403139

RECEIVED
JUL 18 2008
Water Monitoring Assessment & Protection Division

SCANNED

Environmental
Resources
Management

498 Wando Park Blvd.
Suite 100
Mt. Pleasant, SC 29464
(843) 856-4270
(843) 856-4283 (fax)

July 17, 2008
86002

Mr. Chris Forrest, P.G.
South Carolina Department of Health
and Environmental Control (SCDHEC)
Bureau of Water Pollution Control
2600 Bull Street
Columbia, South Carolina 29201

ERM

Subject: Air-Sparge/Soil Vapor Extraction Pilot Test Work Plan
Wix Filtration Corporation - Dillon, South Carolina
The Affinia Group, Inc.
ERM Project 86002

Dear Mr. Forrest:

On behalf of the Affinia Group, Inc., Environmental Resources Management, Inc. (ERM) is pleased to present this Air-Sparge/Soil Vapor Extraction (AS/SVE) Pilot Test Work Plan (Work Plan) for the above referenced site. The Site location map is shown as Figure 1.

This Work Plan has been prepared for the purpose of defining a scope of work for the upcoming AS/SVE Pilot Test, as approved by SCDHEC on February 12, 2008.

All work procedures and quality assurance and quality control efforts will be conducted in accordance with the previously approved March 2006, *Quality Assurance Project Plan* (QAPP).

SCOPE OF WORK

A pilot test is planned to evaluate AS in conjunction with SVE. SVE will be implemented with AS to recover the injected sparge air and to remove residual toluene from the unsaturated soil.

A27

The objectives of the pilot test are:

- Determine the vacuum/flow characteristics of the native subsurface;
- Evaluate toluene concentrations that would be produced by a full-scale low-flow AS/SVE System; and
- Evaluate the relative contributions of contaminant mass from air sparge and soil vapor to total SVE mass recovered.

The AS/SVE pilot test will be performed in conjunction with the semi-annual groundwater sampling event to be conducted in August 2008. The anticipated scope of work for the AS/SVE pilot test includes the following:

- Obtain the necessary UIC/temporary well permits from SCDHEC. The UIC permit # 920 was issued on June 24, 2008. The request for temporary SVE well installation is included as a separate document dated July 16, 2008.
- Install a temporary SVE well five feet west of existing monitoring well MW-4. This area was chosen instead of MW-1 because there are underground utilities near MW-1. Also, the former toluene UST is thought to be in the area of MW-1. SVE pilot tests should be performed in native soil that is undisturbed by backfill or nearby utilities so that the pressure-flow relationship derived by the SVE pilot test is representative of native conditions. The MW-4 area has elevated groundwater and soil toluene concentrations comparable to MW-1.
- Assuming the depth to water at the MW-4 location is four feet below ground surface (bgs), the temporary SVE well will be screened from two to four feet bgs with stainless steel continuous wrap 0.02-inch slotted screen. The filter pack will be No. 2 filter sand installed one to four feet bgs. A one-foot bentonite seal will be installed on top of the filter pack by hydrating bentonite chips. The bentonite seal will be allowed to set at least 24 hours prior to using the well for SVE. Due to the shallow depth of the well, a drill rig will be unnecessary. The well will be installed with a two-man gasoline-powered auger.
- A temporary SVE system will be installed with a 120-volt 1½-horsepower explosion-proof, spark-proof regenerative blower capable of a 50-inch water vacuum. The blower will be attached to the well head with a flexible hose. A vacuum gauge, sample port, moisture separator, and "make-up" air valve will be installed between the well head and the blower inlet, in order.

- The outlet of the SVE blower will be attached to a granular activated carbon (GAC) filter to remove toluene from the blower exhaust.
- The flow velocity of SVE air will be measured within the sample port with a thermo-anemometer. The thermo-anemometer will have a rubber grommet to seal the line during flow measurement. The measured flow velocities, temperature, and vacuums will be used to calculate the SVE air flow rate in standard cubic feet per minute (scfm). Samples will be collected from the sample port with a sample pump and analyzed with a photoionization detector (PID).
- A gasoline-powered air compressor will be attached to well MW-4 in the same configuration as the August 2007 AS pilot test. A pressure regulator will be used to adjust the air-sparge air pressure. A rotameter with a needle valve will be used to measure and adjust the AS flow rate.
- All equipment will be set up and tested for start-up at the beginning of the next work day. Testing will include checking for leaks and checking the operation of the blower, compressor, sample pump, PID, and thermo-anemometer.
- At the start of the next day, the SVE blower will be started with the "make-up" air valve open. The "make-up" air valve will be gradually closed until the well head vacuum reaches 10 inches of water. At this point, a velocity measurement will be collected. Then, the "make-up" air valve will be closed further until the well head vacuum is at 20 inches water, at which point another velocity reading will be collected. This process will be continued until either the vacuum reaches 50 inches water or the "make-up" air valve is closed. During this process, if the extraction line begins to extract water (evidenced by gurgling), the vacuum will be backed off until the water accumulation stops. When maximum vacuum is reached, a PID measurement will be collected from the sample port. The vacuum-velocity data will later be used to graph the SVE flow rate versus vacuum. The PID measurement will be used to determine the SVE well toluene removal rate at maximum vacuum.
- While the SVE blower is operating at maximum vacuum, the vacuum influence will be measured in MW-1, MW-2, and MW-3. This will be accomplished by attaching an air-tight well cap with a vacuum gauge. Once the vacuum gauge reading is stable, the value will be recorded.

- The velocity data will be used to determine the vacuum necessary for 10 scfm from the well head. The "make-up" air valve will be set to this vacuum. A PID measurement will be collected at this flow rate for comparison to the previous measurement (these concentrations are expected to be similar). Ten (10) scfm was chosen as the pilot test operating flow rate since the full-scale low-flow AS rate is expected to be 5 scfm per well. The standard practice when operating AS in conjunction with SVE is to operate the SVE system at 1½ to two times the total AS flow rate. The excess SVE flow rate helps to ensure that the majority of the AS air is captured by the SVE system.
- The AS system then will be started at five scfm and 10 psig. After 15 minutes of operation, another PID and velocity measurement will be collected. This PID measurement will be compared to the one collected before AS start-up to determine the relative contribution of AS to SVE toluene concentrations. Also, a sample will be collected from the sample port for laboratory analysis of toluene in air.
- The AS and SVE systems will be allowed to operate the remainder of the work day. Periodically, the AS and SVE systems will be checked. Before leaving, another PID and velocity measurement will be collected. A second sample will be collected from the sample port for laboratory analysis of toluene in air. The results of the two laboratory analytical samples will be compared to determine whether any reduction in toluene concentrations occurred during the operation period.
- The following day, the systems will be disassembled and the temporary SVE well will be abandoned by removing the screen and riser and backfilling the hole with bentonite.
- All excavated soil, waste GAC, and moisture separator condensate will be drummed for appropriate disposal, which will be managed by Wix personnel.

SUMMARY

Wix will evaluate the results of the AS/SVE pilot test in order to propose a Work Plan for site-specific full-scale design with implementation long enough to meet regulatory goals for a target period of three years of operation. Additionally, Wix will continue to monitor wells MW-1 through MW-4 and MW-7 for VOCs on a semi-annual basis until the full-

scale AS/SVE system has been implemented as addressed in the February 12, 2008 SCDHEC correspondence. Should you have any questions regarding this pilot test Work Plan, please do not hesitate to contact us at 843-856-4270.

Sincerely,

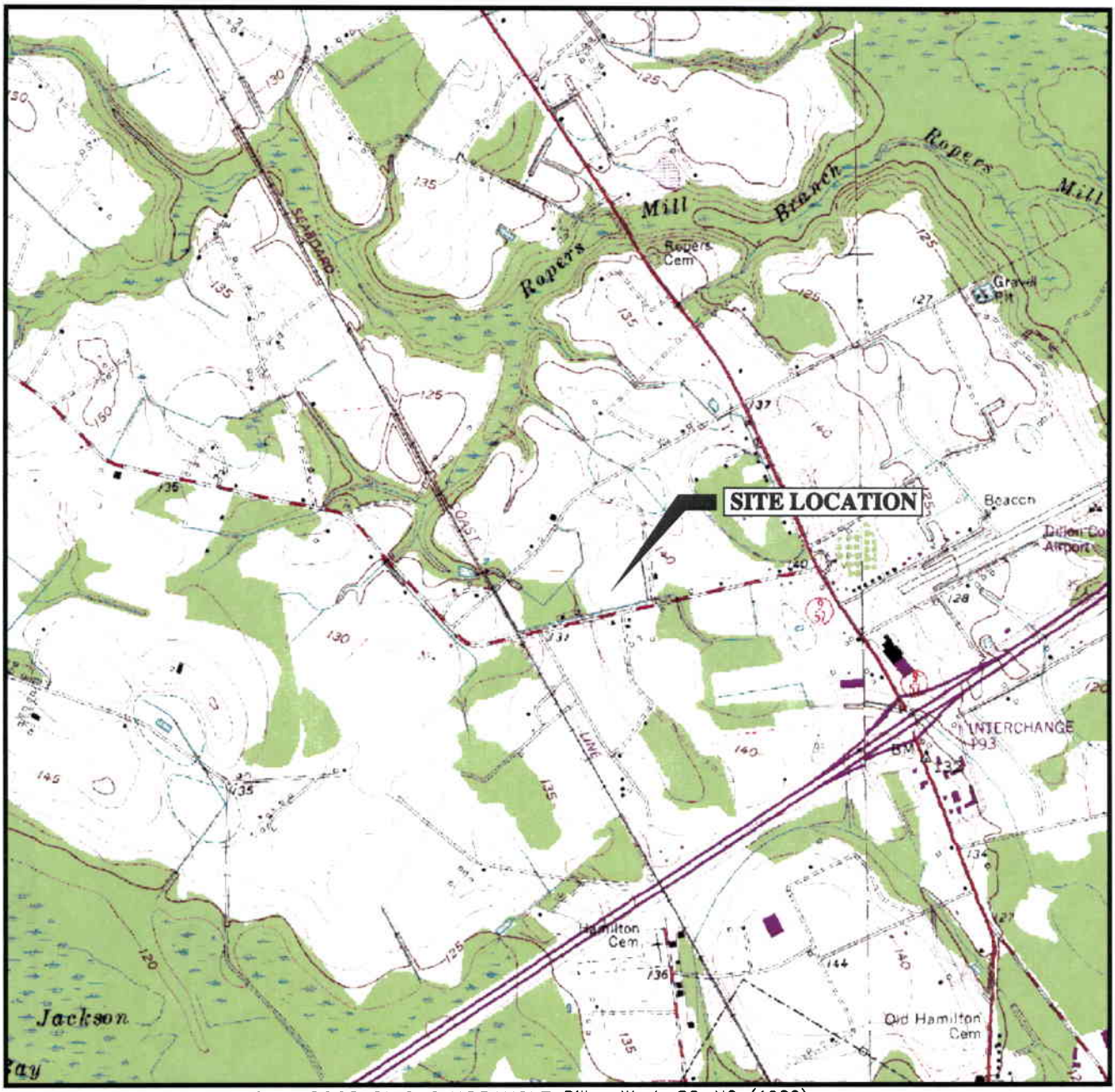
Mark Easterbrook
Project Manager

Hunter Sartain
Principal-in-Charge

cc: (via electronic transmission)
Mr. Richard P. Fahey, Esq. - Vorys, Sater, Seymour and Pease LLP
Mr. Keith Clark - The Affinia Group
Mr. James Hiller - ERM
Ms. Melody Christopher - ERM
Mr. Ken McCutcheon - Wix Filtration Corporation
Mr. Paul H. Caulford, Jr. - Wix Filtration Corporation

Attachment

Figure



SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE: Dillon West, SC–NC (1982)

SCALE 1:24000

1 1/2 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

CONTOUR INTERVAL 5 FEET

SOUTH CAROLINA

QUADRANGLE LOCATION

NATIONAL GEODETIC VERTICAL DATUM OF 1929

N W E S

41287 FIG1.DWG 01-30-08 1=1 DDP REV

Environmental Resources Management

ERM

SITE LOCATION MAP
WIX FILTRATION CORPORATION
AFFINIA GROUP, INC.
DILLON, SOUTH CAROLINA

FIGURE
1