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RECEIVED
SEP 13 2004
By VS

September 8, 2004

Ms. Victoria Stovall
Program Assistant
Wisconsin Department of Natural Resources
Southeast Region
2300 North Martin Luther King Drive
Milwaukee, Wisconsin 53212

RE: Site Investigation Work Plan Addendum
Former Erie Manufacturing Facility
4000 South 13th Street
Milwaukee, Wisconsin
BRRTS#: 02-41-287051
FID #: 241238360

Dear Ms Stovall:

Environmental Resources Management, Inc. (ERM), on behalf of Invensys, Inc. (Invensys), submitted a Site Investigation Work Plan Addendum for the facility located at 4000 South 13th Street, Milwaukee, Wisconsin (August 13 Addendum). The August 13 Addendum described the investigative activities to be performed to continue the investigation of ground water contamination at the Site.

The temporary well work included under the August 13 Addendum began on August 16, 2004, however heaving sand conditions precluded use of the sampling equipment. The August 13 Addendum included a provision to install permanent monitoring wells in the event that problems were encountered with the temporary well methodology. Therefore, four, deep monitoring wells were installed at the temporary well locations described in the August 13 Addendum. The monitoring wells were developed and sampled by September 1, 2004.

Invensys and ERM are continuing an accelerated assessment of the subsurface conditions and distribution of contaminants at the Site. The attached Work Plan Addendum (September 8 Addendum) describes the additional investigative activities that will be employed to further delineate the extent of soil and groundwater impacts at the Site. Work under the September 8 Addendum will include membrane interface probe (MIP) and Waterloo profiler sampling, and bench-scale chemical oxidation treatability studies.

Following the completion of the field investigation, a letter report covering the August 13 and September 8 Addendums will be submitted to the WDNR outlining the results of these investigations, and work plans for performing additional work, if warranted. Please contact me at 414-289-9505 if you have any questions regarding this Work Plan or the investigation of the Site.

Sincerely,

John C. Roberts, P. G.
Project Manager

cc: Matt Daly, ERM, Inc. - Boston

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1.0 INTRODUCTION

This Site Investigation Work Plan is being submitted to the Wisconsin Department of Natural Resources (WDNR) and presents the methods and procedures for conducting site characterization activities at the former Erie Manufacturing facility located at 4000 South 13th Street in Milwaukee, Wisconsin (the Site). A site locus map is included as Figure 1, and a Site plan is included as Figure 2. Environmental Resources Management (ERM) is has been retained by Invensys, Inc. (Invensys) to perform the site assessment activities described herein.

1.1 PURPOSE & SCOPE

The purpose of this assessment program is to delineate the source, nature and extent of chlorinated volatile organic compounds (CVOCs) originating from two apparent sources at the property. The Work Plan includes the advancement of up to 24 Membrane Interface Probe (MIP) and/or Waterloo Vertical Profiler borings for this purpose. The program will be completed using dynamic investigation methods and a Geoprobe drill rig inside and outside the building.

The activities will also allow for the evaluation of using chemical oxidants as a remedial alternative for CVOCs in groundwater originating from the source areas. In addition, numerous floor drains inside the building will be evaluated to determine proper decommissioning procedures.

1.2 SITE HISTORY

An initial work plan to conduct investigation activities was submitted by Invensys in March 2002. The initial work plan included information regarding previous Phase I and Phase II environmental site assessment (ESA) activities and results, site history, facility description, and site physical description.

A subsequent investigation was conducted during March and April 2002, and a Subsurface Investigation Report, dated 18 July 2002, was submitted to the WDNR. The report identified several CVOCs present in the soil and uppermost groundwater unit beneath the Site.

In August 2004, four additional soil borings/monitoring wells were completed at the Site to evaluate groundwater quality in a stratigraphic interval below the historic wells. These activities were outlined in the Site Investigation Work Plan Addendum submitted to WDNR in August 2004.

1.3 SITE GEOLOGY AND HYDROGEOLOGY

Soil borings installed at the Site in 2002 extended to a maximum depth of 32 feet below ground surface (BGS). The soil borings indicated the subsurface geology consisted of a heterogeneous mixture of fill material (sand, gravel, cinders, and ceramic) and native soils consisting of gravel, sand, silt, clay, and peat. Observations from soil borings (SB001, SB007, SB010, SB011, SB013, and B13) have shown this variable stratigraphy across the site.

Several borings at the Site terminate in clay or silty clay that may represent a confining layer beneath the site. The silty clay formation is believed to separate the upper heterogenous units from a lower sand and gravel sequence. This sand and gravel sequence was described in a boring log for an onsite non-potable water-supply well installed in 1959, and was observed during the August 2004 installation of four deep monitoring wells.

Shallow groundwater is generally encountered between 11 to 12 feet bgs. The predominant groundwater flow direction is west-southwest, with localized mounding in the vicinity of a former pond near MW010A (Figure 2). Depth to groundwater within the four deep wells (MW014, MW015, MW016 and MW017) ranges from 10.78 to 19.30 feet. A downward vertical hydraulic gradient is present between the upper heterogeneous units and the lower sand.

2.0 SCOPE OF INVESTIGATION

The investigation will be completed according to the tasks outlined in the following sections. Minor deviations may be required based upon conditions encountered in the field.

2.1 CONDUCT DYNAMIC SITE INVESTIGATION

The MIP and Waterloo Profiler investigation tools will be used to characterize the presence and distribution of CVOCs in the Site subsurface. Both the MIP and Waterloo Profiler allow for a flexible approach to delineating the extent of impacts by providing real-time analysis of subsurface hydrogeology and CVOC distribution. Both techniques will be advanced using a 54-series track-mounted Geoprobe.

Prior to performing intrusive work at the Site, ERM will contact the Wisconsin Diggers Hotline to obtain both aboveground and belowground utility clearance. Additionally, all boring locations will be hand augered to a depth of approximately 5 feet bgs to verify the absence of utilities. If utility lines are encountered, the boring position will be moved.

2.1.1 MIP

The MIP will be advanced at approximately 18 locations, with probing focused on delineating the extent of CVOCs originating from two source areas, including:

- Area 1 - Former machine shop area, corresponding to 2002 soil borings C2, C3, C4 and monitoring well MW006. This location is adjacent to a former degreaser area and floor drain.

- Area 2 - The southeastern corner of the building, corresponding to 2002 soil boring A4 and decommissioned well MW003.

The MIP measures total volatile organic compound (VOC) response within unsaturated and saturated soil as the tool is advanced with a Geoprobe system. When elevated PID readings are noted, a grab gas sample may be collected from the MIP system for VOC speciation and

approximate quantification. The VOC concentrations are considered approximate due to the water-to-gas partitioning within the saturated zone and travel time of the sample within the MIP tool.

The results of the MIP investigation will be utilized to select locations for advancement of the Waterloo Profiler and for installation of additional monitoring wells, if warranted.

2.1.2 *Waterloo Profiler*

The Waterloo Profiler will be advanced at select locations based on the MIP response data. The Waterloo Profiler will provide a continuous vertical log of relative hydraulic conductivity. At each Profiler location, measurement of hydraulic head, geochemical field parameters and the collection of groundwater samples via low-flow sampling techniques will be collected at up to two discrete depths. Groundwater samples will be submitted for analysis of VOCs by EPA Method 8260 under a rush 24-hour turn around time to support the dynamic decision-making process.

2.1.3 *Investigation Approach - Methodology*

An initial MIP boring will be advanced within each suspected source area (i.e. Area 1 and Area 2) to define the vertical distribution and magnitude of CVOCs. After decontamination of down-hole equipment, subsequent MIP borings will be installed around each source area to evaluate the direction of CVOC migration and to delineate the vertical extent of CVOC impacts to groundwater near the apparent source area. An arc-shaped transect of three MIP borings will be advanced further downgradient to define the centerline and lateral margins of the apparent CVOC plume. A finer spacing will be used for those MIP borings located closer to the suspected source areas and a coarser spacing will be at the downgradient transects. All MIP and Waterloo Profiler borings will be abandoned according to Chapter NR 141 of the Wisconsin Administrative Code.

Data-plots generated from the MIP borings will be used to create real-time draft cross-sectional diagrams of the VOC distribution in the subsurface. These diagrams will be produced in the field to aid in the interpretation of data and support a dynamic decision-making process. Conductivity measurements provided by the MIP instrument may also

provide limited geologic information. Data generated by the Waterloo Profiler borings will supply quantitative hydrogeologic data, with relative hydraulic conductivity, hydraulic head, and geochemical measurements available for immediate interpretation and addition to cross-sectional diagrams.

2.2 *CONDUCT LABORATORY TREATABILITY STUDIES*

The purpose of this task is to gather site-specific data to evaluate whether in-situ chemical oxidation (ISCO) is a feasible remedial alternative for CVOCs at the site. Laboratory treatability studies will be performed using representative soil and groundwater samples from the site to evaluate permanganate and persulfate oxidants. For evaluating permanganate, a Soil Oxidant Demand test will be performed to determine the reactivity of native soil. For evaluating persulfate, a persulfate treatability study will be performed to determine the reactivity of persulfate and persulfate-activating catalysts. Treatability studies will be performed at ERM's ISCO Testing Laboratory in Toronto, Canada.

Results of the oxidation treatability studies will be used to evaluate the efficacy of ISCO to cost effectively remediate CVOCs in groundwater.

2.3 *CONDUCT FLOOR DRAIN SURVEY*

The purpose of this task is to locate and map the floor drains inside the building. As outlined under the WDNR regulatory program, floor drains inside the facility need to be sealed up prior to filing for case closure.

ERM will perform a site walk to locate and photograph the floor drains inside the building. ERM will map each location on a site plan, note the diameter and condition of each floor drain and evaluate options for sealing the drains.

2.4 *EQUIPMENT DECONTAMINATION*

All down-hole drilling equipment used during the investigation activities will be decontaminated between each sample location. Because of the

relatively small size of the equipment, decontamination will be manually conducted within a contained decontamination structure using brushes, Alconox detergent, and multiple clean-water rinses.

2.5 *WASTE MANAGEMENT*

Investigative solid and liquid wastes generated during the investigation will be staged at the Site pending analysis and off-site disposal, per applicable requirements. All wastes will be stored in labeled 55-gallon drums while awaiting characterization and disposal.

2.6 *FIELD DOCUMENTATION*

ERM will document daily field activities in a bound field notebook. At a minimum, documentation activities will include boring locations and depths, summarized MIP and Waterloo Vertical Profiling information, soil sample collection and analysis information, and boring abandonment details.

2.7 *DATA EVALUATION*

Data obtained from this investigation will be evaluated along with historical data from the Site to facilitate the horizontal and vertical delineation of cVOCs in the subsurface.

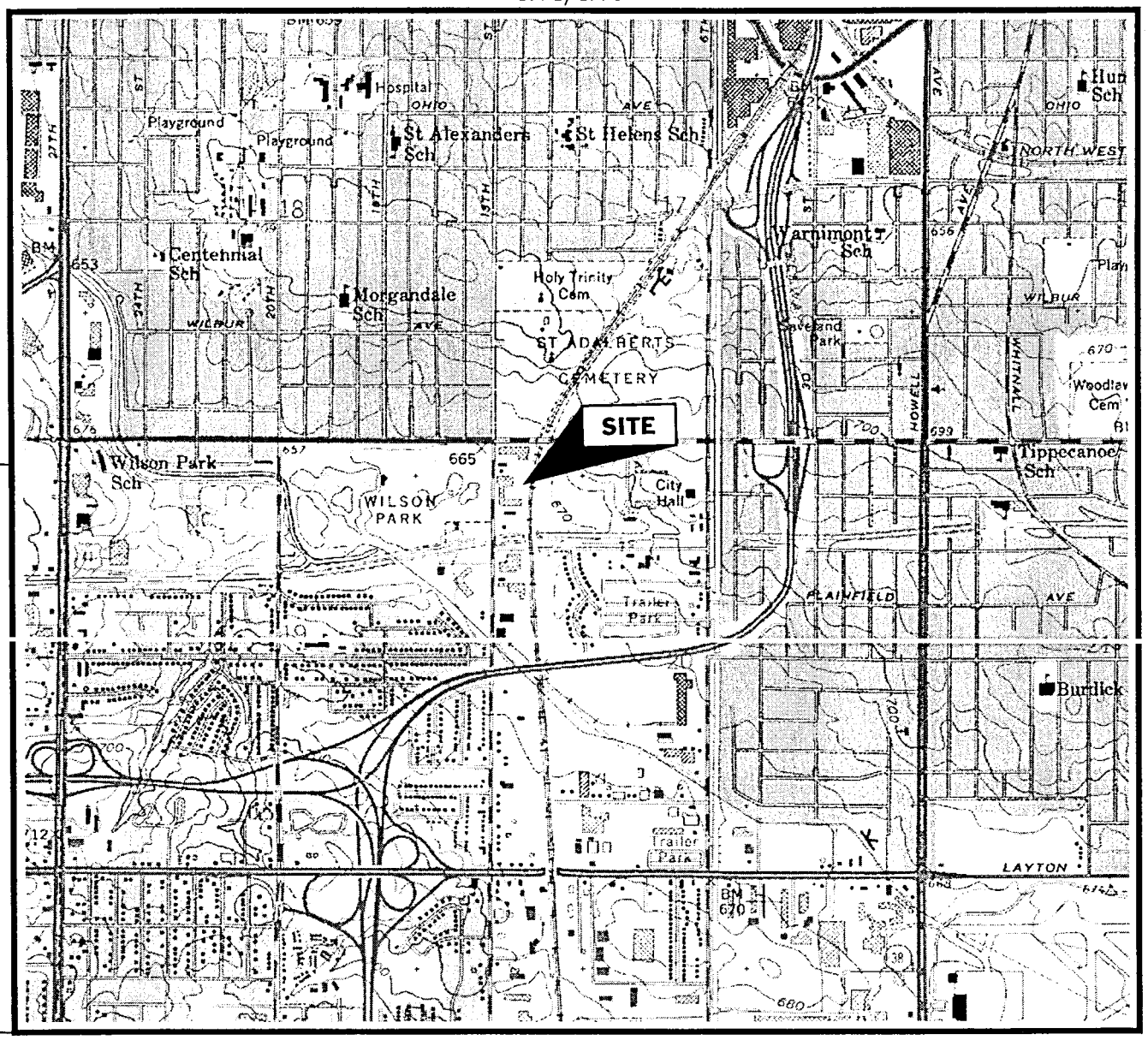
FIGURES

GREENDALE QUADRANGLE

UNITED STATES GEOLOGICAL SURVEY

7.5 MINUTE SERIES (TOPOGRAPHIC)

1971/1976



SCALE

0 1 2 3 4 5 km

0 0.8 1.6 2.4 3.2 4 mi

FIGURE 1

SITE LOCATION MAP
ERIE MANUFACTURING FACILITY
MILWAUKEE, WISCONSIN

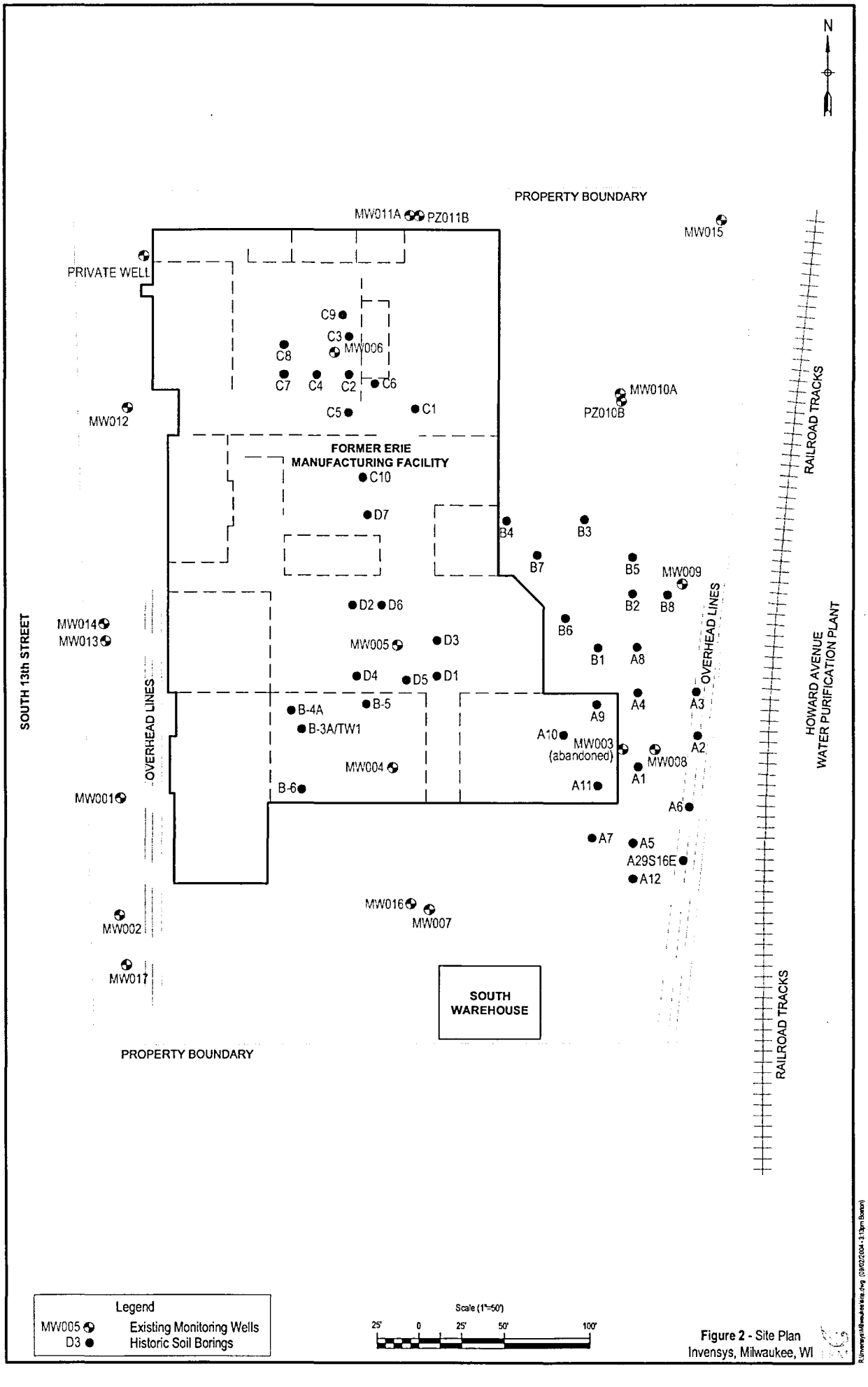


Figure 2 - Site Plan
Invensys, Milwaukee, WI