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DEPARTMENT OF ENVIRONMENTAL PROTECTION

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July 5, 2006

Mr. Orlando Monaco  
Department of Navy  
Base Realignment and Closure  
Program Management Office-Northeast  
4911 South Broad Street  
Philadelphia, PA 19112-1303

Re: Sites 1, 3 & Eastern Plume-Monitoring Event 26  
Naval Air Station, Brunswick, Maine

Dear Mr. Monaco:

The Maine Department of Environmental Protection (MEDEP) has reviewed the draft "Sites 1, 3 & Eastern Plume, Monitoring Event 26 Report", dated April 2005, prepared by Environmental Chemical Corporation. Based on that review MEDEP has the following comments and issues.

General Comments:

1. Overall, data suggest migration of the Eastern Plume is continuing to the east and south, as concentrations increase in wells closest to Mere Brook and Mericonneag Stream. MW-332, MW-333, and MW-334 all have shown increasing concentrations or types of Volatile Organic Compounds (VOCs) detected, while MW-306, at the western edge of the plume, was non-detect for VOCs for the first time. The trends for 1,4 dioxane indicate a wider survey of concentrations in wells at the fringes of the plume is warranted.

Based on discussion among stakeholders at recent Technical Meetings regarding the presence of 1,4 dioxane in the effluent of the Groundwater Treatment System (GWETS), agreement was reached that action would be taken to reduce or eliminate that pathway for discharge of the compound back into the plume.

Data for MW-331 and P-106 suggest the majority of 1,4 dioxane has migrated past those two wells, although concentrations have only recently fallen below the MEG. Detections in 2005 pore water sampling and increasing trends at MW-313 and MW-333 support a wider evaluation of 1,4 dioxane distribution, particularly in wells at the southern and eastern boundary of the plume. Concentrations in this area are frequently well over the MEG of 32 ug/L, and the dioxane concentration at MW-333 (55 ug/L) exceeds the highest historical Total Volatile Organic Compounds (TVOC) concentration at that location.

2. MEDEP anticipates the data from the new multilevel well pairs installed at the Landfill 1 & 3 site will enhance our understanding of contaminant migration from the landfills toward the leachate seeps and Mere Brook. (No response required.)

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3. There were several issues with the laboratory data or sampling that led to "J" qualifiers on numerous data points. Navy must coordinate with their lab to reduce the incidence of improper preservation, initial calibrations and other preventable errors that lead to qualified data or the Navy risks having collected data that is not useable.
4. The review process will be greatly improved with access to the site data in database or spreadsheet form to allow additional comparison of various compounds of interest, water elevations and historical field and lab parameters. Future data submissions must include an electronic data deliverable in the MEDEP's EDD version 4.0 format. Historical data may be supplied in its existing format, in MS Excel™ or Access™, rather than converted to Maine's EDD. Northeast Laboratories (The lab used for ME26.) is familiar with this format, and can supply the analytical data to be compatible with the EDD. MEDEP looks forward to completion of this task now that funding has been obtained.
5. The monitoring reports include interpretation of hydrogeology, and the final report should include the stamp and signature of a Maine Certified Geologist. It would be useful to include the Ground Water Extraction and Treatment System on the site figures, for reference when evaluating the infiltration gallery influence and 1,4 dioxane at the site.
6. MEDEP would like to discuss with the Technical Group the use of pore water samplers, in addition to the surface water samples along Mere Brook and possibly Merriconeag Stream to adequately monitor the Eastern Plume in the area.

Specific Comments:

7. During its review of Monitoring Event 26 MEDEP noted the following:
  - The trend for TVOCs at MW-218 may be decreasing, but the chlorinated VOCs detected this round are the highest values detected since 1995 and 1996. If chlorinated VOCs continue to increase here, further discussion may be warranted.
  - Concentrations at MW-319 have increased from non-detect in 2003, and VOCs exceeding criteria persist at MW-207AR, suggesting the interpreted "lobe" of clean water at the western edge of the eastern plume was a temporary event. MEDEP will continue to evaluate concentration trends in the wells along the flowpath from the GWETS to Mere Brook and Merriconeag Stream to evaluate the extent of the relation between the infiltration gallery and the changing plume boundary.
  - Monitoring well MW-306, at the western edge of the plume, was non-detect for the first time this round, supporting the interpretation of general migration of the plume to the east and south, toward the Merriconeag Stream and Mere Brook.
  - The water elevation data for the area inside the slurry wall suggest that elevations are slowly increasing. None of the water levels are at the trigger elevations currently, but if this trend continues stakeholders will need to address keeping the water table below the landfill waste. MEDEP presented a figure (attached) depicting the long-term trends at the April 2006 Technical Meeting, and the issue has been discussed by the group.
  - The leachate station sediment from location LT-05 contained about 1300 ug/Kg total VOCs and that the majority of the total is 1,2 Dichlorobenzene and 1,4 Dichlorobenzene, and both exceed the new screening criteria.

No response required.

8. Section 2.1, para 3: "Data from the effluent samples collected between 30 September 2004 and 30 April 2005 indicated no violations of permit discharge limits established by the Brunswick Sewer District."  
This statement would also lead the reader to believe that all the effluent was being sent to the Brunswick Sewer District instead of the infiltration gallery. More explanation is needed.
9. Section 2.3, last sentence: "Note: some analytes were not measured..."  
If possible a more distinct character or shape (or possibly a "blank") would make the bar graphs easier to interpret. The underscore dashes look very similar to rounds with relatively low concentrations.
10. MW-217B, Table B-2, Section 2.4.1, and Figures 59-60 in Appendix C:
  - a.) The data in Table B-2 for metals is for low-flow, not diffusion as noted on the table. Please correct.
  - b.) Figures 59 and 60 in the appendix need to be updated for the ME26 data. Please revise.
  - c.) The sodium data on Figure 60 should be plotted on a separate axis so the manganese and aluminum data trends are discernible. Please correct.
11. MW-218, Section 2.4.1, and Figure 65 in Appendix C: It is also notable that TCE was a significant portion of the TVOC value, and it should be added to the trend graph in Appendix C. Methylene Chloride should be removed from the figure (and from any others where it is plotted), as it does not contribute to the TVOC.
12. Section 2.5.2 - MW-319 and Appendix C, Figure 110 of 185: The trend for PCE at MW-319 may still be lower than 2000 to 2002, but the last 4 rounds certainly show an increasing trend. Please revise the assessment to "stable". Without the anomalous 2003 data, the concentrations appear to be stabilizing after the declines of 2000 – 2002.
13. Section 2.1, Section 2.5.3 – EW-02A, Figure 122 of 185 – Appendix C, Table B-3:  
Concentrations at MW-332 (183 ug/L) have increased to their highest level since Spring 2001, while TVOC levels at EW-2A (204 ug/L) declined sharply this round. It is possible (likely) these changes are related to EW-2A's 78-day downtime, and/or another indication that the plume is migrating to the east toward the confluence and the surface waters. MW-311, adjacent to EW-02A, is screened about 35 feet deeper than MW-332, had a temperature of 8.05° C and a TVOC concentration of 121 ug/L. MEDEP has previously proposed EW-2A is drawing clean surface or upper aquifer water to screen depth, raising temperatures and diluting VOCs. Water temperature measured at MW-332 was 2.5° C colder (5.50° C), and was the coldest temperature measured in any well this round. However, the temperature reading for the MNA parameters at this location is listed as 14.62° C, over 9 degrees warmer. Does the Navy have an explanation for this discrepancy or phenomon?

The seasonal variation noted in Section 2.5.1 may be connected to stronger vertical gradients in the spring, this correlation could be evaluated by plotting the historical elevation data for this well. MEDEP could not verify how the temperatures are measured for the MNA parameters vs the diffusion samples (the 2000 LTMP doesn't address PDBs), so MEDEP cannot be sure the "cold-discharge point" comment is true.

Future investigation of the confluence area may shed further light on these relatively cold discharge zones, and help interpret the effectiveness of EW-2A (or any new extraction wells) for removing VOCs before they reach MW-332 and eventually the surface waters.

14. Section 2.6.1, para 1: The natural attenuation results for the September 2004...  
This needs to be revised to "April 2005". (ED)
15. Figure 1-3 and Table 1-2: Locations MW-335, MW-336, MW-337, MW-338 and MW-339 must be added to the figure, they are part of the Long Term Monitoring Program as noted in the Table. (ED)
16. Table B-13, Appendix C Figure 178 of 185: Seep 11 (when it is flowing) appears to be a significant discharge point for the plume under some conditions. Water discharging at this location exceeds groundwater criteria for TCE and PCE, though not the Ambient Surface Water Criteria. Values for ME26 (22.7 ug/L TVOC) were down from 40.2 ug/L in ME24. The trend graph for this location would be more useful for relating groundwater values to values at the discharge point if the individual compounds were plotted. Please add them to the figure.
17. Section 2.4.1 – MW-218, Section 2.4.3 – LT/SEEP-03, Appendix B: Concentrations of metals spiked at MW-218 and in the leachate seep this round, and the leachate sediment and seep at location 03 had numerous low detections for nearly all the common VOCs. The data for 1,1,1 TCA should be added to the trend graph for SEEP-03 if detections continue. At MW-218, arsenic hit a historic high of 360 ug/L, and aluminum, cadmium, and manganese all exceeded groundwater criteria. VOCs at this location were also elevated, with concentrations at the highest point since 1996. The trend assessment must be noted as a spike not as "decreasing".
18. Table B-15, and B-17: The metals screening criteria adopted for sediment must be added for reference to the data tables for sediments at NAS Brunswick. The ME-26 data indicate numerous locations with metals values exceeding the criteria for arsenic, cadmium, manganese, mercury and nickel and other metals.
19. Figure 1-3: The locations for MW-335, MW-336, MW-337, MW-338 and any other missing LTM wells must be added to the figure for reference.
20. Figure 2-2: The TVOC values for some locations do not appear to be updated with the April 2005 data. Locations in question include MW-NASB-212, MW-218, MW-331, P-106, EW-4, and EW-5A. Please revise.
21. Appendix C: For well locations where 1,2 DCA represents a significant portion of the total VOC, the compound must be added to the trend graphs. Specifically, figures for MW-315A, MW-335, MW-337, MW-338B, and MW-339 must include 1,2 DCA.
22. Appendix C, Figure 114 of 171: Please remove cyanide from the figure so trends for other metals can be discerned. (ED)
23. Appendix D and Appendix B, Data Tables: As noted in the general comments, there were numerous qualified VOC results in this round, some due to surrogate, laboratory control sample, and matrix spike/matrix spike duplicate recovery problems. These are all errors that frequently occur, and do not seem to be systematic, although there were more than usual this round. Other data were qualified due to improper calibration checks and improper sample vials. These errors are preventable and must be eliminated to reduce the frequency of qualified data.

Despite these issues, only bromoform and 1,1,2,2 DCA detects were rejected following evaluation of the data, and fortunately these are not important COCs at the site. Metals analyses were overall better at meeting the method requirements. The report indicates the lab notified ECC it had some method deviations, and generally the site COCs were not a concern. Please address how the Navy will ensure overall compliance with the analytical methods will improve in the next sampling event.

24. Appendix F:

a.) The wheel ruts noted in the report may compromise the cap, therefore the Navy needs to implement corrective measures immediately to minimize vehicle activity when the cap is still saturated after snowmelt or heavy rains.

b.) The Maine Geologist certification is a "CG", not a "PG". The appendix needs to be signed in the Final version of the report. (ED)

25. Appendix G and Section 2.4:

a.) The appendix contains the gas vent monitoring data, but there is no discussion in the text about the results, or tables to summarize the data. The sample IDs in the report from Air Toxics in Appendix G do not appear to correlate to the gas vent locations at the landfill, so reviewers cannot evaluate where methane is being detected in the landfill. The data must be summarized in the landfills 1 and 3 section and a table must be included summarizing the data.

b.) Trying evaluate this data, MEDEP checked the LTMP for Sites 1 and 3 and the Eastern Plume (Feb 2000) Section 3.4.1. Gas measurements are taken from 3 gas probes and 14 gas vents for gas pressure, percentage of methane, oxygen, and carbon dioxide. The monitoring is to be conducted in September and the results included in the annual report. Upon checking ME 25 (September 2004) MEDEP could not find the required information. Please confirm that this monitoring is taking place and provide either the information as an addendum or identify where it is located in ME 25.

26. Recommendations & Conclusions, Bullet #1: "Concentration trends from monitoring..."

This sentence should be revised. MEDEP suggests *"Concentration trends from monitoring wells located within the body of the Eastern Plume appear to be relatively stable, suggesting limited migration of the plume's core. Reductions at wells such as MW-306 on the eastern fringe and increases at wells such as MW-332 and MW-313 on the western fringe indicate the plume is migrating east and south to discharge points in Mere Brook"*

MEDEP agrees the areas near P-106 and MW-331 have good potential for reducing "hot-spots" for maximum reduction of overall concentrations within the plume. It will be important to collect supporting data for placement and operation of the extraction well, particularly near MW-331, where there is less historical subsurface data.

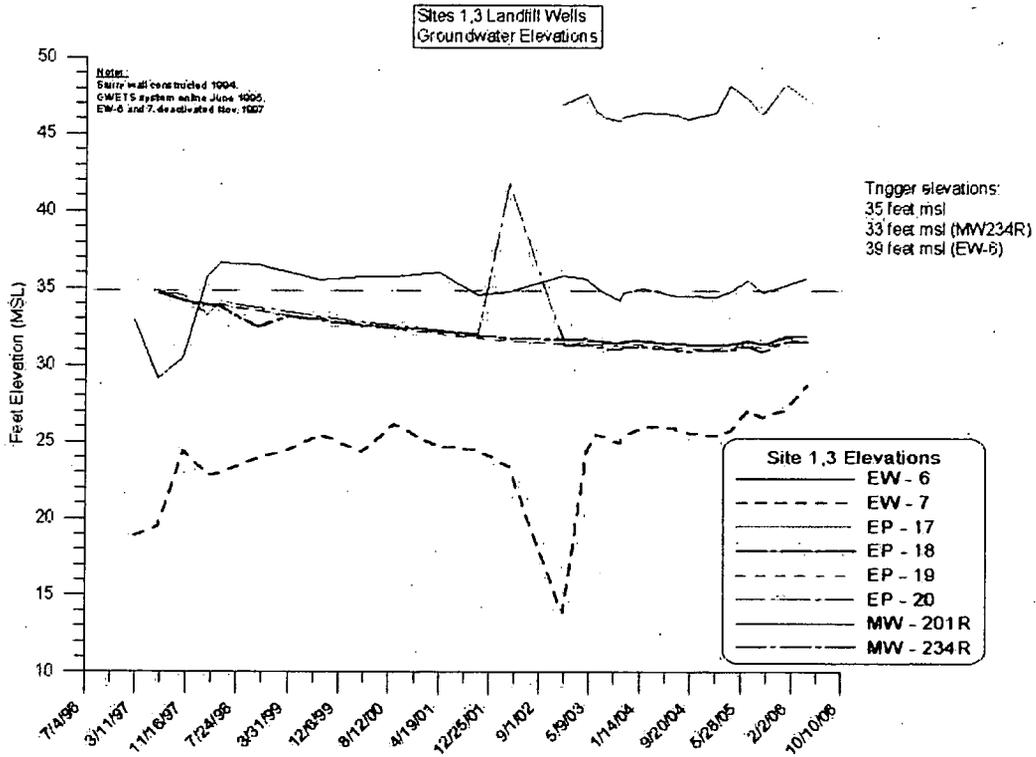
27. Recommendations & Conclusions, Bullet #2:

MEDEP agrees with the overall conclusion and recommendation with one editorial comment for paragraph 2 of the recommendations: MEDEP suggests revising the sentence to read *"Monitoring these MNA wells should be sufficient to determine if biodegradation or other reductive dechlorination is contributing to natural attenuation of the southern region of the plume."* The scoring of the well data indicates the potential for dechlorination / biodegradation, not MNA.

28. Recommendations & Conclusions, Bullet #3:
- a.) In the sentence "Surface water sample SW-12..." please replace "decreasing concentrations" with "a detection", as there has only been one hit at SW-12. Following the Mere Brook investigation a new surface water location may be appropriate to assess discharge to the brook. An additional gauging point in the brook near the confluence, and repair of damaged points will help define the shallow water table and discharge to the surface water channel.
  - b.) This recommendation is out of date. Please update.
29. Recommendations & Conclusions, Bullet #4: "Sample results from groundwater, surface water and leachate..."
- a.) MEDEP disagrees with the conclusion based upon the increases noted at MW-218 and Seep-03. MEDEP will not consider significant reductions in monitoring if these trends persist and will evaluate the data from the new multilevel locations before reaching further conclusions about the effectiveness of the slurry wall. MEDEP will also consider the sediment and surface water screening criteria adoption before major reductions are approved.
  - b.) MEDEP does agree the shallow piezometers should improve the data quality for the leachate seeps, and would like to review those locations after reviewing the sample SOP.
  - c.) The Appendix H Shallow Piezometer SOP was not included on the CD.
30. Recommendations & Conclusions, Bullet #5:
- a.) "The extraction well network, which is currently operating at a reduced capacity, appears to have nearly complete effectiveness at maintaining hydraulic control of the Eastern Plume..."  
Hydraulic control is not complete, as indicated by the plume migration to the eastern surface waters. Please delete that part of this statement.
  - b.) With the recent confirmation that the Eastern Plume has migrated off base property this is not the time to discuss abandoning hydraulic containment in favor of hot spot treatment however MEDEP agrees with the approach of targeting "hot-spots" for some of the new wells. MEDEP is always in favor of optimizing the effectiveness of the GWETS however that may involve eliminating some wells and installing more wells than are eliminated. That will need to be determined.
  - c.) MEDEP suggests that when the groundwater model is being tested, or reduced pumping is evaluated at low-VOC locations, a "step-down" decrease of low-VOC extraction well flows to monitor whether they are restricting expansion of the plume boundaries may be worthwhile. It is possible that although some wells are not removing much VOC mass, they are helping reduce discharge to the east.
31. Recommendations & Conclusions, Bullet #6: MEDEP supports targeting deeper intervals with new well screens. The DO and Eh readings for MW-105B and MW-229B do suggest shallow groundwater is drawn in by EW-1. The associated deep wells, MW-105A and MW-229A, also have elevated DO and Eh relative to other deep wells. MW-229A is screened to about 62 feet bgs, and TCE exceeded criteria there this round. A future extraction well may still need a fairly long screen, 60 to 90 feet bgs.

32. Recommendations & Conclusions, Bullet #7: MEDEP agrees with the recommendation, and suggests that including the GWETS infiltration gallery on the site figures would improve evaluation of the chemical data. MEDEP also suggests initially evaluating locations north or west of the plume boundaries, but outside the areas influenced by the Naval Exchange, Site 9, and the Old Fuel Farm.
33. Section 3.2, LTM Objectives: LTM Goal #1: MEDEP generally agrees the monitoring network is sufficient, but based on the recent pore water investigation of Mere Brook, does not believe the eastern boundary is fully delineated or adequately monitored and some of the wells designated as sentinel wells are now within the plume. The upcoming Mere Brook investigation and new extraction well should improve the current network, but additional focus may be necessary east and south of MW-311, where there is little LTM data to indicate the actual boundary of the plume, and whether it is migrating south toward EW-2A and/or east to Merriconeag Stream.
34. Section 3.2, LTM Goal #2: MEDEP is satisfied with current plans for refining the groundwater extraction and treatment system, specifically the modeling effort and the future Mere Brook investigation.
35. Section 3.2, LTM Goal #3: With the addition of some or all of the new multilevel locations (pending chemical data) to the LTM, the monitoring network is sufficient to evaluate the Landfills 1&3 cap and slurry wall. The new screening criteria, the multilevel well data, and spikes at MW-218 and SEEP-03 will need to be considered when modifying the LTMP.
36. Section 3.2, LTM Goal #4: With the data collected to date, the effectiveness and limitations of the GWETS are reasonably understood.

Figure presented at April 2006 Technical Meeting: See comment 7 bullet 4.



Please contact me at (207) 287-7713 or [claudia.b.sait@maine.gov](mailto:claudia.b.sait@maine.gov), if you have any questions or comments.

Respectfully,

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