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PITT-01-4-054

January 28, 2004

Project Number 6966

Commander, Southern Division
Naval Facilities Engineering Command
Attn: Dan Owens, Code ES32
2155 Eagle Drive
North Charleston, South Carolina 29406

Reference: CLEAN CONTRACT No. N62467-94-D-0888
Contract Task Order No. 0003

Subject: Response to Comments for Field Sampling Plan Addendum
NIROP Fridley, Fridley, Minnesota

Dear Dan:

Please find Response to Comments for EPA and MPCA comments on the NIROP Fridley Field Sampling Plan Addendum. Hard copies of the FSP addendum will be provided shortly. Please note that the RTC requested additional borings and a well, and we have generally agreed to install these. This agreement is caveated by the requirement for Anoka County to approve all installation locations. Now that the team is agreed on the scope of the investigation, we will submit a request to Anoka County to approve this scope. We will keep the team updated on progress.

Please call with any questions.

Sincerely,

A handwritten signature in black ink, appearing to read 'Mark Sladic'.

Mark Sladic P.E.
Task Order Manager

MS/kf

Enclosure

cc: Dave Douglas, MPCA (1 copy)
Wayne Hanson, NAVSEA (1 copy)
Dave Seely, USEPA (1 copy)
Richard Harris, RAB Co-Chair (1 copy)
Tim Ruda, UDLP (1 copy)
Rick Kuhlthau, Tech Law (1 copy)



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Mr. Dan Owens
Naval Facilities Engineering Command
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John Koehnen, Tech Law (1 copy)
Hal Davis, USGS (1 copy)
Venky Venkatesh, CH2MHill (1 copy)
Paul Walz, Bay West (1 copy)
Keith Henn, TtNUS (1 copy)
Mark Perry/File 6966 TtNUS (unbound copy)
Debra Wroblewski TtNUS (Cover Letter Only)

**RESPONSES TO EPA COMMENTS
FIELD SAMPLING PLAN ADDENDUM TO THE ADDITIONAL INVESTIGATION
AT THE ANOKA COUNTY RIVERFRONT PARK
NAVAL INDUSTRIAL RESERVE ORDNANCE PLANT (NIROP)**

GENERAL COMMENTS

1. **Comment:** The Field Sampling Plan Addendum to the Additional Investigation at Anoka County Riverfront Park (FSP Addendum) (pg. 1-1) indicates that "a copy of the Technical Committee 'meeting notes' summarizing the subcommittee meeting can be found in Appendix A." The FSP Addendum (pg. 2-1) similarly indicates that Section 2 "describes the scope of work and rationale to achieve the objectives outlined in the technical meeting memorandum (Appendix A)." However, no Appendix A is provided in the FSP Addendum, and it is not clear what technical meeting memorandum is being referred to. The FSP Addendum should be revised to include a copy of Appendix A.

Response: The Navy agrees. The document will be modified accordingly.

2. **Comment:** The FSP Addendum (pg. 1-2) indicates that the planned "aquifer tests follow a protocol developed by the USGS and previously distributed to the Partnering Team (see Appendix B)." However, Appendix B is not provided with the FSP Addendum, and it is not clear what United States Geological Survey (USGS) protocol is being referred to. The FSP Addendum should be revised to include a copy of Appendix B.

Response: The Navy agrees. The document will be modified accordingly.

3. **Comment:** Boring SB-10 has been identified as a proposed soil boring on Figure 2-1. However, except to indicate that it will be installed (pg. 2-1), no further mention of this soil boring has been provided in the text of the FSP Addendum. The FSP Addendum should discuss the purpose of the proposed boring SB-10 and indicate how if at all, the lithology identified at this boring will influence the installation of monitoring wells at the other boring locations proposed in the FSP Addendum.

Response: The intent of SB-10 is to collect additional lithologic data in this relatively complex geologic environment. SB-8, SB-9, and SB-10 were spread somewhat evenly across the area identified as needing additional data. Based upon the limited area for drilling due to East River Road and the utility corridor SB-10 was added to the plan. If SB-8 and SB-9 do not indicate a presence of an intermediate interval this location will be utilized for the placement of the well. This will be more clearly stated in the work plan. Also please see Navy Responses to the MPCA comments for additional information.

4. **Comment:** The objectives of the proposed investigation, as cited in the FSP Addendum (pg. 2-1), include better definition of the trichloroethylene (TCE) plume in the shallow and intermediate intervals of the unconsolidated aquifer(s) west of AT-10. The installation of monitoring well cluster MS-54 is proposed to address this objective. The proposed location of this well cluster is shown on Figure 2-1. While not clearly stated, it appears that the primary purpose of this well cluster is to better evaluate the degree of capture achieved in the hydraulic feature observed in the intermediate zone in the area of 12-IS and 13-IS. This area has frequently been referred to as the hydraulic 'nose.'

In response to an ongoing review of this FSP Addendum, Hal Davis of the USGS has suggested (in an E-mail dated October 10, 2003) moving well cluster MS-54 further north along the median of East River Road into an area associated with the flatter part of the cone of depression of extraction well

AT-3A. However, moving the well into an area more obviously controlled by AT-3A may not be helpful for evaluating capture in the area of the hydraulic nose.

When reviewing the potentiometric maps prepared by the USGS for the intermediate zone, it has been noted that these maps do not include water level data from monitoring well MS-411. In the December 2002 USGS capture zone analysis, MS-411 was moved into the deep zone. However, as discussed during the NIROP Technical Committee meeting held on July 8 and 9, 2003, it may not be appropriate to eliminate the intermediate zone at many of the locations, as was done in the USGS capture zone analysis, including at MS-411. As shown by Figure 4-8 of the 2001 AMR, if the water-level datum for the pumping scenario from MS-411 is included in the intermediate potentiometric map, the hydraulic nose feature becomes much more evident. This alternate depiction of the potentiometric surface in the intermediate zone under pumping conditions may influence the USGS's analysis of groundwater flow in this area and should be considered in future decision making.

Response: The Navy agrees. Placement of MS-54 is appropriate to define the "nose" emanating from the vicinity of 12-IS and 13-IS. The data collected will certainly be considered in future decision making

5. **Comment:** The FSP Addendum (pg. 2-2) indicates that the new well cluster MS-54 will be installed "only if the intermediate monitoring interval is encountered at soil boring SB-08 or SB-09." Given the heterogeneity previously observed in the lithology in this general area, limiting the installation of MS-54 only if the intermediate monitoring zone is encountered in the area of SB-09 does not appear sufficient. If the intermediate flow zone is not found initially at SB-09, additional borings should be completed in this general area to identify this zone. Otherwise, the intermediate flow zone may inadvertently be missed.

Also, the strategy of placing only one other boring some 200 feet north of SB-09 at SB-08 should be justified. Based on the current conceptual model of the site, it would seem unlikely that an intermediate flow zone would be found this far to the north. Consequently, an approach that steps out from SB-09 in smaller increments would appear more appropriate for delineating the northern extent of the intermediate zone in this area. In addition, this was the approach that was discussed in the July 2003 Technical Committee meeting.

Response: The Navy agrees. The work plan will be modified to allow more flexibility and in doing so will be modified to include additional potential "step-out" borings per the MPCA comment letter. The Navy has chosen a total 6 additional potential "step-out" borings (2 borings per location) instead of the MPCA suggested 9 additional borings (3 per location). This reduction from MPCA's suggestion is solely due to the limited area where wells can be installed at the site. The obvious road restrictions to the northeast and southwest of the medial strip and large utility corridor beyond the road to the northeast severely limit the available area to locate wells. These additional potential "step-out" borings will only be drilled if the intermediate interval is not found in the original borings SB-8 and SB-9.

As stated in the MPCA response letter additional 2 potential "step-out" may be utilized in the vicinity of SB-10 if the borings around SB-08 and SB-09 indicate that the intermediate interval is not present in the medial strip along East River Road.

Please note that the "decision" to install additional borings identified in MPCA's comment will be made in the field, in "near real-time", so it will not create driller "stand-by" time or more than the one mobilization planned. As stated, these borings will only be installed if needed based upon a field decision considering the suggestions by the MPCA in their comment (e.g., rough geologic cross-sections in the field).

The placement of the well cluster MS-55 (not MS-54 as is stated in the comment) will be selected based upon the data collected from these borings. Assuming the intermediate interval is present MS-54S/I will be installed without "field decision".

6. **Comment:** The FSP Addendum pg. (2-3) indicates that if both SB-08 and SB-09 "show the presence of the intermediate monitoring interval then well cluster MW-55S/I will be installed at SB-09." No rationale has been presented for this decision.

As shown on Figures 19 and 23 of the USGS Capture Zone Evaluation, the presence of an intermediate zone at SB-08 would differ significantly from that assumed during the USGS evaluation. The depiction of potentiometric contours and groundwater flow lines shown on these figures may change significantly with such a scenario. Consequently, additional analysis of probable flow paths under these conditions would appear necessary to identify appropriate monitoring well locations. The above decision rule may be based on the observed distribution of TCE in the intermediate zone. However, due to a lack of monitoring wells in this area, the distribution of TCE north of well cluster MS-36 does not appear to be well established; and previous depictions of TCE may not provide a good basis for locating additional well locations.

Based on the conceptual model for the site, the presence of the intermediate zone at SB-08 would appear unlikely. However, if the intermediate flow zone is found to be present at both locations (SB-08 and SB-09), it may be best to consider installing well clusters at both locations. SB-08 is approximately 200 feet from SB-09, and the influence of extraction well AT-3A may not extend to SB-08. The installation of a well cluster only at SB-08 would leave approximately 400 feet of the 'funnel' in the intermediate zone between SB-08 and MW-36 locations unmonitored. The rationale for choosing the final location(s) for the monitoring well cluster(s) should be clearly described and properly justified.

Response: Based upon the geologic information available in addition to the points made it would seem unlikely that the intermediate interval would be present at SB-08. But more importantly, because of the better than expected performance of AT-9 there does not appear to be a debate over capture in this area. On the other hand, the elevated levels of contamination at MS-34I and MS-35I have left cause for concern over the contamination present in the northern vicinity of MS-36. Thus, this area was selected as the more appropriate area for the additional well cluster.

However, the Navy is very interested in working with the EPA and MPCA in achieving closure on the hydrogeologic and contaminant distribution issues at the NIROP site. To that end, the Navy concedes that well(s) will be installed at each location if the intermediate flow zone is present at both boring locations (SB-08 and SB-09). That is, an intermediate well will be installed at SB-08 and a shallow/intermediate well cluster will be installed at SB-09 if the intermediate flow zone is present at both locations (a shallow well is not needed at the SB-08 location due to other wells located nearby). This assumes that these two clusters will be approximately 150 feet or greater apart. This will not apply if "step-out" borings are utilized (implying that the clusters will be less than 150 feet apart from one another).

**RESPONSES TO MPCA COMMENTS
MODIFICATIONS TO "FIELD SAMPLING PLAN ADDENDUM
TO THE ADDITIONAL INVESTIGATION
AT THE ANOKA COUNTY RIVERFRONT PARK,"
DATED SEPTEMBER 30, 2003**

- 1. Comment:** The rationale for SB-10 is not entirely clear. It would seem that one of the primary purposes of the borings is to better define lithology. The MPCA staff requests that a third goal of the work plan be added, i.e., to better define lithology in the study area. If there is additional clarification regarding the rationale for boring SB-10, the MPCA staff requests that the clarification be included in the work plan.

Response: The Navy agrees to more clearly state the objective in the work plan. The intent of proposing soil boring SB-10 is to further better define lithology at this complex geological environment. Based upon the limited area for drilling due to restrictions of East River Road and the utility corridor SB-10 was added to the plan. If SB-8 and SB-9 do not indicate a presence of an intermediate interval this location may be utilized for the placement of an intermediate monitoring well. This will be more clearly stated in the work plan. Also please see Navy Responses to the EPA comments for additional information.

- 2. Comment:** The new hydrogeologic model of the site includes the "funneling" of ground water through a gap in the low permeability (silty clay) unit in the intermediate zone. Presumably, one of the objectives of this work is to clarify the lithologic relationships in this area, i.e., to address this question, "What is the extent of the intermediate aquifer in relation to the silty clay layer?" Once this is known, locations for two nests of wells will be determined. The wells will be used to collect hydraulic head and chemistry data. The data will be used to assist in plume definition and plume capture evaluations, which is the issue raised at the Technical Subcommittee meeting regarding the United States Geological Survey (USGS) capture effectiveness report, "Evaluation of the Capture Zone for Recovery Wells at Naval Industrial Reserve Ordnance Plant, Fridley, MN – (USGS Open File Report - In Preparation," dated December 17, 2002.

Response: The Navy agrees. The intent of the proposed work is to further refine the hydrogeologic model of the site and to foster a better understanding of the site conditions and remedy performance by the Technical Subcommittee.

- 3. Comment:** The geology in the study area is complex due to the glacio-fluvial processes that were at work during the erosional and depositional events that created the lithologic sequence. As we have observed in the past, with this and other areas of the site (AT-2 and AT-10 areas), lithology can change greatly over short horizontal and vertical distances. The changes can profoundly influence ground water flow. A little upfront field work could avoid locating the monitoring wells in less than desirable locations. The additional upfront work can optimize the time and money spent and maximize the quality of the data to be collected. Some flexibility in the field should be built into the work plan.

The best approach for success in properly locating monitoring wells that provide the best data in glacio-fluvial sequences is to do a series of "step-out" borings at a more closely spaced interval. As data is collected from the borings in the field a cross section can be roughed out and the geology interpreted. The data is then reviewed in the field and a decision made as to the best location of the wells.

The MPCA staff requests that in the proposed MS-54S/1, SB-08 and SB-09 locations a series of up to three borings be planned for each location rather than using a single or several fixed

locations. In the case of SB-08 and SB-09, the geology may change greatly in the 200 feet between borings and the complexity of the geology may not be understood. Such rapid lithologic changes were observed between the former AT-2 and the 6-D locations. Although the specific reasoning for SB-10 is not fully articulated in the work plan it is possible that a series of borings in this location may be needed to clarify the lithology. Three borings may not be required in each location if the geology proves to be less complex; the number of borings can be determined in the field as the data is collected.

This work is an opportunity to define the northern and southern edges of the "funnel" and to better define the relationship between the silty clay layers and the extent of the intermediate aquifer. An evaluation of the data collected in the field will lead to a better decision regarding where to locate the monitoring wells so that they provide the best data for plume and capture evaluations, i.e., optimization of the well locations. The MPCA staff requests that the work plan be modified to include field flexibility and "step-out" borings to define the lithologic relationships and to locate the proposed monitoring wells.

Response: The Navy agrees. As stated in previous comment responses, the intent of SB-10 was to accomplish this point. However, it is understood that due to the correctly stated points by the MPCA, the work plan will be modified to allow more flexibility. The work plan will be modified to include additional potential "step-out" borings. The Navy has chosen a total 6 additional potential "step-out" borings (2 borings per location) instead of the suggested 9 additional borings (3 per location). This reduction is solely due to the limited area where wells can be installed at the site. The obvious road restrictions to the northeast and southwest of the medial strip and large utility corridor beyond the road to the northeast severely limit the available area to locate borings/wells. These additional potential "step-out" borings will only be drilled if the intermediate interval is not found in the original borings SB-8 and SB-9.

To meet the MPCA's objective, the additional 2 potential "step-out" not used in the vicinity of SB-8 and SB-9 will potentially be utilized in the vicinity of SB-10 if the borings around SB-08 and SB-09 indicate that the intermediate interval is not present in the medial strip along East River Road.

Please note that the "decision" to install additional borings identified in MPCA's comment will be made in the field, in "near real-time", so it will not create driller "stand-by" time or more than the one mobilization planned. As stated, these borings will only be installed if needed based upon a field decision considering the suggestions by the MPCA in their comment (e.g., rough geologic cross-sections in the field).

4. **Comment:** The MPCA staff requests that the Navy add the draft USGS report to the list of references. Much of the work proposed in this work plan was recommended in the report.

Response: The Navy agrees.

5. **Comment:** The MPCA staff will defer to Hal Davis of the USGS to review the pump test procedures outlined in the work plan.

Response: The Navy agrees.