetrachloroethane	<1	ug/L	EPA 8260	11/27/96	JAR	
1,1,2-Trichloroethane	<1	ug/L	EPA 8260	11/27/96	JAR	
1,1-Dichloroethane	<1	ug/L	EPA 8260	11/27/96	JAR	
1,1-Dichloroethene	<1	ug/L	EPA 8260	11/27/96	JAR	
1,2-Dichloroethane	<1	ug/L	EPA 8260	11/27/96	JAR	
1,2-Dichloropropane	<1	ug/L	EPA 8260	11/27/96	JAR	
Benzene	<1	ug/L	EPA 8260	11/27/96	JAR	
Bromodichloromethane	<1	ug/L	EPA 8260	11/27/96	JAR	
Bromoform	<1	ug/L	EPA 8260	11/27/96	JAR	
Bromomethane	<1	ug/L	EPA 8260	11/27/96	JAR	
Carbon tetrachloride	<1	ug/L	EPA 8260	11/27/96	JAR	
Chlorobenzene	<1	ug/L	EPA 8260	11/27/96	JAR	
Chloroethane	<1	ug/L	EPA 8260	11/27/96	JAR	
Chloroform	<1	ug/L	EPA 8260	11/27/96	JAR	
Chloromethane	<1	ug/L	EPA 8260	11/27/96	JAR	
Cis-1,2-Dichloroethene	<1	ug/L	EPA 8260	11/27/96	JAR	
Cis-1,3-Dichloropropene	<1	ug/L	EPA 8260	11/27/96	JAR	
Dibromochloromethane	<1	ug/L	EPA 8260	11/27/96	JAR	
Ethylbenzene	<1	ug/L	EPA 8260	11/27/96	JAR	
M-and/or p-xylene	<1	ug/L	EPA 8260	11/27/96	JAR	
Methylene chloride	<1	ug/L	EPA 8260	11/27/96	JAR	
O-Xylene	<1	ug/L	EPA 8260	11/27/96	JAR	
Tetrachloroethene	<1	ug/L	EPA 8260	11/27/96	JAR	
Toluene	<1	ug/L	EPA 8260	11/27/96	JAR	
Trans-1,2-Dichloroethene	<1	ug/L	EPA 8260	11/27/96	JAR	

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LABORATORY REPORT

KAR Project No. : *963257*
Date Reported : *12/09/96*

Client: *American Hydrogeology Corp.*

Project Description : *Analysis of one IPP Monitoring sample from General Signal (AHC #1136).*

Sample ID : *"Sump"*
Sampled By : *TM of AHC*
Sample Date : *11/22/96*
Sample Time : *2:00pm*

Date Received : *11/22/96*
Sample Type : *aqueous*
KAR Sample No. : *963257-01*

Test	Result	Units of Measure	Method	Analyzed	Analyst	Comments
Trans-1,3-Dichloropropene	<1	ug/L	EPA 8260	11/27/96	JAR	
Trichloroethene	<1	ug/L	EPA 8260	11/27/96	JAR	
Trichlorofluoromethane	<1	ug/L	EPA 8260	11/27/96	JAR	
Vinyl chloride	<1	ug/L	EPA 8260	11/27/96	JAR	
Prep, ECD	Completed		EPA 3510	11/27/96	SAS	
PCB Aroclor 1016	<0.1	ug/L	EPA 8081	12/6/96	MSZ	
PCB Aroclor 1221	<0.1	ug/L	EPA 8081	12/6/96	MSZ	
PCB Aroclor 1232	<0.1	ug/L	EPA 8081	12/6/96	MSZ	
PCB Aroclor 1242	<0.1	ug/L	EPA 8081	12/6/96	MSZ	
PCB Aroclor 1248	<0.1	ug/L	EPA 8081	12/6/96	MSZ	
PCB Aroclor 1254	<0.1	ug/L	EPA 8081	12/6/96	MSZ	
PCB Aroclor 1260	<0.1	ug/L	EPA 8081	12/6/96	MSZ	
PCB Aroclors, total	NA		EPA 8081	12/6/96	MSZ	

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6869 Sprinkle Road, Portage, Michigan 49002
(616) 329-1600 • FAX (616) 329-2494

IN OF CUSTODY RECORD

Name: General Signal

Project No.: 1136

Analyses Requested

MDL Requested

Tory/Lab Quote No.: KAP LABS/ 94-02

AHC Purchase Order No.: 8464

ed By: Tim Myers

Sample Location	Sample Type S	Sample Type W	Sample Type O	Date Taken	Time Taken	No. of Bottles & Type	Scan to See Attached List									MDEQ Part 201/Part 213	Other
Effluent		✓		11-22-96	2:05p	2 Doms	✓										
PW-B		✓		"	2:10p	"	✓										
PW-A		✓		"	2:15p	"	✓										
Sump		✓		"	2:00p	2 Doms, 1-amber 1-Phenol-16, 1 phenol 1-phenol-500, 1 (SOM) 1-Doms-16		✓									

REQUIRED TURNAROUND TIME: ☐ STANDARD ☐ RUSH: ~~5TD~~ / 1WK DAYS

Attention Laboratory: Project deadlines require that reports of these analyses be received by American Hydrogeology Corporation not later than ~~5TD~~ / 1WK. If this deadline cannot be met, contact AHC immediately.

Comments: Effluent - 1WK Turnaround

* Describe:

Relinquished By (Name, Firm)	Date	Time	Received By (Name, Firm)	Date	Time
1) [signature]	11-22-96	2:35p	[signature]	11/22/96	2:35pm
2)					

AMERICAN
HYDROGEOLOGY
CORPORATION

Environmental Services

Environmental Audit Report: Privileged Document
Confidential and Privileged

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OCT 09 1998
FOSTER, SWIFT,
COLLINS, & SMITH, P.C.

October 8, 1998

Mr. Charles E. Barbieri
Foster, Swift, Collins & Smith
313 South Washington Square
Lansing, MI 48933-2193

Re: Blasland, Bouck and Lee Data Review

Dear Mr. Barbieri:

Per your request, American Hydrogeology Corporation (AHC) has reviewed the materials provided by Blasland, Bouck, and Lee (BBL) and now provides our professional opinion with regard to BBL's conclusions.

The following is the basis for our opinion:

- The BBL conclusions fail to recognize the basic dynamics of surface water systems and their potential to deposit sediments in low areas adjoining the waterway.
- The PCB aroclors identified by BBL in the ditch near Morrow Lake are chemically similar to those found in lake sediments including locations upstream of the Benteler facility.
- The PCB aroclors in the ditch near Morrow Lake clearly differ from those found in the portion of the ditch near the Benteler facility.
- Sampling in the ditch near the Benteler facility shows concentrations of PCBs declining to non-detect 1,650 feet north of Morrow Lake.

AHC disagrees with the assertion made in the July 10, 1998 letter by Kilpatrick Stockton LLP that PCBs from the Benteler facility have impacted Morrow Lake. AHC has previously established that the PCBs found in the upper portion of the ditch near the Benteler facility are attributable to a transformer fire that occurred in June 1989. Please note that General Signal does not believe that PCBs were ever discharged to the ditch during any prior ownership by General Signal or a predecessor. The July 10, 1998 letter from Kilpatrick Stockton LLP to General Signal Corporation

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falsely concludes that oil, which might have been discharged into the upper reaches of the ditch during General Signal's or its predecessor's tenure, contained PCBs. There is no evidence that PCBs were present in any oil that was discharged into the ditch at any time. Therefore, the allegation that "PCBs were released in large quantities from the facility..." is based solely on the assumption that oil discharged into the ditch contained PCBs. The fact remains that the PCBs found in the plant and the upper portion of the ditch are the result of a transformer fire and explosion that occurred in June 1989 during cleaning operations by Benteler. No impact to Morrow Lake resulted.

SUPPORTING ASSESSMENT

The BBL conclusions fail to recognize the basic dynamics of surface water systems and their potential to deposit sediments in low areas adjoining the waterway.

It is common knowledge that rivers and lakes can rise above their banks at times of snow melt or significant rainfall. During flood periods, the surface water will be laden with sediment which is deposited in areas of encroachment. The ultimate result is deposition of sediment along the areas invaded by the swollen surface water body resulting in rich bottomland adjacent to the surface water body. Sediment accumulation is particularly rapid where a major river enters the calmer waters of a lake. This process would provide a transport and deposition mechanism for any contaminants, including PCBs, in the sediment or water. PCBs tend to sorb to particulate matter and are primarily transported in this manner.

AHC has previously observed that a debris line associated with rising lake levels was present about 110 to 210 feet inland from Morrow Lake's normal level. Interviews with a Kalamazoo county employee at River Oaks Park, which is located adjacent to the Benteler facility, indicate that he has observed Morrow Lake to rise significantly during periods of flooding, and on at least one occasion, the lake rose approximately 4.8 feet above its normal water level at the River Oaks Park.

Comparison of the projected surface water elevation during observed periods of relatively high water levels to the ground elevation in the base of the ditch indicates that backwater from Morrow Lake would invade the ditch to at least 625 feet from its normal shoreline. This area of encroachment encompasses the entire stretch of the ditch sampled by BBL and explains the presence of Morrow Lake type PCBs in the lower section of the ditch. BBL collected their samples within 500 feet of Morrow Lake along the base of the ditch as shown on Figure 1. The highest elevation BBL sample collected from within the ditch (500 feet from Morrow Lake), is approximately 3.5 feet above "normal" lake level.

Note also that BBL has characterized the uppermost two inches of soil along their sampling line as black organic silt for the 200 feet nearest the lake and as dark brown silt for the samples collected between 250 and 500 feet from the lake. Soil samples collected from greater depths grade into a fine to medium sand. BBL's characterization of the shallow soil is consistent with the concept of sediment deposited by surface water flooding adjacent to Morrow Lake.

The PCB aroclors identified by BBL in the ditch near Morrow lake are chemically similar to those found in the lake sediments including locations upstream of the Benteler facility

In July 1988, GZA-Donohue collected surface sediment and core samples from Morrow Lake. The surface sediment sampling results showed consistently low concentrations of PCBs (less than 5 ppm) throughout the lake, including locations along Morrow Lake upstream of the Benteler facility. From a total of 18 samples, 13 showed PCB concentrations less than 1.0 ppm. The maximum concentration was 2.4 ppm and the only Aroclor detected was Aroclor 1254. GZA-Donohue's core sampling results correlate well with its sediment samples. There were no PCBs found greater than 2 feet below ground level. The only aroclor detected was Aroclor 1254. The highest concentrations were found in the northwestern portion of the lake which is consistent with the sediment sample results.

In March, 1994, BBL collected seven soil samples (including one duplicate sample), and in May, 1998, BBL collected 35 soil samples (including three duplicate samples) from the base of the ditch near Morrow Lake. The 1994 samples were collected three and 18 feet from the lake, while the 1998 samples were collected between 50 feet and 500 feet from the lake's shoreline. Samples were analyzed for PCBs. All samples were found to be non-detect for Aroclor 1242, while only one sample was positive for Aroclor 1248. A total of 35 samples were positive for Aroclor 1254; only eight of these were quantified above the detection limit with a highest reported concentration of 0.93 mg/kg. The remaining 27 samples testing positive for Aroclor 1254 only have estimated concentrations; the highest estimate is 1.5 mg/kg. A total of 17 samples were positive for Aroclor 1260; only three of these were quantified above the detection limit with a highest reported concentration of 0.15 mg/kg. The remaining 14 samples testing positive for Aroclor 1260 only have estimated concentrations; the highest estimate is 0.21 mg/kg. The results of this BBL sampling generally show the presence of PCBs primarily in the form of 1254, which is consistent with the GZA-Donohue samples collected in 1988. These minimal detections of Aroclor 1254 in the lower segment of the ditch within 500 feet of Morrow Lake do not correlate with the results of PCB testing in the upper portion of the ditch near the Benteler facility where no Aroclor 1254 was found.

The concentrations of PCBs found by BBL in the segment of the ditch nearest Morrow Lake are low. As previously noted, the highest reported concentrations quantified above the detection limit was 0.93 mg/kg for Aroclor 1254 and 0.15 mg/kg for Aroclor 1260. Therefore, on this basis, the concentrations detected in this area are below practicable remediation target levels.

The PCB aroclors in the ditch near Morrow Lake clearly differ from those found in the portion of the ditch near the Benteler facility.

In 1991, WW Engineering & Science (WWES) collected samples from several locations at the site, including 20 sediment samples from the base and sidewalls of the drainage ditch in the segment of the ditch near the Benteler facility. Eleven base samples were collected, five samples were collected from the west sidewall, and four samples were collected from the east sidewall. Figure 1 shows the sample locations within the ditch along with a graph presenting PCB concentrations versus distance along the ditch. Reference Table 1 for a summary of PCB results of the samples collected in the ditch. In addition to samples collected from the ditch, Table 1 also includes a summary of PCB results in Morrow Lake. The twenty samples collected by WWES were analyzed for Aroclor 1242, Aroclor 1248, Aroclor 1254, and Aroclor 1260. Along the base of the ditch, seven of the eleven samples contained Aroclor 1260; only two samples contained Aroclor 1248; there were no detections of Aroclor 1242 or Aroclor 1254. The highest concentration of PCB (84 mg/kg, Aroclor 1248) was found in the base sample collected 110 feet south from the headwall. No PCBs were detected (to method detection limits) in any of the five west sidewall samples. Only one of the four east sidewall samples contained detectable levels of PCBs. That sample was collected 230 feet south of the headwall and contained 0.04 mg/kg of Aroclor 1248.

In summary, the predominant PCB aroclor detected in the upper portions of the ditch near the Benteler facility was Aroclor 1260 with only a few detections of Aroclor 1248. No Aroclor 1254 was detected in the segment of the ditch near the Benteler facility. No PCBs were detected greater than 1,650 feet north of Morrow Lake as shown on the cross section (Figure 1). The sediment and core samples collected from Morrow Lake identified only Aroclor 1254 above method detection limits. The BBL samples collected in the ditch near Morrow Lake indicated higher and more frequent detections of Aroclor 1254. Therefore, the detections in the sediment in Morrow Lake correlate with the detections in the ditch near Morrow Lake and do not correlate with the PCBs detected in soil samples in the ditch near the Benteler facility.

Sampling in the ditch near the Benteler facility shows concentrations of PCBs declining to non-detect 1,650 feet north of Morrow Lake.

There were no PCBs detected to method detection limits in the base samples at distances of 1,400 feet, 1,425 feet, and 1,450 feet south of the headwall. The decline in PCB concentrations downgradient in the ditch is consistent with the concept that subsequent to the release of PCBs into the ditch after June 1989, water discharging from the plant into the ditch has infiltrated into the subsurface and has never reached Morrow Lake. Further, the distance along the ditch from the southernmost downgradient detections of PCBs to the shoreline of Morrow Lake is about 1,650 feet. The distance from the southernmost downgradient PCB detections to the BBL samples in the area where Morrow Lake invades the ditch is 1,150 feet. There is a clear discontinuity between the PCB detections in the ditch at the Benteler facility and those in the ditch near the shoreline of Morrow Lake.

In summary, it is AHC's opinion that there is no substantial evidence that Benteler or its predecessor companies have contributed PCBs to Morrow Lake.

Please call me at (616) 329-1600 if you have any questions or comments.

Sincerely,

AMERICAN HYDROGEOLOGY CORPORATION

Patrick M. Lynch

Patrick M. Lynch
General Manager

PML/ljz/24-1136

Enclosures: Figure 1 - Cross Section
Table 1 - Summary of PCB Results in Morrow Lake and Benteler Automotive Drainage Ditch

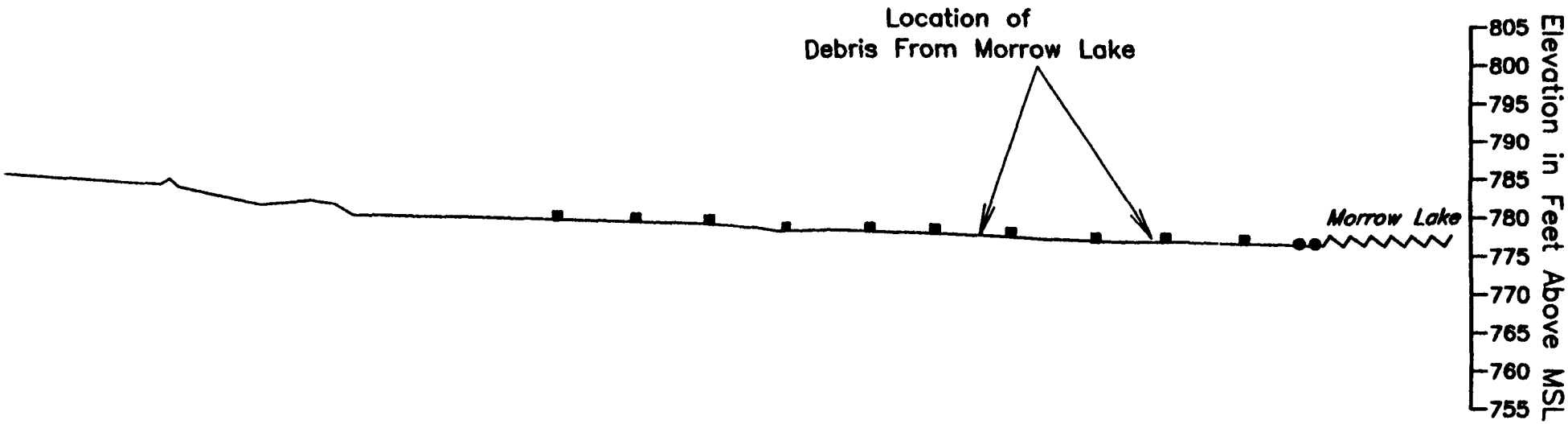
Table 1 (Page 1 of 2)
Summary of PCB Results in Morrow Lake and Benteler Automotive Drainage Ditch
Benteler Automotive Corporation, #350-1855
9000 East Michigan Avenue,
Galesburg, MI
(results expressed in mg/kg)

Sample I.D.	Date	PCB Concentration					Comments
		Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total PCBs	
Sediment Samples Collected in Morrow Lake (samples collected by GZA-Donohue)							
MLS-1	7/18/88	<0.30	<0.30	**0.95**	<0.30	**0.95**	
MLS-2	7/18/88	<0.30	<0.30	**0.50**	<0.30	**0.50**	
MLS-3	7/18/88	<0.20	<0.20	**0.85**	<0.20	**0.85**	
MLS-4	7/19/88	<0.040	<0.040	**0.25**	<0.040	**0.25**	
MLS-5	7/19/88	<0.30	<0.30	**0.46**	<0.30	**0.46**	
MLS-6	7/19/88	<0.50	<0.50	**1.3**	<0.50	**1.3**	
MLS-7	7/19/88	<0.10	<0.10	**0.21**	<0.10	**0.21**	
MLS-8	7/19/88	<0.30	<0.30	**0.97**	<0.30	**0.97**	
MLS-9	7/19/88	<0.30	<0.30	**1.7**	<0.30	**1.7**	
MLS-10	7/19/88	<0.30	<0.30	**2.4**	<0.30	**2.4**	
MLS-11	7/19/88	<0.060	<0.060	**0.80**	<0.060	**0.80**	
MLS-11 (duplicate)	7/19/88	<0.20	<0.20	**1.0**	<0.20	**1.0**	
MLS-12	7/19/88	<0.20	<0.20	**1.3**	<0.20	**1.3**	
MLS-13	7/19/88	<0.10	<0.10	**0.90**	<0.10	**0.90**	
MLS-14	7/19/88	<0.020	<0.020	**0.035**	<0.020	**0.035**	
MLS-15	7/19/88	<0.20	<0.20	**0.43**	<0.20	**0.43**	
MLS-16	7/19/88	<0.10	<0.10	**0.34**	<0.10	**0.34**	
MLS-17	7/19/88	<0.020	<0.020	**0.029**	<0.020	**0.029**	
MLS-18	7/19/88	<0.20	<0.20	**0.91**	<0.20	**0.91**	
MLS-18 (duplicate)	7/19/88	<0.10	<0.10	**0.83**	<0.10	**0.83**	
Core Samples Collected in Morrow Lake (samples collected by GZA-Donohue)							
MLC1-1, 0-1 feet	7/18/88	<0.20	<0.20	**2.4**	<0.20	**2.4**	
MLC1-2, 1-2 feet	7/18/88	<0.20	<0.20	**0.43**	<0.2	**0.43**	
MLC1-3, 2-3 feet	7/18/88	<0.020	<0.020	<0.020	<0.020	<0.020	
MLC1-4, 3-3.16 feet	7/18/88	<0.020	<0.020	<0.020	<0.020	<0.020	
MLC2-1, 0-1 feet	7/18/88	<0.20	<0.20	**0.80**	<0.20	**0.80**	
MLC2-2, 1-2 feet	7/18/88	<0.25	<0.25	**1.1**	<0.25	**1.1**	
MLC3-1, 0-1 feet	7/18/88	<0.10	<0.10	**0.69**	<0.10	**0.69**	
MLC3-2, 1-2 feet	7/18/88	<0.020	<0.020	<0.020	<0.020	<0.020	
MLC3-3, 2-2.25 feet	7/18/88	<0.020	<0.020	<0.020	<0.020	<0.020	
MLC4-1, 0-1 feet	7/19/88	<0.20	<0.20	**0.94**	<0.20	**0.94**	
MLC4-2, 1-2 feet	7/19/88	<2.0	<2.0	**4.1**	<2.0	**4.1**	
MLC4-2, 1-2 feet (dup)	7/19/88	<0.20	<0.20	**4.9**	<0.20	**4.9**	
MLC4-3, 2-3 feet	7/19/88	<0.20	<0.20	<0.20	<0.20	<0.20	
MLC4-4, 3-4 feet	7/19/88	<0.020	<0.020	<0.020	<0.020	<0.020	
MLC4-5, 4-5 feet	7/19/88	<0.020	<0.020	<0.020	<0.020	<0.020	
Soil Samples Collected in Ditch at Benteler Facility (samples collected by WWES)							
0+62 W. Wall	5/7/91	<0.033	<0.033	<0.033	<0.033	---	
2+30 W. Wall	5/7/91	<0.033	<0.033	<0.033	<0.033	---	
4+38 W. Wall	5/7/91	<0.033	<0.033	<0.033	<0.033	---	
5+20 W. Wall	5/7/91	<0.033	<0.033	<0.033	<0.033	---	
7+25 W. Wall	5/8/91	<0.033	<0.033	<0.120	<0.033	---	
1+15 Ditch	5/7/91	<13	**84**	<13	<13	---	
3+25 Ditch	5/7/91	<0.120	**0.190**	<0.120	**0.180**	---	
1+46 E. Wall	5/7/91	<0.033	<0.033	<0.033	<0.033	---	
2+30 E. Wall	5/7/91	<0.033	<0.033	<0.033	**0.040**	---	
5+20 E. Wall	5/7/91	<0.033	<0.033	<0.033	<0.033	---	
7+20 E. Wall	5/8/91	<0.033	<0.033	<0.033	<0.033	---	
6+25 Ditch	5/8/91	<0.250	<0.250	<0.250	**0.900**	---	
7+25 Ditch	5/8/91	<0.120	<0.120	<0.033	**0.112**	---	
8+25 Ditch	5/8/91	<0.120	<0.120	<0.033	**0.033**	---	
10+00 Ditch	5/8/91	<0.400	<0.400	<0.060	**0.090**	---	
11+25 Ditch	5/8/91	<0.033	<0.033	<0.033	**0.060**	---	
12+50 Ditch	5/8/91	<0.120	<0.120	<0.033	**0.110**	---	
1,400 Feet	8/8/91	<0.033	<0.033	<0.033	<0.033	---	1,400 feet from headwall
1,425 Feet	8/8/91	<0.033	<0.033	<0.033	<0.033	---	1,425 feet from headwall
1,450 Feet	8/8/91	<0.033	<0.033	<0.033	<0.033	---	1,450 feet from headwall
Soil Samples Collected Between the Electrical Substation and the Headwall of the Drainage Ditch at Benteler (samples collected by WWES)							
Trans. Area W. Sample	5/8/91	<0.033	<0.033	<0.033	<0.033	---	
Tran. Area E. Sample	5/8/91	<0.033	<0.033	<0.033	<0.033	---	
SS #4	5/2/91	<0.033	**12**	<0.033	**1.1**	---	

Table 1 (Page 2 of 2)
Summary of PCB Results in Morrow Lake and Benteler Automotive Drainage Ditch
Benteler Automotive Corporation, #350-1855
9000 East Michigan Avenue,
Galesburg, MI
(results expressed in mg/kg)

Sample I.D.	Date	PCB Concentration					Comments
		Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total PCBs	
Soil Samples Collected in the Ditch Near the Shore of Morrow Lake (samples collected by BBL)							
3.0 Feet, 0-0.5 Feet	3/28/94	0.076U	0.076U	**0.051J (Estimated)**	0.076U	**0.051J (Estimated)**	3 feet from the confluence of Morrow Lake
3.0 Feet, 0.5-1.0 Feet	3/28/94	0.069U	**0.031J (Estimated)**	0.069U	0.069U	**0.031J (Estimated)**	3 feet from the confluence of Morrow Lake
3.0 Feet, 1.0-1.8 Feet	3/28/94	0.067U	0.067U	0.067U	0.067U	0.067U	3 feet from the confluence of Morrow Lake
18 Feet, 0-0.5 Feet	3/28/94	U	U	**0.93**	**0.20J (Estimated)**	**1.1J (Estimated)**	18 Feet from confluence of Morrow Lake
18 Feet, 0.5-1.0 Feet	3/28/94	0.240U	0.240U	**0.230J (Estimated)**	0.240U	**0.23J (Estimated)**	18 feet from the confluence of Morrow Lake
18 Feet, 0.5-1.0 Feet (duplicate)	3/28/94	0.280U	0.280U	**0.430**	**0.120J (Estimated)**	**0.55J (Estimated)**	18 feet from the confluence of Morrow Lake
18 Feet, 1.0-1.6 Feet	3/28/94	0.420U	0.420U	**0.370J (Estimated)**	0.420U	**0.37J (Estimated)**	18 feet from the confluence of Morrow Lake
BTL-3, 0-2 inches	5/5/98	0.620U	0.620U	0.620U	0.620U	0.620U	50 feet north of Morrow Lake along the ditch, low area
BTL -3, 2-6 inches	5/5/98	0.120U	0.120U	**0.190**	0.120U	**0.19**	50 feet north of Morrow Lake confluence with ditch, low area
BTL-3, 6-12 inches	5/5/98	0.064U	0.064U	0.064U	0.064U	0.064U	50 feet north of Morrow Lake confluence with ditch, low area
BTL-3, 12-21 inches	5/5/98	0.062U	0.062U	0.062U	0.062U	0.062U	50 feet north of Morrow Lake confluence with ditch, low area
BTL-4, 0-2 inches	5/5/98	0.420U	0.420U	**0.270J (Estimated)**	0.420U	**0.27J (Estimated)**	100 feet north of Morrow Lake along the ditch, low area
BTL-4, 2-6 inches	5/5/98	0.110U (Estimated)	0.110U (Estimated)	**1.500J (Estimated)**	**0.200J (Estimated)**	**1.7J (Estimated)**	100 feet north of Morrow Lake along the ditch, low area
BTL-4, 6-12 inches	5/5/98	0.063U	0.063U	**0.230**	0.063U	**0.23**	100 feet north of Morrow Lake along the ditch, low area
BTL-4, 12-20 inches	5/5/98	0.059UJ (Estimated)	0.059UJ (Estimated)	<0.059UJ (Estimated)	<0.059UJ (Estimated)	<0.059UJ (Estimated)	100 feet north of Morrow Lake along the ditch, low area
BTL-5, 0-2 inches	5/5/98	0.380U	0.380U	**0.460J (Estimated)**	0.380U	**0.46J (Estimated)**	150 feet north of Morrow Lake along the ditch, ditch width 6 feet
BTL-5, 2-6 inches	5/5/98	0.077U	0.077U	**0.088J (Estimated)**	0.077U	**0.088J (Estimated)**	150 feet north of Morrow Lake along the ditch, ditch width 6 feet
BTL-5, 2-6 inches (duplicate)	5/5/98	0.077U	0.077U	**0.081J (Estimated)**	0.077U	**0.081J (Estimated)**	150 feet north of Morrow Lake along the ditch, ditch width 6 feet
BTL-5, 6-12 inches	5/5/98	0.060U	0.060U	**0.036J (Estimated)**	0.060U	**0.036J (Estimated)**	150 feet north of Morrow Lake along the ditch, ditch width 6 feet
BTL-6, 0-2 inches	5/5/98	0.170U	0.170U	**0.120J (Estimated)**	0.170U	**0.12J (Estimated)**	200 feet north of Morrow Lake along the ditch, ditch width 5 feet
BTL-6, 2-6 inches	5/5/98	0.068U	0.068U	**0.072J (Estimated)**	0.068U	**0.072J (Estimated)**	200 feet north of Morrow Lake along the ditch, ditch width 5 feet
BTL-6, 6-12 inches	5/5/98	0.062U	0.062U	**0.039J (Estimated)**	0.062U	**0.039J (Estimated)**	200 feet north of Morrow Lake along the ditch, ditch width 5 feet
BTL-7, 0-2 inches	5/5/98	0.083U	0.083U	**0.190J (Estimated)**	**0.047J (Estimated)**	**0.24J (Estimated)**	250 feet north of Morrow Lake along the ditch, ditch width 8 feet
BTL-7, 2-6 inches	5/5/98	0.078U	0.078U	**0.120J (Estimated)**	0.078U	**0.12J (Estimated)**	250 feet north of Morrow Lake along the ditch, ditch width 8 feet
BTL-7, 6-12 inches	5/5/98	0.063U	0.063U	**0.044J (Estimated)**	0.063U	**0.044J (Estimated)**	250 feet north of Morrow Lake along the ditch, ditch width 8 feet
BTL-8, 0-2 inches	5/5/98	0.110UJ (Estimated)	0.110UJ (Estimated)	**0.840J (Estimated)**	**0.210J (Estimated)**	**1.1J (Estimated)**	293 feet north of Morrow Lake along the ditch, ditch width 6 feet
BTL-8, 2-6 inches	5/5/98	0.078U	0.078U	**0.330J (Estimated)**	**0.070J (Estimated)**	**0.40J (Estimated)**	293 feet north of Morrow Lake along the ditch, ditch width 6 feet
BTL-8, 2-6 inches (duplicate)	5/5/98	0.077U	0.077U	**0.400J (Estimated)**	**0.076J (Estimated)**	**0.48J (Estimated)**	293 feet north of Morrow Lake along the ditch, ditch width 6 feet
BTL-8, 6-9 inches	5/5/98	0.059U	0.059U	**0.120**	0.059U	**0.12**	293 feet north of Morrow Lake along the ditch, ditch width 6 feet
BTL-9, 0-2 inches	5/5/98	0.083U	0.083U	**0.320**	**0.086**	**0.41**	350 feet north of Morrow Lake along the ditch, ditch width 5 feet
BTL-9, 2-6 inches	5/5/98	0.059U	0.059U	**0.670J (Estimated)**	**0.096**	**0.77J (Estimated)**	350 feet north of Morrow Lake along the ditch, ditch width 5 feet
BTL-9, 6-12 inches	5/5/98	0.130U	0.130U	**1.100J (Estimated)**	**0.150**	**1.2J (Estimated)**	350 feet north of Morrow Lake along the ditch, ditch width 5 feet
BTL-10, 0-2 inches	5/5/98	0.081U	0.081U	**0.360J (Estimated)**	**0.060J (Estimated)**	**0.42J (Estimated)**	400 feet north of Morrow Lake along the ditch, ditch width 5 feet
BTL-10, 2-6 inches	5/5/98	0.058U	0.058U	**0.270**	**0.041J (Estimated)**	**0.31J (Estimated)**	400 feet north of Morrow Lake along the ditch, ditch width 5 feet
BTL-10, 6-12 inches	5/5/98	0.055U	0.055U	**0.050J (Estimated)**	0.055U	**0.05J (Estimated)**	400 feet north of Morrow Lake along the ditch, ditch width 5 feet
BTL-11, 0-2 inches	5/5/98	0.120UJ (Estimated)	0.120UJ (Estimated)	**0.420J (Estimated)**	**0.130J (Estimated)**	**0.55J (Estimated)**	450 feet north of Morrow Lake along the ditch, ditch width 4 feet
BTL-11, 2-6 inches	5/5/98	0.063U	0.063U	**0.180J (Estimated)**	**0.050J (Estimated)**	**0.23J (Estimated)**	450 feet north of Morrow Lake along the ditch, ditch width 4 feet
BTL-11, 6-12 inches	5/5/98	0.057U	0.057U	**0.050J (Estimated)**	0.057U	**0.05J (Estimated)**	450 feet north of Morrow Lake along the ditch, ditch width 4 feet
BTL-12, 0-2 inches	5/5/98	0.100U	0.100U	**0.310**	**0.076J (Estimated)**	**0.39J (Estimated)**	500 feet north of Morrow Lake along the ditch, ditch width 6 feet
BTL-12, 2-6 inches	5/5/98	0.071UJ (Estimated)	0.071UJ (Estimated)	**0.410J (Estimated)**	**0.120J (Estimated)**	**0.53J (Estimated)**	500 feet north of Morrow Lake along the ditch, ditch width 6 feet
BTL-12, 2-6 inches (duplicate)	5/5/98	0.072UJ (Estimated)	0.072UJ (Estimated)	**0.380J (Estimated)**	**0.110J (Estimated)**	**0.49J (Estimated)**	500 feet north of Morrow Lake along the ditch, ditch width 6 feet
BTL-12, 6-12 inches	5/5/98	0.052U	0.052U	0.052U	0.052U	0.052U	500 feet north of Morrow Lake along the ditch, ditch width 6 feet

Notes:
J = compound positively identified but numerical value is an estimated quantity.
U = compound analyzed for are non-detect. The associated value is the quantitation level.
JU = compound was not detected above the quantitation limit. The reported limit is approximate.



EGEND

WWES PCB Sample Locations And Concentration (May, 1991)
BBL PCB Sample Locations (March, 1994)
BBL PCB Sample Locations (May, 1998)

FIGURE 1
CROSS SECTION
BENTELER AUTOMOTIVE CORPORATION
9000 East Michigan Ave.
Galesburg, Michigan

D3996F

AHC
AMERICAN HYDROGEOLOGY

AMERICAN HYDROGEOLOGY CORPORATION

6869 Sprinkle Road • Portage, Michigan 49002
(616) 329-1600 • FAX (616) 329-2494
email: ahcorp@net-link.net

FILE COPY

June 20, 2001

Ms. Carol Weaver
Michigan Department of Environmental Quality
STD
7953 Adobe Rd.
Kalamazoo, Michigan 49009-5026

Re: Remedial Action Plan
***Project Site:* Benteler Automotive, Inc., 9000 East Michigan Avenue, Galesburg, MI**

Dear Ms. Weaver:

Please find attached the Remedial Action Plan (RAP) for the above-referenced facility. The RAP was prepared to address the impacted soil and groundwater resulting from the historic release for an underground storage tank and includes a summary of the remedial investigations and feasibility analyses. The RAP contemplates a limited residential use closure as allowed by Section 20120a (1) of the Natural Resources and Environmental Protection Act. Please contact either Mick or me regarding any questions or comments you may have.

Sincerely,

AMERICAN HYDROGEOLOGY CORPORATION

Susan Lebke

for Linda Jones Zabik
Project Manager/Hydrogeologist

LJZ/amb/24-1136

cc: Daniel McGrade, SPX Corporation
Steve Curry, Benteler Automotive
Allan Schwartz, Miller, Johnson, Snell & Cummiskey
Dave Preston, Varnum, Riddering, Schmidt & Howlett
Mr. Lawrence Halfen, Environmental Consultations
Mick Lynch, American Hydrogeology Corporation

H \AHC\WPFILES\24-1136\RAPCOVERLETTER wpd

REMEDIAL ACTION PLAN
GENERAL SIGNAL CORP./BENTELER AUTOMOTIVE CORP.
9000 EAST MICHIGAN AVENUE
GALESBURG, MICHIGAN

FILE COPY

JULY 20, 2001

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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
Muskegon, Michigan 49443-3301

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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AHC

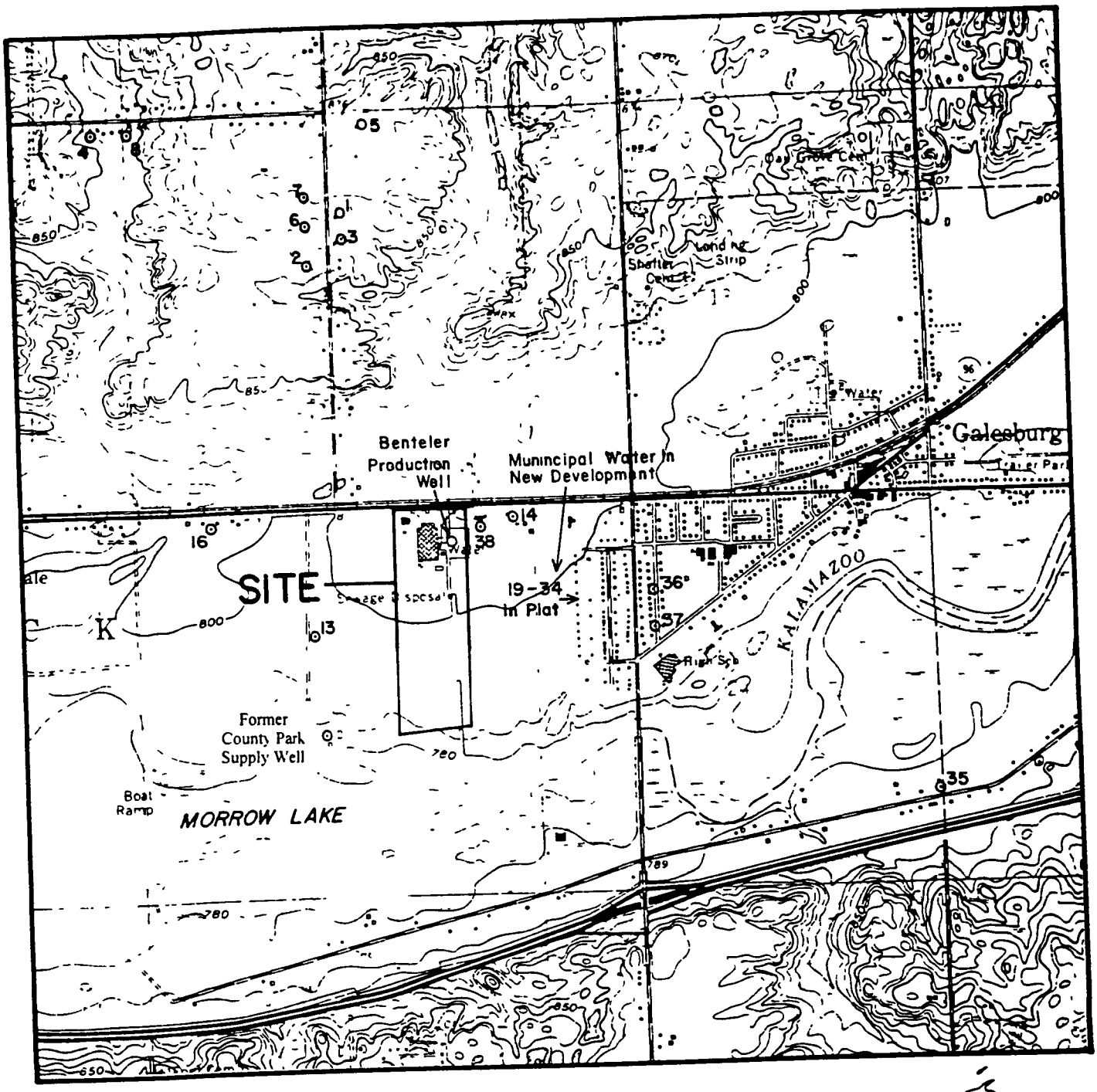
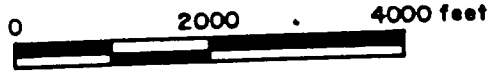


FIGURE I

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

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

AHC AMERICAN HYDROGEOLOGY CORP.

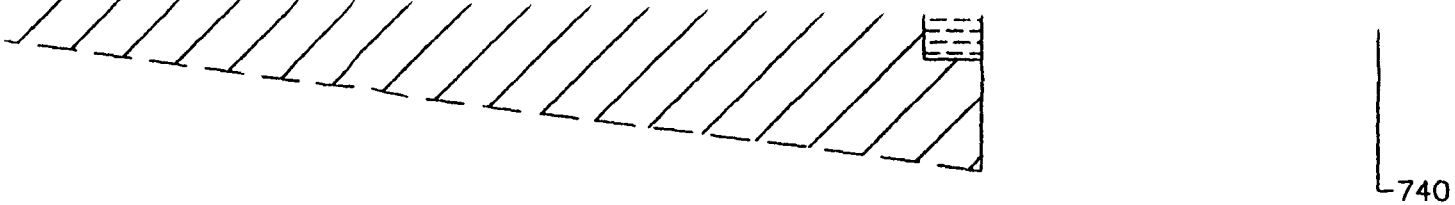
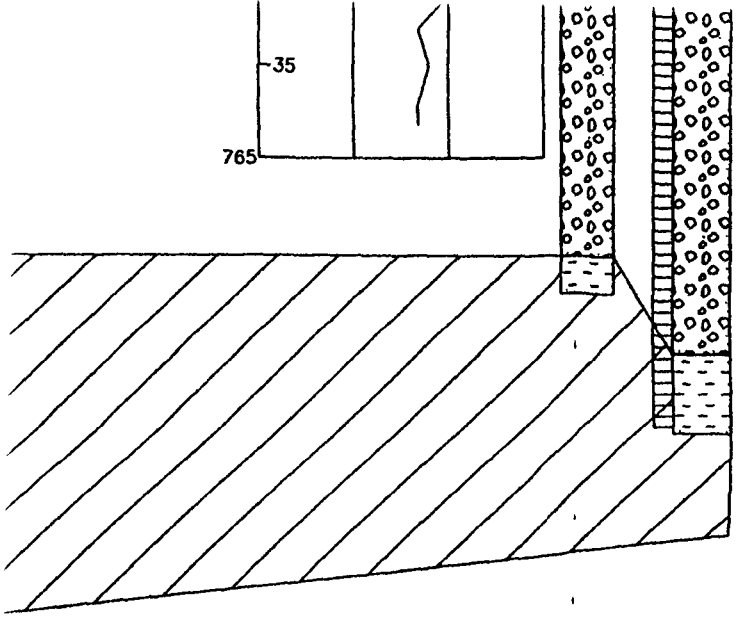


FIGURE 3
CROSS SECTION A TO A'
BENTELER AUTOMOTIVE, INC.
Section 23, T. 2 S., R. 10 W.
Comstock Township
Kalamazoo County, Michigan

AHC
AMERICAN HYDROGEOLOGY CORP.



765

760

755

750

200 Feet

FIGURE 4
CROSS SECTION B TO B'
BENTELER AUTOMOTIVE, INC.
Section 23, T. 2 S., R. 10 W.
Comstock Township
Kalamazoo County, Michigan

AMERICAN HYDROGEOLOGY CORP.

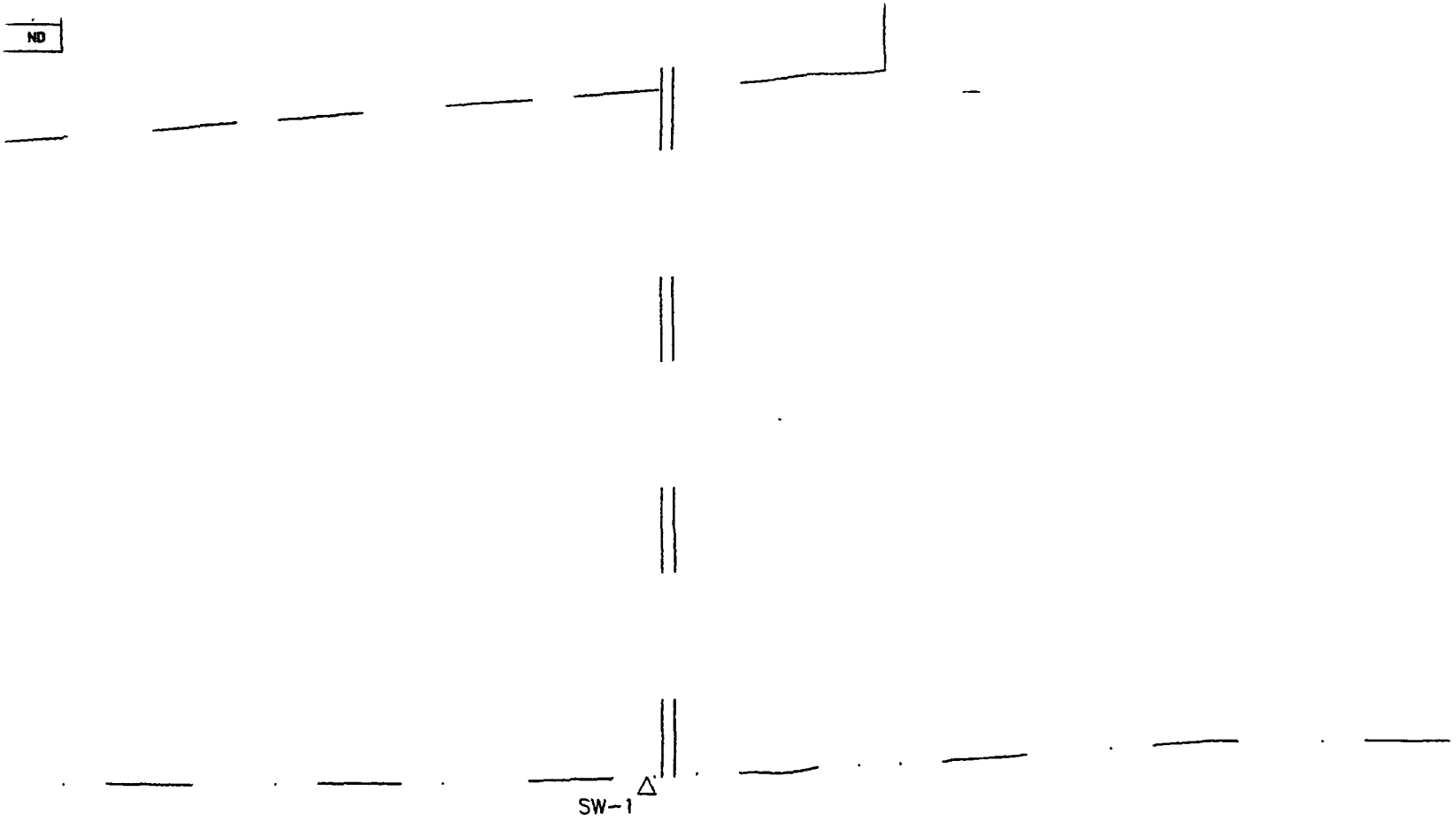


FIGURE 5

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 CORP.

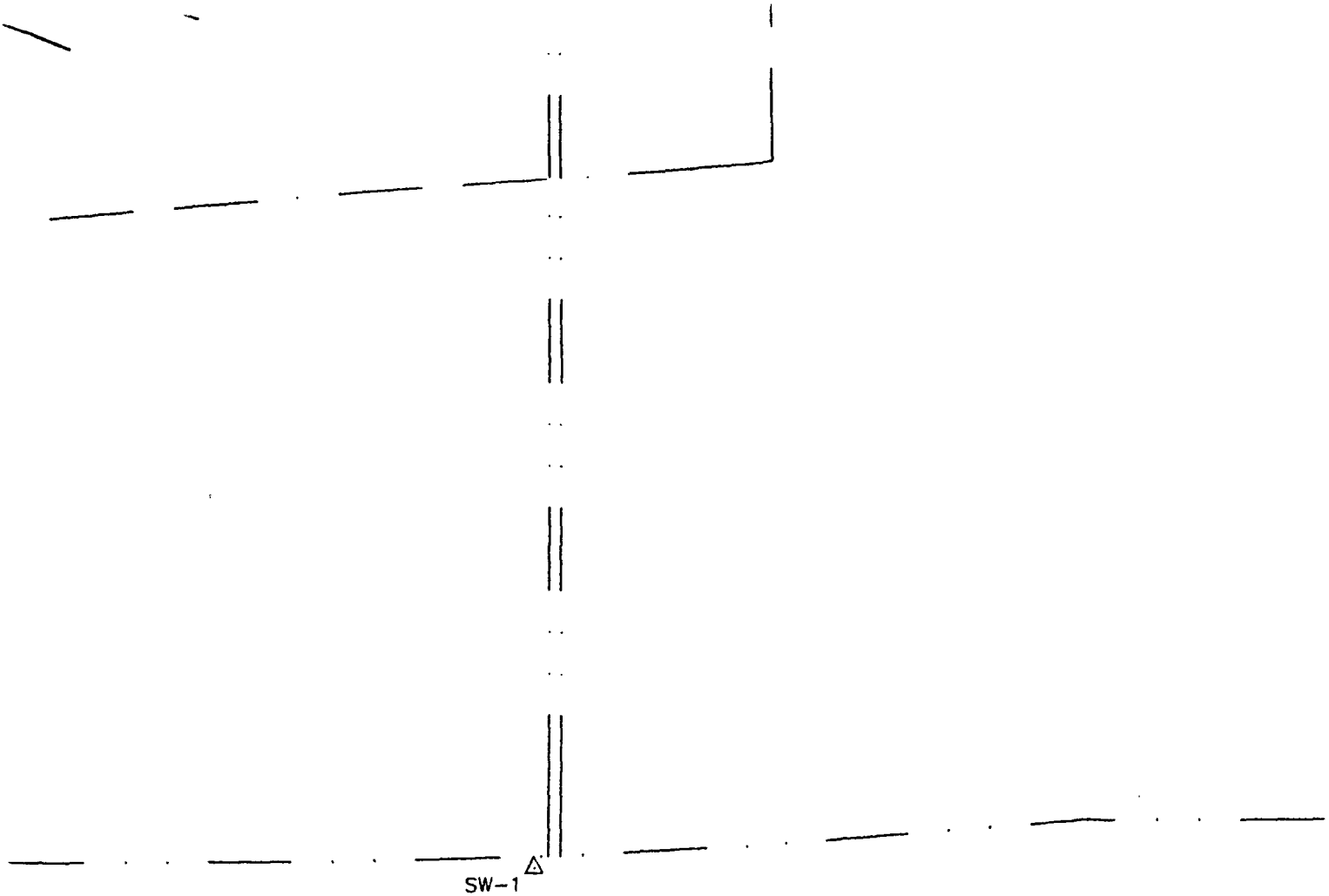


FIGURE 6

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

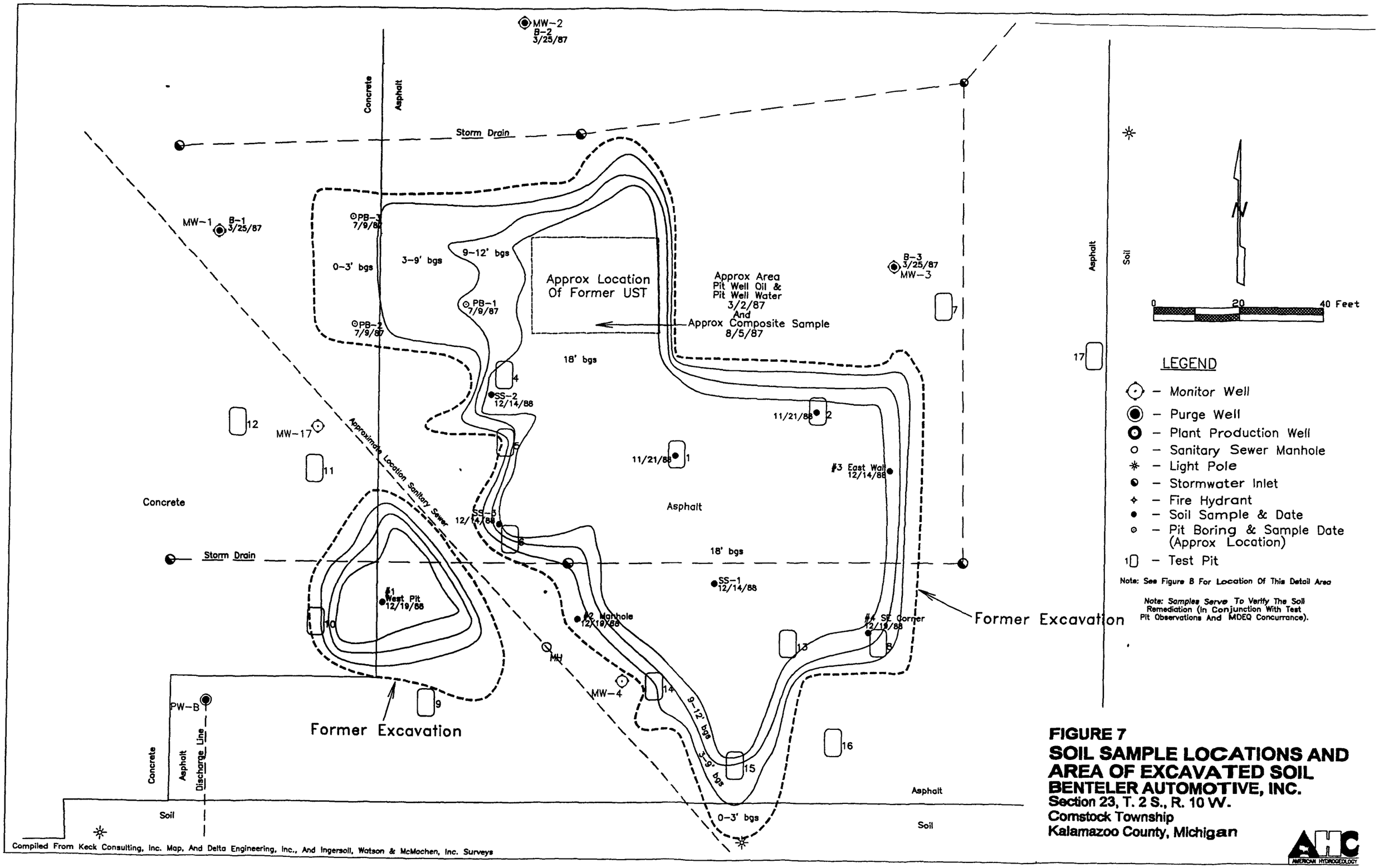


FIGURE 7
SOIL SAMPLE LOCATIONS AND AREA OF EXCAVATED SOIL
BENTELER AUTOMOTIVE, INC.
Section 23, T. 2 S., R. 10 W.
Comstock Township
Kalamazoo County, Michigan

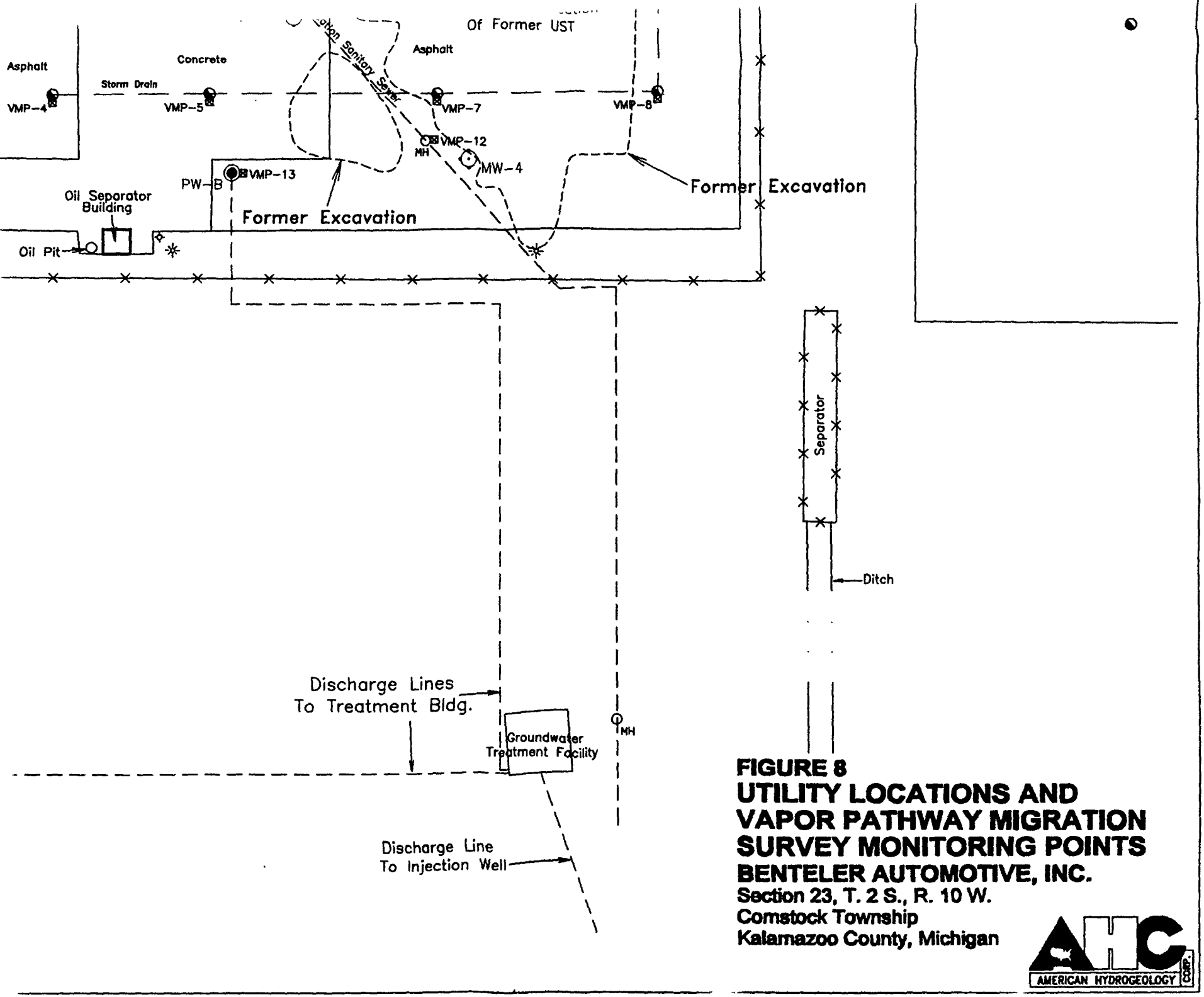


FIGURE 8
UTILITY LOCATIONS AND VAPOR PATHWAY MIGRATION SURVEY MONITORING POINTS
BENTELER AUTOMOTIVE, INC.
Section 23, T. 2 S., R. 10 W.
Comstock Township
Kalamazoo County, Michigan

AMERICAN HYDROGEOLOGY CORP.

APPENDIX B

TABLES

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 6/1/01

Summary of MDEQ Scan 1 an 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	740	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.

Table 1B (Page 2 of 31)
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.*

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 1B
Summary of MDEQ Scan 1 and 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.

Table 1B (Page 4 of 31)
Summary of MDEQ Scan 1 and Scan 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	220	<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	13	<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	18	<1	<1	<1	1	21
	5/19/94	NA	NA	<1	<1	—	NA	<1	<1	<1	<1	30	<1	<1	<1	<1	30
	10/18/94	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	6	<1	<1	<1	<1	6
	1/16/95	NA	NA	<1	11	<1	NA	<1	<1	<1	<1	75	<1	<1	<1	<1	86
	4/5/95	NA	NA	<1	<1	<1	NA	<1	<1	<1	<1	40	<1	<1	<1	1	41
	9/15/95	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	8	<1	<1	<1	<1	8
	1/5/96	NA	NA	<1	<1	<1	NA	<1	<1	<1	<1	12	<1	<1	<1	<1	12
	4/4/96	NA	NA	<1	<1	<1	NA	<1	<1	<1	<1	15	<1	<1	<1	<1	15
	7/9/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	55	<1	<1	<1	<1	55
	10/11/96	NA	NA	<1	<1	<1	NA	<1	<1	<1	<1	22	<1	<1	<1	<1	22
	4/29/97	NA	NA	<1	<1	<1	NA	<1	<1	<1	<1	5.7	<1	<1	<1	** <1	5.7
	11/25/97	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	4.0	<1	<1	<1	** <1	4.0
	4/10/98	NA	NA	<1	<1	<1	NA	<1	<1	<1	<1	7.0	<1	<1	<1	** <1	7.0
	12/18/98	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	4.3	<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 an ompounds 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.

Table 1B
Summary of MDEQ Scan 1 a 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.

Table 1B
Summary of MDEQ Scan 1 and 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.

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 1B (Page 8 of 31)
Summary of MDEQ Scan 1 and 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.

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 1B (7 of 31)
Summary of MDEQ Scan 1 and 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-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	31	<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

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9000 E. Michigan Avenue, Galesburg, MI

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		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 an 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	**22**	<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	**11**	<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.

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ND = Not detected to method detection limits
Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

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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-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.

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 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 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 a 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.

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Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Summary of MDEQ Scan 1 a 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 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 an 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
ND = Not detected to method detection limits
Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Summary of MDEQ Scan 1 and Other 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
ND = Not detected to method detection limits
Shading indicates concentrations exceeding Part 201 Generic Residential Cleanup Criteria.

Table 1B (20 of 31)
Summary of MDEQ Scan 1 a 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	12	2	<1	<1	<1	<1	<1	14
	7/7/93	<1	<1	<1	<1		<1	<1	<1	9	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 an 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.

Table 1B (22 of 31)
Summary of MDEQ Scan 1 and 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.

Table 1B (23 of 31)
Summary of MDEQ Scan 1 a 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	**23**	<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 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	42	<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 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.

Table 1B (P 6 of 31)
Summary of MDEQ Scan 1 and 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.

Table 1B (P 7 of 31)
Summary of MDEQ Scan 1 an ompounds 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.

Table 1B (Pr `8 of 31)
Summary of MDEQ Scan 1 anc mpounds 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 an ompounds 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 an 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.

Table 1B (P 1 of 31)
Summary of MDEQ Scan 1 an 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				
		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	Total VOCs
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 (P 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 (P ' 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 (P 3 of 4)
Groundwater Treatmem tem 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 (P 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 (Air Stripper con't)	12/2/96	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	** <1	624	KAR
	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 (P[illegible] 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 (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-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 (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.

T 'A

Comparision of Highest Detected Concentrat 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 [illegible] (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 4 (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 4L (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

recycled paper

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.

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	

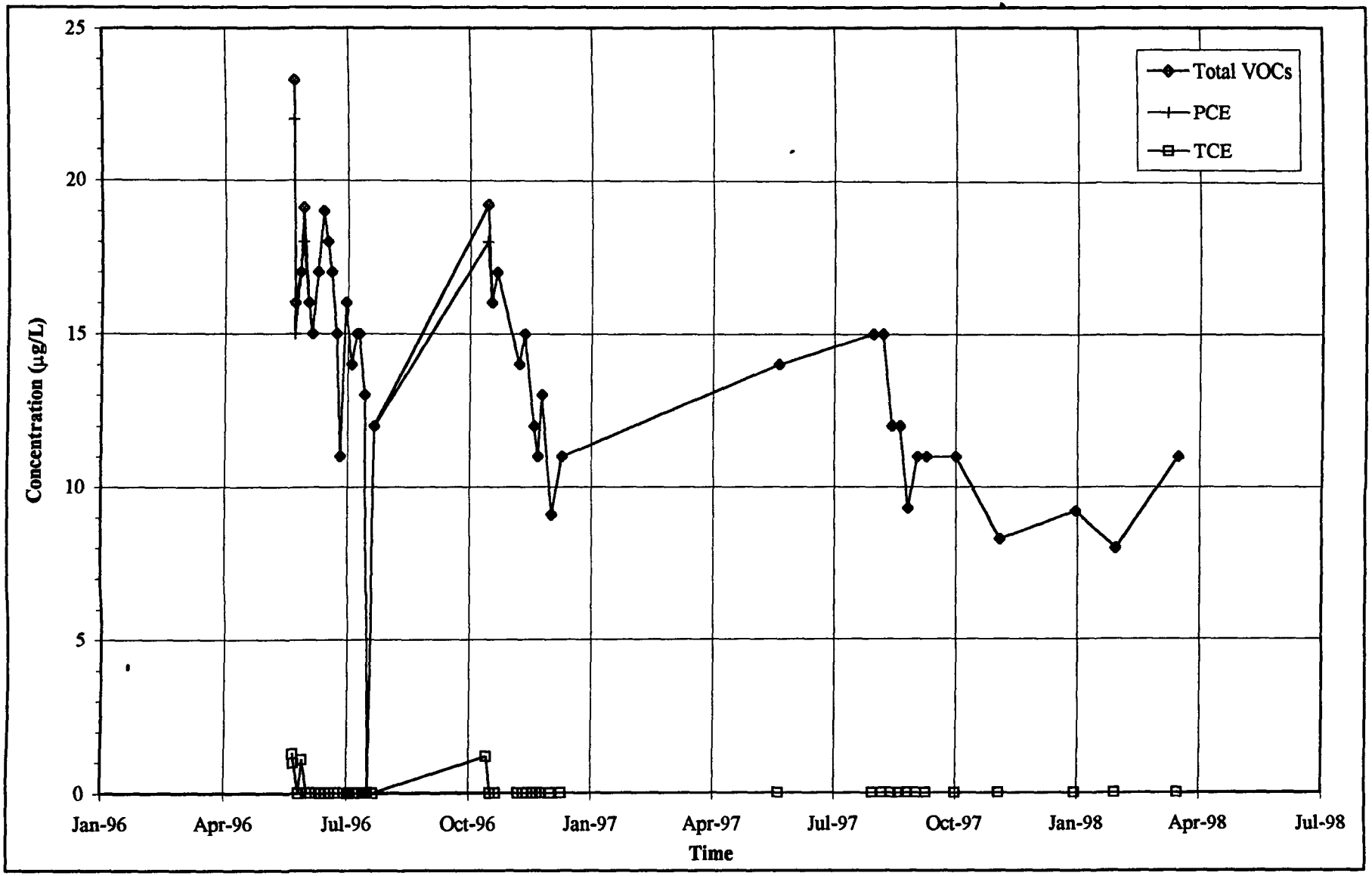
Comments: Groundwater recovery from PW-A began on May 23, 1996. The system was down for 3 days during the month due to high water levels in the purge well sump.

APPENDIX D

GRAPHS

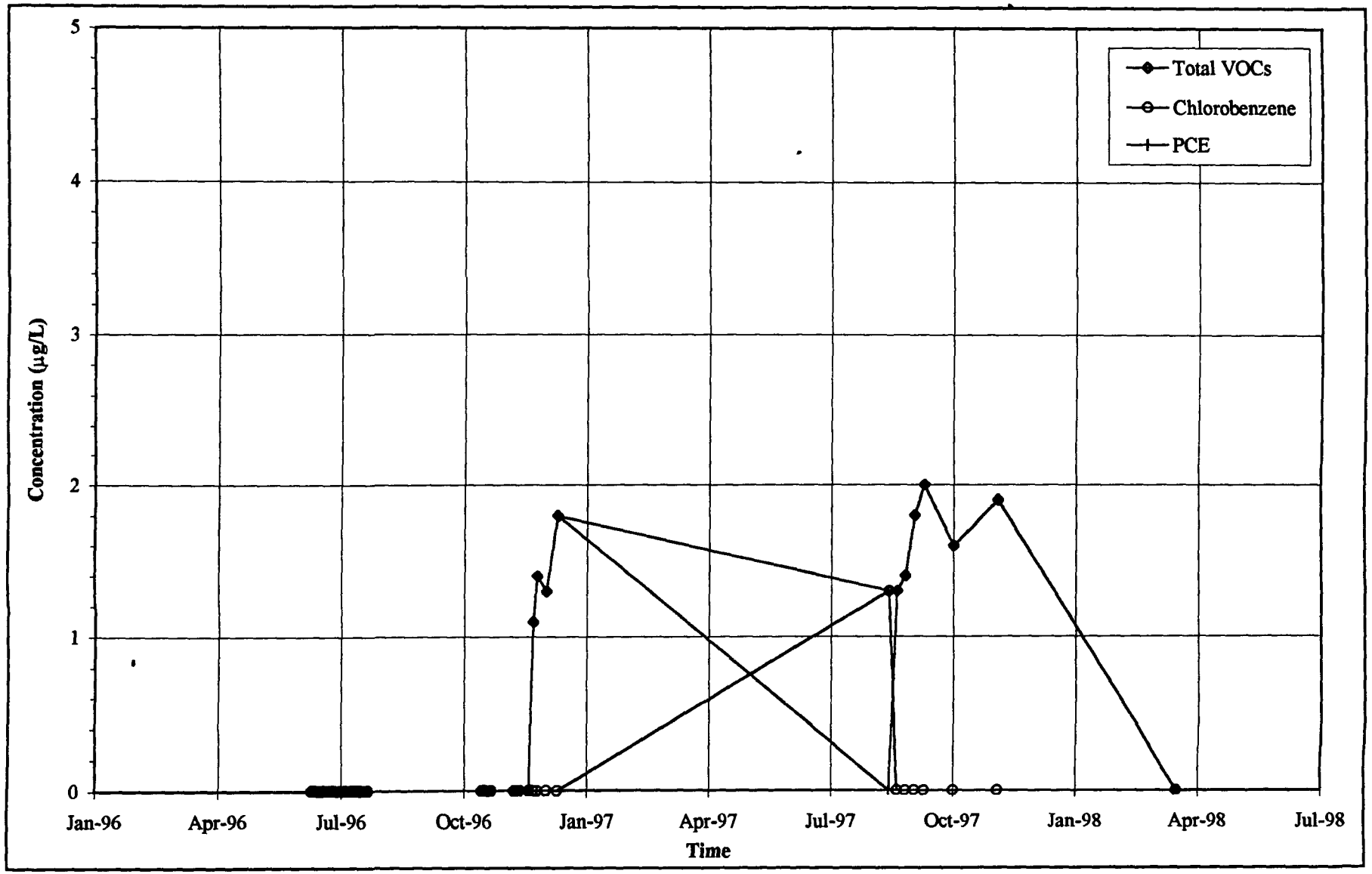
recycled paper

Graph 1
PW-A Effluent Concentrations vs. Time
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



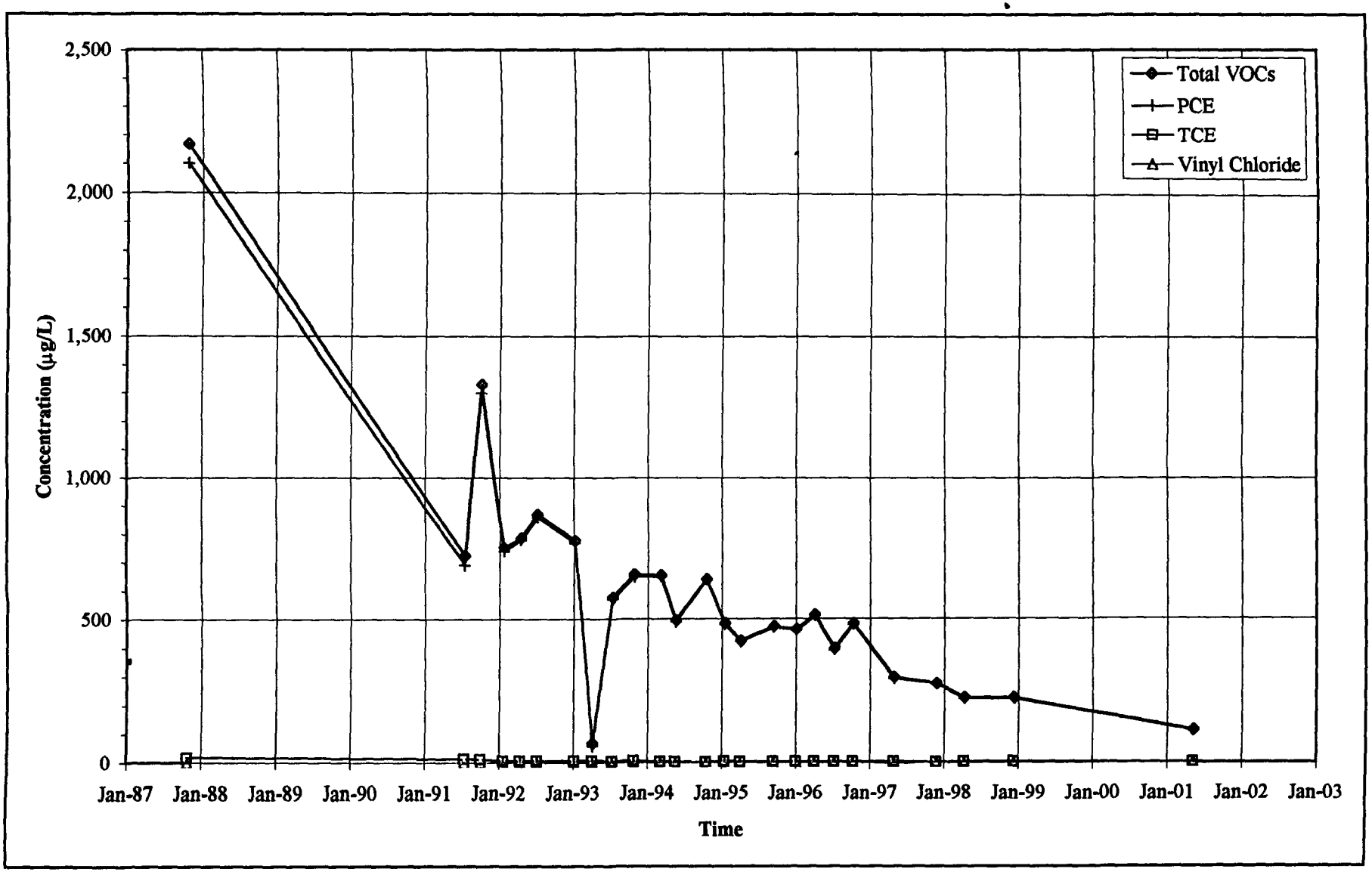
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 2
PW-B Effluent Concentrations vs. Time
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



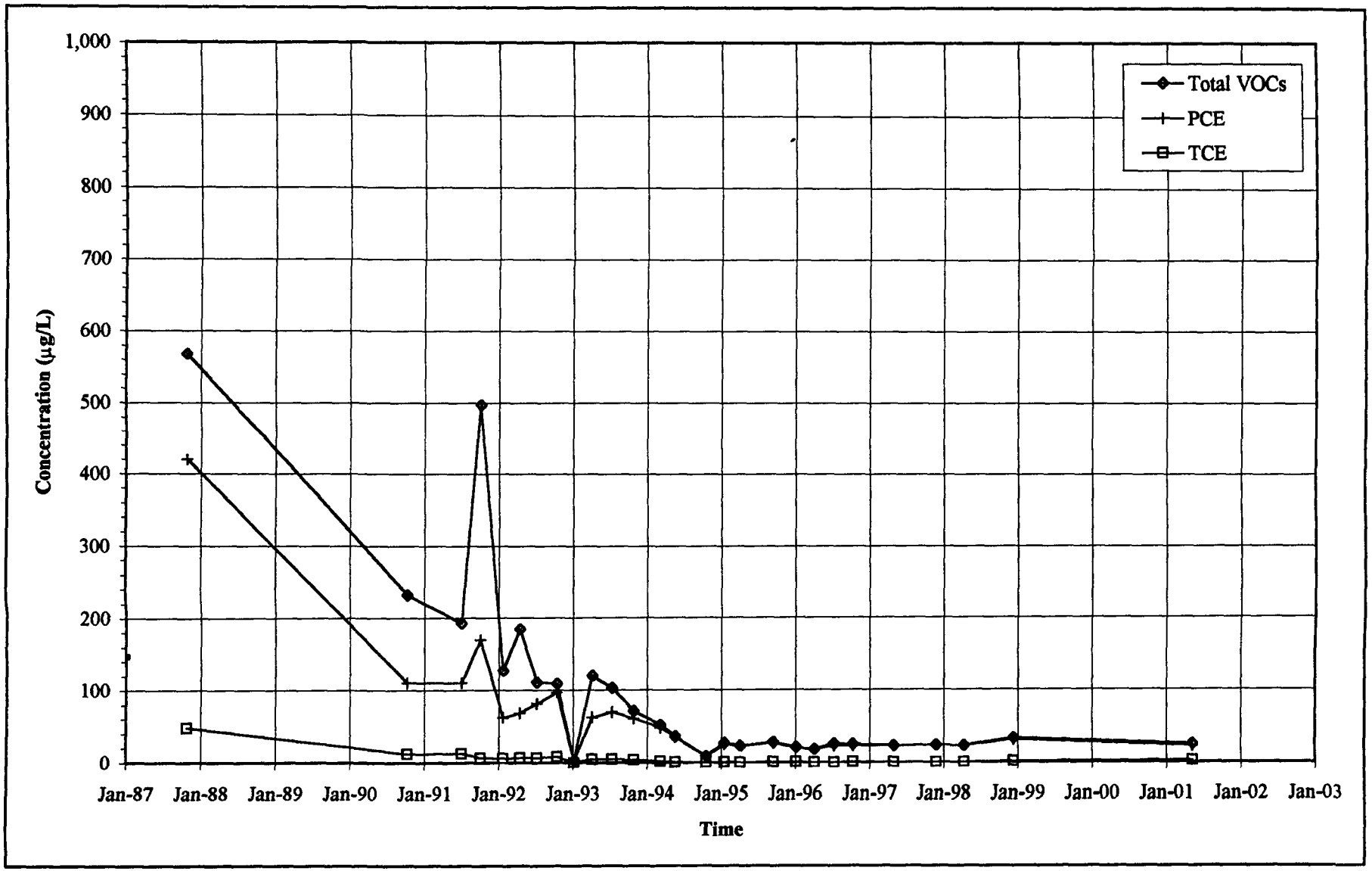
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 3
VOC Concentrations vs. Time - MW-1
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



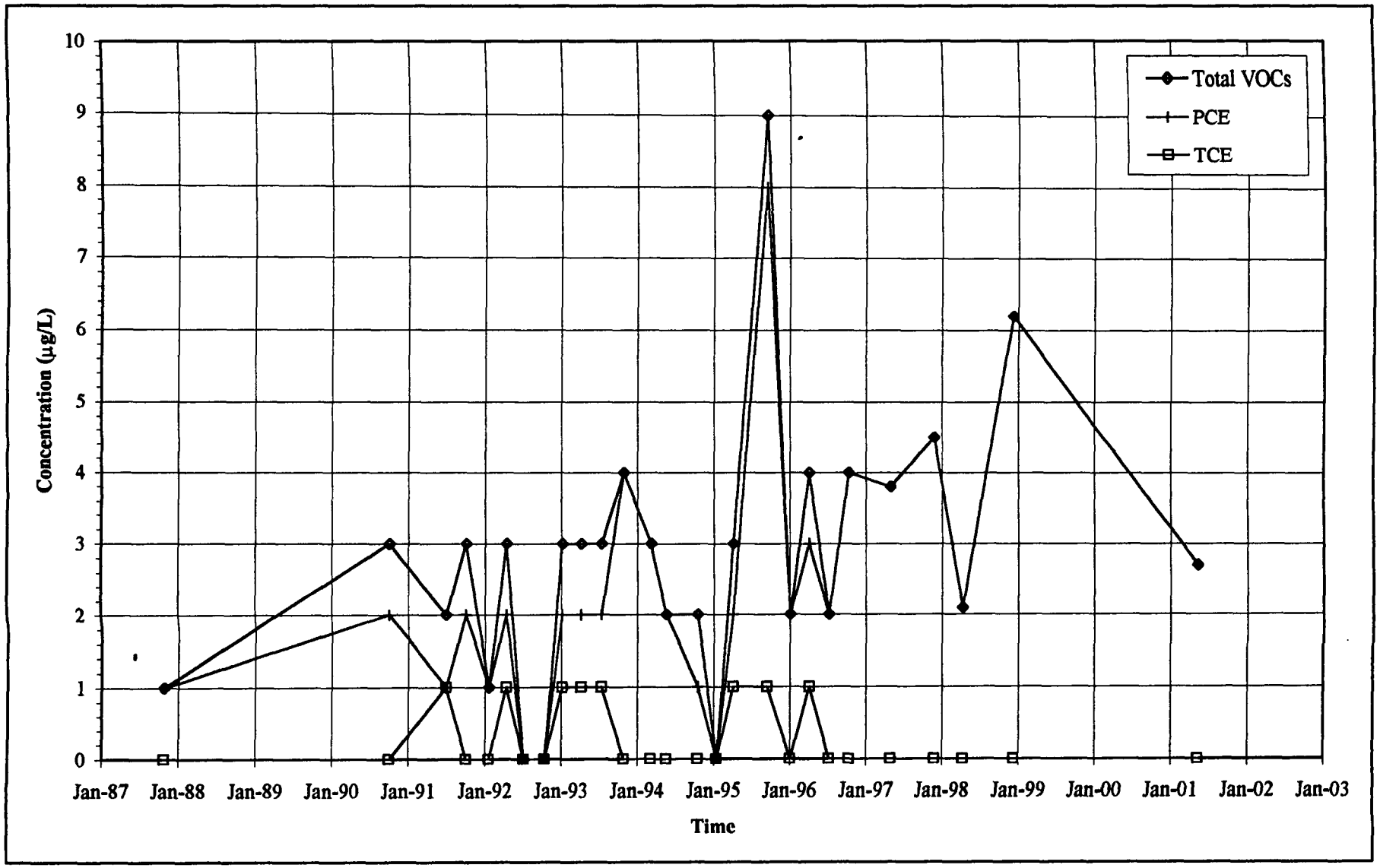
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 4
VOC Concentrations vs. Time - MW-2
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



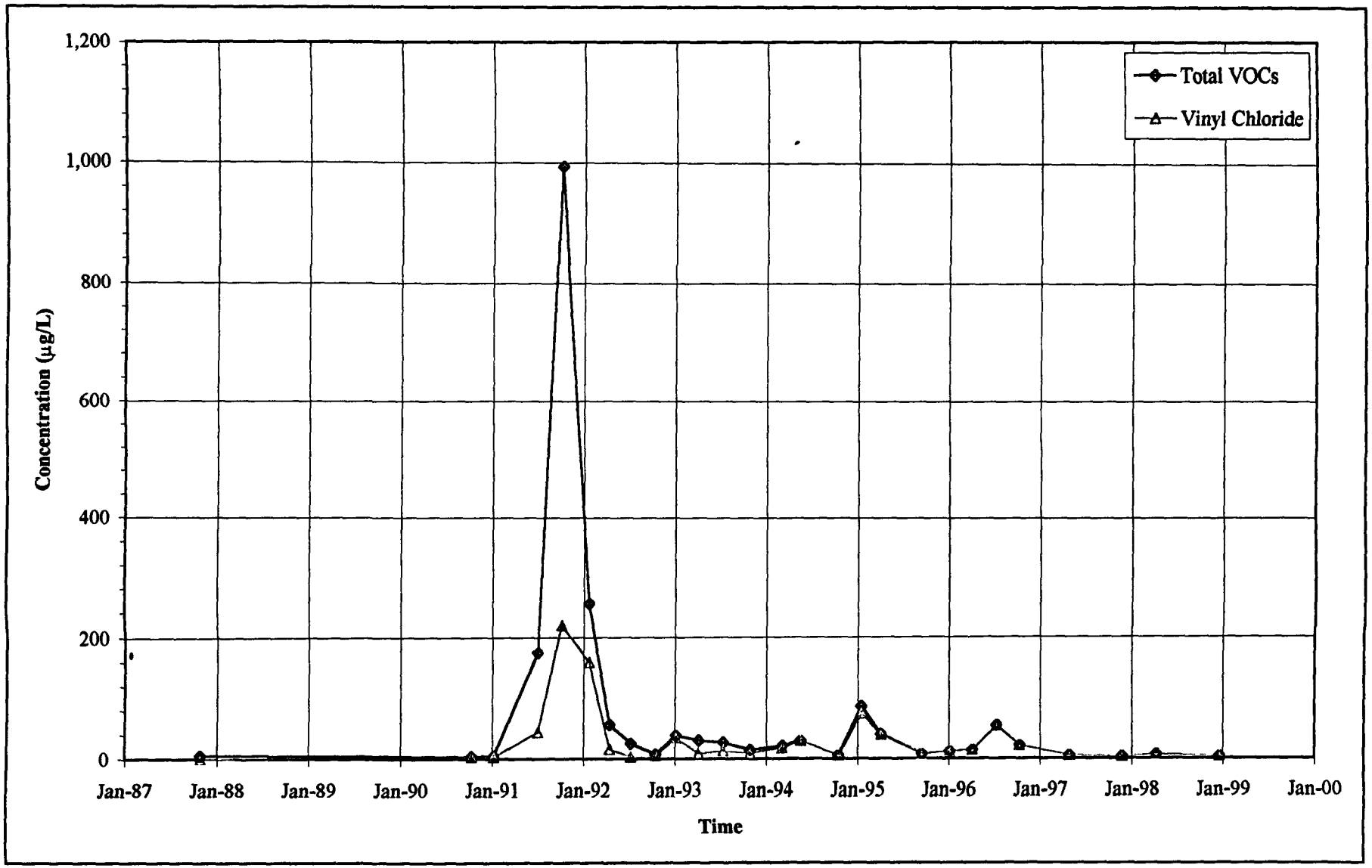
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 5
VOC Concentrations vs. Time - MW-3
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



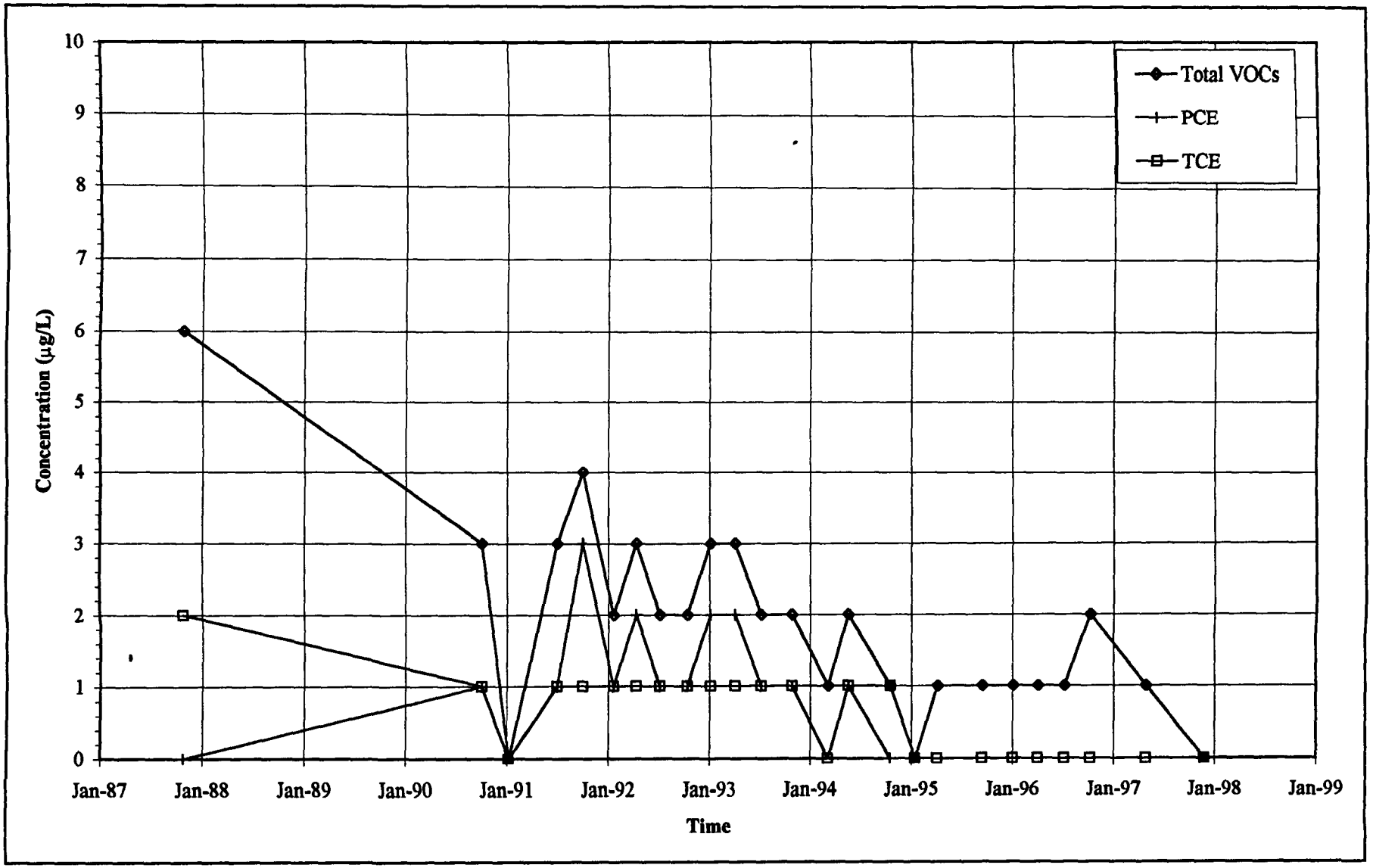
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 6
VOC Concentrations vs. Time - MW-4
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



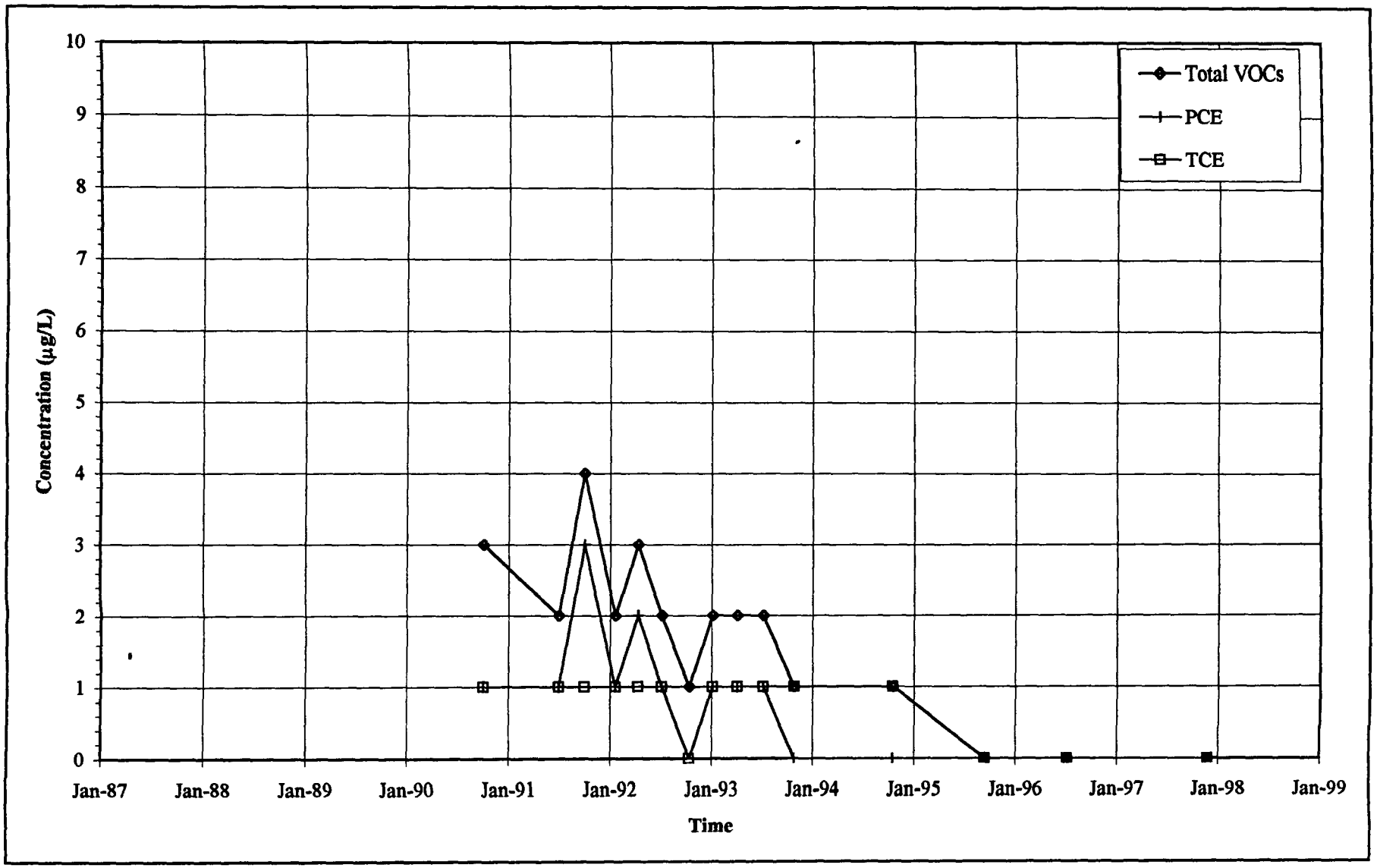
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 7
VOC Concentrations vs. Time - MW-7s
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



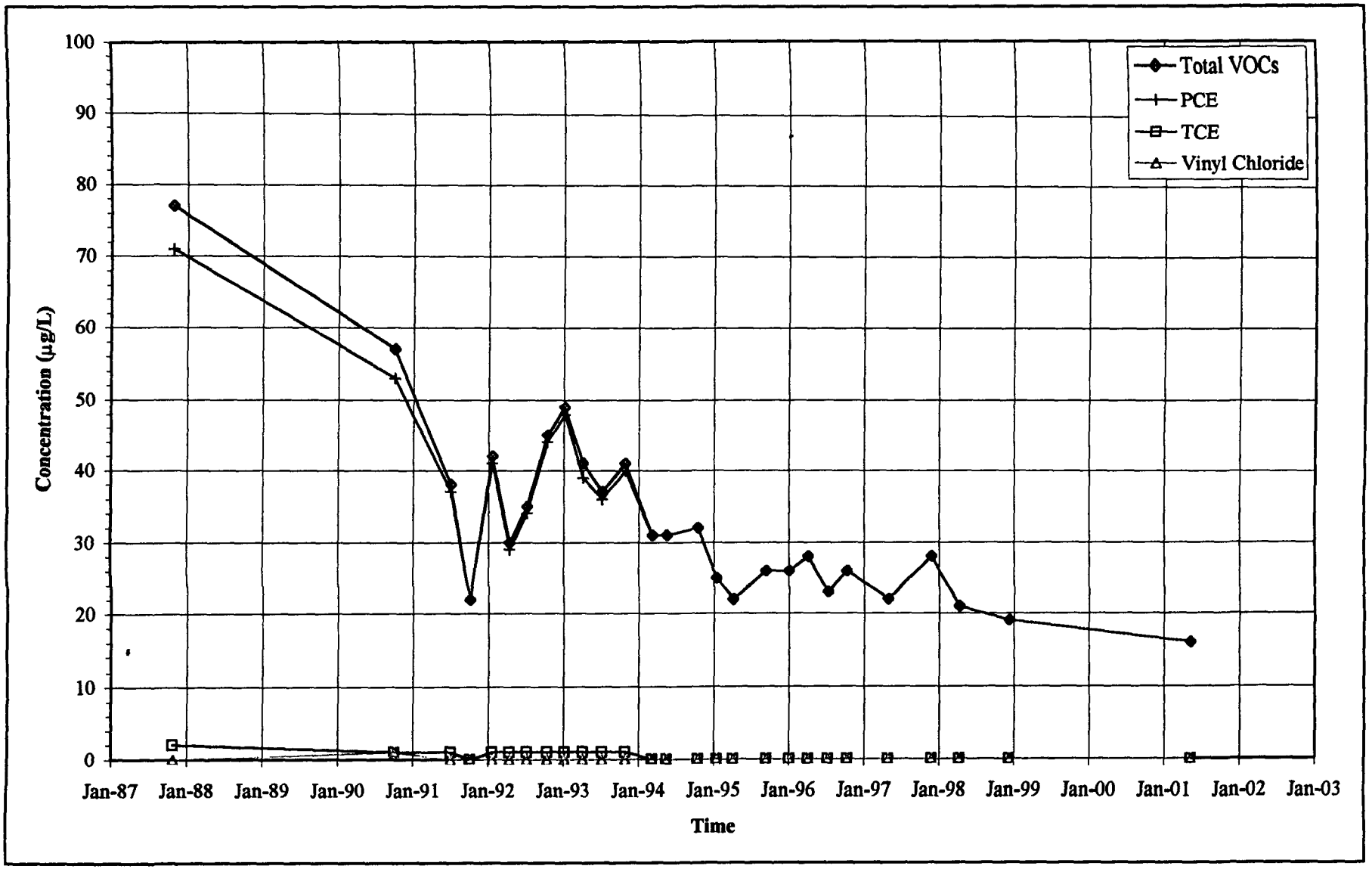
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 8
VOC Concentrations vs. Time - MW-7d
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



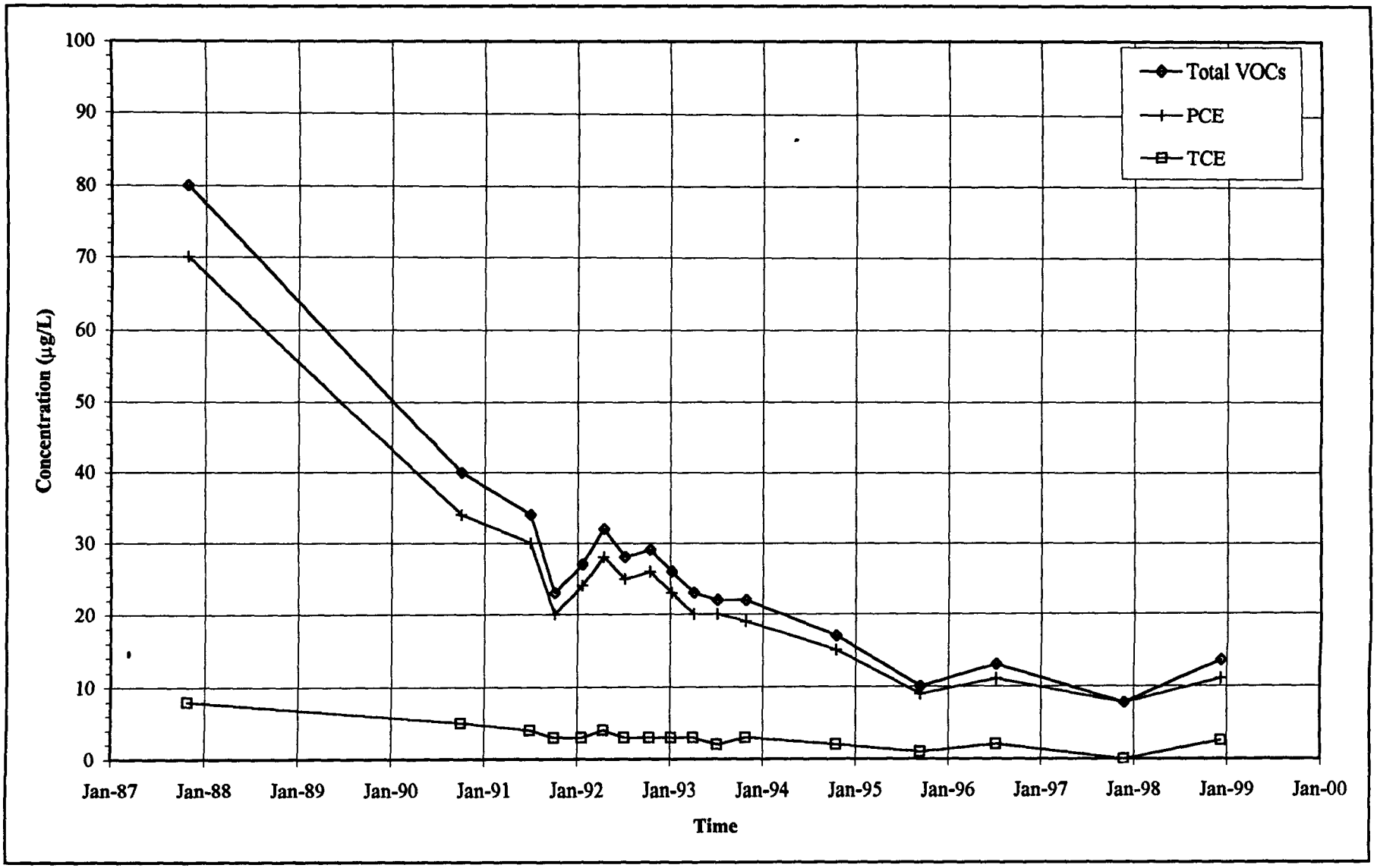
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 9
VOC Concentrations vs. Time - MW-8s
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



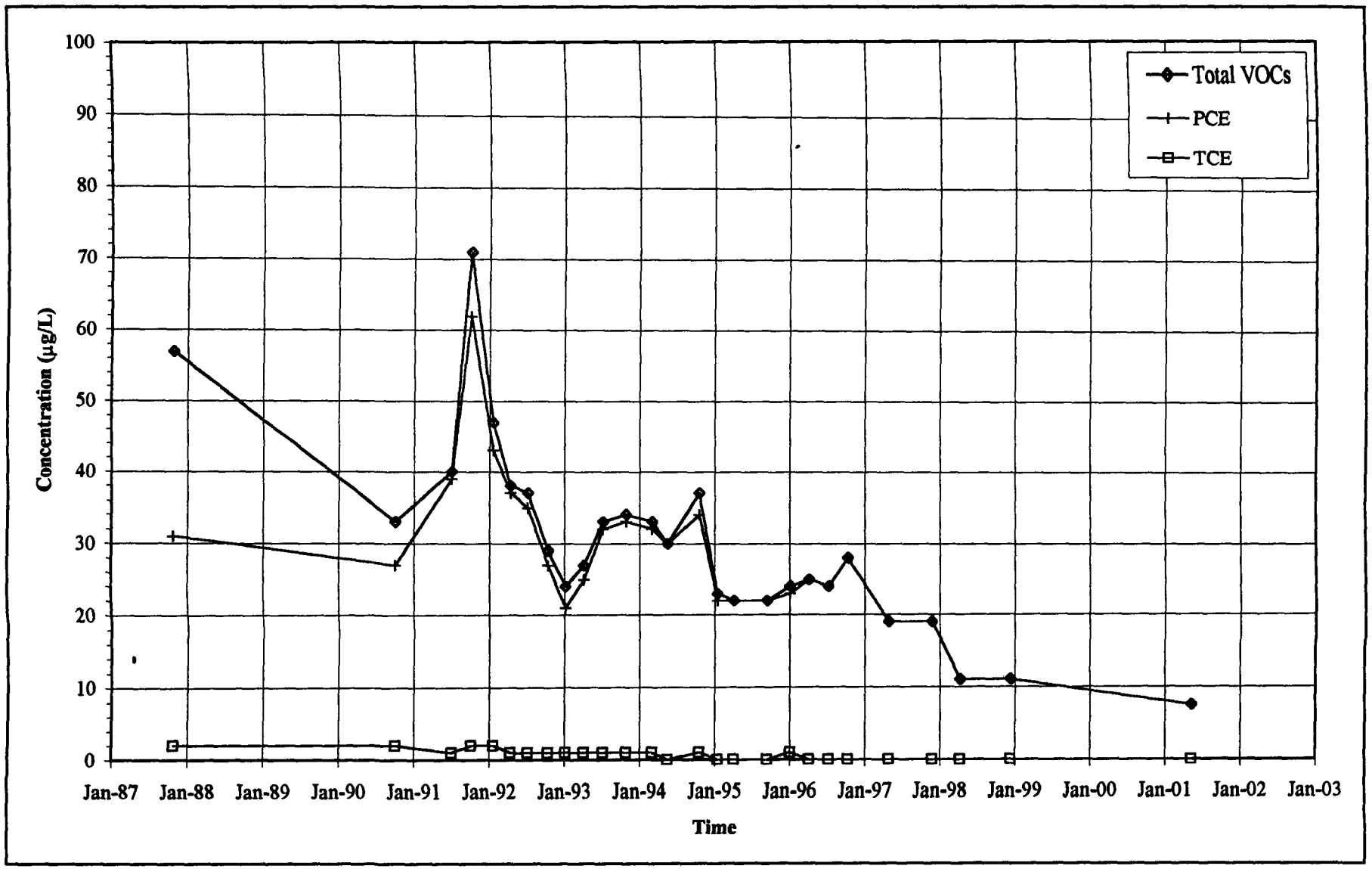
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 10
VOC Concentrations vs. Time - MW-8d
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



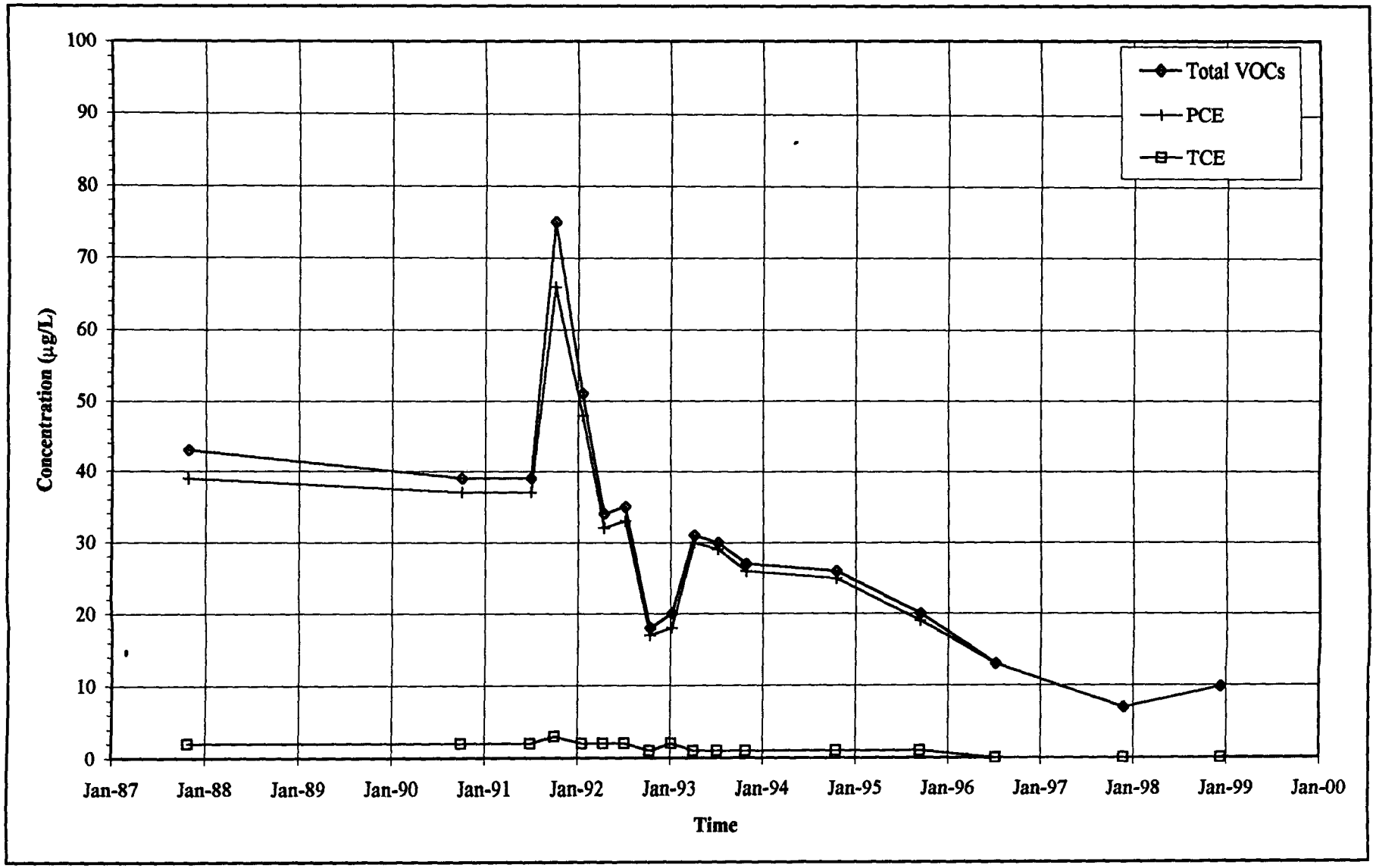
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 11
VOC Concentrations vs. Time - MW-9s
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



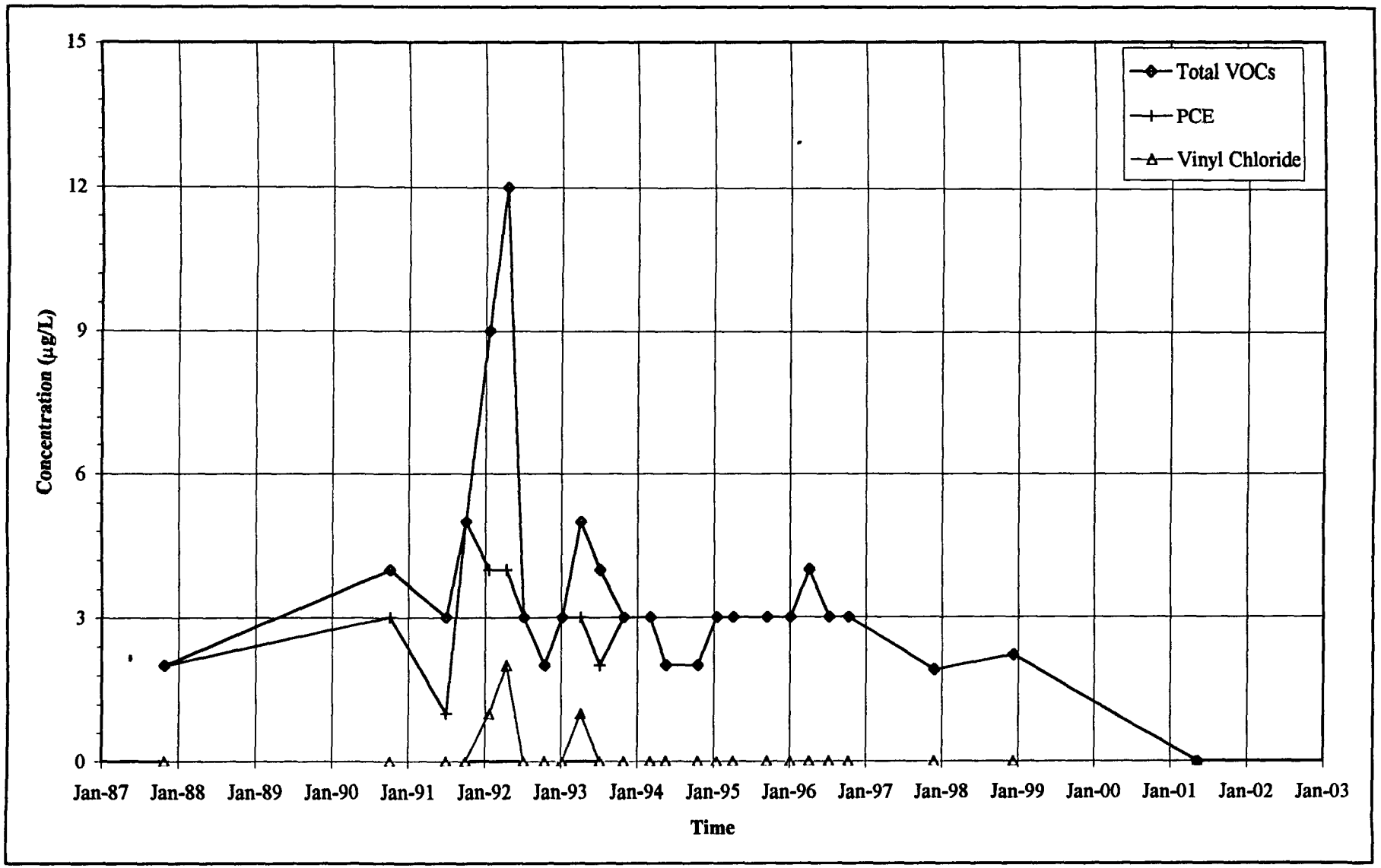
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 12
VOC Concentrations vs. Time - MW-9d
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



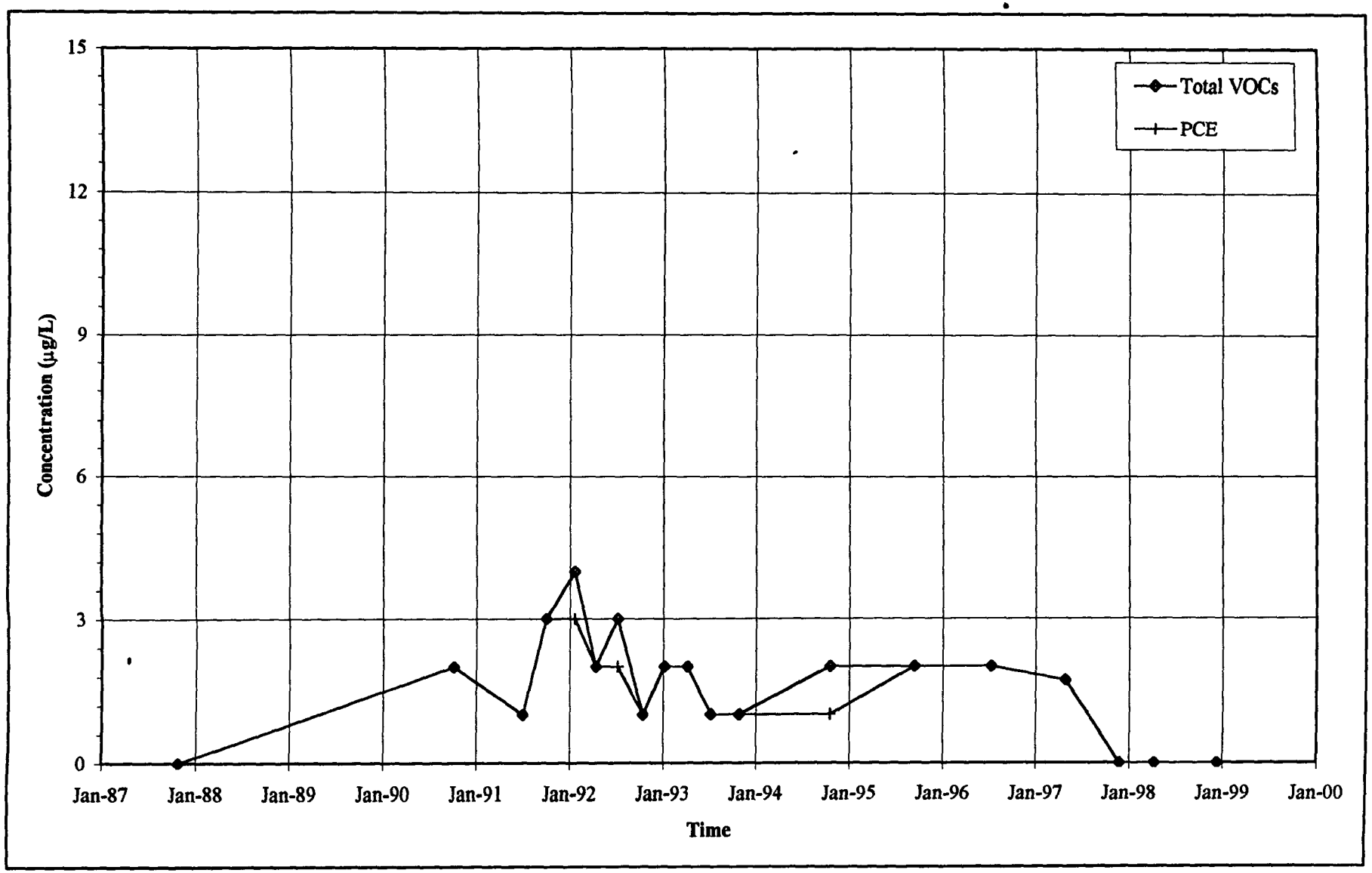
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 13
VOC Concentrations vs. Time - MW-10s
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



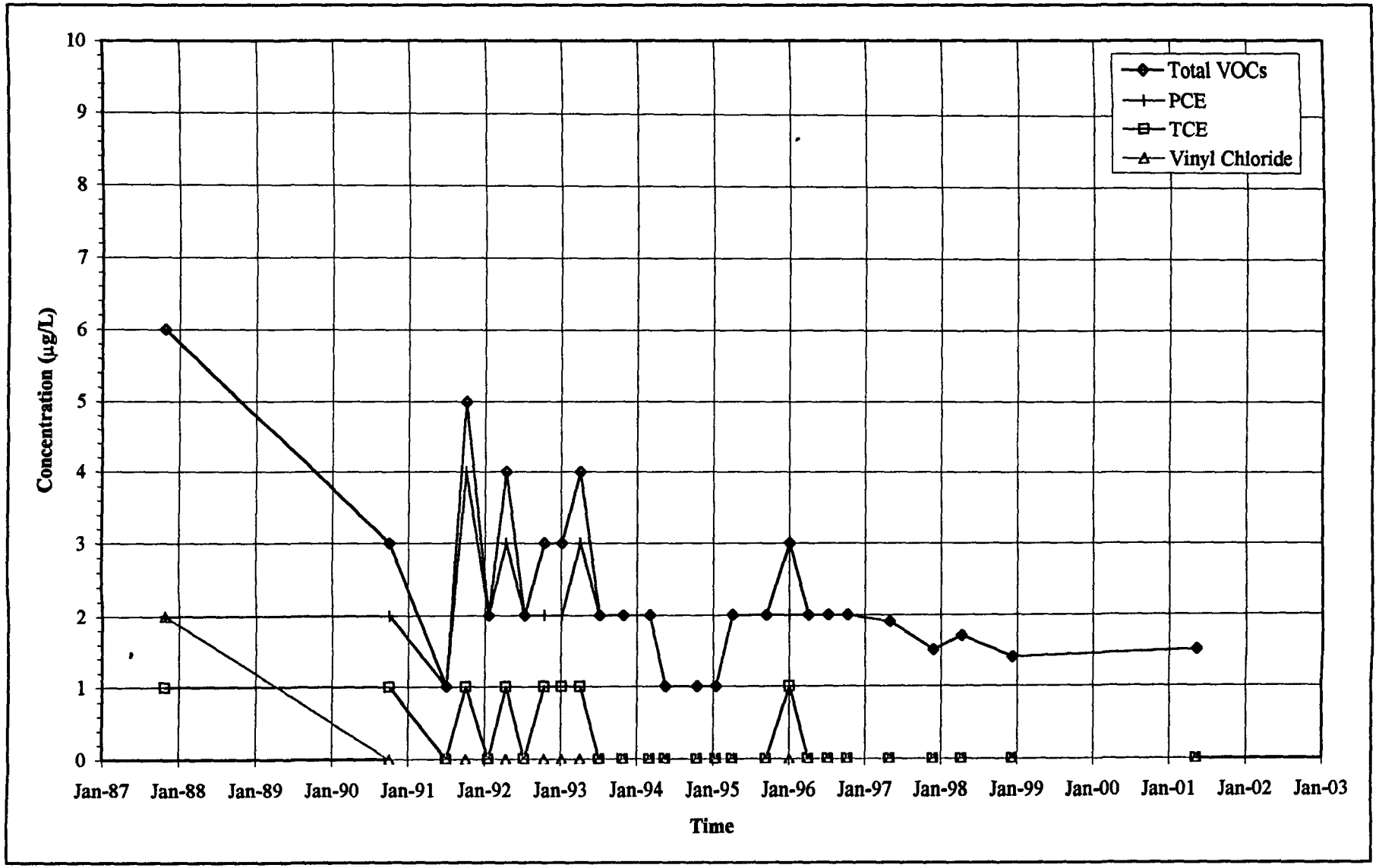
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 14
VOC Concentrations vs. Time - MW-10d
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



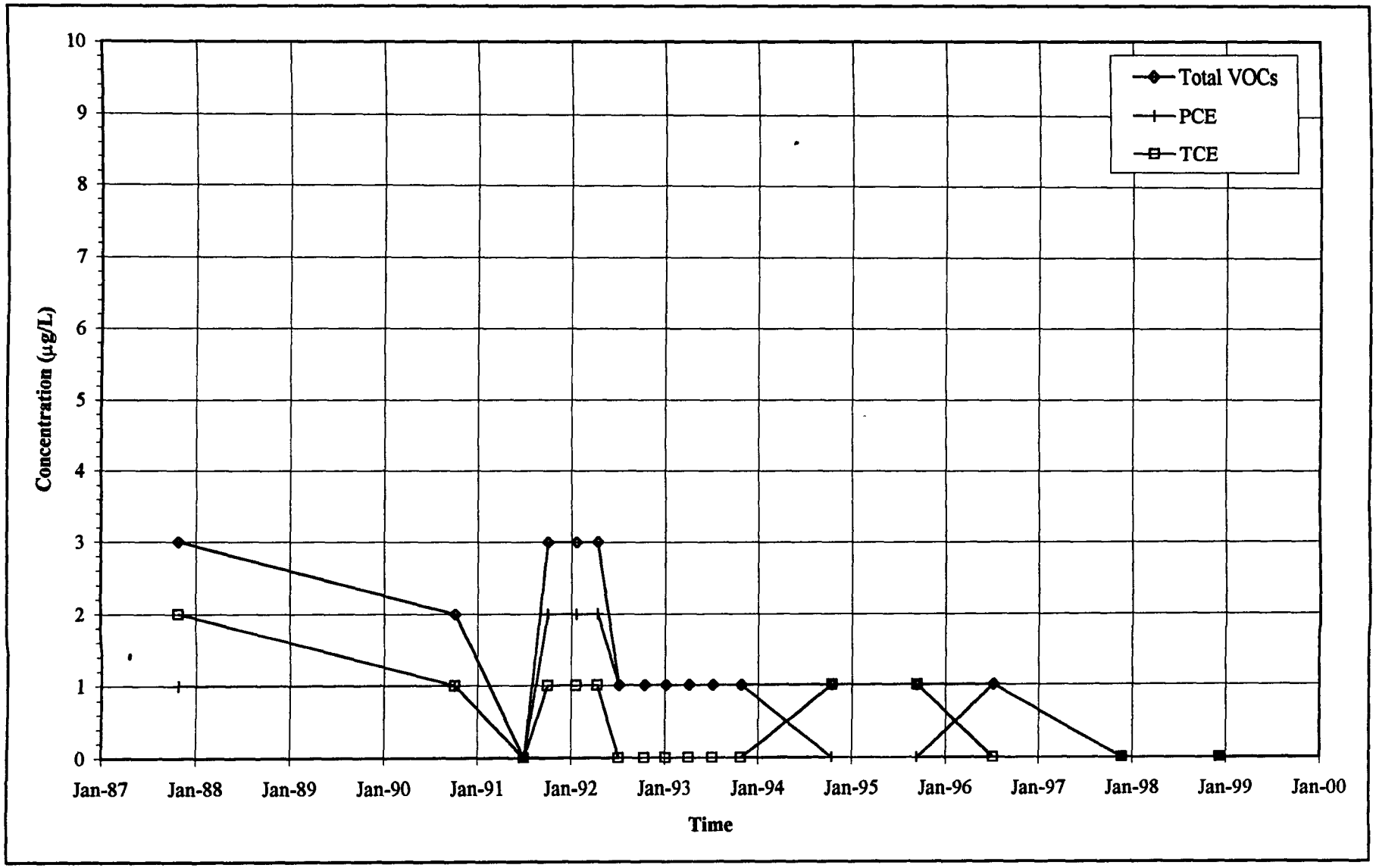
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 15
VOC Concentrations vs. Time - MW-12
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



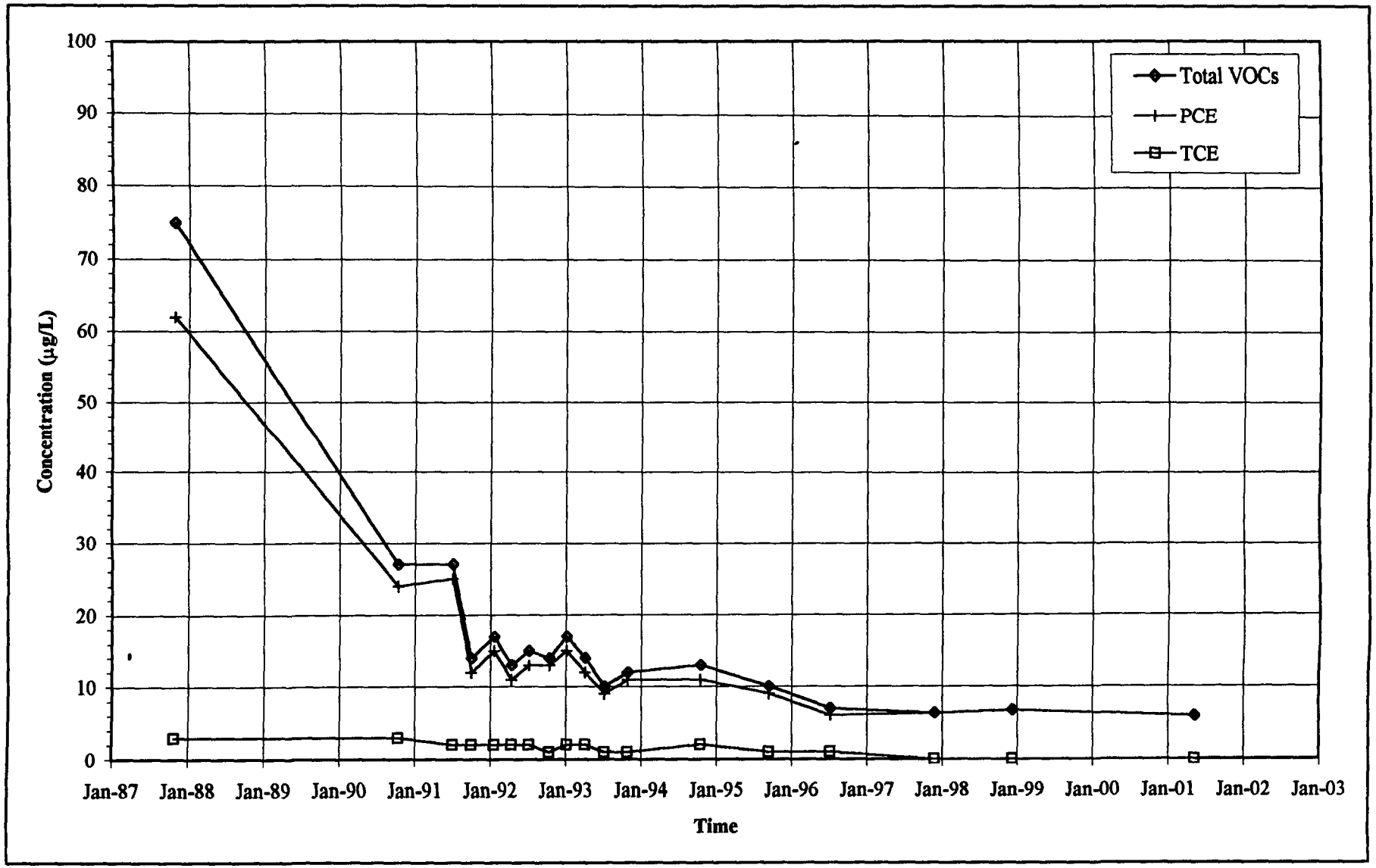
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 16
VOC Concentrations vs. Time - MW-14s
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



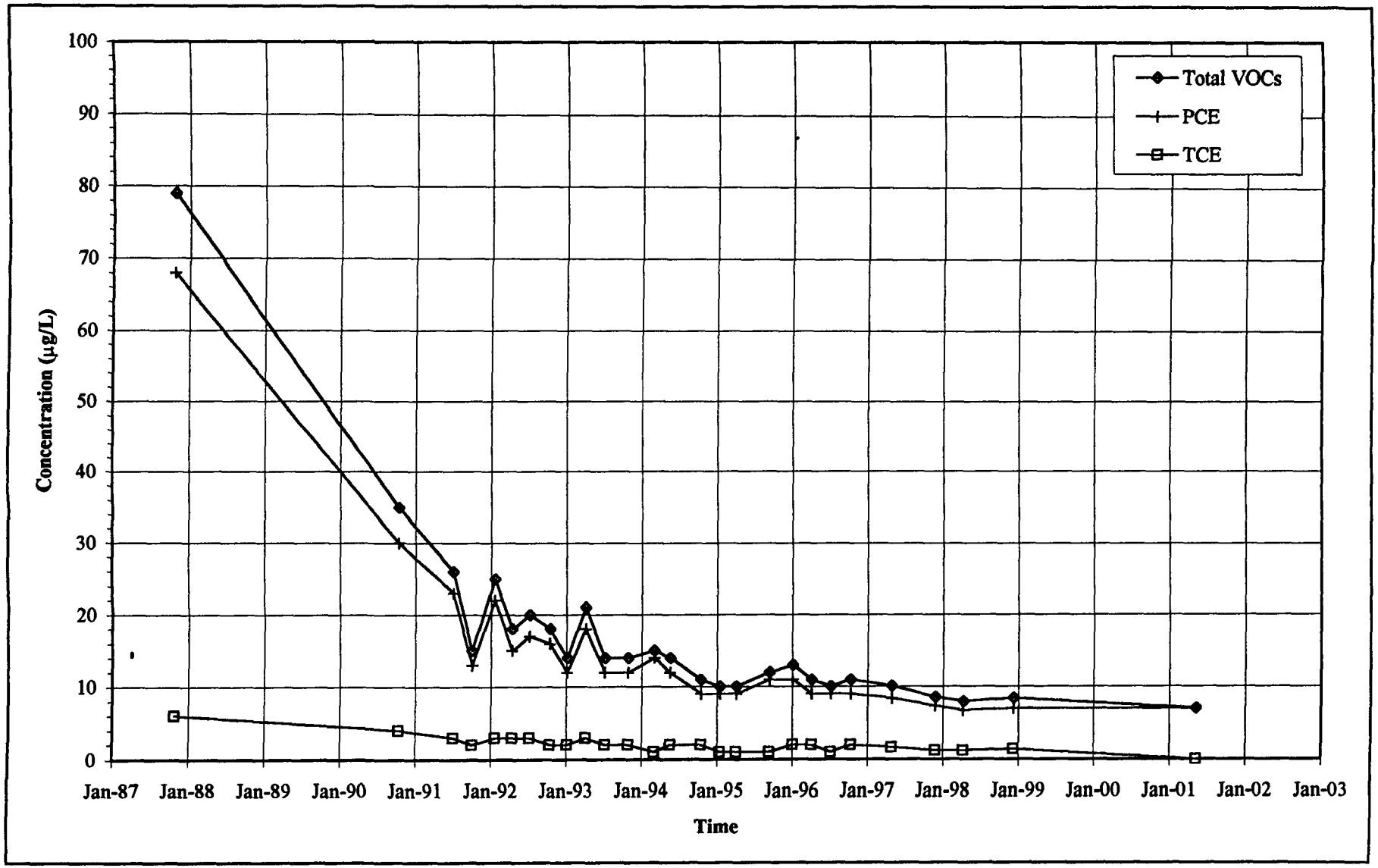
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 17
VOC Concentrations vs. Time - MW-15s
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



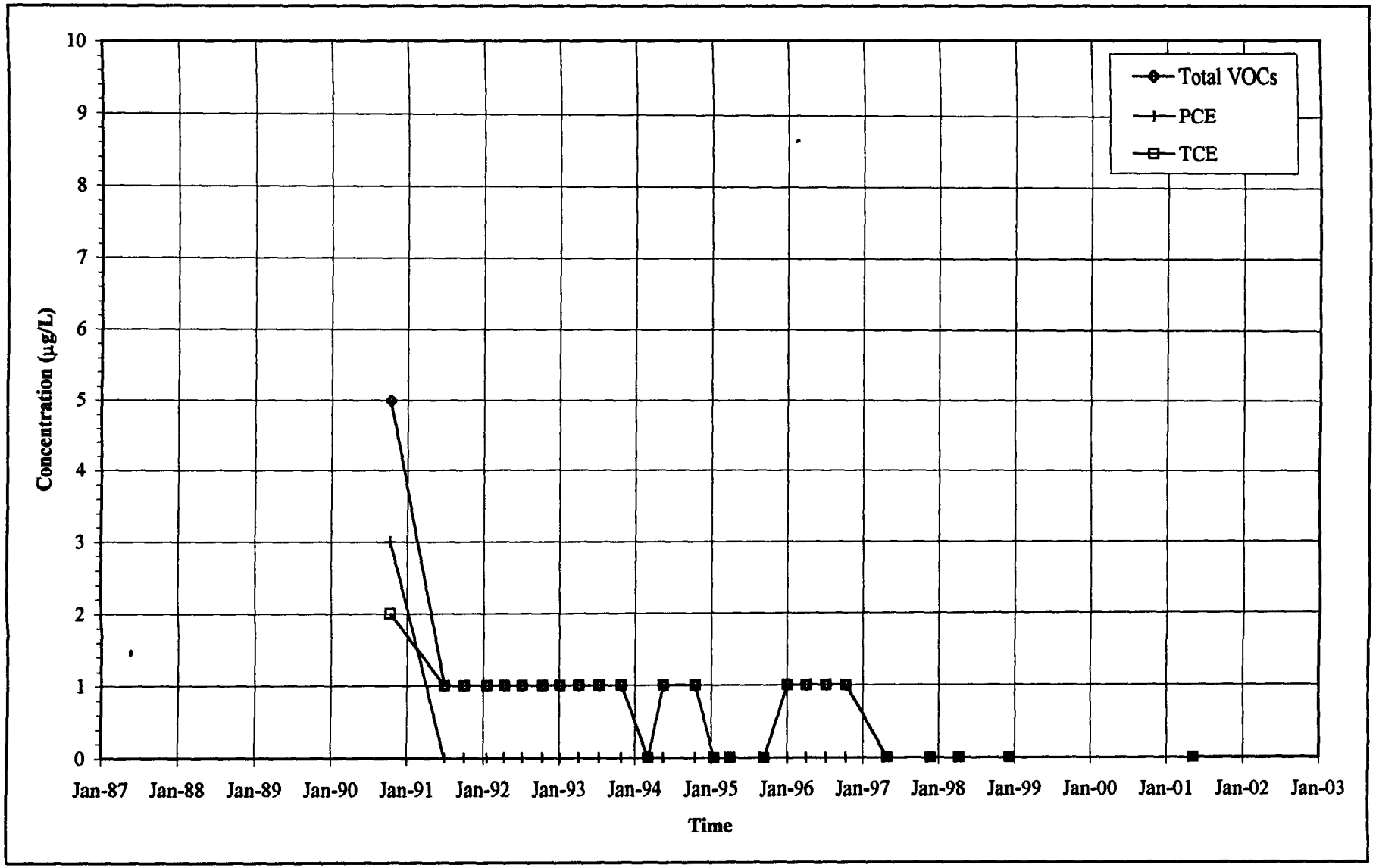
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 18
VOC Concentrations vs. Time - MW-15d
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



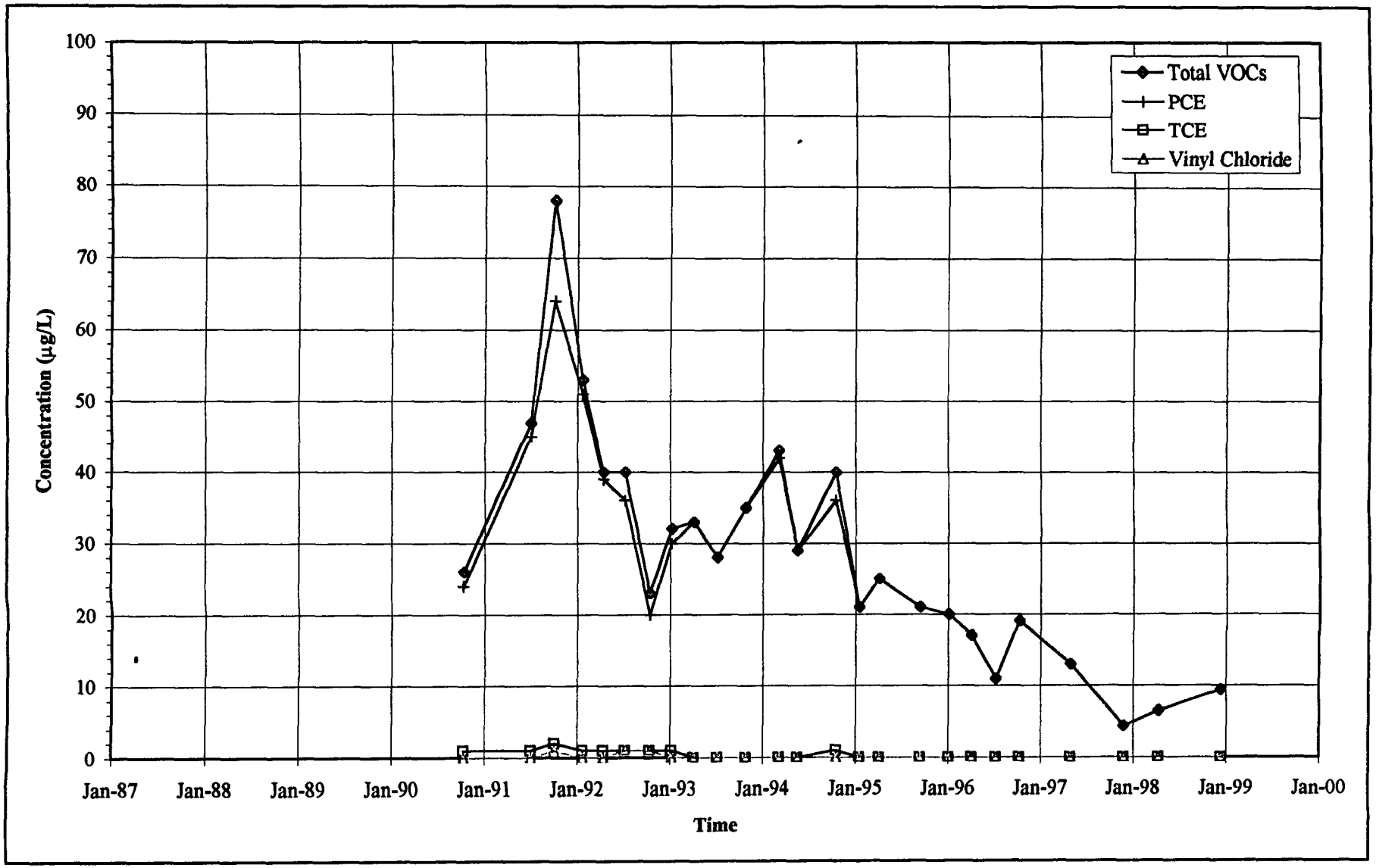
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 19
VOC Concentrations vs. Time - MW-17
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



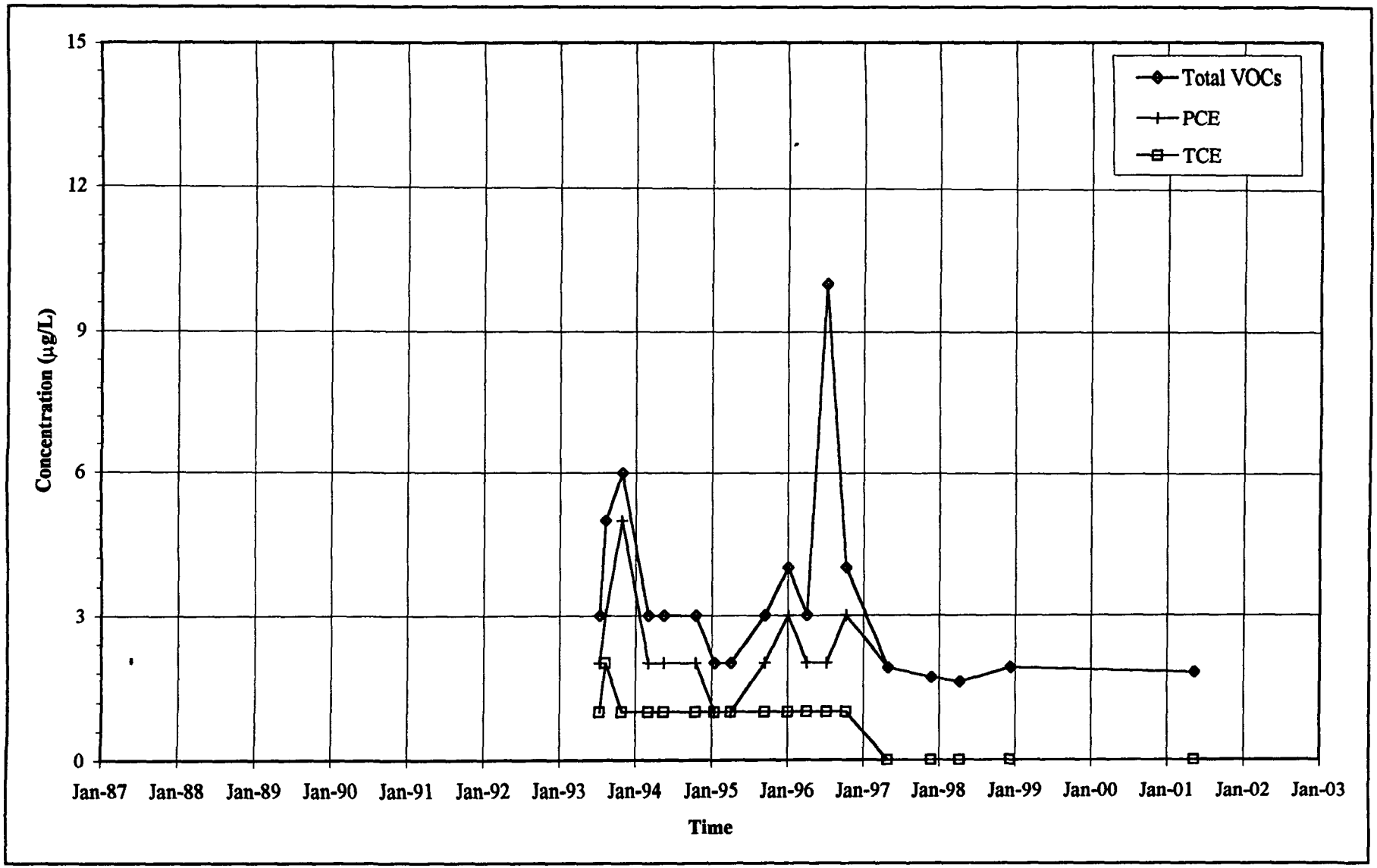
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 20
VOC Concentrations vs. Time - MW-19
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



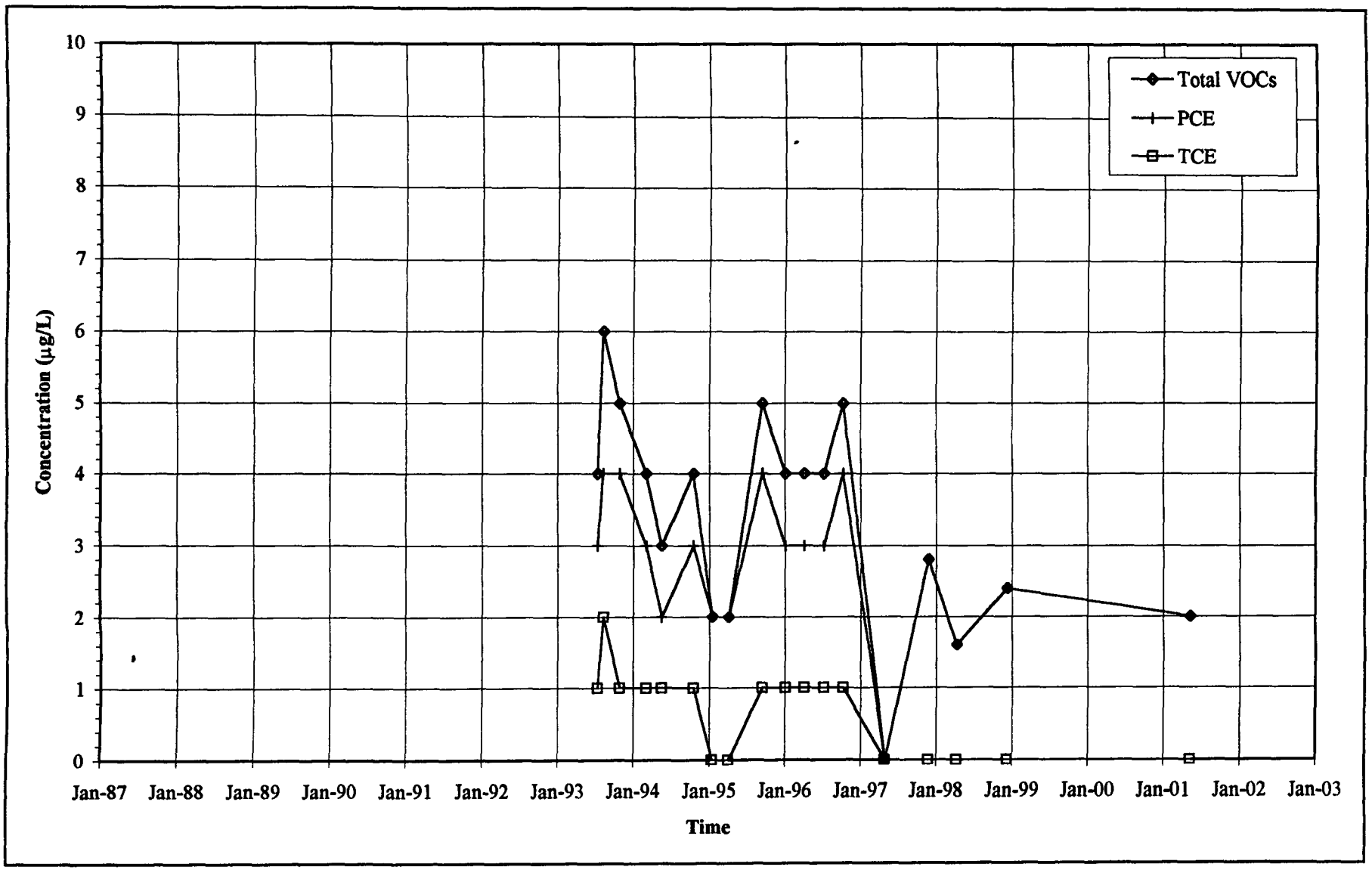
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 21
VOC Concentrations vs. Time - MW-20s
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



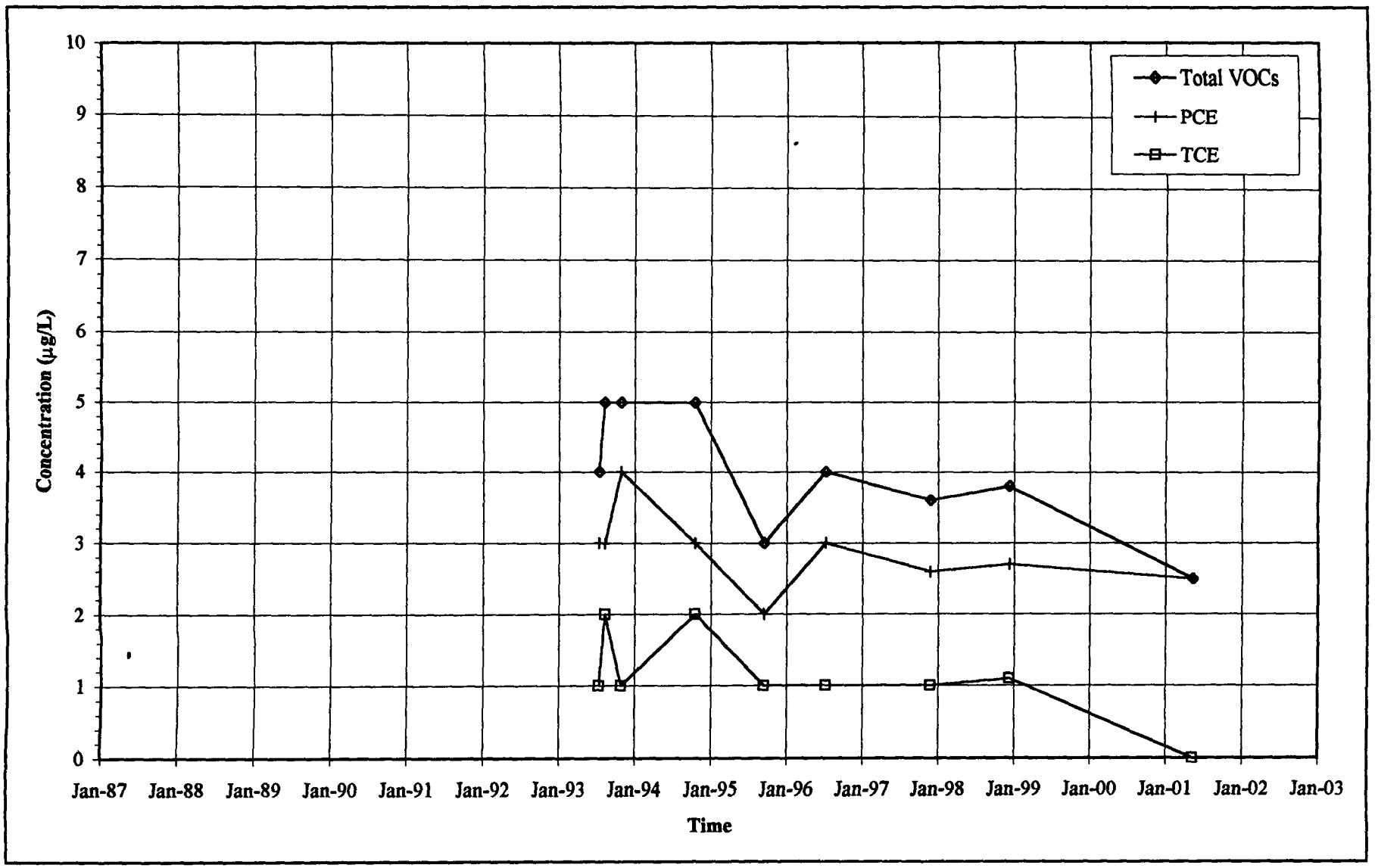
Note: Analytical results recorded as zero were reported as less than the method detection limits.

Graph 23
VOC Concentrations vs. Time - MW-21s
General Signal Corporation, #24-1136
9000 East Michigan Avenue, Galesburg, MI



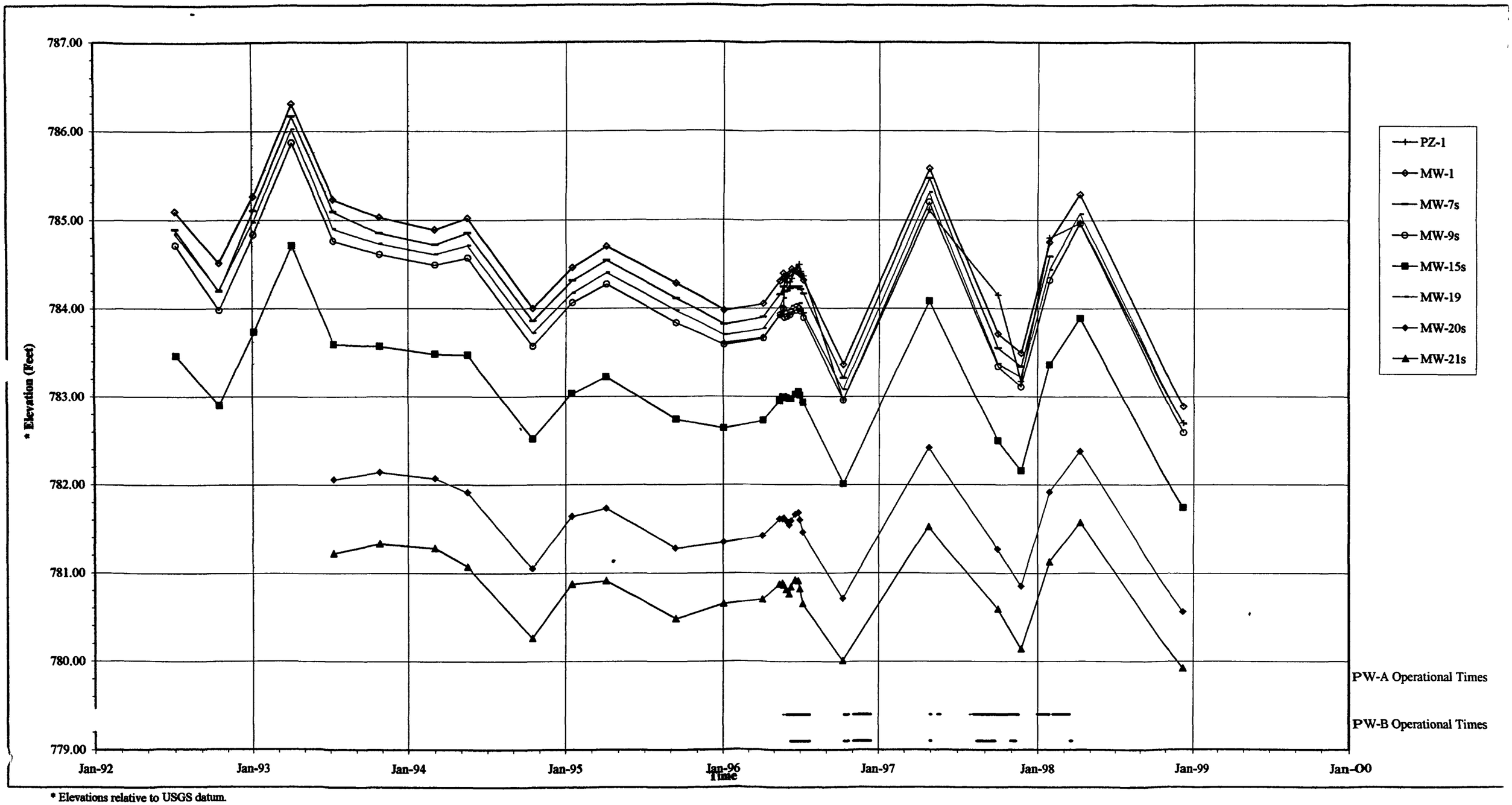
Note: Analytical results recorded as zero were reported as less than the method detection limits.

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 Hydrec

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

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

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

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:	Hudson	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:	16 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.
~~3-4~~		~~Sand, lm~~
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
Well/Boring ID: IW-1

Location: 9000 East Michigan Ave., Galesburg, Michigan
Boring Depth: 42.2'
Date (s) Drilled: January 24, 1998
Boring Diameter: 24"/16"
Logged By: William K. Hunsberger
Drilling Method: Cable Tool
Drilling Co.: Ohio Drilling
Drilling Equipment: Bucyrus Erie 60L
Weather Conditions: Cool, cloudy
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. Loose brown fine to medium SAND, some fine to medium Gravel, trace Silt/Clay. Sand and gravel subrounded. Saturated.	15.25" ID Black Steel Well Casing	779.6
25						Black-brown mottled SAND, SILT, CLAY and PEAT. Saturated. Loose brown fine to coarse SAND, some fine to medium Gravel, little Silt/Clay. Sand and gravel subrounded. Saturated.	Natural Collapse	774.6
30						Loose brown fine to coarse SAND and GRAVEL, trace fine to medium Cobbles, little Silt/Clay. Sand, gravel and cobbles subrounded. Saturated.	14" 30 Slot Stainless Steel Well Screen (5')	769.6
35						Loose brown fine to coarse SAND and GRAVEL, some fine to coarse Cobbles, little Silt/Clay. Sand, gravel and cobbles subrounded. Saturated.		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)
40						Soft brown fine to coarse SAND, SILT, and CLAY, little fine to medium Gravel. Sand and gravel subrounded. Saturated.	14" 100 Slot Stainless Steel Well Screen (10') / Natural Collapse	759.6
45								754.6
50								749.6
55								744.6
60								739.6
65								734.6
70								729.6
75								724.

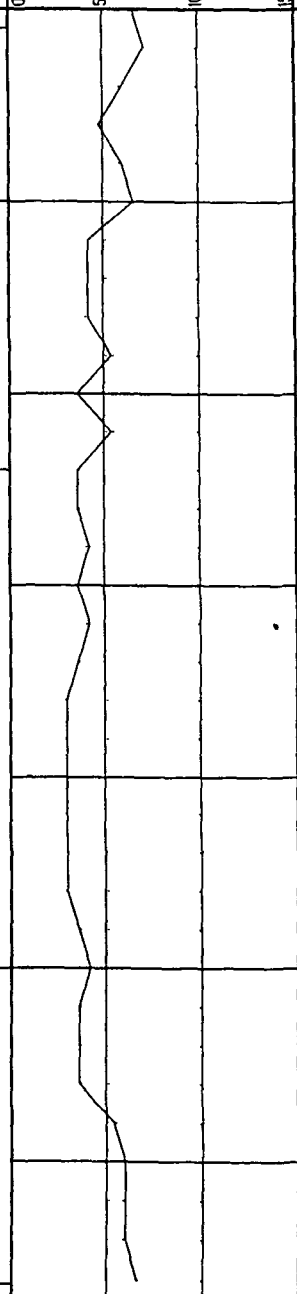
Notes:

AMERICAN HYDROGEOLOGY CORPORATION
WELL/BORING LOG
PROJECT #: 24-1136

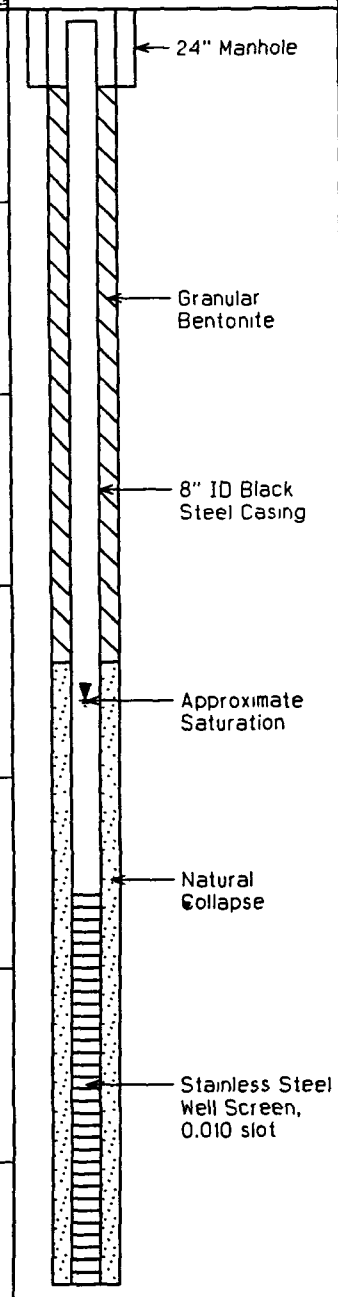
Project: General Signal
Well/Boring ID: PW-B
Page: 1 of 1
ion: Southwest corner trailer lot
Boring Depth: 33.1'
Date (s) Drilled: 8-25-93
Boring Diameter: ≈ 18"
Logged By: Christopher L. Jacobs
Drilling Method: 12.25" Hollow Stem Auger
Drilling Co.: Environmental Science and Engineer
Drilling Equipment: Gus Pech
Weather Conditions: ≈ 90° F, sunny
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
Location:
Date (s) Drilled: May 26, 1988
Logged By: Frank Breen
Drilling Co.:
Weather Conditions:

Well/Boring ID: PW-1
Boring Depth: 44.0'
Boring Diameter:
Drilling Method: HSA
Drilling Equipment:
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:

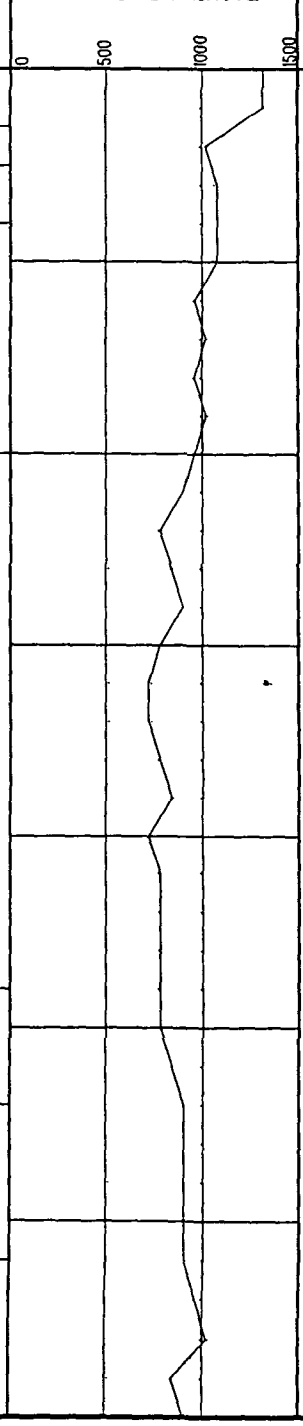
AMERICAN HYDROGEOLOGY CORPORATION
WELL/BORING LOG
PROJECT #: 24-1136

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

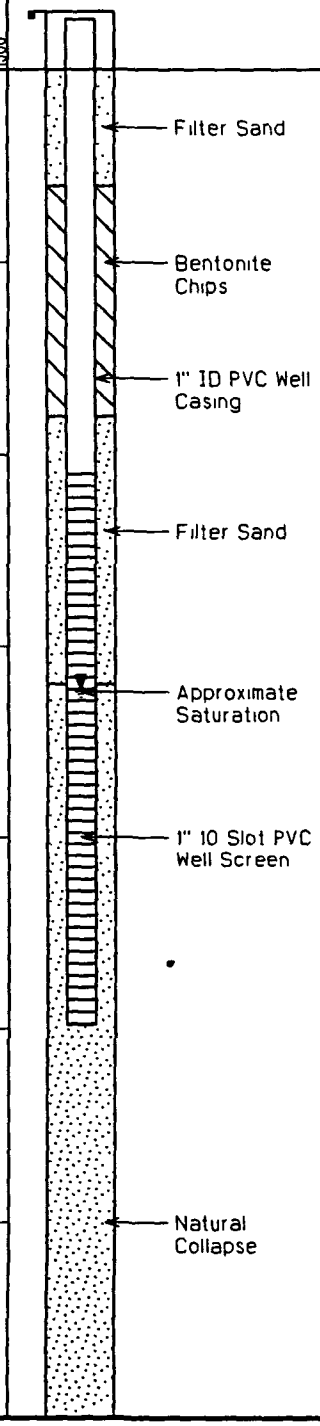
Well/Boring ID: PZ-1
Boring Depth: 41.0
Boring Diameter: 6"
Drilling Method: Cable Tool
Drilling Equipment: 22W Bucyrus Erie
Top of Slots: 10.5' b.g.l.
Bottom of Slots: 24.9' b.g.l.

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									

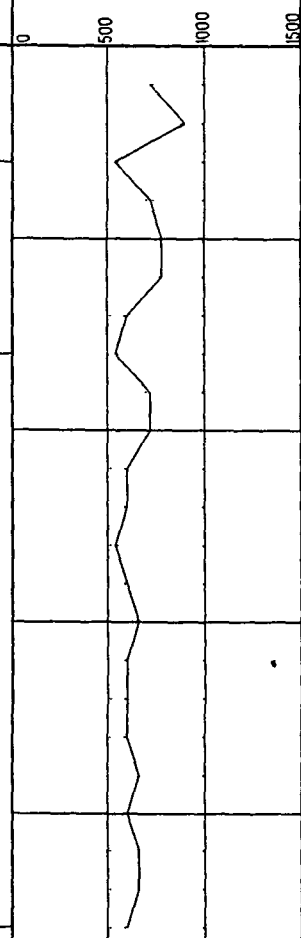
Notes: DTS - driven tube sample.

AMERICAN HYDROGEOLOGY CORPORATION
WELL/BORING LOG
PROJECT #: 24-1136

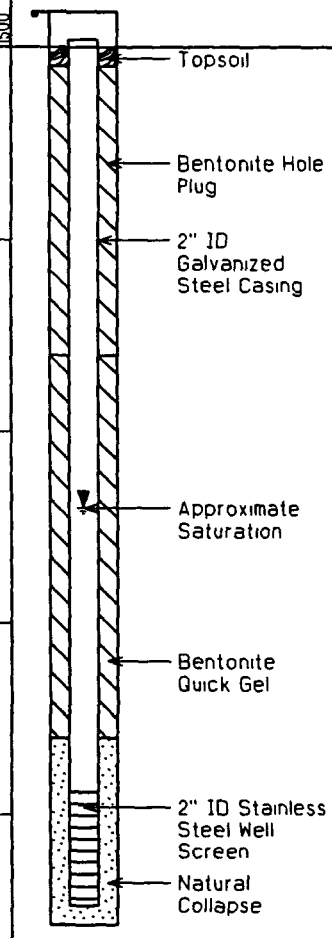
Project: General Signal
Well/Boring ID: MW-20d
Page: 1 of 1
tion: 10' West of HPB-1
Boring Depth: 23.0'
Date (s) Drilled: July 7, 1993
Boring Diameter: 8.25"
Logged By: Chrisopher L. Jacobs
Drilling Method: HSA
Drilling Co.: Environmental Drilling and Services
Drilling Equipment: MD B-59
Weather Conditions: Sunny, 85°
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)

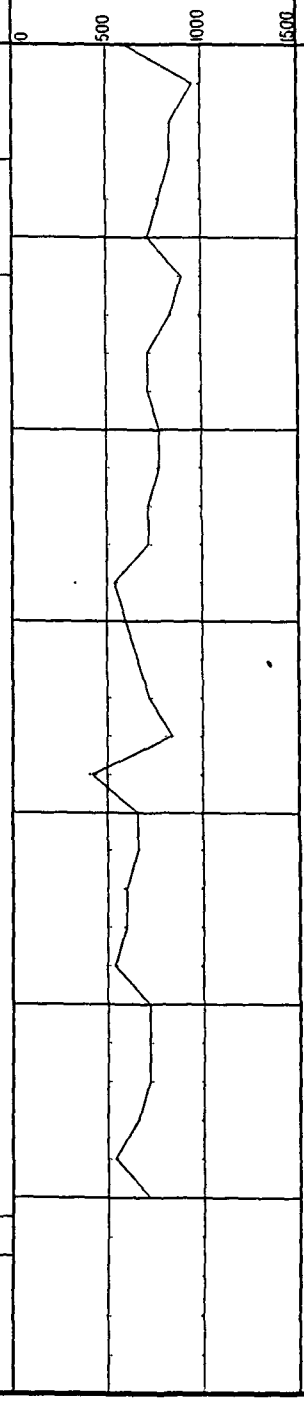
Notes: Located at HPB-1. Natural collapse occurred at 18.0', well developed by surging and bailing. Gamma Log was complete in the HPB-1 boring.

AMERICAN HYDROGEOLOGY CORPORATION
WELL/BORING LOG
PROJECT #: 24-1136

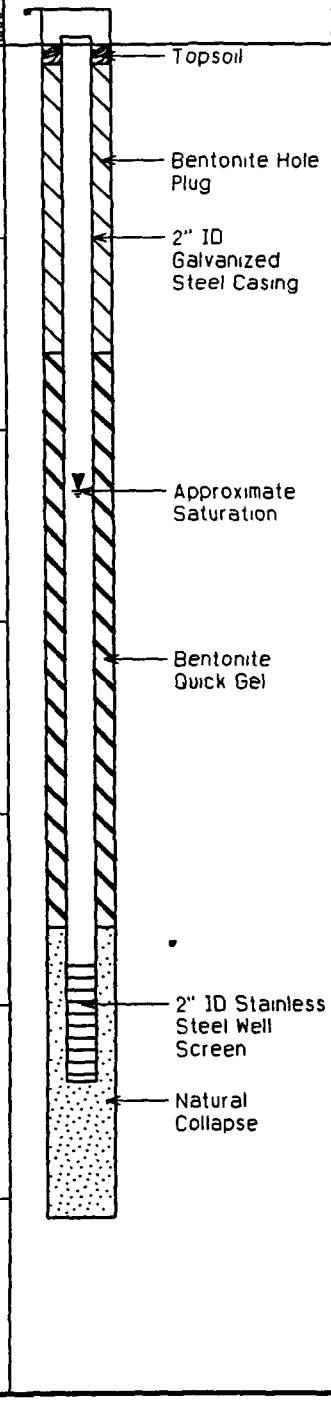
Project: General Signal
Well/Boring ID: MW-21d
Page: 1 of 1
tion: 735' South of MW-15
Boring Depth: 30.5'
Date (s) Drilled: July 7, 1993
Boring Diameter: 8.25"
Logged By: Chrisopher L. Jacobs
Drilling Method: HSA
Drilling Co.: Environmental Drilling and Services
Drilling Equipment: MD B-59
Weather Conditions: Sunny, 85° - 90°
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
						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, light brown mottled.
15						
20						
25						
30	X	27 52 105	0			CLAY: Drilling observation.
35						

GAMMA LOG COUNTS PER MINUTE



WELL CONSTRUCTION DETAIL



ELEV. (feet)

Notes: A Hydropunch sample was taken at 29'-30'. Well was developed by surging and bailing.

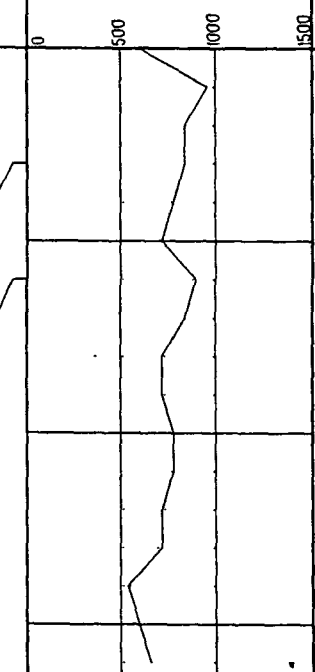
AMERICAN HYDROGEOLOGY CORPORATION
WELL/BORING LOG
PROJECT #: 24-1136

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°

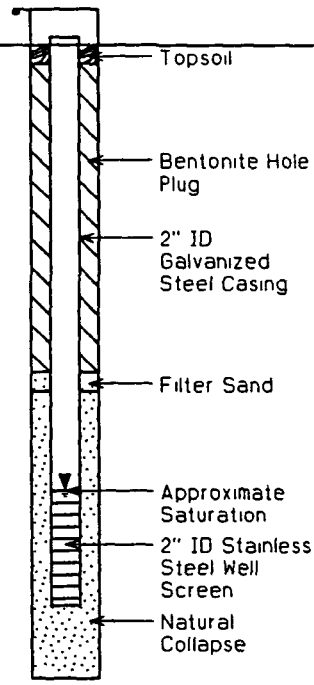
Well/Boring ID: MW-21s
Page: 1 of 1
Boring Depth: 16.5'
Boring Diameter: 8.25"
Drilling Method: HSA
Drilling Equipment: MD B-59
Top of Slots: 11.6' b.g.l.
Bottom of Slots: 14.6' b.g.l.

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: 0, 500, 1000, 1500



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.

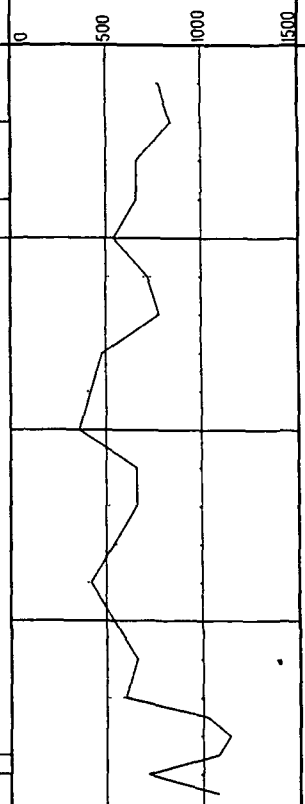
AMERICAN HYDROGEOLOGY CORPORATION
WELL/BORING LOG
PROJECT #: 24-1136

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°

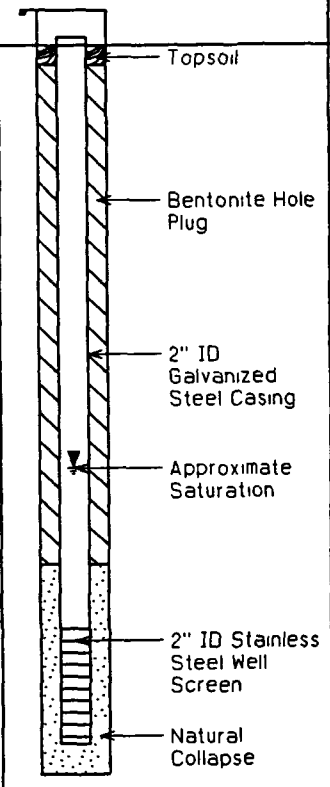
Well/Boring ID: MW-22d
Page: 1 of 1
Boring Depth: 19.0'
Boring Diameter: 8.25"
Drilling Method: HSA
Drilling Equipment: MD B-59
Top of Slots: 15.2' b.g.l.
Bottom of Slots: 18.2' b.g.l.

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		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)

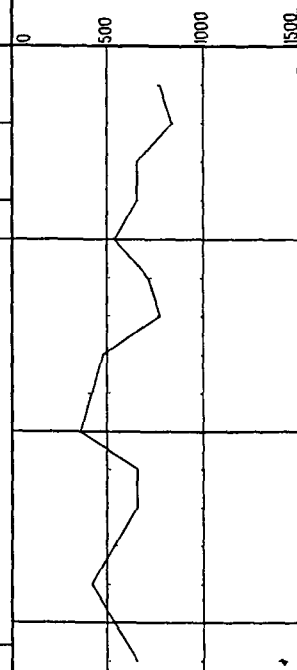
Notes: Well was developed by surging and bailing.

AMERICAN HYDROGEOLOGY CORPORATION
WELL/BORING LOG
PROJECT #: 24-1136

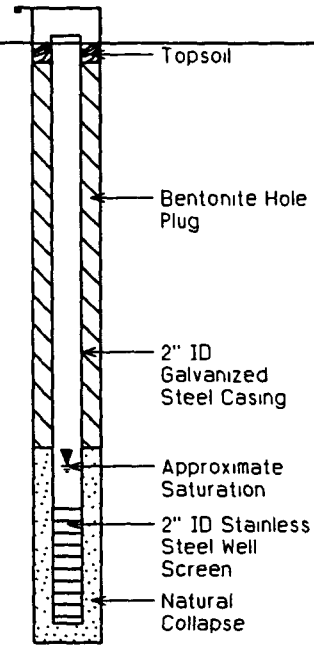
Project: General Signal
Well/Boring ID: MW-22s
Page: 1 of 1
Location: ≈ 1000' South of MW-13
Boring Depth: 15.6'
Date (s) Drilled: July 8, 1993
Boring Diameter: 8.25"
Logged By: Chrisopher L. Jacobs
Drilling Method: HSA
Drilling Co.: Environmental Drilling and Services
Drilling Equipment: MD B-59
Weather Conditions: Sunny, 85° - 90°
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.

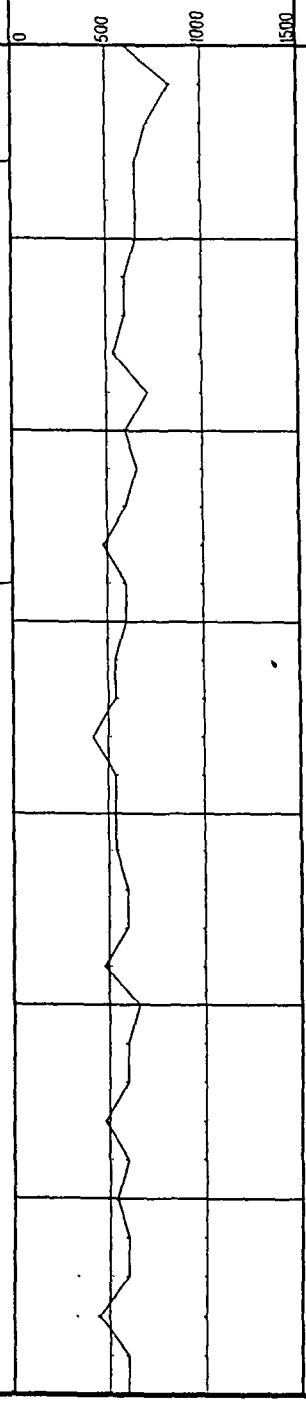
AMERICAN HYDROGEOLOGY CORPORATION
WELL/BORING LOG
PROJECT #: 24-1136

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
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.
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 Well/Boring ID: MW-23d

DEPTH feet (bgl)	SAMPLE DEPTH	BLOWS COUNTS	RECOVERY	PID	STRATA	DESCRIPTION	ELEV. (feet)
40							
		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							

GAMMA LOG COUNTS PER MINUTE: 0, 500, 1000, 1500

WELL CONSTRUCTION DETAIL:
- Natural Collapse
- 2" ID Stainless Steel Well Screen
- Filter Sand
- Natural Collapse

Notes: Well was developed by surging and bailing.

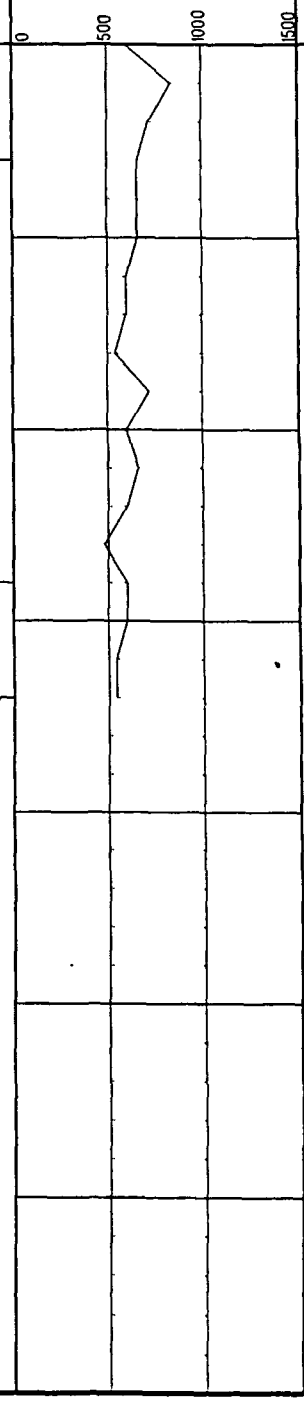
AMERICAN HYDROGEOLOGY CORPORATION
WELL/BORING LOG
PROJECT #: 24-1136

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°

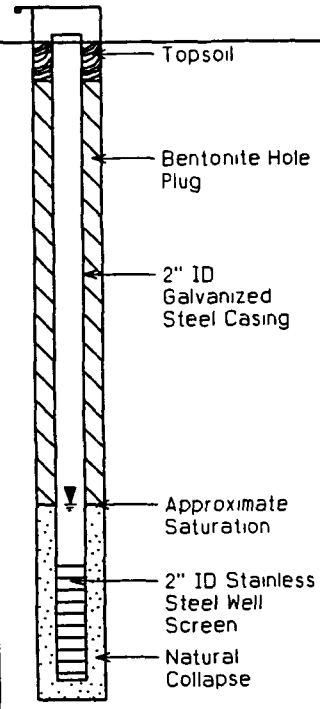
Well/Boring ID: MW-23s
Page: 1 of 1
Boring Depth: 17.0
Boring Diameter: 8.25"
Drilling Method: HSA
Drilling Equipment: MD B-59
Top of Slots: 13.6' b.g.l.
Bottom of Slots: 16.6' b.g.l.

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.

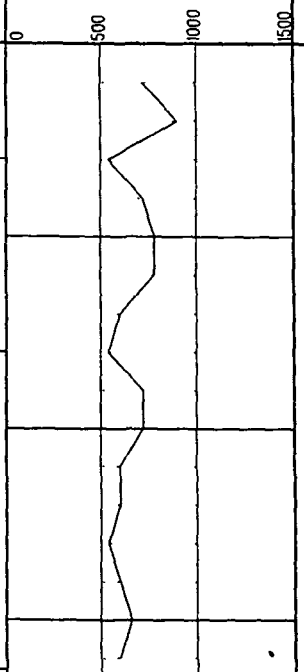
AMERICAN HYDROGEOLOGY CORPORATION
WELL/BORING LOG
PROJECT #: 24-1136

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°

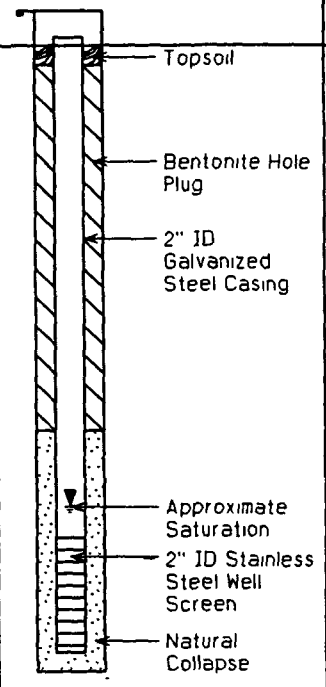
Well/Boring ID: MW-20s
Page: 1 of 1
Boring Depth: 16.3'
Boring Diameter: 8.25"
Drilling Method: HSA
Drilling Equipment: MD B-59
Top of Slots: 12.8' b.g.l.
Bottom of Slots: 15.8' b.g.l.

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	GAMMA LOG COUNTS PER MINUTE (0, 500, 1000, 1500)	WELL CONSTRUCTION DETAIL	ELEV. (feet)
						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.		Approximate Saturation	
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									

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	BLOWS COUNTS	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									

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.			
						SAND-very fine to medium grained, occasional coarse grained Sand, some Silt and fine subrounded Gravel, moderately sorted, cohesive, very soft, moist, medium brown.			
5						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.			
10								Approximate Saturation	
						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.			
15									
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

α_y = transverse dispersivity $\approx \alpha_x/3$ = 80 feet
α_z = vertical dispersivity $\approx \alpha_x/100$ = 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.

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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 00DEG 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

3607-23-210-010
Cert 111348

MBR 1410061060

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 BENTLEY-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:

Victoria A. Bauzer

HYDRECO, INC.

By

Its: Vice President

Wally P. Warlowsky

STATE OF Illinois)
) ss
COUNTY OF Cook)

The foregoing instrument was acknowledged before me this 12th day of May, 1989, by Wally P. Warlowsky, on behalf of HYDRECO, INC.

Notary Public, Cook County
My commission expires:

"OFFICIAL SEAL"
MARC H. SCHWARTZ
NOTARY PUBLIC, STATE OF ILLINOIS
MY COMMISSION EXPIRES 10/24/92

This instrument drafted by:
Bruce E. Parsons
Miller, Johnson, Snell & Cummiskey
800 Calder Plaza Bldg.
Grand Rapids, MI 49503
(616) 459-4311
Permanent Parcel No.: 3607-23-210-010

AFTER RECORDING RETURN TO
Eric J. Thorsen, Esq.
Miller, Johnson, Snell & Cummiskey
800 Calder Plaza Building
Grand Rapids, Michigan

'89 MAY 16 PM 1 07
REGISTER

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.
THOMAS A. DENEAU, P.E.
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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

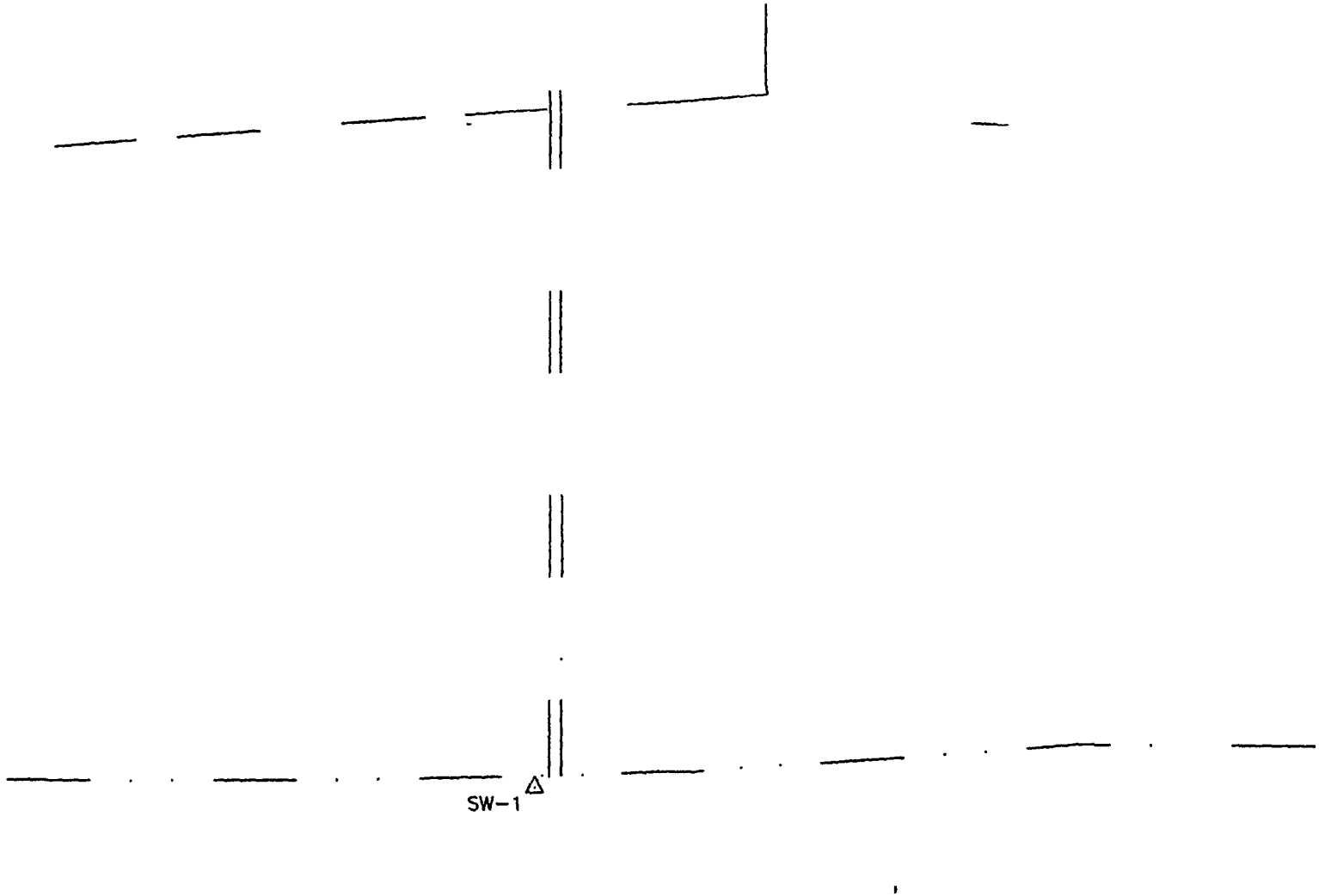

FIGURE 1

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

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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

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

FILE COPY

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 wa Schedule I (Water Supply System Specifications Su een evaluated by the Michigan Department of Environmental (ne "DEPARTMENT") and the proposed location for the rep been determined. This information is found on the attached W.

Please put in 24-1136 with Remedial Action Plan Report dated 2001

It is recommended mine the Technical Specifications for this work and make a p 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.

1.9 ELECTRICAL WORK

Electrical work for single-family dwellings, extending from the pump to the first point of connection inside the dwelling (pressure switch), may be performed by the CONTRACTOR. All electrical work on public water supply systems or electrical work beyond the first point of connection within a single-family dwelling shall be performed under permit by a licensed electrical contractor in compliance with the Michigan Electrical Administrative Act, Act 217, PA 1956 as amended.

1.10 SUBCONTRACTORS

The CONTRACTOR shall provide the DEPARTMENT with a list of all subcontractors which may be used. Such listing shall indicate which portions of the work are to be completed by the subcontractors.

1.11 TIME OF COMPLETION

The CONTRACTOR shall begin work on the site within 20 days from the date the contract is awarded and all work shall be completed within 30 days from the date the work is begun unless otherwise specified in Schedule I.

PART TWO - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

2.1 WELL DRILLING

Payment for well drilling in all formations shall be on the basis of the unit price per lineal foot as measured in place and shall include all materials and labor required to drill the well and to perform initial capacity testing.

2.2 WELL CASING

Payment for well casing shall be on the basis of the unit price per lineal foot of casing actually installed and left in place, and shall include all other material, equipment, and labor to install casing pipe. The unit price shall include removing and pulling back the casing where required.

2.3 DRIVE SHOE

Payment for the drive shoe shall be on the basis of unit price per each and shall include all labor, material, and equipment to install the drive shoe, where applicable.

2.4 GROUTING

Payment for grouting shall be on a per foot basis and shall include all material, equipment, and labor necessary to seal the casing. The unit price shall include circulation of drilling fluid or water to surface prior to grouting.

2.5 WELL SCREEN

Payment for well screen shall be on a lump sum basis and shall include blanks, packers, bottom plug, and related fittings necessary for proper well screen installation. The lump sum shall include initial development of the well screen for a period of one hour.

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.

2.14 WATER SERVICE LINE

Payment for water service line shall be on the basis of the unit price per lineal foot of pipe installed from the pitless adapter to the pressure tank and from the pressure tank to the existing building plumbing, and shall include all material, equipment, and labor to install the piping. The unit price shall include all fittings, trench excavation and backfill, restoration of trench area, and openings through building walls where required.

2.15 PRESSURE STORAGE TANK

Payment for the pressure storage tank shall be on the basis of the unit price per each tank and shall include all material, equipment, and labor to install the tank and fittings. The unit price shall include the tank cross fitting, pressure relief valve, pressure gauge, sampling tap, and mounting provisions.

2.16 SITE CLEAN-UP AND RESTORATION

Payment for site clean-up and restoration shall be on the basis of the unit price per work site and shall include all materials, equipment, and labor to clean up and restore the site.

2.17 PERMITS

Payment for water supply permits issued by the local health departments shall be on the basis of actual fees charged by the agency.

PART THREE - MATERIALS

3.1 WELL CASING

Permanent well casing shall be new, black or galvanized steel pipe conforming to the ASTM specification A 589-89a, A 53-90b, or A 106-91 or the API specification 5L-90, in accordance with the CODE, R325.1626, Rule 126, construction of wells; steel casing and R324.1627, Rule127, Construction of wells; steel casing and types of joints. Casing size shall be as listed in Schedule I.

If requested, the CONTRACTOR shall furnish the DEPARTMENT with a copy of a receipt or invoice from the casing supplier.

In some cases the DEPARTMENT may allow PVC casing. The use of PVC casing shall be as listed in Schedule I. Where allowed, PVC casing shall be new pipe conforming to the ASTM specification F-480-90, in accordance with the CODE, R325.1631a, Rule 131a, construction of wells, PVC casing dimensions, R325.1631b, Rule 131b, construction of wells, PVC casing material standards, and R325.1631c, Rule 131c, construction of wells, PVC casing joints.

3.2 DRIVE SHOE

The drive shoe (if required) shall be hardened, forged steel and the size compatible with that of the casing.

3.3 WELL SCREEN MATERIAL AND DESIGN

The well screen, if required, shall be new and consist of the continuous slot, wire-wound design and made of Type 304 stainless steel. The wire configuration must produce inlet

slots with sharp ou. edges, widening inwardly so as to mir ze 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.

3.7 DRILLING FLUIDS, GROUTS AND ADDITIVES

Bentonite grouts, special cements, or other admixtures to the drilling fluid or grout slurry to reduce permeability, increase fluidity, control time of set, or alter the slurry composition in any way shall not be used unless approved by the DEPARTMENT. DEPARTMENT approval shall be based upon compliance with the following specifications as applicable: ANSI/NSF standards 60 or 61 (additives), ASTM specification C 150 (cements), or section 10 of the API specification 10 and section 4 of the API specification 13A (bentonites), in accordance with the CODE, R325.1640, Rule 140, certification of water well components.

3.8 PITLESS ADAPTER

The pitless adapter shall be of the clamp-on, weld-on or thread-on design and shall be a model approved by the Michigan Department of Environmental Quality, in accordance with the CODE, R325.1642, Rule 142, below ground well casing connections.

3.9 WELL CAP

Well caps shall be of insect-proof design with a screened vent, in accordance with the CODE, R325.1657, Rule 157, pump installation; vents, and Rule 157a, pump installation; well caps and seals.

3.10 SUBMERSIBLE PUMP

(THE DEPARTMENT SHALL CHOOSE ONE OF THE FOLLOWING)

A. Replacement Pump - The pumping equipment shall be a 4-inch nominal size submersible pump, NEMA standard, 1/2 horsepower, single phase, with a 10 gallon per minute capacity. The pump shall have a brass, bronze, stainless steel or engineered thermoplastic discharge head and intake (motor mounting bracket). The pump housing and motor housing shall be Type 304 stainless steel. The voltage of the pump motor shall be identical to the electrical AC current power supply to the existing pump at each replacement well location, either 115 volt single phase or 230 volt single phase, and either two-wire or three-wire. **The submersible pump information is provided for bidding purposes only. Actual pump selection will be determined based on well data and existing pump capacity. Additions or deletions in the amount to be paid will be made equivalent to the difference in the cost of the pump.**

OR

B. Existing Pump - The submersible pump used with the existing water supply will be reused in the new well. The existing pump shall be removed from the existing contaminated well and reinstalled in the new well.

3.11 SUBMERSIBLE PUMP CONTROLS

A. Two-wire Systems - The two-wire pump controls shall consist of a pressure actuated switch, Square D, Class 9013, Type FSG, or equivalent factory set at 30/50 psi operating range. A fused disconnect switch or manual reset circuit breaker shall be provided with properly sized fuses or circuit breakers to meet amperage requirements of the pump. If the pump does not include lightning protection, a lightning arrestor shall be included with the controls.

B. Three-Wire S ems - The three-wire pump controls s 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.

3.16 WATER SERVICE LINE

The water service line between the well and the building shall be flexible copper tubing, Type K conforming to specification ASTM B 88. The pipe shall be 1 inch I.D. The water service line shall have no couplings or splices between the well and pressure tank. Brass compression fittings shall be used for connections to the pressure tank cross and pitless adapter.

In some cases the DEPARTMENT may allow plastic service line. The use of plastic service line shall be as listed in Schedule I. Where allowed, plastic service line shall conform to the CODE, R325.1655(2).

3.17 DISINFECTANT

Chemicals used for disinfecting the drilling water, well, pumping equipment, storage tank, and piping shall be sodium hypochlorite or calcium hypochlorite or others approved by the DEPARTMENT.

PART FOUR - COMPLETION OF WORK

4.1 WELL CONSTRUCTION

A. Well Location - The well shall be constructed in the location designated by the DEPARTMENT. Any deviation in location shall be approved by the DEPARTMENT.

B. Drilling Method - The well shall be constructed using either the cable tool or rotary drilling method. Special construction requirements for each drilling method are specified herein. Other drilling methods may be used only with the permission of the DEPARTMENT.

C. Drilling Equipment - Drilling machines shall be of sufficient size to efficiently complete the work. If requested by the DEPARTMENT, the CONTRACTOR shall present evidence of sufficient equipment and tools to complete the work.

D. Drilling Water - Water necessary for drilling operations shall be obtained by the CONTRACTOR at his expense from a municipal water supply or a well free of organic or bacterial contamination and comply with the CODE in accordance with R325.1639, Rule 139(8), construction of wells, drilling water.

E. Well Screen - The CONTRACTOR shall select the screen to be used based upon analysis of samples from the formation. For naturally developed wells, the screen slot size should be such that between 40 and 50 percent of the material present in the water-bearing formation will be retained by the screen and comply with the CODE in accordance with R325.1639, Rule 139(1), construction of wells, well screens. For gravel-packed wells, the slot size should be such that 90 percent of the gravel pack material is retained by the screen. The minimum length and diameter of the well screen should be based on a maximum inlet velocity of 0.1 feet per second for the selected slot size.

F. Formation Sampling and Well Records - The CONTRACTOR shall maintain a complete and accurately written record of types of formations encountered, depths and thicknesses of formations during construction of a well. Such written log shall be

available for pection on-site at the request of the D ARTMENT. 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

3. The CONTRACTOR shall maintain records of the grouting method and the volume of grout material used.

4. Neat cement grout shall be consistent in texture, free of lumps and shall be pumped into the annulus before initial set, in accordance with the CODE, R325.1633a, Rule 133a(1-6), construction of wells, grouting and R325.1634a, Rule 134a(1), construction of wells; grouting rotary-bored or augered wells.

5. When the DEPARTMENT representative authorizes the CONTRACTOR to grout the well in his absence, the CONTRACTOR shall provide the DEPARTMENT with a copy of a billing invoice for the grout material purchased. Such invoices shall be submitted to the DEPARTMENT with the final bill.

B. Grouting Methods

Grout material shall be placed into the annular space between the well casing and borehole, in accordance with the CODE, R325.1634a, Rule 134a(1), construction of wells, grouting rotary-bored or augered wells, using one of the following methods:

1. Tremie Pipe Outside Casing - A tremie pipe, minimum size 3/4-inch I.D. shall be placed to the bottom of the zone to be grouted. Grout material shall be pumped down a grout pipe (tremie) and placed in the annulus, from bottom to top, in one continuous operation. The end of the tremie pipe must be submerged in the emplaced grout at all times until grouting is complete. The tremie pipe shall remain full of grout at all times until grouting is complete. In the event of interruption in the grouting operations, the bottom of the pipe should be raised above the grout level and not be resubmerged until all air and water have been displaced from the tremie pipe.

2. Displacement Plug Method - The well casing shall be raised off the bottom of the drillhole high enough to allow flow of cement up the annulus. The required volume of grout shall be placed into the well casing. A drillable displacement plug is placed on the top of the grout column. Pressure is then applied to the displacement plug to push it to the bottom of the well, forcing the grout up the annular space. Pressure on the displacement plug shall be maintained a minimum of 24 hours or until such time as a sample of the grout indicates a satisfactory set.

   If the grout material does not appear at the surface upon completion of grouting by the displacement method, grouting of the remaining annular space shall be accomplished by the tremie pipe placement method (See #1 above).

Other grouting methods proposed by the CONTRACTOR shall be approved by the DEPARTMENT prior to use.

4.3 ROTARY DRILLING

General Requirements - The following specification shall apply to all wells constructed using the mud rotary drilling method:

A. A sand separator or desander shall be used with the drilling fluid system to improve filter cake properties and formation samples, and reduce the potential for circulating

contaminants ir ɜ borehole. The desander shall be op ted 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 (ing Method - The upper borehole sh e 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

discharge is directed perpendicular to the direction of the water service line to provide a swing connection.

No surface water, dirt or other debris shall be allowed to enter the well casing during installation of the pitless adapter.

4.10 PUMPING AND STORAGE EQUIPMENT

A. The submersible pump and controls shall be installed in accordance with the manufacturer's instructions.

B. The pressure switch, pressure gauge, pressure relief valve, and sampling tap shall be installed on the tank cross.

C. The sampling tap shall be installed in accordance with the CODE, R325.1658, Rule 158, pump installation; sampling faucets.

D. The pressure tank shall be installed in accordance with the CODE, R325.1656, Rule 156, pump installation; pressure tanks.

4.11 WATER SERVICE LINE

The water service line shall be one continuous length without splices between the well and pressure tank. Splicing of service lines exceeding 100 feet or for connection to existing service lines may be allowed when done in accordance with the state plumbing code and the approval of the DEPARTMENT. The water service line shall have a minimum of 42 inches of cover. Under paved areas a minimum of 60 inches of cover or insulation and an outer conduit shall be provided to protect the water service line from freezing. The DEPARTMENT may modify minimum bury depths due to local climactic conditions.

4.12 SYSTEM TESTING

After completion of the well, installation of the pump, and completion of the piping and pressure tank installation, the water system shall be pressure tested by operating the pump through three complete pumping and delivery cycles. The underground piping and electrical wiring shall not be backfilled prior to the testing. The CONTRACTOR shall inspect all piping and connections during the pressure test to insure watertight construction at the operating pressure of the system. The electrical circuits shall be tested and found to be free from grounds or other malfunctions. Leaking piping or connections or other defects in the system shall be corrected by the CONTRACTOR and the system retested and found to be free of defects.

4.13 BACKFILLING

After the water service line has been installed, inspected, and tested, the excavation shall be backfilled using soil material originating from the excavation. Rocks and other debris that may damage the piping or other equipment shall be removed from the backfilling material.

4.14 DISINFECTION

After completion of the pressure testing, the well, piping and pressure tank shall be disinfected in accordance with the CODE, R325.1661, Rule 161, disinfection of well and pumping equipment.

4.15 WATER SAMPLING

Prior to placing the well into service, the DEPARTMENT representative shall collect a water sample from the well and submit it for bacteriological analysis. If the analysis shows that the water contains coliform bacteria or interference organisms, the CONTRACTOR shall again disinfect the well as specified herein. Additional sampling and re-disinfection shall be performed as required to obtain a bacteriologically safe sample.

A sample of water shall be collected by the DEPARTMENT or its representative and submitted for partial chemical analysis. Chemical parameters desired on each analysis will be determined by the DEPARTMENT. The DEPARTMENT shall collect and analyze samples for the chemical contaminants present in the ground water source being replaced.

In the event the DEPARTMENT or its representative cannot be present on the site, the DEPARTMENT may authorize the CONTRACTOR to collect the necessary samples.

4.16 ABANDONMENT OF WELL

In the event the well is not accepted by the DEPARTMENT due to insufficient capacity, unsatisfactory quality, or should it be abandoned due to loss of drilling tools or other causes, the CONTRACTOR shall seal the well in accordance with the abandonment specifications described herein.

4.17 OPERATING INSTRUCTIONS, MANUALS, AND WARRANTIES

The CONTRACTOR shall provide the property owner with all operating instructions, equipment manuals, repair parts lists and warranties by the manufacturer for the pumping equipment, pressure tank and other equipment installed.

4.18 GUARANTEE

The CONTRACTOR shall guarantee the water system to be free from defects or faulty workmanship for a period of one year from the date of completion. The CONTRACTOR shall furnish and install any parts that malfunction or prove to be defective without further cost, providing that the need for such replacement is not due to negligence of the property owner.

4.19 SITE RESTORATION

The CONTRACTOR shall restore the site by backfilling all trenches and all ruts caused by well drilling operations on the site. Additional soil may be required to fill these areas to prevent undue settling. The work area shall be graded and then raked.

Special site restoration activities deemed necessary by the DEPARTMENT will be specified in Schedule I. Additional unanticipated site restoration will be completed by the CONTRACTOR with the approval of the DEPARTMENT, with the cost to be reimbursed by the DEPARTMENT. Damage to property caused by the negligence of the CONTRACTOR shall be repaired by the CONTRACTOR at his expense.

4.20 SITE CLEAN-UP

Upon completion of the work, the CONTRACTOR shall remove form the premises all materials, debris, tools and machinery. Drilling mud, cuttings, grout material, or other

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

File
Hydreco,
Kalamazoo
MI

APTUS

March 6, 1991

Aptus
Environmental Services
P.O. Box 1328
Coffeyville, KS 67337
(316) 251-6380
FAX (316) 251-7498
Sales FAX (316) 251-1095
Incinerator FAX (316) 251-0089

RECEIVED
MAR 1 0 1991
DANIEL MCGRADE

DAN MCGRADE
GENERAL SIGNAL
HIGH RIDGE PARK / PO BOX 10010
STAMFORD, CT 06904-

RE: Aptus Document No. AE08G

Dear DAN MCGRADE:

Enclosed, please find your Certificate of Disposal from Aptus, which certifies that your waste material received on the manifest referenced has been properly disposed. Also, enclosed is a detail summary of the movement of your material.

Aptus would like to express our appreciation to you and hope that we can assist you in solving your waste management needs in the future.

Should you have any questions regarding our services, please contact one of our offices from 8:00 AM to 5:00 PM.

24 Hour Spill Response call 1-800-292-2558 or (316)251-6380.

Sincerely,

Sheri Sanders

SHERI SANDERS
PCB DOCUMENT ADMINISTRATOR

Enclosure

Aptus
Environmental Services

P.O. Box 1328
Coffeyville, KS 67337
(316) 251-5380
FAX (316) 251-7498
Sales FAX (316) 251-1095
Incinerator FAX (316) 251-0089

APTUS

March 6, 1991

CERTIFICATE OF DISPOSAL

NO. 5340

GENERAL SIGNAL
HIGH RIDGE PARK / PO BOX 10010
STAMFORD, CT 06904-

A. THIS IS TO CERTIFY THAT THE HAZARDOUS SUBSTANCE MANIFESTED TO **APTUS** ON APTUS DOCUMENT #AE08G WAS DISPOSED OF IN ACCORDANCE WITH 40 CFR 761 AS OF 02/17/91. ATTACHED, IS A DETAIL REPORT WHICH IDENTIFIES THE DATE(S) OF DISPOSAL AND THE PROCESS UTILIZED FOR EACH WASTE LISTED.

B. UNDER CIVIL AND CRIMINAL PENALTIES OF LAW FOR THE MAKING OR SUBMISSION OF FALSE OR FRAUDULENT STATEMENTS OR REPRESENTATIONS (18 U.S. C. 1001 AND 15 U.S. C. 2615), I CERTIFY THAT THE INFORMATION CONTAINED IN OR ACCOMPANYING THIS DOCUMENT IS TRUE, ACCURATE AND COMPLETE. AS TO THE IDENTIFIED SECTIONS(S)(A.) OF THIS DOCUMENT FOR WHICH I CANNOT PERSONALLY VERIFY TRUTH AND ACCURACY, I CERTIFY AS THE COMPANY OFFICIAL HAVING SUPERVISORY RESPONSIBILITY FOR THE PERSONS WHO, ACTING UNDER MY DIRECT INSTRUCTIONS, MADE THE VERIFICATION THAT THIS INFORMATION IS TRUE, ACCURATE, AND COMPLETE.

APTUS
EPA ID # KSD980964993

BRIAN BROSNAN
MANAGER, ENVIRONMENTAL AFFAIRS

Aptus

DETAIL REPORT

OR
JERAL SIGNAL
DGE PARK / PO BOX 10010
ID CT 06904-
AIG000025890
2033578800
GRADE
0015956

CORRESPONDENT
ENVIRONMENTAL WASTE CONTROL
P O BOX 468 -27140 PRINCETON
INKSTER MI 48141-
PHONE 3135611400
CHRISTINE JENSEN
CODE 0014542

WORKORDER # 68938
APT DOC # AE08G
CUST MANIFEST 90001
STATE MANIFEST MIZZ26923
DATE CHECKED IN 01/14/91
DATE OF REPORT 03/06/91
SALESMAN 14148
HOLD BACK 0%

RDTYPE	CNT	DESCRIPTION	SERIAL/DRUM #	CONCEN	UNT	OUT/SRVC	WI	QTY	UNT	LOCATN	D	F	SHIP	DISPOSAL FACILITITY	SHIPMAN	DESTROYD	CORECV	CDSENT	CDNUMBER	CAT
EB1	0	WET FLR DRY-GLASS JR	1 of 2/		PPM	02/01/90	426	426 00		13000	F	F	01/23/91	APTUS INCINERATOR COFFEYVILLE,KS	CAJ09	01/27/91	02/18/91	03/06/91	5340	
EB1	0	WET-FLR DRY V SWEEPR	2 of 2/		PPM	02/01/90	394	394 00		13000	F	F	01/23/91	APTUS INCINERATOR COFFEYVILLE KS	CAJ09	01/27/91	02/18/91	03/06/91	5340	
EB	0	SWEEPER PARTS	1 of 2/			02/01/90	62	62 00		9189000	F	F	01/29/91	CHEMICAL WASTE MGMT, EMELLE,AL	CAH41	01/30/91	02/11/91	03/06/91	5340	
EB	0	SRP	2 of 2/			02/01/90	62	62 00		9189000	F	F	01/29/91	CHEMICAL WASTE MGMT, EMELLE,AL	CAH41	01/30/91	02/11/91	03/06/91	5340	
HL1	0	WATER ICE	1 of 1/	1	PPM	02/01/90	188	25 00	Gallo	0000000	F	F	02/06/91	INOXS	CAH79	02/17/91	02/27/91	03/06/91	5340	

STS ON JOB NUMBER 68938

File

Aptus
Environmental Services
P O Box 1328
Coffeyville, KS 67337
(316) 251-6380
FAX (316) 251-7498
Sales FAX (316) 251-1095
Incinerator FAX (316) 251-0089

APTUS

March 14, 1991

RECEIVED
MAR 19 1991
DANIEL McGRADE

Mr. Leo Alderman
Air and Toxics Division
U.S. EPA Region VII
726 Minnesota Avenue
Kansas City, KS 66101

RE: One-Year Exception Report

According to 761.215(c) (1), Aptus must report PCB waste which was received more than nine months after being removed from service for disposal and which also was not disposed within one year of that date.

Enclosed is Manifest #AE08G, which shows General Signal as the generator, Tri-State Motor Transit as the transporter, Chemical Waste, Emelle, AL and Aptus Incinerator, Coffeyville, KS as the disposers of the waste material.

Items on line items 11 a, b, c & d, were removed from service on 02-01-90 and received by Aptus on 01-14-91.

This material was not disposed before 02-01-91 because it was not received at our facility in adequate time to dispose of it before the one year storage date had expired.

If you have any questions about this report, please call me at (316) 251-6380.

Sincerely,

R. B. Wolf
EA Administration & Audit Supervisor

RW:ser

cc. Generator
Correspondent

File Hydraco, Kalamazoo, MI

APTUS

Aptus
Environmental Services

P.O. Box 1328
Coffeyville, KS 67337
(316) 251-6380
FAX (316) 251-7498
Sales FAX (316) 251-1095
Incinerator FAX (316) 251-0089

January 24, 1991

RECEIVED
FEB 12 1991
DANIEL McGRADE

DAN MCGRADE
GENERAL SIGNAL
HIGH RIDGE PARK / PO BOX 10010
STAMFORD, CT 06904-

RE: GENERAL SIGNAL, Aptus Document No. AE08G

Dear DAN MCGRADE:

Enclosed, please find your copy of the hazardous waste manifest indicating that your waste material has been received and accepted by Aptus.

Immediately following the disposal of all your material, you will receive a complete Certificate of Disposal.

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 Customer Service Representative in Sales from 8:00 AM to 5:00 PM, Monday through Friday.

Sincerely,

Environmental Affairs

Enclosure

1157
405080

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-

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. MIG000025890 Manifest Document No. 001
2. Page 1 of 1

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

3. Generator's Name and Mailing Address
General Signal
High Ridge Park/PO Box 10010
Stamford, CT. 06904

4. Generator's Phone ( ) 203-357-8800 - Dan McGrade

A. State Manifest Document Number: MI 2226923
B. State Generator's ID:

5. Transporter 1 Company Name: Tri-State Motor Transit
6. US EPA ID Number: MOD095038998
C. State Transporter's ID:
D. Transporter's Phone: 417-624-313

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
Aptus Environmental Services
Highway 169 North
Coffeyville, KS 67337

10. US EPA ID Number: KSD980964993
G. State Facility's ID:
H. Facility's Phone: 316-251-6380

	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.	HM X RQ, Hazardous substance (solid) n.o.s./ORM-E-NA9188 (polychlorinated biphenyls)	003	DM	EST. 1100	K	026 L
b.	HM X RQ, Hazardous substance (solid (n.o.s./ORM-E NA9188 (polychlorinated biphenyls)	001	DM	EST. 75	K	026 L
c.	HM X RQ, Hazardous substance ((solid) n.o.s./ORM-E NA9188 (polychlorinated biphenyls)	001	DM	EST. 75	K	026 L
d.	HM X RQ, HAZARDOUS SUBSTANCE (LIQUID) N.O.S., ORM-E-NA9188 (POLYCHLORINATED BIPHENYLS)	001	DM	EST. 100	K	026 L

J. Additional Descriptions for Materials Listed Above
a. Core water/oil dry - Storage Date Feb. 1990
b. Sweeper parts - Storage Date Feb. 1990
c. Protective clothing and visqueen - Storage Date Feb. 1990.
d CORE WATER 2-90
Emergency contact: 1-800-292-2558

K. Handling Codes for Wastes Listed Above: (S)
a/S
b/S
c/S
d/S

15. Special Handling Instructions and Additional Information
Work Order #68938/Pick-up spot - Bentler Industries 9000 E. Michigan/Galesburg MI 616-343-9800 ADN# AE08 Contact: Leon Hall Contact: Lee Ingram

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.

GENERATOR

Printed/Typed Name: DANIEL McGRADE
Signature: Daniel McGrade
Date: Month Day Year 0 1 2 8 [illegible]

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: R. BRANAM
Signature: R. Branam
Date: Month Day Year 0 1 2 9 9 1

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name:
Signature:
Date: Month Day Year

FACILITY

19. Discrepancy Indication Space: Discrepancies ok'd by Dan McGrade 1-23-91. aw
11a. 2 dms core water & floor dry = 820 lbs., 373 kg. 11b. 1 dm sweeper parts = 62 lbs., 28 kg. 11c. 1 dm debris = 62 lbs., 28 kg. 11d. 1 dm core water = 25 gals., 188 lbs., 85 kg.

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

Printed/Typed Name: Rick Hurt
Signature: Rick Hurt
Date: Month Day Year 0 1 1 4 9 1

ALL MUST BE REPORTED TO THE MICHIGAN POLLUTION EMERGENCY ALERTING SYSTEM, IN CEN 1-800-424-8802 24 HOURS PER DAY. JAN AT 1-800-292-4706 OR OUT OF STATE AT 517-373-7660 AND THE NATIONAL RESPONSE

EPA Form 8700-22 (Rev. 9/88) PR 5110

DNR

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

File Highland Kalamazoo

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. MIG0000258990 Manifest Document No. 000

2. Page 1 of 1

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

3. Generator's Name and Mailing Address
General Signal
High Ridge Park/PO Box 10010
Stamford, CT. 06904

4. Generator's Phone ( ) 203-357-8800 - Dan McGrade

5. Transporter 1 Company Name
Tri-State Motor Transit

6. US EPA ID Number
MPD005039994

7. Transporter 2 Company Name

8. US EPA ID Number

9. Designated Facility Name and Site Address
Aptus Environmental Services
Highway 169 North
Coffeyville, KS 67337

10. US EPA ID Number
KSD980969993

A. State Manifest Document Number
MI 2226923

B. State Generator's ID

C. State Transporter's ID

D. Transporter's Phone 417-624-1111

E. State Transporter's ID

F. Transporter's Phone

G. State Facility's ID

H. Facility's Phone
316-251-6380

	11. US DOT Description (including Proper Shipping Name, Hazard Class, and ID NUMBER).	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.	
a.	RQ, Hazardous substance (solid) n.o.s./ORM-E- NA9188 (polychlorinated biphenyls)	X	003	DM	EST. 100	K		
b.	RQ, Hazardous substance (solid (n.o.s./ORM-E NA9188 (polychlorinated biphenyls)	X	001	DM	EST. 75	K		
c.	RQ, Hazardous substance ((solid) n.o.s./ORM-E NA9188 (polychlorinated biphenyls)	X	001	DM	EST. 75	K		
d.	RQ HAZARDOUS SUBSTANCE (LIQUID) N.O.S. ORM-E NA9188 (POLYCHLORINATED BIPHENYLS)	X	001	DM	EST 100	K		

J. Additional Descriptions for Materials Listed Above
a. Core water/oil drip - Storage Date Feb. 1990
b. Bumper parts - Storage Date Feb. 1990
c. Protective clothing and wipers - Storage Date Feb. 1990
d. Emergency contact: (800-792-2538)

K. Handling Codes for Wastes Listed Above
a. (3)
b.
c.
d.

15. Special Handling Instructions and Additional Information
Work Order #68938/Pick-up spot - Bentler Industries Contact: Leon Ball
9000 E. Michigan/Galesburg MI 616-343-9800 Contact: Les Ingram

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.

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Printed/Typed Name: [illegible] Signature: [illegible] Date: Month Day Year

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: R. BRAUN Signature: [illegible] Date: Month Day Year 01 09 91

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name: Signature: Date: Month 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: Date: Month Day Year

GENERATOR

TRANSPORTER

FACILITY

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 800-424-8802 24 HOURS PER DAY.

PR 5110

BENTELER INDUSTRIES
KALAMAZOO FACILITY

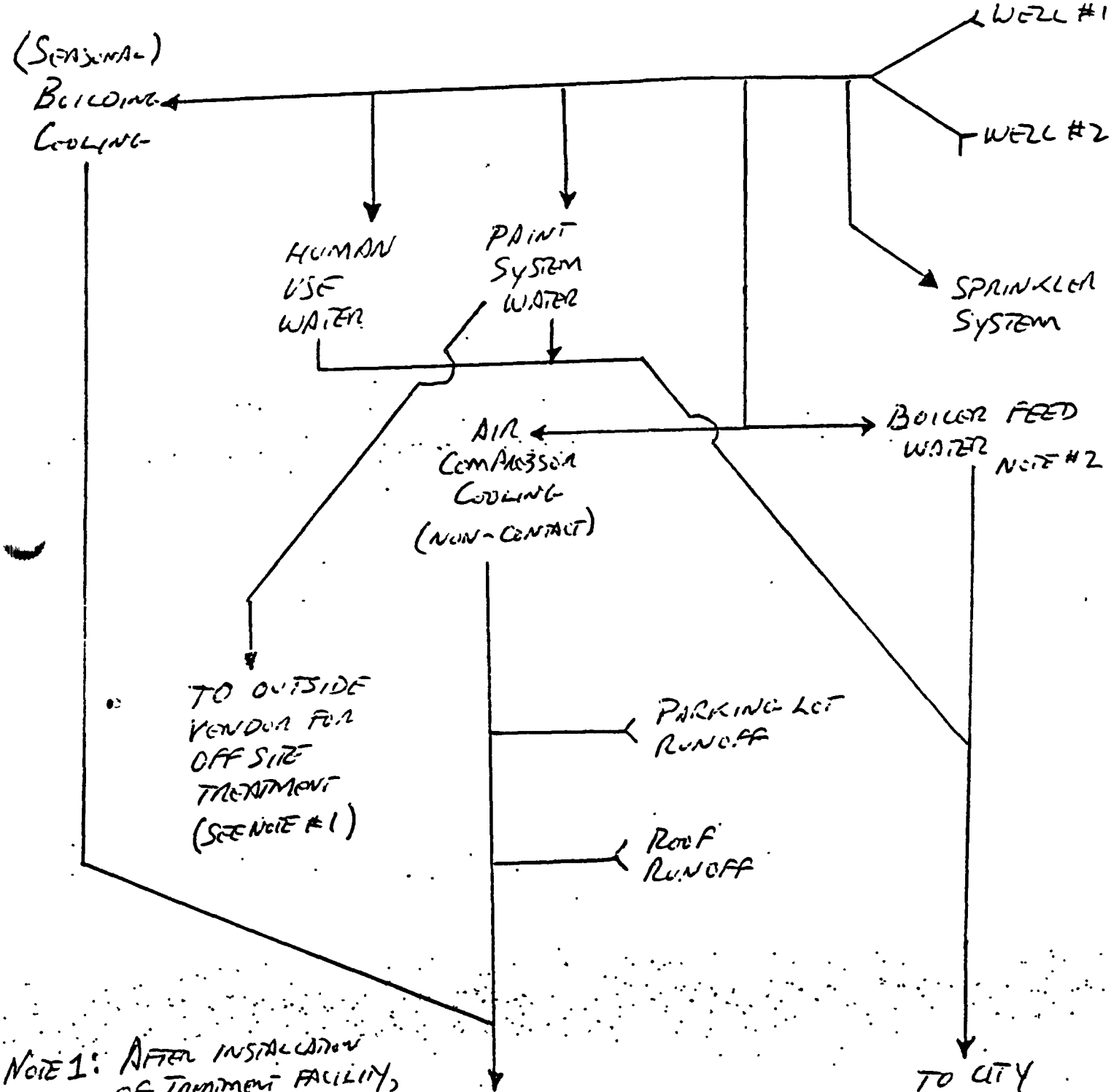
HISTORY

- BUILT IN 1955 WITH A SECOND BUILDING BUILT IN 1966.
- PREVIOUS OWNERS MADE CLOSE TOLERANCE HYDRAULIC PARTS AND EQUIPMENT.
- ACQUIRED BY BENTELER AS AN EMPTY BUILDING MAY 12, 1984.
- ORIGINAL SUPPLY WELLS FROM 1955 STILL IN SERVICE, BUT FACILITY WILL CONNECT TO CITY OF KALAMAZOO WATER AROUND DEC 1990. ORIGINAL WELLS WILL BE BACKUP FOR SPRINKLER (FIRE PROTECTION) SYSTEMS.
- ORIGINALLY BUILT WITH OWN SEWER PLANT, BUT CONNECTED TO CITY OF KALAMAZOO POTW 1973.
- REMODELED BY BENTELER MAY – DECEMBER 1984 AS A FABRICATION / E-COATING FACILITY.

10/16/90
NFC

BENTELER INDUSTRIES
WATER FLOW DIAGRAM
KALAMAZOO PLANT

10/16/90
MPC



NOTE 1: AFTER INSTALLATION OF TREATMENT FACILITY, THIS WATER TO CITY

NOTE 2: AS OF 12/1/90. PRESENTLY, TO DITCH

DENTECH — [illegible]

KALAMAZOO FACILITY

CHART OF DISTANCES

From:	To:	Distance	Comment.
Discharge Point at North End of Ditch	Well #2	300 FT	Aquifer flow is from well to discharge point
"	Well #1	500 FT	"
"	City of Kalamazoo Pump Station #39 Well Field	3 Miles	Across Morrow Lake.

10/10/90
NFC

Name:
Date:

PERMIT DATA FORM

* Project *

Name 1: BENTELER INDUSTRIES INC. (24
ID No.: 10902 (MMYYnn) (6
Address: (24
City: (15
State: (2
Zip: (5
Name 2: (20
Discharge Address: (24
Discharge City: (15
Township: (15
County: (15
District: (LAN, GR, SAG, BOS, MAR, PLA, JAC, CAD, DET, GAY, MPE) (3
Section Quarter #1: Section Quarter #2: (2
Section: (2
T: R: (3
SIC Code: (4
Discharge Type #1: (PROC, SS, CW, NCCW, COMB, OTH, UNK) (4
Discharge Volume #1: (In gpd)
Discharge Type #2: (PROC, SS, CW, NCCW, COMB, OTH, UNK) (4
Discharge Volume #2: (In gpd)
Treatment Type #1: Type #2: Type #3: Type #4: (2
Waste Type: (6
Priority: (2
EQA Assigned: I WESTON (First Initial, Last Name) (10
Geologist Assigned: (First Initial, Last Name) (11
Permit Type: (GW, LAND, P&H) (
Permit Action: (PERMIT, ETC.; NEWPERM, ETC. FOR APPLIC.) (
Permit Number: (M, OD, EXUN, NEW USE) (10
Expiration Date: (MM/DD/YY) (
Exemption Number: (GWE) (11
Termination Number: (GWT) (1
Order of Determination of Degradation: (ODD) (

* STEPS *

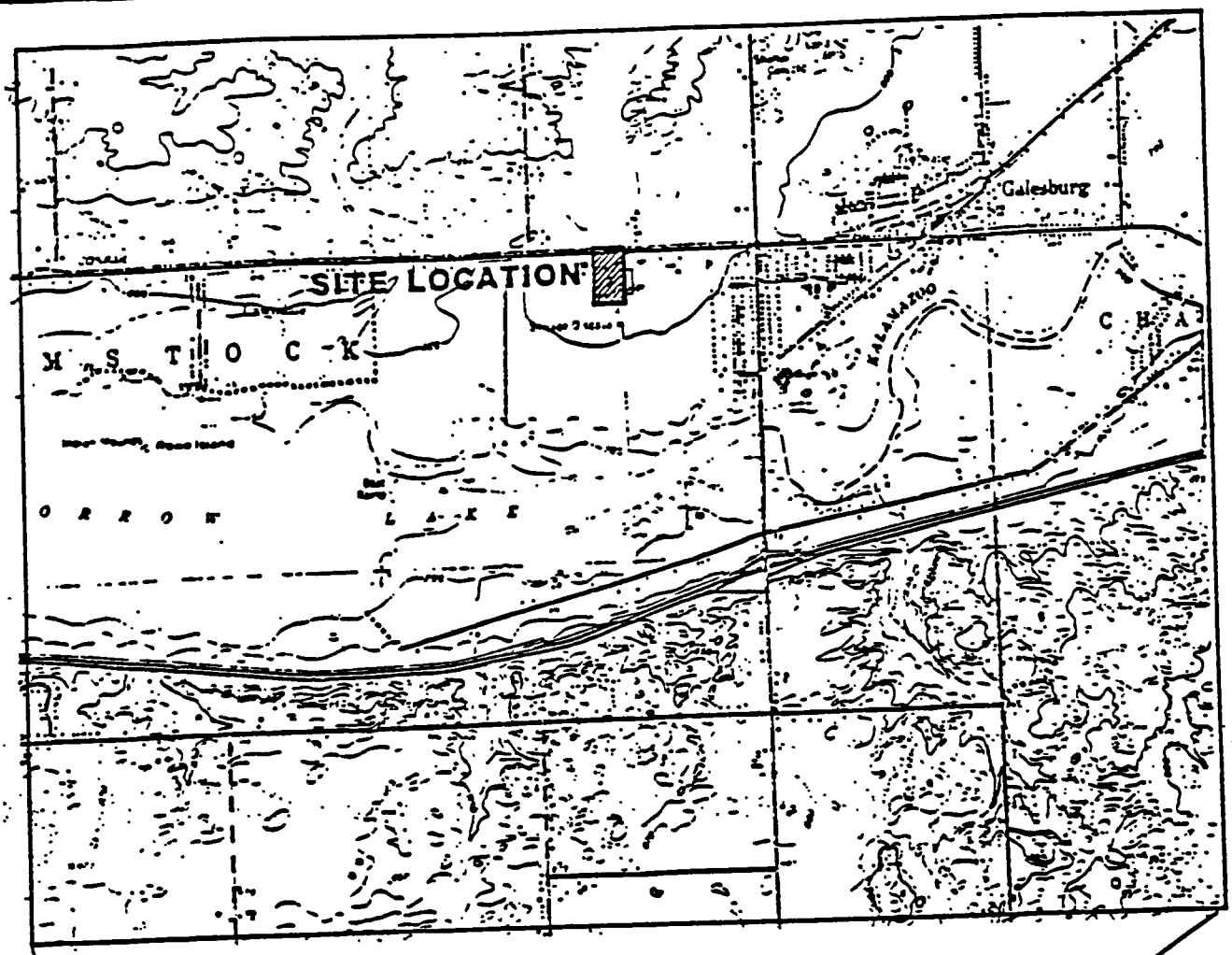
Name 1: (2
ID No.: (MMYYnn) (
Pre-Application Meeting Date: (MM/DD/YY) (
Application Received Date: 10/19/90 (
Application Complete Date: (
Hydrogeologic Study Plan Received Date: (
Hydrogeologic Study Received Date: (
Hydrogeologic Study Complete Date: (
Site Inspection Date: (
Inspection Staff #1: #2: (
Hydrogeologic Study Waiver: (Y or N) (
Monitoring Waiver: (Y or N) (
Permit Drafted Date: (

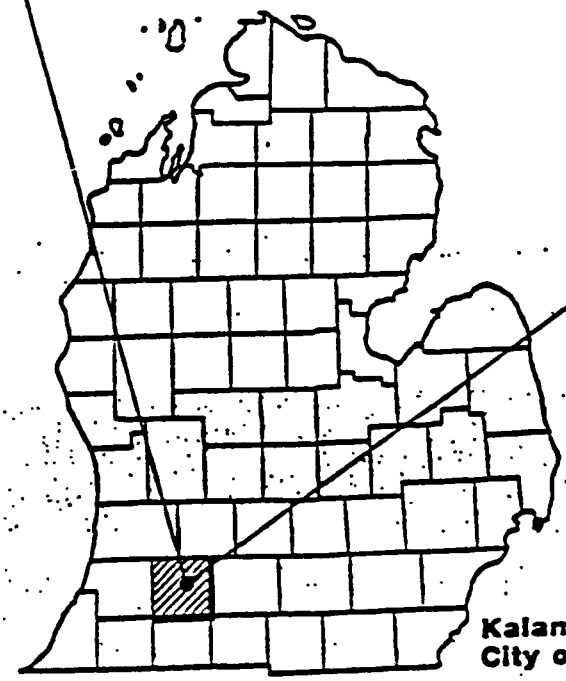
Benteler Industries - Kalamazoo Facility

Legal Description of the Property

Certain land located in the Township of Comstock, County of Kalamazoo, Michigan, more particularly described as follows:

Beginning on the north line of Section 23, Town 2 South, Range 10 West, at a point 30 rods East of the North 1/4 post thereof; thence South parallel to the North and South 1/4 line of said Section 3099 feet; thence northeasterly to a point 110 rods East of said 1/4 line and 3001.5 feet South of said North line; thence North parallel to and 110 rods East of said 1/4 line 3001.5 feet to said North line; thence West thereon 80 rods to the place of beginning.





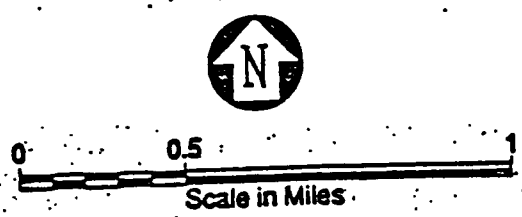


Figure 1

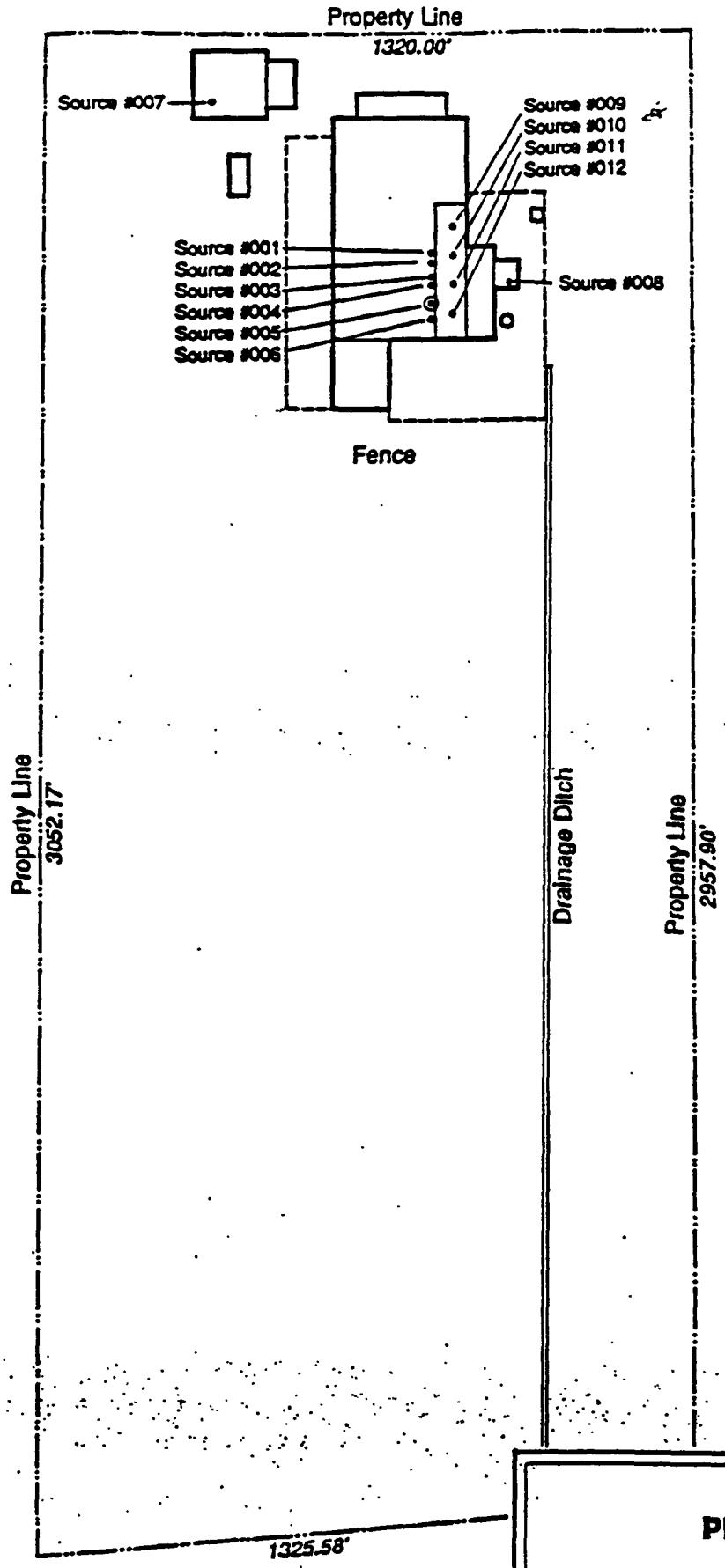
Facility Location

Benteler Industries
Galesburg, Michigan

August, 1989

63098.(

EDI Engineering & Science



Daily
Maximum Flow
600,000 GALS.
June-July
Maximum

Figure 2

Plot Plan

Benteler Industries
Galesburg, Michigan

August, 1989 63098.02

EDI Engineering & Science

RECEIVED
MAY 13 1994
ERD-SUPERFUND

ALLIED PAPER, INC./PORTAGE CREEK/ KALAMAZOO RIVER SUPERFUND SITE

PRP CASE STUDY

Benteler Industries, Inc.
Galesburg, Michigan

Kalamazoo River Study Group

May 1994

BLASLAND, BOUCK & LEE, INC.
ENGINEERS & SCIENTISTS

BENTELER INDUSTRIES, INC.
Galesburg, Michigan

Executive Summary

Benteler, formerly Hydreco, is located at 9000 East Michigan Avenue in Galesburg and produces rear axles. The facility has documented polychlorinated biphenyl (PCB) contamination. Since 1989, PCB, at concentrations up to 164 milligrams per kilogram (mg/kg), have been detected in the sediment of a drainage ditch at Benteler Industries. Recent samples confirm the presence of PCB at the downstream end of the ditch. The ditch was previously a wastewater conveyance from the facility to Morrow Lake. The MDNR has notified Benteler that under large storm conditions, PCB could be carried to the Kalamazoo River from the drainage ditch.

BENTELER INDUSTRIES, INC.
Galesburg, Michigan

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Direct Discharges of PCB to the Kalamazoo River	1
PCB Handling	2
Operating/Inactive Units and Discharge Points	3
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REFERENCES

ADDITIONAL REFERENCES

TABLES
1 Summary of Detectable Concentrations of PCB in Concrete Core Samples Near Transformer Area
2 Summary of Detectable Concentrations of PCB from Wipe Samples of the Concrete Floor
3 Summary of Detectable Concentrations of PCB from Concrete Samples
4 Summary of Detectable Concentrations of PCB from Wipe Samples of the Concrete Floor

FIGURES
1 Benteler Industries, Inc. - Location Map

APPENDIX
A References
B Additional References

BENTELER INDUSTRIES, INC.
Galesburg, Michigan

Direct Discharges of PCB to the Kalamazoo River

The drainage ditch which drains from the Benteler Industries, Inc. (Benteler) facility southward to the Kalamazoo River was sampled for polychlorinated biphenyls (PCB) in 1989. During this event, PCB were detected in the ditch sediments at levels up to 164 milligram per kilogram (mg/kg) total PCB, 44 mg/kg identified as Aroclor 1260 and 120 mg/kg identified as Aroclor 1248 (Begnoche and Remsburg, 1989). The ditch had received cooling water, storm water and floor drainage from the plant.

A sediment sample collected in the drainage ditch 50 feet downstream of the belt skimmer contained 1.6 mg/kg PCB. The source of the PCB to the ditch is believed to be the plant's discharged wastewater (Begnoche and Remsburg, 1989).

In 1990, Benteler resampled the ditch to determine the extent of PCB contamination. A sediment sample taken 12 feet south of the old wastewater treatment plant discharge contained 0.70 mg/kg PCB as Aroclor 1260 (WWES, 1990b).

According to Benteler (Hall, 1990b), the area of residual PCB contamination in the ditch is believed to be limited to an area 200 feet long located upstream of the oil skimmer.

In 1990, this ditch was not flowing to the Kalamazoo River "under normal conditions"; however, MDNR informed Benteler that the potential for discharge existed during significant storm events (Danneffel, 1990). MDNR requested that Benteler cease all discharges to the ditch due to the possibility that "large storm water flows could transport PCB in the ditch to the Kalamazoo River" (Danneffel, 1990).

In 1991, Benteler detected 0.046 part per million (ppm) of PCB at their digester and 0.003 ppm of PCB at the Butler Building (Kempainen, 1992). The precise sample locations and matrix were not given.

PCB Handling

In May 1989, oily residue from the facility's drains and sumps were collected and analyzed. Three transformers were replaced and the area around the units was also sampled and analyzed for PCB. Both sets of samples were found to contain PCB (WWES, 1990a).

In October 1989, PCB as Aroclor 1260 were detected in the top inch of 3-inch concrete cores located near the transformer area at concentrations of 5, 6, 92, 430, and 530 mg/kg (Ann Arbor Technical Services, 1989). Table 1 summarizes the detectable concentrations of PCB in core samples collected near the transformer area.

In 1990, wipe testing of the facility's concrete flooring was performed to determine the extent of PCB contamination at the facility. Resulting concentrations ranged up to 36,000 micrograms (ug)/100 square centimeters (cm^2) (WWES, 1990a). Table 2 summarizes the detectable concentrations of PCB from wipe samples of the concentrations of PCB from wipe samples of the concrete floor. Other miscellaneous solids samples collected at the same time had PCB concentrations ranging up to 58 mg/kg (WWES, 1990a). Table 3 summarizes the detectable concentrations of PCB in the wipe samples.

The flooring located directly south of the Mezzanine Area was found to contain PCB concentrations greater than 100 ug/100 cm^2. The concrete was removed and disposed of off-site (WWES, 1990a). According to hazardous waste manifests for this disposal, CWM Chemical Services disposed of 289 cubic yards of PCB-containing material (Skinner, 1989).

The remaining PCB-contaminated floor areas were decontaminated to below 10 ug/100 cm^2 or decontaminated to below 100 ug/100 cm^2 and encapsulated,

based on United States Environmental Protection Agency (USEPA) action levels. Before and after decontamination, wipe samples were taken in the areas of concern. Before decontamination, PCB were detected at concentrations ranging from 3.2 to 4,000 ug/100 cm^2. After decontamination, PCB levels ranged from below the detection limit of 0.8 to 37.9 ug/100 cm^2. The Aroclors identified were 1260, 1248, and 1254. Table 4 summarizes the detectable concentration of PCB pre- and post-cleanup (WWES, 1990a).

In August 1989, the PCB transformer located in Bay E8 was observed to be leaking at a steady rate, approximately 1 drop per second. The transformer was subsequently drained into seven 55-gallon drums. Spilled oil which had pooled under the unit was absorbed and removed. The clean-up materials and transformer oil were placed in storage for disposal (Corbin, 1989).

Operating/Inactive Units and Discharge Points

In 1974, cooling water was discharged to a drainage ditch and oils were removed by a belt skimmer (Przybysz, 1974).

In 1979, the drainage ditch reportedly discharged to the Kalamazoo River, 2,500 feet south of the facility (Przybysz, 1979). In 1985, air conditioner cooling water, test stand oil coolers water, and surface runoff were also discharged to the ditch (General Signal, 1985). In 1989, this ditch still reportedly drained to the Kalamazoo River and was receiving storm water and floor drainage from the plant (Begnoche and Remsburg, 1989). In March 1989, General Signal informed MDNR that all surface water discharges had been eliminated (Zugger, 1990).

Business Operations

Benteler manufactures rear axles at its 9000 East Michigan Avenue facility in Galesburg (Figure 1) (Kalamazoo County Chamber of Commerce, 1992). Benteler acquired the facility in May 1990 from Hydreco, Inc. (Schwartz, 1992). Historically, the facility ownership changed through time. The company was founded in 1937 as Hydraulic Equipment Company. Hydreco was purchased in

1951 by New York Air Brake and moved to Galesburg in 1955 and to manufacture hydraulic valves and pumps for construction equipment and farm implements. New York Air Brake was purchased by General Signal in 1967, who in September 1987, sold Hydreco to ICM Industries Inc. of Chicago (WWES, 1990a; Roush and Parikh, date unknown).

Benteler Industries Inc. is headquartered in Grand Rapids, Michigan and manufactures automotive parts and stampings. Benteler is owned by Benteler A.G., of Paderborn, Germany, which operates as a manufacturer of steel tubing and automotive parts. Benteler Industries Inc. was started in 1980 and currently employs 1000 people (Dun & Bradstreet, 1992).

Benteler has been negotiating with General Signal to honor their warranty and remediation clauses contained in the property sale and purchase agreement (Hall, 1990a). As an outcome of this dispute, Benteler entered into litigation with General Signal to establish General Signal's liability for the facility's PCB contamination (Schwartz, 1992).

Communications with the KRSG

On February 9, 1993, Benteler Industries received notification from the KRSG that they were considered to be "liable for a portion of the past and future costs paid by the KRSG in connection with the RI/FS and future remediation of the Site" (Horder, 1993a). Enclosed with that correspondence was a copy of the Administrative Order by Consent for the Site. Representatives of Benteler were invited to attend an informational meeting on March 9, 1993 in Grand Rapids to discuss this issue.

On March 3, the KRSG sent Volume I of the Description of the Current Situation to Benteler (Horder, 1993b).

At the March 9 meeting, Benteler Industries was represented by one staff member and received an earlier draft of this case study.

On March 19, outside counsel for Benteler (Jon R. Muth, Esq. of Miller, Johnson, Snell & Cummiskey) notified the KRSG that "Benteler declines your invitation to participate in the activities of KRSG". Three of the reasons stated were: 1) Benteler has not released to the Kalamazoo River, 2) all data suggests that any contamination predates their ownership of the property, and 3) they are not a successor corporation to prior owners. Another reason was that "even if PCBs did reach Morrow Lake at some time in the past, there would be no impact on the NPL site" (Muth, 1993). The letter has been reviewed by the KRSG (Brown, 1994) and does not change their opinion regarding the basic issue of whether PCB from Benteler were released to Morrow Lake.

A second informational meeting was held on March 24, 1993 in Grand Rapids. Benteler was invited but was not represented.

Additional Information

Since the time when the previous version of this case study was submitted to Benteler Industries, additional information has been obtained regarding their property.

In his March 1993 correspondence to the KRSG, Mr. Muth provided additional data for the ditch sediment sampling event which occurred in 1989. Five surficial (0- to 0.5-feet deep) sediment samples were collected and analyzed for PCB. The sample labeled "below pipe" contained 64 mg/kg PCB quantified as Aroclor 1260. The sample collected 25 feet north of the skimmer contained 120 mg/kg PCB quantified as Aroclor 1248. The sample labeled "bet. pip. & skim." contained 43 mg/kg PCB quantified as Aroclor 1260. The sample collected north of skimmer contained 6.6 mg/kg of total PCB (5.1 mg/kg quantified as Aroclor 1248 and 1.5 mg/kg quantified as Aroclor 1260). The sample collected 50 feet south of the skimmer contained 1.6 mg/kg PCB quantified as Aroclor 1260 (Muth, 1993).

Analytical results from samples collected from the ditch in 1991 were also provided in the March 1993 correspondence. One soil sample collected approximately 350 feet upstream of the skimmer from the bottom of the ditch contained 84 mg/kg PCB quantified as Aroclor 1248 (Muth, 1993).

Prior to December 18, 1973, sanitary wastewater was treated on-site and discharged to the ditch. On that date, Benteler connected to the City of Kalamazoo Sanitary Waste Line (MDNR, 1962; Seage, 1973).

Cooling water that contained oil was carried to the ditch via a storm sewer. South of the cooling water discharge point, the treated sanitary waste also entered the ditch (MDNR, 1962). The oil skimmer was originally installed in the ditch in 1961 (Digglas, 1961). The skimmer was placed downstream of the cooling water discharge point but upstream of the sanitary waste discharge point (MDNR, 1962).

In 1962 during an MDNR survey, the oil in the ditch had accumulated for 80 feet behind the skimmer. The MDNR stated that "unless the oil is removed on a regular basis, there is the possibility that heavy runoff will carry this through the separator" (MDNR, 1962).

A meeting was held between MDNR and Benteler on December 13, 1989 to discuss "PCB contamination at the site". The MDNR stated that some floor areas, the sump, and the ditch upstream of the concrete separator were contaminated. MDNR felt that the contamination appears to be the result of activities in the 1970s (Leep, 1989).

1994 Sediment Sampling

In March 1994, Blasland, Bouck & Lee, Inc. collected two sediment cores in the ditch that runs from the Benteler facility to Morrow Lake and analyzed them for PCB. These cores were collected pursuant to the Remedial Investigation/Feasibility Study Work Plan for the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site. This work was approved by MDNR and

was performed with oversight from an MDNR contractor. The samples were analyzed by Aquatec Laboratories following the procedures outlined in the Quality Assurance Project Plan (QAPP) for the Kalamazoo River Site. Both cores contained measurable levels of PCB.

The first core was collected in the ditch 18 feet upstream of the ditch's confluence with Morrow Lake (BBL, 1994). The sample from the 0- to 0.5-foot interval contained an estimated 1.1 mg/kg total PCB (0.93 mg/kg quantified as Aroclor 1254 and an estimated 0.20 mg/kg quantified as Aroclor 1260). The sample from the 0.5- to 1-foot interval contained an estimated 0.23 mg/kg total PCB (quantified as Aroclor 1254). A duplicate of the sample contained an estimated 0.55 mg/kg total PCB (0.43 mg/kg quantified as Aroclor 1254 and an estimated 0.12 mg/kg quantified as Aroclor 1260). The sample from the 1- to 1.6-foot interval contained an estimated 0.37 mg/kg total PCB (quantified as Aroclor 1254) (Aquatec, 1994).

The second core was collected in the ditch 3 feet upstream of the ditch's confluence with Morrow Lake (BBL, 1994). The sample from the 0- to 0.5-foot interval contained an estimated 0.051 mg/kg total PCB (quantified as Aroclor 1254). The sample from the 0.5- to 1-foot interval contained an estimated 0.031 mg/kg total PCB (quantified as Aroclor 1248). The sample from the 1- to 1.8-foot interval did not contain PCB above the detection limit (Aquatec, 1994).

Q. To your knowledge, no one -- that was never anybody's job to inspect transformers periodically?

Page 83

A. No.

Q. So as far as you know, the only people who conducted any inspections of the transformers were the Rowen and Blair people?

A. Right.

Q. Now, other than Rowen and Blair, to your knowledge did anyone at General Signal during the period that you were there have any responsibility for the transformers?

A. You mean -- what do you mean by that?

Q. Well, in other words, did they have any responsibility in terms of making sure that they were operating correctly, making sure that there was nothing wrong with the transformers?

A. Other than Rowen and Blair coming in, that was it, to my knowledge. Years ago they might have been.

Q. You don't know for certain?

A. No.

Q. Do you know whether the plant electricians were involved in any respect other than walking around with Rowen and Blair?

A. They wouldn't touch them because of the high voltage. Like we had to run that line over that little transformer, we had to call Rowen and Blair to run the line. They wouldn't touch them because

Page 84

of the high voltage.

Q. Whose responsibility was it to call in Rowen and Blair?

A. Well, it would come up every so often, you know. I imagine the insurance company may have had something to do with it, but it come down from plant engineering or someplace that they was going to be in to inspect them.

Q. Plant engineering, someone at the plant?

A. Somebody that was in charge in plant engineering would probably set it up, I would imagine.

12 Q. You don't know for certain?
13 A. I would think Roland Devries, who was plant
14 engineer, he might have did it. But every so often
1 they have to have them checked for insurance
16 purposes.
17 Q. Okay. But you personally weren't involved in having
18 Rowen and Blair come in and do various things with
19 the transformers?
20 A. I was the one had to schedule them if they ever had

21 to have them, I would call them.
22 Q. You would make arrangements or set up a schedule,
23 but would you initiate --
24 A. You mean having them come in under my direction?
25 Q. Yes.

Page 85

1 A. No. Only time I would have them come in is if
2 somebody told me to.
3 Q. Do you know how it was determined when or why Rowen
4 and Blair would come in?
5 A. I would imagine the insurance inspection had
6 something to do with it.
7 Q. Okay.
8 A. But insurance inspectors would come through and they
9 would say " When is the last time you had them
10 checked, " you know, so they would in turn --
11 Q. You were aware there were insurance inspectors
1 coming in to do inspections?
13 A. I would walk around with them quite a few times.
14 Q. They would look at transformers?
15 A. They would look at everything. Sprinkler heads,
16 anything that would cause a hazard to their
17 coverage. They would write up this list and at the
18 end of it, because they would bring the list from
19 the time before and it would -- they would go into
20 Jerry Cuyler's office, if he was here, and they
21 would say, " Well, what are you going to do? Are you
22 going to comply to it or deny " -- " or nothing? "
23 And then he would check them off as he went
24 down through it.
25 Q. Do you remember the name of the insurance company?

Page 86

1 A. Factory something. They had two different ones, I
2 know that. I can't think of the name.
3 Q. Was Aetna one of the insurance companies?
4 A. That's a health insurance, not the facility
r insurance. Industrial Risk or something like that
maybe. They were the ones that were a big facility
7 insurer.
8 Q. How about the Hartford Steam Boiler Inspection

9 Insurance Company?
10 A. They are the ones that did the boiler.
11 Q. They didn't?
12 A. They might have carried insurance way, way back
13 before I had anything to do with **maintenance.**
14 Q. That doesn't ring any bells with you in terms of any
15 of the people that you walked around with?
16 A. No. It was something Factory Risk or something like
17 that. I can't remember.

AMERICAN HYDROGEOLOGY CORPORATION

Environmental Consulting Services

6869 Sprinkle Road, Portage, Michigan 49002 (616) 329-1600

File
Hydrico
Kalamazoo
MI

To: Dan McGrade	Date: June 13, 1994
General Signal Corp.	Project No.: 24-1136
1 High Ridge Park Box 10010	Subject: Soils removal LF
Stamford, CT 06904	tickets and manifests

speedimemo

Dan - Enclosed are the original landfill tickets and manifests for the disposal of soil and concrete from the loading dock area.

RECEIVED
JUN 17 1994
DANIEL McGRADE

Sincerely,

Date:

Signed: Linda J. Zolnik

No: 5893833

BROWNING-FERRIS INDUSTRIES

Ticket : B35739 05/18/94 I: 04:02 pm
Customer: GENERAL SIGNAL CORPORATION
Account : 4110284 LMS# A26 O: 04:02 pm
Truck : 14
KALAMAZOO COUNTY
FRED CURTIS
Manifest: 10425
Source: GENERAL SIGNAL CORP.

Volume		Contents
18.00	yd	CONT SOIL

HAVE A NICE DAY!

Browning-Ferris Industries
LYON DEVELOPMENT CO.
C & C LANDFILL 616-781-9742

I hereby certify that this load does not contain any unauthorized hazardous waste.

SIGNATURE: Steven Stager

LF116 7/93

NON-HAZARDOUS SPECIAL WASTE MANIFEST

10425

GENERATOR

a. Generator Name: General Signal Corp.
b. Generating Location: Bertek Industries
c. Address: 1 High Ridge Park
Box 10010 Stamford, CT 10010
d. Address: 9000 E. Michigan Ave.
Galesburg, MI
e. Phone No.: 1-203-357-8800
f. Phone No.: 616-665-4261
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 - 94115 - 211772 - 004
j. Description of Waste: Soils impacted by spills & leaks from Hydraulic & waste oils from past manufacturing operations.
k. Quantity: 18
Units: Y3
TYPE: TR

TYPE	
DM	- METAL DRUM
DP	- PLASTIC DRUM
DF	- FIBRE DRUM
B	- BAG
TR	- TRUCK
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.

UNITS	
P	- POUNDS
Y	- YARDS
T	- TONS
Y3	- CUBIC YARDS
O	- OTHER

AIC for General Signal — Linda G. Jaeszolik
Generator Authorized Agent Name — Signature
Shipment Date: 05/18/94

TRANSPORTER

TRANSPORTER I

a. Name: ~~[illegible]~~ WOOLF EXC.
b. Address: 2829 CAMBRIDGE TERR.
KALAMAZOO MICH. 49001
c. Driver Name/Title: STEVEN SHAGER
PRINT/TYPE
d. Phone No.: 342-8131
e. Truck No.: 14
f. Vehicle License No./State: BP 2354
Acknowledgement of Receipt of Materials.
g. Steven Shager — Driver Signature
Shipment Date: 05/18/94

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

DESTINATION

a. Site Name: C&C LF
b. Physical Address: 14800 P Drive N.
Marshall, MI
c. Phone No.: 616-781-9742
d. Mailing Address:
TICKET No.: P35751

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

f. Name of Authorized Agent — Signature
Receipt Date: 05/18/94

No: 5899798

BROWNING-FERRIS INDUSTRIES

Ticket : B35704 05/18/94 I: 01:51 pm
Customer: GENERAL SIGNAL CORPORATION
Account : 4110284 LMS# A26 O: 01:51 pm
Truck : 14
KALAMAZOO COUNTY
FRED CURTIS
Manifest: 10424
Source: GENERAL SIGNAL CORP.

Browning-Ferris Industries
LYON DEVELOPMENT CO.
C & C LANDFILL 616-781-9742

Volume		Contents
30.00	yd	CONT SOIL

HAVE A NICE DAY!

I hereby certify that this load does not contain any unauthorized hazardous waste.

SIGNATURE: Steven Sloger

LF116 7/93

NON-HAZARDOUS SPECIAL WASTE MANIFEST

10424

GENERATOR

a. Generator Name: General Signal Corp.

b. Generating Location: Benkler Industries

c. Address: 1 High Ridge Park
Box 10010, Stamford, CT 10010

d. Address: 9000 E Michigan Ave,
Galesburg, MI

e. Phone No.: 1-203-357-8800

f. Phone No.: 1-616-665-4261

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 - 94115 - 211772 - 004

j. Description of Waste: Soils impacted by spills & leaks from hydraulic & waste oils from past manufacturing operations.

Quantity	Units	TYPE
30	Y3	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.

X AHC for General Signal — Linda M Jones Zabik — 05/18/94

Generator Authorized Agent Name — Signature — Shipment Date

TRANSPORTER

TRANSPORTER I

a. Name: WOOLF EXCAVATING

b. Address: 2829 CAMBRIDGE TERR.
KALAMAZOO MICH. 49001

c. Driver Name/Title: STEVEN SLAGER
PRINT/TYPE

d. Phone No.: 342-8131

e. Truck No.: 14

f. Vehicle License No./State: BP 2354

Acknowledgement of Receipt of Materials.

g. Steven Slager — 05/18/94

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

DESTINATION

a. Site Name: C&C LF

b. Physical Address: 14 Cc 1 Drive N
Marshall MI

c. Phone No.: 616-781-9742

d. Mailing Address:

e. TICKET No.: P25704

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

f. [illegible] — 05/18/94

No: 5899761

BROWNING-FERRIS INDUSTRIES

Browning-Ferris Industries
LYON DEVELOPMENT CO.
C & C LANDFILL 616-781-9742

Ticket : B35667 05/18/94 I: 11:39 am
Customer: GENERAL SIGNAL CORPORATION
Account : 4110284 LMS# A26 O: 11:39 am
Truck : 14
KALAMAZOO COUNTY
FRED CURTIS
Manifest: 10423
Source: GENERAL SIGNAL CORP.

Volume		Contents
30.00	yd	CONT SOIL

HAVE A NICE DAY!

I hereby certify that this load does not contain any unauthorized hazardous waste.

SIGNATURE: Steven Sagers

LF116 7/93

NON-HAZARDOUS SPECIAL WASTE MANIFEST

10423

SECTION I

a. Generator Name: General Signal Corp

b. Generating Location: Bentcler Industries

c. Address: 1 High Ridge Park, Box 11010, Stamford, CT 10010

d. Address: 9000 E Michigan Ave, Galesburg, MI

e. Phone No.: 1-203-357-8800

f. Phone No.: 1-616-665-4261

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 - 94115 - 211772 - 004

j. Description of Waste: oils impacted w/spills & leaks from hydraulic & waste oils from part manufacturing operation.

k. Quantity: 30 Units: Y TYPE:

TYPE	
DM	- METAL DRUM
DP	- PLASTIC DRUM
DF	- FIBRE DRUM
B	- BAG
TR	- TRUCK
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.

UNITS	
P	- POUNDS
Y	- YARDS
T	- TONS
Y3	- CUBIC YARDS
O	- OTHER

X AHC for General Signal — Generator Authorized Agent Name

Linda G Jae Zahrif — Signature

05/18/94 — Shipment Date

SECTION II — TRANSPORTER

TRANSPORTER I

a. Name: WOOLF EXCAVATING

b. Address: 2829 CAMBRIDGE TERR. KALAMAZOO MICH. 49001

c. Driver Name/Title: STEVEN SLAGER (PRINT/TYPE)

d. Phone No.: 342-8131

e. Truck No.: 14

f. Vehicle License No./State: BP. 2354

Acknowledgement of Receipt of Materials.

g. Driver Signature — Shipment Date: 05/18/94

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: 14800 P. Drive N. Marshall, MI 49068

c. Phone No.: 1-616 781-9742

d. Mailing Address:

e. TICKET No.: B35667

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

f. — Receipt Date: 05/18/94

No: 5899735

BROWNING-FERRIS INDUSTRIES

Ticket : B35641 05/18/94 I: 09:38 am
Customer: GENERAL SIGNAL CORPORATION
Account : 4110284 LMS# A26 O: 09:38 am
Truck : 14
KALAMAZOO COUNTY
FRED CURTIS
Manifest: 10422
Source: GENERAL SIGNAL CORP.

Volume		Contents
30.00	yd	CONT SOIL

HAVE A NICE DAY!

Browning-Ferris Industries
LYON DEVELOPMENT CO.
C & C LANDFILL 616-781-9742

I hereby certify that this load does not contain any unauthorized hazardous waste.

SIGNATURE: Steven Slager

LF116 7/93

NON-HAZARDOUS SPECIAL WASTE MANIFEST

10422

GENERATOR

a. Generator Name: General Signal Corp

b. Generating Location: Berkley Industries

c. Address: 1 High Ridge Park
Box 10010, Stamford, CT 10010

d. Address: 9000 E Michigan Ave
Galesburg, MI

e. Phone No.: 1-203-357-8800

f. Phone No.: 616-665-4261

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 - 94115 - 211772 - 004

j. Description of Waste: Soils impacted by spills & leaks of hydraulic & waste oils from past manufacturing operations.

k. Quantity	Units	TYPE
10	Y3	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.

X Atty for General Signal — Linda Gyorgy Zolik — 051894

Generator Authorized Agent Name — Signature — Shipment Date

TRANSPORTER

TRANSPORTER I

a. Name: WOOLF EXCAVATING

b. Address: 2829 CAMBRIDGE TERR
KALAMAZOO MICH. 49001

c. Driver Name/Title: STEVEN SLAGER
PRINT/TYPE

d. Phone No.: 342-8131

e. Truck No.: 14

f. Vehicle License No./State: BP-2354

Acknowledgement of Receipt of Materials.

g. Steven Slager — 051894

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

DESTINATION

a. Site Name: C & C Landfill

b. Physical Address: 14800 P Drive N.
Marshall, MI 49068

c. Phone No.: 616-781-9742

d. Mailing Address:

e. TICKET No.: 125641

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

f. [signature] — 051894

BROWNING-FERRIS INDUSTRIES

No: 5333710

Ticket : B35616 05/18/94 I: 07:30 am
Customer: GENERAL SIGNAL CORPORATION
Account : 4110284 LMS# A26 O: 07:30 am
Truck : 14
KALAMAZOO COUNTY
FRED CURTIS
Manifest: 10421
Source: GENERAL SIGNAL CORP.

Volume		Contents
30.00	yd	CONT SOIL

HAVE A NICE DAY!

Browning-Ferris Industries
LYON DEVELOPMENT CO.
C & C LANDFILL 616-781-9742

I hereby certify that this load does not contain any unauthorized hazardous waste.

SIGNATURE: Steven Slager

LF116 7/93

NON-HAZARDOUS SPECIAL WASTE MANIFEST

10421

GENERATOR

a. Generator Name: General Signal Corp
b. Generating Location: Bartler Industries
c. Address: 1 High Ridge Park
Box 10010, Stamford, CT 10010
d. Address: 9000 E Michigan Ave
Galesburg, MI
e. Phone No.: 1-203-357-8800
f. Phone No.: 616-665 4261

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 - 94115 - 211772 - 004

j. Description of Waste: Soils unspecifically spills & leaks from hydraulic & waste oils from post manufacturing operations

k. Quantity	Units	TYPE
20	Y3	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.

X NHC for General Signal — Generator Authorized Agent Name
Signature
Shipment Date: 05 18 94

TRANSPORTER

TRANSPORTER I

a. Name: WOOLF EXCAVATING
b. Address: 2829 CAMBRIDGE TERR.
KALAMAZOO MICH. 49001
c. Driver Name/Title: STEVEN SLAGER
PRINT/TYPE
d. Phone No.: 342-8131
e. Truck No.: 14
f. Vehicle License No./State: BP 2354
Acknowledgement of Receipt of Materials.
g. Steven Slager — Driver Signature
Shipment Date: 05 18 94

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

DESTINATION

a. Site Name: C & C Landfill
b. Physical Address: 14500 P Drive N.
Marshall MI 49068
c. Phone No.: 616-781-9742
d. Mailing Address:
e. TICKET No.: P35616

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

f. [signature] — Date: 05 18 94

No: 5899666

BROWNING-FERRIS INDUSTRIES

Ticket : B35577 05/17/94 I: 02:32 pm
Customer: GENERAL SIGNAL CORPORATION
Account : 4110284 LMS# A26 O: 02:33 pm
Truck : 14
KALAMAZOO COUNTY
FRED CURTIS
Manifest: 10420
Source: GENERAL SIGNAL CORP.

Browning-Ferris Industries
LYON DEVELOPMENT CO.
C & C LANDFILL 616-781-9742

Volume		Contents
30.00	yd	CONT SOIL

HAVE A NICE DAY!

I hereby certify that this load does not contain any unauthorized hazardous waste.

SIGNATURE: Steven Slager

LF116 7/93

NON-HAZARDOUS SPECIAL WASTE MANIFEST

10420

Section I: GENERATOR (Complete Section I)

a. Generator Name: General Signal Corp.

b. Generating Location: Bentelar Industries

c. Address: 1 High Ridge Park
Box 10010, Stamford, CT 10010

d. Address: 9000 E. Michigan Ave
Galesburg, MI 4

e. Phone No.: 1-203-357-8800

f. Phone No.: 1-616-665-4261

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 - 94115 - 211772 - 004

j. Description of Waste: Soils impacted by spills & leaks of hydraulic & waste oils from past manufacturing operations.

k. Quantity: 20 Units: Y3 TYPE: TR

TYPE	
DM	- METAL DRUM
DP	- PLASTIC DRUM
DF	- FIBRE DRUM
B	- BAG
TR	- TRUCK
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.

UNITS	
P	- POUNDS
Y	- YARDS
T	- TONS
Y3	- CUBIC YARDS
O	- OTHER

X MHC for General Signal — Generator Authorized Agent Name

Linda Bjorner Zubik — Signature

05/17/94 — Shipment Date

Section II: TRANSPORTER

TRANSPORTER I

a. Name: WOLF EXCAVATING

b. Address: 2829 CAMBRIDGE TERR.
KALAMAZOO MICH 49001

c. Driver Name/Title: STEVEN SLAGER
PRINT/TYPE

d. Phone No.: 342-8131

e. Truck No.: 14

f. Vehicle License No./State: BP-2354

Acknowledgement of Receipt of Materials.

g. Driver Signature — Shipment Date: 05/17/94

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

c. Phone No.: 616-781-9742

b. Physical Address: 14800 P Drive N.
Marshall, MI 49068

d. Mailing Address:

TICKET No.: P25577

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

f. Name of Authorized Agent — Signature — Receipt Date: 05/17/94

No: 5899631

BROWNING-FERRIS INDUSTRIES

Ticket : B35542 05/17/94 I: 12:15 pm
Customer: GENERAL SIGNAL CORPORATION
Account : 4110284 LMS# A26 O: 12:15 pm
Truck : 14
KALAMAZOO COUNTY
FRED CURTIS
Manifest: 10419
Source: GENERAL SIGNAL CORP.

Browning-Ferris Industries
LYON DEVELOPMENT CO.
C & C LANDFILL 616-781-9742

Volume		Contents
30.00	yd	CONT SOIL

HAVE A NICE DAY!

I hereby certify that this load does not contain any unauthorized hazardous waste.

SIGNATURE: Steven Stager

LF116 7/93

NON-HAZARDOUS SPECIAL WASTE MANIFEST

10419

GENERATOR

a. Generator Name: General Signal Corp.

b. Generating Location: Bentler Industries

c. Address: 1 Highridge Park
Box 1010, Stamford, CT 10010

d. Address: 9000 E Michigan Ave
Galesburg, MI

e. Phone No.: 1-203-357-8800

f. Phone No.: 1-616-665-4261

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 - 94115 - 211772 - 004

j. Description of Waste Soils impacted by spills & leaks from hydraulic & waste oils from past manufacturing operations

k. Quantity: 30 Units: Y3 TYPE: TR

TYPE	
DM	- METAL DRUM
DP	- PLASTIC DRUM
DF	- FIBRE DRUM
B	- BAG
TR	- TRUCK
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.

UNITS	
P	- POUNDS
Y	- YARDS
T	- TONS
Y3	- CUBIC YARDS
O	- OTHER

X AHC for General Signal — Generator Authorized Agent Name

Linda G. McGalry — Signature

051794 — Shipment Date

TRANSPORTER

TRANSPORTER I

a. Name: WOOLF EXCAVATING

b. Address: 2829 CAMBRIDGE TERR.
KALAMAZOO MI. 49001

c. Driver Name/Title: STEVEN SLAGER
PRINT/TYPE

d. Phone No.: 342-8131

e. Truck No.: 14

f. Vehicle License No./State: BP 2354

Acknowledgement of Receipt of Materials.

g. Steven Slager — Driver Signature

051794 — 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

DESTINATION

a. Site Name: C & C Landfill

b. Physical Address: 14800 F. Drive N
Marshall, MI 49068

c. Phone No.: 616-781-9742

d. Mailing Address:

e. TICKET No.: B 35542

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

f. Name of Authorized Agent — Signature — 051794 — Receipt Date

BROWNING-FERRIS INDUSTRIES

No: 5899597

Ticket : B35508 05/17/94 I: 09:58 am
Customer: GENERAL SIGNAL CORPORATION
Account : 4110284 LMS# A26 O: 09:58 am
Truck : 14
KALAMAZOO COUNTY
FRED CURTIS
Manifest: 10418
Source: GENERAL SIGNAL CORP.

Browning-Ferris Industries
LYON DEVELOPMENT CO.
C & C LANDFILL 616-781-9742

Volume		Contents
30.00	yd	CONT SOIL

HAVE A NICE DAY!

I hereby certify that this load does not contain any unauthorized hazardous waste.

SIGNATURE: Steven Slager

LF116 7/93

NON-HAZARDOUS SPECIAL WASTE MANIFEST

10418

Section I — GENERATOR

a. Generator Name: General Signal Corporation
Generating Location: Bentler Industries

c. Address: 1 High Ridge Park
Box 10010, Stamford, CT 10010

d. Address: 9000 E. Michigan Ave.
Galesburg, MI

e. Phone No.: 1-203-357-8800

f. Phone No.: 1-616-665-4261

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 - 94115 - 211772 - 004

j. Description of Waste: Soils impacted by spills & leaks of hydraulic oils & waste oils by past manufacturing operations.

k. Quantity: 30 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.

X General Signal — Generator Authorized Agent Name
Signature
Shipment Date: 051794

Section II — TRANSPORTER

TRANSPORTER I

a. Name: WOOLF EXCAVATING

b. Address: 2829 CAMBRIDGE TERR.
KALAMAZOO MI. 49001

c. Driver Name/Title: STEVEN SLAGER
PRINT/TYPE

d. Phone No.: 342-8131 e. Truck No.: 14

f. Vehicle License No./State: BP-2354

Acknowledgement of Receipt of Materials.

g. Steven Slager — Driver Signature
Shipment Date: 051794

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

c. Phone No.: 616-781-9742

b. Physical Address: 14800 P Drive N
Marshall, MI 49068

d. Mailing Address:

e. TICKET No.: 22550P

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

f. Signature
Date: 051794

csra TESTING AND ENGINEERING CO., PC.

1005 EMMETT STREET, SUITE A
AUGUSTA, GEORGIA 30904
(404) 732-6960
FAX (404) 737-0629

Report No. H-07290

Date October 25, 1990

CLIENT: Hydreco, Inc.

PROJECT: New Equipment (Wipe Samples)

LOCATION: Hydreco Plant - Tobacco Road

REQUEST: PCB's (EPA Method 560/5-85-026)

SAMPLE DESCRIPTION: Wipe Samples

SAMPLE ID	LOCATION	CONCENTRATION	DETECTION LIMIT
90-1241	1607/5400 Bottom Pad	ND	5.0 ug/Sample
90-1242	1607/5400 Loose Pad	ND	5.0 ug/Sample
90-1243	1609/6218	ND	5.0 ug/Sample
90-1244	1716/4408 Block	ND	5.0 ug/Sample
90-1245	1716/4408 Plate	ND	5.0 ug/Sample
90-1246	1739/5007	ND	5.0 ug/Sample
90-1247	1739/5007 Block	ND	5.0 ug/Sample

REMARKS: ND = Not Detectable at the limit indicated.

Very large unidentified halogen - containing compounds present.
Quality Assurance: These analyses are performed in accordance with EPA guidelines for quality assurance.

Respectfully submitted,

James M. Pope, P.E.

2 cc: Hydreco, Inc.

LAW OFFICES
LASER, SCHOSTOK, KOLMAN & FRANK
30 NORTH LA SALLE STREET
CHICAGO, ILLINOIS 60602-2504
(312) 641-1300

TELECOPIER
(312) 641-2405

DANNI J. HAAG

WRITER'S DIRECT DIAL

January 28, 1992

VIA TELECOPY (616) 459-6708

Mr. Daniel P. Perk
Miller, Johnson, Snell & Cummiskey
800 Calder Plaza Building
Grand Rapids, Michigan 49503

RE: Benteler Industries, Inc. v. General Signal Corp., et al.
Case #1:90 CV 959

Dear Dan:

Pursuant to Judge Brenneman's Order of today's date, attached hereto are the results of testing performed by CSRA Testing and Engineering Co. on the following machines previously designated by Benteler:

Name	Serial #
Chucker	4408
Blanchard Grinder	5007
Bostomatic	6218
Gardner Grinder	5400

We will provide you with a list of equipment transferred from the Kalamazoo plant to the Augusta facility as soon as we are in receipt of such information from our client.

Very truly yours,

LASER, SCHOSTOK, KOLMAN & FRANK

Danni J. Haag

DJH:gjb

cc via fax: Charles Denton (616) 459-8468
Steven L. Kreuger (616) 459-0657
Judge Brenneman (616) 456-2900

CLIFTON TRANSFORMER SERVICE COMPANY

P. O. Box 69 Three Rivers, Michigan

NAME New York Air Brake Co.
ADDRESS Hydreco Div
Plt. Rep. 9000 E. Mich. Ave Kalamazoo, Mich.
PHONE Att. Mr. Jack Sage

METER GALLONAGE—A.M. _____
—P.M. _____

Customer Ord. No.
Date of Order
Temperature
% Relative Humidity
Tested
Filtered by Beck

DATE 19	Make and Serial No. Transformer	KVA	Capacity in Gallons	Oil Filled	Pyranol	DIELECTRIC STRENGTH KV BEFORE	DIELECTRIC STRENGTH KV AFTER	Gals. New Oil Added	Condition: Dirt. Excessive	Condition: Dirt. Moderate	Condition: Dirt. Slight	Condition: Moist. Excessive	Condition: Moist. Slight	Condition: Acidity	Bushing PRI. OK	Bushing PRI. Broken	Bushing PRI. Loose	Bushing SEC. OK	Bushing SEC. Broken	Bushing SEC. Loose	Cover Gasket Repaired	Cover Gasket New	Bush. Gasket Repaired	Bush. Gasket New	Ground OK	Ground Poor	Sand Blasting	Painting	Leaks Need Welding	Misc.
4-28-67	South Sub					32 KV								.2																
	North Sub					32 KV								.2																
	Boiler Room					33 KV								.2																

REMARKS The Dielectric Strength & The Acid Content Of The Oil In These Transformers Is Well Within Safe Operating Limits At This Time.

No.
Page

XERO COPY
XERO COPY
XERO COPY
XERO COPY
CS 100004

To R. Gruber, Kalamazoo

Department Distribution

From HwVeigt, T-222

Date 7-29-82

Subject PCB ANALYSIS RESULTS

Consumers Power Company

INTERNAL CORRESPONDENCE

Proj No 118103 780 287 77

Analysis No PCB- 300

cc R J Huff M454
B R Dilbert P12102

Analyst S Medica

The following mineral oil samples have been analyzed for PCB concentration. The indicated PCB concentration is reported as parts-per-million by weight as the indicated Aroclor(s).

	Entry	Control Number	Tag Number	PCB ppm	Aroclor 42	54	60	Equipment Description Type	Ø	Position	Serial Number	WO Number
BRHK	1	5898	08301	36			✓	T	3	1-1	2695548	" 656
well	2	5899	08309	289	✓		✓	R	Z	4-6	D554270	" 765
"	3	5900	03789	20	✓	✓	✓	R	Y	5-6	K441423	" 765
well	4	5901	08320	171	✓	✓	✓	R	Z	1-6	D588364	" 765
"	5	5902	08303	361	✓		✓	R	Z	2-6	D460346	" 765
"	6	5903	08298	19	✓		✓	R	X	9-6	L194103	" 765
"	7	5904	03777	150	✓	✓	✓	R	X	1-6	D588363	" 765
"	8	5905	08316	<5	✓			T	3	#3Bk	H886507	" 765
"	9	5906	08310	135	✓	✓	✓	R	Y	10-6	F475579	" 765
well	10	5907	08314	47			✓	T	3	#2Bk	E690403B	" 765
office	11	5908	08307	85			✓	R	3	-	G179767	" 625
	12											
	13											
	14											
	15											
	16											
	17											
	18											
	19											
	20											

CONSUMERS POWER COMPANY
MAJOR EQUIPMENT DISPOSITION

№ 02094

DISTRIBUTION	
White Copy	— Class 22 Record
Blue & Green Copies	— Construction
Canary Copy	— Plant Accounting
Pink Copy	— Engineering Files
Goldenrod Copy	— Material Received

Station Air Brake

Item R 92722

TRANSFER

From		To
☐	M&S	☒
☒	Station	☐
☐	Salvage	☐
☐		☐

REASON

- ☐ Disposal
- ☐ Construction Requirement
- ☒ Construction Retirement
- ☐ Temporary Replacement
- ☐ Loan
- ☐ Retire in Place
- ☐ Cancel Report No. ____
- ☐ Supersedes Report No. ____ for ____
- ☐ ____

FOR ACCOUNTING USE ONLY
P/S Year 1954
Cost $ 13 723.00

SHIP TO Alma

PRESENT LOCATION Air Brake

WORK ORDER/AREA ____ ACCOUNT/FUNCTION ____

RETIREMENT/SALVAGE WO 5637 ACCOUNT 108.102.9, 108.103.7

MARK ATTENTION OF Dave Dam/Bob Lareaux SHIP VIA ____

DATE WANTED 9-30-89 (Do not pick up before start of construction.)

UNITS (QTY) One EQUIPMENT Transformer

EQUIPMENT DESCRIPTION Allis Chalmers, 2500KVA, 3φ, 46.2/8.72KV
ICE 36 PPM

SERIAL NO(S). 2695548

ADDITIONAL REQUIREMENTS ____

WRITTEN BY T Milecke APPROVED BY WP DATE 7-89

The Construction Department, Material Coordinator, will complete the Goldenrod Copy of this report and inform the Area Electric Engineer of the storage location and maintenance requirements.

EQUIPMENT RECEIVED BY D L Dam DATE 9-21-89

IFR DRAWINGS IN FILE ____

☐ WILL BE COPIED FOR
☒ WILL BE TRANSFERRED TO FILE ____

UFI System No ____
UFI Equip No. ____

Consumers Power
POWERING MICHIGAN'S PROGRESS
General Offices: 212 West Michigan Avenue, Jackson, MI 49201 • (517) 788-0550
Writer's direct dial (517) 788-0331

BWR 90-41
M905.4

May 29, 1990

Mr Leon Hall, Plant Manager
Benteler Industries, Inc
9000 E Michigan Ave
Galesburg, MI 49053-9772

Re: Air Brake Substation

Dear Mr Hall:

This is in response to your inquiry regarding Consumers Power Company's spill cleanup program for electrical equipment in service at our Air Brake Substation.

Overview of Consumers' Spill Plans

In 1985, Consumers Power Company entered into a Polychlorinated Biphenyls (PCB) Spill Cleanup Agreement applicable to pole-mounted electrical equipment containing 50 ppm or more PCB with the US Environmental Protection Agency (US EPA). Also in 1985, the Michigan Department of Natural Resources (MDNR) approved Consumers' Pollution Incident Prevention Plan for PCBs applicable to electrical equipment. Consumers Power Company considers both spill plans to be applicable to its substations. These documents specify a number of actions required of the Company in the event of a spill incident involving equipment which contains 50 ppm or greater PCB, including sampling to verify that cleanup has been adequate.

In contrast, spills resulting from electrical equipment containing less than 50 ppm PCB (non-PCB) are covered by a separate Pollution Incident Prevention Plan for Oil Spills which was approved by the MDNR in 1983. This plan requires that Consumers remove all visible signs of oil released. There is no requirement for Consumers to sample following an oil spill cleanup.

Air Brake Substation

Recently the Company installed a voltage regulator (Serial Number D575735) for use in Air Brake Substation which had previously been in service at our Occidental Substation. The regulator had been tested in 1980 and found to contain 138 ppm PCB and therefore was classified as PCB-Contaminated Electrical Equipment (ie, equipment containing 50 ppm or greater PCB, but less than 500 ppm PCB). On September 25, 1989, the Company serviced this regulator for the purpose of reducing its PCB content as provided by US EPA PCB Rules (40 CFR 761). Then, on January 1, 1990, the regulator was retested and found to contain 13 ppm PCB. As a result, its PCB classification has been converted from PCB-Contaminated Electrical Equipment to non-PCB as provided by 40 CFR 761.30(h)(v). Non-PCB electrical equipment is not regulated by PCB Rules.

In the event this non-PCB voltage regulator is involved in a spill incident, cleanup would be subject to the requirements of the Pollution Incident Prevention Plan for Oil Spills, ie equipment containing less than 50 ppm PCB. Again, this includes removal of all visible signs of oil, however no sampling is required.

I hope this answers your questions concerning cleanup of spills from electrical equipment in substations by Consumers. Feel free to contact me if you have any other questions on this matter.

Sincerely,

Bruce W. Rasher

Bruce Rasher
Environmental Department

XC: WDArcher, M-462B
PComerford, Kalamazoo
JPDickey, M-1019
RWMaher, Battle Creek
JDWells, Lansing

To T. Foster, Kalamazoo

From HWVoigt, T-260, Jackson

Date January 10, 1990

Subject PCB ANALYSIS RESULTS

CC WDArcher, M-462B

CONSUMERS POWER COMPANY

Internal Correspondence

7182

Project No 519017780 005
Analysis No 2057

Analyst GL Cattell

The following mineral oil samples have been analyzed for PCB concentration. The indicated PCB concentration is reported as parts per million by weight as the indicated Aroclor.

Entry	Control Number	Tag Number	PCB ppm	Aroclor 42	54	60	Type	Φ	Equipment Description Serial Number	Location
1	30267	38483	13			✓	—		D575735	Air Brake
2										Regulator Winding
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										

Dan McGrade

31926

FORM 40 250M 7-84

To William Merrill

FROM CONSUMERS POWER COMPANY

ATTN:

SUBJECT Bentele Ind. V. General Signal Corp

DATE 10-22-91

MESSAGE Enclosed are all records for Air Brake Substation #656.

- Transformer #2695548 was taken from Sub #656 to our Alma District Office, 1325 Wright Ave, Alma 48801 on 9-21-89 and is stored there. It is classified NON-PCB.

- There is only one transformer located at Sub #656.

REPLY TO

SIGNED Charles T. Fraser

REPLY

DATE

SIGNED

16

ERD

Hydreco

390064

Closure Report for The On Site Drainage Ditch and Manhole #8 Area

EARTH TECH

Prepared for:

Benteler Industries, Inc.
9000 E. Michigan Avenue
Galesburg, Michigan 49053-9772

Prepared by:

EARTH TECH
5555 Glenwood Hills Parkway, SE
Grand Rapids, MI 49588

September 1995

23076.01

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1 Site Location Map
2 Drainage Ditch Sample Locations
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1.0 INTRODUCTION

This document presents the results of the closure activities associated with the remediation of the on-site drainage ditch and the Manhole #8 Area at the former "Hydreco" site in Galesburg, Michigan currently Benteler Industries, Inc. (Figure 1). The results presented in this document and previous investigations demonstrate that the Benteler Industries Galesburg facility drainage ditch and Manhole #8 excavation/remediation areas meet the requirements for a generic industrial closure under the new Act 451, Part 201.

During 1989 and 1991, WW Engineering & Science (now EARTH TECH) completed site investigations of the Sewage Treatment Plant, Butler Building, Drainage Ditch and Sanitary Sewer Drain Line at the above-referenced site. The results of these investigations were used as the basis for design of the remedial action plan (RAP) for this site. In November 1992, Benteler Industries, Inc. submitted to the Michigan Department of Natural Resources a RAP which met the regulatory requirements of the Michigan Environmental Response Act (Act 307 of 1982), the Toxic Substance Control ACT (TSCA) and the requirements of the National Contingency Plan (NCP). The RAP addressed the storm sewer lines and on-site ditch at the Galesburg Plant which was formerly the Hydreco site. In August of 1993 Benteler Industries, Inc. contracted Terra Environmental to conduct the remediation activities. These activities included the remediation of Polychlorinated Biphenyl (PCB) contamination in the storm sewer lines and the on-site drainage ditch and the collection of verification samples. These remedial activities were completed in September 1993.

The final report (Benteler Industries Remediation of Storm Sewer and On-Site Ditch February 9, 1994) submitted to the Michigan Department of Natural Resources, documented these remedial activities.

The MDNR responded to the February 9, 1994 final report by requesting in its May 11, 1994 letter to Mr. Joseph L. Schmidt that three additional soil samples for PCBs and five additional samples for VOCs be collected before closure of the ditch can be considered. In addition, they asked for information about the metals concentrations in the on-site drainage ditch and for more information concerning the level of cleanup in the Manhole #8 Area.

On June 6, 1994, additional soil verification samples were collected and analyzed for PCBs, VOCs and Metals from selected locations in the drainage ditch and for PCBs in the Manhole #8 Area.

During August 1995, EARTH TECH completed a review of the historic sampling data and the most recent round of samples collected on June 6, 1994. Based on the review of the sampling data and the recent amendments to (former Act 307) Act 451, Part 201 it was determined that verification sampling was essentially complete in the ditch and Manhole #8 areas. However, EARTH TECH felt that one

additional soil sample for metals analysis would need to be collected from the ditch at 600 feet from the headwall.

The analytical results of the site investigation, the remedial action activities and the additional verification samples for the closure of the on-site ditch and the Manhole #8 Area are documented in this report.

2.0 REGULATORY FRAMEWORK/SUMMARY OF RECENT PART 201 AMENDMENTS

For the contaminants of concern at this site, cleanup criteria were initially established pursuant to Part 7 of Act 307 administrative rules and were selected as the target Applicable or Relevant and Appropriate Requirements (ARARs). Therefore the RAP was designed to meet regulatory requirements established in the Administrative rules for Act 307. Act 307 is no longer in effect. This statute and others were recently amended (June 2, 1995) into the Natural Resources and Environmental Protection Act (Public Act 451 of 1994). Therefore, the applicable regulatory framework for this site is now Part 201 of Public Act 451.

The recent Part 201 amendments establish a reasonable risk-based approach to the remediation of industrial and commercial sites. The MDNR has developed residential, industrial, and commercial cleanup criteria based on foreseeable land/facility uses and exposure controls. The residential criteria are the most stringent criteria, and the commercial criteria provide the most flexible clean up criteria based on risk/exposure assumptions. Industrial criteria, falls between the two.

Industrial Properties are characterized under Act 451 Part 201 by the following features:

- The primary activity at the site is industrial in nature (i.e., manufacturing:, utilities, industrial research and development, petroleum bulk storage, etc.) and access to the site is reliably restricted consistent with its use (i.e., by fences or security personnel or both). The term industrial site does not include farms, gasoline service stations or other commercial establishments where children may commonly be present. Inactive or abandoned sites are included if the property use was industrial, as described above.

- The current zoning of the property is industrial, the zoning is anticipated to be industrial, or the remedial action plan includes documentation the current industrial use is a legal non-conforming use. This may include different zoning designations, depending on the community, such as "light industrial" or "heavy industrial".

The recent Part 201 amendments also changed how soil cleanup criteria for the protection of groundwater in aquifers is applied. The Part 201 amendments (Section 20120a(9)) also requires that potential aquifer vulnerability from soils at the site, be considered based on site specific factors.

3.0 VERIFICATION OF REMEDIATION

3.1 CURRENT AND FUTURE LAND USE OF SITE AND SURROUNDING PROPERTY

The Benteler Industries Inc., Galesburg Plant property is currently zoned Manufacturing (see Appendix 1 Zoning Map). The current use of the facility is for manufacturing and is expected to continue as such in the future. The adjacent property to the south of the facility is zoned light manufacturing. The adjacent properties to the east are zoned general business along the road frontage and multi and single family behind the road frontage property. The properties to the west are zoned agricultural/residential. Access to the property is limited by marked boundaries and is patrolled regularly by plant security. The Benteler Industries property fits the Industrial Land Use Category according to MDNR guidance (ERD Memorandum #14, Revision 2: Remedial Actions Plans Using Generic Industrial or Generic Commercial Cleanup Criteria and Other Requirements. June 5, 1995).

3.2 ANALYTICAL RESULTS

The analytical results of the historical soil and groundwater samples as well as the most recent analytical results for the samples collected in 1994 and 1995 from the ditch and the Manhole #8 Area are presented in Tables 1 through 6 and are compared to the appropriate cleanup criteria. Exceedances of the cleanup criteria are shaded on these tables. The remediation of the ditch occurred in stages of excavation and verification sampling. Tables 1, 3, and 5 present the results of the preremediation (investigation) and remediation samples that indicated that further excavation would be needed. Tables 2, 4 and 6 present the results of the post remediation samples that indicated no further remediation would be needed.

3.3 CLEANUP CRITERIA/EXPOSURE PATHWAYS

The cleanup criteria for the drainage ditch and the Manhole #8 location are based on the chemicals of concern at the site (PCBs, VOCs and Metals) the fate and transfer characteristics of the chemicals of concern, site specific expected exposure pathways and potential exposure receptors.

Soil verification samples were collected during June 1994 and August 1995 from locations in the drainage ditch (Figure 2). These samples were analyzed for PCBs, VOCs and Metals. The August 1995 sample was only analyzed for metals. The cleanup criteria for the ditch was based on similar exposure pathways and potential exposure receptors for each of the three types of compounds of concern (PCBs,

Metals, and VOCs). Since the drainage ditch is in hydraulic communication with the groundwater below it; soil criteria protective of groundwater was considered. The drainage ditch during periods of high flow can discharge to Morrow Lake; therefore, the criteria protective of surface water (not used as a drinking water source) was also considered; as well as criteria protective of drinking water (in the situation a person in the downstream area decides to drink the ditch water) becomes a consideration. The drainage ditch soils could be contacted by employees or contractors in some unlikely hypothetical situations; therefore soil direct contact criteria is appropriate. The inhalation exposure pathway of these compounds is insignificant since the soils in the upstream portion of the drainage ditch were remediated and are now covered with water and in the downstream portions of the ditch are covered with a substantial vegetative cover or water depending on the flow conditions. Additionally, no employees or other people frequent the ditch area on any kind of a regular basis (including lunch/coffee breaks, to cut a lawn or to conduct landscape maintenance, etc.).

Therefore, the cleanup criteria for the drainage ditch was established as the generic industrial soil direct human contact criteria, the generic residential soil criteria protective of groundwater, groundwater surface water interface (GSI) criteria and residential groundwater criteria.

Because PCBs are known to strongly adsorb to soil and are known not to leach at significant concentrations; the Industrial Direct Contact value is used as the soil cleanup criterion protective of groundwater (see Operational Memorandum #14, Revision #2) for the PCB compounds.

Verification samples were collected from the Manhole #8 excavation in June and July 1993 (Figure 3). The excavation was backfilled after the last verification sampling in July 1993. Since the soils in the bottom of this excavation could also leach to the aquifer which is flowing off-site, the cleanup criteria protective of groundwater was considered for this area. Since contractors or employees could also come in contact with these soils in remote hypothetical situations (such as sewer excavation or other) direct soil contact criteria was also considered. The excavation was backfilled with clean fill and the ground surface in the former excavation area now has a substantial vegetative cover which would eliminate the potential for inhalation exposure. Additionally, no employees or other people frequent the Manhole #8 Area on any kind of a regular basis (including lunch/coffee breaks, to cut the lawn or to conduct landscape maintenance, etc.).

Therefore, the cleanup criteria for the Manhole #8 Area was established as the generic industrial soil direct human contact criteria and the generic industrial soil criteria protective of groundwater (i.e., the industrial soil direct contact criteria) because the PCBs will not leach and will not impact the groundwater moving off-site.

3.4 CONCLUSIONS

- **Land Use**

The zoning and land use of the Benteler Industries Galesburg facility are consistent with the industrial land use category according to MDNR guidance (Environmental Response Division Operation Memorandum #14, Revision 2, Remedial Action Plans Using Generic Industrial or Generic Commercial Cleanup Criteria and Other Requirements, June 5, 1995).

- **PCBs in Manhole #8 Area and Drainage Ditch Area**

The analytical results from verification samples collected from the Manhole #8 Area on July, 1993 and from the drainage ditch in June, 1994 (Table 2) meet the industrial soil, Direct Contact Criteria. Since the residual concentrations of PCBs in the area of Manhole #8 or in the drainage ditch area will not leach significantly to the groundwater, they will be confined to the Benteler Industries property. The appropriate cleanup criteria protective of groundwater in this situation becomes the Industrial Direct Contact values. Therefore, the soil concentrations of PCBs in the Manhole #8 Area and the drainage ditch area are protective of residential groundwater criteria.

- **Volatile Organic Compounds in Drainage Ditch Area**

Five soil verification samples were collected from the drainage ditch in June 1994. Samples were collected at 50 feet, 150 feet, 200 feet, 260 feet and 325 feet from the headwall and were analyzed for the volatile organic compounds listed on Table 6. None of the VOCs analyzed for were detected in the soil verification samples collected in June 1994. Therefore, these samples meet the residential soil criteria protective of groundwater and the industrial soil direct contact criteria. Additionally, since these compounds were non-detectable in these verification samples they would also meet soil criteria protective of surface water (GSI criteria).

- **Metals in the Drainage Ditch Area**

The analytical results of the metals verification samples (Table 4) collected from the drainage ditch in June 1994 and in August 1995 were compared to residential soil criteria protective of groundwater, industrial soil direct contact criteria and in the case of the August 1995 sample the SPLP data for this sample was compared to criteria protective of residential groundwater and surface water (GSI).

The analytical results of the August 7, 1995 sample collected at 600 feet indicated that only the total copper concentration exceeded the cleanup criteria (Table 4). The total concentrations of chromium, lead and zinc in this sample were below the statewide default background values. The SPLP results for

this sample indicated that the copper concentration in the leachate did not exceed the residential ground water criteria. Since the total concentrations of lead, chromium and zinc were less than the statewide default background numbers the leaching data is insignificant for these constituents. (The SPLP copper concentration for this sample was also compared to the GSI criteria and was found to exceed it. Therefore, copper could potentially present a significant exposure concern for the surface water in the drainage ditch or Morrow Lake.

The 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 where GSI criteria are not applicable.

The default GSI criteria are calculated using very conservative exposure assumptions. Discharges to Morrow Lake from the drainage ditch would only represent occasional exposures, if any, and would not represent any type of consistent exposure frequency.

Potential copper concentrations in the ground water discharge into Morrow Lake would be much less than those presented in the SPLP results for the August 7, 1995 verification sample because of natural attenuation occurring in the groundwater between the Benteler Industries property and Morrow Lake.

Additionally, a conservative estimate of a mixing zone occurring either at the GSI or the drainage ditch discharge point into Morrow Lake of 10 times the GSI value would show that the potential copper concentrations would be insignificant.)

The results presented in this document and previous investigations demonstrate that the Benteler Industries Galesburg facility drainage ditch and Manhole #8 excavation/remediation areas meet the requirements for a generic industrial closure under the new Act 451, Part 201. No further closure or post closure activities are required.

4.0 REFERENCES

Environmental Response Division Operational Memorandum #14, Revision 2: Remedial Action Plans Using Generic Industrial or Generic Commercial Cleanup Criteria and Other Requirements

Interim Environmental Response Division. Operational Memorandum #8, Revision #4: Generic Residential Cleanup Criteria

MERA Operational Memorandum #15: Default Type A Cleanup Criteria

WW Engineering & Science. "A Site Investigation of the Sewage Treatment Plant, Butler Building, Drainage Ditch, Sanitary Sewer Drain Line," Benteler Industries and General Signal, July 1991

WW Engineering & Science. "Remedial Action Work Plan for the Storm Sewer Lines and On-Site Ditch," Kalamazoo Plant, Benteler Industries, November 1992.

Terra Environmental Corporation, "Final Report, Benteler Industries, Remediation of Storm Sewer and On Site Ditch," February 9, 1994.

TABLES

T 1

Drainage Ditch and Manhole #8
Summary of Analytical Results for PCB's in Soil Samples
Preremediation and Remediation Verification Samples
Benteler Ind.
Galesburg Facility
(Units as Given)

Site Identification:		Target	Industrial	0+62	1+15	1+46	10+00	11+25	12+50	14+00	14+25
Sample Identification:		Method	Direct Human	E64634	E64649	E64635	E64644	E64645	E64646	E70735	E70736
Date Sampled:		Detection	Contact	5/7/91	5/7/91	5/7/91	5/8/91	5/8/91	5/8/91	8/8/91	8/8/91
Location:		Limits	Criteria (DHC)	W. Sidewall	Ditch	E. Sidewall	Ditch	Ditch	Ditch	Ditch	Ditch
PCB's	***Units***										
PCB: aroclor 1016	mg/kg	0.33	21(g)	-	-	-	-	-	-	-	-
PCB: aroclor 1221	mg/kg	0.33	21(g)	-	-	-	-	-	-	-	-
PCB: aroclor 1232	mg/kg	0.33	21(g)	-	-	-	-	-	-	-	-
PCB: aroclor 1242	mg/kg	0.33	21(g)	< 0.033	< 13	< 0.033	< 0.4	< 0.033	< 0.12	< 0.033	< 0.033
PCB: aroclor 1248	mg/kg	0.33	21(g)	< 0.033	[illegible]	< 0.033	< 0.4	< 0.033	< 0.12	< 0.033	< 0.033
PCB: aroclor 1254	mg/kg	0.33	21(g)	< 0.033	< 13	< 0.033	< 0.06	< 0.033	< 0.033	< 0.033	< 0.033
PCB: aroclor 1260	mg/kg	0.33	21(g)	< 0.033	< 13	< 0.033	**0.09**	**0.06**	**0.11**	< 0.033	< 0.033

Bolded values exceed the Target Method Detection Limit.
Shaded values exceed the Industrial DHC criteria.
Industrial/Commercial Criteria are from ERD Operational Memorandum #14 (revision 2), 6/5/95, MDNR.
(g) = Sum of isomer concentrations must not exceed this criterion.

Ta 1

Drainage Ditch and Manhole #8
Summary of Analytical Results for PCB's in Soil Samples
Preremediation and Remediation Verification Samples
Benteler Ind.
Galesburg Facility
(Units as Given)

Site Identification:		Target	Industrial	14+50	2+30	2+30	3+25	4+38	5+20	5+20	6+25
Sample Identification:		Method	Direct Human	E70737	E64636	E64637	E64638	E64639	E64650	E64651	E64652
Date Sampled:		Detection	Contact	8/8/91	5/7/91	5/7/91	5/7/91	5/7/91	5/7/91	5/7/91	5/8/91
Location:		Limits	Criteria (DHC)	Ditch	W. Sidewall	E. Sidewall	Ditch	W. Sidewall	E. Sidewall	W. Sidewall	Ditch
PCB's	***Units***										
PCB: aroclor 1016	mg/kg	0.33	21(g)	-	-	-	-	-	-	-	-
PCB: aroclor 1221	mg/kg	0.33	21(g)	-	-	-	-	-	-	-	-
PCB: aroclor 1232	mg/kg	0.33	21(g)	-	-	-	-	-	-	-	-
PCB: aroclor 1242	mg/kg	0.33	21(g)	< 0.033	< 0.033	< 0.033	< 0.12	< 0.033	< 0.033	< 0.033	< 0.25
PCB: aroclor 1248	mg/kg	0.33	21(g)	< 0.033	< 0.033	< 0.033	**0.19**	< 0.033	< 0.033	< 0.033	< 0.25
PCB: aroclor 1254	mg/kg	0.33	21(g)	< 0.033	< 0.033	< 0.033	< 0.12	< 0.033	< 0.033	< 0.033	< 0.25
PCB: aroclor 1260	mg/kg	0.33	21(g)	< 0.033	< 0.033	**0.04**	**0.18**	< 0.033	< 0.033	< 0.033	**0.9**

Bolded values exceed the Target Method Detection Limit.
Shaded values exceed the Industrial DHC criteria.
Industrial/Commercial Criteria are from ERD Operational Memorandum #14 (revision 2), 6/5/95, MDNR.
(g) = Sum of isomer concentrations must not exceed this criterion.

Drainage Ditch and Manhole #8
Summary of Analytical Results for PCB's in Soil Samples
Preremediation and Remediation Verification Samples
Benteler Ind.
Galesburg Facility
(Units as Given)

Site Identification:		Target	Industrial	7+20	7+25	7+25	8+25	C464-01	C951-01	C951-02	C951-03
Sample Identification:		Method	Direct Human	E64642	E64640	E64641	E64643	11300257D	93055-A	93055-B	93055-C
Date Sampled:		Detection	Contact	5/8/91	5/8/91	5/8/91	5/8/91	6/24/93	8/4/93	8/4/93	8/4/93
Location:		Limits	Criteria (DHC)	E. Sidewall	W. Sidewall	Ditch	Ditch	Manhole #8	(D-1)	(D-2)	(D-3)
PCB's	***Units***										
PCB: aroclor 1016	mg/kg	0.33	21(g)	-	-	-	-	-	< 0.33	< 0.33	< 0.33
PCB: aroclor 1221	mg/kg	0.33	21(g)	-	-	-	-	-	< 0.33	< 0.33	< 0.33
PCB: aroclor 1232	mg/kg	0.33	21(g)	-	-	-	-	< 0.33	< 0.33	< 0.33	< 0.33
PCB: aroclor 1242	mg/kg	0.33	21(g)	< 0.033	< 0.033	< 0.12	< 0.12	< 0.33	< 0.33	< 0.33	< 0.33
PCB: aroclor 1248	mg/kg	0.33	21(g)	< 0.033	< 0.033	< 0.12	< 0.12	< 0.33	**28**	**39**	**0.96**
PCB: aroclor 1254	mg/kg	0.33	21(g)	< 0.033	< 0.12	< 0.033	< 0.033	**35**	< 0.33	< 0.33	< 0.33
PCB: aroclor 1260	mg/kg	0.33	21(g)	< 0.033	< 0.033	**0.112**	**0.033**	**3.2**	**1.6**	**1.1**	< 0.33

Bolded values exceed the Target Method Detection Limit.
Shaded values exceed the Industrial DHC criteria.
Industrial/Commercial Criteria are from ERD Operational Memorandum #14 (revision 2), 6/5/95, MDNR.
(g) = Sum of isomer concentrations must not exceed this criterion.

Table 1

Drainage Ditch and Manhole #8
Summary of Analytical Results for PCB's in Soil Samples
Preremediation and Remediation Verification Samples
Benteler Ind.
Galesburg Facility
(Units as Given)

Site Identification:		Target	Industrial	C951-04	C951-05	S-01	S-02	S-03	S-04	S-05	Tran. Area
Sample Identification:		Method	Direct Human	93055-D	93055-E	26203	26204	26205	26206	26207	E64647
Date Sampled:		Detection	Contact	8/4/93	8/4/93	10/2/89	10/2/89	10/2/89	10/2/89	10/2/89	5/8/91
Location:		Limits	Criteria (DHC)	(D-4)	(D-5)	Below Pipe	25 ft. North	Pip & Skim	N. of Skim	50' S of Skim	E. Sample
PCB's	***Units***										
PCB: aroclor 1016	mg/kg	0.33	21(g)	< 0.33	< 0.33	-	-	-	-	-	-
PCB: aroclor 1221	mg/kg	0.33	21(g)	< 0.33	< 0.33	-	-	-	-	-	-
PCB: aroclor 1232	mg/kg	0.33	21(g)	< 0.33	< 0.33	-	-	-	-	-	-
PCB: aroclor 1242	mg/kg	0.33	21(g)	< 0.33	< 0.33	< 13	< 8	< 4	< 0.7	< 0.1	< 0.033
PCB: aroclor 1248	mg/kg	0.33	21(g)	**0.65**	< 0.33	< 13	**120**	< 4	**5.1**	< 0.1	< 0.033
PCB: aroclor 1254	mg/kg	0.33	21(g)	< 0.33	< 0.33	< 13	< 8	< 4	< 0.7	< 0.1	< 0.033
PCB: aroclor 1260	mg/kg	0.33	21(g)	< 0.33	< 0.33	**64**	< 8	**43**	**1.5**	**1.6**	< 0.033

Bolded values exceed the Target Method Detection Limit.
Shaded values exceed the Industrial DHC criteria.
Industrial/Commercial Criteria are from ERD Operational Memorandum #14 (revision 2), 6/5/95, MDNR.
(g) = Sum of isomer concentrations must not exceed this criterion.

veo. DC - 2.3 ppm

Ta 1

Drainage Ditch and Manhole #8
Summary of Analytical Results for PCB's in Soil Samples
Preremediation and Remediation Verification Samples
Benteler Ind.
Galesburg Facility
(Units as Given)

Site Identification: Sample Identification: Date Sampled: Location:		Target Method Detection Limits	Industrial Direct Human Contact Criteria (DHC)	Tran. Area E64648 5/8/91 W. Sample
PCB's	***Units***			
PCB: aroclor 1016	mg/kg	0.33	21(g)	-
PCB: aroclor 1221	mg/kg	0.33	21(g)	-
PCB: aroclor 1232	mg/kg	0.33	21(g)	-
PCB: aroclor 1242	mg/kg	0.33	21(g)	< 0.033
PCB: aroclor 1248	mg/kg	0.33	21(g)	< 0.033
PCB: aroclor 1254	mg/kg	0.33	21(g)	< 0.033
PCB: aroclor 1260	mg/kg	0.33	21(g)	< 0.033

Bolded values exceed the Target Method Detection Limit.
Shaded values exceed the Industrial DHC criteria.
Industrial/Commercial Criteria are from ERD Operational Memorandum #14 (revision 2), 6/5/95, MDNR.
(g) = Sum of isomer concentrations must not exceed this criterion.

Table 2

Drainage Ditch and Manhole #8
Summary of Analytical Results for PCB's in Soil Samples
Post Remediation Verification Samples
Benteler Ind.
Galesburg Facility
(Units as Given)

Site Identification:		Target	Industrial	C888-01	D399-01	D399-02	G492-02	G492-04	G492-05
Sample Identification:		Method	Direct Human	11300257F	11300257N	11300257P	93146-B	93146-D	93146-E
Date Sampled:		Detection	Contact	7/28/93	9/10/93	9/10/93	6/1/94	6/1/94	6/1/94
Location:		Limits	Criteria (DHC)	Manhole #8	Resample @ D-1	Resample @ D-2	150' from drain	260' from drain	325' from drain
PCB's	***Units***								
PCB: aroclor 1016	mg/kg	0.33	21(g)	-	< 0.33	< 0.33	< 0.33	< 0.33	< 0.33
PCB: aroclor 1221	mg/kg	0.33	21(g)	-	< 0.33	< 0.33	< 0.33	< 0.33	< 0.33
PCB: aroclor 1232	mg/kg	0.33	21(g)	< 0.33	< 0.33	< 0.33	< 0.33	< 0.33	< 0.33
PCB: aroclor 1242	mg/kg	0.33	21(g)	< 0.33	< 0.33	< 0.33	< 0.33	< 0.33	< 0.33
PCB: aroclor 1248	mg/kg	0.33	21(g)	**2.1**	**0.61**	< 0.33	**2.57**	**6.18**	**4.93**
PCB: aroclor 1254	mg/kg	0.33	21(g)	**1.1**	< 0.33	< 0.33	< 0.33	< 0.33	< 0.33
PCB: aroclor 1260	mg/kg	0.33	21(g)	< 0.33	< 0.33	< 0.33	< 0.33	< 0.33	< 0.33

Bolded values exceed the Target Method Detection Limit.
Shaded values exceed the Industrial DHC criteria.
Industrial/Commercial Criteria are from ERD Operational Memorandum #14 (revision 2), 6/5/95, MDNR.
(g) = Sum of isomer concentrations must not exceed this criterion.

ues. DC-2.3

Drainage Ditch
Summary of Analytical Results for Inorganics in Soil Samples
Preremediation and Remediation Verification Samples
Benteler Ind.
Galesburg Facility
(Units as Given)

Site Identification:			Twenty Times	Industrial	1+15	5+20	5+20	6+25
Sample Identification:		State	Residential	Direct Human	E64649	E64650	E64651	E64652
Date Sampled:		Default	Groundwater	Contact	5/7/91	5/7/91	5/7/91	5/8/91
Location:		Background	Criteria	Criteria (DHC)	Ditch	E. Sidewall	W. Sidewall	Ditch
Total Metals	***Units***							
Arsenic, total	mg/kg	5.8(d)	1	83	5.38	5.75	2.11	4.75
Barium, total	mg/kg	75(d)	40	320000	219	24	16	86
Cadmium, total	mg/kg	1.2(d)	0.1	2300	9.17	0.093	0.095	8.63
Chromium, total	mg/kg	18(d)	2(VI)	22000(VI)	145	5.4	4.7	447
Copper, total	mg/kg	32(d)	20	170000	590	8.5	7.2	457
Lead, total	mg/kg	21(d)	0.08(c)	400	588	11	6.4	376
Mercury, total	mg/kg	0.13(d)	0.04	1400	0.78	< 0.05	< 0.05	0.566
Selenium, total	mg/kg	0.41(d)	1	23000	QC 0.217	< 0.05	< 0.05	0.729 - exceedence
Silver, total	mg/kg	1(d)	0.68	21000	1.7	0.034	0.032	4.4
Zinc, total	mg/kg	47(d)	48	1000000(s)	598	15	15	1880
SPLP Results	***Units***		*GSI*	*Res. GW*				
Chromium, SPLP	ug/L	NA	7.3(VI)	100(u)(g)	-	-	-	-
Copper, SPLP	ug/L	NA	18(H)	1000	-	-	-	-
Lead, SPLP	ug/L	NA	6.6(H)	4(c)	-	-	-	-
Zinc, SPLP	ug/L	NA	81(H)	2400	-	-	-	-

Shaded values exceed the least stringent of the Statewide Background criteria and Residential 20xGW criteria, or the more stringent of the GSI and Residential GW criteria.

Industrial/Commercial Criteria are from ERD Operational Memorandum #14 (revision 2), 6/5/95, MDNR.

GSI and Residential Criteria are from ERD Operational Memorandum #8 (revision 4), 6/5/95, MDNR.

(c) = Higher level may be acceptable if soil concentration is <400ppm and groundwater doesn't migrate off-site.

(d) = This value is a statewide default background value from MERA Operational Memorandum #15, 9/30/93, MDNR.

(g) = Sum of isomer concentrations must not exceed this criterion.

(H) = This value is hardness dependant. A hardness of 178 mg/L of $CaCO_3$ was assumed.

(s) = Criterion was calculated to greater than 100% in soil, hence it was reduced to 100%.

(u) = This value is the State of Michigan Drinking Water Standard (used as the default).

(VI) = Value is for hexavalent chromium (most conservative).

GSI = Groundwater/Surface water Interface Criteria

Res. GW = Residential Groundwater Criteria

QC = Quality control performance criteria not met for this parameter, all others fell within acceptable quality control limits.

NA = Not Available

* = Total concentrations are less than statewide default background concentrations.

Drainage Ditch
Summary of Analytical Results for Inorganics in Soil Samples
Post Remediation Verification Samples
Benteler Ind.
Galesburg Facility
(Units as Given)

Site Identification:			Twenty Times	Industrial	G556-01	G556-02	G556-03	Ditch
Sample Identification:		State	Residential	Direct Human	93147-A	93147-B	93147-C	E124477
Date Sampled:		Default	Groundwater	Contact	6/6/94	6/6/94	6/6/94	8/7/95
Location:		Background	Criteria	Criteria (DHC)	115 feet	600 feet	625 feet	600 feet
Total Metals	***Units***							
Arsenic, total	mg/kg	5.8(d)	1	83	0.38	0.61	1.8	-
Barium, total	mg/kg	75(d)	40	320000	8.3	15	11	-
Cadmium, total	mg/kg	1.2(d)	0.1	2300	0.21	0.69	0.23	-
Chromium, total	mg/kg	18(d)	2(VI)	22000(VI)	3	26	2.6	9.2
Copper, total	mg/kg	32(d)	20	170000	14	77	15	46
Lead, total	mg/kg	21(d)	0.08(c)	400	6.5	41	4.8	21
Mercury, total	mg/kg	0.13(d)	0.04	1400	< 0.1	< 0.1	< 0.1	-
Selenium, total	mg/kg	0.41(d)	1	23000	< 0.5	< 0.5	< 0.5	-
Silver, total	mg/kg	1(d)	0.68	21000	< 0.5	< 0.5	< 0.5	-
Zinc, total	mg/kg	47(d)	48	1000000(s)	27	73	28	41
SPLP Results	***Units***		*GSI*	*Res. GW*				
Chromium, SPLP	ug/L	NA	7.3(VI)	100(u)(g)	-	-	-	< 50 *
Copper, SPLP	ug/L	NA	18(H)	1000	-	-	-	79
Lead, SPLP	ug/L	NA	6.6(H)	4(c)	-	-	-	33 *
Zinc, SPLP	ug/L	NA	81(H)	2400	-	-	-	170 *

no, they're not less than background

Shaded values exceed the least stringent of the Statewide Background criteria and Residential 20xGW criteria, or the more stringent of the GSI and Residential GW criteria.

Industrial/Commercial Criteria are from ERD Operational Memorandum #14 (revision 2), 6/5/95, MDNR.

GSI and Residential Criteria are from ERD Operational Memorandum #8 (revision 4), 6/5/95, MDNR.

(c) = Higher level may be acceptable if soil concentration is <400ppm and groundwater doesn't migrate off-site.

(d) = This value is a statewide default background value from MERA Operational Memorandum #15, 9/30/93, MDNR.

(g) = Sum of isomer concentrations must not exceed this criterion.

(H) = This value is hardness dependant. A hardness of 178 mg/L of $CaCO_3$ was assumed.

(s) = Criterion was calculated to greater than 100% in soil, hence it was reduced to 100%.

(u) = This value is the State of Michigan Drinking Water Standard (used as the default).

(VI) = Value is for hexavalent chromium (most conservative).

GSI = Groundwater/Surface water Interface Criteria

Res. GW = Residential Groundwater Criteria

QC = Quality control performance criteria not met for this parameter, all others fell within acceptable quality control limits.

NA = Not Available

* = Total concentrations are less than statewide default background concentrations.

Res DW

Cr 100 ppb

Cu 1300

Pb 4

Zn 2400

Table 5
Drainage Ditch
Summary of Analytical Results for Volatile Organic Compounds in Soil Samples
Preremediation and Remediation Verification Samples
Benteler Ind.
Galesburg Facility
(Units as Given)

Site Identification: Sample Identification: Date Sampled: Location:		Target Method Detection Limits	Twenty Times Residential Groundwater Criteria	Industrial Direct Human Contact Criteria (DHC)	1+15 E64649 5/7/91 Ditch	5+20 E64650 5/7/91 E. Sidewall	5+20 E64651 5/7/91 W. Sidewall
USEPA-8260 Scan	*Units*						
Benzene	mg/kg	0.01	0.1	850	< 0.01	< 0.01	< 0.01
Dichlorobromomethane	mg/kg	0.01	2(q)	400	< 0.01	< 0.01	< 0.01
Bromoform	mg/kg	0.01	2(q)	3100	< 0.01	< 0.01	< 0.01
Bromomethane	mg/kg	0.01	0.2	1000	< 0.01	< 0.01	< 0.01
Carbon tetrachloride	mg/kg	0.01	0.1	190	< 0.01	< 0.01	< 0.01
Chlorobenzene	mg/kg	0.01	2	14000	**0.5**	< 0.01	< 0.01
Chloroethane	mg/kg	0.01	4.4	6500	< 0.01	< 0.01	< 0.01
Chloroform	mg/kg	0.01	2(q)	4100	< 0.01	< 0.01	< 0.01
Chloromethane	mg/kg	0.01	1.3	1900	-	-	-
2-Chloroethylvinyl ether	mg/kg	0.1	ID	ID	-	-	-
Dibromochloromethane	mg/kg	0.01	2	300	< 0.01	< 0.01	< 0.01
Dichlorodifluoromethane	mg/kg	0.01	34	170000	-	-	-
1,1-Dichloroethane	mg/kg	0.01	18	89000	< 0.01	< 0.01	< 0.01
1,2-Dichloroethane	mg/kg	0.01	0.1	270	< 0.01	< 0.01	< 0.01
1,1-Dichloroethylene	mg/kg	0.01	0.14	740	< 0.01	< 0.01	< 0.01
1,2-Dichloropropane	mg/kg	0.01	0.1	360	-	-	-
cis-1,3-Dichloropropene	mg/kg	0.01	0.096(g)	140(g)	< 0.01	< 0.01	< 0.01
trans-1,3-Dichloropropene	mg/kg	0.01	0.096(g)	140(g)	< 0.01	< 0.01	< 0.01
Ethylbenzene	mg/kg	0.01	1.5	72000	**0.098**	< 0.01	< 0.01
Methylene chloride	mg/kg	0.01	0.1	3300	< 0.01	< 0.01	< 0.01
1,1,2,2-Tetrachloroethane	mg/kg	0.01	0.086	120	< 0.01	< 0.01	< 0.01
Tetrachloroethylene	mg/kg	0.01	0.1	490	< 0.01	< 0.01	< 0.01
1,1,1-Trichloroethane	mg/kg	0.01	4	21000	< 0.01	< 0.01	< 0.01
1,1,2-Trichloroethane	mg/kg	0.01	0.1	440	< 0.01	< 0.01	< 0.01
Trichloroethylene	mg/kg	0.01	0.1	1600	< 0.01	< 0.01	< 0.01
Toluene	mg/kg	0.01	16	160000	**0.031**	< 0.01	< 0.01
Vinyl chloride	mg/kg	0.01	0.04	11	< 0.01	< 0.01	< 0.01
Xylene, total	mg/kg	0.03	5.6	1000000(s)	< 0.4	< 0.01	< 0.01
cis-1,2-Dichloroethylene	mg/kg	0.01	1.4	8200	< 0.01	< 0.01	< 0.01
1,2-Dichlorobenzene	mg/kg	0.01	12	64000	**0.78**	-	-
1,3-Dichlorobenzene	mg/kg	0.01	12	64000	**0.24**	-	-
1,4-Dichlorobenzene	mg/kg	0.01	1.5	1000	**0.41**	-	-
trans-1,2-Dichloroethylene	mg/kg	0.01	2	13000	< 0.01	< 0.01	< 0.01
Trichlorofluoromethane	mg/kg	0.01	52	260000	< 0.01	< 0.01	< 0.01
1,2-Dichloropropene	mg/kg	NA	NA	NA	< 0.01	< 0.01	< 0.01

Bolded values exceed the Target Method Detection Limit.
Shaded values exceed the least stringent of the TMDL or Residential 20 x GW.
Industrial/Commercial Criteria are from ERD Operational Memorandum #14 (revision 2), 6/5/95, MDNR.
Residential Criteria are from ERD Operational Memorandum #8 (revision 4), 6/5/95, MDNR.
(g) = Sum of isomer concentrations must not exceed this criterion.
ID = Insufficient Data to calculate criteria.
(s) = Criterion was calculated to greater than 100% in soil, hence it was reduced to 100%.
(VI) = Value is for hexavalent chromium (most conservative).

Table 5
Drainage Ditch
Summary of Analytical Results for Volatile Organic Compounds in Soil Samples
Preremediation and Remediation Verification Samples
Benteler Ind.
Galesburg Facility
(Units as Given)

Site Identification: Sample Identification: Date Sampled: Location:		Target Method Detection Limits	Twenty Times Residential Groundwater Criteria	Industrial Direct Human Contact Criteria (DHC)	6+25 E64652 5/8/91 Ditch
USEPA-8260 Scan	***Units***				
Benzene	mg/kg	0.01	0.1	850	< 0.01
Dichlorobromomethane	mg/kg	0.01	2(q)	400	< 0.01
Bromoform	mg/kg	0.01	2(q)	3100	< 0.01
Bromomethane	mg/kg	0.01	0.2	1000	< 0.01
Carbon tetrachloride	mg/kg	0.01	0.1	190	< 0.01
Chlorobenzene	mg/kg	0.01	2	14000	< 0.01
Chloroethane	mg/kg	0.01	4.4	6500	< 0.01
Chloroform	mg/kg	0.01	2(q)	4100	< 0.01
Chloromethane	mg/kg	0.01	1.3	1900	-
2-Chloroethylvinyl ether	mg/kg	0.1	ID	ID	-
Dibromochloromethane	mg/kg	0.01	2	300	< 0.01
Dichlorodifluoromethane	mg/kg	0.01	34	170000	-
1,1-Dichloroethane	mg/kg	0.01	18	89000	< 0.01
1,2-Dichloroethane	mg/kg	0.01	0.1	270	< 0.01
1,1-Dichloroethylene	mg/kg	0.01	0.14	740	< 0.01
1,2-Dichloropropane	mg/kg	0.01	0.1	360	-
cis-1,3-Dichloropropene	mg/kg	0.01	0.096(g)	140(g)	< 0.01
trans-1,3-Dichloropropene	mg/kg	0.01	0.096(g)	140(g)	< 0.01
Ethylbenzene	mg/kg	0.01	1.5	72000	**0.016**
Methylene chloride	mg/kg	0.01	0.1	3300	< 0.01
1,1,2,2-Tetrachloroethane	mg/kg	0.01	0.086	120	< 0.01
Tetrachloroethylene	mg/kg	0.01	0.1	490	< 0.01
1,1,1-Trichloroethane	mg/kg	0.01	4	21000	< 0.01
1,1,2-Trichloroethane	mg/kg	0.01	0.1	440	< 0.01
Trichloroethylene	mg/kg	0.01	0.1	1600	< 0.01
Toluene	mg/kg	0.01	16	160000	< 0.01
Vinyl chloride	mg/kg	0.01	0.04	11	< 0.01
Xylene, total	mg/kg	0.03	5.6	1000000(s)	< 0.01
cis-1,2-Dichloroethylene	mg/kg	0.01	1.4	8200	< 0.01
1,2-Dichlorobenzene	mg/kg	0.01	12	64000	-
1,3-Dichlorobenzene	mg/kg	0.01	12	64000	-
1,4-Dichlorobenzene	mg/kg	0.01	1.5	1000	-
trans-1,2-Dichloroethylene	mg/kg	0.01	2	13000	< 0.01
Trichlorofluoromethane	mg/kg	0.01	52	260000	< 0.01
1,2-Dichloropropene	mg/kg	NA	NA	NA	< 0.01

Bolded values exceed the Target Method Detection Limit.
Shaded values exceed the least stringent of the TMDL or Residential 20 x GW.
Industrial/Commercial Criteria are from ERD Operational Memorandum #14 (revision 2), 6/5/95, MDNR.
Residential Criteria are from ERD Operational Memorandum #8 (revision 4), 6/5/95, MDNR.
(g) = Sum of isomer concentrations must not exceed this criterion.
ID = Insufficient Data to calculate criteria.
(s) = Criterion was calculated to greater than 100% in soil, hence it was reduced to 100%.
(VI) = Value is for hexavalent chromium (most conservative).

Table 6
Drainage Ditch
Summary of Analytical Results for Volatile Organic Compounds in Soil Samples
Post Remediation Verification Samples
Benteler Ind.
Galesburg Facility
(Units as Given)

Site Identification:		Target	Twenty Times	Industrial	C951-04	E910-01	G492-01
Sample Identification:		Method	Residential	Direct Human	93055-D	93113-D2	93146-A
Date Sampled:		Detection	Groundwater	Contact	8/4/93	2/1/94	6/1/94
Location:		Limits	Criteria	Criteria (DHC)	(D-4) Ditch Bottom	-	50' from drain
USEPA-8260 Scan	***Units***						
Benzene	mg/kg	0.01	0.1	850	-	< 0.01	< 0.01
Dichlorobromomethane	mg/kg	0.01	2(q)	400	< 0.005	< 0.005	< 0.01
Bromoform	mg/kg	0.01	2(q)	3100	< 0.005	< 0.005	< 0.01
Bromomethane	mg/kg	0.01	0.2	1000	< 0.005	< 0.005	< 0.01
Carbon tetrachloride	mg/kg	0.01	0.1	190	< 0.005	< 0.005	< 0.01
Chlorobenzene	mg/kg	0.01	2	14000	< 0.005	< 0.005	< 0.01
Chloroethane	mg/kg	0.01	4.4	6500	< 0.005	< 0.005	< 0.01
Chloroform	mg/kg	0.01	2(q)	4100	< 0.01	< 0.01	< 0.01
Chloromethane	mg/kg	0.01	1.3	1900	< 0.01	< 0.01	< 0.01
2-Chloroethylvinyl ether	mg/kg	0.1	ID	ID	-	< 0.005	< 0.1
Dibromochloromethane	mg/kg	0.01	2	300	< 0.005	< 0.005	< 0.01
Dichlorodifluoromethane	mg/kg	0.01	34	170000	-	< 0.01	< 0.01
1,1-Dichloroethane	mg/kg	0.01	18	89000	< 0.005	< 0.005	< 0.01
1,2-Dichloroethane	mg/kg	0.01	0.1	270	< 0.005	< 0.005	< 0.01
1,1-Dichloroethylene	mg/kg	0.01	0.14	740	< 0.005	< 0.005	< 0.01
1,2-Dichloropropane	mg/kg	0.01	0.1	360	< 0.005	< 0.005	< 0.01
[illegible],3-Dichloropropene	mg/kg	0.01	0.096(g)	140(g)	< 0.005	< 0.005	< 0.01
trans-1,3-Dichloropropene	mg/kg	0.01	0.096(g)	140(g)	< 0.005	< 0.005	< 0.01
Ethylbenzene	mg/kg	0.01	1.5	72000	-	< 0.01	< 0.01
Methylene chloride	mg/kg	0.01	0.1	3300	< 0.02	< 0.02	< 0.01
1,1,2,2-Tetrachloroethane	mg/kg	0.01	0.086	120	< 0.005	< 0.005	< 0.01
Tetrachloroethylene	mg/kg	0.01	0.1	490	< 0.005	< 0.005	< 0.01
1,1,1-Trichloroethane	mg/kg	0.01	4	21000	< 0.005	< 0.005	< 0.01
1,1,2-Trichloroethane	mg/kg	0.01	0.1	440	< 0.005	< 0.005	< 0.01
Trichloroethylene	mg/kg	0.01	0.1	1600	< 0.005	< 0.005	< 0.01
Toluene	mg/kg	0.01	16	160000	-	< 0.01	< 0.01
Vinyl chloride	mg/kg	0.01	0.04	11	< 0.005	< 0.005	< 0.01
Xylene, total	mg/kg	0.03	5.6	1000000(s)	-	< 0.03	< 0.03
cis-1,2-Dichloroethylene	mg/kg	0.01	1.4	8200	< 0.005	< 0.005	-
1,2-Dichlorobenzene	mg/kg	0.01	12	64000	-	< 0.005	< 0.01
1,3-Dichlorobenzene	mg/kg	0.01	12	64000	-	< 0.005	< 0.01
1,4-Dichlorobenzene	mg/kg	0.01	1.5	1000	-	< 0.005	< 0.01
trans-1,2-Dichloroethylene	mg/kg	0.01	2	13000	< 0.005	< 0.005	< 0.01
Trichlorofluoromethane	mg/kg	0.01	52	260000	< 0.005	< 0.005	< 0.01
1,2-Dichloropropene	mg/kg	NA	NA	NA	-	-	-

Bolded values exceed the Target Method Detection Limit.
Shaded values exceed the least stringent of the TMDL or Residential 20 x GW.
Industrial/Commercial Criteria are from ERD Operational Memorandum #14 (revision 2), 6/5/95, MDNR.
Residential Criteria are from ERD Operational Memorandum #8 (revision 4), 6/5/95, MDNR.
' = Sum of isomer concentrations must not exceed this criterion.
[illegible] Insufficient Data to calculate criteria.
(s) = Criterion was calculated to greater than 100% in soil, hence it was reduced to 100%.
(VI) = Value is for hexavalent chromium (most conservative).

Table 6
Drainage Ditch
Summary of Analytical Results for Volatile Organic Compounds in Soil Samples
Post Remediation Verification Samples
Benteler Ind.
Galesburg Facility
(Units as Given)

Site Identification: Sample Identification: Date Sampled: Location:		Target Method Detection Limits	Twenty Times Residential Groundwater Criteria	Industrial Direct Human Contact Criteria (DHC)	G492-02 93146-B 6/1/94 150' from drain	G492-03 93146-C 6/1/94 200' from drain	G492-04 93146-D 6/1/94 260' from drain
USEPA-8260 Scan	***Units***						
Benzene	mg/kg	0.01	0.1	850	< 0.01	< 0.01	< 0.01
Dichlorobromomethane	mg/kg	0.01	2(q)	400	< 0.01	< 0.01	< 0.01
Bromoform	mg/kg	0.01	2(q)	3100	< 0.01	< 0.01	< 0.01
Bromomethane	mg/kg	0.01	0.2	1000	< 0.01	< 0.01	< 0.01
Carbon tetrachloride	mg/kg	0.01	0.1	190	< 0.01	< 0.01	< 0.01
Chlorobenzene	mg/kg	0.01	2	14000	< 0.01	< 0.01	< 0.01
Chloroethane	mg/kg	0.01	4.4	6500	< 0.01	< 0.01	< 0.01
Chloroform	mg/kg	0.01	2(q)	4100	< 0.01	< 0.01	< 0.01
Chloromethane	mg/kg	0.01	1.3	1900	< 0.01	< 0.01	< 0.01
2-Chloroethylvinyl ether	mg/kg	0.1	ID	ID	< 0.1	< 0.1	< 0.1
Dibromochloromethane	mg/kg	0.01	2	300	< 0.01	< 0.01	< 0.01
Dichlorodifluoromethane	mg/kg	0.01	34	170000	< 0.01	< 0.01	< 0.01
1,1-Dichloroethane	mg/kg	0.01	18	89000	< 0.01	< 0.01	< 0.01
1,2-Dichloroethane	mg/kg	0.01	0.1	270	< 0.01	< 0.01	< 0.01
1,1-Dichloroethylene	mg/kg	0.01	0.14	740	< 0.01	< 0.01	< 0.01
[illegible]ichloropropane	mg/kg	0.01	0.1	360	< 0.01	< 0.01	< 0.01
[illegible]3-Dichloropropene	mg/kg	0.01	0.096(g)	140(g)	< 0.01	< 0.01	< 0.01
trans-1,3-Dichloropropene	mg/kg	0.01	0.096(g)	140(g)	< 0.01	< 0.01	< 0.01
Ethylbenzene	mg/kg	0.01	1.5	72000	< 0.01	< 0.01	< 0.01
Methylene chloride	mg/kg	0.01	0.1	3300	< 0.01	< 0.01	< 0.01
1,1,2,2-Tetrachloroethane	mg/kg	0.01	0.086	120	< 0.01	< 0.01	< 0.01
Tetrachloroethylene	mg/kg	0.01	0.1	490	< 0.01	< 0.01	< 0.01
1,1,1-Trichloroethane	mg/kg	0.01	4	21000	< 0.01	< 0.01	< 0.01
1,1,2-Trichloroethane	mg/kg	0.01	0.1	440	< 0.01	< 0.01	< 0.01
Trichloroethylene	mg/kg	0.01	0.1	1600	< 0.01	< 0.01	< 0.01
Toluene	mg/kg	0.01	16	160000	< 0.01	< 0.01	< 0.01
Vinyl chloride	mg/kg	0.01	0.04	11	< 0.01	< 0.01	< 0.01
Xylene, total	mg/kg	0.03	5.6	1000000(s)	< 0.03	< 0.03	< 0.03
cis-1,2-Dichloroethylene	mg/kg	0.01	1.4	8200	-	-	-
1,2-Dichlorobenzene	mg/kg	0.01	12	64000	< 0.01	< 0.01	< 0.01
1,3-Dichlorobenzene	mg/kg	0.01	12	64000	< 0.01	< 0.01	< 0.01
1,4-Dichlorobenzene	mg/kg	0.01	1.5	1000	< 0.01	< 0.01	< 0.01
trans-1,2-Dichloroethylene	mg/kg	0.01	2	13000	< 0.01	< 0.01	< 0.01
Trichlorofluoromethane	mg/kg	0.01	52	260000	< 0.01	< 0.01	< 0.01
1,2-Dichloropropene	mg/kg	NA	NA	NA	-	-	-

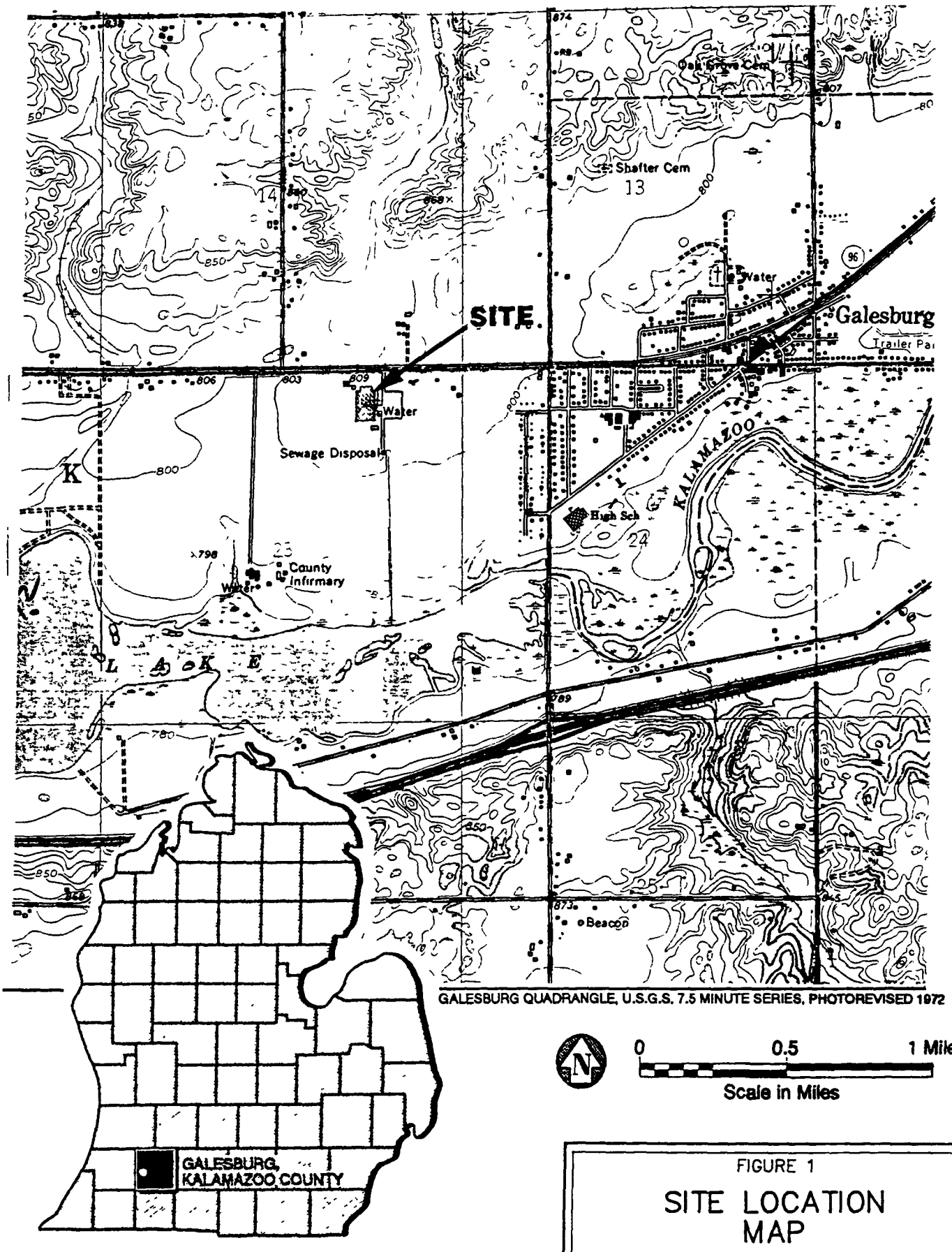
Bolded values exceed the Target Method Detection Limit.
Shaded values exceed the least stringent of the TMDL or Residential 20 x GW.
Industrial/Commercial Criteria are from ERD Operational Memorandum #14 (revision 2), 6/5/95, MDNR.
Residential Criteria are from ERD Operational Memorandum #8 (revision 4), 6/5/95, MDNR.
Sum of isomer concentrations must not exceed this criterion.
Insufficient Data to calculate criteria.
(s) = Criterion was calculated to greater than 100% in soil, hence it was reduced to 100%.
(VI) = Value is for hexavalent chromium (most conservative).

Table 6
Drainage Ditch
Summary of Analytical Results for Volatile Organic Compounds in Soil Samples
Post Remediation Verification Samples
Benteler Ind.
Galesburg Facility
(Units as Given)

Site Identification: Sample Identification: Date Sampled: Location:		Target Method Detection Limits	Twenty Times Residential Groundwater Criteria	Industrial Direct Human Contact Criteria (DHC)	G492-05 93146-E 6/1/94 325' from drain
USEPA-8260 Scan	***Units***				
Benzene	mg/kg	0.01	0.1	850	< 0.01
Dichlorobromomethane	mg/kg	0.01	2(q)	400	< 0.01
Bromoform	mg/kg	0.01	2(q)	3100	< 0.01
Bromomethane	mg/kg	0.01	0.2	1000	< 0.01
Carbon tetrachloride	mg/kg	0.01	0.1	190	< 0.01
Chlorobenzene	mg/kg	0.01	2	14000	< 0.01
Chloroethane	mg/kg	0.01	4.4	6500	< 0.01
Chloroform	mg/kg	0.01	2(q)	4100	< 0.01
Chloromethane	mg/kg	0.01	1.3	1900	< 0.01
2-Chloroethylvinyl ether	mg/kg	0.1	ID	ID	< 0.1
Dibromochloromethane	mg/kg	0.01	2	300	< 0.01
Dichlorodifluoromethane	mg/kg	0.01	34	170000	< 0.01
1,1-Dichloroethane	mg/kg	0.01	18	89000	< 0.01
1,2-Dichloroethane	mg/kg	0.01	0.1	270	< 0.01
1,1-Dichloroethylene	mg/kg	0.01	0.14	740	< 0.01
1,2-Dichloropropane	mg/kg	0.01	0.1	360	< 0.01
cis-1,3-Dichloropropene	mg/kg	0.01	0.096(g)	140(g)	< 0.01
trans-1,3-Dichloropropene	mg/kg	0.01	0.096(g)	140(g)	< 0.01
Ethylbenzene	mg/kg	0.01	1.5	72000	< 0.01
Methylene chloride	mg/kg	0.01	0.1	3300	< 0.01
1,1,2,2-Tetrachloroethane	mg/kg	0.01	0.086	120	< 0.01
Tetrachloroethylene	mg/kg	0.01	0.1	490	< 0.01
1,1,1-Trichloroethane	mg/kg	0.01	4	21000	< 0.01
1,1,2-Trichloroethane	mg/kg	0.01	0.1	440	< 0.01
Trichloroethylene	mg/kg	0.01	0.1	1600	< 0.01
Toluene	mg/kg	0.01	16	160000	< 0.01
Vinyl chloride	mg/kg	0.01	0.04	11	< 0.01
Xylene, total	mg/kg	0.03	5.6	1000000(s)	< 0.03
cis-1,2-Dichloroethylene	mg/kg	0.01	1.4	8200	-
1,2-Dichlorobenzene	mg/kg	0.01	12	64000	< 0.01
1,3-Dichlorobenzene	mg/kg	0.01	12	64000	< 0.01
1,4-Dichlorobenzene	mg/kg	0.01	1.5	1000	< 0.01
trans-1,2-Dichloroethylene	mg/kg	0.01	2	13000	< 0.01
Trichlorofluoromethane	mg/kg	0.01	52	260000	< 0.01
1,2-Dichloropropene	mg/kg	NA	NA	NA	-

Bolded values exceed the Target Method Detection Limit.
Shaded values exceed the least stringent of the TMDL or Residential 20 x GW.
Industrial/Commercial Criteria are from ERD Operational Memorandum #14 (revision 2), 6/5/95, MDNR.
Residential Criteria are from ERD Operational Memorandum #8 (revision 4), 6/5/95, MDNR.
(g) = Sum of isomer concentrations must not exceed this criterion.
ID = Insufficient Data to calculate criteria.
(s) = Criterion was calculated to greater than 100% in soil, hence it was reduced to 100%.
(VI) = Value is for hexavalent chromium (most conservative).

FIGURES



EARTH TECH

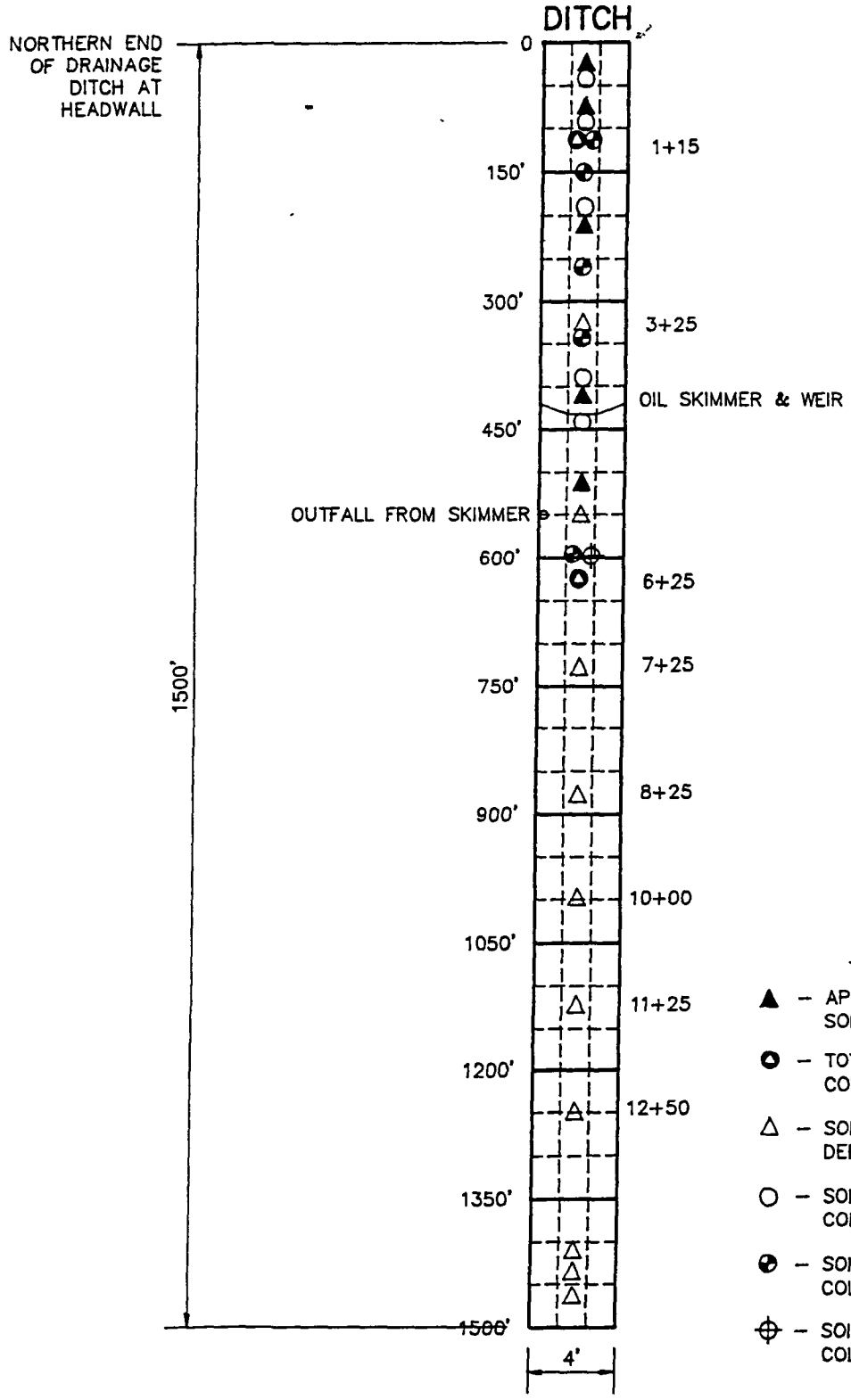
FIGURE 1

SITE LOCATION MAP

BENTELER INDUSTRIES
GALESBURG, MICHIGAN

SEPTEMBER, 1995

23076.0:



LEGEND

- ▲ – APPROXIMATE LOCATION OF SOIL SAMPLES COLLECTED 10/02/89
- ● – TOTAL ANALYSIS (VOC's & METALS) COLLECTED 5/07/91
- △ – SOIL SAMPLE LOCATIONS AT 0–0.5 FOOT DEPTH COLLECTED 5/07/91
- ○ – SOIL SAMPLE LOCATIONS COLLECTED IN 1993
- ◕ – SOIL SAMPLE LOCATIONS COLLECTED IN 1994
- ⊕ – SOIL SAMPLE LOCATIONS COLLECTED IN 1995

23076–DD
VR091295

FIGURE 2

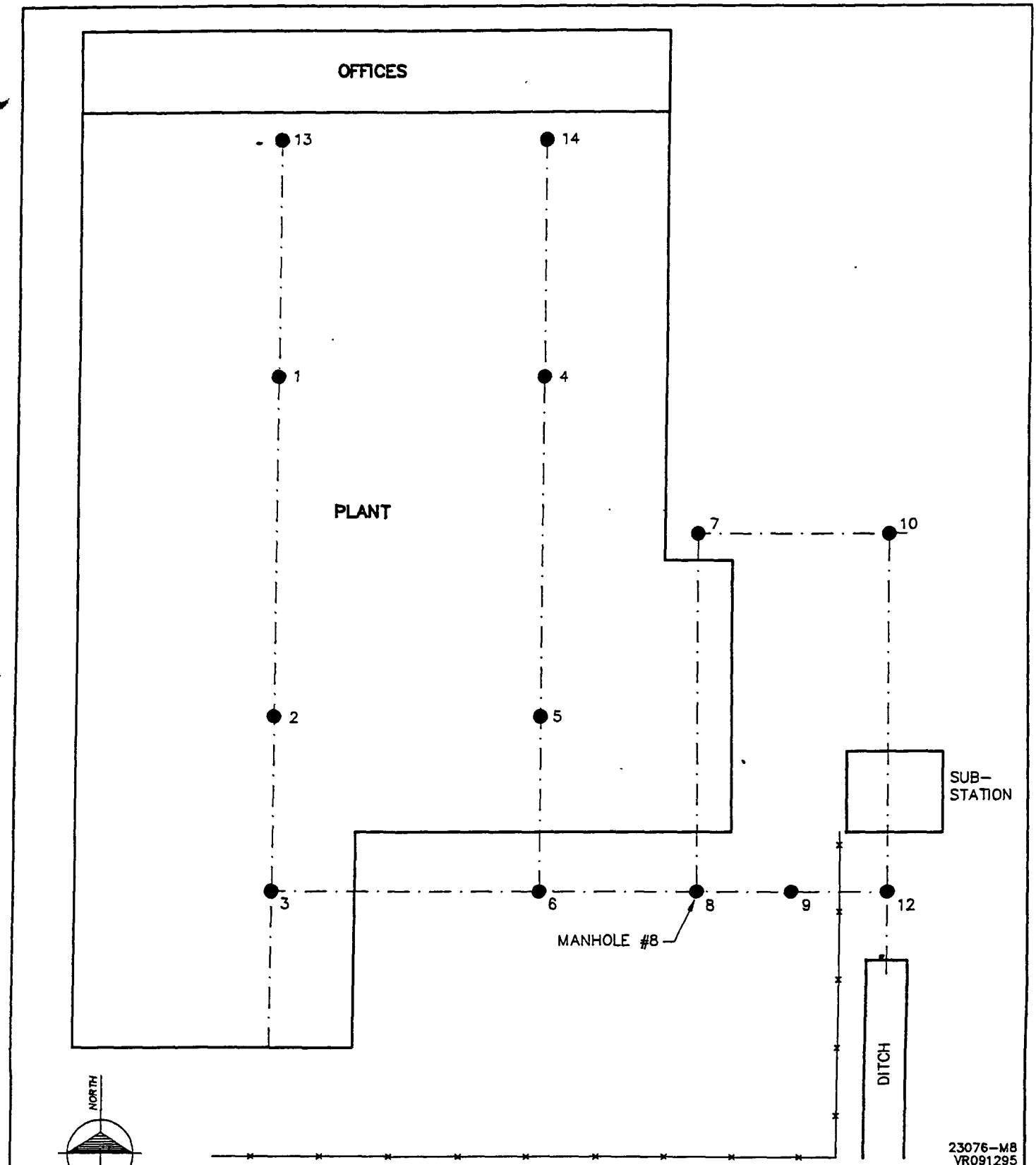
DRAINAGE DITCH SAMPLE LOCATIONS

BENTELER INDUSTRIES
GALESBURG, MICHIGAN

SEPTEMBER, 1995

23076.01

EARTH TECH



NOT TO SCALE

LEGEND

● – MANHOLE

— · — – STORM DRAIN

EARTH TECH

FIGURE 3

MANHOLE #8 AREA

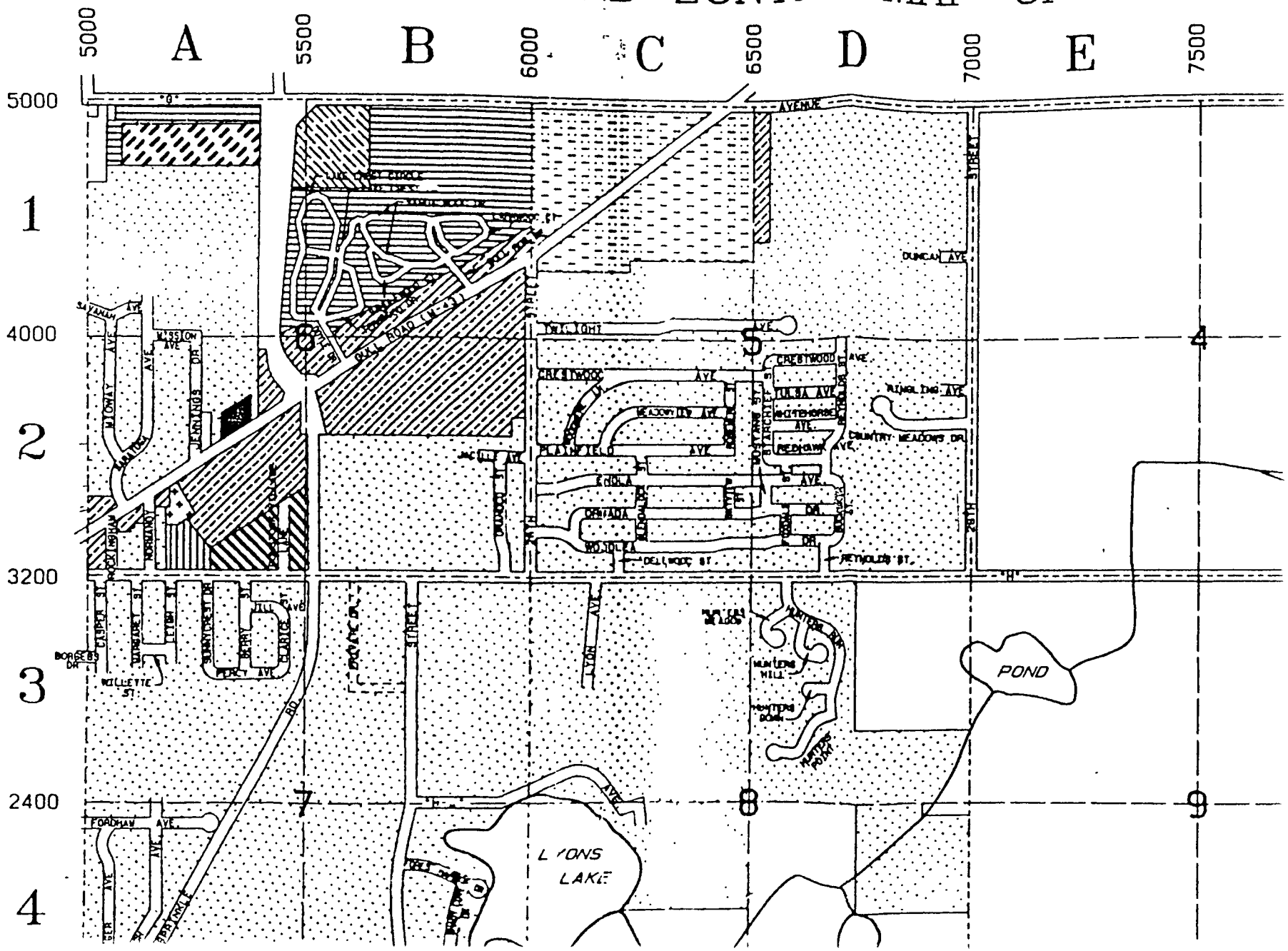
BENTELER INDUSTRIES
GALESBURG, MICHIGAN

SEPTEMBER, 1995

23076.01

APPENDICES

STREET AND ZONING MAP OF COMSTO



MANAGEMENT APPROVAL

Full approval is extended by Management to commit the necessary resources to implement the SPCC/PIPP as described herein.

Signature Charles Van DeLaare

Name Charles VanDeLaare

Title Manufacturing Engineer

Date March 15, 1986

Professional Engineer's Certification

(see Appendix B)

90
Ex ~~89~~

20471

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8 - 6,000-Gallon Waste Oil, Water, Coolant Tank
9 - 250-Gallon Waste Oil Tank
10 - Paint Storage Area
11 - Diesel Fuel Storage
12 - Loading Area at Casting Storage Building
13 - Hydreco Spill Incident Report
14 - MDNR Report of Oil, Salt, or Polluting Material Losses

B SPCC/PIPP 3-Year Reviews (Updates), Amendment Certifications, Past Spill Incidents

C Tank Truck Loading/Unloading Procedures

I. INTRODUCTION

A. FACILITY DESCRIPTION

Hydreco, a Unit of General Signal, manufactures hydraulic gear pumps. The facility is located in Comstock Township six miles east of Kalamazoo, Michigan in Kalamazoo County (see Site Location Map, Appendix A, Figure 1). The plant site totals 80 acres. Approximately 160 workers are employed at Hydreco.

Persons in charge of environmental matters at the Hydreco Plant are:

1. Charles VanDeLaare, Manufacturing/Environmental Engineer
2. ~~Roland DeVries,~~ Manager, Manufacturing Engineering

B. REGULATORY REQUIREMENTS FOR THE SPCC/PIPP

The Spill Prevention Control and Countermeasure/Pollution Incident Prevention Plan (SPCC/PIPP) has been prepared to establish planned procedures at Hydreco to help prevent the discharge of oils and hazardous materials from storage and use areas, manufacturing processes, treatment systems, and areas that receive bulk shipments. This plan has also been developed to establish procedures for the prompt, effective containment and cleanup of oils or hazardous materials in the event of a spill.

The SPCC/PIPP has been prepared in accordance with the provisions of the Federal Water Pollution Control Act as detailed in 40 CFR Part 112 and the Michigan Water Resources Commission Act (Act 245), as detailed in Part V of the General Rules. Although most of the provisions for spills of hazardous materials are addressed in the above regulations, some spills, depending on the material and quantity spilled, are regulated by 40 CFR Parts 116 and 117. These regulations discuss the Designation of Hazardous Substances (Part 116) and the Determination of Reportable Quantities (RQ) for Hazardous Substances (Part 117) (see Section III of this plan).

A copy of this SPCC/PIPP is maintained in the Manufacturing/Environmental Engineer's office.

II. REVIEW (UPDATE) AND AMENDMENT OF THE SPCC/PIPP

The SPCC/PIPP, in accordance with the requirements of 40 CFR 112.5, must be reviewed and evaluated at least once every three years from the date of initial certification of the plan (1985) for the inclusion of more effective spill prevention and control technology. (An example of the initial certification document is shown in Appendix A, Figure 2. The signed certification can be found in Appendix B.) This review must also include a thorough review of all applicable regulations (40 CFR Parts 112, 116, 117 and Michigan Act 245 Part V) for changes, additions and deletions that may have occurred since the last review and which could affect the adequacy and completeness of Hydreco's compliance with these regulations as they pertain to the SPCC/PIPP. The form shown in Appendix A, Figure 3 is used to document the 3-year review. Copies of the 3-year reviews are contained in Appendix B.

In addition to the three-year review, whenever there is a change in facility design, construction, operation or management which materially affects the facility's potential for discharge of oils or hazardous materials to public waterways, the SPCC/PIPP must be amended (see 40 CFR 112.5 and 112.7). Such amendments to the Plan must be certified by a Professional Engineer as provided in 40 CFR 112.3. Appendix A, Figure 4 is the form which is used for this amendment certification. Copies of existing amendment certifications are contained in Appendix B.

In conclusion, the SPCC/PIPP is reviewed and updated at least once every three years by Hydreco for the purposes of:

1. Updating names of personnel listed in Section IV, Notification Procedures.
2. Review of Emergency Response Contractors listed in Section V and updating their contracts.
3. Updating descriptions of manufacturing processes that result in changes regarding hazardous material use and handling procedures, oil and hazardous material storage locations, or spill prevention procedures.

III. SPILL PREVENTION

A. MATERIALS MONITORED AND LOCATIONS OF STORAGE

Existing and proposed locations of storage for oils and hazardous materials at Hydreco are listed in Table 1. The locations of storage are illustrated in Appendix A, Figure 5.

TABLE 1

STORAGE LOCATIONS FOR OILS AND HAZARDOUS* MATERIALS AT HYDRECO

Location on Figure 5	Oil/Hazardous Material	Storage Capacity
S1	Waste Oil and Water	1 3,000-gal above ground tank (proposed)
S2	Hydraulic Oil	1 2,000-gal above ground tank
S3	Waste Oil, Water, Coolants	1 6,000-gal above ground tank (proposed)
S4	Waste Oil	1 500-gal above ground tank
S5	Paint Thinner, Solvents	2 55-gal drums, VW&R Solvent 100
		10 55-gal drums, Thomas Solvent 140
S6	Diesel Fuel	1 275-gal above ground tank
~~S7~~	~~Degreaser****~~	~~1 55-gal drum, Perchloroethylene~~ GONE
S8	Cleaning Agents	2 55-gal drums, Magnafilm 1156
		2 55-gal drums, Commander
S9	PCB Transformer**	1 425-gal, 1000 KVA
S10	PCB Transformer**	1 155-gal, 1000 KVA
S11	PCB Transformer**	1 375-gal, 750 KVA
S12	PCB Transformer**	1 375-gal, 300 KVA
S13	PCB Switches**	3 switches; two 16-gal, one 10-gal
Throughout plant	PCB Capacitors***	Approximately 50
Outside of northwest corner of Main Bldg	Ammonia	1 250-gal above ground tank
Casting Storage Bldg	Coolants	6 55-gal drums, ~~Chemtool 505~~ CHEM TREND 870
		3 55-gal drums, ~~Chemtool 630N~~
		3 55-gal drums, Chemtool 250
Assembly Area	Rust Inhibitor	2 55-gal drums, Magnafilm 31
Engineering Bldg	Solvents, Detergents	4 5-gal cans, Thomas Acetone
~~Near Vapor Degreaser~~	~~Impregnator~~	~~2 55-gal drums, RCI Resin~~ — GONE
Storage Area		
Shed just north of Boiler Room	Landscaping/Lawn Care Supplies	1 55-gal drum, Vegetation Control
		1 55-gal drum, Heavy-Duty Weed Control
Systems Dept. Storage Area	Automatic Transmission Fluid	4 55-gal drums Mobil ATF220

---

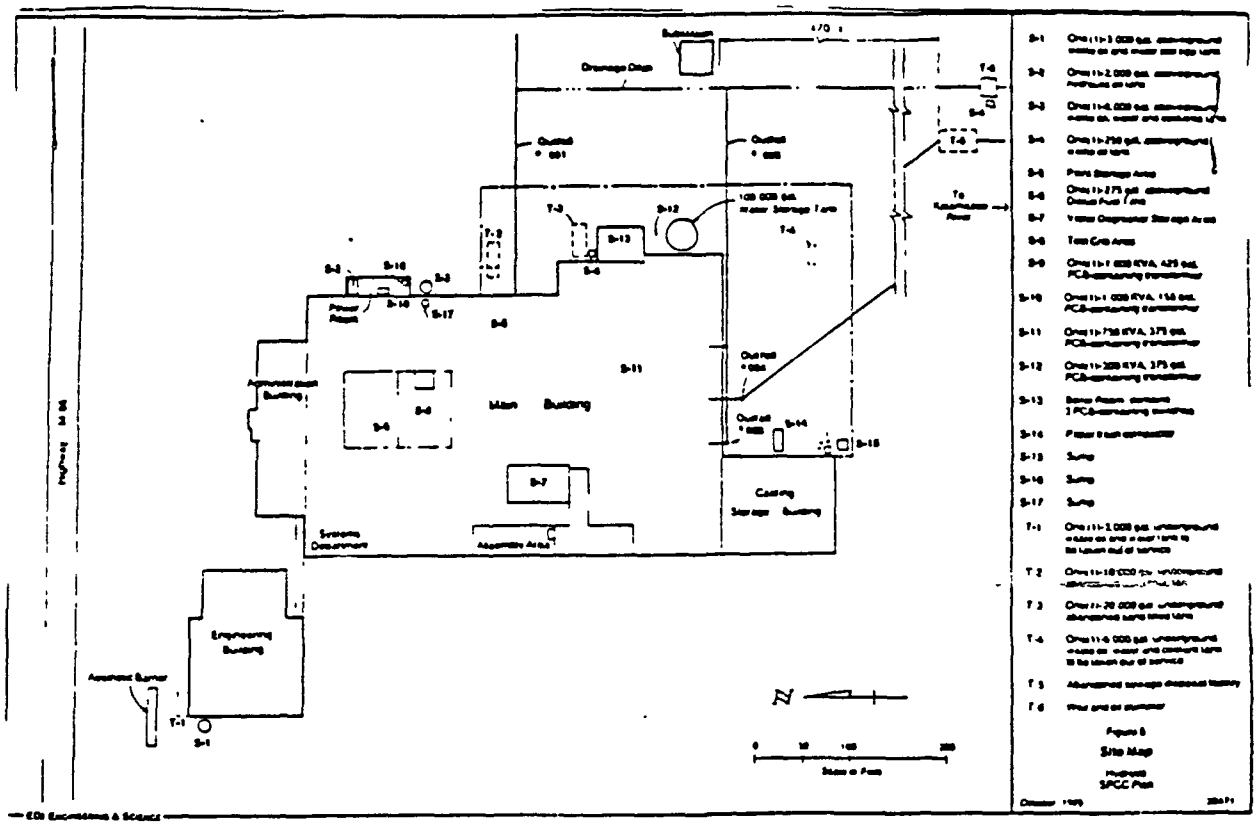
* These non-oil materials contain hazardous substances as defined by 40 CFR 302.

** PCB concentrations are assumed to be greater than 500 ppm since the dielectric fluid has not been tested.

*** PCB Capacitors with the Wemcol, Westinghouse label may be assumed to contain PCB Contaminated dielectric fluid (50-500 ppm PCB's). It has not been determined what number, if any, capacitors at Hydreco have this label.

**** As of July 1, 1986, these materials will no longer be stored (or used) at Hydreco because of the removal of the vapor degreaser/impregnator unit.

Visual inspection Report of P.C.B Type transformers. Location of Transformers are Per Hydreco SPCC Plan Fig. 5 Site map.



Transformer	Loc		Date insp	INSpector
S-9	1000 KVA	425 gal		
S-10	1000 KVA	155 gal		
S-11	750 KVA	375 gal		
S-12	300 KVA	375 gal		

Comments:

B. CONTAINMENT

The following discussion summarizes the areas of concern for containment, existing containment structures, and proposed modifications (concepts). These modifications should be implemented in order to upgrade secondary containment to comply with federal and state regulations. All figures referenced below can be found in Appendix A.

1. 3000-Gallon Hydraulic Oil and Water Collection Tank

Completed 1977

Hydraulic gear pumps are tested in small partitioned rooms or test cells located in the Engineering Building at Hydreco. Water or oil from leaks which may occur during testing activities are collected in the floor drain system which discharges to an underground 3,000-gallon steel storage tank. Because this tank has no secondary containment, a tank leak would allow the tank contents to seep through the soil to the groundwater below. It is recommended that the existing tank be excavated and disposed of. A new 4-foot diameter precast concrete manhole should be installed at this location to act as a transfer point. The existing underground drainage pipe would be connected to this new manhole or sump. A new 3,000-gallon above ground tank should be constructed nearby (see Figure 6) on a 6-inch thick reinforced concrete slab (12' x 16') surrounded by a 3-foot high containment wall. This concrete slab and the containment wall interior should be sealed with a protective coating. The proposed sump will provide a low spot to facilitate collection of any spilled materials or rain water. The regulations regarding the required amount of containment volume state that 100% of the volume of the storage tank (assuming a diked area encompassing only one tank) be provided along with sufficient additional capacity to contain rainfall. Based on this rationale, the amount of required containment capacity is the 3,000 gallons plus rainfall volume. A one-year frequency 24-hour rainfall (2.25 inches) over the proposed containment area would create approximately 270 gallons of water. Consequently, the necessary volume of containment must be greater than 3,270 gallons. The volume of secondary containment present after placement of the concrete slab and wall would be approximately 4,310 gallons.

The 4-foot diameter manhole will be equipped with a submersible pump to transfer oil/water drainage to the new above ground tank. A high level float

switch will be provided in the tank to automatically shut down the transfer pump in the event that the above ground tank becomes full. The proposed transfer manhole will be sealed water tight and the top of the manhole will be set at an elevation abov the test cell room floor. Thus, if the above ground tank is full and the submersible pump in the transfer manhole is shut down, any continuous spillage will back up onto the floor of the test cells.

2. 2,000-Gallon Hydraulic Oil Storage Tank

Hydraulic oil is stored in an above ground horizontal tank located in the north end of the Power Room (see Figure 7). This room has four doors, two along the east wall and two along the west wall. The room is equipped with a floor trench which drains to a 3' x 3' sump in the southeast corner. A pump draws from this sump and pumps to a larger oily waste sump located inside the plant, southwest of the power room. The northern door in the outer wall is used for access to fill the 2,000-gallon oil storage tank. This is accomplished by driving a truck across the lawn to this door. The two doors on the west wall of the power room provide access between the main plant building and the power room. There is a trench just outside of the power room which drains to the main oily waste sump. It is recommended that 6-inch curbs be constructed at each of the outer doors. If there is a spill in this room, hydraulic oil will then flow into the existing drainage system and will eventually be pumped into the new 6,000-gallon storage tank described below. It is also recommended that a small concrete apron with curbing be constructed at the truck unloading area to contain any minor leakage at the transfer location.

3. 6,000-Gallon Waste Oil, Water, Coolant Tank

Presently, portions of the in-plant trench system drains to an oily waste sump located near the power room. Waste is pumped from this sump to a 6,000-gallon underground storage tank located approximately 100 feet outside the southeast corner of the plant building. It is recommended that the existing tank be excavated and disposed of. A new 6,000-gallon above ground tank should be constructed directly south of the power room (see Figure 8) on a 6-inch thick reinforced concrete slab (16' x 21') surrounded by a 3-foot high containment wall. This concrete slab and the containment wall interior should be sealed with a protective coating. The proposed sump will provide a low spot to help collect any spilled materials or rainwater. The regulations regarding the

required amount of containment volume state that 100% of the volume of the storage tank (assuming a diked area encompassing only one tank) be provided along with sufficient additional capacity to contain rainfall. Based on this rationale, the amount of required containment capacity is the 6,000-gallons plus rainfall volume. A one-year frequency 24-hour rainfall (2.25 inches) over the proposed containment area would create approximately 470 gallons of water. Consequently, the necessary volume of containment must be greater than 6,470 gallons. The volume of secondary containment present after placement of the concrete wall is approximately 7,540 gallons and therefore of sufficient capacity.

4. 500-Gallon Waste Oil Tank

The plant storm drainage system discharges to an open drainage ditch emptying into the Kalamazoo River. An overflow weir is set across this ditch and is equipped with a belt type oil skimmer. The belt skimmer adsorbs the floating oils from the water surface and the recovered oil is pumped to an underground 500-gallon capacity tank. This existing tank is checked periodically to determine the need for emptying. It is recommended that this tank be excavated and disposed of. A new 250-gallon above ground tank would be placed nearby inside of an 7' x 9' reinforced concrete containment area (see Figure 9). The slab would be 6 inches thick with a 1.0-foot high perimeter wall, 6 inches thick. The concrete slab and the interior of the containment wall should be sealed with a protective coating. The amount of required containment capacity is the 250 gallons plus rainfall volume. A one-year frequency 24-hour rainfall (2.25 inches) over the proposed containment area would create approximately 90 gallons water; consequently, the necessary volume of containment must be greater than 340 gallons. The volume of secondary containment present after placement of the concrete wall is approximately 470 gallons and therefore of sufficient capacity. The tank would require a heater, as the skimmed material may contain up to 50% water and, therefore, has the potential for freezing.

5. Paint Storage Area REMOVED 1983

~~Paints, thinners and solvents are stored in a 10' x 14' fenced storage area within the plant building. A spill occurring in this area would flow to the~~

nearest trench drains, then to the main oily waste sump, and from there it would be pumped to the new 6,000-gallon waste oils tank discussed previously. It is recommended that this fenced area be expanded from 10' x 14' to 16' x 14' to accommodate 11 additional barrels of solvents from the drum storage area. It is recommended that a small 3-inch concrete curb be constructed around the fenced area with a ramp at the entrance to provide access for wheeled vehicles (see Figure 10).

6. Drum Storage Area

Removed 1986

Hydreco has four existing barrel racks for storing oil, coolants, and solvents. These racks may hold twenty 55-gallon drums and are set on a concrete pad located south of the plant building. Hydreco personnel have indicated that this uncontained area will be abandoned.

7. Diesel Fuel Storage Area

Hydreco presently stores diesel fuel in a 275-gallon above ground storage tank located on the east side of the plant. The required amount of containment volume is 100% of the volume of the storage tank (assuming a diked area encompassing only one tank) be provided along with sufficient additional capacity to contain rainfall. Based on this rationale, the amount of required containment capacity is the 275 gallons plus rainfall volume. It is recommended that the existing storage tank be placed inside of a 7' x 9' reinforced concrete containment area (see Figure 11). The slab would be 6 inches thick with a 1.0-foot high perimeter wall 6 inches thick. The concrete slab and the interior of the containment wall should be sealed with a protective coating. The amount of required containment capacity is the 275 gallons plus rainfall volume. A one-year frequency, 24-hour rainfall (2.25 inches) over the proposed containment area would create approximately 90 gallons of water; consequently, the necessary volume of containment must be greater than 365 gallons. The volume of secondary containment present after placement of the concrete wall is approximately 470 gallons and therefore of sufficient capacity.

8. Vapor Degreaser Storage Area

REMOVED 1986

~~Perchloroethylene is stored in a single drum near the vapor degreser/impregnator area within the plant as listed in Table 1. It is recommended that this drum be stored in a 6' x 6' metal pan with a 3-inch lip around the perimeter. If this drum were to leak or rupture, the available containment volume would be approximately 66 gallons and therefore of sufficient capacity. As of July 1, 1986, this material will no longer be stored or used at Hydreco.~~

9. 10,000-Gallon Hydraulic Oil Tank

In the past, hydraulic oil used at Hydreco was stored in an underground 10,000-gallon tank located just east of the plant building. This tank is not used anymore. Because of a nearby high voltage power line (5,000V), abandoning this tank by excavation was ruled out. Hydreco has abandoned this tank in place by filling it with fresh sand.

10. 20,000-Gallon Fuel Oil Tank

Fuel oil is no longer used at Hydreco. Therefore, this 20,000-gallon underground tank was filled with sand. It was abandoned in place because of its close proximity to the building and to the high voltage underground power line mentioned previously.

11. Loading Area at Casting Storage Building

This low area (40' x 56') sometimes collects oils, resulting from parking lot runoff and from oil leaks in a nearby trash compactor. A sump located at the southwest corner of this area collects the oils/water mixture and at present the collected material is pumped to an adjacent field. It is proposed to install a small coalescing type oil/water separator (see Figure 12) for collecting these oils and pumping the effluent to the main storm drainage ditch, discharging upstream of the belt oil skimmer mentioned previously.

In addition, the trash/paper compactor should be inspected immediately and repaired if necessary to minimize oil leakage.

12. Systems Department Storage Area

Hydreco intends to store four (4) barrels of ATF 220 (automatic transmission fluid) near the Systems Department storage area. It is recommended that the barrels be stored in a 6' x 8' metal pan with a 3-inch lip around the perimeter. If one of these drains were to leak or rupture, the available containment volume would be approximately 70 gallons and therefore of sufficient capacity. As an alternative, Hydreco may wish to store the barrels near an existing trench with curbing to direct a potential spill into the plant's waste oil drainage system.

C. STORM SEWER LOCATIONS AND MONITORING

Various storm sewer inlets and outfalls are located around the perimeter of the facility. Appendix A, Figure 5 shows the locations of the four facility outfalls (001, 002, 003 and 004) and their relation to the bulk material storage areas.

Outfalls 001, 002 and 003 comprise the storm sewer system which leads to the drainage ditch that [illegible] from north to south along the east side of the facility.

Outfall 004 is a part of the sanitary sewer system and leads eventually to the municipal sanitary sewer.

Monitoring of the storm sewer system is achieved through the use of a weir and oil-skimmer located along the drainage ditch southeast of the plant. Presently, oil removed from the drainage ditch is collected in a 500-gallon underground tank. It is proposed that oil removed from the drainage ditch be collected in a 250-gallon above ground tank located in the same area. Weekly samples of the drainage ditch are collected just downstream of the weir and oil skimmer and tested for oil, grease and freon concentration. The maximum allowable concentration of oil, grease and freon in the effluent to the Kalamazoo River is 10 parts per million. Records of this monitoring, Hydreco's Monthly Operating Report for Outfall are maintained in the Manufacturing/ Environmental Engineer's office.

D. INSPECTIONS (Material Storage Locations)

Recommended Procedures:

Visual inspections of all above ground storage tanks and associated lines are conducted on a daily basis by Maintenance Specialists.

The Tool Crib Area which stores cleaning agents, the Paint Storage Area which stores paint and thinners and other solvents, and the Systems Department Storage Area which houses drummed, oil-based substances are inspected daily by the Safety Director.

Immediate records of these inspections may be found on clipboards located within close proximity to each of these storage areas. Permanent records of these inspections are maintained in the Manufacturing/Environmental Engineer's Office.

E. OTHER MONITORING SYSTEMS

Recommended Procedures:

All tanks are tested either by use of a dipstick or by use of a site gauge to record the level of product. These readings are done once a week and are conducted by Maintenance Specialists. Permanent records of dipstick readings are maintained in the Manufacturing/Environmental Engineer's office.

BACK YARD WASTE TANK – TOOL CRIB ATTENDENT.
EXPERMENTAL LAB – ROB TORRES.

F. LABELING

Recommended Procedures:

All bulk storage containers are clearly labeled as to their contents. Bulk storage tanks and basins which are either above ground or under floor, are labeled with a placard that indicates the identity of the material. Hazardous materials stored in 55-gallon drums are labeled or placarded to clearly denote the contents of the drum.

G. MATERIAL PROTECTIVE COVERING

Recommended Procedures:

Oils and hazardous materials used in bulk will be stored in above ground steel storage tanks or drums (see Appendix A, Figure 5). All oil storage tanks will be secondarily contained with diking or curbing and usage of in-plant waste oil drainage system. The diking material is concrete.

The solvents are stored in 55-gallon drums in the Paint Storage Area located inside the plant. Drummed oil-based materials are located in the Systems Department Storage Area within the plant. Floor drains in these storage areas will be sealed and concrete curbing or diking will be installed. Comp. 1986

The secon~~dary containment for Vapor Degreaser Storage Area will consi~~st of a metal pa~~n with appropriate lip height and containment volume.~~ REMOVED 1986 CV.

H. TANK TRUCK UNLOADING PROCEDURE

Detailed tank truck unloading procedures are contained in Appendix C.

MATERIAL INVENTORY SYSTEM

Recommended Procedures:

A complete inventory of oils and hazardous materials purchased, used, stored and produced at Hydreco is kept on file in the Manufacturing/Environmental Engineer's office.

J. EMPLOYEE TRAINING

As of May 1986, a comprehensive employee "right to know" training program will be in effect at Hydreco. Incorporated with this training program will be training for the proper handling of oils so that the potential for spills is minimized. The Personnel Department with the supervision of Personnel Manager Robert Boulis will be responsible for educating employees about potential hazards involving oils and hazardous materials. Presently, records of personnel training are kept in the Personnel Department.

K. HOUSEKEEPING

General facility housekeeping is performed in-house by the Maintenance Department. The cleaning materials used by housekeeping are stored in the Tool Crib Area located west of the Paint Booth (see Appendix A, Figure 5).

L. SECURITY

The plant handling, processing and storage areas are secured with fencing and locked gates, with the exception of the 3,000-gallon waste oil and water tank located on the northwest side of the Engineering Building and the proposed 6,000-gallon storage tank south of the power room.

The entrance gates are locked when the plant is closed or not in production. Retailers Security Service is responsible for twice per night surveillance of the plant from Monday through Saturday and four times on Sundays and holidays, including visual inspection of all storage areas.

It is recommended that the new above ground 3,000-gallon waste oil and water tank located on the west side of the Engineering Building and the new 6,000-gallon above ground waste oil, water and coolant tank located south of the Power Room be contained within a fenced, locked area.

Visitors, contractors and vendors are permitted access to the plant when accompanied by authorized Hydreco personnel and must register at the administration building before entering the facility and sign out there prior to leaving the plant.

Lighting inside the plant building is adequate to illuminate areas of potential spills. Lighting of exterior areas is maintained during production and nonproduction periods.

IV. NOTIFICATION PROCEDURES

A. EMERGENCY COORDINATOR

If an emergency situation develops at the facility, the person coordinating all emergency response efforts is the Emergency Coordinator. The Primary Emergency Coordinator and Alternate Emergency Coordinator are listed in Table 2 with additional persons of authority.

At all times, at least one Emergency Coordinator or person of authority will be at the facility or on-call within reasonable travel time. The Emergency Coordinator and persons of authority are thoroughly familiar with all aspects of:

1. This SPCC/PIPP;
2. All operations and activities at the plant;
3. Location and characteristics of hazardous materials and wastes;
4. Location of records within the plant; and
5. Facility layout.

The Emergency Coordinator is responsible for coordinating all emergency response procedures and has complete authority to commit all resources of the company in the event of an emergency. In addition, he has the authority to commit the resources needed to carry out the SPCC/PIPP and to notify the appropriate local, state and federal agencies.

B. INTERNAL AND EXTERNAL NOTIFICATION PROCEDURES

In the event of a spill or leak, the discoverer will contact his area supervisor who will notify the Emergency Coordinator either at his office or at his home and, in the absence of the primary coordinator, notify an alternate as listed in Table 2.

Once notified, the Emergency Coordinator will:

1. Activate internal facility alarms or communication systems, where applicable, to notify all facility personnel.
2. Notify appropriate Hydreco management and General Signal Corporation management, if applicable.
3. Notify appropriate federal, state and local agencies if their help is needed (see Tables 3 and 4).

C. IDENTIFICATION AND ASSESSMENT OF OILS AND HAZARDOUS MATERIALS

The Emergency Coordinator will identify the character, exact source, amount and extent of the released materials. An initial identification method will be to utilize visual analysis of the material and location of release. The containers are clearly labeled as to their contents and are in distinct, separate locations. All tanks and piping are labeled to identify their contents. If, for some reason, the released material cannot be identified by sight, a review of facility records will be made. If necessary, samples will be identified by chemical analysis.

After evaluating the identity, source, amount, extent and direction of flow or movement of released materials, the Emergency Coordinator will assess possible hazards, both direct and indirect, to human health or the environment from the release of the oils and/or hazardous materials.

If the Emergency Coordinator's assessment indicates that evacuation of local areas is advisable, he will immediately notify appropriate local authorities. He will be available to help these officials decide whether local areas should be evacuated.

TABLE 2

DESIGNATED EMERGENCY COORDINATORS AND PERSONS OF AUTHORITY

INTERNAL NOTIFICATION LIST

Position	Name and Title	Phone Number (Area Code 616)	Address
Primary Emergency Coordinator	NORM BRIGANGE ~~Doug Gasterline~~ Maintenance Foreman	Home: 382-4097 ~~965-6688~~ Work: 349-1511, Ext. 300	KALAMAZOO ~~Battle Creek~~
~~Alternate Coordinator~~	~~Roland DeVries Manager, Manufacturing Engineering~~	Home: ~~342-5904~~ ~~Work: 349-1511 Ext. 309~~	Kalamazoo
Manufacturing/Environmental Engineer	Charles VanDeLaare	Home: 665-9809 Work: 349-1511, Ext. 316	Galesburg
Production Superintendent	Conrad Burket NO	Home: 375-2802 Work: 349-1511, Ext. 302	Kalamazoo
Vice President of Manufacturing	Jerry Cuyler NO	Home: 746-4649 Work: 349-1511, Ext. 312	Climax
Personnel Manager	Robert Boulis	Home: 327-8538 Work: 349-1511, Ext. 323	Portage

TABLE 3

FEDERAL AND STATE NOTIFICATION LIST

	Location	Regular Office Hour Number	Night/Weekend Number
Federal Agencies			
* U.S. Coast Guard/EPA National Response Center	400 Seventh Street, SW Washington, D.C. 20590	24-hour Emergency Response:	800-424-8802
U.S. EPA Region V Office Field Office	9311 Groh Road Grosse Ile, Michigan	24-hour Emergency Response:	(313) 676-6500
U.S. EPA Region V Office	230 S. Dearborn Street Chicago, Illinois 60604	General Office Hours: 24-hour Emergency Response:	(312) 353-2000 (312) 353-2318
State Agencies			
*Michigan DNR - Pollution Emergency Alert System	Lansing, Michigan	24-hour Emergency Response:	800-292-4706
*Michigan DNR District Office Groundwater Quality	Plainwell, Michigan 621 10TH ST. PO BOX #355 PLAINWELL MI. 49080	General Office Hours:	(616) 685-6706 (616) 685-9886

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* Emergency Coordinator must notify this agency if the spill is a designated Reportable Quantity (RQ).

TABLE 4

LOCAL NOTIFICATION LIST

Agency	Location	Phone Number
Fire Department	Comstock	911 or (616) 345-2113
Fire Department	Galesburg	(616) 665-9489
Sheriff Department	Kalamazoo	(616) 383-8821
Michigan State Police	Battle Creek	(616) 968-6115
Health Department	Kalamazoo County	(616) 383-8888
Civil Defense	Kalamazoo County	(616) 383-8743
City of Kalamazoo Sewage Treatment Works Attn: Richard G. Simms Supt of Public Utilities	1415 N. Harrison	(616) 345-6628

Local Hospitals - General Information Telephone

Borgess	Kalamazoo	(616) 373-6999
Bronson	Kalamazoo	(616) 383-7654

D. REQUIREMENTS FOR NOTIFICATIONS OF THE NATIONAL RESPONSE CENTER (Reportable Quantities)

As required by 40 CFR 117, whenever there is a spill or release of a designated hazardous substance in a quantity equal to or exceeding the reportable quantity (RQ) for that substance within a 24-hour period, the facility must notify the U.S. EPA National Response Center of such an incident immediately (1-800/422-8802).

Table 5 lists the name of the hazardous materials stored at Hydreco, the major constituents of each material, where the material is used, and the RQ for the materials. For materials that are mixtures of two or more hazardous substances, the RQ has been calculated. The calculated RQ is obtained by dividing the RQ of the hazardous substance (from 40 CFR 117) by the percentage of that substance in the hazardous material.

The reportable quantity for an oil spillage is any quantity which may affect "navigable waters". As defined by 40 CFR 110.3, harmful discharges of oil include those which violate applicable water quality standards or cause a sheen on the water or shorelines or a sludge beneath the surface of the water or upon the shorelines.

The following items must be included in the telephone report:

- Name and telephone number of reporter.
- Name and address of facility.
- Time and type of incident (e.g., release, fire).
- Name and quantity of materials involved, to the extent known.
- The extent of injuries, if any.
- Possible hazards to human health, or the environment, outside of the facility.

TABLE 5

REPORTABLE QUANTITIES OF OILS AND HAZARDOUS* MATERIALS

STORED AT HYDRECO

Oil/Hazardous Material	Major Constituents	Area of Use	Usage of Material	Reportable Quantity (RQ) in pounds
Hydraulic Oil	Aliphatic and aromatic hydrocarbons	Mfg	Producing and testing hydraulic gear pumps	Any quantity which may affect "navigable waters"
Waste Oil****	Aliphatic and aromatic hydrocarbons, water, cleaners and/or coolants	--	Results from manufacturing processes	Any quantity which may affect "navigable waters"
Diesel Fuel	Aliphatic and aromatic hydrocarbons		Equipment fuel	Any quantity which may affect "navigable waters"
Mobile ATF 220, automatic transmission fluid	90% mineral oil, additives are all non-hazardous	Mfg	Used for assembly in self-contained hydraulic system	Any quantity which may affect "navigable waters"
Magnafilm 31	80% aliphatic hydrocarbons, some coupling hydrocarbons and rust preventatives	Mfg	Rust Inhibitor	Any quantity which may affect "navigable waters"
Thomas Solvent 140	>60% aliphatic hydrocarbons 1 to 10% aromatic hydrocarbons	Mfg	Washing Solvent	>5000
Chemtool 505	Proprietary formula; some phenolic biocides and nitrites	Mfg	Metalworking fluid	>>100
Chemtool 650-N	Proprietary formula; some sodium nitrite content	Mfg	Metalworking fluid	>>100
Chemtool 250	Proprietary formula; 4-6% chlorine; some hydrocarbon content; some p-chloro-cresol content	Mfg	Metalworking fluid	Approx. 40
~~Perchloroethylene**~~	~~100% perchloroethylene~~	~~Mfg~~	~~Degreaser~~ NO LONGER USED	~~1~~

TABLE 5 (Continued)

Oil/Hazardous Material	Major Constituents	Area of Use	Usage of Material	Reportable Quantity (RQ) in pounds
~~RC2 Resin (IMPGO)**~~	~~65% polyester~~ 35% styrene	~~Mfg~~	~~Impregnator~~ No longer used	~~3500~~
VW&R Solvent 100	Mostly aliphatic hydrocarbons	Mfg	Washing solvent	>5000
PCB Dielectric Fluid	Assume >500 ppm PCB's	Mfg	Dielectric fluid in transformers, capacitors*** & switches	1
Ammonia	Primary Ammonia	Tech Drawing	Blueprint production	100 (if undiluted ammonia)
Thomas Acetone	Primarily Acetone	Eng. Lab	Washing solvent	5,000
Vegetation Control 2,4-D (Bidall)	Hazardous constituents 1.09% isooctyl ester of 2,4-D 0.98% bromocil 0.8% pentachlorophenol	Maint.	Landscaping/Lawn care	125
Heavy-Duty Weed Control (Bidall)	Hazardous constituent: 1.85% diquatdibromide (Dupont)	Maint.	Landscaping/Lawn care	54,054
Commander (Bidall)	13.3% potassium hydroxide	Maint.	Floor cleaner	7,518

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* These non-oil materials contain hazardous substances as defined by 40 CFR 302.

** As of July 1, 1986, this material will no longer be stored (or used) at Hydreco because of the removal of the vapor degreaser/impregnation unit.

*** PCB Capacitors with the Wemcol, Westinghouse label may be assumed to contain PCB Contaminated dielectric fluid (50-500 ppm PCB's). It has not been determined what number, if any, capacitors at Hydreco have this label.

**** Waste oil is treated in the same manner as new oil for the purpose of determining reportable quantities provided that it is not characterized as hazardous waste due to contamination.

E. REQUIREMENTS FOR NOTIFICATION OF THE EPA REGIONAL ADMINISTRATOR

Facilities that are required to have a SPCC Plan that have an oil spill in excess of "1,000 U.S. Gallons" in a single event or have two spill events within any 12-month period into or upon "navigable water of the United States" or adjoining shorelines shall submit to the EPA Regional Administrator within 60 days from the time the facility becomes aware of the spill the following information:

- Name of the facility
- Name(s) of the owner or operator of the facility
- Location of the facility
- Date and year of initial facility operation
- Maximum storage or handling capacity of the facility and normal daily throughput.
- Description of the facility, including maps, flow diagrams, and topographical maps
- A complete copy of the SPCC Plan with any amendments
- The cause(s) of such spill, including a failure analysis of system or subsystem in which the failure occurred
- The c[illegible]tive actions and/or countermeasures taken, including an adequate description of equipment repairs and/or replacements
- Additional preventive measures taken or contemplated to minimize the possibility of recurrence
- Such other information as the Regional Administrator may reasonably require pertinent to the Plan or spill event

EPA Region V Regional Administrator:

Valdas V. Adamkus
Regional Administrator (EPA)
230 S. Dearborn Street
Chicago, Illinois 60604
(312) 353-2000

F. REQUIREMENTS FOR NOTIFICATION OF THE MICHIGAN DEPARTMENT OF NATURAL RESOURCES

As required by Act 245 of the Public Acts of Michigan 1929, as amended, any discharge of oil or polluting material into "waters of the state" must be reported. The 24-hour emergency notification number is (800) 292-4706 (in state) and (517) 373-7660. Figure 14 is the form which must be completed and submitted within 10 days to the MDNR in the event of such a spill.

"Polluting materials" are those materials listed on the Michigan Critical Materials Register of the Michigan Water Resources Commission.

G. SPILL INCIDENT REPORT

Whenever there is spill or release of oils or hazardous materials at Hydreco, a report of the event must be made. The report must describe the incident, including the date and time of the incident, the known or suspected cause, the amount of the discharge, the remedial action taken to prevent further incidences of the discharge, and whether the discharge is a listed reportable quantity (RQ). Figure 13 is a form for documenting such spill incidents. Copies of past spill incidents are included in Appendix B.

V. SPILL CONTROL, COUNTERMEASURES, AND CLEAN UP

A. GENERAL SPILL RESPONSE

The first action to be taken in the event of a spill is to prevent the pollutant from entering a public sewer or waterway. Immediate action will be taken to prevent further spillage and to confine the spilled materials. Following are general instructions to confine spills.

1. Spills on land: Dirt, sand, or other relatively impervious materials will be used to dam the spill to prevent the flow of the material.
2. Should spillage occur which may result in contamination of the drainage ditch, floating oil absorbent barriers will be used to prevent contamination of public waterways in the event of a ditch overflow if the weir and oil skimmer are unable to handle it.
3. Spills on the plant floor will, if needed, be contained by the use of a tank, absorption material, and a heavy-duty vacuum and scrubber with a 500-gallon capacity.

After containment of the oil or hazardous material, it will be removed and placed in specific containers for proper disposal in accordance with sound environmental practices. The material will be transported by a licensed waste hauler to a licensed treatment or disposal facility. In no event shall the spilled materials be used as new material.

B. SPECIFIC SPILL RESPONSE PROCEDURES FOR FOUR TYPES OF OILS AND HAZARDOUS MATERIALS

The following procedures will be used for spill response:

1. Flammable, Combustible and Explosive Liquid, page 20.
2. Hydraulic Oil, page 22.
3. PCB's, page 24.
4. Degreasers, Cleaners and Coolants, page 26.

1. FLAMMABLE, COMBUSTIBLE AND EXPLOSIVE LIQUID SPILL RESPONSE PROCEDURES

(includes paints, thinners and solvents)

First Response:

Upon discovery of a spill, the notification procedures of Section IV must be implemented. Upon arrival at the site, the Emergency Coordinator will:

1. Identify the character, exact source, amount and extent of the released materials;
2. Determine if evacuation of the area is necessary; for small spills or leaks, isolate at least 50 feet in all directions. For large spills, initially isolate at least 100 feet in all directions and keep all persons upwind of the spill. Ventilate area;
3. Prevent people from smoking or operating electrical and spark emitting equipment in the area;
4. Dispatch emergency personnel to the site;
5. Take steps as necessary to stop the spill of material. Use soda ash or Hi-Ex Foam to secure flammable liquid vapors;
6. Prevent flammable liquids and solids from entering sewers or floor drains;
7. Have the area roped off if necessary. Maintain limited access until the entire spill has been cleaned up.

Recommended Personal Protective Equipment:

All personnel involved in spill cleanup must adequately protect themselves from direct contact with flammable liquids. The following equipment will be available for use as needed:

1. Nitrile gloves
2. Nitrile boots
3. Fire resistant tough vinyl splash suits
4. Respirators and organic vapor cartridges
5. Chemical splash goggles

Gloves, boots, splash suits, goggles and respirators with cartridges will be available at the south end of the Maintenance Department and the First Aid Room located near the Main Offices.

Spill Cleanup:

The following procedures will be used:

1. Absorbent materials shall be spread over the spillage.
2. Flammable liquids and cleanup materials shall be placed directly into open top drums using non-sparking shovels, if needed.
3. For larger spills, a non-sparking vacuum or pump will be used to pump the spilled material into drums or a tank truck.
4. Containers shall be sealed tightly.

Waste Handling:

All contaminated gloves, boots, and tools will be thoroughly cleaned and placed in storage for future use. Splash suits and respirator cartridges will be discarded in plant rubbish. This equipment shall be replaced immediately.

All drums containing flammable liquids and cleanup materials shall be labeled with an appropriate label. The drum shall state materials in the drum (e.g. naptha and soda ash). The label shall be signed and dated.

All spill cleanup material drums shall be disposed of in an appropriate manner, perhaps as hazardous waste.

2. SPILL RESPONSE PROCEDURES FOR HYDRAULIC OIL (includes new and waste oil)

First Response:

Upon discovery of a spill, the notification procedures of Section IV must be implemented. Upon arrival at the site, the Emergency Coordinator will:

1. Take steps as necessary to stop the spill of material;
2. Have the area roped off if necessary;
3. Prevent oil from entering catch basins, floor drains, or manholes unless drains lead to waste oil tank. This will be done by use of dirt, sand, or absorbent sheeting to dam or absorb the spill. A trench may also be dug to contain the spill.

Recommended Personal Protective Equipment:

All personnel involved in spill cleanup must adequately protect themselves from direct contact with oil. The following equipment will be available for use as needed:

1. Nitrile gloves
2. Nitrile boots
3. Nitrile splash suits
4. Respirators with organic vapor cartridges
5. Chemical splash goggles

Gloves, boots, splash suits, goggles and respirators with cartridges will be available at the south end of the Maintenance Department and the First Aid Room located near the Main Offices.

Spill Cleanup:

The following procedures will be used:

1. Inert absorbent materials shall be placed on the spill to fully absorb all liquids.
2. Oil and cleanup materials shall be transferred directly into the plant waste oil drainage system for containment in the waste oil tank.

3. For large spills, a vacuum or pump will be used to pump the oils into the waste oil tank by route of the waste oil sump.
4. The spill area shall be washed down with water and surfactants.

Waste Handling:

All contaminated gloves, boots, suits, and tools must either be thoroughly cleaned and placed in storage for future use or disposed of in an appropriate manner. Respirator cartridges will be discarded in plant rubbish. This equipment shall be replaced immediately.

3. POLYCHLORINATED BIPHENYL (PCB) SPILL RESPONSE PROCEDURES

First Response:

Upon discovery of a spill, the notification procedures of Section IV must be implemented. Upon arrival at the site, the Emergency Coordinator will:

1. Take steps as necessary to stop the spill of material;
2. Have the area roped off if necessary;
3. Prevent PCB containing oil from entering catch basins, floor drains, or manholes. This will be done by use of dirt, sand, or absorbent sheeting to dam or absorb the spill. A trench may also be dug to contain the spill;
4. Contact the Emergency Coordinator to immediately come to the spill site and to dispatch the cleanup crew to the site, if required;
5. The Emergency Coordinator shall contact the plant electric shop to dispatch an electrician to de-energize equipment, if required.

Recommended Personal Protective Equipment:

All personnel involved in spill cleanup must adequately protect themselves from direct contact with PCB's. The following equipment will be available for use as needed:

1. Neoprene, nitrile or polyethylene gloves
2. Neoprene, nitrile or polyethylene boots
3. Neoprene, nitrile or polyethylene suits
4. Respirators and organic vapor cartridges with additional protection against chlorinated organics
5. Chemical splash goggles

Gloves, boots, suits, goggles and respirators with cartridges will be available at the south end of the Maintenance Department and in the First Aid Room located near the Main Offices.

Spill Cleanup:

All PCB spill cleanup will be done by Plant Engineering. During non-production times, designated personnel will be on call. Spill cleanup procedures are as follows:

1. All PCB must be prevented from entering any sewer or floor drain.
2. Absorbent pads shall be used to clean up the spill. Absorbent pads are available from the Safety Department.
3. All spill cleanup materials shall be placed in open-top drums (DOT style 17H). PCB drums have special exterior paint colors. (Note: Liquid PCB must be placed in open-bung drums only (DOT style 17E).
4. After cleanup of the spilled material is complete, painting may be required over all structural steel or concrete surfaces that have come into contact with PCB material.

Waste Handling:

All contaminated gloves, boots, suits, and respirators with cartridges must be disposed of with all PCB materials. All miscellaneous materials (ladders, buckets, production materials) must also be disposed of in this manner.

All drums and individual PCB contaminated items shall be labeled with a PCB identification sticker.

Drums shall be placed within a sufficiently diked storage area until proper disposal is arranged. (PCB waste must be incinerated and/or sent to a proper chemical landfill.)

4. SPILL RESPONSE PROCEDURES FOR DEGREASERS, CLEANERS AND COOLANTS

First Response:

Upon discovery of a spill, the notification procedures of Section IV must be implemented. Upon arrival at the site, the Emergency Coordinator will:

1. Take steps as necessary to stop the spill of material;
2. Ventilate the area;
3. Have the area roped off if necessary;
4. Prevent materials from entering catch basins, floor drains, or manholes. This will be done by use of dirt, sand, or absorbent sheeting to dam or absorb the spill. A trench may also be dug to contain the spill.

Recommended Personal Protective Equipment:

All personnel involved in spill cleanup must adequately protect themselves from direct contact with degreasers, cleaners and coolants. The following equipment will be available for use as needed:

1. Viton or polyvinyl alcohol coated gloves
2. Viton or polyvinyl alcohol coated boots
3. Heavy duty vinyl splash suit
4. Respirators and acid gas organic vapor cartridges
5. Chemical splash goggles

Gloves, boots, splash suits, goggles and respirators with cartridges will be available at the south end of the Maintenance Department and in the First Aid Room. (Common vinyl and rubber materials may deteriorate when exposed to these chlorinated compounds.)

Spill Cleanup:

The following procedures will be used:

1. Inert absorbent materials shall be placed on the spill to fully absorb all liquids.

2. Spillage and cleanup materials shall be placed directly into open top drums for disposal.
3. For large spills, a vacuum or pump will be used to pump the spilled materials into drums or a tank truck.
4. The spill area shall be washed down with water and dried thoroughly. Care will be taken to remove any slippery residue. (Note: Washwater contaminated with spilled perchloroethylene must be treated as hazardous waste.)

Waste Handling:

All contaminated gloves, boots, suits and tools if salvageable will be thoroughly cleaned and placed in storage for future use. Respirator cartridges will be discarded in plant rubbish. This equipment shall be replaced immediately.

All drums containing spillage and cleanup materials shall be labeled with an appropriate label. The label shall be signed and dated.

All spill cleanup materials in drums shall be placed within a sufficiently diked storage area and then disposed of appropriately, perhaps as hazardous waste.

C. EMERGENCY EQUIPMENT AND CONTRACTORS

The emergency equipment which is available for spill response activities includes fire hoses, eyewash stations, fire alarm boxes, showers, and fire hydrants. Protective clothing and equipment such as rubber gloves and boots, chemical protective suits, safety glasses and goggles, respirators, and disposable cartridges are available at the south end of the Maintenance Department and in the First Aid Room located near the Main Offices.

Table 6 lists the emergency equipment which is available for spill response activities. If the spill response activities require equipment which is not available at Hydreco, the contractors listed in Table 7 may be contacted as needed.

TABLE 6

MATERIALS AND EQUIPMENT FOR SPILL CONTAINMENT AND CLEAN UP

Material(s)/Equipment	Substances contained/ absorbed/cleaned up	Location
10 to 15-gallon vacuum pump	Small oil spills	Maintenance Area
300-gallon vacuum pump	Large oil spills	Maintenance Area
Standard industrial absorbents	Small solvent or coolant spills	Tool Crib Area
Absorbent booms and/or sheets	Floating oil spills (in case of drainage ditch overflow)	Assembly Area

TABLE 7

EMERGENCY RESPONSE CONTRACTORS

Agency	Location	Phone
Tri-County Liquid Waste, Inc.	3432 Gembrit Kalamazoo, Michigan	(616) 345-0937
A&B Industrial Services, Inc.	5070 West Michigan Oshtemo, Michigan	(616) 375-9595

APPENDIX A

FIGURES

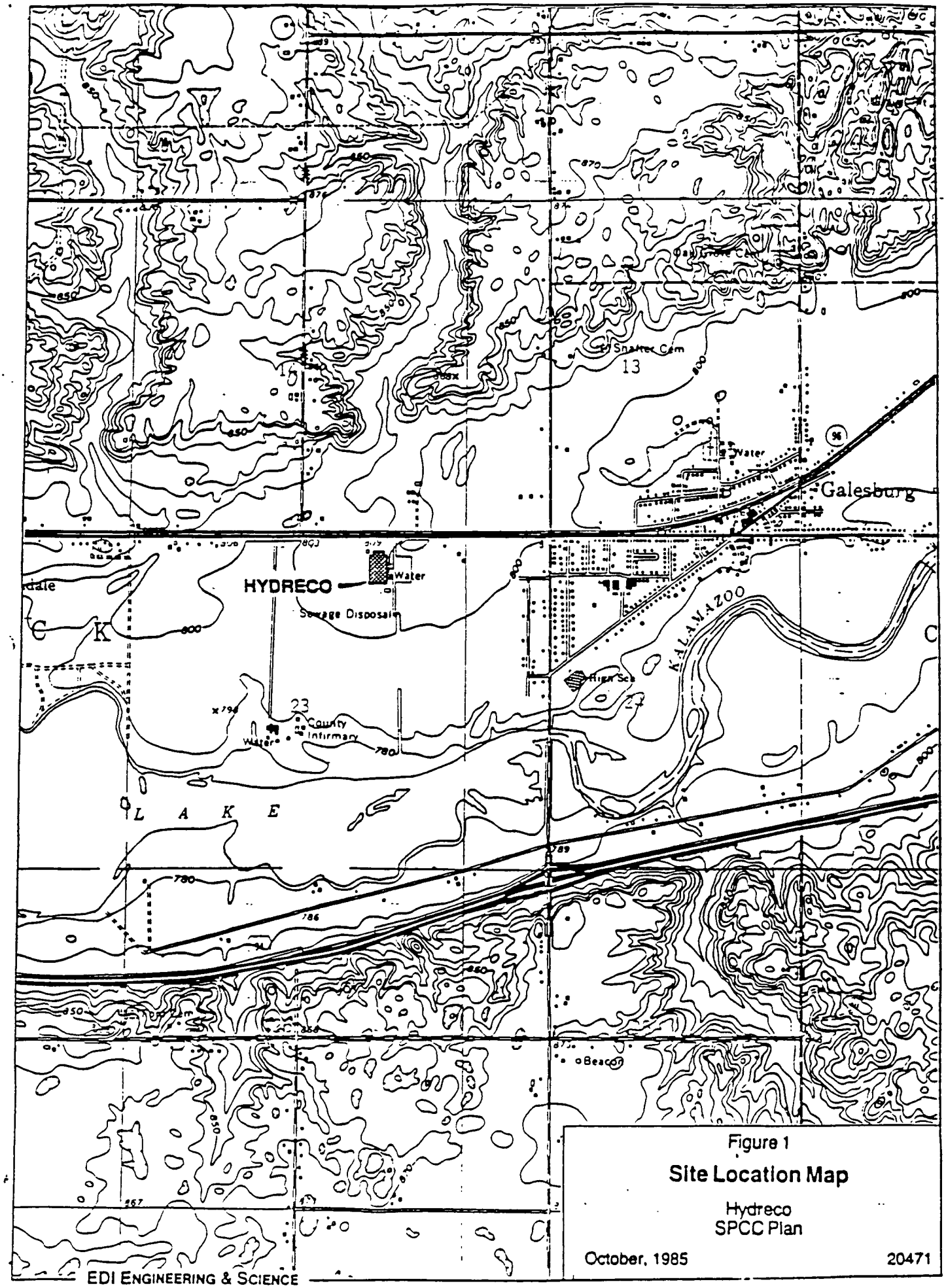


Figure 1

Site Location Map

Hydreco
SPCC Plan

October, 1985 20471

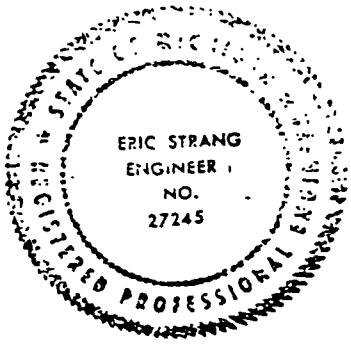
EDI ENGINEERING & SCIENCE

CERTIFICATION

I have reviewed the Spill Prevention Control and Countermeasure Plan for the Hydreco plant attached. The facility has been examined and, being familiar with the provisions of Part 112, Oil Pollution Prevention, Chapter 1, Environmental Protection Agency, Subchapter D, Water Programs, as published in the Federal Register, Vol. 38, No. 237, Tuesday, December 11, 1973, I certify that the SPCC/PIPP has been prepared in accordance with good engineering practices.

Registered Professional Engineer:

SEAL



Signature: Dwight Eric Strang

Name: DWIGHT ERIC STRANG

Company: EDI ENGINEERING & SCIENCE

Date: 11/11/85

Registration Number: 27245

State: MICHIGAN

(This form must be filed in Appendix B of the SPCC/PIPP.)

SPCC/PIPP REVIEW (UPDATE)

EPA Regulations (40 CFR 112.5) on Oil Pollution Prevention specify that the owner or operator of a facility shall complete a review and evaluation of the SPCC/PIPP at least once every three years. As a result of the review and evaluation, the owner or operator shall amend the SPCC/PIPP within six months of the review to include more effective spill prevention and control technology. All amendments to the SPCC/PIPP must be certified by a Professional Engineer (see Figure 4 - SPCC/PIPP Amendment).

In accordance with the requirements of Section 112.5 of the EPA regulations on Oil Pollution Prevention, this Spill Plan has been reviewed and evaluated for the inclusion of more effective spill prevention and control technology.

Signed: _____ Date: _____

Title: _____

(This form must be filed in Appendix B of the SPCC/PIPP.)

FIGURE 3

AMENDMENT CERTIFICATION

In accordance with the provisions of Section 112.5 and 112.7 of the EPA regulations on Oil Pollution Prevention, this spill plan was amended on _____. This amendment is hereby certified

Registered Professional Engineer: SEAL

Signature: _____

Name: _____

Company: _____

Date: _____

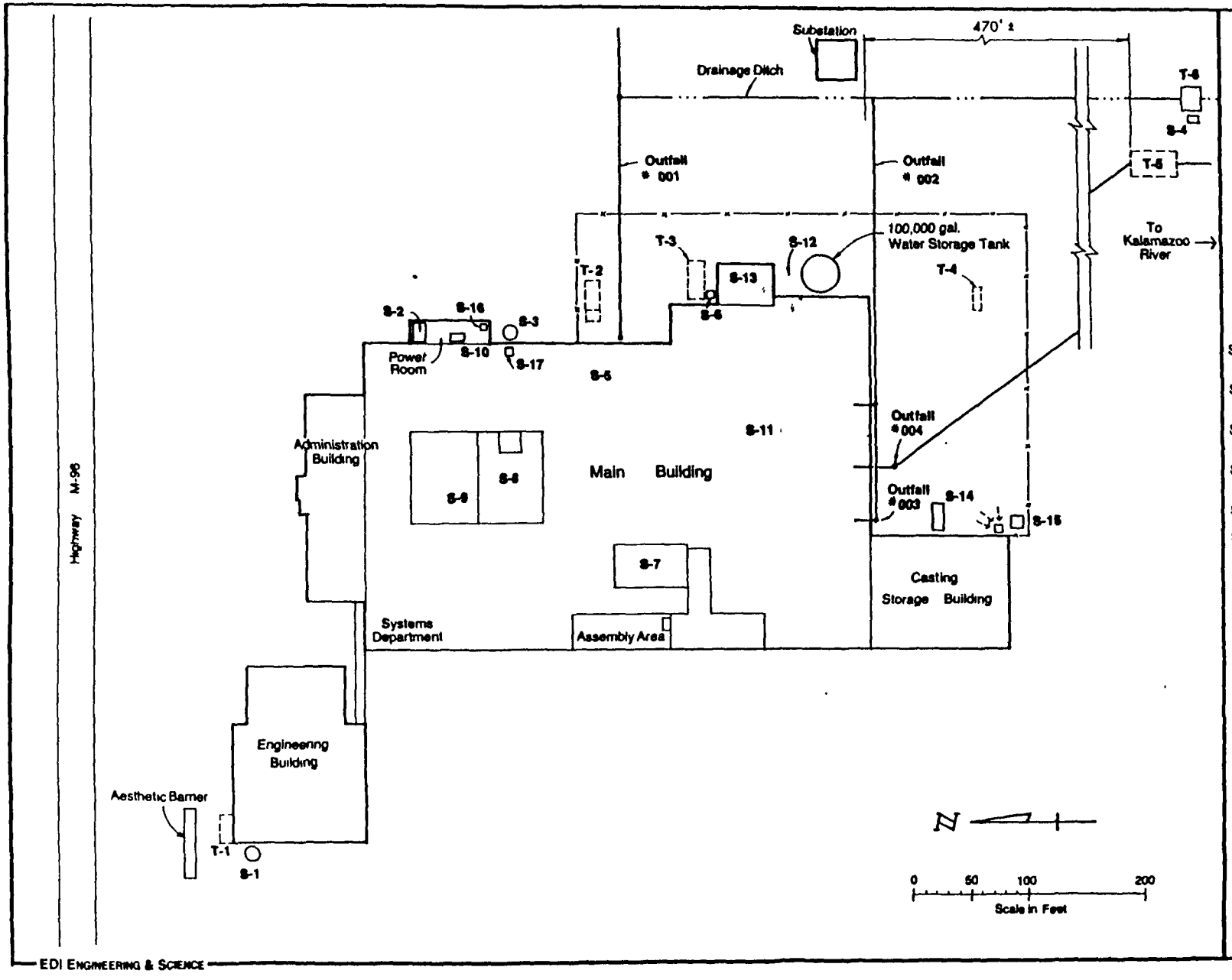
Registration Number: _____

State: _____

SUMMARY OF AMENDMENT:

(This form must be filed in Appendix B of the SPCC/PIPP.)

FIGURE 4



S-1	One (1)-3,000 gal aboveground waste oil and water storage tank
S-2	One(1)-2,000 gal aboveground hydraulic oil tank
S-3	One(1)-6,000 gal aboveground waste oil, water and coolants tank
S-4	One(1)-250 gal aboveground waste oil tank
S-5	Paint Storage Area
S-6	One(1)-275 gal aboveground Diesel Fuel Tank
S-7	Vapor Degreaser Storage Area
S-8	Tool Crib Area
S-9	One(1)-1,000 KVA, 425 gal PCB-containing transformer
S-10	One(1)-1,000 KVA, 155 gal PCB-containing transformer
S-11	One(1)-750 KVA, 375 gal PCB-containing transformer
S-12	One(1)-300 KVA, 375 gal PCB-containing transformer
S-13	Boiler Room, contains 3 PCB-containing switches
S-14	Paper trash compactor
S-15	Sump
S-16	Sump
S-17	Sump
T-1	One (1)-3,000 gal underground waste oil and water tank to be taken out of service
T-2	One(1)-10 000 gal underground abandoned sand filled tank
T-3	One(1)-20,000 gal underground abandoned sand filled tank
T-4	One(1)-6,000 gal underground waste oil, water and coolant tank to be taken our of service
T-5	Abandoned sewage disposal facility
T-6	Weir and oil skimmer

Figure 5

Site Map

Hydreco
SPCC Plan

October 1985 20471

EDI ENGINEERING & SCIENCE

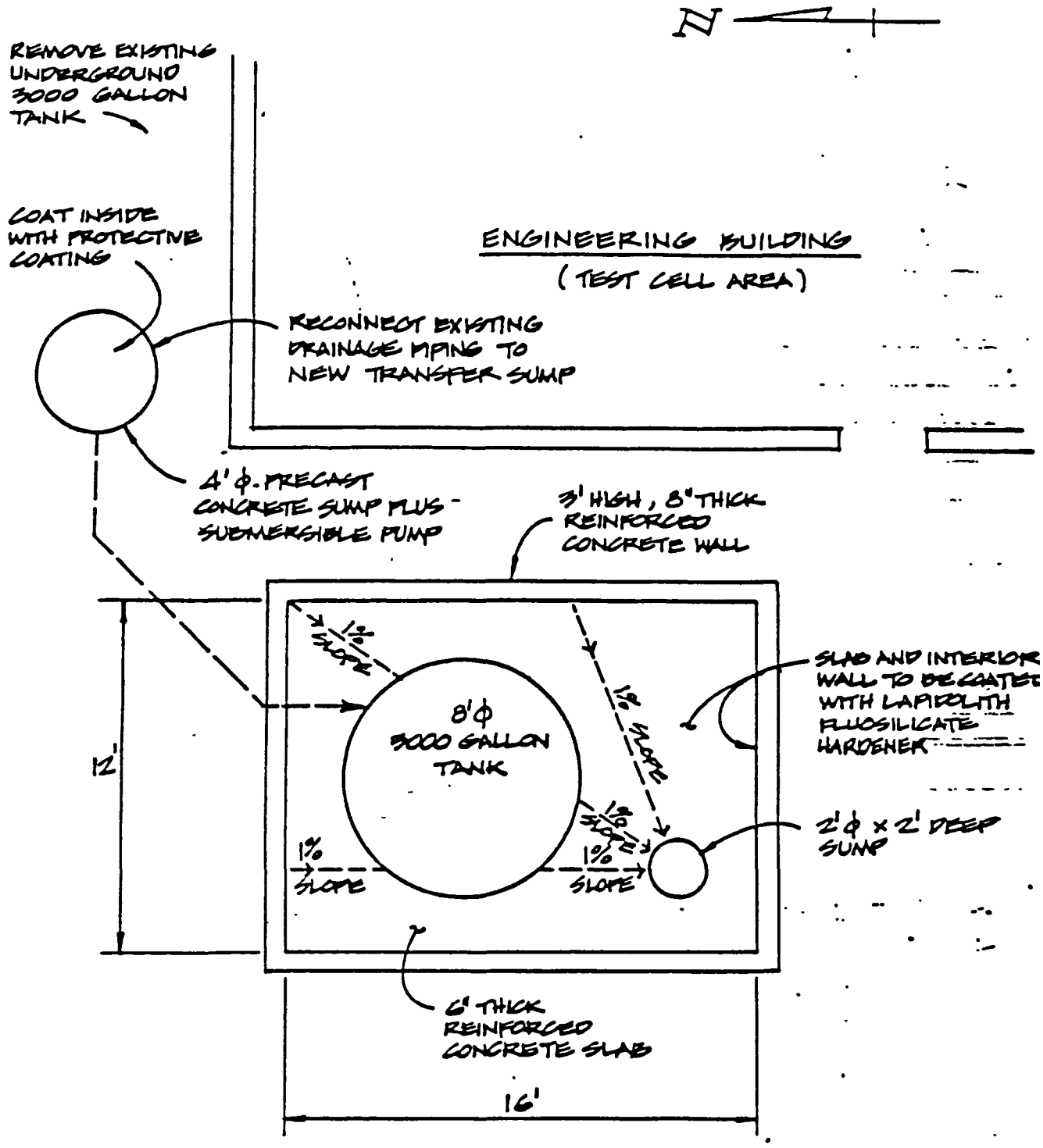


EXHIBIT #1

Figure 6

3000 gal. Hydraulic Oil and Water Collection Tank

Hydreco
SPCC Plan

October, 1985 20471

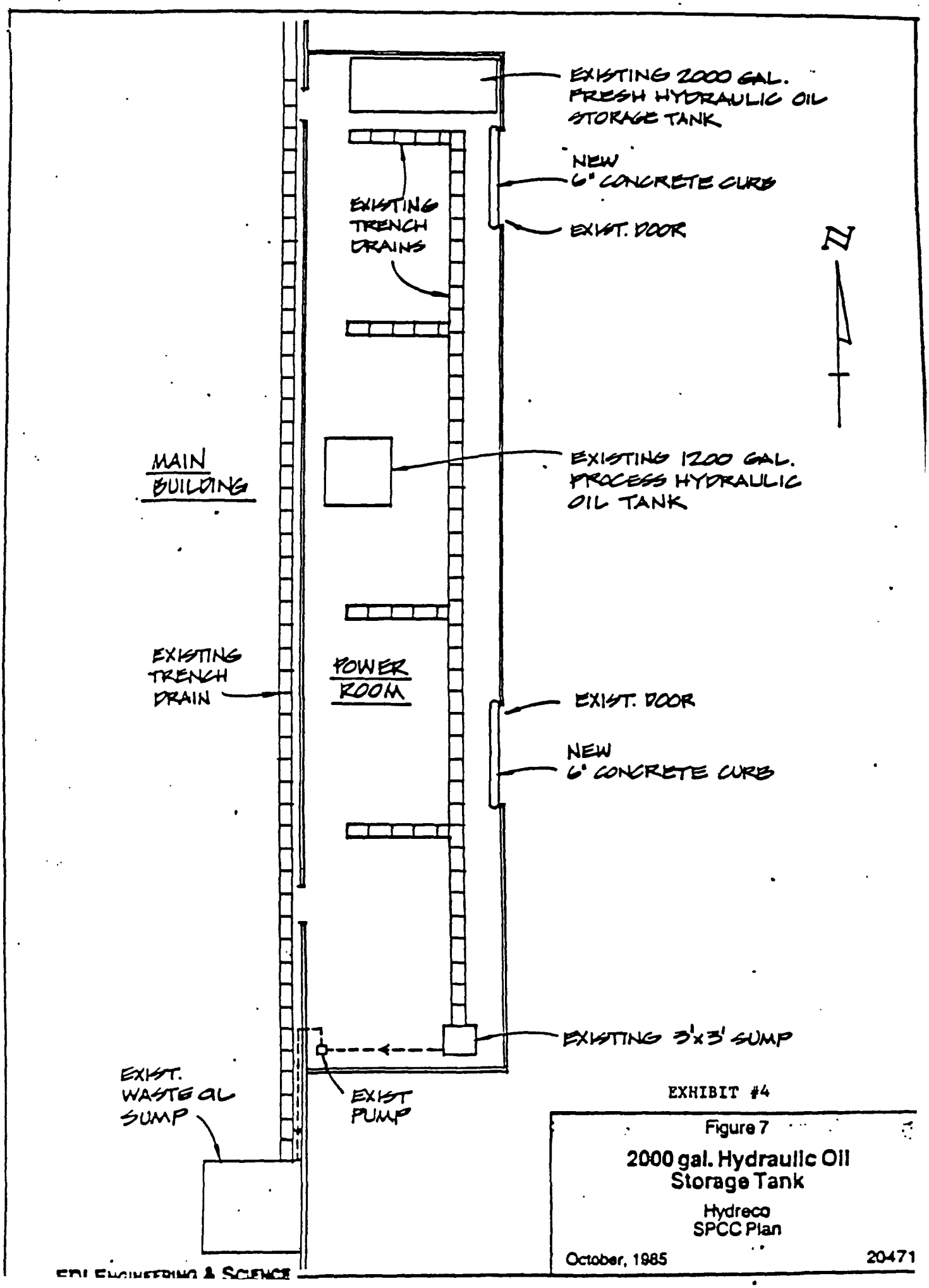


EXHIBIT #4

Figure 7

2000 gal. Hydraulic Oil Storage Tank

Hydreco SPCC Plan

October, 1985

20471

EPI ENGINEERING & SCIENCE

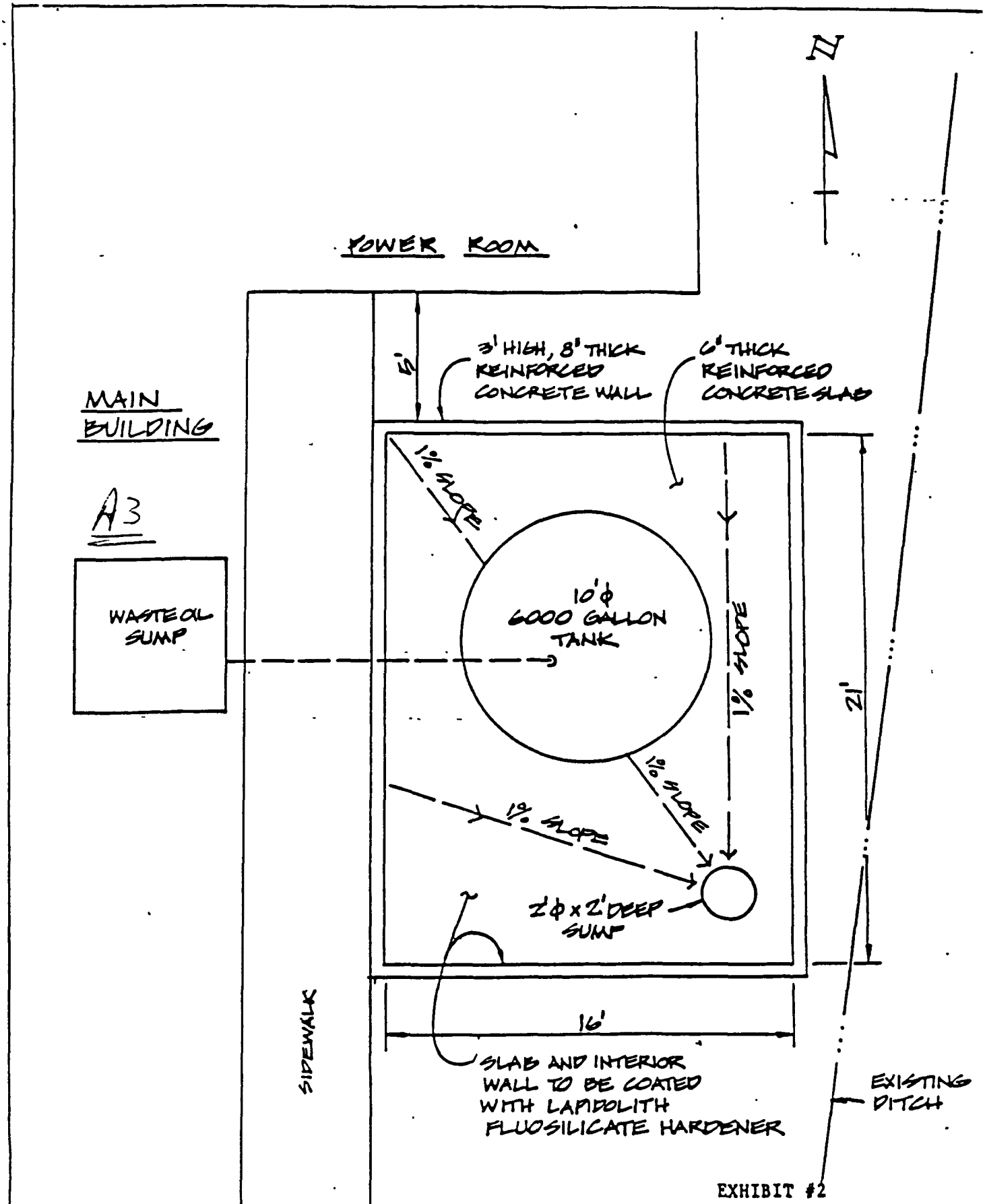


EXHIBIT #2

Figure 8

6000 gal. Waste Oil, Water, Coolant Tank

Hydreco
SPCC Plan

October, 1985

2047

4-29-83

Per phone call to Eric Strang, remove underground tank, but is OK to transport oil to 6000 gal. tank by barrel and not construct new 500 gal tank and containment

C Van Arsdale

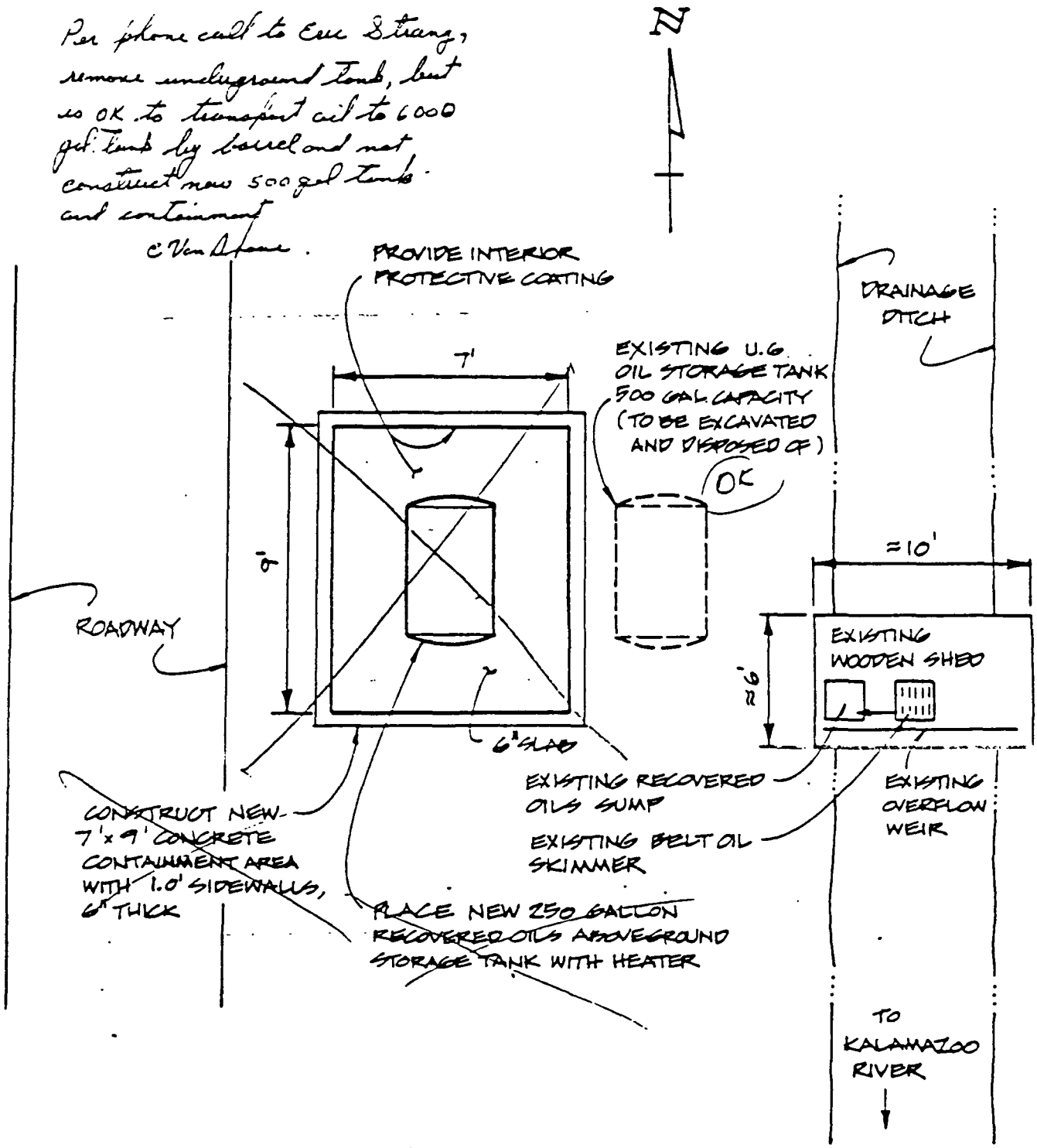


Figure 9

500 gal. Waste Oil Tank

Hydreco
SPCC Plan

October, 1985 20471

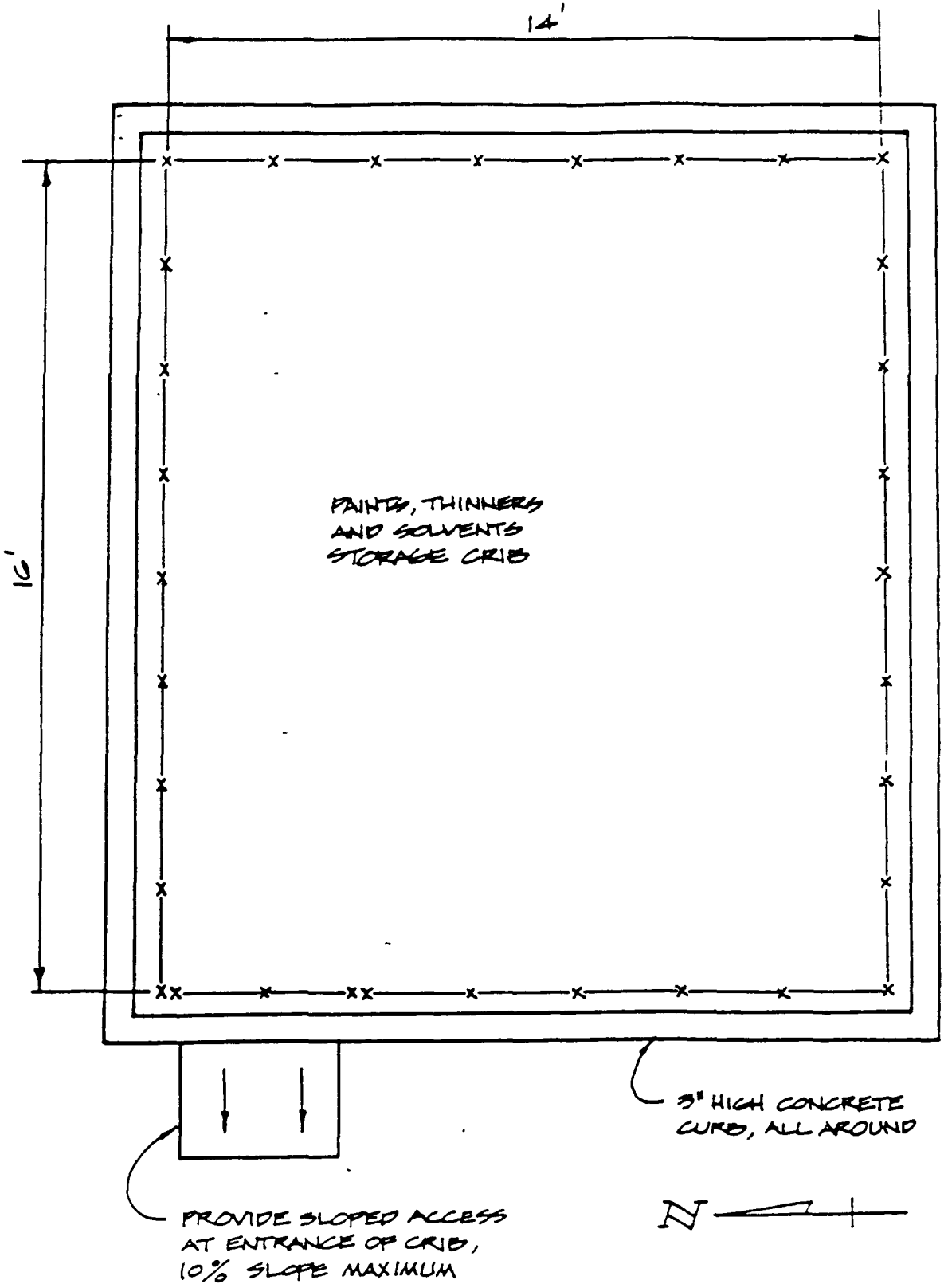


Figure 10

Paint Storage Area

Hydreco
SPCC Plan

October, 1985

20471

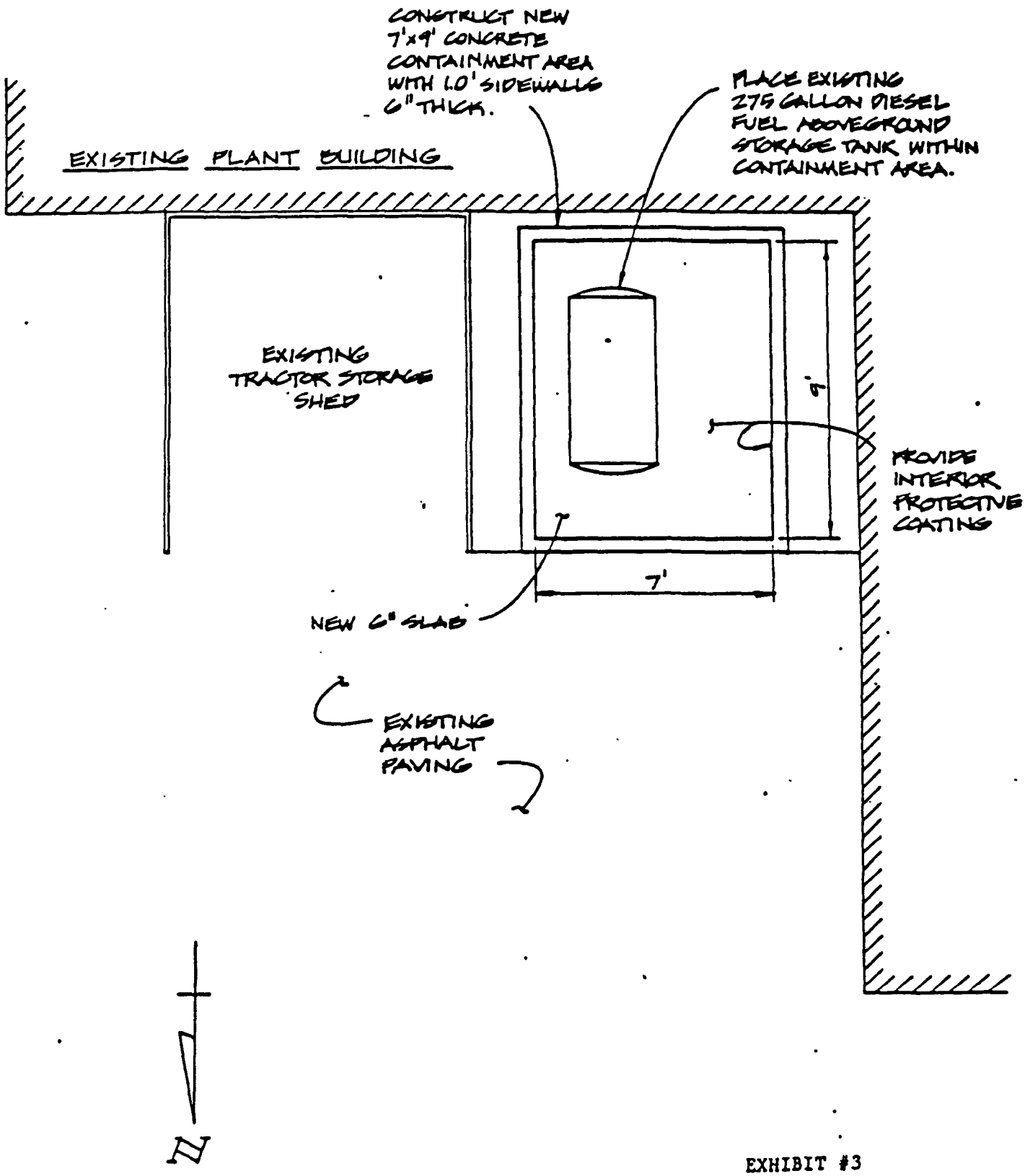


EXHIBIT #3

Figure 11

Diesel Fuel Storage

Hydreco
SPCC Plan

October, 1985

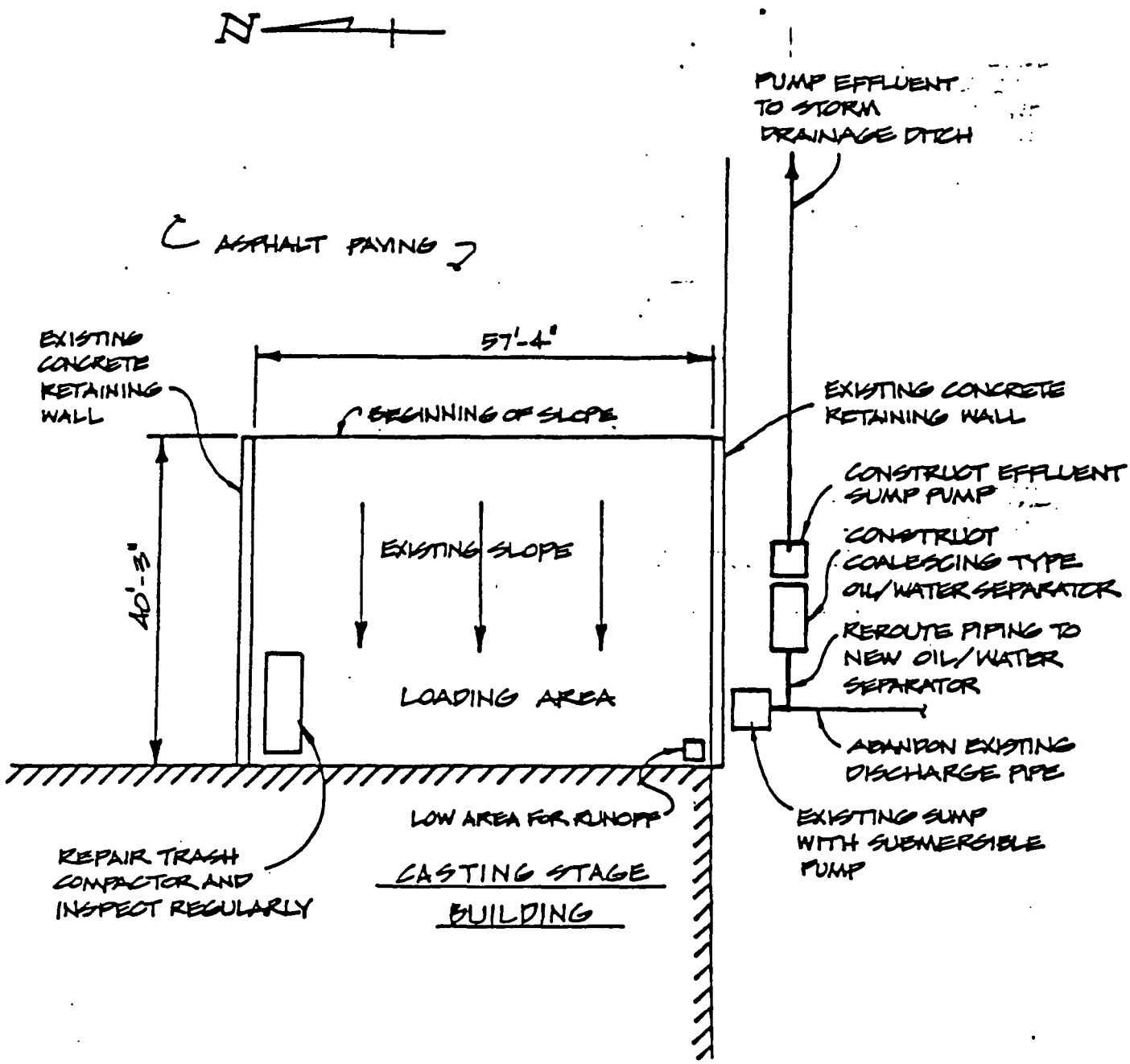


EXHIBIT #5

Figure 12

Loading Area at Casting Storage Building

Hydreco
SPCC Plan

October, 1985

20471

HYDRECO SPILL INCIDENT REPORT

Date of Report:

Date of Spill:

Time of Spill:

Description of Incident:

1. Cause of spill (known or suspected):
2. Amount of material released:
3. Description of spill response:

Action taken to prevent further spill incidents:

Did quantity of material discharged exceed the reportable quantity?

Yes ____ (EPA # 1-800/442-8802)

No ____

Persons or agencies notified:

1. Internal notification:
2. State or local notification:
3. Federal notification: (Note: if RQ of the spilled material is exceeded, the Emergency Response Center must be notified within 24 hours of the spill.)

Name: _____

Signature: _____

(This form must be filed in Appendix B of the SPCC/PIPP.)

FIGURE 13

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

REPORT OF OIL, SALT, OR POLLUTING MATERIAL LOSSES

Pursuant to the provisions of Act 245 of the Public Acts of Michigan 1929 as amended, regulations have been issued which require that all owners, managers, or operators of vessels, oil storage, or on-land facilities shall notify the Water Resources Commission or his authorized representative of oil, salt, and polluting material losses. This notification shall be made promptly by telephone or telegraph, giving briefly the particulars, and by mail, giving a detailed account of events and conditions.

Date	Company Name	
Location of Loss (Be Specific)		
Material Lost	Amount	Name of Surface Water Involved
Date Loss was Discovered		Time of Discovery
Name of Department of Natural Resources Representative Contacted		
Telephoned or Telegraphed by Whom		Time
Cause of Loss (Include Type of Equipment and Other Details)		
Nature of Loss (Include Complete Description of Damage)		
Additional Comments (Include Method of Control, Plans for Prevention of Recurrence, etc.)		
Company Name		By (Signature)

Return this form to: Michigan Department of Natural Resources
Groundwater Quality Division
Attention: Compliance Section
Box 30028
Lansing, Mich. 48909
24-Hour Emergency Notification Number
517/373-7660
800/292-4706 (In state)

APPENDIX B

SPCC/PIPP 3-YEAR REVIEWS (UPDATES),
AMENDMENT CERTIFICATIONS,
PAST SPILL INCIDENTS

CERTIFICATION

I have reviewed the Spill Prevention Control and Countermeasure Plan for the Hydreco plant attached. The facility has been examined and, being familiar with the provisions of Part 112, Oil Pollution Prevention, Chapter 1, Environmental Protection Agency, Subchapter D, Water Programs, as published in tne Federal Register, Vol. 38, No. 237, Tuesday, December 11, 1973, I certify that the SPCC/PIPP has been prepared in accordance with good engineering practices.

Registered Professional Engineer: SEAL

Signature: _____

Name: _____

Company: _____

Date: _____

Registration Number: _____

State: _____

(This form must be filed in Appendix B of the SPCC/PIPP.)

FIGURE 2

DEPARTMENT OF NATURAL RESOURCES

Copy sent to DNR 3-6-86

REPORT OF OIL, SALT, OR POLLUTING MATERIAL LOSSES

Pursuant to the provisions of Act 245 of the Public Acts of Michigan 1929 as amended, regulations have been established which require that all owners, managers, or operators of vessels or storage, or on-land facilities shall notify the Water Resources Commission or its authorized representative of oil, salt, and polluting material losses. This notification shall be made promptly by telephone or telegraph, giving briefly the particulars, and by mail, giving a detailed account of events and conditions.

Date	Company Name
March 6, 1986	Hydreco, A Unit of General Signal

Location of Loss (Be Specific)

Kalamazoo County, Comstock Township, N.E. (1/4), 23 (Section), 002 (Town), and 010 (Range)

Material Lost	Amount	Name of Surface Water Involved
Interlube 6675	Ten Gallons	Kalamazoo River

Date Loss was Discovered	Time of Discovery
March 6, 1986	2:30 a.m.

Name of Department of Natural Resources Representative Contacted

John Vulmer

Telephoned or Telegraphed by Whom	Time
Charles VanDeLaare	9:30 a.m.

Cause of Loss (Include Type of Equipment and Other Details)

Water valve partially left open after cleaning and recharging a washer. The guard service found the floor covered with solution at 2:30 a.m. Therefore, called the emergency coordinator who then called in help to clean up the spill.

Nature of Loss (Include Complete Description of Damage)

The solution (20 water to one (1) interlube) overflowed from the washer on to the floor of which most was contained in the plant, but some reached a floor drain at a water fountain ending up in our outfall.

Additional Comments (Include Method of Control, Plans for Prevention of Recurrence, etc.)

The floor drains have been sealed off previously, but two were left in use for water fountain drainage. There will be a 3" high dip installed on the floor to stop future drainage.

Company Name	By (Signature)
Hydreco, A Unit of General Signal	

Return this form to: MICHIGAN DEPT. OF NATURAL RESOURCES
GROUND WATER DIVISION
621 10TH ST.
PO BOX # 355
PLAINWELL MI. 49080

Telephone Emergency Notification Number

[illegible] (In State)

HYDRECO SPILL INCIDENT REPORT

Date of Report: 3-6-86

Date of Spill: 3-6-86

Time of Spill: 2:30 A.M.

Description of Incident:

1. Cause of spill (known or suspected): WATER VALVE LEFT ON AT 5001 WASHER.
2. Amount of material released: LESS THAN 10 GAL. OF INTELLUBE 6675. IN WATER AT 20-1
3. Description of spill response: GUARD SERVICE FOUND FLOOR COVERED WITH SOLUTIC AT 2:30 AM AND CALLED D CASTERLINE. HE THEN CALL IN HELP TO CLEAN UP FLOOR WITH VACUUM PUMP

Action taken to prevent further spill incidents:

FLOOR DRAIN TO HAVE 3 IN RAZED LIP INSTALLED TO STOP ANY FLOOR DRAINAGE.

Did quantity of material discharged exceed the reportable quantity?

Yes NO (EPA # 1-800/442-8802)

No ____

Persons or agencies notified:

1. Internal notification: D. CASTERLINE, R. DEVRIES, C. VANDELAAR.
2. State or local notification: VEG. DNR. PLAINWELL JOHN VULMER.
3. Federal notification: (Note: if RQ of the spilled material is exceeded, the Emergency Response Center must be notified within 24 hours of the spill.)

Name: CHARLES VAN DE LAAR

Signature: Charles Van De Laar

(This form must be filed in Appendix B of the SPCC/PIPP.)

FIGURE 13

HYDRECC SPILL INCIDENT REPORT

Date of Report:

Date of Spill:

Time of Spill:

Description of Incident:

1. Cause of spill (known or suspected):
2. Amount of material released:
3. Description of spill response:

Action taken to prevent further spill incidents:

Did quantity of material discharged exceed the reportable quantity?

Yes ____ (EPA = 1-800/442-8802)

No ____

Persons or agencies notified:

1. Internal notification:
2. State or local notification:
3. Federal notification: (Note: if RQ of the spilled material is exceeded, the Emergency Response Center must be notified within 24 hours of the spill.)

Name: _____

Signature: _____

(This form must be filed in Appendix B of the SPCC/PIPP.)

FIGURE 13

APPENDIX C

TANK TRUCK LOADING/UNLOADING PROCEDURES

APPENDIX C

TANK TRUCK LOADING/UNLOADING PROCEDURES

1. Insure that tank truck is spotted accurately for loading/unloading waste/new oil - set brakes and place blocks behind tires.

2. Driver shall remain in direct visual observance of transfer operations at all times during loading or unloading operation.

3. Caution - no smoking during loading/unloading operation.

4. Place warning signs around the truck for general cautionary purposes and to prevent possible departure with hoses still attached.

5. Insure tank is vented properly.

6. For unloading of new materials, compare tank truck number to shipping invoice to insure proper material is being unloaded.

7. Read sight gauge prior to discharging product - insure tank has adequate volume.

8. Read sight gauge again soon after commencing discharge to insure product is entering proper tank.

9. Provide a waste pail so that any residual new or waste oil can be drained from the hoses following unloading.

10. Inspect discharge piping for leakage upon commencing loading/unloading product.

11. Call Maintenance Department personnel to report any spills.

SECTION I

PERMIT NUMBER

LIST NAME AND MAILING ADDRESS OF ALL PROPERTY OWNERS ADJACENT TO THE TREATMENT FACILITY AND OR DISCHARGE/DISPOSAL AREA.

ITEM 12

MAILING LIST OF ADJACENT PROPERTY OWNERS

Hydreco boundary property owners are:

South
Consumers Power Company
2500 East Cork Street
Kalamazoo, MI 49001

East
Mr. Cecil Henson
6 Grove Street
Galesburg, MI 49053

Mr. James Breneman
10511 Miller Drive
Galesburg, MI 49053

West
Kalamazoo County Parks & Recreation Department
2900 Lake
Kalamazoo, MI 49001

EDI ENGINEERING & SCIENCE
ENGINEERS / GEOLOGISTS / BIOLOGISTS / CHEMISTS

October 28, 1985

Mr. Charles VanDeLaare
Manufacturing Engineer
Hyreco
9000 East Michigan Avenue
Kalamazoo, MI 49003

Dear Chuck:

Enclosed please find the preliminary draft of the Spill Prevention Control and Countermeasure/Pollution Incident Prevention Plan (SPCC/PIPP) for Hydreco. In its present form, Section III of the plan contains our recommendations for secondary containment structures, inspection schedules and forms, and training. Prior to submmital of the plan to the EPA, Hydreco must approve these recommendations so that the final plan can contain an implementation schedule for the recommendations.

The other sections of the plan also contain recommendations; however, the plan has been written from the perspective that these recommendations have been implemented. Items of concern include the recommended spill control equipment and chemical protective clothing. If Hydreco does not wish to maintain a supply of such items, the appropriate statements should be deleted.

Also, we recommend that Hydreco have its PCB-containing transformers, capacitors and switches tested for actual PCB concentrations in the dielectric fluid so that proper notification and handling requirements may be determined.

As we discussed today, we will meet with you soon to review your comments. The plan will then be finalized so that it can be mailed to the EPA.

Very truly yours,

EDI ENGINEERING & SCIENCE

Eric Strang

D. Eric Strang, PE
Manager, Engineering Services

DES/mck

Enclosure

20471 G/EC5/141

5555 Glenwood Hills Parkway, SE • Grand Rapids Michigan 49506 • (616) 942-9000

EDI Engineering & Science
Environmental Engineering
Geology, Biology and Chemistry

October 20, 1989

Mr. John Wydick
Benteler Industries
320 Hall S.W.
Grand Rapids, MI 49503

RE: Analytical Data - Galesburg, MI

Dear Mr. Wydick:

Enclosed is the analytical data for all of the samples collected by EDI at the Galesburg facility from July 20 to October 16, 1989. There were four separate sampling periods that were conducted at the plant.

On July 20, EDI collected samples from twelve drums, and the samples were analyzed for EPA scan 601 and 602. In addition, one drum was analyzed for PCB's. On September 20, EDI collected nine samples from sumps, trenches, roll-offs, tanks and outside for PCB analysis. One sample (outside) was analyzed for EPA 601 and 602. On October 2, EDI collected five soil samples from the ditch and one water sample from the monitoring well just south of the plant. All six samples were analyzed for PCB. From October 12 to October 16, EDI collected 113 samples during a remediation program of the plant floor. All of the samples were analyzed for PCB. On October 19, 1989, two soil samples were collected and analyzed for PCB. The analytical data has not yet been completed, and it is not included in this summary.

EDI is currently transferring all of the analytical data onto a site plan of the Galesburg Plant. The data will be used to provide an overall perspective for future remediation plans.

EDI appreciates the opportunity to provide services to Benteler. If you have any questions regarding this data, I can be contacted at (616) 942-9600.

Sincerely,

EDI ENGINEERING AND SCIENCE

William W. Beaton

William W. Beaton
Manager, Field Services

cc: R. Johr - W & W Facilities

GS 500354

21413/aes/wwb/wvdick

S

GENERAL SIGNAL

RECEIVED
MAY 21 1981
E. J. SMITH JR.

EDGAR P. DEVYLDER
COUNSEL

May 21, 1981

TO: File

RE: Hydreco (Kalamazoo) - Hazardous Wastes

Hydreco produces approximately 4,000 gallons of liquid industrial waste each month. Those wastes consist of a mixture of water, oil and soluble coolant. They contain less than 37 gallons of xylene and less than 14 gallons of perchlorethylene. Those two chemicals are subject to the 1,000 kilogram per month limitation. Chuck told me that the soluble industrial coolant comprises approximately 20% of the waste fluid (i.e., 800 gallons).

Since January 1981 Hydreco has been disposing of these wastes at Systech Liquid Treatment Corporation, 3030 Wood Street, Muskegon Heights, Michigan 49444. Because Hydreco's storage facilities are full, it must promptly dispose of this industrial waste. Systech has informed Hydreco that it will not accept this waste unless Hydreco has an EPA identification number or a letter from the EPA indicating that no such identification number is necessary. Systech is imposing this requirement because it believes the soluble industrial coolant would fail the EP toxicity test specified at §261.24 and appendix II to part 261 of the RCRA regulations. Mr. Chuck Cody (616) 733-1444 of Systech told me that his company is required to conduct extensive testing on waste products before accepting them for disposal and that it has been their experience that all soluble industrial oils contain such concentrations of heavy metals as to fail the §261.24 toxicity test. He told me that their test results on Hydreco's waste, as treated and then digested (i.e., "leachate") were as follows:

Contaminant	Milligrams per liter
Cadmium	.25 mg/l
Chromium 6	1 mg/l
Copper	6 mg/l
Nickel	.25 mg/l
Lead	22.5 mg/l
Zinc	5.75 mg/l
Iron	15.25 mg/l

He said that the fluid had a pH of 7.3 and that the copper, lead and zinc numbers were high enough to cause the waste to fail the toxicity test. After getting off the phone, I reviewed §261.34

RCRA regulations and found that none of these numbers cause the waste to fail the EP toxicity test. Indeed, copper and zinc are not listed as toxic substances. A copy of that section is attached as Exhibit A. I will review the Michigan Hazardous Waste Management Act as soon as I can get a copy of it from BNA. Also, I have a call into Mr. Cody for more information.

Mr. Cody indicated that in July, industrial oil will be listed as a hazardous waste by Michigan.

If Hydreco wants to do its own testing, Mr. Cody recommended that it contact Dr. Helfen of Williams & Works, 611 Cascade West Parkway, Grand Rapids, Michigan 49506, telephone (216) 942-9600.

Mr. Cody told me that Systech's EPA identification number is MID 072585755. Attached as Exhibit B are pages 17196 - 17198 of the March 18, 1981 Federal Register pertaining to Systech's receipt of a temporary exclusion of solid wastes generated at its plant from hazardous waste status.

Ed

EPD/eg
attach.

cc C. Van Leer (Hydreco)

GENERAL SIGNAL

EDGAR P DEVYLDER, JR
SENIOR ATTORNEY

June 20, 1986

Janet Haff
USEPA - Region V
Waste Management Division
Hazardous Waste Enforcement Branch
CERCLA Enforcement Section
230 South Dearborn Street
Chicago, Illinois 60604

Attention: 5HE - 12
Reference: Your letter on the KL Avenue Landfill, Oshtemo Township, Kalamazoo County

Dear Ms. Haff:

I am in-house counsel for Hydreco which is a company that the USEPA has identified as a potentially responsible party in connection with this site. Hydreco and I have stated in previous correspondence to you that Modern Septic Tank Engineers, Hydreco's only industrial waste hauler during the period 1968 to 1979, did not use the KL Avenue landfill site during that period and that the only substances that Superior Disposal Service hauled from Hydreco to the KL landfill were non-hazardous materials from the company's compactor, including cardboard, paper, floor sweepings, vending machine coffee waste and shipping cartons. Enclosed is a May 8, 1986 letter from the Board of Commissioners of Kalamazoo County County which states that the only reason why Hydreco's name was given to the USEPA was that it used Superior Salvage. Since Superior Salvage did not haul any hazardous substances from Hydreco to the KL landfill, we request that Hydreco's name be removed from the list of potentially responsible parties relating to this site. I look forward to hearing from you.

Sincerely yours,

Ed DeVylder

EPD/eg
Enclosure

cc: S. R. Heldreth (w/encl.)

EPA 007948

HIGH RIDGE PARK • P O BOX 10010 • STAMFORD, CONNECTICUT 06904 • PHONE 203-357-8800