CORRECTIVE ACTION REPORT

Segro/Colonial Abrasive Products Co.
312 South Pine Street
Aberdeen, North Carolina

Prepared for:

Saint-Gobain Abrasives
750 East Swedesford Road
Valley Forge, PA 19482-0101

December 18, 2002

Prepared by:

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1. INTRODUCTION

On behalf of Saint-Gobain Abrasives (SGA), Environmental Liability Management, Inc. (ELM) implemented a groundwater corrective action to address dissolved compounds in shallow groundwater at the Segro/Colonial Abrasive Products facility, 312 Pine Street, Aberdeen, North Carolina. The activities were conducted as proposed in the approved Corrective Action Plan (ELM, 1999b) and Supplemental Corrective Action Plan (ELM 2000) which were previously submitted to the North Carolina Department of Environment and Natural Resources (NCDENR). SGA began the evaluation of environmental conditions as part of the acquisition of the Segro/Colonial Abrasive Products facility in 1998. As reported previously to the NCDENR (ELM, 1999a and ELM, 1999b) there are two areas of the facility where low concentrations of dissolved chlorinated volatile organic compounds had been detected in shallow groundwater:

- Area 1 was the location of a former above ground tank, which was formerly used to store tetrachloroethene (PCE);

- Area 2 is a chemical storage area (Aquaterra 1993).

No evidence of residual source materials have been identified in the several stages of site investigation, as reported previously.

The two areas were first investigated in 1993, as part of Phase I and Phase II Environmental Property Assessments conducted by Aquaterra, Inc. (1993) of Raleigh, North Carolina. In that earlier investigation, PCE was detected at low concentrations in a shallow soil sample in Area 1. In a 1998 investigation conducted by ELM (ELM 1999a), PCE was detected at low concentrations in shallow groundwater samples from temporary monitoring wells. In a 1999 investigation conducted by ELM (ELM, 1999b), PCE was detected at low concentrations in groundwater samples from permanent monitoring wells. It was also during that 1999 investigation that it was confirmed that there are no residual sources in soil.

SGA notes that none of the residues detected in any site investigation result from reportable discharges during SGA ownership of the property. Therefore, the site investigations and corrective actions implemented to date have been conducted pursuant to the voluntary cleanup program and are not subject to other regulatory programs.

Because there is no residual source material in soil, and because it had been documented that natural attenuation of the dissolved compounds was and is occurring in the shallow aquifer which is not used as a commercial or residential supply (e.g. ELM 1999a), the corrective action would focus on the enhancement of natural aquifer conditions to expedite the documented degradation of the dissolved compounds.

1.1. Property Setting

The Segro/Colonial Abrasive Products Co. is located within a mixed residential-commercial-industrial setting in Aberdeen North Carolina (Figure 1). Surrounding land use includes residential properties to the east and south, an active railroad to the west, and commercial land to the north. Storm water drains to the west into Aberdeen Creek, approximately 1,200 feet from the property. The site is bounded to the south by McFarlands Branch, a first-order stream, which flows west into Aberdeen Creek. The property has several buildings formerly used for manufacturing, warehousing and office activities, in addition to a gravel parking lot, several concrete pads, and several grassy areas. Manufacturing has been terminated at the facility, which is currently vacant.

Groundwater flows southwest toward the confluence of McFarlands Branch and Aberdeen Creek (Figures 3 through 6). Water quality in Aberdeen Creek is being monitored by USEPA as part of a remedial action for the nearby Geigy Superfund Site, which is located upgradient (i.e., to the east) of the Segro/Colonial Abrasive Products property. Based on a review of the available data from USEPA, the only compounds of concern in Aberdeen Creek are pesticides, which are not compounds of concern at the SGA facility.

Shallow and deep groundwater in the vicinity of the Segro/Colonial Abrasive Products property is within an area designated by USEPA as non-potable because of the presence of pesticides dissolved in the shallow groundwater, which originate at the upgradient Geigy Superfund Site. The USEPA (1997) also determined that the deep groundwater in the area upgradient of the Segro/Colonial Abrasive Products property also contains trichloroethene from a source other than the Geigy Superfund Site. Throughout the area, potable water is supplied to commercial and domestic users by the Town of Aberdeen Municipal Water Authority (USEPA. 1997). The city has instituted an ordinance which requires all properties within 500 feet of existing water and/or sewer lines to connect to those facilities. Consequently, no downgradient users of groundwater have been identified, so there is no apparent exposure via the groundwater pathway.

1.2. Summary of Remedial Approach

Because there is no residual source material in soil or in the saturated zone, there was a measured and documented decrease of dissolved compound concentration with downgradient distance, and there are no human or ecological receptors of concern, monitored natural attenuation was selected as the best approach. However, to reduce the time period of that monitored natural attenuation, SGA proposed (ELM 1999b) to enhance the in-situ degradation of the regulated compounds by injection of a material (Hydrogen Release Compound - HRC) which would provide for a more rapid and complete degradation. The HRC was injected in August, 2001 as described in Section 2, below.

As a means to confirm groundwater quality conditions after the groundwater amendment, SGA monitored groundwater quality on a quarterly basis in November 2001, February, May, and September 2002 as described in Section 3.

2. HYDROGEN RELEASE COMPOUND INJECTION

On July 30, 31 and August 1, 2, and 3, 2001, 3030 pounds of Hydrogen releasing compound (HRC) were injected into the groundwater at the two Areas of Concern (Figure 2). Prior to

injecting the HRC, a Permit to Construct and/or Use a Well(s) for Injection (Class 5I Wells) was obtained from the NCDENR Underground Injection Control Program (permit number WI0600006). HRC was introduced into groundwater via approximately 56 small diameter (1.25 inch OD) Geoprobe borings (Figure 2). The HRC is a lactic acid based solution which is metabolized by indigenous anaerobic bacteria. The native presence of the bacteria had been determined by the identification of reductive dechlorination degradation compounds in well MW-2 prior to the injection. The anaerobic bacteria release hydrogen, which:

- reduces the concentration of dissolved oxygen in an aquifer, thereby providing a more amenable environment for the growth of the anaerobic bacteria which bio-degrade the chlorinated compounds;

- 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 molecules in the process.

The process strips one chlorine during each successive phase beginning with perchlorethene (four chlorines) which reduces to trichloethene (three), then an isomer of dichloroethene (two), followed by vinyl chloride (one), which is then degraded by aerobic bacteria at a distance beyond the reduced zone of the aquifer.

The HRC was injected by Vironex Environmental Services, under the direction of ELM. Specific injection procedures are provided in Attachment A.

3. POST-INJECTION GROUNDWATER QUALITY INVESTIGATION

Groundwater samples were collected on a quarterly basis for a period of one year after injection of the HRC. Samples were collected on November 8, 2001, February 12, 2002, May

30, 2002, and September 5, 2002, from six of the existing monitoring wells MW-1 through MW-5 and MW-7.

Prior to purging the wells, groundwater elevations were measured in each of the monitoring wells (Figures 3 through 6). With the exception of the episode from September, 2002 which was during the summer drought, groundwater flow was consistent with all previous monitoring episodes; flow was toward the southwest. The February and September 2002 data (Figures 4 and 6) depict a condition in which groundwater flow appears to be reversed and flowing from a mounded area centered approximately on well MW-2. This is most likely an artifact resulting from uneven recharge along the railroad following a prolonged dry spell.

Groundwater was sampled using low-flow purging and sampling methods, using micropurge pump equipment. Field parameters were measured with in-line equipment during well purging and prior to sample collection. Field screening data are provided in Attachment B. The groundwater samples were analyzed by a North Carolina certified laboratory for total volatile organic compounds and for the geochemical parameters which would provide for an evaluation of natural attenuation of the dissolved compounds (Tables 1 through 4 and Figures 3 through 6). Complete laboratory data packages are provided in Attachment C.

Historically, monitoring wells MW-1 through MW-5 had been sampled on September 23, 1999, June 26, 2000 and August 14, 2000 (ELM 1999b, ELM 2000, and ELM 2001) prior to the HRC injection. Monitoring well MW-7 was sampled on October 5, 2000 (ELM 2001) prior to HRC injection. A summary of the historic groundwater sampling analytical results (pre- and post- HRC injection) from monitoring wells MW-1 through MW-4 is presented in Table 5. The suite of target compounds has never been detected in monitoring wells MW-5 and MW-7.

3.1. Findings for Area 1 – Former PCE Above Ground Storage Tank Area

During the first year of the post-injection monitoring period (November 2001, February, May and September 2002) concentrations of PCE in both wells MW-1 and MW-2 fluctuated but remained above the North Carolina Ground Water Standard (Table 5, Figures 3 to 6). The compound TCE was detected only in well MW-2.

Date/Well	Nov. 2001	Feb. 2002	May 2002	Sept. 2002
MW-1 (PCE)	5.3	85	9.1	44.3
MW-2 (PCE)	244	20	190	21
MW-2 (TCE)	10.3	28.7	6	36.1

The recorded variability is typical of *in-situ* aquifer amendment remedies which tend to initially release sorbed compounds which had been bound chemically to the aquifer matrix. The initial variability, and in some cases increases, in compound concentrations is generally followed by a period of stabilization and steady decrease in concentrations.

Field parameters (Table 6) document that in the final two monitoring episodes the amendment had successfully altered geochemical conditions at well MW-1 to those more favorable to reductive dechlorination. Geochemical conditions at well MW-2 which is approximately one to two years travel time downgradient had only begun to alter by the time of the final episode reported herein (Table 6). Consequently, decreases in concentration are predicted over the next year for well MW-1, with a subsequent alteration of conditions and decreasing concentrations in MW-2.

3.2. Findings for Area 2 – Chemical Storage Area

During the first year of post-injection monitoring in well MW-4, concentrations of all target compounds, including TCE, TCA, and PCE, decreased to levels below the NCGWS. The single compound 1,1 DCE remained slightly above the standard in the final episode. During that same time period, concentrations in the off-property well MW-3 remained below respective NCGWS, and target compounds were not detected in the downgradient well MW-7.

Date/Well MW-4	Nov. 2001	Feb. 2002	May 2002	Sept. 2002
PCE	**6.3**	**9.1**	ND	0.8
TCE	**4.8**	**7.1**	7	0.47
1,2 DCE	**54.7**	**99.5**	**63.9**	**8**
1,1,1 TCA	**12604**	**1660**	**2920**	105

Geochemical parameters in well MW-4 (Table 6) document that the amendment altered conditions as predicted, that the reductive dechlorination was successful and that conditions are already returning to the pre-injection geochemistry, but the concentrations of target compounds has been successfully reduced to acceptable levels.

4. EVALUATION OF CORRECTIVE ACTION

4.1. Area 1 – Former PCE Above Ground Storage Tank Area

At Area 1, there has yet been significant change in the distribution of dissolved target compounds as a result of the injection of the geochemical amendment. However, the geochemical conditions are now more amenable to reductive dechlorination and a decrease in concentrations is predicted. Because the distance to downgradient well MW-2 is approximately one year's travel time or greater, further monitoring is needed to assess the amendments effect at that distance from the injection area.

Regardless of the affect of the amendment on concentrations in the immediate area of well MW-2, the main objective of the action was to eliminate sorbed residues and dissolved compounds from the former release area (MW-1) which would result in a decrease at the downgradient location (MW-2). Therefore, the concentration trend at MW-2 is less important as an indicator of the success of the treatment, which was applied at well MW-1. Ultimately, a decreasing trend at well MW-2 is a necessary component of the final remediation, but the result will be from the elimination of the dissolved and sorbed residues at the area of the release (MW-1).

Because there has been no significant increase in dissolved compound concentrations as a result of the introduction of the HRC material and no change in concentration at well MW-2, there is no change in the potential risks associated with the dissolved residues. Therefore, no additional measures are needed at this time to maintain the current risk management conditions, and the remedial approach will continue as planned and as outlined below.

4.2. Area 2 – Chemical Storage Area

At the chemical storage area, the introduction of the geochemical amendment has been successful in achieving the predicted alteration of geochemical conditions and the uniform reduction of dissolved compounds to concentrations below applicable standards. One

degradation compound (DCE) remained at a concentration slightly above the standard. However, because that compound was not one of the substances released, but an *in-situ* degradation compound, its presence is not indicative of a persistent residue. Rather, its presence marks the tail end of the successful remediation.

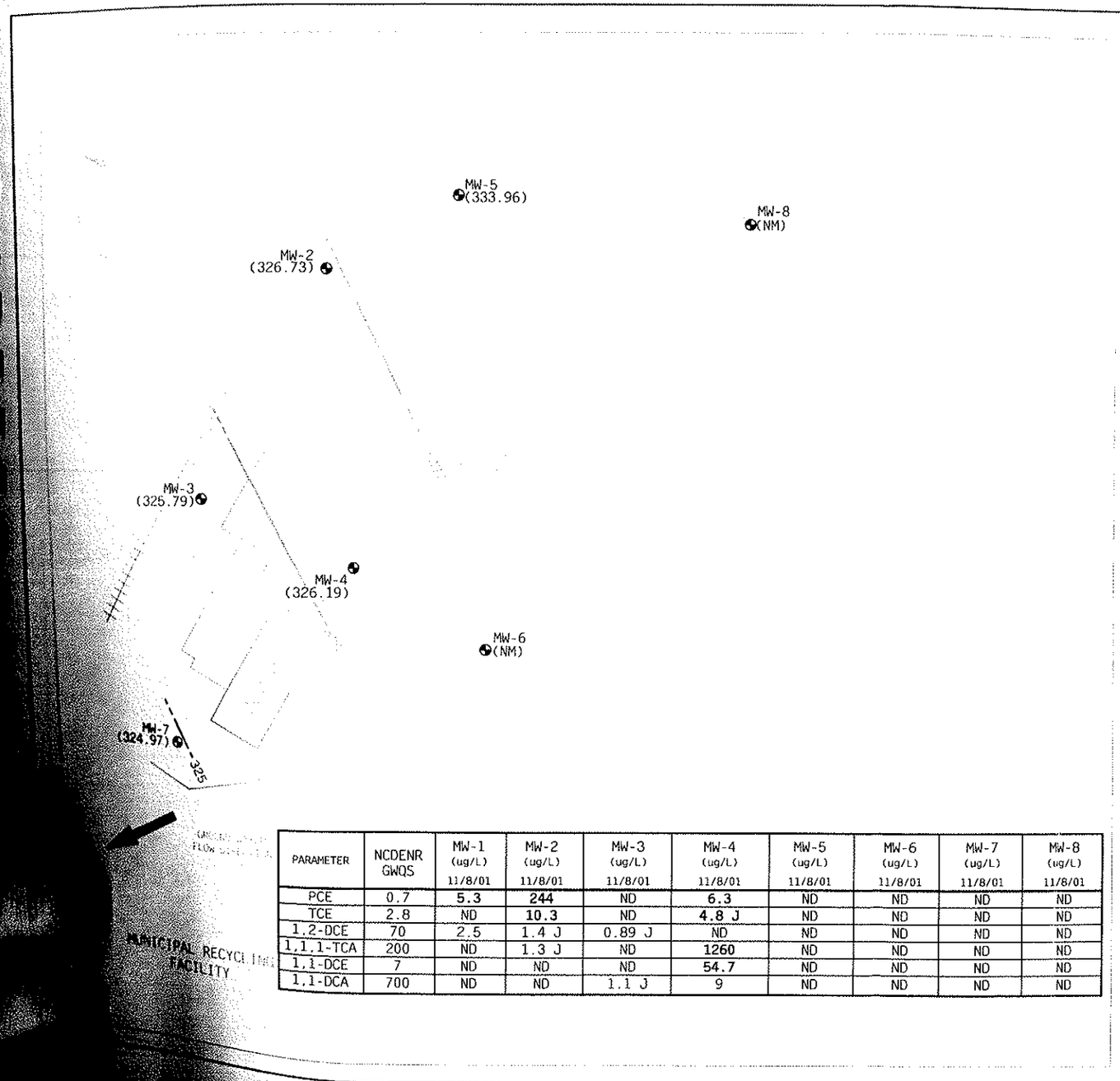
At Area 2, there had never been any off-property transport of dissolved compounds at concentrations above standards. Therefore, the implementation of the action, by decreasing the mass of dissolved residues in the former source area to concentrations below applicable standards, has minimized the potential for any off-property transport and has thereby eliminated the threat of potential future risks. Because the predicted duration of compound release has not yet expired, continued destruction of residual mass is predicted.

5. PROPOSED ADDITIONAL GROUNDWATER MONITORING

Because there has never been any off-property transport of dissolved compounds at concentrations above standards from Area 2, and since recent monitoring indicated a significant decrease in targeted compound concentrations in MW-4, SGA proposes to monitor groundwater quality semi-annually for one additional year, beginning in February, 2003. The data from the two additional monitoring episodes will be compared with the existing data set to determine whether the program can be concluded or if additional monitoring is necessary.

Dissolved compounds remain at Area 1 at a concentration above applicable standards so continued monitoring is proposed. SGA proposes to monitor groundwater quality semi-annually for one additional year, beginning in February 2003, to provide an adequate interval in sampling periods to demonstrate an expected decreasing trend in target compounds. The data from the two additional monitoring episodes will be compared with the existing data set to determine whether the program can be concluded or if additional monitoring is necessary.

Upon completion of the one year of semi-annual sampling (February 2004), SGA will submit a report to NCDENR summarizing the results of the two rounds of sampling and provide recommendations.



LEGEND

MW-1	MONITORING WELL LOCATION AND ID (APPROXIMATE)
PCE	TETRACHLORDETHENE
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
NM	NOT MEASURED
(324.97)	GROUND WATER ELEVATION (FEET)
	GROUND WATER ELEVATION CONTOUR (FEET) CONTOUR INTERVAL = 1 FOOT DASHED WHERE INFERRED
	INFERRED GROUND WATER FLOW DIRECTION

NOTES

1. MW-1 NOT USED TO CALCULATE GROUND WATER CONTOURS (POSSIBLE ERROR IN WELL ELEVATION SURVEY).
2. **BOLD VALUES INDICATE CONCENTRATION EXCEEDS NCDENR GROUNDWATER QUALITY STANDARD (GWQS).**

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.

PARAMETER	NCDENR GWQS	MW-1 (ug/L) 11/8/01	MW-2 (ug/L) 11/8/01	MW-3 (ug/L) 11/8/01	MW-4 (ug/L) 11/8/01	MW-5 (ug/L) 11/8/01	MW-6 (ug/L) 11/8/01	MW-7 (ug/L) 11/8/01	MW-8 (ug/L) 11/8/01
PCE	0.7	**5.3**	**244**	ND	**6.3**	ND	ND	ND	ND
TCE	2.8	ND	**10.3**	ND	**4.8 J**	ND	ND	ND	ND
1.2-DCE	70	2.5	1.4 J	0.89 J	ND	ND	ND	ND	ND
1,1,1-TCA	200	ND	1.3 J	ND	**1260**	ND	ND	ND	ND
1,1-DCE	7	ND	ND	ND	**54.7**	ND	ND	ND	ND
1,1-DCA	700	ND	ND	1.1 J	9	ND	ND	ND	ND

0 100 200

SCALE: 1" = 100'

TITLE:

FIGURE 3
MONITORING WELL LOCATIONS AND SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUND WATER - NOVEMBER, 2001

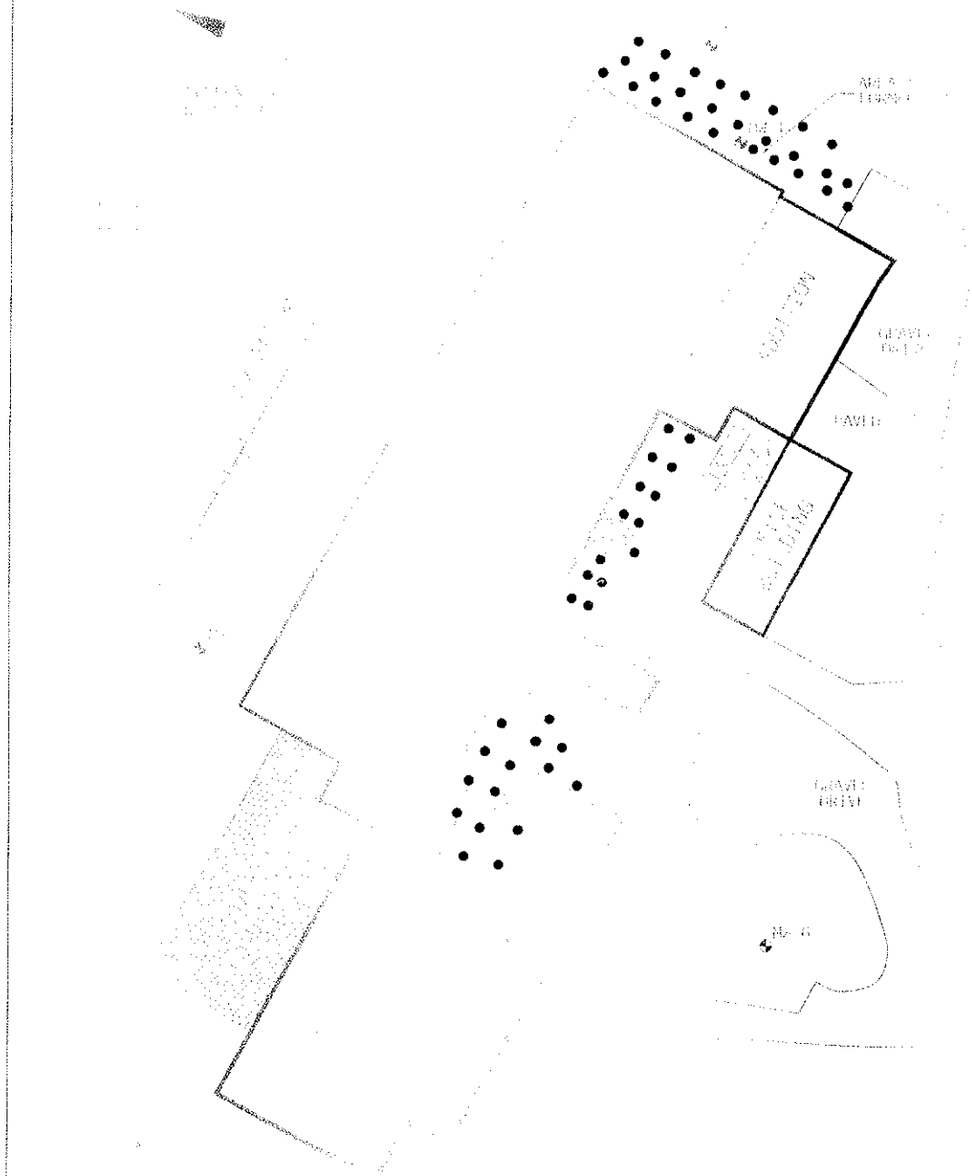
LOCATION:
COLONIAL ABRASIVES PRODUCTS COMPANY
ABERDEEN, NORTH CAROLINA

DATE: 12/16/02

FILENAME: 98177_GWC

LAYOUT: 11-01

ENVIRONMENTAL LIABILITY MANAGEMENT, INC.
218 Wall Street, Research Park, Princeton, NJ 08540
107 North Broad Street, Suite 300, Doylestown, PA 18901
100 Route 46 East, Building A, Mountain Lakes, NJ 07046



LEGEND

MONITORING WELL LOCATION AND ID (APPROXIMATE)

● HRC INJECTION POINTS

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.

0 60 120

SCALE: 1" = 60'

TITLE:

FIGURE 2
LOCATION OF HRC INJECTION POINTS

LOCATION:	COLONIAL ABRASIVES PRODUCTS COMPANY ABERDEEN, NORTH CAROLINA
DATE:	12/04/02
PROJECT NO.:	98177
FILENAME:	98177_HRC

ENVIRONMENTAL LIABILITY MANAGEMENT, INC.
218 Wall Street, Research Park, Princeton, NJ 08540
107 North Broad Street, Suite 300, Doylestown, PA 18901
100 Route 46 East, Building A, Mountain Lakes, NJ 07046

Table 5
Summary of Historic Ground Water Analytical Data
Segro/Colonial Abrasive Products Company
Aberdeen, NC

Sample ID	MW-1							MW-2						
Sample Date	9/23/99	6/26/00	9/14/00	11/8/01	2/12/02	5/30/02	9/5/02	9/23/99	6/26/00	9/14/00	11/8/01	2/12/02	5/30/02	9/5/02
Units Of Measure	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Volatile Organic Compounds														
cis-1,2-Dichloroethene	ND	ND	ND	2.5	7.2	1.8	4.7	7.3	2.9	2.8	1.4	4.3	ND	6.0
Tetrachloroethene	**24.5**	**5.1**	**26.3**	**5.3**	**85.0**	**9.1**	**44.3**	**28.6**	**105**	**152**	**244**	**20**	**190**	**21**
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	6.3	1.7	1.5	1.3	1.5	ND	2.0
Trichloroethene	ND	ND	ND	ND	0.78	1.30	2.00	**51.0**	**20.5**	**19.4**	**10.3**	**28.7**	**6.0**	**36.1**

Sample ID	MW-3							MW-4						
Sample Date	9/23/99	6/26/00	9/14/00	11/8/01	2/12/02	5/30/02	9/5/02	9/23/99	6/26/00	9/14/00	11/8/01	2/12/02	5/30/02	9/5/02
Units Of Measure	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Volatile Organic Compounds														
1,1-Dichloroethane	1.60	1.20	1.20	1.10	0.92	0.80	0.71	26.5	5.0	5.9	9.0	12.7	11.9	1.5
cis-1,2-Dichloroethene	ND	0.73	0.99	0.89	ND	ND	0.60	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	**30.6**	**36.4**	**55.5**	**54.7**	**99.5**	**63.9**	**8.0**
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	N	ND	ND	0.81	ND	ND
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	**1.9**	**2.6**	**ND**	**6.3**	**9.1**	ND	0.8
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	**395**	**609**	**919**	**1260**	**1660**	2920	105
Trichloroethene	ND	ND	ND	0.36	0.34	0.37	ND	**2**	**2.3**	**4.1**	**4.8**	**7.1**	7	0.47

Table 4
Summary of Ground Water Analytical Data, Ground Water Geochemical Parameters to Evaluate the Natural Attenuation of Dissolved Volatile Organic Compounds
September 5, 2002
Segro/Colonial Abrasive Products Company
Aberdeen, NC

		AREA 1						AREA 2					
Sample ID	**North Carolina**	MW-1		MW-2		MW-5		MW-3		MW-4		MW-7	
Laboratory ID	**Department of Environment**	N21639-1		N21639-2		N21639-5		N21639-3		N21639-4		N21639-6	
Sample Media	**and Natural Resources**	Ground Water		Ground Water		Ground Water		Ground Water		Ground Water		Ground Water	
Sample Date	**Ground Water Standards**	9/5/02		9/5/02		9/5/02		9/5/02		9/5/02		9/5/02	
Units Of Measure	**ug/l**	ug/l		ug/l		ug/l		ug/l		ug/l		ug/l	
Volatile Organic Compounds													
Acrolein		50	U	50	U	50	U	50	U	50	U	50	U
Acrylonitrile		50	U	50	U	50	U	50	U	50	U	50	U
Benzene	1	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Bromodichloromethane	NS	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Bromoform	0.19	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*
Bromomethane	NS	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Carbon tetrachloride	0.3	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*
Chlorobenzene	50	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Chloroethane	NS	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
2-Chloroethyl vinyl ether		2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Chloroform	0.19	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*
Chloromethane	NS	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Dibromochloromethane	NS	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
1,2-Dichlorobenzene		2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
1,3-Dichlorobenzene		2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
1,4-Dichlorobenzene		2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Dichlorodifluoromethane		2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
1,1-Dichloroethane	700	2.0	U	0.2	J	2.0	U	0.71	J	1.5	J	2.0	U
1,2-Dichloroethane	0.38	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*
1,1-Dichloroethene	7	2.0	U	2.0	U	2.0	U	2.0	U	**8.0**		2.0	U
cis-1,2-Dichloroethene	70	4.7		6.0		2.0	U	0.6	J	2.0	U	2.0	U
trans-1,2-Dichloroethene	70	2.0	U	0.29	J	2.0	U	2.0	U	2.0	U	2.0	U
1,2-Dichloropropane	0.56	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*
cis-1,3-Dichloropropene	NS	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
trans-1,3-Dichloropropene	NS	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Ethylbenzene	29	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Methylene chloride	5	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
1,1,2,2-Tetrachloroethane	NS	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Tetrachloroethene	0.7	**44.3**		**21**		*2.0*	*U*	*2.0*	*U*	**0.81**	J	*2.0*	*U*
Toluene	1000	0.16	J	0.26	J	1.0	U	1.0	U	1.0	U	1.0	U
1,1,1-Trichloroethane	200	2.0	U	2.0		2.0	U	2.0	U	105		2.0	U
1,1,2-Trichloroethane	NS	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Trichloroethene	2.8	2.0		**36.1**		2.0	U	2.0	U	0.47	J	2.0	U
Trichlorofluoromethane		2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Vinyl chloride	0.015	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*
Xylene (total)	530	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Total TIC, Volatile	NS	0		0		0		0		0		4.9	
TBA-D9													
General Chemistry (unit of measure)													
Sulfide (mg/l)	NS	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Chloride (mg/l)	250	6		1	U	6		2		4		8	
Sulfate (mg/l)	250	20	U	20	U	20	U	20	U	20	U	20	U

Bold value indicates concentration exceeds NCDENR Groundwater Standard.
Italicized value indicates detection limit exceeds NCDENR Groundwater Standard.

NS = No Standard
J = Estimated value
U = Not detected above level indicated
B = Also detected in blank
N = Presumptive evidence of a compound

Table 3
Summary of Ground Water Analytical Data, Ground Water Geochemical Parameters to Evaluate the Natural Attenuation of Dissolved Volatile Organic Compounds
May 30, 2002
Segro/Colonial Abrasive Products Company
Aberdeen, NC

		AREA 1						AREA 2					
Sample ID	**North Carolina**	MW-1		MW-2		MW-5		MW-3		MW-4		MW-7	
Laboratory ID	**Department of Environment**	N15198-1		N15198-2		N15198-5		N15198-3		N15198-4		N15198-6	
Sample Media	**and Natural Resources**	Ground Water		Ground Water		Ground Water		Ground Water		Ground Water		Ground Water	
Sample Date	**Ground Water Standards**	5/30/02		5/30/02		5/30/02		5/30/02		5/30/02		5/30/02	
Units Of Measure	**ug/l**	ug/l		ug/l		ug/l		ug/l		ug/l		ug/l	
Volatile Organic Compounds													
Acrolein		50	U	50	U	50	U	50	U	500	U	50	U
Acrylonitrile		50	U	50	U	50	U	50	U	500	U	50	U
Benzene	1	1.0	U	1.0	U	1.0	U	1.0	U	*10*	*U*	1.0	U
Bromodichloromethane	NS	2.0	U	2.0	U	2.0	U	2.0	U	20	U	2.0	U
Bromoform	0.19	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*20*	*U*	*2.0*	*U*
Bromomethane	NS	2.0	U	2.0	U	2.0	U	2.0	U	20	U	2.0	U
Carbon tetrachloride	0.3	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*20*	*U*	*2.0*	*U*
Chlorobenzene	50	2.0	U	2.0	U	2.0	U	2.0	U	20	U	2.0	U
Chloroethane	NS	2.0	U	2.0	U	2.0	U	2.0	U	20	U	2.0	U
2-Chloroethyl vinyl ether		2.0	U	2.0	U	2.0	U	2.0	U	20	U	2.0	U
Chloroform	0.19	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*20*	*U*	*2.0*	*U*
Chloromethane	NS	2.0	U	2.0	U	2.0	U	2.0	U	20	U	2.0	U
Dibromochloromethane	NS	2.0	U	2.0	U	2.0	U	2.0	U	20	U	2.0	U
1,2-Dichlorobenzene		2.0	U	2.0	U	2.0	U	2.0	U	20	U	2.0	U
1,3-Dichlorobenzene		2.0	U	2.0	U	2.0	U	2.0	U	20	U	2.0	U
1,4-Dichlorobenzene		2.0	U	2.0	U	2.0	U	2.0	U	20	U	2.0	U
Dichlorodifluoromethane		2.0	U	2.0	U	2.0	U	2.0	U	20	U	2.0	U
1,1-Dichloroethane	700	2.0	U	2.0	U	2.0	U	0.80	J	11.9	J	2.0	U
1,2-Dichloroethane	0.38	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*20*	*U*	*2.0*	*U*
1,1-Dichloroethene	7	2.0	U	2.0	U	2.0	U	2.0	U	**63.9**		2.0	U
cis-1,2-Dichloroethene	70	1.8	J	2.0	U	2.0	U	2.0	U	20	U	2.0	U
trans-1,2-Dichloroethene	70	2.0	U	2.0	U	2.0	U	2.0	U	20	U	2.0	U
1,2-Dichloropropane	0.56	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*20*	*U*	*2.0*	*U*
cis-1,3-Dichloropropene	NS	2.0	U	2.0	U	2.0	U	2.0	U	20	U	2.0	U
trans-1,3-Dichloropropene	NS	2.0	U	2.0	U	2.0	U	2.0	U	20	U	2.0	U
Ethylbenzene	29	1.0	U	1.0	U	1.0	U	1.0	U	10	U	1.0	U
Methylene chloride	5	2.0	U	2.0	U	2.0	U	2.0	U	*20*	U	2.0	U
1,1,2,2-Tetrachloroethane	NS	2.0	U	2.0	U	2.0	U	2.0	U	20	U	2.0	U
Tetrachloroethene	0.7	**9.1**		**190**		*2.0*	*U*	*2.0*	*U*	*20*	U	*2.0*	*U*
Toluene	1000	1.0	U	1.0	U	1.0	U	1.0	U	10	U	1.0	U
1,1,1-Trichloroethane	200	2.0	U	2.0	U	2.0	U	2.0	U	**2920**		2.0	U
1,1,2-Trichloroethane	NS	2.0	U	2.0	U	2.0	U	2.0	U	20	U	2.0	U
Trichloroethene	2.8	1.30	J	**6.0**		2.0	U	0.37	J	**7.0**		2.0	U
Trichlorofluoromethane		2.0	U	2.0	U	2.0	U	2.0	U	20	U	2.0	U
Vinyl chloride	0.015	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*20*	*U*	*2.0*	*U*
Xylene (total)	530	5.0	U	5.0	U	5.0	U	5.0	U	50	U	5.0	U
Total TIC, Volatile	NS	0		0		0		3.7		0		4.9	
TBA-D9													
General Chemistry (unit of measure)													
Sulfide (mg/l)	NS	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Chloride (mg/l)	250	10		5		5.5		1	U	2		9.5	
Sulfate (mg/l)	250	20	U	20	U	20	U	20	U	20	U	20	U

Bold value indicates concentration exceeds NCDENR Groundwater Standard.
Italicized value indicates detection limit exceeds NCDENR Groundwater Standard.

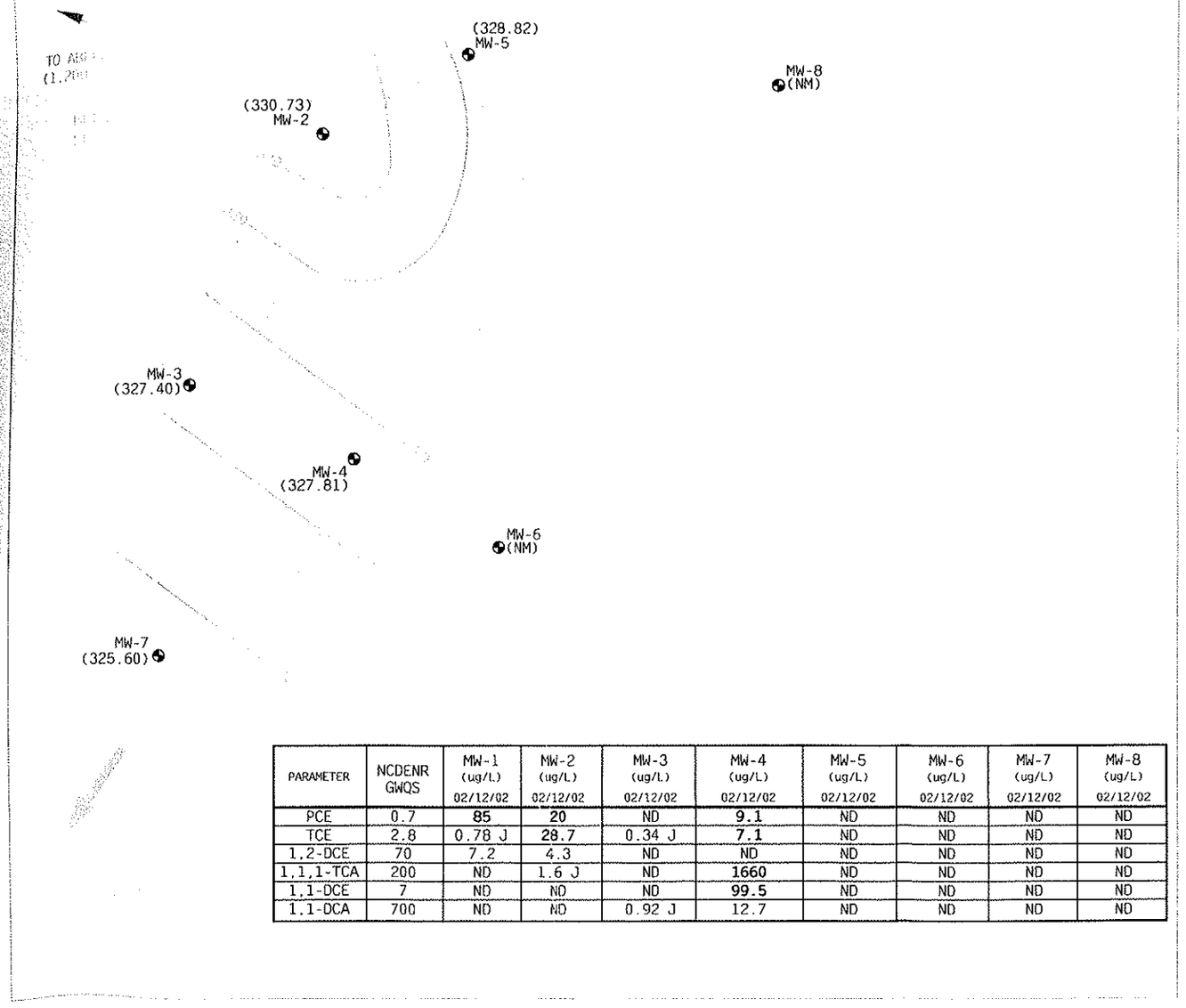
NS = No Standard
J = Estimated value
U = Not detected above level indicated
B = Also detected in blank
N = Presumptive evidence of a compound

Table 2
Summary of Ground Water Analytical Data, Ground Water Geochemical Parameters to Evaluate the Natural Attenuation of Dissolved Volatile Organic Compounds
February 12, 2002
Segro/Colonial Abrasive Products Company
Aberdeen, NC

		AREA 1						AREA 2					
Sample ID	North Carolina	MW-1		MW-2		MW-5		MW-3		MW-4		MW-7	
Laboratory ID	Department of Environment	N8400-1		N8400-2		N8400-5		N8400-3		N8400-4		N8400-6	
Sample Media	and Natural Resources	Ground Water		Ground Water		Ground Water		Ground Water		Ground Water		Ground Water	
Sample Date	Ground Water Standards	2/12/02		2/12/02		2/12/02		2/12/02		2/12/02		2/12/02	
Units Of Measure	ug/l	ug/l		ug/l		ug/l		ug/l		ug/l		ug/l	
Volatile Organic Compounds													
Acrolein		50	U	50	U	50	U	50	U	120	U	50	U
Acrylonitrile		50	U	50	U	50	U	50	U	120	U	50	U
Benzene	1	1.0	U	1.0	U	1.0	U	1.0	U	*2.5*	*U*	1.0	U
Bromodichloromethane	NS	2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
Bromoform	0.19	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*5.0*	*U*	*2.0*	*U*
Bromomethane	NS	2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
Carbon tetrachloride	0.3	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*5.0*	*U*	*2.0*	*U*
Chlorobenzene	50	2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
Chloroethane	NS	2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
2-Chloroethyl vinyl ether		2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
Chloroform	0.19	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*5.0*	*U*	*2.0*	*U*
Chloromethane	NS	2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
Dibromochloromethane	NS	2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
1,2-Dichlorobenzene		2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
1,3-Dichlorobenzene		2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
1,4-Dichlorobenzene		2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
Dichlorodifluoromethane		2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
1,1-Dichloroethane	700	2.0	U	2.0	U	2.0	U	0.92	J	12.7		2.0	U
1,2-Dichloroethane	0.38	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*5.0*	*U*	*2.0*	*U*
1,1-Dichloroethene	7	2.0	U	2.0	U	2.0	U	2.0	U	**99.5**		2.0	U
cis-1,2-Dichloroethene	70	7.2		4.3		2.0	U	2.0	U	5.0	U	2.0	U
trans-1,2-Dichloroethene	70	2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
1,2-Dichloropropane	0.56	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*5.0*	*U*	*2.0*	*U*
cis-1,3-Dichloropropene	NS	2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
trans-1,3-Dichloropropene	NS	2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
Ethylbenzene	29	1.0	U	1.0	U	1.0	U	1.0	U	0.81	J	1.0	U
Methylene chloride	5	2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
1,1,2,2-Tetrachloroethane	NS	2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
Tetrachloroethene	0.7	**85.0**		**20**		*2.0*	*U*	*2.0*	*U*	**9.1**		*2.0*	*U*
Toluene	1000	1.0	U	1.0	U	1.0	U	1.0	U	2.5	U	1.0	U
1,1,1-Trichloroethane	200	2.0	U	1.5	J	2.0	U	2.0	U	**1660**		2.0	U
1,1,2-Trichloroethane	NS	2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
Trichloroethene	2.8	0.78	J	**28.7**		2.0	U	0.34	J	**7.1**		2.0	U
Trichlorofluoromethane		2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
Vinyl chloride	0.015	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*5.0*	*U*	*2.0*	*U*
Xylene (total)	530	5.0	U	5.0	U	5.0	U	5.0	U	12	U	5.0	U
Total TIC, Volatile	NS	9.3		0		0		0		49		0	
TBA-D9													
General Chemistry (unit of measure)													
Sulfide (mg/l)	NS	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Chloride (mg/l)	250	20	U	20	U	20	U	20	U	20	U	20	U
Sulfate (mg/l)	250	20	U	20	U	20	U	20	U	20	U	20	U

Bold value indicates concentration exceeds NCDENR Groundwater Standard.
Italicized value indicates detection limit exceeds NCDENR Groundwater Standard.

NS = No Standard
J = Estimated value
U = Not detected above level indicated
B = Also detected in blank
N = Presumptive evidence of a compound



PARAMETER	NCDENR GWQS	MW-1 (ug/L) 02/12/02	MW-2 (ug/L) 02/12/02	MW-3 (ug/L) 02/12/02	MW-4 (ug/L) 02/12/02	MW-5 (ug/L) 02/12/02	MW-6 (ug/L) 02/12/02	MW-7 (ug/L) 02/12/02	MW-8 (ug/L) 02/12/02
PCE	0.7	**85**	**20**	ND	**9.1**	ND	ND	ND	ND
TCE	2.8	0.78 J	**28.7**	0.34 J	**7.1**	ND	ND	ND	ND
1,2-DCE	70	7.2	4.3	ND	ND	ND	ND	ND	ND
1,1,1-TCA	200	ND	1.6 J	ND	**1660**	ND	ND	ND	ND
1,1-DCE	7	ND	ND	ND	**99.5**	ND	ND	ND	ND
1,1-DCA	700	ND	ND	0.92 J	12.7	ND	ND	ND	ND

LEGEND

MW-1	MONITORING WELL LOCATION AND ID (APPROXIMATE)
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
NM	NOT MEASURED
(328.82)	GROUND WATER ELEVATION (FEET)
	GROUND WATER ELEVATION CONTOUR (FEET) CONTOUR INTERVAL = 1 FOOT DASHED WHERE INFERRED
	INFERRED GROUND WATER FLOW DIRECTION

NOTES

1. MW-1 NOT USED TO CALCULATE GROUND WATER CONTOURS (POSSIBLE ERROR IN WELL ELEVATION SURVEY).
2. **BOLD VALUES INDICATE CONCENTRATION EXCEEDS NCDENR GROUNDWATER QUALITY STANDARD (GWQS).**

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.

0 100 200

SCALE: 1" = 100'

TITLE:

FIGURE 4
MONITORING WELL LOCATIONS AND SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUND WATER - FEBRUARY, 2002

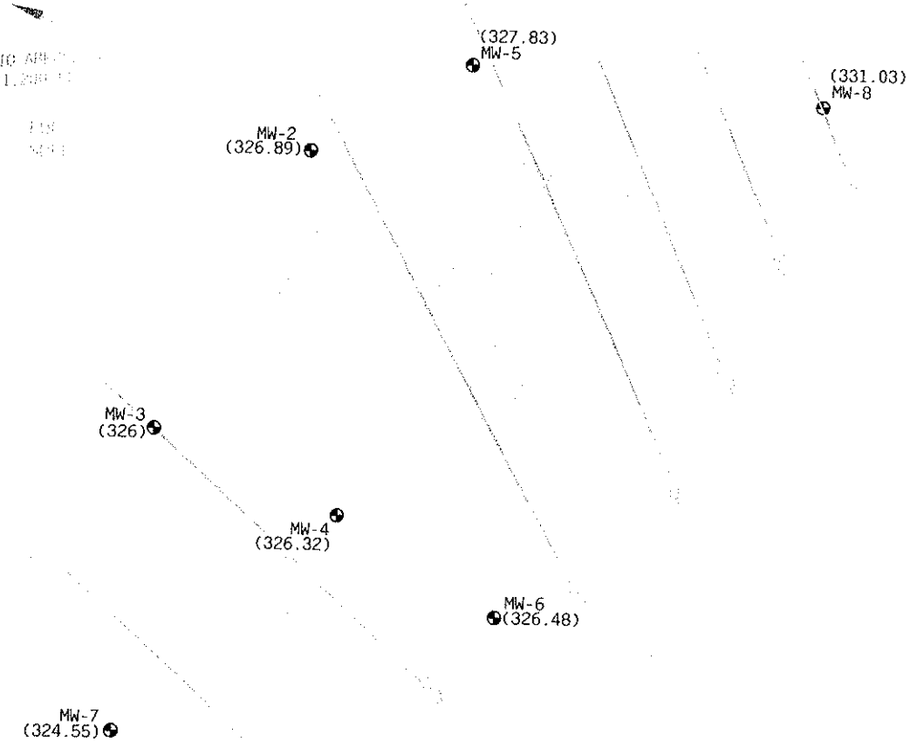
LOCATION:
COLONIAL ABRASIVES PRODUCTS COMPANY
ABERDEEN, NORTH CAROLINA

DATE: 12/16/02

FILENAME: 98177_GWC

LAYOUT: 02-02

ENVIRONMENTAL LIABILITY MANAGEMENT, INC.
218 Wall Street, Research Park, Princeton, NJ 08540
107 North Broad Street, Suite 300, Doylestown, PA 18901
100 Route 46 East, Building A, Mountain Lakes, NJ 07046



LEGEND

MW-1	MONITORING WELL LOCATION AND ID (APPROXIMATE)
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
(326.89)	GROUND WATER ELEVATION (FEET)
	GROUND WATER ELEVATION CONTOUR (FEET) CONTOUR INTERVAL = 1 FOOT DASHED WHERE INFERRED
	INFERRED GROUND WATER FLOW DIRECTION

NOTES

1. MW-1 NOT USED TO CALCULATE GROUND WATER CONTOURS (POSSIBLE ERROR IN WELL ELEVATION SURVEY).
2. **BOLD VALUES INDICATE CONCENTRATION EXCEEDS NCDENR GROUNDWATER QUALITY STANDARD (GWQS).**

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.

PARAMETER	NCDENR GWQS	MW-1 (ug/L) 05/30/02	MW-2 (ug/L) 05/30/02	MW-3 (ug/L) 05/30/02	MW-4 (ug/L) 05/30/02	MW-5 (ug/L) 05/30/02	MW-6 (ug/L) 05/30/02	MW-7 (ug/L) 05/30/02	MW-8 (ug/L) 05/30/02
PCE	0.7	**9.1**	**190**	ND	ND	ND	ND	ND	ND
TCE	2.8	1.3 J	6	0.37 J	7	ND	ND	ND	ND
1,2-DCE	70	1.8 J	ND	ND	ND	ND	ND	ND	ND
1,1,1-TCA	200	ND	ND	ND	**2920**	ND	ND	ND	ND
1,1-DCE	7	ND	ND	ND	**63.9**	ND	ND	ND	ND
1,1-DCA	700	ND	ND	0.8 J	11.9 J	ND	ND	ND	ND

0 100 200

SCALE: 1" = 100'

TITLE: FIGURE 5
MONITORING WELL LOCATIONS AND SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUND WATER - MAY 2002

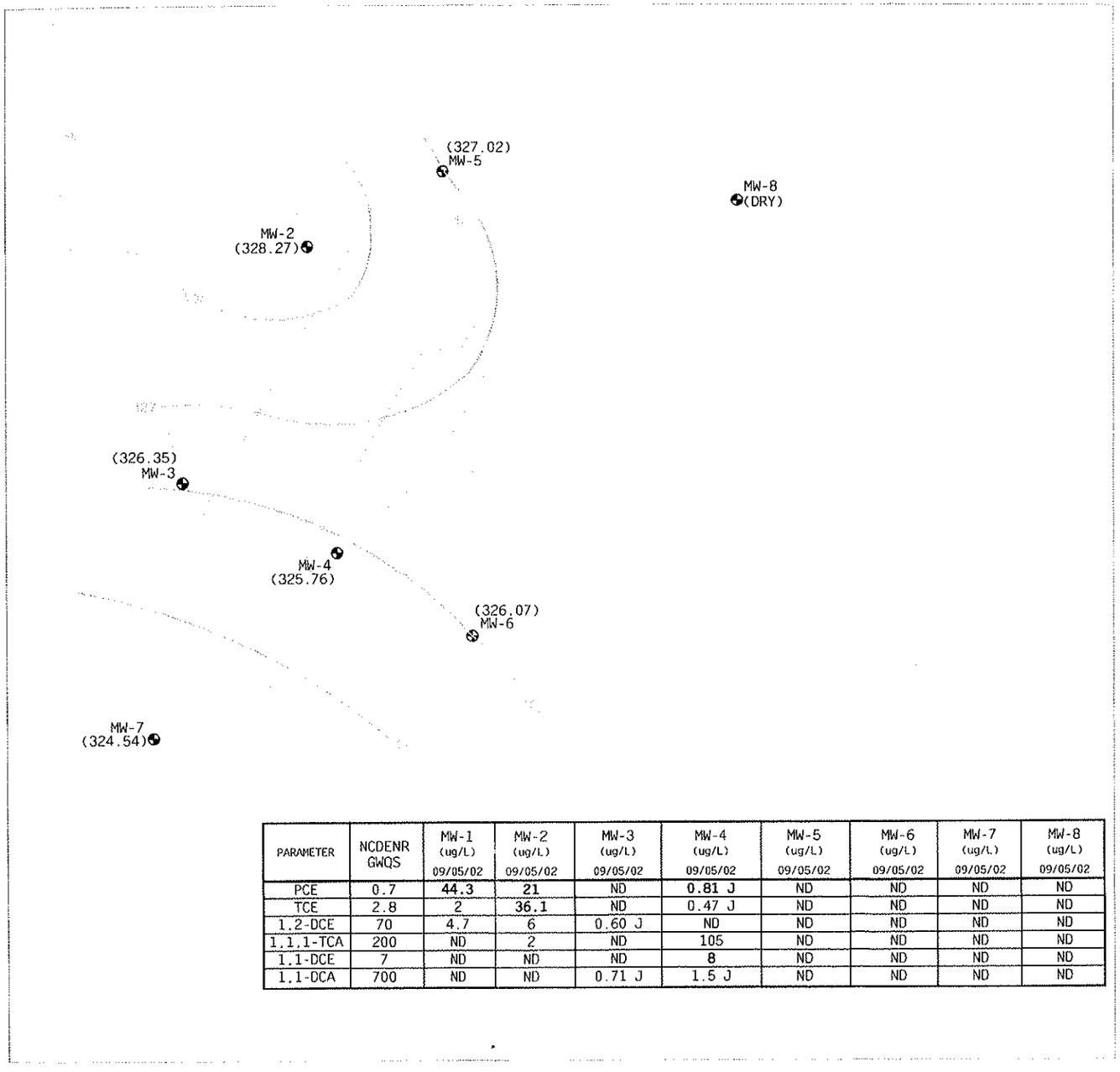
LOCATION: COLONIAL ABRASIVES PRODUCTS COMPANY ABERDEEN, NORTH CAROLINA

DATE: 12/13/02

FILENAME: 98177_GWC

LAYOUT: 05-02

ENVIRONMENTAL LIABILITY MANAGEMENT, INC.
218 Wall Street, Research Park, Princeton, NJ 08540
107 North Broad Street, Suite 300, Doylestown, PA 18901
100 Route 46 East, Building A, Mountain Lakes, NJ 07046



LEGEND

MW-1	MONITORING WELL LOCATION AND ID (APPROXIMATE)
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
(327.02)	GROUND WATER ELEVATION (FEET)
	GROUND WATER ELEVATION CONTOUR (FEET) CONTOUR INTERVAL = 1 FOOT DASHED WHERE INFERRED
	INFERRED GROUND WATER FLOW DIRECTION

NOTES

1. MW-1 NOT USED TO CALCULATE GROUND WATER CONTOURS (POSSIBLE ERROR IN WELL ELEVATION SURVEY).
2. **BOLD VALUES INDICATE CONCENTRATION EXCEEDS NCDENR GROUNDWATER QUALITY STANDARD (GWQS).**

PARAMETER	NCDENR GWQS	MW-1 (ug/L) 09/05/02	MW-2 (ug/L) 09/05/02	MW-3 (ug/L) 09/05/02	MW-4 (ug/L) 09/05/02	MW-5 (ug/L) 09/05/02	MW-6 (ug/L) 09/05/02	MW-7 (ug/L) 09/05/02	MW-8 (ug/L) 09/05/02
PCE	0.7	**44.3**	**21**	ND	**0.81 J**	ND	ND	ND	ND
TCE	2.8	2	**36.1**	ND	0.47 J	ND	ND	ND	ND
1,2-DCE	70	4.7	6	0.60 J	ND	ND	ND	ND	ND
1,1,1-TCA	200	ND	2	ND	105	ND	ND	ND	ND
1,1-DCE	7	ND	ND	ND	8	ND	ND	ND	ND
1,1-DCA	700	ND	ND	0.71 J	1.5 J	ND	ND	ND	ND

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.

0 100 200

SCALE: 1" = 100'

TITLE:

FIGURE 6
MONITORING WELL LOCATIONS AND SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUND WATER - SEPTEMBER 2002

LOCATION:
COLONIAL ABRASIVES PRODUCTS COMPANY
ABERDEEN, NORTH CAROLINA

DATE: 12/13/02

FILENAME: 98177_GWC

LAYOUT: 11-02

ENVIRONMENTAL LIABILITY MANAGEMENT, INC.
218 Wall Street, Research Park, Princeton, NJ 08540
107 North Broad Street, Suite 300, Doylestown, PA 18901
100 Route 46 East, Building A, Mountain Lakes, NJ 07046

Table 1
Summary of Ground Water Analytical Data, Ground Water Geochemical Parameters to Evaluate the Natural Attenuation of Dissolved Volatile Organic Compounds
November 8, 2001
Segro/Colonial Abrasive Products Company
Aberdeen, NC

		AREA 1						AREA 2					
Sample ID	North Carolina	MW-1		MW-2		MW-5		MW-3		MW-4		MW-7	
Laboratory ID	Department of Environment	N2492-3		N2492-2		N2492-1		N2492-5		N2492-6		N2492-4	
Sample Media	and Natural Resources	Ground Water		Ground Water		Ground Water		Ground Water		Ground Water		Ground Water	
Sample Date	Ground Water Standards	11/8/01		11/8/01		11/8/01		11/8/01		11/8/01		11/8/01	
Units Of Measure	ug/l	ug/l		ug/l		ug/l		ug/l		ug/l		ug/l	
Volatile Organic Compounds													
Acrolein		50	U	50	U	50	U	50	U	120	U	50	U
Acrylonitrile		50	U	50	U	50	U	50	U	120	U	50	U
Benzene	1	1.0	U	1.0	U	1.0	U	1.0	U	*2.5*	*U*	1.0	U
Bromodichloromethane	NS	2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
Bromoform	0.19	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*5.0*	*U*	*2.0*	*U*
Bromomethane	NS	2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
Carbon tetrachloride	0.3	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*5.0*	*U*	*2.0*	*U*
Chlorobenzene	50	2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
Chloroethane	NS	2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
2-Chloroethyl vinyl ether		2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
Chloroform	0.19	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*5.0*	*U*	*2.0*	*U*
Chloromethane	NS	2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
Dibromochloromethane	NS	2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
1,2-Dichlorobenzene		2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
1,3-Dichlorobenzene		2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
1,4-Dichlorobenzene		2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
Dichlorodifluoromethane		2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
1,1-Dichloroethane	700	2.0	U	2.0	U	2.0	U	1.1	J	9.0		2.0	U
1,2-Dichloroethane	0.38	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*5.0*	*U*	*2.0*	*U*
1,1-Dichloroethene	7	2.0	U	2.0	U	2.0	U	2.0	U	**54.7**		2.0	U
cis-1,2-Dichloroethene	70	2.5		1.4	J	2.0	U	0.89	J	5.0	U	2.0	U
trans-1,2-Dichloroethene	70	2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
1,2-Dichloropropane	0.56	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*5.0*	*U*	*2.0*	*U*
cis-1,3-Dichloropropene	NS	2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
trans-1,3-Dichloropropene	NS	2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
Ethylbenzene	29	1.0	U	1.0	U	1.0	U	1.0	U	2.5	U	1.0	U
Methylene chloride	5	2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
1,1,2,2-Tetrachloroethane	NS	2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
Tetrachloroethene	0.7	**5.3**		**244**		*2.0*	*U*	*2.0*	*U*	**6.3**		*2.0*	*U*
Toluene	1000	1.0	U	1.0	U	1.0	U	1.0	U	2.5	U	1.0	U
1,1,1-Trichloroethane	200	2.0	U	1.3	J	2.0	U	2.0	U	**1260**		2.0	U
1,1,2-Trichloroethane	NS	2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
Trichloroethene	2.8	2.0	U	**10.3**		2.0	U	0.36	J	**4.8**	J	2.0	U
Trichlorofluoromethane		2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	2.0	U
Vinyl chloride	0.015	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*2.0*	*U*	*5.0*	*U*	*2.0*	*U*
Xylene (total)	530	5.0	U	5.0	U	5.0	U	5.0	U	12	U	5.0	U
Total TIC, Volatile	NS	0		0		0		0		0		0	
TBA-D9		7.6	JBN	7.4	JBN	6.2	JB	6	JBN	13	JBN	7.3	JBN
General Chemistry (unit of measure)													
Sulfide (mg/l)	NS	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Chloride (mg/l)	250	20	U	20	U	20	U	20	U	20	U	20	U
Sulfate (mg/l)	250	20	U	20	U	20	U	20	U	20	U	20	U

Bold value indicates concentration exceeds NCDENR Groundwater Standard.
Italicized value indicates detection limit exceeds NCDENR Groundwater Standard.

NS = No Standard
J = Estimated value
U = Not detected above level indicated
B = Also detected in blank
N = Presumptive evidence of a compound

Table 6
Summary of Historic Ground Water Natural Attenuation Parameters
Segro/Colonial Abrasive Products Company
Aberdeen, NC

	MW-3	MW-3	MW-3	MW-3	MW-3	MW-3	MW-3
	9/23/99	6/26/00	9/14/00	11/8/01	2/12/02	5/30/02	9/5/02
Sulfide (mg/l)	ND	ND	ND	ND	ND	ND	ND
Chloride (mg/l)	ND	2.6	1.5	ND	ND	ND	2
Sulfate (mg/l)	12.8	ND	ND	ND	ND	ND	ND
pH	5.45	5.39	5.84	6.19	6.27	6.14	6.2
Turbidity (ntu)	89	150	58	31	14	12.5	48.1
Specific Conductivity (um/cm)	122	6.9	0.088	0.115	0.141	0.079	0.149
Temperature (C)	19.5	22.7	24	20.23	15.1	19.94	23.83
Dissolved Oxygen (mg/l)	0.98	2.23	0	0.2	0.41	1.07	2.18
Red-Ox Potential (mV)	180.1	-8	-82	-39	-53	-45	-72
Ferrous Iron (mg/l)	2.51	2.89	12.05	13.85	17.8	14.7	16.6
PCE	-	-	-	-	-	-	-
TCE	-	-	-	0.36	0.34	0.37	-
1,1-DCA	1.6	1.2	1.2	1.1	0.92	0.8	0.71
1,2-DCE	-	0.73	0.99	0.89	-	-	0.6
1,1,1-TCA	-	-	-	-	-	-	-

	MW-4	MW-4	MW-4	MW-4	MW-4	MW-4	MW-4
	9/23/99	6/26/00	9/14/00	11/8/01	2/12/02	5/30/02	9/5/02
Sulfide (mg/l)	ND	ND	ND	ND	ND	ND	ND
Chloride (mg/l)	ND	2.6	5.4	ND	ND	2	4
Sulfate (mg/l)	ND	ND	ND	ND	ND	ND	ND
pH	5.21	4.19	5.49	6.12	6.32	6.07	5.45
Turbidity (ntu)	30	200	69	54	52.9	10.7	28.7
Specific Conductivity (um/cm)	110	4.3	0.069	0.115	0.167	0.079	0.066
Temperature (C)	19.4	17.7	23.6	22.03	16.41	20.56	24.79
Dissolved Oxygen (mg/l)	1.23	7.41	1.27	0.31	0.49	1.15	2.99
Red-Ox Potential (mV)	178	149	98	23	-32	12	148
Ferrous Iron (mg/l)	2.65	0	0.38	3.33	5.6	3.7	0.83
PCE	1.9	2.6	-	6.3	9.1	-	0.81
TCE	2	2.3	4.1	4.8	7.1	7	0.47
1,1-DCA	26.5	5	5.9	9	12.7	11.9	1.5
1,1-DCE	30.6	36.4	55.5	54.7	99.5	63.9	8
1,1,1-TCA	395	609	919	1260	1660	2920	105

Table 6
Summary of Historic Ground Water Natural Attenuation Parameters
Segro/Colonial Abrasive Products Company
Aberdeen, NC

	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1
	9/23/99	6/26/00	9/14/00	11/8/01	2/12/02	5/30/02	9/5/02
Sulfide (mg/l)	ND	ND	ND	ND	ND	ND	ND
Chloride (mg/l)	ND	4.8	5.9	ND	ND	10	6
Sulfate (mg/l)	ND	ND	ND	ND	ND	ND	ND
pH	4.3	4.4	4.58	6.03	6.00	6.17	6.42
Turbidity (ntu)	75	150	120	368	190	31.7	12.4
Specific Conductivity (um/cm)	80	3.9	0.036	0.157	0.091	0.066	0.148
Temperature (C)	19.2	22.3	22.9	19.62	14.15	18.92	22.83
Dissolved Oxygen (mg/l)	3.9	6.73	5.07	0.34	1.1	1.12	1.62
Red-Ox Potential (mV)	158	145	306	-75	-92	-115	-149
Ferrous Iron (mg/l)	2.11	2	0.02	31.5	27.1	20.8	32
PCE	24.5	5.1	26.3	5.3	85	9.1	44.3
TCE	-	-	-	-	-	-	2
1,2-DCE	-	-	-	2.5	7.2	1.8	4.7
1,1,1-TCA	-	-	-	-	-	-	-

	MW-2	MW-2	MW-2	MW-2	MW-2	MW-2	MW-2
	9/23/99	6/26/00	9/14/00	11/8/01	2/12/02	5/30/02	9/5/02
Sulfide (mg/l)	ND	ND	ND	ND	ND	ND	ND
Chloride (mg/l)	ND	10.1	3.5	ND	ND	5	ND
Sulfate (mg/l)	14.7	20.5	ND	ND	ND	ND	ND
pH	5.45	5.21	5.31	5.44	5.61	5.31	5.55
Turbidity (ntu)	67	120	120	23	17.7	7.1	13.2
Specific Conductivity (um/cm)	134	6.6	0.06	0.057	0.052	0.039	0.08
Temperature (C)	23.1	23.9	25.2	21.15	13.67	21.42	24.59
Dissolved Oxygen (mg/l)	1.11	2.04	3.11	3.48	3.87	4.92	4.46
Red-Ox Potential (mV)	94.7	105	225	270	211	215	223
Ferrous Iron (mg/l)	4.4	0	0	0.01	0	0	0.04
PCE	28.6	105	152	244	20	190	21
TCE	51	20.5	19.4	10.3	28.7	6	36.1
1,2-DCE	7.3	2.9	2.8	1.4	4.3	-	6
1,1,1-TCA	6.3	1.7	1.5	1.3	1.5	-	2

Attachment A

Hydrogen Releasing Compound (HRC) Injection Procedures

1. The location of all underground structures, including utilities, tanks, distribution piping, sewers, drains, and landscape irrigation systems were identified. Surface and overhead impediments were identified.
2. The planned installation locations were adjusted for all impediments and obstacles.
3. The installation grid point locations were then premarked, noting any points that may have different vertical application requirements or total depth.
4. The direct push unit was then setup over each specific point.
5. The 1.25-inch drive rod assembly with an expendable tip was driven to the desired maximum depth of 20 feet.
6. The expendable tip from the drive rod was then released.
7. To displace air in the rods and prevent injection of air into the aquifer during HRC application, the drive rods were filled with water.
8. The HRC was poured into the pump hopper (up to a capacity of 40 gallons). The pump recirculation feature was used to obtain a uniform consistency.
9. Prior to pumping into the aquifer, the strokes per gallon were measured by counting the number of pump strokes required to deliver 3 gallons of HRC. This was confirmed against the HRC level decrease in the pump hopper.
10. The 1.25-inch outer diameter, 1-inch inner diameter delivery hose was connected to the pump outlet and the HRC delivery subassembly. The HRC was circulated through the hose and the delivery subassembly to remove air in the hose.
11. The HRC subassembly was then connected to the drive rods. Upon confirmation of all connections, the HRC was pumped through the delivery system to displace the water in the rods.
12. Using the pump's stroke counter and volume/weight conversions to calculate the number of strokes to deliver the appropriate volume of HRC per vertical foot.
13. While slowly withdrawing a single length of drive rod (3 or 4 feet), the predetermined volume of HRC (26 pounds per boring) were pumped into the aquifer (Step 12). Using the stroke counter and pump on/off switch to control volume of injection.
14. During pumping of the predetermined quantity of HRC material across the desired treatment interval any indications of aquifer refusal were observed. This is typically indicated by a high-pitched squeal in the pump's hydraulic system or HRC "surfacing" around the injection rods or previously installed injection points. If aquifer acceptance is low, 0.5 to 1 minute will be allowed for backpressure to equilibrate prior to removal of the rod.

15. One section of the drive rod was then removed. The drive rod may have contained some residual HRC. The HRC-filled rod were then placed in a clean, empty bucket and allowed to drain. The HRC was then returned to the HRC pump hopper for reuse.

16. Steps 10 through 15 were repeated until treatment of the entire contaminated vertical zone (approximately 10 feet) has been achieved.

17. A bentonite seal was placed above the HRC material through the entire vadose zone. This assured that the HRC remained properly placed and prevents contaminant migration from the surface.

18. The drive rods were removed and cleaned as necessary.

19. The probe hole was finished at the surface as appropriate (concrete or asphalt cap, if necessary).

20. The pump stroke volume were checked periodically for variability by counting pump strokes per gallon throughout the day. Counting the number of strokes needed to fill up a 3-gallon bucket.

21. The equipment was then moved to the next probe point, and steps 4 through 19 were repeated.

DIVISION OF WATER QUALITY
Groundwater Section
March 28, 2001

MEMORANDUM

TO: Tommy Stevens

THROUGH: Art Barnhardt
Arthur Mouberry

FROM: Sean Boyles

SUBJECT: Segro/Colonial Abrasive Products, 312 South Pine Street, Aberdeen, Groundwater Incident # 19858, Moore County, .0106(k) CAP

Our office has reviewed the above-referenced document, and we recommend approval of this CAP based on the following:

* All of the information required under 15A NCAC 2L .0106 (k) has been submitted.

* All primary sources of contamination have been removed. No free-product has been detected at the site.

* The contaminant plume has been delineated in the surficial aquifer. Although the full vertical extent of the contamination has not been defined on-site, previous investigations have determined that the underlying Black Creek aquifer has been impacted from other up-gradient sources.

* The rate of plume migration can be predicted with reasonable certainty based on existing analytical data. Computer modeling indicates that the contaminants should stabilize and achieve the expected target cleanup concentrations within a 5-year time frame.

* The injection of Hydrogen Releasing Compounds (HRC™) has been proposed at the site as a means of accelerating natural attenuation of the dissolved chlorinated solvents. An injection well permit (WI0600006) for HRC™ injection was issued on February 6, 2001 and remains in effect until January 31, 2004.

* The nearest receptors to the site are the surface waters of McFarland's Branch and Aberdeen Creek. McFarland's Branch borders the southern property boundary, while Aberdeen Creek is located approximately 1200 feet west of the site. Modeling data supports the contention that the contaminants will naturally attenuate prior to reaching any known receptors.

* The area is served by a public water supply and there are no plans to develop the groundwater resources in the foreseeable future. The Town of Aberdeen's Planning Department has provided a letter documenting projected groundwater use.

* A monitor well network is in place as part of this CAP to track the migration of the plume.

* Public Notice was provided in accordance with 15A NCAC 2L .0114 (b) with no responses received in this office.

Also enclosed for your review is a copy of the documents submitted in fulfillment of the Corrective Action Plan, dated January 5, 2001 through January 10, 2001.

Should you have any questions regarding the recommendation or review, please call me at 910-486-1541.