2010 Annual Groundwater and Surface Water Monitoring Report

Prepared for

Owens Corning
4837 Highway 81 South
Anderson, South Carolina

January 2011

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Brown AND Caldwell

990 Hammond Drive, Suite 400
Atlanta, Georgia 30328

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List of Abbreviations

AES	Analytical Environmental Services
amsl	Above Mean Sea Level
bgs	Below Ground Surface
BC	Brown and Caldwell
1,1-DCA	1,1-Dichloroethane
1,2-DCA	1,2-Dichloroethane
1,1-DCE	1,1-Dichloroethene
cis-1,2-DCE	cis-1,2-Dichloroethene
DO	Dissolved Oxygen
DNAPL	Dense non-aqueous phase liquid
EISOP/QAM	Environmental Investigations Standard Operating Procedures and Quality Assurance Manual
EB	Equipment Blank
EPA	United States Environmental Protection Agency
MCL	EPA Maximum Contaminant Level
NAVD	North American Vertical Datum of 1988
NTU	Nephelometric Turbidity Unit
PCE	Tetrachloroethene
ORP	Oxidation Reduction Potential
RCRA	Resource Recovery and Conservation Act
RFI	RCRA Facility Investigation
RL	Reporting Limit
SCDHEC	South Carolina Department of Health and Environmental Control
SESDPROC	Science and Ecosystem Support Division Groundwater Sampling Procedure
SWMU	Solid Waste Management Unit
1,1,1-TCA	1,1,1-Trichloroethane
TCE	Trichloroethene
trans-1,2-DCE	trans-1,2-Dichloroethene
VOCs	Volatile Organic Compounds
Waterloo	Solinst Waterloo Multilevel Groundwater Monitoring System

Professional Geologist Certification

The 2010 Annual Groundwater and Surface Water Monitoring Report has been prepared under the direction and supervision of a qualified, State of South Carolina licensed, Professional Geologist. Mr. Reinhard Ruhmke, P.G., of Brown and Caldwell was responsible for the overall preparation of the Report.

January 27, 2011

Reinhard Ruhmke, P.G.
Managing Geologist
South Carolina Professional Geologist #2469

Date

Section 1

Introduction

This 2010 Annual Groundwater and Surface Water Monitoring Report was prepared by Brown and Caldwell (BC) on behalf of the Owens Corning Starr, South Carolina facility for submittal to the U.S. Environmental Protection Agency (EPA) in accordance with an October 1989 Consent Order (89-34-R) with the EPA under Section 3008(h) of the Resource Recovery and Conservation Act (RCRA). The report summarizes the August 2010 quarterly groundwater monitoring and November 2010 annual surface water and groundwater monitoring events. The results for the February and May 2010 groundwater sampling events were reported in the *2010 Semiannual Groundwater Sampling Report* dated July 30, 2010. The Consent Order requires that Owens Corning perform annual groundwater monitoring and in 2005 EPA required that quarterly groundwater monitoring be conducted for select bedrock wells located in the Northeast Area.

This report fulfills the Consent Order requirements for submitting an Annual RCRA Facility Investigation Groundwater Report for 2010. Section 1 of this report presents an introduction. Section 2 summarizes the surface water and groundwater monitoring activities. Section 3 provides and discusses the analytical results and Section 4 provides conclusions. Appendices to this document contain the laboratory analytical reports, historical groundwater data, and groundwater sampling field forms.

The Owens Corning facility is situated on 160 acres of land located at 4837 Highway 81 South in Starr, South Carolina within Anderson County (Site). As shown on Figure 1 the property is bounded by Highway 81 South to the west, True Temper Road to the north, Keys Street to the east, and Harry Drive to the south. The facility is located approximately 4 miles south of the town of Anderson.

The facility began its composite systems business operations in 1951 and since then has engaged in the production of glass fiber reinforcements and similar materials for composite systems. Historical manufacturing processes involved a variety of chemicals, including acids and solvents, some of which were inadvertently released to the environment and resulted in significant Site investigation work that has been reported to EPA and the South Carolina Department and Environmental Control (SCDHEC).

Section 2

Groundwater and Surface Water Assessment

Brown and Caldwell personnel performed the third quarter groundwater monitoring event between August 9 and 12, 2010 and the annual groundwater monitoring event between November 15 and November 20, 2010. Section 2 provides an overview of these events and includes detailed information on site hydrogeology and aquifer characteristics, groundwater and surface water sampling locations, sampling procedures and analytical methods.

2.1 Subsurface Geology

The Owens Corning site is located within the Inner Piedmont Belt of the Piedmont Geologic Physiographic Province that is characterized by moderate to high-grade metamorphic rocks of Precambrian to early Paleozoic age. The bedrock in the vicinity of the Site is granitic gneiss which is overlain by overburden comprised of clay and silt soil, and saprolite. The saprolite exhibits some structural characteristics of the parent rock material such as foliation and fracturing. The thickness of the soil and saprolite unit beneath the Site ranges from approximately 5 to 100 feet. The primary lineaments and fracture zones beneath the Site trend in a northeast and southwest orientation (LeGrand and Furcron, 1956). A more detailed description of the subsurface geology beneath the Site can be found in the Supplemental RCRA Facility Investigation (RFI) Report (Brown and Caldwell, January 2009), which was prepared by BC on behalf of Owens Corning for submittal to the EPA.

2.2 Aquifer Characteristics

At the Site, groundwater is present in both the overburden/saprolite unit and the bedrock unit. Water level measurements were collected from 32 wells during the August monitoring event and from 48 wells during the November monitoring event as identified in Tables 1 and 2, respectively. Refer to the Site Map in Figure 1 to identify well locations. This information was used to calculate groundwater elevations and prepare potentiometric maps for the overburden and bedrock aquifers for the August (Figures 2 through 5) and November (Figures 6 through 9) 2010 monitoring events. Ground surface and top of casing elevations are provided in Table 3 and depth to water and groundwater elevations are provided in Tables 1 and 2.

Based on the monitoring well measurements from November 2010, groundwater levels in the overburden aquifer ranged from approximately 3 (MW-8) to 26 (MW-10) feet below ground surface (bgs) and from 761 to 804 feet in elevation (NAVD88). Measurements from the same time period taken from wells in the bedrock aquifer exhibit hydraulic heads ranging from 8 feet above ground surface (MW-41 Zone 2) to 40 feet bgs (MW-42 Zone 2) and from 720 to 804 feet in elevation (NAVD88), with the variation in head being highly dependent on both the elevation and fractures present in the wells screened interval.

Based on the November 2010 data, groundwater onsite in both overburden and bedrock aquifers flows toward the fracture zones associated with Betsy Creek, giving an east-northeasterly gradient. This is consistent with the historical groundwater flow direction with the exception that groundwater from SWMU-9 was previously shown flowing more to the north than the northeast. Measurements from the bedrock aquifer wells offsite indicate that flow direction continues to align with Betsy Creek as the stream turns to flow to the north-northeast in the area of MW-35. The magnitude of the horizontal gradient onsite varies depending on the aquifer and fracture zone. Observed horizontal gradients are as follows: 0.013 in the overburden (calculated between MW-2 and TW-42); 0.014 in the bedrock aquifer in the 699-740 ft NAVD88 zone (calculated between MW-27 and MW-41 Zone 1); 0.014 in the bedrock aquifer in the 660-699 ft NAVD88 zone (calculated between MW-6 and MW-15); and 0.0095 in the bedrock aquifer in the 574-630 ft NAVD88 zone (calculated between MW-19 and MW-35). The following vertical gradients were also observed: a downward gradient of 0.0012 in SWMU-9 across the overburden/bedrock aquifer (calculated between MW-28 and MW-6); and an upward gradient of 0.031 at the intersection of Keys Street and True Temper Road across the overburden/bedrock aquifer (calculated between MW-21 and MW-38 Zone 2).

Additional information can be found in the Supplemental RFI Report (Brown and Caldwell, January 2009).

2.3 Groundwater Monitoring Wells

The original quarterly groundwater monitoring program included seven bedrock monitoring wells (MW-15, MW-22, MW-29R, MW-33, MW-35, MW-36 and MW-37). MW-33 has since been removed from the quarterly and annual groundwater monitoring program because it will become one of the groundwater extraction wells for the proposed interim measures hydraulic containment system. The removal of this well from the monitoring program is of little consequence since there are several wells in the surrounding area that provide both hydraulic potential and concentration data that are used to model plume behavior. During the summer of 2010, three additional bedrock wells (MW-38, MW-41, and MW-42) were installed and added to the quarterly and annual monitoring program.

The annual groundwater monitoring program includes the following 45 overburden, top of rock and bedrock monitoring wells as shown on Figure 1:

- Overburden Wells: MW-1, MW-3, MW-4, MW-5, MW-7, MW-9, MW-11, MW-12, MW-18, MW-26, MW-28, MW-32, TW-43, and TW-45
- Top of Rock Wells: MW-2, MW-10, MW-13, MW-14, MW-17, MW-20, MW-21, MW-24, MW-25, MW-30, MW-31, TW-42 and TW-46
- Bedrock Wells: Alloy, MW-6, MW-15, MW-16, MW-19, MW-22, MW-27, MW-29R, MW-35, MW-36, MW-37, MW-38, MW-39, MW-41, MW-42, TW-40, TW-41 and TW-44.

Monitoring well TW-45 could not be gauged or sampled in November 2010 due to damage to the well. The extent of damage will be evaluated during the upcoming quarterly monitoring event in February. The locations of the wells are shown on Figure 1 and well construction details are provided in Table 1. Multiple water-bearing zones were sampled in bedrock wells MW-29R, MW-36, MW-37, MW-38, MW-39, MW-41, and MW-42 (Tables 4 and 5).

2.4 Surface Water Monitoring Locations

The surface water monitoring program consisted of collecting samples from 11 locations (SW-1, SW-3, SW-3A, SW-3B, SW-6, SW-10, SW-11, SW-12, SW-13, SW-14 and SW-15). The surface water samples were collected on November 15, 2010 and the locations are presented on Figure 10.

2.5 Groundwater and Surface Water Sampling Procedures

On August 9 and November 15, 2010, depth to groundwater measurements were collected from 50 and 64 monitoring wells, respectively. The water level meter was decontaminated between wells with an Alconox® solution and rinsed with distilled water.

Sampling procedures were performed in the same manner as the previous quarterly and annual sampling events. Prior to collecting groundwater samples from the wells, the wells were purged using either a low-flow submersible electric pump or a peristaltic pump. The Waterloo system monitoring zones were purged and sampled using their dedicated compressed air driven stainless steel double valve pumps. Groundwater was pumped at an approximate rate of 0.25 gallons per minute through new or dedicated polyethylene tubing equipped with a field-calibrated, in-line YSI® 556 meter to measure field parameters: pH, temperature, specific conductance, oxidation-reduction potential (ORP), and dissolved oxygen (DO). Turbidity was measured using a HF® Scientific DRT-15CE turbidity meter. Purging was considered complete when at least three of the field parameters had stabilized. An attempt was made to obtain turbidity readings of less than 10 Nephelometric Turbidity Units (NTUs); however, this was not achieved for all the wells. Groundwater samples were collected when pH, temperature and specific conductance had stabilized as defined in EPA's Environmental Investigations Standard Operating Procedures and Quality Assurance Manual (EISOP/QAM), November 2001 and Science and EPA's Ecosystem Support Division Groundwater Sampling Procedure (SESDPROC-301-RO), February 2007. Groundwater sampling field data sheets documenting the purging activities are included as Appendix A.

Groundwater samples were collected from the wells using the same low-flow pump that was used for purging. The pump was decontaminated between sample locations using an Alconox® solution and rinsed with distilled water. The groundwater samples were labeled, containerized, documented, placed into a cooler containing ice and chilled to about 4 degrees Celsius (temperatures verified by laboratory and are reported in the Laboratory Analytical Report in Appendix B). Monitoring wells were sampled from least contaminated to most contaminated, based on previous groundwater monitoring data, to minimize the potential for carryover and cross-contamination between wells.

Surface water samples were collected on November 15, 2010 by manually filling the sample containers with surface water using a pre-cleaned, disposable 46-inch polyethylene dipper.

2.6 Residential Well Sampling Procedures

During the November 2010 annual sampling event, 14 residential wells were sampled (Figure 11). The wells were sampled in accordance with methods described in EPA's Field Branches Quality System and Technical Procedures. Wells that pumped into a holding tank were purged of at least one tank volume (generally 15 to 20 gallons) and water quality parameters such as, pH, conductivity, temperature, DO, ORP, and turbidity were measured and recorded in a field notebook. After purging, the samples were collected at a low flow rate through a hose connected to the holding tank. Wells that did not utilize a holding tank were sampled directly from the well head. The groundwater samples were labeled, containerized, documented, placed into a cooler containing ice and chilled to about 4 degrees Celsius (temperatures verified by laboratory and are reported in the Laboratory Analytical Report in Appendix B).

Once the analytical data were validated, a letter documenting the results for each well owner was prepared and hand delivered to each well owner by Mr. Steve Tenry, the Anderson Plant Environmental Manager.

2.7 Analytical Procedures

Groundwater, surface water, and residential well samples were submitted to Analytical Environmental Services, Inc. (AES) of Atlanta, Georgia for analysis of the focused list of volatile organic compounds (VOCs) using EPA Method 8260B. The focused list of VOCs included tetrachloroethene (PCE); trichloroethene (TCE); 1,1,1-trichloroethane (1,1,1-TCA); 1,1-dichloroethane (1,1-DCA); 1,2-dichloroethane (1,2-DCA); 1,1-dichloroethene (1,1-DCE); cis-1,2-dichloroethene (cis-1,2-DCE); trans-1,2-dichloroethene (trans-1,2-DCE); vinyl chloride; carbon tetrachloride; chloroform; methylene chloride; benzene; toluene; ethylbenzene and xylenes.

2.8 Quality Assurance/Quality Control

The groundwater sampling was performed in accordance with EPA's EISOP/QAM, November 2001 and EPA's Science and Ecosystem Support Division Groundwater Sampling Procedure (SESDPROC-301-RO), February 2007. To assess the quality of the sampling program, duplicate samples were collected (approximately one sample for every 20 samples) and analyzed for the focused list of VOCs. One duplicate sample was collected during the August sampling event. One duplicate surface water sample and three duplicate groundwater samples were collected during the November sampling event. An evaluation of the analytical results for the duplicate samples showed that the reported constituents and concentrations were similar. Five equipment blanks (EBs) were collected during the August sampling and nine EBs were collected during the November sampling to determine the efficacy of non-dedicated equipment decontamination activities. The EB samples were obtained by collecting distilled water passed through or over decontaminated equipment. Trip blanks, provided by AES, were in all coolers and were submitted for analysis with the groundwater samples. The EB and trip blank samples were analyzed for the same constituents as the groundwater samples. No detections were found in any of the EB or trip blank samples. The analytical reports for these samples are provided in Appendix B.

Section 3

Analytical Results

The following section includes the results for the August 2010 quarterly groundwater event and the November 2010 annual surface water, groundwater, and residential well monitoring event. The August event included collecting samples from six of the seven bedrock wells located on the northeast portion of the Owens Corning property (including MW-15, MW-22, MW-29R, MW-36, MW-37 and MW-38), and four offsite bedrock wells (MW-35, MW-39, MW-41, and MW-42). For the November event, samples were collected from 44 overburden, top of rock, and bedrock wells (as stated in Section 2.3, TW-45 could not be sampled in November 2010 due to damage to the well), 11 surface water locations, and 14 residential wells.

The August and November 2010 groundwater analytical results are summarized in Tables 4 and 5, respectively. The November 2010 surface water analytical results are summarized in Table 6, and the November 2010 residential well analytical results are summarized in Table 7. Historical groundwater analytical data can be found in previous reports submitted to EPA and summaries of this information can be found in Appendix C of this report. Analytical reports that include method detection limits and QA/QC information are provided in Appendix B.

One analytical parameter, 1,1-DCE, was selected for presentation on isoconcentration contour maps for the August and November events as shown on Figures 12 through 18. This analyte was selected because it is the most prevalent and widespread analyte detected at the Site. A concentration map for 1,1,1-TCA in the overburden, top of rock and bedrock wells was also prepared because it was the parent compound originally released at SWMU-9; it is presented as Figure 19 for the November 2010 event.

3.1 Groundwater Analytical Results

3.1.1 Overburden and Top of Rock Aquifer

Consistent with observations made during previous monitoring events, the highest VOC concentrations were detected in the overburden and top of rock aquifer in the vicinity of SWMU-9 where 1,1,1-TCA and 1,1-DCE are the primary VOC constituents (Tables 4 and 5). The highest 1,1,1-TCA and 1,1-DCE concentrations were measured in well MW-28 at 170,000 micrograms per liter (μg/L) and 98,000 μg/L, respectively. The 1,1,1-TCA concentrations in this well have fluctuated for years but have consistently been greater than 1 percent of the solubility limit (950,000 μg/L), thus suggesting the potential presence of dense non-aqueous phase liquid (DNAPL).

Similarly elevated concentrations of 1,1,1-TCA were detected in MW-7 where concentrations have been trending upward: 17,000 μg/L (2007), 24,000 μg/L (2008), 30,000 μg/L (2009), 31,000 ug/L (2010). This too may be indicative of nearby DNAPL, which most likely would be in the form of residual stringers given the shallow depth of MW-7 and the absence of a confining clay layer. The only other detection of 1,1,1-TCA during the November event was in MW-32 at a concentration of 22 ug/L, which was only slightly greater than in 2009 (14 μg/L). No other samples produced detections of 1,1,1-TCA above the laboratory reporting limit (RL). The rapid disappearance of 1,1,1-TCA in groundwater is consistent with known transformation mechanisms, particularly aqueous hydrolysis which is a very fast reaction.

Although there were no reported VOC detections other than 1,1,1-TCA and 1,1-DCE in MW-7 and MW-28, these two samples required dilution during analysis by the analytical laboratory that resulted in reporting limits greater than EPA maximum contaminant levels (MCLs) which are 200 and 7 ug/L, respectively.

Several other overburden and top of rock wells contain 1,1-DCE at levels above the MCL. In the area of monitoring wells MW-11, MW-12, and MW-13, 1,1-DCE concentrations range from 280 to 350 ug/L. In the Northeast Area of the Site, however, concentrations of 1,1-DCE decrease to below the RL of 5 ug/L.

Other VOCs that exceeded MCLs in the overburden and top of rock wells were 1,2-DCA, carbon tetrachloride, PCE, TCE and vinyl chloride. Monitoring well MW-30, located northeast of SWMU-9, contained the highest concentrations of 1,2-DCA (24 ug/L) and carbon tetrachloride (170 ug/L), and the only detection of TCE (5.8 ug/L) at the Site. Monitoring well MW-31, farther northeast of MW-30, contained the only detection of PCE at the Site at a concentration of 6 ug/L. The highest detection of vinyl chloride was in monitoring well MW-11 (35 ug/L).

3.1.2 Bedrock Aquifer

To understand the distribution of 1,1-DCE, isoconcentration maps were created for multiple vertical intervals within the fractured bedrock. The projected distribution of 1,1-DCE over the vertical intervals from 699 feet to 740 feet, 660 feet to 699 feet and 574 feet to 630 feet above mean sea level (amsl) for the August and November events is presented on Figures 12 through 14 and Figures 16 through 18, respectively. Assuming that 1,1-DCE entered the top of bedrock near SWMU 9, the axis of the plume, consistent with the groundwater flow direction and local bedrock fracture patterns as identified in the Bedrock Geologic Map of the Little Mountain Area Anderson South Quadrangle is oriented to the north-northeast. Refer to the *Supplemental RCRA Facility Investigation Report* (Brown and Caldwell, January 2009) for a more detailed review of these figures.

Concentrations of 1,1-DCE in well MW-29R Zone 3 and Zone 4 have been relatively stable over the four quarterly monitoring events conducted in 2010. In Zone 3, the concentration of 1,1-DCE was 410 ug/L in February. It increased to 550 ug/L and 530 ug/L in May and August, respectively, then dropped to 370 ug/L in November. In Zone 4, concentrations followed a very similar trend, starting the year at 380 ug/L in February. The concentration increased to 520 and 440 ug/L in May and August, respectively, then decreased to 360 ug/L during the November monitoring event. Farther north and hydraulically downgradient of MW-29R, 1,1-DCE has not been detected in groundwater above MCLs in any of the three zones of MW-36 during the quarterly monitoring events since it was installed in 2008.

The 1,1-DCE concentration in groundwater monitoring well MW-37, located on the southeastern edge of the plume, remained relatively stable over the past two years in all three zones according to the Mann-Kendall Test (Appendix D). In 2010, the concentration of 1,1-DCE in MW-37 Zone 1 increased from less than 5 µg/L in February to 74 µg/L in November. Concentrations of 1,1-DCE in MW-37 Zone 2 ranged from 160 µg/L in May to 340 µg/L in November. The 1,1-DCE concentration in MW-37 Zone 3 ranged from < 5 µg/L in May and August to 6.7 µg/L in November. Bedrock well MW-39 was installed in summer 2010 farther southeast of MW-37 to delineate 1,1-DCE in this direction. No VOCs, including 1,1-DCE, were detected above RLs during the August and November monitoring events in groundwater collected from MW-39 (Tables 4 and 5). Accordingly, delineation of the south edge of the plume appears to be complete.

Well MW-35, an artesian well located northeast of the intersection of True Temper Road and Keys Streets, contained 580 µg/L of 1,1-DCE in August and 490 µg/L of 1,1-DCE in November. Bedrock wells MW-41 and MW-42 were the first included in the monitoring program in summer of 2010 to delineate 1,1-DCE in the Northeast Area. Both wells were installed with nested wells, such that three independent zones could be sampled. The 1,1-DCE concentration in MW-41 Zone 1 decreased from 340 ug/L in August 2010 to 300 ug/L in November 2010. Zone 2 contained slightly higher concentrations than

Zone 1, containing up to 530 ug/L of 1,1-DCE during the November monitoring event. Groundwater collected from MW-41 Zone 3 contained 260 ug/L in August and 180 ug/L in November 2010. MW-42 is currently the farthest well from the Site in the northeast direction. During the August and November monitoring events, no VOCs were detected above MCLs in groundwater collected from MW-42. Therefore, the plume appears to be delineated to the northeast.

The only other contaminant detected above an MCL in the bedrock wells was carbon tetrachloride. This contaminant was detected in MW-22 and MW-29R Zones 3 and 4 during both monitoring events at maximum concentrations of 17 µg/L in August and 25 ug/L in November. No other parameters from the focused list of VOCs were detected above MCLs in the bedrock well samples.

1,1-DCE concentration trends for three bedrock wells, MW-27, MW-35, and MW-37 (Zones 1, 2, and 3), were determined using the Mann-Kendall Test (Gilbert, 1987). This test is a non-parametric statistical test that is routinely used to identify trends in groundwater concentration data. Data utilized in the test included annual groundwater monitoring data from 2006 through 2010 for MW-27 and the 2010 quarterly groundwater monitoring data for MW-35 and MW-37, resulting in the use of four or more data points for each well and/or zone. The test can be run on data sets with as few as 4 data points. According to the test results at a 90 percent confidence level, 1,1-DCE concentrations in the three bedrock wells show no trend, which indicates that concentrations near the property boundary are stable. Refer to Appendix D for Mann-Kendall Test results.

3.2 Surface Water Analytical Results

Surface water was collected from 11 locations (Figure 10). All VOC concentrations measured in November 2010 were below the applicable EPA Region IV Ecological Risk Assessment, Surface Water Screening Values. The only VOCs detected above RLs in surface water samples from Betsy Creek at locations both on and off Site during the November sampling event were 1,1-DCE and vinyl chloride. The 1,1-DCE concentrations ranged from 7.5 µg/L at SW-6 to 120 µg/L at SW-3A which is located within the Owens Corning property. Concentrations of 1,1-DCE have fluctuated at this location over the past 6 years, ranging from 2.3 ug/L to 390 ug/L. Vinyl chloride was detected at only one location (SW-3A) at 7.9 ug/L, which is also below the EPA Screening Value. All surface water analytical results are included in Table 6.

3.3 Residential Well Analytical Results

None of the parameters from the focused list of VOCs were detected above RLs in the residential well samples. All residential well analytical results are included in Table 7. Locations of the residential wells are provided on Figure 11, with the corresponding well location map ID's provided in Table 8.

Section 4

Summary and Conclusions

The third quarterly and the annual groundwater monitoring events were conducted at the Owens Corning Site in August and November 2010, respectively. Samples were collected from 10 bedrock wells during the August event and from 44 wells and 11 surface water locations during the November event. In addition, samples were collected from 14 residential wells during the November event. The samples were analyzed for the focused list of VOCs. Multiple water-bearing zones were sampled in wells MW-29R, MW-36, MW-37, MW-38, MW-39, MW-41, and MW-42.

The following conclusions were developed based on the quarterly and annual monitoring events summarized in this report:

- Based on historical and recent site monitoring data 1,1-DCE and 1,1,1-TCA are the primary constituents in groundwater, though 1,1 DCE is the primary constituent that persists beyond SWMU-9 and the property boundary and within both the overburden and bedrock water bearing zones.
- The highest concentrations of 1,1 DCE and 1,1,1 TCA are in the overburden and top of rock water bearing zones in the vicinity of SWMU-9. Contaminants detected above their MCLs in the overburden and top of rock water bearing zones other than 1,1-DCE and 1,1,1-TCA were 1,2-DCA, carbon tetrachloride, PCE, TCE and vinyl chloride.
- The plume of 1,1-DCE that originates in the vicinity of SWMU-9 travels downgradient towards the northeast and east towards Betsy Creek. The 1,1-DCE and 1,1,1-TCA groundwater plumes appear to be relatively stable and the downgradient boundaries of these plumes in the top of rock aquifer appear to be defined by wells MW-21 and MW-25, which were both non-detect.
- The main contaminant in the bedrock aquifer is 1,1-DCE. Concentration data obtained from the Northeast Area bedrock wells MW-27, MW-35 and MW-37 and results from the Mann-Kendall Test at the 90% confidence level revealed that the plume in this area has been relatively stable over the past 2 years. The only other VOC detected in bedrock wells above its MCL was carbon tetrachloride; concentrations have remained stable at low levels (less than 30 ug/L) over the past 2 years according to Mann-Kendall analysis results.
- In the new bedrock well MW-41, located downgradient and to the north of MW-35, concentrations of 1,1-DCE decreased in Zones 1 and 3 from the August to November monitoring events by 12 and 31 percent, respectively. Additional monitoring data from this well is needed to meet the minimum requirements for the Mann-Kendall analysis as the current data set currently includes only 2 data points.
- Finally, during the August and November monitoring events, no VOCs were detected above MCLs in groundwater collected from the new offsite bedrock wells, MW-39 and MW-42. Monitoring well MW-42 is the farthest monitoring well in the northeast direction from the Site, and monitoring well MW-39 is the farthest in the southeast direction.

Based on the above results, additional delineation is required downgradient and to the north of MW-41. Owens Corning submitted the Phase II Supplemental Investigation Results and Work Plan Addendum (Brown and Caldwell, September 2010) proposing the installation of MW-43 downgradient of MW-41.

Section 5

Limitations

This document was prepared solely for Owens Corning in accordance with professional standards at the time the services were performed and in accordance with the contract between Owens Corning and Brown and Caldwell dated January 13, 2010. This document is governed by the specific scope of work authorized by Owens Corning; it is not intended to be relied upon by any other party except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by Owens Corning and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.

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Appendix A: Groundwater Sampling Field Data Sheets

Appendix B: Laboratory Analytical Reports

Appendix C: Historical Groundwater Data

(Excerpted from the 2005 Annual Groundwater and Surface Water Monitoring Report, ARCADIS G&M, Inc., 2006)

Appendix D: Mann-Kendall Test Results