



Minnesota Pollution Control Agency

**CERTIFIED MAIL
RETURN RECEIPT REQUESTED**

November 1, 2004

Commanding Officer
Southern Division
Naval Facilities Engineering Command
Attn.: Dan Owens, Code ES32
P.O. Box 190010
North Charleston, SC 29419-9010

RE: Naval Industrial Reserve Ordnance Plant Superfund Site

Dear Mr. Owens:

The Minnesota Pollution Control Agency (MPCA) staff has reviewed the document entitled, "Technical Memorandum Work Plan Addendum," dated October 15, 2004. The Technical Memorandum Work Plan Addendum is for Operable Unit 1 of the Naval Industrial Reserve Ordnance Plant (NIROP) Superfund Site was submitted pursuant to the Federal Facility Agreement, dated March 27, 1991, between the MPCA, the U.S. Environmental Protection Agency, and the U.S. Navy (Navy).

The MPCA staff hereby modifies the Technical Memorandum Work Plan Addendum pursuant to Attachment I of this letter.

If you have any questions regarding this letter, please call me at (651) 296-7818.

Sincerely,

A handwritten signature in black ink, appearing to read "Dan Douglas", is written over the typed name.

David N. Douglas, Project Manager
Superfund Unit 2
Superfund Section
Majors and Remediation Division

DND:csa

cc: Tom Smith, U.S. Environmental Protection Agency (w/enclosures)
Venky Venkatesh, CH2MHILL Constructors, Inc. (w/enclosures)
Mark Sladic, Tetra Tech NUS, Inc. (w/enclosures)

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Attachment I

Modifications to the Document Entitled "Technical Memorandum Work Plan Addendum," Dated October 15, 2004

PROPOSED EXTENDED MONITORING ACTIVITIES, page 2, bullet 2

The MPCA staff requests that the location of the conceptual cross section shown in Figure 1 be shown on Figure 2. Ideally the cross section should be constructed along the ground water flow path.

PROPOSED EXTENDED MONITORING ACTIVITIES, page 2, bullet 2

The conceptual cross section indicates that MS-46S is screened through the upper sand, the silt/clay unit, and the sand below the silt/clay unit. Most of the screen is located in the silty/clay unit, not in aquifer material. As stated in the discussion, it is difficult to determine what interval the volatile organic compounds (VOCs) may be derived from when a ground water sample is collected from this well. The location of the vegetable oil pilot test was selected based largely on the results from this monitoring well. It appears that this well may not be representative of the VOC concentrations in the shallow aquifer, which has been the assumption in the past. The VOC concentrations may be more representative of the VOC adsorbed in the silt/clay or may be a mixture of water derived from within the silt/clay unit and from the semi-confined unit below it. It is difficult to determine with any degree of confidence.

It is evident that the data from this well should not be used to represent VOC concentrations in the shallow plume for the pilot test. It is also evident that the data from this well should not be used to determine the VOC concentrations in the shallow plume by the Navy as reported in its annual monitoring reports (AMRs) because the well is not screened in the shallow aquifer. The well should be used only for measuring water levels in the future although, since the well is screened both above and below the silt/clay unit, it may be difficult to determine whether or not the water level is an unconfined water level or whether or not there is influence from the semi-confined or confined aquifer below the clay. It is important for the pilot test and for accurate interpretation of the NIROP plumes to clarify where the high VOC concentrations are located in this area of Anoka County Park (ACP). An erroneous data point may lead to errant interpretations of the plume that may also impact interpretations of the vegetable oil pilot test. Recommendations follow regarding monitoring in the MS-46S area.

Soil Boring Installations, page 4

This section discusses that boring PES-SB-1 is expected to be in an area that has not been impacted by the vegetable oil injection. At the latest technical meeting, it was discussed that there was not a good upgradient monitoring well for the test area. An upgradient well is an essential requirement for interpretation of the pilot test. The MPCA staff has determined that MS-46S is not a monitoring well that is representative of the aquifer below the silt/clay in which the pilot test is being conducted. Questions apparently still remain as to whether the well was impacted by vegetable oil injection.

The MPCA staff requests that, at the PES-SB-1 location, the boring be used to collect the soil samples as described in the work plan. Once the stratigraphy has been determined, the MPCA staff requests that a monitoring well be installed below the silt/clay layer, if it is present at that location, or at a depth equivalent to the depth at which the vegetable oil was injected. The monitoring well would be considered a non-impacted well (i.e., not impacted by injected oil) and would serve as a well to monitor water conditions in the aquifer upgradient of the pilot test. The MPCA staff requests that the well be sampled as part of the pilot test and that water levels be collected for equipotential maps. The MPCA staff requests that this monitoring well also be sampled as part of the Navy's AMR sampling in the place of MS-46S to monitor the ACP plume and the progress of the ground water improvement from the pumpout system.

Monitoring Well Installations, page 4

The MPCA staff requests that the Navy take great care to describe the lithologic information from the borings done in proposed well locations. The MPCA staff requests that the monitoring wells be screened entirely in the aquifer at the appropriate zone. The wells should not be screened in fine grained materials and should not be screened in multiple units above and below confining or semi confining units.

Monitoring Well Installations, page 4

At the PES-MW10A/B and PES-MW-11A/B locations, deep wells are proposed for both locations. The 2 well clusters are located approximately 20 feet apart. The MPCA staff believes that the closeness of the cluster locations requires that only one deep monitoring well be installed to determine vertical gradients. The MPCA staff requests that the Navy install one deep well at these two locations to determine vertical gradients and that the other proposed deep well be allocated to another location. The Navy may want to do a deep boring at each location to collect soil samples and to define lithology.

Monitoring Well Installations, page 4

Considerable discussion has occurred regarding the true direction of ground water flow from the oil injection area. In addition, lithologic variability has also been discussed with respect to the impact on ground water flow in the pilot area. Uncertainty regarding these factors has made interpretation of the success of the test difficult. Monitoring wells may not have been located in areas where impacts of the test may be present.

The Navy has spent considerable time and money to conduct the pilot test. The MPCA staff believes that the pilot test is a valuable endeavor that may show that vegetable oil injection has the potential to reduce VOC concentrations in ACP or under the NIROP building on a larger scale. To date, the confidence in the vegetable oil results by the MPCA staff have been tempered by the mixed results and partial success of the test.

The MPCA staff feels that the Navy should maximize the opportunity to adequately monitor this second phase of the test so the technology might, with a reasonable degree of confidence, be given the best opportunity to provide data that might show it to be an effective technology that could be implemented on a larger scale.

To this end, the MPCA staff requests that the Navy install an additional nest of monitoring wells at a location half the distance between PES-MW-4 and proposed location PES-MW-12 A/B. There is uncertainty regarding the direction of ground water flow from the injection area. The additional wells would increase the opportunity of observing down gradient impacts from the vegetable oil and would reduce the chance that the impacts are missed by monitoring wells spaced too far apart. The additional well nest may also identify lithologic variability down gradient of the test area that might impact ground water flow and the results of the test.

Reporting - Fence Diagram

The MPCA staff requests that the Navy produce a fence diagram using all of the information from existing (including NIROP wells) and new borings and wells in the pilot test area. An understanding of the distribution of fine grained intervals is very important and may have a profound influence on ground water flow, the movement of contaminants, desorption of VOCs from fine grained layers and the distribution of substrate from the injection area. It is important to understand these relationships for interpretation of the data.

The MPCA staff requests that the fence diagram indicate the lithologic units found in the general area of the test and include the screened intervals of all wells in the general pilot test area. The diagram should show all significant fine grained intervals. The water table should be indicated on the diagram. The diagram should be used as a "base map" upon which to display monitoring data in the progress monitoring and final reports including various chemical and hydrologic parameters.

General Modification

The ground water flow direction will be determined using information from the existing and new wells. The MPCA staff requests that the location of the downgradient contingency wells be evaluated based on the new information to determine if their location is down gradient of the pilot test. It appears that the current contingency wells may not be downgradient of the vegetable oil injection area and will not serve the purpose intended.

General Modification, Figure 1

Wells PES-MW-3 and PES-MW-4 are screened primarily in a silt/clay unit. Only several feet of each 10-foot screen in these wells are screened in aquifer material. The construction of these wells may have influenced the results of analysis of water samples from the wells. It is unlikely that the silt/clay unit was impacted by the vegetable oil; most of the wells screens are located in this material.

Ideally the wells should be screened entirely below the silt/clay unit in the aquifer. The location of the screens in these wells (mostly in the silty/clay unit) may be responsible for the seeming lack of impact shown from the vegetable oil test in these wells. The MPCA staff requests that the logs for all of the monitoring wells installed for the test be checked to see if they have this problem. The MPCA staff requests that a list of such wells be provided in the next report.

General Modification

The Technical Memorandum Work Plan Addendum presents a thorough and insightful sampling and analysis plan for the vegetable oil pilot project area. In general, the work described reflects the substantive discussion of October 6, 2004 meeting when MPCA, EPA, MDH, and Navy agreed to the approach for further pilot test study. However, there are several inconsistencies between the discussion in the text and the tables in the Technical Memorandum Work Plan Addendum that need correction. These are detailed below:

Volatile Organic Compound Analysis in Groundwater, page 11

The text states “. . . if VOC mass is moving toward the contingency wells, which could potentially pose a threat to the Mississippi River.” The MPCA staff requests removing or rewriting this phrase. While it is understood that the statement is made in the context of the vegetable oil pilot study, it also implies that VOC mass is not posing a threat to the Mississippi River. VOC mass is already entering the Mississippi River from the Site.

Geochemical Analysis in Groundwater, page 11

The MPCA staff requests that the analyte “manganese” should be referenced as “reduced manganese”, or Mn^{+2}

Table 2:

There are several inconsistencies between what the text describes and the contents of the table. The MPCA staff requests that these inconsistencies identified below be corrected.

a. VOC column:

PES-SB-5: The table specifies that three samples will be collected, while the text on pages 7 and 8 appear to indicate that four VOC samples will be collected from this soil boring.

PES-SB-9, 10, and 11: Table 2 indicates that one VOC sample will be collected from each of these soil borings, while the text on page 8 does not specify this.

PES-MW-10, 11, and 12: Table 2 indicates that three soil samples will be taken for VOC analysis on 10A, 11A, and 12A, and one sample from 10B, 11B, and 12B. The text on page 8 appears to indicate that three soil samples for VOC analysis will be collected from each well drilling activity.

b. AMIBA Analysis column:

PES-SB-1: Table 2 indicates that three AMIBA samples will be taken, while the text on pages 7 and 8 appears to indicate that one sample will be collected for this analysis.

PES-SB-9, 10, and 11: Table 2 indicates that three AMIBA samples will be taken. The text on page 8 does not indicate that any AMIBA samples will be collected from these borings.

c. Microbial Population Characterization Analyses column:

PES-SB-9, 10, and 11 Table 2 indicates that one sample will be taken from these locations to determine microbial population, while the text on page eight appears to indicate that three samples will be taken from these borings for this purpose.

d. Bioavailable Ferric Iron column:

PES-SB-1: Table 2 indicates that three samples will be taken from this location for iron analysis, whereas the text on page seven appears to specify that one sample will be taken for this analysis at this location.

PES-SB-9, 10, and 11: Table 2 indicates that three samples will be taken from each of these borings for iron analysis, while the text on page eight does not appear to specify sampling for this analyte at these locations.

e. Phospholipid Fatty Acid Analysis column:

PES-MW-10, 11, and 12: Table 2 indicates that phospholipids analysis will be done on samples from MW-10 A and B, although the text on page ten does not indicate this.

f. Total Organic Carbon column:

PES-MW-10, 11, and 12: Table 2 indicates that three soil samples will be taken for total organic carbon analysis on 10A, 11A, and 12A, and one sample from 10B, 11B, and 12B. The text on page 8 appears to indicate that three soil samples for TOC analysis will be collected from each well drilling activity.

Table 4, Mobile Lab Analysis column

The table indicates that a mobile lab will be used to analyze ferrous iron and manganese, while Table 3 indicates that these analyses will be carried out in the field using colorimetric field test kits. The MPCA staff requests that this inconsistency be corrected.