N91192.AR.001051
NIROP FRIDLEY
5090.3a

LETTER AND THE U S EPA REGION V PRELIMINARY COMMENTS REGARDING THE UNIFORM FEDERAL POLICY SAMPLING AND ANALYSIS PLAN QUALITY ASSURANCE PROJECT PLAN FOR SOURCE AREA GROUNDWATER INVESTIGATION INITIAL DRAFT AND THE PRELIMINARY DRAFT SCOPE OF WORK SOURCE CONTROL INVESTIGATION WITH FIELD SCALE TRIAL OF EMULSIFIED ZERO VALENT IRON INJECTION NIROP FRIDLEY MN

10/03/2012

U S EPA REGION V CHICAGO , IL

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

SR-6J

October 3, 2012

VIA ELECTRONIC MAIL AND CERTIFIED MAIL

Mr. Harvey Pokorny
Regional Project Manager
NAVFAC Midwest
201 Decatur Avenue, Building 1A
Great Lakes, IL 60088-2801

Re: EPA Preliminary Comments on the UFP-SAP/QAPP for Source Area Groundwater Investigation, Initial Draft, dated September 13, 2012 and the Preliminary Draft Scope of Work - Source Control Investigation with Field-Scale Trial of Emulsified Zero Valent Iron Injection, dated September 2012, Naval Industrial Reserve Ordnance Plant, Fridley, Minnesota

Dear Mr. Pokorny:

The United States Environmental Protection Agency (EPA) and its contractor, TechLaw Inc., have conducted a cursory review of the Naval Industrial Reserve Ordnance Plant (NIROP) Fridley UFP-SAP/QAPP for Source Area Groundwater Investigation, Initial Draft, dated September 13, 2012 (QAPP) and the Preliminary Draft Scope of Work - Source Control Investigation with Field-Scale Trial of Emulsified Zero Valent Iron Injection (Draft SOW), dated September 2012, for the NIROP, located in Fridley, Minnesota. The review was performed to assess compliance of the QAPP with the Uniform Federal Policy for Quality Assurance Project Plans EPA-505-B-04-900A, dated March 2005 (UFP QAPP).

The review of the QAPP and Draft SOW only focused on significant issues and gross deficiencies. The Draft SOW and QAPP provide only a conceptual proposal for site investigation activities and a field scale study for the injection of Emulsified Zero Valent Iron Injection (EZVI). Due to the deficiencies in the QAPP and Draft SOW, a re-submittal of the QAPP and Draft SOW addressing the significant issues and deficiencies will be required before a detailed review is conducted. The following preliminary comments are provided to facilitate discussion at the October 9-11, 2012 partnering meeting:

GENERAL COMMENTS ON THE QAPP

1. The QAPP does not adequately describe the decision rules for the study. For example, the Site Overview on page 5 of 83 states that an overall review of the extraction system is

being conducted in 2012 to determine if additional extraction wells require replacement, or new wells are needed to supplement the existing wells. Worksheets #10 and #11 describe site conditions and general sampling approach. However, neither the Introduction nor the Worksheets state what evaluation parameters/benchmarks will be used to assess whether additional extraction wells are needed. Revise the QAPP to include decision rules and criteria for determining how decisions will be made for all proposed activities.

2. The QAPP does not identify the laboratory proposed to support the study. Therefore, laboratory-specific information such as quantitation and detection limits, standard operating procedures (SOPs), and quality control (QC) acceptance limits cannot be evaluated. This laboratory-specific information is essential for determining if the study objectives can be met. Ensure that the revised QAPP contains all of the necessary laboratory-specific information, including but not limited to the items listed in the previous sentence.

3. The QAPP does not present a rationale for why the proposed sample numbers, types, locations and analyses will address the study questions. Revise the QAPP to provide a rationale that clarifies why the proposed sample number, types, locations and analyses (i.e., analytical methods as well as the analyte lists) are sufficient to meet study goals.

4. The QAPP is missing figures or maps which depict the scope of the project and the conceptual site model, and which identify sample collection locations. It is noted that Worksheets # 10 and #17 reference figures; however, figures are not included with the draft version of the QAPP. In accordance with the UFP QAPP, this information is needed to communicate the scope of the project and to assist the field team in identifying the correct sample collection locations. Revise the QAPP to include figures and/or maps.

5. The QAPP is missing much of the necessary information required by the UFP QAPP, and it is unclear from the text if this information will be added in a subsequent revision. For example, the QAPP does not provide a summary of project tasks in Worksheet #14. Additionally, it is unclear if this Worksheet will be revised to present this information. Ensure that Worksheet #14 will be revised to present a summary of all project tasks consistent with the UFP QAPP. Also, ensure that all QAPP worksheets will be reviewed and revised as necessary so that the QAPP presents all necessary information to evaluate the proposed sampling activities.

6. The QAPP discussion on data validation and assessment is insufficiently detailed. For example:

   - The QAPP does not indicate the validation qualifiers that may be used or discuss how qualifiers will be applied based (i.e., under what circumstances samples will be qualified estimated or rejected).
   - Data validation checklists are not provided.
   - The data validation report discussion does not indicate that the extent of QC exceedances, as well as the samples/analytes affected by the exceendances will be presented.

- The QAPP does not present a field or laboratory completeness goal nor does it discuss how completeness will be measured.
- The QAPP indicates that statistical comparisons and mathematical manipulations of the data will be used in evaluating the results. However, the QAPP does not present the anticipated statistical tests, rationale for why various statistics should be used to evaluate the data, or underlying assumptions for the proposed statistics. Additionally, the QAPP does not indicate that the underlying assumptions will be assessed to ensure the data support use of the proposed statistical tests.

Revise the QAPP to address these discrepancies.

SPECIFIC COMMENTS ON THE QAPP

1. **QAPP Worksheet #10 – Problem Definition, Page 24 of 83:** Worksheet #10 indicates that sampling will occur to identify potential source areas. However, the Introduction to the QAPP also discusses an evaluation of the effectiveness of the extraction system. Revise the QAPP to clarify if it is also intended to evaluate the effectiveness of the extraction system.

2. **QAPP Worksheet #10 – Problem Definition, Page 24:** According to the UFP QAPP, Worksheet #10 should include the following information in the Problem Definition: "A synopsis of secondary data or information from site reports," "Information concerning various environmental indicators," and "Project decision conditions ("If..., then..." statements)." The Problem Definition information in Worksheet #10 is missing this information. Revise Worksheet #10 to address this deficiency.

3. **QAPP Worksheet #15 – Reference Limits and Evaluation Table, Page 38:** Worksheet #15 is missing the project action limits. This information is necessary to evaluate the adequacy of the proposed analyses. Revise Worksheet #15 to include this information.

4. **QAPP Worksheet #18 – Sampling Locations and Methods/SOP Requirements Table, Page 46:** In Worksheet #18, the number of samples for the NIROP Monitoring Wells is listed as "TBD" (to be decided) for some of the sample locations. In addition, SOP references are missing. Revise Worksheet #18 to include the number of required samples and include all pertinent SOP references. All sampling SOPs should be made available on a compact disc, or the QAPP should state how the SOPs can be accessed.

5. **QAPP Worksheet #19 – Analytical SOP Requirements Table, Page 49:** Worksheet #19 indicates that Terra Core™ samplers may be used to collect volatile organic compound (VOC) soil samples, and also that the holding time for soil VOCs is 14 days until analysis. However, Terra Core™ samplers not acceptable for storing VOCs samples. Samples collected using a Terra Core™ sampler must be immediately extruded and field-preserved. Revise the QAPP to correct this discrepancy.

6. **QAPP Worksheet #28 – QC Samples Table, Page 63-64:** Worksheet #28 does not include information for soil samples. Revise Worksheet #28 to also provide QC sample tables for soils.

GENERAL COMMENTS ON THE DRAFT SOW

1. The proposed sequence for installing borings and collecting field investigation data is not clear from the information provided in the Draft SOW and QAPP. More specifically, it is not clear if the Navy is proposing the collection of investigation data/EZVI injections from the same borings, or different sets of borings, during the three proposed investigation steps For example:

   - The QAPP first states on Page 25 that the groundwater samples (proposed under Phase 2) "may be collected from the same boring used for the MIP/EC screening." However, later in the same paragraph, the QAPP indicates that a second set of borings will be required to obtain groundwater samples for analysis. The Draft SOW does not describe whether the proposed groundwater samples will be collected from the same borings as the Membrane Interface Probe/Electrical Conductivity (MIP/EC) screening data, or a different set of borings.
   - The Draft SOW (Step 3) states that "NAVFAC MW is contemplating the feasibility of injecting EZVI in the investigative boreholes as a field-scale trial of this technology," and goes on to state, "While it is the current intent that if Step 3 is exercised, injection of EZVI would be limited to the existing 28 borings identified in Exhibit B, it is possible that is sufficient funding is available, NAVFC MW may elect to request additional EZVI injection boring locations to increase the coverage for the delivery of the EZVI." It is also unclear in the QAPP whether the EZVI will be injected into previously installed, or a new set of borings, as it states that "A remediation field scale trial consisting of injection of emulsified ZVI will be performed immediately after evaluation of data collected firm the above-described investigation. Identified source areas will be targeted immediately adjacent to selected boreholes. Emulsified ZVI will be injected into said identified source areas."
   - It is unclear if analytical data will be received before the EZVI injections are done or if all of the MIP/EC and Waterloo^{APS-TM} samples will be collected before any EZVI injections are done. If there are preferential pathways (e.g., along subsurface utilities or sand stringers), EZVI injections could impact groundwater in nearby sample locations, thus all groundwater sampling should be completed before EZVI injections commence.
   - QAPP Worksheets #17 and #18 include installation of a monitoring well cluster, but it is unclear if these wells will be installed before the EZVI injections. The Draft SOW indicates that one monitoring well nest will be installed during Step 1 (page 2, bullet 5) and two monitoring well nests will be installed (page 3, bullet 3) during Step 2. It is unclear whether all three sets of wells are needed to monitor the field-scale trial.

   The Draft SOW and QAPP require revision to provide additional detail on how the field investigation data will be collected from the proposed borings and the sequence in which the data will be collected. If the number of borings is limited due to funding constraints

or concerns with installing multiple borings in the indoor location, this should be stated and the investigation objectives revised to specifically address any constraints. Revise the QAPP to provide this information, as discussed in General Comment 4 below. Also, revise the Draft SOW and QAPP to be consistent.

2. It is not clear from the Draft SOW and QAPP when the data from Steps 1 through 3 will be reported. Also, the criteria that will be used for determining the objectives and procedures for the next "step" in the investigative process are not clear. For example:

   - Step 1 of the Draft SOW suggests that a Source Control Investigation Report for Remedial Systems Optimization will be generated, and this report will include MIP investigation data from Step 1 (tables and figures, borings and well logs, cross sections, etc.), groundwater data from Step 2 with comparisons to regulatory criteria, and a detailed description of the EZVI work as proposed in Step 3. This suggests that the data from the three steps will be reported in the same timeframe. Other sections of the Draft SOW and QAPP suggest that the completion/reporting of data collection activities will be iterative, which would require some type of reporting and analysis between steps.
   - The QAPP suggests in several sections that the MIP/EC data (obtained during Step 1) will be used to identify groundwater profile locations/depths in the subsequent step of the investigation (Step 2). For example, Page 25 states that "The MIP data from above will identify Waterloo $^{APS\text{-}TM}$ or HPT ^{TM} profile locations." The QAPP also indicates that MIP/EC and groundwater sampling data will be used to target areas for EZVI injection locations. However, the criteria for determining the objectives and procedures for the next step of the investigation are not provided in the Draft SOW or QAPP.

   Revise the Draft SOW to describe when data from each of the proposed steps will be reported, and provide the specific criteria that will be used to establish the objectives and procedures for the next "step" in the investigative/injection process. This information should be provided in the revised QAPP, as discussed in General Comment 4 below.

3. The procedures that will be followed to collect much of the investigation data are not clearly presented in the Draft SOW. For example, it is not clear how the groundwater samples will be collected from four different intervals using the Waterloo$^{APS\text{-}TM}$ profiler, and how hydraulic conductivity data will be collected. Further, the criteria that will be used to determine the four sampling depths during vertical profiling are not provided. The procedures that will be followed during each step of the proposed investigation should be provided in general in the Draft SOW, and detail in the revised QAPP, as discussed below in General Comment 4.

4. Step 2 in the Draft SOW states that "Because the base CTO assumes only the collection of qualitative data that would not be used for risk assessment purposes, no QAPP [quality assurance project plan] is included in the base scope. However, if Step 2 is exercised, the Contractor shall prepare a UFP SAP." These statements insinuate that a QAPP will not be prepared if only the Step 1 investigation is undertaken. This is not adequate. A QAPP should be prepared for the Step 1 activities, and all subsequent investigation and injection

activities. Although the phased approach proposed in Steps 1 through 3 appears appropriate, the data quality requirements, reporting requirements, decision criteria and specific procedures (including SOPs) for the collection of investigation data and EZVI injection methods should be documented in the revised QAPP. This approach will ensure that the procedures are properly implemented during each step of the investigation, and the technical team is in agreement with the project objectives, decision criteria and data collection activities. Revise the QAPP to include the specific information discussed above.

5. The terms "Option 1" and "Option 2" are used throughout the Draft SOW. These options appear to have an impact on the types of work to be performed and the schedules for completing the work described in the Draft SOW. The meaning of the options and their significance on the completion of the activities described in the Draft SOW require clarification. Revise the SOW to define the options.

6. The QAPP indicates that the EZVI injections will occur within silty zones surrounding potential clay source areas. However, it is unclear how the injections will treat the source areas since EZVI injections will be scattered throughout the plume and source areas. As discussed above, it is not clear how these source areas will be targeted since the Draft SOW and QAPP do not provide any detail on where and how the injection borings will be completed, other than to suggest that EZVI will be injected adjacent to the 28 proposed borings. If this is the case, only two injections would be done in the northern source area, which will not be sufficient to treat this source area. Further, the expected radius of influence of the injections is not specified so it appears that none of source areas or groundwater plumes will be fully treated. Typically EZVI is injected to cover a source area (e.g., an area of closely spaced injections) or provide a zone where all groundwater flowing through that zone is treated (e.g., lines of closely spaced injections). Scattered injections, as apparently proposed, have been demonstrated not to be successful in treating source areas or lower concentration areas of a groundwater contaminant plume at other sites. As a result, a treatment approach is likely necessary. Revise the Draft SOW and QAPP to explain in more detail how these source areas will be targeted.

7. The performance criteria for the proposed EZVI field testing, and the procedures for measuring these criteria, are not provided in the Draft SOW and QAPP. The last paragraph of the Draft SOW discusses reporting requirements after the EZVI injections have been completed. However, performance criteria are not addressed. Revise the Draft SOW and QAPP to describe the performance criteria for the EZVI field testing, and the procedures that will be used to measure the effectiveness in remediating source areas.

   It is assumed that the measurement of performance criteria will involve the sampling of existing wells. However, the revised QAPP should address the locations of the existing wells and their screen depths with respect to the injection areas/depths. Note that the cluster of wells proposed in QAPP Worksheets #17 and 18 and the three clusters described in the Draft SOW are not depicted on any of the figures, so it is unclear if these wells will be used to monitor the injections. Further, analytical data collected from the 28 borings may indicate that additional monitoring wells are needed during a subsequent phase of the investigation. These monitoring wells could serve the dual purpose of measuring the effectiveness of the EZVI injections and supplementing the existing

monitoring well network for future monitoring purposes. Clarify the number of clusters of wells to be installed, the purpose of the wells, and include them on the site figures.

8. Figure 2 shows the proposed configuration of the cross sections that will be produced in the investigation report. The orientation of the cross sections appears appropriate. However, it is recommended that the lines be extended in all directions as far as possible to provide the most comprehensive view of subsurface conditions. This includes extensions into areas outside the building. For example, B-B' should be extended further to the east and west, where boring locations exist (including a potential boring outside the building to the west), and C-C' should be extended further north and south. Revise the cross-section configuration to extend to historical boring locations to areas outside the building.

9. The figures in the Draft SOW show several proposed boring locations. However, it is not clear why the configuration of the boring locations was selected. Revise the Draft SOW and QAPP to provide the rationale for the boring locations shown in the figures.

10. The purpose of the proposed soil samples is unclear since soil samples from beneath the water table provide data that reflects both contaminants sorbed to soil and groundwater contamination. Further, soil sample data from depths below the water table are not useful for evaluating the potential for soil vapor intrusion. The collection of soil vapor samples for volatile organic compound (VOC) analysis should be considered prior to the installation of the MIP/EC borings. Since the slab beneath the building has not been penetrated recently, soil vapor may have built up beneath the building. When the slab is cut, installation of at least two or three soil vapor probes for immediate sampling should be considered to provide information about potential vapor intrusion risk. Consider installing soil vapor probes when the building slab is cut and collecting targeted soil vapor samples to address potential vapor intrusion risk.

11. Step 1 of the Draft SOW indicates that one monitoring well nest (three horizons) at a location to be determined in the east plating room will be installed. However, the criteria that will be used in determining the location of the well nest and the depths of the screened intervals are not provided. Step 2 of the Draft SOW (fourth bullet item) suggests that two monitoring well nests will be installed. However, it is unclear whether one, two, or three well nests will be installed. Revise the Draft SOW and QAPP to address these concerns.

In addition, the fourth bullet item under Step 2 indicates that eight soil samples will be collected per monitoring well nest. However, the Draft SOW and QAPP do not include the criteria that will be used to determine the depth intervals for each of the proposed soil samples and specify the purpose of these samples. Revise the Draft SOW and QAPP to address this discrepancy.

12. The Draft SOW indicates that MIP/EC borings will be advanced to a depth of approximately 75 feet or the top of the local confining unit. Revise the Draft SOW and QAPP to describe the procedures that will be followed to ensure the confining unit is not breached during any phase of the investigation. Also, confirm whether soil/geophysical data have been previously collected to confirm the depth of the confining layer

(approximately 75 feet). If these data do not exist, include in the Draft SOW and QAPP a description of the procedures that will be followed to identify potential confining units at shallower depths and to ensure these units are not breached without properly constructing a barrier/protective casing to minimize potential for cross contamination.

In addition, the Draft SOW states that the "depth of investigation may be increased up to 100 feet west of the E. [East] Plating room," but criteria for making this change are not provided. Further, increasing the depth of the borings could increase the likelihood of breaching the confining unit, thus detailed criteria for determining the depth of the borings should be provided. Revise the Draft SOW and QAPP to provide criteria for determining when the depth of investigation will be increased and how the depth of the borings will be determined.

13. Figures 1, 2, and 3 of the Draft SOW do not include all of the proposed 28 boring locations and do not include the same number of proposed borings. For example, Figure 2 includes one additional green-filled diamond and one green-outlined diamond in the vicinity of AOC58, compared to Figure 1. Figure 3 includes two additional green diamonds (locations) to the southwest, on BAE property, compared to Figures 1 and 2, but does not include the location southwest of PO6. Figure 3 includes the green-filled diamond, but not the green-outlined diamond in the vicinity of AOC58. Also, the three figures include a teal diamond on BAE property west-northwest of UD 59I; it is unclear if this location is one of the 28 proposed locations. Further, if some borings will be installed based on analytical results from earlier borings (e.g., step-out borings), the order in which borings will be installed and criteria for determining step-out locations should be included in the revised QAPP. Revise the figures to be consistent, clarify whether the teal diamond on BAE property is part of the proposed investigations, and provide the order in which borings will be installed and the criteria for determining step-out locations.

14. It is recommended that data quality objectives (DQOs) and/or a decision tree be provided in QAPP Worksheet #11 to clarify the sequencing of work elements and the criteria to be used for determining where step-out borings, EZVI locations, etc. should be installed. Consider including DQOs and/or a decision tree in the QAPP.

Please submit a revised QAPP and SOW that incorporates all the above comments and resolves the deficiencies within 45 days of receipt of this letter. If you have any questions or comments regarding this letter, please contact me at (312) 353-4150 or via email at desai.sheila@epa.gov.

Sincerely,

Sheila Desai

Sheila Desai
Remedial Project Manager

cc: Deepa de Alwis, MPCA (via email)
Nicole Goers, TechLaw Inc. (via email)