DEPARTMENT OF THE NAVY
NORTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
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Seacoast Anti-Pollution League
Attn: Peter Vandermark
127 High Street
P.O. Box 1136
Portsmouth, NH 03802

Subj: RESPONSE TO COMMENTS ON THE PHASE I GROUNDWATER MODELING WORK PLAN FOR PORTSMOUTH NAVAL SHIPYARD, KITTERY, ME

Dear Mr. Vandermark,

On behalf of Portsmouth Naval Shipyard, we are forwarding the Navy's responses to your comments on the Phase I Groundwater Modeling Work Plan.

If additional information is required please contact Ms. Marty Raymond at (207) 438-2536.

Sincerely,

Frederick J. Evans
Remedial Project Manager
By direction of the
Commanding Officer

Encl:
(1) Response To SAPL Comments, Phase I Groundwater Modeling Work Plan

Subj: RESPONSE TO COMMENTS ON THE PHASE I GROUNDWATER MODELING WORK PLAN FOR PORTSMOUTH NAVAL SHIPYARD, KITTERY, ME

Copy to:
USEPA Region I (Ms. M. Cassidy)
Maine DEP (Mr. I. McLeod)
NOAA (K. Finkelstein)
US Fish & Wildlife Service (K. Munney)
ME Dept. of Marine Resources (D. Card)
NH Fish & Game (J. Nelson)
PNS (Code 106.3R, M. Raymond)
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Ms. Juanita Bell
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Mr. Phil McCarthy
Mr. Guy Petty
Mr. Peter Vandermark
Mr. Doug Bogen
Ms. Michele Dionne
Ms. Mary Marshall
Mr. Jack McKenna
Mr. Onil Roy
Ms. Carolyn Lepage
PNS (Code 100PAO) w/o encl
Brown and Root Environmental (L. Klink, B. Horne)

RESPONSE TO SEACOAST ANTI-POLLUTION LEAGUE (SAPL) COMMENTS DATED 11/24/96
ON-SHORE/OFF-SHORE CONTAMINANT FATE AND TRANSPORT MODELING
PHASE I WORK PLAN
PNS, KITTERY, MAINE

GENERAL COMMENTS

Model Validation

1. **Comment**: This is the question, "Does the model (set of equations) actually describe the natural system under study?" B&R Environmental should demonstrate and document this. All significant approximations and deviations between model and natural system behavior should be shown to be conservative. Expected deviations between model and natural system behavior should be described. This will help us understand what is not being modeled.

   Response: Agree. Any model is a simplified description of the natural system under study. Therefore, one of the major requirements in a modeling study is to identify necessary and appropriate simplifications which can be incorporated in computer models. Assumptions regarding the natural system will be documented in the OU-specific conceptual models which are the blueprints for the computer models to be developed and applied. All the important physical and chemical processes identified in the previous studies at the PNS which may have significant impacts on future contaminant fate and transport will first be evaluated during the conceptual model development process. The main objective of the Phase I Modeling Task is to conservatively incorporate these processes in efficient analytical computer models. The OU-specific conceptual models will be documented in the Phase I Modeling Report.

   All significant approximations and deviations from the natural system as well as the expected level of conservativeness of the modeling results due to these simplifications will first be qualitatively described in the conceptual model section of the modeling report. Quantitative information comparing the modeling results and existing surface water and sediment monitoring data will also be provided in the report to demonstrate/verify the level of conservativeness of the modeling results.

Uncertainty and Conservatism

2. **Comment**: Screening level models (such as proposed for Phase I), being so simple, possess a high degree of uncertainty. Their utility as quantitative tools therefore depends on being conservative, i.e., they should use parameter values that will overestimate contaminant levels. B&R Environmental recognizes this. They should be careful to document that all model calculations are indeed conservative. Furthermore, they should quantify the uncertainty in all model results, e.g., as a 95% confidence interval range. The conservative result would correspond to the high end of this range. Final interpretations and comparisons should be based on this high end value for simulated concentrations. An area that deserves close scrutiny is that of model parameter values that are not based on site-specific data. Calculations based on those values will be highly uncertain and subject to question.

   Response: Agree. Conservative values of model parameters necessary to simulate the conceptualized physical/chemical processes will be determined using currently available site-specific data. When no site-specific data is available, conservative literature values will be used. The ranges of possible values of the model parameters that have significant level of uncertainty will be summarized in the report to put the selected baseline parameter values in proper perspective.

In the Phase I Modeling Task, the baseline modeling result will be based on the reasonable worst-case value of each model parameter. In addition to the conservative baseline modeling simulations, Monte Carlo simulations will also be conducted to determine the possible range of future conditions. Results of the Monte Carlo simulations will be summarized in the uncertainty analysis section of the Phase I Modeling Report. Ranges of the possible values of all the sensitive model parameters will be evaluated during the simulations. Results of the Monte Carlo simulations will be used to further demonstrate the level of conservativeness of the baseline estimates.

Uncertainty and Model "Prediction"

3. **Comment**: B&R Environmental uses the word "prediction" regularly for the results calculated by the models. The word "prediction" implies a high level of certainty unlikely to be achieved, due to the inherent uncertainty and approximation in screening level models and unwarranted by the quality of the supporting data and model parameter values. B&R Environmental should instead use the word "estimate" (which implies some uncertainty); "simulation" is even better, as it implies no particular *a prior* correspondence between model result and natural system behavior.

   Response: Agree. The word "prediction" will bereplaced by "simulation" or "estimate" whenever appropriate in the Phase I Modeling Report to avoid unnecessary confusion. The words "simulation" or "estimate" will also be used in the modeling report to describe the modeling results instead of "prediction".

Characterization by Modeling and Investigation

4. **Comment**: The work plan at times seems to imply that the models will play a role in characterizing the site and related marine environments. The models can be useful for identifying data gaps, system sensitivities, and linkages between the various subsystems. They can also provide a means for extrapolating from existing data to a broader understanding of the site, provided the conceptual and mathematical models are accurate descriptions of the natural system. But strictly speaking, characterization should be data-driven, not model-driven.

   Response: Agree. Characterization is generally data-driven. Modeling is usually used to integrate available data and extrapolate from existing data. The Work Plan does not intend to overstate the proposed role of the modeling task. Whenever appropriate purposes and limitations of the Phase I Modeling will be re-emphasized in the modeling report.