DuPont Pompton Lakes Works
2000 Cannonball Road
Pompton Lakes, NJ 07442

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May 12, 2011

Mr. Anthony Cinque
New Jersey Department of Environmental Protection
Division of Responsible Party Site Remediation
401 East State Street
P.O. Box 028
Trenton, New Jersey 08625-0028

RE: Request for NJDEP Permit-by-Rule for Hydraulic Testing
Interim Remedial Measure Field Pilot Study Near Well 128
DuPont Pompton Lakes Works Site
Pompton Lakes, New Jersey
PI# 007411

Dear Mr. Cinque:

E.I. du Pont de Nemours and Company (DuPont) is requesting a 180-calendar day permit-by-rule (PBR) for the DuPont Pompton Lakes Works (PLW) Site located in Pompton Lakes, Passaic County, New Jersey for the purpose of conducting hydraulic testing as the first stage of a technology evaluation pilot study. This transmittal includes information to demonstrate compliance with the requirements of the New Jersey Pollutant Discharge Elimination System (NJPDES) Discharge to Groundwater (DGW) regulations. The PBR is for the proposed discharge/addition of potassium bromide and/or Brilliant Blue FCF during borehole dilution and point velocity probe hydraulic testing to characterize subsurface aquifer properties in the area of monitoring well cluster 128, as allowed by N.J.A.C. 7:14A-7.5(b)3.

Background

Site groundwater quality is monitored as part of a comprehensive monitoring program with sampling on a semi-annual basis and reporting on an annual basis. Semi-annual monitoring began under the *Groundwater Remedial Action Plan* dated July 21, 1993. The most recent monitoring report is the *2010 Annual Groundwater Monitoring Report* dated February 28, 2011 and prepared by O'Brien & Gere. The following ten chlorinated volatile organic compounds (VOCs) have been identified as the primary constituents of concern (COCs) in onsite and offsite groundwater: tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), 1,1-dichloroethene (1,1-DCE), 1,1,1-trichloroethane (1,1,1-TCA), 1,1-dichloroethane (1,1-DCA), 1,2-dichloroethane (1,2-DCA), vinyl chloride (VC), and carbon tetrachloride (CT). Many of these COCs exist at concentrations

above the New Jersey Groundwater Quality Standards for Class IIA (GWIIA) in monitoring wells 128, 128-I, and 128-D.

The October 27, 2010 *Off-Site Groundwater IRM Characterization Report* prepared by Geosyntec presented the findings of the detailed characterization of the well 128 area and confirmed that the highest concentrations of VOCs are present in the intermediate zone. Investigations to collect soil and groundwater data in the vicinity of the well 128 area identified target VOCs generally distributed over a broad interval of the aquifer (nominally from 30 to 80 feet below ground surface [bgs]). A downward fining sequence indicates a potential decrease in hydraulic conductivity with depth, which may influence the design and implementation of an injection-based remedial design.

On January 5, 2011, the New Jersey Department of Environmental Protection (NJDEP) approved the *Interim Remedial Measure Work Plan for Groundwater Near Well 128* dated November 9, 2010 and prepared by Geosyntec. The work plan was developed to evaluate a potential remedial technology to address chlorinated VOC concentrations in offsite groundwater. Since the prevailing geochemical conditions at depth are generally reducing and the distribution of VOCs (predominantly partially dechlorinated) suggests some native microbial activity, the remedial technology being evaluated is enhanced anaerobic bioremediation (EAB).

The first step of the pilot study will be to confirm the effects that conductivity and permeability may have on an injection-based remedial approach, as this will directly impact the implementability of the technology. Successful application of the EAB technology in the offsite plume area will be contingent on achieving delivery of reagent chemicals throughout the treatment zone. Hence, understanding the aquifer hydraulic properties is critical to the design and interpretation of the resulting data. As such, the first step in the process, and the basis for this PBR request, is hydraulic testing.

The hydraulic testing activities described herein will be conducted in the shallow and intermediate portions of the unconfined aquifer in the vicinity of well cluster 128 as depicted on Figure 1.

Receptor Evaluation for Groundwater and Surface Water

A receptor evaluation was completed by O'Brien & Gere and submitted to NJDEP on February 28, 2011. It consisted of an evaluation of surrounding land and groundwater use and potential ecological receptors.

A well search of the area surrounding the offsite Classification Exception Area (CEA) was completed as part of the biennial certification approval process to evaluate if additional wells existed within this area. The most recent CEA Biennial Certification Monitoring Report was submitted to NJDEP on April 30, 2010 by DuPont. The search conducted in accordance with this biennial report indicated that residences receive potable water supplied through the municipal system and no potable wells were identified to currently exist within the groundwater plume area. NJDEP geographic information system (GIS) searches also indicated that

groundwater contamination is not located within a Tier 1 or Tier 2 wellhead protection area (WHPA). There are no surface water bodies in the immediate vicinity of well cluster 128.

Potential impact to any potable wells in the pilot study area is negligible. The only wells located in the vicinity are DuPont PLW monitoring wells.

PBR Scope of Work for Hydraulic Testing

The objective of this testing program is to collect data on the hydraulic properties of the shallow and intermediate portions of the unconfined aquifer in the pilot study area. Data collected will be used to determine if an injection-based technology is appropriate for application as part of an interim remedial measure (IRM) and, if so, guide the selection and operation of the final IRM implementation design as part of the next stage in the pilot study program.

An evaluation of applicable hydraulic testing methods for the characterization of groundwater flow in the well 128 area was conducted. Results of the evaluation indicated that indirect velocity measurements (slug tests and pump tests) and direct measurements (point velocity probes [PVPs], borehole dilution tests, and tracer tests) were best suited for this project. The key criteria used to select a specific test, or series of tests, to determine groundwater flow characteristics in the pilot study area included:

- Desired scale of investigation, which is in the range of 3,000 square feet for the area;
- Anticipated range of hydraulic conductivity based on current site data and literature ranges;
- Balance between the methods' advantages and disadvantages; and
- Availability of the method to deliver defensible results within the timeframe of the project.

Groundwater flow velocity in the pilot study area will be measured via a borehole dilution tests completed in one of the injection wells. The test will proceed with the introduction of a conservative tracer, either potassium bromide with a target concentration of 500 milligrams per liter (mg/L) and maximum mass of 200 grams (g) or Brilliant Blue FCF with a target concentration of 200 mg/L and maximum mass of 200 g, across the entire borehole length followed by monitoring of the depletion of the tracer concentration at a number of levels (a point dilution test). The test will provide vertical profiling data to determine groundwater velocity at predetermined depths across the aquifer.

The tracer will be introduced using a gravity-feed system into a tracer release hose positioned within a well. If required, additional water may be added to the tracer hose to a form a combined volume that is equivalent to the volume of the inside of the tracer release hose below the level of the water table. Following a short period of time (<5 minutes), the tracer release hose will be slowly withdrawn from the borehole at a rate of less than 6 feet per minute.

Immediately after withdrawal of the tracer release hosing, point dilution sampling tubes will be sampled to determine the initial test conditions concentration (T_0) along the vertical borehole profile. Subsequent sampling of the point dilution tubing will record depletion of tracer with time. Tracer samples will be collected via a peristaltic pump and analyzed in the field utilizing

an iron bromide electrode kit for potassium bromide or fluorescence wavelengths will be recorded via a spectrofluorometer for Brilliant Blue FCF. Additional samples will be preserved for laboratory analysis, if required. Groundwater results from monitoring well sampling conducted from May 1993 through March 1998 were reviewed. Bromide was detected at very low concentrations in groundwater samples collected from the wells in the pilot study area. Prior to hydraulic testing, groundwater samples will be collected from select wells in the area and analyzed for background (ambient) concentrations of the chosen tracer.

A PVP will be installed for comparison with the point dilution data from the injection well borehole dilution test. The PVP will be placed at an equivalent depth to the ML sampling ports and the methodology will provide a complementary in-situ velocity measurement to the point dilution test, except that the measurement is in direct contact with the formation and not inferred via flow through an open well. Measurements of apparent groundwater velocity in the PVP will proceed by injecting a small volume of tracer to the injection point of the device followed by detection of the changes in electrical resistance at the PVP detectors. Approximately 10 milliliters (mL) of tracer (i.e., potassium bromide) will be injected per PVP detector. The target injection concentration of the potassium bromide will not exceed 500 mg/L per PVP detector and a maximum mass of 200 g of potassium bromide. The geometry of the PVP will then be used to correct the apparent velocity to the ambient groundwater velocity.

A recognized suite of hydraulic tests will also be conducted to determine hydraulic conductivity ranges and well efficiency (Q/s) including slug tests (falling or rising head), step drawdown tests, and constant rate abstraction (pumping) tests. The slug, step, and pumping tests will provide design data to determine optimal pumping rates in the vicinity of the pilot study area.

Schedule of Testing

The testing described above will be conducted over an approximate 3-week time period. The 180-day PBR is requested to begin on the day that the tracer is first introduced (discharged) and not on the date when the discharge approval letter is issued by NJDEP or received by DuPont. A record of the date discharging begins will be made in the field operation log and NJDEP will be notified within 24 hours of that first discharge day.

If you have any questions regarding this 180-day PBR request, please feel free to contact me at (973) 492-7733.

Sincerely,

David E Epps

David E. Epps, P.G.
Project Director, Pompton Lakes Works
DuPont Corporate Remediation Group

cc: Clifford Ng – USEPA Region II
PLW Central File

BARBARA DRIVE

SCHUYLER AVENUE

IW03

IW02

IW01

ML01*

ML02

ML03*

ML04

PVP01

SGP01

EW01

30

30

15

20

20

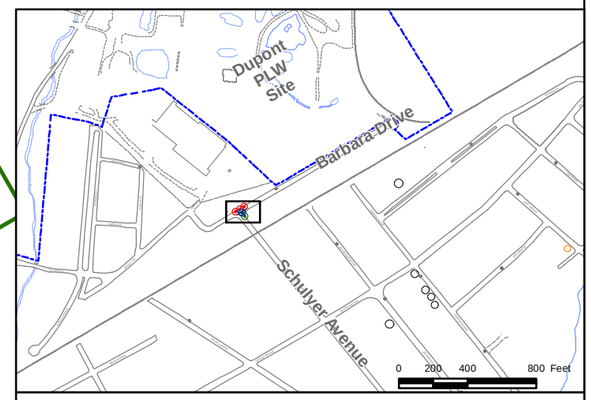
7.5

7.5

4

20

N



10 5 0 10 Feet

Legend:

- Soil Gas Probe
- Extraction Well
- Injection Well
- Point Velocity Probe
- Multilevel Monitoring Well
- Target Treatment Area

Notes:
EW - extraction well
IW - injection well
ML - multilevel monitoring well
PVP - point velocity probe
SGP - soil gas probe
* to be installed at a later date
Distances between wells are expressed in feet.

Proposed Interim Measure Layout

DuPont Pompton Lakes Works
Pompton Lakes, New Jersey

Geosyntec consultants

Guelph | 9-May-2011

Figure 1

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