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State of Ohio Environmental Protection Agency

Southeast District Office

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Bob Taft, Governor
Christopher Jones, Director

May 13, 2002

Mr. Andrew S. Hartten, Project Director
DuPont Engineering
Barley Mill Plaza - Bldg. 27
Lancaster Pike & Rte. 141
Wilmington, DE 19805

Re: Comments on April 2002 Proposed Sampling Investigation Plan for
Little Hocking Water Association Well Field
Washington County
Little Hocking, Ohio

Dear Mr. Hartten:

On April 23, 2002, the Ohio Environmental Protection Agency Southeast District Office received the April 2002 Proposed Sampling Investigation Plan for the Little Hocking Water Association Well Field. The work plan outlines the technical approach to determine the horizontal and vertical extent of C-8 in ground water in the vicinity of test well TW-4. Ground water C-8 concentrations were measured in TW-4 at approximately 37 ug/l.

Ohio EPA has completed a review of the work plan. In addition, the Little Hocking Water Association, Inc. and their consultants, Burgess & Niple, Limited; and Bennett & Williams Environmental Consultants, Inc. have collectively reviewed the work plan. Ohio EPA comments are presented first, followed by Little Hocking's comments as submitted to the Ohio EPA by letter dated May 3, 2002. Ohio EPA request that DuPont address each of the comments provided below.

Ohio EPA Comments

1. Ohio EPA request that DuPont collect and analyze soil samples in the Little Hocking Well Field to evaluate presence or absence of C-8. These soil samples should be collected in the vicinity of TW-4 and at the locations and vertical depths as indicated below in comment 3. Ohio EPA is aware that the methodology to run soil samples for C-8 may not be fully developed by Exygen at this time. Please provide a time frame for the collection and analysis of soil from the Little Hocking Well Field.

2. Ohio EPA request that duplicates of water samples be collected at an approximately 10% rate for analysis by the US EPA Laboratory in Colorado.

Little Hocking Water Association Comments

1. The Plan proposes to use a Geoprobe® for penetration into the ground. The primary advantage of the Geoprobe® is that it does not generate wastewater or cuttings, and as such, there is no disposal required. The primary disadvantages are that the method may not allow penetration to the bottom of the aquifer and that the sample obtained is quite small and no sample may be recovered from coarser material.

2. The upper sample is proposed to be taken at the top of the saturated zone, but the aquifer is more permeable in its lower 20 feet of section. It will not be known whether or not the upper part of the aquifer is confined. We therefore propose that, in the event that some wells do not fully penetrate the aquifer, the contractor be prepared to propose another method that will allow full penetration of the aquifer. Because the complete chemical properties of C-8 are not known to us at this time, we concur that collection of both shallow and deep samples address potential density issues. According to the 3M Materials Safety Data Sheet, the specific gravity is 0.4-0.5. This means that C-8 in pure form should float. However, it is imperative that the bottom of the aquifer be reached for sampling in light of the information contained in Dupont's information contained in "TE3170 PTFE Fluoropolymer Dispersions All In" wherein ammonium perfluorooctanoate (C-8) is listed as one of the compounds and the generic description of the compound include a notation that the specific gravity is 1.4 - 1.5. This means that the compound is more dense than water and will sink in the water column. There is no data provided to indicate that the surfactant, C-8, becomes stable when combined with other compounds. Further, there is no data to indicate whether or not the C-8 assumes the greater specific gravity of the new compound and is therefore denser than water and in a form that dissociates.

3. In order to look at potential differential vertical densities and solubilities, we suggest that at least two of the wells be sampled at five-foot intervals throughout the entire section from the ground surface to the bedrock surface (which is approximately 55 feet below ground surface). This includes sampling both saturated and unsaturated sections (e.g. collecting both soil and groundwater samples). A surface sample of soil should also be collected at these locations. The Geoprobe® borings that we propose for this sampling include:

   a. the first Geoprobe® boring south of TW-3 and
   b. the first Geoprobe® boring east of TW-4.

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4. In order to gather additional information between the two wells with the highest detections to date (TW-4 and PW-5), we recommend that two additional borings should be advanced between TW-4 and PW-5. These borings should be advanced at approximately equal intervals between these two existing wells.

5. In addition to the water sampling and analyses proposed in the Geoprobe® holes, existing test wells (TW-1 through TW-6 and TW-9 through TW-11) and production wells PW-1 through PW-3 and PW-5) should be sampled and analyzed at the same time as the Geoprobe® investigation. In addition, water levels should be collected from all existing production and test wells prior to beginning the Geoprobe® investigation. Water levels should be recorded for the Geoprobe® borings as the borings progress. In addition, the level of the Ohio River should be recorded at the time of the tests.

6. The Work Plan does not contain a map that shows the location of all the test wells. The Work Plan map should be revised to include all wells on the property. (The Work Plan map is attached for reference. A plat map showing the location of all the test wells and production wells is also attached).

7. According to the Work Plan, *"the probe assembly used will be decontaminated between sample locations according to the procedures described in the Quality Assurance Project Plan (Dupont, 2002)."* However, the Work Plan is not specific as to whether or not other procedures in this document will be followed. For example, the Work Plan states *"The temporary well points or Screen Point 15 Groundwater Sampler will be purged a minimum of three volumes before groundwater is sampled."* However, there are no stated requirements for collection of indicator parameters such as pH, temperature, specific conductance, and turbidity in the event of Geoprobe® sampling. The QAPP addresses these types of procedures on page 14, but it is not clear if any of these procedures will be used. Also page 11 implies that pH and specific conductance meters will be calibrated, but does not mention other meters. This needs clarification.

8. If the QAPP is to be used for determining water stability before sampling, pH, temperature, specific conductance and turbidity should be collected at a minimum. PH is of specific importance because the well with the highest reported value for C-8 (TW-4) had a field pH of 11.5 (as reported on the Chain of Custody) during the January 22, 2002 sampling event. This value was significantly higher than TW-1 at 8.2 and the remaining wells in the 7.0 to 7.6 range. Turbidity may also be important in that Geoprobe® samples typically have a higher turbidity due to the temporary nature of the well screen installation and the lack of well development. Because not a lot of information is available about C-8, sorption to the finer particles, sequestering of the finer particles and subsequent removal of the surfactant through filtering prior to laboratory analysis may prove to be a factor in concentrations. A report by A. N. Welter for 3M dated March 23, 1979 shows that FC-143 (aka C-8) sorbs only slightly (5%) to a sandy loam soil and then is readily desorbed. However, no studies on clay-rich soils or soils with appreciable organic content were included. It has been reported to the authors that Dupont currently uses granular activated carbon to lower concentrations of C-8 prior to discharge. Turbidity may prove to be a factor in interpreting the results, and therefore should be monitored and recorded.

9. The QAPP recognizes that three consecutive readings of the measured field parameters are used as the criteria to indicate stabilization of the sampled water and initiate sampling. However, the QAPP states that the readings of the parameters must be within 10 percent on the three consecutive readings. In fact, the 10 percent rule should only apply to specific conductance and turbidity. One tenth of a unit should be the criteria for pH and °C. This is due to the large nature of the increments in these measurements. For example, 10 percent of a pH of 7 means that the pH can vary between as low as 6.3 or as high as 7.7 and be considered stable. Considering that each pH unit is an order of magnitude greater than the next whole number, this shows that 10 percent is not the correct interpretation for stability. However, a one tenth of a pH unit when used as the criteria for stability means that a pH of 7 can be as low as 6.9 or as high as 7.1 and meet the stabilization criteria.

10. The QAPP indicates on page 9 that the sample will be analyzed using a LC/MS/MS and that *"Selectivity for C-8 is demonstrated by the presence in the chromatogram of a peak of a daughter ion at 369 amu from a parent of 413 amu."* We recommend that, as part of the reporting process, a library search be performed and the results be reported for other chemicals present as indicated by peaks on the same chromatogram.

11. The Work Plan states, *"The sampling process will use a narrow diameter bailer, tubing/check valve system, and peristaltic pumps."* The reviewed Materials Data Safety Sheet states that the compound is 33 to 40 percent volatiles by volume. According to the Technical Guidance Manual for Hydrogeologic Investigations and Ground Water Monitoring (Ohio EPA, February 1995), peristaltic pumps promote *"degassing and loss of VOCs; therefore, these devices are not recommended for collecting samples to be analyzed for volatile or semi-volatile compounds and dissolved gasses. The National Council of Industry for Air and Stream Improvement (NCASI, 1984) found a 10 to 30 percent loss in VOC concentrations from peristaltic/vacuum flask systems compared to results for bailers, bladder pumps, or submersible pumps."* The sample extraction methodology should be revised to exclude peristaltic pumps or sampling method that uses suction lift (and thereby creates a vacuum). Other methods of sample extraction should be specified that minimize volatilization. In the Screen Point 15 Groundwater Sampler this may effectively limit the sampling device to a mini bailer.

12. The Work Plan does not specify the material to be utilized as screen in either the Geoprobe® or the Screen Point 15 Groundwater Sampler. Screens for these devices are manufactured in aluminum, stainless steel and PVC. The QAPP indicates on page 12 that aluminum foil should be avoided. Does this mean that the Work Plan will only accept stainless steel or plastic? If so, this should be stated.

13. The Work Plan states on page 2 *"Once groundwater is sampled, the wellbore will be backfilled with bentonite."* However, neither the type of bentonite (pellets, slurry, etc.) nor the method of bentonite emplacement is specified. These penetrations into the subsurface are being made in the wellfield and if not sealed will provide a direct route for contamination from the surface. Given the concern about the route of migration for the C-8 at Dupont to the wellfield (i.e. airborne and subsequent infiltration, groundwater migration, or combination of both), ensuring sealing of the boreholes is imperative. The Work Plan should specify that a bentonite/cement slurry or neat cement grout mixture will be emplaced from the bottom of the boring until returns are seen at the surface. Both the Geoprobe® and Screen Point 15 Groundwater Sampler can meet these objectives and grout can be emplaced through a tremie tube.

14. The Work Plan should acknowledge that the Geoprobe® is good for preliminary screening efforts, but that permanent sampling points and further investigation may be necessary at the wellfield. These investigations would include looking into the reasons for the high C-8 level in Production Well #5.

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15. We will require copies of all field notes and/or data collection sheets. Engineers will need this information in order to interpret the sample results and to facilitate their investigations of this contaminant.

If you have any questions, concerning the above comments, please contact me.

Sincerely,

Steven E. Williams
Hydrogeologist

SEW/jmd

Enclosures

cc: Mike Preston, Ohio EPA, DDAGW, SEDO
Sarah Wallace, Ohio EPA, DDAGW, SEDO
Mr. Robert L. Griffin, P.E. Little Hocking Water Association
Ms. Linda Aller, Bennett & Williams
Mr. Ron Schultz, Burgess & Niple
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