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NSY PORTSMOUTH  
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LETTER AND U S NAVY RESPONSE TO U S EPA REGION I COMMENTS REGARDING  
ONSHORE/OFFSHORE CONTAMINANT FATE AND TRANSPORT MODELING NSY  
PORTSMOUTH ME  
5/10/1996  
NAVFAC NORTHERN



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/JMC

MAY 10 1996

Ms. Meghan Cassidy  
U.S. Environmental Protection Agency New England Region  
JFK Federal Building, HAN-CAN 1  
Boston, MA 02203-2211

Ms. Nancy Beardsley  
Maine Department of Environmental Protection  
State House Station 17  
Augusta, ME 04333-0017

Subj: ONSHORE/OFFSHORE CONTAMINANT FATE AND TRANSPORT MODELING,  
PORTSMOUTH NAVAL SHIPYARD, KITTERY, ME

Dear Ms. Cassidy and Ms. Beardsley:

Enclosed are responses to the EPA letter of April 16, 1996 containing comments on the proposed migration modeling workplan outline. If you have any questions on this matter please call me at (610) 595-0567 extension 117.

Sincerely,

A handwritten signature in cursive script that reads "Jim Conroy".

JAMES M. CONROY, PE  
LT, CEC, USN  
Remedial Project Manager  
By direction of the  
Commanding Officer

Encl: Response to Comments

Distribution:

PNS (121.10, F. Endyke)  
COMSUBGRU TWO (R. Jones)

**RESPONSE TO EPA COMMENTS  
DRAFT GROUNDWATER/SURFACE WATER MODELING PHASE I WORK PLAN  
PNS, KITTEERY, MAINE**

Note that EPA comments on the outline were received after preparation of the Rough Draft Plan. Some of the below comments have already been addressed during the preparation of the Rough Draft Work Plan (for Navy's review); other comments will be incorporated in the Draft Work Plan (for regulatory agency review), as appropriate.

**Comment 1:** The outline should not presume that Phase-II work will be needed, as indicated in Task 9.4. (The flowchart is better in this respect.) The title should indicate that Phase-II modeling will be explored, and decided whether it would be useful and/or required. This task (or another, new one) should also include an evaluation of the need for further data collection and/or analysis, aside from an evaluation of the need for more modeling.

**Response:** Agree. For the Rough Draft Work Plan, Section 9.4 was retitled to "Need for Phase II Modeling Study" and the accompanying text reflects the fact that additional modeling may not be necessary. For the Draft Work Plan, a sentence will be added that further data collection and/or analysis, may be required as well.

**Comment 2:** The work plan should include a task(s) for analyzing trends in the data, and for assessing and evaluating the trends and whether trends can be shown or not. Evaluating whether the situation is in "steady state" flushing mode, with declining groundwater discharge concentrations, is one of the most important aspects of Phase-I.

The work plan should also include exploring and discussing the uncertainties of the predicted/simulated trends in contaminant migration and resulting concentrations, i.e., the level of uncertainty in the analysis of trends.

**Response:** For Phase I work, data is too limited to evaluate trends. In fact, modeling is preferred to be accomplished using the low-flow sampling results as initial concentrations. However if not available, existing data will be used and then the results re-evaluated when low-flow sampling results are available. The first low-flow sampling event has yet to occur.

Agree that it is important to establish whether steady state conditions have been reached. This will be accomplished by estimating current leachate concentrations from source areas and comparing with actual groundwater concentrations. If groundwater concentrations are equal to or higher than model predicted concentrations due to leaching from the contaminant source, then it will be concluded that steady state conditions have been reached.

**Comment 3:** In Task 3.3, the key point is to perform just the right amount of modeling, by representing the features essential for accurate simulation and prediction, and by not including features that are unnecessary and therefore "clutter." In this regard, Task 3.3.2 could be labeled "Analysis Tools" instead of "Complexities," and Task 3.3.3 could be "Evaluation of Uncertainties" in place of "Conservatism."

**Response:** For the Rough Draft Work Plan, Section 3.3 was revised as follows:

- 3.3 General Modeling Strategy
  - 3.3.1 Phases of Study
  - 3.3.2 Levels of Conservatism
  - 3.3.3 Criteria of Success

Agree that modeling needs to be tailored to avoid "clutter". The Rough Draft Work Plan accomplishes this in Section 6.0 Conceptual Model Development by only considering the important pathways for both on-shore and off-shore environments. Additionally, only current-day continued migration is considered rather than impacts of previous contaminant migration.

In order to simplify the model by using conservative assumptions, conservatism needs to be defined when the conceptual model is being developed. Appropriate level of uncertainty is evaluated during the model application.

**Comment 4:** Task 3.5, Criteria of Success, is an important task. It deserves to have more detail in the work plan outline, because it should be the task in which the modeling analysis and result interpretation approach will be developed in detail. Besides adding more detail to the outline, this task could be moved under Task 3.3, General Modeling Strategy, because "setting criteria" belongs under "strategy."

**Response:** For the Rough Draft Work Plan, the Criteria of Success section was moved under Section 3.3 (refer to response to Comment 3). For the Draft Work Plan, the accompanying text will be expanded.

**Comment 5:** Add a task(s) for the review and evaluation of recent work and modeling tools applicable to the project, such as EPA's TSD for estuary/ocean modeling.

**Response:** Agree. A separate task will be added to the Draft Work Plan describing the review and evaluation of relevant recent work and modeling tools.

**Comment 6:** Similarly, or in conjunction with #5, add a task for "selection of analytical tools" or perhaps "selection of the type of analytical tools." This additional task could be provided as part of Section 7.3 under Analytical Equations.

**Response:** Agree. For both Section 7.2 (On-Shore Model) and Section 7.3 (Off-Shore Model), two new subsections will be added:

- 7.2(or 3).1 Evaluation of Recent Work and Modeling Tools
- 7.2(or 3).2 Selection of Modeling Tools

**Comment 7:** Is Task 6.2.4 needed if there are no groundwater receptors?

**Response:** For the Rough Draft Work Plan, Sections 6.2 (On-Shore Conceptual Model) and 6.3 (Off-Shore Conceptual Model), the organization was simplified to 2 subsections:

- 6.1(or 2).1 Site Conditions
- 6.1(or 2).2 Conceptualization

Section 6.1.2.4 Receptors is included to make the point that facility groundwater is not a current or future drinking water source and, therefore, on-shore receptors are not considered in the conceptual model or analytical modeling effort.

**Comment 8:** Consider adding "groundwater" to "on-shore" and "surface water" to "off-shore" in all occurrences, to be specific and to match better the title of the work plan document, "Groundwater/Surface Water Modeling Phase-I Work Plan Outline."

**Response:** For the Rough Draft Work Plan, the title was changed to On-Shore/Off-Shore Contaminant Fate and Transport Modeling Phase I Work Plan for Portsmouth Naval Shipyard.

**Comment 9:** Consider adding a new Section 6.3.1 to provide a review of the previous estuarine modeling or how the current work would build on or extrapolate from the previous effort. This would allow the proposed work to easily build off of earlier studies.

**Response:** Agree. However, since the previous model was a numerical model covering the entire estuary, previous estuarine modeling will be more compatible to the Phase-II modeling, if required. We will describe the previous efforts and if what we are incorporating from it into this effort.

**Comment 10:** During the meeting held on March 18, 1996, we discussed the need to divide the island into compartments or analysis cells. These areas might correspond to the currently defined ones (e.g., the landfill and DRMO) or they might be smaller areas defined by variations in hydrogeologic/surface water hydraulic needs. Either way, a section needs to be added that describes the discretization of the facility and the factors that will be used to make these decisions.

**Response:** Within the Rough Draft Work Plan (e.g., Section 5.2 On-Shore Zones of Contamination), plans to divide sites into subzones have been incorporated.

**Comment 11:** Similar to #10, a section should be added that explains how the near-shore zone will be delineated for assessing compliance with criteria. During the March meeting, a multi-box analytical approach was presented by the Navy for predicting contaminant levels in the near-shore area. It is not clear from this outline whether the work plan will contain a thorough description of the reasoning of this approach. The approach also needs to incorporate mixing zone concepts, which will require interaction with MEDEP. It is assumed that the actual analytical techniques to be used will be included in Section 7.3.

**Response:** For the Phase I modeling, the off-shore environment is divided into the intertidal zone, the near-shore zone, and the off-shore zone (not modeled); it is planned to compare concentrations in the near-shore mixing zone with criteria. This will be clearly depicted on appropriate figures, Section 4.0 Identification of Preliminary Criteria.

**Comment 12:** Based on Discussions held during the March meeting, a section should be added that describes how contamination from direct erosion of the island will be evaluated.

**Response:** The Rough Draft Work Plan (Figure 6-1) provides a general depiction of important pathways and exposure points. To focus the modeling effort, only major pathways are considered. The plans are to evaluate each site individually to tailor the general depiction, as necessary. In general, tidal erosion of contaminated soil is expected to be minimal, because the rocky intertidal zone provides protection along the facility perimeter. One exception may be the DRMO. For the Draft Work Plan, the addition of evaluation of available groundwater TSS data will be used to evaluate potential tidal erosion of fine particles from the on-shore area.

**Comment 13:** The subtasks under Tasks 7.0 and 8.0 may need to be arranged. One example of the need for rearrangement is the development of finalization of "cross-media COC screening," which is listed as Task 8.2. It is not clear why or how this can be done before the models are run (which appears to be planned for Task 8.3).

Another possible reordering (and addition) involves Task 8.3.1, Comparison with Measured Data. This is, in effect, a "calibration" task and should be placed within the "model development" Tasks 7.2/7.3.

**Response:** The purpose of establishing preliminary contaminants of concern prior to modeling is to focus the modeling effort to important contaminants. To support this objective, a preliminary list of COCs will be developed base on previous on-shore and off-shore studies. Then, this preliminary list will be finalized based on leachate production and contaminant transport in groundwater.

No changes to the format are planned concerning the comment. Task 8.3 focuses on evaluation of the modeling results to evaluate whether the modeling results are realistic and/or conservative.

**Comment 14:** Tasks 7.2.3/7.3.3 Parameter Sensitivity are good exercises, which can be done as part of model development. This would involve an exploration of sensitivity, based on the modeling approach, but not based on actual model output yet. A further exploration of uncertainty, performed with the calibrated models, should be done as part of "model application," under Task 8.3.2, Monte Carlo Uncertainty Analyses. The differences between Tasks 7.2.3/7.3.3 and 8.3.2 should be clearly distinguished in the outline.

**Response:** Section 7.0 addresses model development while Section 8.0 addresses model application. Subsection 7.2.2/7.3.3 does address an exploration of sensitivity, based on modeling approach, but not based on actual model output yet. The Section 8.0 discussion on Monte Carlo analysis is being conducted under model application.

**Comment 15:** There is some inconsistency between the Phase-I flowchart and the work plan outline. An example is the box in the flowchart for "determine source-area specific baseline impacts" which appears to have no counterpart in the work plan outline. Another example is that the first time the "conceptual model" is mentioned in the flowchart is in the box for "finalize source-area specific conceptual model" but there are no other boxes for the tasks in the work plan outline that include development of the conceptual model(s). The inconsistencies should be resolved, or explained (e.g., the flowchart could be described as an "abbreviated" or "highlight" flowchart).

**Response:** Minor modifications will be made to the Work Plan as necessary. Baseline impacts are addressed in Section 9.1 of the Work Plan. Development of the "conceptual model" was considered as being initiated during the Work Plan effort and that is why the box refers to finalization of these efforts; wording will be revised or another box will be added for model development.