



**BrightFields, Inc.**  
Environmental Services

March 12, 2007

Stephen Johnson, P.E.  
Delaware Department of Natural Resources and Environmental Control  
Site Investigation and Restoration Branch  
391 Lukens Rive  
New Castle, DE 19720-2774

**RE:** Response to Questions from Randal L. Derta, Ph.D.  
DNREC/Public Meeting  
March 8, 2007, 10 A.M. to Noon

Dear Mr. Johnson:

BrightFields received the questions from Randal Derta following your meeting with him on March 8, 2007 regarding the proposed remedial action at the former Hercules Golf Course. Per your request, BrightFields has addressed the questions which pertain to the proposed remedial action, and we understand DNREC will address the remaining issues with Mr. Derta.

The forwarded questions are restated below followed by BrightFields' response, or an indication that the question refers to a DNREC issue.

**1. Communication Issues:**

**First order of business was a discussion on communication networks both within DNREC, within the public community and between DNREC and the community. We all agreed the communication lines need to be streamlined. DNREC has several different departments responsible for issues concerning the public and not all DNREC representatives can answer for other departments. This can lead to some misunderstanding. The public needs to have a more efficient way to transmit news and developments among each other reliably. As for the new developments and postings by DNREC, a new website concerning the Delaware National Golf Course has just been posted on the web and they will enter an option for anyone to be automatically informed of new developments, time lines, programs etc by email notices. We all know not all people have computer availability but this may be the easiest and least expensive way to broadcast such news items.**

DNREC Response

## **2. Questions concerning the Risk Assessment:**

**Much discussion on the philosophy, technology and principles behind the process of hazard/risk assessment methods used for the remediation. We concluded there are some questions we might present to BrightFields who applied the risk assessment. Stephen Johnson said he would make some inquiries.**

Not a Question

## **3. Need for analysis of non-agricultural pollutants:**

**Some of us have been concerned that the analyses done so far have been heavily biased toward agrichemicals. Given that this area is on or near a plant with a significant toxic waste stream, it seems more emphasis on industrial chemicals. There have been VOC and SVOC analyses on sediment and water samples but not on other soil samples. Stephen Johnson said he would make an inquiry.**

BrightFields Response - The statement that VOC and SVOC analyses have not been performed on soil samples is not correct. The following is quoted from BrightFields October 2004 Remedial Investigation/Feasibility Study (RI/FS); Section 5.2 HSCA Remedial Investigation; page 10.

### **Soil**

- Eight Geoprobe<sup>®</sup> borings and 2 hand auger borings were advanced across the property and 10 shallow and 10 deep soil samples were collected.
- All 20 soil samples were submitted to Lancaster Laboratories, a HSCA certified lab, to be analyzed for: Target Compound List (TCL) Volatile Organic Compounds (VOCs), TCL Semivolatile Organic Compounds (SVOCs), TCL pesticides/PCBs, and Target Analyte List (TAL) metals and cyanide according to the Delaware HSCA SOP.

The following analytical results were reported on Page 24 of the above referenced RI/FS.

### **TCL VOCs**

Toluene and xylenes were detected at estimated concentrations in soil sample HRP-SB04-S001 below URS criteria and were not detected in any other sample. All other VOCs were not detected above laboratory detection limits.

### **TCL SVOCs:**

2-Methylnaphthalene was detected in soil sample HRP-SB04-S001 at an estimated concentration below DNREC URS criteria and was not detected in any other sample. No other SVOCs were detected above laboratory detection limits.

These analytical results are reported in tabular form in Table 6-2 of the RI/FS.

#### **4. More testing on the west Woods area:**

**There is apparently some intent on clearing and building on parts of the wooded area near Tall Trees Ln. No testing has been done on this area and we suggested this be considered. Stephen Johnson said he would investigate**

BrightFields Response - The wooded area on the western portion of the subject property includes woods both east and west of golf holes #6 and #7. It was reported to BrightFields that these two golf holes were constructed after the other portions of the golf course were constructed. Construction of holes #6 and #7 included clearing a swath through the referenced woods near Tall Trees Lane. Figure 2 of the RI/FS shows the location of 12 soil samples collected on and around holes #6 and #7, thus providing data from the historically wooded area. There were no exceedences of DNREC URS values reported in these 12 samples.

It is BrightFields opinion that the lack of contaminants in the samples from the vicinity of holes # 6 and #7 strongly supports the conclusion that the contaminants identified on the property are related to the historical application of pesticides associated with operation of the golf course. By the time these holes were constructed, arsenic-containing pesticides and pesticides such as chlordane, were not used.

All building lots, including any located in the wooded area near Tall Trees Lane, will be sampled for contaminants of concern prior to construction of new residences. If necessary, remedial measures will be taken to achieve the target cleanup levels as set by DNREC policy.

#### **5. More testing on Red Clay Creek:**

**This was discussed. No resolution was settled.**

Not a Question

#### **6. Investigate residues of pesticides known to exist on the property:**

**We have a list of pesticides that have been used on the golf course since 1973. Some of them have been tested but many have not. Indeed the analyses have been heavily biased towards insecticides. The list was handed to Stephen Johnson. He said he would inquire if**

**these have actually been examined or if not, could they be...or should they be? We may need to revisit this issue when we get a report from Brightfields.**

BrightFields Response – BrightFields October 2004 RI/FS reported the results of soil analysis for Priority Pollutant pesticides. BrightFields received comments from DNREC that included a generic list of “pesticides, herbicides, and fungicides that are *typically* used on golf courses in this region.” At that time BrightFields obtained the referenced pesticide application logs for the golf course that listed the actual chemicals used dating back to 1973. We undertook a review of the chemicals that were used, including how frequently they were applied and identified root chemicals associated with the commercial brand-names of the products. As noted by DNREC, “most of these materials are not included in the Target Compound List (TCL)/Target Analyte List (TAL)” which were reported in the RI/FS; therefore BrightFields performed a supplementary investigation to address this data gap.

A comparison was done of the chemicals referenced in the application logs to the chemicals regulated by DNREC in the Uniform Risk-based Standards (URS) under HSCA. Many of the applied chemicals do not have a URS value; therefore, there is not an applicable regulatory benchmark by which to compare the analytical data. BrightFields identified all pesticides, herbicides, insecticides, fungicides, and growth hormones which are listed in the site’s application log and for which there is also a DNREC URS value and conducted a Supplementary Investigation. The following was stated in our April 6, 2006 Supplementary Investigation Report.

“Soil investigations on the golf course were performed to confirm that additional pesticide/herbicide compounds (2,4-D, Glyphosate, Oxadiazon, and Chlorpyrifos), not analyzed previously, have the same vertical distribution with arsenic as the currently known pesticides documented in BrightFields’ Remedial Investigation/Feasibility Study...” “None of the additional pesticide/herbicide compounds that were tested (2,4-D, Glyphosate, Oxadiazon, and Chlorpyrifos) were found to be above the URS for residential use.”

Based on our Remedial Investigation data, evaluation of the pesticide application logs, and the Supplementary Investigation we believe that the chemicals actually used at this site and for which there is an applicable cleanup level have been considered in the investigation and development of the cleanup plan. Soil samples collected following remedial action to confirm that targeted soil cleanup levels have been achieved will include analysis for identified contaminants of concern.

#### **7. Missing herbicide tests:**

**Samples from PH-1 through PH-23 were extracted for herbicide analysis by the Washington Group. However no data were reported for these samples. It is unclear if they were sent off to another laboratory for analysis or if they were simply stored away. Stephen Johnson will make an inquiry on this.**

**I (RLD) also asked why no other samples were subjected to herbicide analysis. We await an answer.**

BrightFields Response – Nine of the TriState surface soil samples (PH-1, PH-2, PH-4, PH-6, PH-14, PH-17, PH-22, and PH-23), plus a duplicate of sample PH-2, were extracted and analyzed for the herbicides 2,4-D and 2,4,5-TP (Silvex). These samples were collected from various parts of the golf course and included tees, green, fairways, and wooded areas. None of these herbicides were detected in any of the nine soil samples. The analytical data is included in Appendix B.1 of the October 2004 RI/FS.

In addition, herbicide analysis (for 2,4-D, Glyphosate, and Oxadiazon) was performed during the soil sampling event summarized in the April 2006 Supplemental Investigation, as summarized in Question #6 above.

#### **8. Sample analyses through 2005 and 2006:**

**We have been told that more samples have been taken and analyzed through 2005 and 2006. I (RLD) asked for the data. Amanda Gonye said she had the new data and could make it available to me.**

BrightFields Response – Soil sampling data collected subsequent to the October 2004 RI/FS includes the April 2006 Supplemental Investigation Report referenced above and the results from soil samples collected by BrightFields during a test pit investigation at the site by Toll Brothers civil engineer in January 2005. A written summary of both of these events has been provided to DNREC.

#### **9. No analyses for Dioxin:**

**On account this is an industrial site with an incinerator, I (RLD) asked if there has been any dioxin analyses which may have broad cast over the area as dust or condensation. Amanda Gonye also suggested there might have been dioxin contamination of 2,4-D or 2,4,5-TP which has been used on the property since 1973. Stephen Johnson and Timothy Ratsep discussed the possibility that a screening test was done early in the testing series. Stephen Johnson said he will investigate.**

BrightFields Response – See response to the missing herbicide test comment. In addition, 2,4-D was analyzed for and not detected in the six additional soil samples as reported in BrightFields April 2006 Supplemental Investigation report.

#### **10. The RCRA Corrective action site:**

**Several issues were brought to the table regarding this. The RCRA Corrective action (actions) was/were burned onto a CD and given to me (RLD). Apparently there is some confusion regarding the demolition of a building on the research property and removal of**

**50 tons of soil. Both Stephen Johnson and Timothy Ratsep agreed this sounded like an Aqualon remediation which is located elsewhere. However there has been RCRA Corrective actions on the Hercules property and this should be summarized on the CD.**

**I (RLD) suggested the “Dump Site” may not be directly connected to the area in question for development, but the fact that it is there could endanger curious children as an “attractive nuisance.” Stephen suggested the site would surely be fenced. However it doesn’t appear to be so. I said I have not seen such a barrier when visiting personally and it certainly is not shown on any satellite photographs.**

DNREC Response

**11. Inhalation vs. oral ingestion of Arsenic as a mode of exposure:**

**It appeared the consensus among the DNREC attendees was that inhalation of Arsenic was not a significant route of exposure. I (RLD) insisted that inhalation of dust particles is an important and significant route of Arsenic exposure. I explained that inhalation and lodging inside the lungs would give the Arsenic greater body residence time as it is either enzymatically mobilized or absorbed or it is expressed out of the lungs by ciliary action and consequently swallowed. The process is, at that point, equivalent to direct oral ingestion. I insisted this had to be taken into account for containment of dust during remediation. I did not detect a significant conclusion on this issue. Presumably any remediation will be done in a manner that minimizes dust release.**

BrightFields Response – The presumption that remediation will be done in a manner that minimizes dust release is correct. In addition, dust monitoring will be conducted during the remediation in accordance with a Health and Safety Plan that establishes action levels for dust readings that are based on site-specific analytical data.

**12. Concerns of the waste stream of the Hercules Research Facility:**

**I (RLD) mentioned my concern of a residential area being placed so closely to a facility which is a major producer of hazardous waste. I mentioned a few of the statistics from the EDR Feasibility report regarding mercury, lead, methyl ethyl ketone and caustics. It appears this was a surprise to the DNREC personnel. No conclusion was made but because the waste stream data appeared to not be in the copy of the feasibility report in Stephen Johnson’s I promised to make the data possession, I said I would locate my copy and he will try to find it after I have given him page numbers or a section description.**

DNREC Response

**13. Data for similar golf courses in the local area and around the country:**

I (RLD) requested any information DNREC might have for comparison of analytical data for golf courses around the country and specifically in this region. They gave me two articles I have not had time to review and a reference from the Journal of Environmental Science and Technology. I will have to secure that article on my own. A cursory examination indicates these sources are limited in scope and content.

DNREC Response

**14. What is Hercules working with at this time?:**

I (RLD) asked if there is any information regarding what products were being developed at the site at this time and if it might have an impact on the future community. I also wanted to know if there were any industrial intermediate components that might be hazardous to the local population. This information was not available. Stephen Johnson said he would make an inquiry.

DNREC Response

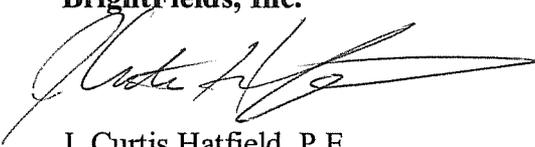
**15. What about storage of toxic waste on the site?:**

I asked this for the same reason, regarding the safety and health of the new residents as well as those who currently live in the area. This information was not available. Stephen Johnson said he would make an inquiry.

DNREC Response

If you have any questions or comments, please contact me at 302-656-9600.

Sincerely,  
**BrightFields, Inc.**



J. Curtis Hatfield, P.E.  
Program Manger

cc: Jeffrey Bartos – TBI  
Andrew Semon, TBI  
Marc Kaplin - Esq.