M67001.AR.006863
MCB CAMP LEJUENE
5090.3a

U S NAVY RESPONSES TO NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES COMMENTS ON THE DRAFT PERMANGANATE TRACER STUDY WORK PLAN FOR SITE 88 OPERABLE UNIT 15 (OU 15) MCB CAMP LEJEUNE NC
7/21/2015
CH2M HILL

Response to Comments
Draft Site 88 Tracer Study Work Plan
MCIEAST-MCB CAMLEJ, North Carolina

PREPARED FOR: Dave Cleland, NAVFAC Mid-Atlantic
Charity Delaney, MCIEAST-MCB CAMLEJ
Gena Townsend, EPA Region 4
Randy McElveen, NCDENR

PREPARED BY: CH2M HILL

DATE: July 21, 2015

The purpose of this document is to address comments and provide revisions to the Draft Permanganate Tracer Study Work Plan for Site 88, Operable Unit 15, Marine Corps Installations East - Marine Corps Base Camp Lejeune (MCIEAST-MCB CAMLEJ), North Carolina, as follows:

- The United States Environmental Protection Agency (EPA) Region 4 had no comments on the document.
- The North Carolina Department of Environment and Natural Resources (NCDENR) comments are listed below. Responses to comments are provided in bold.

NCDENR Comments (dated July 1, 2015)

1. The last paragraph of Section 3.2.4 on page 3-2 states that 800 mg/l of sodium chloride will be included along with the permanganate injections to improve conductivity for detection of the injected permanganate solution using geophysical imaging equipment. Are there any potential negative impacts to the permanganate injection remedy by adding the sodium chloride and will the sodium chloride be used up along with the permanganate or will it continue to disperse. If it continues to disperse in the groundwater, then it may not be giving us a true picture of what is occurring with the permanganate as shown by the geophysical images. Has this been studied?

   A literature search was conducted following the proposed use of sodium chloride, and potential negative impacts were not identified. Additionally, sodium chloride is a conservative tracer, i.e., it will not react with the permanganate. If the permanganate is spent due to the oxidation demand of COCs, the sodium chloride will continue to disperse, which will allow for distribution assessment. The geophysics will only provide a snapshot of the presence or absence of injected material that has a significantly higher conductivity than background levels, so that the change in fluid conductivity can be detected by the geophysical mapping equipment when compared to the baseline data. To help confirm the geophysical mapping results, field measurements will also be collected periodically to assess for the presence or absence of permanganate with field testing kits.

2. The third bullet from the top of page 4-1 states that one groundwater performance monitoring event will be conducted following the completion of the tracer study to assess the overall

effectiveness of the tracer study field application. Will one monitoring event tell us if the tracer study was effective or not? Please explain.

One groundwater performance monitoring event will provide some indication of how well the permanganate was distributed and was effective at treating COCs in an effort to meet the tracer study objective to "Evaluate the feasibility and effectiveness of ISCO using permanganate for treating COCs". The data collected during the performance monitoring event will also be compared to the baseline sampling event conducted in October 2014 to help assess the results and will provide further information on how frequent performance monitoring events should be conducted during the full-scale remedy implementation.

3. Section 4.1.1 on page 4-1 discusses the 15A NCAC 02C.0225 injection well permit requirements. It is true that the injection is deemed permitted as long as one of the in-situ remediation tests on the front of the Notification Form is true; unless the injection process includes re-circulation. In the case where re-circulation is required, the injection process is no longer just an injection remedy but a dual remedy that requires a Non-Discharge Groundwater Remediation Permit Application Waiver process. In this case the Notification is no longer applicable, only the Non-Discharge Permit Waiver request is required.

   References to the Notification of Intent to Construct or Operate Injection Wells form were deleted from the Work Plan and the form was removed from Appendix D.

4. Should screen slots as discussed in Section 3.2.3 be size graded and spaced based on their nearness to the injection point (base on pressure, volume, and friction losses along the pipe)?

   The number of slots, slot spacing, and total open area are based on pipe and orifice flow equations assuming incompressible flow. A copy of the well screen design report is included in Appendix C of the Work Plan, but is based upon using HDPE well screen materials. Losonsky & Associates, Inc. (the well screen design modeling firm) is currently revising the well screen design to account for changing the well screen material from HDPE to FRE. The revised well screen design report will be included in the Final Tracer Study Work Plan.