Groundwater
& Environmental Services, Inc.

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July 7, 2011

Ms. Ellen Jackson
Oil Control Program
Maryland Department of the Environment
1800 Washington Boulevard, Suite 620
Baltimore, MD 21230

RE: Borehole Infiltration Test Work Plan
Wally's BP Former Citgo Station
19200 Middletown Road
Parkton, Maryland
MDE Case # 2006-0319-BA2

Dear Ms. Jackson:

Groundwater & Environmental Services, Inc. (GES), on behalf of Carroll Independent Fuel Company (CIFC), is providing this work plan to the Maryland Department of the Environment's (MDE) Oil Control Program for your review and approval. This work plan proposes revised procedures regarding infiltration rate characterization at the referenced location, from procedures initially presented in documents titled *Pump Test Work Plan* and the *Pumping Test Work Plan – Addendum #1 – Infiltration Testing* submitted to the MDE on January 11, 2011 and January 14, 2011, respectively.

On April 27, 2011, infiltration tests as outlined in the January 2011 *Pump Test Work Plan* and corresponding *Addendum #1*, were conducted in wells MW-8A and MW-8B during the final phase of the 72-hour extended duration pumping test activities. It was determined during these tests that the selected wells MW-8A and MW-8B had inadequate infiltration capacity for the planned reintroduction of treated groundwater discharge to the local groundwater aquifer. (A summary of the MW-8A and MW-8B infiltration tests was provided in the recent *Pumping Test Summary and Corrective Action Plan Addendum (CAPA)* submitted to the MDE on June 29, 2011.) It was concluded in the infiltration test summary (Section 4.4.4) of the *CAPA* that construction of screen intervals for wells MW-8A & MW-8B did not provide enough exposure to productive (and accepting) hydraulic features within the water-bearing bedrock formation.

Therefore, a revised approach for the re-infiltration of treated groundwater from the planned groundwater pump and treat (P&T) remediation system into the overburden lithology at the site has been prepared and is submitted as follows:

- Installation of three 6-inch diameter infiltration test boreholes at the following depths:
  - 5 feet below grade surface (bgs)
  - 12 feet bgs
  - 16 feet bgs
- Conduct a one-day test event that includes a series of falling head infiltration tests on each of the three installed test boreholes

A map detailing the location of the proposed infiltration area and borehole test locations is attached to this correspondence.

Borehole Construction
The proposed boreholes would be installed to the following criteria:

- Each hole cleared to 5 feet bgs to inspect for subsurface utility conflicts;
- Each borehole will be drilled by either hollow-stem auger or air-rotary methods and continuous split-spooned sampled to characterize overburden lithology in the planned area of infiltration at the site;

- Each borehole would be kept open and unconstructed through its corresponding depth unless field conditions dictate otherwise. This open construction will allow for both horizontal and vertical infiltration to occur and best simulate the anticipated design of a future infiltration structure.

Infiltration Test Procedures

The proposed borehole infiltration tests will be conducted under the following criteria:

- Water used for all infiltration testing activities will be sourced from onsite potable supply wells;
- Each test will consist of an initial loading of the selected test borehole with a full column of water (filled to grade), with regular measurements of the falling head occurring every 5 minutes over an approximately 30 minute total test time;
- After the 30 minute test period, the full column of water would be restored in the test borehole and a new falling head test would begin;
- In order to achieve a statistically valid dataset, a series of three 30-minute falling head tests is proposed for each test borehole;
- An infiltration rate will be determined using a derivation of the Darcy's Law:

  Q=K I A where:

  - Q = flow rate
  - K = hydraulic conductivity
  - I = hydraulic gradient
  - A = area of wetted soil

A summary of the proposed borehole infiltration activities will be presented in the *Corrective Action Plan (CAP) Implementation Plan* to be submitted as future correspondence. This *CAP Implementation Plan* will also include the design and layout of the infiltration gallery as well as the design of the P&T system for the approval.

GES acknowledges from the *MDE Report of Observations* dated June 6, 2011, that existing septic structures both onsite and offsite within the project study area are to be included in future map submissions. At this point in time, few records exist on the exact placement of said structures, however, GES in conjunction with the property owner and CIFC, are working to verify and locate all relevant subsurface structures in preparation for the installation of the planned groundwater P&T remediation system and associated infiltration gallery. This information will be included in the CAP Implementation Plan.

GES and CIFC would appreciate the MDE's expedited review and approval of the borehole infiltration work plan presented above so that design activities can continue to progress. If you have any questions or require any additional information, please do not hesitate to contact me at (800) 220-3606, extension 3706.

Sincerely,
Groundwater & Environmental Services, Inc.

Steven M. Slatnick
Site Operations Manager/
Senior Project Manager

Peter Reichardt
Project Hydrogeologist

Attachment

c: Herb Meade, Carroll Fuels
Jerry Phillips, 19200 Middletown Road
Jenny Herman, MDE
Andrew Applebaum, Environmental Alliance
Dwight W. Stone, Esq., Whiteford Taylor Preston
Eric M. Rosenfield, Esq., Law Offices of Peter G. Angelos