



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**  
NEW ENGLAND - REGION I  
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BOSTON, MASSACHUSETTS 02114-2023

August 16, 2006

Lonnie Monaco (orlando.monaco@navy.mil)  
Dept of the Navy, BRAC PMO Northeast  
Code 5090 BPMO NE/LM  
4911 South Broad St  
Philadelphia, PA 19112-1303

**Re: *Draft Monitored Natural Attenuation Assessment of the Eastern Plume Long Term Monitoring, dated June 2006, Naval Air Station Brunswick, Maine***

Dear Mr. Monaco:

Pursuant to § 6 of the Naval Air Station Brunswick, Maine Federal Facility Agreement dated October 19, 1990, as amended (FFA), the Environmental Protection Agency has reviewed the subject document and comments are below.

**General Comments**

1. The document provides a complete and accurate summary of the data collected to support an assessment of the natural-attenuation potential for the Eastern Plume. This will serve as a valuable resource for continuing work on the plume. The conclusion reached in the report, i.e., that conditions in the Eastern Plume generally are not favorable for reductive dechlorination, is supported by the data.

**Specific Comments**

2. **p. 2, sec. 2, para. 1:** It is agreed that "... biodegradation mechanisms are the most critical ...," as stated. It might be noted here that EPA guidance expresses a clear preference for "destruction" as a natural attenuation mechanism, i.e., it is unlikely to receive EPA approval for a MNA remedy that relies primarily on non-destructive mechanisms, such as dispersion.

It might also be noted in this context that *abiotic* degradation processes are likely to be viewed favorably by regulators, if demonstrable. A previous qualitative assessment of monitoring data from the Eastern Plume found that 1,1-DCA and 1,1-DCE are present at comparable concentrations at wells exhibiting elevated 1,1,1-TCA. The 1,1-DCE may be present as an abiotic degradation product (by hydrolysis) of 1,1,1-TCA, suggesting that abiotic breakdown is comparable in magnitude to microbial degradation (the latter

yielding the 1,1-DCA).

3. **p. 3, sec. 2:** The text states, "... natural organic carbon [has] not been reported at detectable levels ... ." Does this refer to the TOC analyses performed on the groundwater samples collected for the MNA assessment? If so, how does that analysis discriminate between naturally occurring carbon and carbon from anthropogenic sources (e.g., BTEX)? Have any organic carbon analyses been performed on soil samples collected from the contaminated intervals of the Eastern Plume? It might be more precise simply to state that organic carbon has not been reported at detectable levels in groundwater in the present study, either in the form of dissolved TOC or in the form of common anthropogenic electron donor compounds.
  
4. **p. 4, sec. 3:** The text notes that the appropriateness of MW-1104 as a representative "background" well has been discussed in the past. Another issue that was discussed in this context is that a single well may or may not be representative, particularly for parameters that exhibit natural variability. It is interesting to note that, if one simply assumes that all of the wells in the MNA sampling program are sampling from the same population (i.e., that there are no discernible effects of the contamination on the alkalinity and chloride), and looks at the resulting distributions (see attached histograms), the alkalinity appears (qualitatively) to be log-normally distributed. (This crude assessment is based on data from ME 26 only.) Chloride does not exhibit quite so nice a "bell-shaped" distribution of log-transformed values; it is weighted a bit by low values. The geometric means for the alkalinity and chloride distributions for all wells are 29.9 and 14.0 mg/L, respectively. The concentrations adopted as reference values for MW-1104 are 29.3 and 19.1, remarkably close to the expected values from the entire set of wells. On this basis, MW-1104 appears to be reasonably representative of site conditions. At the same time, however, it is noted that, if the set of all MNA wells exhibits "well-behaved" statistical distributions of alkalinity and chloride, higher values may not reflect anomalous microbial activity or reductive dechlorination. Rather, relatively high values may simply reflect natural variability within the population of all wells. A number of wells received 1 to 3 points in the assessment based on alkalinity or chloride or both (MW-228A and MW-NASB-212). These scores should be viewed with some circumspection.

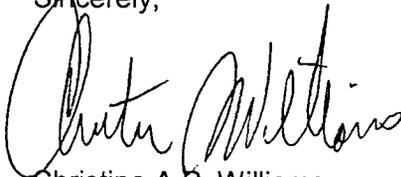
As a passing remark on the reference well, MW-1104, it is curious to note that alkalinity and chloride, as well as sulfate, exhibited monotonic increases across the four reported monitoring events (MEs 23 to 26). Alkalinity rose from 15.9 to 37 mg/L, and chloride from 17.5 to 23 mg/L in this period. It is difficult to know, of course, whether this trend signals a long-term shift in the geochemical conditions at MW-1104, or simply a short-term fluctuation. On what basis was ME 25 chosen for the "background" values?

5. **p. 4, sec. 3, second bullet:** The text refers to TCE as a "daughter," which it certainly can be. However, TCE is often itself used as a solvent, and may be present in the system both as a degradation product of PCE and as an original release. Is there any evidence to support one interpretation or the other, e.g., in historical records of solvent use on the facility?

6. **p. 7, sec. 5:** The report concludes that "... the dechlorination process appears to be stalled." This does appear to be the case. The presence of reasonably high concentrations of degradation products relative to the parent compounds suggests that dechlorination was active at one time, yet current conditions are not highly favorable overall.
7. **p. 8, sec. 5:** It is agreed that MNA monitoring can be reduced or discontinued, as the assessment indicates that natural attenuation is probably not contributing significantly to groundwater quality recovery at the present time. As noted in the recommendation, the MNA parameters can be resampled in the future, if called for.
8. **Figure 1:** The figure would be more complete if it were to include a note in the legend indicating the date corresponding to this delineation, as well as the basis for the delineation (e.g., exceedance of MCL for any VOC?).

EPA is willing to discuss and finalize responses to these comments with all parties at the technical meeting in September or during a regularly scheduled conference call after a draft response is reviewed. If you have any questions with regard to this letter, please contact me at (617) 918-1384.

Sincerely,



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Remedial Project Manager  
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