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MCRD PARRIS ISLAND
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LETTER REGARDING U S EPA REGION IV COMMENTS ON WORK PLAN FOR
EMULSIFIED ZERO-VALENT IRON TREATABILITY STUDY AT SITE 45 DRY CLEANING
FACILITY SPILL AREA MCRD PARRIS ISLAND SC
6/1/2006
U S EPA REGION IV



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4**

**Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, Georgia 30303-8960**

June 01, 2006

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

4WD-FFB

Brigadier General Joseph J. McMenamain
Commander
Marine Corps Recruiting Depot - Parris Island
P.O. Box 19001
Parris Island, SC 29905-9001

SUBJ: EPA Review of Work Plan for EZVI Treatability Study, Site/SWMU 45 Marine Corps Recruit Depot, Parris Island, South Carolina

Dear General McMenamain:

The U.S. Environmental Protection Agency (EPA) has completed its review of the above referenced document. EPA offers the following comments. Please revise the document based on these comments and resubmit for review and approval.

EPA's comments are as follows:

General Comments:

1. As reported, other potential source areas in addition to the ASTs source area may exist at SWMU 45. It is likely these areas will continue to contribute contaminant mass to the surficial aquifer. Although it is not within the scope of this investigation any future remedial action should address these other potential source areas.
2. Instructions given to the Navy via the Partnering Team was to consider this project to be a Treatability Study under CERCLA. While this work plan generally addresses items suggested to be covered by various EPA Guidance documents for Treatability Studies (EPA/540/R-92/071a and EPA/540/G-89/004 particularly), the comments below ask for clarification and inclusion of additional information desired by the EPA RPM. Additionally, when writing the results Report, be sure to follow the standardized report format requested within EPA guidance and

submit a camera-ready master copy to:

Mr. Glen M. Shaul
RREL Treatability Data Base
U.S.Environmental Protection Agency
Office of Research and Development
Risk Reduction Engineering Laboratory
26 W. Martin Luther King Drive
Cincinnati, Ohio 45268

3. Add language as necessary in the Work Plan to state that this is being implemented as a Treatability Study under CERCLA at an NPL Site, and as such, is subject to the requirements of CERCLA and the Remediation process.

Specific Comments:

4. **Table of Contents:** Please modify the TOC as necessary based on all comments received. (See herein and State comments.)
5. **Section 1.1, Background, second par.:** The text states “research is required to...clarify the relative degradation contributions of the ZVI versus biodegradation promoted by the emulsifying agents...”. Please explain how the study makes this clarification, particularly in the project objectives, as well as during monitoring/sampling, performance criteria, report format/contents, and other sections as necessary.
6. **Section 1.2 Objectives:** Please add a fourth objective to clarify the relative degradation contributions of the ZVI versus biodegradation promoted by the emulsifying agents if appropriate (See comment #5). Also, please add a fifth objective as follows, “Provide information for use in the Feasibility Study for Site 45.” Also, please provide a copy of the Draft Site Selection Memorandum.
7. **Section 1.5 Roles and Responsibilities:** Please add this section to the document. Within this section, please describe who does what, who funds what, and for how long. Please include the MCRD Partnering Team (Team). Specify who will submit reports (qtrly, final, etc.) to the Team and by when. Describe interactions with the Team, including reporting incidents, accidents, and requesting approval for any modifications to the plan, etc.
8. **Table 3-1:** Please add a performance criteria to clarify the relative degradation contributions of the ZVI versus biodegradation promoted by the emulsifying agents, if appropriate (See comments #5, 6 and 12).
9. **Section 3.5.2, Pre-Design Evaluation and Selection of Injection Methods,**
Page 12

As discussed in Section 3.5.2, an evaluation of four different injection techniques (pneumatic fracturing/injection, pressure pulse injection, hydraulic fracturing/injection and direct injection using controlled pressures, seismic enhancement and directional flow) was conducted to determine which techniques are best able to distribute the emulsified zero-valent iron (EZVI) within a shallow aquifer over a large area without damage to the structure of the emulsion. Additionally, the last sentence in the first paragraph in Section 3.5.2 indicates that based on the results of the injection tests, pneumatic injection and direct injection were selected as the optimal technologies for the field Demonstration/Validation (Dem/Val). However, it is not clear if the selected injection techniques will include fracturing which was reported as a component of the evaluated pneumatic and direct injection techniques. Revise Section 3.5.2 of the Draft Technology Demonstration Plan (the Plan) to clarify if fracturing is included as a component to each of the selected injection techniques.

10. **Section 3.5.3, Installation of Monitoring Wells, Page 13**

The first paragraph in Section 3.5.3 indicates that the boreholes for both the fully screened monitoring wells and multilevel monitoring wells will be advanced to a maximum depth of 20 ft below the ground surface (bgs). Additionally, the screened interval for the direct injection well (fully screened) is reported to be 6 to 12 ft bgs. Revise Section 3.5.3 of the Plan to indicate if the 8 foot space between the bottom of the screened interval at 12 ft bgs and the bottom of the borehole at 20 ft bgs will be backfilled with sand, bentonite or native soil.

11. **Section 3.6.5, Operating Parameters for the Technology, Page 19**

The fifth sentence in the first paragraph on Page 19 states “First the formation is fluidized, followed by injection of the EZVI.” To further clarify the pneumatic injection method, revise Section 3.6.5 of the Plan to describe how the formation is fluidized prior to injection of EZVI.

In Section 3.6.5, the second paragraph on Page 20 indicates that the injection areas will be monitored for surface heave, and evidence of daylighting or blowby using a graduated heave rod and surveyor’s transit. Groundwater mounding in the EZVI injection areas could also occur. Due to the shallow groundwater encountered at the site, monitoring the water table elevations for potential mounding in surrounding monitoring wells should also be conducted in the EZVI injection areas. Revise Section 3.6.5 of the Plan to address this issue.

12. **Section 4.1 Performance Criteria:** To the last bullet add the words “and cost” after “complexity”. Please add an objective to clarify the relative degradation contributions of the ZVI versus biodegradation promoted by the emulsifying agents if appropriate (See comment #5, 6, and 8).

13. **Section 4.2 Performance Confirmation Methods**: In the last sentence add the words “and cost effective” after “simple”.
14. **Section 5 Cost Assessment**: Please be sure, when reporting results, to clarify if costs for this project differ from what would be anticipated in regular field implementation for remediation (e.g. monitoring and sampling may not need to be as extensive (7 wells in about a 10 x 5 treatment area for remediation as opposed to research?). Be sure to follow the EPA guidance for cost assessments.
15. **Section 7 Report Content and Submission**: Please add this section to the report. Commit to follow the standardized report format from the EPA guidance. Briefly describe the anticipated content of the report. Discuss report submittal schedule. Content should include at least a report of what occurred, issues/problems encountered, resolution of problems/adjustments made, discussion of objectives and performance, conclusions and recommendations, cost estimates (as implemented and projected field application), suggestions of what should have been done differently, etc. (See list of questions to answer in the Guidance.)
16. **Tables**: Update tables as necessary based on comments (objectives, criteria, etc.)
17. **Table 8-1**: Please identify any other EPA contacts who have participated (ORD, HQ, etc.). In Table 8-1, Timothy J. Harrington’s project role is listed as “MCRD Commanding General”. The correct role in the project for Mr. Harrington is “Deputy Natural Resources & Environmental Affairs Officer, Installation Restoration Program Manager”. Also, Lila’s fax number is 404-562-8518. Revise Table 8-1 as appropriate.
18. Please clarify if other EPA entities have already provided input/feedback on this plan, sampling methods, analytical methods, H&S, QAPP, etc.

If there are any questions regarding these comments, I can be reached at 404-562-9969.

Sincerely,

Lila Llamas, Senior RPM
Federal Facilities Branch
Waste Management Division

cc: Tim Harrington, MCRD
Art Sanford, NAVFAC
Jerry Stamps, SCDHEC
Don Hargrove, SCDHEC