N00102.AR.000765
NSY PORTSMOUTH
5090.3a

DEPARTMENT OF THE NAVY
NORTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
10 INDUSTRIAL HIGHWAY
MAIL STOP, #82
LESTER, PA 19113-2090

IN REPLY REFER TO

5090
Code 1823/FE

08 DEC 1999

Ms. Meghan Cassidy
U.S. Environmental Protection Agency, Region I
JFK Federal Building HBT
Boston, MA 02203-2211

Mr. Iver McLeod
Maine Department of Environmental Protection
State House Station 17
Augusta, ME 04333-0017

Dear Ms. Cassidy/Mr. McLeod:

SUBJECT: ON-SHORE/OFF-SHORE CONTAMINANT FATE AND TRANSPORT MODELING PHASE II REPORT FOR INSTALLATION RESTORATION PROGRAM AT PORTSMOUTH NAVAL SHIPYARD, KITTERY, ME

The Navy is pleased to submit to the U.S. Environmental Protection Agency Region 1 (USEPA) and to Maine Department of Environmental (MEDEP) "insert pages" to finalize the ON-SHORE/OFF-SHORE CONTAMINANT FATE AND TRANSPORT MODELING PHASE II REPORT. Four copies each have been provided.

A comment response letter is enclosed documenting USEPA, MEDEP, and Seacoast Anti-Pollution League (SAPL) comments, dated July 29, 1999, August 23, 1999/September 20, 1999, and September 10, 1999, respectively, on the Draft Final version of the report dated July 1999. The comments resulted in only minor changes to the report, therefore the Navy has enclosed "insert pages" for insertion in the report to accomplish finalization. The comment response letter should be inserted in Appendix H of your report. The other insert pages consist of the following:

- Maine Certified Geologist certification page for insertion at the front of your report

- Replacement page 6-1/6-2:

  - Page 6-1, 2nd bullet, 7th line, changed "(seawell)" to "(seawall)", and

SUBJECT: ON-SHORE/OFF-SHORE CONTAMINANT FATE AND TRANSPORT MODELING PHASE II REPORT FOR INSTALLATION RESTORATION PROGRAM AT PORTSMOUTH NAVAL SHIPYARD, KITTERY, ME

- Page 6-2, 1st line, changed "1997/1998" to "1996/1997" low flow sampling dates.

- Statistical methodology information (normal/lognormal determination) for insertion at the front of Appendix D.

- Responses to Comments for insertion at the front of Appendix H.

If additional information is required, please contact me at 610-595-0567, x159.

For the Community Restoration Advisory Board (RAB) members; if you have any comments or questions on these issues, they can be provided to the Navy at a RAB meeting, by calling the Public Affairs Office at (207) 438-1140 or by writing to:

Portsmouth Naval Shipyard
Code 106.3R Bldg 44
Attn Marty Raymond
Portsmouth, NH 03804-5000

Sincerely,

Frederick J. Evans

FREDERICK J. EVANS, P.E.
Remedial Project Manager
By direction of the
Commanding Officer

Encl:
(1) Maine Certified Geologist Certification
(2) Section 6, Replacement page 6-1/6-2, Rev. 2, 11/99
(3) Appendix D, Statistical Methodology Information
(4) Appendix H, Response to Comments

Copy to:
NOAA (K. Finkelstein)
MEDMR (D. Card)
Mr. Doug Bogen
Ms. Michele Dionne
Ms. Mary Marshall
Mr. Jack McKenna
Mr. Onil Roy
Dr. Roger Wells
PNS Code 100PAO
PNS (Code 106.3R, M. Raymond)
US FWS (K. Munney)
NHFG (C. McBane)
Mr. Jeff Clifford
Ms. Eileen Foley
Mr. Phil McCarthy
Ms. Mary Menconi
Ms. Johanna Lyons
Ms. Carolyn Lepage
TtNUS (L. Klink, D. Cohen)
COMSUBGRU TWO (R. Jones)

I have reviewed this Final Phase II Modeling Report (Report) prepared by Tetra Tech NUS, Inc. (TtNUS) and it meets the scope of the Final Phase II Work Plan. The modeling and statistical analysis were performed by TtNUS specialists who have experience using the analytical model and statistical methods utilized in this Report.

STATE OF MAINE
CHARLES D. RACE
243
CERTIFIED GEOLOGIST

6.0 CONCLUSIONS AND RECOMMENDATIONS

The overall conclusions of the modeling studies conducted for PNS can be discussed in general terms related to the two receiving media of interest: the near shore surface water and the sediment. It is important to note that the model results (both surface water and sediment) are sensitive to the sediment/water partitioning coefficient [sediment Kd]. The sediment Kd will affect how the contaminant mass, predicted to be migrating to the shoreline, is allocated between the surface water and sediment in the model. The sediment Kd has opposite effects on the predicted surface water concentration and the predicted sediment concentration (i.e., as the value of the sediment Kd increases, the predicted sediment concentration increases; however, the predicted surface water concentration will decrease). Considerable effort has been put forth to accurately estimate the values of this parameter; however, some uncertainty still remains due to limitations of the Kd estimation procedure and the designed simplicity of the model.

- Based on the modeling results, for all cases and scenarios evaluated in the modeling task, the on-shore sources of contamination (OU2, OU3 Clarks Cove, OU3 Back Channel, and OU5) are not impacting the surface water above the surface water screening criteria and are generally much lower than the criteria. Based on the modeling results, it does not appear that the onshore sources are significantly affecting the surface water.

- The modeling results also indicate that the on-shore sources of contamination (for OU2, OU3 Clarks Cove, OU3 Back Channel) could cause the predicted sediment concentrations to exceed the sediment screening criteria for most COCs under the conservative baseline case. The model indicates that the onshore sources of contamination could potentially impact the sediments above screening levels some time in the future, if it is assumed that groundwater has not yet reached maximum concentrations (i.e., unsteady state). OU5 modeling for sediment was not necessary because of the nature of the shoreline (seawall). Since OU5 sediments are not impacted by groundwater flowing from onshore, OU5 is not a current source of heavy metal contamination of sediment and was not modeled. However, contamination has been found in OU5 sediments (from other potential sources).

- When only the current groundwater concentrations are used as input to the model (equating to the case where the groundwater concentrations will not increase in the future [steady state]), the model predicted sediment concentrations were of the same order of magnitude as the measured sediment concentrations and the sediment screening criteria. Of note, groundwater monitoring data has not shown an increasing trend in groundwater concentrations (comparing the RFI groundwater data for

dissolved analytes with the 1996/1997 low flow sampling data) which supports the conclusion that steady state conditions are currently prevalent.

Conclusions of an independent geochemical modeling study conducted for the MEDEP by Dr. Andrew Reeve of the University of Maine are presented in Appendix F. Based on this geochemical modeling study, the predicted concentrations for mercury and nickel are considered more uncertain than other chemicals modeled and must be given additional consideration when evaluating the remedial alternatives during the feasibility study stage.

At this time, the Navy intends to continue offshore monitoring of sediments at PNS as part of the Interim Record of Decision for Operable Unit 4 (Navy, 1999). For more recently discovered sites (such as Site 32 Topeka Pier) or for any future sites, modeling plans will be evaluated on a site-specific basis.

RESPONSE TO EPA COMMENT DATED JULY 29, 1999
DRAFT FINAL ON-SHORE/OFF-SHORE CONTAMINANT FATE AND TRANSPORT MODELING PHASE II REPORT DATED JULY 1999
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

1. **Comment:** EPA previously reviewed the Navy's responses to our comments submitted on the draft version of this document. As stated in EPA's letter dated June 22, 1999, the Navy has adequately responded to all of EPA's concerns pertaining to this document. Pending satisfactory resolution of any other outstanding comments, EPA believes this document can be finalized.

   Response: Comment acknowledged.

RESPONSE TO MEDEP COMMENTS DATED AUGUST 23, 1999 and SEPTEMBER 20, 1999
DRAFT FINAL ON-SHORE/OFF-SHORE CONTAMINANT FATE AND TRANSPORT MODELING PHASE II REPORT DATED JULY 1999
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

1. **Comment:**

   (08/23/99) The Maine Department of Environmental Protection has reviewed the Navy's response to comment in Appendix H of the document referenced above. The Department has no further comments regarding this document.

   (09/20/99) In an August 23, 1999 letter the Maine Department of Environmental Protection indicated it had no further comments regarding the referenced document. The Department would like to clarify that despite our lack of comment to the Navy's response we still stand by our interpretation of the groundwater data as stated in our July 6, 1999 comment letter.

   Response: Comment acknowledged.

RESPONSE TO SAPL COMMENTS DATED SEPTEMBER 10, 1999
DRAFT FINAL ON-SHORE/OFF-SHORE CONTAMINANT FATE AND TRANSPORT MODELING PHASE II REPORT DATED JULY 1999
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

Comments from Ms. Carolyn LePage, C.G., Lepage Environmental Services, Inc.

1. Comment: We reiterate Dr. Hebson's comment that it is appropriate that a report of this nature be stamped by a qualified professional. Furthermore, it is essential that the professional be involved to a significant degree with the project or task covered in the report. Other issues identified in previous comments will likely be raised again whenever the Phase II Modeling results are quoted or otherwise applied in future remedial and investigative efforts at the Shipyard.

   Response: A Maine Certified Geologist, Mr. Charles Race, has been involved in the modeling efforts and associated documents and has certified the final report.

Comments from Mr. Charles Hebson, P.E., C.G., CMT Engineering

1. Comment: I examined Appendix H of the PNS Modeling Phase II Work Report that you recently sent. This is the final report and so contains nothing new, at least regarding work that I reviewed and commented on. Appendix H contains the comments from various reviewers and responses from TtNUS. However, the format of Appendix H deserves comment. TtNUS's responses are presented by first quoting the original comment, followed by their response. I found at least one instance of where they misquoted my original comment. On Page 3 in Appendix H TtNUS quotes my comment as

   I had commented on the anonymity of the TtNUS team that executed the work behind this report. TtNUS responded that it is against company protocol to identify the participants in this work. A very general reference is made to individuals involved, as well as a reference to "supervision of a Maine Certified Geologist who will certify the final document". *It is proper that TtNUS were more forthright in this matter.* I am also curious about this Maine Certified Geologist and the nature of supervision supplied by this CG.

   The italics are mine. My actual comment (from my June 15 letter) was

   I had commented on the anonymity of the TtNUS team that executed the work behind this report. TtNUS responded that it is against company protocol to identify the participants in this work. A very general reference is made to individuals involved, as well as a reference to "supervision of a Maine Certified geologist who will certify the final document". It is proper that TtNUS set its own policies regarding the identity of their employees in this work, yet I would feel better if TtNUS were more forthright in this matter. I am also curious about this Maine Certified Geologist and the nature of supervision provided by this CG.

   Note that in the italicized sentence TtNUS omitted the words

   "...set its own policies regarding the identity of their employees in this work, yet I would feel better if TtNUS..."

   thereby changing the meaning and spirit of this sentence. I have not checked every other comment for veracity. If TtNUS wishes to keep this format for reporting comments and responses, they should check their work for these transcription errors. This would appear

to be the report of record and therefore errors like this are unacceptable. Before accepting this report, TtNUS should certify that all errors like this have been removed. Alternatively, they could simply reproduce reviewers' comments and their responses.

Response: The Navy apologizes for any misrepresentation of Mr. Hebson's comment. The Navy and its contractors have and will continue to check the comments for transcription errors. It was not our intent to change the meaning or spirit of any comments received on Navy documents. The comment/response format in use is preferred by the Navy because reiteration of the comment, immediately followed by a response, aids the reader in following the issue at hand and the resolution, rather than looking at comment letter and the response letter.

2. **Comment:** TtNUS was good enough to identify their Certified Geologist, Charles Race. One final question in this regard: just what work product will Mr. Race certify? I found neither his name nor stamp on this Phase II final report. My own experience (and practice) in Maine has been that submissions as substantial as this report usually have professional stamps. Does this imply that Mr. Race had little or no role in the execution of this work?

   Response: The Phase II Modeling Report version you received was the Draft Final Phase II Modeling Report as indicated in TtNUS's letter dated July 28, 1999. The Final Phase II Modeling Report has been certified by Mr. Charles Race (see attached certification page). Mr. Race has been involved as a reviewer since development of the Rough Draft, Phase II Work Plan in August 1997. He reviewed the Rough Draft Phase II Work Plan, Comments/Responses and the Final Phase II Work Plan. He also reviewed the Rough Draft, Draft and Draft Final Phase II Report and comments/responses to these Reports. Mr. Race provided comments regarding the technical content and organization of the Phase II Modeling Report; and discussed technical issues with the project modeler throughout the process since 1997. Mr. Race has had a significant role in the execution of this work.

3. **Comment:** As I noted in my June 15 letter, TtNUS appeared to be willing to address editorial matters but wanted to avoid any substantive additional work. I would like it noted that my original comments still apply, notwithstanding TtNUS's determination to conclude the Phase II fate and transport modeling work as expeditiously as possible.

   Response: The Navy acknowledges the request for additional work but does not believe it necessary to meet the objectives of the Phase II Modeling Report, regardless of time constraints.

   The Navy seriously considers the comments generated by all reviewers and feels that their participation has added value to the project. As stated in the previous comment letters from Lepage Environmental Services on behalf of SAPL, the two major areas of concern not changed in the report were the sensitivity of the hydrogeological data and the explanation of the statistical analysis of the sediment-porewater distribution coefficient (Kd)values. The Navy acknowledges that the comments are technically valid, however, the Navy believes that the requested change regarding the sensitivity of the hydrogeologic model to the report is not required to meet the objectives of the Phase II Modeling Report, nor will the change significantly affect the report conclusions. However, the comment regarding the statistical methodology reference information has been addressed.

SENSITIVITY OF HYDROGEOLOGIC MODEL

The Navy agrees the hydrogeologic parameters entered into the model will directly affect the model output, however, this concern was raised during preparation of the Phase I Modeling Work Plan. The concern with the method of estimating the hydrogeologic input parameters and their implied sensitivity was first commented on by the USEPA on the Draft Phase I Work Plan (Comment Dated June 26, 1996). In that comment the USEPA felt that using Darcy's law with hydraulic conductivities estimated with slug test data was a relatively uncertain method of estimating the groundwater discharge to the surface water. In order to address this comment, the Navy agreed to estimate the groundwater discharge through an independent method to confirm the results calculated with Darcy's Law. The groundwater discharge was estimated by an analysis of the total recharge through infiltration to the island (i.e. water budget). This analysis is documented in detail in the Draft Phase I Modeling Report (B&R Environmental February 1997) in Section 6.2.3 and Appendix C of that report. The two independent methods of calculating the average groundwater flow rates matched very well (See Table 6-1 for the Draft Phase I Modeling Report). The Navy believes there is less sensitivity with the hydrogeologic parameters (as compared to the chemical transport parameters) because the two methods confirmed each other. The Monte Carlo simulation attempted to focus on the parameters with the greatest sensitivity, therefore, the hydrogeologic parameters were not simulated.

While it is acknowledged including the hydrogeologic parameters in the Monte Carlo analysis would create a more complete document, it is unlikely that such an analysis would affect the overall conclusions of the modeling task. The Navy believes that at this point of the project, additional study of these parameters will not significantly change any of the conclusions of the sites included in the modeling report.

EXPLANATION OF STATISTICAL ANALYSIS

The other comment requested an explanation of the statistical analysis presented in Appendix D of the Phase II Modeling Report. Appendix D provides the Navy's justification for assuming that the sediment Kd values are lognormally distributed and is used to supplement data in Appendix A. Refer to the enclosed insert pages, to be placed in Appendix D of the Phase II Modeling Report, which provides the requested information. This information discusses the standard procedure used for calculating whether data sets are normally or lognormally distributed.