414343

GROUNDWATER MONITORING
&
ADDITONAL ASSESSMENT REPORT
MARSH LUMBER COMPANY FACILITY
PAMLICO, SOUTH CAROLINA

S&ME Project No. 1584-98-146

Prepared For:
Marsh Furniture Company
P.O. Box 870
High Point, North Carolina 28261

Prepared By:
S&ME, Inc.
3718 Old Battleground Road
Greensboro, North Carolina 27410

January 30, 2009

Edmund Q.B. Henriques, L.G.
Project Manager

John Whitehead, P.G.
Senior Hydrogeologist

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S&ME

January 30, 2009

SCDHEC
Groundwater Quality Section
Bureau of Water
2600 Bull Street
Columbia, South Carolina 29201-1708

Attention: Ms. Addie Walker, Hydrogeologist

Reference: **Groundwater Monitoring & Assessment Summary Report**
Marsh Lumber Company
Pamplico, South Carolina Facility
Site # 14343
S&ME Project No. 1584-98-146B

Dear Ms. Walker:

S&ME, Inc. (S&ME) has completed additional groundwater monitoring at the subject site. This report describes the most recent monitoring procedures and the analytical results for monitor wells and surface water samples. A summary of additional assessment activities is also provided to address earlier comments.

If you have any questions or comments, please contact Bruce Braswell at Marsh Furniture Company or S&ME at (336) 288-7180.

Sincerely,

S&ME, Inc.

Edmund Q.B. Henriques, P.G.
Environmental Department Manager

Wayne H. Watterson, P.E.
Senior Engineer

EQBH/sc

cc: Bruce Braswell, Marsh Furniture Company, P.O. Box 870, High Point, NC 27261
Bruce Collins, Marsh Lumber Co., 6th Avenue, Pamplico, SC 29583

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1. BACKGROUND

1.1 Site History

The Marsh Lumber Company facility, located in Pamplico, South Carolina, consists of approximately 15 acres and contains a sawmill operation with approximately 75,000 square feet of enclosed space. Operations include lumber handling and storage, drying kilns, saw and dimension mills, and lumber treating and drying areas.

The lumber treating and drying includes the use of a dip tank and drip pad (e.g. Green Chain Area) used to treat green lumber freshly cut from logs. Reportedly, the Green Chain Area operations previously used a product containing sodium pentachlorophenol to treat the freshly cut lumber.

Analytical data collected by Law Engineering (LAW) during 1992, detected the existence of soil and groundwater impacts in the Green Chain Area. Pentachlorophenol (PCP) represented the primary contaminant of concern. The detected concentrations of PCP exceeded the Maximum Contaminant Levels (MCLs) established by EPA and the South Carolina Department of Health and Environmental Control (SCDHEC). LAW completed additional site assessment activities from 1993 through 1998, roughly defining the horizontal extent of the plume in all directions except toward the west.

During 1998, S&ME was contracted to complete additional site investigations in an effort to delineate the vertical and horizontal extent of the PCP groundwater contaminant plume. The additional groundwater investigations were also designed to test potential aspects of contaminant fate and transport. A dissolved-phase PCP groundwater contaminant plume could migrate with the natural flow of the groundwater beneath the site. However, since PCP has a density greater than water, any free-phase or dissolved phase pentachlorophenol could migrate vertically and/or laterally, dependent upon subsurface stratigraphy and the orientation of the stratigraphic units, rather than following the direction of natural groundwater flow. Therefore, the hydrogeologic study included a detailed evaluation of site stratigraphy. The collected stratigraphic data evidenced the presence of a clay rich layer beneath portions of the site. Based upon the analytical data collected during the additional site investigations, the clay layer appears to be limiting the vertical migration of the dissolved phase PCP in the groundwater. The apparent dip of this clay layer was thought to have the potential to control the lateral migration of the dissolved phase contaminant plume.

Vertical extent well MW-8 monitored groundwater quality below the clay layer, in the vicinity of shallow aquifer well MW-3. The detection of PCP at vertical extent well MW-8 during August 2000 was thought to indicate a damaged or leaking well casing. The area surrounding wells MW-3 and MW-8 was susceptible to heavy equipment traffic. S&ME recommended proper abandonment of the well in an effort to reduce the potential for the migration of pentachlorophenol into the underlying aquifer. SCDHEC later concurred with this recommendation during a telephone conversation on September 12, 2000 and the well was properly abandoned.

S&ME submitted a Site Assessment Report to the SCDHEC on July 7, 1999. The report summarized the results of the additional site assessment activities and included a recommendation to monitor the potential natural attenuation of the pentachlorophenol, as a corrective measure. In a correspondence dated April 20, 2000, the SCDHEC Groundwater Quality Section agreed with the recommendation to install four Type II monitoring wells in order to determine the horizontal extent of the contaminant pentachlorophenol plume. SCDHEC requested the semi-annual monitoring of wells MW-1, MW-3, MW-8, MW-9, MW-10, MW-11, MW-13, MW-14, MW-15, and MW-16. SCDHEC indicated that upon completion of two consecutive semi-annual monitoring events, the site would be evaluated for natural biodegradation trends and an annual sampling program. The installation of the required additional wells and the first semi-annual groundwater monitoring event were completed on August 16, 2000. Including the August 2000 sampling event, fourteen semi-annual groundwater monitoring have been completed to date to monitor potential plume migration, contaminant concentrations, and the potential for natural attenuation of pentachlorophenol.

On April 3, 2006, SCDHEC issued a letter to Marsh Lumber Company requiring additional assessment at the subject site. In general, Marsh Lumber Company was directed by SCDHEC to complete one additional groundwater monitoring event and to provide a proposed scope of work to evaluate the potential presence or absence of pentachlorophenol in the lower sand unit (e.g. below the clay rich layer).

During August 2006, S&ME conduct the requested additional assessment. Groundwater analytical data for sample DS-1, DS-2, and DS-3D, collected from the lower sand unit aquifer below the clay-rich layer, reported no detected PCP or other compounds targeted by Method 8270 acid extractables. This data supported the theory that the observed clay-rich layer may act as a restrictive layer, possibly restricting the vertical movement of dissolved phase PCP.

In a letter dated from SCDHEC dated January 25, 2007, Marsh Lumber Company was directed to install one monitoring well on the periphery of the PCP plume and to a depth above the clay layer. The requested monitoring well was installed on March 28, 2007 in accordance with SCDHEC Monitor Well Approval # 2962. S&ME *"Groundwater Monitoring Report"* dated May 3, 2007 documented the January 24, 2007 groundwater monitoring event, the March 24, 2007 installation of SCDHEC requested well MW-17 and associated analytical results.

In a letter from SCDHEC dated August 21, 2007, Marsh Lumber Company was directed to submit an additional monitoring report and a SCDHEC *"Mixing Zone Application."* A Groundwater Monitoring Report was submitted on November 15, 2007 and the Mixing Zone Application was submitted on December 17, 2007.

In a letter from SCDHEC dated November 19, 2008, Marsh Lumber Company received approval for additional site characterization work outlined in S&ME's Work Plan dated September 18, 2008. Marsh Lumber Company also received conceptual approval of the air-sparging based bio-stimulation pilot test (with SCDHEC comments) and was directed by SCDHEC to obtain an Underground Injection Permit for the proposed sodium lactate

injection pilot test. Marsh Lumber Company was also directed to submit the first and second semi-annual monitoring reports on or before January 30, 2009. This report was prepared to comply with this request.

1.2 Scope of Work

The following scope of work was completed for during this reporting period.

- During July 2008, groundwater samples were collected from monitoring wells MW-1, MW-3A, MW-9, MW-10, MW-11, MW-13A, MW-14, MW-15, MW-16, and MW-17. The samples were submitted for laboratory analysis by EPA Method 8270 (acid extractables only) and for sulfate, nitrate, ferrous iron, and chloride. Surface water samples SW-1, SW-2, and SW-3 were collected and submitted for laboratory analysis by EPA Method 8270 (acid extractables only).
- During January 2009, groundwater and surface water samples were collected from monitoring wells MW-1, MW-2, MW-3A, MW-9, MW-10, MW-11, MW-13A, MW-14, MW-15, MW-16, MW-17, MW-18A, and MW-18B and surface water sample locations SW-1, SW-2, and SW-3. The samples were submitted for laboratory analysis by EPA Method 8270 (acid extractables only). The samples from wells MW-1, MW-3, MW-10, and MW-15 were also submitted to the laboratory for heterotrophic plate counts.
- A Monitor Well Application for wells MW-18A, MW-18B, BSW-1 and BSW-2 was submitted on December 8, 2008 and SCDHEC approval was received on January 6, 2009.
- Nested monitor well pair MW-18A and MW-18B were installed near the creek which parallels the western property boundary. For each well the top of casing elevation was determined relative to a local benchmark. A vertical groundwater flow gradient was calculated from the water levels detected at this well pair.
- Bio-sparge well BSW-1 and the associated sparge pilot test monitor well BSW-2 were installed.

This report was prepared to summarize the field data collected and to report the findings for this monitoring event.

2. DATA COLLECTION

During July 2008, groundwater samples were collected from monitoring wells MW-1, MW-3A, MW-9, MW-10, MW-11, MW-13A, MW-14, MW-15, MW-16 and MW-17, as part of the on-going semi-annual groundwater monitoring program.

During January 2009, in addition to collecting semi-annual groundwater samples from the same set of wells listed above, samples were collected from monitor wells MW-18A and MW-18B installed during January 2009. As agreed upon by Marsh Lumber and SCDHEC, a sample was also collected from monitor well MW-2, located at the end of the Green Chain, as a means to examine the potential for residual PCP in the soil in this area.

2.1 Groundwater Sample Collection

The groundwater samples were collected at relatively low flow purge rates using a peristaltic pump. During purging, the purge water was monitored using a flow-through cell and field instruments to measure pH, temperature, DO, conductivity, and ORP. Prior to sample collection, the volume of water in each well was determined. Groundwater samples were collected after pH, DO, and temperature readings stabilize or after removing three well casing volumes. The collected groundwater samples placed directly into laboratory-prepared containers.

A new pair of disposable nitrile gloves was utilized at each location to reduce the potential for cross-contamination of the samples. Each sample container was labeled with the project name and number, the time and date of sample collection, the analyses to be performed, and the presence or absence of preservative. The sample containers for Method 8270 were pre-acidified by the laboratory. The sample containers were then placed on ice and cooled to approximately 4° C. The chain-of-custody was initiated and the coolers were transported to Research & Analytical Laboratories located in Kernersville, North Carolina. The samples were analyzed according to SW-846 Method 8270 (acid extractables).

During the July 2008 event, the groundwater samples were also analyzed for nitrate, sulfate, ferrous iron, and chloride as potential indirect indicators of natural attenuation of pentachlorophenol.

During the January 2009 event, groundwater samples from wells MW-1, MW-3, MW-10, and MW-15 were also analyzed to obtain heterotrophic bacteria counts. The selected wells form a profile that runs perpendicular to groundwater flow and extends from the up-gradient background well MW-1, through the core of the PCP plume at wells MW-3 and MW-10, and ends at the down-gradient limit of the plume at well MW-15.

2.2 Natural Attenuation Indicator Parameters

As discussed in the prior Site Assessment Report, research into potential biodegradation of pentachlorophenol revealed several references, all of which suggest that PCP is biodegradable. PCP reportedly biodegrades under a wide range of conditions including aerobic and anaerobic biodegradation.

The following site-specific evidence will be considered in the evaluation of the potential effectiveness of the remedial approach.

- Historic groundwater analytical data that demonstrate a trend of declining concentrations.
- Geochemical groundwater data that indirectly demonstrate the types and rates of natural attenuation processes active at the site. For the subject site, indicator parameters utilized to date included dissolved oxygen, ferrous iron, nitrate, sulfate and/or chloride. Other parameters such as temperature, pH, and ORP were also collected to determine if these environmental conditions might be conducive to the biodegradation processes.

- Heterotropic bacteria plate count data were obtained during 2009 to initiate an assessment of pre-existing bacteria populations and their spatial distribution.

2.3 Groundwater Flow Direction

As discussed in the Site Assessment Report, topography is a major influence on regional groundwater flow in Coastal Plain aquifers. Groundwater originates as recharge from precipitation in aquifer outcrop areas. The elevation of recharge areas, the degree of incisement of streams, and the location and extent of lowland areas largely determines the groundwater flow patterns. Streams and swampy lowland areas are places where groundwater discharges either as base flow or diffuse upward as leakage. Based upon the topography of the subject site, groundwater flow is anticipated to mimic surface topography, flowing down dip, perpendicular to topographic contour lines. On this basis, the direction of groundwater within the study area is anticipated to flow southwest, toward the adjacent unnamed tributary of Big Swamp.

During the July 2008 and January 2009 monitoring events, depth to groundwater data was collected. The depth to groundwater and top of casing elevation data were used to calculate the groundwater elevations at the monitoring wells. **Table 1** provides a summary of the current and historic groundwater elevation data. **Figure 2** depicts a groundwater surface contour map prepared using the January 2009 data. This map suggests that groundwater flow in the water table aquifer beneath the site is generally migrating toward the west-southwest. This flow direction is generally consistent with prior assessment data.

2.4 Surface Water Sampling

On July 24, 2008 and January 8, 2009, surface water samples SW-1, SW-2, and SW-3 were collected from the tributary of the Big Swamp that is located along the southern and western portions of the site. A segment of the tributary is located downgradient of the contaminant plume. The stream also flows through the former log storage area within a storm drain conduit. The tributary's flow can be described as open channel prior to the study area and after it leaves the site.

The surface water sample locations are indicated on **Figure 1**. Surface water sample SW-1 was collected from an open channel portion of the creek before it flows in the vicinity of the contaminant plume. Surface water samples SW-2 and SW-3 represent samples collected after the stream flows through the site. Sample SW-2 is downgradient of the contaminant plume. Sample location SW-3 was approximately 200 feet down stream of location SW-2. The collected samples were placed into laboratory prepared containers and submitted for analysis according to SW-846 Method 8270 (acid extractables).

On January 8, 2009 field measurements of pH, temperature, conductivity, D.O., and ORP were obtained at approximate 50 foot intervals along the open channel portion of the creek immediately down-gradient of the groundwater plume, and at the surface water sample locations.

3. DISCUSSION OF WATER QUALITY MONITORING RESULTS

3.1 Pentachlorophenol Concentrations

Table 2 provides a summary of the current and historical semi-volatile organic groundwater analytical data for the site's monitoring well network. PCP was detected at quantifiable or estimated concentrations in monitoring wells MW-3A, MW-10, MW-14, and MW-16 during the reporting period. **Figure 2** presents the isoconcentration map prepared using the analytical results for the January 2009 monitoring event. Based upon the groundwater analytical data collected during this and prior monitoring events, off-site migration of the PCP plume is not suggested. The following provides a brief discussion of the January 2009 analytical results. **Appendix A** contains copies of the laboratory analytical data.

Appendix B includes graphs displaying historic PCP concentrations over time at monitoring wells MW-3, MW-10, MW-14 and MW-16. Since monitor well MW-3A replaced monitor well MW-3, the data for both wells is combined to examine possible data trends. The following provides a brief discussion of the graphs.

- The historic analytical data for MW-3A can be inferred to suggest potential lognormal decay of PCP over time, with minor fluctuations in the detected concentrations after the July 24, 1998 monitoring event. The PCP concentrations reported during the December 2004 and June 2005 monitoring events were unusually high when compared with the post 1998 data set. Following the December 2004 event, a trend of declining PCP concentrations over time is indicated.
- The historic analytical data set for well MW-10 contains two anomalous periods represented by spikes in the detected PCP concentrations. During 2001 and 2002 PCP concentrations spiked to a maximum concentration of 241 µg/L followed by seven events with PCP concentrations roughly an order of magnitude lower. The October 2007 event represents the second observed spike in the detected concentrations of PCP. The second spike has been followed by two consecutive monitoring events reporting significant reductions in PCP concentrations. In the absence of these concentration spikes, the remaining data set can be inferred to suggest a slight overall decline in PCP concentrations over time. The observed spikes in PCP concentrations have a tendency to correlate with lower than average groundwater elevations and with periods when drought conditions persisted.
- The historic analytical data for well MW-14 depicts a relatively consistent trend of declining PCP concentration over time; however, a notable single point spike in the PCP concentration was reported during the October 2001 event.
- The historic analytical data for well MW-16 can be inferred to suggest an overall decline in PCP concentrations over time; however, a notable spike in the PCP concentration was reported during the October 2001 event. Analytical data for the last 12 monitoring events reported PCP concentrations below the 20 ug/L laboratory quantitation limit. Estimated PCP concentrations during the last three events range from 2 to 3 ug/L. These laboratory estimated PCP concentrations were not provided until the more recent events.

3.2 Natural Attenuation Indicators

The observed overall trend of declining PCP concentrations (discussed in Section 3.1) has been considered the primary line of evidence for the existence of natural attenuation of PCP. The detection of daughter products stemming from the biodegradation of PCP is limited in the site's monitored history; however, their absence does not suggest that biodegradation is not occurring. The historic monitoring data does include a few spikes in PCP concentrations within the plume; however, down-gradient sentinel wells have consistently reported below detection limit concentrations of PCP, suggesting overall plume stability.

As potential additional lines of evidence in the screening of the site's capacity for natural attenuation, several other geochemical indicator parameters have been measured with laboratory testing and with field measurements. **Table 3** provides a summary of the natural attenuation geochemical indicator data collected during this monitoring event. **Table 4** provides a summary of the field data collected during this monitoring event. As stated in the March 1995, Protocol for Monitoring Intrinsic Bioremediation in Groundwater, by Chevron Research and Technology Company, "During biodegradation certain electron acceptors (dissolved oxygen, nitrate and sulfate) are consumed (reduced). If a particular electron acceptor is reduced as part of microbially-catalyzed biodegradation, one would expect to observe an inverse correlation between the contaminant and the electron acceptor (declining concentrations of the electron receptor with increasing contaminant concentrations).

Based upon the analytical and field data collected during the last two monitoring events, the following observation are made with regard to the spatial distribution patterns of certain natural biodegradation indicators:

- For the July 2008 event, no consistent spatial distribution pattern was recognized when comparing the relationship between PCP concentrations and the detected nitrate and sulfate. Nitrate was slightly elevated immediately down-gradient of the former septic field located to the east of MW-3. Similarly the highest sulfate concentration was detected in well MW-3. Well MW-3 has the historically highest PCP concentrations.
- When ferric iron (e.g. an electron acceptor) is reduced as part of microbially-catalyzed biodegradation, **ferrous iron** concentrations will increase, particularly in the middle of the contaminant plume. Based upon the July 2008 data set, ferrous iron concentrations were generally higher in wells containing PCP. Exceptions to this are MW-9, MW-15, MW-16, and MW-17, all on the down-gradient plume margins.
- For the July 2008 monitoring event, no clear spatial distribution pattern was recognized when comparing the detected PCP concentrations and the detected chloride concentrations within and outside of the dissolved phase PCP plume. However, most wells down-gradient of MW-1 (background well) report chloride concentrations at least two time greater than the concentration at MW-1.

Current literature suggest that due to complex site issue, some sites do not always exhibit clear spatial distribution patterns in the geochemical data, and that in these cases the use of a geochemical point system can be another tool for screening sites. The EPA's *"Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater"* dated September 1998, provides an example point system framework which was developed to screen sites for anaerobic biodegradation of chlorinated aliphatic hydrocarbons. Since we are not aware of a similar framework specific to poly chlorinated phenols, such as PCP, site specific parameters were compared with EPA scoring system; however, scoring was limited to groundwater geochemical parameters which have been measured and with no points awarded for the presence of daughter compounds. Based on the EPA scoring system, the following site specific parameters were considered.

- Dissolved oxygen concentrations within the plume are less than 0.5 mg/L (3 points).
- Nitrate concentrations within the plume are less than 1 mg/L (2 points).
- Sulfate concentrations are less than 20 mg/L at wells containing PCP with the exception of MW-3. The former septic field use may have contributed to the elevated sulfate at MW-3 (1 point).
- Ferrous Iron concentrations are greater than 1 mg/L within the plume (3 points).
- Chloride concentrations are 2 times the up-gradient background well concentrations (2 points).
- Field pH was greater than 5 and less than 9 within the plume (0 points).
- Groundwater temperatures are greater than 20 degree Celsius an estimated 2/3rd of the year (0 points).
- ORP was field measured to be in the negative mill volt range within the plume, except for at well MW-3 where it may be influence by the former septic field operations (1 point).

The points awarded to these factors alone scored 12 points, which falls in the upper end of the category interpreted by this EPA screening tool to suggest *"limited evidence for anaerobic biodegradation of chlorinated organic."* By comparison, a score of 15 would be interpreted to be in the category of *"adequate evidence for anaerobic biodegradation."* Since all of the parameters used by this scoring system were not measured and thus available for points, we believe that it is premature to rule out anaerobic biodegradation at the subject site.

During the January 2009 event, groundwater samples from wells MW-1, MW-3, MW-10, and MW-15 were analyzed to obtain heterotrophic bacteria counts. The selected wells form a profile that runs perpendicular to groundwater and extends from the up-gradient background well MW-1, through the core of the PCP plume at wells MW-3 and MW-10, and end at the down-gradient limit of the plume at well MW-15. This test was conducted to initiate an assessment of pre-existing bacteria populations and their distribution. Laboratory results reported 19.5 colony forming units per milliliter (CFU/ml), 1 CFU, 121 CFU, and 5,200 CFU at wells MW-1, MW-3, MW-10, and MW-15 respectively. The relatively lower populations in wells containing PCP as compared with wells with no

PCP, may suggest that the PCP is inhibiting bacteria population growth and/or an insufficient number of electron acceptors in these areas to support greater bacteria populations. A copy of the laboratory report is contained in **Appendix A**.

3.3 Surface Water Results

Analytical results for surface water sample SW-1, SW-2, and SW-3 reported no EPA Method 8270 acid extractable target compounds were detected during the July 2008 and January 2009 events. **Table 5,** provides a summary of the historic surface water sampling analytical data. **Appendix A** contains a copy of the laboratory analytical report.

4. ADDITIONAL ASSESSMENT

The focus of the additional assessment activities was to further characterize the shallow aquifer down-gradient of the dissolved phase PCP plume and additional assessment to examine the potential for residual PCP in source area soils. In a letter dated from SCDHEC dated November 19, 2008, Marsh Lumber Company received approval for additional site characterization activities outlined in S&ME's Work Plan dated September 18, 2008.

On January 7, 2009, a groundwater sample was be collected from monitor well MW-2. As agreed upon by SCDHEC, the sample was analyzed for pentachlorophenol in lieu of conducting soil sampling to reassess the 1992 detection of PCP in one soil sample, B-3 at a depth of 9.5 feet below grade. Soil boring B-3 was the only historic soil sample reported to contain PCP. As summarized in **Table 2** no quantified or estimate concentrations of PCP were reported in the groundwater at MW-2. This data suggests that if residual PCP were present in the soil in the vicinity of MW-2, it is not leaching to groundwater in sufficient quantities to result in a measured groundwater PCP concentration.

The additional assessment included evaluating a segment of the creek down-gradient of well MW-10 as a groundwater discharge area, and to assess the potential for impacted groundwater to migrate below the creek and beyond the subject site. On January 7, 2009 well pair MW-18A and MW-18B were installed hydraulically down-gradient of well MW-10 and before the creek (see Figure 1). The well pair was installed to measure the vertical hydraulic gradient near the creek above the clay rich layer. **Appendix C** contains copies of the well construction records for these wells.

The top of casings elevations for wells MW-18A and MW-18B were determined using a rod and level, relative to a local benchmark. A comparison of the total heads measured at nested wells MW-18A and MW-18B indicates upward groundwater flow component, suggesting a discharge of the water table aquifer into the adjacent creek. A vertical gradient of 0.25 foot/foot was calculated from the January 2009 data for well pair MW-18A and MW-18B. **Appendix D** provides sample vertical gradient calculations.

The elevation of the adjacent creek bottom was also measure relative to the same local bench mark using a rod and level. A comparison of the elevation of the bottom creek with the prior reported depths to the top of the clay rich layer at soil profile probes GP-15 and

GP-21 (see Figure 1), the top of the clay and the bottom of the creek are separated by approximately 7 feet of water table aquifer.

To examine shallow groundwater quality immediately prior to discharge to the creek at MW-18A and MW-18B, both wells were purged and sampled using low flow sampling methods. The collected groundwater samples were submitted for laboratory analysis according to Method 8270 (acid extractables). As summarized in **Table 2**, analytical results report no quantified or estimated concentrations of PCP at wells MW-18A and MW-18B, providing evidence to demonstrate a less than MCL compliance boundary at this location, prior to shallow groundwater discharging to surface waters. This finding is consistent with the finding of no reported PCP concentration in down stream surface water samples SW-2 and SW-3, as discussed in Section 3.3. With an upward flow gradient at the creek, low to moderate horizontal groundwater flow velocities, and a relatively narrow window for groundwater to pass beneath the creek, it appears reasonable to conclude the most dissolved phase PCP would discharge to the creek rather than under the creek, assuming that the plume reaches the point of the creek

As an additional method to screen the creek for isolated PCP groundwater discharge points into the surface water, stream water quality parameters were measured in-situ. On January 8, 2009 field measurements of pH, temperature, conductivity, dissolved oxygen, and ORP were obtained at approximate 50 foot intervals along the open channel portion of the creek immediately down-gradient of the groundwater plume and at the sample points where the three surface water samples were collected. **Table 6** provides a summary of the field data. Sample locations SW-1, SW-2 and SW-3 refer to the sample locations shown on Figure 1 while locations referred to as "SW-2 + X" represent sample locations approximately "X" feet up stream of SW-2. Based on our review of the surface water field parameters recorded in Table 6, specific location(s) along the creek warranting focused surface water quality sampling for PCP were not identified.

In the letter dated from SCDHEC dated November 19, 2008, Marsh Lumber Company received approval for a bio-sparge pilot test. On January 7, 2009, bio-sparge well BSW-1 and the associated sparge pilot test monitor well BSW-2 were installed at the locations depicted on **Figure 1**. Copies of the well construction records for these wells are contained in **Appendix C**.

5. CONCLUSIONS

Prior site investigations define the vertical and horizontal extent of the PCP dissolved phase plume. The stratigraphic data collected during prior site assessments indicated the presence of a clay rich layer at each location examined beneath the site. Groundwater analytical data suggested that the clay-rich layer is limiting the vertical migration of the dissolved phase pentachlorophenol in the unconfined shallow aquifer. Potable water for the area is provided by wells owned by the Town of Pamplico and prior investigations identified no off-site water supply wells at risk. The creek which borders the western side of the site is a potential at risk receptor; however, the plume has not reached this point and is currently not predicted to reach the creek.

Additional assessment activities conducted during this reporting period indicate the following:

- PCP was not detected at well MW-2 suggesting limited or no residual PCP in the soil at Law Engineering's 1992 soil sample B-3.
- Hydraulic head data for well nest MW-18A & MW-18B indicates an upward vertical groundwater gradient at the point where the shallow groundwater reaches the creek which borders the site, down-gradient of the PCP plume. Comparing the top of clay elevation with the creek bottom elevation suggests approximately 7 feet of separation between the two.
- PCP was not detected in wells MW-18A and MW-18B during January 2009.
- PCP was not detected in the surface water samples collected during January 2009.

Groundwater analytical data from the July 2008 and January 2009 monitoring events report the detection of PCP in monitor wells MW-3A, MW-10, MW-14 and MW-16. Groundwater analytical data discussed herein, defines the horizontal extent of the dissolved phase plume, which is limited to property owned by Marsh Lumber.

The historic groundwater analytical data suggests that the detected groundwater concentrations of pentachlorophenol have decreased significantly over time in well MW-3A, with less dramatic declines at wells MW-10, MW14, and MW-16. The observed trends in the historic data can be interpreted to provide indirect evidence, which indicates a fairly stable plume and supports natural attenuation as a viable remedial option for the subject site.

With regard to demonstrating natural biodegradation of PCP, daughter compound detections have been somewhat limited in the historical data set. There are multiple reasons why they have not been detected; therefore, their apparent absence does not necessarily suggest the absence of a capacity for PCP biodegradation at the site.

Field and laboratory data for other biodegradation indicators parameters such as nitrate, sulfate, chloride, ferrous iron, DO, and ORP do not depict text book spatial distribution patterns as additional lines of evidence to support the potential for natural biodegradation of PCP at the subject site. The spatial distribution patterns could be affected by complex land use issues such as a former septic system within the PCP plume, the historic placement of fill in portions of the site, historic irrigation of cut logs, and the historic storage of logs over portion of the plume. By comparison, the preliminary EPA geochemical scoring of the site's measured aquifer conditions does not rule out biodegradation of a viable option. It is possible that site conditions need augmentation to stimulate more productive biodegradation.

It was on this basis that Marsh Lumber previously requested approval for a bio-stimulation pilot test, and recently received conceptual SCDHEC approval. At this time a SCDHEC Underground Injection Control (UIC) permit application is being prepared for the bio-stimulation pilot test which will include the injection of sodium lactate into a proposed infiltration trench.

Based on limited, but available research regarding in-situ PCP biodegradation studies, it appears that wood treating facilities have observed some success at reducing PCP concentrations using bio-sparging to enhance oxidative dechlorination of PCP. In a letter dated November 19, 2008, SCDHEC approved Marsh Lumber's request to conduct at a bio-sparge pilot test. Wells BSW-1 and BSW-2 were installed during the reporting period and the pilot test is expected to begin shortly.

S&ME plans to further examine the potential for PCP impacts at the creek which borders the subject site beyond the down-gradient end of the PCP plume. Groundwater model "Bioscreen" will be used to provide predictive calculations of potential PCP impacts to water quality in the creek and to further characterize contaminant migration and the plume attenuation factors operating at the site. Existing site assessment data will be used for the required model input parameters, other model require parameters will be estimated using professional judgment. The finding from the screening assessment will be provided under separate cover.

At this time continued semi-annual groundwater monitoring is recommended.

6. SOLE USE STATEMENT

All materials and information obtained by S&ME on this project are provided for the sole use of Marsh Furniture Company, Inc. and SCDHEC for this project. Use of the report issued for this project by any third parties will be at such party's sole risk. S&ME disclaims liability for any use of or reliance on the report issued for this project by third parties.

TABLES

TABLE 1
GROUNDWATER ELEVATION DATA SUMMARY
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Well Location	Date	Top of Casing Elevation (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet)	Data Collected By
MW-1	1/6/1993	100.39	6.73	93.66	LAW
	10/18/1993	100.39	8.08	92.31	LAW
	11/11/1993	100.39	7.92	92.47	LAW
	1/5/1999	100.39	7.80	92.59	S&ME
	8/16/2000	100.39	7.66	92.73	S&ME
	3/28/2001	100.39	7.76	92.63	S&ME
	10/22/2001	100.39	10.05	90.34	S&ME
	4/24/2002	100.39	8.83	91.56	S&ME
	10/22/2002	100.39	8.32	92.07	S&ME
	5/20/2003	100.39	7.42	92.97	S&ME
	12/11/2003	100.39	7.59	92.80	S&ME
	5/25/2004	100.39	8.18	92.21	S&ME
	12/14/2004	100.39	7.44	92.95	S&ME
	6/15/2005	100.39	7.08	93.31	S&ME
	12/19/2005	100.39	6.98	93.41	S&ME
	7/21/2006	100.39	7.84	92.55	S&ME
	1/24/2007	100.39	7.69	92.70	S&ME
	10/3/2007	100.39	9.41	90.98	S&ME
	7/24/2008	100.39	8.64	91.75	S&ME
	1/8/2009	100.39	7.75	92.64	S&ME
MW-3	1/6/1993	99.13	7.88	91.25	LAW
	10/18/1993	99.13	8.52	90.61	LAW
	11/11/1993	99.13	8.47	90.66	LAW
	1/5/1999	99.13	8.87	90.26	S&ME
	8/16/2000	99.13	8.14	90.99	S&ME
	3/28/2001	99.13	8.04	91.09	S&ME
	10/22/2001	99.13	9.43	89.7	S&ME
	4/24/2002	99.13	8.86	90.27	S&ME
	10/22/2002	99.13	8.61	90.52	S&ME
	5/20/2003	99.13	8.03	91.10	S&ME
	12/11/2003	99.13	8.30	90.83	S&ME
	5/25/2004	99.13	well damaged	no data	S&ME
*	12/14/2004	99.11	8.26	90.85	S&ME
*	6/15/2005	99.11	7.81	91.30	S&ME
*	12/19/2005	99.11	8.08	91.03	S&ME
*	8/22/2006	99.11	8.14	90.97	S&ME
*	1/24/2007	99.11	7.68	91.43	S&ME
*	10/3/2007	99.11	9.05	90.06	S&ME
*	7/24/2008	99.11	8.74	90.37	S&ME
*	1/8/2009	99.11	8.26	90.85	S&ME

* = MW-3A

TABLE 1
GROUNDWATER ELEVATION DATA SUMMARY
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Well Location	Date	Top of Casing Elevation (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet)	Data Collected By
MW-9	10/18/1993	97.97	7.91	90.06	LAW
	11/11/1993	97.97	7.86	90.11	LAW
	1/5/1999	97.97	8.11	89.86	S&ME
	8/16/2000	97.97	7.42	90.55	S&ME
	3/28/2001	97.97	7.32	90.65	S&ME
	10/22/2001	97.97	8.62	89.35	S&ME
	4/24/2002	97.97	8.22	89.75	S&ME
	10/22/2002	97.97	8.03	89.94	S&ME
	5/20/2003	97.97	7.70	90.27	S&ME
	12/11/2003	97.97	7.87	90.10	S&ME
	5/25/2004	97.97	7.84	90.13	S&ME
	12/14/2004	97.97	7.65	90.32	S&ME
	6/15/2005	97.97	7.79	90.18	S&ME
	12/19/2005	97.97	8.04	89.93	S&ME
	7/20/2006	97.97	7.98	89.99	S&ME
	1/24/2007	97.97	7.81	90.16	S&ME
	10/3/2007	97.97	8.54	89.43	S&ME
	7/24/2008	98.51	8.41	90.1	S&ME
	1/8/2009	98.51	8.11	90.4	S&ME
MW-10	10/18/1993	93.42	4.86	88.56	LAW
	11/11/1993	93.42	4.98	88.44	LAW
	1/5/1999	93.42	4.19	89.23	S&ME
	8/16/2000	93.42	4.59	88.83	S&ME
	3/28/2001	93.42	4.51	88.91	S&ME
	10/22/2001	93.42	6.72	86.70	S&ME
	4/24/2002	93.42	5.64	87.78	S&ME
	10/22/2002	93.42	5.25	88.17	S&ME
	5/20/2003	93.42	4.25	89.17	S&ME
	12/11/2003	93.42	4.26	89.16	S&ME
	5/25/2004	93.42	4.92	88.50	S&ME
	12/15/2004	93.42	4.06	89.36	S&ME
	6/15/2005	93.42	3.80	89.62	S&ME
	12/19/2005	93.42	3.64	89.78	S&ME
	7/20/2006	93.42	4.74	88.68	S&ME
	1/24/2007	93.42	3.09	90.33	S&ME
	10/3/2007	93.42	5.08	88.34	S&ME
	7/24/2008	93.93	5.48	88.45	S&ME
	1/8/2009	93.93	3.99	89.94	S&ME

TABLE 1
GROUNDWATER ELEVATION DATA SUMMARY
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Well Location	Date	Top of Casing Elevation (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet)	Data Collected By
MW-11	10/18/1993	97.45	7.59	89.86	LAW
	11/11/1993	97.45	7.43	90.02	LAW
	1/5/1999	97.45	7.58	89.87	S&ME
	8/16/2000	97.45	7.04	90.41	S&ME
	3/28/2001	97.45	7.14	90.31	S&ME
	10/22/2001	97.45	8.26	89.19	S&ME
	4/24/2002	97.45	7.74	89.71	S&ME
	10/22/2002	97.45	7.50	89.95	S&ME
	5/20/2003	97.45	6.93	90.52	S&ME
	12/11/2003	97.45	7.20	90.25	S&ME
	5/25/2004	97.45	7.38	90.07	S&ME
	12/115/04	97.45	7.12	90.33	S&ME
	6/15/2005	97.45	6.72	90.73	S&ME
	12/19/2005	97.45	6.97	90.48	S&ME
	7/20/2006	97.45	7.18	90.27	S&ME
	1/24/2007	97.45	6.60	90.85	S&ME
	10/3/2007	97.45	7.91	89.54	S&ME
	7/24/2008	97.45	7.63	89.82	S&ME
	1/8/2009	97.45	7.12	90.33	S&ME
MW-13	8/16/2000	93.18	5.09	88.09	S&ME
	3/28/2001	93.18	5.19	87.99	S&ME
	10/22/2001	93.18	5.43	87.75	S&ME
	4/24/2002	93.18	5.21	87.97	S&ME
	10/22/2002	93.18	5.15	88.03	S&ME
	5/20/2003	93.18	4.69	88.49	S&ME
	12/11/2003	93.18	4.52	88.66	S&ME
	5/25/2004	93.18	well damaged	no data	S&ME
**	12/15/2004	94.16	6.29	87.87	S&ME
**	6/15/2005	94.16	5.64	88.52	S&ME
**	12/19/2005	94.16	5.89	88.27	S&ME
**	7/20/2006	94.16	5.91	88.25	S&ME
**	1/24/2007	94.16	5.82	88.34	S&ME
	10/3/2007	94.16	6.22	87.94	S&ME
**	7/24/2008	94.19	5.61	88.58	S&ME
**	1/8/2009	94.19	5.27	88.92	S&ME

** = MW-13A

TABLE 1
GROUNDWATER ELEVATION DATA SUMMARY
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Well Location	Date	Top of Casing Elevation (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet)	Data Collected By
MW-14	8/16/2000	93.02	4.59	88.43	S&ME
	3/28/2001	93.02	4.49	88.53	S&ME
	10/22/2001	93.02	5.60	87.42	S&ME
	4/24/2002	93.02	5.00	88.02	S&ME
	10/22/2002	93.02	4.93	88.09	S&ME
	5/20/2003	93.02	4.61	88.41	S&ME
	12/11/2003	93.02	4.86	88.16	S&ME
	5/25/2004	93.02	4.79	88.23	S&ME
	12/15/2004	93.02	4.88	88.14	S&ME
	6/15/2005	93.02	4.55	88.47	S&ME
	12/19/2005	93.02	5.65	87.37	S&ME
	7/20/2006	93.02	well not found	no data	S&ME
	1/24/2007	93.02	4.42	88.60	S&ME
	10/3/2007	92.94	4.79	88.15	S&ME
	7/24/2008	93.02	4.69	88.33	S&ME
	1/8/2009	93.02	4.61	88.41	S&ME
MW-15	8/16/2000	92.74	6.04	86.70	S&ME
	3/28/2001	92.74	6.14	86.60	S&ME
	10/22/2001	92.74	6.66	86.08	S&ME
	4/24/2002	92.74	6.35	86.39	S&ME
	10/22/2002	92.74	6.36	86.38	S&ME
	5/20/2003	92.74	5.69	87.05	S&ME
	12/11/2003	92.74	5.99	86.75	S&ME
	5/25/2004	92.74	5.93	86.81	S&ME
	12/15/2004	92.74	5.91	86.83	S&ME
	6/15/2005	92.74	5.43	87.31	S&ME
	12/19/2005	92.74	5.72	87.02	S&ME
	7/21/2006	92.74	5.71	87.03	S&ME
	1/24/2007	92.74	5.38	87.36	S&ME
	10/3/2007	92.74	6.30	86.44	S&ME
	7/24/2008	92.95	6.15	86.80	S&ME
	1/8/2009	92.95	5.63	87.32	S&ME

1) Groundwater depths measured from the top of the PVC well casings
2) Elevations are referenced to an assumed site datum (southeast corner of th Pre-Dryer Building = 100.00 feet)

TABLE 1
GROUNDWATER ELEVATION DATA SUMMARY
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Well Location	Date	Top of Casing Elevation (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet)	Data Collected By
MW-16	8/16/2000	94.76	5.37	89.39	S&ME
	3/28/2001	94.76	5.27	89.49	S&ME
	10/22/2001	94.76	6.25	88.51	S&ME
	4/24/2002	94.76	5.87	88.89	S&ME
	10/22/2002	94.76	5.86	88.90	S&ME
	5/20/2003	94.76	5.18	89.58	S&ME
	12/11/2003	94.76	5.41	89.35	S&ME
	5/25/2004	94.76	5.30	89.46	S&ME
	12/15/2004	94.76	5.24	89.52	S&ME
	6/15/2005	94.76	4.92	89.84	S&ME
	12/19/2005	94.76	5.30	89.46	S&ME
	7/20/2006	94.76	5.14	89.62	S&ME
	1/24/2007	94.76	5.03	89.73	S&ME
	10/3/2007	94.76	5.62	89.14	S&ME
	7/24/2008	94.74	5.43	89.31	S&ME
	1/8/2009	94.74	4.51	90.23	S&ME
MW-17	3/28/2007	94.66	6.49	88.17	S&ME
	10/3/2007	94.66	8.00	86.66	S&ME
	7/24/2008	94.70	7.71	86.99	S&ME
	1/8/2009	94.70	5.92	88.78	S&ME
MW-18A	1/8/2009	90.77	4.71	86.06	S&ME
MW-18B	1/8/2009	90.97	3.17	87.80	S&ME
MW-2	1/8/2009	99.89	8.26	91.63	S&ME

1) Groundwater depths measured from the top of the PVC well casings
2) Elevations are referenced to an assumed site datum (southeast corner of the concrete slab at the Pre-Dryer Building = 100.00 feet)

TABLE 2
MONITORING WELL GROUNDWATER ANALYTICAL DATA SUMMARY
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Sample Location	Date Collected	Target Compounds					Tentatively Identified Compounds		
		Pentachloro-phenol	bis-2-ethylhexyl phthalate	2,4-dichloro-phenol	2,4,6-Trichloro-phenol**	2,4,5-trichloro-phenol	1,2,3,4-tetrachloro-phenol	3,4,5-trichloro-phenol	styrene
MW-1	1/6/1993	nd	29	nd	nd	nd	nt	nt	nt
	2/10/1993	nd	nd	nd	nd	nd	nt	nt	nt
	10/18/1993	nd	nd	nd	nd	nd	nt	nt	nt
	1/5/1999	nd	nt	nd	nd	nd	nt	nt	nt
	8/16/2000	nd	nt	nd	nd	nd	nt	nt	nt
	3/28/2001	nd	nt	nd	nd	nd	nt	nt	nt
	10/22/2001	nd	nt	nd	nd	nd	nt	nt	nt
	4/24/2002	nd	nt	nd	nd	nd	nt	nt	nt
	10/22/2002	nd	nt	nd	nd	nd	nt	nt	nt
	5/20/2003	nd	nt	nd	nd	nd	nt	nt	nt
	12/11/2003	nd	nt	nd	nd	nd	nt	nt	nt
	5/25/2004	nd	nt	nd	nd	nd	nt	nt	nt
	12/14/2004	nd	nt	nd	nd	nd	nt	nt	nt
	6/15/2005	nd	nt	nd	nd	nd	nt	nt	nt
	12/19/2005	nd	nt	nd	nd	nt	nd	nd	nd
	7/21/2006	nd	nt	nd	nd	nd	nt	nt	nt
	1/24/2007	nd	nt	nd	nd	nd	nt	nt	nt
	10/3/2007	nd	nt	nd	nd	nd	nt	nt	nt
	7/24/2008	nd	nt	nd	nd	nd	nt	nt	nt
	1/8/2009	nd	nt	nd	nd	nd	nt	nt	nt
CORRESPONDING MCL'S		1	NS	NS	NS	NS	NS	NS	NS

all concentrations reported in micrograms per liter (ug/l)

MCL's = Maximum Concentration Limits

nd = not detected, nt = not tested, NS = no standard

*** = Reported pentachlorophenol biodegradation compounds*

TABLE 2
MONITORING WELL GROUNDWATER ANALYTICAL DATA SUMMARY
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Sample Location	Date Collected	Target Compounds					Tentatively Identified Compounds		
		Pentachloro-phenol	bis-2-ethylhexyl phthalate	2,4-dichloro-phenol	2,4,6-Trichloro-phenol**	2,4,5-trichloro-phenol	1,2,3,4-tetrachloro-phenol	3,4,5-trichloro-phenol	styrene
MW-2	1/6/1993	nd	nd	nd	nd	nd	nt	nt	nt
	10/18/1993	nd	nd	nd	nd	nd	nt	nt	nt
	1/8/2009	nd	nd	nd	nd	nd	nt	nt	nt
MW-4	1/6/1993	nd	nd	nd	nd	nd	nt	nt	nt
	10/18/1993	nd	nd	nd	nd	nd	nt	nt	nt
MW-8	1/5/1999	nd	nd	nd	nd	nd	nt	nt	nt
	8/16/2000	**320**	nt	nd	nd	nd	nt	nt	nt
MW-12	10/18/1993	nd	**22**	nd	nd	nd	nt	nt	nt
	7/24/1998	nd	nt	nd	nd	nd	nt	nt	nt
CORRESPONDING MCL'S		1	NS	NS	NS	NS	NS	NS	NS

all concentrations reported in micrograms per liter (ug/l)

MCL's = Maximum Concentration Limits

nd = not detected, nt = not tested, NS = no standard

*** = Reported pentachlorophenol biodegradation compounds*

TABLE 2
MONITORING WELL GROUNDWATER ANALYTICAL DATA SUMMARY
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Sample Location	Date Collected	Target Compounds					Tentatively Identified Compounds		
		Pentachloro-phenol	bis-2-ethylhexyl phthalate	2,4-dichloro-phenol	2,4,6-Trichloro-phenol**	2,4,5-trichloro-phenol	1,2,3,4-tetrachloro-phenol	3,4,5-trichloro-phenol	styrene
MW-3	1/6/1993	4000	nd	13	14	380	nt	nt	nt
	2/10/1993	4300	nd	11	15	290	nt	nt	nt
	10/18/1993	3000	nd	nd	nd	170	nt	nt	nt
	7/24/1998	215	nt	nd	nd	nd	nt	nt	nt
	1/5/1999	271	nt	nd	nd	nd	nt	nt	nt
	4/27/1999	145	nt	nd	nd	nd	nt	nt	nt
	8/16/2000	230	nt	nd	nd	nd	17	15	55
	3/28/2001	128	nt	nd	nd	nd	nt	nt	nt
	10/22/2001	134	nt	nd	nd	nd	nt	nt	nt
	4/24/2002	166	nt	nd	nd	nd	nt	nt	nt
	10/22/2002	201	nt	nd	nd	nd	nt	nt	nt
	5/20/2003	193/"194"	nt	nd	nd	nd	nt	nt	nt
	12/11/2003	295	nt	nd	nd	nd	nt	nt	nt
	5/25/2004	well not found	well not found	well not found	well not found	well not found	nt	nt	nt
MW-3A	12/15/2004	795	nt	nd	nd	nd	well not found	well not found	well not found
MW-3A	6/15/2005	360	nt	nd	nd	nd	nt	nt	nt
MW-3A	12/19/2005	204	nt	nd	nd	nd	nt	nt	nt
MW-3A	8/22/2006	169	nt	nd	nd	nt	nd	nd	nd
MW-3A	1/24/2007	112	nt	nd	nd	nd	nt	nt	nt
MW-3A	10/3/2007	117	nt	nd	nd	nd	nt	nt	nt
MW-3A	7/24/2008	71	nt	nd	nd	nd	nt	nt	nt
MW-3A	1/8/2009	115	nt	nd	nd	nd	nt	nt	nt
CORRESPONDING MCL'S		1	NS	NS	NS	NS	NS	NS	NS

all concentrations reported in micrograms per liter (ug/l)

MCL's = Maximum Concentration Limits

nd = not detected, nt = not tested, NS = no standard

*** = Reported pentachlorophenol biodegradation compounds*

TABLE 2
MONITORING WELL GROUNDWATER ANALYTICAL DATA SUMMARY
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Sample Location	Date Collected	Target Compounds					Tentatively Identified Compounds		
		Pentachloro-phenol	bis-2-ethylhexyl phthalate	2,4-dichloro-phenol	2,4,6-Trichloro-phenol**	2,4,5-trichloro-phenol	1,2,3,4-tetrachloro-phenol	3,4,5-trichloro-phenol	styrene
MW-9	10/18/1993	nd	21	nd	nd	nd	nt	nt	nt
	1/5/1999	nd	nt	nd	nd	nd	nt	nt	nt
	8/16/2000	nd	nt	nd	nd	nd	nt	nt	nt
	3/28/2001	nd	nt	nd	nd	nd	nt	nt	nt
	10/22/2001	nd	nt	nd	nd	nd	nt	nt	nt
	4/24/2002	nd	nt	nd	nd	nd	nt	nt	nt
	10/22/2002	nd	nt	nd	nd	nd	nt	nt	nt
	5/20/2003	nd	nt	nd	nd	nd	nt	nt	nt
	12/11/2003	nd	nt	nd	nd	nd	nt	nt	nt
	5/25/2004	nd	nt	nd	nd	nd	nt	nt	nt
	12/14/2004	nd	nt	nd	nd	nd	nt	nt	nt
	6/15/2005	nd	nt	nd	nd	nd	nt	nt	nt
	12/19/2005	nd	nt	nd	nd	nd	nt	nt	nt
	7/20/2006	nd	nt	nd	nd	nt	nd	nd	nd
	1/24/2007	nd	nt	nd	nd	nd	nt	nt	nt
	10/3/2007	nd	nt	nd	nd	nd	nt	nt	nt
	7/24/2008	nd	nt	nd	nd	nd	nt	nt	nt
	1/8/2009	nd	nt	nd	nd	nd	nt	nt	nt
CORRESPONDING MCL'S		1	NS	NS	NS	NS	NS	NS	NS

all concentrations reported in micrograms per liter (ug/l)
nd = not detected. nt = not tested. NS = no standard
MCL's = Maximum Concentration Limits
** = *Reported pentachlorophenol biodegradation compounds*

TABLE 2
MONITORING WELL GROUNDWATER ANALYTICAL DATA SUMMARY
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Sample Location	Date Collected	Target Compounds					Tentatively Identified Compounds		
		Pentachloro-phenol	bis-2-ethylhexyl phthalate	2,4-dichloro-phenol	2,4,6-Trichloro-phenol**	2,4,5-trichloro-phenol	1,2,3,4-tetrachloro-phenol	3,4,5-trichloro-phenol	styrene
MW-10	10/18/1993	**62**	**18**	nd	nd	nd	nt	nt	nt
	7/24/1998	**76**	nd	nd	nd	nd	nt	nt	nt
	1/5/1999	**58**	nt	nd	nd	nd	nt	nt	nt
	4/27/1999	**35**	nt	nd	nd	nd	nd	nd	nd
	8/16/2000	**53**	nt	nd	nd	nd	nd	nd	nd
	3/28/2001	nd	nt	nd	nd	nd	nd	nd	nd
	10/22/2001	**185**	nt	nd	nd	nd	nt	nt	nt
	4/24/2002	**240 / (220)**	nt	nd	nd	nd	nt	nt	nt
	10/22/2002	**155/ {241}**	nt	nd	nd	nd	nt	nt	nt
	5/20/2003	nd/"nd"	nt	nd	nd	nd	nt	nt	nt
	12/11/2003	**10 J**	nt	nd	nd	nd	nt	nt	nt
	5/25/2004	nd	nt	nd	nd	nd	nt	nt	nt
	12/15/2004	nd	nt	nd	nd	nd	nt	nt	nt
	6/15/2005	**11**	nt	nd	nd	nd	nt	nt	nt
	12/19/2005	**8.4 J**	nt	nd	nd	nt	nd	nd	nd
	7/20/2006	**2 J**	nt	nd	nd	nd	nt	nt	nt
	1/24/2007	**nd**	nt	nd	nd	nd	nt	nt	nt
	10/3/2007	**128**	nt	nd	nd	nd	nt	nt	nt
	7/24/2008	**90**	nt	nd	nd	nd	nt	nt	nt
	1/8/2009	**7 J**	nt	nd	nd	nd	nt	nt	nt
CORRESPONDING MCL'S		1	NS	NS	NS	NS	NS	NS	NS

155/ {241} = The number on the left is the analytical results for the sample collected following normal well purging procedures.
The bracketed number on the right represents the analytical results for the sample collected with no purging prior to sample collection.

557/"576" The value on the left is for pre-acidified samples preparation used site wide. The 2nd value for the split sample result with no pre-acidification.

J = A reported value less than the standard reporting value of 20 micrograms per liter.'

TABLE 2
MONITORING WELL GROUNDWATER ANALYTICAL DATA SUMMARY
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Sample Location	Date Collected	Target Compounds					Tentatively Identified Compounds		
		Pentachloro-phenol	bis-2-ethylhexyl phthalate	2,4-dichloro-phenol	2,4,6-Trichloro-phenol**	2,4,5-trichloro-phenol	1,2,3,4-tetrachloro-phenol	3,4,5-trichloro-phenol	styrene
MW-11	10/18/1993	nd	14	nd	nd	nd	nt	nt	nt
	1/5/1999	nd	nt	nd	nd	nd	nt	nt	nt
	8/16/2000	19	nt	nd	nd	nd	nt	nt	nt
	3/28/2001	nd	nt	nd	nd	nd	nt	nt	nt
	10/22/2001	nd	nt	nd	nd	nd	nt	nt	nt
	4/24/2002	nd	nt	nd	nd	nd	nt	nt	nt
	10/22/2002	nd	nt	nd	nd	nd	nt	nt	nt
	5/20/2003	nd	nt	nd	nd	nd	nt	nt	nt
	12/11/2003	nd	nt	nd	nd	nd	nt	nt	nt
	5/25/2004	nd	nt	nd	nd	nd	nt	nt	nt
	12/15/2004	nd	nt	nd	nd	nd	nt	nt	nt
	6/15/2005	nd	nt	nd	nd	nd	nt	nt	nt
	12/19/2005	nd	nt	nd	nd	nt	nd	nd	nd
	7/20/2006	nd	nt	nd	nd	nd	nt	nt	nt
	1/24/2007	nd	nt	nd	nd	nd	nt	nt	nt
	10/4/2007	nd	nt	nd	nd	nd	nt	nt	nt
	7/24/2008	nd	nt	nd	nd	nd	nt	nt	nt
	1/8/2009	nd	nt	nd	nd	nd	nt	nt	nt
CORRESPONDING MCL'S		1	NS	NS	NS	NS	NS	NS	NS

all concentrations reported in micrograms per liter (ug/l) *MCL's = Maximum Concentration Limits*

nd = not detected, nt = not tested, NS = no standard

*** = Reported pentachlorophenol biodegradation compounds*

TABLE 2
MONITORING WELL GROUNDWATER ANALYTICAL DATA SUMMARY
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Sample Location	Date Collected	Target Compounds					Tentatively Identified Compounds		
		Pentachloro-phenol	bis-2-ethylhexyl phthalate	2,4-dichloro-phenol	2,4,6-Trichloro-phenol**	2,4,5-trichloro-phenol	1,2,3,4-tetrachloro-phenol	3,4,5-trichloro-phenol	styrene
MW-13	8/16/2000	nd	nt	nd	nd	nd	nt	nt	nt
	3/28/2001	nd	nt	nd	nd	nd	nt	nt	nt
	10/22/2001	nd	nt	nd	nd	nd	nt	nt	nt
	4/24/2002	nd	nt	nd	nd	nd	nt	nt	nt
	10/22/2002	nd	nt	nd	nd	nd	nt	nt	nt
	5/20/2003	nd	nt	nd	nd	nd	nt	nt	nt
	12/11/2003	nd	nt	nd	nd	nd	nt	nt	nt
MW-13A	12/15/2004	nd	nt	nd	nd	nd	nt	nt	nt
MW-13A	6/15/2005	nd	nt	nd	nd	nd	nt	nt	nt
MW-13A	12/19/2005	nd	nt	nd	nd	nt	nd	nd	nd
MW-13A	7/20/2006	nd	nt	nd	nd	nd	nt	nt	nt
MW-13A	1/24/2007	nd	nt	nd	nd	nd	nt	nt	nt
MW-13A	10/3/2007	nd	nt	nd	nd	nd	nt	nt	nt
MW-13A	7/24/2008	nd	nt	nd	nd	nd	nt	nt	nt
MW-13A	1/8/2009	nd	nt	nd	nd	nd	nt	nt	nt
CORRESPONDING MCL'S		1	NS	NS	NS	NS	NS	NS	NS

all concentrations reported in micrograms per liter (ug/l)

MCL's = Maximum Concentration Limits

nd = not detected, nt = not tested, NS = no standard

*** = Reported pentachlorophenol biodegradation compounds*

TABLE 2
MONITORING WELL GROUNDWATER ANALYTICAL DATA SUMMARY
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Sample Location	Date Collected	Target Compounds					Tentatively Identified Compounds		
		Pentachloro-phenol	Phenol	2,4-dichloro-phenol	2,4,6-Trichloro-phenol**	2,4,5-trichloro-phenol	1,2,3,4-tetrachloro-phenol	3,4,5-trichloro-phenol	styrene
MW-14	8/16/2000	**1100**	nd	nd	nd	**15**	nt	nt	nt
	3/28/2001	**734**	nd	nd	nd	nd	nt	nt	nt
	10/22/2001	**2020**	nd	nd	nd	nd	nt	nt	nt
	4/24/2002	**595 / (950)**	nd	nd	nd	nd	nt	nt	nt
	10/22/2002	**741/ {908}**	nd	nd	nd	nd	nt	nt	nt
	5/20/2003	**557/"576"**	nd	nd	nd	nd	nt	nt	nt
	12/11/2003	**650**	nd	nd	nd	nd	nt	nt	nt
	5/25/2004	**590**	nd	nd	nd	nd	nt	nt	nt
	12/15/2004	**625**	nd	nd	nd	nd	nt	nt	nt
	6/15/2005	**482**	nd	nd	nd	nd	nt	nt	nt
	12/19/2005	**411**	nd	nd	nd	nt	nd	13	nd
	7/20/2006	well not found	well not found	well not found	well not found	well not found	well not found	well not found	well not found
	1/24/2007	**584**	nd	nd	nd	nd	nt	nt	nt
	10/4/2007	**42**	**92**	nd	**11**	nd	nt	nt	nt
	7/24/2008	**264**		nd		nd	nt	nt	nt
	1/8/2009	**142**		nd		nd	nt	nt	nt
MW-14*	3/28/2001	**479**	nt	nd	**11**	nd	nt	nt	nt
	10/22/2001	**994**	nt	nd	**11**	nd	nt	nt	nt
	4/24/2002	**737**	nt	nd	no data	nd	nt	nt	nt
CORRESPONDING MCL'S		1	NS	NS	NS	NS	NS	NS	NS

595 / (950) Sample analytical result on left. Analytical result for split sample on the right in parenthesis

741/ {908} = The number on the left is the analytical results for the sample collected following normal well purging procedure: The bracketed number on the right represents the analytical results for the sample collected with no purging prior to sample collection.

557/"576" The value on the left is for pre-acidified samples preparation used site wide. The 2nd value for the split sample result with no pre-acidification.

* = *"MW-14 shallow" sample Sample collected to compare with "MW-14 deep" = sample collected with a pump off the bottom of the well.*

All groundwater samples collected since 8/16/00 were collected with a peristaltic pump, at the low flow rate, and pumping off the bottom of each well.

TABLE 2
MONITORING WELL GROUNDWATER ANALYTICAL DATA SUMMARY
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Sample Location	Date Collected	Target Compounds					Tentatively Identified Compounds		
		Pentachloro-phenol	bis-2-ethylhexyl phthalate	2,4-dichloro-phenol	2,4,6-Trichloro-phenol**	2,4,5-trichloro-phenol	1,2,3,4-tetrachloro-phenol	3,4,5-trichloro-phenol	styrene
MW-15	8/16/2000	nd	nt	nd	nd	nd	nt	nt	nt
	3/28/2001	nd	nt	nd	nd	nd	nt	nt	nt
	10/22/2001	nd	nt	nd	nd	nd	nt	nt	nt
	4/24/2002	nd	nt	nd	nd	nd	nt	nt	nt
	10/22/2002	nd	nt	nd	nd	nd	nt	nt	nt
	5/20/2003	551	nt	nd	nd	nd	nt	nt	nt
	6/16/2003	nd	nt	nd	nd	nd	nt	nt	nt
	12/11/2003	nd	nt	nd	nd	nd	nt	nt	nt
	5/25/2004	nd	nt	nd	nd	nd	nt	nt	nt
	12/14/2004	nd	nt	nd	nd	nd	nt	nt	nt
	6/15/2005	nd	nt	nd	nd	nd	nt	nt	nt
	12/19/2005	nd	nt	nd	nd	nt	nd	nd	nd
	7/21/2006	nd	nt	nd	nd	nd	nt	nt	nt
	1/24/2007	nd	nt	nd	nd	nd	nt	nt	nt
	10/4/2007	nd	nt	nd	nd	nd	nt	nt	nt
	7/24/2008	nd	nt	nd	nd	nd	nt	nt	nt
	1/8/2009	nd	nt	nd	nd	nd	nt	nt	nt
CORRESPONDING MCL'S		1	NS	NS	NS	NS	NS	NS	NS

all concentrations reported in micrograms per liter (ug/l) *MCL's = Maximum Concentration Limits*

nd = not detected, nt = not tested, NS = no standard

*** = Reported pentachlorophenol biodegradation compounds*

TABLE 2
MONITORING WELL GROUNDWATER ANALYTICAL DATA SUMMARY
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Sample Location	Date Collected	Target Compounds					Tentatively Identified Compounds		
		Pentachloro-phenol	bis-2-ethylhexyl phthalate	2,4-dichloro-phenol	2,4,6-Trichloro-phenol**	2,4,5-trichloro-phenol	1,2,3,4-tetrachloro-phenol	3,4,5-trichloro-phenol	styrene
MW-16	8/16/2000	**16**	nt	nd	nd	nd	nt	nt	nt
	3/28/2001	**27**	nt	nd	nd	nd	nt	nt	nt
	10/22/2001	**56**	nt	nd	nd	nd	nt	nt	nt
	4/24/2002	**38**	nt	nd	nd	nd	nt	nt	nt
	10/22/2002	nd/{nd}	nt	nd	nd	nd	nt	nt	nt
	5/20/2003	nd	nt	nd	nd	nd	nt	nt	nt
	12/11/2003	nd	nt	nd	nd	nd	nt	nt	nt
	5/25/2004	nd	nt	nd	nd	nd	nt	nt	nt
	12/14/2004	nd	nt	nd	nd	nd	nt	nt	nt
	6/15/2005	nd	nt	nd	nd	nd	nt	nt	nt
	12/19/2005	nd	nt	nd	nd	nt	nd	nd	nd
	7/20/2006	**1.9 J**	nt	nd	nd	nd	nt	nt	nt
	1/24/2007	nd	nt	nd	nd	nd	nt	nt	nt
	10/4/2007	**2 J**	nt	nd	nd	nd	nt	nt	nt
	7/24/2008	nd	nt	nd	nd	nd	nt	nt	nt
	1/8/2009	**3 J**	nt	nd	nd	nd	nt	nt	nt
CORRESPONDING MCL'S		1	NS	NS	NS	NS	NS	NS	NS

all concentrations reported in micrograms per liter (ug/l) *MCL's = Maximum Concentration Limits*

nd = not detected, nt = not tested, NS = no standard

*** = Reported pentachlorophenol biodegradation compounds*

TABLE 2
MONITORING WELL GROUNDWATER ANALYTICAL DATA SUMMARY
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Sample Location	Date Collected	Target Compounds					Tentatively Identified Compounds		
		Pentachloro-phenol	bis-2-ethylhexyl phthalate	2,4-dichloro-phenol	2,4,6-Trichloro-phenol**	2,4,5-trichloro-phenol	1,2,3,4-tetrachloro-phenol	3,4,5-trichloro-phenol	styrene
MW-17	3/28/2007	nd	nt	nd	nd	nd	nt	nt	nt
	10/3/2007	nd	nt	nd	nd	nd	nt	nt	nt
	7/24/2008	nd	nt	nd	nd	nd	nt	nt	nt
	1/8/2009	nd	nt	nd	nd	nd	nt	nt	nt
MW-18A	1/8/2009	nd	nt	nd	nd	nd	nt	nt	nt
MW-18B	1/8/2009	nd	nt	nd	nd	nd	nt	nt	nt
CORRESPONDING MCL'S		1	NS	NS	NS	NS	NS	NS	NS

all concentrations reported in micrograms per liter (ug/l)
nd = not detected, nt = not tested, NS = no standard
*** = Reported pentachlorophenol biodegradation compounds*

MCL's = Maximum Concentration Limits

TABLE 3
NATURAL ATTENUATION INDICATOR SUMMARY
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Sample Location	Date Collected	Parameters					
		Pentachloro-phenol	Chloride	Nitrate	Sulfate	Iron Ferrous	D.O.
MW-1	8/16/2000	nd	no data	nd	nd	16	0.45
	3/26/2001	nd	no data	nd	7.1	nd	0.73
	10/22/2001	nd	no data	nd	7.02	2.59	no data
	4/24/2002	nd	no data	nd	12	nd	0.54
	10/22/2002	nd	no data	nd	9.57	nd	no data
	5/20/2003	nd	no data	nd	7.09	1.37	no data
	12/11/2003	nd	no data	nd	5.94	0.184	no data
	5/25/2004	nd	no data	0.152	6.32	nd	no data
	12/14/2004	nd	no data	nd	6.15	nd	no data
	6/15/2005	nd	no data	nd	nd	nd	0.08
	12/19/2005	nd	no data	nd	20.4	0.425	5.24
	7/21/2006	nd	no data	0.279	12	0.181	0.69
	1/24/2007	nd	no data	0.092	8.00	0.513	0.77
	10/3/2007	nd	no data	nd	8.50	nd	6.33
	7/24/2008	nd	4.50	0.100	13.4	0.271	0.08

all concentrations reported in milligrams per liter (mg/l)
nd = not detected

TABLE 3
NATURAL ATTENUATION INDICATOR SUMMARY
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Sample Location	Date Collected	Parameters					
		Pentachloro-phenol	Chloride	Nitrate	Sulfate	Iron Ferrous	D.O.
MW-3	8/16/2000	0.230	no data	nd	22	26	0.47
	3/26/2001	0.128	no data	nd	42.9	19.2	0.98
	10/22/2001	0.134	no data	nd	47.5	41	no data
	4/24/2002	0.166	no data	nd	46.8	13.9	0.9
	10/22/2002	0.201	no data	nd	38.8	3.09	no data
	5/20/2003	0.193	no data	0.056	37	44.7	no data
	12/11/2003	0.295	no data	nd	32.3	16.1	no data
	5/25/2004	*well damaged*					
	12/15/2004	0.795	no data	nd	59.5	0.485	no data
	6/15/2005	0.360	no data	nd	51	2.60	0.08
	12/19/2005	0.204	no data	nd	59.2	2.90	0.42
	8/22/2006	0.169	no data	nd	71.7	4.19	0.11
	1/24/2007	0.112	no data	nd	78.7	0.553	0.3
	10/3/2007	0.117	no data	nd	64.5	5.180	5.23
	7/24/2008	0.071	19.0	0.158	65.7	2.460	0.06

all concentrations reported in milligrams per liter (mg/l)
nd = not detected

TABLE 3
NATURAL ATTENUATION INDICATOR SUMMARY
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Sample Location	Date Collected	Parameters					
		Pentachloro-phenol	Chloride	Nitrate	Sulfate	Iron Ferrous	D.O.
MW-9	8/16/2000	nd	no data	nd	7.1	11	0.33
	3/26/2001	nd	no data	0.722	13	0.614	0.90
	10/22/2001	nd	no data	11.9	12.8	13.3	no data
	4/24/2002	nd	no data	nd	12.8	0.236	0.71
	11/22/2002	nd	no data	0.24	14.5	nd	no data
	5/20/2003	nd	no data	0.789	11.9	8.05	no data
	12/11/2003	nd	no data	0.443	13.7	5.93	no data
	5/25/2004	nd	no data	0.17	16.1	0.996	no data
	12/14/2004	nd	no data	0.216	16.0	0.100	no data
	6/15/2005	nd	no data	nd	13.0	3.150	0.10
	12/19/2005	nd	no data	nd	22.2	6.30	2.88
	7/20/2006	nd	no data	nd	18.5	0.437	0.29
	1/24/2007	nd	no data	0.075	16.1	11.8	0.20
	10/3/2007	nd	no data	0.130	16.3	nd	3.99
	7/24/2008	nd	5.50	nd	nd	3.16	0.11

all concentrations reported in milligrams per liter (mg/l)
nd = not detected

TABLE 3
NATURAL ATTENUATION INDICATOR SUMMARY
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Sample Location	Date Collected	Parameters					
		Pentachloro-phenol	Chloride	Nitrate	Sulfate	Iron Ferrous	D.O.
MW-10	8/16/2000	0.053	no data	nd	8.8	3.5	0.39
	3/26/2001	nd	no data	nd	14.9	nd	no data
	10/22/2001	0.185	no data	0.06	7.24	1.26	no data
	4/24/2002	0.240	no data	nd	10.7	1.29	0.56
	10/22/2002	0.155	no data	nd	22.7	nd	no data
	5/20/2003	nd	no data	0.06	20.4	0.53	no data
	12/11/2003	0.010	no data	0.08	30.9	0.234	no data
	5/25/2004	nd	no data	nd	23.8	0.143	no data
	12/15/2004	nd	no data	nd	26.0	nd	no data
	6/15/2005	0.011	no data	nd	17.7	nd	0.07
	12/19/2005	0.0084	no data	nd	21.6	0.349	0.46
	7/20/2006	0.002 J	no data	nd	27.6	0.173	0.17
	1/24/2007	nd	no data	nd	37.3	0.317	0.19
	10/3/2007	0.128	no data	nd	16.2	0.105	4.65
	7/24/2008	0.090	21.0	nd	10.9	1.00	0.07

all concentrations reported in milligrams per liter (mg/l)
nd = not detected

TABLE 3
NATURAL ATTENUATION INDICATOR SUMMARY
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Sample Location	Date Collected	Parameters					
		Pentachloro-phenol	Chloride	Nitrate	Sulfate	Iron Ferrous	D.O.
MW-11	8/16/2000	0.019	no data	nd	15	0.66	3.21
	3/26/2001	nd	no data	0.176	22	nd	1.45
	10/22/2001	nd	no data	nd	20.4	0.466	no data
	4/24/2002	nd	no data	nd	23.7	nd	0.74
	10/22/2002	nd	no data	nd	26.6	nd	no data
	5/20/2003	nd	no data	0.165	0.366	20.5	no data
	12/11/2003	nd	no data	0.124	26.8	0.427	no data
	5/25/2004	nd	no data	1.36	20.9	nd	no data
	12/15/2004	nd	no data	nd	19.5	nd	no data
	6/15/2005	nd	no data	nd	9.15	nd	0.024
	12/19/2005	nd	no data	nd	22.0	nd	1.8
	7/20/2006	nd	no data	0.187	18.9	0.132	0.42
	1/24/2007	nd	no data	0.148	25.1	nd	1.27
	10/3/2007	nd	no data	nd	24.8	nd	5.46
	7/24/2008	nd	7.500	nd	18.3	nd	0.11

all concentrations reported in milligrams per liter (mg/l)
nd = not detected

TABLE 3
NATURAL ATTENUATION INDICATOR SUMMARY
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Sample Location	Date Collected	Parameters					
		Pentachloro-phenol	Chloride	Nitrate	Sulfate	Iron Ferrous	D.O.
MW-13	8/16/2000	nd	no data	nd	11	0.22	6.96
	3/26/2001	nd	no data	nd	42.6	nd	0.80
	10/22/2001	nd	no data	nd	14.5	0.155	no data
	4/24/2002	nd	no data	nd	41	nd	1.19
	10/22/2002	nd	no data	nd	43.8	nd	no data
	5/20/2003	nd	no data	0.054	43.7	0.314	no data
	12/11/2003	nd	no data	nd	52.5	0.219	no data
	5/25/2004	*well damaged*					
	12/15/2004	nd	no data	nd	72.5	nd	no data
	6/15/2005	nd	no data	nd	77	nd	0.11
	12/19/2005	nd	no data	nd	92.5	0.422	0.09
	7/20/2006	nd	no data	nd	102	0.611	0.13
	1/24/2007	nd	no data	nd	90.5	0.584	0.17
	10/3/2007	nd	no data	nd	109.0	nd	4.46
	7/24/2008	nd	27.0	nd	18.6	nd	0.06

all concentrations reported in milligrams per liter (mg/l)
nd = not detected

TABLE 3
NATURAL ATTENUATION INDICATOR SUMMARY
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Sample Location	Date Collected	Parameters					
		Pentachloro-phenol	Chloride	Nitrate	Sulfate	Iron Ferrous	D.O.
MW-14	8/16/2000	1.100	no data	nd	nd	1.2	2.98
	3/26/2001	0.734	no data	nd	6.19	0.679	0.57
	3/26/2001	2.020	no data	nd	5.30	0.345	no data
	4/24/2002	0.737	no data	nd	5.62	nd	0.49
	10/22/2002	0.741	no data	nd	10.10	0.128	no data
	5/20/2003	0.557	no data	nd	8.02	0.497	no data
	12/11/2003	0.650	no data	0.09	7.51	1.00	no data
	5/25/2004	0.590	no data	nd	5.91	1.57	no data
	12/15/2004	nd	no data	nd	5.60	2.05	no data
	6/15/2005	0.482	no data	nd	5.15	0.266	0.09
	12/19/2005	0.411	no data	nd	21.0	1.06	4.54
	7/20/2006	well not found	no data	well not found	well not found	well not found	well not found
	1/24/2007	0.584	no data	nd	26.0	1.09	0.230
	10/3/2007	0.042	no data	0.062	ND	13.7	6.54
	7/24/2008	0.264	15.0	nd	nd	12.7	0.06

all concentrations reported in milligrams per liter (mg/l)
nd = not detected

TABLE 3
NATURAL ATTENUATION INDICATOR SUMMARY
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Sample Location	Date Collected	Parameters					
		Pentachloro-phenol	Chloride	Nitrate	Sulfate	Iron Ferrous	D.O.
MW-15	8/16/2000	nd	no data	nd	nd	21	4.48
	3/26/2001	nd	no data	nd	nd	1.69	1.32
	10/22/2001	nd	no data	0.31	nd	13.5	no data
	4/24/2002	nd	no data	nd	23.1	0.166	1.26
	10/22/2002	nd	no data	nd	nd	0.139	no data
	5/20/2003	0.551	no data	nd	5.58	20	no data
	6/16/2003	nd	no data	no data	no data	no data	no data
	12/11/2003	nd	no data	nd	6.9	25.4	no data
	5/25/2004	nd	no data	nd	22.4	14.2	no data
	12/14/2004	nd	no data	nd	12.8	0.639	no data
	6/15/2005	nd	no data	nd	nd	8.48	0.10
	12/19/2005	nd	no data	nd	5.52	18.9	0.41
	7/21/2006	nd	no data	nd	nd	17.8	1.01
	1/24/2007	nd	no data	nd	5.58	22.2	0.34
	10/3/2007	nd	no data	nd	7.0	8.29	4.69
	7/24/2008	nd	7.00	nd	nd	12.0	0.10

all concentrations reported in milligrams per liter (mg/l)
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TABLE 3
NATURAL ATTENUATION INDICATOR SUMMARY
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Sample Location	Date Collected	Parameters					
		Pentachloro-phenol	Chloride	Nitrate	Sulfate	Iron Ferrous	D.O.
MW-16	8/16/2000	0.016	no data	nd	8.4	1.4	6.42
	3/26/2001	0.027	no data	0.311	18.7	2.48	0.79
	10/22/2001	0.056	no data	nd	15.1	2.62	no data
	4/24/2002	0.038	no data	nd	15	3.33	0.70
	10/22/2002	nd	no data	nd	nd	0.396	nd
	5/20/2003	nd	no data	nd	16.9	12.7	no data
	12/11/2003	nd	no data	nd	19	15.1	no data
	5/25/2004	nd	no data	nd	22.4	3.28	no data
	12/14/2004	nd	no data	nd	14.5	0.151	no data
	6/15/2005	nd	no data	nd	15	0.448	0.10
	12/19/2005	nd	no data	nd	21.0	5.98	0.80
	7/20/2006	nd	no data	nd	18.1	9.11	0.33
	1/24/2007	nd	no data	nd	23.1	6.49	0.40
	10/3/2007	0.002J	no data	nd	23.4	9.1	4.29
	7/24/2008	nd	44.0	nd	24.1	9.78	0.06

all concentrations reported in milligrams per liter (mg/l)
nd = not detected

TABLE 3
NATURAL ATTENUATION INDICATOR SUMMARY
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Sample Location	Date Collected	Parameters					
		Pentachloro-phenol	Chloride	Nitrate	Sulfate	Iron Ferrous	D.O.
MW-17	3/28/2007	nd	no data	no data	no data	no data	no data
	1/24/2007	nd	no data	1.26	7.5	nd	6.35
	7/24/2008	nd	11.0	2.11	nd	nd	0.32

all concentrations reported in milligrams per liter (mg/l)
nd = not detected

TABLE 4
MONITORING WELL FIELD DATA
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Well Location	Total Well Depth (feet)	T.O.C. Elevation (feet)	DTGW (feet)	Groundwater Elevation (feet)	*Dissolved Oxygen (mg/l)	Conductivity	ORP	Groundwater Temperature (Celsius)
MW-1								
1/5/1999	15.2	100.39	7.80	92.59	no data	no data	NM	no data
4/27/1999	15.2	100.39	8.10	92.29	0.31	no data	NM	17.5
8/16/2000	15.2	100.39	7.66	92.73	0.45	0.877	NM	22.4
3/28/2001	15.2	100.39	7.76	92.63	0.73	1.380	NM	no data
10/22/2001	15.2	100.39	10.05	90.34	no data	1.042	NM	22.8
4/24/2002	15.2	100.39	8.83	91.56	0.54	0.970	NM	19.2
10/22/2002	15.2	100.39	8.32	92.07	no data	1.099	NM	21.2
5/20/2003	15.2	100.39	7.42	92.97	no data	0.810	NM	21.1
12/11/2003	15.2	100.39	7.59	92.80	no data	1.029	NM	19.2
5/25/2004	15.2	100.39	8.18	92.21	no data	1.036	NM	20.3
12/14/2004	15.2	100.39	7.44	92.95	no data	0.984	NM	16.7
6/15/2005	15.2	100.39	7.08	93.31	0.08	1.183	NM	19.8
12/19/2005	15.2	100.39	6.98	93.41	5.24	1.179	NM	18.3
7/21/2006	15.2	100.39	7.84	92.55	0.69	1.05	NM	21.2
1/24/2007	15.2	100.39	7.69	92.70	0.77	1.272	NM	17.4
10/3/2007	15.2	100.39	9.41	90.98	6.33	0.103	NM	22.8
7/24/2008	15.2	100.39	8.64	91.75	0.08	1.290	NM	22.6
1/8/2009	15.2	100.39	7.75	92.64	0.05	1.314	-141.100	18.1
MW-3								
1/5/1999	15.0	99.13	8.78	90.35	no data	no data	NM	no data
4/27/1999	15.0	99.13	8.89	90.24	0.26	no data	NM	17.7
8/16/2000	15.0	99.13	8.14	90.99	0.47	0.845	NM	21.8
3/28/2001	15.0	99.13	8.04	91.09	0.98	1.000	NM	no data
10/22/2001	15.0	99.13	9.43	89.7	no data	0.810	NM	22.3
4/24/2002	15.0	99.13	8.86	90.27	0.9	0.817	NM	20.4
11/22/2002	15.0	99.13	8.61	90.52	no data	0.870	NM	22.1
5/20/2003	15.0	99.13	8.03	91.1	no data	0.630	NM	21.2
12/11/2003	15.0	99.13	8.3	90.83	no data	0.475	NM	19.8
5/25/2004	15.0	99.13	no data	no data	no data	no data	NM	no data
12/15/2004	15.0	99.13	8.26	90.87	no data	0.268	NM	15.8
6/15/2005	15.0	99.13	7.81	91.32	0.08	0.285	NM	19.8
12/19/2005	15.0	99.13	8.08	91.05	0.42	0.285	NM	19.3
8/22/2006	15.0	99.13	8.14	90.99	0.11	0.29	NM	22.54
1/24/2007	15.0	99.13	7.68	91.45	0.3	0.318	NM	18.12
10/3/2007	15.0	99.13	9.05	90.08	5.23	28.2	NM	22.90
7/24/2008	15.0	99.11	8.74	90.37	0.06	0.323	NM	23.44
1/8/2009	15.0	99.11	8.26	90.85	0.10	0.249	128.7	18.54

TABLE 4
MONITORING WELL FIELD DATA
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Well Location	Total Well Depth (feet)	T.O.C. Elevation (feet)	DTGW (feet)	Groundwater Elevation (feet)	*Dissolved Oxygen (mg/l)	Conductivity	ORP	Groundwater Temperature (Celsius)
MW-9								
1/5/1999	18.0	97.97	8.11	89.86	no data	no data	NM	no data
4/27/1999	18.0	97.97	8.23	89.74	0.32	no data	NM	18.6
8/16/2000	18.0	97.97	7.42	90.55	0.33	0.695	NM	24.1
3/28/2001	18.0	97.97	7.32	90.65	0.90	1.133	NM	no data
10/22/2001	18.0	97.97	8.62	89.35	no	0.999	NM	24.0
4/24/2002	18.0	97.97	8.22	89.75	0.71	0.980	NM	19.9
10/22/2002	18.0	97.97	8.03	89.94	no data	1.000	NM	23.2
5/20/2003	18.0	97.97	7	90.97	no data	0.810	NM	21.2
12/11/2003	18.0	97.97	7.87	90.1	no data	0.773	NM	20.2
5/25/2004	18.0	97.97	7.84	90.13	no data	1.140	NM	21.0
12/14/2004	18.0	97.97	7.65	90.32	no data	0.756	NM	18.6
6/15/2005	18.0	97.97	7.79	90.18	0.10	0.902	NM	20.7
12/19/2005	18.0	97.97	8.04	89.93	2.88	0.736	NM	20.4
7/20/2006	18.0	97.97	7.98	89.99	0.29	0.656	NM	23.4
1/24/2007	18.0	97.97	7.81	90.16	0.20	0.856	NM	18.6
10/3/2007	18.0	97.97	8.54	89.43	3.99	74.8	NM	25.0
7/24/2008	18.0	98.51	8.41	90.1	0.11	0.834	NM	24.0
1/8/2009	18.0	98.51	8.11	90.4	0.20	0.803	-29.3	19.4
MW-10								
1/5/1999	15.5	93.42	4.19	89.23	no data	no data	NM	no data
4/27/1999	15.5	93.42	4.25	89.17	0.25	nd	NM	17.6
8/16/2000	15.5	93.42	4.59	88.83	0.39	0.588	NM	21.9
3/28/2001	15.5	93.42	4.51	88.91	no data	0.790	NM	no data
10/22/2001	15.5	93.42	6.72	86.70	no data	0.561	NM	23.2
4/24/2002	15.5	93.42	5.64	87.78	0.56	0.680	NM	19.2
10/22/2002	15.5	93.42	5.25	88.17	no data	0.662	NM	21.1
5/20/2003	15.5	93.42	4.25	89.17	no data	0.640	NM	19.7
12/11/2003	15.5	93.42	4.26	89.16	no data	0.659	NM	20.1
5/25/2004	15.5	93.42	4.92	88.50	no data	0.640	NM	19.2
12/15/2004	15.5	93.42	4.06	89.36	no data	0.599	NM	16.5
6/15/2005	15.5	93.42	3.80	89.62	0.07	0.686	NM	18.5
12/19/2005	15.5	93.42	3.64	89.78	0.46	0.589	NM	19.6
7/20/2006	15.5	93.42	4.74	88.68	0.17	0.658	NM	22.2
1/24/2007	15.5	93.42	3.09	90.33	0.19	0.627	NM	18.3
10/3/2007	15.5	93.42	5.08	88.34	4.65	50.3	NM	24.3
7/24/2008	15.5	93.93	5.48	88.45	0.07	0.645	NM	23.9
1/8/2009	15.5	93.93	3.99	89.94	0.20	0.653	-57.600	19.5

TABLE 4
MONITORING WELL FIELD DATA
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Well Location	Total Well Depth (feet)	T.O.C. Elevation (feet)	DTGW (feet)	Groundwater Elevation (feet)	*Dissolved Oxygen (mg/l)	Conductivity	ORP	Groundwater Temperature (Celsius)
MW-11								
1/5/1999	15.5	97.45	7.58	89.87	no data	no data	NM	no data
4/27/1999	15.5	97.45	7.67	89.78	0.33	no data	NM	18.8
8/16/2000	15.5	97.45	7.04	90.41	3.21	1.650	NM	23.4
3/28/2001	15.5	97.45	7.14	90.31	1.45	1.800	NM	nd
10/22/2001	15.5	97.45	8.26	89.19	no data	1.950	NM	22.9
4/24/2002	15.5	97.45	7.74	89.71	0.74	1.610	NM	20.4
10/22/2002	15.5	97.45	7.50	89.95	no data	1.570	NM	23.5
5/20/2003	15.5	97.45	6.93	90.52	no data	1.123	NM	21.2
12/11/2003	15.5	97.45	7.20	90.25	no data	1.050	NM	21.1
5/25/2004	15.5	97.45	7.38	90.07	no data	1.128	NM	21.4
12/15/2004	15.5	97.45	7.12	90.33	no data	0.980	NM	18.6
6/15/2005	15.5	97.45	6.72	90.73	0.24	0.111	NM	21.2
12/19/2005	15.5	97.45	6.97	90.48	1.8	0.099	NM	20.0
7/20/2006	15.5	97.45	7.18	90.27	0.42	0.087	NM	24.9
1/24/2007	15.5	97.45	6.60	90.85	1.27	0.105	NM	19.0
10/3/2007	15.5	97.45	7.91	89.54	5.46	9.500	NM	25.4
7/24/2008	15.5	97.45	7.63	89.82	0.11	0.071	NM	24.9
1/8/2009	15.5	97.45	7.12	90.33	0.60	0.098	220.100	18.7
MW-13								
8/16/2000	22.0	93.18	5.09	88.09	6.96	0.600	NM	23.0
3/28/2001	22.0	93.18	5.19	87.99	0.80	0.730	NM	no data
10/22/2001	22.0	93.18	5.43	87.75	no data	no data	NM	no data
4/24/2002	22.0	93.18	5.21	87.97	1.19	0.660	NM	10.4
10/22/2002	22.0	93.18	5.15	88.03	no data	0.608	NM	20.8
5/20/2003	22.0	93.18	4.69	88.49	no data	0.648	NM	19.3
12/11/2003	22.0	93.18	4.52	88.66	no data	0.520	NM	20.2
5/25/2004	22.0	93.18	no data	no data	no data	no data	NM	no data
12/15/2004	22.0	93.18	6.29	86.89	no data	0.614	NM	18.1
6/15/2005	22.0	93.18	5.64	87.54	0.11	0.695	NM	20.0
12/19/2005	22.0	93.18	5.89	87.29	0.09	0.601	NM	20.4
7/20/2006	22.0	93.18	5.91	87.27	0.13	0.630	NM	22.2
1/24/2007	22.0	93.18	5.82	87.36	0.17	0.650	NM	18.9
10/3/2007	22.0	93.18	6.22	86.96	4.46	52.700	NM	24.8
7/24/2008	22.0	94.19	5.61	88.58	0.06	0.686	NM	21.3
1/8/2009	22.0	94.19	5.27	88.92	0.10	0.694	128.700	20.1

TABLE 4
MONITORING WELL FIELD DATA
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Well Location	Total Well Depth (feet)	T.O.C. Elevation (feet)	DTGW (feet)	Groundwater Elevation (feet)	*Dissolved Oxygen (mg/l)	Conductivity	ORP	Groundwater Temperature (Celsius)
MW-14								
8/16/2000	16.0	93.02	4.59	88.43	2.98	0.318	NM	23.9
3/28/2001	16.0	93.02	4.49	88.53	0.57	0.215	NM	no data
10/22/2001	16.0	93.02	5.60	87.42	no data	0.146	NM	22.4
4/24/2001	16.0	93.02	5.00	88.02	0.49	0.126	NM	19.2
10/22/2002	16.0	93.02	4.93	88.09	no data	0.106	NM	22.1
5/20/2003	16.0	93.02	4.61	88.41	no data	0.115	NM	20.1
12/11/2003	16.0	93.02	4.86	88.16	no data	0.113	NM	19.2
5/25/2004	16.0	93.02	4.79	88.23	no data	0.126	NM	20.5
12/15/2004	16.0	93.02	4.88	88.14	no data	0.124	NM	15.1
6/15/2005	16.0	93.02	4.55	88.47	0.09	0.112	NM	20.4
12/19/2005	16.0	93.02	5.65	87.37	4.54	0.115	NM	18.2
7/20/2006	16.0	93.02	ell not foun	no data	no data	no data	NM	no data
1/24/2007	16.0	93.02	4.42	88.6	0.23	0.118	NM	16.3
10/3/2007	16.0	93.02	4.79	88.23	6.54	79.9	NM	23.6
7/24/2008	16.0	93.02	4.69	88.33	0.06	0.273	NM	24.5
1/8/2009	16.0	93.02	4.61	88.41	0.10	0.246	-41.6	17.5
MW-15								
8/16/2000	15.0	92.74	6.04	86.7	4.48	0.718	NM	24
3/28/2001	15.0	92.74	6.14	86.6	1.32	1.140	NM	no data
10/22/2001	15.0	92.74	6.66	86.08	no data	0.960	NM	22.0
4/24/2002	15.0	92.74	6.35	86.39	1.26	1.048	NM	22.1
10/22/2002	15.0	92.74	6.36	86.38	no data	0.847	NM	20.7
5/20/2003	15.0	92.74	5.69	87.05	no data	0.820	NM	19.7
12/11/2003	15.0	92.74	5.99	86.75	no data	0.821	NM	18.9
5/25/2004	15.0	92.74	5.93	86.81	no data	0.807	NM	20.0
12/14/2004	15.0	92.74	5.91	86.83	no data	0.629	NM	16.5
6/15/2005	15.0	92.74	5.43	87.31	0.10	0.880	NM	19.2
12/19/2005	15.0	92.74	5.72	87.02	0.41	0.647	NM	17.2
7/21/2006	15.0	92.74	5.71	87.03	1.01	0.750	NM	22.8
1/24/2007	15.0	92.74	5.38	87.36	0.34	0.798	NM	15.4
10/3/2007	15.0	92.74	6.3	86.44	4.69	66.5	NM	21.5
7/24/2008	15.0	92.95	6.15	86.8	0.10	0.775	NM	23.5
1/8/2009	15.0	92.95	5.63	87.32	0.20	0.692	-78.400	17.5

TABLE 4
MONITORING WELL FIELD DATA
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Well Location	Total Well Depth (feet)	T.O.C. Elevation (feet)	DTGW (feet)	Groundwater Elevation (feet)	*Dissolved Oxygen (mg/l)	Conductivity	ORP	Groundwater Temperature (Celsius)
MW-16								
8/16/2000	16.0	94.76	5.37	89.39	6.42	0.298	NM	23.4
3/28/2001	16.0	94.76	5.27	89.49	0.79	0.310	NM	no data
10/22/2001	16.0	94.76	6.25	88.51	no data	0.260	NM	21.7
4/24/2002	16.0	94.76	5.87	88.89	0.7	0.335	NM	20.6
10/22/2002	16.0	94.76	5.86	88.9	no data	0.506	NM	21.0
5/20/2003	16.0	94.76	5.18	89.58	no data	0.350	NM	20.0
12/11/2003	16.0	94.76	5.41	89.35	no data	0.411	NM	17.6
5/25/2004	16.0	94.76	5.30	89.46	no data	0.327	NM	20.1
12/14/2004	16.0	94.76	5.24	89.52	no data	0.351	NM	14.9
6/15/2005	16.0	94.76	4.92	89.84	0.10	0.345	NM	19.9
12/19/2005	16.0	94.76	5.3	89.46	0.80	0.352	NM	17.7
7/20/2006	16.0	94.76	5.14	89.62	0.33	0.312	NM	23.1
1/24/2007	16.0	94.76	5.03	89.73	0.40	0.325	NM	15.0
10/3/2007	16.0	94.76	5.62	89.14	4.29	24.7	NM	23.6
7/24/2008	16.0	94.74	5.43	89.31	0.06	0.334	NM	24.5
1/8/2009	16.0	94.74	4.51	90.23	0.10	0.327	60.600	17.4
MW-17								
10/3/2007	16.0	94.76	8.00	86.76	6.35	8.3	NM	22.7
7/24/2008	16.0	94.70	7.71	86.99	0.32	0.072		23.4
1/8/2009	16.0	94.70	5.92	88.78	2.30	0.071	128.200	17.0
MW-18A								
1/8/2009	6.7	90.77	4.71	86.06	6.7	0.825	36.400	14.9
MW-18B								
1/8/2009	15.2	90.97	3.17	87.8	0.10	0.800	-76.100	18.5
MW-2								
1/8/2009	14.9	99.89	8.26	91.63	0.10	0.630	-77.300	18.4

T.O.C. = Top of well Casing

DTGW = Depth To Groundwater

** groundwater parameters measured in-situ (within the monitoring wells)*

TABLE 5
SURFACE WATER ANALYTICAL DATA SUMMARY
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Sample Location		Date Collected	Target Compounds				
			Pentachloro-phenol	2,4-dichloro-phenol	2,4,6-Trichloro-phenol**	2,4,5-trichloro-phenol	3,4-Methly phenol
SW-1		12/19/2005	nd	nd	nd	nd	nt
		7/22/2006	nd	nd	nd	nd	nt
	*	8/22/2006	not tested	not tested	not tested	not tested	nt
		1/24/2007	nd	nd	nd	nd	nt
		10/3/2007	nd	nd	nd	nd	nt
		7/24/2008	nd	nd	nd	nd	nt
		1/8/2009	nd	nd	nd	nd	nt
CORRESPONDING MCL'S			1	NS	NS	NS	NS

Sample Location		Date Collected	Target Compounds				
			Pentachloro-phenol	2,4-dichloro-phenol	2,4,6-Trichloro-phenol**	2,4,5-trichloro-phenol	3,4-Methly phenol
SW-2		12/19/2005	nd	nd	nd	nd	nt
		7/22/2006	2.3 J	nd	nd	nd	nt
	*	8/22/2006	nd	nd	nd	nd	nt
		1/24/2007	nd	nd	nd	nd	nt
		10/3/2007	nd	nd	nd	nd	nt
		7/24/2008	nd	nd	nd	nd	nt
		1/8/2009	nd	nd	nd	nd	nt
CORRESPONDING MCL'S			1	NS	NS	NS	NS

Sample Location		Date Collected	Target Compounds				
			Pentachloro-phenol	2,4-dichloro-phenol	2,4,6-Trichloro-phenol**	2,4,5-trichloro-phenol	3,4-Methly phenol
SW-3		12/19/2005	nd	nd	nd	nd	nt
		7/22/2006	3.3 J	nd	nd	nd	nt
	*	8/22/2006	nd	nd	nd	nd	1.9
		1/24/2007	nd	nd	nd	nd	nt
		10/3/2007	nd	nd	nd	nd	nt
		7/24/2008	nd	nd	nd	nd	nt
		1/8/2009	nd	nd	nd	nd	nt
CORRESPONDING MCL'S			1	NS	NS	NS	NS

all concentrations reported in micrograms per liter (ug *MCL's = Maximum Concentration Limits*

nd = not detected, NS = no standard J = Estimated value

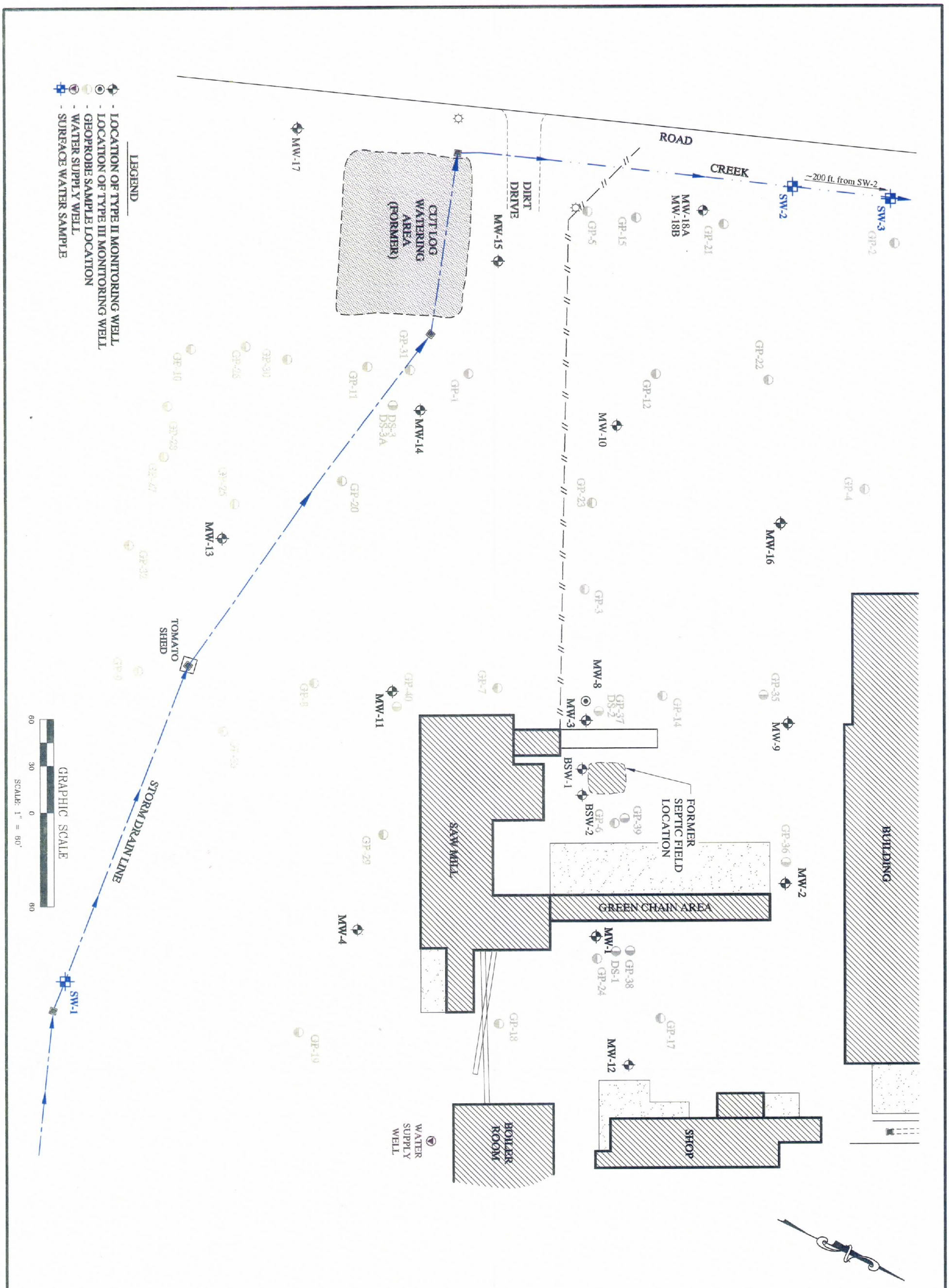
** Confirmation sampling event. Samples analyzed by PACE Analytical (R&A is the regular subcontract laboratory)*

*** = Reported pentachlorophenol biodegradation compounds*

TABLE 6
SURFACE WATER FIELD PARAMETERS - JANUARY 2009
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA
S&ME PROJECT NO. 1584-98-146B

Sample Location	Temperature (Celsius)	pH (S.U.)	Conductivity ($ms/cm^{3)}$	ORP (millivolts)	Dissolved Oxygen (% staturation)	Comment
SW-3	12.14	6.21	0.130	58.9	76.6	water depth 1-2 feet
SW-2	11.85	6.27	0.201	88.1	79.9	water depth 1-2 feet
SW-2 + 50'	11.79	6.23	0.281	90.8	83.5	water depth < 1foot
SW-2 + 100'	11.81	6.21	0.133	101.3	81.7	water depth ~ 1foot
SW-2 + 150'	11.74	6.18	0.148	84.3	83.0	water depth < 1foot
SW-2 + 200'	11.71	6.22	0.142	93.8	83.2	water depth < 0.5 feet
SW-2 + 250'	11.57	6.11	0.171	88.3	84.1	water depth < 0.5 feet
SW-2 + 268'	11.51	6.05	0.223	90.9	84.2	water depth < 0.5 feet
SW-1	11.33	6.00	0.115	117.1	73.5	water depth < 0.5 feet

FIGURES



S&ME
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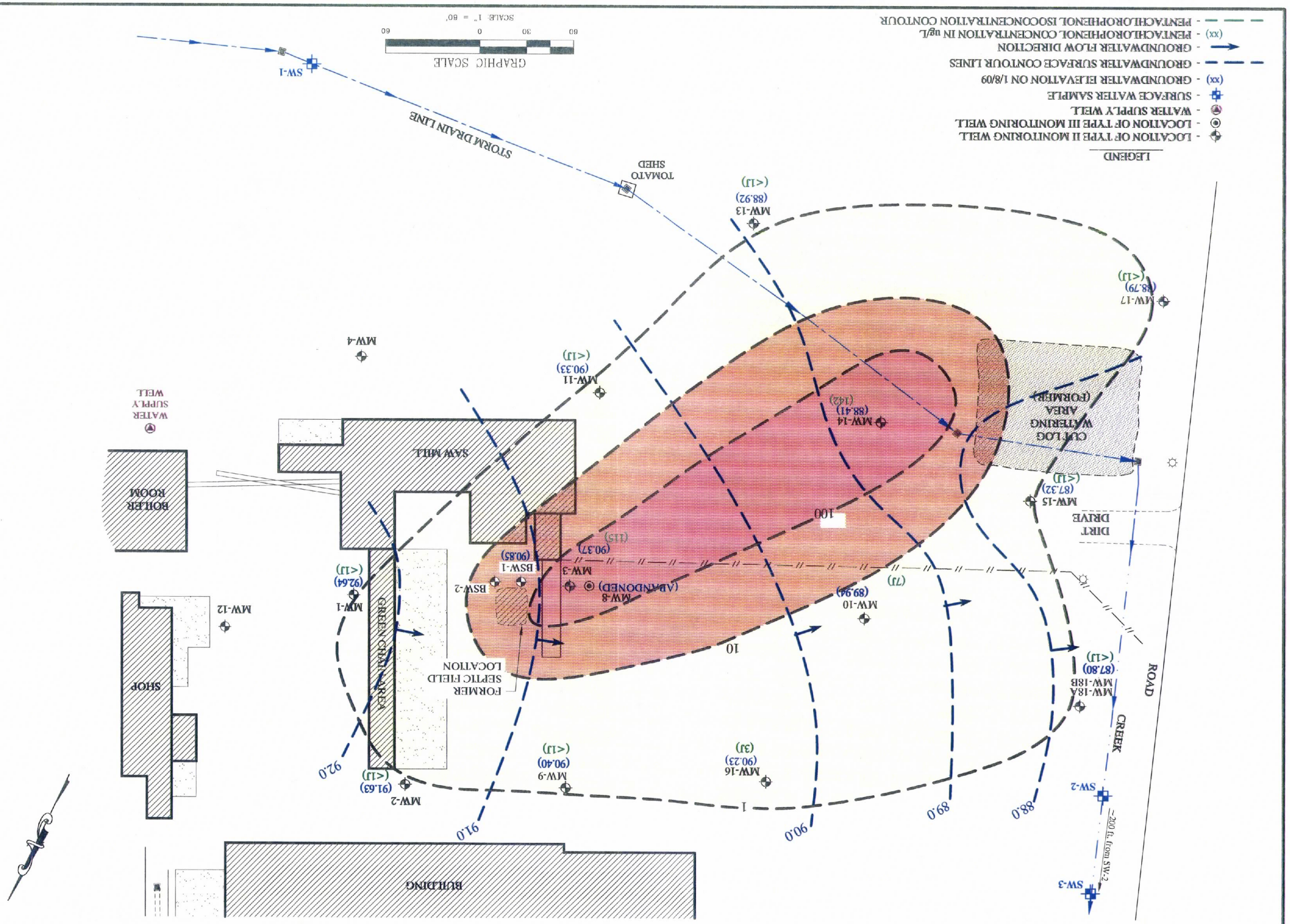
SITE PLAN

MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA

SCALE:	DRAWN BY:	CHECKED BY:
AS SHOWN	RDM	EQBH
JOB NO.	DATE:	FIGURE NO.
1584-98-146B	JANUARY 2009	1



S&ME
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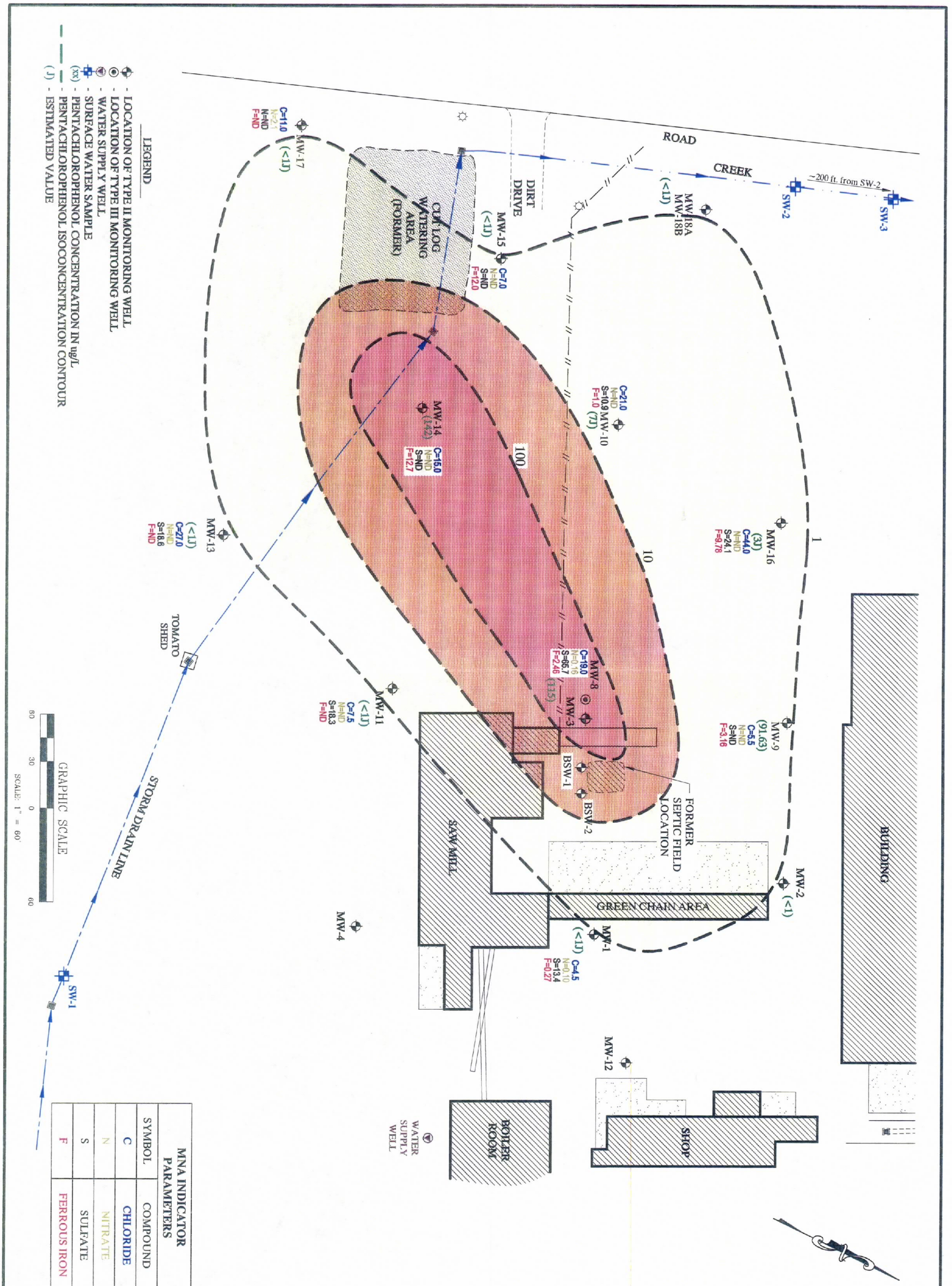
GROUNDWATER FLOW MAP WITH PCP ISOCONCENTRATIONS
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA

SCALE:	DRAWN BY:	CHECKED BY:
AS SHOWN	RDM	EQBH
JOB NO. 1584-98-146B	DATE: JANUARY 2009	FIGURE NO. 2



MNA INDICATOR PARAMETERS	
SYMBOL	COMPOUND
C	CHLORIDE
N	NITRATE
S	SULFATE
F	FERROUS IRON

S&ME
ENVIRONMENTAL SERVICES
ENGINEERING · TESTING

PCP INSCONCENTRATION MAP
PLUS MNA INDICATORS
MARSH LUMBER COMPANY
PAMPLICO, SOUTH CAROLINA

SCALE:	DRAWN BY:	CHECKED BY:
AS SHOWN	RDM	EQBH
JOB NO.	DATE:	FIGURE NO.
1584-98-146B	JANUARY 2009	3

APPENDIX A
Groundwater Analytical Data

Research & Analytical Laboratories, Inc.

Analytical/Process Consultations

RESEARCH & ANALYTICAL LABS. SIDNEY L. CHAMPION NC #34 DIRECTOR CERTIFIED ANALYSIS

Chemical Analysis for Selected Parameters and Water Samples Identified as Marsh Pamplico

(A S & ME, Inc. Project #1584-98-146B, collected 24-25 July 2008)

I. Semi-Volatile Organics EPA Method 8270 - Acids Parameter	Quantitation Limit (mg/L)	MW-1 (mg/L)	MW-3 (mg/L)	MW-9 (mg/L)	MW-10 (mg/L)	MW-11 (mg/L)	MW-13 (mg/L)	MW-14 (mg/L)	MW-15 (mg/L)	MW-16 (mg/L)	MW-17 (mg/L)	SW-1 (mg/L)	SW-2 (mg/L)	SW-3 (mg/L)	MWS (mg/L)
4-Chloro-3-methylphenol	0.010	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
2-Chlorophenol	0.010	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
2,4-Dichlorophenol	0.010	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
2,4-Dimethylphenol	0.010	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
2,4-Dinitrophenol	0.020	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
2-Methyl-4,6-dinitrophenol	0.020	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
2-Nitrophenol	0.010	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
4-Nitrophenol	0.020	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Pentachlorophenol	0.020	BQL	**0.071**	BQL	**0.090**	BQL	BQL	**0.264**	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Phenol	0.010	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
2,4,6-Trichlorophenol	0.010	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Dilution Factor		1	1	1	1	1	1	1	1	1	1	1	1	1	1

II. Miscellaneous Parameters	Quantitation Limit (mg/L)	MW-1 (mg/L)	MW-3 (mg/L)	MW-9 (mg/L)	MW-10 (mg/L)	MW-11 (mg/L)	MW-13 (mg/L)	MW-14 (mg/L)	MW-15 (mg/L)	MW-16 (mg/L)	MW-17 (mg/L)	SW-1 (mg/L)	SW-2 (mg/L)	SW-3 (mg/L)	MWS (mg/L)
Total Nitrate	0.050	**0.100**	**0.158**	BQL	BQL	BQL	BQL	BQL	BQL	BQL	**2.11**	NR	NR	NR	NR
Ferrous Iron	0.100	**0.271**	**2.46**	**3.16**	**1.00**	BQL	BQL	**12.7**	**12.0**	**9.78**	BQL	NR	NR	NR	NR
Sulfate	10.00	**13.4**	**65.7**	BQL	**10.9**	**18.3**	**18.6**	BQL	BQL	**24.1**	BQL	NR	NR	NR	NR
Chloride	1.00	**4.50**	**19.0**	**5.50**	**21.0**	**7.50**	**27.0**	**15.0**	**7.00**	**44.0**	**11.0**	NR	NR	NR	NR
Sample Number		622886	622887	622888	622889	622890	622891	622892	622893	622894	622895	622896	622897	622898	622899
Sample Date		07/24/08	07/24/08	07/24/08	07/24/08	07/24/08	07/24/08	07/24/08	07/24/08	07/24/08	07/24/08	07/25/08	07/25/08	07/25/08	07/25/08
Sample Time (hrs)		1855	1620	1045	1710	1135	1220	1810	1310	1525	1420	0650	0705	0720	0630

BQL = Below Quantitation Limits

mg/L = milligrams per Liter = parts per million (ppm)

NR = Not Requested

RESEARCH & ANALYTICAL LABORATORIES, INC.
Analytical / Process Consultations
Phone (336) 996-2841

CHAIN OF CUSTODY RECORD

COMPANY: S&ME, INC.	JOB NO.: 1584-08-146B
STREET ADDRESS: 3718 OLD BATTLEGROUND RD.	PROJECT: MARSH PAMPLICO
CITY, STATE, ZIP: GREENSBORO, NC 27410	SAMPLER NAME (PLEASE PRINT): GARY SIMCOX
CONTACT: ED HENRIQUES PHONE: 336 288-7180	SAMPLER SIGNATURE: [signature]

REQUESTED ANALYSIS — WATER / WASTEWATER | MISC.

SAMPLE NUMBER (LAB USE ONLY)	DATE	TIME	COMP	GRAB	TEMP °C	RES Cl	CHLORINE REMOVED (Y or N)	SAMPLE MATRIX (S or W)	SAMPLE LOCATION / I.D.	NO. OF CONTAINERS	2L G (BNA, Herb. / Pest.)	2 40ml Vials (VOA) HCL	250ml G (TOX)	250ml P (TOC) H_2SO_4	1L P, G (BOD, TSS, Unpreserved, etc.)	1L G (Phenol, Oil & Grease) H_2SO_4	1L P, G (COD, N, P) H_2SO_4	1L P, G (Metals, Hardness) HNO_3	1L P, G (CYANIDE) NaOH	Sterile P, G (Coliform)	CHLORIDE	8270 ACID EXTRACTABLES ONLY	(ACP SUBJECT CONT.)?	SULFATE, NITRATE, FERROUS IRON
622886	7/24/08	1855		✓				W	MW-1	5											x	x	x	x
887	7/24/08	1620		✓				W	MW-3	5											x	x	x	x
888	7/24/08	1045		✓				W	MW-9	5											x	x	x	x
889	7/24/08	1710		✓				W	MW-10	5											x	x	x	x
890	7/24/08	1135		✓				W	MW-11	5											x	x	x	x
891	7/24/08	1220		✓				W	MW-13	5											x	x	x	x
892	7/24/08	1810		✓				W	MW-14	5											x	x	x	x
893	7/24/08	1310		✓				W	MW-15	5											x	x	x	x
894	7/24/08	1525		✓				W	MW-16	5											x	x	x	x
895	7/24/08	1420		✓				W	MW-17	5											x	x	x	x
896	7/25/08	0650		✓				W	SW-1	2												x	x	
897	7/25/08	0705		✓				W	SW-2	2												x	x	
898	7/25/08	0720		✓				W	SW-3	2												x	x	
899	7/25/08	0630		✓				W	MWS	2												x	x	

RELINQUISHED BY	DATE/TIME	RECEIVED BY	REMARKS:
[signature]	7/25/08 1230	Susan Layell	on ice
RELINQUISHED BY	DATE/TIME	RECEIVED BY	SAMPLE TEMPERATURE AT RECEIPT 2.8 °C

Research & Analytical Laboratories, Inc.

Analytical/Process Consultations

RESEARCH & ANALYTICAL LABS SIDNEY L. CHAMPION NC #34 DIRECTOR CERTIFIED ANALYSIS

Chemical Analysis for Selected Parameters and Water Samples Identified as Marsh Pamplico

(A S & ME, Inc. Project #1584-98-146B, collected 07 & 08 January 2009)

I. Semi-Volatile Organics EPA Method 8270 - Acids Parameter	Quantitation Limit (mg/L)	MW-1 (mg/L)	MW-2 (mg/L)	MW-3 (mg/L)	MW-9 (mg/L)	MW-10 (mg/L)	MW-11 (mg/L)	MW-13 (mg/L)	MW-14 (mg/L)	MW-15 (mg/L)	MW-16 (mg/L)	MW-17 (mg/L)	MW-18A (mg/L)	MW-18B (mg/L)	SW-1 (mg/L)	SW-2 (mg/L)	SW-3 (mg/L)	Well (mg/L)
4-Chloro-3-methylphenol	0.010	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
2-Chlorophenol	0.010	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
2,4-Dichlorophenol	0.010	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
2,4-Dimethylphenol	0.010	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
2,4-Dinitrophenol	0.020	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
2-Methyl-4,6-dinitrophenol	0.020	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
2-Nitrophenol	0.010	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
4-Nitrophenol	0.020	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Pentachlorophenol	0.020	BQL	BQL	**0.115**	BQL	**0.007J**	BQL	BQL	**0.142**	BQL	**0.003J**	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Phenol	0.010	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
2,4,6-Trichlorophenol	0.010	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Dilution Factor		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sample Number		636192	636193	636194	636195	636196	636197	636198	636199	636200	636201	636202	636203	636204	636205	636206	636207	636208
Sample Date		01/08/09	01/08/09	01/07/09	01/07/09	01/07/09	01/07/09	01/08/09	01/08/09	01/07/09	01/08/09	01/08/09	01/08/09	01/08/09	01/08/09	01/08/09	01/08/09	01/08/09
Sample Time (hrs)		1145	1100	1655	1100	1350	1750	1640	1455	1430	1600	1400	0900	0830	1045	1055	1345	1400

BQL = Below Quantitation Limits
mg/L = milligrams per Liter = parts per million (ppm)
J= Estimated concentration - present but below quantitation limit

NR = Not Requested

Research & Analytical Laboratories, Inc.

Analytical/Process Consultations

RESEARCH & ANALYTICAL LABS. SIDNEY L. CHAMPION NC #34 DIRECTOR CERTIFIED ANALYSIS

January 21, 2009

S & ME, Inc.
3718 Old Battleground Ro
Greensboro, NC 27410
Attention: Ed Henriques

Parameter	Units	MW-1	MW-3	MW-10	MW-15
BACTI Count	CFU/ml	**19.5**	**1**	**121**	**5,200**
Sample Number:		636192	636194	636196	636200
Sample Collected Date:		01/07/09	01/07/09	01/07/09	01/07/09
Sample Collected Time (Hrs):		1145	1655	1350	1430

Analyses Performed by: SJ

CFU/ml = Colony Forming Units per milliliter

RESEARCH & ANALYTICAL LABORATORIES, INC.

Analytical / Process Consultations
Phone (336) 996-2841

CHAIN OF CUSTODY RECORD

COMPANY	JOB NO.
S&ME, INC.	1584-98-146B
STREET ADDRESS	PROJECT
3718 OLD BATTLEGROUND RD.	MARSH PANDLICO
CITY, STATE, ZIP	SAMPLER NAME (PLEASE PRINT)
GREENSBORO, NC 27410	GARY SIMCOX
CONTACT / PHONE	SAMPLER SIGNATURE
ED HENRIQUES 288-7180	

SAMPLE NUMBER (LAB USE ONLY)	DATE	TIME	COMP	GRAB	TEMP °C	RES Cl	CHLORINE REMOVED (Y or N)	SAMPLE MATRIX (S or W)	SAMPLE LOCATION / I.D.	NO. OF CONTAINERS	WATER / WASTEWATER: 2L G (BNA, Herb. / Pest.)	2 40ml Vials (VOA) HCl	250ml G (TOX)	250ml P (TOC) H_2SO_4	1L P,G (BOD, TSS, Unpreserved, etc.)	1L G (Phenol, Oil & Grease) H_2SO_4	1L P,G (COD, N, P) H_2SO_4	1L P,G (Metals, Hardness) HNO_3	Sterile P,G (Coliform)	MISC.: 8270 Acid Extractable only (PCP suites contaminant)	Heterotrophic Plate Count	REQUESTED ANALYSIS
636192	1/8/09	1145		✓				W	MW-1	3										✓	✓	
193	1/8/09	1100		✓				W	MW-2	2										✓		
194	1/7/09	1655		✓				W	MW-3	3										✓	✓	
195	1/7/09	1100		✓				W	MW-9	2										✓		
196	1/7/09	1350		✓				W	MW-10	3										✓	✓	
197	1/7/09	1750		✓				W	MW-11	2										✓		
198	1/8/09	1640		✓				W	MW-13	2										✓		
199	1/8/09	1455		✓				W	MW-14	2										✓		
200	1/7/09	1430		✓				W	MW-15	3										✓	✓	
201	1/8/09	1600		✓				W	MW-16	2										✓		
202	1/8/09	1400		✓				W	MW-17	2										✓		
203	1/8/09	0900		✓				W	MW-18A	2										✓		
204	1/8/09	0830		✓				W	MW-18B	2										✓		
205	1/8/09	1045		✓				W	SW-1	2										✓		
206	1/8/09	1055		✓				W	SW-2	2										✓		
207	1/8/09	1345		✓				W	SW-3	2										✓		
208	1/8/09	1400		✓				W	WELL	1										✓		

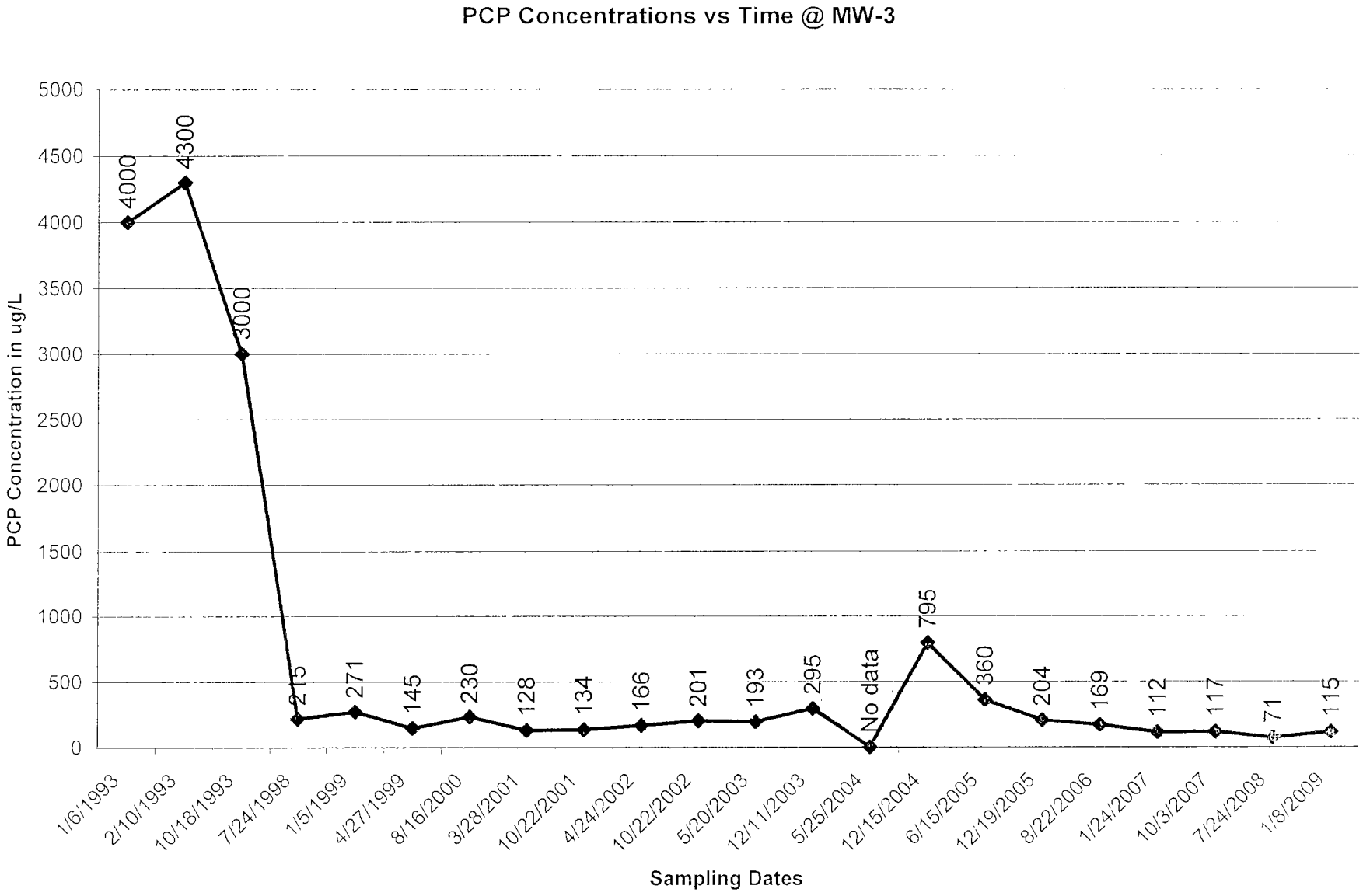
RELINQUISHED BY	DATE/TIME	RECEIVED BY
	1/9/09 1120	
RELINQUISHED BY	DATE/TIME	RECEIVED BY

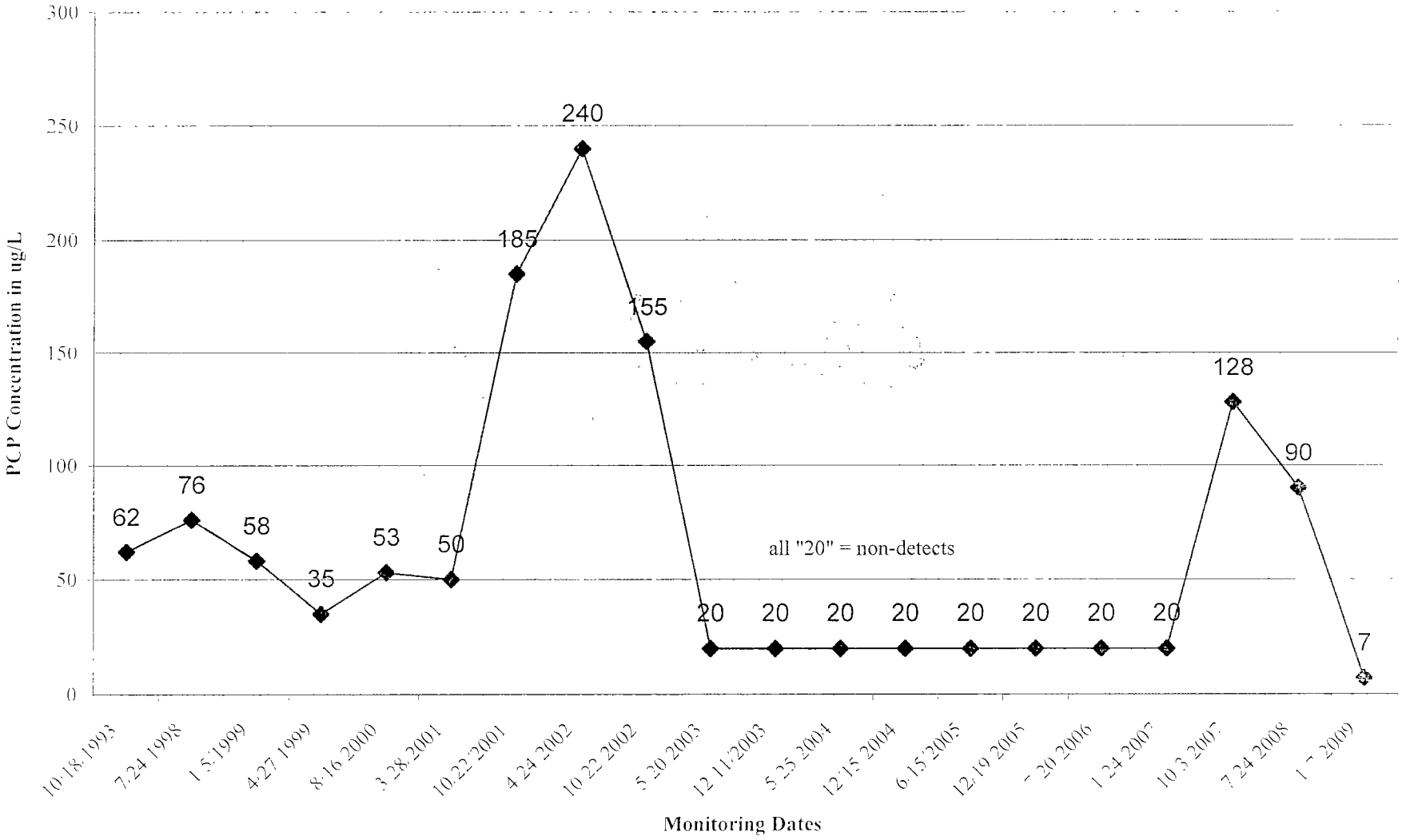
REMARKS:

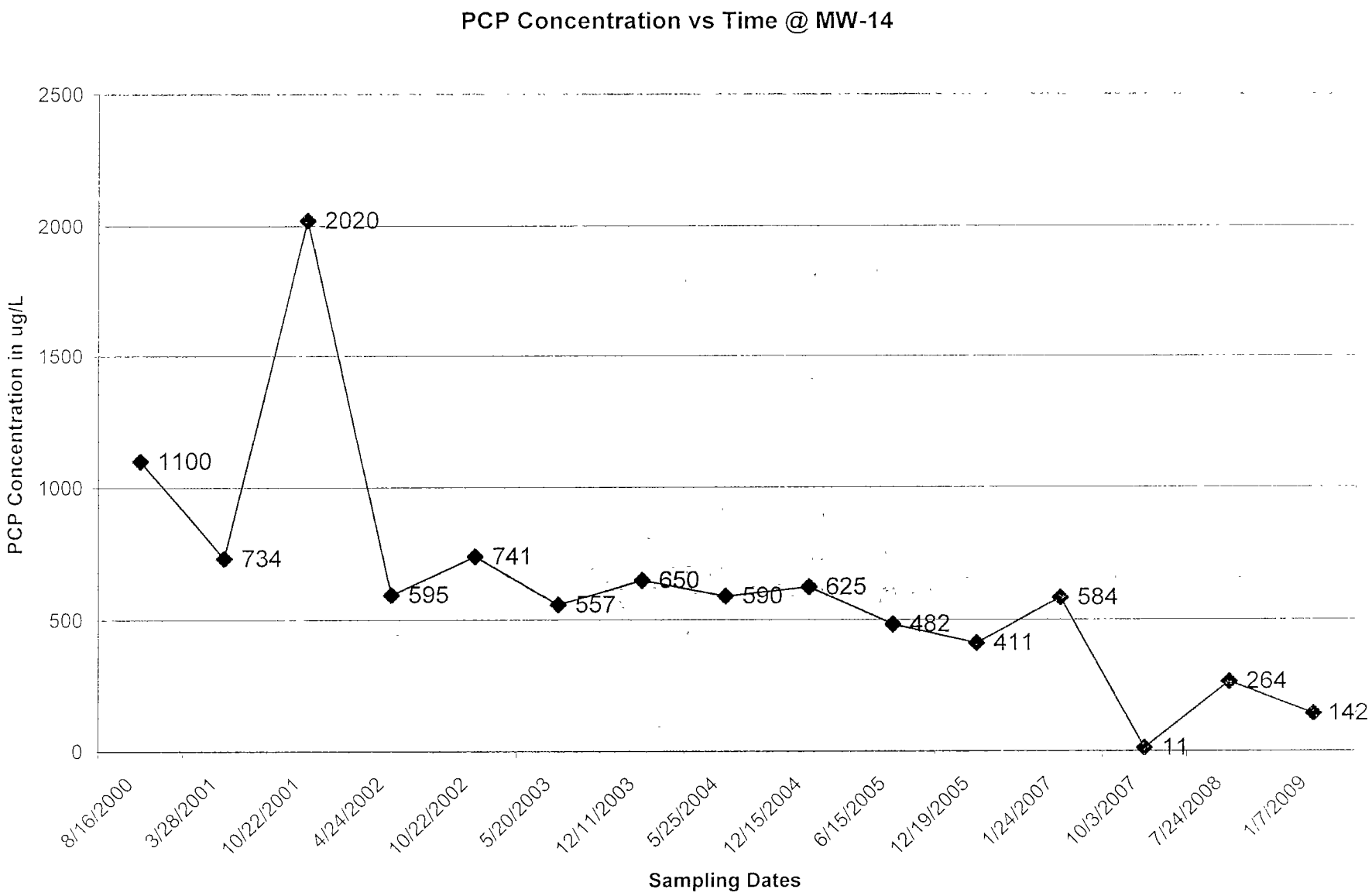
SAMPLE TEMPERATURE AT RECEIPT 1.7 °C on ice

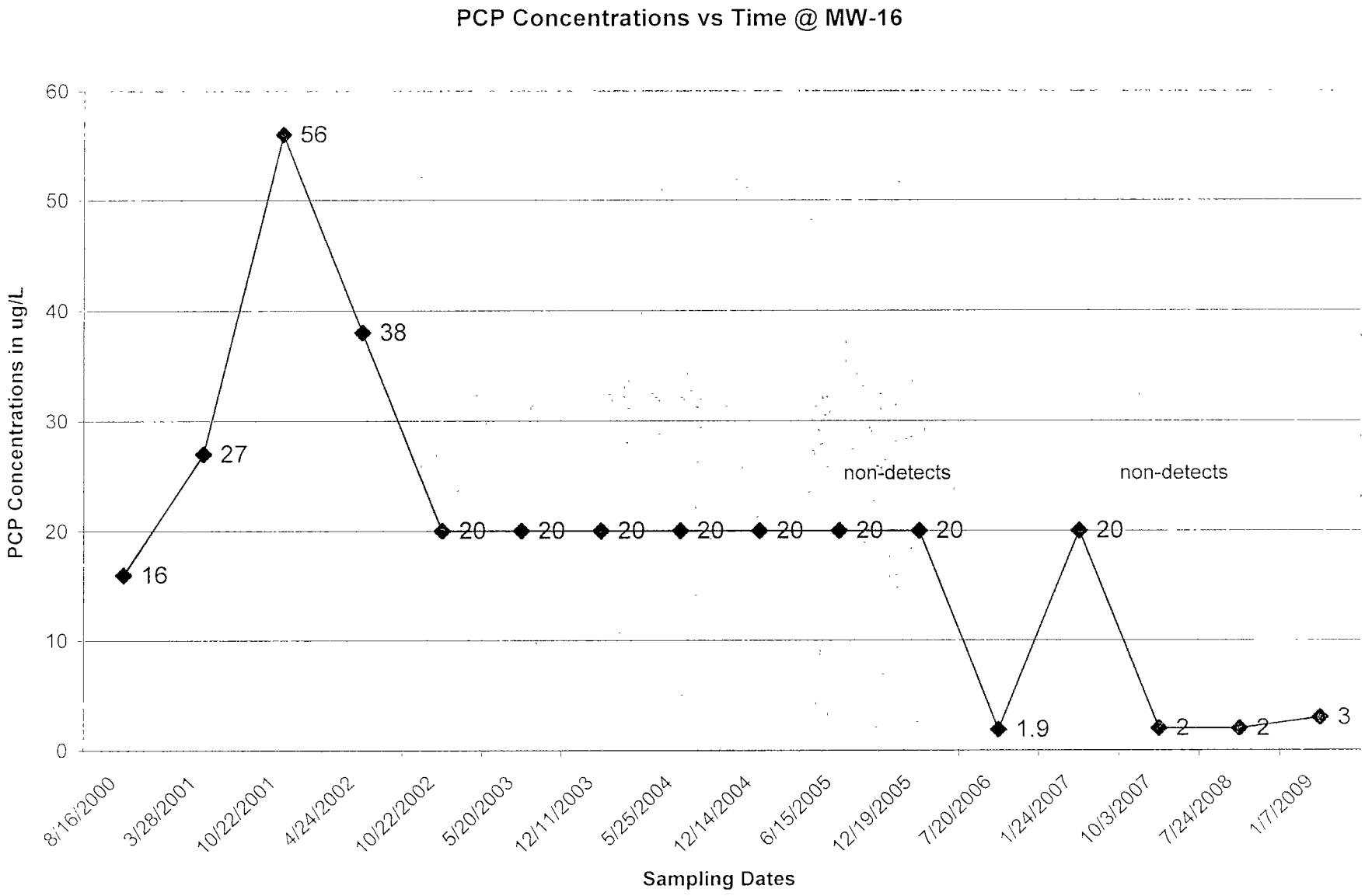
APPENDIX B

Time vs. Concentration Graphs


PCP Concentrations vs Time @ MW-3
PCP Concentration in ug/L
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
4000
4300
3000
215
271
145
230
128
134
166
201
193
295
No data
795
360
204
169
112
117
71
115
1/6/1993
2/10/1993
10/18/1993
7/24/1998
1/5/1999
4/27/1999
8/16/2000
3/28/2001
10/22/2001
4/24/2002
10/22/2002
5/20/2003
12/11/2003
5/25/2004
12/15/2004
6/15/2005
12/19/2005
8/22/2006
1/24/2007
10/3/2007
7/24/2008
1/8/2009
Sampling Dates


PCP Concentrations vs Time @ MW-10
PCP Concentration in ug/L
300
250
200
150
100
50
0
62
76
58
35
53
50
185
240
155
20
20
20
20
20
20
20
20
128
90
7
all "20" = non-detects
10/18/1993
7/24/1998
1/5/1999
4/27/1999
8/16/2000
3/28/2001
10/22/2001
4/24/2002
10/22/2002
5/20/2003
12/11/2003
5/25/2004
12/15/2004
6/15/2005
12/19/2005
1/24/2007
10/3/2007
7/24/2008
Monitoring Dates


PCP Concentration vs Time @ MW-14
PCP Concentration in ug/L
2500
2000
1500
1000
500
0
1100
734
2020
595
741
557
650
590
625
482
411
584
11
264
142
8/16/2000
3/28/2001
10/22/2001
4/24/2002
10/22/2002
5/20/2003
12/11/2003
5/25/2004
12/15/2004
6/15/2005
12/19/2005
1/24/2007
10/3/2007
7/24/2008
1/7/2009
Sampling Dates


PCP Concentrations vs Time @ MW-16
PCP Concentrations in ug/L
60
50
40
30
20
10
0
56
38
27
16
20
20
20
20
20
20
20
20
non-detects
non-detects
1.9
20
2
2
3
8/16/2000
3/28/2001
10/22/2001
4/24/2002
10/22/2002
5/20/2003
12/11/2003
5/25/2004
12/14/2004
6/15/2005
12/19/2005
7/20/2006
1/24/2007
10/3/2007
7/24/2008
1/7/2009
Sampling Dates

APPENDIX C

Well Construction Record

COMPLETION REPORT OF WELL No. MW-18A

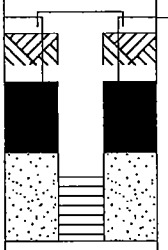
PROJECT: **Marsh Lumber**
PROJECT NO: **1584-98-146B**
PROJECT LOCATION: **Pamplico, SC**

WATER LEVEL:

LATITUDE:
LONGITUDE:
TOP OF CASING ELEVATION: **90.77**
DATUM: **MSL**
LOGGED BY: **GS/EQBH**

DRILLING CONTRACTOR: **Probe Technology**
DRILLING METHOD: **HSA**
DATE DRILLED: **1/7/09**

STRATA DESCRIPTION	SYMBOL	DEPTH (ft.)	WELL DETAILS	DEPTH (ft.)	LEGEND	ELEVATION (ft.)
				0.00	GS	
Silty Sand **SILT**		0		1.50	CG	
				4.25	BS	
		5		7.00	FP BSC	



WELL CONSTRUCTION DETAILS

PROTECTIVE CASING
Diameter:
Type:
Interval:

RISER CASING
Diameter: **2**
Type: **PVC**
Interval: **0-5**

GROUT
Type: **Portland**
Interval: **0.5-1.5**

SEAL
Type: **Bentonite**
Interval: **2-4.25**

FILTERPACK
Type: **Sand**
Interval: **4.25-7.0**

SCREEN
Diameter: **2**
Type: **PVC**
Interval: **5-7**

LEGEND
- FILTER PACK
- BENTONITE
- CEMENT GROUT
- CUTTINGS / BACKFILL
- STATIC WATER LEVEL

TOC	TOP OF CASING
GS	GROUND SURFACE
BS	BENTONITE SEAL
FP	FILTER PACK
TSC	TOP OF SCREEN
BSC	BOTTOM OF SCREEN
TD	TOTAL DEPTH
CG	CEMENT GROUT

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COMPLETION REPORT OF WELL No. MW-18A

MONITORING WELL 1584-98-146B PAMPLICO, SC.GPJ S&ME.GDT 1/28/09

COMPLETION REPORT OF WELL No. MW-18B

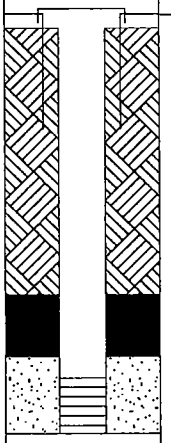
PROJECT: **Marsh Lumber**
PROJECT NO: **1584-98-146B**
PROJECT LOCATION: **Pamplico, SC**

WATER LEVEL:

LATITUDE:
LONGITUDE:
TOP OF CASING ELEVATION: **90.97**
DATUM: **MSL**
LOGGED BY: **GS/EQBH**

DRILLING CONTRACTOR: **Probe Technology**
DRILLING METHOD: **HSA**
DATE DRILLED: **1/7/09**

STRATA DESCRIPTION	SYMBOL	DEPTH (ft.)
(Not Sampled)		0
		5
Gray Silty Fine to Medium **SAND** (Saturated)		10
Gray Brown Mottled Silty Fine **SAND** (Saturated)		
Brown Tan Silty Fine **SAND** (Saturated)		15
Gray Silty Medium **SAND** (Saturated) with increasing Clay Content with increased depth		
Gray Sandy **CLAY** (Saturated) with 25% fine sand & 1-5% shell Fragments		
Dark Gray Sandy **CLAY** (Saturated) with increasing percentage of shell fragments with depth, Sand is fvg		



DEPTH (ft.)	LEGEND	ELEVATION (ft.)
0.00	GS	
10.00	CG	
12.25	BS	
15.00	FP BSC	

WELL CONSTRUCTION DETAILS

PROTECTIVE CASING
Diameter:
Type:
Interval:

RISER CASING
Diameter: **2**
Type: **PVC**
Interval: **0-13**

GROUT
Type: **Portland**
Interval: **0.5-10**

SEAL
Type: **Bentonite**
Interval: **10-12.25**

FILTERPACK
Type: **Sand**
Interval: **12-25-15.0**

SCREEN
Diameter: **2**
Type: **PVC**
Interval: **13-15**

LEGEND
- FILTER PACK
- BENTONITE
- CEMENT GROUT
- CUTTINGS / BACKFILL
- STATIC WATER LEVEL

TOC	TOP OF CASING
GS	GROUND SURFACE
BS	BENTONITE SEAL
FP	FILTER PACK
TSC	TOP OF SCREEN
BSC	BOTTOM OF SCREEN
TD	TOTAL DEPTH
CG	CEMENT GROUT

MONITORING WELL 1584-98-146B PAMPLICO, SC.GPJ S&ME.GDT 1/28/09

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COMPLETION REPORT OF WELL No. MW-18B

COMPLETION REPORT OF WELL No. BSW-1

PROJECT: **Marsh Lumber**
PROJECT NO: **1584-98-146B**
PROJECT LOCATION: **Pamplico, SC**

WATER LEVEL:

LATITUDE:
LONGITUDE:
TOP OF CASING ELEVATION: **100.63**
DATUM: **MSL**
LOGGED BY: **GS/EQBH**

DRILLING CONTRACTOR: **Probe Technology**
DRILLING METHOD: **HSA**
DATE DRILLED: **1/7/09**

STRATA DESCRIPTION	SYMBOL	DEPTH (ft.)	WELL DETAILS	DEPTH (ft.)	LEGEND	ELEVATION (ft.)
				0.00	GS	
Not Sampled		0				
		5		13.00	CG	
				14.00	BS	
				18.50	FP	
					BSC	

WELL CONSTRUCTION DETAILS

PROTECTIVE CASING
Diameter:
Type:
Interval:

RISER CASING
Diameter: **2**
Type: **PVC**
Interval: **0-16.5**

GROUT
Type: **Portland**
Interval: **0.5-13**

SEAL
Type: **Bentonite**
Interval: **13-14**

FILTERPACK
Type: **Sand**
Interval: **14-18.5**

SCREEN
Diameter: **2**
Type: **PVC**
Interval: **16.5-18.5**

LEGEND
- FILTER PACK
- BENTONITE
- CEMENT GROUT
- CUTTINGS / BACKFILL
- STATIC WATER LEVEL

TOC	TOP OF CASING
GS	GROUND SURFACE
BS	BENTONITE SEAL
FP	FILTER PACK
TSC	TOP OF SCREEN
BSC	BOTTOM OF SCREEN
TD	TOTAL DEPTH
CG	CEMENT GROUT

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COMPLETION REPORT OF WELL No. BSW-1

MONITORING WELL 1584-98-146B PAMPLICO, SC.GPJ S&ME.GDT 1/28/09

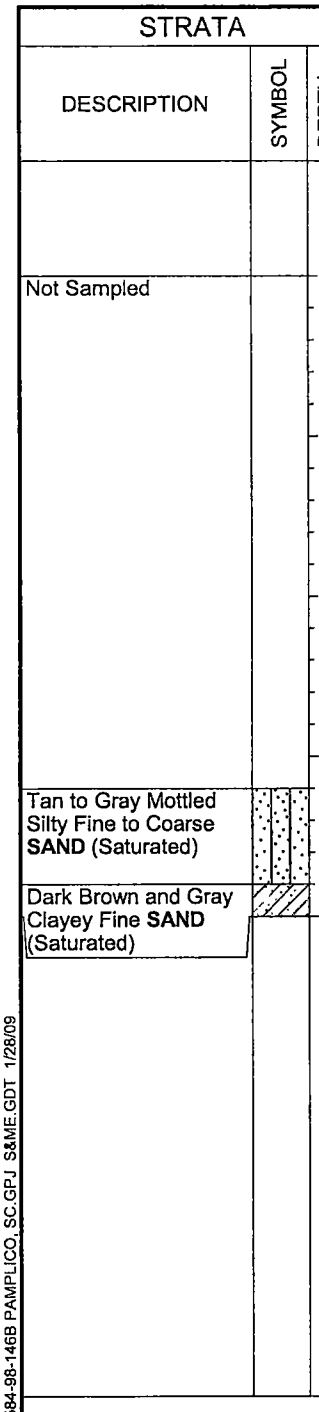
COMPLETION REPORT OF WELL No. BSW-2

PROJECT: **Marsh Lumber**
PROJECT NO: **1584-98-146B**
PROJECT LOCATION: **Pamplico, SC**

WATER LEVEL:

LATITUDE:
LONGITUDE:
TOP OF CASING ELEVATION: **100.32**
DATUM: **MSL**
LOGGED BY: **GS/EQBH**

DRILLING CONTRACTOR: **Probe Technology**
DRILLING METHOD: **HSA**
DATE DRILLED: **1/7/09**



WELL CONSTRUCTION DETAILS

PROTECTIVE CASING
Diameter:
Type:
Interval:

RISER CASING
Diameter: **2**
Type: **PVC**
Interval: **0-10**

GROUT
Type: **Portland**
Interval: **0.5-6**

SEAL
Type: **Bentonite**
Interval: **6-7.5**

FILTERPACK
Type: **Sand**
Interval: **7.5-20**

SCREEN
Diameter: **2**
Type: **PVC**
Interval: **10-20**

LEGEND
- FILTER PACK
- BENTONITE
- CEMENT GROUT
- CUTTINGS / BACKFILL
- STATIC WATER LEVEL

TOC	TOP OF CASING
GS	GROUND SURFACE
BS	BENTONITE SEAL
FP	FILTER PACK
TSC	TOP OF SCREEN
BSC	BOTTOM OF SCREEN
TD	TOTAL DEPTH
CG	CEMENT GROUT

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COMPLETION REPORT OF WELL No. BSW-2

MONITORING WELL 1584-98-146B PAMPLICO_SC.GPJ S&ME.GDT 1/28/09

APPENDIX D

Sample Calculations

S&ME

Job No. 1584-98-146B
Sheet No. 1 of 1
Date January 8, 2009
Computed By Ed Henriques
Checked By

Job Name Marsh Lumber - Pamplico, South Carolina
Subject Evaluate Vertical Flow Gradients

Vertical Gradient = Difference in total head divided by the vertical distance betwee

	TD	Screen	TOC elevation	DTGW	GWE/Total Head	Separation
MW-18A	15.2	13.2' - 15.2'	90.77	4.47	86.30	
MW-18B	6.7	4.7' - 6.7'	90.97	2.49	88.46	8.5

$$Vg = \frac{8.46' - 86.30'}{8.50'} = 0.25\ ft/ft$$

Note: Calculations Based on groundwater elevation data obtained on 1-8-09

Summary of Elevations Determined on 1/8/09 by a rod and level survey

	TOC	GS	Local Benchmark
MW-18A	90.77		TOC @ MW-10
MW-18B	90.97		TOC @ MW-10
BSW-1	100.63		TOC @ MW-1
BSW-2	100.32		TOC @ MW-1
Creek bottom at SW-3		not measured	TOC @ MW-15
Creek bottom at SW-2		82.30	TOC @ MW-15
Creek bottom at MW-18A		84.73	TOC @ MW-10
Creek bottom @ pipe discharge near GP-5		85.96	TOC @ MW-15
Drop Inlet Near MW-14		85.96	TOC @ MW-15
Creek Bottom at SW-1		89.34	TOC @ MW-15