GROUNDWATER MONITORING REPORT

Saint-Gobain Abrasives, Inc.

2003 GROUNDWATER MONITORING REPORT

Former Segro-Colonial Abrasive Products Facility
Aberdeen, North Carolina

February 24, 2004

ERM NC, PC
7300 Carmel Executive Park
Suite 200
Charlotte, NC 28226
704-541-8345

ERM

1.0 INTRODUCTION

This report presents the results of the June 2003 and December 2003 groundwater monitoring events conducted at the former Segro-Colonial Abrasive Products (Segro-Colonial) facility in Aberdeen, North Carolina. The purpose of the groundwater monitoring program is to monitor groundwater quality within and downgradient of the observed volatile organic compound (VOC) plume in accordance with the approved Site Assessment and Corrective Action Plan (CAP) dated December 28, 1999 and associated CAP addendums, and the letter from the North Carolina Department of Environment and Natural Resources (DENR) dated May 23, 2003 specifying additional groundwater monitoring requirements. The groundwater monitoring was conducted by ERM NC, PC (ERM), of Charlotte, North Carolina, on behalf of Saint-Gobain Abrasives, Inc., parent company of the former Segro-Colonial Abrasives facility.

1.1 SCOPE OF WORK

The monitoring activities conducted at the site included: 1) measuring groundwater elevations in the on-site monitor wells; 2) evaluating the direction of groundwater flow at the site; and 3) sampling the groundwater monitor wells for VOCs, pH, specific conductance, dissolved oxygen (DO), temperature, turbidity, oxygen reduction potential (ORP), sulfate, sulfide, chloride, and ferrous iron.

1.2 REPORT ORGANIZATION

The remainder of this report is divided into five sections. Section 2.0 provides background information pertaining to the site location and previous environmental investigations. Sections 3.0 and 4.0 describe the site geology and outline field methodologies employed during the work, respectively. Section 5.0 presents the results of the field investigation and Section 6.0 provides a discussion of the results.

2.0 BACKGROUND INFORMATION

2.1 SITE LOCATION

The former Segro-Colonial facility, located within the Atlantic Coastal Plain physiographic province, occupies approximately 20 acres at 312 South Pine Street in Aberdeen (Moore County), North Carolina, 28315 (see Figures 1 and 2). The site is generally bounded to the north by single family residences, to the west by CSX railroad, to the south by McFarlands Branch and the Town of Aberdeen Public Works Recycling Center, and to the east by South Pine Street followed by residential properties and an undeveloped wooded area.

Manufacturing operations at the Segro-Colonial facility were closed during December 2001. Prior to closing, the facility employed approximately 80 workers while manufacturing abrasive wheels, as well as a ceramic diffuser used in batteries.

2.2 PREVIOUS INVESTIGATIONS AND REMEDIATION

A listing of the previous site assessment reports prepared for the subject property is presented in Section 7.0. A summary of the previous environmental work is presented below.

A Phase II soil assessment of the former Segro-Colonial Abrasive Products facility was conducted by Aquaterra, Inc. during 1993. The Phase II investigation identified trace levels of tetrachloroethene (PCE) in soils near the location of an aboveground storage tank (AST) formerly used to store PCE. This area has been designated as Area 1. The Aquaterra Phase II also detected traces of PCE and 1,1,1 trichloroethane (TCA) in soils at the former chemical storage area, which has been designated Area 2.

During 1998, Environmental Liability Management (ELM) conducted a groundwater investigation at the site which consisted of the installation of five shallow temporary groundwater monitor wells to depths ranging from 11.5 to 14.5 feet below grade using the direct push drilling method. The two temporary wells installed in Area 1 detected up to 310 ug/l PCE and 1 ug/l trichloroethene (TCE). The three temporary wells installed in Area 2 detected up to 1.5 ug/l PCE, 36 ug/l 1,1,1-TCA, and 3.2 ug/l 1,1-dichloroethene (DCE). These data confirmed that groundwater in both areas had been affected by VOCs, and that PCE was the predominant VOC

detected in groundwater. Subsequently, eight permanent groundwater monitor wells have been installed into the shallow aquifer at the subject property to monitor groundwater quality. Groundwater monitoring has been ongoing since that time. ELM also conducted additional soil sampling in Areas 1 and 2 during 1999. The results of the soil sampling did not indicate the presence of a residual source in the soils from either Area 1 or Area 2.

During July and August, 2001, 3030 pounds of Hydrogen Releasing Compound (HRC) was injected into the groundwater at Areas 1 and 2, as well as the area adjacent to the east side of the building, between Areas 1 and 2. The injection was performed in accordance with the DENR Underground Injection Control (UIC) Permit No. WI0600006. The HRC is a lactic acid-based solution which is metabolized by indigenous anaerobic bacteria. The anaerobic bacteria release hydrogen which reduces the concentration of dissolved oxygen in the aquifer, thereby providing a more amenable environment for the growth of the anaerobic bacteria which biodegrade the chlorinated ethenes. The hydrogen released by the anaerobic bacteria also provides an electron acceptor needed for respiration by the anaerobic bacteria which then metabolizes the dissolved organic compound as an energy source, stripping a chlorine ion from the molecule in the process. In this manner PCE is reduced to TCE, then to either of two DCE isomers, followed by vinyl chloride, which is then degraded by aerobic bacteria once it migrates beyond the reduced zone of the aquifer. Post-injection groundwater monitoring has been ongoing since November 2001. The historical groundwater flow direction in the shallow aquifer was found, generally, to be to the southwest.

During January 2003, ERM excavated and oversaw the remediation of 160 tons of soils affected by oil and grease and total petroleum hydrocarbons (TPH) from the hydraulic press area inside the facility building. These petroleum affected soils do not appear to be related to the observed VOC plume in groundwater at the site. A limited volume of petroleum affected soils remains below the concrete slab of the building in this area. Monitor wells MW-2 and MW-3 located downgradient of the former hydraulic press area have not detected petroleum hydrocarbons (i.e., semi-volatile organic compounds).

2.3 *HYDROGEOLOGY*

The Aberdeen Area, including the subject property, is located within the Atlantic Coastal Plain physiographic province of North Carolina. The lithology of the Coastal Plain province generally consists of unconsolidated sediments and sedimentary rocks deposited on top of crystalline basement rocks. Typically, coastal plain sediments dip and thicken to the east. The thickness of Coastal Plain sediments ranges from a few feet at the western limit of deposition to over 10,000 feet along the coastline. According to the Geologic Map of North Carolina (1985), the subject property is underlain by Cretaceous age (225 million to 65 million years ago) sand, sandstones, and mudstones of the Middendorf Formation. The well logs compiled by ELM indicate that the shallow aquifer at the site is generally comprised of medium to coarse grain sand with varying amounts of silt and clay. Thin (less than 2 feet in thickness), discontinuous clay lenses were noted at depths of less than 10 feet in wells MW-3 and MW-4. Sandy clays were reported in monitor well MW-7 to a depth of 10 feet before grading into a tan flowing sand. Sandy clay was also reported at the MW-8 location, at a depth of 5 to 15 feet. Sand was indicated from 0 to 5 feet and from 15 to 20 feet at the MW-8 location. At twenty feet in total depth, monitor well MW-8 is the deepest of the eight monitor wells at the subject property. Monitor well MW-8 is also located on a high embankment (a gravel parking area) of probable fill material.

4.0 *METHODOLOGY*

4.1 *GROUNDWATER ELEVATION MEASUREMENTS*

Water level measurements were obtained in the monitor wells on June 18, 2003 and December 3, 2003. The water level measurements were obtained using an electronic water level meter, and were used to establish the depth to groundwater and to calculate groundwater elevations and the hydraulic gradient across the site.

4.2 *GROUNDWATER SAMPLE COLLECTION*

Eight groundwater monitor wells were sampled for VOCs (EPA Method 8260) during the June 2003 event, and seven monitor wells were sampled during the December 2003 event. Monitor well MW-8 was dry during the December groundwater monitoring event. In accordance with the DENR

letter dated May 23, 2003, wells MW-2 and MW-3 were also analyzed for semi-VOCs (SVOCs) plus the ten highest tentatively identified compounds. The inclusion of SVOCs in the groundwater monitoring program was due to the presence of oil and grease affected soils extending to the water table beneath the facility building. The affected soils were excavated by ERM during January 2003.

Each monitor well was purged and sampled using a peristaltic pump and polyethylene tubing. Average flow rates ranged from approximately 200 to 380 milliliters per minute. Parameters were measured in the field during purging using a flow-through sampling cell. Sampling was performed once the parameters had stabilized and at least one well bore volume of groundwater had been evacuated. All samples were collected directly from the tubing. VOC samples were collected into laboratory supplied 40 milliliter vials. Sulfate, sulfide, and chloride were also collected into laboratory supplied containers, while pH, specific conductance, DO, temperature, turbidity, ORP, and ferrous iron measurements were also recorded at the time of sample collection. The sulfate, sulfide, chloride, and ferrous iron results are summarized in Table 2. Field data sampling forms showing the field parameter measurements obtained during purging is presented in Appendix A. The final field measurements for pH, specific conductance, DO, temperature, turbidity, and ORP are summarized on Table 3.

The samples were immediately placed on ice inside insulated shipping containers, then were delivered under the appropriate chain-of-custody protocol to a North Carolina certified laboratory for VOC analysis.

5.0 GROUNDWATER MONITORING RESULTS

Groundwater elevations and depth to water are presented in Table 4. The direction of groundwater flow is illustrated on Figures 3 and 4, respectively. Following the example of previous ELM reports, the groundwater elevations from well MW-1 were not utilized to construct groundwater flow maps due to a possible error in the original well elevation survey.

5.1 GROUNDWATER ELEVATIONS AND FLOW

Depth to groundwater in the monitor wells during the June sampling event ranged from 0.02 (MW-7) to 10.42 feet (MW-5), and were at their highest historical levels owing to an exceptionally wet winter, spring, and early summer. Measured groundwater elevations ranged from 326.39 feet (MW-7) to 331.06 feet (MW-5) above mean sea level. Groundwater in the southern portion of the site generally flows to the south-southwest under an average hydraulic gradient of 0.013, as measured between monitor wells MW-4 and MW-7 (see Figure 3). Groundwater flow in the northern portion of the site is dominated by an apparent mounding of groundwater at MW-2 located adjacent to the low-lying railroad tracks.

Depth to groundwater in the monitor wells during the December sampling event ranged from 0.94 (MW-7) to 12.42 feet (MW-5). Measured groundwater elevations ranged from 325.47 feet (MW-7) to 329.06 feet (MW-5) above mean sea level. Groundwater flows to the southwest under a fairly uniform hydraulic gradient of 0.008, as measured between monitor wells MW-3 and MW-5 (see Figure 4).

5.2 ORGANIC COMPOUND ANALYSES

The organic analytical results for the June and December 2003 monitoring events are presented in Table 5, and are summarized on Figures 5 and 6. SVOCs were not detected above the laboratory reporting limit during either of the 2003 monitoring events. Historical groundwater analytical results are presented in Table 6. Table 7 shows graphs of VOC concentrations (PCE, TCE, and 1,1,1-TCA) versus time for wells MW-1, MW-2, and MW-4, the three monitor wells in which detectable VOCs have been found. Laboratory analytical data sheets are presented in Appendix B.

5.2.1 *June Results*

Five of the eight monitor wells (MW-8, 5, 3, 6, and 7) sampled during June did not detect any compounds of concern. Monitor well MW-1, located in Area 1, detected only one compound, PCE at 120 ug/l. Well MW-2, located near the railroad tracks, detected 36 ug/l PCE, 34 ug/l TCE, and 4.9 ug/l cis 1,2-DCE. Monitor well MW-4, located in Area 2, detected 2.5 ug/l PCE, 1.0 ug/l TCE, 2.5 ug/l 1,1-DCA, 390 ug/l TCA, and 9.4 ug/l 1,1-DCE.

5.2.2 *December Results*

Four of the seven monitor wells (MW-8, 5, 3, 6, and 7) sampled during December did not detect any compounds of concern. Monitor well MW-1, located in Area 1, detected only 6.4 ug/l PCE. Well MW-2, located near the railroad tracks, detected 55 ug/l PCE, 15 ug/l TCE, and 3.0 ug/l cis 1,2-DCE. Monitor well MW-4, located in Area 2, detected 1.2 ug/l PCE, 1.1 ug/l TCE, 5.6 ug/l 1,1-DCA, 300 ug/l TCA, and 14 ug/l 1,1-DCE.

5.3 *INORGANIC COMPOUND ANALYSES*

The inorganic analytical results for the June and December 2003 monitoring events are presented in Table 2. The USEPA criteria for conditions favorable to biodegradation are also listed in Table 2. Laboratory analytical data sheets are presented in Appendix B.

Overall, the 2003 inorganic analytical results indicate marginal to adequate evidence for biodegradation of VOCs by reductive de-chlorination processes at the site.

5.3.1 *June Results*

Sulfate concentrations ranged from 15 mg/l in downgradient well MW-7 to 25 mg/l in well MW-3 located near the railroad tracks. Chloride concentrations ranged from 2 mg/l (MW-2) to 23 mg/l (MW-3). Sulfide concentrations ranged from non-detectable in MW-8 and MW-1 to 16 mg/l in MW-4. Ferrous iron concentrations ranged from 0 mg/l (MW-2, MW-5, and MW-8) to 6.5 mg/l in MW-7.

5.3.2 *December Results*

Sulfate concentrations ranged from 7.4 mg/l in well MW-6 to 22 mg/l in well MW-1. Chloride concentrations ranged from 1.6 mg/l (MW-3) to 13 mg/l (MW-6). Sulfide concentrations were not detected in any wells at concentrations exceeding the laboratory reporting limit of 2.0 mg/l. Ferrous iron concentrations ranged from 0 mg/l (MW-2, MW-3, and MW-5) to 5.1 mg/l in MW-7.

5.4 *QUALITY ASSURANCE/QUALITY CONTROL*

For quality assurance/quality control (QA/QC) purposes, duplicate groundwater samples were collected from selected monitor wells analyzed for VOCs during both groundwater monitoring events. During June, neither of the duplicate samples collected from MW-8 detected any VOCs. During December, the results from duplicate samples from well MW-4 were very similar, showing PCE at 280 and 300 ug/l, PCE at 1.1 and 1.2 ug/l, and 1,1-DCA at 5.3 and 5.6 ug/l. The analytical results for these two samples are exactly equivalent for TCE and 1,1-DCE (detection of TCE at 1.1 ug/l and 1,1-DCE at 14 ug/l in both samples, see Table 5). This data indicates that the data are reproducible.

An equipment rinsate blank, or field blank, was also prepared and submitted for VOC analyses during both monitoring events. The field blanks were prepared by placing the polyethylene tubing into a liter jar of laboratory supplied de-ionized water and pumping it through the tubing into the laboratory-supplied sample containers using the peristaltic pump. The purpose of the field blank is to evaluate the potential for contaminants to be introduced to the sample from the field sampling equipment. Compounds of concern were not detected in the field blanks.

5.5 *FIELD PARAMETERS*

Field measurements of specific conductance, pH, temperature, DO, ORP, and turbidity recorded during the June and December 2003 groundwater monitoring events are summarized below.

June 2003 Parameters – Final Measurements

Parameter	Final Lowest Measurement	Final Highest Measurement
PH	4.30 in MW-8	5.93 in MW-3
Specific Conductivity	29 umhos/cm in MW-5	119 umhos/cm in MW-7
Temperature	18.69 °C in MW-5	22.42 °C in MW-7
Dissolved Oxygen	0 mg/l in MW-3, MW-7	8.22 mg/l in MW-5
ORP	-65 mg/l in MW-7	350 mg/l in MW-5
Turbidity	7.7 NTUs in MW-8	38 NTUs in MW-5

December 2003 Parameters – Final Measurements

Parameter	Final Lowest Measurement	Final Highest Measurement
PH	4.52 in MW-5	6.50 in MW-2
Specific Conductivity	25 umhos/cm in MW-5	129 umhos/cm in MW-7
Temperature	16.50 °C in MW-1	20.08 °C in MW-4
Dissolved Oxygen	0 mg/l in MW-1,2,3,4,5,7	3.88 mg/l in MW-6
ORP	-5 mg/l in MW-7	372 mg/l in MW-5
Turbidity	5.0 NTUs in MW-4	203 NTUs in MW-7

umhos/cm = micromhos per centimeter
NTU = Nepholometric Turbidity Unit

A complete listing of the recorded parameters for all monitor wells is provided in Table 3 and Appendix A.

6.0 *DISCUSSION AND CONCLUSIONS*

Groundwater samples collected during June and December 2003 detected four VOCs (PCE, TCE, 1,1,1-TCA, and 1,1-DCE) in excess of the North Carolina groundwater standards. PCE is the most prevalent compound in groundwater at the site, being detected in wells MW-1, MW-2, and MW-4 during both monitoring events. Based on the most recent analytical data (December 2003), the highest VOC concentrations on-site include 55 ug/l PCE, 15 ug/l TCE, 14 ug/l 1,1-DCE, and 300 ug/l 1,1,1-TCA.

The presence of up to 300 ug/l 1,1,1-TCA in MW-4 (which slightly exceeds its North Carolina groundwater standard of 200 ug/l) is indicative of a second source area in Area 2 (former chemical storage building). However, well MW-7, which is downgradient from both Area 1 and Area 2, has not detected any VOCs, indicating that the TCA plume is not migrating and is of relatively limited extent.

Groundwater flow directions and hydraulic gradients during the 2003 monitoring events are generally correlative with previous work conducted at the site. However, the June groundwater elevations in all monitor wells were at their highest levels since monitoring began in 2000. Groundwater elevations dropped an average of 1 to 2 feet in all wells between the June and December monitoring events. The unusually wet months of January through June 2003 likely caused accumulations of ponded water along the swales adjacent to the railroad tracks, thus contributing to an apparent mounding of groundwater in monitor well MW-2, located adjacent to the railroad tracks.

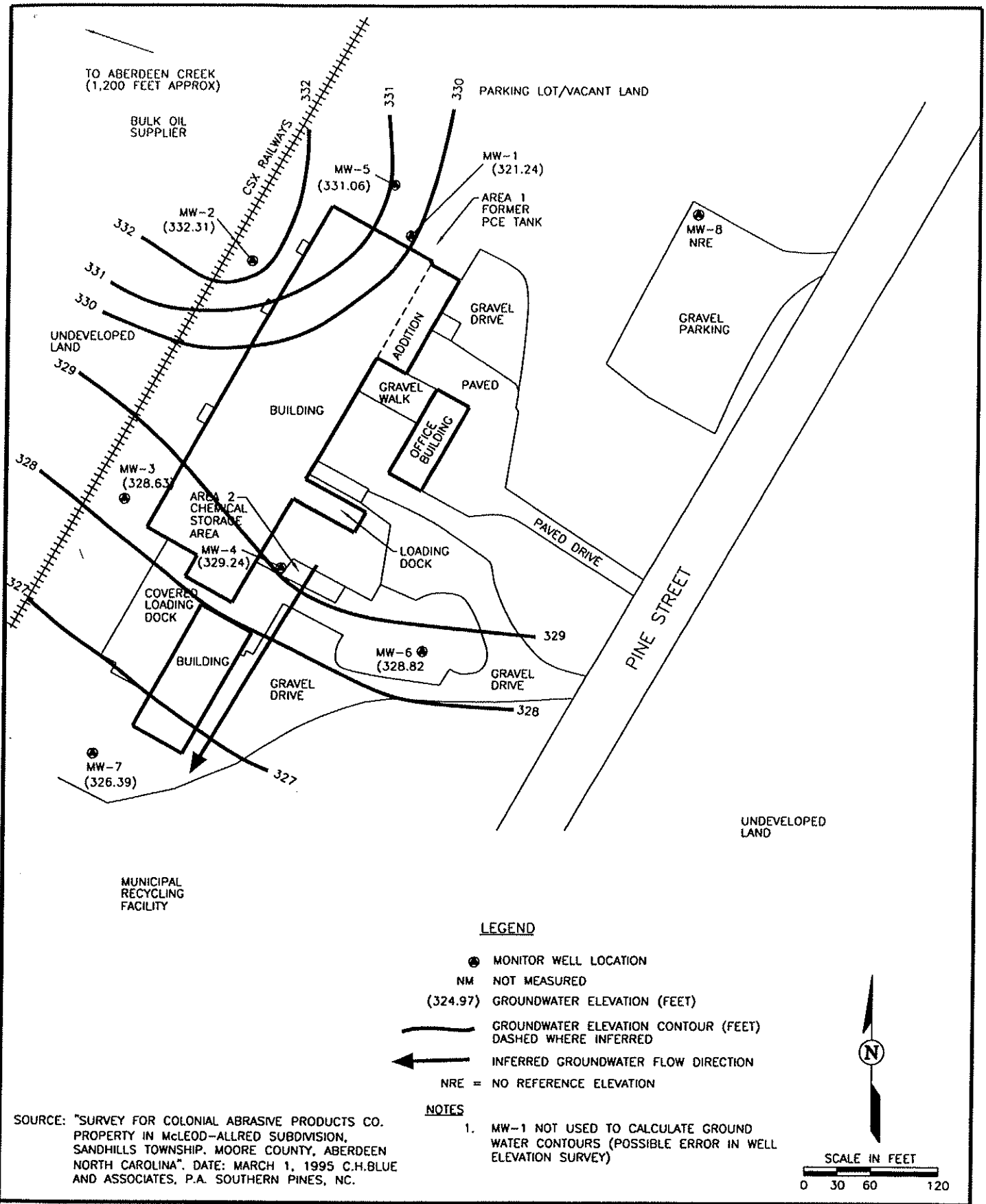
Field parameter values, including pH, specific conductance, temperature, ORP, and turbidity are also correlative with past sampling events and are within realistic ranges for the shallow coastal plain aquifer. DO levels were essentially non-detectable during the December monitoring event due to the HRC injection during 2001. DO levels were slightly elevated during June, presumably due to the abundance of recharge from unusually high levels of precipitation and subsequent infiltration during the first half of 2003.

During June, the highest PCE concentration was detected in monitor well MW-1 at 120 ug/l. However, by December this concentration had dropped to 6.4 ug/l, the lowest concentration of PCE in MW-1 since

November 2001. This decrease in PCE concentration appears to be attributable to the HRC injection. The presence of low DO levels in groundwater at the site indicate that the HRC injection is successfully creating the anaerobic conditions necessary for the natural de-chlorination and attenuation of PCE. Additional evidence for this is the presence of PCE degradation products TCE and the DCE isomers in groundwater downgradient from Area 1.

As indicated by the graphs of concentrations versus time (see Table 7) for monitor wells MW-1, MW-2, and MW-4, the VOC concentrations have, in general, exhibited stable to decreasing trends since the HRC groundwater treatment activities were conducted in 2001.

Additional groundwater monitoring events are proposed for June and December 2004 in order to continue monitoring the attenuation of PCE in groundwater at the site. However, because no SVOCs were detected in groundwater in wells MW-2 and MW-3, ERM and Saint-Gobain Abrasives believe that further SVOC sampling is not necessary. As an alternative, analyses of MW-2 and MW-3 for polynuclear aromatic hydrocarbons (PAHs) on an annual basis (i.e., in December 2004) is proposed.

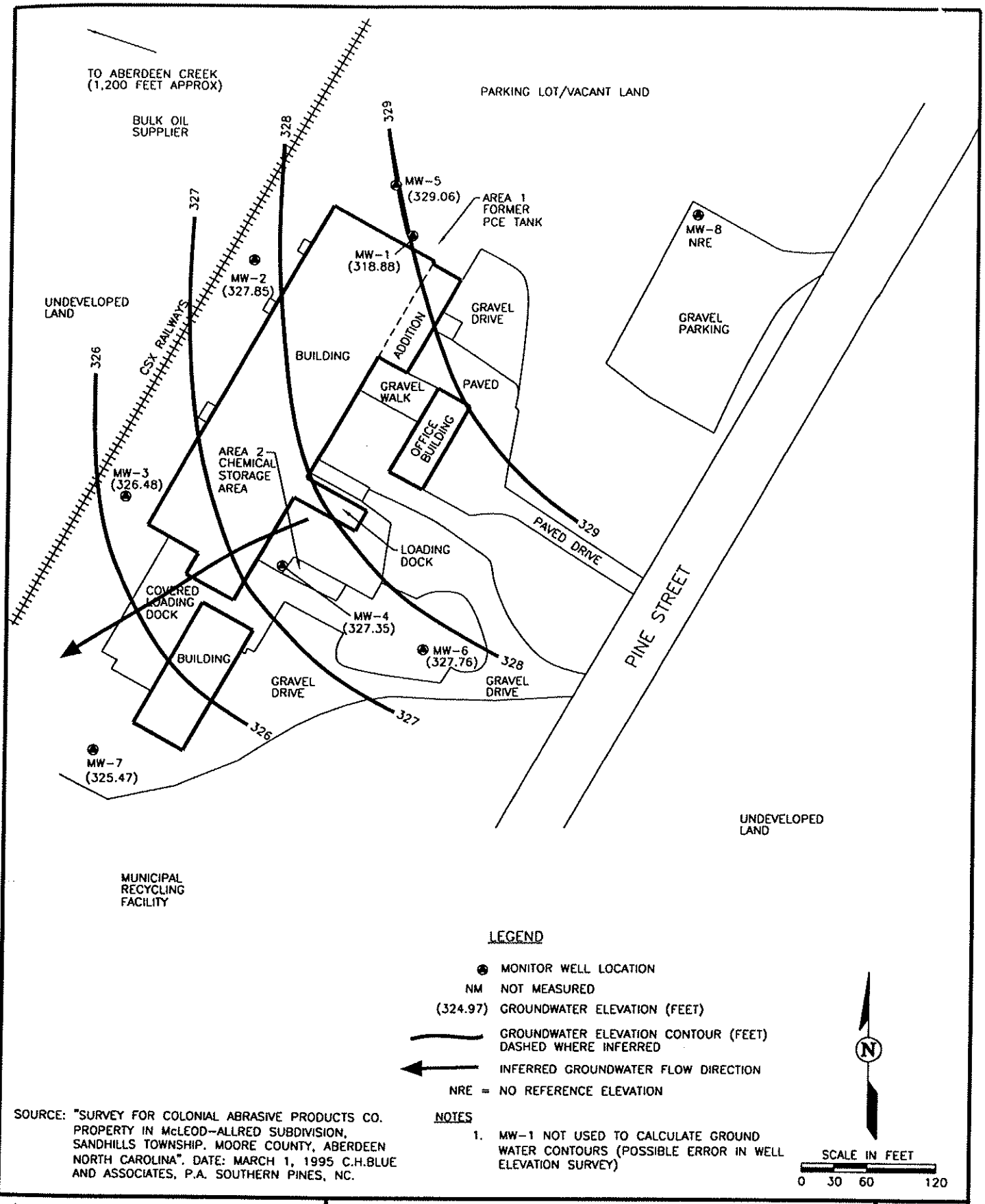


12139GWEC 6-03.DWG 1/15/04 1=120 CH/RT

ERM Environmental Resources Management

GROUNDWATER ELEVATION CONTOUR MAP
JUNE 2003
SAINT-GOBAIN ABRASIVES
ABERDEEN, NORTH CAROLINA

FIGURE 3



SOURCE: "SURVEY FOR COLONIAL ABRASIVE PRODUCTS CO. PROPERTY IN McLEOD-ALLRED SUBDIVISION, SANDHILLS TOWNSHIP, MOORE COUNTY, ABERDEEN NORTH CAROLINA". DATE: MARCH 1, 1995 C.H.BLUE AND ASSOCIATES, P.A. SOUTHERN PINES, NC.

NOTES

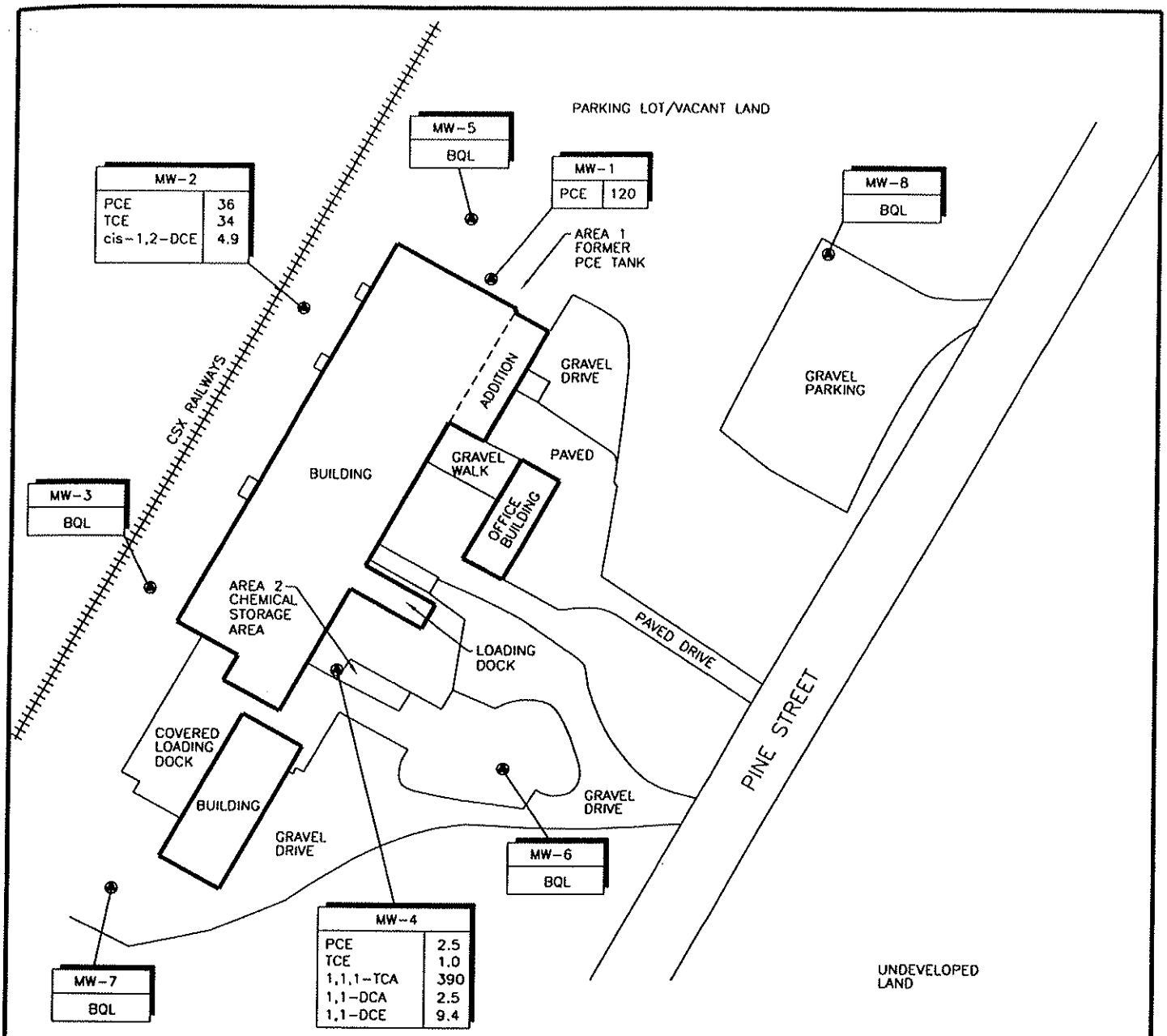
1. MW-1 NOT USED TO CALCULATE GROUND WATER CONTOURS (POSSIBLE ERROR IN WELL ELEVATION SURVEY)

12139GWEC 12-03.DWG 1/15/04 1=120 CH/RT

ERM Environmental Resources Management

GROUNDWATER ELEVATION CONTOUR MAP
DECEMBER 2003
SAINT-GOBAIN ABRASIVES
ABERDEEN, NORTH CAROLINA

FIGURE 4



LEGEND

- ⊕ MONITOR WELL LOCATION
- PCE = TETRACHLOROETHENE
- TCE = TRICHLOROETHENE
- 1,2-DCE = cis-1,2-DICHLOROETHENE
- 1,1,1-TCA = 1,1,1-TRICHLOROETHANE
- 1,1-DCE = 1,1-DICHLOROETHENE
- 1,1-DCA = 1,1-DICHLOROETHANE
- J ESTIMATED VALUE
- BQL = BELOW QUANTITATION LIMITS

N

SCALE IN FEET

0 30 60 120

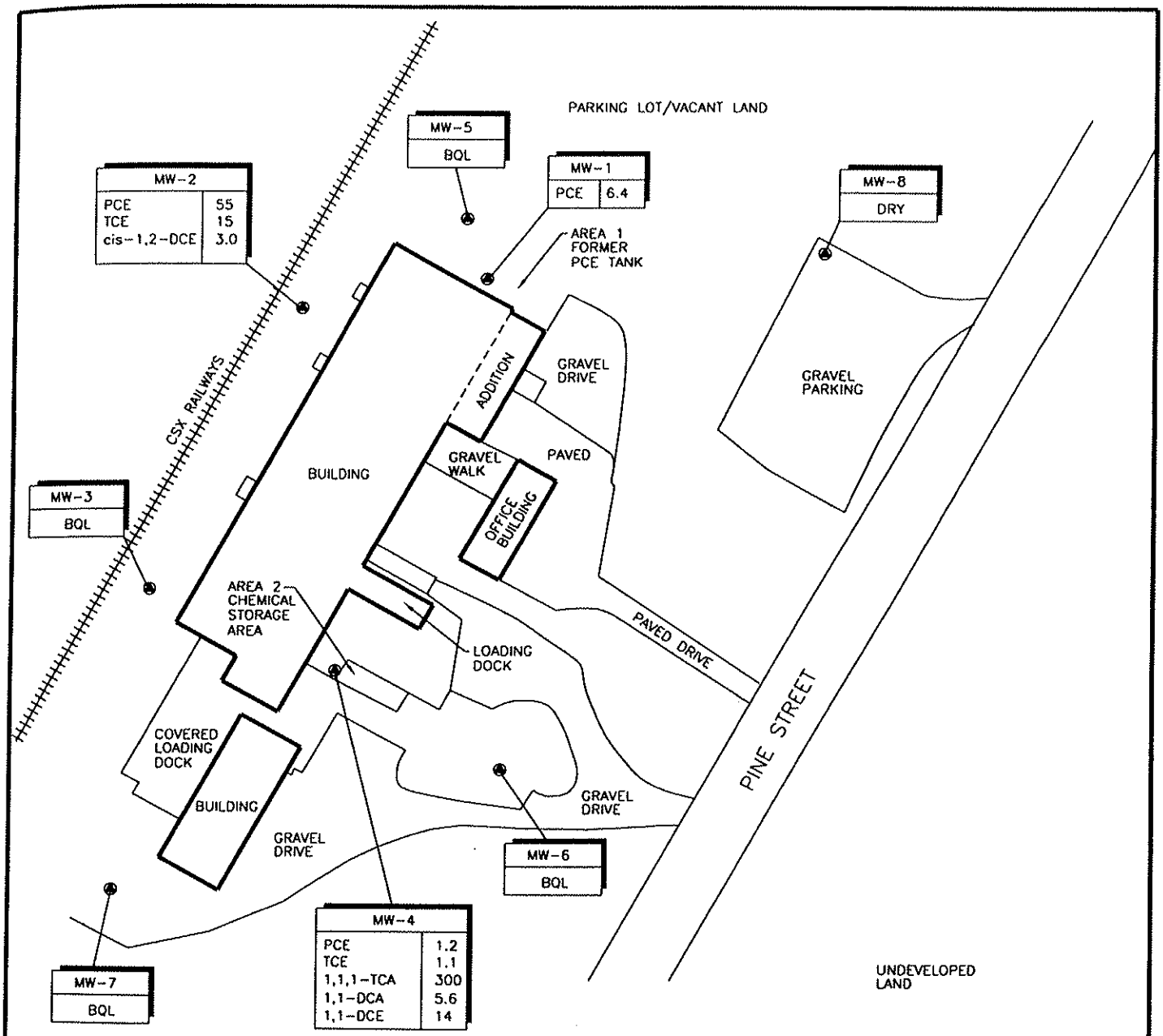
SOURCE: "SURVEY FOR COLONIAL ABRASIVE PRODUCTS CO. PROPERTY IN McLEOD-ALLRED SUBDIVISION, SANDHILLS TOWNSHIP, MOORE COUNTY, ABERDEEN NORTH CAROLINA". DATE: MARCH 1, 1995 C.H.BLUE AND ASSOCIATES, P.A. SOUTHERN PINES, NC.

ERM Environmental Resources Management

GROUNDWATER ANALYTICAL RESULTS
JUNE 2003
SAINT-GOBAIN ABRASIVES
ABERDEEN, NORTH CAROLINA

FIGURE 5

12139GW AN RES 6-03.DWG 1/15/04 1=120 CH/RT



LEGEND

- ⊕ MONITOR WELL LOCATION
- PCE = TETRACHLOROETHENE
- TCE = TRICHLOROETHENE
- 1,2-DCE = cis-1,2-DICHLOROETHENE
- 1,1,1-TCA = 1,1,1-TRICHLOROETHANE
- 1,1-DCE = 1,1-DICHLOROETHENE
- 1,1-DCA = 1,1-DICHLOROETHANE
- J ESTIMATED VALUE
- BQL = BELOW QUANTITATION LIMITS

N

SCALE IN FEET

0 30 60 120

SOURCE: "SURVEY FOR COLONIAL ABRASIVE PRODUCTS CO. PROPERTY IN McLEOD-ALLRED SUBDIVISION, SANDHILLS TOWNSHIP, MOORE COUNTY, ABERDEEN NORTH CAROLINA". DATE: MARCH 1, 1995 C.H.BLUE AND ASSOCIATES, P.A. SOUTHERN PINES, NC.

12139GW AN RES 12-03.DWG 1/15/04 1=120 CH/RT

ERM Environmental Resources Management

GROUNDWATER ANALYTICAL RESULTS
DECEMBER 2003
SAINT-GOBAIN ABRASIVES
ABERDEEN, NORTH CAROLINA

FIGURE 6

TABLE 1
MONITOR WELL CONSTRUCTION DATA
FORMER SAINT GOBAIN FACILITY
ABERDEEN, NORTH CAROLINA

MONITOR WELL	DATE INSTALLED	TOTAL DEPTH (feet below grade)	SCREENED ZONE (feet below grade)
MW-1	09/21/1999	13	3-13
MW-2	09/21/1999	13	3-13
MW-3	09/21/1999	13	3-13
MW-4	09/21/1999	13	3-13
MW-5	09/21/1999	21	11-21
MW-6	09/21/1999	13	3-13
MW-7	09/15/2000	13	3-13
MW-8	09/15/2000	20	5-20

NOTES:

1) ALL MONITOR WELLS CONSTRUCTED WITH SCHEDULE 40 PVC CASING, 0.010-INCH SLOT WELL SCREENS, LOCKING CAPS, AND FLUSH MOUNT PROTECTIVE COVERS
2) BGS = BELOW GROUND SURFACE
3) MONITOR WELLS MW-1,2, 3, 4, 5, AND 6 ARE 1-INCH DIAMETER WELLS. MONITOR WELLS MW-7 AND 8 ARE 2-INCH DIAMETER WELLS.

TABLE 2
GROUND WATER PARAMETERS
FORMER SAINT GOBAIN FACILITY
ABERDEEN, NORTH CAROLINA

JUNE 2003

SAMPLE LOCATION	SULFATE (mg/l)	CHLORIDE (mg/l)	SULFIDE (mg/l)	FERROUS IRON (mg/l)
MW-1	16	5.8	<0.20	2.5
MW-2	23	23	0.3	0.0
MW-3	25	2.0	11	4.5
MW-4	17	6.5	6.9	2.5
MW-5	17	5.9	16	0.0
MW-6	20	4.4	2.1	3.5
MW-7	15	11	9.6	6.5
MW-8	20	11	<0.10	0.0
USEPA Criteria for Conditions Favorable to Biodegradtion*	<20	> 2 Times Background	>1	>1

DECEMBER 2003

SAMPLE LOCATION	SULFATE (mg/l)	CHLORIDE (mg/l)	SULFIDE (mg/l)	FERROUS IRON (mg/l)
MW-1	22	4.9	<2.0	4.0
MW-2	18	4.2	<2.0	0
MW-3	15	1.6	<2.0	0
MW-4	12	6.2	<2.0	1.8
MW-5	12	3.7	<2.0	0
MW-6	7.4	13	<2.0	3.2
MW-7	9.6	9.7	<2.0	5.1
MW-8	Dry	Dry	Dry	Dry
USEPA Criteria for Conditions Favorable to Biodegradtion*	<20	> 2 Times Background	>1	>1

Notes:

1) mg/l = Milligrams Per Liter
2) MW = Monitor Well
3) Field Parameters Collected June 18 & 19, 2003 and December 3 & 4, 2003
4) Dry = Insufficient groundwater for sampling
5) Ferrous iron measurements collected in the field
6) All other constituents analyzed by a North carolina certified laboratory
7) US EPA, 1997. Draft EPA Region 4 Document.

TABLE 3
FINAL GROUNDWATER PARAMETERS - FIELD MEASURED
FORMER SAINT GOBAIN FACILITY
ABERDEEN, NORTH CAROLINA

JUNE 2003

SAMPLE LOCATION	TEMP (centigrade)	Dissolved Oxygen (mg/L)	pH (Std. Units)	ORP (mV)	Specifc Conductance (umhos/cm)	Turbidity (NTUs)
MW-1	19.78	2.06	5.32	81	36	35.1
MW-2	21.56	4.38	5.45	219	65	16
MW-3	18.79	0.0	5.93	-34	79	37
MW-4	20.79	1.18	5.82	18	72	32
MW-5	18.69	8.22	4.34	350	29	38
MW-6	21.60	3.16	5.13	201	47	31
MW-7	22.42	0.0	5.85	-65	119	26
MW-8	19.39	8.08	4.30	418	43	7.7
EPA Criteria	>20	<0.5	5<pH<9	<-100	---	---

DECEMBER 2003

SAMPLE LOCATION	TEMP (centigrade)	Dissolved Oxygen (mg/L)	pH (Std. Units)	ORP (mV)	Specifc Conductance (umhos/cm)	Turbidity (NTUs)
MW-1	17.66	0.0	5.45	150	32	27.9
MW-2	16.50	0.0	6.50	341	67	53.4
MW-3	18.13	0.0	6.16	22	75	139
MW-4	20.08	0.0	5.83	172	64	5.0
MW-5	18.12	0.0	4.52	372	25	32.7
MW-6	19.25	3.88	6.04	155	79	25.1
MW-7	18.03	0.0	6.09	-5	129	203
MW-8	Dry	Dry	Dry	Dry	Dry	Dry
EPA Criteria	>20	<0.5	5<pH<9	<-100	---	---

NOTES:

1) mg/l = Milligrams Per Liter
2) MW = Monitor Well
3) Field Parameters Collected June 18 & 19, 2003 and December 3 & 4, 2003
4) Dry = Insufficient groundwater for sampling
5) Ferrous iron measurements collected in the field
6) mV = millivolts, NTU = Nepholometric Turbidity Units
7) umhos/cm = micromhos per centimeter
8) All other constituents analyzed by a North Carolina certified laboratory
9) EPA Criteria = Criteria favorable to biodegradation (EPA, Draft Region 4 Document, 1997).

TABLE 5
GROUND WATER ANALYTICAL SUMMARY - VOLATILE ORGANIC COMPOUNDS
FORMER SAINT GOBAIN FACILITY
ABERDEEN, NORTH CAROLINA

JUNE 2003

SAMPLE LOCATION	DETECTED VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (ug/l)						
	1,1-DCA	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	PCE	1,1,1-TCA	TCE
MW-1	BQL	BQL	BQL	BQL	**120**	BQL	BQL
MW-2	BQL	BQL	4.9	BQL	**36**	BQL	**34**
MW-3	BQL	BQL	BQL	BQL	BQL	BQL	BQL
MW-4	2.5	**9.4**	BQL	BQL	**2.5**	**390**	1.0
MW-5	BQL	BQL	BQL	BQL	BQL	BQL	BQL
MW-6	BQL	BQL	BQL	BQL	BQL	BQL	BQL
MW-7	BQL	BQL	BQL	BQL	BQL	BQL	BQL
MW-8	BQL	BQL	BQL	BQL	BQL	BQL	BQL
MW-8 (dup)	BQL	BQL	BQL	BQL	BQL	BQL	BQL
FIELD BLANK	BQL	BQL	BQL	BQL	BQL	BQL	BQL
NC GW STD	700	7	70	70	0.7	200	2.8

DECEMBER 2003

SAMPLE LOCATION	DETECTED VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (ug/l)						
	1,1-DCA	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	PCE	1,1,1-TCA	TCE
MW-1	BQL	BQL	BQL	BQL	**6.4**	BQL	BQL
MW-2	BQL	BQL	3.0	BQL	**55**	BQL	**15**
MW-3	BQL	BQL	BQL	BQL	BQL	BQL	BQL
MW-4	5.6	**14**	BQL	BQL	**1.1**	**300**	1.1
MW-4 (dup)	5.3	**14**	BQL	BQL	**1.2**	**280**	1.1
MW-5	BQL	BQL	BQL	BQL	BQL	BQL	BQL
MW-6	BQL	BQL	BQL	BQL	BQL	BQL	BQL
MW-7	BQL	BQL	BQL	BQL	BQL	BQL	BQL
MW-8	Dry	Dry	Dry	Dry	Dry	Dry	Dry
FIELD BLANK	BQL	BQL	BQL	BQL	BQL	BQL	BQL
NC GW STD	700	7	70	70	0.7	200	2.8

Notes: dup = duplicate, PCE = tetrachloroethene, TCE = trichloroethene, DCE = dichloroethene, TCA = trichloroethane, BQL = below quantitation limits, Dry = Insufficient groundwater for sampling DCA = dichloroethane, ug/l = micrograms per liter, NC GW STD = North Carolina ground water standard, Results shown in bold exceed NC GW STD. Samples collected June 18 - 19, and on December 3 - 4, 2003.