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U.S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL OCEAN SERVICE  
OFFICE OF OCEANOGRAPHY AND MARINE ASSESSMENT  
OCEAN ASSESSMENTS DIVISION  
Hazardous Material Response Branch  
c/o U.S. Environmental Protection Agency  
26 Federal Plaza  
New York, New York 10278

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Doug Tomchuk, RPM  
Eastern New York/Caribbean Compliance Section  
New York/Caribbean Compliance Branch  
Emergency and Remedial Response Division  
26 Federal Plaza  
New York, NY 10278

Dear Mr. Tomchuk:

NOAA has completed its review of the Phase 1 - Work Plan; Preliminary Reassessment; Hudson River PCB Reassessment RI/FS; EPA Work Assignment No.013-2N84. Bloomfield, New Jersey, January 1991.

### Summary

The work plan has been almost entirely reworked. While most of the changes and additions have been for the better, the geographic scope has been decisively limited to the upper Hudson River. Only a modest literature review and some work in the human health risk assessment are proposed to address the lower reach of the river. This limited scope is artificial in such a study and will not serve NOAA's trustee responsibility.

The ecological risk assessment is presented as only a general outline and a more detailed plan should be developed and reviewed after the literature review and before beginning the risk assessment.

Work from this first phase should be reviewed and recommendations should then be formulated for original field work to occur in the second phase.

### Overview of Document

(1) The Phase 1 work plan is divided into five technical tasks: (1) site characterization and data synthesis (upper and lower Hudson); (2) evaluation of fish and food chain PCB accumulation (upper Hudson); (3) PCB transport model (upper Hudson); (4) baseline risk assessments (upper and lower Hudson for human health risk assessment; upper Hudson for ecological risk assessment); and (5) ARAR identification and remedial technology assessment (upper Hudson). Other components of the work plan include report preparation and community relations. The site characterization task is essentially gathering the existing data and a literature review. The PCB accumulation task seeks to develop a "management tool," identified as a model in the document, to be used in future phases of the reassessment (though in unspecified ways); the management model includes three components, a transport model (identified as a separate task), an exposure point model, and a receptor model, and its primary output is a risk/benefit calculation. The human health risk assessment contains the usual steps



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(hazard identification, exposure assessment, toxicity assessment, and risk characterization). The ecological risk assessment also includes four steps, a literature review on effects of PCBs on biota, identification of representative ecological receptors, identification of major food web exposure pathways and effects, and calculations of exceedances of water quality and sediment criteria. The last task includes the routine compiling of a list of applicable or relevant and appropriate requirements (ARARs), but also comprises three other elements, identification of remedial technologies in a broad and general sense, identification of which technologies should undergo preliminary or bench-scale testing, and an independent evaluation of the General Electric bioremediation demonstration project.

## Comments

(2) This document is much expanded over the previous version. The tasks are described with enough detail to provide a general understanding of what is the aim of the task and of how the products will fit together. This edition develops work only for phase 1, the preliminary assessment based on literature review and modeling. The other two phases (original field work and the feasibility study) are mentioned, but not detailed.

(3) This version of the work plan recognizes explicitly NOAA's mandate as a resource trustee and its potential contribution to the study. Coordination with NOAA in the phase 1 evaluation of the lower Hudson River (estuary) is mentioned in the first task. NOAA is cited as a source of monitoring data for the PCB bioaccumulation model and as a source of environmental criteria for the task on identification of ARARs. The work plan states that NOAA will be consulted in identifying indicator species in the ecological risk assessment.

(4) The previous version of the work plan was somewhat vague about the geographic extent of the study area. The present version restricts the study area—clearly and almost exclusively—to the upper Hudson River. There are four problems deriving from the geographic scope of the study:

- (a) While it is gratifying to receive recognition by having one's name mentioned, the limited geographic scope of the study will not assist NOAA in carrying out its mandate. Further, NOAA's trustee interest in the upper river is minimal, at best, and given the geographic scope of the ecological risk assessment, consultation with NOAA on indicator species (as mentioned in the ecological risk assessment) may not be appropriate.
- (b) For the human health risk assessment, the work plan proposed a *qualitative* evaluation of the lower river in phase 1 and a *quantitative* evaluation in phase 2. There the study will be investigating the lower reach. The only domain mentioned for the ecological risk assessment is the upper Hudson. It would seem some work parallel to the human health risk assessment could be proposed for an ecological risk assessment in the lower river.
- (c) The literature review task contains three steps that seek to gather data from agencies and research organizations (including NOAA's Preliminary Natural Resource Survey), but the only clue about how the data will be analyzed is the phrase "identifying assessment strategies for Phase 2." This approach indicates a low level of effort in studying the lower river and a low level of commitment to integrating conditions in the lower river into the overall reassessment study.
- (d) The task on site characterization cites two primary reasons why the treatment of lower Hudson is more limited, the sediment data are less comprehensive and more diverse in nature than those for the upper river and the lower river

includes a vast geographic area that is subject to a large number of potential PCB sources that cannot be accounted for by modeling the river (i.e., other discrete and diffuse inputs, like industrial discharges, storm water drains, landfill runoff and leachate). Though the assessment of bioaccumulation is generally restricted to striped bass, the model on long-term behavior developed by Thomann et al. (1989) uses the domain of the lower Hudson River. It appears that they did not find the circumstance of other potential sources of PCBs insurmountable.

(5) The role of the Thomann model in the reassessment has changed substantially. In the first version of the reassessment work plan, the model was cast as a centerpiece of the assessment process, and that work plan proposed running the model (presumably of the lower Hudson) with alternative input assumptions. The first work plan also proposed evaluation of methods for applying the Thomann model to resident populations (again presumably of the lower Hudson). The current work plan proposes development of a new model of PCB bioaccumulation in the upper Hudson; though it has structural similarities with the Thomann model, it appears to be more sophisticated—though more general—in proposing to examine the broad aquatic food web as well as target fish species.

(6) Modeling can be a tricky exercise. The work plan is proposing an essentially new model for the upper river, which if it is going to be a useful management tool, is going to consume a great deal of the project resources. The resources that go into developing a model cannot be used for direct observation on the system (i.e., sampling and analysis). The model of fate, transport, and uptake of PCBs developed for New Bedford Harbor was so complex that it required the capabilities of a supercomputer to run. In the end, it became too expensive for the modeling effort to produce useful results. Many times, more traditional ways of investigating a system (including having humans evaluate field data by “eye”) can provide more insight.

(7) If a decision to pursue a modeling effort is made in spite of these potential drawbacks, it will be necessary to verify the results of the model. Verification is the comparison of the outputs of the natural system with the outputs of the model, given the same inputs; for a model to have predictive power, the same inputs should have the same outputs as the natural system. This is a general problem in modeling, and was a specific fault of the New Bedford Harbor study. The developers of the model for the Hudson River reassessment will need to fully describe the verification step, including what variables will be selected and what criteria will be used to evaluate the results.

(8) While more narrative has been written about the ecological risk assessment, it is still not entirely clear how risks are going to be assessed and how NOAA could make use of the information that the risk assessment will provide. Some of the additional narrative comes from expanding the scope of the ecological risk assessment to include potentially affected terrestrial biota, a noble exercise, but one having limited interest to NOAA. The work plan states that a quantitative assessment of “ecosystem” risks (meaning evaluation of *all* potential ecological risks) is not possible, which is true enough. But the work plan does not explain exactly how it

is going to assess risk. Three of the activities described in this task (the literature review, comparison of water and sediments with criteria values, and identification of representative receptors) are reasonable preliminary steps to take, but do not by themselves assess risk. The activity that is closest to assessing risk (identification of major food web exposure pathways and effects) is described to be little more than a free-form elaboration of the bioaccumulation model developed in a previous task; it will of course be dependent on the quality of the modeling results. The work plan suggested a few interesting ideas (like community disruption, reproductive effects, food web and predator/prey interactions), and then wiped them out by saying that it would be too difficult to consider all of them. The analysis proposed will be based on the results of the literature review, which generally illustrates the embryonic level of development of ecological risk assessments. As such, the results of the literature review on biotic effects should be circulated and NOAA (and other resource agencies) should be able to comment on the final proposed work plan for the ecological risk assessment.

(9) In addition to these drawbacks, the geographic scope of the ecological risk assessment has been clearly defined to be only the upper reach of the river. For reassessing remedial actions at the site, which is the objective of the study, it is important to assess risk wherever there may be effects of the site, including and especially the lower river. The lower river is clearly the habitat of interest to NOAA and, while the Thomann model provides a good start in evaluating effects of the site in the lower river, it is this reassessment where issues affecting NOAA resources should be analyzed.

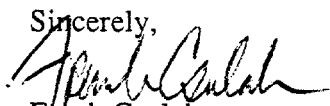
#### **Recommendations for Sampling and Biological Assessment**

(10) This phase of the reassessment is based exclusively in literature review and modeling. Field work is reserved for phase 2. As such, it would be useful to see the results of the first phase to develop recommendations on additional field sampling.

(11) The reassessment study contractors should circulate for review the final proposed work plan for the ecological risk assessment, and the geographical scope for that assessment should include the lower Hudson River.

In general the work plan has been much improved, however, there are still several major concerns to NOAA which need to be addressed. If you have any questions concerning these comments, please do not hesitate to contact me and we can discuss them in more detail.

Sincerely,



Frank Csulak  
Coastal Resource Coordinator

cc: L. Tannenbaum, PSB  
D. Adams, BTAG  
R. Hargrove, EIB