

**CDM Federal Programs Corporation (CDM)  
Preliminary Phase 2 Groundwater Report  
Borit Asbestos Super fund Site, Operable Unit 1, Ambler, P A**

**A review by Gordon Chase for Borit CAG members  
May 13<sup>th</sup> 2011**

## **Introduction**

On February 25<sup>th</sup> 2011 CDM submitted to EPA a '*brief Preliminary Phase 2 Groundwater Report that presents data tables and figures summarizing only the results of the Operable Unit 1 (OU-1) Phase 2 field investigation for groundwater and dioxins in soil at the Borit Asbestos Site (the Site) in Ambler, P A. EPA authorized CDM to prepare this Preliminary Groundwater Report to support EPA's scoping process for additional groundwater field investigation at the Site.*'<sup>1</sup>

At the May CAG meeting, EPA made a presentation summarising aspects of the CDM report for the benefit of members so that they may better understand the contamination of soils and groundwater at the site.

A review of CDM's report by this author suggested that perhaps a more detailed review of the quantitative data than that given in EPA's presentation may provide CAG members with a deeper understanding of the contaminant levels found by CDM that were not detailed in the EPA presentation.

Data reviewed in this report comes solely from the CDM report and the views expressed in this review are solely those of the author. This review is intended only to highlight those aspects of the CDM report that were not dealt with by the EPA presentation to CAG and is not intended to validate or otherwise any of the CDM data.

## **Contaminants**

As detailed by CDM and EPA, contaminants found during this investigation included asbestos, arsenic, manganese, vanadium, carbon tetrachloride, tetrachloroethene, bis(2-ethylhexyl)phthalate and dioxins. I shall touch on each of these in turn detailing the contamination levels found and how they compare to regional screening limits (RSL) and maximum contaminant levels (MCL) as mandated by EPA. Since Ambler Borough receives drinking water from ground water sources (less than 0.5 miles from Ambler Borough well #4 to Borit), I shall also relate them to drinking water standards as laid down by EPA where appropriate.

### **Asbestos**

As no doubt the most obvious of contaminants at Borit, it may not be surprising that asbestos was found in one of the wells. What is noteworthy is that it was found at the deepest well (#4 adjacent to the reservoir) some 100ft below ground surface level. The detection level of 510,000 fibres/l is within the MCL of 7 million fibres/l (as per EPA's presentation). Clearly, the asbestos is capable of travelling deep below the surface when suitable pathways present themselves.

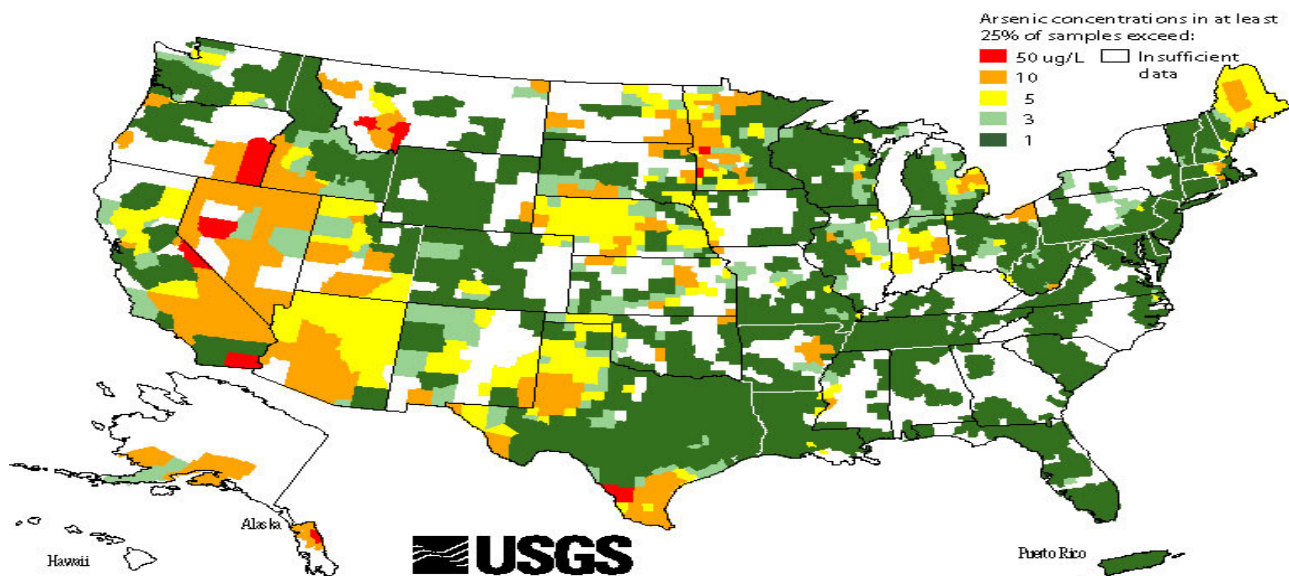
### **Arsenic**

Arsenic is the number 1 priority contaminant listed on the ATSDR CERCLA priority list of hazardous substances and as such will be of concern to both residents and authorities alike. Though a naturally occurring metalloid, present in significant concentrations in different parts of the USA, the US Geological Service indicates south-east Pennsylvania as being generally one of the

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<sup>1</sup> [http://www.epa.gov/reg3hwmd/npl/PAD981034887/documents/Preliminary\\_Phase\\_2\\_Groundwater\\_Report-2011.pdf](http://www.epa.gov/reg3hwmd/npl/PAD981034887/documents/Preliminary_Phase_2_Groundwater_Report-2011.pdf)

lowest contamination regions in the country.<sup>2</sup>



The EPA presentation stated that arsenic was found in wells 3 and 5 (depths of 53 and 64 ft respectively), but did not give any further details. The CDM report states that concentrations of 7.6ug/l (micrograms/litre) and 5ug/l were found in the respective wells, but the samples were flagged 'J = Analyte present. Reported value may not be accurate or precise.' The RSL for arsenic is 0.045ug/l. Levels of 7.6 and 5.0 are two orders of magnitude above the RSL at 169 and 111 times respectively. The MCL for arsenic in drinking water is 10ug/l in Pennsylvania, though it is worth noting that New Jersey considers this level too high and has a MCL of 5ug/l. The EPA also has a MCL goal of zero for this contaminant.

Clearly detection of arsenic at such levels, if confirmed as accurate, would constitute a significant finding for residents, the water authority and EPA. It would appear necessarily prudent to investigate arsenic contamination further to validate or otherwise the findings in the CDM report.

### Manganese

Manganese is listed at 117 on the CERCLA list. It has a RSL of 88ug/l, though no MCL as manganese is not a contaminant that is currently controlled under the EPA mandated drinking water specifications. However the EPA does give a 'secondary drinking water standard' for manganese (not enforceable) of 50ug/l.<sup>3</sup> The EPA presentation stated that manganese was found in four of the six wells (3,4,5 and 6) at depths of between 53 and 100ft (the deepest well). EPA did not detail the quantitative data in their presentation. CDM reported the following contaminant levels:

well 3:	9,620 ug/l
well 4:	86.7ug/l
well 5:	156 ug/l
well 6:	426 ug/l

Clearly all of the samples were at or exceeded both the RSL and secondary drinking water standard with well 3 being two orders of magnitude higher at nearly 200 times the drinking water standard. Ambler Borough has for some time noted problems with manganese contamination with the drinking water as evidenced from their web site which states: "The chief complaint about the Borough' water is its hardness, with iron and manganese problems being the next in line."<sup>4</sup>

<sup>2</sup>[http://water.usgs.gov/nawqa/trace/pubs/geo\\_v46n11/fig2.html](http://water.usgs.gov/nawqa/trace/pubs/geo_v46n11/fig2.html)

<sup>3</sup>There appears to be some incongruity here as the RSL appears higher than the secondary drinking water standard.

<sup>4</sup><http://www.ambler.pa.us/utilities.asp#wfd>

## Vanadium

Vanadium is #198 on the CERCLA list and was detected in well # 2 (63ft) at concentrations of 10.6ug/l compared to the RSL of 0.26ug/l (40 times the RSL). However this sample was flagged '*J = Analyte present. Reported value may not be accurate or precise.*' There is no MCL for Vanadium.

## Carbon Tetrachloride

Carbon Tetrachloride is #47 on the CERCLA list and was found in well #2 (63ft) at 5.8ug/l compared to an RSL of 0.44ug/l and a MCL of 5.0ug/l. As such the level detected exceeds the mandated drinking water level and is 13 times the RSL. The EPA has a MCL goal of zero for this contaminant.

## Tetrachloroethene

Tetrachloroethene is #33 on CERCLA list and was found in well #2 at 22ug/l., exactly 200 times the RSL of 0.11ug/l and over 4 times the drinking water MCL of 5ug/l. According to EPA, potential health effects include '*liver problems; increased risk of cancer.*'<sup>5</sup> EPA has a MCL goal of zero for this contaminant.

## Bis(2-ethylhexyl)phthalate

Sometimes referred to in EPA literature as Di(2-ethylhexyl)phthalate this contaminant is #76 on the CERCLA list with an MCL of 6ug/l and an EPA MCL target of zero. This contaminant was found in wells 2,5 and 6 at levels of 55, 42 and 14ug/l respectively. According to EPA this contaminant is associated with '*Reproductive difficulties; liver problems; increased risk of cancer.*'<sup>5</sup>

## Dioxins

EPA advised in their presentation that EPA clean up goal for for dioxin residential soil is 1000parts per trillion (ppt) and that the highest result was 46ppt. However it should be noted that CDM reported '*Twenty samples out of 22 sample results (91%) exceeded the RSL for 2,3,7,8 TCDD.*' The RSL for dioxins is 4.5ppt revealing that the sample from well 1A was 10 ten times the RSL

## Turbidity

Whilst it must be remembered that we are not looking at drinking water samples taken from these test wells, the concerns that the CAG and residents will have is the possibility of these contaminants ultimately reaching the drinking water source of Ambler Borough. For the sake of completeness therefore I am also reporting here the turbidity findings from the test wells. The EPA states with regards to turbidity in drinking water that: '*For systems that use conventional or direct filtration, at no time can turbidity (cloudiness of water) go higher than 1 nephelometric turbidity unit NTU, and samples for turbidity must be less than or equal to 0.3 NTU in at least 95 percent of the samples in any month. Systems that use filtration other than the conventional or direct filtration must follow state limits, which must include turbidity at no time exceeding 5 NTU.*'<sup>6</sup>

CDM reports that the turbidity levels in wells 1a through 6 were (in NTU's): 25.9, 24.2, 0, 130, 4.1 and 5.5 respectively. As a visual aid CAG members might find the pictorial below helpful.

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<sup>5</sup> <http://water.epa.gov/drink/contaminants/index.cfm#Secondary>

<sup>5</sup>

<sup>6</sup><http://water.epa.gov/drink/contaminants/index.cfm#List>



Source: <http://ga.water.usgs.gov/edu/pictures/turbiditywithnumbers.jpg>

### **Summary, conclusions and recommendations**

Going through the CDM report and the EPA presentation, one could not help but notice that despite there being several contaminants found by CDM at orders of magnitude above the regional screening limits (and highlighted in bold figures in their report), none of these severe exceedances were highlighted by EPA in their presentation to the CAG. The only quantitative contaminant highlights given by EPA were for those contaminants that did *not* exceed the MCL's.

In addition, CDM made note that '*At the request of the EPA WAM [work assignment manager], CDM is not including any recommendations for additional field investigations at this time.*'<sup>7</sup> Considering the levels of contaminants found and the proximity to Ambler Borough drinking water wells, it appears essential that further field investigations are required to determine the pathways that may exist between the varying groundwater bodies in the region. The fact that Ambler Borough already note significant manganese issues and that high levels of manganese has been found both in the soils and groundwater at Borit should surely make further field investigations concerning linkage, necessary.

Current Ambler Borough water well test data was not available at the time of writing. The latest report available on line was for 2008 and strangely, many of the results quoted in the 2008 report actually refer to samples taken in 2004! As such I consider it a matter of some importance that the latest test data from each Ambler Borough public water well be provided to the CAG for our deliberation. It would also be important to know the exact location and depth of the Ambler Borough wells so that we may compare water levels and distances from the Borit site. The CDM report is based upon samples from ground water levels at between 175 and 182 ft above mean sea level for the six monitoring (water sampling) wells and 188ft above mean sea level at the 3 geotechnical wells.

In addition to these results found at Borit, one cannot ignore the fact that the old Ambler Piles super-fund site sits quietly next door to Borit and may well be leaching the same cocktail of chemicals into the groundwater. It seems inescapable, now that we have ascertained positive contamination of Borit groundwater, that groundwater under the old Ambler piles also needs to be investigated. Failure to investigate the Ambler Pile while investigating the Borit pile would be akin to the blind man describing an elephant by holding on to its tail.

The fatalities associated with arsenic poisoning from well water are well known, hence arsenic appearing at the top of the CERCLA hazardous priority list. If only this were the sole toxic substance appearing in the groundwater at Borit, but it is not. The USGS would seem to suggest that arsenic contamination at the levels experienced at Borit is unlikely to have come from natural geological presence, nor would I venture, are many of the other contaminants found at such high levels. Our concern now must be to focus on the possible pathways to Ambler Borough drinking water supplies and also to the extent that the old Ambler Piles may be contributing similar levels of toxins.

The EPA in their presentation stated that the next steps would include additional

<sup>7</sup> [http://www.epa.gov/reg3hwmd/npl/PAD981034887/documents/Preliminary\\_Phase\\_2\\_Groundwater\\_Report-2011.pdf](http://www.epa.gov/reg3hwmd/npl/PAD981034887/documents/Preliminary_Phase_2_Groundwater_Report-2011.pdf) section 4-1

groundwater sampling, a background sampling program and a human and ecological risk program. What additional groundwater sampling is envisioned by EPA I cannot say, but I believe the CAG must prompt the EPA to pursue a full evaluation of the geological pathways between Borit, the Ambler Piles and the Ambler Borough water wells. Contaminants have already found their way to at least 100 feet below the surface and maybe much further, but we do not know their lateral spread. The manganese in the Ambler Borough water gives this author further grounds for suspicion of possible linkage to Borit. These questions need to be investigated further.

I hope this personal review of the CDM report and the EPA presentation is of use in assisting CAG members evaluate the valuable information contained therein. I respectfully submit it to the RR&M work-group for deliberation and subsequent discussion by the full CAG at the June meeting, to which end may I request time be allotted by the co-chairs accordingly.

Gordon Chase  
May 13<sup>th</sup> 2011