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AUG 11 2008

I certify this to be a true and accurate copy of the official documents as filed in the records of the Ohio Environmental Protection Agency.

By: _____ Date: 8-11-08

Certified Mail

OHIO E.P.A.
AUG 11 2008

Mr. William Miller, President
Superior Fibers, Inc.
499 North Broad Street
Bremen, OH 43107

Re: **Approval of the Addendum to the 2005 O&M Plan Pursuant to the Compliance Schedule Agreement and Ohio Revised Code Section 3746.12(B)**
Superior Fibers, Inc., Bremen, Fairfield County (03NFA161)
Project ID # 123-002115-002

Dear Mr. Miller:

On March 22, 2005, Ohio EPA issued a Covenant Not to Sue (Covenant) to Superior Fibers, Inc. (Superior Fibers). The Covenant was issued for the 32.076 acre property located at 499 North Broad Street, Bremen, Fairfield County, Ohio (Property). Pursuant to the conditions and limitations identified in the Covenant as well as Ohio Revised Code (ORC) Section 3746.12(B)(1), the Covenant shall remain in effect as long as the Property continues to comply with the applicable standards upon which the Covenant was based and Superior Fibers implements the Operation and Maintenance Plan (2005 O&M Plan) in accordance with the terms of the Operation and Maintenance Agreement (2005 O&M Agreement).

The February 2006 ground water sampling event indicated that chemicals of concern (COCs) were detected in nine of the 16 wells that comprised the early warning well network. Confirmatory sampling conducted on March 16, 2006 verified the existence of COCs in five of the early warning wells, and that the volatile organic compound (VOC) ground water plume had migrated down-gradient and beyond the Property's boundary. The 2005 O&M Plan provided for the implementation of a contingent ground water remediation plan in the event that COCs were reported in any of the early warning wells on the Property. However, Superior Fibers did not implement the contingent ground water remediation plan. Subsequent ground water sampling confirmed that the ground water plume was much larger than previously determined.

Superior Fibers retained the services of CH2M Hill in late June 2006 and proposed to implement an alternate contingency plan for remediation of ground water in lieu of that originally detailed in Sections 6.1 through 6.1.4 of the approved 2005 O&M Plan. Specifically, Superior Fibers proposed to use a perimeter air sparging/biosparging system to prevent the migration of the VOC plume off property. Superior Fibers also proposed to treat the source area soil and ground water. On December 13, 2006, Ohio EPA provided Superior Fibers with notice of the Property's noncompliance with applicable ground water standards upon which the Covenant is based, and an opportunity to cure the noncompliance in accordance with ORC Section 3746.12(B)(2) and (3). On January 26, 2007, Ohio EPA and Superior Fibers entered into a Compliance Schedule Agreement in accordance with ORC Section 3746.12(B)(3).

The purpose of the Compliance Schedule Agreement was to provide a schedule for restoring the Property to compliance with the applicable standards of the Voluntary Action Program (VAP) as set forth in ORC Chapter 3746 and Ohio Administrative Code (OAC) Chapter 3745-300. Pursuant to the Compliance Schedule Agreement, Superior Fibers initially submitted to Ohio EPA a draft Addendum to the 2005 O&M Plan on February 14, 2007. A meeting was held with Superior Fibers and their consultant in early April 2007 to discuss deficiencies in the February 2007 submittal. Ohio EPA provided formal comments by letter dated June 1, 2007. Superior Fibers timely submitted a revised draft Addendum on July 2, 2007; however, further revisions were required. On July 17, 2007, Superior Fibers submitted a revised draft Addendum to the 2005 O&M Plan and Ohio EPA made further revisions to the draft.

Quarterly ground water monitoring data was reported by CH2M Hill in late August and September 2007 and included several new off-property wells. The data indicated the contaminated ground water plume extended well beyond the Superior Fibers' property boundary. Internal meetings at Ohio EPA were held to discuss the potential threat of the off-property plume to the village of Bremen wellfield. In late December 2007, Ohio EPA met with representatives from Superior Fibers and Reichhold Chemicals, Inc. (Reichhold), the prior owner, to discuss the effectiveness of the air sparging/biosparging system as an on-property remedy and the Agency's concerns regarding the off-property plume. The additional remedial work included in the proposed draft Addendum to the 2005 O&M plan for the Superior Fibers' property was also discussed with the ultimate common goal for all participants of bringing the Superior Fibers' property back into compliance with VAP applicable standards.

Ohio EPA expressed its additional concerns to Superior Fibers and Reichhold regarding the extent of the contaminated ground water plume located beyond the VAP property boundary. It was noted that the southern edge of the off-property plume was extending toward the village of Bremen wellfield, with low level detections of COCs within approximately 400 feet of the wellfield. Ohio EPA advised that Superior Fibers and Reichhold needed to evaluate and address the off-property plume and potential threat to the village of Bremen wellfield separate from the remedy to be implemented to restore the Superior Fibers' property to VAP applicable standards. Ohio EPA advised that we would continue to monitor the situation while the parties met with the adjacent property owner and reviewed the ground water monitoring data on their impacted property to determine what the appropriate course of action for the off-property plume would be.

Following the meetings with Superior Fibers and Reichhold, additional changes were proposed by Ohio EPA to the draft Addendum to the 2005 O&M Plan. A final revised draft was submitted by CH2M Hill in early March 2008. Pursuant to ORC Section 3746.12(B) and the January 26, 2007 Compliance Schedule Agreement, the attached March 2008 Addendum to the 2005 O&M Plan is approved and incorporated into the approved 2005 O&M Plan as if fully rewritten. The 2005 O&M Plan including the attached March 2008 Addendum remain a part of the March 22, 2005 Covenant and subject to the terms of the Covenant, including the 2005 O&M Agreement, and the January 26, 2007 Compliance Schedule Agreement.

This approval of the March 2008 Addendum to the 2005 O&M Plan is a final action of the Director and will be public noticed in accordance with OAC 3745-47-07. The action may be appealed to the Environmental Review Appeals Commission. The appeal must be in writing and set forth the action complained of and the grounds upon which the appeal is based. The appeal must be filed with the Commission within 30 days after notice or issuance of the action. (See ORC 3745.04 and 3745.07.) The appeal must be accompanied by a filing fee of $70.00 which the Commission, in its

discretion, may reduce if by affidavit it is demonstrated that payment of the full amount of the fee would cause extreme hardship. Notice of the filing of the appeal shall be filed with the Director within three days after the appeal is filed with the Commission. Ohio EPA requests that a copy of the appeal be served upon the Ohio Attorney General's Office, Environmental Enforcement Section. The appeal may be filed with the Commission at 309 South Fourth Street, Room 222, Columbus, Ohio 43215.

Your cooperation in this matter is appreciated. If you have any questions regarding this approval, the March 2008 Addendum to the 2005 O&M Plan, the Compliance Schedule Agreement, the 2005 O&M Agreement or the Covenant, please contact Ms. Martha Cooper of Ohio EPA's Legal Office at (614) 644-3037.

Sincerely,

Chris Korleski
Director

Enclosure

c: Rick Ricketts, Esq., Ricketts Law
Chris Schraff, Esq., Porter, Wright, Morris and Arthur
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CK/nsm Superior Fibers Director's letter approving Addendum 7-11-08

Addendum to the 2005 Operation and Maintenance Plan

Prepared for

Superior Fibers, Inc.
499 North Broad Street
Bremen, OH 43017

March 5, 2008

Volunteer

Superior Fibers, Inc.
499 North Broad Street
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Certified Professional

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CH2MHILL

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Abbreviations and Acronyms

AS/B	air sparge/biosparge
AST	aboveground storage tank
bgs	below ground surface
COC	chemicals of concern
DCE	dichloroethylene
DO	dissolved oxygen
DPT	direct push technology
ISCO	in situ chemical oxidation
J&E	Johnson and Ettinger
MDL	method detection limit
mg/L	milligrams per liter
MNA	monitored natural attenuation
mV	millivolt
NFA	no further action
O&M	operation and maintenance
OAC	Ohio Administrative Code
Ohio EPA	Ohio Environmental Protection Agency
ORP	oxidation-reduction potential
PLC	programmable logic controller
PMW	pressure monitoring well
POC	point of compliance
psi	pounds per square inch
PVC	polyvinyl chloride
RMP	risk mitigation plan
S	(Mann-Kendall) statistic
SAI	Smalley & Associates, Inc.
Superior Fibers	Superior Glass Fibers, Inc.

TCE	trichloroethylene
TOC	total organic carbon
UIC	underground injection control
UPUS	unrestricted potable use standards
USEPA	United States Environmental Protection Agency
VAP	Voluntary Action Program
VMP	vapor monitoring probe
VOC	volatile organic compound

1 Introduction

CH2M HILL has prepared this Voluntary Action Program (VAP) Addendum to the 2005 Operation and Maintenance (O&M) Plan for the Volunteer, Superior Glass Fibers, Inc. (Superior Fibers). The Superior Fibers facility is located at 499 North Broad Street, Bremen, Ohio (Figure 1-1). In June 2006, CH2M HILL was requested to provide VAP-certified professional support to Superior Fibers to conduct the ongoing groundwater sampling events, prepare this revised O&M Plan Addendum, and oversee implementation of the alternate remedial activities selected to achieve perimeter plume control, prevent future offsite migration of chemicals of concern (COCs) related to historical use of trichloroethylene (TCE), and reduce concentrations of site-related COCs.

CH2M HILL has prepared this document to present the selected remedial activities to be implemented by Superior Fibers to protect public health and the environment and to achieve and maintain continued compliance with applicable standards in accordance with the Ohio Administrative Code (OAC) 3745-300-15. Except where noted, this document follows the outline of the O&M plan (addendum) prepared by Smalley & Associates, Inc. (SAI) dated February 2005, and as requested by Ohio EPA, contains only the text that is being revised from the original Ohio EPA-approved version.

1.1 Property Description

Refer to Section 1.1 of the February 2005 SAI O&M plan (addendum).

1.2 Background and Property History

Refer to Section 1.2 of the February 2005 SAI O&M plan (addendum).

1.3 Soil Investigation and Findings

SAI conducted a VAP Phase II property assessment from June through December 2002 to determine if soil contamination remained within previously identified areas. Twelve COCs were identified during this assessment; most were attributed to historical use of TCE to clean resinous fiberglass from equipment on a concrete pad on the south side of Plant 1. More information on this assessment can be found in the SAI *Phase II Assessment Report* (SAI 2002b).

CH2M HILL collected additional soil samples as part of supplemental investigation activities to further delineate the extent of COCs within the soil source area (sampling locations are shown on Figure 1-2. Findings and results from these supplemental sampling events are provided in the semiannual groundwater reports submitted in February 2007 (CH2M HILL 2007a) and July 2007 (CH2M HILL 2007b). COCs in soil remain the same as those listed in Section 1.3 of the SAI February 2005 O&M plan (addendum): acetone, 2-butanone, 1,2,4-trimethylbenzene, benzene, toluene, ethylbenzene, xylene, TCE, 1,1-dichloroethylene (DCE), cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride.

In addition to the soil investigations, approximately 2,200 tons of VOC-impacted shallow vadose zone soil was excavated from the source area in August and September 2007 in accordance with the source area soil excavation work plan (CH2M HILL 2007c). Details related to excavation activities are summarized in the semiannual groundwater monitoring report that will be submitted to Ohio EPA in February 2008.

1.4 Groundwater Investigation and Findings

Historical groundwater investigation activities and findings are summarized in Section 1.4 of the SAI February 2005 O&M plan (addendum) and the no further action (NFA) letter (SAI 2002a). To evaluate the migration of COCs vertically and horizontally through the aquifer, shallow, intermediate, and deep monitoring wells were installed. Shallow monitoring wells are screened in the gravelly sandy clay and the upper portion of the sand and gravel aquifer (generally shallower than 25 feet bgs). Intermediate monitoring wells are screened in the sand and gravel aquifer generally between 25 and 40 feet bgs. The deep monitoring wells are screened in the lower portion of the sand and gravel aquifer (generally deeper than 40 feet bgs).

The general stratigraphy at the site consists of a surficial gravelly sandy clay extending to depths from approximately 5 to 20 feet bgs. The gravelly sandy clay is underlain by a sand and gravel unit that extends to depths of approximately 55 feet bgs. The sand and gravel unit is underlain by silty clay ("basal clay"), which in most cases directly overlies bedrock. The basal silty clay ranges in thickness from 1 to tens of feet and transitions to weathered sandstone at approximately 60 feet bgs, though shale is observed below the basal clay in some areas of the site. An interpretation of the subsurface geology along the eastern property boundary is presented on Figure 1-3. As shown on Figure 1-3, the thin, clayey silt layer is between the intermediate and deep monitoring intervals at the property line. The thickness of the sand and gravel aquifer, intermediate clayey silt, and basal silty clay are variable across the site; and the intermediate clayey silty and basal silty clay are not observed in some locations.

Various supplemental groundwater investigation and well repair activities have been completed since October 2006. These activities have provided some clarification to understanding of the subsurface lithology and site conceptual model. Results of these activities are presented in the current conditions and interim remediation work plan (CH2M HILL 2006) and the semiannual groundwater monitoring reports submitted to Ohio EPA in February 2007 (CH2M HILL 2007a) and July 2007 (CH2M HILL, 2007a) and the semiannual groundwater monitoring report that will be submitted to Ohio EPA in February 2008. The current well network at the site is illustrated on Figure 1-4.

1.5 Exposure Pathway Assessment

As presented in Section 1.5 of the SAI February 2005 O&M plan (addendum), the following pathways were determined to be complete, and pose a potential risk to human health and the environment:

- Direct contact soils (onsite)
- Construction worker

- Groundwater ingestion
- Soil-to-indoor air
- Groundwater-to-indoor air
- Groundwater direct contact

The following sections describe changes to the status of these pathways based on information that has been obtained since the SAI February 2005 O&M plan (Addendum). A Risk Mitigation Plan (RMP) was submitted to Ohio EPA on December 14, 2007 and approved by Ohio EPA on January 2, 2008, to address exposures that might pose a potential risk to workers during construction or excavation activities.

Evaluations of potential indoor air exposure pathways were conducted in accordance with the guidelines presented in *Methodology for Vapor Intrusion Assessment* (Ohio EPA 2005) and the J&E model presented in *User's Guide for Evaluating Subsurface Vapor Intrusion Into Buildings* (USEPA 2004).

1.5.1 Direct Contact Soils

Soil analytical results from all sampling events were compared to the VAP generic direct contact limits for industrial land use (Table 3 of OAC 3745-300-08[B][3][c]). The results from this comparison indicate there are no exceedances of the direct contact standard for industrial use; therefore, this exposure pathway is incomplete.

1.5.2 Groundwater Ingestion

A declaration of use restriction (Section 3) has been implemented for onsite groundwater to prohibit the extraction or use of groundwater at the site except for noncontact process operations associated with manufacturing at the property; as necessary for investigation or remediation of groundwater; or in conjunction with construction activities or the installation or maintenance of subsurface utilities.

1.5.3 Soil-to-Indoor Air

To evaluate the soil-to-indoor air exposure pathway, site-specific risk-based soil screening levels were calculated with the J&E model and cumulative risk evaluated for a potential industrial worker exposure scenario for volatile organic compounds (VOCs) detected in soil samples collected from the source area. The cumulative risk evaluation included an adjustment for multiple constituents to assess the carcinogenic and noncarcinogenic cumulative risk from VOCs detected in soil near the boundaries of the excavation. Results of the soil vapor intrusion risk evaluation were presented in the source area soil excavation work plan (CH2M HILL 2007c). As part of the source area remedy, the soil sampling locations where screening values were exceeded were excavated (Section 5.2); therefore, this pathway is incomplete.

1.5.4 Groundwater-to-Indoor Air

To evaluate the groundwater-to-indoor air exposure pathway, site-specific groundwater screening levels were calculated with the J&E model and cumulative risks evaluated for a potential industrial worker exposure scenario for groundwater VOCs. The screening level calculations and results from the cumulative risk evaluation for potential indoor air vapor intrusion from groundwater COCs were presented in the semiannual groundwater

monitoring report for the August and December 2006 events (CH2M HILL 2007a). Quarterly groundwater monitoring events continued in 2007. As summarized in the semiannual reports, screening level and cumulative risk evaluations of each quarterly groundwater sampling event continue to indicate that concentrations of COCs in groundwater are lower than risk-based thresholds (a target carcinogenic risk of 1×10^{-5} and a noncarcinogenic hazard index of 1) for the potential groundwater to indoor air vapor intrusion pathway.

Future groundwater sampling events will be compared to the site-specific screening levels and evaluated for potential cumulative risks. If future monitoring indicates that concentrations exceed the calculated screening values in onsite groundwater, a work plan will be submitted to Ohio EPA no more than 30 calendar days following receipt of the final analytical results unless Ohio EPA provides an alternative schedule. The work plan will include a summary of the existing cumulative risk evaluation, analytical results, details of the design for contingency remedies, if needed, and implementation schedule.

Additional activities occurred in 2007 to monitor the potential for COC-impacted soil gas to migrate into Plant 2 indoor air. These activities included installation of two vapor monitor points (VMPs) between the AS/B system and the Plant 2 building. To evaluate the soil gas-to-indoor air exposure pathway, site-specific soil gas screening levels were calculated with the J&E model and cumulative risks evaluated for a potential industrial worker exposure scenario for soil gas VOCs. The screening level calculations and results from the cumulative risk evaluation for potential vapor intrusion from soil gas COCs are presented in the semiannual groundwater monitoring report for the August and December 2007 events (CH2M HILL 2008a). Screening level and cumulative risk evaluations of the soil gas sampling events indicate that current concentrations of COCs in the VMPs are lower than risk-based thresholds (a target carcinogenic risk of 1×10^{-5} and a noncarcinogenic hazard index of 1) for the potential soil gas to indoor air vapor intrusion pathway.

Future soil gas sampling events as detailed in Section 5.1.1 of this document will be compared to the site-specific screening levels and evaluated for potential cumulative risk. If future soil gas monitoring indicates that concentrations exceed the calculated screening values in soil gas adjacent to the Plant 2 building, a work plan will be submitted to Ohio EPA no more than 30 calendar days following receipt of the final analytical results unless Ohio EPA approves an alternative schedule. The work plan will include a summary of the existing cumulative risk evaluation, analytical results, details of the design for contingency remedies, if needed, and implementation schedule.

1.5.5 Groundwater Direct Contact

There are no VAP criteria for groundwater direct contact. Groundwater at the site is typically encountered from 6 to 10 feet bgs, which in conjunction with the declaration of use restriction limiting the use of groundwater to noncontact processes, eliminates the potential for direct contact during normal activities. However, because groundwater could be encountered during construction activities, this pathway remains complete and will be considered as part of the RMP associated with the remedial measures discussed in Section 5.

2 Determination of Applicable Standards

Applicable standards for groundwater to be met at the point of compliance (POC), which is the Superior Fibers property boundary, will be the COC UPUS values. Ultimately, the long-term groundwater monitoring program discussed in Section 4 will be used to demonstrate that the resulting remediation strategy will achieve UPUS at the property boundary. Applicable standards will be attained in groundwater by May 15, 2011, unless Ohio EPA approves an alternative schedule. Discussion on the implementation of the long-term groundwater monitoring plan described in Sections 2.2 through Section 2.7 of SAI February 2005 O&M plan (addendum) is included in Section 3 of this addendum.

3 Implementation of the Long-term Groundwater Monitoring Plan

The main purposes of the long-term groundwater monitoring are to (1) demonstrate that applicable standards are being met in groundwater at the property boundary, (2) monitor the progress of remedial actions, and (3) ensure the site remains protective of human health and the environment. This section describes the long-term plan for groundwater sampling and monitoring, data evaluation procedures, and criteria for termination of monitoring.

The monitoring wells to be sampled during the long-term groundwater monitoring program are summarized in Tables 2-1 and shown on Figure 1-4. As remediation activities progress and the plume size decreases, wells that currently are monitored may no longer be necessary to show compliance with applicable standards. Any recommendations to changes to the sampling frequencies or the well network will be submitted in writing to Ohio EPA. Changes will be implemented following receipt of written approval from Ohio EPA. Monitoring wells used for the long-term groundwater monitoring program are screened in the upper, intermediate, and deep aquifer zones. As discussed in Section 1, shallow wells are usually screened less than 30 feet bgs in the gravelly sandy clay and/or upper sand and gravel deposit. Intermediate wells are usually screened between 25 and 40 feet bgs in the sand and gravel deposit. Deep wells are usually screened deeper than 40 feet bgs at the bottom of the sand and gravel deposit. Based on available well logs, the three process water wells appear to be screened within the intermediate portion of the aquifer. Aquifer zone classifications for all monitoring wells are listed in Table 2-1.

3.1 Tasks for Operation of the Long-term Groundwater Monitoring System

Refer to Section 2.2 of the SAI February 2005 O&M plan (Addendum).

3.2 Maintenance and Preventive Measures

Monitoring wells will be inspected during each sampling event for cracked and damaged casings, cracked concrete pads, and damage to the outer protective casing and locking caps. Wells will be locked at all times except during a sampling event. Well inspection results and any needed repairs will be documented with each monitoring report (see Section 6). Damage to wells will be repaired, as necessary, after receipt of approval from Ohio EPA.

3.3 Operating Conditions and Monitoring Schedule during Routine Groundwater Sampling Events

Monitoring wells will be sampled quarterly until the source area remedy is implemented and the perimeter control measure proves effective at maintaining applicable standards at

the property boundary. At that time and as deemed appropriate in the future based on current site conditions, a request may be made in writing to Ohio EPA to modify the list of monitoring wells in Table 2-1 and sampling frequencies. Any changes to the sampling frequencies or well network, as appropriate, will only be implemented after Ohio EPA approval. Quarterly sampling will take place during the middle month of the quarter (that is, February, May, August, and November) unless Ohio EPA approves an alternative sampling schedule. A request to add newly installed monitoring wells to the monitoring program well list in Table 2-1 will be submitted to Ohio EPA within 15 days of completion of new well construction.

3.4 Operating Conditions and Monitoring Schedule during Remediation

Wells that are monitored during ongoing remediation activities are also listed in the most current version of Table 2-1. Additional monitoring activities to evaluate the performance and progress of remediation activities are further specified in Section 5 of this report.

3.5 Data Collection

During each quarterly groundwater sampling event, groundwater elevations will be measured in the wells listed in Table 2-1. A potentiometric groundwater surface map depicting groundwater flow direction and groundwater elevation contours will be prepared for each sampling event.

Sampling will be conducted following low-flow sampling protocols, or volumetric purging if low-flow is not possible, and analyzed for the presence of COCs by a VAP-certified laboratory following U.S. Environmental Protection Agency (USEPA) Method 8260B. Field parameters (turbidity, pH, temperature, oxidation-reduction potential [ORP], dissolved oxygen (DO), and specific conductance) will be measured during purging of the wells. Any variance from the above schedule or monitoring program will be submitted in writing to Ohio EPA for approval before implementation.

3.6 Evaluation of Sampling Results

After completing eight quarterly groundwater monitoring events following implementation of the source area soil and groundwater remedies, and after demonstration of the effectiveness of the perimeter control system, the analytical data for groundwater will be reviewed in light of the following objectives:

- Evaluate whether there are decreasing (or increasing) trends in COC concentrations in monitoring wells across the site
- Evaluate seasonal fluctuations in groundwater elevations and the potential impact of such fluctuations on migration of COCs

A trend analysis will be performed using the Mann-Kendall trend test (or similar) for collected analytical data in individual monitoring wells. In this method, the Mann-Kendall statistic (S) is calculated. The Mann-Kendall statistic is the difference between the number of

positive changes and the number of negative changes in the data sequence for a single monitoring well. Given S and the number of data points available, a probability value is derived from probability tables that indicate whether the concentration is increasing or decreasing.

If the evaluation indicates (1) COC concentrations have an increasing trend, (2) COC concentrations have reached steady-state (that is, are not decreasing and still exceed applicable criteria), or (3) UPUS cannot be achieved at the property boundary within a reasonable time frame, the contingency plan outlined in Section 5.4.3 will be implemented.

3.7 Criteria for Termination of Long-term Groundwater Monitoring

Before discontinuing the remedial activities, COCs in soil and groundwater must meet applicable standards. Termination of remedial activities may occur in a phased approach depending on the results of ongoing groundwater monitoring activities. Termination of any portion of a remedial system will occur after Ohio EPA approval.

Upon termination of all remedial activities, verification sampling to evaluate potential rebound of COCs will take place after the remedial system operations have been discontinued. Following termination of active remediation and re-equilibration of geochemical conditions in groundwater, groundwater monitoring will be conducted for a minimum period of eight quarters of consecutive monitoring events. Groundwater monitoring will be terminated after demonstrating that concentrations of COCs are at or below UPUS at the property boundary, and no statistically significant increases in COC concentrations are observed anywhere on Property which could result in an exceedance of applicable standards at the property boundary.

Upon termination of remedial and monitoring activities, a letter will be submitted to Ohio EPA including the plans for abandoning monitoring wells and remediation system infrastructure. Upon Ohio EPA approval, monitoring wells and remediation system infrastructure will be properly abandoned and dismantled, and well sealing reports will be submitted to the Ohio Department of Natural Resources. Well abandonment will be performed in accordance with OAC 3745-09-03.

4 Declaration of Use Restrictions

Refer to Section 4 of the SAI February 2005 O&M plan (addendum). In addition, the SAI February 2005 O&M plan (addendum) contained a use restriction presented in Section 2.2. The following text updates that information.

Until site closure status is achieved, farming will only be permitted north of the creek that flows along the northern boundary of the facility.

5 Implementation of Contingency Plan for Remediation

As stated in Section 6 the SAI February 2005 O&M plan (addendum), if COCs were detected in groundwater from any of the early warning wells at or above the method detection limit (MDL), Ohio EPA will be notified and a contingency plan for remediation will be implemented. This section, which includes the installation and operation of the perimeter control system, source area remediation activities and residual groundwater remediation activities, replaces Section 6 of the SAI February 2005 O&M plan (addendum). Additional contingencies also are specified in this section.

5.1 Perimeter Control System

During the February and May 2006 sampling events, detections of COCs were encountered at the early warning wells. As discussed with Ohio EPA, the contingency plan detailed in Section 6 of the SAI February 2005 O&M plan (addendum) was not implemented because the approach was deemed not technically feasible given the current site conditions and more appropriate remedial options were evaluated for implementation at the site. A perimeter groundwater plume containment system was selected as the replacement remedial approach for the contingency plan.

The objective of the perimeter groundwater plume containment system is to prevent COCs from migrating offsite at concentrations above UPUS. To meet this objective, AS/B was selected as the preferred remedy to obtain control of the groundwater plume along the perimeter of the facility. The AS/B system was installed to promote volatilization and biodegradation of VOCs and prevent further migration of the plume beyond the property boundary.

5.1.1 Remediation System Description

AS/B is a process in which air is injected into groundwater through a series of wells. Injected air migrates to the surface through the saturated zone in a complex and non-uniform series of finger-like channels, the paths of which are strongly influenced by subsurface heterogeneity. While air sparging removes contaminants primarily through volatilization, biosparging promotes aerobic biodegradation of site constituents susceptible to aerobic degradation (USEPA 1994).

The components of the AS/B system are listed in Table 2-1 and are illustrated on Figure 1-4. AS/B system is a single row of vertical air injection wells along the eastern perimeter of the site. The 29 deep AS/B wells are spaced approximately 30 feet apart to create a "sparging curtain." Air is distributed to the wells through individual subsurface conveyance pipes. A fully enclosed, trailer-mounted remediation system was installed to provide air to the AS/B wells. Process equipment inside the trailer includes a rotary screw air compressor, manifold, and various flow and pressure control devices, with a programmable logic controller (PLC) that can be remotely programmed and monitored. The air compressor is equipped with a

receiving tank, pressure relief valve, pressure regulator, particulate filter, coalescing filter, and carbon filter.

VMPs and pressure monitoring wells (PMWs) were installed to evaluate the effectiveness of the AS/B system. VMPs are screened at two separate intervals in the vadose zone and are used to monitor pressure and vapor concentration within the radius of influence. PMWs are located approximately 30 feet away from the curtain and are used to evaluate VOC concentration changes and potentially alleviate pressure that could build up under the surficial silty loam or sandy clay units, if necessary. PMWs are screened in the top portion of the sand and gravel unit and can be equipped with an air diffuser and ball valve. When open, the ball valve allows pressurized water and vapor to flow to the diffuser, which will retain the water and let vapor pass to the atmosphere.

To evaluate the potential for COC-impacted soil gas to migrate into the Plant 2 indoor air, COC concentrations from selected VMPs will be evaluated as discussed in Section 1.5.4. If additional air sparge wells are installed or if the flow rates are increased, the VMPs near Plant 2 will be resampled and results will be presented in the semiannual reports.

The AS/B system is operated in accordance with the August 31, 2006, letter from the Ohio EPA, Division of Drinking and Ground Waters, Underground Injection Control (UIC) Unit, which indicated that injection of air into these wells is authorized under Ohio's underground injection control regulations in OAC Chapter 3745-34.

5.1.2 Routine System Operations and Maintenance

Routine O&M and system monitoring have been performed since continuous operation of the system began in November 2006. Operational parameters that will be routinely monitored include compressor outlet temperature and pressure; manifold position, temperature, pressure, and flow rate; and individual sparge well pressure and flow rate. Other routine O&M activities include compressor oil changes, filter change-out, and system flow/pressure adjustments. The AS/B system is equipped with a PLC-based control system that allows remote login. A notification fax is automatically sent when the system shuts down. This notification ensures that the AS/B will be restarted as soon as possible (preferably within 24 hours of notification).

The network used to monitor the AS/B system includes monitoring wells, PMWs, and VMPs. Routine monitoring activities include groundwater sampling for VOCs at the monitoring wells; water level elevation measurement from monitoring wells and PMWs; field measurement of groundwater for DO, pH, temperature, ORP, and specific conductance; field measurement of soil vapor at the VMPs for organic vapor, carbon dioxide and oxygen concentrations and pressure monitoring at the VMPs and PMWs. The monitoring schedule is included in the effectiveness monitoring plan for the AS/B system (Table 5-1).

5.1.3 Effectiveness Evaluation

The objective of the perimeter AS/B system is to prevent COCs from migrating offsite at concentrations above UPUS. The most critical criterion for initially assessing the effectiveness of the AS/B system is the observance of a decreasing trend in VOC concentration in the local monitoring wells. Although other indications of sparge system influence are important to observe (such as measurable DO and positive ORP for wells in

the aeration zone), if the concentrations are not decreasing, the system is not effective at achieving the objectives. When it becomes evident that the AS/B system is effective, the most critical criterion for assessing its effectiveness is that it is maintaining UPUS at the property boundary and providing general indications of effective operations, including ORP values greater than -100 millivolts (mV) and DO greater than 0.5 milligram per liter (mg/L). An AS/B Effectiveness Criteria Plan, which will define effectiveness monitoring metrics for geochemical and analytical parameters, was submitted to Ohio EPA for review and approval on July 13, 2007. Pending Ohio EPA concurrence, the metrics provided in an approved Effectiveness Criteria Plan will be used to clarify the effectiveness monitoring program so that AS/B system modifications are made in a timely manner.

To evaluate the sparge system effectiveness, the VOC concentrations will be measured, and field data listed in Section 5.1.2 will be collected to evaluate general indicators of effectiveness. Monitoring wells will be evaluated by position (upgradient, aeration zone, or downgradient) and depth (shallow, intermediate, or deep). A list of the current monitoring wells used to monitor the AS/B system and their respective positions relative to the AS/B system is included in Table 2-1. Any changes to the long-term groundwater monitoring well network may cause changes to the wells listed as AS/B O&M monitored wells listed in Table 2-1. Only the most current Ohio EPA-approved version of Table 2-1 will be used to evaluate the AS/B system's effectiveness on property.

Field data also will be collected as part of these monitoring activities to evaluate the overall effectiveness and radius of influence of the AS/B system. The following are general indicators of AS/B system influence:

- DO concentration, ORP, and vapor phase oxygen and carbon dioxide increases
- Pressure accumulation in nearby monitoring wells
- Vapor phase VOC concentrations increase in VMPs
- Variations in pH, temperature, or specific conductivity from baseline conditions

When the AS/B system is proven to be effective at achieving UPUS at the property boundary, routine monitoring should indicate that UPUS continues to be achieved at the property boundary and the AS/B system is maintaining target ORP and DO results. These parameters will be used to demonstrate that sparged air continues to influence the aquifer, thereby providing adequate conditions for aerobic biodegradation and volatilization. In accordance with the pending AS/B effectiveness criteria plan, if these conditions are not achieved, recommendations for any system operational changes, enhancements, or modifications will be provided in the semiannual reports (Section 6).

5.1.4 Reporting

Monthly operating reports are submitted to the Division of Drinking and Ground Waters, UIC unit. The monthly reports include the following elements:

- Description of the injected fluids
- Injection rate and volume
- Description of any injection well maintenance and rehabilitation procedures
- Field and laboratory results
- Latitude and longitude coordinates for the AS/B wells (previously submitted in the monthly report dated December 6, 2006)

The semiannual report will include an assessment of system performance with a review of physical, geochemical, analytical results. Conclusions and recommendations will be provided in the semiannual submittal.

5.1.5 Termination Criteria

Shutdown of the perimeter sparge system may occur in a phased approach, depending on the results of ongoing groundwater monitoring activities. Shutdown of any portion of the sparge system can only occur with Ohio EPA approval. Before complete termination of the AS/B system can be considered, concentrations of COCs upgradient of the sparge system must meet UPUS. Before this demonstration can be made, the active soil and groundwater source treatment remedies must be completed. When source area remedies have been implemented and UPUS have been achieved at the property boundary, the entire AS/B system operation will be discontinued. After sparge air dissipates and geochemical conditions have equilibrated, a minimum of eight consecutive quarters of groundwater monitoring events will be performed to assess potential rebounding. Monthly geochemical measurements will be collected after the AS/B system has been shut down to ensure conditions have equilibrated before the first groundwater monitoring event. If rebounding does not occur, Ohio EPA approval will be obtained to abandon the AS/B wells and associated infrastructure.

5.1.6 Contingency Plan

If the effectiveness evaluation indicates the AS/B system is not effectively reducing COC concentrations along the property boundary to below UPUS, contingency remedies will be evaluated based on site-specific data available at the time of the evaluation. Any significant changes in the perimeter control system approach will be discussed with Ohio EPA and will be summarized in the semiannual reports.

5.2 Source Area Soil Remediation

In August and September 2007, approximately 2,200 tons of VOC-impacted shallow vadose zone soil was excavated from the source area in accordance with source area soil excavation work plan (CH2M HILL 2007c) and as shown on Figure 5-1. The depth of the excavation was approximately 8.5 feet bgs. A summary of the field activities and demonstration of the effectiveness are presented in the semiannual report covering the August and December 2007 groundwater sampling events (CH2M HILL 2008a). No further vadose zone soil remedies are currently deemed necessary. If additional information becomes available during future monitoring activities conducted at the site that require supplemental remedies to site soils, approaches will be discussed with Ohio EPA and any supplemental remedies will be summarized in the semiannual reports.

5.3 Source Area Groundwater Remediation

Before backfilling the excavation that was conducted in August and September 2007, a 5 percent sodium permanganate solution was applied to the floor of the excavation to treat shallow groundwater directly beneath. This first application was designed, by mass, to treat groundwater from 8 to 12 feet bgs.

Before backfilling the excavation, four lengths of 2-inch slotted polyvinyl chloride (PVC) pipe were installed horizontally on the floor of the excavation for possible future ISCO applications (or delivery of other remediation reagents) to shallow groundwater within the excavation boundaries. Further details related to the excavation, initial ISCO application and installation of the shallow pipes are detailed in source area soil removal and initial ISCO application construction completion report (CH2M HILL 2008c) that is included as an appendix to the semiannual report covering the August and December 2007 groundwater sampling events.

As detailed in both the September 2007 technical memorandum for ISCO application in the source area (CH2M HILL 2007d) and January 2008 work plan for subsequent ISCO application in the source area (CH2M HILL 2008b), ISCO is being used to address the 8- to 10-foot bgs groundwater smear zone and deeper groundwater in the source area. The objective of the source area groundwater remedy is to remove COC mass to help achieve UPUS at the property boundary.

5.3.1 Remediation System Description

Two injection methods are currently planned to be used to treat shallow groundwater in the source area, including:

- Application using the horizontal piping installed during excavation activities to treat approximately 8 to 12 feet bgs in the former excavation area
- Use of DPT to inject oxidant into the 8- to 10-foot zone outside the excavation area and deeper source area groundwater

Details related to future ISCO injection events are summarized in the January 2008 work plan for subsequent ISCO application in the source area (CH2M HILL 2008b). The location of the horizontal piping and current areas proposed for ISCO treatment are illustrated on Figure 5-2.

5.3.2 Performance Evaluation Monitoring

Groundwater grab samples will be used to monitor groundwater before, during, and after the oxidant application during excavation activities. The performance monitoring approach for additional injection events is included in the January 2008 work plan (CH2M HILL 2008b). O&M activities during the oxidant injections include monitoring the following:

- Well head and pump pressures
- Injection flow rates
- Groundwater levels
- Presence of oxidant at or near the ground surface (for example, observed in stormwater conveyance piping)
- Geochemical parameters that indicate the presence of oxidant at each monitoring well (for example, use a Hach colorimeter for the presence of permanganate)

Adjustments to the injection process will be made based on the monitoring parameters.

The ISCO application plan will be adjusted for subsequent injection events according to the results of post injection monitoring. Any significant changes in the ISCO approach for future applications compared to that described in the work plan (CH2M HILL 2008b) will be discussed with Ohio EPA and/or will be summarized in the semiannual reports. Such changes might include selection of a difference oxidant (or dose) or a different method of application, changes to the targeted treatment area or targeted treatment interval, or changes to the performance monitoring plan.

5.3.3 Reporting

A summary of the field activities, sampling results, and future recommendations will be presented in the semiannual report that will be submitted following completion of the injection activities and subsequent sampling events. Additional reporting details are provided in Section 6.

5.3.4 Contingency Plan

If after the subsequent ISCO applications injection events into the shallow and deep groundwater, the monitoring results indicate the planned ISCO application is not effectively reducing COC concentrations in the source area, contingency remedies will be evaluated based on site-specific data available at the time of the evaluation. Potential contingency remedies include the following:

- Additional ISCO injections (modifications to the approach will be made as necessary)
- Air sparging
- Enhanced bioremediation or enhanced reductive dechlorination
- Other applicable technologies

Any significant changes in the ISCO approach for future applications compared to that described in the work plan (CH2M HILL 2008b) will be discussed with Ohio EPA and summarized in the semiannual reports.

5.3.5 Termination Criteria

Further remediation in the source area will no longer be necessary when a minimum of eight consecutive quarterly rounds of groundwater sampling following termination of active remediation and re-equilibration of geochemical conditions in groundwater have demonstrated that VOC concentrations have not rebounded (see Section 3.6 for trend analysis approach) and no statistically significant increases in COC concentrations are observed that would result in an exceedance of applicable standards at the property boundary.

5.4 Groundwater Plume Remediation

Monitored natural attenuation (MNA) is a possible remedy to address the onsite dissolved-phase plume following source area soil remediation and groundwater remediation activities as described above. MNA is a site management strategy used where chemical degradation or reduction rates are sufficient to protect human health and the environment under natural conditions. Natural attenuation is best described as the use of natural biological, physical, and chemical processes to contain the migration of COCs, reduce their concentrations in the

subsurface, or transform them into nontoxic or less toxic end products. A long-term groundwater monitoring program is being implemented as described in Section 3. Groundwater analytical data collected during sampling events will be used to support evaluation of MNA.

5.4.1 Reporting

All results of analyses conducted to support the evaluation of MNA will be reported in the semiannual report.

5.4.2 Effectiveness Evaluation

After the source area soil and groundwater remedies are completed, a trend analysis will be completed using the Mann-Kendall trend test (or similar) described in Section 3.6 within 45 calendar days of receipt of the eighth quarterly groundwater sampling event data following termination of the active remedy and re-equilibration of geochemical conditions in groundwater. If the evaluation indicates that (1) COC concentrations have an increasing trend, (2) COC concentrations have reached steady-state (that is, are not decreasing and still exceed applicable criteria), or (3) UPUS cannot be achieved at the property boundary within a reasonable timeframe taking into consideration the May 15, 2011, timeframe referenced in Section 2, a contingency plan will be proposed for implementation or an alternate timeframe for achieving UPUS at the property boundary will be requested for Ohio EPA's approval. Overall compliance with applicable standards will be demonstrated through ongoing groundwater monitoring.

5.4.3 Contingency Plan

If an alternate timeframe is not requested for Ohio EPA's approval and a contingency remedy is deemed necessary, a work plan will be prepared that will include an alternate remedial approach. Technologies that will be considered include ISCO, AS/B, enhanced reductive dechlorination, or other applicable technologies. The work plan will be prepared and submitted to Ohio EPA for review and approval no later than 60 calendar days after the trend analysis is completed unless Ohio EPA approves an alternate schedule. The work plan will include the results of the trend analysis, details of the design for contingency remedies, and an implementation schedule.

Recommendations for any changes to the monitoring well network will be presented in this report. Groundwater sampling will continue as outlined in Section 3 followed by a Mann-Kendall trending (or similar) evaluation. The results of the trend evaluation will be submitted in the semiannual report.

Finally, if there is an exposure pathway risk associated with groundwater-to-vapor intrusion or other exposure pathway based on concentrations in onsite groundwater (at any time during long-term groundwater monitoring), a work plan will be submitted to Ohio EPA no later than 30 calendar following receipt of analytical data that identify a potential exposure risk unless Ohio EPA approves an alternative schedule. The work plan will include the results of the evaluation, details of the design for contingency remedies, and an implementation schedule.

5.4.4 Termination Criteria

The criteria for termination of long-term groundwater monitoring are provided in Section 3.7.

6 Reporting

The monitoring report discussion was moved from Section 4 of the SAI February 2005 O&M plan (addendum) to Section 6 of this report to consolidate the reporting requirements for the long-term groundwater monitoring program (described in Section 3 of this report) and the active remedial activities (described in Section 5 of this report).

Upon receiving the final analytical data from the laboratory, the data will be reviewed to ensure its usability, including checks on quality controls. Data from monitoring events will be summarized and submitted semiannually to Ohio EPA within 60 calendar days of receipt of the final analytical results following the 2nd and 4th quarter groundwater sampling event from the VAP-certified laboratory unless Ohio EPA approves an alternate schedule. If the monitoring frequency is changed to semiannually, then only annual reports will be prepared and submitted to Ohio EPA within 60 calendar days of receipt of the final analytical results unless Ohio EPA approves an alternative schedule. The reports will be submitted under affidavit and will include the following information:

- Results in table format of all sampling analytical values of COC in groundwater
- Potentiometric groundwater elevation maps from each sampling event
- Updated groundwater contamination plume maps for each COC
- Summary of any well repair or replacement conducted during the reporting period
- Copies of all laboratory analytical data reports and VAP laboratory certification affidavits
- Data evaluation, summary, and next steps, as necessary
- Monitoring well sampling log sheets documenting field equipment used, static water level, sampling methodology, monitoring well condition, and water quality data collected during purging at each monitoring well
- Summary of remedial measures or system modifications implemented during the reporting period and an evaluation of the effectiveness of those systems, as necessary

Ohio EPA will be consulted and written approval will be requested before any changes to the content of these reports may be made.

As discussed in Section 3, a trend evaluation will be performed on groundwater analytical results obtained after eight events have been completed following implementation of the source area remedy and demonstration of the effectiveness of the perimeter system. A trend evaluation report will be prepared and submitted to Ohio EPA within 60 calendar days of receipt of the final analytical data from the laboratory. This report will summarize all seven sampling events, and discuss the results and trends observed from the data. Draft or preliminary laboratory data reports will be provided to Ohio EPA upon request.

7 References

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Tables

TABLE 2-1
Site Well Summary [1]
Superior Fibers, Inc., Bremen, Ohio

Well Name	Screen Interval	Screened Zone	Quarterly Groundwater Monitoring Program[2]	Monitored during Source Area O&M[2]	Monitored during Air Sparge/ Biosparge O&M[2]	Offsite Monitoring[3]	Comment
EW-1	16 - 21	*Shallow*					
EW-2R	20 - 25	*Shallow*					
EW2DR	30 - 35	*Intermediate*					
EW-3	16 - 21	*Shallow*	x		x		Downgradient of AS/B
EW-3DR	32.5 - 37.5	*Intermediate*	x		x		Replacement well
EW-4	17.5 - 22.5	*Shallow*			x		Aeration Zone of AS/B
EW-4DR	30 - 35	*Deep*	x		x		Replacement well, Aeration Zone of AS/B
EW-5	19.5 - 24.5	*Shallow*					
EW-5DR	32 - 37	*Deep*					Replacement well
EW-6	18.5 - 23.5	*Shallow*					
EW-6DD	48.7 - 53.7	*Deep*					New monitoring well
DW-7	14 - 19	*Shallow*	x		x		Downgradient of AS/B
DW-8	18 - 23	*Shallow*	x		x		Downgradient of AS/B
DW-8D	41.5 - 46.5	*Deep*	x		x		Downgradient of AS/B
DW-9	11 - 16	*Shallow*	x		x		Downgradient of AS/B
DW-9D	39 - 44	*Deep*	x		x		Downgradient of AS/B
DW-10	11.5 - 16.5	*Shallow*	x				
DW-10D	24 - 29	*Shallow*	x				
DW-11	19.5 - 24.5	*Shallow*					
DW-11D	46 - 51	*Deep*					
DW-12R	12 - 17	*Shallow*			x		Replacement well, Aeration Zone of AS/B
DW-12I	30 - 35	*Intermediate*			x		New monitoring well, Aeration Zone of AS/B
DW-12DR	52.3 - 57.3	*Deep*	x		x		Replacement well, Aeration Zone of AS/B
DW-13R	12 - 17	*Shallow*	x		x		Replacement well, Aeration Zone of AS/B
DW-13I	28.1 - 33.1	*Intermediate*	x		x		New monitoring well, Aeration Zone of AS/B
DW-13DR	43 - 48	*Deep*	x		x		Replacement well, Aeration Zone of AS/B
DW-14R	14 - 19	*Shallow*	x		x		Replacement well, Aeration Zone of AS/B
DW-14I	31 - 36	*Intermediate*	x		x		New monitoring well, Aeration Zone of AS/B
DW-14DR	42 - 47	*Deep*	x		x		Replacement well, Aeration Zone of AS/B
MW-1	10 - 15	*Shallow*					
MW-2	16.5 - 21.5	*Shallow*					
MW-4R	10 - 15	*Shallow*	x	x			Replacement well, Source Area
MW-6	9 - 14	*Shallow*			x		Upgradient/Sidegradient of AS/B
MW-9D	34 - 39	*Intermediate*	x				
MW-10	18 - 23	*Shallow*					
MW-11	14 - 19	*Shallow*	x	x			
MW-11D	26 - 36	*Intermediate*		x			New monitoring well, Source Area
MW-13	24.5 - 29.5	*Shallow*			x		Upgradient/Sidegradient of AS/B
MW-14D	25.5 - 30.5	*Intermediate*	x		x		Upgradient/Sidegradient of AS/B
MW-15	19 - 24	*Shallow*					
MW-17	19.5 - 24.5	*Shallow*					Upgradient
MW-18R	10-15	*Shallow*	x		x		Replacement well, Upgradient/Sidegradient of AS/B
MW-18DR	24 -29	*Intermediate*	x		x		Replacement well, Upgradient/Sidegradient of AS/B
MW 18DDR	34.1 - 39.1	*Deep*	x		x		Replacement well, Upgradient/Sidegradient of AS/B
MW-19	8.5 - 13.5	*Shallow*	x				
MW-19D	28.5 - 33.5	*Intermediate*					
MW-20	19.5 - 24.5	*Shallow*					
MW-20B	14.5 - 19.5	*Shallow*	x				
MW-20BD	27.5 - 32.5	*Intermediate*	x				
MW-21	14 - 19	*Shallow*			x		Aeration Zone of AS/B
MW-21BR	15 - 20	*Shallow*	x		x		Replacement well
MW-21D	26 - 31	*Intermediate*			x		Aeration Zone of AS/B
MW-22	7 - 12	*Shallow*			x		Upgradient/Sidegradient of AS/B
MW-22B	14 - 19	*Shallow*					
MW-22BD	27 - 32	*Intermediate*					
MW-22D	26 - 31	*Intermediate*	x		x		Upgradient/Sidegradient of AS/B
MW-22DD	48 - 53	*Deep*			x		Upgradient/Sidegradient of AS/B
MW-23	7 - 12	*Shallow*			x		Upgradient/Sidegradient of AS/B
MW-23D	28 - 33	*Intermediate*			x		Upgradient/Sidegradient of AS/B
MW-23DD	43 - 48	*Deep*	x		x		Upgradient/Sidegradient of AS/B
MW-25R	15 - 20	*Shallow*	x				Replacement well
MW-25DR	34 - 39	*Intermediate*	x				Replacement well
MW-30	22 - 27	*Shallow*					
MW-31	9.5 - 14.5	*Shallow*				x	New monitoring well, offsite
MW-31D	26 - 31	*Intermediate*				x	New monitoring well, offsite
MW-31DD	54 - 59	*Deep*					New monitoring well, offsite
MW-32	78 - 83	*Bedrock*	x				New monitoring well, top of bedrock
MW-33	15 - 20	*Shallow*	x		x		New monitoring well, Upgradient/Sidegradient of AS/B
MW-33D	27.6 - 32.6	*Intermediate*	x		x		New monitoring well, Upgradient/Sidegradient of AS/B
MW-33DD	49.3 - 54.3	*Deep*	x		x		New monitoring well, Upgradient/Sidegradient of AS/B
MW-34	10 - 15	*Shallow*				x	New monitoring well
MW-34D	30 - 35	*Intermediate*				x	New monitoring well
MW-34DD	51.5 - 56.5	*Deep*				x	New monitoring well
MW-35	17 - 22	*Shallow*				x	New monitoring well
MW-35D	29.5 - 34.5	*Deep*				x	New monitoring well
MW-36	12 - 17	*Shallow*				x	New monitoring well
MW-36D	28 - 33	*Intermediate*				x	New monitoring well
MW-36DD	43.5 - 48.5	*Deep*				x	New monitoring well
MW-37	12.4 - 17.5	*Shallow*				x	New monitoring well, offsite
MW-37D	30.4 - 35.4	*Intermediate*					New monitoring well, offsite
MW-37DD	47.6 - 52.6	*Deep*					New monitoring well, offsite
MW-38	9.4 - 14.4	*Shallow*				x	New monitoring well, offsite
MW-38D	29.5 - 34.5	*Intermediate*					New monitoring well, offsite
MW-38DDR	58 - 63	*Deep*					New monitoring well, offsite
MW-39	10.7 - 15.7	*Shallow*					New monitoring well, offsite
MW-39D	19.9 - 24.9	*Intermediate*					New monitoring well, offsite
MW-40	10.4 - 15.4	*Shallow*	x				New monitoring well, offsite
MW-40D	25.6 - 30.6	*Intermediate*	x				New monitoring well, offsite
MW-40DD	47.7 - 52.7	*Deep*	x				New monitoring well, offsite
MW-41	11.7 - 16.7	*Shallow*				x	New monitoring well, offsite
MW-41D	33 - 38	*Intermediate*					New monitoring well, offsite
MW-41DD	46.2 - 51.2	*Deep*					New monitoring well, offsite
MW-42	13.2 - 18.2	*Shallow*				x	New monitoring well, offsite
MW-42D	30.5 - 35.5	*Intermediate*					New monitoring well, offsite
MW-42DD	51.7 - 56.7	*Deep*					New monitoring well, offsite
MW-43	13 - 18	*Shallow*				x	New monitoring well, offsite
MW-43D	30 - 35	*Intermediate*					New monitoring well, offsite

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Site Well Summary [1]
Superior Fibers, Inc., Bremen, Ohio

Well Name	Screen Interval	Screened Zone	Quarterly Groundwater Monitoring Program[2]	Monitored during Source Area O&M[2]	Monitored during Air Sparge/ Biosparge O&M[2]	Offsite Monitoring[3]	Comment
MW-44	13.2 - 18.2	*Shallow*					New monitoring well, offsite
MW-44D	25.5 - 30.5	*Intermediate*					New monitoring well, offsite
MW-44DD	52.0 - 57.0	*Deep*					New monitoring well, offsite
MW-45	12 - 17	*Shallow*		x			New monitoring well, source area
MW-45D	25.5 - 35.5	*Intermediate*		x			New monitoring well, source area
MW-46	12 - 17	*Shallow*		x			New monitoring well, source area
MW-46D	22 - 32	*Intermediate*		x			New monitoring well, source area
MW-47	12 - 17	*Shallow*		x			New monitoring well, source area
MW-47D	23.5 - 33.5	*Intermediate*		x			New monitoring well, source area
SFMW	NA	*NA*	x				Offsite well
Offsite easterly potable water	NA	*NA*	x				Offsite well
PMW-1	20 - 25	*Shallow*			x		Upgradient/Sidegradient of AS/B
PMW-2	13 - 18	*Shallow*			x		Downgradient of AS/B
PMW-3	11 - 16	*Shallow*			x		Upgradient/Sidegradient of AS/B
PMW-4	11 - 16	*Shallow*			x		Downgradient of AS/B
PMW-5	11 - 16	*Shallow*			x		Upgradient/Sidegradient of AS/B
PW-1	NA	*Intermediate*	x				
PW-2	7.5 - 19.5	*Intermediate*	x				
PW-3	NA	*Intermediate*	x				
VMP-1S	4.5 - 5.5	*NA*					
VMP-1D	9.5 - 10.5	*NA*					
VMP-2S	4.5 - 5.5	*NA*					
VMP-2D	9.5 - 10.5	*NA*					
VMP-3S	4.5 - 5.5	*NA*					
VMP-3D	9.5 - 10.5	*NA*					
VMP-4S	4 - 5	*NA*					
VMP-4D	9 - 10	*NA*					
VMP-5S	4 - 5	*NA*					
VMP-5D	9 - 10	*NA*					
AS-1	49 - 51	*NA*					
AS-2	49 - 51	*NA*					
AS-3	48 - 50	*NA*					
AS-4	48 - 50	*NA*					
AS-5	49 - 51	*NA*					
AS-6	49 - 51	*NA*					
AS-7	50 - 52	*NA*					
AS-8	49 - 51	*NA*					
AS-9	47 - 49	*NA*					
AS-10	46 - 48	*NA*					
AS-11	46 - 48	*NA*					
AS-12	46 - 48	*NA*					
AS-13	44 - 46	*NA*					
AS-14	44.5 - 46.5	*NA*					
AS-15	45 - 47	*NA*					
AS-16	46 - 48	*NA*					
AS-17	46 - 48	*NA*					
AS-18	47 - 49	*NA*					
AS-19	46 - 48	*NA*					
AS-20	47 - 49	*NA*					
AS-21	49 - 51	*NA*					
AS-22	49 - 51	*NA*					
AS-23	47 - 49	*NA*					
AS-24	45 - 47	*NA*					
AS-25	44 - 46	*NA*					
AS-26	50 - 52	*NA*					
AS-27	50 - 52	*NA*					
AS-28	51.5 - 53.5	*NA*					
AS-29	51 - 53	*NA*					
AS/PR-30 (AS)	29.8 - 34.8	*NA*					
AS/PR-30 (PR)	37.5 - 42.5	*NA*					
AS/PR-31 (AS)	31.8 - 36.8	*NA*					
AS/PR-31 (PR)	38.8 - 43.8	*NA*					
AS/PR-32 (AS)	30.8 - 35.8	*NA*					
AS/PR-32 (PR)	38.5 - 43.5	*NA*					
AS/PR-33 (AS)	31.3 - 36.3	*NA*					
AS/PR-33 (PR)	39.3 - 44.3	*NA*					

Abbreviations:
Shallow Zone: Wells Screened less than 30 ft bgs, in the gravelly sandy clay and/or upper sand and gravel.
Intermediate Zone: Wells Screened between 25-40 bgs, in the sand and gravel deposit.
Deep Zone: Wells Screened greater than 40 ft bgs in the bottom of the sand and gravel deposit.

Notes:

1 As deemed appropriate in the future based on current site conditions, a request may be made in writing to the Ohio EPA to modify the list of monitoring wells and sampling frequencies included in this table. Any changes to the sampling frequencies or well network, as appropriate, will only be implemented after approval by the Ohio EPA.

2 Wells are sampled quarterly to evaluate compliance with the applicable standards upon which the March 22, 2005 Covenant not to Sue was based (column entitled "Quarterly Groundwater Monitoring Program") and the effectiveness of remediation being performend in support of those standards (columns entitled "Monitored during Source Area O&M" and "Monitored during Air Sparge/Biosparge O&M").

3 Wells listed in the column entitled "Offsite Monitoring" are sampled quarterly to evaluate changes in conditions to the offsite portion of the plume. These wells are not associated with the March 22, 2005 Covenant not to Sue, however are included herein until the Volunteer determines how best to handle the offsite portion of the plume.

TABLE 5-1
Air Sparge/Biosparge Monitoring Schedule
Superior Fibers, Inc., Bremen, Ohio

Monitoring Parameter	Process Stream	Location ID	Number Available	Equipment	Range Expected	Expected Frequency[a]			
						Startup Week 1	Weeks 2-4	Months 2-12	Long-Term
System									
Barometric Pressure	Ambient Air	PI-AMBIENT	1	Direct Read	28–32 "Hg	Weekly	Weekly	Monthly	Quarterly
Relative Humidity		HI-AMBIENT	1	Direct Read	0–100%	2/week	Weekly	Monthly	Quarterly
Outside Air Temperature		TI-AMBIENT	1	Direct Read	Standard	2/week	Weekly	Monthly	Quarterly
Field Measured VOC Concentration		Breathing Zone-Work Area	1	PID	0–10 ppm	2/week	Weekly	Monthly	Quarterly
Compressor Outlet Temperature	AS/B Air	TI-SPRG	1	Direct Read	0–200°F	2/week	Weekly	Monthly	Quarterly
Compressor Outlet Pressure		PI-SPRG	1	Direct Read	0–200 psig	2/week	Weekly	Monthly	Quarterly
Manifold Solenoid Position		Solenoid at each manifold (1-5)	5	Solenoid	0–100%	As needed	As needed	As needed	As needed
Manifold Temperature		TI at each manifold (1-5)	5	Direct Read	0–200°F	2/week	Weekly	Monthly	Quarterly
Manifold Flow Rate		FI at each manifold (1-5)	5	Gauge	8–80 scfm	2/week[b]	Weekly	Monthly	Quarterly
Manifold Pressure		PI at each manifold (1-5)	5	Gauge	0–100 psig	2/week[b]	Weekly	Monthly	Quarterly
AS/B Pressure		PI at each well head (AS-1 through AS-29)	29	Gauge	0–100 psig	2/week[b]	Weekly	Monthly	Quarterly
AS/B Flow Rate		FI at each well head (AS-1 through AS-29)	29	Gauge	1–12 scfm	2/week[b]	Weekly	Monthly	Quarterly
Wellheads									
Groundwater Elevations	GW	MW-22D, MW-22, MW-22DD, MW-21B, MW-14D, MW-6, MW-13, MW-20, MW-23, MW-23D, MW-23DD, MW-18, MW18D, MW-18DD, DW-12, DW-12D, DW-13, DW-13D, DW-14, DW-14D, MW-21, MW-21D, DW-7, DW-7D, EW-4, EW-4D, DW-8, DW-8D, EW-3, EW-3D, DW-9, DW-9D	32	Water Level Meter	Standard	2/week	Weekly	Monthly	Quarterly
Pressure at PMWs[c]	Soil Vapor	PMW-1 through PMW-5	5	Digital Manometer	0–100 in.H_2O	2/week	Weekly	Monthly	Quarterly
Pressure at VMPs	Soil Vapor	VMP-1S through VMP-5S VMP-1D through VMP-5D	5	Digital Manometer	0–100 in.H_2O	2/week	Weekly	Monthly	Quarterly
Field Measured VOC Concentration			5	PID	0–10 ppm	2/week	Weekly	Monthly	Quarterly
Oxygen Concentration			5	GEM 2000 (or equivalent)	18–22 %	Weekly	Monthly	Quarterly	None
Carbon Dioxide Concentration			5	GEM 2000 (or equivalent)	0–5 %	Weekly	Monthly	Quarterly	None
Methane			5	GEM 2000 (or equivalent)	0–5 %	Weekly	Monthly	Quarterly	None
LEL			5	GEM 2000 (or equivalent)	0–5 %	Weekly	Monthly	Quarterly	None

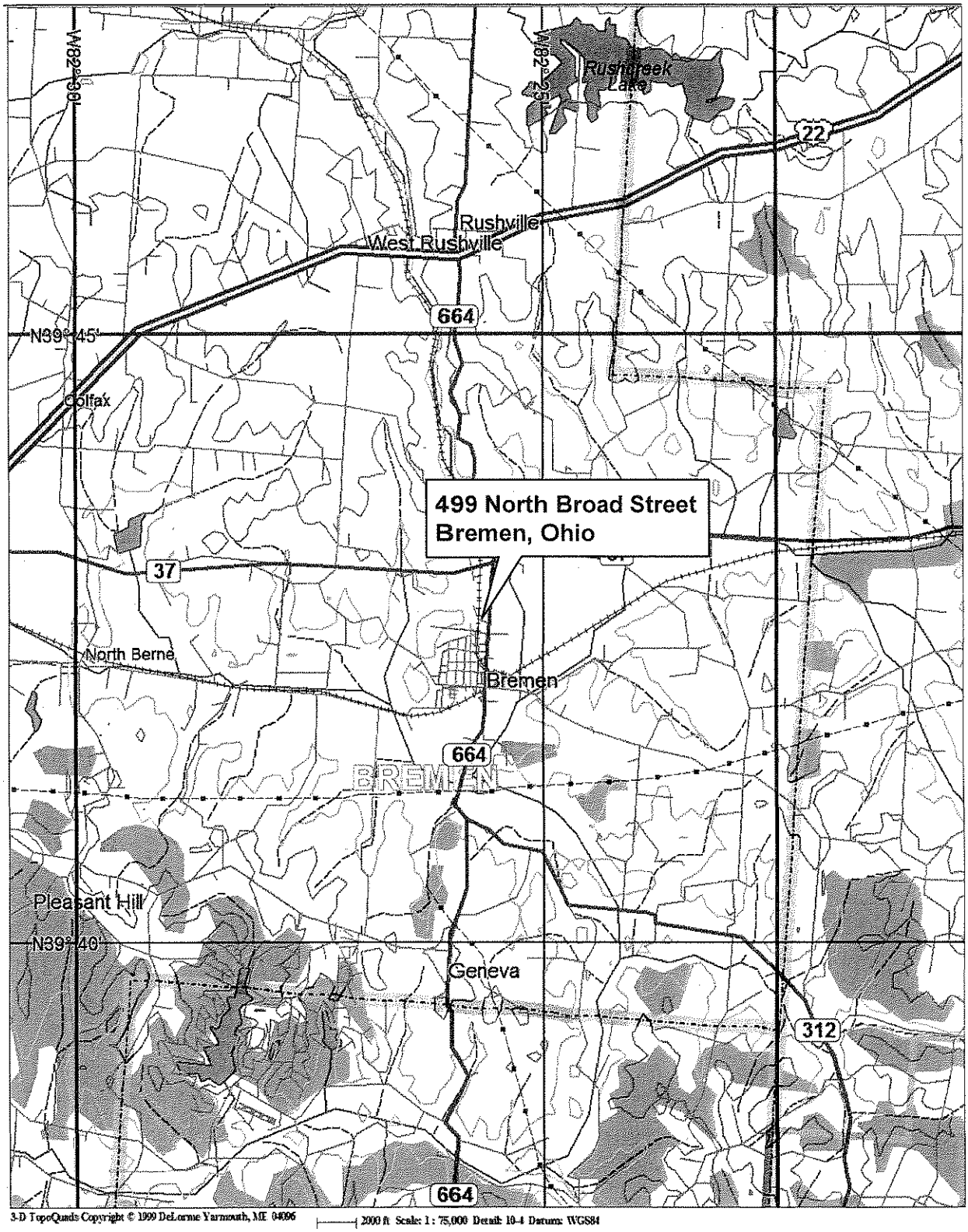
Abbreviations:
PID = photoionization detector
ppm = parts per million
psig = pounds per square inch gauge
scfm = standard cubic feet per minute
PMW = pressure monitoring well
VMP = vapor monitoring probe
LEL = lower explosive limit
Hg = mercury

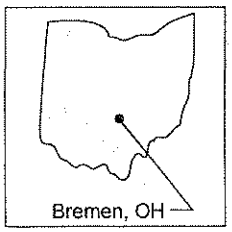
[a] Measurements will only be collected during normal business hours (not including weekends and holidays). The expected frequency may be increased or decreased at any time during operations based on the results of field measurements. Some parameters may be discontinued if it is determined that they are providing no additional value other than what has already been collected.

[b] Additional measurements may be necessary if the solenoid valves are adjusted.

[c] Vapor samples will be collected from PMWs if positive pressure above approximately 2 inches of water is observed at the wellheads. Collected vapor samples will be field analyzed for VOCs with a PID and for CO_2 and O_2 with a GEM 2000 (or equivalent).

Figures





Site Location:
39° 42.677' N
82° 25.648' W

FIGURE 1-1
Site Location Map
Superior Fibers Inc., Bremen, Ohio

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ES072006009SAC figure_1-1.ai 07/31/06 tdaus

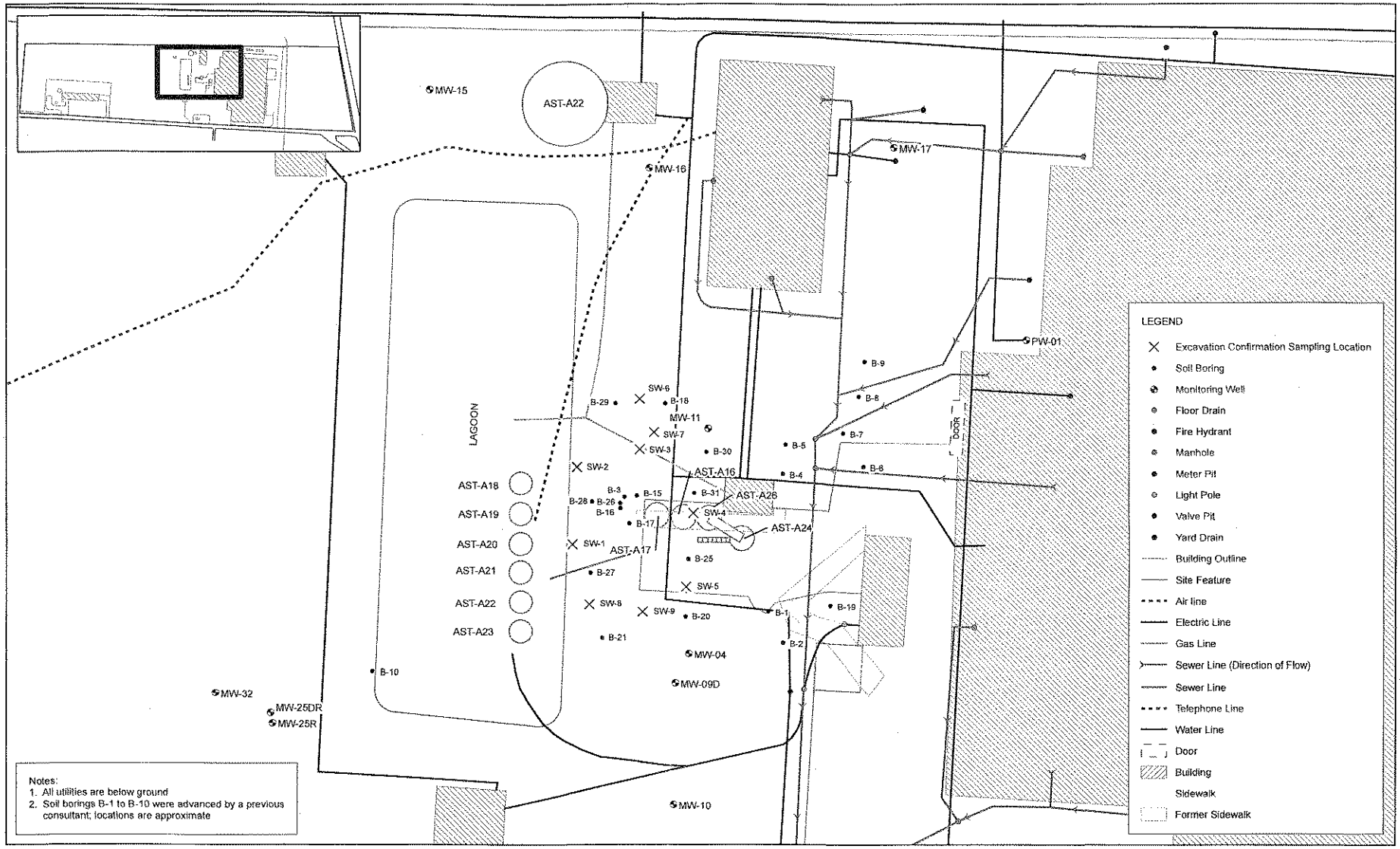

FIGURE 1-2
Soil Sample Locations
Superior Fibers Inc., Bremen, Ohio

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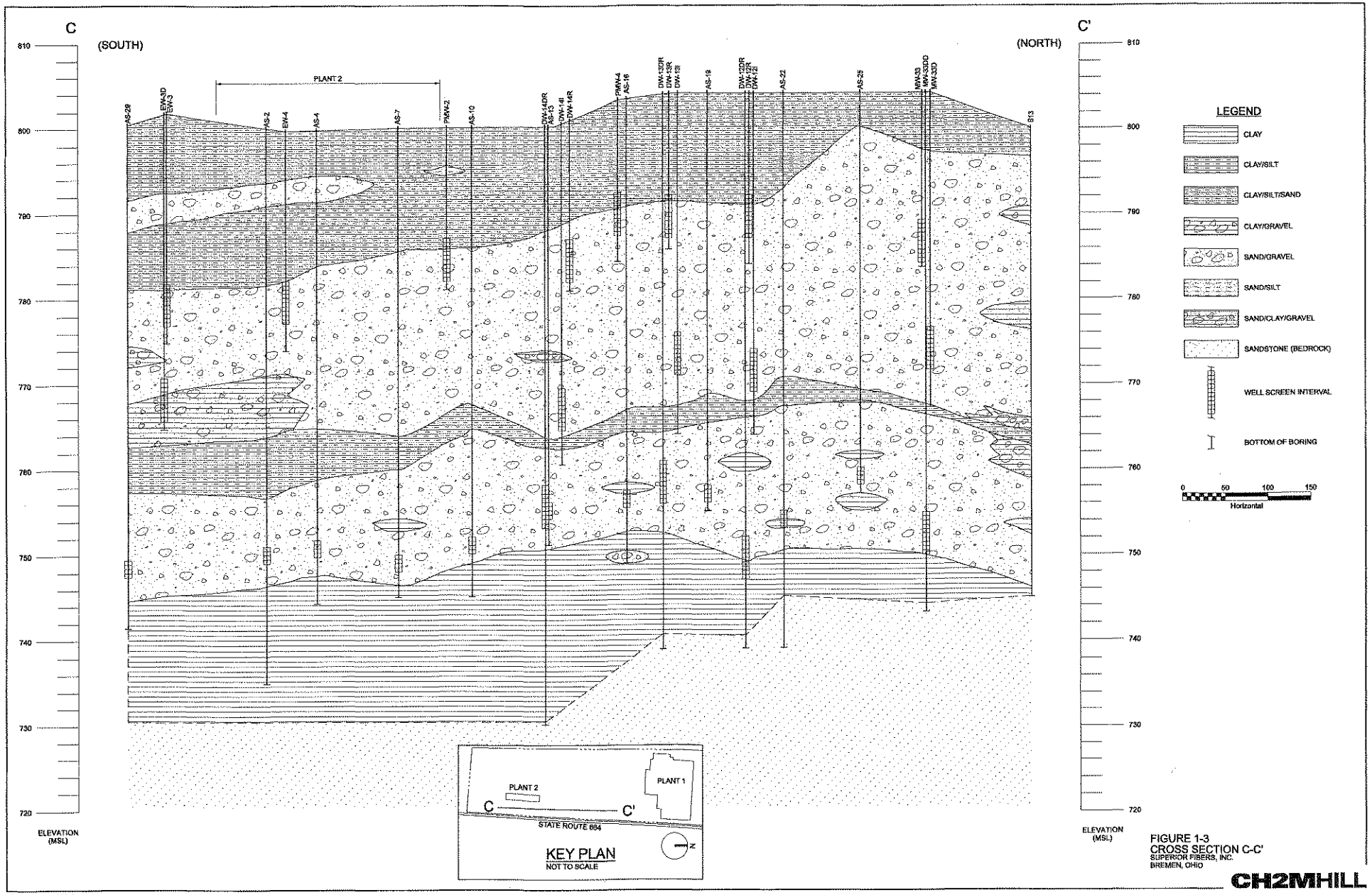

FIGURE 1-3
CROSS SECTION C-C'
SUPERIOR FIBERS, INC.
BREMEN, OHIO

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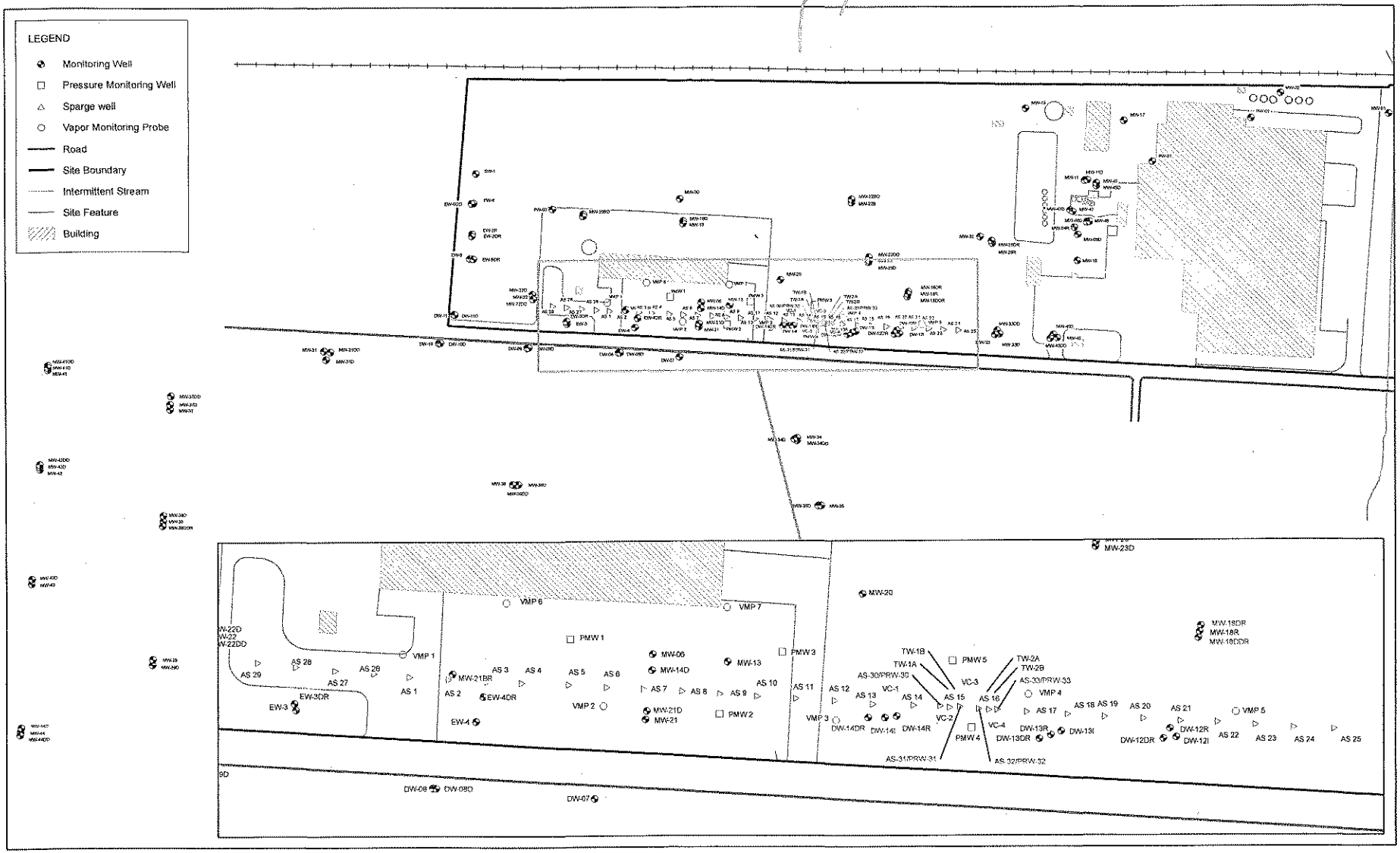

FIGURE 1-4
Groundwater Sample Locations, Air Sparge/Biosparge Wells, and Vapor Monitoring Probes
Superior Fibers Inc., Bremen, Ohio

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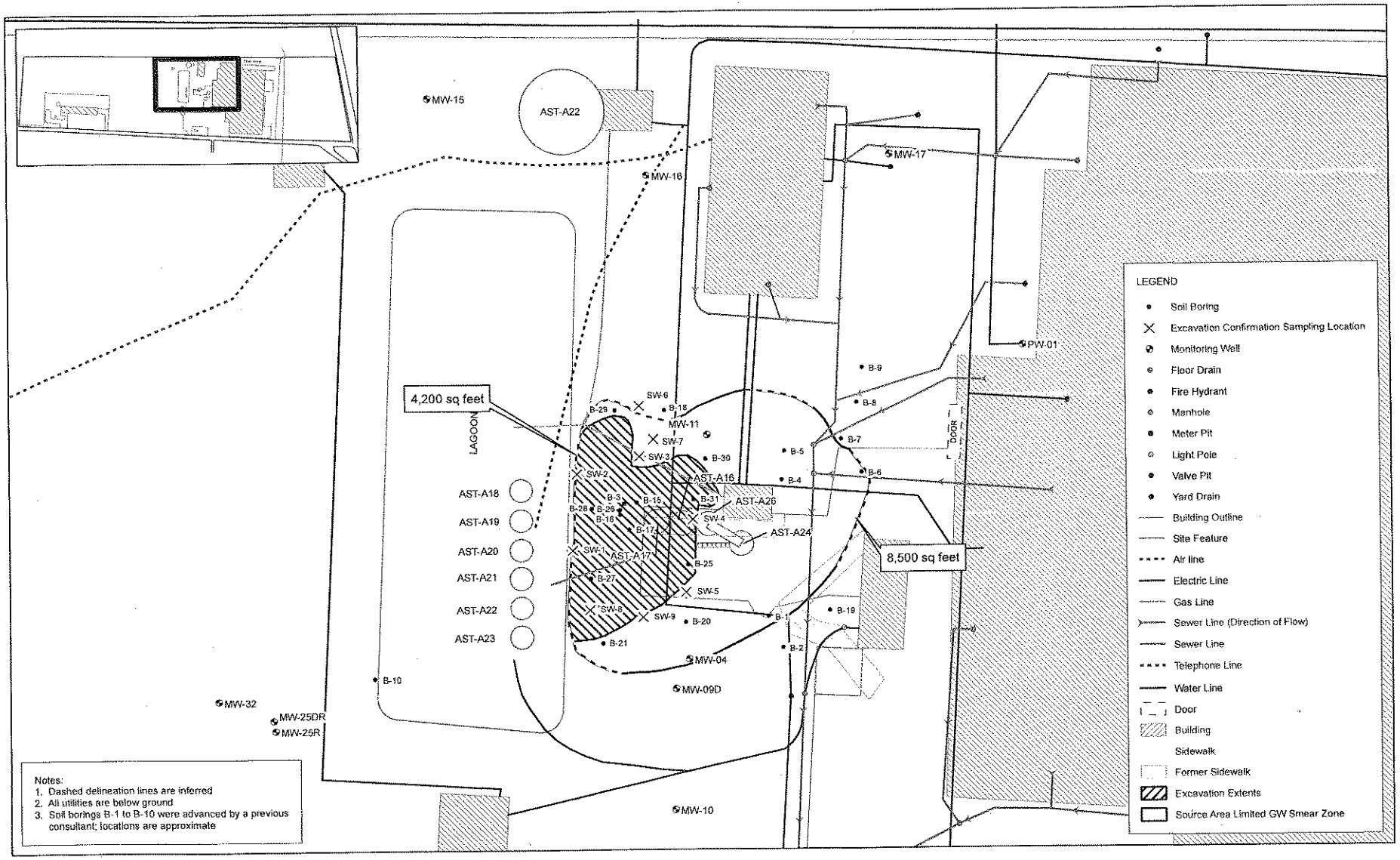

FIGURE 5-1
Excavation Extents
Superior Fibers Inc., Bremen, Ohio

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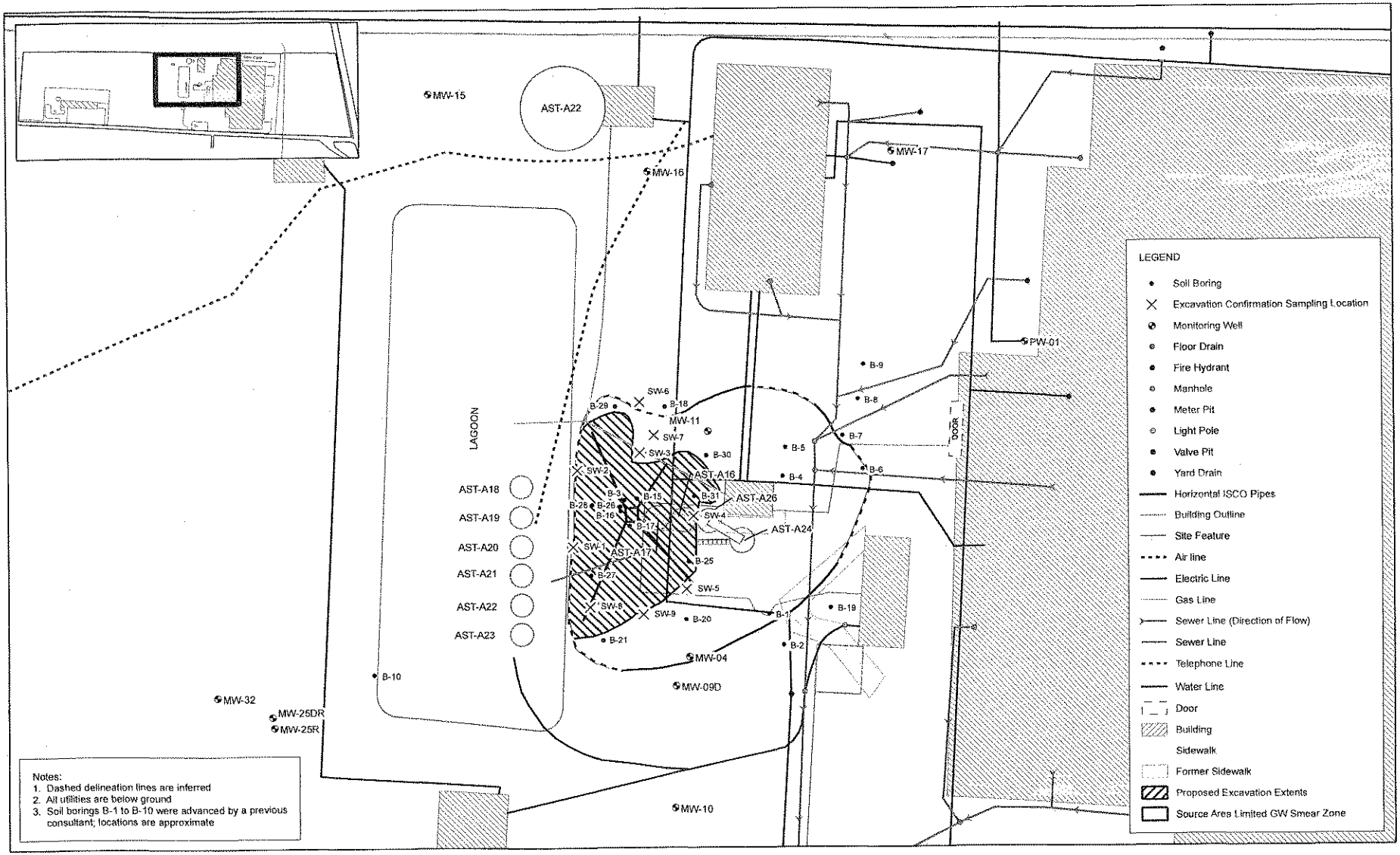

FIGURE 5-2
Horizontal Pipe Layout
Superior Fibers Inc., Bremen, Ohio

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