



STATE OF MAINE  
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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April 7, 2000

Mr. Arthur Coccoli  
Code 1821 AC  
Department of the Navy, Northern Division  
Naval Facilities Engineering Command  
10 Industrial Highway, Mail Stop 82  
Lester, PA 19113-2090

Re: Sites 1,3, & Eastern Plume-1999 Annual Report,  
Naval Air Station, Brunswick”

Dear Mr. Coccoli:

The Maine Department of Environmental Protection (MEDEP or Department) has reviewed the report entitled 1999 Annual Report, Monitoring Events 14 & 15, Sites 1 and 3 and Eastern Plume (draft), dated March 2000, prepared by EA Engineering, Science and Technology. Based on that review the Department has the following comments and issues.

Each of our comments is followed with a code that indicates whether a response is required (RR), no response is required (NR), editorial correction needed (ED); or meeting discussion requested (MTG). No response is required for editorial corrections unless the Navy disagrees with the correction.

**General Comments:**

1. General comment for the Monitoring Event 15 (letter dated January 10, 2000) review stated that “several interesting relationships were noted and will be carried forward to the annual report”. These observations were presented at the November 1999 Technical Meeting in Bedford, Massachusetts. Six points were expressed, supported by MEDEP-developed maps and figures. These themes are summarized below:
  - ◆ Convincing evidence does not exist to show that the current extraction well system is actually containing the Eastern Plume within the currently mapped bounds.

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- ◆ Current evidence suggests little, if any, plume shrinkage, and a low percentage of contaminant mass removed to date relative to the entire plume.
- ◆ Remediation of solvent plumes is dependent on eliminating both the primary source and any secondary residual source in the subsurface. The possibility of DNAPL in depressions on the clay surface or in shallow bedrock where exposed to the plume migration pathway should not be ignored.
- ◆ Volumetric flushing of the Eastern Plume by remedial pumping has been very slow compared to recommended literature rates.
- ◆ Optimization of pump-and-treat remediation of the Eastern Plume would benefit from a more thorough understanding of the subsurface stratigraphy, through the compilation and study of 3-D models.
- ◆ Current data suggest that bio-attenuation of solvents in the Eastern Plume may be occurring in some areas and not in other areas within the plume

The Navy should keep these concepts in mind as it strives to improve optimization of the remedial efforts.

**Specific Comments:**

2. Background, Section 1.1, p. 1, 2<sup>nd</sup> para:

“Remedial actions included placement of a low permeability cap and slurry wall and 2 ground-water extraction wells at Sites 1 and 3, and installation of 6 extraction wells at the Eastern Plume (Figure 1-2).

After “installation”, please insert “...*subsequent operation of...*” (ED)

3. Long-Term Monitoring Program, Section 1.2, p. 2, 2<sup>nd</sup> bullet:

“Analyze the effective capture zone of the ground-water extraction system at Sites 1 and 3 and the Eastern Plume to determine if hydraulic control of the plume is being maintained.”

Because hydraulic control of the plume has not been demonstrated to date, it is inappropriate to indicate that the Navy is using monitoring to determine if control is being maintained. It would be good if this were the case. The Department suggests the following: “...to determine the degree of hydraulic control achieved through remedial pumping.” (ED)

4. Location of Extraction Wells, Sites 1 and 3 and the Eastern Plume, Figure 2-1:

The locations of EW-6 and EW-7 seem to move around from report to report. In this figure, EW-6 is shown as too far west. Please correct these well locations. (ED)

5. Summary of Ground-Water Extraction and Treatment System Performance, Section 3.1, p. 3-1, 4<sup>th</sup> bullet:

“This similarity in total VOC concentrations suggest the deep ground water being withdrawn by EW-1 is not being diluted by groundwater also extracted from the shallow interval.”

The sentence reads as if EW-1 is extracting groundwater from the shallow interval; in which case, the sample’s VOC concentrations would be diluted by the clean shallow groundwater. Because this well has a long screen that spans both shallow and deep sandy zones, it is reasonable to expect water contribution from the upper zone. A plausible explanation of similar concentrations between EW-1 and MW-229A is that MW-229A is located closer to the plume’s southern boundary than it is to EW-1 (giving low concentrations) and that EW-1 effluent is being diluted by the shallow zone. MEDEP recommends that in-well testing (flowmeter) be performed to verify that shallow groundwater is not entering the upper screened interval at significant rates during pumping. (RR)

6. Summary of Ground-Water Extraction and Treatment System Performance, Section 3.1, p. 3-2, 3<sup>rd</sup> bullet:

What is the diameter of the connecting pipe? A 2-inch diameter pipe can handle 20 to 30 gallons per minute. Is the Navy comfortable with this assessment? Please provide more details. (RR)

7. Summary of Water Level Gauging Program, Section 3.2, p. 3-3, 2<sup>nd</sup> bullet:

“Ground water immediately south of Mere Brook (near MW-230A and MW-231A) is interpreted to flow to the northeast.”

Granted, this is the direction that the potentiometric contour maps drawn to date indicate. The TCE reported at depth in CP-118 during the Supplemental RI Investigation appears to contradict this direction of flow. Future data collection in this area, now in the discussion stage, hopefully will provide an explanation for the past TCE at CP-118. (NR)

8. Effects of Remedial Measures – Eastern Plume, Section 3.2.3, p. 3-4, 1<sup>st</sup> and 2<sup>nd</sup> bullets:

a.) Wherever “cone of depression” is used in these paragraphs, it must be stated that the distances given refer to the radius of the cone, to eliminate any depth connotations. (ED)

b.) Also, in the first bullet, EW-3 and EW-5 should be reversed, and only Figure 8 shows groundwater contours in the shallow interval (at EW-5). Reference to Figures 10, 12, and 14 are inappropriate here. Figure 8 should be eliminated from the second bullet. (ED)

9. Effects of Remedial Measures – Eastern Plume, Section 3.2.3, p. 3-5, 3<sup>rd</sup> bullet:

The same problems in references wells and figures as in Comment 8 were found. (ED)

10. Volatile Organic Compound Concentrations and Distribution, Section 3.3.1.2, p. 3-6, 4<sup>th</sup> bullet:

“Samples collected from shallow well MW-202A, located hydraulically crossgradient to the landfill, have detected concentrations of VOCs above the State MEGs and/or Federal MCLs...”

The Department believes that MW-202A is located downgradient of the landfill, not cross gradient. As previously stated in other monitoring event reviews, the groundwater contours very likely parallel Mere Brook at the landfill, instead of cutting directly across the deep valley containing the brook. Under the Navy’s contouring scenario, how could the landfill have impacted groundwater quality at MW-202A (one of the proposed explanations in the last sentence of the bullet)? The Navy should undertake measures to resolve this on going question. (RR)

11. Volatile Organic Compound Concentrations and Distribution – Eastern Plume, Section 3.3.2.1, p. 3-7 and 3-8, 3<sup>rd</sup> paragraph under the 3<sup>rd</sup> bullet:

a.) “These changing VOC concentrations are likely the result of natural ground-water flow and VOC migration to the south-southeast and groundwater extraction at EW-2, which...”

Does the Navy mean to say “EW-2A” in place of “EW-2”? (ED)

b. The individual well graphs in Appendix A-3 show that, for all wells listed at the top of page 3-8, their total VOCs do not contain any contaminants of concern.

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Therefore, discussion of trends for VOCs in these wells is not of particular interest. Please delete this paragraph. (ED)

- c. In the 2<sup>nd</sup> paragraph, the trends discussed are stated as based on the last two years. However, MW-224 and MW-229A showed very slight increasing or stable trends in 1999, contrary to the overall two year trends. The 1999 Annual Report should emphasize trends that occurred in 1999. A two year trend (or longer) can also be presented, as long as the 1999 trend has also been discussed in the text. (NR)

12. Volatile Organic Compound Concentrations and Distribution – Eastern Plume, Section 3.3.2.1, p. 3-8 , 2<sup>nd</sup> bullet on page:

Monitoring well MW-334 is upgradient of MW-333 according to their respective potentiometric elevations, not downgradient as stated. Therefore, the theme of this bullet will need different support, if the Navy wants to define the plume boundary as between these wells. It is suggested that this paragraph be deleted. (RR)

13. Eastern Plume, Section 3.4.1.2, p. 3-9, last sentence of bullet:

“These results strongly support the conclusion that VOCs from the deep plume are not impacting surface water.”

This statement is too all inclusive, as the lower reach of Mere Brook has not been sampled. Please narrow the scope of the statement by identifying the stream reaches where diffusion sampling and conventional sampling has occurred. (ED)

14. Leachate Station Seeps, Section 3.4.3.1, p. 3-10, 1<sup>st</sup> bullet:

Please identify where SEEP-09 is shown on a map in the report. If necessary, please include the seep on the appropriate figures and reference a figure in this bullet. (ED)

15. Eastern Plume, Section 3.4.3.2, p. 3-10:

Seeps 6, 7, and 8 are not located on any figures in the report, as far as MEDEP can tell. Please add these, and reference in this paragraph. (ED)

16. Leachate Station Sediment, Section 3.4.4, p. 3-11:

Please add Sites 1 and 3 to the section title. (ED)

17. Extraction System Refinement, Section 3.6.3, p. 3-13:

- a.) The proposed data collection activities for hydrogeologic definition are good, but could be improved by adding natural gamma logging of all new boreholes. MEDEP

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has reviewed the gamma logs run by ABB-ES in extraction wells EW-1, EW-2 and EW-4 for the Navy in 1996 and the contacts of the major BNAS lithologic units can be determined with greater confidence from studying these logs. (RR)

b.) In the second paragraph under "Identify the locations of new extraction wells", the Department recommends that the 3-dimensional geometry of the lower sand aquifer also be reviewed. (RR)

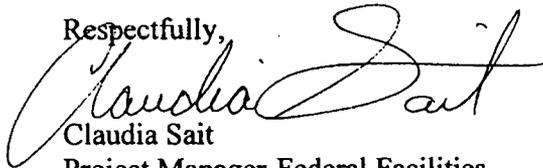
18. Additional Data Collection and Review, Section 3.6.4, p. 3-14, last bullet:

a.) The "assessment window" for investigating currently unidentified preferential flow pathways for groundwater at the southern boundary of the Eastern Plume is too narrow. MEDEP recommends substituting Orion Street for MW-231A. (RR/MTG)

b.) Also, in the second sentence, natural gamma logging should be added to compliment electrical conductivity logging (see Comment 17 above). (RR)

Thank you for the opportunity to review this report. If you have any questions or comments please call me at (207) 287-7713.

Respectfully,



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