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PITT-05-7-035

May 17, 2007

Project Number 0182

Mr. Lonnie Monaco
BRAC Program Management Office Northeast
4911 South Broad Street
Philadelphia, Pennsylvania 19112-1303

Reference: CLEAN Contract No. N62472-03-D-0057
Contract Task Order 041

Subject: Restoration Advisory Board (RAB) Meeting Minutes of May 2, 2007
Former Naval Air Warfare Center (NAWC) Warminster, Pennsylvania

Dear Mr. Monaco:

Enclosed please find the minutes from the RAB meeting held on May 2, 2007. Copies of the minutes are being sent to the individuals identified on the distribution list.

Please contact me if you have any questions or comments.

Sincerely,

~~Jeffrey P. Orient~~
Project Manager

JPO/sic

Enclosure

c: Ron Sloto (USGS)
April Flipse (PADEP)
Tony Sauder (Pennoni)
Dave Fennimore (Earth Data)
Garth Glenn (TtNUS)
Pat Schauble (ECOR)
Kathy Davies (U.S. EPA)
Carolyn Ohart (Battelle)
Norm Kelly (RAB Co-Chair)
Dennis Orenshaw (U.S. EPA)
Drew Lausch (U.S. EPA)
Bob Lewandowski (Navy BRAC PMO)
Mike Nines (MGKF Law)
File 0182

**FORMER NAVAL AIR WARFARE CENTER (NAWC) WARMINSTER
MEETING MINUTES**

RESTORATION ADVISORY BOARD (RAB) MEETING NO. 107

REFERENCE: CLEAN CTO NO. 041

1. Meeting Date and Time: May 2, 2007, 9:45 AM to 11:45 AM
2. Location: Warminster Municipal Authority Board Room
3. Attendees: See Attachment 1 (attendance list)
4. Summary of Meeting Discussions: See below.

Introduction and Administrative Update

Mr. Lonnie Monaco, the Navy's Remedial Project Manager (RPM) for the project working out of the Navy's Base Realignment and Closure Program Management Office (BRAC PMO) in Philadelphia, opened the meeting by welcoming the attendees and providing an agenda for the meeting (Attachment 2).

Comments were solicited on the minutes from the previous meeting, with no comments offered by those in attendance.

Action Item Review

Action items from the February 7, 2007 RAB meeting were reviewed as the associated agenda topics were discussed. The action items from the February 2007 meeting are summarized below:

- EPA is to provide an update of the status of site assessment activities around late March or early April.
- Mr. Nines is to provide groundwater flow maps for the 905 Louis Drive investigation, and is to expand the scope of groundwater sampling to include shallow Navy wells along the railroad tracks (pending client approval).
- PADEP is to investigate whether data exists regarding tank farm releases at CRC Chemicals.
- Warminster Municipal Authority is to look into whether any private wells are in use along Kirk Road.
- The Navy (TtNUS) is to address BTAG comments on the OU-10 work plan.
- ECOR is to find the treatment plant outfall location (with help from Mr. Hagey).

- The TEG is to identify extraction wells for shutdown during the water level study and address any comments on the draft memo.
- WMA is to sample Well 26 for 1,4 dioxane.
- Any optimization study comments are to be submitted by March 9th.
- The TEG is to provide a recommendations memo for long term monitoring by February 23rd.

Area C Source Assessment

Mr. Jeff Orient (Tetra Tech NUS) provided an update on the status of the Area C source assessment activities. The final work plan was issued and TtNUS is currently mobilizing for field work, which is anticipated to begin in early June. As part of the mobilization, a meeting is being set up with Ann's Choice representatives to discuss logistics related to execution of the field activities. Several RAB members asked to be informed about the schedule for the meeting, which is tentatively scheduled for mid-May. Mr. Orient stressed that attendance of any RAB members at the meeting was contingent on them getting prior approval from Mr. Chris Candela of ATC Associates.

Mr. Tony Sauder (Pennoni Associates, representing Warminster Township) stated that he was asked in a recent FLRA meeting if there was any documentation that Area C was deemed acceptable for residential land use, as there have been some questions "in the community". Mr. Bob Lewandowski (Navy BRAC PMO) indicated that if it wasn't, there would have been some sort of land use control in the deed, and suggested directing the people that raised the question to the Finding of Suitability to Transfer (FOST) document. Ms. April Flipse (PADEP) suggested that Mr. Sauder check the ROD.

WMA Update

Mr. Monaco asked Mr. Dave Fennimore (Earth Data, representing Warminster Municipal Authority) for updates regarding municipal well treatment system upgrade/construction work and sampling of the municipal wells for 1,4 dioxane. Mr. Fennimore indicated that preliminary designs for the treatment system upgrade (for WMA 26) and treatment system installation (for WMA 13) have been completed but final designs are not yet done. Mr. Fennimore also indicated that a search had been done to identify private wells along Kirk Road but none had been found, and that wells WMA 13 and 26 had been sampled for 1,4 dioxane with none detected.

Post-ROD Monitoring at OU-10

Mr. Monaco provided a brief background summary of the issues involved with OU-10, stated that the final work plan has been submitted by TtNUS, and indicated that TtNUS will be tasked with performing the sampling. Mr. Orient indicated that there was one BTAG comment on the draft work plan and that it was addressed in the final letter work plan submittal (two background sampling locations were moved).

Act II – 905 Louis Drive

Mr. Drew Lausch (U.S. EPA site assessment group) provided an update on EPA site assessment activities in the Louis Drive area. One likely source for the PCE contamination has been identified so far, CRC Industries. Money has been set aside and a contractor lined up (Tetra Tech) to perform site assessment activities, including well installations and sampling. Mr. Lausch also described the databases that EPA uses in their searches for potential contaminant sources. Mr. Orient asked if EPA was confining their search to potential PCE sources only or looking at potential sources for other contaminants also. Mr. Lausch indicated that the search was not limited to potential PCE sources. Mr. Sauder asked if CRC Industries had been informed of the site assessment work yet – Mr. Lausch indicated that they had not contacted CRC yet, but that notification would occur soon. Mr. Sauder also questioned whether the EPA using Tetra Tech for the CRC Industries site assessment may constitute a conflict of interest given that TtNUS represents the Navy at Warminster – Mr. Lausch indicated that he would look into the issue. Ms. Flipse stated that CRC has DEP-registered above-ground tanks (ASTs), including one with PCE that is located near the fenceline and close to one of the monitoring wells on the 905 Louis Drive property. There have been no reported releases to date according to the PADEP database. Mr. Fennimore asked if a work plan for the site assessment activities was being developed and who has the lead for the site investigation. Mr. Lausch indicated that a work plan will be prepared, the investigation is an EPA-lead activity, and PADEP will also have some involvement through their storage tanks program. He also indicated that he will solicit RAB input to the work plan development process, and that EPA and PADEP are scheduled to meet tomorrow (May 3) to discuss the process of moving forward with the investigation. Mr. Fennimore asked when field work was anticipated to begin – Mr. Lausch stated that he has developed a detailed, aggressive schedule for the overall project and that field work is targeted to begin around July. Mr. Sauder asked how the RAB would know if an investigation is proceeding. Mr. Monaco requested that Mr. Lausch keep the RAB informed of the status of the investigation. Ms. Flipse stated that Mr. Jim Burke (PADEP hydrogeologist) will be the PADEP project manager for the CRC investigation.

Mr. Dennis Orenshaw (U.S. EPA RPM) asked if there are any railroad sidings near the tanks. Ms. Flipse and Mr. Pat Schauble (ECOR) indicated that there is a nearby siding. Mr. Mike Nines (MGKF Law) also stated that according to the information they have gathered CRC does ship PCE via rail. Mr. Nines then briefed the RAB on recent developments with the Act II work that his firm is performing at 905 Louis Drive. In the most recent round of sampling (March 2007), PCE concentrations are still high. No 1,4 dioxane was detected in the wells. Mr. Nines volunteered to share the sampling data with the RAB via email.

Mr. Monaco asked if any further sampling was planned for the 905 Louis Drive investigation – Mr. Nines indicated that another round was scheduled for June. Mr. Sauder pointed out that wells HN-14S and 59S were to be sampled by MGKF Law as per previous meeting minutes. Mr. Nines stated that they had collected water levels from the wells but didn't sample them. There was a general discussion of the best course of action to take to get the wells sampled, sampling methodology, and the appropriate timing of the sampling event. Mr. Lewandowski and Mr. Monaco indicated that they would direct ECOR to sample the two wells as part of the annual round of groundwater sampling that is currently ongoing.

Treatment Outfall Location

Mr. Schauble indicated that the treatment plant outfall location had been found. Based on original drawings and survey coordinates provided by WMA, ECOR representatives found the outfall at the location indicated on the drawings, approximately 1 mile north of the treatment plant where the receiving stream crosses under Bristol Road. Mr. Orient suggested that, given the difficulty experienced in locating the outfall, ECOR distribute copies of an outfall location map to the RAB so that the location information is disseminated to a number of parties.

Extraction Well near HN-69D/Long Term Monitoring

Mr. Orient indicated that the final version of a Technical Evaluation Group (TEG) memo addressing water level monitoring during the drilling of the new extraction well near HN-69D was sent out in February and a second memo addressing long term monitoring program modifications sent out in March. Mr. Monaco indicated that a few minor comments had been received on the draft water level monitoring memo.

Revised Optimization Study

Mr. Monaco summarized recent developments with the Battelle Optimization Study. A revised draft of the optimization study had been sent out for comment by Battelle, with comments received from the USGS, ECOR, and TtNUS. Ms. Kathy Davies (U.S. EPA hydrogeologist) requested the opportunity to provide comments also. Battelle had sent out a comment response letter on April 13. Ms. Carolyn Scala (Battelle) handed out copies of the comment response letter (Attachment 3) and summarized the comments in general. Ms. Scala and others then brought up a few comments for further clarification/discussion, as follows:

- For TtNUS comment No. 9 (asking for additional discussion of the rationale behind reducing the Area C pumping rate), Ms. Scala asked if there was any historic information about throttling back wells other than EWs C-16 and C-17 for contaminant reduction reasons – Mr. Orient stated that he wasn't aware of any and that the comment was focused on further clarifying the rationale for shutting down the two wells.
- For USGS comment No. 9 (concerning the potential shutdown of extraction wells D1 and D4), Ms. Scala asked for additional clarification from Mr. Ron Sloto (USGS hydrogeologist). Mr. Sloto explained that he was concerned that there would be no pumping in the northeastern half of Area D if these two wells were shut down. Ms. Davies suggested shutting down D4 and keeping D1 pumping until the effects of the D4 shutdown could be evaluated. The RAB agreed to this course of action.
- For USGS comment No. 11 (suggesting that the annual sampling round be performed in the fall versus the spring), Mr. Fennimore asked for more clarification of the Battelle response that stated that spring sampling would be more conservative. There was a general discussion of when the highest concentrations could be expected to be seen in groundwater, with the conclusion that Battelle would evaluate the historic data and recommend whichever time period (spring or fall) that statistically had higher overall concentrations observed in the past.
- For USGS comment No. 7 (asking for information about well SW-7), Ms. Davies asked whether this well was the high-yielding production well that the Navy had given to WMA. Mr. Fennimore stated that the well that WMA has taken ownership of is SW-10.
- For TtNUS comment No. 10 (pointing out the issue of incorrect use of non-detect values in statistical evaluations and requesting that Battelle stick with the more valid statistical evaluation of PCE concentrations in Area A that did not use detection limits as data), Mr. Fennimore asked what the impacts of the use of non-detects was. Mr. Orient stated that the use of non-detect values artificially increased the concentrations of PCE in Area A. After some general discussion about whether the non-detect data had in fact artificially skewed the data upwards or downwards, ECOR was assigned to check their historic graphs/tables to determine which was the case.

- For the proposed treatment plant modifications, Ms. Flipse cautioned that the proposed treatment plant modifications may be in conflict with new permit requirements that may be coming out, for both water and air. Ms. Scala described the rationale for some of the proposed modifications.

At the conclusion of the Optimization Study discussion, Mr. Monaco asked Mr. Orenshaw when the Navy would get EPA comments – Mr. Orenshaw stated that comments would be provided within a week.

Miscellaneous Topics and Issues – Action Items

Ms. Flipse announced that this was her last RAB meeting, as she is retiring from PADEP at the end of May.

Action items identified at the wrap-up of the meeting include:

- Mr. Lausch is to keep the RAB updated on the schedule for the CRC Industries site investigation.
- TiNUS is to notify the RAB about the schedule for the Area C pre-investigation meeting/site walk with Ann's Choice representatives.
- ECOR is to check the Area A PCE graphs that they prepared to evaluate the non-detect data issue.
- The Navy is to provide the FOST and/or ROD language for Area C to Mr. Sauder that indicates no Area C soils restrictions.
- The Navy is to direct ECOR to sample wells HN-14S and 59S.
- The Navy will have well D4 shut down after the current round of sampling is completed.
- EPA is to provide optimization study comments within one week.

Next Meeting Date

A conference call was scheduled for 10:00 AM on May 30 to discuss the scope of the CRC Industries investigation. Mr. Lausch is to provide an agenda; Mr. Monaco is to provide a call-in number.

The next RAB meeting date was set for August 1, 2007 at 9:30 AM in the WMA Board Room.

The meeting was adjourned at approximately 11:45 AM.

**ATTACHMENT 1
ATTENDANCE LIST**

WARMINGSTER RAB MEETING

MAY 2, 2007

<u>NAME</u>	<u>AFFILIATION</u>	<u>PHONE/EMAIL</u>
JEFF ORIENT	TETRA TECH NUS	⁴¹² 921-8778 jeff.orient@ttnus.com
LONNIE MONACO	US NAVY	⁸¹⁵ 897-4911 orlando.monaco@navy.mil
Amanda Bell	ECOR Solutions	⁴⁰⁴ 887-7510 bell@ecor-solutions.com
Patrice Schauble	ECOR Solutions	⁴⁸⁴ 853-7510 schauble@ecor-solutions.com
Kathy Davies	EPA	215-814-3315 davies.kathy@epa.gov
APRIL FLIPSE	PADEP	484-250-5721 aflipse@state.pa.us
Bob Lewandowski	NAVY BRAC OFFICE	215-897-4908 robert.f.lewandowski@navy.mil
DENNIS ORENSHAW	EPA	215-814-3361 ORENSHAW.DENNIS@EPA.GOV
Amanda Gibson ^(for Chris Cardella)	ATC	610-313-3100 amanda.gibson@atassociates.com
Drew Lausch	EPAR3	215-814-3359 lausch.robert@epa.gov
Tony Sander	Pennoni/Warmingster	215-222-3000 tsander@pennoni.com
MICHAEL NINES	MGRF/905 ASSOC	484-430-2350 MNINES@MGRFLW.COM
Carolyn Scala	Battelle	215-504-5003 scalac@battelle.org
Dave Ferrimone	EDW/WTMA	610-524-9466 dferrimone@earthdatare.com
Ron Soto	US Geological Survey	610-321-2434 X212 rsoto@USGS.gov

**ATTACHMENT 2
MEETING AGENDA**

**NAWC WARMINSTER
TECHNICAL SUBCOMMITTEE/RAB MEETING**

02 May 2007 9:30 AM

WMA Board Room

415 Gibson Ave

Warminster, PA

MEETING AGENDA

Administrative Update

- Minutes of the Last Meeting
- Review Action Items (see below)

Area C Source Assessment

- Status of Implementing January 2007 Final Work Plan (Navy/TtNUS)

WMA Update

- Status of Wells #13 and #26
- Private well usage along Kirk Road (AI #4)
- 1,4 dioxane sample results (AI#8)

Post-ROD monitoring at OU-10

- Status of comments on draft review (AI #5)

Act II – 905 Louis Drive

- EPA Update on Offsite Preliminary Assessment (AI #1)
- Status Update from property owner (rep Mike Nines) – 1, 4 dioxane sampling? (AI #2)
- PADEP investigation of CRC Chemical (AI #3)

Treatment Outfall Location (ECOR) (AI #6)

Extraction Well near 69D/ Long Term Monitoring

- TEG update (AI #7) (AI #10)

Revised Optimization Study

- Response to comments from Battelle (AI#9)

Miscellaneous Topics and Issues – Action Items

Time and Location of Next Meeting: - Date to be determined

Action Items

The following action items were identified at the wrap-up of our last meeting:

- 1) EPA is to provide an update of the status of site assessment activities around late March or early April.
- 2) Mr. Nines is to provide groundwater flow maps for the 905 Louis Drive investigation, and is to expand the scope of groundwater sampling to include shallow Navy wells along the railroad tracks (pending client approval).
- 3) PADEP is to investigate whether data exists regarding tank farm releases at CRC Chemicals.
- 4) Warminster Municipal Authority is to look into whether any private wells are in use along Kirk Road.
- 5) The Navy (TtNUS) is to address BTAG comments on the OU-10 work plan.
- 6) ECOR is to find the treatment plant outfall location (with help from Mr. Hagey).
- 7) The TEG is to identify extraction wells for shutdown during the water level study and address any comments on the draft memo.
- 8) WMA is to sample Well 26 for 1,4 dioxane.
- 9) Any optimization study comments are to be submitted by March 9th.
- 10) The TEG is to provide a recommendations memo for long term monitoring by February 23rd.

**ATTACHMENT 3
BATTELLE RESPONSE TO COMMENTS LETTER
REVISED DRAFT OPTIMIZATION STUDY**

Battelle
The Business of Innovation

505 King Avenue
Columbus, Ohio 43201-2693
(614) 424-6424 Fax (614) 424-5263

April 13, 2007

Mr. Orlando Monaco
BRAC Program Management Office Northeast
4911 South Broad Street
Philadelphia, Pennsylvania 19112-1303

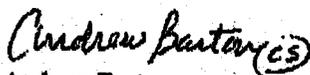
Contract No. N62472-00-D-1300, Task Order 0002, Mod 08
Response to Comments received for the NAWC Warminster Revised Draft Optimization Study
Warminster, Pennsylvania

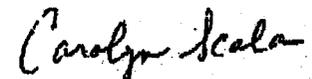
Dear Mr. Monaco:

Attached for your review are three (3) hard copies of the response to comments received for the *Revised Draft Optimization Study Report for NAWC Warminster, Warminster, Pennsylvania*. Per your request, copies have also been sent to the distribution list below.

If you have any questions or comments, please contact either Andrew Barton at (412) 427-7030 or Carolyn Scala at (215) 504-5003.

Sincerely,


Andrew Barton
Project Manager
Environmental Restoration


Carolyn Scala, P.E.
Project Engineer
Environmental Restoration

Enclosure

cc: Orlando Monaco, HFANE (3 copy)
Kathy Davies, EPA (2 copies)
James Burke, PADEP (1 copy)
April Flipse, PADEP (1 copy)
Ronald A. Sloto, USGS (1 copy)
Jeff Orient, Tetra Tech NUS (1 copy)
Dave Fennimore, WMA (1 copy)
Anthony Sauder, Pennoni Associates (1 copy)
Patrick Schanble, ECOR Solutions, Inc. (1 copy)

**Response to USGS Comments on the
Revised Draft Optimization Report for NAWC Warminster (January 2007)
Received February 9, 2007**

Comment 1. Battelle recommended: Reduce sampling frequency from quarterly to semiannually in all extraction wells.

Semiannually should be defined to mean every spring (usually a time of high GW levels) and every fall (usually a time of low GW levels).

I agree, BUT... We can switch to semiannually for the OU-4/Area D wells this year. For OU1A/Area A we should sample extraction wells quarterly for 4 quarters after the new HN-69D extraction well goes on line so we can monitor its effects. We could extend quarterly sampling if the data indicate quarterly sampling should be continued; we need to be sure that the drilling did not set anything loose and that the current network of extraction wells is not adversely impacted.

For OU3/Area C we should sample extraction wells quarterly for 4 quarters after the Area C source investigation has been completed. Likewise, we could extend quarterly sampling if the data indicate quarterly sampling should be continued; we need to be sure that the drilling did not set anything loose and that the current network of extraction wells is not adversely impacted. See Comment 5 below.

Response. Semiannually will be defined as spring and fall (normal periods of high and low groundwater levels).

TEG recommendations (March 2007) regarding the LTM program will be incorporated into the optimization study. Semiannual sampling for the extraction wells in Areas C and D will begin now. Extraction wells in Area A will be sampled quarterly for 2 quarters after the new extraction well is installed and any approved pumping rate changes are implemented, then sampling will be reduced to semiannually.

Comment 2. Battelle recommended: Increasing VOC sampling and GW level monitoring frequency to semiannual for HN-52-S and HN-52-D, while continuing semiannual monitoring in HN-52-I.

Currently, HN-52-S is sampled annually, and HN-52-D is not sampled. The LTMP notes that there is an obstruction in the casing of HN-52-D that prevents it from being sampled at the required depth. USGS can use their borehole TV camera to determine the cause of the problem (often it is stuff lost/dropped down the well).

Sampling frequency should be increased to quarterly during the 905 Louis Drive Investigation for wells HN-14-S, HN-16-S, HN-19-S, HN-52-S, HN-55-S, HN-59-S and then revert back to the established LTMP schedule.

Because of the high concentrations of PCE measured in well HN-52-S, it should be sampled semiannually. Well HN-52-D should be sampled annually if the obstruction in the casing can be removed.

Response. The TEG recommendations (March 2007) will be implemented for monitoring of the HN-52 well cluster. Annual sampling at HN-52S will continue – the recent data from the 905 Louis Drive investigation strongly implicates an adjacent property as the primary source contamination for that well and a process is underway to eventually address the issue (EPA/PADEP involvement). Sampling of HN-52D will not be conducted, as it was removed from the LTM program as part of the 2004/2005 LTM optimization work. HN-52I is the monitoring well at this location most likely impacted by the site, and semiannual sampling will be continued.

At the February 2007 RAB meeting, the recommendation to sample wells HN-14S, HN-16S, HN-52S, and HN-59S more frequently during the 905 Louis Drive investigation was presented for consideration by the firm completing this investigation (MGKF Law), and can be discussed between the Navy and MGKF Law.

Comment 3. Battelle recommended: Add EW-A18 to monitoring network after removal of pumping equipment. Monitor quarterly for two quarters then decrease frequency to semiannually. Use the PDB method.

Well EW-A18 should be added to the network after the pump has been removed. It should be sampled quarterly for 4 quarters after the new HN-69D extraction well goes on line and semiannually thereafter following evaluation of the data by the TEG. The established procedure to determine if it is appropriate to use a PDB sampler in this well should be followed. The well should be sampled by the conventional method and the PDB method and the results compared to determine if the difference is within guidelines.

Response. EW-A18 will be kept out of the LTM program in accordance with the TEG recommendations (March 2007). This well has had trace levels of contamination for some time (under 10 ug/L TCE, <1 ug/L other VOCs) and there are several better monitoring points in the near vicinity of it that are actively being sampled (HN-14I, HN-59I, HN-67D).

Comment 4. Battelle recommended: Remove HN-69-S from the network.

HN-69-S is sampled annually. TCE has dropped from 300 ug/L in 2000 to 2.9 ug/L in 2006. HN-69-S should be sampled semiannually for 2 events after the new HN-69D extraction well goes on line and then be dropped if constituents are still below MCL.

Response. The TEG recommendations (March 2007) will be implemented at HN-69S and HN-69D. Sampling at HN-69S will be discontinued as concentrations in this well have always been much lower than those in HN-69D. HN-69D will also be removed from the LTM program once the new extraction well is installed, since it will be located adjacent to this well and the collection of sampling data from both HN-69D and the new extraction well would most likely be redundant. Implementation of this recommendation will be contingent on a final review of sampling data from the new extraction well.

Comment 5. Battelle recommended: Reduce sampling frequency of BG-05A, HN-23A, HN-27S, and HN-28S from quarterly to semiannually.

If sampling of the extraction wells goes from quarterly to semiannually, then these wells should be sampled semiannually as well; however... The newly installed Area C wells, the extraction wells, and BG-05A, HN-23A, HN-27S, and HN-28S should be sampled quarterly for 4 quarters after the Area C source investigation has been completed. At that point the TEG should evaluate the data and recommend which wells should be sampled and their sampling frequency.

What is well SW-7? Is it in use by someone? Should it be sampled?

Response. The TEG recommendations (March 2007) will be implemented. Area C downgradient monitoring wells are now on a semiannual schedule, and therefore the upgradient wells BG-05A, HN-23A, HN-27S, and HN-28S should be sampled at the same frequency. Also, the extraction wells will be on a semiannual sampling schedule once the other proposed modifications are implemented. HN-23A will be investigated further during the Area C Source Assessment site investigation – other LTM program changes may result from this study. The monitoring schedule may be reevaluated in the future based on the results of the Area C source investigation.

Former production well SW-7 is located approximately 100 ft west of well HN-27S. The status of this well is unclear, but the monitoring performed in well HN-27S is sufficient to characterize the groundwater in this area.

Comment 6. Battelle recommended: Reduce reporting from quarterly to semiannually.

The July 20, 2004, TEG memo to Frank Cellucci recommended that the reporting format be changed to a quarterly “streamlined” version with only pumping rates, sampling results, water-level measurements and any notable issues and a separate annual report similar to the current quarterly reports. This recommendation was never followed, and I think it is a good idea.

Response. The optimization study will be revised to include the recommendation from the July 20, 2004 TEG memo. Rather than semiannual reporting, streamlined quarterly reports will be recommended that will include only pumping rates, sampling results, water-level measurements and any notable issues. Submission of an annual report will continue under the current format.

Comment 7. Battelle recommended: Taking EW-A2 and/or EW-A3 temporarily offline after the new HN-69D extraction well goes on line.

This should be addressed by the TEG during evaluation of well drilling and yield test data from the new HN-69D extraction well.

Response. This recommendation was made in accordance with the October 2006 TEG memo *Evaluation of NH-69D and the Potential Installation of a New Extraction Well*. The optimization report will be revised to reflect the most recent TEG memo *Water level Monitoring during Extraction Well Drilling at HN-69D* (February 2007). Specifically, extraction wells EW-A2, -A3, -A4, -A5, -A6, -A7 and -A9 will be temporarily shut down during the water level study to minimize any interferences. Following the completion of well drilling and yield testing activities, the water level data will be evaluated to determine the hydraulic interconnections between the new extraction well and the surrounding wells. Longer term shut down or reduced pumping at extraction wells which may have a high degree of hydraulic interconnectedness with the new extraction well will be recommended by the TEG following the pumping tests.

Comment 8. Battelle recommended: Turning off EW-A15 and turning on EW-A5 and EW-A9.

EW-A15 appears to producing relatively clean water so there is no need to continue pumping it. July 2006 sampling results indicate the concentration of TCE in water from well EW-A5 was 2,500 ug/L, and from well EW-A9 was 12,000 ug/L. Pumping these wells would contribute to greater recovery.

Response. Comment noted. These recommendations will remain in the optimization report.

Comment 9. Battelle recommended: Turning off wells EW-D1 and EW-D4.

July 2006 sampling results indicate the concentration of TCE in water from well EW-D1 was 17 ug/L, and from well EW-D4 was 8.9 ug/L. Because the concentrations are above the MCL, pumping should continue.

Response. The optimization report states that the goal of turning off well EW-D1 and EW-D4 is to maintain hydraulic containment of TCE concentrations greater than approximately 10 to 20 ug/L under the new pumping scenario. This recommendation will remain in the optimization report, as it is consistent with the Area D ROD where MNA was selected as the remedy for the portion of the plume with TCE concentrations less than 30 ug/L. As stated in the optimization report, additional pumping modifications may be necessary based on groundwater level data in order to optimize the area of hydraulic containment.

Comment 10. Data collected for the LTMP (chemical and water level) should be entered into a user friendly (Microsoft Excel or Access) database/spreadsheet (preferably Excel) and maintained. Only compounds of interest and detected compounds should be included as was done for the Area A compilation. The Area A WQ compilation has been often used and is immensely valuable. It was used often in preparing this evaluation. I cannot stress enough the importance and value of having these data readily available for decision making. An updated database should be provided as a deliverable with the quarterly monitoring reports.

Response. The recommendation to create and maintain a database with current and historical data from all areas, similar to that available for Area A, will be added to the Optimization Report.

Comment 11. Annual sampling should be done in the fall when water levels generally are lowest and water in the upper units is not diluted by winter/spring recharge.

Response. The rationale for fall annual sampling is noted. However, annual sampling performed in the spring is likely to be more conservative based on the flushing of DNAPL and high groundwater levels coming in contact with normally unsaturated source zone areas. A comparison of spring and fall groundwater chemical concentrations since 2002 indicated that average concentrations were slightly higher during the spring, thus further supporting continuation of the current annual spring sampling schedule.

Comment 12. Water levels should be measured semiannually in the spring and fall to coincide with semiannual sampling.

Response. After the initial increase in groundwater-level monitoring frequency to quarterly following modification of the pumping rates, the semiannual schedule as stated in the LTPMP (ECOR, 2005) will continue, with groundwater levels measured in the spring and fall to coincide with semiannual sampling.

Comment 13. Changes to the LTMP should be either summarized in an addendum to the November 2005 LTMP or preferably as substituted tables 1, 2, and 3 in a revised LTMP.

Response. The optimization report will recommend that the changes to the LTM program be incorporated in updated tables 1, 2, and 3 of the November 2005 LTPMP.

**Response to Tetra Tech Comments on the
Revised Draft Optimization Report for NAWC Warminster (January 2007)
Received March 7, 2007**

Comment 1. General comment – the findings of the recent work at 905 Louis Drive should be worked into the report where/as appropriate.

Response. Results of the recent sampling at 905 Louis Drive will be included as an attachment to the optimization report, and will be referenced in Sections 2.4.1 and 4.2.1.1. The optimization report will also note that additional data is being collected and that a final report is scheduled to be submitted to the PADEP by the end of 2007.

Comment 2. Section 1.2 – It would be useful to add a brief update about what current land use conditions are at the former NAWC (park, residential housing, retirement community, commercial use, etc.).

Response. A summary of the current land use conditions at the former NAWC will be added to Section 1.2 of the optimization report.

Comment 3. Section 2.2 – The description of Hydrogeologic units A, B, and C is somewhat misleading as each unit is Area-specific, i.e., Hydrogeologic units A/B/C in Area A are not the same stratigraphic sequences as Hydrogeologic units A/B/C in Area D. Within each area, the uppermost flow system was designated as A, the next deeper was B, and the underlying unit was C. The way it is written, it indicates that Hydrogeologic unit A in Area A is the same as Hydrogeologic unit A in Area D. I suggest rewriting it to reflect the area-specific designations.

Response. The text in Section 2.2 will be updated to more accurately describe the area-specific hydrogeologic unit designations.

Comment 4. Section 2.4.1 – Update as necessary to reflect the recent data from 905 Louis Drive investigation that indicates an offsite PCE source. The PCE issue relative to Area A versus offsite sources has been a major point of discussion with the RAB.

Response. Results of the recent sampling at 905 Louis Drive will be included as an attachment to the optimization report, and will be referenced in Section 2.4.1. The optimization report will also note that additional data is being collected and that a final report is scheduled to be submitted to the PADEP by the end of 2007.

Comment 5. Section 2.4.4 – Clarify that the MCL exceedances for WMA 26 are for the untreated water and that the treated water meets MCLs (verify with recent sampling data).

Response. The text in Section 2.4.4 will be revised to clarify that MCLs for TCE and PCE are exceeded in the untreated water, but that the treated water meets MCLs.

Comment 6. Section 2.6.1, 3rd paragraph – In terms of reducing groundwater concentrations, the most progress has been accomplished in Area A, not Area D. Note that there has only been one (questionable) TCE detection above 300 ug/l in the Area D extraction wells.

Response. The last sentence in this paragraph indicating that the most progress in reducing groundwater concentrations has been accomplished in Area D will be removed from the report.

Comment 7. Section 4.2.1.1, p. 36 – "...although the system is not meeting the estimated long term sustainable yields (110-148 gpm)." This statement is misleading in that meeting the estimated long term sustainable yields was never even considered as an objective, in fact would in all probability not be possible as the long term yields were estimated independently for each well and the concurrent operation of multiple wells (with the resulting interference effects) would reduce the sustainable yields for each individual well. Suggest removing from the text.

Response. References to the long term sustainable yields will be removed from the Optimization Report since these were never considered as an objective for the groundwater extraction program.

Comment 8. Table 4-2 – The heading for Column 2 is misleading – the rates are the actual startup rates, not the "design" startup rates. Suggest revising as per Tables 4-3 and 4-4. Also, if you want to keep the long term sustainable yield information in there, clearly note in the footnotes that they are in parentheses.

Response. The heading for Column 2 will be changed to indicate that the rates are startup rates from the initial operation in 1999. The long term sustainable yield information will be removed from the Optimization Report.

Comment 9. Section 4.2.1.2 – Emphasize more prominently in the text that the Area C pumping rates were intentionally reduced as the area of the plume decreased.

Response. Section 4.2.1.2 currently states that extraction wells EW-C16 and EW-C17 were turned off because they were not capturing highly contaminated groundwater. While the pumping rates in EW-C18, -C19, C-20, and C-21 have decreased over time, no information was identified indicating why the overall pumping rate has decreased. Battelle requests that the source documenting the decision to intentionally reduce pumping rates within Area C be provided so that it can be properly referenced within the Optimization Report.

Comment 10. Section 4.2.3.2/Table 4-7, p. 47 – The text states that the initial statistical analysis for PCE in Area A (which showed mostly increasing concentration trends) was skewed by using non-detect data, and subsequent reevaluation showed that almost all trends for PCE in Area A are downward, however Table 4-7 shows results of the initial approach and not the revised approach. If the second approach was more valid, get rid of the first approach and present the more valid statistical evaluation that wasn't influenced by high non-detects in Table 4-7 as the primary statistical approach used. In light of the sensitivity of the PCE issue in Area A, we shouldn't be presenting a questionable approach as the primary evaluation.

Response. Table 4-7 will be updated with results from the more valid statistical analysis for PCE that was performed using data from 2001 to present.

Comment 11. Table 4-9 – The PCE results in Table 4-9, which show increasing PCE levels for Area A, are based on the flawed data set that uses non-detects to influence the results. Suggest reevaluating, using the data that we have more confidence in, as per the revised statistical approach use on p. 47.

Response. Table 4-9 will be updated with results from the more valid statistical analysis for PCE that was performed using data from 2001 to present.

Comment 12. Section 4.4.1.1 – "...however, the system is not meeting the projected long term sustainable yields of 110 to 148 gpm." Suggesting removing this from the text – meeting the long term sustainable yields was never an objective nor is it realistic (see Comment 7).

Response. References to the long term sustainable yield information will be removed from the Optimization Report.

Comment 13. Section 4.4.1.1 – Revise the text r.e. the new extraction well near HN-69D to reflect the revised memo sent out by the TEG in February 2007.

Response. The text in Section 4.4.1.1 will be revised to reflect the most recent TEG memo *Water level Monitoring during Extraction Well Drilling at HN-69D* (February 2007).

Comment 14. Section 4.4.1.1 – The recommended changes to pumping rates and well maintenance activities sound reasonable.

Response. Comment noted. These recommendations will be retained in the optimization report.

Comment 15. Table 4-13 – Suggest at least a 10 foot separation between high and low level probes unless it is impractical for some reason. It would be better to drop the low level switch than to raise the high level switch. Also, the high and low level switch settings for extraction wells A1, A2, A3, A11, and A12 should be identified even if they are not to be changed, so there is a record of the setup.

Response. The recommended separation between the level switches was based on the drawdown rate and pumping capacity at each well (as measured during the one day pumping tests), and on the premise that the pumps will operate at full capacity with no more than 5 starts per hour. This logic will be more clearly discussed within the Optimization Report.

No information was available regarding the pump intake depths, therefore lowering the low level switch may not be practical without also lowering the pumps. The Optimization Report will be revised to state that the level switch depths should be adjusted in the field as necessary, placing the low level switch no less than 2 or 3 feet above the pump intake and the high level switch the recommended distance above the low switch.

Section 4.4.1.1 will be revised to recommend that all level set points be identified during the recommended maintenance to suspend the level switched independently of the groundwater pumps.

Comment 16. Section 4.4.3 - See the TEG memo for comment r.e. the LTM recommendations.

Response. Recommendations from the TEG memo *Modifications to the Long Term Groundwater Monitoring Program* (March 2007) will be incorporated into the optimization report.

Comment 17. Section 4.5 – There have been two revisions to the LTPMP – one by Battelle in 2003 and one by ECOR in 2005.

Response. Section 4.5 will be revised to indicate that the LTPMP was also revised again by ECOR in 2005.

Comment 18. Section 5 (and executive summary) – Revise as appropriate as per comment resolution.

Response. Section 5 and the Executive Summary will be revised as appropriate in accordance with the comment resolutions.

**Response to ECOR Comments on the
Revised Draft Optimization Report for NAWC Warminster (January 2007)
Received March 27, 2007**

Comment 1. Several of the proposed modifications proposed by Battelle in the Optimization Report were considered to be a high priority and were implemented in December 2006. These include:

- Bypassing metals removal equipment which was inactivated prior to ECOR's tenure (September 2003). Because TSS influent concentrations are typically ND and no chemical additions are made, by-passing the equipment does not effectively change the treatment process but does allow more water to be processed as the sand filter was limiting the hydraulic capacity of the treatment plant. As a precautionary measure, two bag filters in series were installed on the bypass line to protect against any significant TSS loading from being introduced into the air stripper.
- A secondary vapor-phase carbon unit (5,000 lb) was added to the existing two 1,500 lb primary units to provide better emissions control on the air stripper.
- Monthly sampling for Cr+6 from both the influent and effluent of the ion exchange resin treatment unit was initiated in January 2006.

Response: The optimization report will be revised to reflect these recent modifications to the treatment system.

Comment 2. Section ES p. vii last paragraph – The \$67,500 cost to modify the GWTP is low. The estimated costs to perform the bypass piping, sand filter cleanout and disposal, VGAC upgrade, and air stripper upgrade were on the order of \$110,000.

Response. The optimization report will be updated to reflect these actual costs for modifications and projected air stripper upgrade costs. In order to best incorporate this information into the Optimization Report, Battelle requests that ECOR provide the approximate percentage of the total \$110,000 spent for each of the upgrades (bypass piping, sand filter cleanout and disposal, VGAC upgrade, and air stripper upgrade).

Comment 3. Page 22, 1st paragraph – The text refers to one level switch in the equalization (EQ) tank and concludes that the pump cycle can only be controlled by a delay on the pump relay. ECOR's understanding is that the level switch is actually a pressure transducer monitoring the height of water in the EQ tank and that high and low water set points can be electronically adjusted. In addition, the VFDs on the two EQ pumps were reconfigured by the instrumentation engineer to allow them to control pump rates in response to changing EQ tank levels to minimize cycling.

Response. Section 3.2 will be revised to include this updated information regarding the EQ tank controls.

Comment 4. Page 23, Section 3.3 – The text indicates that valves were configured to treat a side stream of Area A process water. This is accurate but the report should reference the design as this was the intended operating scenario. As previously stated, Cr+6 influent/effluent samples are collected monthly from the ion exchange system.

Response. Section 3.3 will be revised to state that "the valve settings in the piping from Area A was set to allow a side stream of Area A groundwater to be diverted through the ion exchange vessel prior to the EQ tank, as per the design for this treatment unit." The optimization report will also be revised to indicate that monthly influent/effluent samples are now collected for hexavalent chromium analysis from the ion exchange system.

Comment 5. Page 25, Section 3-5 – The write up on the air stripper seems accurate. However, it is important to note that ECOR inherited the system including the booster blower, two vapor carbons in parallel, and preheater in the off position. We concur that the vapor carbon was inadequate and have since upgraded it. However, we are uncertain as why there is a booster blower on the air stripper and why the preheater is shutdown.

Response. Comment noted. Section 3.5 will be revised to reflect the recent upgrades to the vapor carbon treatment system.

Comment 6. Page 26 – The statement that ECOR has never changed out VGACs is incorrect. Both units were changed on 11 Jan 06. Also note that it would be difficult to demonstrate the desired removal rate (90%) using a PID at these low concentrations (<10 ppm).

Response. Section 3.5 will be updated to indicate that carbon in the VGAC units was replaced in January 2006. Battelle agrees that PID results may not be reliable for documenting effectiveness of the VGAC units. Because of this, Section 4.4.2.5 of the optimization report will be updated to recommend that sampling and laboratory analysis be completed in accordance with PADEP requirements.

Comment 7. Page 29, Section 3.6. - This section should be revised to indicate that both LGACs were changed by TtFW in Jan 2004. In addition, the primary LGAC was subsequently changed out in June 2006.

Response. Section 3.6 will be updated to indicate that the primary LGAC unit was last changed out in June 2006.

Comment 8. Page 33, Section 3.9 – The system operating software was recently upgraded and was migrated to a desktop computer on a Windows XP® platform. Remote login capability was restored such that the system can be monitored and controlled using a dial-up connection. In addition, minor programming modifications were made to accommodate for the metals removal system bypass. Report generation and enhanced storage capabilities were also added.

Response. These system control upgrades will be included in Section 3.9 of the optimization report.

Comment 9. Page 38, Table 4.3 – The table incorrectly indicates that the pump in well C-21 did not operate in 2006. While there were interruptions in operation do to a damaged underground cable apparently do to construction activities, pumping at this well was performed in 2006 and this well continues to be an active extraction well.

Response. Pumping rates were not reported for EW-C21 in the most recent Quarterly Monitoring Report for the Fourth Quarter of FY 2006. Battelle requests that the pumping rates for EW-C21 be provided so that the information may be included in the optimization report.

Comment 10. Page 61, 2nd paragraph – The cost for installing the new piping and bag filters were considerably higher than \$1,500 and were closer to \$10,000.

Response. Section 4.4.2.3 will be updated to reflect the actual cost of approximately \$10,000 for installing new piping and bag filters in the treatment system.

Comment 11. Page 61, 5th paragraph – Based on the permit applications, a proposed average flow rate of 130 gpm and maximum flow rate of 150 gpm were assumed. The text should be revised to be consistent with this scenario. The installed cost will be considerably more than \$30,000 as this is the raw cost of just the air stripper unit. An installed cost of \$45,000 is more accurate.

Response. Section 4.4.2.4 will be revised to reflect these design flow rates and updated cost for installation of a new air stripper.

Comment 12. Page 62 Section 4.4.2.5 – We concur that the treated air stripper emissions should be considered insignificant per PA regulations and a determination should be made indicating that neither Plan Approval nor an Operating Permits are required. However, comparing NAWC Warminster to a gasoline station seems irrelevant as the contaminants are different. Also the recommended air sampling may be appropriate, please note that monthly TO-14 sampling (3 per month) will increase the O&M operating budget.

Response. While the contaminants at the former NAWC are different from those at a fuel oil contaminated site, Battelle considers the system monitoring and operating guidelines outlined in the PADEP regulations to be relevant and believe that they should be followed as a best management practice for operation of the treatment system. Section 4.4.2.5 of the optimization report will be updated to recommend that sampling and laboratory analysis be completed in accordance with PADEP requirements.

Comment 13. Page 64, Section 4.4.4 – In addition to prior comments regarding cost savings, it seems unlikely that simplifying the treatment systems will result in a substantial labor savings. While this is a reasonable expectation, the current operating costs which serve as a basis for this proposal already assume a simplified system as all of the equipment which would be time consuming to operate (i.e. filter press) has been offline in recent years.

Response. The labor savings estimated in the Optimization Report is \$10,900/year. The basis for this estimate is the average cost of service calls over the past two years (\$4,900) plus a 10% savings on annual routine labor costs (\$6,000). According to previous comments received by Battelle, four service calls were necessary over the past two years, and were associated with repairs to the equalization tank transfer pumps, the sand filter back wash pumps, and the sand filter influent valve. Recent upgrades to the equalization tank transfer pump controls and bypassing of the sand filter will eliminate these problems. The 10% reduction in routine labor also seems reasonable based on reducing labor intensive activities such as not operating/backwashing the sand filter and associated equipment (e.g., air compressor), and reducing labor required for operating/troubleshooting the extraction well pumps.

Comment 14. Page 67 Section 5 – The conclusions should be revised to address prior comments and current conditions as much of the recommended work has been performed. In addition, please note the NPDES permit application and the air Request for Determination were submitted to PADEP in March 2007. Preliminary indications are that effluent limitations are likely to be revised which may affect the optimization study recommendations.

Response. All prior comments will be reflected in Section 5 and the Executive Summary. The optimization report will also be revised to indicate that both the NPDES permit application and RFD were submitted to PADEP in March 2007.