RESPONSE TO COMMENTS
ARTMENT OF ENVIRONMENTAL PROTECTION
***TU* CHEMICAL OXIDATION REMEDIATION PLAN**
Y EXCHANGE SERVICE STATION

COMMENTOR: Claudia Sait **DATED: 14 March 2002**

The Maine Department of Environmental Protection (MEDEP) has reviewed the draft work plan entitled *In Situ Chemical Oxidation Remediation Plan, Navy Exchange Service Station*, dated February 2002, prepared by EA Engineering, Science, and Technology. Based on that review, the Department has the following comments and issues.

GENERAL COMMENTS

1. MEDEP is pleased that the Navy will be attempting to actively remediate the petroleum hydrocarbon plume core at the NEX, with the objective to substantially reduce the time frame to clean the site to acceptable levels of subsurface contamination. (NR)

   Response—Comment noted.

2. Please identify the target remedial goals since they do not appear to be clearly stated in the document. Also what is the trigger for determining whether an additional application is necessary? This also needs to be identified in the document. (ED)

   Response—The target remedation goals for the *in situ* chemical oxidation project will be presented in the Remediation Plan. The anticipated target goals for total petroleum hydrocarbon concentrations and benzene, toluene, ethylbenzene, and xylenes are approximately 25-350 ppb and 50-80 ppb, respectively. The *in situ* chemical oxidation effort presented in the Remediation Plan assumes two injection events will be completed.

3. The proposed plan includes many drive points of a temporary nature. Our review did not find mention of how these injection or monitoring points would be located (conventional survey or GPS) and/or marked in the field for future reference. It seems appropriate to leave some sort of ID marker in or on the ground for all injection and monitoring points. [RR]

   Response—The proposed injection point locations will be located and marked with spray paint prior to the first injection event by measuring from site features such as wells, building, and utility poles; however, the exact injection point location may need to shift due to the location of utilities. After the first injection event, the injection locations and the newly installed wells will be surveyed by a licensed surveyor. If temporary monitoring locations are used during the injection events, they will be marked with spray paint for the surveyor to include in the survey.

4. Please identify the closest surface water body and the distance from this proposed action.

   Response—The closest surface waterbodies to the Navy Exchange Service Station are the Upper and Lower Impoundment Ponds at Site 9 (Neptune Drive Disposal Site) located approximately 1,356 ft south of the Navy Exchange Service Station (Building 538).

SPECIFIC COMMENTS

5. ***Section 2.5, Summary of Bench-Scale In Situ Chemical Oxidation results, Page 6***—In situ chemical oxidation has been found to be less effective for saturated zone soil remediation due to reduced contact between the oxidant and the target compounds ...

   Based on the above, the likely situation of a very low water table during the treatment period could be interpreted as a benefit. However, it seems intuitive that a high water table would help the oxidant spread farther in 3-dimensions from the injection points than a low water table. Has the Navy considered what the consequences of a very low water table at the time of injection may be, and planned accordingly? [RR]

   Response—The Navy intended to convey the fact that *in situ* chemical oxidation is more effective at treating dissolved-phase contaminants than contaminants sorbed to soil particles within the saturated zone (since the soil particles tend to inhibit contact between sorbed contaminants and the hydrogen peroxide). *In situ* chemical oxidation is not very effective in the vadose zone, as MEDEP correctly suggests. However, the Navy respectfully disagrees with the MEDEP's prediction of low ground-water levels during April-May 2002. Spring conditions at NAS Brunswick generally represent high ground-water elevations that would be the ideal condition for application of the hydrogen peroxide.

6. ***Section 4.2.3, Containment Monitoring During In Situ Chemical Oxidation Pilot Testing, Page 12***—In addition to determining the effective radius-of-influence, EA will be collecting ground-water samples from four downgradient monitoring wells (MW-NASB-008, MW-NASB-009, MW-NASB-250, and MW-NASB-251) at the NEX site for the same field parameters to ensure there is containment of the hydrogen peroxide within the NEX site.

   As stated in the paragraph above, these four monitoring locations are shown in Figure 5. This figure also depicts the 10, 100, 1000, and 10,000 µg/L dissolved-phase plume contours. The contouring shows an interpreted narrow tongue of contamination in groundwater that might be expected to head for new proposed well MW-NASB-250 according to the groundwater flow arrows on Figure 4. However, the tongue as drawn appears to head between MW-NASB-250 and MW-NASB-008. Groundwater flow direction and contaminant migration direction do not always align precisely in nature. The gap between these two locations is over 90 feet, whereas the breadth of the contamination tongue is approximately 30 feet. Therefore, MEDEP is concerned that hydrogen peroxide may pass between MW-NASB-250 and MW-NASB-008 undetected.

   Given the uncertainty of the actual groundwater flow path in this area and the importance of confirming containment, another monitoring well needs to be installed midway between MW-NASB-250 and MW-NASB-008. [RR]

Response—The Navy will install this proposed well between MW-NASB-008 and proposed well location MW-NASB-250. The construction of and screen placement of the third additional well will be completed in the same manner as the other additional new wells at the Navy Exchange Service Station.

7. ***Section 4.6, Site Restoration and Management of Investigative-Derived Waste, Page 15***— The first sentence states some contamination may be "disposed of onsite." Please clarify what this actually means. [RR]

   Response—The text will be edited to clarify the meaning of this section for the reader.

8. ***Figure 3, Interpreted Total Dissolved-Phase BTEX Concentration Isopleth Map***—The figure legend is missing a symbol and description for the direct-push data points shown. (ED)

   Response—Figure 3 will be edited to include the direct-push symbol in the legend of the figure.

9. ***Appendix A***—The Class V Underground Injection Control Well Registration needs to be revised as follows:

   - The type of well is an Aquifer Remediation Well of which one is defined as injection wells used to clean up contaminated ground water, either by injecting solutions to neutralize contamination or return previously contaminated ground water that has been treated. (Experimental technology wells include any well that is an integral part of an unproven subsurface injection technology other than waste disposal, such as in situ coal liquification, in situ oil shale retorting, tracer studies, and secondary water recovery (e.g., using air to force underground water bound in the unsaturated zone into the saturated zoned where it can be recovered.) (ED)

   - The numbers of proposed wells or injection points (40) needs to be indicated. (ED)

   Once this registration has been corrected a copy including the attachment must be sent to Tammy Gould, Maine Department of Environmental Protection, Bureau of Land & Water Quality, 17 State House Station, Augusta, Maine 04333. (RR)

   Response—The recommended edits will be made to the Underground Injection Control registration. Once the registration has been edited, a complete copy will be sent to Tammy Gould.

10. Safety issues concerning the dilution of 35% hydrogen peroxide on site have not been discussed, and the mixing process has not been described in the draft plan.

    Response—The Remediation Plan is not a safety and health plan. The existing Navy Exchange Service Station Safety and Health Plan will be used for this effort. Safety issues will be discussed during the safety briefings held every day prior to work and in the Site Safety and Health Plan. The mixing process for this effort involves adding 35 percent

hydrogen peroxide to potable water, at a ratio of 3:1, to get an approximate 8-12 percent hydrogen peroxide solution.

11. Section 2.4 mentions that hydrogen peroxide and total dissolved iron will be measured on site using Hach tests. The Hach web site lists several test kits for measuring each of these parameters. The plan should clarify exactly what tests will be performed, and what concentration range will be covered.

    Response—Hach kits that will be used in the field include: iron test kit No. 1464-01 (concentration range of 0-10 mg/L) and hydrogen peroxide test kit No. 22917-00 (concentration range of 0.2-10 mg/L). These will be footnoted in Table 1 of the Remediation Plan.

12. Procedures for sampling have not been included in this plan. Sampling procedures should be included, or referenced if included in other site plans.

    Response—Sampling procedures for ground-water samples collected from monitoring wells for laboratory analysis are the same as those presented in the Navy Exchange Service Station quarterly reports that have been submitted to MEDEP. Sample procedures for field monitoring of iron and hydrogen peroxide will be collected as grab samples from the monitoring wells by using a dedicated polyethylene bailer.

13. VOC soil samples should be taken according to EPA SW846 method 5035 or frozen and handled in accordance with SOP DR#005. GRO soil samples should be preserved with methanol in accordance with procedures in the ME GRO method.

    Response—Soil samples collected for laboratory analysis for gasoline range organic and diesel range organic analysis will be collected in accordance with U.S. Environmental Protection Agency Method 5035. Soil samples for gasoline range organic analysis will be preserved with methanol in accordance with the Maine Gasoline Range Organic Method.

14. Quality assurance/quality control criteria have not been established for field or lab analytical procedures in the plan. QA/QC criteria should be either established for this endeavor or referenced if suitable criteria have been established in other site plans.

    Response—Quality assurance/quality control criteria for laboratory analyses will have duplicate, trip blanks, and matrix spike/matrix spike duplicate sample collected. Field screening samples will have duplicate samples collected at the rate of once per 20 samples screened by field test methods.

15. Sample handling procedures should be included in the plan, or referenced if included in other site plans.

    Response—Sample handling procedure will be the same as those presented in the Long-Term Monitoring Plan for Building 95 (dated May 2000), Appendix B, Section 3.2. "Field Sampling Operations."

16. Analytical methods and quality control criteria must be given for all field and lab analyses.

Response—Laboratory analytical methods are presented in Table 1. Field methods are described in response to MEDEP Comment No. 11. The field Hach methods will be added to Table 1 in the Remediation Plan.

17. Laboratory data deliverables should be stated, and must be adequate for QA/QC review of data.

Response—The analytical data deliverables for laboratory analyzed samples will include the results, blanks, surrogate summary, spike, spike duplicate, duplicate, laboratory control sample, chain-of-custody, checklist, and certificates. All laboratory data packages will be reviewed for data completeness and other criteria noted in MEDEP Comment No. 18.

18. Data should be reviewed for conformance in the following areas:

- Completeness [have enough samples been analyzed by the appropriate methods with adequate QC to make environmental decisions]
- Holding times
- Calibration [initial calibration/ continuing calibration checks]
- Accuracy [laboratory control samples, matrix spikes]
- Precision [field & laboratory duplicates, matrix spike duplicates]
- Sensitivity [reporting limits low enough to support environmental decisions at ARARs]

Response—The laboratory analytical data will be reviewed for conformance with these bulleted items.