

# Critical Analysis and Comments on March 2007 Proposed Remedial Action

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Explanation: Text in black (Times 12 font) refers to actual text copied from title document.

Page numbers of text are **bold**.

HEADING, in capitals, refer to headings in text, to help in finding the cited lines.

Items I am calling attention to and later making my comments on are highlighted in **bold red**.

My comments and observations are in *bold italics*.

## Page 1

“PREAMBLE” — present the **approach** for remediation

*What is really meant by approach? Are other approaches considered? Should these alternatives be at least mentioned?*

## SITE DESCRIPTION

— **subject** property

The site is composed of **two** tax **parcels**.

*Does this remedial action plan cover both parcels?*

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### ENVIRONMENTAL .....SOIL

(TriState) in 2003) Samples contained **elevated concentrations** of arsenic, lead, chlordane, 4,4' DDE, heptachlor epoxide and dieldrin

*Actual levels not mentioned (on purpose?)*

Samples collected from golf course greens were **significantly higher in concentration** than those collected from fairways.

*Levels not mentioned (on purpose?)*

(BrightFields in Oct. 2003) Technical chlordane, dieldrin, heptachlor epoxide, **aldrin, cadmium, lead and mercury** were detected in several of the soil samples collected from both greens

*The more they tested the more harmful chemicals they found.*

(BrightFields in Oct. 2004) During the RI (Remedial Investigation) arsenic, mercury, cadmium and lead were detected at elevated concentrations in soil samples.....from the surface to a maximum depth of 3.5 feet bgs (below ground surface)

*The contamination concentration gradient is not disclosed. Was 3.5 ft bgs the limit of contamination? That is, all the above mentioned 10 harmful contaminants were found to be present at 3.5 bgs. ? How sure are we that at 4 bgs there are NO contaminants?*

## Page 3

Additional soil samples will be **collected and analyzed** (*how and when?*) throughout the proposed remedial **action** .....

*So far, the action has not been proposed in this text*

..... in conjunction with the collection of real time field **screening** data.....

*How is this going to influence the remediation process? Are the communities going to be notified if some hitherto undetected contaminants are detected?*

.....(i.e., **XRF soil analyses**).

*We have serious doubts about the accuracy of the XRF testing.*

Data presented in "Response to Comments on the June 2005 Draft Arsenic Risk Management Proposal, dated February 2007, Attachment B, Table 1 Replicate soil analysis" show a range from 5.7 to 12.9 mg/kg (= ppm) arsenic concentration performed 12/5/05 on 20 soil replicates (sic!) by X-ray Fluorescent (XRF) analysis. That is a lower and higher deviation of 43 and 29%, respectively, from the 10 ppm median, or 42 and 31% deviation from the 9.8 ppm average.

*Thus, a single analysis can be off by 30%!*

#### SUPPLEMENTAL INVESTIGATION

In February 2006, per DNREC direction, BrightFields conducted additional soil investigations on the southern wooded lot (#10) to assess whether **golf course operations** on the adjacent lot have impacted this area where future residential lots are planned.

*This lot being next to the Hercules Research Center, it should have been scrutinized for residues that could have been deposited from the operation of the now-defunct INCINERATOR and possible buried waste material from the era when Hercules was working on Agent Orange.*

*Even DNREC realized that this tract should be examined differently* (e-mailed to BrightFields on 2/23/05 by Gregory M. DeCowsky gregory.decowsky@state.de.us Environmental Scientist III \_DNREC/DAWM/SIRB): "Although, the report indicates that Lot 10 was not used in golf course operation, other past uses may have occurred since the site was formerly owned by Hercules, Inc. and is adjacent to their Research Center. Collection of additional samples from this lot will be needed to evaluate risk to human health and the environment."

..... confirm that **additional pesticide/herbicide compounds** (2,4-D, Glyphosate, Oxadiazon and Chlorpyrifos), **not analyzed previously**, .....

*Why were previous samples not re-analyzed on Lot #5 for these compounds — which are admittedly "pesticide/herbicide compounds" — in February 2006?*

.....have the **same vertical distribution with arsenic** as the currently known pesticides ...

Does this imply that if there was no arsenic present, they did not seem to find a need to analyze for other contaminants?

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#### CONCLUSIONS.....SOIL

...arsenic **appears** to be present to depths of 3.5 feet bgs..... (and even) 6 inches bgs in the fairways.

*Because of their low solubility, most pesticides/fungicides do not migrate far into the soil. Their presence at 3.5 bgs indicates that the soil has been greatly disturbed during the several modifications of the golf course. Thus, one cannot assume that the present layout should be the basis for assuming where excessive application of these chemicals should be the "logical" sites.*

Seven of 9 greens, 2 practice greens, 2 of 9 tees and one fairway have **arsenic concentration exceeding 37 mg/kg.**

*Some areas far exceeded this level!*

*Even DNREC indicated that some areas are unbelievably contaminated.*

*DNREC Community Update (May 27, 2004) clearly defines that some contaminations were far, far*

*greater than what Toll Bros. uses:*

"...arsenic in surface soils ranged from below ... detection ... to 1,100 ppm. .... The concentration of lead in surface soils ranged from non-detect to 3,400 ppm. DNREC considers 400 ppm lead as a health-based action level for lead in a residential setting.

## Page 5

### HUMAN HEALTH RISKS

The cumulative **risk calculations** indicate.....

*I could find only reference to Inhalation Exposure Calculation (DNREC cited Feb 2007):*

Carcinogenic Intake = CS x IR(Ingestion Rate) x ET x EF(Exposure Frequency) x ED/BW (Exposure Duration/Body Weight) x AT x PEF (Particulate Emission Factor).

*[I could find no explanation for the other abbreviations]*

*The interesting part is that for children IR is considered twice as for adults, and the body weight about 1/5 of an adult. If everything else remains equal, a child's "intake" is 10 times greater than for an adult, thus putting him/her at a far greater risk. DNREC calculates risk as:*

Carcinogenic Risk = Carcinogenic Intake x Slope Factor

*Since the slope factor is 10 times greater for inhaled particulate than for dermal contact or incidental ingestion, our focus (and DNREC's) should be on avoiding ANY operation that would generate airborne particles, i.e., dust.*

Elevated arsenic concentration .....**would** result in unacceptable risks in a residential land use scenario.

*It should have stated "does result"*

### REMEDIAL ACTION OBJECTIVES

- Control potential human contact (dermal, inhalation and ingestion) with contaminated soil.

These objectives are consistent with ..... **New Castle County zoning policies** ..... and worker health and safety.

*We need to find out whether NCCo has really any reference to acceptable levels of contamination in its "zoning policies". If yes, we should examine it for relevance.*

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- The cleanup goal for arsenic in soil is a concentration 11 mg/kg/ This is the default background concentration **recognized** in DNREC **guidance**.

... the cleanup goals are more conservative than applied in **some states**.

*"Some states" with a minimum background level (according to Table 2 in previously cited 2007 DNREC document) of between 5 and 7 ppm arsenic: HI, RI, WA, VW; between 1 and 4.9 ppm: AK, AR, CO, ME, MD, NC, OR, VA, TX; Between 0 and 0.9 ppm: FL, KT, LA, MI, NH, NJ, NM, ND, MT, OK, TN. That's 24 states!*

*The minimum background levels apply to residential areas and playgrounds.*

- The cleanup goal for pesticide-related compounds in sediment is a concentration of 0.002 mg/kg.  
*There has been no mention how these levels will be ascertained and for what compounds.*

PROPOSED REMEDIAL ACTION

Based on.....**historical** information

*Before the golf course, this area was an orchard. In those days, most pesticides and fungicides contained arsenic. Did anybody research the "historical past" of this area beyond the golf course's existence?*

1. No soil **will** be left on site with arsenic concentration exceeding 11 mg/kg.

*How can this be categorically stated without actually analyzing every part of the area after remediation?*

1.a Solid containing arsenic concentration greater than 37 mg/kg, will be excavated and removed offsite for **proper disposal**.

*There has been no mention how this contaminated soil is going to be transported safely on public highways, on routes lined with residential communities, and what "proper disposal" entails.*

1.b Soil concentration between 11 mg/kg and 37 mg/kg will be **mechanically** blended.....

*There has been no detail given how this mechanical blending will be carried out, nor has been any detail given why one should assume that no dust (that is floating soil particles with "sorbed" dangerous contaminants attached to them) will be generated that will be carried by natural air stream beyond the boundaries of the work area into the neighboring residential communities and beyond.*

.....with the **soil below** it **containing** the default background standard of **11 mg/kg** or less **in a 1:1 blending ratio** .....the resulting arsenic concentrations will be less than ..... 11 mg/kg.

*(a) This does not specify how far below one will have to excavate to find soil with suitable low concentration.*

*(b) There is a significant flaw in the reasoning! If one blends 37 mg/kg As soil with 11 mg/kg AS soil in a 1:1 blending ratio, one will wind up with soil containing (on the average) 24 mg/kg As! The blending ratio has to be adjusted for each particular contamination combination.*

*Even if one had "clean" soil with 0 ppm As, one would need a 1:2.36 blending ratio (contaminated:clean) to achieve 11 ppm. But if one has only 5 ppm As soil, the blending ratio would have to be increased to 1: 4.33.*

BrightFields will conduct environmental and safety **oversight**...

*The idea that the possible contaminator should watch over itself goes against conventional wisdom.*

Contingency plans **will** also **be prepared**.....

*Why haven't yet been prepared to allow public scrutiny?*

.....which address **procedures** in the event unforeseen environmental conditions are encountered

*Will these procedures involve immediate notification of neighboring communities? In what manner?*

*(Although, as the events at Chernobyl demonstrated, it is too late to issue notification once the damage to the neighboring population became irreversible)*

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BrightFields will **coordinate oversight and monitoring** activities with DNREC...

*What does "coordination" entail? Who is accepting responsibility in case of contamination? BrightFields, DNREC or even New Castle County (for approving a process that it did not oversee)?*

## GENERAL COMMENTS

As a chemist, as a chemical engineer, as a concerned citizen, and as the board member of our civic association, I have read word by word the remedial action plan.

The greatest flaws in the Proposed Remedial Action are not what it says, but what it does NOT mention (or purposely avoids?)

Namely, the health and safety considerations affecting the neighboring communities, as well as that of the worker who will carry out the proposed remediation.

The neighboring communities, and there are several hundreds households with hundreds of children, do not want only "general reassurances" that the remediation is going to be carried out safely but want to see the DETAILS of the proposed project, want to see the credentials — not only "organizational" but scientific credentials — of the individuals overseeing this project because these individuals will hold in their hands literally the health of everybody living in the "airborne" neighborhood, as well as the life expectancy of every child.

We define "airborne" neighborhoods as an area in the vicinity of the ex Hercules Golf Course where dust particles, contaminated with toxic pollutants — especially arsenic, can be carried by the wind during the unavoidably dust-generating operations of digging up soil, dumping it into trucks and, especially, mechanically mixing it (tilling, in BrightFields parlance).

The size of this "airborne" area will be dependent on the force and direction of the then-prevailing wind and the fineness of the dust particles. It can even include the playground and the ball fields in Brandywine Springs Park.

Nowhere in the Proposed Remedial Action was it specified what level of arsenic will be in these dust particles. Nor does it disclose what the government standards are for airborne dust particles.

We have not seen any plans as to how the communities will be notified in case of an "accidental" dust emission, or what remedial action will be taken to counteract the already inhaled poisonous arsenic in the affected population. We want to know who is going to be financially and legally responsible in case of such an incident.

And if the dust cloud was substantial enough, who is going to foot the bill for the remediation of the affected neighboring properties? Or are the now dispersed arsenic-containing particles be just be left in everybody's yard to be stirred up next time they mow their lawns.

I hope my comments convinced you how serious this problem is, and how superficial the Proposed Remedial Action is. Before the public should accept or reject such a plan, it should be at least given enough information.