Prepared for:
Parker Hannifin Corporation
Cleveland, Ohio

RCRA Facility Investigation Groundwater Investigation Report (Phase VII – Offsite Investigation)

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Former Parker Hannifin Facility
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Wake Forest, North Carolina

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1.0 Introduction

ENSR Consulting and Engineering (NC), Inc. (ENSR) prepared this RCRA Facility Investigation - Groundwater Assessment Report on behalf of Parker Hannifin (Parker) to summarize results of offsite (downgradient) assessment activities conducted at the facility. The Former Parker Hannifin Wake Forest facility (hereinafter referred to as the Former Parker Facility) is located at 12415 Capital Blvd in Wake Forest, Wake County, North Carolina (**Figure 1**). Soil and groundwater investigations along with corrective action activities are required at the Former Parker Facility as conditions of the facility's Final RCRA Post-Closure Part B Permit (Permit). The permit was originally issued August 1991 by the North Carolina Department of Environment and Natural Resources (NCDENR). Parker submitted a ten year renewal application March 2003, and the Permit was reissued and became effective on July 1, 2006. As specified in Part V of the Permit, corrective action activities require that a RCRA Facility Investigation (RFI) be completed for the Former Parker Facility. A summary of the RCRA Permitting history of the Parker Facility is provided in **Appendix A**.

This RCRA Facility Investigation Report (documenting Phase VII of the investigations) has been prepared by ENSR on behalf of Parker to present the results of the offsite monitoring well installation and sampling activities conducted during the period from November 2006 through February 2007. This investigation and report have been conducted and submitted in order to complete the offsite efforts to define the aerial extent of impacted groundwater. The plume of impacted groundwater has now been completely defined. In addition, this report includes a discussion of the conceptual site model developed by ENSR and Parker which provides an explanation for the movement (from the documented sources areas) and current orientation/location of the impacted groundwater plume.

1.1 Summary of Previous Work

Several phases of RCRA Facility Investigations (RFI) have been completed to-date, addressing both soil and groundwater issues. The location of the monitoring wells installed during the current and previous phases of groundwater investigations are shown on **Figure 2**. The following is a review of the previous investigation phases.

- The original Comprehensive RFI Report was submitted by Parker in 1997 (Rust, 1997). This report outlined the extensive soil and groundwater investigation phases completed prior to that date and summarized the list of previously identified solid waste management units (SWMUs) and areas of concern (AOCs) that had been investigated and identified as requiring No Further Action. In particular, this report outlined the investigation of three SWMUs (SWMU #24, #32, and #33), five AOCs (AOC #27, 28, 35, 36, and 37), and also identified one additional AOC (AOC#38). After submission of this report, the NCDENR Hazardous Waste Section (HWS) submitted comments and required corrective action at AOC #27/#28 along with additional downgradient groundwater investigations. The HWS also recommended additional soil sampling in the SWMU#31/#33 area and the SWMU#16 area.
- The Phase II RFI Report was submitted by Parker in 2002 (Earth Tech, 2002). This report summarized the results of the soil and groundwater investigations completed after the 1997 report. The investigation procedures included the installation of monitoring wells (MW-27, 28, 29, and 30) along with several shallow Geoprobe points north of the facility. Limited soil sampling was conducted in the SWMU#16 area and the SWMU #31/#33 area. Section 3.0 of the 2002 report documents all of

the SWMUs and AOC that were previously identified, summarizes the associated investigations, and identifies which have been labeled as requiring no further action.

- The Phase III RFI Report was submitted by Parker in February 2005 (Earth Tech, 2005) documenting additional soil sampling in the northeast building area (NEBA), the SWMU#31/#33 area, and the AOC#38 area. The NEBA encompasses the following SWMUs and AOCs listed in the permit as requiring further action; SWMU #11, SWMU #15, SWMU #16, SWMU #24, SWMU #32, SWMU #36, AOC #37. This work was conducted in November and December 2003 in accordance with the approved Workplan (Earth Tech, 2003). This phase of the soil investigation generally defined the aerial extent of impacted soils in these three areas, and served to identify the preliminary Compounds of Concern in those three areas.
- The Phase IV RFI Report was submitted by Parker and ENSR in June 2005 (ENSR, June 2005) documenting investigations conducted in the fall of 2004. The main goal of this phase of the RFI was to complete the offsite (northwest) delineation of the impacted groundwater plume. The investigation was designed to supplement the existing monitoring well network with the installation of four additional wells (MW-32, MW-33, MW-34, and MW-35) north and west of the Former Parker Facility. The report included a description of well installation activities for two saprolite/partially weathered rock (PWR) monitoring wells and two bedrock monitoring wells. Geophysical, optical, and acoustic logging were also conducted to evaluate bedrock lithology and fracture dimensions and orientations. The geographic extent of TCE-impacted groundwater was not fully delineated during this investigation. However, the presence of TCE in the newly installed wells (MW-33, MW-34, and MW-35) indicated that TCE-impacted groundwater was present offsite to the northwest of the Former Parker Facility.
- The Phase V RFI Report was submitted by Parker and ENSR in December 2005 and documented the installation of two additional groundwater monitoring wells (MW-36 and MW-37) hydraulically upgradient (southeast) of the former manufacturing building during August and September 2005. The primary goals of this investigation were to demonstrate that the impacted groundwater plume was adequately delineated in the upgradient (relative to confirmed sources areas) direction. These activities were conducted in response to recommendations from Larry Stanley of the HWS.
- The Phase VI RFI Report was submitted by ENSR and Parker in July 2006, and documented the completion of the delineation of impacted soil in three areas of the Former Parker Facility. Soil sampling was conducted in November 2005 in the NEBA, the SWMU#31/#33 area, and the AOC #38 area. These areas had been previously investigated in 2003 during Phase III of the RFI but the delineation of the horizontal and vertical extent of impacted soils was not completed at that time. The Phase VI investigation completed the delineation of impacted soils in these three areas and also provided background sampling data for use in the evaluation of background metals in these three areas.
- Offsite water supply wells located north and west of the Former Parker Facility were sampled in April 2006. Copies of letter reports with laboratory analytical data are included in **Appendix B**, along with a map demonstrating the location of the water supply wells relative to the Former Parker Facility.

Based on a review of the data collected during the previous phases of RFIs at the Former Parker Facility, ENSR and Parker have established the following conclusions.

- All of the SWMUs and AOCs identified at the Parker facility have been adequately investigated. The majority of these have been identified as requiring No Further Action. Only three areas of the Former Parker Facility require additional corrective action for soils: SWMU #16, #24, and #32 in the NEBA, the

SWMU #31/#33 area, and the AOC #38 area. It has been determined that these were the source areas for the existing impacted groundwater plume.

- Parker and ENSR will be submitting (under separate cover) workplans for interim corrective action to address the impacted soil in these three source areas.
- The previous RFI work including the installation and sampling of groundwater monitoring wells both on-site and offsite, the sampling of surface water points both on-site and offsite, and the sampling of potable water supply wells offsite, have defined the extent of the impacted groundwater plume except along the northern boundary of the plume on the Holding property.

Based on the conclusions outlined above, this final phase of investigation (RFI Phase VII, outlined herein) was recommended to extend the definition of the horizontal and vertical extent of the dissolved phase plume of targeted compounds along the northern flank of the facility on the Holding Property. The scope of work included the installation of monitoring wells and the collection of surface water samples. This RFI report also includes a conceptual site model which explains the orientation and location of the dissolved phase plume.

1.2 Phase VII RFI Objectives

The objectives of this phase of the RFI were as follows:

- Supplement the existing monitoring well network with installation of additional wells (MW-38, MW-39, MW-39D, MW-40, MW-40D, and MW-41) downgradient (north and west) of the existing monitoring well network in order to support site assessment activities;
    - Collect water level data from existing and newly installed monitoring wells to prepare a groundwater flow map;
    - Prepare maps depicting the distribution of VOCs in groundwater (including information from the newly installed wells along with information from existing wells collected during the 1st 2007 semi-annual groundwater sampling);
    - Determine the extent of Volatile Organic Compound (VOC) concentrations in groundwater above regulatory limits within the Former Parker Facility, and downgradient (north and west) of the Former Parker Facility;
- Develop documentation supporting the conceptual site model of plume movement in the subsurface at the Parker facility;
    - Evaluate aquifer hydraulic characteristics at the new monitoring wells to support characterization of groundwater flow and dissolved VOC transport; and
    - Identify geologic features (e.g., fractures, varied lithologies, etc.) that influence groundwater flow.

This report includes a description of well installation activities for four saprolite/partially weathered rock (PWR) monitoring wells and two bedrock monitoring wells. Also discussed are the groundwater sampling and water level gauging results for newly constructed and existing monitoring wells.

The following sections provide a brief site history, an overview of site geology and hydrology, the methods and procedures used during the site investigation, and a summary of results.

2.0 Background and Site History

This section of the report provides background information on topography of the Former Parker Facility area and details some of the historic site operations. A detailed description of regional and site-specific physiography, geology, and hydrogeology is also provided below.

2.1 Site Location and Description

The Parker facility is located at 12415 Capital Blvd in northeastern Wake County, North Carolina. The Former Parker Facility consists of approximately 30 acres along US Highway 1, 0.4 miles north of the intersection of Highway 1 and Highway 98 in Wake Forest, North Carolina (**Figure 1**). The manufacturing building was located on the upper portion of the property at an elevation of 396 feet. The property slopes gently to the north and northwest, reaching an elevation of 345 feet where intermittent streams drain the property into nearby Horse Creek. During plant construction, a large area of the upper portion of the property was graded and the excess dirt was moved to the north of the plant where it is now bisected by an intermittent stream and covered by a large stand of pines and hardwoods. The northern one third of the property is heavily wooded with thick undergrowth. Properties surrounding the Former Parker Facility consist of residential, commercial, and undeveloped properties. The layout of the Former Parker Facility and surrounding property is depicted on **Figure 2**.

2.2 Site History

The Former Parker Facility was constructed in 1964 for the manufacture and distribution of air control devices. The Former Parker Facility was previously owned by the Scovill Corporation and Schrader Bellows prior to its purchase by Parker in 1986. Parker had historically leased the property from the Wake Forest Industrial Development Corporation. The property was sold to St. Ives 220 LLC on June 2, 2006. Manufacturing activities at the Former Parker Facility ceased in January 2002.

Since its opening in 1964 through January 2002, the Former Parker Facility operated a system for the treatment of wastewater generated by metal finishing and plating operations. The original wastewater treatment system consisted of a clarifier and two sand filter beds. Wastewater from the plating operation was chemically treated in batch tanks to produce an insoluble metal hydroxide. The wastewater was then pumped into the clarifier, where the metal hydroxides became concentrated as a wet sludge. To further facilitate the removal of solids, the treated wastewater was discharged to the sand filter beds. The metal hydroxide precipitates were retained on the surface of the filter beds and filtrate was collected in the bottom of the filter beds. The treated water was discharged from the filter beds to the Wake Forest Publicly Owned Treatment Works (POTW).

Parker previously used chlorinated solvents, primarily trichloroethene (TCE), to remove oil and metal particles from machined parts during its manufacturing process. Two above ground storage tanks (one for virgin product and one for used product) referred to as SWMU#24 were located on the northeast side of the building.

3.0 Field Procedures – Offsite Well Installation Testing

The field program was conducted in stages from November 2006 through February 2007 including installation of monitoring wells, groundwater sampling, groundwater level measurements, and aquifer testing. Investigation methods for the assessment are described in the following subsections.

The groundwater investigation focused on obtaining analytical data to assess the horizontal and vertical delineation of VOCs in groundwater to the north of the property. The assessment included installation and sampling of four (4) groundwater monitoring wells constructed in deep saprolite/PWR and two (2) monitoring wells constructed in bedrock. The newly installed wells were sampled during two (2) separate events and were also sampled in conjunction with the 1st 2007 Semi-Annual (February 2007) Monitoring event. During the 1st 2007 Semi-Annual Monitoring event, twenty-three (23) existing, and eight (8) newly installed wells were gauged, and sampled. Slug testing was conducted on all newly installed wells and a step drawdown test was conducted at the MW-39/MW-39D well pair.

3.1 Offsite Monitoring Well Installation

Four, two-inch outside diameter (OD) PWR wells (MW-38, MW-39, MW-40, and MW-41) were completed in deep saprolite/PWR zone on top of bedrock. Two, two-inch diameter monitoring wells (MW-39D and MW-40D) were installed in the upper bedrock. The wells were installed by Geologic Exploration, Inc. of Statesville, North Carolina. The location of the new wells is illustrated on **Figure 2**. Well construction details for the existing wells are provided on **Table 1** and well construction and boring logs for the newly constructed wells are provided in **Appendix C**.

3.1.1 Deep Saprolite/PWR Monitoring Well Construction

Monitoring wells MW-38, MW-39, MW-40, and MW-41 were installed in the deep saprolite/PWR zone on top of bedrock using a hollow-stem auger rig. The boring was terminated at auger refusal. Soil samples were collected for organic vapor screening with a photo ionization detector (PID) calibrated to 100 ppm isobutylene gas and lithologically logged by a geologist. Samples were obtained by advancing a decontaminated four-foot long Geoprobe® macrocore sampler. The deep saprolite/PWR wells were constructed with two-inch OD polyvinyl chloride (PVC) well casing and a ten-foot section of 0.01-inch slot PVC screen set at the bottom of the boring. The annular space around the screened interval was filled with #2 filter sand to at least two feet above the top of the well screen using a tremie pipe. A two-foot thick bentonite seal was placed on top of the sand pack and the remainder of the well annulus was filled with grout to the ground surface. The well depths for newly installed monitoring wells are included in **Table 1**.

3.1.2 Bedrock Well Construction

Bedrock wells MW-39D and MW-40D were installed by advancing hollow-stem augers to refusal. Upon auger refusal, a tri-cone roller bit was used to advance the borehole through the PWR zone. When more competent rock was encountered, wire-line coring equipment was used to further advance the borehole to the desired casing depth. MW-39D was installed to approximately 70 ft bls and MW-40D was installed to 60 ft bls. A six-inch OD PVC outer casing was set to a depth of approximately 23.5 ft bls in MW-39D and 33.5 feet in MW-40D. The annular space around the casing was then pressure grouted with a bentonite (approximately 5%)

and Portland cement slurry to the surface. A four-inch OD PVC casing was then installed to approximately 52 ft bls in MW-39D and 40.5 ft bls in MW-40D. The annular space between the four-inch and six-inch casing was pressure grouted to the surface.

After allowing the grout to cure for a minimum of 24 hours, a 3-inch diameter coring device was used to collect a continuous bedrock core from within the four-inch casing. Approximately 18 feet of continuous bedrock core was collected from boring MW-39D and about 19.5 feet was collected from boring MW-40D. Following core collection, a five-foot section of 0.01-inch slot PVC screen was set in the bottom of the boring and completed to the surface with two-inch OD PVC casing. The annular space around the screened interval was filled with #2 filter sand to at least two feet above the top of the well screen using a tremie pipe. A four-foot thick bentonite seal was placed on top of the sand pack and the remainder of the well annulus was tremie grouted to the ground surface. The total depths of wells MW-39D and MW-40D are 70 and 60 ft bls, respectively.

The six newly installed wells were secured with locking expansion plugs, a locking well case, and concrete pad. Following installation, each well was developed with a decontaminated submersible pump. The newly installed wells were surveyed for horizontal location and top of casing elevation on January 31, 2007 by the John R. McAdams Company. The newly installed wells were tied-into the existing plat map.

3.2 Groundwater Gauging, Sampling, and Analysis

To evaluate the shallow groundwater flow direction, groundwater levels were measured in the six new wells during each of the sampling events using an electronic water level meter. Measurements were collected prior to groundwater sampling. A summary of the data collected during the sampling event is included in **Table 1.**

The following sampling procedures were used for the six newly installed wells during the three sampling events. These procedures are consistent with the sampling and analysis plan used for all sampling events at this facility. Prior to sampling, stagnant water in each well was removed using a decontaminated submersible Monsoon pump with new polyethylene tubing. Temperature, pH, specific conductance, dissolved oxygen (DO), oxidation-reduction potential (ORP), and turbidity were measured and recorded during well purging using a YSI 556. The wells were considered purged when measurements of groundwater temperature, pH, specific conductance, DO, ORP were stable, turbidity was below 10 Nephelometric Turbidity Units (NTUs) and after one well volume was removed from the well (or the well was pumped dry). Field parameters were considered stable if consecutive measurements were within 10% of the previous well volume measurements. A groundwater sample collection record was prepared for each well sampled. These records are included in **Appendix D** of this report. Evacuated groundwater was placed into labeled 55-gallon drums. The contents of the drums were pumped into the on-site remediation system for treatment. Field parameters are summarized on the groundwater collection records found in **Appendix D**.

Once the field parameters had stabilized to within 10% for three consecutive readings, groundwater samples were collected and transferred into laboratory supplied sample containers and immediately placed on ice. A chain-of-custody record was completed and the samples were delivered via courier to Pace Analytical Services (Pace) of Huntersville, North Carolina for analysis. Groundwater samples were analyzed for VOCs by United States Environmental Protection Agency (EPA) Method 8260, 1,4-dioxane by EPA Method 8270, and RCRA metals (arsenic, barium, cadmium, chromium, lead, iron, and manganese) by EPA Method 6010B, and mercury by EPA Method 7470. The laboratory analytical report is provided in **Appendix E**.

3.3 Aquifer Testing

3.3.1 Slug Testing

On March, 2007, ENSR performed falling-head and rising-head slug tests on the newly installed monitoring wells. The falling-head and rising-head test methods involved the following procedures:

- The initial static water level in the well was measured and recorded.
- A decontaminated In-Situ™ Leveltroll data logger was then lowered at least two feet from the well bottom.
- Once water levels had stabilized, the Leveltroll data logger was started and a decontaminated six-foot long one-inch diameter PVC slug was inserted into the well and completely submerged.
- Once water levels had stabilized the Leveltroll data logger was stopped. After starting the Leveltroll again, the slug was rapidly removed from the well.
- During both tests, water levels were recorded periodically until the water level returned to at least 95% of the static water level.

The aquifer test data was imported into AQTESOLV for Windows Professional Edition 3.5 (Hydrosolve, Inc., 2002) and analyzed using the Bouwer and Rice Method (Bouwer and Rice, 1976) of partially penetrating wells in unconfined aquifers. The results of the slug tests are summarized in Section 4.4. Field collection records and data graphs are provided in **Appendix F**.

3.3.2 Step-Drawdown Testing

One step-drawdown test was performed at monitoring well MW-39D. The step-drawdown test methods involved the following procedures:

- The initial static water levels in MW-39 (observation well) and MW-39D (pumping well) were measured and recorded.
- A decontaminated submersible Monsoon pump with new polyethylene tubing was then lowered to within 2 feet from the bottom of MW-39D.
- Decontaminated In-Situ™ Leveltroll data loggers were lowered at least two feet from the well bottom in both MW-39 and MW-39D.
- Once water levels had stabilized in both wells, the Leveltroll data loggers were started.
- MW-39D was pumped at a rate of 3 Liters per minute (l/min) until the water level stabilized. The pumping rate was then increased to 6 l/min.
- This step was repeated two more times increasing the pumping rate to 7.5 l/min, and then 10 l/min until the water level stabilized.
- Water levels were recorded at 3 second intervals from MW-39D and at 30 second intervals from MW-39. Water levels in both wells were also recorded manually during the test.

The aquifer test data was imported into AQTESOLV for Windows Professional Edition 3.5 (Hydrosolve, Inc., 2002) and analyzed using the Hantush-Jacob Method (Hantush and Jacob, 1955) of wells in leaky confined aquifers. The results of the step-drawdown tests are summarized in Section 4.4. Field collection records and data graphs are provided in **Appendix F**.

4.0 Passive Aquifer Pumping Test

With prior approval from the NCDENR, ENSR shut down Recovery well RW-4 at the Parker Hannifin facility on April 12, 2007 in order to conduct a passive aquifer pumping test. Recovery well RW-4 was shut down from April 12, 2007 until May 25, 2007 and water levels in select monitoring wells (MW-2, MW-3, MW-4, MW-5, MW-6, MW-10, MW-11, and MW-18) were monitored in order to evaluate changes in the shape and orientation of the cone of depression created by recovery well RW-6. The results of the passive aquifer pumping test are summarized in Section 5.6 and included in **Table 2**.

5.0 Field Program Results

The following sections summarize results from well installation and groundwater sampling activities conducted at the Former Parker Facility along with relevant data interpretations.

5.1 Site Geology

Site geology was evaluated based on a historical fracture trace analysis, soil boring and monitoring well lithologic logs, historic geophysical surveys, a magnetometer survey, and downhole geophysical surveys. A literature review of geological research in the area was also performed. A generalized geologic map of the area is provided on **Figure 3**. Boring logs for the monitoring wells installed during this investigation are provided in **Appendix B**. Geologic information from the logs is presented on the geologic cross-sections (**Figure 4 and Figure 5**). Lines of cross-section are illustrated on **Figure 2**.

Based on the available data, four major lithologic units have been identified. These units include the uppermost soil horizon, saprolite, PWR, and bedrock. The upper soil layer is comprised of micaceous red to brown clayey silts and silty clays and ranged from < 5.0 to 10 feet in thickness. The surficial soil layer transitions gradually to saprolite that is composed of clayey silts with some sand and clayey sands with some silt. The material generally coarsens with depth. The thickness of the saprolite ranges from 14 to 30 feet thick in the borings installed during this phase of site assessment. Beneath the saprolite is a partially weathered rock zone of variable thickness (~7 to 18 feet). The PWR zone, often referred to as the transition zone, exhibits the same properties as deeper soils but with higher occurrence of rock and rock fragments.

Depth to competent bedrock was approximately 40 ft bls in boring MW-39D and 52 ft bls in boring MW-40D. The bedrock encountered during this investigation in borings MW-39D and MW-40D is a biotite-hornblende gneiss with quartz veins locally known as the Raleigh Gneiss (Farrar, 1985). Cores recovered from both borings revealed a near vertical foliation with joint sets parallel to foliation. Joint sets were also noted orthogonally to foliation planes.

In MW-39D, fractures (or groups of fractures) believed to be water producing occur from 56-70 feet. Potential water producing fracture zones occur between 43-45 feet and 52-60 feet in monitoring well MW-40D. In both borings there was an average of approximately two features (either sealed or partially opened) per foot.

Based on the results of coring in MW-39D and MW-40D it does not appear that the Nutbush Creek Fault was encountered during drilling activities. Core recovery indicates that both wells were installed in the Raleigh Gneiss. Drilling at MW-39D encountered a thick weathering profile that would be expected in a stream valley. Core recovered at MW-40D indicates a thinner weathering profile. No diabase was encountered during drilling or coring activities.

5.2 Site Hydrology

The rolling hills in the region surrounding the Former Parker Facility are dissected by many small to medium-sized streams in a geologically-controlled trellis drainage system. Generally the larger streams

in the area tend to parallel bedrock strike, while the course of the smaller streams is more related to fracture orientation. Runoff at the Former Parker Facility drains north/northwest into three unnamed intermittent streams. These streams drain into Horse Creek which flows into the Neuse River.

5.3 Groundwater Gauging Event

In February 2007, depth to water measurements were collected from all active monitoring wells by ENSR personnel (**Table 1**). A groundwater elevation map is provided as **Figure 6**. During the gauging event, depth to groundwater ranged from approximately 5 (MW-21) to 47 (POC-2B) ft bls. The water table contours illustrated are based on the February 2007 gauging event and historic interpretations of shallow groundwater flow. Based on the groundwater elevation data, the shallow groundwater flow generally mimics topography and topographic divides with the majority of groundwater flowing towards the intermittent streams surrounding the Former Parker Facility at an average gradient of approximately 0.05 ft/ft.

5.4 Groundwater Sampling and Analysis

A total of 32 groundwater samples (29 wells and 3 duplicates) were collected from the six newly installed monitoring wells (MW-38, MW-39, MW-39D, MW-40, MW-40D, and MW-41) and 23 existing monitoring wells. Duplicate samples were collected from MW-32, MW-28, and RW-4. Groundwater samples were analyzed for VOCs, 1,4-dioxane, and metals (arsenic, barium, cadmium, chromium, iron, manganese, lead, and mercury). Groundwater analytical results for VOCs, 1,4-dioxane, and metals are summarized on **Tables 3, 4, and 5**, and are discussed below. Copies of the laboratory analytical reports are provided in **Appendix E**. An isoconcentration map depicting the spatial distribution of trichloroethene (TCE) is presented in **Figure 7.**

5.4.1 Newly Installed Deep Saprolite/PWR Wells

Groundwater samples were collected from the six newly installed wells during three separate events on December 15, 2006, January 18, and during the February 2007 semi-annual monitoring event. A complete summary of the three events is included in **Table 6**. Groundwater samples collected from monitoring wells MW-38 and MW-40 had detectible concentrations of TCE which exceed the 2L standard of 2.8 µg/l. Trichloroethene was detected at concentrations of 20 µg/l in MW-38 and 12 µg/l in MW-40. No targeted compounds were detected at concentrations above laboratory reporting limits in groundwater samples collected from monitoring wells MW-39 and MW-41. Groundwater samples collected from newly installed deep saprolite/PWR monitoring wells did not contain 1,4-dioxane at concentrations above laboratory reporting limits. No metals were detected at concentrations above the permit designated limits.

5.4.2 Newly Installed Bedrock Wells

Groundwater samples collected from bedrock monitoring well MW-40D had detectible concentrations of TCE (12 µg/l). No targeted compounds were detected at concentrations above laboratory reporting limits in groundwater samples collected from monitoring well MW-39D. Groundwater samples collected from newly installed bedrock monitoring wells did not contain 1,4-dioxane at concentrations above laboratory reporting limits. No metals were detected at concentrations above the permit designated limits.

5.4.3 Point of Compliance Wells

Trichloroethene was detected at concentrations above the 2L standard in all four Point of Compliance (POC) Wells during the subject event. A total of seven VOCs were detected above reportable concentrations in the groundwater sample collected from monitoring well POC-2A during the sampling event. Four VOCs exceeded the 2L standard including 1,2,3-trichloropropane (6.1 µg/L), chloroform (6.4 µg/L), PCE (9.3 µg/L), and TCE (5,800 µg/L). Groundwater samples collected from POC wells did not contain 1,4-dioxane at concentrations above laboratory reporting limits. No metals were detected at concentrations above the permit designated limits.

5.4.4 TCE Distribution

TCE concentrations detected during the February 2007 investigation ranged from non-detect (MW-39, MW-39D, MW-40, and MW-41) to 12,000 µg/L (POC-2B). TCE concentrations generally decrease with distance northward from the former manufacturing facility (**Figure 7**). The newly installed wells indicate that a portion of the contaminant plume has migrated to the north of the facility. The contaminant plume is bracketed by Horse Creek to the northwest of the facility.

5.5 Aquifer Test Results

Rising head and falling head slug tests were conducted in wells MW-38, MW-39, MW-39D, MW-40, MW-40D, and MW-41 to evaluate hydraulic conditions at the Former Parker Facility. One step-drawdown test was also performed at MW-39D. Data results are summarized in **Table 7**.

5.5.1 Slug Testing

Slug test data sheets and graphical results of the analysis are presented in **Appendix F**. Slug test data were analyzed in AQTESOLV (Hydrosolve, 2002) by the Bouwer and Rice (1976) methodology to estimate the hydraulic conductivity (K) of the subsurface materials on-site.

5.5.2 Step-Drawdown Testing

Step-drawdown data were analyzed in AQTESOLV (Hydrosolve, 2002) by the Hantush-Jacob (1955) methodology to estimate the hydraulic conductivity of the bedrock aquifer.

5.5.3 Summary

Aquifer test data results were used to calculate groundwater velocity using the following equations and variables.

$V=Ki/n_e$, where;
V = velocity approximation based on groundwater flow under homogenous and isotropic conditions in ft/day or ft/year
K = hydraulic conductivity in ft/day
i = hydraulic gradient determined from aquifer flow (unitless or ft/ft)
n_e = effective porosity estimate based on aquifer material type (unitless)

The hydraulic conductivity values in the water table aquifer ranged from 0.26 to 3.20 feet per day (ft/day).

The geometric mean was calculated to be 1.28 ft/day. The groundwater velocity was calculated to be 0.24 ft/day or 86.14 ft/year. This assumes a hydraulic gradient of 0.02 ft/ft and an effective porosity of 0.20. These values are within the range of K values typical of silty clay to silty sand soils and saprolite (Fetter, 2001).

The hydraulic conductivity values in the bedrock aquifer ranged from 4.80 to 5.60 ft/day. The geometric mean was calculated to be 5.09 ft/day. Step-drawdown testing for the bedrock aquifer indicated a hydraulic conductivity of 8.33 ft/day. The groundwater velocity was calculated to be 0.24 feet per day or 87.60 feet per year. This assumes a hydraulic gradient of 0.01 ft/ft and an effective porosity of 0.20.

5.6 Results of Passive Aquifer Pumping Test

After shutdown of recovery well RW-4 on April 12, 2007, ENSR conducted a passive aquifer pumping test at recovery well RW-6. Water levels in surrounding monitoring wells (MW-2, MW-3, MW-4, MW-5, MW-6, MW-10, MW-11, MW-18, POC-1A, and POC-2B) and recovery wells (RW-4 and RW-6) to monitor changes in the shape and orientation of the cone of depression.

Recovery wells RW-4 and RW-6 are oriented approximately on-strike with the surrounding geologic material. Since their installation and activation, the cone of depression surrounding the wells has maintained an ellipsoidal shape elongated in an approximately northeast orientation. During shut down of RW-4 between April 12 and May 25, 2007, the cone of depression rebounded slightly in the southern portion; however throughout the test the ellipsoidal shape was maintained. The resulting cone of depression following the passive aquifer pumping test was oriented on an approximately N 17° E orientation. Weekly groundwater gauging results for surrounding monitoring and recovery wells during passive aquifer pumping test are included in **Table 2**.

6.0 Conceptual Site Model

One of the goals of this phase of the investigation was to develop a basic conceptual site model to explain the movement of the impacted groundwater plume. Previous reports have noted that based on the known source areas for impact to soils and eventually groundwater, the current configuration of the impacted groundwater plume is inconsistent with the expected direction of groundwater flow based on the topography and the potentiometric surface as measured in the monitoring wells. During this investigation, ENSR and Parker have carefully reviewed the geologic investigations conducted at the facility, and also conducted a pumping test to evaluate drawdown from RW-6, and using this information developed a model for the groundwater flow that effectively explains the current configuration and location of the impacted groundwater plume. The following sections reviews and summarizes all of the geologic investigations conducted at the site to date.

6.1 Regional Physiography

The Former Parker Facility is situated within the eastern-most portion of the Piedmont Physiographic Province of North Carolina. Regional and local topography consists of rolling hills dissected by narrow v-shaped drainage ways and perennial streams that eventually drain into the Neuse River. The relief on the subject property averages 100 feet from valley floor to the top of interstream ridges. The Facility is situated on a north-south ridge at an elevation of approximately 398 feet. The trellis drainage system in the vicinity of the Facility is geologically controlled, with the larger streams generally paralleling the bedrock strike and the smaller streams oriented perpendicular to bedrock strike along fracture planes.

6.2 Regional Geology

Regionally, the Former Parker Facility is situated in the Raleigh Geologic Belt with underlying bedrock consisting of injected gneisses and schists of the approximately north-trending Cambrian-aged Raleigh Terrane (informally known as the Raleigh gneiss; Farrar, 1985). **Figure 3** provides a generalized bedrock geologic map of the Falls Lake-Wake Forest area (Horton et al., 1992) showing the lithologic units characteristic of the area around the Former Parker Facility. The Raleigh Terrane is characterized by a heterogeneous, locally migmatitic, gneiss composed mainly of hornblende-biotite gneiss and biotite gneiss (Horton et al., 1994). Numerous sets of joints exist in this area, particularly in gneisses with generally northeast strikes and vertical to subvertical dips. The majority of the meta-igneous rocks (from cores) show some foliation due to the presence of cleavage, the uniform orientation of platy minerals, or a layering of different mineral compositions (Parker, 1979).

The Raleigh Terrane is bounded by the Paleozoic-aged Nutbush Creek fault to the west and the Rolesville batholith to the east. The Nutbush Creek fault zone is part of a regional system of right-lateral Alleghanian faults that extend from Virginia to Alabama (Druhan et al., 1994). In the Wake County area, the fault zone trends north-northeast and is typically about 1 km wide. The felsic gneisses and schists beneath the Former Parker Facility have been deformed into a regional series of folds which plunge gently to the north-northeast. These folds in turn have been refolded around steeply west-plunging axes. Felsic rocks form the ridge on which the plant is located and are in contact with belts of more micaceous rocks in the valleys to either side. The lithology associated with the Nutbush Creek fault in the Wake Forest area is the subhorizontally lineated, granitic orthogneiss informally named the Falls Leucogneiss (Farrar, 1985). The contact between the Raleigh

terrane and the Nutbush Creek fault is generally sharp; however, some textural overprinting can occur up to a few kilometers away from the fault zone (Druhan et al., 1994).

Diabase dikes traverse the area regionally along a general northwest to southeast alignment; at least one of these is mapped just to the south of the Facility on the North Carolina Geologic Map (Brown, 1985). According to published geologic documents, these dike features may be up to 100 to 200 feet wide. Smaller dike splays may be 10 to 20 feet wide (Parker, 1979). Mapped dike locations for the region are based on previously conducted aeromagnetic surveys and are subject to interpretation. Diabase was reported in a core sample from monitoring well MW-24 at a depth of between 82 and 90 feet below land surface (ft bls).

6.3 Site Geology

In general, subsurface soil and rock can be subdivided into units to facilitate localized lithologic characterization as follows:

- According to the Wake County Soil Survey, surficial soils in the vicinity of the former plant have been mapped as the Cecil series CeB2 and CeC2 (USDA, 1970). These Cecil soils are described as sandy loams, typical of well drained, gently sloping to steep areas, and are derived mostly from gneiss and schist. The following soil series have been mapped in the area northeast of the facility: Wilkes soils (sandy loam), Madison soils (sandy loam), and Chewacla soils. Wilkes and Madison soils are generally located on slopes in wooded areas. Chewacla soils are formed on floodplains of streams.
- In general, subsurface soils consist of silty clay (CL) residuum overlying clayey sand (SC) and silt (ML) saprolite, which coarsens with depth. The saprolite originates from the underlying gneissic material and typically contains relict structures and fabric from the parent rock from which it was weathered. Regionally, saprolite can vary in thickness from a few feet up to hundreds of feet, generally being the thickest in locations without visible rock outcropping. A thick saprolite zone suggests that underlying rock is fractured (LeGrand, 1988).
- The saprolite gradually grades into PWR with depth. PWR often exhibits the same properties as deeper saprolitic soils (SM), but with higher occurrence of rock and rock fragments. PWR is typically thinnest along ridges and uplands and thickest beneath slopes and low-lying areas.
- Bedrock in the vicinity of the Former Parker Facility typically consists of a gneissic rock with a high degree of fractures near the interface of PWR and bedrock. Based on a review of the literature and previous investigations, the average strike of the structural features in the bedrock in the vicinity of the Former Parker Facility is north 7 degrees (°) -26° east(E) with a dip of 70° to 80° E. Joints and fractures are common and dissipate with depth while voids and vugs are common in shallow rock zones when weak exfoliation soil zones are encountered near PWR. The dominant regional joint orientation is north 75° ± 10° west (W) with a dip of 80° north (N). A secondary, longitudinal joint orientation that is approximately parallel to strike is present at N 4° -25° E. A summary of regional geologic observations is included in **Table 8**.

6.4 Geophysical Investigations

6.4.1 Fracture Trace Analysis-February 1989

A fracture trace analysis was conducted in February 1989 and consisted of a study of topographic maps and aerial photographs, and the measurement and mapping of joints, fractures, and foliations in limited nearby outcrops and a local quarry (WES, 1989). The fracture trace study indicated the presence of two bedrock fracture system orientations in the region.

The predominant regional system trends north-northeast and dips mainly to the southeast and is expressed in the orientation of the major streams in the area such as Horse Creek. This longitudinal joint set is present striking N 5-25° E with a near vertical dip (Parker, 1979). The literature review revealed that the most numerous joint sets in the area are oriented N 75 ° ± 10° W and dip about 80° N. The less predominant regional west-northwest trend is expressed in the smaller tributaries as evidenced by the small stream on the northern portion of the Parker Property. This stream trends north-northwest, then west-northwest before feeding into Horse Creek. Strike and dip measurements of foliation collected by Westinghouse Environmental Services (Westinghouse) within a two (2) mile radius of the Former Parker Facility revealed an average trend of N 8° to 28° E dipping from 70° to 80° E (Westinghouse, 1989). This trend parallels one of the longitudinal joint sets.

6.4.2 Geophysical Survey-January 1990

A seismic refraction survey, consisting of two seismic refraction lines, was completed in January 1990 (Almy and Harvey, 1990). This study concluded that the regional west-northwest trend of fracture orientations could be resolved into two probable fracture orientations developed in bedrock underlying the Former Parker Facility. The two fracture systems strike north to slightly northwest and west-northwest and dip approximately vertically. Each of these zones is expressed topographically by the presence of a portion of the intermittent stream bed. The formation and location of the stream appears to have been structurally controlled by deep weathering along the fracture zones. This is especially true of the west-northwest trend which is the predominant on site stream orientation prior to the shift in stream course after fill was placed in this area. The geophysical survey located one area of deeper weathering in the stream trace near the northern property boundary and recovery well RW-19 was placed in this area.

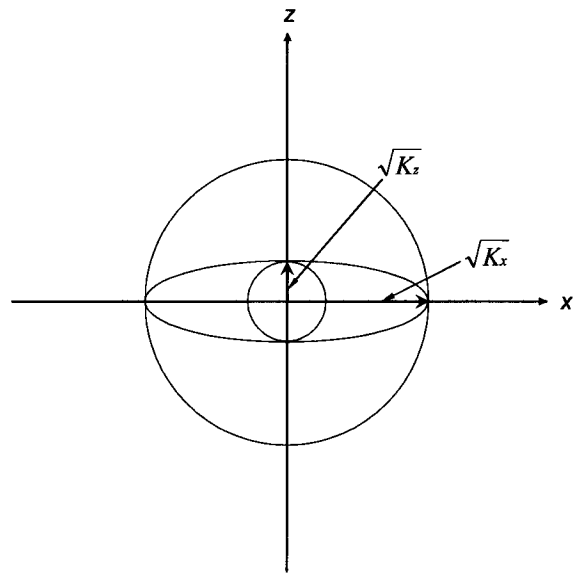
Magnetometer work was performed in the fall of 1995 to try to locate any extension of the diabase rock encountered in MW-24 (S&ME, 1995). The North Carolina Geological Survey Map of North Carolina shows an extensive diabase dike trending north through Wake County and mapped up to US Highway 1, east of the Parker Facility. The authors of the magnetometer survey concluded that any diabase on the Former Parker Facility was too deep to be located by magnetometer survey (S&ME, 1995).

6.5 Regional Hydrogeology

Hydrogeologically, the Former Parker Facility is situated in a meta-igneous hydrostratigraphic province of the eastern Piedmont of North Carolina (Daniel and Payne, 1990). The water table surface is approximately 10 to 40 feet below the ground surface within the unconsolidated saprolite in the eastern Piedmont. Three general hydrostratigraphic units characterize the hydrogeology of the area. The top unit (often referred to as saprolite)

Discussion of Transformed Section

In homogeneous anisotropic media, flow net (groundwater flow) construction is complicated by the fact that flowlines and equipotential lines are not orthogonal. One practical method that has been devised to circumvent the conditions of nonorthogonality involves the construction of a "transformed section". An excellent review of this can be found in Freeze and Cherry (1979), The flow in a two-dimensional region in a homogeneous, anisotropic aquifer can be viewed as having two principal hydraulic conductivities of K_x and K_z. These would be perpendicular to each other, and their orientation would be controlled by geologic and hydrogeologic characteristics of the aquifer. The hydraulic conductivity ellipse (**inset**) will have semiaxes $\sqrt{K_x}$ and $\sqrt{K_z}$.



The scale of the region of flow can be transformed such that the coordinate directions *X* and *Z* are related to those in the original xz system by Z = *z;* and

$$X = \frac{x\sqrt{Kz}}{\sqrt{Kx}}.$$

(Equation 4.4)

For $K_x > K_z$, the transformation will reduce the scale in the x-direction of regional flow. It will also reduce the hydraulic conductivity ellipse into a circle of radius $\sqrt{Kz}$. The fabricated, expanded region of flow will then act as if it were homogeneous with conductivity K_z.

Construction of Anisotropic Flow Net

With this information, a flow net was constructed for a homogeneous, anisotropic aquifer. Refer to **Figure 8** (Equipotential Map-Original Coordinate System) for the groundwater isoconcentration contours for a portion of the Parker Hannifin facility where $K_x > K_z$ (flow net of a homogeneous anisotropic aquifer). **Figure 8** (Equipotential Map-Transformed Coordinate System) can then be transformed (50%) using equation 4.4 so that Kx = Kz in graphical representation. A new flow net was then constructed in the transformed section, according to the rules for a homogeneous, isotropic aquifer. Refer to **Figure 8** (Flownet Constructed on Equipotential Map-Transformed Coordinate System) for the transformed section. Finally, the scaling ratio is inverted 50% so that reference points in the section are in their original geographical positions. Refer to **Figure 8** (Flownet on Equipotential Map-Original Coordinate System) for the transformed section with new scaling ratio. A final transformed section with an overlay of TCE isoconcentration contours is included in **Figure 8** (Flownet on Equipotential Map-Original Coordinate System). Data results are summarized in **Table 2**.

TABLE 1
Well Construction and Groundwater Elevation Data
RCRA Facility Investigation
Former Parker Hannifin Facility
Wake Forest, North Carolina

Well	Top of Casing Elevation (ft)	Stickup (ft)	Ground Surface Elevation (ft)	Depth to Water (ft) Feb. 2007	Groundwater Elevation (ft) Feb. 2007	Screened Zone
MW-1	398.52	2.74	395.78	38.81	359.71	Silty Sand
MW-2	394.14	1.49	392.65	39.32	354.82	Silty Sand
MW-3	393.71	2.62	391.09	38.8	354.91	Silty Sand
MW-4	395.83	1.61	394.22	DRY	DRY	Sandy Silt
MW-5	394.76	1.96	392.8	DRY	DRY	Silty Sand
MW-6	385.63	1.78	383.85	43.03	342.6	Silty Sand
MW-6D	385.73	2.25	383.48	52.17	333.56	Rock
MW-6DR	387.18	2.22	384.96	14.23	372.95	Rock
MW-6DR3	388.11	2.5	385.61	41.48	346.63	Rock
MW-7	354.62	NA	NM	9.88	344.74	Silt to Sand
MW-8	357.77	2	355.77	13.49	344.28	Silt to Sand
MW-8D	358.3	2	356.3	13.09	345.21	Rock
MW-8DR	358.47	1.79	356.68	15.37	343.1	Rock
MW-9	362.44	2.75	359.69	DRY	NM	Silt to Sand
MW-10	389.22	3	386.22	DRY	NM	Silty Sand
MW-11	384.83	2	382.83	31.56	353.27	Silty Sand
MW-11D	384.96	2	382.96	31.81	353.15	Rock
MW-12	386.83	2	384.83	36.26	350.57	Sandy Silt
MW-13	375.96	2	373.96	27.36	348.6	Silt
MW-14	377.03	2	375.03	DRY	DRY	Silt to Sand
MW-15	369.96	2	367.96	21.74	348.22	Silty Sand
MW-16	372.99	1.58	371.41	21.87	351.12	Silt
MW-17	357.15	1.58	355.57	NM	NM	Sand
MW-18	394.45	1.7	392.75	36.11	358.34	Sand
MW-18D	397.17	2.27	394.9	NM	NM	Rock
MW-20	396.22	2.05	394.17	37.9	358.32	Sand
MW-21	339.38	2.45	336.93	5.15	334.23	Sand
MW-21D	340.07	2.14	337.93	14.57	325.5	Rock
MW-22	382.17	1.83	380.34	28.38	353.79	Silty Sand
MW-23	361.45	1.63	359.82	18.5	342.95	Silt to Sand
MW-24	395.28	1.9	393.38	35.51	359.77	Rock
MW-25	395.24	-0.3	395.54	NM	NM	Silty Sand
MW-26	393.82	-0.15	393.97	NM	NM	Rock
MW-27	390.96	3.38	387.58	35.36	355.6	Sandy Silt
MW-28	383.22	3.5	379.72	33.17	350.05	Silty Sand
MW-29	376.69	3	373.69	26.3	350.39	Rock
MW-30	389.97	2.17	387.8	38.93	351.04	Rock
MW-31	391.26	NA	NA	33.97	357.29	NA
MW-32	375.67	NA	375.94	31.09	344.58	Rock
MW-33	382.54	NA	382.69	33.42	349.12	Sand/Rock
MW-34	383.07	NA	383.38	34.05	349.02	Rock
MW-35	377.00	NA	377.56	Destroyed	NM	Silty Sand
MW-36	391.26	NA	391.26	30.79	360.47	Silty Sand
MW-37	395.01	NA	395.01	36.3	358.71	Silty Sand
MW-38	335.51	3.23	332.28	15.56	316.72	Silty Sand
MW-39	352.05	3.39	348.66	12.72	335.94	Silty Sand
MW-39D	352.02	2.76	349.26	11.39	337.87	Rock
MW-40	350.10	3.12	346.98	13.31	333.67	Silty Sand
MW-40D	350.54	3.35	347.19	12.77	334.42	Rock
MW-41	371.79	3.10	368.69	17.68	351.01	Silty Sand
RW-4	393.97	3.08	390.89	44.65	349.32	Silty Sand/Rock
RW-6	388.14	1.5	386.64	43.47	344.67	Rock
RW-19	358.76	2.48	356.28	13.4	345.36	Rock
POC-1A	393.86	1.54	392.32	37.41	356.45	Sandy Silt
POC-1B	393.59	1.85	391.74	38.47	355.12	Rock
POC-2A	395.44	1.86	393.58	43.83	351.61	Silty Sand
POC-2B	395.82	1.52	394.3	46.85	348.97	Rock

Notes:
Depth to water data collected by ENSR personnel during the week of February 19, 2007.
NM = not measured, NA = not available.

TABLE 2
Summary of Passive Aquifer Pumping Test Results
RCRA Facility Investigation
Former Parker Hannifin Facility
Wake Forest, North Carolina

Well ID	TOC Elevation	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
RW-4	393.97	57.43	[illegible]	43.71	[illegible]	43.75	[illegible]	43.43	[illegible]	50.46	[illegible]	48.53	[illegible]	43.16	[illegible]
RW-6	388.14	52.64	[illegible]	69.37	[illegible]	63.1	[illegible]	69.85	[illegible]	45.86	[illegible]	68.67	[illegible]	52.73	[illegible]
RW-19	358.76	60.14	[illegible]	76.14	[illegible]	72.43	[illegible]	76.15	[illegible]	64.86	[illegible]	40.15	[illegible]	64.48	[illegible]
MW-2	394.14	38.52	[illegible]	38.56	[illegible]	38.47	[illegible]	38.43	[illegible]	38.42	[illegible]	38.48	[illegible]	38.43	[illegible]
MW-3	393.71	40.02	[illegible]	39.83	[illegible]	39.69	[illegible]	39.65	[illegible]	39.64	[illegible]	39.67	[illegible]	39.59	[illegible]
MW-4	395.83	Dry	[illegible]	Dry	[illegible]	Dry	[illegible]	Dry	[illegible]	Dry	[illegible]	Dry	[illegible]	Dry	[illegible]
MW-5	394.76	38.32	[illegible]	38.34	[illegible]	38.37	[illegible]	38.34	[illegible]	38.36	[illegible]	38.42	[illegible]	38.41	[illegible]
MW-6	385.63	40.52	[illegible]	41.01	[illegible]	NG	NG	41.3	[illegible]	41.02	[illegible]	41.02	[illegible]	41.01	[illegible]
MW-10	389.22	Dry	[illegible]	Dry	[illegible]	Dry	[illegible]	Dry	[illegible]	Dry	[illegible]	Dry	[illegible]	Dry	[illegible]
MW-11	384.83	31.98	352.85	31.78	353.05	31.83	353	32	352.83	31.75	353.08	32.4	352.43	31.85	352.98
MW-18	394.45	35.88	[illegible]	35.86	[illegible]	35.87	[illegible]	35.83	[illegible]	35.8	[illegible]	35.83	[illegible]	35.81	[illegible]
POC-1A	393.86	NG	NG	38.49	[illegible]	38.42	[illegible]	38.39	[illegible]	38.38	[illegible]	38.39	[illegible]	38.37	[illegible]
POC-2B	395.82	NG	NG	46.61	[illegible]	45.43	[illegible]	43.39	[illegible]	45.37	[illegible]	45.3	[illegible]	45.21	[illegible]

Notes:
RW-4 turned off on April 16, 2007
RW-6 (running)
RW-19 (running)
DTW=Depth to Water
All depths to water were measured from top of PVC well casing
NG=Not Gauged

TABLE 3
Summary of Volatile Organic Compounds: Groundwater Analytical Results
RCRA Facility Investigation
Former Parker Hannifin Facility
Wake Forest, North Carolina

Well Identification	Sampling Date	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MW-3	2/22/07	<5.0	<5.0	26	<5.0	<5.0	<5.0	**980**	<5.0	1006
MW-6	2/22/07	<5.0	<5.0	**550**	24	**5.4**	<5.0	**970**	<5.0	1550.4
MW-6D	2/22/07	<10	<10	**230**	<10	<10	<10	**1700**	<10	1930
MW-6DR	2/22/07	<1.0	<1.0	60	<1.0	**18**	<1.0	**1200**	4.1	1278
MW-6DR3	2/23/07	1.1	<1.0	1.3	<1.0	<1.0	<1.0	**120**	<1.0	122.4
MW-7	2/22/07	<1.0	<1.0	30	<1.0	**9.8**	<1.0	**84**	<1.0	123.8
MW-8	2/21/07	<1.0	<1.0	6.2	<1.0	**7.0**	<1.0	**6.7**	<1.0	19.9
MW-8D	2/21/07	<1.0	<1.0	9.9	1.4	**3.3**	<1.0	**16**	2.7	33.3
MW-8DR	2/21/07	<1.0	<1.0	19.0	<1.0	**9.1**	<1.0	**65**	4.1	97.2
MW-9	2/23/07	<5.0	<5.0	6.1	<5.0	**6.0**	<5.0	**610**	<5.0	622.1
MW-21	2/21/07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	ND
MW-21D	2/21/07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	ND
MW-28	2/21/07	<1.0	2.8	41.0	1.3	**4.5**	<1.0	**470**	<1.0	519.6
MW-28 Dup (DUP 2)	2/21/07	<5.0	<5.0	57	<5.0	**5.4**	<5.0	**620**	<5.0	682.4
MW-32	2/20/07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	ND
MW-32 DUP (DUP 1)	2/20/07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	ND
MW-33	2/21/07	<5.0	<5.0	31.0	<5.0	**9.7**	<5.0	**510**	<5.0	550.7
MW-34	2/22/07	<2.0	<2.0	34.0	<2.0	**5.1**	2.0	**390**	<2.0	429.1
MW-38	2/20/07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**20**	<1.0	20
MW-39	2/21/07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	ND
MW-39D	2/21/07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	ND
MW-40	2/20/07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	ND
MW-40D	2/20/07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**12**	<1.0	12
MW-41	2/21/07	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	ND
RW-4	2/23/07	<50	<50	<50	<50	<50	<50	**7100**	<50	7100
RW-4 Dup (DUP4)	2/23/07	<50	<50	<50	<50	<50	<50	**9100**	<50	9100
RW-6	2/23/07	<10	<10	**86**	<10	**19**	<10	**1500**	<10	1605
RW-19	2/23/07	<5.0	<5.0	65	<5.0	**50**	<5.0	**690**	<5.0	805
POC-1A	2/22/07	<10	<10	**190**	<10	<10	<10	**4800**	<10	4990
POC-1B	2/21/07	<50	<50	<50	<50	<50	<50	**5600**	<50	5600
POC-2A	2/22/07	<10	<10	<10	<10	<10	<10	**1300**	<10	1300
POC-2B	2/22/07	<100	<100	<100	<100	<100	<100	**12000**	<100	12000

Notes:
ND = Not detected above laboratory reporting limits
Bold indicates exceedance of permit limit
1,1,1-TCA = 1,1,1-Trichloroethane
1,1,2,2-PCA = 1,1,2,2-Tetrachloroethane
1,1-DCE = 1,1-Dichloroethene
1,2-DCA = 1,2-Dichloroethane
PCE = Tetrachloroethene
trans-1,2-DCE = trans-1,2-Dichloroethene
NS = No Standard

TABLE 4
Summary of 1,4-Dioxane: Groundwater Analytical Results
RCRA Facility Investigation
Former Parker Hannifin Facility
Wake Forest, North Carolina

MW-3	2/22/2007	< 3.6 U
MW-6	2/22/2007	< 3.4 U
MW-6D	2/22/2007	< 3.5 U
MW-6DR	2/22/2007	< 3.3 U
MW-6DR3	2/23/2007	< 3.1 U
MW-7	2/22/2007	< 3.6 U
MW-8	2/21/2007	< 4.2 U
MW-8D	2/21/2007	< 3.6 U
MW-8DR	2/21/2007	< 3.8 U
MW-21	2/21/2007	< 3.4 U
MW-21D	2/21/2007	< 3.4 U
MW-28 DUP	2/21/2007	< 3.3 U
MW-28	2/21/2007	< 3.2 U
MW-32 DUP	2/20/2007	< 3.3 U
MW-32	2/20/2007	< 3.5 U
MW-33	2/21/2007	**29**
MW-34	2/22/2007	**13**
MW-38	2/20/2007	< 4.3 U
MW-39	2/21/2007	< 3.4 U
MW-39D	2/21/2007	< 3.4 U
MW-40	2/20/2007	< 3.4 U
MW-40D	2/20/2007	< 3.3 U
MW-41	2/21/2007	< 3.3 U
POC-1A	2/22/2007	< 3.6 U
POC-1B	2/21/2007	< 17 U
POC-2A	2/22/2007	< 4.1 U
POC-2B	2/22/2007	< 17 U
RW-19	2/23/2007	< 3.6 U
RW-4 DUP	2/23/2007	< 3.6 U
RW-4	2/23/2007	< 3.3 U
RW-6	2/23/2007	< 3.7 U

TABLE 5
Summary of Metals: Groundwater Analytical Results
RCRA Facility Investigation
Former Parker Hannifin Facility
Wake Forest, North Carolina

Well	Sample Date	Antimony (ug/L)	Arsenic (ug/L)	Barium (ug/L)	Cadmium (ug/L)	Chromium (ug/L)	Copper (ug/L)	Lead (ug/L)	Nickel (ug/L)	Selenium (ug/L)	Vanadium (ug/L)
MW-3	2/22/2007	< 5 U	NA	< 1 U	**57**	< 2 U	30	< 5 U	20	< 0.2 U
MW-6	2/22/2007	< 5 U	NA	< 1 U	6.9	6.2	< 5 U	< 5 U	25	< 0.2 U
MW-6D	2/22/2007	< 5 U	NA	< 1 U	9.1	< 2 U	< 5 U	< 5 U	33	< 0.2 U
MW-6DR	2/22/2007	< 5 U	NA	< 1 U	< 5 U	3.9	< 5 U	< 5 U	10	< 0.2 U
MW-6DR3	2/23/2007	< 5 U	NA	< 1 U	< 5 U	< 2 U	< 5 U	< 5 U	19	< 0.2 U
MW-7	2/22/2007	< 5 U	NA	< 1 U	< 5 U	2	< 5 U	< 5 U	12	< 0.2 U
MW-8	2/21/2007	< 5 U	NA	< 1 U	< 5 U	< 2 U	< 5 U	< 5 U	< 10 U	< 0.2 U
MW-8D	2/21/2007	< 5 U	NA	< 1 U	30	8.4	16	< 5 U	81	< 0.2 U
MW-8DR	2/21/2007	6	NA	< 1 U	5.9	20	5.4	8.3	94	< 0.2 U
MW-21	2/21/2007	7.9	NA	< 1 U	< 5 U	24	9.7	8.9	89	< 0.2 U
MW-21D	2/21/2007	< 5 U	NA	< 1 U	< 5 U	< 2 U	< 5 U	< 5 U	31	< 0.2 U
MW-28 DUP	2/21/2007	< 5 U	NA	< 1 U	13	2.4	6.8	< 5 U	19	< 0.2 U
MW-28	2/21/2007	< 5 U	NA	< 1 U	11	2.4	5.6	< 5 U	26	< 0.2 U
MW-32 DUP	2/20/2007	< 5 U	NA	< 1 U	**190**	6.1	95	< 5 U	< 10 U	< 0.2 U
MW-32	2/20/2007	< 5 U	NA	< 1 U	**160**	5.2	79	< 5 U	< 10 U	< 0.2 U
MW-33	2/21/2007	< 5 U	NA	< 1 U	15	7.8	7.5	5.4	45	< 0.2 U
MW-34	2/22/2007	< 5 U	NA	< 1 U	< 5 U	2.8	< 5 U	< 5 U	11	< 0.2 U
MW-38	2/20/2007	< 5 U	NA	< 1 U	< 5 U	< 2 U	5.5	< 5 U	11	< 0.2 U
MW-39	2/21/2007	< 5 U	NA	< 1 U	< 5 U	< 2 U	9.3	< 5 U	< 10 U	< 0.2 U
MW-39D	2/21/2007	< 5 U	NA	< 1 U	< 5 U	< 2 U	< 5 U	< 5 U	< 10 U	< 0.2 U
MW-40	2/20/2007	< 5 U	NA	< 1 U	5.6	< 2 U	< 5 U	< 5 U	12	< 0.2 U
MW-40D	2/20/2007	< 5 U	NA	< 1 U	26	24	14	< 5 U	< 10 U	< 0.2 U
MW-41	2/21/2007	< 5 U	NA	< 1 U	< 5 U	< 2 U	< 5 U	< 5 U	14	< 0.2 U
POC-1A	2/22/2007	< 5 U	NA	< 1 U	< 5 U	< 2 U	< 5 U	< 5 U	< 10 U	< 0.2 U
POC-1B	2/21/2007	< 5 U	NA	< 1 U	13	6.5	< 5 U	< 5 U	35	< 0.2 U
POC-2A	2/22/2007	< 5 U	NA	< 1 U	< 5 U	< 2 U	< 5 U	< 5 U	23	< 0.2 U
POC-2B	2/22/2007	< 5 U	NA	< 1 U	13	< 2 U	< 5 U	< 5 U	18	< 0.2 U
RW-19	2/23/2007	< 5 U	NA	< 1 U	< 5 U	11	< 5 U	< 5 U	56	0.47
RW-4 DUP	2/23/2007	< 5 U	NA	< 1 U	5.8	4.8	< 5 U	8.5	16	< 0.2 U
RW-4	2/23/2007	< 5 U	NA	< 1 U	< 5 U	5.8	< 5 U	< 5 U	35	0.39
RW-6	2/23/2007	< 5 U	NA	< 1 U	< 5 U	3	< 5 U	< 5 U	130	< 0.2 U

Notes:
NA = Not analyzed
ug/L = Micrograms per liter
J = Estimated
U = Not detected
Bold = Indicates concentration of general fault

Table 6
Summary of Volatile Organic Compounds: Groundwater Analytical Results for Newly Installed Wells
RCRA Facility Investigation
Former Parker Hannifin Facility
Wake Forest, North Carolina

Well ID	Sampling Date	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Permit Limit	2L Standard	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MW-38	11/15/2006	< 1.0	**20**	< 1.0	< 1.0	< 5.0
	1/18/2007	< 1.0	**20**	< 1.0	< 1.0	< 5.0
	2/20/2007	< 1.0	**20**	< 1.0	< 1.0	< 5.0
MW-39	11/15/2006	< 1.0	1.0	< 1.0	< 1.0	< 5.0
	2/21/2007	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
MW-39D	1/18/2007	2.8	1.0	< 1.0	< 1.0	< 5.0
	2/21/2007	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
MW-40	11/15/2006	< 1.0	1.0	< 1.0	< 1.0	< 5.0
	2/20/2007	< 1.0	**12**	< 1.0	< 1.0	< 5.0
MW-40D	1/18/2007	**12**	1.3	**2.2**	2.1	26
	2/20/2007	< 1.0	**12**	< 1.0	< 1.0	< 5.0
MW-41	11/15/2006	< 1.0	1.0	< 1.0	< 1.0	< 5.0
	2/21/2007	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0

[illegible]
U - not detected
[illegible]
[illegible]
[illegible]
Bold indicates exceedance of permit limit

TABLE 7

Summary of Aquifer Testing Results
Former Parker Hannifin Facility
Wake Forest, North Carolina

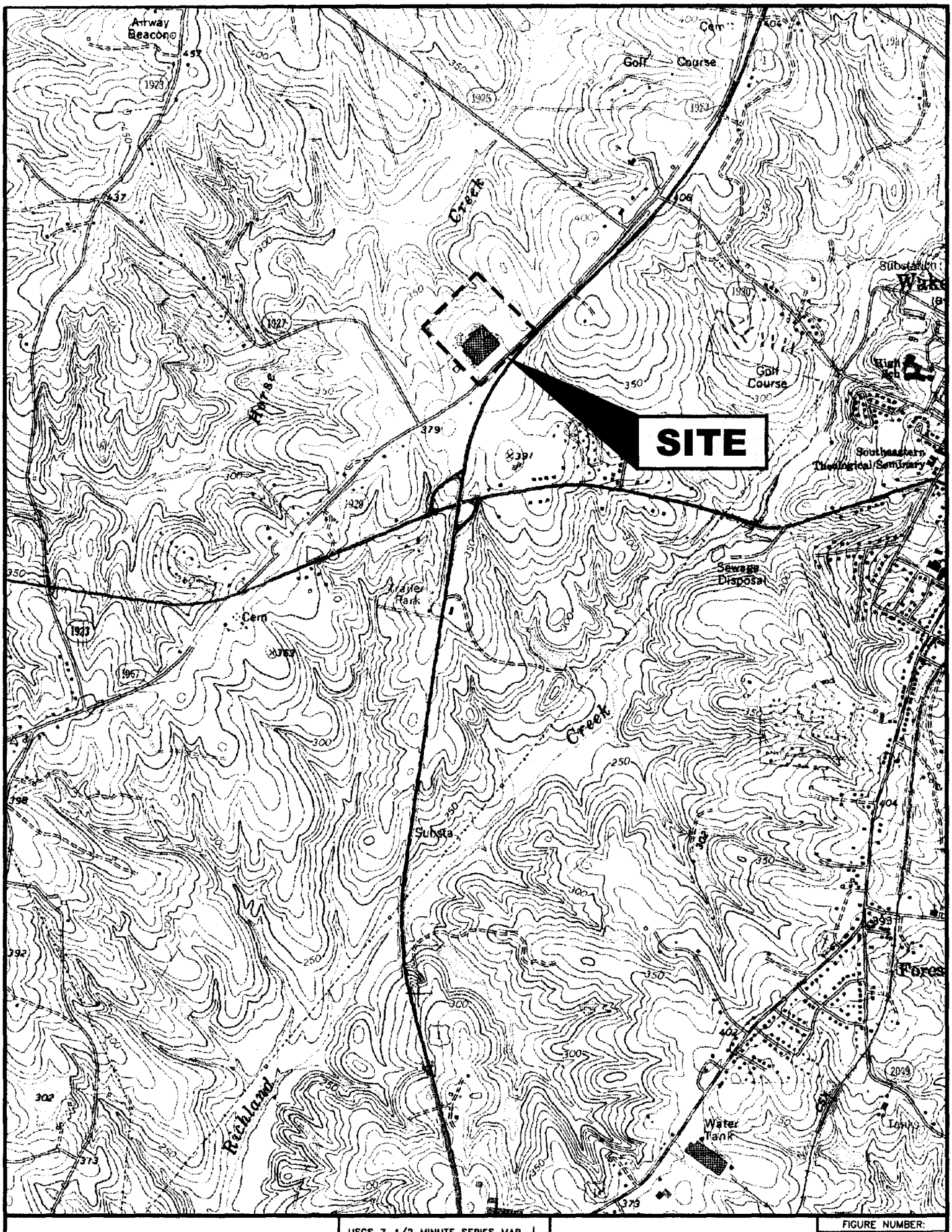
Well ID		K		T	
		Slug test	Bouwer	Bouwer	Nyman
Shallow Wells	MW-38	1.81E-04	0.26		
	MW-39	9.46E-04	1.36		
	MW-40	2.22E-03	3.20		
	MW-41	1.64E-03	2.36		
Geometric Mean		8.88E-04	1.28	0.24	86.14
Deep Wells	MW-39D	3.89E-03	5.60		
	*MW-39D	3.41E-03	4.91		
	MW-40D	3.33E-03	4.80		
Geometric Mean		3.54E-03	5.09	0.24	87.60

[illegible]

TABLE 8
Summary of Regional Geology Observations
RCRA Facility Investigation
Former Parker Hannifin Facility
Wake Forest, North Carolina

N 5-25° E	near vertical	N 75° ± 10° W	80° N	N 4-25° E	Near Vertical	Geologic Mapping	John M. Parker, 1979
N 8-28° E	70 to 80° E					Fracture Trace Analysis	Westinghouse Environtmental Services, 1989
		W-NW	Near Vertical	N-NE	Near Vertical	Seismic Refraction Survey	Almy and Harvey, 1990
						Electrical Resistivity Survey	
N 8-24° E						Passive Aquifer Pumping Test	ENSR, Consulting and Engineering, 2007
N 7-26° E	70 to 80° E	N 75° ± 10° W	80° N	N 4-25° E	Near Vertical	Average	

PLEASE SEE MAP(S) IN THE HARD COPY



ENSR

ENSR CONSULTING AND ENGINEERING (NC), INC.
RALEIGH, NORTH CAROLINA 27616
PHONE: (919) 872-6600
FAX: (919) 872-7996
WEB: HTTP://WWW.ENSR.AECOM.COM

USGS 7-1/2 MINUTE SERIES MAP
Wake Forest, NC
1987
TOPOGRAPHIC QUADRANGLE

SCALE 1:24000

SITE LOCATION MAP

Former Parker-Hannifin Facility
Wake Forest, North Carolina

FIGURE NUMBER: 1

DRAWN BY:	DATE:	PROJECT NUMBER:	DRAWING NUMBER:
KLR	6/15/07	05303-026	A70384A

Appendix A

Summary of RCRA Permitting History

APPENDIX A

FACILITY PERMITTING HISTORY

July 1980
Parker files a RCRA Part A application to notify the State of North Carolina and the United States Environmental Protection Agency (USEPA) that hazardous wastes are generated and stored on site.

August 1985
Parker enters into a Consent Order with the North Carolina Department of Human Resources (NCDHR), Division of Health Services (DHS) now the Hazardous Waste Section (HWS) agreeing to discontinue using, and to close, the sand filter beds, which were part of their treatment system. Parker also agrees to implement a groundwater monitoring program for the sand filter beds.

October 1986
Closure of the sand filter beds, with contaminated soil left in-place, is certified complete in accordance with the approved closure plan. Sand filter media was excavated along with one foot of soil below the beds. In addition, the cement walls of the beds were hand scraped and hydroblasted to remove all adhering wastes. All waste materials were transported to Pinewood, South Carolina for disposal in the GSX Services Landfill. Each filter bed was backfilled to the top with clean washed stone and capped with a reinforced concrete cover.

August 1985 through January 1986
Four shallow monitoring wells (MW-1 through 4) are installed in August as required by the Consent Order, on upgradient of the waste treatment system and three downgradient. Groundwater samples from the wells are analyzed for parameters required for RCRA interim status facilities including volatile organic compounds (VOCs). The samples contain TCE and indicate groundwater contamination in this area. An additional two shallow groundwater monitoring wells (MW-5 and MW-6) are installed in January to investigate the extent of the contamination. TCE is detected in the groundwater samples from these two wells.

September 1986 through April 1987
The Consent Order is amended to require delineation of the groundwater contamination. A Phase I Groundwater Assessment Workplan is approved by the HWS. Six additional shallow wells (MW-7 through MW-12) are installed and contain TCE. Groundwater data collected thus far indicate two possible sources, a primary source near the wastewater treatment facility and an additional source on the north side of the plant indicated by higher than expected concentrations of TCE in MW-5. Groundwater quality data also indicates that the leading edge of the plume is near the plant's northeast property line.

June 1987
Parker submits a RCRA Park B Post-Closure Application for the closed sand filter beds as required by the EPA and the HWS.

August 1988
Three additional wells (MW-13, 14, and 15) six shallow temporary wells, and three deep wells (MW-6D, 8D, and 11D) screened in bedrock are installed as Phase II of the groundwater assessment. TCE is

detected in all three bedrock wells to depths of 67 feet. TCE is not detected in the shallow wells, which were installed offsite along the stream bed.

December 1988
Parker receives a Notice of Deficiency on the Part B Application with requirements generally identical to the requirements for Phase III of the groundwater assessment.

Through August 1989
Three additional shallow wells (MW-16, 17, and 18) are installed on the outer boundaries of the plume and two deeper bedrock wells (MW-6DR and MW-8DR) are installed to approximately 100 feet as Phase III of the groundwater assessment. All wells contain TCE. Several pumping tests are performed to evaluate the hydraulic properties of the shallow saprolite and the deep bedrock aquifer. A fracture trace analysis of fracture trends is completed to aid in understanding bedrock contaminant transport processes.

January and February 1990
The RCRA Facility Investigation (RFI) process begins with NUS Corporation conducting a Preliminary Assessment and a Visual Site Inspection (VSI) at the facility for the EPA (NUS, 1990). The VSI identifies SWMUs and AOCs.

Through March 1990
Three additional bedrock wells (RW-19, MW-18D, and 6DR3) are installed and found to contain TCE. A pumping test is performed on RW-19, an open hole well, and a geophysical study is completed to evaluate the orientation of the primary bedrock fracture system.

April 1990
Parker installs shallow wells MW-20 on the northeast boundary of the plume and wells MW-21 and MW-21D offsite and downgradient of the plume. Well MW-20 contains concentrations of TCE and wells MW-21 and MW-21D do not contain TCE.

August 1991
The EPA and HWS issue Parker's RCRA Hazardous Waste Management Permit. SWMU 24, and AOCs 27, 28, 29, 35, 36, and 37 were identified as requiring an RFI. An additional 27 units were either deleted or required no further action. SWMU 16, the closed sand filter beds, was designated as regulated by the State's portion of the RCRA permit and three SWMUs (32, 22, and 34) required confirmatory sampling.

October through November 1991
Parker installs the required point-of-compliance wells (POC-1A, -1B, -2A, and -2B) to be used for long term monitoring of the source area and two additional wells (MW-22 and MW-23) to monitor the lateral effectiveness of the corrective action system (WEGS, 1991a). These wells were required by Schrader Bellow's RCRA Permit.

December 1991
Parker submits an RFI Workplan to the EPA addressing SWMU 24 and five AOCs (27, 28, 35, 36, and 37).

October 1991
Parker submits a Confirmatory Sampling Workplan for SWMUs 32, 33, and 34 to the HWS and EPA.

November 1991
The HWS approves an interim groundwater pump and treat system from Parker. The interim system is designed to capture and treat groundwater from the central core of the plume and from the downgradient area using the three wells.

May 1992
Parker begins operation of their groundwater remediation system.

August 1992
Parker begins semi-annual reports on the performance of the corrective action system. These reports are submitted August and February of each year.

September through November 1992
Parker submits a revised Confirmatory Sampling Workplan for SWMUs 32, 33, and 34 to the HWS and EPA incorporating their comments. Parker collects soil samples at SWMUs 32, 33, and 34 to complete the confirmatory sampling activities. The sample data confirms that hazardous materials had been released from SWMU 32 (former drum storage area) and SWMU 33 (former 1,000 gallon underground storage tank). The EPA required no further investigation at SWMU 34.

May 1993
Parker submits a revised RFI Workplan incorporating the results of the confirmatory sampling.

October 1994 through October 1995
Parker completes Phases I and II of the RFI Workplan. The work includes additional soil and groundwater investigations, collection of soil background data, collection of stream and sediment samples, identification of any potential receptors, and studies of local flora and fauna. The Workplan now addresses SWMUs 24, 32, and 33 and the north corner of the parking lot where spills of TCE may have occurred.

December 1996 through August 1997
Parker receives comments on the results of the RFI work and continues the RFI investigation with collection of additional soil background samples and soil samples from AOCs 27 and 28.

August 1997
Parker completes RFI Workplan activities and submits their report to the HWS. The report identifies three sources for groundwater contamination (SWMUs 24, 32, and 33) and delineates soils contamination in these source areas. The report also provides analytical data of soils collected at AOCs 27 and 28.

December 1997
The HWS comments on the Workplan and requires that soils at AOCs 27 and 28 be cleaned up using the Groundwater Section Guidelines for petroleum contaminated soils. Parker must also continue groundwater investigation downgradient of SWMU 33 and to the northeast of the facility.

May 1998 through April 1999
Parker submits an RFI Workplan Supplement to the HWS. HWS provides comments and Parker revises the workplan to address these comments. Parker will excavate oil and grease contaminated soils at

AOCs 27 and 28. Additional soil samples will be taken at the background locations and analyzed for an expanded site list of fourteen metals. Soil samples will also be taken downgradient of SWMU 16.

May 1999 through March 2002

Parker completes revised workplan activities and prepares an RFI report detailing additional groundwater investigation downgradient of SWMU #33 to define the area of groundwater impacted by TCE and other VOCs. The report also included information concerning additional soil sampling at background locations and downgradient of SWMU #16.

May 2003

Parker submitted the RCRA Part B Post-Closure Permit Renewal Application as required by the EPA and the NCDENR-HWS.

June 2005

Parker continues the RFI for the offsite northwestern portion of the site. Four additional monitoring wells were installed to the north of the former manufacturing building to support assessment activities. Geophysical logging and slug testing were conducted in order to evaluate aquifer properties associated with fate and transport. The HWS comments on the RFI and indicates that Parker must investigate downgradient portions of the TCE plume.

June - August 2005

The Draft Permit was issued June 2005. Public Hearing was held on August 10, 2005. Parker submitted comments to the NCDENR-HWS in August 2005.

June 2006

The final permit was issued June 1, 2006. The property was sold on June 1, 2006 to St Ives 220 Commercial, LLC by the previous owner (The Industrial Development Corporation of the Town of Wake Forest). In addition, the new owner of the property St Ives 220 Commercial LLC entered into a Brownfields Agreement with the NCDENR on June 1, 2006, covering the Former Parker Facility.

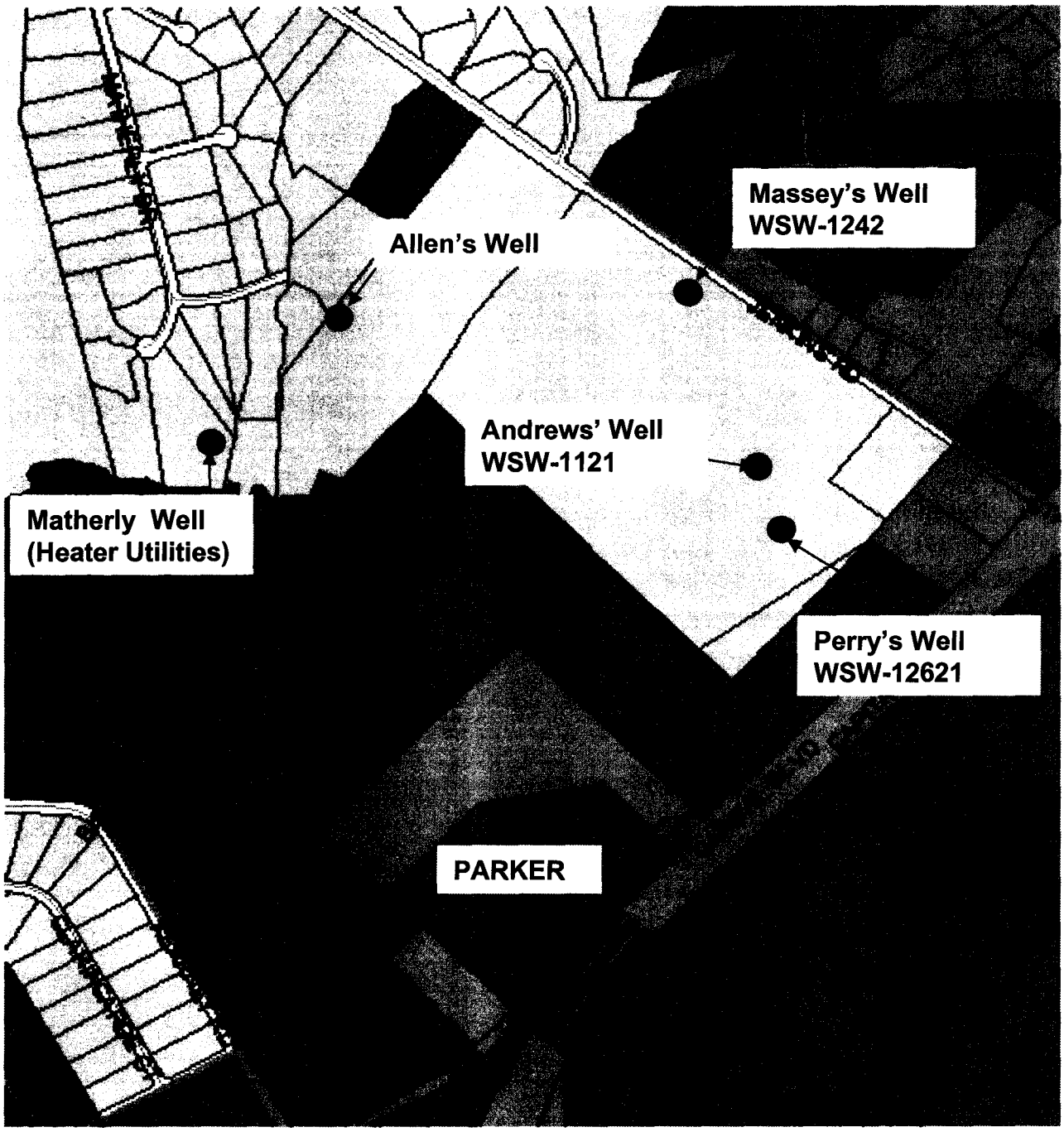
2006 through July 2007

Parker continued with RFI activities, including the installation of additional offsite wells as documented in the Phase VII RFI Report.

Appendix B

Offsite Potable Well Sampling Reports and Location Map

Water Supply Wells Sampled in Spring 2006



LEGEND

● Private Water Supply Well

Well Sampling Map

Parker Hannifin Facility
12415 Capital Boulevard
Wake Forest, Wake County, North Carolina

SCALE	DWG DATE	PROJECT NO.
Not Defined	07/2007	05303-026

Appendix B

ENSR

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Raleigh, North Carolina 27616-3013
Phone: (919) 872-6800
Fax: (919) 872-7996
Web: www.ENSR.com

May 16, 2006

Mr. Andy Massey
7605 Southwick Court
Wake Forest, NC 27587

Parker Hannifin Corporation
Cleveland, OH 44124-4141
Phone (216) 896-3000
Fax (216) 896-4034

RE: Laboratory Analytical Results – Water Supply Well Sampling Event
Parker Hannifin Corporation – Wake Forest, NC Facility
EPA ID # NCD 002 591 014

Dear Mr. Massey:

As you are aware, ENSR Consulting & Engineering (NC), Inc. (ENSR) obtained a water sample from the water supply well at your property located at 1242 Jenkins Road on April 28, 2006. The water sample was submitted for laboratory analysis for a suite of volatile organic compounds and for one semi-volatile compound, 1,4-dioxane. The analysis was performed to determine if environmental impacts from the former Parker Hannifin facility are affecting the well water. This letter shall provide you with the results of the sampling.

No compounds associated with the former Parker Hannifin facility were detected; all constituents for which the water was analyzed were below the laboratory detection limits. The laboratory report for the sample from your property is enclosed.

If you have any questions or require any additional information please contact ENSR at 919-872-6600 or me at 216-896-2710. Thank you for your cooperation with this sampling activity.

Regards,

Martha Connell
Manager, Environmental Services
Parker Hannifin Corporation.

cc: Larry Stanley, NC DENR
Lance Tully, ENSR

Pace Analytical™
www.pacelabs.com

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Pace Analytical Services, Inc.
2225 Riverside Drive
Asheville, NC 28804
Phone: 828.254.7176
Fax: 828.252.4618

May 15, 2006

Mr. David Simpson
ENSR C&E
7041 Old Wake Forest Rd.
Suite 103
Raleigh, NC 27616

RE: Lab Project Number: 92118456
Client Project ID: Parker Hannifin/WF

Dear Mr. Simpson:

Enclosed are the analytical results for sample(s) received by the laboratory on May 2, 2006. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

Inorganic Wet Chemistry and Metals Analyses were performed at our Pace Asheville laboratory and Organic testing was performed at our Pace Charlotte laboratory unless otherwise footnoted.

If you have any questions concerning this report please feel free to contact me.

Sincerely,

Teresa Adams

Teresa Adams
Teresa.Adams@pacelabs.com
Project Manager

Enclosures

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SAMPLE SUMMARY

Lab Project Number: 92118456
Client Project ID: Parker Hannifin/WF

Project Sample Number	Sample Number	Client Sample ID	Matrix	Date Collected	Date Received
92118456-001	926933300	WSW-1242	Water	04/28/06 09:20	05/02/06 15:20
92118456-002	926933334	APR06-EFF	Water	04/28/06 09:55	05/02/06 15:20
92118456-003	926933342	APR06-INF	Water	04/28/06 10:00	05/02/06 15:20

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SAMPLE ANALYTE COUNT

Lab Project Number: 92118456
Client Project ID: Parker Hannifin/WF

Project Sample Number	Sample No	Client Sample ID	Analysis Code	Analysis Description	Analytes Reported
92118456-001	926933300	WSW-1242	8260X WL92	GC/MS VOCs by 8260, low level	66
			8270D WL92	1,4-Dioxane by 8270 SIM	2
92118456-002	926933334	APR06-EFF	3512 WL92	Total Kjeldahl Nitrogen	1
			3532 WL92	28 day NOX	1
			6010T WL92	Metals by Trace ICP	11
			624 WL92	Volatile GC/MS by 624	35
			625 WL92	Extractables in Water by 625	63
			N2 CALC	Nitrogen, Total	1
92118456-003	926933342	APR06-INF	3512 WL92	Total Kjeldahl Nitrogen	1
			3532 WL92	28 day NOX	1
			6010T WL92	Metals by Trace ICP	11
			624 WL92	Volatile GC/MS by 624	35
			625 WL92	Extractables in Water by 625	63
			N2 CALC	Nitrogen, Total	1

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Asheville, NC 28804
Phone: 828.254.7176
Fax: 828.252.4618

Lab Project Number: 92118456
Client Project ID: Parker Hannifin/NF

Lab Sample No: 926933300 | Project Sample Number: 92118456-001 | Date Collected: 04/28/06 09:20
Client Sample ID: WSW-1242 | Matrix: Water | Date Received: 05/02/06 15:20

Parameters	Results	Units	Report Limit	MDL	Analyzed	By	CAS No.	Qual	RegLmt
GC/MS Semivolatiles									
1,4-Dioxane by 8270 SIM	Prep/Method: EPA 3510 / EPA 8270								
1,4-Dioxane (p-Dioxane)	ND	ug/l	3.3	0.78	05/09/06 12:51	BET	123-91-1	1	
Date Extracted	05/04/06				05/04/06				
GC/MS Volatiles									
GC/MS VOCs by 8260, low level	Method: EPA 8260								
Acetone	ND	ug/l	25.	1.8	05/07/06 08:33	MCK	67-64-1		
Benzene	ND	ug/l	1.0	0.31	05/07/06 08:33	MCK	71-43-2		
Bromobenzene	ND	ug/l	1.0	0.16	05/07/06 08:33	MCK	108-86-1		
Bromochloromethane	ND	ug/l	1.0	0.37	05/07/06 08:33	MCK	74-97-5		
Bromodichloromethane	ND	ug/l	1.0	0.21	05/07/06 08:33	MCK	75-27-4		
Bromoform	ND	ug/l	1.0	0.17	05/07/06 08:33	MCK	75-25-2		
Bromomethane	ND	ug/l	1.0	0.51	05/07/06 08:33	MCK	74-83-9		
2-Butanone (MEK)	ND	ug/l	5.0	1.2	05/07/06 08:33	MCK	78-93-3		
n-Butylbenzene	ND	ug/l	1.0	0.20	05/07/06 08:33	MCK	104-51-8		
sec-Butylbenzene	ND	ug/l	1.0	0.20	05/07/06 08:33	MCK	135-98-8		
tert-Butylbenzene	ND	ug/l	1.0	0.17	05/07/06 08:33	MCK	98-06-6		
Carbon tetrachloride	ND	ug/l	1.0	0.27	05/07/06 08:33	MCK	56-23-5		
Chlorobenzene	ND	ug/l	1.0	0.15	05/07/06 08:33	MCK	108-90-7		
Chloroethane	ND	ug/l	1.0	0.78	05/07/06 08:33	MCK	75-00-3		
Chloroform	ND	ug/l	1.0	0.29	05/07/06 08:33	MCK	67-66-3		
Chloromethane	ND	ug/l	1.0	0.78	05/07/06 08:33	MCK	74-87-3		
2-Chlorotoluene	ND	ug/l	1.0	0.16	05/07/06 08:33	MCK	95-49-8		
4-Chlorotoluene	ND	ug/l	1.0	0.20	05/07/06 08:33	MCK	106-43-4		
1,2-Dibromo-3-chloropropane	ND	ug/l	1.0	0.39	05/07/06 08:33	MCK	96-12-8		
Dibromochloromethane	ND	ug/l	1.0	0.17	05/07/06 08:33	MCK	124-48-1		
1,2-Dibromoethane (EDB)	ND	ug/l	1.0	0.15	05/07/06 08:33	MCK	106-93-4		
Dibromomethane	ND	ug/l	1.0	0.27	05/07/06 08:33	MCK	74-95-3		
1,2-Dichlorobenzene	ND	ug/l	1.0	0.14	05/07/06 08:33	MCK	95-50-1		
1,3-Dichlorobenzene	ND	ug/l	1.0	0.16	05/07/06 08:33	MCK	541-73-1		
1,4-Dichlorobenzene	ND	ug/l	1.0	0.17	05/07/06 08:33	MCK	106-46-7		
Dichlorodifluoromethane	ND	ug/l	1.0	0.59	05/07/06 08:33	MCK	75-71-8		
1,1-Dichloroethane	ND	ug/l	1.0	0.42	05/07/06 08:33	MCK	75-34-3		
1,2-Dichloroethane	ND	ug/l	1.0	0.18	05/07/06 08:33	MCK	107-06-2		
1,1-Dichloroethene	ND	ug/l	1.0	0.39	05/07/06 08:33	MCK	75-35-4		
cis-1,2-Dichloroethene	ND	ug/l	1.0	0.33	05/07/06 08:33	MCK	156-59-2		
trans-1,2-Dichloroethene	ND	ug/l	1.0	0.44	05/07/06 08:33	MCK	156-60-5		
1,2-Dichloropropane	ND	ug/l	1.0	0.20	05/07/06 08:33	MCK	78-87-5		

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Asheville, NC 28804
Phone: 828.254.7176
Fax: 828.252.4618

Lab Project Number: 92118456
Client Project ID: Parker Hannifin/WF

Lab Sample No: 926933300 | Project Sample Number: 92118456-001 | Date Collected: 04/28/06 09:20
Client Sample ID: WSW-1242 | Matrix: Water | Date Received: 05/02/06 15:20

Parameters	Results	Units	Report Limit	MDL	Analyzed	By	CAS No.	Qual	RegLmt
1,3-Dichloropropane	ND	ug/l	1.0	0.11	05/07/06 08:33	MCK	142-28-9		
2,2-Dichloropropane	ND	ug/l	1.0	0.44	05/07/06 08:33	MCK	594-20-7		
1,1-Dichloropropene	ND	ug/l	1.0	0.26	05/07/06 08:33	MCK	563-58-6		
Diisopropyl ether	ND	ug/l	1.0	0.25	05/07/06 08:33	MCK	108-20-3		
Ethylbenzene	ND	ug/l	1.0	0.17	05/07/06 08:33	MCK	100-41-4		
Hexachloro-1,3-butadiene	ND	ug/l	1.0	0.32	05/07/06 08:33	MCK	87-68-3		
Isopropylbenzene (Cumene)	ND	ug/l	1.0	0.16	05/07/06 08:33	MCK	98-82-8		
p-Isopropyltoluene	ND	ug/l	1.0	0.20	05/07/06 08:33	MCK	99-87-6		
Methylene chloride	ND	ug/l	2.0	0.46	05/07/06 08:33	MCK	75-09-2		
Methyl-tert-butyl ether	ND	ug/l	1.0	0.22	05/07/06 08:33	MCK	1634-04-4		
Naphthalene	ND	ug/l	1.0	0.22	05/07/06 08:33	MCK	91-20-3		
n-Propylbenzene	ND	ug/l	1.0	0.20	05/07/06 08:33	MCK	103-65-1		
Styrene	ND	ug/l	1.0	0.15	05/07/06 08:33	MCK	100-42-5		
1,1,1,2-Tetrachloroethane	ND	ug/l	1.0	0.25	05/07/06 08:33	MCK	630-20-6		
1,1,2,2-Tetrachloroethane	ND	ug/l	1.0	0.24	05/07/06 08:33	MCK	79-34-5		
Tetrachloroethene	ND	ug/l	1.0	0.16	05/07/06 08:33	MCK	127-18-4		
Toluene	ND	ug/l	1.0	0.24	05/07/06 08:33	MCK	108-88-3		
1,2,3-Trichlorobenzene	ND	ug/l	1.0	0.18	05/07/06 08:33	MCK	87-61-6		
1,2,4-Trichlorobenzene	ND	ug/l	1.0	0.20	05/07/06 08:33	MCK	120-82-1		
1,1,1-Trichloroethane	ND	ug/l	1.0	0.35	05/07/06 08:33	MCK	71-55-6		
1,1,2-Trichloroethane	ND	ug/l	1.0	0.16	05/07/06 08:33	MCK	79-00-5		
Trichloroethene	ND	ug/l	1.0	0.26	05/07/06 08:33	MCK	79-01-6		
Trichlorofluoromethane	ND	ug/l	1.0	0.41	05/07/06 08:33	MCK	75-69-4		
1,2,3-Trichloropropane	ND	ug/l	1.0	0.22	05/07/06 08:33	MCK	96-18-4		
1,2,4-Trimethylbenzene	ND	ug/l	1.0	0.15	05/07/06 08:33	MCK	95-63-6		
1,3,5-Trimethylbenzene	ND	ug/l	1.0	0.21	05/07/06 08:33	MCK	108-67-8		
Vinyl chloride	ND	ug/l	1.0	0.58	05/07/06 08:33	MCK	75-01-4		
Xylene (Total)	ND	ug/l	1.0		05/07/06 08:33	MCK	1330-20-7		
m&p-Xylene	ND	ug/l	2.0	0.39	05/07/06 08:33	MCK			
o-Xylene	ND	ug/l	1.0	0.17	05/07/06 08:33	MCK	95-47-6		
Toluene-d8 (S)	97	%			05/07/06 08:33	MCK	2037-26-5		
4-Bromofluorobenzene (S)	100	%			05/07/06 08:33	MCK	460-00-4		
Dibromofluoromethane (S)	106	%			05/07/06 08:33	MCK	1868-53-7		
1,2-Dichloroethane-d4 (S)	99	%			05/07/06 08:33	MCK	17060-07-0		

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92 1184

ENSR

CHAIN OF CUSTODY RECORD

Page 1 of 1

Client/Project Name: PARKER HANNIFIN

Project Location: WAKE FOREST, NC

Project Number: 05303-022-500

Field Logbook No.: #1 (Cont)

Sampler: (Print Name) /Affiliation: LANCE TULLY ENSR

Signature: [signature]

Chain of Custody Tape No.:

Send Results/Report to: David Simpson DSIMPSON@ENSR.AECOM.COM

Analysis Requested: VOCs 8260; 1,4-Dioxane 8270; VOCs by 624; SVOCs by 625; Metals (Ag, Cd, Cr, Cu, Ni, Pb, Zn, As, Se, Mo); Total Nitrogen

Field Sample No./ Identification	Date	Time	Grab	Comp	Sample Container (Size/Mat'l)	Sample Type (Liquid, Sludge, Etc.)	Preservative	Field Filtered	VOCs 8260	1,4-Dioxane 8270	VOCs by 624	SVOCs by 625	Metals (Ag, Cd, Cr, Cu, Ni, Pb, Zn, As, Se, Mo)	Total Nitrogen	Lab I.D.	Remarks
WSW-1242	4-28-06	0920	✓		40ml VOA / 1L Amber	GW	HCl / Ice	No	✓	✓						9269 33300
APROG-EFF	↓	0955	✓		Various	↓	Various	↓			✓	✓	✓	✓		3334
APROG-INF	↓	1000	✓		↓	↓	↓	↓			✓	✓	✓	✓		3342

Relinquished by: (Print Name)	Date: / Time:	Received by: (Print Name)	Date: / Time:
Lance Tully Signature: [signature]		R A Snyder / PACE Signature: [signature]	5-2-6 10:53
Relinquished by: (Print Name) R A Snyder / PACE Signature:	Date: 5-2-6 Time: 15:20	Received by: (Print Name) Kim Thurk 5/2/06 Signature:	Date: Time: 15:20
Relinquished by: (Print Name) Signature:	Date: Time:	Received by: (Print Name) Signature:	Date: Time:

Analytical Laboratory (Destination): PACE Analytical, Huntersville, NC

Metals: Ag, Cd, Cr, Cu, Ni, Pb, Zn, As, Se, + Mo

Serial No. 33734

June 5, 2006

Trent Parker / Danny Lassiter
Heater Utilities
PO Box 4889
Cary, NC 27511

Parker Hannifin Corporation
Cleveland, OH 44124-4141
Phone (216) 896-3000
Fax (216) 896-4034

RE: Laboratory Analytical Results – Water Supply Well Sampling Event
Parker Hannifin Corporation – Wake Forest, NC Facility
EPA ID # NCD 002 591 014

Dear Mr. Parker and Mr. Lassiter:

As you are aware, ENSR Consulting & Engineering (NC), Inc. (ENSR) obtained a water sample from the water supply well servicing the Matherly housing development in Wake Forest, North Carolina on May 5, 2006. The water sample was submitted for laboratory analysis for a suite of volatile organic compounds and for one semi-volatile compound, 1,4-dioxane. The analysis was performed to determine if environmental impacts from the former Parker Hannifin facility are affecting the well water. This letter shall provide you with the results of the sampling.

No compounds associated with the former Parker Hannifin facility were detected; all constituents for which the water was analyzed were below the laboratory detection limits. The laboratory report for the sample from your property is enclosed.

If you have any questions or require any additional information please contact ENSR at 919-872-6600 or me at 216-896-2710. Thank you for your cooperation with this sampling activity.

Regards,

Martha Connell
Manager, Environmental Services
Parker Hannifin Corporation.

cc: Larry Stanley, NC DENR
Lance Tully, ENSR

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Fax: 828.252.4618

May 22, 2006

Mr. David Simpson
ENSR C&E
7041 Old Wake Forest Rd.
Suite 103
Raleigh, NC 27616

RE: Lab Project Number: 92118954
Client Project ID: Parker Hannifin-WF/05303026400

Dear Mr. Simpson:

Enclosed are the analytical results for sample(s) received by the laboratory on May 9, 2006. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

Inorganic Wet Chemistry and Metals Analyses were performed at our Pace Asheville laboratory and Organic testing was performed at our Pace Charlotte laboratory unless otherwise footnoted.

If you have any questions concerning this report please feel free to contact me.

Sincerely,

Teresa Adams

Teresa Adams
Teresa.Adams@pacelabs.com
Project Manager

Enclosures

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Phone: 828.254.7176
Fax: 828.252.4618

SAMPLE SUMMARY

Lab Project Number: 92118954
Client Project ID: Parker Hannifin-WF/05303026400

Project Sample Number	Sample Number	Client Sample ID	Matrix	Date Collected	Date Received
92118954-001	926960196	MATHERLY MAY 06	Water	05/05/06 10:20	05/09/06 15:45

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Fax: 828.252.4618

SAMPLE ANALYTE COUNT

Lab Project Number: 92118954
Client Project ID: Parker Hannifin-WF/05303026400

Project Sample Number	Sample No	Client Sample ID	Analysis Code	Analysis Description	Analytes Reported
92118954-001	926960196	MATHERLY MAY 06	8260X WL92	GC/MS VOCs by 8260, low level	66
			8270D WL92	1,4-Dioxane by 8270 SIM	2

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Lab Project Number: 92118954
Client Project ID: Parker Hannifin-WF/05303026400

Lab Sample No: 926960196 | Project Sample Number: 92118954-001 | Date Collected: 05/05/06 10:20
Client Sample ID: MATHERLY MAY 06 | Matrix: Water | Date Received: 05/09/06 15:45

Parameters	Results	Units	Report Limit	MDL	Analyzed	By	CAS No.	Qual	RegLmt
GC/MS Semivolatiles									
1,4-Dioxane by 8270 SIM	Prep/Method: EPA 3510 / EPA 8270								
1,4-Dioxane (p-Dioxane)	ND	ug/l	3.5	0.82	05/20/06 16:45	BET	123-91-1	1	
Date Extracted	05/11/06				05/11/06				
GC/MS Volatiles									
GC/MS VOCs by 8260, low level	Method: EPA 8260								
Acetone	ND	ug/l	25.	1.8	05/12/06 15:45	MSF	67-64-1		
Benzene	ND	ug/l	1.0	0.31	05/12/06 15:45	MSF	71-43-2		
Bromobenzene	ND	ug/l	1.0	0.16	05/12/06 15:45	MSF	108-86-1		
Bromochloromethane	ND	ug/l	1.0	0.37	05/12/06 15:45	MSF	74-97-5		
Bromodichloromethane	ND	ug/l	1.0	0.21	05/12/06 15:45	MSF	75-27-4		
Bromoform	ND	ug/l	1.0	0.17	05/12/06 15:45	MSF	75-25-2		
Bromomethane	ND	ug/l	1.0	0.51	05/12/06 15:45	MSF	74-83-9		
2-Butanone (MEK)	ND	ug/l	5.0	1.2	05/12/06 15:45	MSF	78-93-3		
n-Butylbenzene	ND	ug/l	1.0	0.20	05/12/06 15:45	MSF	104-51-8		
sec-Butylbenzene	ND	ug/l	1.0	0.20	05/12/06 15:45	MSF	135-98-8		
tert-Butylbenzene	ND	ug/l	1.0	0.17	05/12/06 15:45	MSF	98-06-6		
Carbon tetrachloride	ND	ug/l	1.0	0.27	05/12/06 15:45	MSF	56-23-5		
Chlorobenzene	ND	ug/l	1.0	0.15	05/12/06 15:45	MSF	108-90-7		
Chloroethane	ND	ug/l	1.0	0.78	05/12/06 15:45	MSF	75-00-3		
Chloroform	ND	ug/l	1.0	0.29	05/12/06 15:45	MSF	67-66-3		
Chloromethane	ND	ug/l	1.0	0.78	05/12/06 15:45	MSF	74-87-3		
2-Chlorotoluene	ND	ug/l	1.0	0.16	05/12/06 15:45	MSF	95-49-8		
4-Chlorotoluene	ND	ug/l	1.0	0.20	05/12/06 15:45	MSF	106-43-4		
1,2-Dibromo-3-chloropropane	ND	ug/l	1.0	0.39	05/12/06 15:45	MSF	96-12-8		
Dibromochloromethane	ND	ug/l	1.0	0.17	05/12/06 15:45	MSF	124-48-1		
1,2-Dibromoethane (EDB)	ND	ug/l	1.0	0.15	05/12/06 15:45	MSF	106-93-4		
Dibromomethane	ND	ug/l	1.0	0.27	05/12/06 15:45	MSF	74-95-3		
1,2-Dichlorobenzene	ND	ug/l	1.0	0.14	05/12/06 15:45	MSF	95-50-1		
1,3-Dichlorobenzene	ND	ug/l	1.0	0.16	05/12/06 15:45	MSF	541-73-1		
1,4-Dichlorobenzene	ND	ug/l	1.0	0.17	05/12/06 15:45	MSF	106-46-7		
Dichlorodifluoromethane	ND	ug/l	1.0	0.59	05/12/06 15:45	MSF	75-71-8		
1,1-Dichloroethane	ND	ug/l	1.0	0.42	05/12/06 15:45	MSF	75-34-3		
1,2-Dichloroethane	ND	ug/l	1.0	0.18	05/12/06 15:45	MSF	107-06-2		
1,1-Dichloroethene	ND	ug/l	1.0	0.39	05/12/06 15:45	MSF	75-35-4		
cis-1,2-Dichloroethene	ND	ug/l	1.0	0.33	05/12/06 15:45	MSF	156-59-2		
trans-1,2-Dichloroethene	ND	ug/l	1.0	0.44	05/12/06 15:45	MSF	156-60-5		
1,2-Dichloropropane	ND	ug/l	1.0	0.20	05/12/06 15:45	MSF	78-87-5		

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Lab Project Number: 92118954
Client Project ID: Parker Hannifin-WF/05303026400

Lab Sample No: 926960196 | Project Sample Number: 92118954-001 | Date Collected: 05/05/06 10:20
Client Sample ID: MATHERLY MAY 06 | Matrix: Water | Date Received: 05/09/06 15:45

Parameters	Results	Units	Report Limit	MDL	Analyzed	By	CAS No.	Qual	RegLmt
1,3-Dichloropropane	ND	ug/l	1.0	0.11	05/12/06 15:45	MSF	142-28-9		
2,2-Dichloropropane	ND	ug/l	1.0	0.44	05/12/06 15:45	MSF	594-20-7		
1,1-Dichloropropene	ND	ug/l	1.0	0.26	05/12/06 15:45	MSF	563-58-6		
Diisopropyl ether	ND	ug/l	1.0	0.25	05/12/06 15:45	MSF	108-20-3		
Ethylbenzene	ND	ug/l	1.0	0.17	05/12/06 15:45	MSF	100-41-4		
Hexachloro-1,3-butadiene	ND	ug/l	1.0	0.32	05/12/06 15:45	MSF	87-68-3		
Isopropylbenzene (Cumene)	ND	ug/l	1.0	0.16	05/12/06 15:45	MSF	98-82-8		
p-Isopropyltoluene	ND	ug/l	1.0	0.20	05/12/06 15:45	MSF	99-87-6		
Methylene chloride	ND	ug/l	2.0	0.46	05/12/06 15:45	MSF	75-09-2		
Methyl-tert-butyl ether	ND	ug/l	1.0	0.22	05/12/06 15:45	MSF	1634-04-4		
Naphthalene	ND	ug/l	1.0	0.22	05/12/06 15:45	MSF	91-20-3		
n-Propylbenzene	ND	ug/l	1.0	0.20	05/12/06 15:45	MSF	103-65-1		
Styrene	ND	ug/l	1.0	0.15	05/12/06 15:45	MSF	100-42-5		
1,1,1,2-Tetrachloroethane	ND	ug/l	1.0	0.25	05/12/06 15:45	MSF	630-20-6		
1,1,2,2-Tetrachloroethane	ND	ug/l	1.0	0.24	05/12/06 15:45	MSF	79-34-5		
Tetrachloroethene	ND	ug/l	1.0	0.16	05/12/06 15:45	MSF	127-18-4		
Toluene	ND	ug/l	1.0	0.24	05/12/06 15:45	MSF	108-88-3		
1,2,3-Trichlorobenzene	ND	ug/l	1.0	0.18	05/12/06 15:45	MSF	87-61-6		
1,2,4-Trichlorobenzene	ND	ug/l	1.0	0.20	05/12/06 15:45	MSF	120-82-1		
1,1,1-Trichloroethane	ND	ug/l	1.0	0.35	05/12/06 15:45	MSF	71-55-6		
1,1,2-Trichloroethane	ND	ug/l	1.0	0.16	05/12/06 15:45	MSF	79-00-5		
Trichloroethene	ND	ug/l	1.0	0.26	05/12/06 15:45	MSF	79-01-6		
Trichlorofluoromethane	ND	ug/l	1.0	0.41	05/12/06 15:45	MSF	75-69-4		
1,2,3-Trichloropropane	ND	ug/l	1.0	0.22	05/12/06 15:45	MSF	96-18-4		
1,2,4-Trimethylbenzene	ND	ug/l	1.0	0.15	05/12/06 15:45	MSF	95-63-6		
1,3,5-Trimethylbenzene	ND	ug/l	1.0	0.21	05/12/06 15:45	MSF	108-67-8		
Vinyl chloride	ND	ug/l	1.0	0.58	05/12/06 15:45	MSF	75-01-4		
Xylene (Total)	ND	ug/l	1.0		05/12/06 15:45	MSF	1330-20-7		
m&p-Xylene	ND	ug/l	2.0	0.39	05/12/06 15:45	MSF			
o-Xylene	ND	ug/l	1.0	0.17	05/12/06 15:45	MSF	95-47-6		
Toluene-d8 (S)	100	%			05/12/06 15:45	MSF	2037-26-5		
4-Bromofluorobenzene (S)	97	%			05/12/06 15:45	MSF	460-00-4		
Dibromofluoromethane (S)	102	%			05/12/06 15:45	MSF	1868-53-7		
1,2-Dichloroethane-d4 (S)	102	%			05/12/06 15:45	MSF	17060-07-0		

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Lab Project Number: 92118954
Client Project ID: Parker Hannifin-WF/05303026400

PARAMETER FOOTNOTES

Method 9071B modified to use ASE.

All pH, Free Chlorine, Total Chlorine and Ferrous Iron analyses conducted outside of EPA recommended immediate hold time.

Depending on the moisture content the PRLs can be elevated for all soil samples reported on a dry weight basis.

2-Chloroethyl vinyl ether has been shown to degrade in the presence of acid.

ND	Not detected at or above adjusted reporting limit
NC	Not Calculable
J	Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit
MDL	Adjusted Method Detection Limit
(S)	Surrogate
[1]	Sample was extracted using SW846-3510, utilizing an Isotope Dilution (1,4-Dioxane-d8), and analyzed by SW846-8270 SIM (Selective Ion Monitoring).

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QUALITY CONTROL DATA

Lab Project Number: 92118954
Client Project ID: Parker Hannifin-WF/05303026400

QC Batch: 156943 — Analysis Method: EPA 8270
QC Batch Method: EPA 3510 — Analysis Description: 1,4-Dioxane by 8270 SIM
Associated Lab Samples: 926960196

METHOD BLANK: 926968744
Associated Lab Samples: 926960196

Parameter	Units	Blank Result	Reporting Limit	Footnotes
1,4-Dioxane (p-Dioxane)	ug/l	ND	3.0	

LABORATORY CONTROL SAMPLE: 926968751

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Footnotes
1,4-Dioxane (p-Dioxane)	ug/l	10.00	10.20	102	50-150	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 926968769 926968777

Parameter	Units	926957325 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Footnotes
1,4-Dioxane (p-Dioxane)	ug/l	0	20.00	20.11	20.21	101	101	50-150	0	30	

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QUALITY CONTROL DATA

Lab Project Number: 92118954
Client Project ID: Parker Hannifin-WF/05303026400

QC Batch: 157074 — Analysis Method: EPA 8260
QC Batch Method: EPA 8260 — Analysis Description: GC/MS VOCs by 8260, low level
Associated Lab Samples: 926960196

METHOD BLANK: 926974197
Associated Lab Samples: 926960196

Parameter	Units	Blank Result	Reporting Limit	Footnotes
Acetone	ug/l	ND	25.	
Benzene	ug/l	ND	1.0	
Bromobenzene	ug/l	ND	1.0	
Bromochloromethane	ug/l	ND	1.0	
Bromodichloromethane	ug/l	ND	1.0	
Bromoform	ug/l	ND	1.0	
Bromomethane	ug/l	ND	1.0	
2-Butanone (MEK)	ug/l	ND	5.0	
n-Butylbenzene	ug/l	ND	1.0	
sec-Butylbenzene	ug/l	ND	1.0	
tert-Butylbenzene	ug/l	ND	1.0	
Carbon tetrachloride	ug/l	ND	1.0	
Chlorobenzene	ug/l	ND	1.0	
Chloroethane	ug/l	ND	1.0	
Chloroform	ug/l	ND	1.0	
Chloromethane	ug/l	ND	1.0	
2-Chlorotoluene	ug/l	ND	1.0	
4-Chlorotoluene	ug/l	ND	1.0	
1,2-Dibromo-3-chloropropane	ug/l	ND	1.0	
Dibromochloromethane	ug/l	ND	1.0	
1,2-Dibromoethane (EDB)	ug/l	ND	1.0	
Dibromomethane	ug/l	ND	1.0	
1,2-Dichlorobenzene	ug/l	ND	1.0	
1,3-Dichlorobenzene	ug/l	ND	1.0	
1,4-Dichlorobenzene	ug/l	ND	1.0	
Dichlorodifluoromethane	ug/l	ND	1.0	
1,1-Dichloroethane	ug/l	ND	1.0	
1,2-Dichloroethane	ug/l	ND	1.0	
1,1-Dichloroethene	ug/l	ND	1.0	
cis-1,2-Dichloroethene	ug/l	ND	1.0	
trans-1,2-Dichloroethene	ug/l	ND	1.0	

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QUALITY CONTROL DATA

Lab Project Number: 92118954
Client Project ID: Parker Hannifin-WF/05303026400

METHOD BLANK: 926974197
Associated Lab Samples: 926960196

Parameter	Units	Blank Result	Reporting Limit	Footnotes
1,2-Dichloropropane	ug/l	ND	1.0	
1,3-Dichloropropane	ug/l	ND	1.0	
2,2-Dichloropropane	ug/l	ND	1.0	
1,1-Dichloropropene	ug/l	ND	1.0	
Diisopropyl ether	ug/l	ND	1.0	
Ethylbenzene	ug/l	ND	1.0	
Hexachloro-1,3-butadiene	ug/l	ND	1.0	
Isopropylbenzene (Cumene)	ug/l	ND	1.0	
p-Isopropyltoluene	ug/l	ND	1.0	
Methylene chloride	ug/l	ND	2.0	
Methyl-tert-butyl ether	ug/l	ND	1.0	
Naphthalene	ug/l	ND	1.0	
n-Propylbenzene	ug/l	ND	1.0	
Styrene	ug/l	ND	1.0	
1,1,1,2-Tetrachloroethane	ug/l	ND	1.0	
1,1,2,2-Tetrachloroethane	ug/l	ND	1.0	
Tetrachloroethene	ug/l	ND	1.0	
Toluene	ug/l	ND	1.0	
1,2,3-Trichlorobenzene	ug/l	ND	1.0	
1,2,4-Trichlorobenzene	ug/l	ND	1.0	
1,1,1-Trichloroethane	ug/l	ND	1.0	
1,1,2-Trichloroethane	ug/l	ND	1.0	
Trichloroethene	ug/l	ND	1.0	
Trichlorofluoromethane	ug/l	ND	1.0	
1,2,3-Trichloropropane	ug/l	ND	1.0	
1,2,4-Trimethylbenzene	ug/l	ND	1.0	
1,3,5-Trimethylbenzene	ug/l	ND	1.0	
Vinyl chloride	ug/l	ND	1.0	
Xylene (Total)	ug/l	ND	1.0	
m&p-Xylene	ug/l	ND	2.0	
o-Xylene	ug/l	ND	1.0	
Toluene-d8 (S)	%	100		
4-Bromofluorobenzene (S)	%	98		
Dibromofluoromethane (S)	%	102		
1,2-Dichloroethane-d4 (S)	%	100		

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QUALITY CONTROL DATA

Lab Project Number: 92118954
Client Project ID: Parker Hannifin-WF/05303026400

LABORATORY CONTROL SAMPLE: 926974205

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Footnotes
Acetone	ug/l	100.00	98.84	99	50-150	
Benzene	ug/l	50.00	52.99	106	66-123	
Bromobenzene	ug/l	50.00	50.26	101	62-125	
Bromochloromethane	ug/l	50.00	51.53	103	64-125	
Bromodichloromethane	ug/l	50.00	52.53	105	66-126	
Bromoform	ug/l	50.00	52.56	105	50-132	
Bromomethane	ug/l	50.00	67.85	136	50-150	
2-Butanone (MEK)	ug/l	100.00	107.9	108	51-135	
n-Butylbenzene	ug/l	50.00	50.36	101	56-132	
sec-Butylbenzene	ug/l	50.00	54.03	108	59-132	
tert-Butylbenzene	ug/l	50.00	53.85	108	54-135	
Carbon tetrachloride	ug/l	50.00	58.63	117	65-134	
Chlorobenzene	ug/l	50.00	51.33	103	66-123	
Chloroethane	ug/l	50.00	55.65	111	52-146	
Chloroform	ug/l	50.00	53.75	108	64-128	
Chloromethane	ug/l	50.00	47.67	95	25-127	
2-Chlorotoluene	ug/l	50.00	51.31	103	63-126	
4-Chlorotoluene	ug/l	50.00	52.49	105	63-124	
1,2-Dibromo-3-chloropropane	ug/l	50.00	46.76	94	56-125	
Dibromochloromethane	ug/l	50.00	49.81	100	57-131	
1,2-Dibromoethane (EDB)	ug/l	50.00	47.85	96	64-123	
Dibromomethane	ug/l	50.00	48.72	97	64-122	
1,2-Dichlorobenzene	ug/l	50.00	50.43	101	63-123	
1,3-Dichlorobenzene	ug/l	50.00	50.82	102	63-125	
1,4-Dichlorobenzene	ug/l	50.00	49.27	98	62-123	
Dichlorodifluoromethane	ug/l	50.00	49.13	98	50-138	
1,1-Dichloroethane	ug/l	50.00	53.36	107	64-132	
1,2-Dichloroethane	ug/l	50.00	49.95	100	62-123	
1,1-Dichloroethene	ug/l	50.00	56.56	113	62-139	
cis-1,2-Dichloroethene	ug/l	50.00	51.88	104	65-130	
trans-1,2-Dichloroethene	ug/l	50.00	52.96	106	67-134	
1,2-Dichloropropane	ug/l	50.00	52.24	104	66-124	
1,3-Dichloropropane	ug/l	50.00	48.37	97	65-122	
2,2-Dichloropropane	ug/l	50.00	53.87	108	50-143	
1,1-Dichloropropene	ug/l	50.00	53.90	108	66-133	
Diisopropyl ether	ug/l	50.00	50.83	102	56-131	
Ethylbenzene	ug/l	50.00	51.71	103	68-126	

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QUALITY CONTROL DATA

Lab Project Number: 92118954
Client Project ID: Parker Hannifin-WF/05303026400

LABORATORY CONTROL SAMPLE: 926974205

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Footnotes
Hexachloro-1,3-butadiene	ug/l	50.00	66.25	133	50-150	
Isopropylbenzene (Cumene)	ug/l	50.00	58.47	117	63-132	
p-Isopropyltoluene	ug/l	50.00	48.22	96	58-130	
Methylene chloride	ug/l	50.00	54.65	109	54-132	
Methyl-tert-butyl ether	ug/l	50.00	49.47	99	53-128	
Naphthalene	ug/l	50.00	61.17	122	50-131	
n-Propylbenzene	ug/l	50.00	53.72	107	63-130	
Styrene	ug/l	50.00	51.94	104	65-127	
1,1,1,2-Tetrachloroethane	ug/l	50.00	51.03	102	65-125	
1,1,2,2-Tetrachloroethane	ug/l	50.00	49.84	100	58-124	
Tetrachloroethene	ug/l	50.00	50.06	100	50-150	
Toluene	ug/l	50.00	51.05	102	66-125	
1,2,3-Trichlorobenzene	ug/l	50.00	53.33	107	50-132	
1,2,4-Trichlorobenzene	ug/l	50.00	52.12	104	50-132	
1,1,1-Trichloroethane	ug/l	50.00	52.65	105	65-133	
1,1,2-Trichloroethane	ug/l	50.00	51.53	103	64-122	
Trichloroethene	ug/l	50.00	53.16	106	63-134	
Trichlorofluoromethane	ug/l	50.00	54.99	110	54-135	
1,2,3-Trichloropropane	ug/l	50.00	44.52	89	63-124	
1,2,4-Trimethylbenzene	ug/l	50.00	46.58	93	60-128	
1,3,5-Trimethylbenzene	ug/l	50.00	47.83	96	61-128	
Vinyl chloride	ug/l	50.00	53.39	107	50-130	
Xylene (Total)	ug/l	150.00	157.5	105		
m&p-Xylene	ug/l	100.00	105.2	105	66-126	
o-Xylene	ug/l	50.00	52.31	105	65-126	
Toluene-d8 (S)				101	70-120	
4-Bromofluorobenzene (S)				101	76-112	
Dibromofluoromethane (S)				101	86-119	
1,2-Dichloroethane-d4 (S)				98	79-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 926974338 926974346

Parameter	Units	926963158 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Footnotes
Benzene	ug/l	0	50.00	52.89	54.12	106	108	53-134	2	30	
Chlorobenzene	ug/l	0	50.00	51.51	54.06	103	108	53-133	5	30	

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QUALITY CONTROL DATA

Lab Project Number: 92118954
Client Project ID: Parker Hannifin-WF/05303026400

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 926974338 926974346

Parameter	Units	926963158 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Footnotes
1,1-Dichloroethene	ug/l	0	50.00	54.85	57.55	110	115	50-146	5	30	
Toluene	ug/l	0	50.00	50.24	52.44	100	105	51-133	4	30	
Trichloroethene	ug/l	0	50.00	52.09	54.39	104	109	55-138	4	30	
Toluene-d8 (S)						101	100	70-120			
4-Bromofluorobenzene (S)						99	98	76-112			
Dibromofluoromethane (S)						103	104	86-119			
1,2-Dichloroethane-d4 (S)						106	102	79-130			

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Lab Project Number: 92118954
Client Project ID: Parker Hannifin-WF/05303026400

QUALITY CONTROL DATA PARAMETER FOOTNOTES

Consistent with EPA guidelines, unrounded concentrations are displayed and have been used to calculate % Rec and RPD values.

LCS(D)	Laboratory Control Sample (Duplicate)
MS(D)	Matrix Spike (Duplicate)
DUP	Sample Duplicate
ND	Not detected at or above adjusted reporting limit
NC	Not Calculable
J	Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit
MDL	Adjusted Method Detection Limit
RPD	Relative Percent Difference
(S)	Surrogate

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QUALITY CONTROL DATA

CROSS REFERENCE TABLE

Lab Project Number: 92118954
Client Project ID: Parker Hannifin-WF/05303026400

Lab Sample No Identifier	Client Sample Identifier	QC Batch Method	QC Batch Identifier	Analytical Method	Analytical Batch Identifier
926960196	MATHERLY MAY 06	EPA 3510	156943	EPA 8270	157754
926960196	MATHERLY MAY 06	EPA 8260	157074		

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M901376

G2 118954

ENSR

CHAIN OF CUSTODY RECORD

Client/Project Name: PARKER- Wake Forest

Project Location: Wake Forest, NC

Project Number: 05303-026-400

Field Logbook No.: 1

Sampler: (Print Name) /Affiliation: LANCE Tully/ ENSR

Chain of Custody Tape No.: NA

Signature:

Send Results/Report to: David Simpson
DSIMPSON@ENSR.AECOM.COM

Analysis Requested

Field Sample No./ Identification	Date	Time	Grab	Comp	Sample Container (Size/Mat'l)	Sample Type (Liquid, Sludge, Etc.)	Preservative	Field Filtered	VOCs - 8260	1,4-dioxane - 8270						Lab I.D.	Remarks
MATHERLY MAY06	5-5-06	1020	✓		40ml VOA 1L Amber	GW	HCl/Ice	No	✓	✓							926960196

Relinquished by: (Print Name)	Date	Received by: (Print Name)	Date
LANCE TULLY	5-9-05	RA-SNYDER / PACE	5-9-06
Signature:	Time: 0800	Signature:	Time: 10:20
Relinquished by: (Print Name) RASNYDER PACE	Date:	Received by: (Print Name)	Date: 5/9/06
Signature:	Time:	Signature:	Time: 1545
Relinquished by: (Print Name)	Date:	Received by: (Print Name)	Date:
Signature:	Time:	Signature:	Time:

Analytical Laboratory (Destination): PACE ANALYTICAL

Serial No. 33736

June 13, 2006

Mr. K. Ray Allen
7605 Southwick Court
Wake Forest, NC 27587

Parker Hannifin Corporation
Cleveland, OH 44124-4141
Phone (216) 896-3000
Fax (216) 896-4034

RE: Laboratory Analytical Results – Water Supply Well Sampling Event
Parker Hannifin Corporation – Wake Forest, NC Facility
EPA ID # NCD 002 591 014

Dear Mr. Allen:

As you are aware, ENSR Consulting & Engineering (NC), Inc. (ENSR) obtained a water sample from the water supply well at the property located at 1325 Jenkins Road on May 25, 2006. The water sample was submitted for laboratory analysis for a suite of volatile organic compounds and for one semi-volatile compound, 1,4-dioxane. The analysis was performed to determine if environmental impacts from the former Parker Hannifin facility are affecting the well water. This letter shall provide you with the results of the sampling.

No compounds associated with the former Parker Hannifin facility were detected; all constituents for which the water was analyzed were below the laboratory detection limits. The laboratory report for the sample from your property is enclosed.

If you have any questions or require any additional information please contact Lance Tully of ENSR at 919-872-6600 or me at 216-896-2710. Thank you for your cooperation with this sampling activity.

Regards,

Martha Connell
Manager, Environmental Services
Parker Hannifin Corporation.

cc: Larry Stanley, NC DENR
Lance Tully, ENSR

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June 08, 2006

Mr. David Simpson
ENSR C&E
7041 Old Wake Forest Rd.
Suite 103
Raleigh, NC 27616

RE: Lab Project Number: 92120194
Client Project ID: Parker-Wake Forest/05303026400

Dear Mr. Simpson:

Enclosed are the analytical results for sample(s) received by the laboratory on May 26, 2006. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

Inorganic Wet Chemistry and Metals Analyses were performed at our Pace Asheville laboratory and Organic testing was performed at our Pace Charlotte laboratory unless otherwise footnoted.

If you have any questions concerning this report please feel free to contact me.

Sincerely,

Teresa Adams

Teresa Adams
teresa.adams@pacelabs.com
Project Manager

Enclosures

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SAMPLE SUMMARY

Lab Project Number: 92120194
Client Project ID: Parker-Wake Forest/05303026400

Project Sample Number	Sample Number	Client Sample ID	Matrix	Date Collected	Date Received
92120194-001	927031161	WSW-1325	Water	05/25/06 17:45	05/26/06 17:10

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SAMPLE ANALYTE COUNT

Lab Project Number: 92120194
Client Project ID: Parker-Wake Forest/05303026400

Project Sample Number	Sample No	Client Sample ID	Analysis Code	Analysis Description	Analytes Reported
92120194-001	927031161	WSW-1325	8260X WL92	GC/MS VOCs by 8260, low level	67
			8270D WL92	1,4-Dioxane by 8270 SIM	2

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Lab Project Number: 92120194
Client Project ID: Parker-Wake Forest/05303026400

***ALL QC IS NOT COMPLETE FOR QC SAMPLE(S):
ESN 927045310 BATCH 158689
ESN 927045328 BATCH 158689

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Lab Project Number: 92120194
Client Project ID: Parker-Wake Forest/05303026400

Lab Sample No: 927031161 | Project Sample Number: 92120194-001 | Date Collected: 05/25/06 17:45
Client Sample ID: WSW-1325 | Matrix: Water | Date Received: 05/26/06 17:10

Parameters	Results	Units	Report Limit	MDL	Analyzed	By	CAS No.	Qual	ReqLmt
GC/MS Semivolatiles									
1,4-Dioxane by 8270 SIM	Prep/Method: EPA 3510 / EPA 8270								
1,4-Dioxane (p-Dioxane)	ND	ug/l	3.3	0.77	06/07/06 23:24	BET	123-91-1	1	
Date Extracted	06/01/06				06/01/06				
GC/MS Volatiles									
GC/MS VOCs by 8260, low level	Method: EPA 8260								
Acetone	ND	ug/l	25.	1.8	06/04/06 22:25	MCK	67-64-1		
Benzene	ND	ug/l	1.0	0.31	06/04/06 22:25	MCK	71-43-2		
Bromobenzene	ND	ug/l	1.0	0.16	06/04/06 22:25	MCK	108-86-1		
Bromochloromethane	ND	ug/l	1.0	0.37	06/04/06 22:25	MCK	74-97-5		
Bromodichloromethane	ND	ug/l	1.0	0.21	06/04/06 22:25	MCK	75-27-4		
Bromoform	ND	ug/l	1.0	0.17	06/04/06 22:25	MCK	75-25-2		
Bromomethane	ND	ug/l	1.0	0.51	06/04/06 22:25	MCK	74-83-9		
2-Butanone (MEK)	ND	ug/l	5.0	1.2	06/04/06 22:25	MCK	78-93-3		
n-Butylbenzene	ND	ug/l	1.0	0.20	06/04/06 22:25	MCK	104-51-8		
sec-Butylbenzene	ND	ug/l	1.0	0.20	06/04/06 22:25	MCK	135-98-8		
tert-Butylbenzene	ND	ug/l	1.0	0.17	06/04/06 22:25	MCK	98-06-6		
Carbon tetrachloride	ND	ug/l	1.0	0.27	06/04/06 22:25	MCK	56-23-5		
Chlorobenzene	ND	ug/l	1.0	0.15	06/04/06 22:25	MCK	108-90-7		
Chloroethane	ND	ug/l	1.0	0.78	06/04/06 22:25	MCK	75-00-3		
Chloroform	ND	ug/l	1.0	0.29	06/04/06 22:25	MCK	67-66-3		
Chloromethane	ND	ug/l	1.0	0.78	06/04/06 22:25	MCK	74-87-3		
2-Chlorotoluene	ND	ug/l	1.0	0.16	06/04/06 22:25	MCK	95-49-8		
4-Chlorotoluene	ND	ug/l	1.0	0.20	06/04/06 22:25	MCK	106-43-4		
1,2-Dibromo-3-chloropropane	ND	ug/l	1.0	0.39	06/04/06 22:25	MCK	96-12-8		
Dibromochloromethane	ND	ug/l	1.0	0.17	06/04/06 22:25	MCK	124-48-1		
1,2-Dibromoethane (EDB)	ND	ug/l	1.0	0.15	06/04/06 22:25	MCK	106-93-4		
Dibromomethane	ND	ug/l	1.0	0.27	06/04/06 22:25	MCK	74-95-3		
1,2-Dichlorobenzene	ND	ug/l	1.0	0.14	06/04/06 22:25	MCK	95-50-1		
1,3-Dichlorobenzene	ND	ug/l	1.0	0.16	06/04/06 22:25	MCK	541-73-1		
1,4-Dichlorobenzene	ND	ug/l	1.0	0.17	06/04/06 22:25	MCK	106-46-7		
Dichlorodifluoromethane	ND	ug/l	1.0	0.59	06/04/06 22:25	MCK	75-71-8		
1,1-Dichloroethane	ND	ug/l	1.0	0.42	06/04/06 22:25	MCK	75-34-3		
1,2-Dichloroethane	ND	ug/l	1.0	0.18	06/04/06 22:25	MCK	107-06-2		
1,2-Dichloroethene (Total)	ND	ug/l	1.0		06/04/06 22:25	MCK	540-59-0		
1,1-Dichloroethene	ND	ug/l	1.0	0.39	06/04/06 22:25	MCK	75-35-4		
cis-1,2-Dichloroethene	ND	ug/l	1.0	0.33	06/04/06 22:25	MCK	156-59-2		
trans-1,2-Dichloroethene	ND	ug/l	1.0	0.44	06/04/06 22:25	MCK	156-60-5		

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Lab Project Number: 92120194
Client Project ID: Parker-Wake Forest/05303026400

Lab Sample No: 927031161 | Project Sample Number: 92120194-001 | Date Collected: 05/25/06 17:45
Client Sample ID: WSW-1325 | Matrix: Water | Date Received: 05/26/06 17:10

Parameters	Results	Units	Report Limit	MDL	Analyzed	By	CAS No.	Qual	RegLmt
1,2-Dichloropropane	ND	ug/l	1.0	0.20	06/04/06 22:25	MCK	78-87-5		
1,3-Dichloropropane	ND	ug/l	1.0	0.11	06/04/06 22:25	MCK	142-28-9		
2,2-Dichloropropane	ND	ug/l	1.0	0.44	06/04/06 22:25	MCK	594-20-7		
1,1-Dichloropropene	ND	ug/l	1.0	0.26	06/04/06 22:25	MCK	563-58-6		
Diisopropyl ether	ND	ug/l	1.0	0.25	06/04/06 22:25	MCK	108-20-3		
Ethylbenzene	ND	ug/l	1.0	0.17	06/04/06 22:25	MCK	100-41-4		
Hexachloro-1,3-butadiene	ND	ug/l	1.0	0.32	06/04/06 22:25	MCK	87-68-3		
Isopropylbenzene (Cumene)	ND	ug/l	1.0	0.16	06/04/06 22:25	MCK	98-82-8		
p-Isopropyltoluene	ND	ug/l	1.0	0.20	06/04/06 22:25	MCK	99-87-6		
Methylene chloride	ND	ug/l	2.0	0.46	06/04/06 22:25	MCK	75-09-2		
Methyl-tert-butyl ether	ND	ug/l	1.0	0.22	06/04/06 22:25	MCK	1634-04-4		
Naphthalene	ND	ug/l	1.0	0.22	06/04/06 22:25	MCK	91-20-3		
n-Propylbenzene	ND	ug/l	1.0	0.20	06/04/06 22:25	MCK	103-65-1		
Styrene	ND	ug/l	1.0	0.15	06/04/06 22:25	MCK	100-42-5		
1,1,1,2-Tetrachloroethane	ND	ug/l	1.0	0.25	06/04/06 22:25	MCK	630-20-6		
1,1,2,2-Tetrachloroethane	ND	ug/l	1.0	0.24	06/04/06 22:25	MCK	79-34-5		
Tetrachloroethene	ND	ug/l	1.0	0.16	06/04/06 22:25	MCK	127-18-4		
Toluene	ND	ug/l	1.0	0.24	06/04/06 22:25	MCK	108-88-3		
1,2,3-Trichlorobenzene	ND	ug/l	1.0	0.18	06/04/06 22:25	MCK	87-61-6		
1,2,4-Trichlorobenzene	ND	ug/l	1.0	0.20	06/04/06 22:25	MCK	120-82-1		
1,1,1-Trichloroethane	ND	ug/l	1.0	0.35	06/04/06 22:25	MCK	71-55-6		
1,1,2-Trichloroethane	ND	ug/l	1.0	0.16	06/04/06 22:25	MCK	79-00-5		
Trichloroethene	ND	ug/l	1.0	0.26	06/04/06 22:25	MCK	79-01-6		
Trichlorofluoromethane	ND	ug/l	1.0	0.41	06/04/06 22:25	MCK	75-69-4		
1,2,3-Trichloropropane	ND	ug/l	1.0	0.22	06/04/06 22:25	MCK	96-18-4		
1,2,4-Trimethylbenzene	ND	ug/l	1.0	0.15	06/04/06 22:25	MCK	95-63-6		
1,3,5-Trimethylbenzene	ND	ug/l	1.0	0.21	06/04/06 22:25	MCK	108-67-8		
Vinyl chloride	ND	ug/l	1.0	0.58	06/04/06 22:25	MCK	75-01-4		
Xylene (Total)	ND	ug/l	1.0		06/04/06 22:25	MCK	1330-20-7		
m&p-Xylene	ND	ug/l	2.0	0.39	06/04/06 22:25	MCK			
o-Xylene	ND	ug/l	1.0	0.17	06/04/06 22:25	MCK	95-47-6		
Toluene-d8 (S)	100	%			06/04/06 22:25	MCK	2037-26-5		
4-Bromofluorobenzene (S)	93	%			06/04/06 22:25	MCK	460-00-4		
Dibromofluoromethane (S)	115	%			06/04/06 22:25	MCK	1868-53-7		
1,2-Dichloroethane-d4 (S)	113	%			06/04/06 22:25	MCK	17060-07-0		

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Lab Project Number: 92120194
Client Project ID: Parker-Wake Forest/05303026400

PARAMETER FOOTNOTES

Method 9071B modified to use ASE.

All pH, Free Chlorine, Total Chlorine and Ferrous Iron analyses conducted outside of EPA recommended immediate hold time.

Depending on the moisture content the PRLs can be elevated for all soil samples reported on a dry weight basis.

2-Chloroethyl vinyl ether has been shown to degrade in the presence of acid.

ND	Not detected at or above adjusted reporting limit
NC	Not Calculable
J	Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit
MDL	Adjusted Method Detection Limit
(S)	Surrogate
[1]	Sample was extracted using SW846-3510, utilizing an Isotope Dilution (1,4-Dioxane-d8), and analyzed by SW846-8270 SIM (Selective Ion Monitoring).

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QUALITY CONTROL DATA

Lab Project Number: 92120194
Client Project ID: Parker-Wake Forest/05303026400

QC Batch: 156943
QC Batch Method: EPA 3510
Associated Lab Samples: 927031161

Analysis Method: EPA 8270
Analysis Description: 1,4-Dioxane by 8270 SIM

METHOD BLANK: 927047233
Associated Lab Samples: 927031161

Parameter	Units	Blank Result	Reporting Limit	Footnotes
1,4-Dioxane (p-Dioxane)	ug/l	ND	3.0	

LABORATORY CONTROL SAMPLE: 926968751

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Footnotes
1,4-Dioxane (p-Dioxane)	ug/l	10.00	10.20	102	50-150	

LABORATORY CONTROL SAMPLE: 927047241

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Footnotes
1,4-Dioxane (p-Dioxane)	ug/l	10.00	9.756	98	50-150	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 926968769 926968777

Parameter	Units	926957325 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Footnotes
1,4-Dioxane (p-Dioxane)	ug/l	0	20.00	20.11	20.21	101	101	50-150	0	30	

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QUALITY CONTROL DATA

Lab Project Number: 92120194
Client Project ID: Parker-Wake Forest/05303026400

QC Batch: 158689 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: GC/MS VOCs by 8260, low level
Associated Lab Samples: 927031161

METHOD BLANK: 927044826
Associated Lab Samples: 927031161

Parameter	Units	Blank Result	Reporting Limit	Footnotes
Acetone	ug/l	ND	25.	
Benzene	ug/l	ND	1.0	
Bromobenzene	ug/l	ND	1.0	
Bromochloromethane	ug/l	ND	1.0	
Bromodichloromethane	ug/l	ND	1.0	
Bromoform	ug/l	ND	1.0	
Bromomethane	ug/l	ND	1.0	
2-Butanone (MEK)	ug/l	ND	5.0	
n-Butylbenzene	ug/l	ND	1.0	
sec-Butylbenzene	ug/l	ND	1.0	
tert-Butylbenzene	ug/l	ND	1.0	
Carbon tetrachloride	ug/l	ND	1.0	
Chlorobenzene	ug/l	ND	1.0	
Chloroethane	ug/l	ND	1.0	
Chloroform	ug/l	ND	1.0	
Chloromethane	ug/l	ND	1.0	
2-Chlorotoluene	ug/l	ND	1.0	
4-Chlorotoluene	ug/l	ND	1.0	
1,2-Dibromo-3-chloropropane	ug/l	ND	1.0	
Dibromochloromethane	ug/l	ND	1.0	
1,2-Dibromoethane (EDB)	ug/l	ND	1.0	
Dibromomethane	ug/l	ND	1.0	
1,2-Dichlorobenzene	ug/l	ND	1.0	
1,3-Dichlorobenzene	ug/l	ND	1.0	
1,4-Dichlorobenzene	ug/l	ND	1.0	
Dichlorodifluoromethane	ug/l	ND	1.0	
1,1-Dichloroethane	ug/l	ND	1.0	
1,2-Dichloroethane	ug/l	ND	1.0	
1,2-Dichloroethene (Total)	ug/l	ND	1.0	
1,1-Dichloroethene	ug/l	ND	1.0	
cis-1,2-Dichloroethene	ug/l	ND	1.0	

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QUALITY CONTROL DATA

Lab Project Number: 92120194
Client Project ID: Parker-Wake Forest/05303026400

METHOD BLANK: 927044826
Associated Lab Samples: 927031161

Parameter	Units	Blank Result	Reporting Limit	Footnotes
trans-1,2-Dichloroethene	ug/l	ND	1.0	
1,2-Dichloropropane	ug/l	ND	1.0	
1,3-Dichloropropane	ug/l	ND	1.0	
2,2-Dichloropropane	ug/l	ND	1.0	
1,1-Dichloropropene	ug/l	ND	1.0	
Diisopropyl ether	ug/l	ND	1.0	
Ethylbenzene	ug/l	ND	1.0	
Hexachloro-1,3-butadiene	ug/l	ND	1.0	
Isopropylbenzene (Cumene)	ug/l	ND	1.0	
p-Isopropyltoluene	ug/l	ND	1.0	
Methylene chloride	ug/l	ND	2.0	
Methyl-tert-butyl ether	ug/l	ND	1.0	
Naphthalene	ug/l	ND	1.0	
n-Propylbenzene	ug/l	ND	1.0	
Styrene	ug/l	ND	1.0	
1,1,1,2-Tetrachloroethane	ug/l	ND	1.0	
1,1,2,2-Tetrachloroethane	ug/l	ND	1.0	
Tetrachloroethene	ug/l	ND	1.0	
Toluene	ug/l	ND	1.0	
1,2,3-Trichlorobenzene	ug/l	ND	1.0	
1,2,4-Trichlorobenzene	ug/l	ND	1.0	
1,1,1-Trichloroethane	ug/l	ND	1.0	
1,1,2-Trichloroethane	ug/l	ND	1.0	
Trichloroethene	ug/l	ND	1.0	
Trichlorofluoromethane	ug/l	ND	1.0	
1,2,3-Trichloropropane	ug/l	ND	1.0	
1,2,4-Trimethylbenzene	ug/l	ND	1.0	
1,3,5-Trimethylbenzene	ug/l	ND	1.0	
Vinyl chloride	ug/l	ND	1.0	
Xylene (Total)	ug/l	ND	1.0	
m&p-Xylene	ug/l	ND	2.0	
o-Xylene	ug/l	ND	1.0	
Toluene-d8 (S)	%	100		
4-Bromofluorobenzene (S)	%	94		
Dibromofluoromethane (S)	%	111		
1,2-Dichloroethane-d4 (S)	%	116		

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QUALITY CONTROL DATA

Lab Project Number: 92120194
Client Project ID: Parker-Wake Forest/05303026400

LABORATORY CONTROL SAMPLE: 927044834

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Footnotes
Acetone	ug/l	100.00	105.0	105	50-150	
Benzene	ug/l	50.00	59.95	120	66-123	
Bromobenzene	ug/l	50.00	60.50	121	62-125	
Bromochloromethane	ug/l	50.00	58.14	116	64-125	
Bromodichloromethane	ug/l	50.00	56.53	113	66-126	
Bromoform	ug/l	50.00	60.59	121	50-132	
Bromomethane	ug/l	50.00	68.68	137	50-150	
2-Butanone (MEK)	ug/l	100.00	113.3	113	51-135	
n-Butylbenzene	ug/l	50.00	52.52	105	56-132	
sec-Butylbenzene	ug/l	50.00	59.60	119	59-132	
tert-Butylbenzene	ug/l	50.00	55.31	111	54-135	
Carbon tetrachloride	ug/l	50.00	48.44	97	65-134	
Chlorobenzene	ug/l	50.00	57.32	115	66-123	
Chloroethane	ug/l	50.00	63.41	127	52-146	
Chloroform	ug/l	50.00	58.28	117	64-128	
Chloromethane	ug/l	50.00	60.63	121	25-127	
2-Chlorotoluene	ug/l	50.00	59.09	118	63-126	
4-Chlorotoluene	ug/l	50.00	59.86	120	63-124	
1,2-Dibromo-3-chloropropane	ug/l	50.00	55.65	111	56-125	
Dibromochloromethane	ug/l	50.00	58.04	116	57-131	
1,2-Dibromoethane (EDB)	ug/l	50.00	59.75	119	64-123	
Dibromomethane	ug/l	50.00	57.31	115	64-122	
1,2-Dichlorobenzene	ug/l	50.00	58.34	117	63-123	
1,3-Dichlorobenzene	ug/l	50.00	58.17	116	63-125	
1,4-Dichlorobenzene	ug/l	50.00	56.12	112	62-123	
Dichlorodifluoromethane	ug/l	50.00	68.32	137	50-138	
1,1-Dichloroethane	ug/l	50.00	57.15	114	64-132	
1,2-Dichloroethane	ug/l	50.00	56.63	113	62-123	
1,2-Dichloroethene (Total)	ug/l	100.00	122.2	122		
1,1-Dichloroethene	ug/l	50.00	62.96	126	62-139	
cis-1,2-Dichloroethene	ug/l	50.00	60.66	121	65-130	
trans-1,2-Dichloroethene	ug/l	50.00	61.50	123	67-134	
1,2-Dichloropropane	ug/l	50.00	56.56	113	66-124	
1,3-Dichloropropane	ug/l	50.00	56.17	112	65-122	
2,2-Dichloropropane	ug/l	50.00	46.08	92	50-143	
1,1-Dichloropropene	ug/l	50.00	60.29	121	66-133	
Diisopropyl ether	ug/l	50.00	56.84	114	56-131	

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Fax: 828.252.4618

QUALITY CONTROL DATA

Lab Project Number: 92120194
Client Project ID: Parker-Wake Forest/05303026400

LABORATORY CONTROL SAMPLE: 927044834

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Footnotes
Ethylbenzene	ug/l	50.00	59.78	120	68-126	
Hexachloro-1,3-butadiene	ug/l	50.00	55.39	111	50-150	
Isopropylbenzene (Cumene)	ug/l	50.00	55.62	111	63-132	
p-Isopropyltoluene	ug/l	50.00	48.58	97	58-130	
Methylene chloride	ug/l	50.00	58.11	116	54-132	
Methyl-tert-butyl ether	ug/l	50.00	56.88	114	53-128	
Naphthalene	ug/l	50.00	49.24	98	50-131	
n-Propylbenzene	ug/l	50.00	59.60	119	63-130	
Styrene	ug/l	50.00	56.70	113	65-127	
1,1,1,2-Tetrachloroethane	ug/l	50.00	56.61	113	65-125	
1,1,2,2-Tetrachloroethane	ug/l	50.00	58.43	117	58-124	
Tetrachloroethene	ug/l	50.00	55.20	110	50-150	
Toluene	ug/l	50.00	58.55	117	66-125	
1,2,3-Trichlorobenzene	ug/l	50.00	60.50	121	50-132	
1,2,4-Trichlorobenzene	ug/l	50.00	58.60	117	50-132	
1,1,1-Trichloroethane	ug/l	50.00	57.50	115	65-133	
1,1,2-Trichloroethane	ug/l	50.00	56.55	113	64-122	
Trichloroethene	ug/l	50.00	57.98	116	63-134	
Trichlorofluoromethane	ug/l	50.00	63.24	126	54-135	
1,2,3-Trichloropropane	ug/l	50.00	54.57	109	63-124	
1,2,4-Trimethylbenzene	ug/l	50.00	50.51	101	60-128	
1,3,5-Trimethylbenzene	ug/l	50.00	55.43	111	61-128	
Vinyl chloride	ug/l	50.00	68.91	138	50-130	1
Xylene (Total)	ug/l	150.00	181.2	121		
m&p-Xylene	ug/l	100.00	119.9	120	66-126	
o-Xylene	ug/l	50.00	61.28	123	65-126	
Toluene-d8 (S)				100	70-120	
4-Bromofluorobenzene (S)				98	76-112	
Dibromofluoromethane (S)				102	86-119	
1,2-Dichloroethane-d4 (S)				104	79-130	

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Lab Project Number: 92120194
Client Project ID: Parker-Wake Forest/05303026400

QUALITY CONTROL DATA PARAMETER FOOTNOTES

Consistent with EPA guidelines, unrounded concentrations are displayed and have been used to calculate % Rec and RPD values.

LCS(D)	Laboratory Control Sample (Duplicate)
MS(D)	Matrix Spike (Duplicate)
DUP	Sample Duplicate
ND	Not detected at or above adjusted reporting limit
NC	Not Calculable
J	Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit
MDL	Adjusted Method Detection Limit
RPD	Relative Percent Difference
(S)	Surrogate
[1]	Recovery falls outside of QC limits, however, this compound is not found in the associated samples.

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QUALITY CONTROL DATA

CROSS REFERENCE TABLE

Lab Project Number: 92120194
Client Project ID: Parker-Wake Forest/05303026400

Lab Sample No Identifier	Client Sample Identifier	QC Batch Method	QC Batch Identifier	Analytical Method	Analytical Batch Identifier
927031161	WSW-1325	EPA 3510	156943	EPA 8270	159200
927031161	WSW-1325	EPA 8260	158689		

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CHAIN OF CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: of 0998185

Section A Required Client Information:

Company: ENSR
Address: 7041 Old Wake Forest Rd., Ste 103
RALEIGH, NC 27616
Email To: LTULLY@ENSR.AECOM.COM
Phone: 919-872-6600 Fax: 919-872-7196
Requested Due Date/TAT: Standard

Section B Required Project Information:

Report To: DAVID SIMPSON
Copy To: DSIMPSON@ENSR.AECOM.COM
Purchase Order No.: 2040290
Project Name: PARKER-WAKE FOREST
Project Number: 05703-026-400

Section C Invoice Information:

Attention:
Company Name:
Address:
Pace Quote Reference:
Pace Project Manager: Terrin Adam
Pace Profile #: 383, 12

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☐ Other

SITE LOCATION: ☐GA ☐IL ☐IN ☐MI ☐MN ☒NC ☐OH ☐SC ☐WI ☐OTHER

Section D Required Client Information

SAMPLE ID: One Character per box. (A-Z, 0-9 / .-) Samples IDs MUST BE UNIQUE

Valid Matrix Codes: MATRIX / CODE — DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS

Filtered (Y/N): N N

Requested Analysis: VOC 8260 / 1,4-Dioxane - 8270 / Residual Chlorine (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE G=GRAB C=COMP	COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Pace Project Number / Lab I.D
1	WSW-1325	WT				5-25-06	1745		5	2			3					92703161
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		
11																		
12																		

Additional Comments:

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Lance Tully / ENSR	5-26-06	0900	David R Nyman / PACE	5/26/06	10:15
David R Nyman	5/26/06	1710	[illegible]	5/26/06	17:23

SAMPLE CONDITION

Temp in °C	Received on Ice	Custody Sealed Cooler	Samples Intact
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: LANCE TULLY

SIGNATURE of SAMPLER:

DATE Signed (MM/DD/YY): 5-26-06

SEE REVERSE SIDE FOR INSTRUCTIONS

May 4, 2006

Mr. Bill Andrews
1121 Jenkins Road
Wake Forest, NC 27587

Mrs. Elizabeth Perry
12621 Capital Blvd.
Wake Forest, NC 27587

Parker Hannifin Corporation
6035 Parkland Blvd.
Cleveland, OH 44124-4141
Phone (216) 896-3000
Fax (216) 896-4034

RE: Laboratory Analytical Results – Water Supply Well Sampling Event
Parker Hannifin Corporation – Wake Forest, NC Facility
EPA ID # NCD 002 591 014

Dear Mr. Andrews and Mrs. Perry:

As you are aware, ENSR Consulting & Engineering (NC), Inc. (ENSR) obtained water samples from the water supply wells at your homes on April 21, 2006. The water samples were submitted for laboratory analysis for a suite of volatile organic compounds and for one semi-volatile compound, 1,4-dioxane. The analysis was performed to determine if environmental impacts from the former Parker Hannifin facility are affecting the well water. This letter shall provide you with the results of the sampling.

No compounds associated with the former Parker Hannifin facility were detected. Low levels of two volatile organic compounds were detected in the samples from each home. Both the Andrews well and the Perry well had xylene present at 1.2 µg/l. US EPA has established that xylene present at or below 10,000 µg/l in potable water is protective of public health. Both wells also had low levels of chloromethane (1.3 µg/l at 12621 Capital Blvd. and 1.0 µg/l at 1121 Jenkins). US EPA has not established a contaminant limit for chloromethane in drinking water. The laboratory analysis report is enclosed for your files.

If you have any questions or require any additional information please contact ENSR at 919-872-6600 or me at 216-896-2710.

Regards,

Martha Connell
Manager, Environmental Services
Parker Hannifin Corporation.

cc: Grady Shields, Wyrick Robbins Yates & Ponton
Larry Stanley, NC DENR
Lance Tully, ENSR

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May 01, 2006

Mr. David Simpson
EHSR C&E
7041 Old Wake Forest Rd.
Suite 103
Raleigh, NC 27616

RE: Lab Project Number: 92117972
Client Project ID: Parker Hannafin Wake Forest

Dear Mr. Simpson:

Enclosed are the analytical results for sample(s) received by the laboratory on April 25, 2006. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

Inorganic Wet Chemistry and Metals Analyses were performed at our Pace Asheville laboratory and Organic testing was performed at our Pace Charlotte laboratory unless otherwise footnoted.

If you have any questions concerning this report please feel free to contact me.

Sincerely,

Teresa Adams

Teresa Adams
Teresa.Adams@pacelabs.com
Project Manager

Enclosures

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SAMPLE SUMMARY

Lab Project Number: 92117972
Client Project ID: Parker Hannafin Wake Forest

Project Sample Number	Sample Number	Client Sample ID	Matrix	Date Collected	Date Received
92117972-001	926907916	WSW-12621	Water	04/21/06 09:15	04/25/06 17:15
92117972-002	926907932	WSW-1121	Water	04/21/06 09:30	04/25/06 17:15

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SAMPLE ANALYTE COUNT

Lab Project Number: 92117972
Client Project ID: Parker Hannafin Wake Forest

Project Sample Number	Sample No	Client Sample ID	Analysis Code	Analysis Description	Analytes Reported
92117972-001	926907916	WSW-12621	8260X WL92	GC/MS VOCs by 8260, low level	66
			8270D WL92	1,4-Dioxane by 8270 SIM	2
92117972-002	926907932	WSW-1121	8260X WL92	GC/MS VOCs by 8260, low level	66
			8270D WL92	1,4-Dioxane by 8270 SIM	2

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Lab Project Number: 92117972
Client Project ID: Parker Hannafin Wake Forest

Lab Sample No: 926907916 | Project Sample Number: 92117972-001 | Date Collected: 04/21/06 09:15
Client Sample ID: WSW-12621 | Matrix: Water | Date Received: 04/25/06 17:15

Parameters	Results	Units	Report Limit	MDL	Analyzed	By	CAS No.	Qual	RegLmt
GC/MS Semivolatiles									
1,4-Dioxane by 8270 SIM	Prep/Method: EPA 3510 / EPA 8270								
1,4-Dioxane (p-Dioxane)	ND	ug/l	3.2	0.74	04/30/06 00:44	BET	123-91-1	1	
Date Extracted	04/26/06				04/26/06				
GC/MS Volatiles									
GC/MS VOCs by 8260, low level	Method: EPA 8260								
Acetone	ND	ug/l	25.	1.8	04/26/06 21:16	MSF	67-64-1		
Benzene	ND	ug/l	1.0	0.31	04/26/06 21:16	MSF	71-43-2		
Bromobenzene	ND	ug/l	1.0	0.16	04/26/06 21:16	MSF	108-86-1		
Bromochloromethane	ND	ug/l	1.0	0.37	04/26/06 21:16	MSF	74-97-5		
Bromodichloromethane	ND	ug/l	1.0	0.21	04/26/06 21:16	MSF	75-27-4		
Bromoform	ND	ug/l	1.0	0.17	04/26/06 21:16	MSF	75-25-2		
Bromomethane	ND	ug/l	1.0	0.51	04/26/06 21:16	MSF	74-83-9		
2-Butanone (MEK)	ND	ug/l	5.0	1.2	04/26/06 21:16	MSF	78-93-3		
n-Butylbenzene	ND	ug/l	1.0	0.20	04/26/06 21:16	MSF	104-51-8		
sec-Butylbenzene	ND	ug/l	1.0	0.20	04/26/06 21:16	MSF	135-98-8		
tert-Butylbenzene	ND	ug/l	1.0	0.17	04/26/06 21:16	MSF	98-06-6		
Carbon tetrachloride	ND	ug/l	1.0	0.27	04/26/06 21:16	MSF	56-23-5		
Chlorobenzene	ND	ug/l	1.0	0.15	04/26/06 21:16	MSF	108-90-7		
Chloroethane	ND	ug/l	1.0	0.78	04/26/06 21:16	MSF	75-00-3		
Chloroform	ND	ug/l	1.0	0.29	04/26/06 21:16	MSF	67-66-3		
Chloromethane	1.3	ug/l	1.0	0.78	04/26/06 21:16	MSF	74-87-3		
2-Chlorotoluene	ND	ug/l	1.0	0.16	04/26/06 21:16	MSF	95-49-8		
4-Chlorotoluene	ND	ug/l	1.0	0.20	04/26/06 21:16	MSF	106-43-4		
1,2-Dibromo-3-chloropropane	ND	ug/l	1.0	0.39	04/26/06 21:16	MSF	96-12-8		
Dibromochloromethane	ND	ug/l	1.0	0.17	04/26/06 21:16	MSF	124-48-1		
1,2-Dibromoethane (EDB)	ND	ug/l	1.0	0.15	04/26/06 21:16	MSF	106-93-4		
Dibromomethane	ND	ug/l	1.0	0.27	04/26/06 21:16	MSF	74-95-3		
1,2-Dichlorobenzene	ND	ug/l	1.0	0.14	04/26/06 21:16	MSF	95-50-1		
1,3-Dichlorobenzene	ND	ug/l	1.0	0.16	04/26/06 21:16	MSF	541-73-1		
1,4-Dichlorobenzene	ND	ug/l	1.0	0.17	04/26/06 21:16	MSF	106-46-7		
Dichlorodifluoromethane	ND	ug/l	1.0	0.59	04/26/06 21:16	MSF	75-71-8		
1,1-Dichloroethane	ND	ug/l	1.0	0.42	04/26/06 21:16	MSF	75-34-3		
1,2-Dichloroethane	ND	ug/l	1.0	0.18	04/26/06 21:16	MSF	107-06-2		
1,1-Dichloroethene	ND	ug/l	1.0	0.39	04/26/06 21:16	MSF	75-35-4		
cis-1,2-Dichloroethene	ND	ug/l	1.0	0.33	04/26/06 21:16	MSF	156-59-2		
trans-1,2-Dichloroethene	ND	ug/l	1.0	0.44	04/26/06 21:16	MSF	156-60-5		
1,2-Dichloropropane	ND	ug/l	1.0	0.20	04/26/06 21:16	MSF	78-87-5		

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Lab Project Number: 92117972
Client Project ID: Parker Hannafin Wake Forest

Lab Sample No: 926907916 | Project Sample Number: 92117972-001 | Date Collected: 04/21/06 09:15
Client Sample ID: WSW-12621 | Matrix: Water | Date Received: 04/25/06 17:15

Parameters	Results	Units	Report Limit	MDL	Analyzed	By	CAS No.	Qual	RegLmt
1,3-Dichloropropane	ND	ug/l	1.0	0.11	04/26/06 21:16	MSF	142-28-9		
2,2-Dichloropropane	ND	ug/l	1.0	0.44	04/26/06 21:16	MSF	594-20-7		
1,1-Dichloropropene	ND	ug/l	1.0	0.26	04/26/06 21:16	MSF	563-58-6		
Diisopropyl ether	ND	ug/l	1.0	0.25	04/26/06 21:16	MSF	108-20-3		
Ethylbenzene	ND	ug/l	1.0	0.17	04/26/06 21:16	MSF	100-41-4		
Hexachloro-1,3-butadiene	ND	ug/l	1.0	0.32	04/26/06 21:16	MSF	87-68-3		
Isopropylbenzene (Cumene)	ND	ug/l	1.0	0.16	04/26/06 21:16	MSF	98-82-8		
p-Isopropyltoluene	ND	ug/l	1.0	0.20	04/26/06 21:16	MSF	99-87-6		
Methylene chloride	ND	ug/l	2.0	0.46	04/26/06 21:16	MSF	75-09-2		
Methyl-tert-butyl ether	ND	ug/l	1.0	0.22	04/26/06 21:16	MSF	1634-04-4		
Naphthalene	ND	ug/l	1.0	0.22	04/26/06 21:16	MSF	91-20-3		
n-Propylbenzene	ND	ug/l	1.0	0.20	04/26/06 21:16	MSF	103-65-1		
Styrene	ND	ug/l	1.0	0.15	04/26/06 21:16	MSF	100-42-5		
1,1,1,2-Tetrachloroethane	ND	ug/l	1.0	0.25	04/26/06 21:16	MSF	630-20-6		
1,1,2,2-Tetrachloroethane	ND	ug/l	1.0	0.24	04/26/06 21:16	MSF	79-34-5		
Tetrachloroethene	ND	ug/l	1.0	0.16	04/26/06 21:16	MSF	127-18-4		
Toluene	ND	ug/l	1.0	0.24	04/26/06 21:16	MSF	108-88-3		
1,2,3-Trichlorobenzene	ND	ug/l	1.0	0.18	04/26/06 21:16	MSF	87-61-6		
1,2,4-Trichlorobenzene	ND	ug/l	1.0	0.20	04/26/06 21:16	MSF	120-82-1		
1,1,1-Trichloroethane	ND	ug/l	1.0	0.35	04/26/06 21:16	MSF	71-55-6		
1,1,2-Trichloroethane	ND	ug/l	1.0	0.16	04/26/06 21:16	MSF	79-00-5		
Trichloroethene	ND	ug/l	1.0	0.26	04/26/06 21:16	MSF	79-01-6		
Trichlorofluoromethane	ND	ug/l	1.0	0.41	04/26/06 21:16	MSF	75-69-4		
1,2,3-Trichloropropane	ND	ug/l	1.0	0.22	04/26/06 21:16	MSF	96-18-4		
1,2,4-Trimethylbenzene	ND	ug/l	1.0	0.15	04/26/06 21:16	MSF	95-63-6		
1,3,5-Trimethylbenzene	ND	ug/l	1.0	0.21	04/26/06 21:16	MSF	108-67-8		
Vinyl chloride	ND	ug/l	1.0	0.58	04/26/06 21:16	MSF	75-01-4		
Xylene (Total)	1.2	ug/l	1.0		04/26/06 21:16	MSF	1330-20-7		
m&p-Xylene	ND	ug/l	2.0	0.39	04/26/06 21:16	MSF			
o-Xylene	ND	ug/l	1.0	0.17	04/26/06 21:16	MSF	95-47-6		
Toluene-d8 (S)	100	%			04/26/06 21:16	MSF	2037-26-5		
4-Bromofluorobenzene (S)	104	%			04/26/06 21:16	MSF	460-00-4		
Dibromofluoromethane (S)	97	%			04/26/06 21:16	MSF	1868-53-7		
1,2-Dichloroethane-d4 (S)	97	%			04/26/06 21:16	MSF	17060-07-0		

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Lab Project Number: 92117972
Client Project ID: Parker Hannafin Wake Forest

Lab Sample No: 926907932 | Project Sample Number: 92117972-002 | Date Collected: 04/21/06 09:30
Client Sample ID: WSW-1121 | Matrix: Water | Date Received: 04/25/06 17:15

Parameters	Results	Units	Report Limit	MDL	Analyzed	By	CAS No.	Qual	RegLmt
GC/MS Semivolatiles									
1,4-Dioxane by 8270 SIM	Prep/Method: EPA 3510 / EPA 8270								
1,4-Dioxane (p-Dioxane)	ND	ug/l	3.6	0.83	04/30/06 01:08	BET	123-91-1	1	
Date Extracted	04/26/06				04/26/06				
GC/MS Volatiles									
GC/MS VOCs by 8260, low level	Method: EPA 8260								
Acetone	ND	ug/l	25.	1.8	04/26/06 20:52	MSF	67-64-1		
Benzene	ND	ug/l	1.0	0.31	04/26/06 20:52	MSF	71-43-2		
Bromobenzene	ND	ug/l	1.0	0.16	04/26/06 20:52	MSF	108-86-1		
Bromochloromethane	ND	ug/l	1.0	0.37	04/26/06 20:52	MSF	74-97-5		
Bromodichloromethane	ND	ug/l	1.0	0.21	04/26/06 20:52	MSF	75-27-4		
Bromoform	ND	ug/l	1.0	0.17	04/26/06 20:52	MSF	75-25-2		
Bromomethane	ND	ug/l	1.0	0.51	04/26/06 20:52	MSF	74-83-9		
2-Butanone (MEK)	ND	ug/l	5.0	1.2	04/26/06 20:52	MSF	78-93-3		
n-Butylbenzene	ND	ug/l	1.0	0.20	04/26/06 20:52	MSF	104-51-8		
sec-Butylbenzene	ND	ug/l	1.0	0.20	04/26/06 20:52	MSF	135-98-8		
tert-Butylbenzene	ND	ug/l	1.0	0.17	04/26/06 20:52	MSF	98-06-6		
Carbon tetrachloride	ND	ug/l	1.0	0.27	04/26/06 20:52	MSF	56-23-5		
Chlorobenzene	ND	ug/l	1.0	0.15	04/26/06 20:52	MSF	108-90-7		
Chloroethane	ND	ug/l	1.0	0.78	04/26/06 20:52	MSF	75-00-3		
Chloroform	ND	ug/l	1.0	0.29	04/26/06 20:52	MSF	67-66-3		
Chloromethane	1.0	ug/l	1.0	0.78	04/26/06 20:52	MSF	74-87-3		
2-Chlorotoluene	ND	ug/l	1.0	0.16	04/26/06 20:52	MSF	95-49-8		
4-Chlorotoluene	ND	ug/l	1.0	0.20	04/26/06 20:52	MSF	106-43-4		
1,2-Dibromo-3-chloropropane	ND	ug/l	1.0	0.39	04/26/06 20:52	MSF	96-12-8		
Dibromochloromethane	ND	ug/l	1.0	0.17	04/26/06 20:52	MSF	124-48-1		
1,2-Dibromoethane (EDB)	ND	ug/l	1.0	0.15	04/26/06 20:52	MSF	106-93-4		
Dibromomethane	ND	ug/l	1.0	0.27	04/26/06 20:52	MSF	74-95-3		
1,2-Dichlorobenzene	ND	ug/l	1.0	0.14	04/26/06 20:52	MSF	95-50-1		
1,3-Dichlorobenzene	ND	ug/l	1.0	0.16	04/26/06 20:52	MSF	541-73-1		
1,4-Dichlorobenzene	ND	ug/l	1.0	0.17	04/26/06 20:52	MSF	106-46-7		
Dichlorodifluoromethane	ND	ug/l	1.0	0.59	04/26/06 20:52	MSF	75-71-8		
1,1-Dichloroethane	ND	ug/l	1.0	0.42	04/26/06 20:52	MSF	75-34-3		
1,2-Dichloroethane	ND	ug/l	1.0	0.18	04/26/06 20:52	MSF	107-06-2		
1,1-Dichloroethene	ND	ug/l	1.0	0.39	04/26/06 20:52	MSF	75-35-4		
cis-1,2-Dichloroethene	ND	ug/l	1.0	0.33	04/26/06 20:52	MSF	156-59-2		
trans-1,2-Dichloroethene	ND	ug/l	1.0	0.44	04/26/06 20:52	MSF	156-60-5		
1,2-Dichloropropane	ND	ug/l	1.0	0.20	04/26/06 20:52	MSF	78-87-5		

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Lab Project Number: 92117972
Client Project ID: Parker Hannafin Wake Forest

Lab Sample No: 926907932 | Project Sample Number: 92117972-002 | Date Collected: 04/21/06 09:30
Client Sample ID: WSW-1121 | Matrix: Water | Date Received: 04/25/06 17:15

Parameters	Results	Units	Report Limit	MDL	Analyzed	By	CAS No.	Qual	RegLmt
1,3-Dichloropropane	ND	ug/l	1.0	0.11	04/26/06 20:52	MSF	142-28-9		
2,2-Dichloropropane	ND	ug/l	1.0	0.44	04/26/06 20:52	MSF	594-20-7		
1,1-Dichloropropene	ND	ug/l	1.0	0.26	04/26/06 20:52	MSF	563-58-6		
Diisopropyl ether	ND	ug/l	1.0	0.25	04/26/06 20:52	MSF	108-20-3		
Ethylbenzene	ND	ug/l	1.0	0.17	04/26/06 20:52	MSF	100-41-4		
Hexachloro-1,3-butadiene	ND	ug/l	1.0	0.32	04/26/06 20:52	MSF	87-68-3		
Isopropylbenzene (Cumene)	ND	ug/l	1.0	0.16	04/26/06 20:52	MSF	98-82-8		
p-Isopropyltoluene	ND	ug/l	1.0	0.20	04/26/06 20:52	MSF	99-87-6		
Methylene chloride	ND	ug/l	2.0	0.46	04/26/06 20:52	MSF	75-09-2		
Methyl-tert-butyl ether	ND	ug/l	1.0	0.22	04/26/06 20:52	MSF	1634-04-4		
Naphthalene	ND	ug/l	1.0	0.22	04/26/06 20:52	MSF	91-20-3		
n-Propylbenzene	ND	ug/l	1.0	0.20	04/26/06 20:52	MSF	103-65-1		
Styrene	ND	ug/l	1.0	0.15	04/26/06 20:52	MSF	100-42-5		
1,1,1,2-Tetrachloroethane	ND	ug/l	1.0	0.25	04/26/06 20:52	MSF	630-20-6		
1,1,2,2-Tetrachloroethane	ND	ug/l	1.0	0.24	04/26/06 20:52	MSF	79-34-5		
Tetrachloroethene	ND	ug/l	1.0	0.16	04/26/06 20:52	MSF	127-18-4		
Toluene	ND	ug/l	1.0	0.24	04/26/06 20:52	MSF	108-88-3		
1,2,3-Trichlorobenzene	ND	ug/l	1.0	0.18	04/26/06 20:52	MSF	87-61-6		
1,2,4-Trichlorobenzene	ND	ug/l	1.0	0.20	04/26/06 20:52	MSF	120-82-1		
1,1,1-Trichloroethane	ND	ug/l	1.0	0.35	04/26/06 20:52	MSF	71-55-6		
1,1,2-Trichloroethane	ND	ug/l	1.0	0.16	04/26/06 20:52	MSF	79-00-5		
Trichloroethene	ND	ug/l	1.0	0.26	04/26/06 20:52	MSF	79-01-6		
Trichlorofluoromethane	ND	ug/l	1.0	0.41	04/26/06 20:52	MSF	75-69-4		
1,2,3-Trichloropropane	ND	ug/l	1.0	0.22	04/26/06 20:52	MSF	96-18-4		
1,2,4-Trimethylbenzene	ND	ug/l	1.0	0.15	04/26/06 20:52	MSF	95-63-6		
1,3,5-Trimethylbenzene	ND	ug/l	1.0	0.21	04/26/06 20:52	MSF	108-67-8		
Vinyl chloride	ND	ug/l	1.0	0.58	04/26/06 20:52	MSF	75-01-4		
Xylene (Total)	1.2	ug/l	1.0		04/26/06 20:52	MSF	1330-20-7		
m&p-Xylene	ND	ug/l	2.0	0.39	04/26/06 20:52	MSF			
o-Xylene	ND	ug/l	1.0	0.17	04/26/06 20:52	MSF	95-47-6		
Toluene-d8 (S)	98	%			04/26/06 20:52	MSF	2037-26-5		
4-Bromofluorobenzene (S)	103	%			04/26/06 20:52	MSF	460-00-4		
Dibromofluoromethane (S)	98	%			04/26/06 20:52	MSF	1868-53-7		
1,2-Dichloroethane-d4 (S)	98	%			04/26/06 20:52	MSF	17060-07-0		

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Lab Project Number: 92117972
Client Project ID: Parker Hannafin Wake Forest

PARAMETER FOOTNOTES

Method 9071B modified to use ASE.

All pH, Free Chlorine, Total Chlorine and Ferrous Iron analyses conducted outside of EPA recommended immediate hold time.

Depending on the moisture content the PRLs can be elevated for all soil samples reported on a dry weight basis.

2-Chloroethyl vinyl ether has been shown to degrade in the presence of acid.

ND	Not detected at or above adjusted reporting limit
NC	Not Calculable
J	Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit
MDL	Adjusted Method Detection Limit
(S)	Surrogate
[1]	Sample was extracted using SW846-3510, utilizing an Isotope Dilution (1,4-Dioxane-d8), and analyzed by SW846-8270 SIM (Selective Ion Monitoring).

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QUALITY CONTROL DATA

Lab Project Number: 92117972
Client Project ID: Parker Hannafin Wake Forest

QC Batch: 155614 — Analysis Method: EPA 8270
QC Batch Method: EPA 3510 — Analysis Description: 1,4-Dioxane by 8270 SIM
Associated Lab Samples: 926907916 926907932

METHOD BLANK: 926911157
Associated Lab Samples: 926907916 926907932

Parameter	Units	Blank Result	Reporting Limit	Footnotes
1,4-Dioxane (p-Dioxane)	ug/l	ND	3.0	

LABORATORY CONTROL SAMPLE: 926911165

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Footnotes
1,4-Dioxane (p-Dioxane)	ug/l	10.00	10.54	105	50-150	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 926911173 926911181

Parameter	Units	926907932 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Footnotes
1,4-Dioxane (p-Dioxane)	ug/l	0	20.00	22.08	21.64	110	108	50-150	2	30	

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QUALITY CONTROL DATA

Lab Project Number: 92117972
Client Project ID: Parker Hannafin Wake Forest

QC Batch: 155612 — Analysis Method: EPA 8260
QC Batch Method: EPA 8260 — Analysis Description: GC/MS VOCs by 8260, low level
Associated Lab Samples: 926907916 926907932

METHOD BLANK: 926910597
Associated Lab Samples: 926907916 926907932

Parameter	Units	Blank Result	Reporting Limit	Footnotes
Acetone	ug/l	ND	25.	
Benzene	ug/l	ND	1.0	
Bromobenzene	ug/l	ND	1.0	
Bromochloromethane	ug/l	ND	1.0	
Bromodichloromethane	ug/l	ND	1.0	
Bromoform	ug/l	ND	1.0	
Bromomethane	ug/l	ND	1.0	
2-Butanone (MEK)	ug/l	ND	5.0	
n-Butylbenzene	ug/l	ND	1.0	
sec-Butylbenzene	ug/l	ND	1.0	
tert-Butylbenzene	ug/l	ND	1.0	
Carbon tetrachloride	ug/l	ND	1.0	
Chlorobenzene	ug/l	ND	1.0	
Chloroethane	ug/l	ND	1.0	
Chloroform	ug/l	ND	1.0	
Chloromethane	ug/l	ND	1.0	
2-Chlorotoluene	ug/l	ND	1.0	
4-Chlorotoluene	ug/l	ND	1.0	
1,2-Dibromo-3-chloropropane	ug/l	ND	1.0	
Dibromochloromethane	ug/l	ND	1.0	
1,2-Dibromoethane (EDB)	ug/l	ND	1.0	
Dibromomethane	ug/l	ND	1.0	
1,2-Dichlorobenzene	ug/l	ND	1.0	
1,3-Dichlorobenzene	ug/l	ND	1.0	
1,4-Dichlorobenzene	ug/l	ND	1.0	
Dichlorodifluoromethane	ug/l	ND	1.0	
1,1-Dichloroethane	ug/l	ND	1.0	
1,2-Dichloroethane	ug/l	ND	1.0	
1,1-Dichloroethene	ug/l	ND	1.0	
cis-1,2-Dichloroethene	ug/l	ND	1.0	
trans-1,2-Dichloroethene	ug/l	ND	1.0	

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QUALITY CONTROL DATA

Lab Project Number: 92117972
Client Project ID: Parker Hannafin Wake Forest

METHOD BLANK: 926910597
Associated Lab Samples: 926907916 926907932

Parameter	Units	Blank Result	Reporting Limit	Footnotes
1,2-Dichloropropane	ug/l	ND	1.0	
1,3-Dichloropropane	ug/l	ND	1.0	
2,2-Dichloropropane	ug/l	ND	1.0	
1,1-Dichloropropene	ug/l	ND	1.0	
Diisopropyl ether	ug/l	ND	1.0	
Ethylbenzene	ug/l	ND	1.0	
Hexachloro-1,3-butadiene	ug/l	ND	1.0	
Isopropylbenzene (Cumene)	ug/l	ND	1.0	
p-Isopropyltoluene	ug/l	ND	1.0	
Methylene chloride	ug/l	ND	2.0	
Methyl-tert-butyl ether	ug/l	ND	1.0	
Naphthalene	ug/l	ND	1.0	
n-Propylbenzene	ug/l	ND	1.0	
Styrene	ug/l	ND	1.0	
1,1,1,2-Tetrachloroethane	ug/l	ND	1.0	
1,1,2,2-Tetrachloroethane	ug/l	ND	1.0	
Tetrachloroethene	ug/l	ND	1.0	
Toluene	ug/l	ND	1.0	
1,2,3-Trichlorobenzene	ug/l	ND	1.0	
1,2,4-Trichlorobenzene	ug/l	ND	1.0	
1,1,1-Trichloroethane	ug/l	ND	1.0	
1,1,2-Trichloroethane	ug/l	ND	1.0	
Trichloroethene	ug/l	ND	1.0	
Trichlorofluoromethane	ug/l	ND	1.0	
1,2,3-Trichloropropane	ug/l	ND	1.0	
1,2,4-Trimethylbenzene	ug/l	ND	1.0	
1,3,5-Trimethylbenzene	ug/l	ND	1.0	
Vinyl chloride	ug/l	ND	1.0	
Xylene (Total)	ug/l	ND	1.0	
m&p-Xylene	ug/l	ND	2.0	
o-Xylene	ug/l	ND	1.0	
Toluene-d8 (S)	%	100		
4-Bromofluorobenzene (S)	%	102		
Dibromofluoromethane (S)	%	99		
1,2-Dichloroethane-d4 (S)	%	101		

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QUALITY CONTROL DATA

Lab Project Number: 92117972
Client Project ID: Parker Hannafin Wake Forest

LABORATORY CONTROL SAMPLE: 926910605

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Footnotes
Acetone	ug/l	100.00	109.3	109	50-150	
Benzene	ug/l	50.00	48.17	96	66-123	
Bromobenzene	ug/l	50.00	50.48	101	62-125	
Bromochloromethane	ug/l	50.00	45.66	91	64-125	
Bromodichloromethane	ug/l	50.00	50.96	102	66-126	
Bromoform	ug/l	50.00	47.90	96	50-132	
Bromomethane	ug/l	50.00	54.25	109	50-150	
2-Butanone (MEK)	ug/l	100.00	97.23	97	51-135	
n-Butylbenzene	ug/l	50.00	48.73	98	56-132	
sec-Butylbenzene	ug/l	50.00	53.84	108	59-132	
tert-Butylbenzene	ug/l	50.00	52.53	105	54-135	
Carbon tetrachloride	ug/l	50.00	54.58	109	65-134	
Chlorobenzene	ug/l	50.00	50.47	101	66-123	
Chloroethane	ug/l	50.00	52.89	106	52-146	
Chloroform	ug/l	50.00	50.26	101	64-128	
Chloromethane	ug/l	50.00	48.00	96	25-127	
2-Chlorotoluene	ug/l	50.00	52.06	104	63-126	
4-Chlorotoluene	ug/l	50.00	51.69	103	63-124	
1,2-Dibromo-3-chloropropane	ug/l	50.00	41.58	83	56-125	
Dibromochloromethane	ug/l	50.00	47.74	96	57-131	
1,2-Dibromoethane (EDB)	ug/l	50.00	48.57	97	64-123	
Dibromomethane	ug/l	50.00	48.74	98	64-122	
1,2-Dichlorobenzene	ug/l	50.00	49.37	99	63-123	
1,3-Dichlorobenzene	ug/l	50.00	50.45	101	63-125	
1,4-Dichlorobenzene	ug/l	50.00	49.55	99	62-123	
Dichlorodifluoromethane	ug/l	50.00	57.13	114	50-138	
1,1-Dichloroethane	ug/l	50.00	49.23	98	64-132	
1,2-Dichloroethane	ug/l	50.00	48.49	97	62-123	
1,1-Dichloroethene	ug/l	50.00	53.77	108	62-139	
cis-1,2-Dichloroethene	ug/l	50.00	49.39	99	65-130	
trans-1,2-Dichloroethene	ug/l	50.00	51.29	103	67-134	
1,2-Dichloropropane	ug/l	50.00	52.02	104	66-124	
1,3-Dichloropropane	ug/l	50.00	49.25	98	65-122	
2,2-Dichloropropane	ug/l	50.00	53.44	107	50-143	
1,1-Dichloropropene	ug/l	50.00	56.72	113	66-133	
Diisopropyl ether	ug/l	50.00	52.23	104	56-131	
Ethylbenzene	ug/l	50.00	49.02	98	68-126	

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Huntersville, NC 28078
Phone: 704.875.9092
Fax: 704.875.9091

Pace Analytical Services, Inc.
2225 Riverside Drive
Asheville, NC 28804
Phone: 828.254.7176
Fax: 828.252.4618

QUALITY CONTROL DATA

Lab Project Number: 92117972
Client Project ID: Parker Hannafin Wake Forest

LABORATORY CONTROL SAMPLE: 926910605

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Footnotes
Hexachloro-1,3-butadiene	ug/l	50.00	60.47	121	50-150	
Isopropylbenzene (Cumene)	ug/l	50.00	57.13	114	63-132	
p-Isopropyltoluene	ug/l	50.00	48.08	96	58-130	
Methylene chloride	ug/l	50.00	45.87	92	54-132	
Methyl-tert-butyl ether	ug/l	50.00	49.37	99	53-128	
Naphthalene	ug/l	50.00	41.69	83	50-131	
n-Propylbenzene	ug/l	50.00	52.94	106	63-130	
Styrene	ug/l	50.00	51.35	103	65-127	
1,1,1,2-Tetrachloroethane	ug/l	50.00	49.63	99	65-125	
1,1,2,2-Tetrachloroethane	ug/l	50.00	47.59	95	58-124	
Tetrachloroethene	ug/l	50.00	51.58	103	50-150	
Toluene	ug/l	50.00	46.33	93	66-125	
1,2,3-Trichlorobenzene	ug/l	50.00	48.10	96	50-132	
1,2,4-Trichlorobenzene	ug/l	50.00	49.15	98	50-132	
1,1,1-Trichloroethane	ug/l	50.00	52.12	104	65-133	
1,1,2-Trichloroethane	ug/l	50.00	48.06	96	64-122	
Trichloroethene	ug/l	50.00	50.66	101	63-134	
Trichlorofluoromethane	ug/l	50.00	59.20	118	54-135	
1,2,3-Trichloropropane	ug/l	50.00	49.22	98	63-124	
1,2,4-Trimethylbenzene	ug/l	50.00	60.40	121	60-128	
1,3,5-Trimethylbenzene	ug/l	50.00	46.82	94	61-128	
Vinyl chloride	ug/l	50.00	52.66	105	50-130	
Xylene (Total)	ug/l	150.00	150.2	100		
m&p-Xylene	ug/l	100.00	99.98	100	66-126	
o-Xylene	ug/l	50.00	50.22	100	65-126	
Toluene-d8 (S)				99	70-120	
4-Bromofluorobenzene (S)				100	76-112	
Dibromofluoromethane (S)				102	86-119	
1,2-Dichloroethane-d4 (S)				99	79-130	

SAMPLE DUPLICATE: 926911017

Parameter	Units	926887027 Result	DUP Result	RPD	Max RPD	Footnotes
Acetone	ug/l	ND	ND	NC	30	
Benzene	ug/l	ND	ND	NC	30	

Asheville Certification IDs
NC Wastewater 40
NC Drinking Water 37712
SC Environmental 99030
FL NELAP E87648

REPORT OF LABORATORY ANALYSIS
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Charlotte Certification IDs
NC Wastewater 12
NC Drinking Water 37706
SC 99006
FL NELAP E87627

Pace Analytical
www.pacelabs.com

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QUALITY CONTROL DATA

Lab Project Number: 92117972
Client Project ID: Parker Hannafin Wake Forest

SAMPLE DUPLICATE: 926911017

Parameter	Units	926887027 Result	DUP Result	RPD	Max RPD	Footnotes
Bromobenzene	ug/l	ND	ND	NC	30	
Bromochloromethane	ug/l	ND	ND	NC	30	
Bromodichloromethane	ug/l	ND	ND	NC	30	
Bromoform	ug/l	ND	ND	NC	30	
Bromomethane	ug/l	ND	ND	NC	30	
2-Butanone (MEK)	ug/l	ND	ND	NC	30	
n-Butylbenzene	ug/l	ND	ND	NC	30	
sec-Butylbenzene	ug/l	ND	ND	NC	30	
tert-Butylbenzene	ug/l	ND	ND	NC	30	
Carbon tetrachloride	ug/l	ND	ND	NC	30	
Chlorobenzene	ug/l	ND	ND	NC	30	
Chloroethane	ug/l	ND	ND	NC	30	
Chloroform	ug/l	ND	ND	NC	30	
Chloromethane	ug/l	ND	ND	NC	30	
2-Chlorotoluene	ug/l	ND	ND	NC	30	
4-Chlorotoluene	ug/l	ND	ND	NC	30	
1,2-Dibromo-3-chloropropane	ug/l	ND	ND	NC	30	
Dibromochloromethane	ug/l	ND	ND	NC	30	
1,2-Dibromoethane (EDB)	ug/l	ND	ND	NC	30	
Dibromomethane	ug/l	ND	ND	NC	30	
1,2-Dichlorobenzene	ug/l	ND	ND	NC	30	
1,3-Dichlorobenzene	ug/l	ND	ND	NC	30	
1,4-Dichlorobenzene	ug/l	ND	ND	NC	30	
Dichlorodifluoromethane	ug/l	ND	ND	NC	30	
1,1-Dichloroethane	ug/l	ND	ND	NC	30	
1,2-Dichloroethane	ug/l	ND	ND	NC	30	
1,1-Dichloroethene	ug/l	25.00	25.00	0	30	
cis-1,2-Dichloroethene	ug/l	ND	ND	NC	30	
trans-1,2-Dichloroethene	ug/l	ND	ND	NC	30	
1,2-Dichloropropane	ug/l	ND	ND	NC	30	
1,3-Dichloropropane	ug/l	ND	ND	NC	30	
2,2-Dichloropropane	ug/l	ND	ND	NC	30	
1,1-Dichloropropene	ug/l	ND	ND	NC	30	
Diisopropyl ether	ug/l	ND	ND	NC	30	
Ethylbenzene	ug/l	ND	ND	NC	30	
Hexachloro-1,3-butadiene	ug/l	ND	ND	NC	30	
Isopropylbenzene (Cumene)	ug/l	ND	ND	NC	30	

Asheville Certification IDs
NC Wastewater 40
NC Drinking Water 37712
SC Environmental 99030
FL NELAP E87648

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QUALITY CONTROL DATA

Lab Project Number: 92117972
Client Project ID: Parker Hannafin Wake Forest

SAMPLE DUPLICATE: 926911017

Parameter	Units	926887027 Result	DUP Result	RPD	Max RPD	Footnotes
p-Isopropyltoluene	ug/l	ND	ND	NC	30	
Methylene chloride	ug/l	ND	ND	NC	30	
Methyl-tert-butyl ether	ug/l	ND	ND	NC	30	
Naphthalene	ug/l	ND	ND	NC	30	
n-Propylbenzene	ug/l	ND	ND	NC	30	
Styrene	ug/l	ND	ND	NC	30	
1,1,1,2-Tetrachloroethane	ug/l	ND	ND	NC	30	
1,1,2,2-Tetrachloroethane	ug/l	ND	ND	NC	30	
Tetrachloroethene	ug/l	ND	ND	NC	30	
Toluene	ug/l	ND	ND	NC	30	
1,2,3-Trichlorobenzene	ug/l	ND	ND	NC	30	
1,2,4-Trichlorobenzene	ug/l	ND	ND	NC	30	
1,1,1-Trichloroethane	ug/l	9.100	8.800	3	30	
1,1,2-Trichloroethane	ug/l	ND	ND	NC	30	
Trichloroethene	ug/l	ND	ND	NC	30	
Trichlorofluoromethane	ug/l	ND	ND	NC	30	
1,2,3-Trichloropropane	ug/l	ND	ND	NC	30	
1,2,4-Trimethylbenzene	ug/l	ND	ND	NC	30	
1,3,5-Trimethylbenzene	ug/l	ND	ND	NC	30	
Vinyl chloride	ug/l	ND	ND	NC	30	
Xylene (Total)	ug/l	ND	ND	NC		
m&p-Xylene	ug/l	ND	ND	NC	30	
o-Xylene	ug/l	ND	ND	NC	30	
Toluene-d8 (S)	%	99	99			
4-Bromofluorobenzene (S)	%	103	101			
Dibromofluoromethane (S)	%	98	98			
1,2-Dichloroethane-d4 (S)	%	99	97			

Asheville Certification IDs
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Fax: 828.252.4618

Lab Project Number: 92117972
Client Project ID: Parker Hannafin Wake Forest

QUALITY CONTROL DATA PARAMETER FOOTNOTES

Consistent with EPA guidelines, unrounded concentrations are displayed and have been used to calculate % Rec and RPD values.

LCS(D)	Laboratory Control Sample (Duplicate)
MS(D)	Matrix Spike (Duplicate)
DUP	Sample Duplicate
ND	Not detected at or above adjusted reporting limit
NC	Not Calculable
J	Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit
MDL	Adjusted Method Detection Limit
RPD	Relative Percent Difference
(S)	Surrogate

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QUALITY CONTROL DATA

CROSS REFERENCE TABLE

Lab Project Number: 92117972
Client Project ID: Parker Hannafin Wake Forest

Lab Sample No Identifier	Client Sample Identifier	QC Batch Method	QC Batch Identifier	Analytical Method	Analytical Batch Identifier
926907916	WSW-12621	EPA 3510	155614	EPA 8270	156015
926907932	WSW-1121	EPA 3510	155614	EPA 8270	156015
926907916	WSW-12621	EPA 8260	155612		
926907932	WSW-1121	EPA 8260	155612		

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M901376

ENSR

CHAIN OF CUSTODY RECORD

Client/Project Name: PARKER HANNIFIN - WF

Project Location: Wake Forest, NC

Project Number:

Field Logbook No.: 1

Sampler: (Print Name) /Affiliation: LANCE TULLY JOE LADD / ENSR

Signature: [illegible] Joe Ladd

Chain of Custody Tape No.: NA

Send Results/Report to: David Simpson DSIMPSON@ENSR.AECOM.COM

Analysis Requested: VOCs by 8260; 1,4-Dioxane by 8270

921792

Field Sample No./ Identification	Date	Time	Grab	Comp	Sample Container (Size/Mat'l)	Sample Type (Liquid, Sludge, Etc.)	Preservative	Field Filtered	VOCs by 8260	1,4-Dioxane by 8270						Lab I.D.	Remarks
WSW-12621	4-21-06	0915	✓		40mL VOA 1L Amber	H_2O	HCl/Ice	No	✓	✓							926907916
WSW-1121	↓	0930	↓		↓	↓	↓	↓	↓	↓							7932

Relinquished by: (Print Name)	Date	Received by: (Print Name)	Date
Lance Tully Signature: [illegible]	4-24-06 Time: 0800	RA Snyder / J Moore Signature: [illegible]	4-27-6 Time: 1130
RA Snyder Signature: [illegible]	4-25-6 Time: 1215	J Moore Signature:	4/25/06 Time: 1715
Relinquished by: (Print Name) Signature:	Date: Time:	Received by: (Print Name) Signature:	Date: Time:

Analytical Laboratory (Destination): Pace Analytical Huntersville, NC

Serial No. 33733

May 16, 2006

Mr. K. Ray Allen
1325 Jenkins Road
Wake Forest, NC

Parker Hannifin Corporation
6035 Parkland Boulevard
Cleveland, OH 44124-4141
Phone (216) 896-3000
FAX (216) 896-4032

Dear Mr. Allen,

As you are aware, Parker Hannifin (Parker) formerly operated a manufacturing facility on Capital Blvd. and is contacting several nearby homeowners requesting to collecting water samples. Parker did receive your signed authorization to take a sample from the property located at 1325 Jenkins Road. However, Parker's environmental consultant, ENSR Consulting and Engineering (ENSR), has been unable to make contact with you to schedule a time to take the sample. ***Please contact Lance Tully at ENSR at 919-872-6600 to make an appointment for the sample to be obtained.***

Within approximately one month after the sampling event, Parker will mail you the results of the sampling. Copies of the results will also be submitted to the North Carolina Department of Environment and Natural Resources.

Should you have any questions, Lance can assist you or you are welcome to contact me directly, 216-896-2710. Thank you in advance for your assistance.

Regards,

Martha Connell
Manager, Environmental Services
Parker Hannifin Corporation

cc: L. Tully, ENSR
L. Stanley, DENR

Appendix C

Well Construction and Boring Logs

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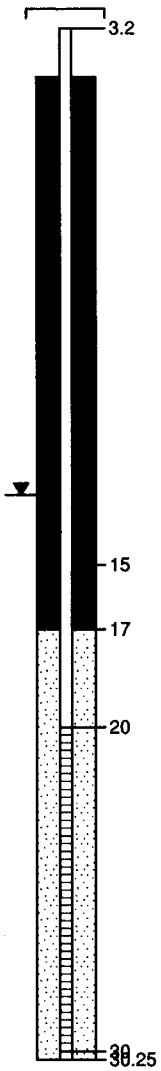
LOG OF BORING MW-38

Parker Hannifin - Wake Forest
Wake Forest, North Carolina
Project # 05303-026-100

Drilling Method	: Geoprobe - Auger	Well Elevation	:
Boring Diameter	: 5 in	Ground Elevation	:
Sample Type(s)	: Continuous	Depth of Boring	: 30.0
Northing Coord.	:	Screened Interval	: 20.0-30.0
Easting Coord.	:	Water Level	: 13.0

Depth in Feet	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION
0		SM, silty sands		light brown SILTY SAND, soft, moist, abundant roots and organic matter, trace mica
2		SM, silty sand		red brown SILTY SAND, micaceous, soft, trace clay, moist
6		SW, well graded sands		light gray very fine SAND, trace silt, gneissic saprolite, trace gravel, soft, near vertical soil structuring, moist 16' probe refusal
16		SM, silty sands		light gray micaceous SILTY SAND, soft,moist
40				

Well: MW-38
Elev.:



Well Construction Information

WELL CONSTRUCTION

Date Compl.	: 11/13/06
Hole Diameter	: 5 in.
Drill. Method	: Geoprobe-Auger
Drilling Contractor:	: Geologic Exploration

WELL CASING

Material	: PVC
Diameter	: 2 in.
Joints	: threaded

WELL SCREEN

Material	: PVC/pre-pack
Diameter	: 2 in.
Joints	: threaded
Opening	: .010 slot
Flat End Cap	:
Sand Pack	: #2
Annulus Seal	: bentonite : pellets

Log Reviewed By. L. Tully -

Water level was measured after well development was completed.

Well Completion Infomation:
Cement grout: 0 - 15.0 ft
Bentonite seal: 15.0 - 17.0
Fine sand: 17.0 - 30.25 ft

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ENSR | AECOM

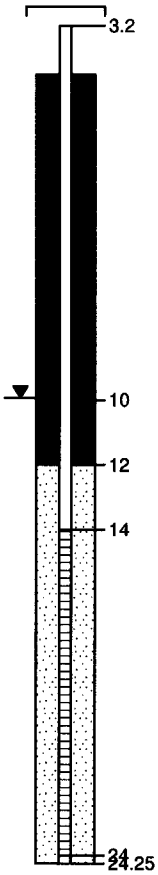
LOG OF BORING MW-39

Parker Hannifin - Wake Forest
Wake Forest, North Carolina
Project # 05303-026-100

Drilling Method	: Geoprobe - Auger	Well Elevation	:
Boring Diameter	: 5 in	Ground Elevation	:
Sample Type(s)	: Continuous	Depth of Boring	: 24.0
Northing Coord.	:	Screened Interval	: 14.0-24.0
Easting Coord.	:	Water Level	: 13.14

Depth in Feet	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION
0		SM, silty sands		light brown to red brown SILTY SAND, trace roots, soft, dry
4		F48, sandy silt		red brown to light gray mottled SANDY SILT, trace clay, slightly plastic, soft, dry
8		F48, sandy silt		red brown to light gray SANDY SILT, trace clay, slightly plastic, soft, dry
10		SM, silty sands		red brown micaceous SILTY SAND, soft, wet, faint sub-horizontal saprolitic structuring
14		SM, silty sands		red brown micaceous SILTY SAND, strong structuring, abundant mica and becoming stiff at depth 18' geoprobe refusal
18		SM, silty sands		light gray micaceous SILTY SAND, soft, wet 24' auger refusal

Well: MW-39
Elev.:



Well Construction Information

WELL CONSTRUCTION

Date Compl.	: 11/13/06
Hole Diameter	: 5 in.
Drill. Method	: Geoprobe-Auger
Drilling Contractor:	: Geologic Exploration

WELL CASING

Material	: PVC
Diameter	: 2 in.
Joints	: threaded

WELL SCREEN

Material	: PVC/pre-pack
Diameter	: 2 in.
Joints	: threaded
Opening	: .010 slot
Flat End Cap	:
Sand Pack	: #2
Annulus Seal	: bentonite : pellets

Log Reviewed By. L. Tully -

Water level was measured after well development was completed.

Well Completion Infomation:
Cement grout: 0 - 10.0 ft
Bentonite seal: 10.0 - 12.0
Fine sand: 12.0 - 24.25 ft

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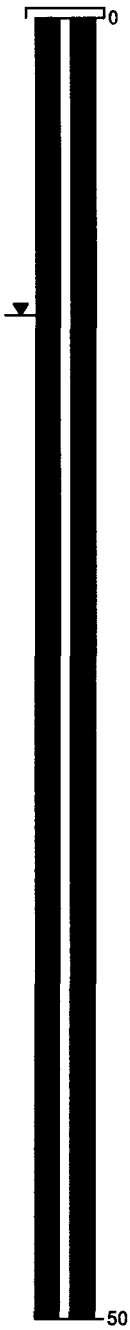
LOG OF BORING MW-39D

Parker Hannifin - Wake Forest
Wake Forest, North Carolina
Project # 05303-026-100

Drilling Method	: Auger-mud rotary core	Well Elevation	: 352.05
Boring Diameter	: 5 in	Ground Elevation	: 349.26
Sample Type(s)	: Core	Depth of Boring	: 70.0
Northing Coord.	:	Screened Interval	: 65.0 - 70.0
Easting Coord.	:	Water Level	: 11.39

Well: MW-39D
Elev.: 349.26'

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
0	SM		light brown to red brown SILTY SAND, trace roots, low density, dry
5	SM		red brown to light gray mottled SANDY SILT, trace clay, slightly plastic, low density, dry
	SM		red brown to light gray SANDY SILT, trace clay, slightly plastic, low density, dry
10	SM		red brown micaceous SILTY SAND, low density, wet, faint sub-horizontal saprolitic structuring
15	SM		red brown micaceous SILTY SAND, strong structuring, abundant mica and becoming dense at depth 18' geoprobe refusal
20	SM		light gray micaceous SILTY SAND, low density, wet
25	Gneiss		24' auger refusal Gray, with white and black spotting, felsic, medium grained, biotite gneiss with quartz rich zones. Foliation is near vertical, some assessory minerals. No fractures. Fractures start at 54'2" and continues to a depth of 56'.
30			
35			
40			
45			
50			



Well Construction Information

WELL CONSTRUCTION

Date Compl. : 1/12/2007
Hole Diameter : 5 in.
Drill. Method: :
Auger-mud rotary core
Drilling Contractor:
Geologic Exploration

WELL CASING

Material : PVC
Diameter : 2 in.
Joints : threaded

WELL SCREEN

Material : PVC
Diameter : 2 in.
Joints : threaded
Opening : .010 slot
Flat End Cap :
Sand Pack : #2
Annulus Seal : bentonite
: pellets

Log Reviewed By. M. Allen

Water level was measured after well development was completed.

Well Completion Infomation:
Cement grout: 0 - 58.0 ft
Bentonite seal: 63.0 - 58.0
Fine sand: 63.0 - 70.0 ft

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LOG OF BORING MW-39D

Parker Hannifin - Wake Forest
Wake Forest, North Carolina
Project # 05303-026-100

Drilling Method	: Auger-mud rotary core	Well Elevation	: 352.05
Boring Diameter	: 5 in	Ground Elevation	: 349.26
Sample Type(s)	: Core	Depth of Boring	: 70.0
Northing Coord.	:	Screened Interval	: 65.0 - 70.0
Easting Coord.	:	Water Level	: 11.39

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
50	Gneiss		
55			
	Gneiss		Gray. felsic, medium grained, biotite gneiss. Very weathered. Dark banding. Fracture plane is 30 degrees from vertical. Possible near horizontal joint plane, 3 -30 degree fractures per foot, 4 - 90 degree fractures per foot.
60	Gneiss		Gray, felsic, medium grained biotite gneiss. Weathered zone with broken rock fragments. Dark mafic band near vertical. Quartz rich zone present along fracture. Near vertical foliation with parallel fractures 3 - 30 degrees from vertical fractures per foot.
	Gneiss		
65	Gneiss		Gray, felsic, medium grained, biotite, gneiss, with near vertical fractures. Fractures have biotite on surface. Some quartz veining. At 65 feet vertical foliation plane with quartz rich zones.
70			Highly weathered micaceous layer, very friable. No discernable foliation. Very fractured.
			Boring terminated
75			
80			
85			
90			
95			
100			

Well: MW-39D
Elev.: 349.26'

Well Construction Information

WELL CONSTRUCTION

Date Compl. : 1/12/2007
Hole Diameter : 5 in.
Drill. Method: :
Auger-mud rotary core
Drilling Contractor:
Geologic Exploration

WELL CASING

Material : PVC
Diameter : 2 in.
Joints : threaded

WELL SCREEN

Material : PVC
Diameter : 2 in.
Joints : threaded
Opening : .010 slot
Flat End Cap :
Sand Pack : #2
Annulus Seal : bentonite
: pellets

Log Reviewed By. M. Allen

Water level was measured after well development was completed.

Well Completion Infomation:
Cement grout: 0 - 58.0 ft
Bentonite seal: 63.0 - 58.0
Fine sand: 63.0 - 70.0 ft

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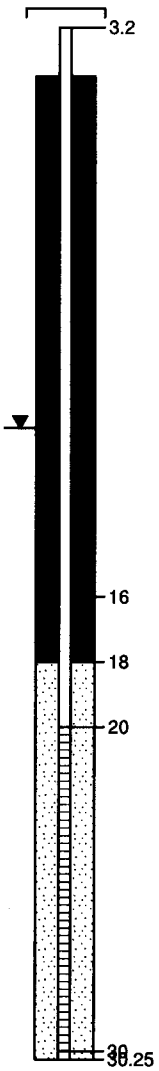
LOG OF BORING MW-40

Parker Hannifin - Wake Forest
Wake Forest, North Carolina
Project # 05303-026-100

Drilling Method	: Geoprobe - Auger	Well Elevation	:
Boring Diameter	: 5 in	Ground Elevation	:
Sample Type(s)	: Continuous	Depth of Boring	: 36.0
Northing Coord.	:	Screened Interval	: 20.0-30.0
Easting Coord.	:	Water Level	: 14.0

Depth in Feet	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION
0		SM, silty sands		dark brown SILTY SAND, abundant roots and organic matter
2		F47, clayey silt		red brown CLAY SILT, trace qtz. sand, slightly stiff, minor mottling, moist
4		F47, clayey silt		yellow brown to red brown CLAYEY SILT, extensive mottling, trace qtz. Sand
6		F48, sandy silt		red brown SANDY SILT, slightly stiff, trace qtz. with mica sand and gravel, moist
8		SM, silty sands		yellow brown to orange brown mottled SILTY SAND, micaceous, faint sub-vertical saprolitic structuring
10				
12				
14		SM, silty sands		light brown to dark gray SILTY SAND, micaceous, soft, mottled, trace qtz. gravel, wet, sub-vertical saprolitic structuring
16				
18				
20				
22				
24				
26				
28				
30				
32				
34				
36				
38				
40				

Well: MW-40
Elev.:



Well Construction Information

WELL CONSTRUCTION

Date Compl.	: 11/13/06
Hole Diameter	: 5 in.
Drill. Method	: Geoprobe-Auger
Drilling Contractor:	: Geologic Exploration

WELL CASING

Material	: PVC
Diameter	: 2 in.
Joints	: threaded

WELL SCREEN

Material	: PVC/pre-pack
Diameter	: 2 in.
Joints	: threaded
Opening	: .010 slot
Flat End Cap	:
Sand Pack	: #2
Annulus Seal	: bentonite pellets

Log Reviewed By. L. Tully -

Water level was measured after well development was completed.

Well Completion Infomation:
Cement grout: 0 - 16.0 ft
Bentonite seal: 16.0 - 18.0
Fine sand: 18.0 - 30.25 ft

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ENSR | AECOM

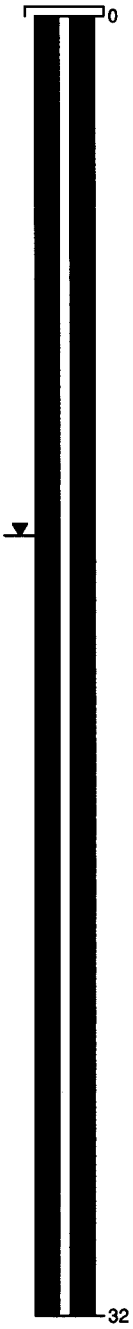
LOG OF BORING MW-40D

Parker Hannifin - Wake Forest
Wake Forest, North Carolina
Project # 05303-026-100

Drilling Method	: Auger-mud rotary core	Well Elevation	: 350.54
Boring Diameter	: 5 in	Ground Elevation	: 347.19
Sample Type(s)	: Core	Depth of Boring	: 60.0
Northing Coord.	:	Screened Interval	: 59.0 - 54.0
Easting Coord.	:	Water Level	: 12.77

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
0	SM		light brown to red brown SILTY SAND, abundant roots and organic matter
	CL		Red brown, CLAYEY SILT, trace quartz and sand, medium density, minor mottling, moist
5	CL		Yellow brown to red CLAYEY SILT, extensive mottling, trace quartz and sand
10	ML		red brown micaceous SANDY SILT, medium dense, trace quartz with mica, sand and gravel, moist
15	ML		Yellow brown to orange, mottled SILTY SAND, micaceous, faint sub-vertical saprolitic structuring
20			
25	SM		light brown to dark gray SILTY SAND, micaceous, low density, mottled, trace quartz gravel, wet
30			

Well: MW-40D
Elev.: 350.54



Well Construction Information

WELL CONSTRUCTION

Date Compl. : 1/16/2007
Hole Diameter : 5 in.
Drill. Method : Auger-mud rotary core
Drilling Contractor : Geologic Exploration

WELL CASING

Material : PVC
Diameter : 2 in.
Joints : threaded

WELL SCREEN

Material : PVC
Diameter : 2 in.
Joints : threaded
Opening : .010 slot
Flat End Cap :
Sand Pack : #2
Annulus Seal : bentonite pellets

Log Reviewed By. E. Stewart

Water level was measured after well development was completed.

Well Completion Infomation:
Cement grout: 0 - 48.0 ft
Bentonite seal: 48.0 - 52.0
Fine sand: 52.0 - 60.0 ft

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ENSR | AECOM

LOG OF BORING MW-40D

Parker Hannifin - Wake Forest
Wake Forest, North Carolina
Project # 05303-026-100

Drilling Method	: Auger-mud rotary core	Well Elevation	: 350.54
Boring Diameter	: 5 in	Ground Elevation	: 347.19
Sample Type(s)	: Core	Depth of Boring	: 60.0
Northing Coord.	:	Screened Interval	: 59.0 - 54.0
Easting Coord.	:	Water Level	: 12.77

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
32	SM		
37	Gneiss-		34' Auger Refusal Course micaceous sand, salt-sized sand with visible quartz, mica and mafic materials
42	Gneiss		Dark grey to black, biotite, hornblende, gneiss. Foliation near vertical.
47	Gneiss		Gneissic texture, abundant biotite on fracture plane with iron staining on fracture plane. More competent with depth.
52	Gneiss		Quartz becoming more abundant about 15% visible in foliations. 52-54 - many near vertical fractures; iron staining on fracture planes. Water between fracture core pieces when core removed.
57	Gneiss		Same as above with top 3 feet very fractured (near vertical). Quartz more prodominant at 70%
62			Boring terminated at 60'

Well: MW-40D
Elev.: 350.54

Well Construction Information

WELL CONSTRUCTION

Date Compl. : 1/16/2007
Hole Diameter : 5 in.
Drill. Method : Auger-mud rotary core
Drilling Contractor : Geologic Exploration

WELL CASING

Material : PVC
Diameter : 2 in.
Joints : threaded

WELL SCREEN

Material : PVC
Diameter : 2 in.
Joints : threaded
Opening : .010 slot
Flat End Cap :
Sand Pack : #2
Annulus Seal : bentonite pellets

Log Reviewed By. E. Stewart

Water level was measured after well development was completed.

Well Completion Infomation:
Cement grout: 0 - 48.0 ft
Bentonite seal: 48.0 - 52.0
Fine sand: 52.0 - 60.0 ft

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ENSR | AECOM

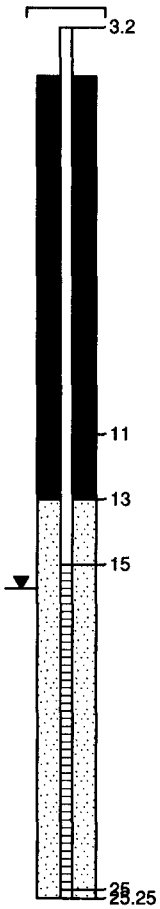
LOG OF BORING MW-41

Parker Hannifin - Wake Forest
Wake Forest, North Carolina
Project # 05303-026-100

Drilling Method	: Geoprobe - Auger	Well Elevation	:
Boring Diameter	: 5 in	Ground Elevation	:
Sample Type(s)	: Continuous	Depth of Boring	: 36
Northing Coord.	:	Screened Interval	: 20-30
Easting Coord.	:	Water Level	: 10.00 ft below TOC

Depth in Feet	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION
0		SM, silty sands		dark brown SILTY SAND, soft, moist, abundant roots and organic matter
2		F47, clayey silt		red brown CLAYEY SILT, trace qtz. sand,slightly stiff, minormottling, moist
4		F47, clayey silt		
6		F48, sandy silt		yellow brown to orange brown CLAY SILT, extensive mottling, trace qtz. sand
8		SM, silty sand		red brown SANDY SILT, slightly stiff, trace qtz. and mica sand and gravel, moist
10				yellow brown to orange brown mottled SILTY SAND, micaceous, faint sub-vertical saprolitic structuring
12				
14		SM, silty sands		light brown to dark gray SILTY SAND, micaceous, soft, mottled, trace gtz. gravel wet, sub-vertical saprolitic structuring
16				
18				
20				
22				
24				
26				
28				
30				
32				
34				
36				
38				
40				

Well: MW-41
Elev.:



Well Construction Information

WELL CONSTRUCTION

Date Compl.	: 11/13/06
Hole Diameter	: 5 in.
Drill. Method	: Geoprobe-Auger
Drilling Contractor:	: Geologic Exploration

WELL CASING

Material	: PVC
Diameter	: 2 in.
Joints	: threaded

WELL SCREEN

Material	: PVC/pre-pack
Diameter	: 2 in.
Joints	: threaded
Opening	: .010 slot
Flat End Cap	:
Sand Pack	: #2
Annulus Seal	: bentonite
	: pellets

Log Reviewed By. L. Tully -

Water level was measured after well development was completed.

Well Completion Infomation:
Cement grout: 0 - 11.0 ft
Bentonite seal: 11.0 - 13.0
Fine sand: 13.0 - 25.25 ft

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Appendix D

Groundwater Collection Records

ENSR | AECOM

Well/Piezo ID: MW-~~38~~ 38

Ground Water Sample Collection Record

Client:	Parker Hannifin - Wake Forest	Date:	11-15-06
Project No:	05303-026-100	Time: Start	1045 am/pm
Site Location:	Wake Forest, North Carolina	Finish	1115 am/pm
Weather Conds:	Cloudy, 60's Collector(s) L. Tully		

WATER LEVEL DATA: (measured from Top of Casing) Well [x] Piezometer [ ]

a. Total Well Length ~~TB~~ 33.05 c. Casing Material PVC e. Length of Water Column 17.02 (a-b)

b. Water Table Depth 16.03 d. Casing Diameter 2" f. Calculated Well Volume (see back) 2.7

V = 0.041 d^2*h V in gallons
d = well dia (in.)
h = height of water column

WELL PURGING DATA

a. Purge Method PERISTALTIC PUMP

b. Acceptance Criteria defined (from workplan)
- Minimum Required Purge Volume (@ 3 well volumes) ~8
- Maximum Allowable Turbidity ____ NTUs
- Stabilization of parameters 10 %

c. Field Testing Equipment Used:

Make	Model	Serial Number
YSI		

d. Field Testing Equipment Calibration Documentation Found in Field Notebook # 1 Page # 142

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (mS/cm)	Turbidity (NTUs)	DO ~~(g/L %)~~	Color	Odor	ORP (mV)
1045	0.5	16.7	6.48	0.134	NA	64	clear	NA	45
1050	2	16.7	6.10	0.150	↓	60	↓	↓	47
1055	6	16.6a	6.1a	0.151	↓	61	↓	↓	53
1105	8	16.7	6.1	0.151	↓	58	↓	↓	51

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	[x]	[ ]	[ ]
Has required turbidity been reached	[ ]	[ ]	[x]
Have parameters stabilized	[x]	[ ]	[ ]

If no or N/A - Explain below.

SAMPLE COLLECTION: Method: PERISTALTIC PUMP

Sample ID	Container Type	No. of Containers	Preservation	Analysis	Time
MW-38	40 ml VOA	3	HCl/Ice	VOCs by 8260B	1115

Comments

Signature L. Tully Date 11-15-06

ENSR AECOM

Well/Piezo ID: MW-[redacted]39

Ground Water Sample Collection Record

Client: Parker Hannifin - Wake Forest
Project No: 05303-026-100
Site Location: Wake Forest, North Carolina
Weather Conds: Cloudy, 60's Collector(s) L. Tully

Date: 11-15-06
Time: Start 0950 am/pm
Finish 1040 am/pm

WATER LEVEL DATA: (measured from Top of Casing) Well ☒ Piezometer ☐

a. Total Well Length 26.82 c. Casing Material PVC e. Length of Water Column 13.68 (a-b)

b. Water Table Depth 13.14 d. Casing Diameter 2" f. Calculated Well Volume (see back) 2.1

V = 0.041 d^2*h V in gallons
d = well dia (in.)
h = height of water column

WELL PURGING DATA

a. Purge Method ~~PERISTALTIC PUMP~~ PERISTALTIC PUMP

b. Acceptance Criteria defined (from workplan)
- Minimum Required Purge Volume (@ 3 well volumes) ~6.3
- Maximum Allowable Turbidity ____ NTUs
- Stabilization of parameters 10 %

c. Field Testing Equipment Used: Make YSI Model Serial Number

d. Field Testing Equipment Calibration Documentation Found in Field Notebook # 1 Page # 142

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (mS/cm)	Turbidity (NTUs)	DO (g/L)	Color	Odor	ORP (mV)
0955	0.5	16.5	6.35	0.202	N/A	65	clear	N/A	-50
1000	2	16.51	6.34	0.205	↓	63	↓	↓	-52
1005	4	16.5	6.32	0.203		62			-57
1010	6	16.5	6.3	0.203	↓	60	↓	↓	-59

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☐	☐	☑
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

SAMPLE COLLECTION: Method: PERISTALTIC PUMP

Sample ID	Container Type	No. of Containers	Preservation	Analysis	Time
MW-41	40 ml VOA	3	HCl/Ice	VOCs by 8260B	1040

Comments

Signature [signature] Date 11-15-06

ENSR | AECOM

Well/Piezo ID: MW-[redacted]-XO

Ground Water Sample Collection Record

Client: Parker Hannifin - Wake Forest
Project No: 05303-026-100
Site Location: Wake Forest, North Carolina
Weather Conds: Cloudy, 60's Collector(s) L. Tully

Date: 11-15-06
Time: Start 1135 am/pm
Finish 1215 am/pm

WATER LEVEL DATA: (measured from Top of Casing) Well [x] Piezometer [ ]

a. Total Well Length 73.21
b. Water Table Depth 14.0
c. Casing Material PVC
d. Casing Diameter 2"
e. Length of Water Column 17.21 (a-b)
f. Calculated Well Volume (see back) 2.75
V = 0.041 d^2*h V in gallons
d = well dia (in.)
h = height of water column

WELL PURGING DATA

a. Purge Method PERISTALTIC PUMP

b. Acceptance Criteria defined (from workplan)
- Minimum Required Purge Volume (@ 3 well volumes) 8.25
- Maximum Allowable Turbidity ____ NTUs
- Stabilization of parameters 10 %

c. Field Testing Equipment Used:

Make	Model	Serial Number
YSI		

d. Field Testing Equipment Calibration Documentation Found in Field Notebook # 1 Page # 142

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (mS/cm)	Turbidity (NTUs)	DO (g/L)	Color	Odor	ORP (mV)
1140	0.5	16.2	6.12	0.120	NA	82	Clear	NA	82
1150	2.5	16.15	6.10	0.118	↓	80	↓	↓	84
1200	5	16.14	6.07	0.118		74			87
1210	8	16.15	6.05	0.117		73			90

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	[x]	[ ]	[ ]
Has required turbidity been reached	[ ]	[ ]	[x]
Have parameters stabilized	[x]	[ ]	[ ]

If no or N/A - Explain below.

SAMPLE COLLECTION: Method: PERISTALTIC PUMP

Sample ID	Container Type	No. of Containers	Preservation	Analysis	Time
MW-32	40 ml VOA	3	HCl/Ice	VOCs by 8260B	1215

Comments

Signature [signature] Date 11-15-06

ENSR | AECOM

Well/Piezo ID: MW-40

Ground Water Sample Collection Record

Client: Parker Hannifin - Wake Forest
Project No: 05303-026-100
Site Location: Wake Forest, North Carolina
Weather Conds: Cloudy 60's Collector(s) L. Tully

Date: 11-15-06
Time: Start 0900 am/pm
Finish _____ am/pm

WATER LEVEL DATA: (measured from Top of Casing) Well [X] Piezometer [ ]

a. Total Well Length 28.92 c. Casing Material PVC e. Length of Water Column 9.02 (a-b)

b. Water Table Depth 18.94 d. Casing Diameter 2" f. Calculated Well Volume (see back) 1.4

V = 0.041 d^2*h V in gallons
d = well dia (in.)
h = height of water column

WELL PURGING DATA

a. Purge Method ~~PERISTALTIC PUMP~~ BAILER

b. Acceptance Criteria defined (from workplan)
- Minimum Required Purge Volume (@ 3 well volumes) ~4.5
- Maximum Allowable Turbidity N/A NTUs
- Stabilization of parameters 10 %

c. Field Testing Equipment Used: Make YSI Model 600 Serial Number

d. Field Testing Equipment Calibration Documentation Found in Field Notebook # 1 Page # 142

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (mS/cm)	Turbidity (NTUs)	DO (mg/L)	Color	Odor	ORP (mV)
0930	0.5	15.63	5.77	0.372	N/A	22.6	Clear	~~Sl~~ N/A	160.2
0933	2.0	15.49	5.46	0.134	↓	76.3	↓	↓	205
0935	3.0	15.48	5.44	0.132		75			198
0940	5.0	15.48	5.4	0.134		77			202

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	[x]	[ ]	[ ]
Has required turbidity been reached	[ ]	[ ]	[x]
Have parameters stabilized	[x]	[ ]	[ ]

If no or N/A - Explain below.

SAMPLE COLLECTION: Method: ~~PERISTALTIC PUMP~~ BAILER

Sample ID	Container Type	No. of Containers	Preservation	Analysis	Time
MW-40	40 ml VOA	3	HCl/Ice	VOCs by 8260B	0945

Comments TO DEEP FOR PERI. PUMP

Signature [signature] Date 11-15-06

ENSR

Well ID: **MW-38**

Low Flow Ground Water Sample Collection Record

Client: Parker Hannifin
Date: 1/18/2007
Time: Start 1650 am/pm
Finish 1745 am/pm
Project No: 05303 026
Site Location: Wake Forest
Weather Conds: Rain 40°
Collector(s): Joe Ladd

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 32.83
c. Length of Water Column 17.24 (a-b)
Casing Diameter/Material 2" / PVC
b. Water Table Depth 15.59
d. Calculated System Volume (see back) 2.81

2. WELL PURGE DATA

a. Purge Method: Monsoon

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

Make	Model	Serial Number
YSI	556	

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
1710	1 liter	8.45°	8.16	.170	7.64	140.16	NA	900		Clear/none
1720	2.5 liters	8.42°	8.17	.170	7.67	140.9	"	700		" "

(continued on back)

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☐	☐	☑
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

No Turbidity Function

3. SAMPLE COLLECTION: Method: Monsoon

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
MW-38	VOA	3	HCL	8260	1730

Comments

Signature Joe Ladd
Date 1/18/2007

ENSR

Well ID: **MW-39D**

Low Flow Ground Water Sample Collection Record

Client: Parker Hannifin
Date: 1/18/2007
Time: Start 1530 am/pm
Finish 1645 am/pm
Project No: 05303 026
Site Location: Wake Forest
Weather Conds:
Collector(s): Joe Ladd

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 69.91'
c. Length of Water Column 58.66 (a-b)
Casing Diameter/Material 2" / PVC
b. Water Table Depth 11.25
d. Calculated System Volume (see back) 9.56

2. WELL PURGE DATA

a. Purge Method: Monsoon

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

Make	Model	Serial Number
YSI	556	

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
1600	1 liter	14.87	10.87	.262	6.02	131.4	N/A	1500		clear / none
1615	3	14.80	10.80	.264	6.04	124.5		900		"
1620	4	14.83	10.83	.268	6.06	124.6		800		"

(continued on back)

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☐	☐	☑
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

No Turbidity Function

3. SAMPLE COLLECTION: Method: Monsoon

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
MW-38	VOA	3	HCL	8260	1645

Comments

Signature Joe Ladd
Date 1/18/2007

ENSR

Well ID: **MW-40D**

Low Flow Ground Water Sample Collection Record

Client: Parker Hannifin
Date: 1/18/2007
Time: Start 1315 am/pm
Finish 1435 am/pm
Project No: 05303 026
Site Location: Wake Forest
Weather Conds: 38° Rain/Sleet Cold
Collector(s): Joe Ladd

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 60.79'
c. Length of Water Column 47.69 (a-b)
Casing Diameter/Material 2"/PVC
b. Water Table Depth 13.10'
d. Calculated System Volume (see back) 7.77

2. WELL PURGE DATA

a. Purge Method: Monsoon

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

Make	Model	Serial Number
YSI	556	

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
1345	2 liters	17.55	11.68	.739	8.63	146.2	N/A	1500		Cloudy/brown
1350	4 liters	17.68	11.65	.731	8.56	128.0	"	800		"
1357	6 liters	17.68	11.64	.730	8.54	127.0	"	"		Clear/tan

(continued on back)

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☐	☐	☑
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

No Turbidity Function

3. SAMPLE COLLECTION: Method: Monsoon

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
MW-38	VOA	3	HCL	8260	

Comments

Signature Joe Ladd
Date 1/18/2007

ENSR | AECOM

Well ID: MW-38

Low Flow Ground Water Sample Collection Record

Client: Parker Hannifin
Date: 2-20-07
Time: Start 1615 am/pm
Finish 1700 am/pm
Project No: 05303-035-201G
Site Location: Wake Forest, NC
Weather Conds: ~60 sunny
Collector(s): D. Bolivar, T. Ahom

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 32.79
c. Length of Water Column 17.23 (a-b)
Casing Diameter/Material 2"/PVC
b. Water Table Depth 15.56
d. Calculated System Volume (see back) 2.75 gal

2. WELL PURGE DATA

a. Purge Method: Geopump

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used: Make: YSI Model: Serial Number: 04K1664

Time (24hr)	Volume Removed gal (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
[illegible]27	1/4 gal	14.4	6.37	.340	5.04	174.5	22	200	.12	Clear
[illegible]32	.75 gal	14.23	6.34	.340	4.52	188.2	15	200	2.43	clear
1637	1.25 gal	14.22	6.32	.337	4.34	194.4	13	200	2.58	clear
1643	2.0	14.24	6.30	.331	4.27	195.9	11	200	3.02	clear
1648	2.25	14.32	6.3	.323	4.01	198.7	11	200	3.14	clear
1653	2.75	14.38	6.24	.299	4.11	195.3	8.8	200	2.23	clear

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☒	☐	☐
Has required turbidity been reached	☑	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: Peristaltic

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
MW-38	40 mL	Vial	HCL	8260 B	1700
MW-38	1 L	Amber	None	8270 - 1,4 Dioxane	
MW-38	500 ml	Poly	HNO3	Gold + Mercury	

Comments

Signature D. Bolivar Date 2/20/07

ENSR | AECOM

Well ID: MW-39

Low Flow Ground Water Sample Collection Record

Client: Parker Hannifin
Date: 2-21-07
Time: Start 0930 am/pm
Finish 1030 am/pm
Project No: 05303-035-201G
Site Location: Wake Forest, NC
Weather Conds: ~60 clear
Collector(s): D Babineau, T. Adham

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 26.63 c. Length of Water Column 13.91 (a-b)

Casing Diameter/Material 2" PVC

b. Water Table Depth 12.72 d. Calculated System Volume (see back) 2.23 gal

2. WELL PURGE DATA

a. Purge Method: Geo pump (Parastalic)

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

Make	Model	Serial Number
YSI		04K16614

Time (24hr)	Volume Removed D.O. ~~(Liters)~~ (gal)	Temp. (°C)	pH	Spec. Cond. ~~D.O. (µS/cm)~~ mS/cm	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
[illegible]	<1/2 gal	14.63	6.69	.158	5.15	181.8	30	200	14.70	clear
0950	<1/2 gal	14.41	6.71	.153	4.39	189.0	22	200	14.20	clear
1000	1 gal	14.50	6.71	.151	3.75	192.3	19	200	14.50	clear
1010	2 gal	14.69	6.66	.149	3.71	192.0	20	200	14.80	clear
1020	2.25 gal	14.62	6.63	.149	3.70	194.1	14	200	14.61	clear

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☑	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: Parastalic (Geo pump)

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
MW-39	40 ml VOA	~~2~~ 3	HCl	8260	1025
MW-39	1L Amber-S	2	None	8270	
MW-39	250 ml Plastic	1	HNO3	Metals	

Comments

Signature [signature] Date 2-21-07

ENSR | AECOM

Well ID: MW-39D

Low Flow Ground Water Sample Collection Record

Client: Parker Hannifin
Date: 2/21/07
Time: Start 1058 am/pm
Finish 1220 am/pm
Project No: 05303-035-201G
Site Location: Wake Forest, NC
Weather Conds: ~60, clear + Sunny
Collector(s): D. Bobikow, T. Abram

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 69.82
c. Length of Water Column 58.43 (a-b)
Casing Diameter/Material 2" / PVC
b. Water Table Depth 11.39
d. Calculated System Volume (see back) 9.35

2. WELL PURGE DATA

a. Purge Method: Peristaltic (Geopump)

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

Make	Model	Serial Number
YSI		04K1664

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
1105	<.25	14.38	7.19	.168	4.62	201.3	15	200	11.52	Clear
1115	.50	14.47	7.16	.170	4.57	200.2	12	200	11.57	clear
1125	1.0	14.8	7.16	.169	4.21	195.0	11	200	11.58	clear
1135	1.5	14.70	7.15	.170	4.42	197.7	9.9	200	11.59	clear
1145	2.5	14.79	7.15	.170	4.11	196.1	10	200	11.60	clear
1155	3.5	15.00	7.13	.169	3.94	191.9	8.9	200	11.74	Clear
1205	5.0	15.00	7.09	.169	3.96	190.9	7.5	200	11.80	Clear

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☑	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: Peristaltic

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
MW-39D	40ml VOA	3	HCL	8260	1215
MW-39D	1 Liter Amber	2	None	8270	
MW-39D	250 ml Plastic	1	HNO3	Metals	

Comments Pump Died for about a min before Battery was changed - 11:23 - 11:24

Signature D. Bobikow
Date 2/21/07

ENSR | AECOM

Well ID: ~~EB-1~~ MW-40 MW-40

Low Flow Ground Water Sample Collection Record

Client: Parker Hannifin
Date: 2·20·07
Time: Start 15:05 am/pm
Finish 16:05 am/pm
Project No: 05303-035-201G
Site Location: Wake Forest, NC
Weather Conds: ~60 Sunny
Collector(s): D. Babineau

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 32.96 c. Length of Water Column 19.65 (a-b)

Casing Diameter/Material 2"/PVC

b. Water Table Depth 13.31 d. Calculated System Volume (see back) 3.14 gal

2. WELL PURGE DATA

a. Purge Method: Geopump

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

Make	Model	Serial Number
YSI	CES-2006	04K16614

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
05	.5	14.83	6.58	.102	7.31	182.1	53.3	200	.21	Clear
15:10	1	14.89	6.24	.102	6.28	192.0	7.66	200	.24	Clear
15:15	1.5	14.95	6.21	.102	6.27	196.2	6.60	200	.24	Clear
15:25	2	14.90	6.35	.100	7.20	199.6	12	200	.04	Clear
15:35	2.5	14.82	6.13	.099	6.45	208.4	8.3	200	.08	Clear
1540	3	14.78	6.13	.099	5.83	209.3	7.6	300	.05	Clear
1545	3.5	14.79	6.10	.099	6.08	215.2	7.7	300	.06	Clear

(continued on back)

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☒	☐	☐
Has required turbidity been reached	☑	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

3. SAMPLE COLLECTION: Method: Parasoltic

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
MW-40	40mL VOA	3	HCL	8260 B	1545
MW-40	1L Amber	2	None	8270-1,4-Dioxane	
MW-40	500 ml Poly	1	HNO_3	~~6010~~ 6010 + Mercury	
~~MW-40~~ DUP					

Comments Equipment Blank was taken

Signature [signature] Date 2/20/07

ENSR | AECOM

Well ID: MW-40D

Low Flow Ground Water Sample Collection Record

Client: Parker Hannifin
Date: 2/20/07
Time: Start 1355 am/pm
Finish 1505 am/pm
Project No: 05303-035-201G
Site Location: Wake Forest, NC
Weather Conds: ~60, Sunny
Collector(s): M. Allen, D. Bohman

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 69.82
c. Length of Water Column 57.05 (a-b)
Casing Diameter/Material 2"/PVC
b. Water Table Depth 12.77
d. Calculated System Volume (see back) 9.13 g

2. WELL PURGE DATA

a. Purge Method: Monsoon

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

Make	Model	Serial Number
YSI	556 2006	04K1664

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
1415	2.5	15.45	10.60	.217	4.41	168.7	1000+	600	13.60	milky
1425	3	15.20	8.33	.214	6.08	185.7	1000+	600	13.58	milky
1435	5 gal	15.08	7.16	.177	6.55	213.8	1007	600	13.57	cloudy
1445	8 gal	15.02	6.97	.171	6.80	205.9	885	1200	13.56	l. cloudy
1455	10.5 gal	14.99	6.91	.170	6.91	203.6	784	1200	13.59	l. cloudy
1500	13.0 gal	14.96	6.92	.168	6.97	192.9	573	1200	13.47	l. cloudy
~~1500~~ 1505	18.0 gal	14.93	6.63	.165	7.18	191.6	375	600	13.51	cloudy

(continued on back)

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☑	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

3. SAMPLE COLLECTION: Method: Peristaltic

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
MW-40D	40 mL VOA	3	HCl	8260 B	1435
MW-40D	1 L Amber	2	None	8270 - 1,4 Dioxane	
MW-40D	500 mL Poly	1	HNO3	6010	

Comments

Signature D. Bohman
Date 2/20/07

ENSR | AECOM

Well ID: MW-41

Low Flow Ground Water Sample Collection Record

Client: Parker Hannifin
Date: 2/21/07
Time: Start 1237 am/pm
Finish 1320 am/pm
Project No: 05303-035-201G
Site Location: Wake Forest, NC
Weather Conds: ~60, calm clear sky
Collector(s): D. Babineau, T. Abram

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 28.68
c. Length of Water Column 11 (a-b)
Casing Diameter/Material 2"/pvc
b. Water Table Depth 17.68
d. Calculated System Volume (see back) 1.76 gal

2. WELL PURGE DATA

a. Purge Method: Peristaltic

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

Make	Model	Serial Number
YSI		04K-16614

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
1245	.5 gal	15.12	5.40	0.078	6.55	225.3	5	200	17.79	clear
1250	1 gal	15.10	5.40	.078	5.65	227.1	4.6	200	17.75	clear
1255	1.25	15.12	5.39	.077	5.51	227.4	3.8	200	17.77	clear
1300	1.50	15.13	5.39	.077	5.43	227.0	4.1	200	17.80	clear
1305	2.00	15.15	5.35	.077	5.34	228.9	4.6	200	17.76	clear

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☑	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: Peristaltic

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
MW-41	40 ml	3	HCl	8260	1310
MW-41	1L Amber	2	None	8270	
MW-41	250 ml Plastic	1	HNO3	metals	

Comments

Signature [signature] Date 2/21/07

Appendix E

Laboratory Analytical Reports

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
9800 Kincey Avenue, Suite 100
Huntersville, NC 28078
Phone: 704.875.9092
Fax: 704.875.9091

November 30, 2006

Mr. Bob Wyrick
ENSR C&E
7041 Old Wake Forest Road
Suite 103
Raleigh, NC 27616

RE: Lab Project Number: 92132394
Client Project ID: PARKER-WAKE FOR 05303-026-106

Dear Mr. Wyrick:

Enclosed are the analytical results for sample(s) received by the laboratory on November 16, 2006. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

Inorganic Wet Chemistry and Metals Analyses were performed at our Pace Asheville laboratory and Organic testing was performed at our Pace Charlotte laboratory unless otherwise footnoted.

If you have any questions concerning this report please feel free to contact me.

Sincerely,

Teresa Adams

Richard Swartz for
richard.swartz@pacelabs.com
(704) 875-9092 ext. 237
Project Manager

Enclosures

Pace Analytical
www.pacelabs.com

Pace Analytical Services, Inc.
9800 Kincey Avenue, Suite 100
Huntersville, NC 28078
Phone: 704.875.9092
Fax: 704.875.9091

SAMPLE SUMMARY

Lab Project Number: 92132394
Client Project ID: PARKER-WAKE FOR 05303-026-106

Project Sample Number	Sample Number	Client Sample ID	Matrix	Date Collected	Date Received
92132394-001	927693051	MW-38	Water	11/15/06 11:15	11/16/06 15:25
92132394-002	927693069	MW-39	Water	11/15/06 10:40	11/16/06 15:25
92132394-003	927693077	MW-40	Water	11/15/06 12:15	11/16/06 15:25
92132394-004	927693085	MW-41	Water	11/15/06 09:45	11/16/06 15:25
92132394-005	927693093	SB-15B 0-2	Soil	11/15/06 12:45	11/16/06 15:25
92132394-006	927693101	SB-15B 2-4	Soil	11/15/06 12:50	11/16/06 15:25
92132394-007	927693119	SB-48B 0-2	Soil	11/15/06 13:10	11/16/06 15:25
92132394-008	927693127	SB-48B 2-4	Soil	11/15/06 13:15	11/16/06 15:25

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Huntersville, NC 28078
Phone: 704.875.9092
Fax: 704.875.9091

SAMPLE ANALYTE COUNT

Lab Project Number: 92132394
Client Project ID: PARKER-WAKE FOR 05303-026-106

Project Sample Number	Sample No	Client Sample ID	Analysis Code	Analysis Description	Analytes Reported
92132394-001	927693051	MW-38	8260X WL92	GC/MS VOCs by 8260, low level	67
92132394-002	927693069	MW-39	8260X WL92	GC/MS VOCs by 8260, low level	67
92132394-003	927693077	MW-40	8260X WL92	GC/MS VOCs by 8260, low level	67
92132394-004	927693085	MW-41	8260X WL92	GC/MS VOCs by 8260, low level	67
92132394-005	927693093	SB-15B 0-2	%MOISTURE	Percent Moisture	1
			3500D SMOD	Chromium, Hexavalent, in Soil	1
			6010T SL92	Metals, Trace ICP	2
92132394-006	927693101	SB-15B 2-4	%MOISTURE	Percent Moisture	1
			3500D SMOD	Chromium, Hexavalent, in Soil	1
			6010T SL92	Metals, Trace ICP	2
92132394-007	927693119	SB-48B 0-2	%MOISTURE	Percent Moisture	1
			3500D SMOD	Chromium, Hexavalent, in Soil	1
			6010T SL92	Metals, Trace ICP	2
92132394-008	927693127	SB-48B 2-4	%MOISTURE	Percent Moisture	1
			3500D SMOD	Chromium, Hexavalent, in Soil	1
			6010T SL92	Metals, Trace ICP	2

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9800 Kincey Avenue, Suite 100
Huntersville, NC 28078
Phone: 704.875.9092
Fax: 704.875.9091

Lab Project Number: 92132394
Client Project ID: PARKER-WAKE FOR 05303-026-106

Solid results are reported on a dry weight basis

Lab Sample No: 927693051 | Project Sample Number: 92132394-001 | Date Collected: 11/15/06 11:15
Client Sample ID: MW-38 | Matrix: Water | Date Received: 11/16/06 15:25

Parameters	Results	Units	Report Limit	MDL	Analyzed	By	CAS No.	Qual	RegLmt
GC/MS Volatiles									
GC/MS VOCs by 8260, low level	Method: EPA 8260								
Acetone	ND	ug/l	25.	1.8	11/23/06 01:03	MSF	67-64-1		
Benzene	ND	ug/l	1.0	0.31	11/23/06 01:03	MSF	71-43-2		
Bromobenzene	ND	ug/l	1.0	0.16	11/23/06 01:03	MSF	108-86-1		
Bromochloromethane	ND	ug/l	1.0	0.37	11/23/06 01:03	MSF	74-97-5		
Bromodichloromethane	ND	ug/l	1.0	0.21	11/23/06 01:03	MSF	75-27-4		
Bromoform	ND	ug/l	1.0	0.17	11/23/06 01:03	MSF	75-25-2		
Bromomethane	ND	ug/l	1.0	0.51	11/23/06 01:03	MSF	74-83-9		
2-Butanone (MEK)	ND	ug/l	5.0	1.2	11/23/06 01:03	MSF	78-93-3		
n-Butylbenzene	ND	ug/l	1.0	0.20	11/23/06 01:03	MSF	104-51-8		
sec-Butylbenzene	ND	ug/l	1.0	0.20	11/23/06 01:03	MSF	135-98-8		
tert-Butylbenzene	ND	ug/l	1.0	0.17	11/23/06 01:03	MSF	98-06-6		
Carbon tetrachloride	ND	ug/l	1.0	0.27	11/23/06 01:03	MSF	56-23-5		
Chlorobenzene	ND	ug/l	1.0	0.15	11/23/06 01:03	MSF	108-90-7		
Chloroethane	ND	ug/l	1.0	0.78	11/23/06 01:03	MSF	75-00-3		
Chloroform	ND	ug/l	1.0	0.29	11/23/06 01:03	MSF	67-66-3		
Chloromethane	ND	ug/l	1.0	0.78	11/23/06 01:03	MSF	74-87-3		
2-Chlorotoluene	ND	ug/l	1.0	0.16	11/23/06 01:03	MSF	95-49-8		
4-Chlorotoluene	ND	ug/l	1.0	0.20	11/23/06 01:03	MSF	106-43-4		
1,2-Dibromo-3-chloropropane	ND	ug/l	1.0	0.39	11/23/06 01:03	MSF	96-12-8		
Dibromochloromethane	ND	ug/l	1.0	0.17	11/23/06 01:03	MSF	124-48-1		
1,2-Dibromoethane (EDB)	ND	ug/l	1.0	0.15	11/23/06 01:03	MSF	106-93-4		
Dibromomethane	ND	ug/l	1.0	0.27	11/23/06 01:03	MSF	74-95-3		
1,2-Dichlorobenzene	ND	ug/l	1.0	0.14	11/23/06 01:03	MSF	95-50-1		
1,3-Dichlorobenzene	ND	ug/l	1.0	0.16	11/23/06 01:03	MSF	541-73-1		
1,4-Dichlorobenzene	ND	ug/l	1.0	0.17	11/23/06 01:03	MSF	106-46-7		
Dichlorodifluoromethane	ND	ug/l	1.0	0.59	11/23/06 01:03	MSF	75-71-8		
1,1-Dichloroethane	ND	ug/l	1.0	0.42	11/23/06 01:03	MSF	75-34-3		
1,2-Dichloroethane	ND	ug/l	1.0	0.18	11/23/06 01:03	MSF	107-06-2		
1,2-Dichloroethene (Total)	ND	ug/l	1.0		11/23/06 01:03	MSF	540-59-0		
1,1-Dichloroethene	ND	ug/l	1.0	0.39	11/23/06 01:03	MSF	75-35-4		
cis-1,2-Dichloroethene	ND	ug/l	1.0	0.33	11/23/06 01:03	MSF	156-59-2		
trans-1,2-Dichloroethene	ND	ug/l	1.0	0.44	11/23/06 01:03	MSF	156-60-5		
1,2-Dichloropropane	ND	ug/l	1.0	0.20	11/23/06 01:03	MSF	78-87-5		
1,3-Dichloropropane	ND	ug/l	1.0	0.11	11/23/06 01:03	MSF	142-28-9		
2,2-Dichloropropane	ND	ug/l	1.0	0.44	11/23/06 01:03	MSF	594-20-7		
1,1-Dichloropropene	ND	ug/l	1.0	0.26	11/23/06 01:03	MSF	563-58-6		

Asheville Certification IDs
NC Wastewater 40
NC Drinking Water 37712
SC Environmental 99030
FL NELAP E87648

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Charlotte Certification IDs
NC Wastewater 12
NC Drinking Water 37706
SC 99006
FL NELAP E87627

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Huntersville, NC 28078
Phone: 704.875.9092
Fax: 704.875.9091

Lab Project Number: 92132394
Client Project ID: PARKER-WAKE FOR 05303-026-106

Lab Sample No: 927693051 | Project Sample Number: 92132394-001 | Date Collected: 11/15/06 11:15
Client Sample ID: MW-38 | Matrix: Water | Date Received: 11/16/06 15:25

Parameters	Results	Units	Report Limit	MDL	Analyzed	By	CAS No.	Qual	RegLmt
Diisopropyl ether	ND	ug/l	1.0	0.25	11/23/06 01:03	MSF	108-20-3		
Ethylbenzene	ND	ug/l	1.0	0.17	11/23/06 01:03	MSF	100-41-4		
Hexachloro-1,3-butadiene	ND	ug/l	1.0	0.32	11/23/06 01:03	MSF	87-68-3		
Isopropylbenzene (Cumene)	ND	ug/l	1.0	0.16	11/23/06 01:03	MSF	98-82-8		
p-Isopropyltoluene	ND	ug/l	1.0	0.20	11/23/06 01:03	MSF	99-87-6		
Methylene chloride	ND	ug/l	2.0	0.46	11/23/06 01:03	MSF	75-09-2		
Methyl-tert-butyl ether	ND	ug/l	1.0	0.22	11/23/06 01:03	MSF	1634-04-4		
Naphthalene	ND	ug/l	1.0	0.22	11/23/06 01:03	MSF	91-20-3		
n-Propylbenzene	ND	ug/l	1.0	0.20	11/23/06 01:03	MSF	103-65-1		
Styrene	ND	ug/l	1.0	0.15	11/23/06 01:03	MSF	100-42-5		
1,1,1,2-Tetrachloroethane	ND	ug/l	1.0	0.25	11/23/06 01:03	MSF	630-20-6		
1,1,2,2-Tetrachloroethane	ND	ug/l	1.0	0.24	11/23/06 01:03	MSF	79-34-5		
Tetrachloroethene	ND	ug/l	1.0	0.16	11/23/06 01:03	MSF	127-18-4		
Toluene	ND	ug/l	1.0	0.24	11/23/06 01:03	MSF	108-88-3		
1,2,3-Trichlorobenzene	ND	ug/l	1.0	0.18	11/23/06 01:03	MSF	87-61-6		
1,2,4-Trichlorobenzene	ND	ug/l	1.0	0.20	11/23/06 01:03	MSF	120-82-1		
1,1,1-Trichloroethane	ND	ug/l	1.0	0.35	11/23/06 01:03	MSF	71-55-6		
1,1,2-Trichloroethane	ND	ug/l	1.0	0.16	11/23/06 01:03	MSF	79-00-5		
Trichloroethene	20.	ug/l	1.0	0.26	11/23/06 01:03	MSF	79-01-6		
Trichlorofluoromethane	ND	ug/l	1.0	0.41	11/23/06 01:03	MSF	75-69-4		
1,2,3-Trichloropropane	ND	ug/l	1.0	0.22	11/23/06 01:03	MSF	96-18-4		
1,2,4-Trimethylbenzene	ND	ug/l	1.0	0.15	11/23/06 01:03	MSF	95-63-6		
1,3,5-Trimethylbenzene	ND	ug/l	1.0	0.21	11/23/06 01:03	MSF	108-67-8		
Vinyl chloride	ND	ug/l	1.0	0.58	11/23/06 01:03	MSF	75-01-4		
Xylene (Total)	ND	ug/l	2.0		11/23/06 01:03	MSF	1330-20-7		
m&p-Xylene	ND	ug/l	2.0	0.39	11/23/06 01:03	MSF			
o-Xylene	ND	ug/l	1.0	0.17	11/23/06 01:03	MSF	95-47-6		
Toluene-d8 (S)	99	%			11/23/06 01:03	MSF	2037-26-5		
4-Bromofluorobenzene (S)	106	%			11/23/06 01:03	MSF	460-00-4		
Dibromofluoromethane (S)	99	%			11/23/06 01:03	MSF	1868-53-7		
1,2-Dichloroethane-d4 (S)	95	%			11/23/06 01:03	MSF	17060-07-0		

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Huntersville, NC 28078
Phone: 704.875.9092
Fax: 704.875.9091

Lab Project Number: 92132394
Client Project ID: PARKER-WAKE FOR 05303-026-106

Lab Sample No: 927693069 | Project Sample Number: 92132394-002 | Date Collected: 11/15/06 10:40
Client Sample ID: MW-39 | Matrix: Water | Date Received: 11/16/06 15:25

Parameters	Results	Units	Report Limit	MDL	Analyzed	By	CAS No.	Qual	RegLmt
GC/MS Volatiles									
GC/MS VOCs by 8260, low level	Method: EPA 8260								
Acetone	ND	ug/l	25.	1.8	11/23/06 01:26	MSF	67-64-1		
Benzene	ND	ug/l	1.0	0.31	11/23/06 01:26	MSF	71-43-2		
Bromobenzene	ND	ug/l	1.0	0.16	11/23/06 01:26	MSF	108-86-1		
Bromochloromethane	ND	ug/l	1.0	0.37	11/23/06 01:26	MSF	74-97-5		
Bromodichloromethane	ND	ug/l	1.0	0.21	11/23/06 01:26	MSF	75-27-4		
Bromoform	ND	ug/l	1.0	0.17	11/23/06 01:26	MSF	75-25-2		
Bromomethane	ND	ug/l	1.0	0.51	11/23/06 01:26	MSF	74-83-9		
2-Butanone (MEK)	ND	ug/l	5.0	1.2	11/23/06 01:26	MSF	78-93-3		
n-Butylbenzene	ND	ug/l	1.0	0.20	11/23/06 01:26	MSF	104-51-8		
sec-Butylbenzene	ND	ug/l	1.0	0.20	11/23/06 01:26	MSF	135-98-8		
tert-Butylbenzene	ND	ug/l	1.0	0.17	11/23/06 01:26	MSF	98-06-6		
Carbon tetrachloride	ND	ug/l	1.0	0.27	11/23/06 01:26	MSF	56-23-5		
Chlorobenzene	ND	ug/l	1.0	0.15	11/23/06 01:26	MSF	108-90-7		
Chloroethane	ND	ug/l	1.0	0.78	11/23/06 01:26	MSF	75-00-3		
Chloroform	ND	ug/l	1.0	0.29	11/23/06 01:26	MSF	67-66-3		
Chloromethane	ND	ug/l	1.0	0.78	11/23/06 01:26	MSF	74-87-3		
2-Chlorotoluene	ND	ug/l	1.0	0.16	11/23/06 01:26	MSF	95-49-8		
4-Chlorotoluene	ND	ug/l	1.0	0.20	11/23/06 01:26	MSF	106-43-4		
1,2-Dibromo-3-chloropropane	ND	ug/l	1.0	0.39	11/23/06 01:26	MSF	96-12-8		
Dibromochloromethane	ND	ug/l	1.0	0.17	11/23/06 01:26	MSF	124-48-1		
1,2-Dibromoethane (EDB)	ND	ug/l	1.0	0.15	11/23/06 01:26	MSF	106-93-4		
Dibromomethane	ND	ug/l	1.0	0.27	11/23/06 01:26	MSF	74-95-3		
1,2-Dichlorobenzene	ND	ug/l	1.0	0.14	11/23/06 01:26	MSF	95-50-1		
1,3-Dichlorobenzene	ND	ug/l	1.0	0.16	11/23/06 01:26	MSF	541-73-1		
1,4-Dichlorobenzene	ND	ug/l	1.0	0.17	11/23/06 01:26	MSF	106-46-7		
Dichlorodifluoromethane	ND	ug/l	1.0	0.59	11/23/06 01:26	MSF	75-71-8		
1,1-Dichloroethane	ND	ug/l	1.0	0.42	11/23/06 01:26	MSF	75-34-3		
1,2-Dichloroethane	ND	ug/l	1.0	0.18	11/23/06 01:26	MSF	107-06-2		
1,2-Dichloroethene (Total)	ND	ug/l	1.0		11/23/06 01:26	MSF	540-59-0		
1,1-Dichloroethene	ND	ug/l	1.0	0.39	11/23/06 01:26	MSF	75-35-4		
cis-1,2-Dichloroethene	ND	ug/l	1.0	0.33	11/23/06 01:26	MSF	156-59-2		
trans-1,2-Dichloroethene	ND	ug/l	1.0	0.44	11/23/06 01:26	MSF	156-60-5		
1,2-Dichloropropane	ND	ug/l	1.0	0.20	11/23/06 01:26	MSF	78-87-5		
1,3-Dichloropropane	ND	ug/l	1.0	0.11	11/23/06 01:26	MSF	142-28-9		
2,2-Dichloropropane	ND	ug/l	1.0	0.44	11/23/06 01:26	MSF	594-20-7		
1,1-Dichloropropene	ND	ug/l	1.0	0.26	11/23/06 01:26	MSF	563-58-6		
Diisopropyl ether	ND	ug/l	1.0	0.25	11/23/06 01:26	MSF	108-20-3		

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Phone: 704.875.9092
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Lab Project Number: 92132394
Client Project ID: PARKER-WAKE FOR 05303-026-106

Lab Sample No: 927693069 | Project Sample Number: 92132394-002 | Date Collected: 11/15/06 10:40
Client Sample ID: MW-39 | Matrix: Water | Date Received: 11/16/06 15:25

Parameters	Results	Units	Report Limit	MDL	Analyzed	By	CAS No.	Qual	RegLmt
Ethylbenzene	ND	ug/l	1.0	0.17	11/23/06 01:26	MSF	100-41-4		
Hexachloro-1,3-butadiene	ND	ug/l	1.0	0.32	11/23/06 01:26	MSF	87-68-3		
Isopropylbenzene (Cumene)	ND	ug/l	1.0	0.16	11/23/06 01:26	MSF	98-82-8		
p-Isopropyltoluene	ND	ug/l	1.0	0.20	11/23/06 01:26	MSF	99-87-6		
Methylene chloride	ND	ug/l	2.0	0.46	11/23/06 01:26	MSF	75-09-2		
Methyl-tert-butyl ether	ND	ug/l	1.0	0.22	11/23/06 01:26	MSF	1634-04-4		
Naphthalene	ND	ug/l	1.0	0.22	11/23/06 01:26	MSF	91-20-3		
n-Propylbenzene	ND	ug/l	1.0	0.20	11/23/06 01:26	MSF	103-65-1		
Styrene	ND	ug/l	1.0	0.15	11/23/06 01:26	MSF	100-42-5		
1,1,1,2-Tetrachloroethane	ND	ug/l	1.0	0.25	11/23/06 01:26	MSF	630-20-6		
1,1,2,2-Tetrachloroethane	ND	ug/l	1.0	0.24	11/23/06 01:26	MSF	79-34-5		
Tetrachloroethene	ND	ug/l	1.0	0.16	11/23/06 01:26	MSF	127-18-4		
Toluene	ND	ug/l	1.0	0.24	11/23/06 01:26	MSF	108-88-3		
1,2,3-Trichlorobenzene	ND	ug/l	1.0	0.18	11/23/06 01:26	MSF	87-61-6		
1,2,4-Trichlorobenzene	ND	ug/l	1.0	0.20	11/23/06 01:26	MSF	120-82-1		
1,1,1-Trichloroethane	ND	ug/l	1.0	0.35	11/23/06 01:26	MSF	71-55-6		
1,1,2-Trichloroethane	ND	ug/l	1.0	0.16	11/23/06 01:26	MSF	79-00-5		
Trichloroethene	ND	ug/l	1.0	0.26	11/23/06 01:26	MSF	79-01-6		
Trichlorofluoromethane	ND	ug/l	1.0	0.41	11/23/06 01:26	MSF	75-69-4		
1,2,3-Trichloropropane	ND	ug/l	1.0	0.22	11/23/06 01:26	MSF	96-18-4		
1,2,4-Trimethylbenzene	ND	ug/l	1.0	0.15	11/23/06 01:26	MSF	95-63-6		
1,3,5-Trimethylbenzene	ND	ug/l	1.0	0.21	11/23/06 01:26	MSF	108-67-8		
Vinyl chloride	ND	ug/l	1.0	0.58	11/23/06 01:26	MSF	75-01-4		
Xylene (Total)	ND	ug/l	2.0		11/23/06 01:26	MSF	1330-20-7		
m&p-Xylene	ND	ug/l	2.0	0.39	11/23/06 01:26	MSF			
o-Xylene	ND	ug/l	1.0	0.17	11/23/06 01:26	MSF	95-47-6		
Toluene-d8 (S)	99	%			11/23/06 01:26	MSF	2037-26-5		
4-Bromofluorobenzene (S)	108	%			11/23/06 01:26	MSF	460-00-4		
Dibromofluoromethane (S)	98	%			11/23/06 01:26	MSF	1868-53-7		
1,2-Dichloroethane-d4 (S)	96	%			11/23/06 01:26	MSF	17060-07-0		

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Lab Project Number: 92132394
Client Project ID: PARKER-WAKE FOR 05303-026-106

Lab Sample No: 927693077 | Project Sample Number: 92132394-003 | Date Collected: 11/15/06 12:15
Client Sample ID: MW-40 | Matrix: Water | Date Received: 11/16/06 15:25

Parameters	Results	Units	Report Limit	MDL	Analyzed	By	CAS No.	Qual	RegLmt
GC/MS Volatiles									
GC/MS VOCs by 8260, low level	Method: EPA 8260								
Acetone	ND	ug/l	25.	1.8	11/23/06 01:50	MSF	67-64-1		
Benzene	ND	ug/l	1.0	0.31	11/23/06 01:50	MSF	71-43-2		
Bromobenzene	ND	ug/l	1.0	0.16	11/23/06 01:50	MSF	108-86-1		
Bromochloromethane	ND	ug/l	1.0	0.37	11/23/06 01:50	MSF	74-97-5		
Bromodichloromethane	ND	ug/l	1.0	0.21	11/23/06 01:50	MSF	75-27-4		
Bromoform	ND	ug/l	1.0	0.17	11/23/06 01:50	MSF	75-25-2		
Bromomethane	ND	ug/l	1.0	0.51	11/23/06 01:50	MSF	74-83-9		
2-Butanone (MEK)	ND	ug/l	5.0	1.2	11/23/06 01:50	MSF	78-93-3		
n-Butylbenzene	ND	ug/l	1.0	0.20	11/23/06 01:50	MSF	104-51-8		
sec-Butylbenzene	ND	ug/l	1.0	0.20	11/23/06 01:50	MSF	135-98-8		
tert-Butylbenzene	ND	ug/l	1.0	0.17	11/23/06 01:50	MSF	98-06-6		
Carbon tetrachloride	ND	ug/l	1.0	0.27	11/23/06 01:50	MSF	56-23-5		
Chlorobenzene	ND	ug/l	1.0	0.15	11/23/06 01:50	MSF	108-90-7		
Chloroethane	ND	ug/l	1.0	0.78	11/23/06 01:50	MSF	75-00-3		
Chloroform	ND	ug/l	1.0	0.29	11/23/06 01:50	MSF	67-66-3		
Chloromethane	ND	ug/l	1.0	0.78	11/23/06 01:50	MSF	74-87-3		
2-Chlorotoluene	ND	ug/l	1.0	0.16	11/23/06 01:50	MSF	95-49-8		
4-Chlorotoluene	ND	ug/l	1.0	0.20	11/23/06 01:50	MSF	106-43-4		
1,2-Dibromo-3-chloropropane	ND	ug/l	1.0	0.39	11/23/06 01:50	MSF	96-12-8		
Dibromochloromethane	ND	ug/l	1.0	0.17	11/23/06 01:50	MSF	124-48-1		
1,2-Dibromoethane (EDB)	ND	ug/l	1.0	0.15	11/23/06 01:50	MSF	106-93-4		
Dibromomethane	ND	ug/l	1.0	0.27	11/23/06 01:50	MSF	74-95-3		
1,2-Dichlorobenzene	ND	ug/l	1.0	0.14	11/23/06 01:50	MSF	95-50-1		
1,3-Dichlorobenzene	ND	ug/l	1.0	0.16	11/23/06 01:50	MSF	541-73-1		
1,4-Dichlorobenzene	ND	ug/l	1.0	0.17	11/23/06 01:50	MSF	106-46-7		
Dichlorodifluoromethane	ND	ug/l	1.0	0.59	11/23/06 01:50	MSF	75-71-8		
1,1-Dichloroethane	ND	ug/l	1.0	0.42	11/23/06 01:50	MSF	75-34-3		
1,2-Dichloroethane	ND	ug/l	1.0	0.18	11/23/06 01:50	MSF	107-06-2		
1,2-Dichloroethene (Total)	ND	ug/l	1.0		11/23/06 01:50	MSF	540-59-0		
1,1-Dichloroethene	ND	ug/l	1.0	0.39	11/23/06 01:50	MSF	75-35-4		
cis-1,2-Dichloroethene	ND	ug/l	1.0	0.33	11/23/06 01:50	MSF	156-59-2		
trans-1,2-Dichloroethene	ND	ug/l	1.0	0.44	11/23/06 01:50	MSF	156-60-5		
1,2-Dichloropropane	ND	ug/l	1.0	0.20	11/23/06 01:50	MSF	78-87-5		
1,3-Dichloropropane	ND	ug/l	1.0	0.11	11/23/06 01:50	MSF	142-28-9		
2,2-Dichloropropane	ND	ug/l	1.0	0.44	11/23/06 01:50	MSF	594-20-7		
1,1-Dichloropropene	ND	ug/l	1.0	0.26	11/23/06 01:50	MSF	563-58-6		
Diisopropyl ether	ND	ug/l	1.0	0.25	11/23/06 01:50	MSF	108-20-3		

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Lab Project Number: 92132394
Client Project ID: PARKER-WAKE FOR 05303-026-106

Lab Sample No: 927693077 | Project Sample Number: 92132394-003 | Date Collected: 11/15/06 12:15
Client Sample ID: MW-40 | Matrix: Water | Date Received: 11/16/06 15:25

Parameters	Results	Units	Report Limit	MDL	Analyzed	By	CAS No.	Qual	RegLmt
Ethylbenzene	ND	ug/l	1.0	0.17	11/23/06 01:50	MSF	100-41-4		
Hexachloro-1,3-butadiene	ND	ug/l	1.0	0.32	11/23/06 01:50	MSF	87-68-3		
Isopropylbenzene (Cumene)	ND	ug/l	1.0	0.16	11/23/06 01:50	MSF	98-82-8		
p-Isopropyltoluene	ND	ug/l	1.0	0.20	11/23/06 01:50	MSF	99-87-6		
Methylene chloride	ND	ug/l	2.0	0.46	11/23/06 01:50	MSF	75-09-2		
Methyl-tert-butyl ether	ND	ug/l	1.0	0.22	11/23/06 01:50	MSF	1634-04-4		
Naphthalene	ND	ug/l	1.0	0.22	11/23/06 01:50	MSF	91-20-3		
n-Propylbenzene	ND	ug/l	1.0	0.20	11/23/06 01:50	MSF	103-65-1		
Styrene	ND	ug/l	1.0	0.15	11/23/06 01:50	MSF	100-42-5		
1,1,1,2-Tetrachloroethane	ND	ug/l	1.0	0.25	11/23/06 01:50	MSF	630-20-6		
1,1,2,2-Tetrachloroethane	ND	ug/l	1.0	0.24	11/23/06 01:50	MSF	79-34-5		
Tetrachloroethene	ND	ug/l	1.0	0.16	11/23/06 01:50	MSF	127-18-4		
Toluene	ND	ug/l	1.0	0.24	11/23/06 01:50	MSF	108-88-3		
1,2,3-Trichlorobenzene	ND	ug/l	1.0	0.18	11/23/06 01:50	MSF	87-61-6		
1,2,4-Trichlorobenzene	ND	ug/l	1.0	0.20	11/23/06 01:50	MSF	120-82-1		
1,1,1-Trichloroethane	ND	ug/l	1.0	0.35	11/23/06 01:50	MSF	71-55-6		
1,1,2-Trichloroethane	ND	ug/l	1.0	0.16	11/23/06 01:50	MSF	79-00-5		
Trichloroethene	ND	ug/l	1.0	0.26	11/23/06 01:50	MSF	79-01-6		
Trichlorofluoromethane	ND	ug/l	1.0	0.41	11/23/06 01:50	MSF	75-69-4		
1,2,3-Trichloropropane	ND	ug/l	1.0	0.22	11/23/06 01:50	MSF	96-18-4		
1,2,4-Trimethylbenzene	ND	ug/l	1.0	0.15	11/23/06 01:50	MSF	95-63-6		
1,3,5-Trimethylbenzene	ND	ug/l	1.0	0.21	11/23/06 01:50	MSF	108-67-8		
Vinyl chloride	ND	ug/l	1.0	0.58	11/23/06 01:50	MSF	75-01-4		
Xylene (Total)	ND	ug/l	2.0		11/23/06 01:50	MSF	1330-20-7		
m&p-Xylene	ND	ug/l	2.0	0.39	11/23/06 01:50	MSF			
o-Xylene	ND	ug/l	1.0	0.17	11/23/06 01:50	MSF	95-47-6		
Toluene-d8 (S)	100	%			11/23/06 01:50	MSF	2037-26-5		
4-Bromofluorobenzene (S)	107	%			11/23/06 01:50	MSF	460-00-4		
Dibromofluoromethane (S)	97	%			11/23/06 01:50	MSF	1868-53-7		
1,2-Dichloroethane-d4 (S)	96	%			11/23/06 01:50	MSF	17060-07-0		

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Fax: 704.875.9091

Lab Project Number: 92132394
Client Project ID: PARKER-WAKE FOR 05303-026-106

Lab Sample No: 927693085 | Project Sample Number: 92132394-004 | Date Collected: 11/15/06 09:45
Client Sample ID: MW-41 | Matrix: Water | Date Received: 11/16/06 15:25

Parameters	Results	Units	Report Limit	MDL	Analyzed	By	CAS No.	Qual	RegLmt
GC/MS Volatiles									
GC/MS VOCs by 8260, low level	Method: EPA 8260								
Acetone	ND	ug/l	25.	1.8	11/21/06 20:30	MSF	67-64-1		
Benzene	ND	ug/l	1.0	0.31	11/21/06 20:30	MSF	71-43-2		
Bromobenzene	ND	ug/l	1.0	0.16	11/21/06 20:30	MSF	108-86-1		
Bromochloromethane	ND	ug/l	1.0	0.37	11/21/06 20:30	MSF	74-97-5		
Bromodichloromethane	ND	ug/l	1.0	0.21	11/21/06 20:30	MSF	75-27-4		
Bromoform	ND	ug/l	1.0	0.17	11/21/06 20:30	MSF	75-25-2		
Bromomethane	ND	ug/l	1.0	0.51	11/21/06 20:30	MSF	74-83-9		
2-Butanone (MEK)	ND	ug/l	5.0	1.2	11/21/06 20:30	MSF	78-93-3		
n-Butylbenzene	ND	ug/l	1.0	0.20	11/21/06 20:30	MSF	104-51-8		
sec-Butylbenzene	ND	ug/l	1.0	0.20	11/21/06 20:30	MSF	135-98-8		
tert-Butylbenzene	ND	ug/l	1.0	0.17	11/21/06 20:30	MSF	98-06-6		
Carbon tetrachloride	ND	ug/l	1.0	0.27	11/21/06 20:30	MSF	56-23-5		
Chlorobenzene	ND	ug/l	1.0	0.15	11/21/06 20:30	MSF	108-90-7		
Chloroethane	ND	ug/l	1.0	0.78	11/21/06 20:30	MSF	75-00-3		
Chloroform	ND	ug/l	1.0	0.29	11/21/06 20:30	MSF	67-66-3		
Chloromethane	ND	ug/l	1.0	0.78	11/21/06 20:30	MSF	74-87-3		
2-Chlorotoluene	ND	ug/l	1.0	0.16	11/21/06 20:30	MSF	95-49-8		
4-Chlorotoluene	ND	ug/l	1.0	0.20	11/21/06 20:30	MSF	106-43-4		
1,2-Dibromo-3-chloropropane	ND	ug/l	1.0	0.39	11/21/06 20:30	MSF	96-12-8		
Dibromochloromethane	ND	ug/l	1.0	0.17	11/21/06 20:30	MSF	124-48-1		
1,2-Dibromoethane (EDB)	ND	ug/l	1.0	0.15	11/21/06 20:30	MSF	106-93-4		
Dibromomethane	ND	ug/l	1.0	0.27	11/21/06 20:30	MSF	74-95-3		
1,2-Dichlorobenzene	ND	ug/l	1.0	0.14	11/21/06 20:30	MSF	95-50-1		
1,3-Dichlorobenzene	ND	ug/l	1.0	0.16	11/21/06 20:30	MSF	541-73-1		
1,4-Dichlorobenzene	ND	ug/l	1.0	0.17	11/21/06 20:30	MSF	106-46-7		
Dichlorodifluoromethane	ND	ug/l	1.0	0.59	11/21/06 20:30	MSF	75-71-8		
1,1-Dichloroethane	ND	ug/l	1.0	0.42	11/21/06 20:30	MSF	75-34-3		
1,2-Dichloroethane	ND	ug/l	1.0	0.18	11/21/06 20:30	MSF	107-06-2		
1,2-Dichloroethene (Total)	ND	ug/l	1.0		11/21/06 20:30	MSF	540-59-0		
1,1-Dichloroethene	ND	ug/l	1.0	0.39	11/21/06 20:30	MSF	75-35-4		
cis-1,2-Dichloroethene	ND	ug/l	1.0	0.33	11/21/06 20:30	MSF	156-59-2		
trans-1,2-Dichloroethene	ND	ug/l	1.0	0.44	11/21/06 20:30	MSF	156-60-5		
1,2-Dichloropropane	ND	ug/l	1.0	0.20	11/21/06 20:30	MSF	78-87-5		
1,3-Dichloropropane	ND	ug/l	1.0	0.11	11/21/06 20:30	MSF	142-28-9		
2,2-Dichloropropane	ND	ug/l	1.0	0.44	11/21/06 20:30	MSF	594-20-7		
1,1-Dichloropropene	ND	ug/l	1.0	0.26	11/21/06 20:30	MSF	563-58-6		
Diisopropyl ether	ND	ug/l	1.0	0.25	11/21/06 20:30	MSF	108-20-3		

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Lab Project Number: 92132394
Client Project ID: PARKER-WAKE FOR 05303-026-106

Lab Sample No: 927693085 | Project Sample Number: 92132394-004 | Date Collected: 11/15/06 09:45
Client Sample ID: MW-41 | Matrix: Water | Date Received: 11/16/06 15:25

Parameters	Results	Units	Report Limit	MDL	Analyzed	By	CAS No.	Qual	RegLmt
Ethylbenzene	ND	ug/l	1.0	0.17	11/21/06 20:30	MSF	100-41-4		
Hexachloro-1,3-butadiene	ND	ug/l	1.0	0.32	11/21/06 20:30	MSF	87-68-3		
Isopropylbenzene (Cumene)	ND	ug/l	1.0	0.16	11/21/06 20:30	MSF	98-82-8		
p-Isopropyltoluene	ND	ug/l	1.0	0.20	11/21/06 20:30	MSF	99-87-6		
Methylene chloride	ND	ug/l	2.0	0.46	11/21/06 20:30	MSF	75-09-2		
Methyl-tert-butyl ether	ND	ug/l	1.0	0.22	11/21/06 20:30	MSF	1634-04-4		
Naphthalene	ND	ug/l	1.0	0.22	11/21/06 20:30	MSF	91-20-3		
n-Propylbenzene	ND	ug/l	1.0	0.20	11/21/06 20:30	MSF	103-65-1		
Styrene	ND	ug/l	1.0	0.15	11/21/06 20:30	MSF	100-42-5		
1,1,1,2-Tetrachloroethane	ND	ug/l	1.0	0.25	11/21/06 20:30	MSF	630-20-6		
1,1,2,2-Tetrachloroethane	ND	ug/l	1.0	0.24	11/21/06 20:30	MSF	79-34-5		
Tetrachloroethene	ND	ug/l	1.0	0.16	11/21/06 20:30	MSF	127-18-4		
Toluene	ND	ug/l	1.0	0.24	11/21/06 20:30	MSF	108-88-3		
1,2,3-Trichlorobenzene	ND	ug/l	1.0	0.18	11/21/06 20:30	MSF	87-61-6		
1,2,4-Trichlorobenzene	ND	ug/l	1.0	0.20	11/21/06 20:30	MSF	120-82-1		
1,1,1-Trichloroethane	ND	ug/l	1.0	0.35	11/21/06 20:30	MSF	71-55-6		
1,1,2-Trichloroethane	ND	ug/l	1.0	0.16	11/21/06 20:30	MSF	79-00-5		
Trichloroethene	ND	ug/l	1.0	0.26	11/21/06 20:30	MSF	79-01-6		
Trichlorofluoromethane	ND	ug/l	1.0	0.41	11/21/06 20:30	MSF	75-69-4		
1,2,3-Trichloropropane	ND	ug/l	1.0	0.22	11/21/06 20:30	MSF	96-18-4		
1,2,4-Trimethylbenzene	ND	ug/l	1.0	0.15	11/21/06 20:30	MSF	95-63-6		
1,3,5-Trimethylbenzene	ND	ug/l	1.0	0.21	11/21/06 20:30	MSF	108-67-8		
Vinyl chloride	ND	ug/l	1.0	0.58	11/21/06 20:30	MSF	75-01-4		
Xylene (Total)	ND	ug/l	2.0		11/21/06 20:30	MSF	1330-20-7		
m&p-Xylene	ND	ug/l	2.0	0.39	11/21/06 20:30	MSF			
o-Xylene	ND	ug/l	1.0	0.17	11/21/06 20:30	MSF	95-47-6		
Toluene-d8 (S)	99	%			11/21/06 20:30	MSF	2037-26-5		
4-Bromofluorobenzene (S)	106	%			11/21/06 20:30	MSF	460-00-4		
Dibromofluoromethane (S)	93	%			11/21/06 20:30	MSF	1868-53-7		
1,2-Dichloroethane-d4 (S)	97	%			11/21/06 20:30	MSF	17060-07-0		

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Lab Project Number: 92132394
Client Project ID: PARKER-WAKE FOR 05303-026-106

Lab Sample No: 927693093 | Project Sample Number: 92132394-005 | Date Collected: 11/15/06 12:45
Client Sample ID: SB-15B 0-2 | Matrix: Soil | Date Received: 11/16/06 15:25

Parameters	Results	Units	Report Limit	MDL	Analyzed	By	CAS No.	Qual	RegLmt
Metals									
Metals, Trace ICP	Prep/Method: EPA 3050 / EPA 6010								
Chromium	18.	mg/kg	0.37	0.022	11/28/06 13:23	EWS	7440-47-3		
Date Digested	11/27/06 14:30				11/27/06 14:30				
Wet Chemistry									
Percent Moisture	Method: % Moisture								
Percent Moisture	27.0	%			11/17/06 09:03	TNM			
Chromium, Hexavalent, in Soil	Method: SM 3500-Cr D Modified								
Chromium, Hexavalent	ND	mg/kg	4.39		11/29/06 06:11	TMR	18540-29-9		

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Lab Project Number: 92132394
Client Project ID: PARKER-WAKE FOR 05303-026-106

Lab Sample No: 927693101 | Project Sample Number: 92132394-006 | Date Collected: 11/15/06 12:50
Client Sample ID: SB-15B 2-4 | Matrix: Soil | Date Received: 11/16/06 15:25

Parameters	Results	Units	Report Limit	MDL	Analyzed	By	CAS No.	Qual	RegLmt
Metals									
Metals, Trace ICP	Prep/Method: EPA 3050 / EPA 6010								
Chromium	15.	mg/kg	0.19	0.012	11/28/06 13:28	EWS	7440-47-3		
Date Digested	11/27/06 14:30				11/27/06 14:30				
Wet Chemistry									
Percent Moisture	Method: % Moisture								
Percent Moisture	35.9	%			11/17/06 09:04	TNM			
Chromium, Hexavalent, in Soil	Method: SM 3500-Cr D Modified								
Chromium, Hexavalent	ND	mg/kg	5.74		11/29/06 06:11	TMR	18540-29-9		

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Lab Project Number: 92132394
Client Project ID: PARKER-WAKE FOR 05303-026-106

Lab Sample No: 927693119 | Project Sample Number: 92132394-007 | Date Collected: 11/15/06 13:10
Client Sample ID: SB-48B 0-2 | Matrix: Soil | Date Received: 11/16/06 15:25

Parameters	Results	Units	Report Limit	MDL	Analyzed	By	CAS No.	Qual	RegLmt
Metals									
Metals, Trace ICP	Prep/Method: EPA 3050 / EPA 6010								
Chromium	7.2	mg/kg	0.36	0.021	11/28/06 13:33	EWS	7440-47-3		
Date Digested	11/27/06 14:30				11/27/06 14:30				
Wet Chemistry									
Percent Moisture	Method: % Moisture								
Percent Moisture	24.7	%			11/17/06 09:04	TNM			
Chromium, Hexavalent, in Soil	Method: SM 3500-Cr D Modified								
Chromium, Hexavalent	ND	mg/kg	7.72		11/29/06 06:11	TMR	18540-29-9		

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Lab Project Number: 92132394
Client Project ID: PARKER-WAKE FOR 05303-026-106

Lab Sample No: 927693127 | Project Sample Number: 92132394-008 | Date Collected: 11/15/06 13:15
Client Sample ID: SB-48B 2-4 | Matrix: Soil | Date Received: 11/16/06 15:25

Parameters	Results	Units	Report Limit	MDL	Analyzed	By	CAS No.	Qual	RegLmt
Metals									
Metals, Trace ICP	Prep/Method: EPA 3050 / EPA 6010								
Chromium	14.	mg/kg	0.44	0.026	11/28/06 13:38	EWS	7440-47-3		
Date Digested	11/27/06 14:30				11/27/06 14:30				
Wet Chemistry									
Percent Moisture	Method: % Moisture								
Percent Moisture	23.2	%			11/17/06 09:04	TNM			
Chromium, Hexavalent, in Soil	Method: SM 3500-Cr D Modified								
Chromium, Hexavalent	ND	mg/kg	5.33		11/29/06 06:11	TMR	18540-29-9		

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Lab Project Number: 92132394
Client Project ID: PARKER-WAKE FOR 05303-026-106

PARAMETER FOOTNOTES

Method 9071B modified to use ASE.

All pH, Free Chlorine, Total Chlorine and Ferrous Iron analyses conducted outside of EPA recommended immediate hold time.

Depending on the moisture content the PRLs can be elevated for all soil samples reported on a dry weight basis.

2-Chloroethyl vinyl ether has been shown to degrade in the presence of acid.

ND	Not detected at or above adjusted reporting limit
NC	Not Calculable
J	Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit
MDL	Adjusted Method Detection Limit
(S)	Surrogate

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QUALITY CONTROL DATA

Lab Project Number: 92132394
Client Project ID: PARKER-WAKE FOR 05303-026-106

QC Batch: 173564 — Analysis Method: EPA 8260
QC Batch Method: EPA 8260 — Analysis Description: GC/MS VOCs by 8260, low level
Associated Lab Samples: 927693085

METHOD BLANK: 927707117
Associated Lab Samples: 927693085

Parameter	Units	Blank Result	Reporting Limit	Footnotes
Acetone	ug/l	ND	25.	
Benzene	ug/l	ND	1.0	
Bromobenzene	ug/l	ND	1.0	
Bromochloromethane	ug/l	ND	1.0	
Bromodichloromethane	ug/l	ND	1.0	
Bromoform	ug/l	ND	1.0	
Bromomethane	ug/l	ND	1.0	
2-Butanone (MEK)	ug/l	ND	5.0	
n-Butylbenzene	ug/l	ND	1.0	
sec-Butylbenzene	ug/l	ND	1.0	
tert-Butylbenzene	ug/l	ND	1.0	
Carbon tetrachloride	ug/l	ND	1.0	
Chlorobenzene	ug/l	ND	1.0	
Chloroethane	ug/l	ND	1.0	
Chloroform	ug/l	ND	1.0	
Chloromethane	ug/l	ND	1.0	
2-Chlorotoluene	ug/l	ND	1.0	
4-Chlorotoluene	ug/l	ND	1.0	
1,2-Dibromo-3-chloropropane	ug/l	ND	1.0	
Dibromochloromethane	ug/l	ND	1.0	
1,2-Dibromoethane (EDB)	ug/l	ND	1.0	
Dibromomethane	ug/l	ND	1.0	
1,2-Dichlorobenzene	ug/l	ND	1.0	
1,3-Dichlorobenzene	ug/l	ND	1.0	
1,4-Dichlorobenzene	ug/l	ND	1.0	
Dichlorodifluoromethane	ug/l	ND	1.0	
1,1-Dichloroethane	ug/l	ND	1.0	
1,2-Dichloroethane	ug/l	ND	1.0	
1,2-Dichloroethene (Total)	ug/l	ND	1.0	
1,1-Dichloroethene	ug/l	ND	1.0	
cis-1,2-Dichloroethene	ug/l	ND	1.0	

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QUALITY CONTROL DATA

Lab Project Number: 92132394
Client Project ID: PARKER-WAKE FOR 05303-026-106

METHOD BLANK: 927707117
Associated Lab Samples: 927693085

Parameter	Units	Blank Result	Reporting Limit	Footnotes
trans-1,2-Dichloroethene	ug/l	ND	1.0	
1,2-Dichloropropane	ug/l	ND	1.0	
1,3-Dichloropropane	ug/l	ND	1.0	
2,2-Dichloropropane	ug/l	ND	1.0	
1,1-Dichloropropene	ug/l	ND	1.0	
Diisopropyl ether	ug/l	ND	1.0	
Ethylbenzene	ug/l	ND	1.0	
Hexachloro-1,3-butadiene	ug/l	ND	1.0	
Isopropylbenzene (Cumene)	ug/l	ND	1.0	
p-Isopropyltoluene	ug/l	ND	1.0	
Methylene chloride	ug/l	ND	2.0	
Methyl-tert-butyl ether	ug/l	ND	1.0	
Naphthalene	ug/l	ND	1.0	
n-Propylbenzene	ug/l	ND	1.0	
Styrene	ug/l	ND	1.0	
1,1,1,2-Tetrachloroethane	ug/l	ND	1.0	
1,1,2,2-Tetrachloroethane	ug/l	ND	1.0	
Tetrachloroethene	ug/l	ND	1.0	
Toluene	ug/l	ND	1.0	
1,2,3-Trichlorobenzene	ug/l	ND	1.0	
1,2,4-Trichlorobenzene	ug/l	ND	1.0	
1,1,1-Trichloroethane	ug/l	ND	1.0	
1,1,2-Trichloroethane	ug/l	ND	1.0	
Trichloroethene	ug/l	ND	1.0	
Trichlorofluoromethane	ug/l	ND	1.0	
1,2,3-Trichloropropane	ug/l	ND	1.0	
1,2,4-Trimethylbenzene	ug/l	ND	1.0	
1,3,5-Trimethylbenzene	ug/l	ND	1.0	
Vinyl chloride	ug/l	ND	1.0	
Xylene (Total)	ug/l	ND	2.0	
m&p-Xylene	ug/l	ND	2.0	
o-Xylene	ug/l	ND	1.0	
Toluene-d8 (S)	%	99		
4-Bromofluorobenzene (S)	%	107		
Dibromofluoromethane (S)	%	100		
1,2-Dichloroethane-d4 (S)	%	99		

Date: 11/30/06

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QUALITY CONTROL DATA

Lab Project Number: 92132394
Client Project ID: PARKER-WAKE FOR 05303-026-106

LABORATORY CONTROL SAMPLE: 927707125

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Footnotes
Acetone	ug/l	100.00	91.59	92	50-150	
Benzene	ug/l	50.00	52.87	106	66-123	
Bromobenzene	ug/l	50.00	50.25	101	62-125	
Bromochloromethane	ug/l	50.00	52.59	105	64-125	
Bromodichloromethane	ug/l	50.00	51.10	102	66-126	
Bromoform	ug/l	50.00	48.20	96	50-132	
Bromomethane	ug/l	50.00	50.82	102	50-150	
2-Butanone (MEK)	ug/l	100.00	100.9	101	51-135	
n-Butylbenzene	ug/l	50.00	46.60	93	56-132	
sec-Butylbenzene	ug/l	50.00	51.85	104	59-132	
tert-Butylbenzene	ug/l	50.00	51.75	103	54-135	
Carbon tetrachloride	ug/l	50.00	51.91	104	65-134	
Chlorobenzene	ug/l	50.00	54.24	108	66-123	
Chloroethane	ug/l	50.00	45.76	92	52-146	
Chloroform	ug/l	50.00	52.39	105	64-128	
Chloromethane	ug/l	50.00	54.30	109	25-127	
2-Chlorotoluene	ug/l	50.00	50.14	100	63-126	
4-Chlorotoluene	ug/l	50.00	50.31	101	63-124	
1,2-Dibromo-3-chloropropane	ug/l	50.00	45.58	91	56-125	
Dibromochloromethane	ug/l	50.00	48.56	97	57-131	
1,2-Dibromoethane (EDB)	ug/l	50.00	56.57	113	64-123	
Dibromomethane	ug/l	50.00	55.83	112	64-122	
1,2-Dichlorobenzene	ug/l	50.00	51.69	103	63-123	
1,3-Dichlorobenzene	ug/l	50.00	51.32	103	63-125	
1,4-Dichlorobenzene	ug/l	50.00	50.69	101	62-123	
Dichlorodifluoromethane	ug/l	50.00	52.10	104	50-138	
1,1-Dichloroethane	ug/l	50.00	53.89	108	64-132	
1,2-Dichloroethane	ug/l	50.00	47.24	94	62-123	
1,1-Dichloroethene	ug/l	50.00	59.54	119	62-139	
cis-1,2-Dichloroethene	ug/l	50.00	54.13	108	65-130	
trans-1,2-Dichloroethene	ug/l	50.00	57.28	115	67-134	
1,2-Dichloropropane	ug/l	50.00	54.41	109	66-124	
1,3-Dichloropropane	ug/l	50.00	52.98	106	65-122	
2,2-Dichloropropane	ug/l	50.00	48.91	98	50-143	
1,1-Dichloropropene	ug/l	50.00	52.99	106	66-133	
Diisopropyl ether	ug/l	50.00	51.60	103	56-131	
Ethylbenzene	ug/l	50.00	52.71	105	68-126	

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QUALITY CONTROL DATA

Lab Project Number: 92132394
Client Project ID: PARKER-WAKE FOR 05303-026-106

LABORATORY CONTROL SAMPLE: 927707125

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Footnotes
Hexachloro-1,3-butadiene	ug/l	50.00	50.92	102	50-150	
Isopropylbenzene (Cumene)	ug/l	50.00	55.85	112	63-132	
p-Isopropyltoluene	ug/l	50.00	47.91	96	58-130	
Methylene chloride	ug/l	50.00	46.44	93	54-132	
Methyl-tert-butyl ether	ug/l	50.00	49.10	98	53-128	
Naphthalene	ug/l	50.00	48.51	97	50-131	
n-Propylbenzene	ug/l	50.00	51.16	102	63-130	
Styrene	ug/l	50.00	58.86	118	65-127	
1,1,1,2-Tetrachloroethane	ug/l	50.00	56.64	113	65-125	
1,1,2,2-Tetrachloroethane	ug/l	50.00	54.23	108	58-124	
Tetrachloroethene	ug/l	50.00	55.84	112	50-150	
Toluene	ug/l	50.00	49.91	100	66-125	
1,2,3-Trichlorobenzene	ug/l	50.00	55.64	111	50-132	
1,2,4-Trichlorobenzene	ug/l	50.00	54.74	109	50-132	
1,1,1-Trichloroethane	ug/l	50.00	53.80	108	65-133	
1,1,2-Trichloroethane	ug/l	50.00	50.27	101	64-122	
Trichloroethene	ug/l	50.00	53.96	108	63-134	
Trichlorofluoromethane	ug/l	50.00	56.61	113	54-135	
1,2,3-Trichloropropane	ug/l	50.00	52.44	105	63-124	
1,2,4-Trimethylbenzene	ug/l	50.00	46.72	93	60-128	
1,3,5-Trimethylbenzene	ug/l	50.00	46.85	94	61-128	
Vinyl chloride	ug/l	50.00	52.28	105	50-130	
m&p-Xylene	ug/l	100.00	107.6	108	66-126	
o-Xylene	ug/l	50.00	53.73	107	65-126	
Toluene-d8 (S)				100	70-120	
4-Bromofluorobenzene (S)				109	76-112	
Dibromofluoromethane (S)				97	86-119	
1,2-Dichloroethane-d4 (S)				95	79-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 927707398 927707406

Parameter	Units	927697854 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Footnotes
Benzene	ug/l	0	50.00	53.03	51.58	106	103	53-134	3		
Chlorobenzene	ug/l	0	50.00	56.88	55.08	114	110	53-133	3		
1,1-Dichloroethene	ug/l	0	50.00	51.99	53.19	104	106	50-146	2		

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QUALITY CONTROL DATA

Lab Project Number: 92132394
Client Project ID: PARKER-WAKE FOR 05303-026-106

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 927707398 927707406

Parameter	Units	927697854 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Footnotes
Toluene	ug/l	0	50.00	50.50	48.71	101	97	51-133	4		
Trichloroethene	ug/l	0	50.00	53.94	52.26	108	104	55-138	3		
Toluene-d8 (S)						99	98	70-120			
4-Bromofluorobenzene (S)						107	108	76-112			
Dibromofluoromethane (S)						97	99	86-119			
1,2-Dichloroethane-d4 (S)						93	95	79-130			

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QUALITY CONTROL DATA

Lab Project Number: 92132394
Client Project ID: PARKER-WAKE FOR 05303-026-106

QC Batch: 173691 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: GC/MS VOCs by 8260, low level
Associated Lab Samples: 927693051 927693069 927693077

METHOD BLANK: 927713925
Associated Lab Samples: 927693051 927693069 927693077

Parameter	Units	Blank Result	Reporting Limit	Footnotes
Acetone	ug/l	ND	25.	
Benzene	ug/l	ND	1.0	
Bromobenzene	ug/l	ND	1.0	
Bromochloromethane	ug/l	ND	1.0	
Bromodichloromethane	ug/l	ND	1.0	
Bromoform	ug/l	ND	1.0	
Bromomethane	ug/l	ND	1.0	
2-Butanone (MEK)	ug/l	ND	5.0	
n-Butylbenzene	ug/l	ND	1.0	
sec-Butylbenzene	ug/l	ND	1.0	
tert-Butylbenzene	ug/l	ND	1.0	
Carbon tetrachloride	ug/l	ND	1.0	
Chlorobenzene	ug/l	ND	1.0	
Chloroethane	ug/l	ND	1.0	
Chloroform	ug/l	ND	1.0	
Chloromethane	ug/l	ND	1.0	
2-Chlorotoluene	ug/l	ND	1.0	
4-Chlorotoluene	ug/l	ND	1.0	
1,2-Dibromo-3-chloropropane	ug/l	ND	1.0	
Dibromochloromethane	ug/l	ND	1.0	
1,2-Dibromoethane (EDB)	ug/l	ND	1.0	
Dibromomethane	ug/l	ND	1.0	
1,2-Dichlorobenzene	ug/l	ND	1.0	
1,3-Dichlorobenzene	ug/l	ND	1.0	
1,4-Dichlorobenzene	ug/l	ND	1.0	
Dichlorodifluoromethane	ug/l	ND	1.0	
1,1-Dichloroethane	ug/l	ND	1.0	
1,2-Dichloroethane	ug/l	ND	1.0	
1,2-Dichloroethene (Total)	ug/l	ND	1.0	
1,1-Dichloroethene	ug/l	ND	1.0	
cis-1,2-Dichloroethene	ug/l	ND	1.0	

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QUALITY CONTROL DATA

Lab Project Number: 92132394
Client Project ID: PARKER-WAKE FOR 05303-026-106

METHOD BLANK: 927713925
Associated Lab Samples: 927693051 927693069 927693077

Parameter	Units	Blank Result	Reporting Limit	Footnotes
trans-1,2-Dichloroethene	ug/l	ND	1.0	
1,2-Dichloropropane	ug/l	ND	1.0	
1,3-Dichloropropane	ug/l	ND	1.0	
2,2-Dichloropropane	ug/l	ND	1.0	
1,1-Dichloropropene	ug/l	ND	1.0	
Diisopropyl ether	ug/l	ND	1.0	
Ethylbenzene	ug/l	ND	1.0	
Hexachloro-1,3-butadiene	ug/l	ND	1.0	
Isopropylbenzene (Cumene)	ug/l	ND	1.0	
p-Isopropyltoluene	ug/l	ND	1.0	
Methylene chloride	ug/l	ND	2.0	
Methyl-tert-butyl ether	ug/l	ND	1.0	
Naphthalene	ug/l	ND	1.0	
n-Propylbenzene	ug/l	ND	1.0	
Styrene	ug/l	ND	1.0	
1,1,1,2-Tetrachloroethane	ug/l	ND	1.0	
1,1,2,2-Tetrachloroethane	ug/l	ND	1.0	
Tetrachloroethene	ug/l	ND	1.0	
Toluene	ug/l	ND	1.0	
1,2,3-Trichlorobenzene	ug/l	ND	1.0	
1,2,4-Trichlorobenzene	ug/l	ND	1.0	
1,1,1-Trichloroethane	ug/l	ND	1.0	
1,1,2-Trichloroethane	ug/l	ND	1.0	
Trichloroethene	ug/l	ND	1.0	
Trichlorofluoromethane	ug/l	ND	1.0	
1,2,3-Trichloropropane	ug/l	ND	1.0	
1,2,4-Trimethylbenzene	ug/l	ND	1.0	
1,3,5-Trimethylbenzene	ug/l	ND	1.0	
Vinyl chloride	ug/l	ND	1.0	
Xylene (Total)	ug/l	ND	2.0	
m&p-Xylene	ug/l	ND	2.0	
o-Xylene	ug/l	ND	1.0	
Toluene-d8 (S)	%	101		
4-Bromofluorobenzene (S)	%	106		
Dibromofluoromethane (S)	%	98		
1,2-Dichloroethane-d4 (S)	%	94		

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QUALITY CONTROL DATA

Lab Project Number: 92132394
Client Project ID: PARKER-WAKE FOR 05303-026-106

LABORATORY CONTROL SAMPLE: 927713933

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Footnotes
Acetone	ug/l	100.00	89.49	90	50-150	
Benzene	ug/l	50.00	53.03	106	66-123	
Bromobenzene	ug/l	50.00	50.61	101	62-125	
Bromochloromethane	ug/l	50.00	51.81	104	64-125	
Bromodichloromethane	ug/l	50.00	52.11	104	66-126	
Bromoform	ug/l	50.00	50.30	101	50-132	
Bromomethane	ug/l	50.00	68.80	138	50-150	
2-Butanone (MEK)	ug/l	100.00	102.2	102	51-135	
n-Butylbenzene	ug/l	50.00	46.74	94	56-132	
sec-Butylbenzene	ug/l	50.00	52.36	105	59-132	
tert-Butylbenzene	ug/l	50.00	52.54	105	54-135	
Carbon tetrachloride	ug/l	50.00	51.78	104	65-134	
Chlorobenzene	ug/l	50.00	54.49	109	66-123	
Chloroethane	ug/l	50.00	50.71	101	52-146	
Chloroform	ug/l	50.00	52.65	105	64-128	
Chloromethane	ug/l	50.00	52.99	106	25-127	
2-Chlorotoluene	ug/l	50.00	50.47	101	63-126	
4-Chlorotoluene	ug/l	50.00	50.91	102	63-124	
1,2-Dibromo-3-chloropropane	ug/l	50.00	45.11	90	56-125	
Dibromochloromethane	ug/l	50.00	49.40	99	57-131	
1,2-Dibromoethane (EDB)	ug/l	50.00	57.55	115	64-123	
Dibromomethane	ug/l	50.00	55.96	112	64-122	
1,2-Dichlorobenzene	ug/l	50.00	52.17	104	63-123	
1,3-Dichlorobenzene	ug/l	50.00	51.98	104	63-125	
1,4-Dichlorobenzene	ug/l	50.00	50.59	101	62-123	
Dichlorodifluoromethane	ug/l	50.00	50.37	101	50-138	
1,1-Dichloroethane	ug/l	50.00	53.61	107	64-132	
1,2-Dichloroethane	ug/l	50.00	47.11	94	62-123	
1,1-Dichloroethene	ug/l	50.00	59.63	119	62-139	
cis-1,2-Dichloroethene	ug/l	50.00	66.04	132	65-130	1
trans-1,2-Dichloroethene	ug/l	50.00	57.51	115	67-134	
1,2-Dichloropropane	ug/l	50.00	55.15	110	66-124	
1,3-Dichloropropane	ug/l	50.00	53.41	107	65-122	
2,2-Dichloropropane	ug/l	50.00	45.72	91	50-143	
1,1-Dichloropropene	ug/l	50.00	52.96	106	66-133	
Diisopropyl ether	ug/l	50.00	51.85	104	56-131	
Ethylbenzene	ug/l	50.00	52.49	105	68-126	

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QUALITY CONTROL DATA

Lab Project Number: 92132394
Client Project ID: PARKER-WAKE FOR 05303-026-106

LABORATORY CONTROL SAMPLE: 927713933

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Footnotes
Hexachloro-1,3-butadiene	ug/l	50.00	50.07	100	50-150	
Isopropylbenzene (Cumene)	ug/l	50.00	56.05	112	63-132	
p-Isopropyltoluene	ug/l	50.00	47.90	96	58-130	
Methylene chloride	ug/l	50.00	46.35	93	54-132	
Methyl-tert-butyl ether	ug/l	50.00	49.83	100	53-128	
Naphthalene	ug/l	50.00	41.86	84	50-131	
n-Propylbenzene	ug/l	50.00	51.53	103	63-130	
Styrene	ug/l	50.00	59.36	119	65-127	
1,1,1,2-Tetrachloroethane	ug/l	50.00	56.49	113	65-125	
1,1,2,2-Tetrachloroethane	ug/l	50.00	53.91	108	58-124	
Tetrachloroethene	ug/l	50.00	54.85	110	50-150	
Toluene	ug/l	50.00	50.12	100	66-125	
1,2,3-Trichlorobenzene	ug/l	50.00	55.90	112	50-132	
1,2,4-Trichlorobenzene	ug/l	50.00	54.72	109	50-132	
1,1,1-Trichloroethane	ug/l	50.00	53.67	107	65-133	
1,1,2-Trichloroethane	ug/l	50.00	50.52	101	64-122	
Trichloroethene	ug/l	50.00	54.08	108	63-134	
Trichlorofluoromethane	ug/l	50.00	56.23	112	54-135	
1,2,3-Trichloropropane	ug/l	50.00	52.11	104	63-124	
1,2,4-Trimethylbenzene	ug/l	50.00	47.65	95	60-128	
1,3,5-Trimethylbenzene	ug/l	50.00	47.53	95	61-128	
Vinyl chloride	ug/l	50.00	50.97	102	50-130	
m&p-Xylene	ug/l	100.00	107.5	107	66-126	
o-Xylene	ug/l	50.00	54.08	108	65-126	
Toluene-d8 (S)				100	70-120	
4-Bromofluorobenzene (S)				110	76-112	
Dibromofluoromethane (S)				99	86-119	
1,2-Dichloroethane-d4 (S)				102	79-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 927714089 927714097

Parameter	Units	927697912 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Footnotes
Benzene	ug/l	0	50.00	52.40	51.93	105	104	53-134	1		
Chlorobenzene	ug/l	0	50.00	56.12	54.78	112	110	53-133	2		
1,1-Dichloroethene	ug/l	0	50.00	51.96	51.62	104	103	50-146	1		

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QUALITY CONTROL DATA

Lab Project Number: 92132394
Client Project ID: PARKER-WAKE FOR 05303-026-106

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 927714089 927714097

Parameter	Units	927697912 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Footnotes
Toluene	ug/l	0.1340	50.00	50.28	49.72	100	99	51-133	1		
Trichloroethene	ug/l	0	50.00	53.36	53.07	107	106	55-138	1		
Toluene-d8 (S)						99	100	70-120			
4-Bromofluorobenzene (S)						108	108	76-112			
Dibromofluoromethane (S)						97	98	86-119			
1,2-Dichloroethane-d4 (S)						95	95	79-130			

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QUALITY CONTROL DATA

Lab Project Number: 92132394
Client Project ID: PARKER-WAKE FOR 05303-026-106

QC Batch: 173843 — Analysis Method: EPA 6010
QC Batch Method: EPA 3050 — Analysis Description: Metals, Trace ICP
Associated Lab Samples: 927693093 927693101 927693119 927693127

METHOD BLANK: 927719328
Associated Lab Samples: 927693093 927693101 927693119 927693127

Parameter	Units	Blank Result	Reporting Limit	Footnotes
Chromium	mg/kg	ND	0.50	

LABORATORY CONTROL SAMPLE: 927719336

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Footnotes
Chromium	mg/kg	50.00	43.80	88	80-120	

MATRIX SPIKE: 927719344

Parameter	Units	927703678 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Footnotes
Chromium	mg/kg	29.33	48.64	57.59	58	75-125	2

SAMPLE DUPLICATE: 927719351

Parameter	Units	927703686 Result	DUP Result	RPD	Max RPD	Footnotes
Chromium	ug/g	1.390	1.470	6	20	

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QUALITY CONTROL DATA

Lab Project Number: 92132394
Client Project ID: PARKER-WAKE FOR 05303-026-106

QC Batch: 173199 Analysis Method: % Moisture
QC Batch Method: Analysis Description: Percent Moisture
Associated Lab Samples: 927693093 927693101 927693119 927693127

SAMPLE DUPLICATE: 927693382

Parameter	Units	927692814 Result	DUP Result	RPD	RPD	Footnotes
Percent Moisture	%	16.60	17.10	3	20	

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FL NELAP E87648

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Charlotte Certification IDs
NC Wastewater 12
NC Drinking Water 37706
SC 99006
FL NELAP E87627

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9800 Kincey Avenue, Suite 100
Huntersville, NC 28078
Phone: 704.875.9092
Fax: 704.875.9091

QUALITY CONTROL DATA

Lab Project Number: 92132394
Client Project ID: PARKER-WAKE FOR 05303-026-106

QC Batch: 173937 — Analysis Method: SM 3500-Cr D Modified
QC Batch Method: SM 3500-Cr D Modified — Analysis Description: Chromium, Hexavalent, in Soil
Associated Lab Samples: 927693093 927693101 927693119 927693127

METHOD BLANK: 927722348
Associated Lab Samples: 927693093 927693101 927693119 927693127

Parameter	Units	Blank Result	Reporting Limit	Footnotes
Chromium, Hexavalent	mg/kg	ND	5.00	

LABORATORY CONTROL SAMPLE: 927722355

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Footnotes
Chromium, Hexavalent	mg/kg	50.00	52.80	106	90-110	

MATRIX SPIKE: 927722363

Parameter	Units	927679175 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Footnotes
Chromium, Hexavalent	mg/kg	0	71.91	70.76	98	75-125	

SAMPLE DUPLICATE: 927722371

Parameter	Units	927679183 Result	DUP Result	RPD	Max RPD	Footnotes
Chromium, Hexavalent	mg/kg	ND	ND	NC	25	

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Lab Project Number: 92132394
Client Project ID: PARKER-WAKE FOR 05303-026-106

QUALITY CONTROL DATA PARAMETER FOOTNOTES

Consistent with EPA guidelines, unrounded concentrations are displayed and have been used to calculate % Rec and RPD values.

LCS(D)	Laboratory Control Sample (Duplicate)
MS(D)	Matrix Spike (Duplicate)
DUP	Sample Duplicate
ND	Not detected at or above adjusted reporting limit
NC	Not Calculable
J	Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit
MDL	Adjusted Method Detection Limit
RPD	Relative Percent Difference
(S)	Surrogate
[1]	Recovery falls outside of QC limits, however, this compound is not found in the associated samples.
[2]	The spike recovery was outside acceptance limits for the MS and /or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.

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QUALITY CONTROL DATA

CROSS REFERENCE TABLE

Lab Project Number: 92132394
Client Project ID: PARKER-WAKE FOR 05303-026-106

Lab Sample No Identifier	Client Sample Identifier	QC Batch Method	QC Batch Identifier	Analytical Method	Analytical Batch Identifier
927693085	MW-41	EPA 8260	173564		
927693051	MW-38	EPA 8260	173691		
927693069	MW-39	EPA 8260	173691		
927693077	MW-40	EPA 8260	173691		
927693093	SB-15B 0-2	EPA 3050	173843	EPA 6010	173913
927693101	SB-15B 2-4	EPA 3050	173843	EPA 6010	173913
927693119	SB-48B 0-2	EPA 3050	173843	EPA 6010	173913
927693127	SB-48B 2-4	EPA 3050	173843	EPA 6010	173913
927693093	SB-15B 0-2	% Moisture	173199		
927693101	SB-15B 2-4	% Moisture	173199		
927693119	SB-48B 0-2	% Moisture	173199		
927693127	SB-48B 2-4	% Moisture	173199		
927693093	SB-15B 0-2	SM 3500-Cr D Modified	173937		
927693101	SB-15B 2-4	SM 3500-Cr D Modified	173937		
927693119	SB-48B 0-2	SM 3500-Cr D Modified	173937		
927693127	SB-48B 2-4	SM 3500-Cr D Modified	173937		

Date: 11/30/06

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

1042896

Section A Required Client Information:

Company	ENSR
Address	7041 Old Wake Forest Rd, Ste 103 Raleigh, NC
Email To:	BWYRICK@ENSR.AECOM.COM
Phone	919-872-6600
Fax	919-872-7996
Requested Due Date/TAT:	STD

Section B Required Project Information:

Report To:	Bob Wyrick
Copy To:	DAVID SIMPSON
	DSIMPSON@ENSR.AECOM.COM
Purchase Order No.:	
Project Name:	PARKER - WAKE FOREST
Project Number:	05303-026-106

Section C Invoice Information:

Attention:	AP - Raleigh
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	T. Adams
Pace Profile #:	383, 14

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☑ DRINKING WATER ☐ UST ☑ RCRA ☐ Other_____

SITE LOCATION: ☐GA ☐IL ☐IN ☐MI ☐MN ☑NC ☐OH ☐SC ☐WI ☐OTHER _____

Section D Required Client Information

Valid Matrix Codes: MATRIX / CODE — DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / .-) Samples IDs MUST BE UNIQUE)	MATRIX CODE	SAMPLE TYPE G=GRAB C=COMP	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Filtered (Y/N)	Requested Analysis: VOCs 8260B	Total Chromium	HEX Chromium	Residual Chlorine (Y/N)	Pace Project Number / Lab I.D
1	MW-38	WT				11-15-06	1115		3				✓						✓				92169305
2	MW-39	↓				↑	1040		↓				↓						✓				3069
3	MW-40	↓				↑	1215		↓				↓						✓				307
4	MW-41	↓				↑	0945		↓				↓						✓				3085
5	SB-1 SB(0-2)	SL				↑	1245		1	✓									✓	✓			3095
6	SB-1 SB(2-4)	↓				↑	1250		↓	↓									✓	✓			3101
7	SB-48 B(0-2)	↓				↑	1310		↓	↓									✓	✓			319
8	SB-48 B(2-4)	↓				↑	1315		↓	↓									✓	✓			3127
9																							
10																							
11																							
12																							

Additional Comments:

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
LANCE TULLY / ENSR	11-16-06	0900	David R Simpson PACE	11/16/06	1005
David R Simpson	11/16/06	1525	VLMMatt	11/16/06	15:52.2

SAMPLE CONDITION: Temp in °C; Received on Ice (Y/N); Custody Sealed Cooler (Y/N); Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: LANCE TULLY

SIGNATURE of SAMPLER: [signature]

DATE Signed (MM / DD / YY): 11-15-06

SEE REVERSE SIDE FOR INSTRUCTIONS

ORIGINAL

ALL-020rev.3.31Mar05

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January 26, 2007

Mr. David Simpson
ENSR C&E
7041 Old Wake Forest Rd.
Suite 103
Raleigh, NC 27616

RE: Lab Project Number: 92136454
Client Project ID: Parker-Wake Forest/05303-026

Dear Mr. Simpson:

Enclosed are the analytical results for sample(s) received by the laboratory on January 19, 2007. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

Inorganic Wet Chemistry and Metals Analyses were performed at our Pace Asheville laboratory and Organic testing was performed at our Pace Charlotte laboratory unless otherwise footnoted.

If you have any questions concerning this report please feel free to contact me.

Sincerely,

Teresa Adams

Teresa Adams
teresa.adams@pacelabs.com
(704) 875-9092 ext. 241
Project Manager

Enclosures

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SAMPLE SUMMARY

Lab Project Number: 92136454
Client Project ID: Parker-Wake Forest/05303-026

Project Sample Number	Sample Number	Client Sample ID	Matrix	Date Collected	Date Received
92136454-001	927918045	MW-38	Water	01/18/07 17:30	01/19/07 15:00
92136454-002	927918052	MW-39D	Water	01/18/07 16:45	01/19/07 15:00
92136454-003	927918060	MW-40D	Water	01/18/07 14:00	01/19/07 15:00

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SAMPLE ANALYTE COUNT

Lab Project Number: 92136454
Client Project ID: Parker-Wake Forest/05303-026

Project Sample Number	Sample No	Client Sample ID	Analysis Code	Analysis Description	Analytes Reported
92136454-001	927918045	MW-38	8260X WL92	GC/MS VOCs by 8260, low level	65
92136454-002	927918052	MW-39D	8260X WL92	GC/MS VOCs by 8260, low level	65
92136454-003	927918060	MW-40D	8260X WL92	GC/MS VOCs by 8260, low level	65

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Lab Project Number: 92136454
Client Project ID: Parker-Wake Forest/05303-026

Lab Sample No: 927918045 | Project Sample Number: 92136454-001 | Date Collected: 01/18/07 17:30
Client Sample ID: MW-38 | Matrix: Water | Date Received: 01/19/07 15:00

Parameters	Results	Units	Report Limit	MDL	Analyzed	By	CAS No.	Qual	RegLmt
GC/MS Volatiles									
GC/MS VOCs by 8260, low level	Method: EPA 8260								
Acetone	ND	ug/l	25.	1.8	01/25/07 02:34	MSF	67-64-1		
Benzene	ND	ug/l	1.0	0.31	01/25/07 02:34	MSF	71-43-2		
Bromobenzene	ND	ug/l	1.0	0.16	01/25/07 02:34	MSF	108-86-1		
Bromochloromethane	ND	ug/l	1.0	0.37	01/25/07 02:34	MSF	74-97-5		
Bromodichloromethane	ND	ug/l	1.0	0.21	01/25/07 02:34	MSF	75-27-4		
Bromoform	ND	ug/l	1.0	0.17	01/25/07 02:34	MSF	75-25-2		
Bromomethane	ND	ug/l	1.0	0.51	01/25/07 02:34	MSF	74-83-9		
2-Butanone (MEK)	ND	ug/l	5.0	1.2	01/25/07 02:34	MSF	78-93-3		
n-Butylbenzene	ND	ug/l	1.0	0.20	01/25/07 02:34	MSF	104-51-8		
sec-Butylbenzene	ND	ug/l	1.0	0.20	01/25/07 02:34	MSF	135-98-8		
tert-Butylbenzene	ND	ug/l	1.0	0.17	01/25/07 02:34	MSF	98-06-6		
Carbon tetrachloride	ND	ug/l	1.0	0.27	01/25/07 02:34	MSF	56-23-5		
Chlorobenzene	ND	ug/l	1.0	0.15	01/25/07 02:34	MSF	108-90-7		
Chloroethane	ND	ug/l	1.0	0.78	01/25/07 02:34	MSF	75-00-3		
Chloroform	ND	ug/l	1.0	0.29	01/25/07 02:34	MSF	67-66-3		
Chloromethane	ND	ug/l	1.0	0.78	01/25/07 02:34	MSF	74-87-3		
2-Chlorotoluene	ND	ug/l	1.0	0.16	01/25/07 02:34	MSF	95-49-8		
4-Chlorotoluene	ND	ug/l	1.0	0.20	01/25/07 02:34	MSF	106-43-4		
1,2-Dibromo-3-chloropropane	ND	ug/l	1.0	0.39	01/25/07 02:34	MSF	96-12-8		
Dibromochloromethane	ND	ug/l	1.0	0.17	01/25/07 02:34	MSF	124-48-1		
1,2-Dibromoethane (EDB)	ND	ug/l	1.0	0.15	01/25/07 02:34	MSF	106-93-4		
Dibromomethane	ND	ug/l	1.0	0.27	01/25/07 02:34	MSF	74-95-3		
1,2-Dichlorobenzene	ND	ug/l	1.0	0.14	01/25/07 02:34	MSF	95-50-1		
1,3-Dichlorobenzene	ND	ug/l	1.0	0.16	01/25/07 02:34	MSF	541-73-1		
1,4-Dichlorobenzene	ND	ug/l	1.0	0.17	01/25/07 02:34	MSF	106-46-7		
Dichlorodifluoromethane	ND	ug/l	1.0	0.59	01/25/07 02:34	MSF	75-71-8		
1,1-Dichloroethane	ND	ug/l	1.0	0.42	01/25/07 02:34	MSF	75-34-3		
1,2-Dichloroethane	ND	ug/l	1.0	0.18	01/25/07 02:34	MSF	107-06-2		
1,1-Dichloroethene	ND	ug/l	1.0	0.39	01/25/07 02:34	MSF	75-35-4		
cis-1,2-Dichloroethene	ND	ug/l	1.0	0.33	01/25/07 02:34	MSF	156-59-2		
trans-1,2-Dichloroethene	ND	ug/l	1.0	0.44	01/25/07 02:34	MSF	156-60-5		
1,2-Dichloropropane	ND	ug/l	1.0	0.20	01/25/07 02:34	MSF	78-87-5		
1,3-Dichloropropane	ND	ug/l	1.0	0.11	01/25/07 02:34	MSF	142-28-9		
2,2-Dichloropropane	ND	ug/l	1.0	0.44	01/25/07 02:34	MSF	594-20-7		
1,1-Dichloropropene	ND	ug/l	1.0	0.26	01/25/07 02:34	MSF	563-58-6		
Diisopropyl ether	ND	ug/l	1.0	0.25	01/25/07 02:34	MSF	108-20-3		
Ethylbenzene	ND	ug/l	1.0	0.17	01/25/07 02:34	MSF	100-41-4		

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Lab Project Number: 92136454
Client Project ID: Parker-Wake Forest/05303-026

Lab Sample No: 927918045 | Project Sample Number: 92136454-001 | Date Collected: 01/18/07 17:30
Client Sample ID: MW-38 | Matrix: Water | Date Received: 01/19/07 15:00

Parameters	Results	Units	Report Limit	MDL	Analyzed	By	CAS No.	Qual	RegLmt
Hexachloro-1,3-butadiene	ND	ug/l	1.0	0.32	01/25/07 02:34	MSF	87-68-3		
Isopropylbenzene (Cumene)	ND	ug/l	1.0	0.16	01/25/07 02:34	MSF	98-82-8		
p-Isopropyltoluene	ND	ug/l	1.0	0.20	01/25/07 02:34	MSF	99-87-6		
Methylene chloride	ND	ug/l	2.0	0.46	01/25/07 02:34	MSF	75-09-2		
Methyl-tert-butyl ether	ND	ug/l	1.0	0.22	01/25/07 02:34	MSF	1634-04-4		
Naphthalene	ND	ug/l	1.0	0.22	01/25/07 02:34	MSF	91-20-3		
n-Propylbenzene	ND	ug/l	1.0	0.20	01/25/07 02:34	MSF	103-65-1		
Styrene	ND	ug/l	1.0	0.15	01/25/07 02:34	MSF	100-42-5		
1,1,1,2-Tetrachloroethane	ND	ug/l	1.0	0.25	01/25/07 02:34	MSF	630-20-6		
1,1,2,2-Tetrachloroethane	ND	ug/l	1.0	0.24	01/25/07 02:34	MSF	79-34-5		
Tetrachloroethene	ND	ug/l	1.0	0.16	01/25/07 02:34	MSF	127-18-4		
Toluene	ND	ug/l	1.0	0.24	01/25/07 02:34	MSF	108-88-3		
1,2,3-Trichlorobenzene	ND	ug/l	1.0	0.18	01/25/07 02:34	MSF	87-61-6		
1,2,4-Trichlorobenzene	ND	ug/l	1.0	0.20	01/25/07 02:34	MSF	120-82-1		
1,1,1-Trichloroethane	ND	ug/l	1.0	0.35	01/25/07 02:34	MSF	71-55-6		
1,1,2-Trichloroethane	ND	ug/l	1.0	0.16	01/25/07 02:34	MSF	79-00-5		
Trichloroethene	20.	ug/l	1.0	0.26	01/25/07 02:34	MSF	79-01-6		
Trichlorofluoromethane	ND	ug/l	1.0	0.41	01/25/07 02:34	MSF	75-69-4		
1,2,3-Trichloropropane	ND	ug/l	1.0	0.22	01/25/07 02:34	MSF	96-18-4		
1,2,4-Trimethylbenzene	ND	ug/l	1.0	0.15	01/25/07 02:34	MSF	95-63-6		
1,3,5-Trimethylbenzene	ND	ug/l	1.0	0.21	01/25/07 02:34	MSF	108-67-8		
Vinyl chloride	ND	ug/l	1.0	0.58	01/25/07 02:34	MSF	75-01-4		
m&p-Xylene	ND	ug/l	2.0	0.39	01/25/07 02:34	MSF			
o-Xylene	ND	ug/l	1.0	0.17	01/25/07 02:34	MSF	95-47-6		
Toluene-d8 (S)	97	%			01/25/07 02:34	MSF	2037-26-5		
4-Bromofluorobenzene (S)	107	%			01/25/07 02:34	MSF	460-00-4		
Dibromofluoromethane (S)	100	%			01/25/07 02:34	MSF	1868-53-7		
1,2-Dichloroethane-d4 (S)	95	%			01/25/07 02:34	MSF	17060-07-0		

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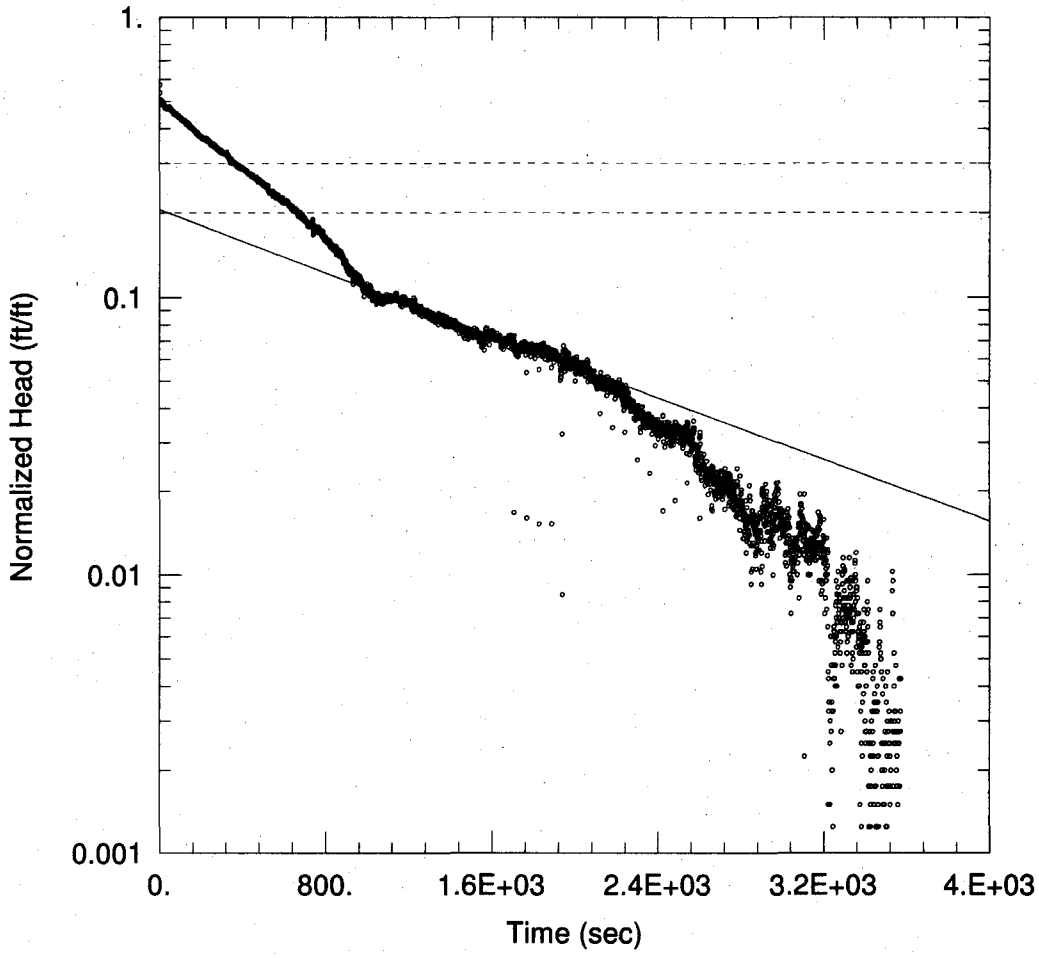
Appendix F

Slug Test and Step-Drawdown Test Datasheets



MW-38 SLUG TEST (FALLING HEAD)

PROJECT INFORMATION

Company: ENSR
Client: Parker Hannifin
Project: 05303-026
Location: Wake Forest, NC
Test Well: MW-38
Test Date: 3-13-2007

AQUIFER DATA

Saturated Thickness: 14.53 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-38)

Initial Displacement: 4.013 ft
Total Well Penetration Depth: 14.53 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 14.53 ft
Screen Length: 10. ft
Wellbore Radius: 0.3333 ft
Gravel Pack Porosity: 0.25

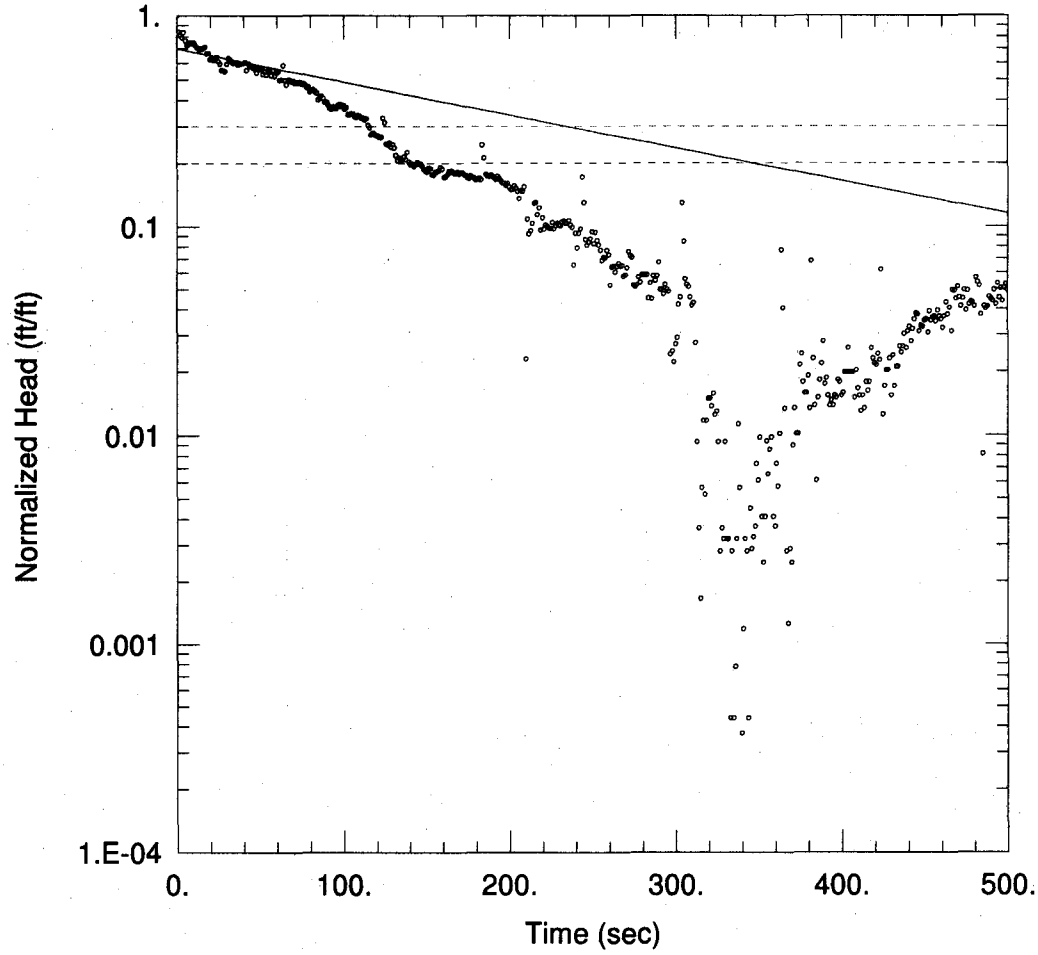
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.2572 ft/day

y0 = 0.8224 ft



MW-39 SLUG TEST (RISING HEAD)

PROJECT INFORMATION

Company: ENSR
Client: Parker Hannifin
Project: 05303-026
Location: Wake Forest, NC
Test Well: MW-39
Test Date: 3-13-2007

AQUIFER DATA

Saturated Thickness: 11.35 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-40D)

Initial Displacement: 2.47 ft
Total Well Penetration Depth: 11.35 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 11.35 ft
Screen Length: 10. ft
Wellbore Radius: 0.3333 ft
Gravel Pack Porosity: 0.25

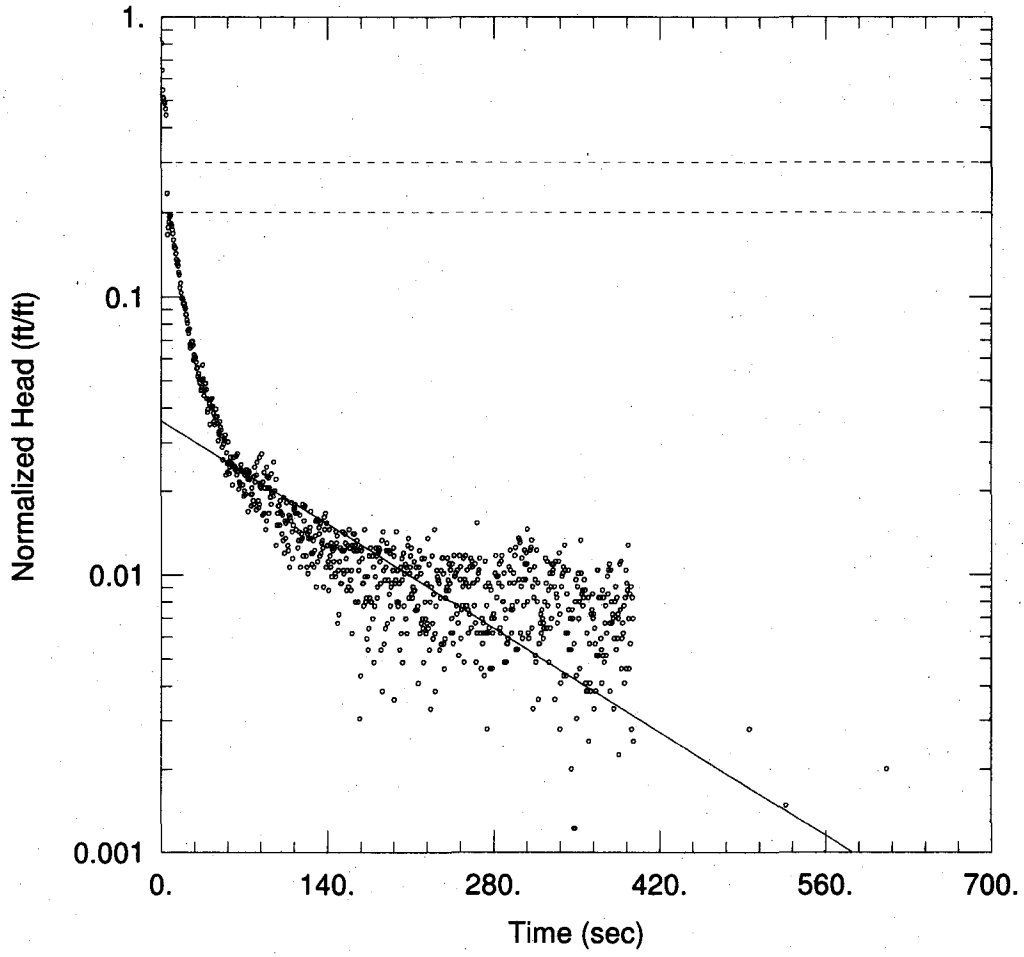
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 1.362 ft/day

y0 = 1.729 ft



MW-39D SLUG TEST (FALLING HEAD)

PROJECT INFORMATION

Company: ENSR
Client: Parker Hannifin
Project: 05303-026
Location: Wake Forest, NC
Test Well: MW-39D
Test Date: 3-13-2007

AQUIFER DATA

Saturated Thickness: 58.61 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-39D)

Initial Displacement: 3.832 ft
Total Well Penetration Depth: 58.61 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 58.61 ft
Screen Length: 5. ft
Wellbore Radius: 0.3333 ft
Gravel Pack Porosity: 0.25

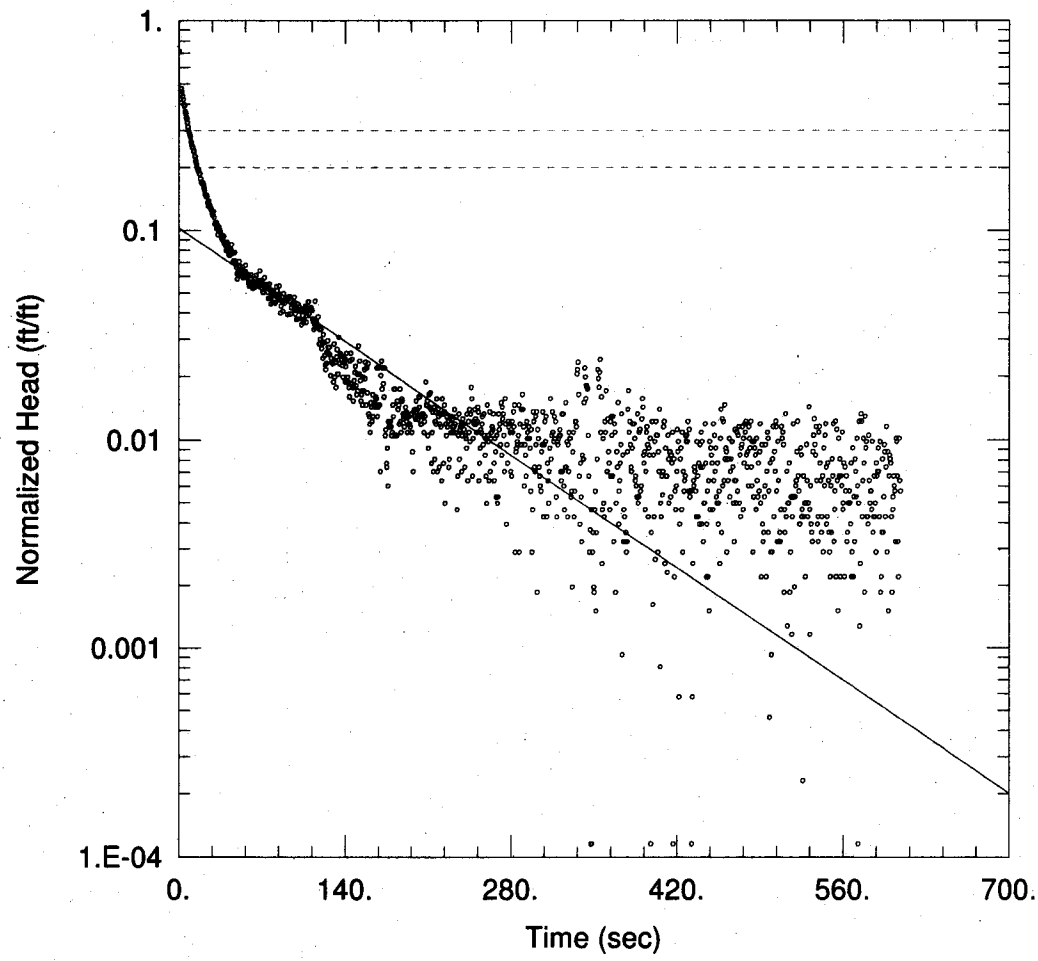
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 5.602 ft/day

y0 = 0.1379 ft



MW-39D SLUG TEST (RISING HEAD)

PROJECT INFORMATION

Company: ENSR
Client: Parker Hannifin
Project: 05303-026
Location: Wake Forest, NC
Test Well: MW-39D
Test Date: 3-13-2007

AQUIFER DATA

Saturated Thickness: 58.61 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-39D)

Initial Displacement: 2.885 ft
Total Well Penetration Depth: 58.61 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 58.61 ft
Screen Length: 5. ft
Wellbore Radius: 0.3333 ft
Gravel Pack Porosity: 0.25

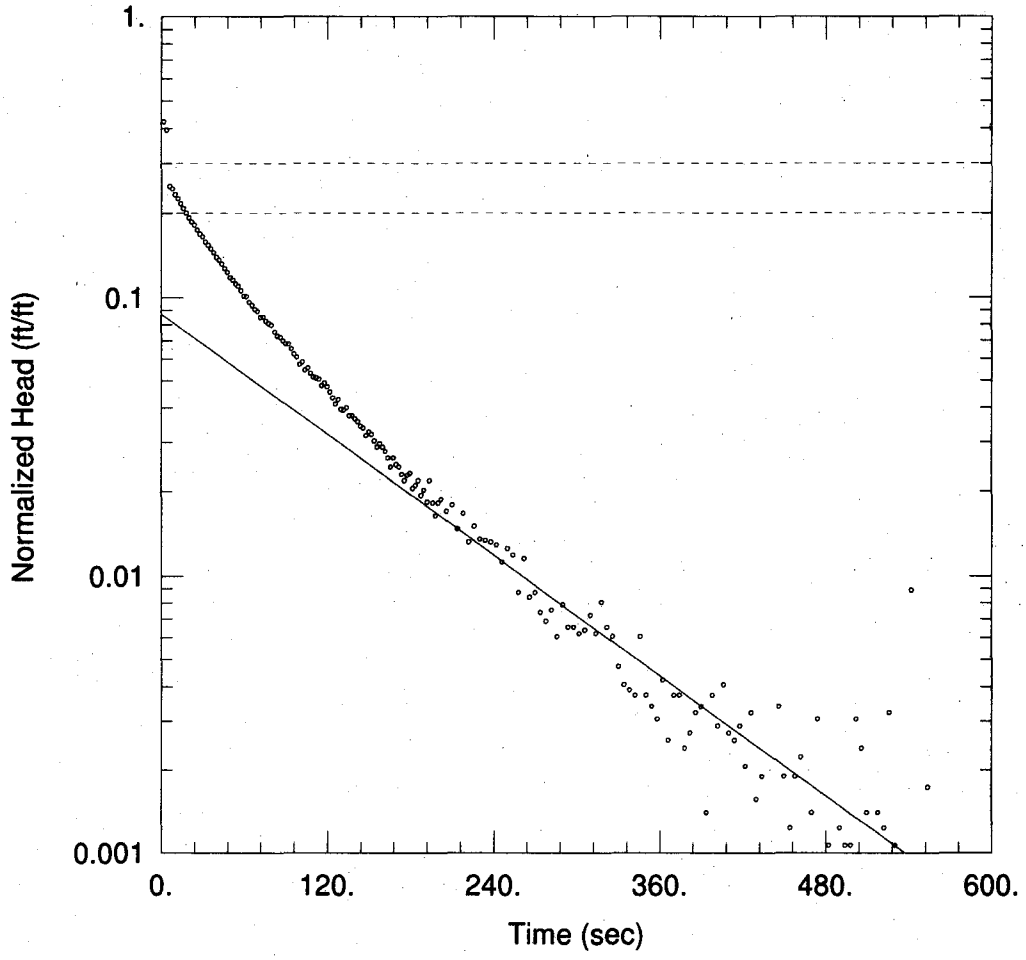
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 8.11 ft/day

y0 = 0.2947 ft



MW-40 SLUG TEST (FALLING)

PROJECT INFORMATION

Company: ENSR
Client: Parker Hannifin
Project: 05303-026
Location: Wake Forest, NC
Test Well: MW-40
Test Date: 3-13-2007

AQUIFER DATA

Saturated Thickness: 12.28 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-40)

Initial Displacement: 6.021 ft
Total Well Penetration Depth: 12.28 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 12.28 ft
Screen Length: 10. ft
Wellbore Radius: 0.3333 ft
Gravel Pack Porosity: 0.25

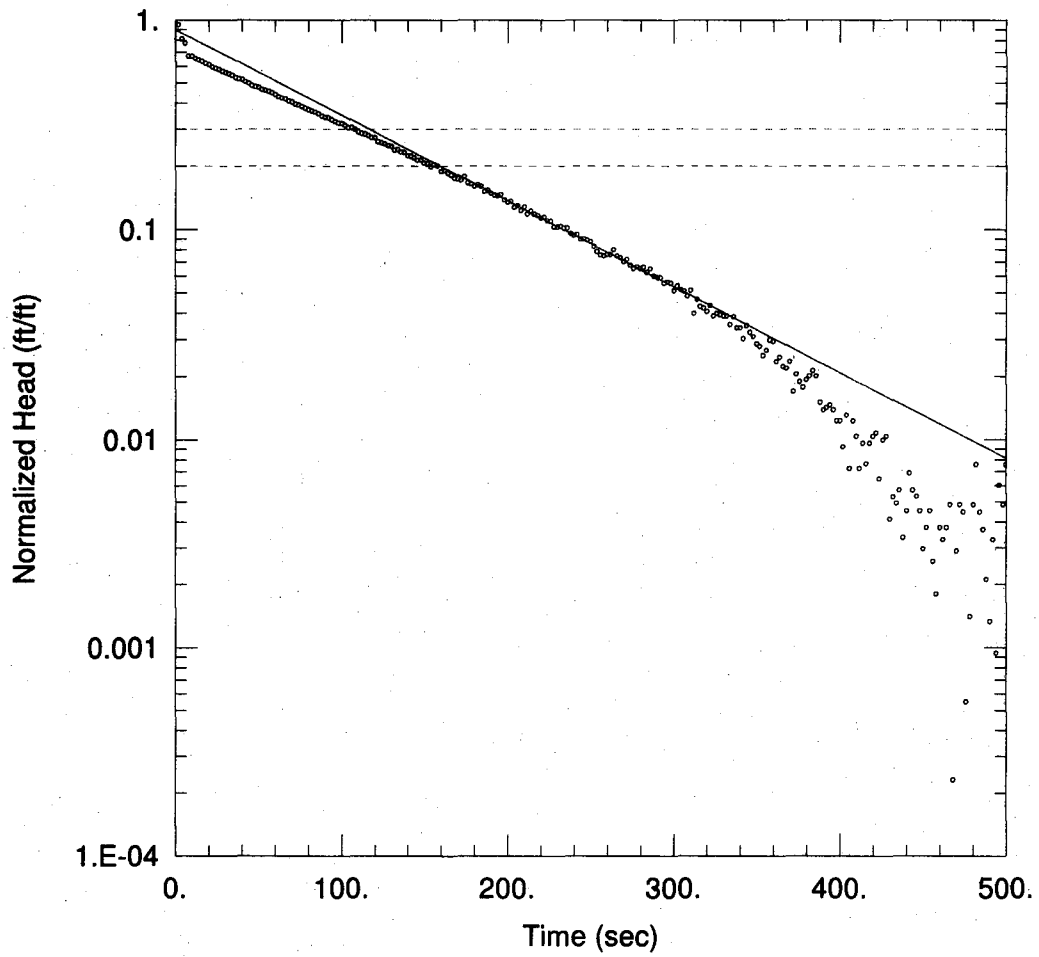
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 3.198 ft/day

y0 = 0.5256 ft



MW-40 SLUG TEST (FALLING HEAD)

PROJECT INFORMATION

Company: ENSR
Client: Parker Hannifin
Project: 05303-026
Location: Wake Forest, NC
Test Well: MW-40
Test Date: 3-13-2007

AQUIFER DATA

Saturated Thickness: 12.28 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-40)

Initial Displacement: 2.568 ft
Total Well Penetration Depth: 12.28 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 12.28 ft
Screen Length: 10. ft
Wellbore Radius: 0.3333 ft
Gravel Pack Porosity: 0.25

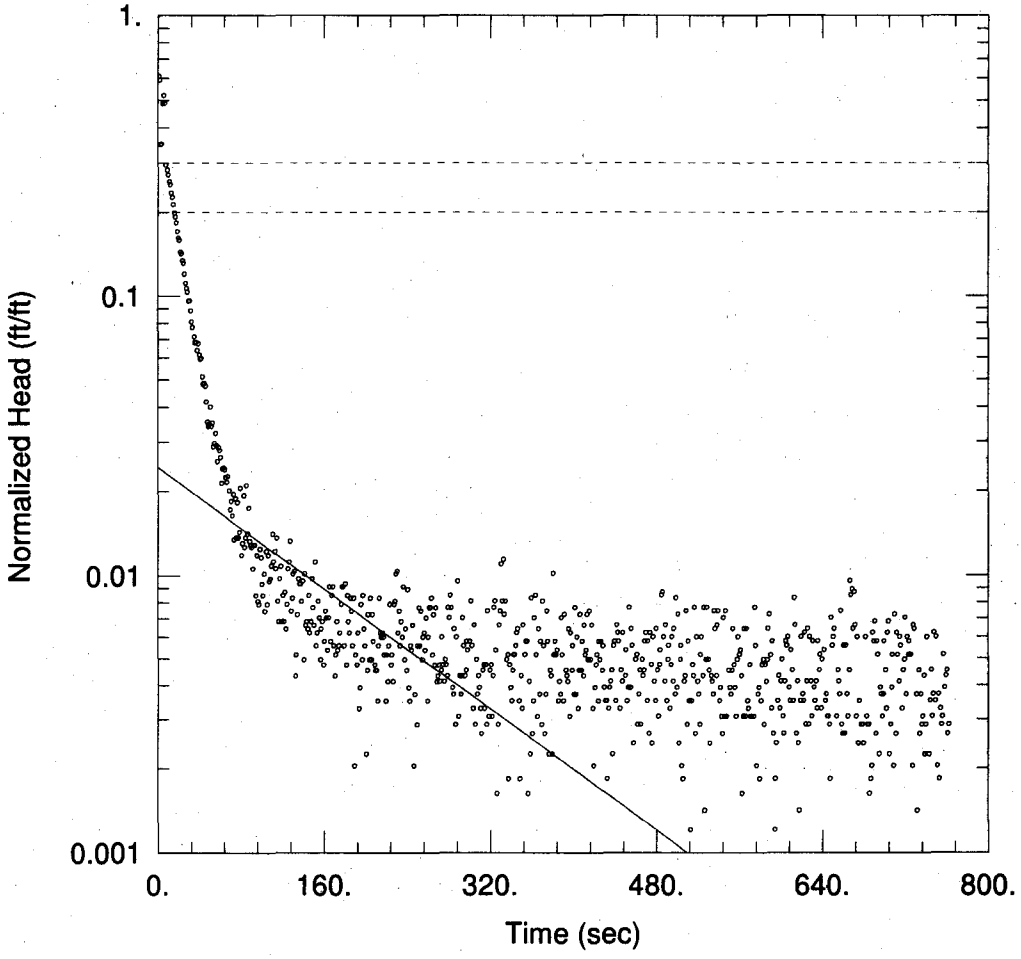
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 3.617 ft/day

y0 = 2.309 ft



MW-40D SLUG TEST (FALLING HEAD)

PROJECT INFORMATION

Company: ENSR
Client: Parker Hannifin
Project: 05303-026
Location: Wake Forest, NC
Test Well: MW-40D
Test Date: 3-13-2007

AQUIFER DATA

Saturated Thickness: 46.01 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-40D)

Initial Displacement: 4.808 ft
Total Well Penetration Depth: 46.01 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 46.01 ft
Screen Length: 5. ft
Wellbore Radius: 0.3333 ft
Gravel Pack Porosity: 0.25

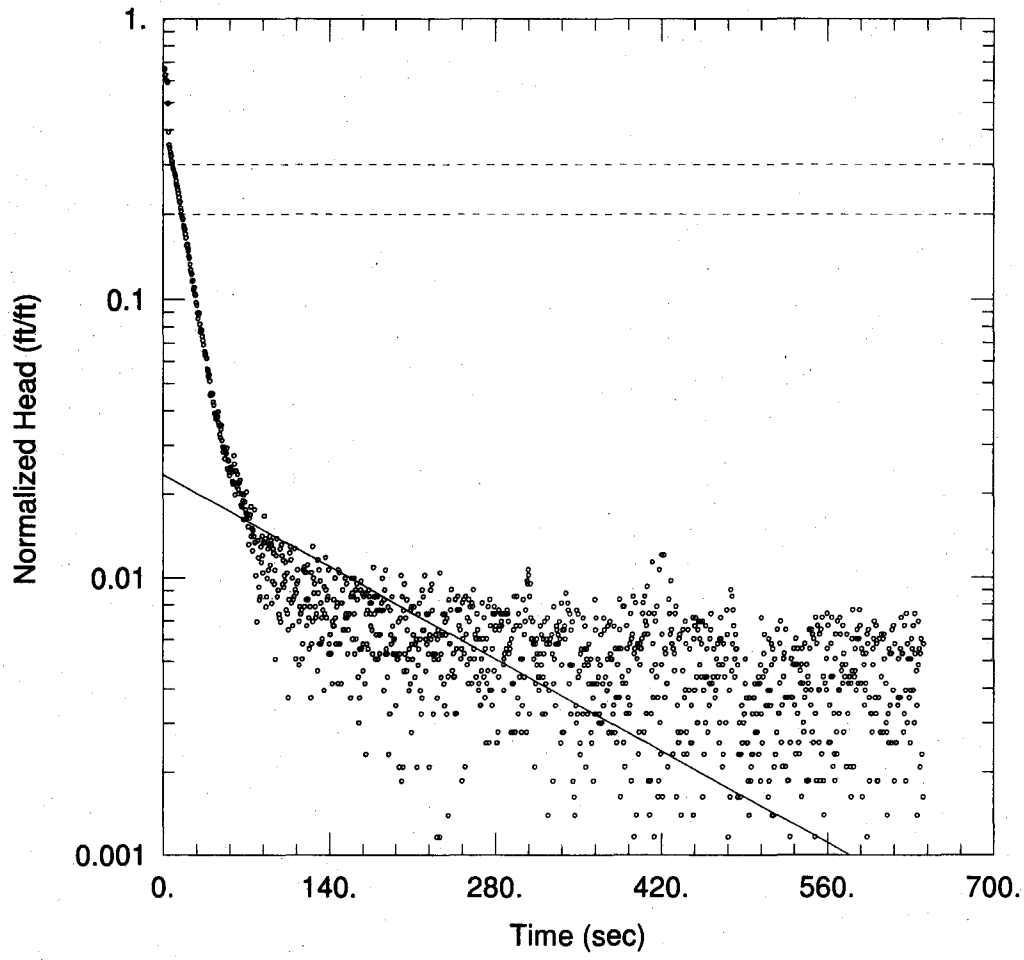
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 5.53 ft/day

y0 = 0.1174 ft



MW-40D SLUG TEST (FALLING HEAD)

PROJECT INFORMATION

Company: ENSR
Client: Parker Hannifin
Project: 05303-007
Location: Wake Forest, NC
Test Well: MW-40D
Test Date: 3-13-2007

AQUIFER DATA

Saturated Thickness: 46.01 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-40D)

Initial Displacement: 4.329 ft
Total Well Penetration Depth: 46.01 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 46.01 ft
Screen Length: 5. ft
Wellbore Radius: 0.3333 ft
Gravel Pack Porosity: 0.25

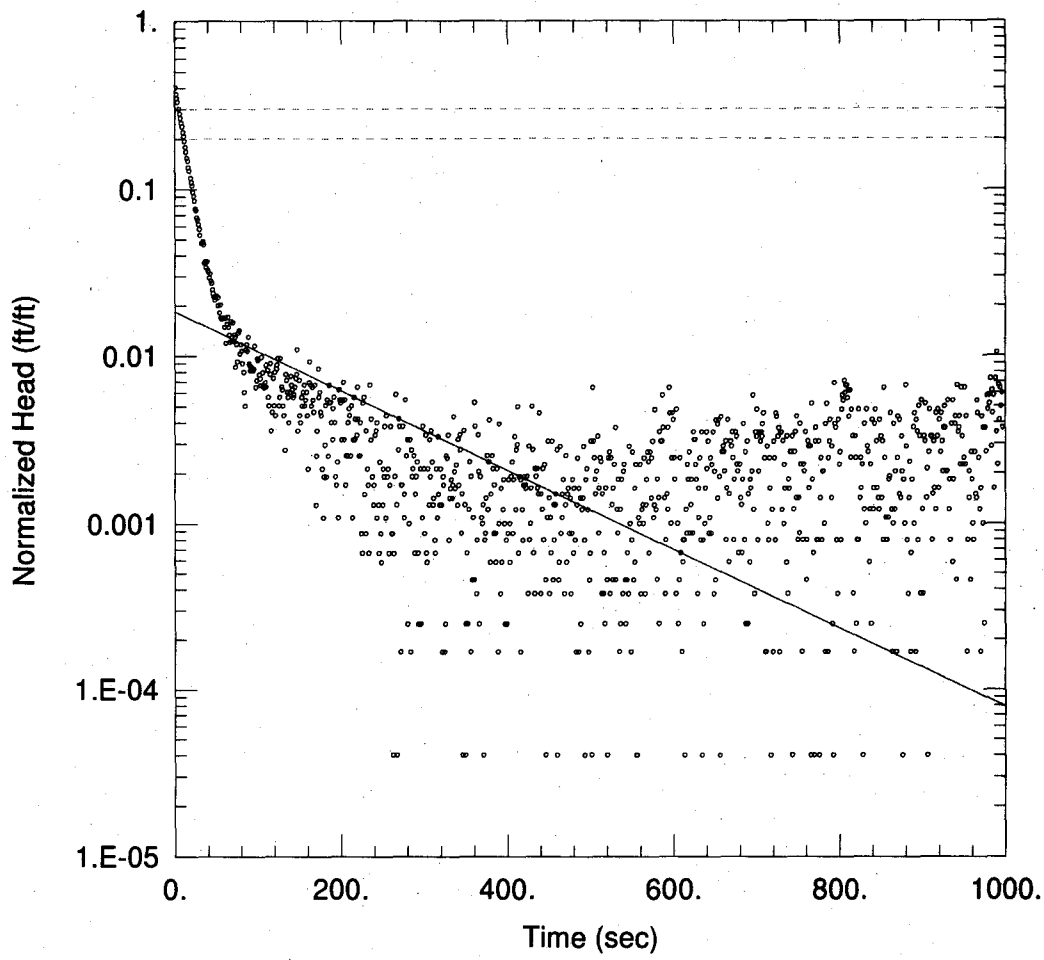
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 4.809 ft/day

y0 = 0.1019 ft



MW-40D SLUG TEST (RISING HEAD)

PROJECT INFORMATION

Company: ENSR
Client: Parker Hannifin
Project: 05303-026
Location: Wake Forest, NC
Test Well: MW-40D
Test Date: 3-13-2007

AQUIFER DATA

Saturated Thickness: 46.01 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-40D)

Initial Displacement: 4.808 ft
Total Well Penetration Depth: 46.01 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 46.01 ft
Screen Length: 5. ft
Wellbore Radius: 0.3333 ft
Gravel Pack Porosity: 0.25

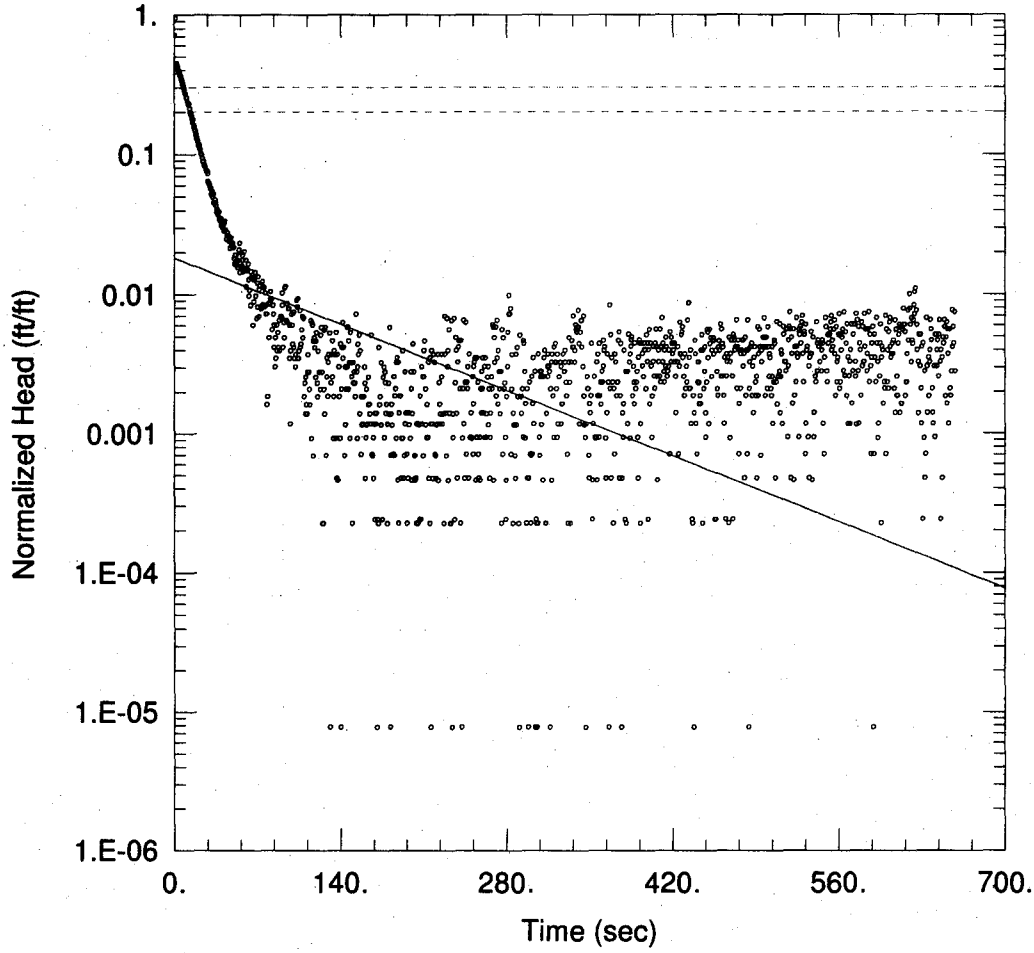
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 4.814 ft/day

y0 = 0.0886 ft



MW-40D SLUG TEST (RISING HEAD)

PROJECT INFORMATION

Company: ENSR
Client: Parker Hannifin
Project: 05303-026
Location: Wake Forest, NC
Test Well: MW-40D
Test Date: 3-13-2007

AQUIFER DATA

Saturated Thickness: 46.01 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-40D)

Initial Displacement: 4.29 ft
Total Well Penetration Depth: 46.01 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 46.01 ft
Screen Length: 5. ft
Wellbore Radius: 0.3333 ft
Gravel Pack Porosity: 0.25

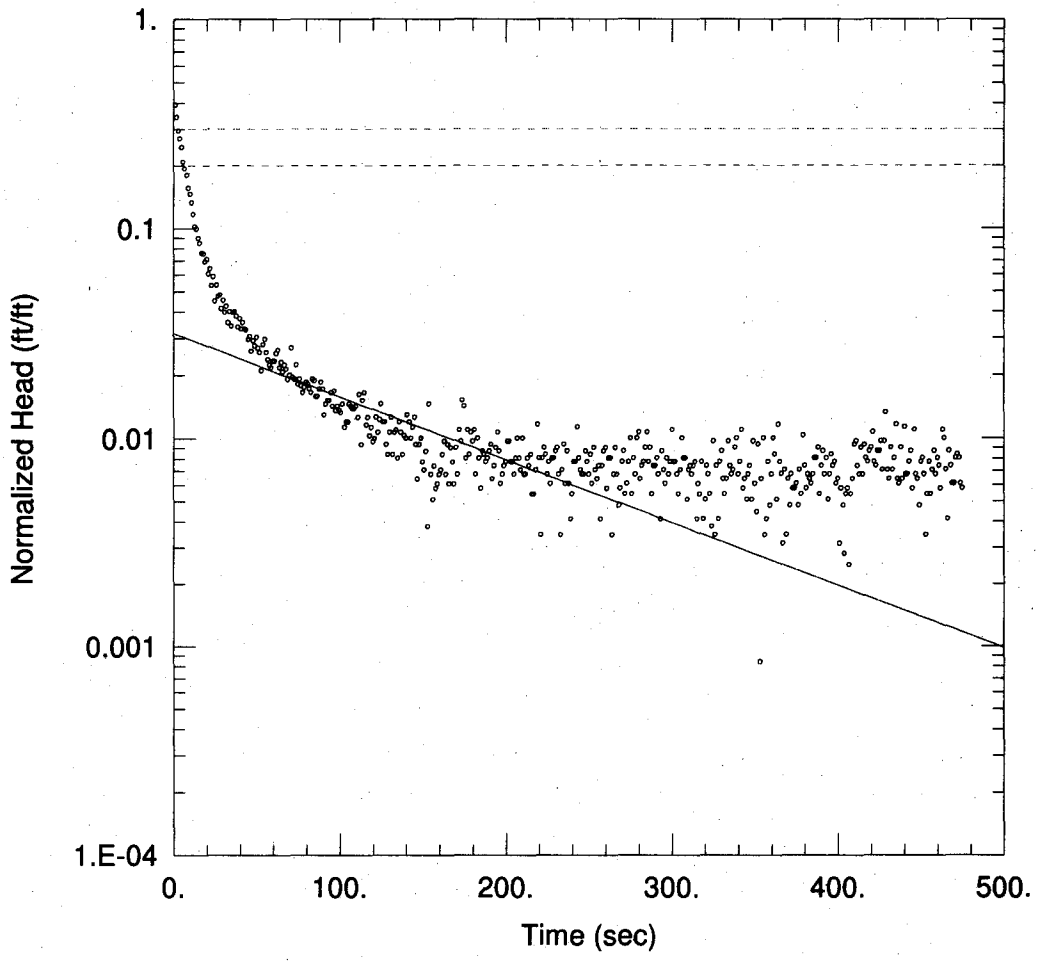
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 6.885 ft/day

y0 = 0.07851 ft



MW-41 SLUG TEST (FALLING HEAD)

PROJECT INFORMATION

Company: ENSR
Client: Parker Hannifin
Project: 05303-026
Location: Wake Forest, NC
Test Well: MW-41
Test Date: 3-13-2007

AQUIFER DATA

Saturated Thickness: 7.41 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-41)

Initial Displacement: 3.05 ft
Total Well Penetration Depth: 7.41 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 7.41 ft
Screen Length: 10. ft
Wellbore Radius: 0.3333 ft
Gravel Pack Porosity: 0.25

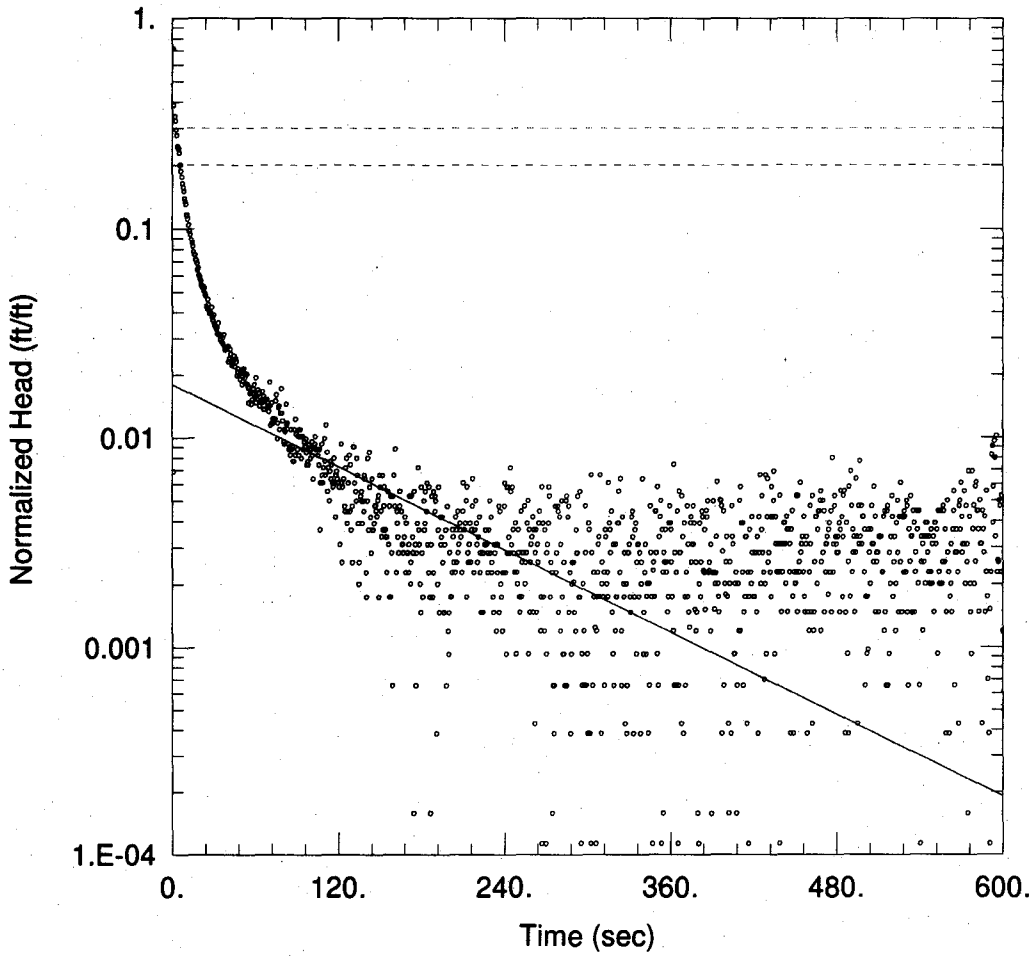
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 2.357 ft/day

y0 = 0.09694 ft



MW-41 SLUG TEST (FALLING HEAD)

PROJECT INFORMATION

Company: ENSR
Client: Parker Hannifin
Project: 05303-026
Location: Wake Forest, NC
Test Well: MW-41
Test Date: 3-13-2007

AQUIFER DATA

Saturated Thickness: 7.41 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-41)

Initial Displacement: 3.69 ft
Total Well Penetration Depth: 7.41 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 7.41 ft
Screen Length: 10. ft
Wellbore Radius: 0.3333 ft
Gravel Pack Porosity: 0.25

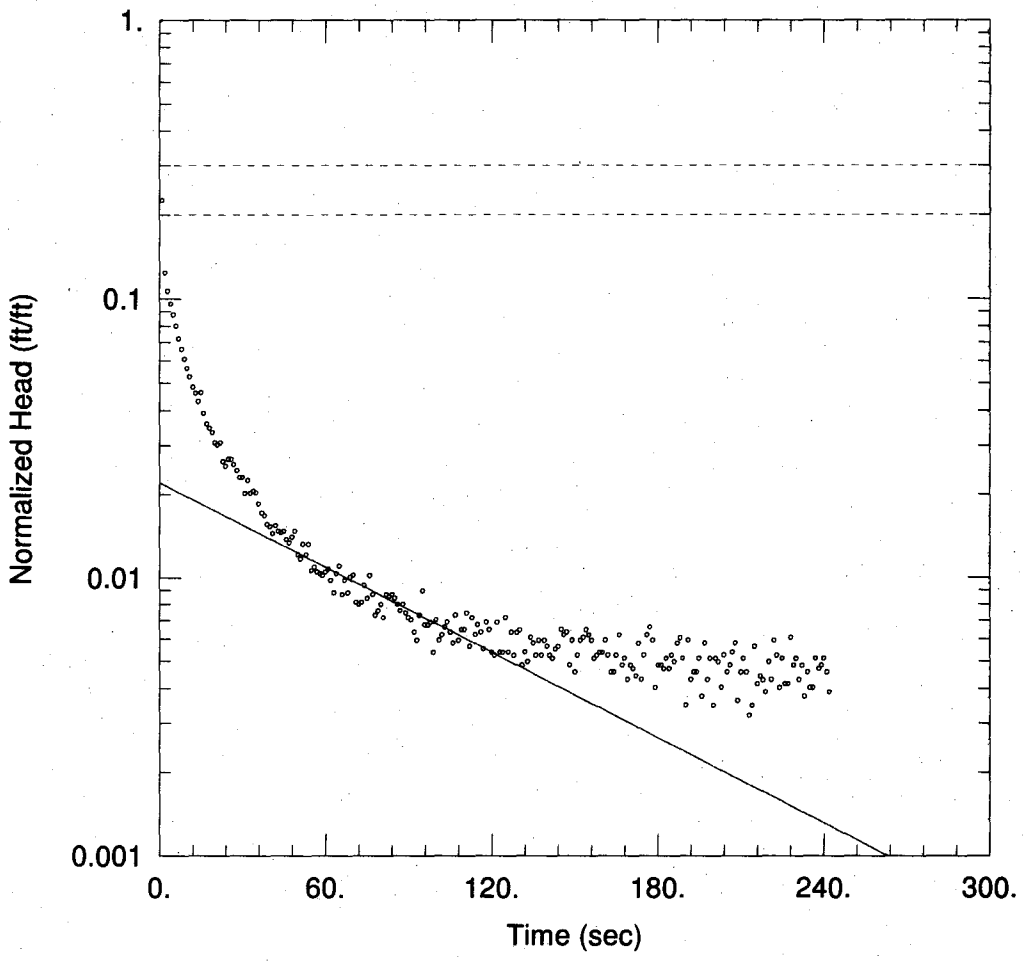
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 2.569 ft/day

y0 = 0.06659 ft



MW-41 SLUG TEST #1

PROJECT INFORMATION

Company: ENSR
Client: Parker Hannifin
Project: 05303-026
Location: Wake Forest, NC
Test Well: MW-41
Test Date: 3-13-2007

AQUIFER DATA

Saturated Thickness: 7.41 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-41)

Initial Displacement: 7.314 ft
Total Well Penetration Depth: 7.41 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 7.41 ft
Screen Length: 10. ft
Wellbore Radius: 0.3333 ft
Gravel Pack Porosity: 0.25

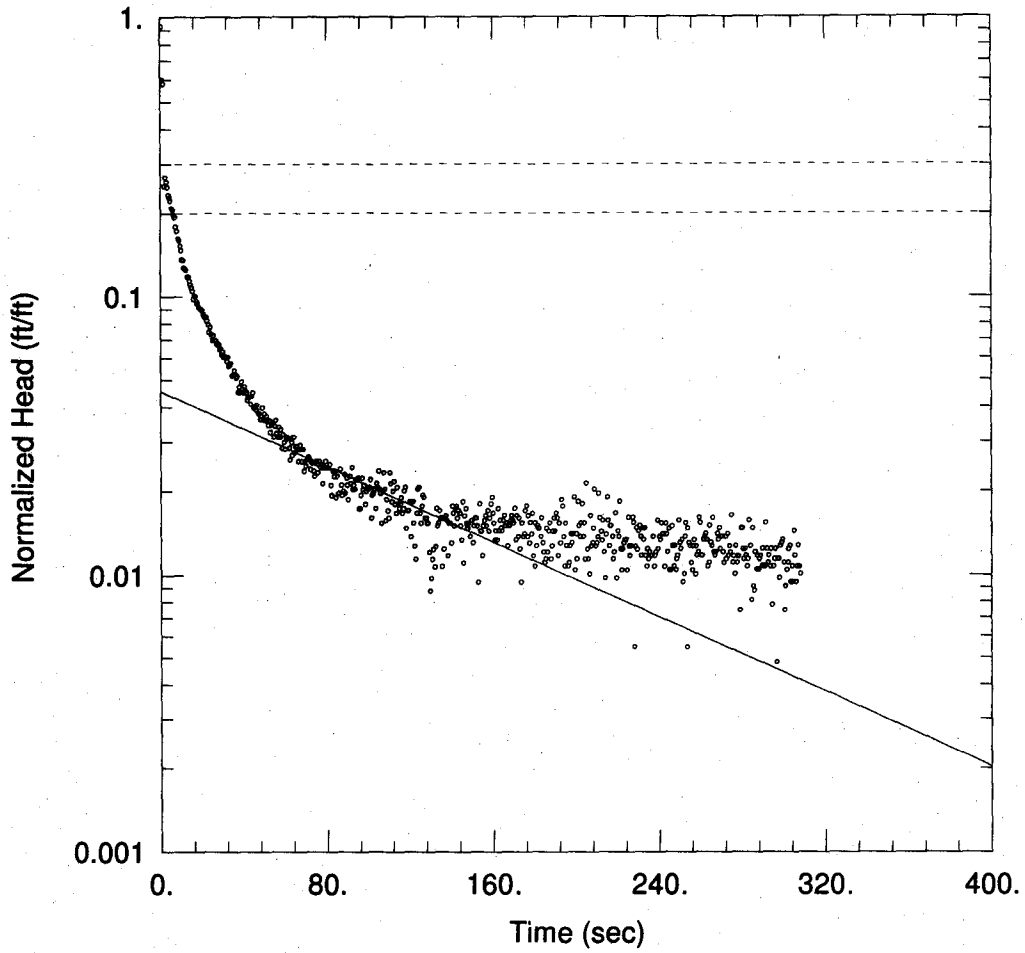
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 3.982 ft/day

y0 = 0.1615 ft



MW-41 SLUG TEST (RISING HEAD)

PROJECT INFORMATION

Company: ENSR
Client: Parker Hannifin
Project: 05303-007
Location: Wake Forest, NC
Test Well: MW-41
Test Date: 3-13-2007

AQUIFER DATA

Saturated Thickness: 7.41 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-41)

Initial Displacement: 3.035 ft
Total Well Penetration Depth: 7.41 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 7.41 ft
Screen Length: 10. ft
Wellbore Radius: 0.3333 ft
Gravel Pack Porosity: 0.25

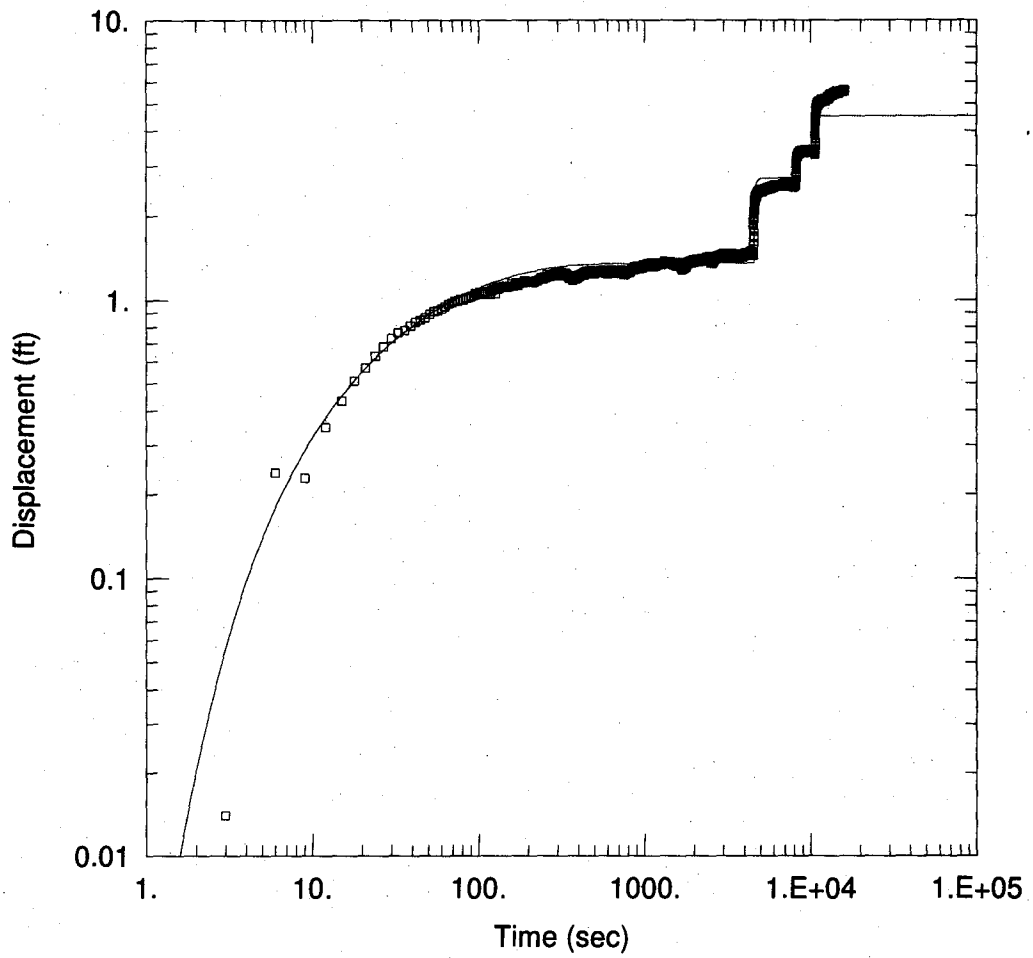
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 2.639 ft/day

y0 = 0.1383 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW-39D step test.aqt
Date: 07/18/07 Time: 14:16:47

PROJECT INFORMATION

Company: ENSR
Client: Parker Hannifin
Project: 05303-026-300
Location: Wake Forest
Test Well: MW-39D
Test Date: 4/12/07

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-39D	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
▫ MW-39D	0	0

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 24.57 ft^2/day
r/B = 0.3
b = 5. ft

S = 0.04338
Kz/Kr = 1.

Appendix G

RCRA Facility Investigation Checklist

The Former Parker Hannifin Facility Post Closure Part B Permit includes a checklist in Appendix E, Section II of the components which must be addressed in order to complete the RCRA Facility Investigation. The following is a listing of the major components of the checklist along with reference information and discussion regarding the data collected for each item.

A. Environmental Setting

1. Hydrogeology

The Hydrogeology has been effectively characterized for both the former Parker facility and the adjacent properties in previously submitted reports (Earth Tech 2002, RUST 1997, S&ME 1995), along with extensive additional information provided in this Phase VII RFI report. The direction and rate of groundwater movement across the facility is well understood, as is the current location and movement of the dissolved phase plume. Semi-annual groundwater monitoring and reporting have been conducted for several years and these reports provide substantial documentation of the temporal trends for groundwater movement.

2. Soils

Both near surface soils and subsurface geology have been adequately characterized for both on-site and adjacent properties in previously submitted reports (Earth Tech 2002, RUST 1997, S&ME 1995), along with the extensive additional information provided in this Phase VII RFI report. This report also includes cross sections which summarize some of that information, along with a detailed summary of site geology and local geologic maps. Approximately fifty-five monitoring wells have been installed onsite and offsite, and subsurface soil and geology information has been collected from the majority of these, including rock cores from a handful of these wells, and all of this information has been documented in boring logs prepared for each well.

3. Surface Water and Sediment

Surface water and sediment characteristics have been adequately defined in previous RFI report submissions (Earth Tech 2002, RUST 1997). There are no surface water bodies (e.g.; ponds or lakes) on the subject site. There are three small streams which are sourced on the western perimeter of the subject property and adjacent properties, and monitoring programs over the past three years have demonstrated the flow in these streams to be seasonally dependent. The ongoing RCRA Permit required monitoring program includes sampling of these streams.

4. Air

The required climate and air flow conditions at the site have been addressed in a previous RFI report submission (RUST 1997).

B. Source Characterization

1. Unit/Disposal Area Characteristics

A complete list of SWMUs and AOCs is included in Appendix D of the RCRA Part B Permit. The Permit lists a current status of all SWMUs and AOCs that have been associated with the site. Other previous RFI reports also contain information concerning SWMUs and AOCs (Earth Tech 2002, RUST 1997, S&ME 1995).

2. Waste Characteristics

A list of SWMUs and AOCs and the wastes that were associated with each are included in Section 4.0 of the 2002 Earth Tech RFI Report, along with a brief history of releases that have been associated with each SWMU or AOC. Other previous RFI reports also contain information concerning historic site waste characteristics (Earth Tech 2002, RUST 1997, S&ME 1995).

C. *Characterization of Releases of Hazardous Constituents*

1. Groundwater Contamination

On- and off-site groundwater contamination has been effectively characterized for both the former Parker facility and the adjacent properties in previously submitted reports (Earth Tech 2002, RUST 1997, S&ME 1995), along with extensive additional information provided in this Phase VII RFI report. Groundwater flow direction, as well as the extent of the dissolved phase groundwater plume is well defined. Semi-annual groundwater monitoring and reporting have been conducted for several years and these reports provide substantial documentation of the temporal trends for dissolved phase groundwater contaminant concentrations.

2. Soil Contamination

ENSR completed soil delineation activities at SWMUs #31/#33, AOC #38, and the Northeast Building Area (NEBA) along with a statistical evaluation of background metals in soil. A complete description of delineation activities is included in the RCRA Facility Investigation-Soil Assessment and Statistical Evaluation of Background Metals in Soils (ENSR, 2006).

A description of soil contamination associated with SWMUs and AOCs on-site is included in Section 6.3 of the 2002 Earth Tech RFI Report. Other previous RFI reports also contain information concerning soil contamination at the site (Earth Tech 2002, RUST 1997, S&ME 1995).

3. Surface Water and Sediment Contamination

Low concentrations of volatile organic compounds from the groundwater plume discharge into the stream in the vicinity of the property line along the western perimeter of the site. Surface water contamination has been effectively characterized for both the former Parker facility and the adjacent properties in previously submitted reports (Earth Tech 2002, RUST 1997, S&ME 1995). Semi-annual surface water monitoring and reporting have been conducted for several years and these reports provide substantial documentation of the temporal trends for surface water contaminant concentrations.

4. Air Contamination

The required climate and air flow conditions at the site have been addressed in a previous RFI report submission (RUST 1997).

D. Potential Receptors

1. Current local uses and planned future uses of groundwater

Surrounding water supply wells have been sampled, and water usage has been verified within one mile of the facility. There are no water supply wells located within the defined plume of impacted groundwater, or between the plume and the apparent groundwater discharge point; Horse Creek. All land within the Town of Wake Forest city limits has access to municipal water and several subdivisions located within the survey area have been annexed by the Town of Wake Forest and receive municipal water. Surrounding water supply wells have been sampled to the north, south and west of the facility. Future planning in the vicinity of the site will take into account the need for municipal water.

2. Current local uses and planned future uses of surface waters directly impacted by the facility.

There are three small streams which are sourced on the western perimeter of the property and adjacent properties, and monitoring programs over the past three years have demonstrated the flow in these streams to be seasonally dependent. There are currently no surface water intakes on Horse Creek or any of the perennial streams adjacent to the facility. Due to the limited quantity and seasonally variable flow of surface waters in the vicinity to the site, and the availability of Town of Wake Forest municipal water supplies in the area, it is unlikely that the streams would be utilized as water supplies in the future.

3. Human use of or access to adjacent lands.

The facility is bordered to the east and southeast by Route US 1. The areas immediately adjacent to the facility to the northeast, north, and northwest are undeveloped. The land along the western boundary of the site is being developed as residential property with municipal water supplies. The properties immediately to the south and east of the facility are zoned for commercial use. Previous reports summarize human use and access to adjacent properties (Earth Tech 2002).

4. General description of the biota in surface water bodies on, adjacent to, or affected by the facility.

The biota survey was performed in 1997 by contacting the North Carolina Natural Heritage Program (NCNHP) which maintains a database of state or federally listed threatened, endangered, or rare plant and animal species. The NCNHP has no records of known occurrences of state or federally listed threatened, endangered, or rare plant and animal species within a one-mile radius of the facility.

5. A general description of the ecology within the area adjacent to the facility.

An investigation was conducted of the study area to classify dominant ecological communities and investigate the possible presence of endangered, threatened, or rare species. The survey included a review of existing literature and mapping conducted by the NCNHP, U.S. Fish and Wildlife Service, National Wetlands Inventory Mapping, USGS 7-1/2 Minute Topographic Quadrangle Mapping, Wake County Soil Survey maps and data, aerial photographs, and a field reconnaissance of the study area. No federally or state listed threatened or endangered species are reported to occur in the area and none were observed during the field reconnaissance (Earth Tech 2002).

6. **A general demographic profile of the people who use or have access to the facility and adjacent land.**

The estimated population of Wake Forest, NC is 22,651 with 47.5% male and 52.1% female breakdown. The median age of residence is 31.5 years old. The median household income in Wake Forest for 2005 was $54,500. The Wake Forest community is broken down into 78.6% White Non-Hispanic, 15.8% Black, 2.1% Hispanic, 1.6% two or more races, 0.8% other race, 0.6% American Indian, and 0.6% Korean (2000 Census).

7. **A description of any known or documented endangered or threatened species near the facility.**

No federally or state listed threatened or endangered species are reported to occur in the area and none were observed during the field reconnaissance (Earth Tech 2002).

ENSR
7041 Old Wake Forest Drive, Suite 103, Raleigh, North Carolina, 27616-3013
T 919-872-6600 F 919-872-7996 www.ensr.aecom.com

February 4, 2008

Received
FEB 2008
Hazardous
Waste Section

Mr. Larry Stanley
North Carolina Department of Environment and Natural Resources
Division of Waste Management
401 Oberlin Road, Suite 150
Raleigh, North Carolina 27605

Re: Response to NCDENR Comments Regarding RFI
(NCDENR-HWS Comment Letter dated December 3, 2007)
Revised RFI – Groundwater Investigation Report (Phase VII – Offsite Investigation)
Former Parker Hannifin Facility,
Wake Forest, NC
EPA ID # NCD 002 591 014

Dear Mr. Stanley:

ENSR Consulting and Engineering (NC), Inc. (ENSR), on behalf of Parker Hannifin Corporation (Parker), is providing replacement pages for the report, a summary table for Appendix H, and new figures for the above referenced document in response to the December 3, 2007 comment letter from the North Carolina Department of Environment and Natural Resources (NCDENR) Hazardous Waste Section (HWS). The document referenced above was prepared and submitted by ENSR and Parker in September 2007 and documents Phase VII of the RCRA Facility Investigation (RFI) for the former Parker facility in Wake Forest North Carolina.

ENSR and Parker have reviewed the comments provided by the HWS and have modified the text for the RFI Report to address the comments. Attached are three complete sets of replacement pages for the Table of Contents (pages iii, iv, and vi) along with replacement pages for the text of the report (pages 6-6 through 6-8, 7-1, 7-2, 8-1 and 8-2) in order to revise document. In addition, we are adding a new Appendix H to the report that will consist of one table and three figures. In addition, we are providing revised figures (Figures 2, 4 and 5) for the report.

The remaining tables, figures, and appendices from the original submission of this document should not be removed or replaced.

Parker and ENSR appreciate your prompt review and comment on these revisions. If you have any questions, please contact us at (919) 872-6600.

Sincerely,

ENSR Consulting and Engineering (NC), Inc.

Bob Wyrick, PG
Project Manager

David H. Simpson, PG
Program Manager

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: Martha Connell Date: 2/4/2005

Martha Connell

Parker-Hannifin Corporation; Manager, Environmental Services

Designated Signatory

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Appendix G RCRA Facility Investigation Checklist

6.7 Summary of Conceptual Site Model

Findings and conclusions based on the conceptual site model are summarized below.

- Bedrock in the vicinity of the Former Parker Facility typically consists of a gneissic rock with a high degree of fractures and structure fabric near the interface of PWR and bedrock. The Former Parker Facility is bounded by the north-northeast trending Paleozoic-aged Nutbush Creek fault to the west and the Rolesville batholith to the east.
- Numerous joint sets exist in the area with dominantly northeast strikes and vertical to subvertical dips. The dominant regional joint orientation is north 75° ± 10° west (W) with a dip of 80° north (N). A secondary, longitudinal joint orientation that is approximately parallel to strike is present at N 4° -25° E. The predominant regional joint orientation is expressed in the smaller tributaries and the secondary joint orientation is expressed in the orientation of Horse Creek.
- Due to the foliated nature of the underlying geologic material, groundwater flow on-site is complex (i.e. not isotropic, and homogeneous). The water table surface is approximately 10 to 40 feet below the ground surface within the unconsolidated saprolite in the eastern Piedmont.
- Groundwater flow is not perpendicular to the potentiometric lines or the topographic (ground surface) contours on the Former Parker Facility. The flow is more complex due to local and regional geology and hydrogeology. The groundwater flow as demonstrated by the flow nets constructed for this phase of investigation explains the orientation and current location of the dissolved phase plume. The groundwater flow has been effectively "deflected" northward by the structural fabric of the aquifer, leading to the orientation and current location of the plume.

Based on the proposed conceptual site model for groundwater and dissolved phase plume movement, the current monitoring well network is fully adequate for monitoring the position and movement of the dissolved phase plume.

7.0 Conclusions

This RCRA Facility Investigation Report (documenting Phase VII of the investigations) was prepared by ENSR on behalf of Parker to present the results of offsite monitoring well installation/sampling activities along with a Conceptual Site Model for the movement of groundwater and the dissolved phase plume. This investigation and report have been conducted and submitted in order to complete the offsite efforts to define the aerial extent of impacted groundwater, and based on the results outlined herein; the dissolved phase groundwater plume has now been completely defined. In addition, this report includes a discussion of the conceptual site model developed by ENSR and Parker which provides an explanation for the movement (from the documented sources areas) and current orientation/location of the impacted groundwater plume.

7.1 Site Geology

A total of six monitoring wells (MW-38, MW-39, MW-39D, MW-40, MW-40D, and MW-41) were installed during this investigation to evaluate the extent of VOC impacted groundwater. Monitoring wells MW-38, MW-39, MW-40, and MW-41 were shallow wells installed in the deep saprolite/PWR zone. Monitoring wells MW-39D and MW-40D were deep wells installed in the upper bedrock. During the installation of the deep wells, rock cores were collected to examine the lithology and fracture density of the underlying bedrock and to evaluate the location of the Nutbush Creek fault zone (mapped near the Former Parker Facility: **Figure 3**). During rock coring, a biotite-hornblende gneiss, informally known as the Raleigh Gneiss, was encountered. The Falls Leucogneiss, normally associated with the Nutbush Creek fault, was not observed in either of the cores, suggesting that the Nutbush Creek fault is west of the boring locations.

7.2 Extent of VOCs, 1,4-Dioxane, and Metals in Groundwater

A total of thirteen groundwater samples were collected from the six monitoring wells installed during the subject investigation (MW-38, MW-39, MW-39D, MW-40, MW-40D, and MW-41). Samples were collected during three different sampling events during November 2006, and January and February 2007. Groundwater samples were analyzed for VOCs, 1,4-dioxane, and metals.

Groundwater analytical results from the subject event indicated several compounds detected at concentrations in excess of the 2L groundwater standards. The compounds detected at concentrations exceeding the 2L standard (indicated in parentheses) are summarized below (**Tables 3, 4, 5, and 6**).

- TCE (2.8 µg/L) was detected in the groundwater samples from MW-38, MW-40, and MW-40D;
- 1,4-dioxane (7 µg/L) was not detected above laboratory reporting limits in groundwater samples collected from newly installed wells; and
- No metals were detected above the RCRA permit limits in groundwater samples collected from newly installed wells.

The geographic extent of TCE-impacted groundwater was not delineated to below 2L groundwater standards during this investigation. However, the areal extent of TCE impacted groundwater is bracketed to the northwest of MW-38 by Horse Creek. The northern plume boundary does not likely cross the hydrologic boundary with Horse Creek. This is supported by offsite potable water supply well sampling completed previously (**Appendix B**). Based on the results of the offsite RFI, the plume boundaries are well defined in all

directions. An isoconcentration map of TCE in groundwater for the 1st 2007 Semi-Annual Groundwater Monitoring event is included in **Figure 7**.

7.3 Completion of RFI

All of the SWMUs and AOCs identified at the Former Parker Facility have been adequately investigated during successive phases of investigation by Parker, ENSR and others. Of the SWMUs originally identified and investigated by the various phases of RFI completed to-date, only three areas remain as requiring additional corrective action for soil impacts. Extensive investigation through soil sampling, the installation of additional offsite monitoring wells, sampling of offsite potable water supply wells, and surface water sampling have defined the aerial extent of the dissolved phase groundwater plume from the source areas on the Former Parker Facility to Horse Creek.

With the completion of this Phase VII RFI and submission of this report, Parker has satisfied all of the requirements for completion of the RCRA Facility Investigation which are listed in the facility's RCRA Part B Post Closure Permit (Appendix E – RCRA Facility Investigation Plan Outline). Appendix G in this Phase VII RFI report contains a listing of the major components of the RFI Outline taken from the Permit along with reference information and discussion regarding the data collected for each item.

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6.7 Surface Water Quality

In connection with previous investigations conducted at the site, surface water samples have been collected from three tributaries to Horse Creek. One of these tributaries (identified as Tributary A-1 with Sub-Tributary A-2) drains the north and northwest portions of the site. This tributary and its sub-branches originate on-site and carry flow to the northwest. A second tributary (identified as Tributary B-1) drains the property located north of the Former Parker Facility, and flows northwest to Horse Creek. The third tributary (identified as Tributary C-1) drains the property south of the Former Parker Facility, and flows north to Horse Creek.

Samples were collected from Tributary A-1 in 1995 in connection with RFI field studies underway. Additional samples were collected in 2002, also in connection with RFI field studies. Surface water sampling from all three tributaries has been conducted in conjunction with the semi-annual groundwater monitoring and reporting events for the Former Parker Facility since July 2005. Sampling results and sample locations for the prior field studies have been included in previous RFI reports. **Appendix H** of this document includes a summary table which presents all surface water sampling results for these sampling events conducted since 1995.

The sampling procedures used during the semi-annual sampling events (beginning in 2005) are outlined in the monitoring reports, and can be summarized as follows. The grab samples are collected by submerging a new capped glass jar into the stream. The jar is then uncapped below the air-water interface with the mouth of the jar pointed downstream. The jar is then closed underwater and its contents transferred into laboratory supplied containers. During the sampling process, the sampler is careful to stand beside the stream while sampling to reduce the extent of disturbance to the stream bottom. To avoid influences from surface run-off, samples are not collected within 72 hours of a significant rain event (i.e., more than 0.5-inches in a 24-hour period). It should be noted that samples can only be collected when adequate water is available in the tributaries at the specified locations. Due to severe regional drought conditions, it has not been possible to collect samples from all locations during the monitoring events conducted since 2005. The following sections provide a review of the analytical results from the surface water sampling events

6.7.1 Pre-2005 Surface Water Sampling Events

Surface water samples were collected from several locations along Tributary A, on the former Parker Facility property, during the 1995 field investigations. The compound TCE was detected in four of the samples (SW-1 at 13.1 µg/l, SW-2 at 9.8 µg/l, SW-3 at 19.1 µg/l, and SW-4 at 9.5 µg/l) and cis-1,2 DCE was detected in two of the samples (SW-3 at 5.0 µg/l and SW-4 at 8.8 µg/l). Sample locations SW-3 and SW-4 were close to the facility building and SW-1 was near the downgradient property line. Sample locations and summary analytical data are provided in **Appendix H**.

Samples were also collected from Weirs installed in Tributary A to measure the stream flow. Weir W-1 was installed in approximately the same location as SW-1. The compound dichloromethane was detected in one of these samples (SW-1 at 10.3 µg/l).

Another round of surface water sample collection was conducted at several locations along Tributary A, on the former Parker Facility property, during the 2002 field investigations. The compound TCE was detected in two of the samples (SW-6 at 33 µg/l and SW-7 at 3.0 µg/l). The compound PCE was detected in one of the samples (SW-6 at 7.0 µg/l). The compound cis-1,2 DCE was detected in two of the samples (SW-6 at 47 µg/l

and SW-7 at 4 µg/l). These sample locations are along Tributary A, and are all located off the Former Parker Facility property. Sample location SW-6 is at the old property line, then moving down stream the sample locations precede in this order: SW-7, SW-10, SW-9 and then SW-8 at Horse Creek. Sample locations and summary analytical data are provided in **Appendix H**.

6.7.2 Post 2005 Surface Water Sampling Events

Surface water sampling has been conducted along the three tributaries to Horse Creek in conjunction with the semi-annual groundwater sampling events since 2005. A total of nine sampling points have been included in these events. Sampling locations and summary analytical data are provided in **Appendix H**. The current sampling locations identified as SW-8, SW-9, and SW-10 correspond approximately with the sampling locations from the 2002 field event as discussed in the previous section. The current sampling program includes an additional location, SW-11, which is upstream of the SW-10 location. In addition, there is now a location SW-12 which is approximately between the old SW-1 and SW-3 locations from the 1995 field events. The new sampling locations SW-14 and SW-15 are on Tributary B, and the new sampling locations SW-16 and SW-17 are located on tributary C.

A review of the analytical results for sampling events conducted since 2005 indicate only limited detections of targeted compounds during the monitoring events. Targeted VOCs have been detected in four sampling points during three sampling events. Multiple targeted compounds have only been found in the sample collected from one location (SW-12). Sampling location SW-12 is on Tributary A, and is the closest current sampling location to the SWMU#16 area and the former Parker Facility building.

Surface Water sampling location SW-12 is located near monitoring well MW-7 and Extraction well RW-19. During the February 2006 and the February 2007 sampling events, four targeted VOC compounds were detected in samples collected at this location. The compounds detected were cis-1,2-DCE, PCE, TCE, and trichlorofluoromethane. These are the only two sampling events where a sample could be collected from this location during the monitoring events, due to seasonal and drought induced low flow conditions.

Very low concentrations of TCE were detected at sampling point SW-14 during the August 2006 event (2.0 µg/l), and also at sampling point SW-15 during the February 2007 sampling event (1.0 µg/l).

In addition, a low concentration of Toluene (1.4 µg/l) was detected at the SW-11 sampling point during the July 2005 event, and in the SW-17 sampling point during the February 2007 event.

6.7.3 Comparison to Surface Water Standards

The sample summary table in **Appendix H** also lists the applicable NCDENR Surface Water Standards based on the classification of the Horse Creek and its tributaries as Water Supply WS-IV (15A NCAC 2B .0216). A review of the historical sampling data indicates that only two compounds have been detected at concentrations above the associated standard: TCE and PCE.

- PCE was detected at sampling point SW-6 during the January 2002 sampling event at concentrations above the standard of 0.7 µg /l.
- PCE was detected at sampling point SW-12 during the February 2006 and February 2007 sampling events at concentrations above the standard of 0.7 µg /l.

- TCE was detected at sampling points SW-1, SW-2, SW-3, and SW-4 during the 1995 sampling events at concentrations above the standard of 2.5 µg /l. as detailed above.
- TCE was detected at sampling points SW-6 and SW-7 during the January 2002 sampling event at concentrations above the standard of 2.5 µg /l.
- TCE was detected at sampling point SW-12 during the February 2006 and February 2007 sampling events at concentrations significantly above the standard of 2.5 µg /l.
  and
- TCE was detected at sampling points SW-14 in August 2006 and SW-15 during the February 2007 sampling events at concentrations below the standard of 2.5 µg /l.

In summary, concentrations of targeted compounds in excess of the NCDENR Surface Water Standards have been detected in samples collected at surface water sampling locations on the Former Parker Hannifin property, with the most significant detections occurring at the SW-12 sampling location. This sampling location is near the currently active groundwater extraction well RW-19.

6.8 Summary of Conceptual Site Model

Findings and conclusions based on the conceptual site model are summarized below.

- Bedrock in the vicinity of the Former Parker Facility typically consists of a gneissic rock with a high degree of fractures and structure fabric near the interface of PWR and bedrock. The Former Parker Facility is bounded by the north-northeast trending Paleozoic-aged Nutbush Creek fault to the west and the Rolesville batholith to the east.
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A total of six monitoring wells (MW-38, MW-39, MW-39D, MW-40, MW-40D, and MW-41) were installed during this investigation to evaluate the extent of VOC impacted groundwater. Monitoring wells MW-38, MW-39, MW-40, and MW-41 were shallow wells installed in the deep saprolite/PWR zone. Monitoring wells MW-39D and MW-40D were deep wells installed in the upper bedrock. During the installation of the deep wells, rock cores were collected to examine the lithology and fracture density of the underlying bedrock and to evaluate the location of the Nutbush Creek fault zone (mapped near the Former Parker Facility: **Figure 3**). During rock coring, a biotite-hornblende gneiss, informally known as the Raleigh Gneiss, was encountered. The Falls Leucogneiss, normally associated with the Nutbush Creek fault, was not observed in either of the cores, suggesting that the Nutbush Creek fault is west of the boring locations.

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7.3 Completion of RFI

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Appendix H

Summary Table of Surface Water Sampling Results (1995 – 2007)

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PLEASE SEE MAP(S) IN THE HARD COPY