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HUDSON RIVER PCBs REASSESSMENT RI/FS
RESPONSIVENESS SUMMARY FOR PHASE 3 - FEASIBILITY STUDY SCOPE OF WORK

JUNE 1999

UNITED STATES • ENVIRONMENTAL PROTECTION AGENCY •

For

U.S. Environmental Protection Agency
Region 2
and
U.S. Army Corps of Engineers
Kansas City District

Book 1 of 1

TAMS Consultants, Inc.

400054

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

June 10, 1999

To All Interested Parties:

The U.S. Environmental Protection Agency (USEPA) is pleased to release the Responsiveness Summary for the Phase 3 Feasibility Study Scope of Work (FSSOW) for the Hudson River PCBs Reassessment Remedial Investigation/Feasibility Study (Reassessment RI/FS).

This Responsiveness Summary contains USEPA's responses to public comments received on the September 1998 FSSOW. The FSSOW presented the general approach to be taken by USEPA to evaluate remedial alternatives for the PCB-contaminated sediments in the Upper Hudson River.

If you have any questions regarding this Responsiveness Summary or the Reassessment RI/FS in general, please contact Ann Rychlenski, the Community Relations Coordinator for the site, at (212) 637-3672.

Sincerely yours,

Richard L. Caspe, Director
Emergency and Remedial Response Division

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INTRODUCTION

HUDSON RIVER PCBs REASSESSMENT RI/FS
RESPONSIVENESS SUMMARY FOR
PHASE 3 - FEASIBILITY STUDY SCOPE OF WORK

JUNE 1999

I. INTRODUCTION AND COMMENT DIRECTORY

1. INTRODUCTION

The U.S. Environmental Protection Agency (USEPA) has prepared this Responsiveness Summary to address comments received during the public comment period on the Phase 3 Feasibility Study Scope of Work (FSSOW) for the Hudson River PCBs Reassessment Remedial Investigation/Feasibility Study (Reassessment RI/FS), dated September 1998.

For the Hudson River PCBs Reassessment RI/FS, USEPA has established a Community Interaction Program (CIP) to elicit on-going feedback through regular meetings and discussion and to facilitate review of and comment upon work plans and reports prepared during all phases of the Reassessment RI/FS.

Because of the large number of CIP participants and associated costs of reproduction, the FSSOW is incorporated by reference and is not reproduced herein. No revised FSSOW will be published. The comment responses and revisions noted herein are considered to amend the FSSOW. For complete coverage, the FSSOW and this Responsiveness Summary must be used together.

The first part of this three-part Responsiveness Summary is entitled, "Introduction and Comment Directory." It describes the FSSOW review and commenting process, explains the organization and format of comments and responses, and contains a comment directory.

The second part, entitled "Response to Comments on the Feasibility Study Scope of Work," contains USEPA's responses to all significant written comments received on the FSSOW. Responses are grouped according to the section number of the FSSOW to which they refer. For example, responses to comments on Section 2.2 of the FSSOW are found in Section 2.2 of the Responsiveness Summary. Additional information about how to locate responses to comments is contained in the Comment Directory.

The third part, entitled, "Comments on the Feasibility Study Scope of Work," contains copies of the comments submitted to USEPA. The comments are identified by commenter and comment number, as further explained in the Comment Directory.

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2. COMMENTING PROCESS

This section documents and explains the commenting process and the organization of comments and responses in this document. Readers interested in finding responses to their comments may skip this section and go directly to the tab labeled "Comment Directory."

2.1 Distribution of FSSOW

The FSSOW, issued in September 1998, was distributed to federal and state agencies and officials, participants in the CIP, and General Electric Company (GE), as shown in Table 1. Distribution was made to approximately 100 agencies, groups, and individuals. Copies of the FSSOW were also made available for public review in 17 Information Repositories, as shown in Table 2, and on the USEPA Region 2 Internet webpage, entitled "Hudson River PCBs Superfund Site Reassessment," at www.epa.gov/hudson.

2.2 Review Period and Public Availability Meetings

Review of and comment on the FSSOW occurred from September 23, 1998 to November 2, 1998. On September 23, USEPA held a Joint Liaison Group meeting open to the public at the Holiday Inn at Latham, New York. Subsequently, on October 20, USEPA sponsored an availability session at the Marriott Hotel in Albany, New York to answer questions from the public regarding the FSSOW. These meetings were conducted in accordance with USEPA's *Community Relations in Superfund: Handbook, Interim Version (1988)*. Minutes of the Joint Liaison Group meeting will be available for public review at the Information Repositories listed in Table 2.

As stated in USEPA's letter transmitting the FSSOW, all citizens were urged to participate in the Reassessment process and to join one of the Liaison Groups formed as part of the CIP.

2.3 Receipt of Comments

Comments on the FSSOW were received in two ways: letters and oral statements made at the September 23, 1998 Joint Liaison Group meeting. USEPA's responses to comments raised at the Joint Liaison Group meeting are provided in the meeting minutes.

All significant comments received on the FSSOW are addressed in this Responsiveness Summary. Comments were received from four commenters. Total comments numbered approximately 70.

TABLE 1
DISTRIBUTION OF FEASIBILITY STUDY SCOPE OF WORK

HUDSON RIVER PCBs OVERSIGHT COMMITTEE MEMBERS

- USEPA ERRD Deputy Division Director (Chair)
- USEPA Project Managers
- USEPA Community Relations Coordinator, Chair of the Steering Committee
- NYSDEC Division of Hazardous Waste Management representative
- NYSDEC Division of Construction Management representative
- National Oceanic and Atmospheric Administration (NOAA) representative
- Agency for Toxic Substances and Disease Registry (ATSDR) representative
- US Army Corps of Engineers representative
- New York State Thruway Authority (Department of Canals) representative
- USDOI (US Fish and Wildlife Service) representative
- New York State Department of Health representative
- GE representative
- Liaison Group Chairpeople
- Scientific and Technical Committee representative

SCIENTIFIC AND TECHNICAL COMMITTEE MEMBERS

The members of the Science and Technical Committee (STC) are scientists and technical researchers who provide technical input by evaluating the scientific data collected on the Reassessment RI/FS, identifying additional sources of information and on-going research relevant to the Reassessment RI/FS, and commenting on USEPA documents. Members of the STC are familiar with the site, PCBs, modeling, toxicology, and other relevant disciplines.

- Dr. Daniel Abramowicz
- Dr. Donald Aulenbach
- Dr. James Boner, Texas A&M University
- Dr. Richard Bopp, Rensselaer Polytechnic Institute
- Dr. Brian Bush, New York State Department of Health
- Dr. Lenore Clesceri, Rensselaer Polytechnic Institute
- Mr. Kenneth Darmer
- Mr. John Davis, New York State Dept. of Law
- Dr. Robert Dexter, EVS Consultants, Inc.
- Dr. Kevin Farley, Manhattan College
- Dr. Jay Field, National Oceanic and Atmospheric Administration
- Dr. Ken Pearsall, U.S. Geological Survey
- Dr. John Herbich, Texas A&M University
- Dr. Behrus Jahan-Parwar, SUNY - Albany
- Dr. Nancy Kim, New York State Dept. of Health
- Dr. William Nicholson, Mt. Sinai Medical Center
- Dr. George Putman, SUNY - Albany
- Dr. G-Yull Rhee, New York State Dept. of Health
- Dr. Francis Reilly, The Reilly Group

TABLE 1
DISTRIBUTION OF FEASIBILITY STUDY SCOPE OF WORK (Cont.)

- Dr. John Sanders
- Ms. Anne Secord, U.S. Fish and Wildlife Service
- Dr. Ronald Sloan, New York State Dept. of Environmental Conservation

STEERING COMMITTEE MEMBERS

- USEPA Community Relations Coordinator (Chair)
- Governmental Liaison Group Chair and two Co-chairs
- Citizen Liaison Group Chair and two Co-chairs
- Agricultural Liaison Group Chair and two Co-chairs
- Environmental Liaison Group Chair and two Co-chairs
- USEPA Project Managers
- NYSDEC Technical representative
- NYSDEC Community Affairs representative

FEDERAL AND STATE REPRESENTATIVES

Copies of the FSSOW were sent to relevant federal and state representatives who have been involved with this project. These include, in part, the following:

- The Hon. Daniel P. Moynihan
- The Hon. Alphonse D'Amato
- The Hon. Gerald Solomon
- The Hon. Nita Lowey
- The Hon. Maurice Hinchey
- The Hon. Ronald B. Stafford
- The Hon. Michael McNulty
- The Hon. Sue Kelly
- The Hon. Benjamin Gilman
- The Hon. Richard Brodsky
- The Hon. Bobby D'Andrea

17 INFORMATION REPOSITORIES (*see* Table 2)

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TABLE 2
INFORMATION REPOSITORIES

Adriance Memorial Library
93 Market Street
Poughkeepsie, NY 12601

Catskill Public Library
1 Franklin Street
Catskill, NY 12414

^ Cornell Cooperative Extension
Sea Grant Office
74 John Street
Kingston, NY 12401

Crandall Library
City Park
Glens Falls, NY 12801

County Clerk's Office
Washington County Office Building
Upper Broadway
Fort Edward, NY 12828

* ^ Marist College Library
Marist College
290 North Road
Poughkeepsie, NY 12601

* New York State Library
CEC Empire State Plaza
Albany, NY 12230

New York State Department
of Environmental Conservation
Division of Environmental Remediation
50 Wolf Road, Room 212
Albany, NY 12233

* ^ R.G. Folsom Library
Rensselaer Polytechnic Institute
Troy, NY 12180-3590

Saratoga County EMC
50 West High Street
Ballston Spa, NY 12020

* Saratoga Springs Public Library
49 Henry Street
Saratoga Springs, NY 12866

*^ SUNY at Albany Library
1400 Washington Avenue
Albany, NY 12222

* ^ Sojourner Truth Library
SUNY at New Paltz
New Paltz, NY 12561

Troy Public Library
100 Second Street
Troy, NY 12180

U.S. Environmental Protection Agency
Region 2
290 Broadway
New York, NY 10007

* ^ U.S. Military Academy Library
Building 757
West Point, NY 10996

White Plains Public Library
100 Martine Avenue
White Plains, NY 12601

* **Repositories with Database Report CD-ROM (as of 10/98)**

^ **Repositories without Project Documents Binder (as of 10/98)**

2.4 Distribution of Responsiveness Summary

This Responsiveness Summary will be distributed to the Liaison Group Chairs and Co-Chairs and interested public officials. This Responsiveness Summary will be placed in the 17 Information Repositories and is part of the Administrative Record.

3. ORGANIZATION OF FSSOW COMMENTS AND RESPONSIVENESS SUMMARY

3.1 Identification of Comments

Each submission commenting on the FSSOW was assigned the letter "F" for FSSOW and one of the following letter codes:

F - Federal agencies and officials;
S - State agencies and officials;
L - Local agencies and officials; and
G - GE.

The letter codes were assigned for the convenience of readers and to assist in the organization of this document. Priority or special treatment was neither intended nor given in the responses to comments.

Once a letter code was assigned, each submission was then assigned a number, in the order that it was received and processed, such as FF-1. Each different comment within a submission was assigned a separate sub-number. Thus, if a federal agency submission contained three different comments, they would be designated as FF-1.1, FF-1.2, and FF-1.3. Written comment letters are reprinted following the fourth tab of this document.

The alphanumeric code associated with each reprinted written submission is marked at the top right corner of the first page of the comment letter. The subnumbers designating individual comments are marked in the margin. Comment submissions are reprinted in numerical order by letter code in the following order: FF, FS, FL, and FG.

3.2 Location of Responses to Comments

The Comment Directory, following this text, contains a complete listing of all commenters and comments. This directory allows readers to find responses to comments and provides several items of information.

- The first column lists the names of commenters. Comments are grouped first by: FF (Federal), FS (State), FL (Local) or FG (GE).

- The second column identifies the alphanumeric comment code (*e.g.*, FF-1.1)

- The third column identifies the location of the response by FSSOW Section number. For example, comments raised on Section 2.2 of the FSSOW can be found in the corresponding Section 2.2 of the Responses, following the third tab of this document.

- The fourth, fifth, and sixth columns list key words that describe the subject matter of each comment. Readers will find these key words helpful as a means to identify subjects of interest and related comments.

Responses are grouped and consolidated by section number of the FSSOW in order that all responses to related comments appear together for the convenience of the reader interested in responses to related or similar comments.

4. COMMENT DIRECTORY

4.1 Guide to Comment Directory

This section contains a diagram illustrating how to find responses to comments. The Comment Directory follows. As stated in the Introduction, this document does not reproduce the FSSOW. Readers are urged to use this Responsiveness Summary in conjunction with the FSSOW.

Step 1	Step 2	Step 3
Find the commenter or the key words of interest in the Comment Directory.	Obtain the alphanumeric comment codes and the corresponding FSSOW Section.	Find the responses following the Responses tab. See the Table of Contents to locate the page of the Responsiveness Summary for the FSSOW Section.
Key to Comment Codes:		
Comment codes are in this format FX-a.b F=FSSOW X=Commenter Group (F=Federal, S=State, L=Local, G=GE) a=Numbered letter containing comments b=Numbered comment		

Example:

COMMENT RESPONSE ASSIGNMENT FOR THE FSSOW

AGENCY/ Name	Comment CODE	REPORT SECTION	KEY WORDS 1	KEY WORDS 2	KEY WORDS 3
NOAA /Rosman	FF-1.1	4	Site	Mid-Hudson	Lower Hudson Impacts

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COMMENT DIRECTORY

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4.2 Comment Directory

AGENCY/ NAME	COMMENT CODE	REPORT SECTION	KEYWORDS 1	2	3
NOAA/Rosman	FF-1.1	2.2	Site	Mid-Hudson	Lower Hudson Impacts
NOAA/Rosman	FF-1.2	2.2	ARARs	FDA	
NOAA/Rosman	FF-1.3	2.2	Alternatives Evaluation	Modeling	Lower Hudson Impacts
NOAA/Rosman	FF-1.4	2.2	Remedial Action Objectives	PCB Inventory Reduction	
NOAA/Rosman	FF-1.5	2.3	General Response Actions	Monitored Natural Attenuation	
NOAA/Rosman	FF-1.6	3.2	Technology Evaluation	Sediment Cleanup Levels	
NOAA/Rosman	FF-1.7	2.3	No Action	Institutional Controls	
NOAA/Rosman	FF-1.8	2.1	ARARs		
NOAA/Rosman	FF-1.9	2.1	ARARs		
NOAA/Rosman	FF-1.10	2.1	Editorial Comment		
NOAA/Rosman	FF-1.11	3.1	General Response Actions		
NYSDEC/Ports	FS-1.1	1	Remedial Action Objectives	Modeling	
NYSDEC/Ports	FS-1.2	1.2	HHRA	Exposure Routes	
NYSDEC/Ports	FS-1.3	2.2	Remedial Action Objectives	Upstream Sources	
NYSDEC/Ports	FS-1.4	2.1	Remedial Action Objectives		
NYSDEC/Ports	FS-1.5	2.2	Remedial Action Objectives	Risk	PCB
NYSDEC/Ports	FS-1.6	2.3	No Action	Institutional Controls	
NYSDEC/Ports	FS-1.7	2.3	Site Definition		
NYSDEC/Ports	FS-1.8	2.1	ARARs		
SCEMC/Balet	FL-1.1	2	Remedial Action Objectives	Response Actions	
SCEMC/Balet	FL-1.2	2	Remedial Action Objectives	PCB Source	
SCEMC/Balet	FL-1.3	2.2	Remedial Action Objectives	PCB Source	
SCEMC/Balet	FL-1.4	2.2	Remedial Action Objectives	PCB Source	
SCEMC/Balet	FL-1.5	2.2	Mid-Hudson	Lower Hudson	Modeling
SCEMC/Balet	FL-1.6	2.2	Modeling	Scour	
SCEMC/Balet	FL-1.7	2.2	PCB Distribution		
SCEMC/Balet	FL-1.8	2.3	Site Definition		
SCEMC/Balet	FL-1.9	2.3	Response Actions		
SCEMC/Balet	FL-1.10	3.1	Technology Screening		

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AGENCY/ NAME	COMMENT CODE	REPORT SECTION	KEYWORDS 1	2	3
SCEMC/Balet	FL-1.11	3.2	Evaluation Criteria		
SCEMC/Balet	FL-1.12	4.2	Remedial Alternatives Screening	Effectiveness Evaluation	
SCEMC/Balet	FL-1.13	5	FS Report	Recommendations	
SCEMC/Balet	FL-1.14	2.1	ARARs		
GE	FG-1.1	2.2	Remedial Action Objectives	Mass Removal vs. Risk Reduction	
GE	FG-1.2	3.1	Technologies	Large-Scale, Intrusive Remedies	Dredging
GE	FG-1.3	3.2	Evaluation	Effectiveness	Dredging
GE	FG-1.4	1.1	Remedial Action Objectives	PCB Source	
GE	FG-1.5	4.2	Remedial Alternatives Evaluation	NCP	
GE	FG-1.6	1.1	Site Definition		
GE	FG-1.7	4.2	Alternatives Screening	Short-Term Effectiveness	Risk of Implementation
GE	FG-1.8	General	Peer Review		
GE	FG-1.9	2.2	Remedial Action Objectives	Mass Removal vs. Risk Reduction	
GE	FG-1.10	3.1	Technologies	Large-Scale, Intrusive Remedies	Dredging
GE	FG-1.11	1.1	Site Definition		
GE	FG-1.12	2.3	Alternatives Evaluation		
GE	FG-1.13	2.1	ARARs		
GE	FG-1.14	2.2	Remedial Action Objectives	Modeling	Mass Removal vs. Risk Reduction
GE	FG-1.15	3.1	Technologies	Large-Scale, Intrusive Remedies	Dredging
GE	FG-1.16	3.2	Technologies	Dredging	Risk Reduction
GE	FG-1.17	3.2	Technologies	Engineered Capping	
GE	FG-1.18	3.1	Technologies	Thin-Layer Capping	
GE	FG-1.19	3.1	Technologies	Stabilization	
GE	FG-1.20	2.3	Site Definition		
GE	FG-1.21	4.2	Remedial Alternatives Evaluation	NCP	Long-Term Effectiveness
GE	FG-1.22	4.2	Remedial Alternatives Evaluation	NCP	Short-Term Risks
GE	FG-1.23	3.1	Technology Screening	Technical Feasibility	

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AGENCY/ NAME	COMMENT CODE	REPORT SECTION	KEYWORDS 1	2	3
GE	FG-1.24	2.3	Monitored Natural Attenuation	Modeling	
GE	FG-1.25	1.2	Site Definition	Upper Hudson	Lower Hudson
GE	FG-1.26	2.1	ARARs	TBCs	
GE	FG-1.27	1	Responsiveness Summary		
GE	FG-1.28	1.1	Sediments	Terminology	
GE	FG-1.29	1.1	PCB Sources	Loading	
GE	FG-1.30	1.1	PCB Sources		
GE	FG-1.31	1.1	Allen Mill		
GE	FG-1.32	1.1	Loading		
GE	FG-1.33	1.2	Responsiveness Summary	CIP	
GE	FG-1.34	2.2	PCBs	Contaminant of Concern	
GE	FG-1.35	2.2	PCBs	Target Level	
GE	FG-1.36	4.1	Institutional Controls	Fishing Ban	

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RESPONSES

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II. Responses to Comments

GENERAL COMMENTS

Response to FG-1.8

Consistent with the Peer Review Handbook (USEPA, 1998a), USEPA has determined that the FS is not a candidate for peer review. Although the FS will require the application of major scientific and technical work products to the process of evaluating remedial alternatives, each of those work products already will have been the subject of a peer review. Specifically, USEPA has conducted or will conduct peer reviews for the six reports that comprise the Phase 2 Reassessment Remedial Investigation: the Preliminary Model Calibration Report (USEPA, 1996), the Data Evaluation and Interpretation Report (USEPA, 1997a), the Low Resolution Sediment Coring Report (USEPA, 1998b), the Baseline Modeling Report (USEPA, 1999b), and the upcoming Human Health Risk Assessment and Ecological Risk Assessment. These documents will form the scientific and technical basis for the evaluation of remedial alternatives presented in the FS. Moreover, the application of major scientific and technical work products in the FS will not depart significantly from the situations that those work products were originally designed to address.

1. INTRODUCTION

Response to FS-1.1

The use of computer models to develop the remedial action objectives (RAOs) is described in the FSSOW (p. 3, pp. 5-6, p. 9, and pp. 12-16). USEPA will use the results of the Human Health Risk Assessment and Ecological Risk Assessment and the applicable or relevant and appropriate requirements (ARARs) for the site to develop the RAOs. The computer models will be run to determine whether any unacceptable risk to human health or the environment and any exceedence of chemical-specific ARARs would be adequately addressed by the extent of cleanup specified in the RAOs.

Response to FG-1.27

The Landfill/Treatment Facility Siting Survey (USEPA, 1997b) is not one of the Phase 2 Reassessment reports. To the extent that information from USEPA (1997b) is used in the FS, that information will be available for public comment during the public comment period on the Proposed Plan. Following the close of the public comment period on the Proposed Plan, USEPA will respond to all significant public comments in a responsiveness summary that will be part of the Agency's Record of Decision.

1.1 Site History

Response to FG-1.6 and FG-1.11

USEPA disagrees with the comments suggesting that the FSSOW seeks to expand the definition of the site. As stated in the FSSOW (p. 3), "The Hudson River PCBs Superfund site encompasses the Hudson River from Hudson Falls to the Battery in New York Harbor, a stretch of nearly 200 river miles (322 km)." USEPA has consistently defined the site to include the Lower Hudson River since at least April 1984, when the Agency issued its FS for the site and before the site was listed on the National Priorities List (codified at 40 CFR Part 300, App. B). In its September 25, 1984 Record of Decision, USEPA defined the site by reference to three figures which, together, depict the site as the entire 200-mile stretch of the River from Hudson Falls to the Battery in New York City, plus the remnant deposits. In addition, during the Reassessment RI/FS, USEPA has consistently defined the site as including the Upper and Lower River (*e.g.*, the Scope of Work for Hudson River Reassessment RI/FS (December 1990) and the Phase 1 Report for the Reassessment RI/FS (August 1991)). In no way does the FSSOW expand the areal extent of the site.

Response to FG-1.28

The FSSOW states (p. 3): "...the [Fort Edward] dam was removed in 1973. During subsequent spring floods, PCB-contaminated sediments were scoured and transported downstream. A substantial portion of these sediments were stored in relatively quiescent areas of the river. These areas, which were surveyed by New York State Department of Environmental Conservation (NYSDEC) in 1976 to 1978 and 1984, have been described as PCB *hot spots*." In this context, the term "stored" means "deposited." The phrase "relatively quiescent areas" is intended in a qualitative, not quantitative, sense to refer to the lower-energy areas where the finer-grained sediments with higher PCB concentrations are deposited. Specific evidence documenting the occurrence of PCB deposition in such areas of the Hudson River can be found in Tofflemire and Quinn (1979), Brown *et al.* (1988) and USEPA (1998b). Although no stretch of the river is specifically mentioned in the FSSOW, the *hot spots* surveyed by New York State Department of Environmental Conservation (NYSDEC) extend from Rogers Island at RM 194 to Lock 2 at RM 163.

Response to FG-1.29

Commercial use of PCBs ceased in 1977. However, PCBs from GE's Ft. Edward and Hudson Falls plants continued to contaminate the Hudson River after that date due to erosion of PCB-contaminated remnant deposits, discharges of PCBs from the GE Hudson Falls plant via bedrock fractures, and erosion of PCB-contaminated soil into the river near the GE Fort Edward plant outfall (FSSOW, pp. 3-4). Evidence for PCBs emanating from the remnant deposits and the GE Hudson Falls plant is presented in Tofflemire (1984). Evidence for PCBs in the Hudson River that originated from the GE Fort Edward plant is presented in NYSDEC's 1999 Proposed Remedial Action Plan: GE Capacitor Products Division (Ft. Edward), Operable Units 03 & 04.

Response to FG-1.30

As stated in the FSSOW (p. 4), capping of the remnant deposits was completed in 1991 and high concentrations of PCBs were detected in the Hudson River surface water in September 1991. Specifically, the levels of PCBs detected in September 1991 were nearly two orders of magnitude (*i.e.*, 100 times) higher than those detected the previous month. Such high levels had not been seen in the Hudson River since the early 1980s.

Response to FG-1.4, FG-1.31 and FG-1.32

USEPA acknowledges the comments noting that GE performed the removal of PCB-bearing oils and sediments at the Allen Mill and that GE's remediation efforts at the GE Hudson Falls and Fort Edward plants should result in a decreasing load of PCBs to the Hudson River. USEPA will model various scenarios with different PCB-loading to the upstream water column to account for assumed reductions due to GE's remediation efforts associated with its capacitor plants (FSSOW, p. 5).

1.2 Objective and Scope

Response to FS-1.2

USEPA agrees with the comment. The FS will address all unacceptable risk identified in the Human Health and Ecological Risk Assessments.

Response to FG-1.25

The Ecological Risk Assessment will identify any unacceptable risks to the environment in the Lower Hudson River using the revised Thomann-Farley model, which will also be used in the FS to evaluate the effects of remedial alternatives in the Upper Hudson on the Mid-Hudson (*i.e.*, from the Federal Dam at Troy to Poughkeepsie) (FSSOW, pp. 2 and 6). While USEPA expects any unacceptable risk to be greater in the Upper Hudson than in the Lower Hudson because the PCB concentrations are higher in the Upper Hudson, nonetheless it is appropriate for USEPA to ensure that any unacceptable risk to the Lower Hudson posed by PCB-contaminated sediments in the Upper Hudson is addressed by remediation in the Upper River. See also response to FG-1.6 and FG-1.11.

Response to FG-1.33

USEPA disagrees with the comment that it has not responded to public comment. The Agency routinely provides written responses to letters from stakeholders regarding their comments on the Reassessment. Moreover, the Agency is responding to significant comments received from the public on each of the Phase 2 Reassessment Reports. Specifically, USEPA has responded to public comment in Responsiveness Summaries issued for the Database Report, the Preliminary Model Calibration Report, and Data Evaluation and Interpretation Report (USEPA, 1998d), and for the Low Resolution Sediment Coring Report (USEPA, 1999a), and will issue responsiveness summaries responding to public comments received on the recently issued Baseline Modeling Report

(USEPA, 1999b), and the upcoming Human Health Risk Assessment and Ecological Risk Assessment. In addition, USEPA has responded to public comment in Responsiveness Summaries issued for the Ecological Risk Assessment Scope of Work (USEPA, 1999d) and for the Human Health Risk Assessment Scope of Work (USEPA, 1999e), and is responding to public comment on the Feasibility Study SOW (this responsiveness summary). USEPA will also respond to significant public comment received on the FS and the Proposed Plan, to be released in December 2000.

The comments submitted to date on the Reassessment RI/FS have been voluminous, and some responses require USEPA to conduct additional technical analysis. While the effort to respond to comments is substantial, due to both the quantity and nature of the comments, USEPA will continue to respond to significant public comments in a timely manner.

1.3 Schedule

No significant comments were received on Section 1.3.

2. DEVELOPMENT OF REMEDIAL ACTION OBJECTIVES AND GENERAL RESPONSE ACTIONS

Response to FL-1.1 and FL-1.2

The FS for the Reassessment will evaluate various remedial alternatives for the PCBs that are in the Upper Hudson River sediments. As part of the "No Action" alternative required by CERCLA, USEPA will model a zero-PCB load at Rogers Island to simulate a hypothetical total elimination of the external PCB load from the source areas north of Rogers Island without any remedial action to the sediments. This "No Action" alternative will include monitoring, as recommended by the commenter. Using these model results, USEPA will evaluate the length of time needed for the river to meet the RAOs in the absence of remediation. USEPA notes that the remediation of the external sources of PCBs to the river, such as the GE Hudson Falls plant, is being addressed by NYSDEC and therefore is beyond the scope of the FSSOW.

2.1 Applicable or Relevant and Appropriate Requirements

Response to FG-1.13 and FG-1.26

Tables 1, 2 and 3 of the FSSOW list potential ARARs and TBCs for the site, which is appropriate for the FSSOW (USEPA, 1989). USEPA will review and modify the list of ARARs and TBCs as appropriate during the FS (FSSOW, p. 9). The revised ARARs will be identified in USEPA's Proposed Plan, which will be made available for public comment. The final ARARs will be set forth in USEPA's Record of Decision.

Table 1: Potential Chemical-Specific ARARs and Criteria, Advisories and Guidance

Response to FF-1.8

USEPA agrees with the comment with respect to sediment and has revised Table 1 accordingly. Based on the scope of the Reassessment, USEPA does not believe that it is appropriate to add groundwater standards to Table 1. USEPA will review and modify the list of ARARs and TBCs as appropriate during the FS (FSSOW, p. 9).

Response to FS-1.8

USEPA agrees with the comment and has revised Table 1 accordingly.

Response to FL-1.14

USEPA's monitoring work for the Hudson River PCBs Reassessment RI/FS routinely achieved detection limits of 0.05 ng/L (parts per trillion) for individual congeners (USEPA, 1997a), which is significantly lower than the "normal detection limit of 300 ng/L" mentioned by the commenter. USEPA acknowledges that NYSDEC's standards for Total PCBs in surface water for the protection of human health and wildlife (0.001 ng/L and 0.12 ng/L, respectively), are below the detection limits achieved by EPA. Nonetheless, these standards are included in Table 1 because they are potential ARARs.

Table 2: Potential Location-Specific ARARs and Criteria, Advisories and Guidance

Response to FF-1.9

USEPA agrees with the comment and has revised Table 2 accordingly.

Table 3: Potential Action-Specific ARARs

Response to FF-1.10

USEPA agrees with the comment and has revised Table 3 accordingly.

Response to FS-1.4

USEPA has revised Table 3 of the FSSOW to include the NYSDEC pisciverous wildlife criterion of 0.1 part per million (ppm) in whole fish. The final selection of RAOs will be made in the FS following completion of the Human Health and Ecological Risk Assessments.

2.2 Remedial Action Objectives

Response to FF-1.2

USEPA agrees with the comment. The sentence (FSSOW, p. 11) has been clarified to read, "Target concentration limits will also be developed using the geochemical and ecological models to examine the relationship between various sediment concentrations and attainment of acceptable PCB levels in fish and other biota (*e.g.*, FDA limit for human consumption of fish)."

Response to FS-1.3

Areas near remnant deposits 3 and 4, which are north of the upstream boundary of the models at Rogers Island, will not be included explicitly in the modeling runs described in the FSSOW (p. 12). However, the models will be run for constant and zero upstream PCB-load scenarios. This modeling will assist USEPA in evaluating the importance of the PCB load from upstream sources and, consequently, the need to consider these upstream sources in developing the RAOs for the site.

Response to FS-1.5

USEPA agrees with the comment. The second bullet on FSSOW (p. 15) has been revised to read, "reduce human health risk associated with exposure to near-shore contamination to an acceptable level (to be determined by USEPA, expected to be in the range of 10^{-4} to 10^{-6} incremental carcinogenic risk and result in a Hazard Index of 1 or less for non-cancer health effects)."

Response to FL-1.3

USEPA has documented that PCBs in the sediments of Thompson Island Pool are not being sequestered by widespread burial and that the sediments provide a continuing source of PCBs to the water column and into the food web (USEPA, 1998b; 1999a; 1999b). The Human Health and Ecological Risk Assessments will evaluate whether the site poses unacceptable risk to human health or the environment. Assuming the risk assessments show unacceptable risk, CERCLA requires that the selected remedy comply with ARARs or justify a waiver under Section 121(d)(4).

Response to FL-1.4

As stated in the FSSOW (p. 11), the geochemical and ecological modeling will be used to evaluate target contaminant concentration ranges or limits, as well as the specific locations where the sediment would be remediated.

Response to FF-1.1, FF-1.3 and FL-1.5

The Lower Hudson extends from the Federal Dam at Troy (RM 154) to the Battery (lower tip of Manhattan, RM 0). The Mid-Hudson is defined as the freshwater portion of the Lower Hudson River, which extends from the Federal Dam to Poughkeepsie (RM 74) (FSSOW, p. 6). The results of the Thomann-Farley modeling on the Lower Hudson will not be used to select RAOs for the

Upper Hudson, but will be used to evaluate the effects of remediation in the Upper Hudson on the Mid-Hudson water column and biota.

USEPA acknowledges the comment regarding the clarity, conciseness, and thoroughness of the FSSOW. However, USEPA disagrees with the comment that it is necessary to model the effect of remedial action taken in the Upper Hudson River on the Poughkeepsie to the Battery portion of the Lower Hudson River. As described in the FSSOW (pp. 13-14), USEPA will use the Thomann-Farley model developed for the Hudson River Foundation to model the effects of remedial action taken in the Upper Hudson River on the Mid-Hudson. It is not necessary for USEPA to model the effects of remediation on the Poughkeepsie to the Battery stretch of the river because this stretch has lower concentrations of PCBs in sediments and the water column, and therefore would be expected to be less adversely affected by the site.

Response to FG-1.34

The contaminants of concern are limited to PCBs by definition of the site. To address this comment, the sentence (FSSOW, p. 10) has been revised to read, "The results of the preliminary risk assessment completed in Phase 1 indicate that the primary exposure route for PCBs, which are the contaminants of concern, is consumption of aquatic life."

Response to FL-1.6

The Depth of Scour Model (FSSOW, Figure 1) is a means of locating areas in the river that are subject to high shear stress during periods of high flow such as a 100 year flow event. Sediment in these areas would be subject to remobilization during a flood. These areas would be considered for remedial action to prevent remobilization of contaminated sediments. The Scour Model does not determine the fate and transport of the sediments and is not directly connected to the HudTox Model.

Response to FF-1.4 and FL-1.7

USEPA agrees that the RAO of reducing the inventory of PCBs in sediments to acceptable levels is generalized (FSSOW, p. 16). The specific locations, depth, and areal extent of PCB-contaminated sediment to be remediated will be determined based on site data, the Human Health and Ecological Risk Assessments, and the geochemical and ecological modeling. It is not possible to determine the details of this RAO until completion of the FS modeling. The purpose of this generalized RAO is to indicate that the FS is expected to include an RAO regarding reduction of the PCB inventory in sediments. The comment regarding the low resolution coring data is also addressed in USEPA's Responsiveness Summary for Volume 2C-A Low Resolution Sediment Coring Report (USEPA, 1999a).

Response to FG-1.1, FG-1.9, and FG-1.14

USEPA agrees with the comment that a fundamental goal of the Reassessment RI/FS is to select a remedy that is protective of human health and the environment. As required by CERCLA and the NCP, the selected remedy must also comply with ARARs (or justify a waiver). These two criteria are the threshold criteria that must be satisfied before the remaining five balancing criteria (long-term effectiveness and permanence, reduction of toxicity, mobility or volume through treatment, short-term effectiveness, implementability, and cost) and two modifying criteria (state acceptance and community acceptance) are applied in the detailed analysis of remedial alternatives (FSSOW, pp. 29-30). USEPA will not select a remedy based solely on the need for navigational dredging. However, assuming remedial action is required under CERCLA for protection of human health or the environment, USEPA will consider the navigational use of the river in evaluating the appropriateness of various remedial alternatives, such as capping, consistent with its policy, "Land Use in the CERCLA Remedy Selection Process," OSWER Directive No. 9355.7-04 (May 1995).

USEPA agrees with the comment that USEPA's geochemical and ecological models, along with the results of the Human Health Risk Assessment and the Ecological Risk Assessment, will be useful tools for developing the remedial alternatives that will be compared to the "No Action" alternative required by statute. USEPA disagrees with the comment that USEPA's approach for using the models in developing the RAOs is "backwards" and that the list of remedial scenarios is "arbitrary." The models will be used in an iterative manner to develop and refine the RAOs (FSSOW, p. 14 and Figure 1). The list of likely remedial scenarios to be modeled (FSSOW, pp. 12-13), while not a final compilation, is based on USEPA's knowledge of the site and engineering experience and is appropriate for the FSSOW. The exact language for the RAOs will be finalized in the FS after the risk assessments and modeling have been completed.

Mass removal will be evaluated as one of the options for meeting the RAOs. USEPA will consider site data and the results of its risk assessments and modeling to evaluate the reduction of risk to acceptable levels for each remedial alternative. The time required for each alternative, including the "No Action" alternative, to achieve the RAOs will be estimated and compared as part of the Implementability criterion under the screening and detailed analysis of alternatives (FSSOW, pp. 28 and 30). The geochemical model, which includes a term for organic matter, and the ecological model, which evaluates bioaccumulation, will provide important input to this analysis. PCB loss during a 100-year flood is evaluated in the Baseline Modeling Report (USEPA, 1999b). Nevertheless, USEPA recognizes that the models are not designed to answer all questions that may arise during its FS evaluation. See also Response to FF-1.5, FF-1.7, FS-1.6, FG-1.12, and FG-1.24.

Response to FG-1.35

The use of a target maximum range for PCBs in sediment of 1 to 50 mg/kg (FSSOW, p. 16) is an appropriate assumption for beginning FS work prior to completion of Phase 2. USEPA will present the final RAOs and remedial alternatives, as well as any final target sediment concentration range, in the FS.

2.3 General Response Actions

Response to FF-1.5, FF-1.7, FS-1.6, FG-1.12, and FG-1.24

Consistent with USEPA policy (USEPA, 1999c), "No Action" and monitored natural attenuation are two distinct general response actions. Specifically, for the site, "No Action" consists of monitoring and the existing institutional controls (*e.g.*, fish advisories) but no additional institutional controls; "No Action" would be appropriate if the site poses no current or potential threat to human health or the environment (FSSOW, pp. 17 and 26). The monitored natural attenuation response action for the site could include existing and/or new institutional controls and monitoring, but no active remedial measures; this would be appropriate where *in situ* processes would achieve the site-specific RAOs in a timeframe that is reasonable compared to active remedial measures (FSSOW, p. 17). For clarity, the sentence on p. 17 has been revised to read, "No additional institutional controls beyond those currently in place (*e.g.*, fish consumption advisories) are implemented as part of a "No Action" alternative." USEPA notes that monitored natural attenuation can be used as one component of a total remedy, either in conjunction with active remediation or as a follow-up measure (USEPA, 1999c; FSSOW, p. 17).

One commenter identified three factors for USEPA to consider as part of its monitored natural attenuation alternative: 1) burial of PCB-contaminated sediments by clean sediments, 2) dechlorination of PCBs, and 3) control of upstream sources. With respect to each of these factors:

1. USEPA has documented that PCBs in the Thompson Island Pool sediments are not being sequestered by widespread burial (USEPA, 1998b; 1999a; 1999b) (see response to FL-1.3). Moreover, recent sampling by GE indicates that surface sediments at some locations have concentrations greater than 30 ppm (USEPA, 1999a) and therefore are not clean.

2. Dechlorination does not account for a substantial loss of mass of PCBs from the contaminated sediments (USEPA, 1997a). The dechlorination process does not continue indefinitely and is unlikely to reduce existing sediment inventories much further than has already occurred (USEPA, 1997a; McNulty, 1997; USEPA, 1999a).

3. The FS will consider GE's efforts to control the upstream sources of PCBs. Specifically, the modeling performed to evaluate the "No Action" alternative will assume various PCB loads (including zero load) at the upstream boundary, as requested by the commenter (FSSOW, p. 5).

Response to FS-1.7, FL-1.8, and FG-1.20

The term "on-site" in the FSSOW at p. 17, which refers to a corridor that includes the Upper Hudson River and extends two miles from either bank (*i.e.*, near-river), is intended to be used only in considering the two general response actions that contemplate removal of PCB-contaminated sediments. This specific use of the term does not change the extent of the site (see response to FG-1.6 and FG-1.11) and does not change the requirements for obtaining any necessary permits associated with remedial action or the permit exemption provisions of CERCLA §121(e)(1), 42 U.S.C. §9621(e)(1).

A two-mile corridor was used in the FSSOW because it represents an area that encompasses a wide variety of locations that could be considered for a local dewatering or disposal facility that are within a reasonable hauling distance from the river. For the same practical engineering considerations, "off-site" is used in this context to refer to any dewatering or disposal facility that would be located outside the two mile corridor. USEPA notes that this engineering consideration is not the same as an assessment of the implementability of an alternative, including the administrative feasibility of siting a local landfill within a reasonable time period, which will be used in developing and screening the remedial alternatives, and it is not the same as the Community Acceptance criterion, which USEPA will consider in selecting its remedial action.

Response to FL-1.9

The scenario suggested by the commenter will be considered in the modeling. See response to comments FL-1.1 and FL-1.2.

3. IDENTIFICATION AND SCREENING OF APPLICABLE TECHNOLOGIES AND PROCESS OPTIONS

3.1 Technology and Process Option Identification and Screening

Response to FG-1.2, FG-1.10 and FG-1.15

USEPA disagrees with the comment that the FSSOW is biased towards large-scale and intrusive remedies. As noted in the response to FL-1.10, Table 4 of the FSSOW includes the full range of technologies identified for consideration. In the FS, USEPA will update and finalize the list of technologies that pass the initial screening (FSSOW, pp. 20-21). As noted in the FSSOW (p. 21), the actual volume of sediment to be remediated will be dependent on the final RAOs and will be determined during the FS. Therefore, all technologies that are appropriate for the scale of the project, based on the final RAOs, will be carried forward into the second screening step (FSSOW, p. 21). With respect to the sediment removal alternatives, USEPA will consider the effects to human health and the environment from implementation of the removal itself as part of the Short-term Effectiveness criterion. The technical feasibility of sediment removal has been confirmed by past dredging of the Hudson River for navigational purposes and by dredging of other rivers for environmental purposes.

Response to FG-1.18

The thin-layer capping, or sediment broadcasting, technique falls into the subaqueous capping technology listed in Table 4 of the FSSOW under general response action 3: Containment. USEPA will consider this innovative technology in the FS consistent with the NCP (§300.430(a)(1)(iii)(E)).

Response to FG-1.19

Stabilization of sediments by rip-rap or other stabilization materials is similar to the retaining dikes and berms listed in Table 4 of the FSSOW, under general response action 3: Containment. USEPA will consider rip-rap and other stabilization materials in the FS, as appropriate.

Response to FG-1.23

USEPA will consider technical feasibility in developing and screening the various technologies consistent with the NCP (§300.430(e)) and its RI/FS guidance (USEPA, 1989). The rationale for eliminating any remedial technology for further consideration based on technical infeasibility will be documented in the FS (FSSOW, p. 20).

Table 4: Initial Identification of General Response Actions and Remedial Technologies

Response to FF-1.11

USEPA agrees with the comment and has revised Table 4 to add a monitoring component to general response actions 3, 4, 5, and 6.

Response to FL-1.10

Consistent with USEPA guidance (USEPA, 1989), Table 4 includes the full range of technologies identified for consideration, which is appropriate for the FSSOW. Technologies will be screened and eliminated as appropriate in the FS. The initial screening will be updated and finalized in the FS (FSSOW, pp. 20-21).

3.2 Evaluation of Technologies and Process Options

Response to FL-1.11, FG-1.3, and FG-1.16

Consistent with the NCP (§ 300.430(e)(7)), technologies and process options that are carried forward from the screening for technical feasibility will be screened for effectiveness, implementability, and cost (FSSOW, p. 21). The screening criterion of effectiveness will include an assessment of the extent to which the technology or process option may adversely affect human health or the environment during construction and implementation (FSSOW, p. 22). Implementability will be evaluated on both technical and administrative factors (FSSOW, p. 22). Consistent with USEPA (1989), the screening criterion of cost will assess the relative capital and operation and maintenance costs (FSSOW, p. 23). Technologies and process options that pass this second screening will be assembled into remedial alternatives, which then will be screened for effectiveness, implementability, and cost (FSSOW, pp. 27-28) and undergo a detailed analysis with respect to USEPA's nine criteria for evaluation (NCP §300.430(e)(9)), which are overall protection of human health and the environment, compliance with ARARs, long-term effectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, short-term effectiveness, implementability, cost, state acceptance, and community acceptance (FSSOW, pp. 29-30).

USEPA is aware of concerns regarding the economic impact of a remedy on the local community, and will respond to all significant comments received during the public comment period on its Proposed Plan in a responsiveness summary. USEPA will consider these public comments in its decision-making under the Community Acceptance criterion.

Because the FS will contain the results of the screening process and detailed analysis outlined above and required by the NCP, USEPA disagrees with the comment that the FS will not adequately analyze the effectiveness of the sediment removal alternative in achieving the RAOs for the site. USEPA also disagrees with the assertion that environmental dredging has not been proven to be effective in reducing risk. This assertion is not supported by USEPA's knowledge of environmental dredging at other sites, such as Lake Jarnsjon (Bremle *et al.*, 1998; Forlin and Norrgren, 1998) and New Bedford Harbor (Bergen *et al.*, 1998). Nevertheless, USEPA will consider available information regarding environmental dredging, including the commenter's future report regarding lessons learned at sediment sites, as appropriate, in evaluating remedial alternatives based on sediment removal.

<u>Response to FF-1.6</u>

USEPA agrees with the comment. For clarity, the sentence (FSSOW, p. 22) has been revised to read, "It is expected that sediment cleanup levels will be established on the basis of current sediment inventories, proximity to shore, availability to human and ecological receptors, and potential for release."

4. DEVELOPMENT, SCREENING AND DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES

4.1 "No-Action" Alternative

<u>Response to FG-1.36</u>

USEPA agrees with the comment and has revised the sentence (FSSOW, p. 26) to read, "The "No Action" alternative...could include...continuation of current institutional controls, such as the fish consumption ban.".

4.2 Effectiveness Evaluation

<u>Response to FG-1.5</u>

USEPA disagrees with the comment that the proposed method for analyzing remedial alternatives is inconsistent with the NCP. The development, screening, and detailed analysis of remedial alternatives described in the FSSOW (pp. 25-30) are consistent with the requirements of §300.430(e) of the NCP and USEPA guidance (USEPA, 1989).

Response to FL-1.12, FG-1.7 and FG-1.22

USEPA will evaluate short-term risk during implementation of remedial action quantitatively or qualitatively, as appropriate. As noted in the FSSOW (p. 27), short-term risk will be considered during the screening of remedial alternatives for effectiveness, but may be difficult to quantify due to the lack of information on the nature of PCB releases during implementation of the remedial action. The FSSOW (p. 27) identifies two sources of short-term risk during sediment removal that will be addressed qualitatively (resuspension and air-borne releases), but does not limit short-term risk to these two sources. Addressing resuspension and air-bore releases qualitatively is appropriate for the FS; these short-term risks would be addressed in a health and safety plan and other documents during remedial design, if appropriate.

USEPA agrees that model runs to develop and refine the RAOs will assume that various remedial actions have taken place (FSSOW, p. 12), but this does not mean that USEPA will ignore short-term risk. Rather, short-term risk will be evaluated during the screening of remedial alternatives developed to achieve the RAOs, as noted above (FSSOW, p. 27). The length of time over which the short-term risk would exist will be considered as part of the implementability screening criterion (FSSOW, p. 22) and the implementability criterion of the detailed analysis of remedial alternatives (FSSOW, p. 29).

Response to FG-1.21

USEPA agrees with the comment that long-term effectiveness is an important consideration in the analysis of remedial alternatives. However, USEPA disagrees that the FSSOW implies that it prefers processes that degrade contaminants to natural attenuation or "No Action" and is therefore biased towards sediment removal. Rather, the FSSOW correctly states (p. 17) that, when relying on natural attenuation, USEPA prefers processes that degrade contaminants over other *in situ* natural attenuation processes such as dispersion, dilution or volatilization.

USEPA disagrees with the comment that the long-term effectiveness criterion is misapplied in the FSSOW. The FSSOW correctly states that the long-term effectiveness of sediment removal is greater than the long-term effectiveness of in-place capping in light of the cap stability concerns during major floods (FSSOW, p. 30).

4.3 Implementability Evaluation

No significant comments were received on Section 4.3.

4.4 Cost Evaluation

No significant comments were received on Section 4.4.

4.5 Detailed Analysis of Remedial Alternatives

No significant comments were received on Section 4.5.

5. FEASIBILITY STUDY REASSESSMENT REPORT

Response to FL-1.13

Consistent with USEPA guidance (USEPA, 1989), the FS will contain a detailed analysis of remedial alternatives, but will not present a preferred alternative (FSSOW, p. 31). USEPA will present its preferred alternative in a Proposed Plan, which will be released to the public along with the FS in December 2000.

REFERENCES

No significant comments were received on the References.

ADDITIONAL REFERENCES

Bain, M. 1997. Atlantic and shortnose sturgeons of the Hudson River: common and divergent life history attributes. Environmental Biology of Fishes. Vol. 48, pp. 347-358.

Bergen, B. J., K.A. Rahn, and W. G. Nelson. 1998. Remediation at a Marine Superfund Site: Surficial Sediment PCB Congener Concentration, Composition, and Redistribution. Environmental Science & Technology, Vol. 32, No. 22, pp. 3496-3501.

Bremle, G., L. Okla and P. Larsson, 1998. PCB in Water and Sediment of a Lake after Remediation of Contaminated Sediment. Ambio, Vol.27, No. 5, pp. 398-403.

Forlin, L., and L. Norrgren. 1998. Physiological and Morphological Studies of Feral Perch Before and After Remediation of a PCB Contaminated Lake Jarnsjon. Ambio, Vol. 27, No. 5, pp. 418-424.

Ingersoll C.G., P.S. Haverland, E.L. Brunson, T.J. Canfield, F.J. Dwyer, C.E. Henke, N.E. Kemble, D.R. Mount and R.G. Fox. 1996. Calculation and evaluation of sediment effect concentrations for the amphipod *Hyalella azteca* and the midge *Chironomous riparius*. *J. Great Lakes Res.* 22(3):602-623.

Persaud, D., R. Jaagumagi and A. Hayton. 1993. Guidelines for the protection and management of aquatic sediment quality in Ontario. Ontario Ministry of the Environment and Energy. August 1993.

Smith, S.L., D.D. MacDonald, K.A. Keenleyside, C.G. Ingersoll, and L.J. Field. 1996. A preliminary evaluation of sediment quality assessment values for freshwater ecosystems. *J. Great Lakes Res.* 22(3):624-638.

Tofflemire, T.J. 1984. PCB Transport in the Fort Edward Area. Northeastern Environmental Science, Vol. 3 No. 3&4, pp. 203-208.

USEPA. 1996. Hudson River PCBs Reassessment RI/FS, Preliminary Model Calibration Report. Prepared by TAMS Consultants, Inc, Limno-Tech, Inc., TetraTech, Inc. and Menzie-Cura & Associates, October 1996.

USEPA. 1997a. Hudson River PCBs Reassessment RI/FS, Volume 2C - Data Evaluation and Interpretation Report. Prepared by TAMS Consultants, Inc., Cadmus Group, Inc. and Gradient Corporation. February 1997.

USEPA. 1997b. Hudson River PCBs Reassessment RI/FS, Landfill/Treatment Facility Siting Survey. Prepared by TAMS Consultants, Inc. December 1997.

USEPA. 1998a. Science Policy Council Handbook: Peer Review (EPA 100-B-98-001). January 1998.

USEPA. 1998b. Hudson River PCBs Reassessment RI/FS, Volume 2C-A - Low Resolution Sediment Coring Report. Addendum to the Data Evaluation and Interpretation Report. Prepared by TAMS Consultants, Inc., TetraTech, Inc. and Gradient Corporation. July 1998.

USEPA. 1998c. Hudson River PCBs Reassessment RI/FS, Phase 3 Feasibility Study Scope of Work. Prepared by TAMS Consultants, Inc. September 1998.

USEPA. 1998d. Responsiveness Summary for Volume 2A: Database Report, Volume 2B: Preliminary Model Calibration Report, and Volume 2C: Data Evaluation and Interpretation Report. Hudson River PCBs Reassessment RI/FS. Prepared by TAMS Consultants, Inc., Limno-Tech, Inc., TetraTech, Inc. and Menzie-Cura & Associates, December 1998.

USEPA. 1999a. Responsiveness Summary for the Phase 2 Report, Volume 2C-A, Low Resolution Sediment Coring Report. Hudson River PCBs Reassessment RI/FS. Prepared by TAMS Consultants, Inc. and Tetra Tech, Inc. February 1999.

USEPA. 1999b. Hudson River PCBs Reassessment RI/FS, Volume 2D - Baseline Modeling Report. Prepared by Limno-Tech, Inc., Menzie-Cura and Associates, and TetraTech, Inc. May 1999.

USEPA. 1999c. Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites (OSWER Directive 9200.4-17P). April 1999.

USEPA, 1999d. Responsiveness Summary for Ecological Risk Assessment Scope of Work, Hudson River PCBs Reassessment RI/FS. Prepared by TAMS Consultants, Inc. and Menzie-Cura & Associates, Inc. April 1999.

USEPA, 1999e. Responsiveness Summary for Human Health Risk Assessment Scope of Work, Hudson River PCBs Reassessment RI/FS. Prepared by TAMS Consultants, Inc. and Gradient Corp. April 1999.

Washington State Department of Ecology. 1997. Creation and Analysis of Freshwater Sediment Quality Values in Washington State, Publication No. 97-323a. July 1997.

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REVISED TABLES AND FIGURE

TABLE 1
POTENTIAL CHEMICAL-SPECIFIC ARARS AND CRITERIA, ADVISORIES AND GUIDANCE (Revised)

MEDIUM/ AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CONSIDERATION IN THE RI/FS
BIOTA				
Federal Regulatory Requirements	Federal Food, Drug and Cosmetic Act Regulations (21 CFR 109.30(a)(7))	Relevant and Appropriate	This sets forth FDA tolerance limit of 2 ppm for PCB concentrations in commercial fish and shellfish	Applicable.
NYSDEC/ International Joint Commision	Protection of Piscivorous Wildlife Species	Relevant and Appropriate	Recommended body burden concentrations (0.1 mg/kg total PCBs) in fish tissue protective of piscivorous birds and mammals.	A risk based guidance value adopted for protection of piscivorous wildlife species from reproductive impariment due to PCBs.
SURFACE WATER				
New York State Standards	6 NYCRR 703, NYSDEC TOGS 1.1.1 (June 1998)	Applicable	Establishes water quality standards for various classes of surface water. Standards for PCBs are 0.09 μg/L (potable water source) and 0.001 ng/L for protection of human health (fish consumption) and 0.12 ng/L for protection of wildlife.	Potential ARAR for establishing PCB cleanup criteria for Hudson River water.
Federal Criteria, Advisories, and Guidance	Federal Water Pollution Control Act and Ambient Water Quality Criteria (AWQC) [USEPA; May 1991]	To Be Considered	Federal AWQC are ecological and health-based criteria developed for various pollutants, including total PCBs and individual Aroclors. Freshwater chronic (ecological) criterion for total PCBs is 0.014 μg/L.	To be determined.
Safe Drinking Water Act and Regulations	42 USC 300f et seq; 40 CFR 141	Relevant and Appropriate	Maximum Contaminant Level (MCL) for PCBs in finished drinking water supplied to consumers of public water supply systems is 0.5 μg/L; goal (MCLG) is zero (40 CFR 141,part P).	Relevant and appropriate since Hudson River water is used as a drinking water supply source for several communities.
Toxic Pollutant Effluent Standards	Clean Water Act; Pollutants listed in 40 CFR 401.15 - 401.16; PCB criterion in 40 CFR 129.105	Applicable	The ambient water quality criterion for navigable waters is established at 0.001 mg/L total PCBs (40 CFR 129.105(a)(4)). PCB manufacturers prohibited from discharging PCBs (40 CFR 129.105).	Applicable; Hudson River is a navigable water. Applicability of manufacturing discharge prohibition to be determined.

Source: Based(ible C 3-1 of the Phase 1 Report; updated 5/05/95, 9/3/98, 1/15/99, and 5/11/99

TABLE 1
POTENTIAL CHEMICAL-SPECIFIC ARARS AND CRITERIA, ADVISORIES AND GUIDANCE (Revised)

MEDIUM/ AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CONSIDERATION IN THE RI/FS
NY SPDES limits	6 NYCRR Parts 700-757; NYSDEC TOGS 1.3.4	Applicable	BAT/BPJ 30-day limit for PCBs is 3.0 µg/L (TOGS 1.3.4); nothing on PCBs in 6 NYCRR 700-757.	Applicable to activities (e.g., remediation) involving discharges of water to the Hudson River.
GROUND WATER				
New York State Standards	6 NYCRR 703.5 NYSDEC TOGS 1.1.1 (June 1998)	Applicable	Establishes groundwater quality standards. Standard for total PCBs is 0.09 µg/L for protection of human health (water source).	Potential ARAR for protection of groundwater resources (as a potential source of drinking water).
AIR				
Federal Regulatory Requirements	CAA - National Ambient Air Quality Standards (NAAQS) 40 CFR 50	Relevant and Appropriate	These standards were primarily developed for particulates and conventional air pollutants. No specific standard for PCBs.	Standards for particulate matter will be used when assessing excavation and emission controls for sediment treatments.
New York State	Clean Air Act (6 NYCRR 256 and 257)	Applicable	Establishes an air quality classification system and air quality standards. No specific standard for PCBs.	Standards for emissions from remedial activities.
Federal Criteria, Advisories, and Guidance	American Conference of Governmental Industrial Hygienists Threshold Limit Values (TLV)	To Be Considered	These standards were issued as consensus standards for controlling air quality in workplace environments.	TLVs could be used for assessing site inhalation risks for soil removal operations.
New York State Guidance	Air Guide-1 (NYSDEC Division of Air Resources; Draft, 1991)	To Be Considered	Establishes Short-term Guideline Concentrations and Annual Guideline Concentrations (SGCs and AGCs) for PCBs (0.1 $\mu g/m^3$ and 0.00045 $\mu g/m^3$)	Applicable to emissions of PCBs from the Hudson River (e.g., volatilization); potentially applicable to various remedial actions.

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Source: Based on Table C.3-1 of the Phase 1 Report; updated 5/05/95, 9/3/98, 1/15/99, and 5/11/99

TABLE 1
POTENTIAL CHEMICAL-SPECIFIC ARARS AND CRITERIA, ADVISORIES AND GUIDANCE (Revised)

MEDIUM/ AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CONSIDERATION IN THE RI/FS
SEDIMENT				
New York State (NYSDEC)	Technical Guidance for Screening Contaminated Sediment, November 1993; January 1999 update	To Be Considered	Guidance document used by the Division of Fish, Wildlife, and Marine Resources, for evaluating contaminant levels in sediment. Calculated value based on the concentrations of contaminant and of organic carbon in the sediment, and the affinity of the contaminant for the organic carbon in the sediment.	Criteria for determining water and sediment levels for protection of human health (bioaccumulation), benthic aquatic life (acute and chronic toxicity), and wildlife (bioaccumulation). Values for PCBs vary by several orders of magnitude for the four levels of protection.
National Oceanic and Atmospheric Administration	Potential for Biological Effects of Sediment-Sorbed Contaminants - Technical Memorandum NOS OMA 52, March 1990	To Be Considered	Guidance document with estimated concentrations at which biological effects of contaminants including PCBs may be observed.	Technical guidance for use in establishing sediment cleanup levels. Cited in the Technical Guidance for Screening Contaminated Sediment, November 1993; January 1999 update.
Ontario Ministry of the Environment (Persaud *et al.*, 1992)	Technical guidance for screening freshwater sediments	To Be Considered	Guidance document for establishment of freshwater sediment related effects on freshwater benthic communities.	Technical guidance for use in establishing sediment clean up levels. Cited in NYSDEC Technical Guidance for Screening Contaminated Sediment, November 1993; January 1999 update
TSCA Spill Cleanup Policy	49 CFR 761.120 ,761.123, 761.125, 761.135	To Be Considered	Not an ARAR but specifies allowable levels of residual PCB contamination from spill cleanup.	Requirement for cleanup to 10 ppm PCBs in unrestricted access areas may be relevant as guidance to some areas of site.

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TABLE 2
POTENTIAL LOCATION-SPECIFIC ARARS AND CRITERIA, ADVISORIES AND GUIDANCE (Revised)

MEDIUM/ AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CONSIDERATION IN THE RI/FS
Federal Regulatory Requirements for Wetlands/ Floodplains	Clean Water Act (CWA) Section 404 and Rivers and Harbors Act of 1899 (40 CFR Part 230 and 33 CFR Part 320-329)	Applicable	Under this requirement, no activity that adversely effects a wetland shall be permitted if a practicable alternative that has less effect is available. If there is no other practical alternative, impacts must be mitigated. A permit is required for construction of any structure in a navigable water. Section 307, effluent standards of 1-ppb concentration of PCB, is incorporated into this section by reference.	During the identification, screening, and evaluation of alternatives, the effects on wetlands are evaluated. Effluent levels will be used as guidance levels to which alternatives will be evaluated.
	RCRA Location Standards (40 CFR 264.18)	Relevant and Appropriate	This regulation outlines the requirements for constructing a RCRA facility on a 100-year floodplain.	A facility located on a 100-year floodplain must be designed, constructed, operated, and maintained to prevent washout of any hazardous waste by a 100-year flood, unless waste may be removed safely before floodwater can reach the facility or no adverse effects on public health and the environment would result if washout occurred.
	TSCA facility requirements (40 CFR 761.65 - 761.75)	Applicable	Establishes siting guidance and criteria for storage (761.65), chemical waste landfills (761.70), and incinerators (761.75).	Land disposal facilities should not be in 100-year floodplain; not hydraulically connected to surface water bodies.
Federal Nonregulatory Requirements for Wetlands/ Floodplains	Executive Order 11990 (Protection of Wetlands); 40 CFR Part 6, Appendix A, mandated by EPA's 1985 Statement of Policy on Wetlands and Floodplains Assessments for CERCLA Sites.	To Be Considered	Under this regulation, federal agencies are required to minimize the destruction loss or degradation of wetlands, and preserve and enhance natural and beneficial values of wetlands.	Remedial alternatives that involve construction must include all practicable means of minimizing harm to wetlands. Wetlands protection considerations must be incorporated into the planning and decision-making about remedial alternatives.
	Executive Order 11988 (Floodplain Management)	To Be Considered	Federal agencies are required to reduce the risk of flood loss, minimize impact of floods, and restore and preserve the natural and beneficial values of floodplains.	Evaluate potential effects of actions to ensure that planning and decision-making consider the effect of the 100-year and 500-year floodplains and floodplain management, including floodplain preservation and/or restoration.

400095

Source: Based on Table C.3-2 of the Phase I Report; updated 5/05/95, 9/3/98 and 01/11/99

TABLE 2
POTENTIAL LOCATION-SPECIFIC ARARS AND CRITERIA, ADVISORIES AND GUIDANCE (Revised)

MEDIUM/ AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CONSIDERATION IN THE RI/FS
New York State Freshwater Wetlands Law	ECL Article 24 & 71 in Title 23; 6 NYCRR Part 665	Applicable	Regulates activities conducted in a wetlands area to minimize the destruction, loss or degradation of the wetlands.	Remedial alternatives that involve construction must include means to protect wetlands.
New York State Freshwater Wetlands Permit Requirements Regulations	6 NYCRR Part 663	Applicable	Regulates the procedural requirements to be followed in undertaking different activities in wetlands and in areas adjacent to wetlands.	Remedial alternatives that involve construction must include means to protect wetlands. No permit required for CERCLA but actions must meet substantive requirements.
NY State Floodplain Regulations	6 NYCRR 372-2	Applicable	Establishes construction requirements for hazardous waste facilities in 100-year floodplain	Potentially applicable for remedial activities if conducted within floodplain
Endangered Species Act of 1973, as amended; Fish and Wildlife Coordination Act	16 USC 1531; 16 USC 661	Applicable	Federally supported actions are required to not jeopardize the continued existence of endangered/threatened species or adversely modify or destroy the critical habitats of such species. Consultation with NOAA/NMFS and USFWS required (Section 7 consultation).	Potential ARAR as threatened or endangered species (shortnose sturgeon) have been recorded in the Lower Hudson River between river miles 24 and 148 (Bain, 1997).
Farmland Protection Policy Act of 1981 (FPPA)	7 USC 4201 *et seq*	Applicable	Regulates the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses.	Potential ARAR for remedial alternatives.
Endangered and Threatened Species of Fish and Wildlife Requirements	6 NYCRR 182	Applicable	Restricts activities in areas inhabited by endangered species.	Potential ARAR as many fish and wildlife species inhabit the site.
National Historic Preservation Act	PL 89-655; 33 CFR Part 800	Potentially Applicable	Proposed remedial actions must take into account effect on properties in or eligible for inclusion in the National Registry of Historic Places.	Presence of National Landmarks and NRHP sites to be determined.
Wild and Scenic Rivers Act	16 USC 1271-1272; 40 CFR 6.302	Potentially applicable	Selected rivers of the Nation and their immediate environments shall be protected for the benefit and enjoyment of present and future generations.	Wild or scenic status to be determined. Designation made by States using federal criteria. Not applicable if Hudson River project area is not designated as wild and scenic river.

Source: Based on Table 3-2 of the Phase 1 Report, updated 5/05/95, 9/3/98 and 01/11/99.

TABLE 2
POTENTIAL LOCATION-SPECIFIC ARARS AND CRITERIA, ADVISORIES AND GUIDANCE (Revised)

MEDIUM/ AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CONSIDERATION IN THE RI/FS
NY Wild, Scenic, and Recreational Rivers Act and Regulations	ECL Article 15, Title 27; 6 NYCRR Part 666	Potentially applicable	Similar to Federal act but adds additional category of "recreational"	Presence of wild, scenic, and recreational rivers to be determined.
NY Industrial Hazardous Waste Facility Siting Board	6 NYCRR Part 361	Potentially applicable	Hazardous waste management facilities must obtain a certificate from the board before a new facility can be sited.	To be determined.
Migratory Bird Treaty Act of 1918 as Amended in 1986	16 U.S.C. 703-712	Applicable	Provides for the protection of native species from unregulated and unintentional takings which includes poisoning from hazardous wastes.	Potential ARAR for remedial alternatives.

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Source: Based on Table C.3-2 of the Phase 1 Report, updated 5/05/95, 9/3/98 and 01/11/99.

TABLE 3
POTENTIAL ACTION-SPECIFIC ARARS (Revised)

ARAR	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARARS IF A REMEDY IS SELECTED FOR WHICH THESE REQUIREMENTS ARE ARAR
Toxic Substances Control Act (TSCA) - Chemical Waste Landfill Requirements (40 CFR 761.75)	Establishes approval and technical requirements for land disposal (landfilling) of PCBs	Landfills must be approved by Regional administrator, soil/liners permeability $<10^{-7}$ cm/sec, must have groundwater monitoring, leachate collection and monitoring, etc.
TSCA - Incineration Requirements (40 CFR 761.70)	Establishes requirements for thermal destruction of PCBs in incinerators (boilers not permitted for non-liquid PCBs [e.g., dredged material])	Incinerators must be approved (trial burn at discretion of regional administrator). For non-liquid PCBs, combustion efficiency must be $\geq$99.9%, air emissions $\leq$ 1 μg/kg PCB in feed; feed, stack gas, and operation monitoring required; shutdown required if monitoring fails.
TSCA - Storage requirements (40 CFR 761.65)	Establishes technical requirements for temporary storage of PCB wastes prior to treatment or disposal	Must have roof, curbing, impervious floor; check monthly; not allowed within a 100-year floodplain. Allows storage in RCRA hazardous PCB facilities.
Resource Conservation and Recovery Act (RCRA) - General Facility Standards (40 CFR 264.10 - 264.16)	General facility requirements outline general waste analysis, security measures, inspections and training requirements.	Any facilities will be constructed, fenced, posted and operated in accordance with this requirement. Workers must be properly trained. Process wastes will be evaluated for the characteristics of hazardous wastes to assess further landfilling requirements.
RCRA - Preparedness and Prevention (40 CFR 264.30 - 264.37)	This regulation outlines requirements for safety equipment and spill control.	Safety and communication equipment will be installed at the site; local authorities will be familiarized with site operations.
RCRA - Contingency Plan and Emergency Procedures (40 CFR 264.50 - 264.56)	This regulation outlines the requirements for emergency procedures to be used following explosions, fires, etc. Includes coordination with and notification of local emergency responders.	Plans will be developed and implemented during site work including response to fires, explosions, or unplanned releases to air, soil, or water.
RCRA - Releases from Solid Waste Management Units (40 CFR 264.90 - 264.101)	This regulation details requirements for a groundwater monitoring program to be installed at the site.	A groundwater monitoring program may be a component of remedial alternatives. RCRA regulations will be utilized as guidance during development of this program.
RCRA - Closure and Post-closure (40 CFR 264.110 - 264.120)	This regulation details specific requirements for closure and post-closure of hazardous waste facilities.	Those parts of the regulation concerned with technical requirements, long-term monitoring and maintenance of the site will be incorporated into the design

Source: Based on Table C.3-3 of the Phase 1 Report, updated 5/05/95, 9/3/98, 1/15/99, and 5/11/99.

TABLE 3
POTENTIAL ACTION-SPECIFIC ARARS (Revised)

ARAR	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARARS IF A REMEDY IS SELECTED FOR WHICH THESE REQUIREMENTS ARE ARAR
RCRA - Surface Impoundments Items (40 CFR 264.220 - 264.232)	This regulation details the design, construction, operation, monitoring, inspection and contingency plans for a RCRA surface impoundment.	To comply with clean closure, owner must remove or decontaminate all waste. To comply with containment closure, the owner must eliminate free liquid, stabilize remaining waste, and cover impoundment with a cover that complies with the regulation. Integrity of cover must be maintained, groundwater system monitored, and runoff controlled (40 CFR 264.228).
RCRA - Waste Piles (40 CFR 264.250 - 264.259)	Details procedures, operating requirements, and closure and post-closure options for waste piles. If removal or decontamination of all contaminated subsoils is not possible, closure and post-closure requirements for landfills must be attained.	Waste piles used for treatment or storage of non-containerized accumulation of solid, non-flowing hazardous waste may comply with either the waste pile or landfill requirements. The storage of hazardous waste on-site, therefore, must comply with one or the other subpart.
RCRA - Landfills (40 CFR 264.300 - 264.317)	This regulation details the design, operation, monitoring, inspection, record keeping, and closure requirements, for a RCRA landfill.	Disposal of contaminated materials if determined to be characteristic hazardous wastes from the river would be to a permitted facility that complies with RCRA landfill regulations, including closure and post-closure. On-site disposal would include a cover meeting the requirements of 264.310 and relevent technical guidance documents.
USEPA - Covers for Uncontrolled Hazardous Waste Sites (EPA/540/2-85-002; September 1985)	In order to fulfill most requirements, the most efficient cover system is made of layers. The minimum specifications, as dictated by RCRA, should include a vegetated top cover, middle drainage layer, and low permeability layer.	The low permeability bottom layer consists of an upper component (at least 20 mil synthetic), which may or may not be needed, and a lower component (must have at least 2 feet of soil recompacted to a saturated conductivity).
RCRA - Incinerators (40 CFR 264.340 - 264.351)	This regulation specifies the performance standards, operating requirements, monitoring, inspection, record-keeping, and closure guidelines of any incinerator burning hazardous waste.	On-site/off-site thermal treatment must comply with the appropriate requirements specified in this subpart of RCRA, if determined to be RCRA characteristic hazardous wastes. (Incineration of PCB wastes must meet requirements of 40CFR 761.70)
RCRA - Miscellaneous Units (40 CFR 264.600 - 264.603) (Misc. Units defined in 40 CFR 260.10)	These standards are applicable to miscellaneous units not previously defined under existing RCRA regulations for treatment, storage, and disposal units.	Units not previously defined under RCRA must comply with these requirements.

Source: Based on Table C.3-3 of the Phase 1 Report, updated 5/05/95, 9/3/98, 1/15/99, and 5/11/99.

TABLE 3
POTENTIAL ACTION-SPECIFIC ARARS (Revised)

ARAR	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARARS IF A REMEDY IS SELECTED FOR WHICH THESE REQUIREMENTS ARE ARAR
TSCA Disposal Requirements (40 CFR Part 761.60)	Liquid PCBs at concentrations greater than 50 ppm, but less than 500 ppm, must be disposed of either in a high efficiency boiler, or in a chemical waste landfill. Liquid PCBs at concentrations greater than 500 ppm must be disposed of in an incinerator. Other PCB items (dredged materials with PCB concentrations greater than 50 ppm) may be disposed of by alternative methods which are protective of public health and the environment, if shown that incineration or disposal in a chemical waste landfill is not reasonable or appropriate.	PCB treatment must comply with these regulations during remedial action. 40 CFR 761 clarifies that approval of Regional Administrator is required for any destruction method other than incineration per 761.70. Only requirements applicable to non-liquid PCBs and dredged material are likely to be applicable for the Hudson River site.
Occuptational Safety and Health Act (OSHA) - Occupational Safety and Health Standards (29 CFR Part 1910)	These regulations specify the 8-hour time-weighted average concentration for various organic compounds. Training requirements for workers at hazardous waste operations are specified in 29 CFR 1910.120.	Proper respiratory equipment will be worn if it is impossible to maintain the work atmosphere below the specified concentrations. Workers performing remedial activities would be required to have completed specified training requirements.
OSHA - Safety and Health Regulations for Construction (29 CFR Part 1926)	This regulation specifies the type of safety equipment and procedures to be followed during site remediation.	All appropriate safety equipment will be on-site. In addition, safety procedures will be followed during on-site activities.
OSHA - Recording and Reporting Occupational Injuries and Illnesses (29 CFR 1904)	This regulation outlines the record keeping and reporting requirements for an employer under OSHA.	These requirements apply to all site contractors and subcontractors and must be followed during all site work.
Clean Water Act (CWA) - 40 CFR Part 403	This regulation specifies pretreatment standards for discharge to a publicly owned treatment works (POTW).	If a leachate collection system is installed and the discharge is sent to a POTW, the POTW must have an approved pretreatment program. The collected leachate runoff must be in compliance with the approved program. Prior to discharging, a report must be submitted containing identifying information, list of approved permits, description of operations, flow measurements, measurement of pollutants, certification by a qualified professional, and a compliance schedule (40 CFR403.12).
Regulations on Disposal Site Determinations Under the Clean Water Act (40 CFR 231)	These regulations apply to all existing, proposed, or potential disposal sites for discharges of dredged or fill materials into U.S. waters, which include wetlands.	The dredged or fill material should not be discharged unless it can be demonstrated that such a discharge will not have an unacceptable adverse impact on the wetlands.

Source: Based on Table C.3-3 of the Phase I Report, updated 5/05/95, 9/3/98, 1/15/99, and 5/11/99.

TABLE 3
POTENTIAL ACTION-SPECIFIC ARARS (Revised)

ARAR	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARARS IF A REMEDY IS SELECTED FOR WHICH THESE REQUIREMENTS ARE ARAR
DOT Rules for Transportation of Hazardous Materials (49 CFR Parts 171.1-171.5)	This regulation outlines procedures for the packaging, labeling, manifesting and transporting of hazardous materials.	Contaminated materials will be packaged, manifested and transported to a licensed off-site disposal facility in compliance with these regulations.
New York State Pollutant Discharge Elimination System (6 NYCRR 750-757; TOGS 1.3.4)	Establishes water quality standards, effluent limitations, standards of performance, toxic effluent standards and prohibitions, and pretreatment standards (6 NYCRR 750.1).	BAT/BPJ 30-day limit for PCBs is 3.0µg/L.
New York State RCRA Hazardous Waste Regulations (6 NYCRR 372)	Outlines standards for generators and transporters of hazardous waste, and standards for generators, transporters, and treatment, storage or disposal facilities relating to the use of manifest systems. Floodplain requirements in 6 NYCRR 372-2.	To be determined.
New York State RCRA Hazardous Waste Regulations (6 NYCRR 373)	The regulations for treatment, storage, and disposal of hazardous waste; the permit requirements; the construction and the operation standards are established.	To be determined.
New York State Solid Waste Regulations (6 NYCRR 360-361)	Requirements for landfill operation and closure and other solid waste management activities. Facility siting requirements in 6 NYCRR Part 361.	To be determined.
New York State Air Pollution Control Regulations (6 NYCRR 200-221); the sections that pertain to emissions are 200, 202, 205, 211, 212, 219; the exact citations that are relevent to the project are yet to be determined	The emissions of air contaminants that jeopardize human, plant, or animal life, or is ruinous to property, or causes a level of discomfort is strictly prohibited (6 NYCRR 211).	To be determined. PCBs are not VOCs. NYSDEC Division of Air Resources Air Guide-1 may be applicable to PCB emissions.
NY Environmental Conservation Law, Article 15, Title 5	Regulates excavation and fill of the navigable waters of the state.	To be determined; applicable to consideration of any alternative involving dredging or filling.

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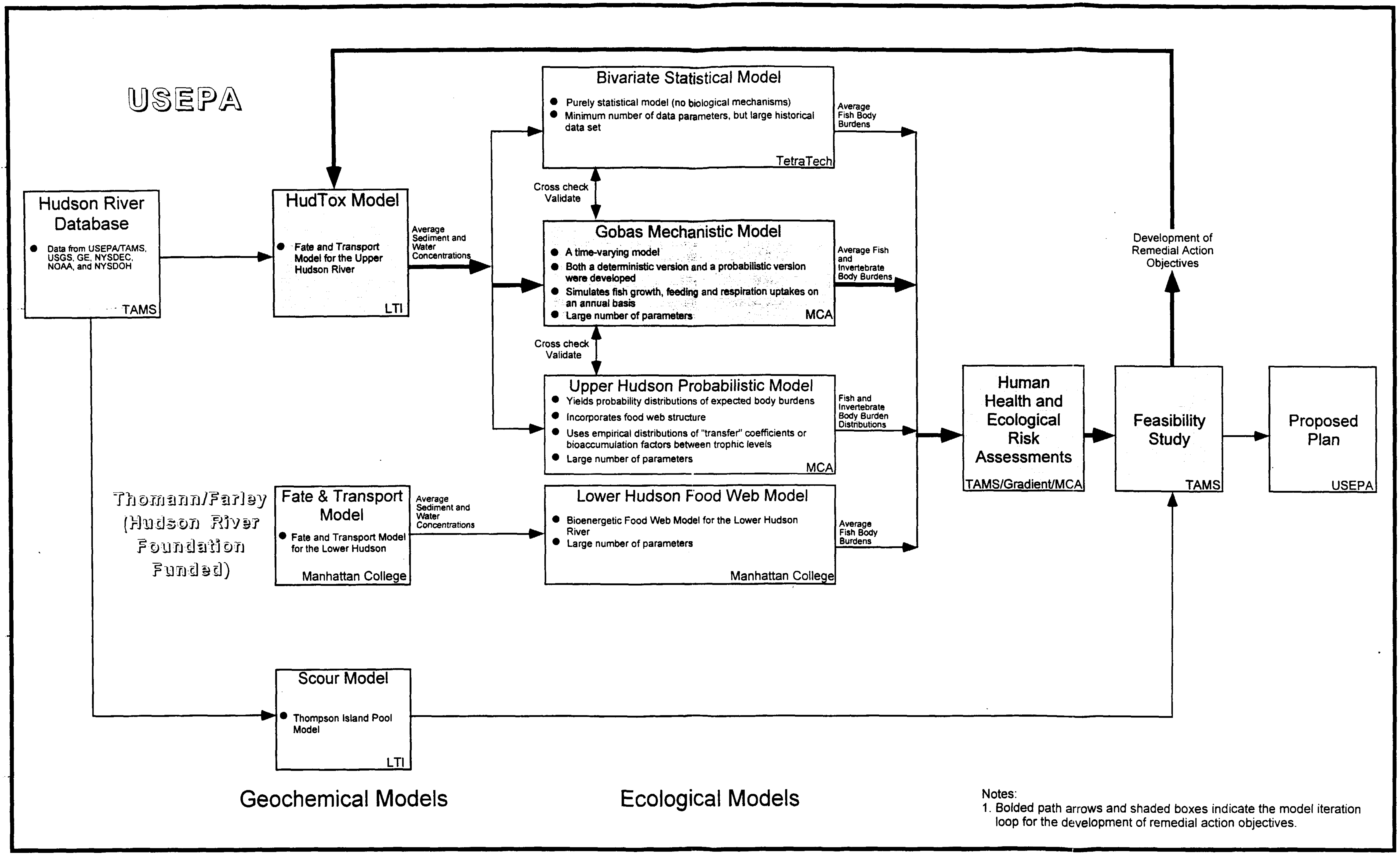
Source: Based on Table C.3-3 of the Phase I Report, updated 5/05/95, 9/3/98, 1/15/99, and 5/11/99.

TABLE 4
INITIAL IDENTIFICATION OF GENERAL RESPONSE ACTIONS AND REMEDIAL TECHNOLOGIES (Revised)

GENERAL RESPONSE ACTION	REMEDIAL TECHNOLOGY
1 NO ACTION	None (with or without continuation of existing monitoring and institutional controls)
2 MONITORED NATURAL ATTENUATION	None
3 CONTAINMENT	Subaqueous Capping Retaining Dikes and Berms Ground Freezing
4 IN SITU TREATMENT	Bioremediation Solidification/Stabilization Dechlorination/Solidification Solvent Extraction Chemical Dechlorination
5 REMOVAL	Environmental Dredging (with or without dispersion controls) Excavation
SEDIMENT PRETREATMENT	Dewatering Solids Classification
DISPOSAL	Beneficial Use Land Disposal (Landfills) Confined Disposal Facility
6 REMOVAL	Environmental Dredging (with or without dispersion controls)
SEDIMENT PRETREATMENT	Dewatering Solids Classification
EX SITU TREATMENT	Dechlorination Solvent Extraction Thermal Desorption Combined Physical/Chemical Incineration Soil Washing Bioremediation Solidification/Stabilization Dechlorination/Stabilization
DISPOSAL	Beneficial Use Land Disposal (Landfills) Confined Disposal Facility

Notes:

1. Response action numbering on this table corresponds to numbering in Section 2.3.
2. The continuation of existing monitoring and institutional controls or additional monitoring and institutional controls will be performed as a part of each general response action with the possible exception of the No Action response.



TAMS Consultants, Inc.

05/29/98

Figure 1
Hudson River PCBs Reassessment Feasibility Study Modeling Analysis Flowchart

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III. COMMENTS ON THE FEASIBILITY STUDY SCOPE OF WORK

Copies of the comments received during the public comment period follow.

400104

FEDERAL

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Ocean Service
Office of Ocean Resources Conservation and Assessment
Hazardous Materials Response and Assessment Division
Coastal Resources Coordination Branch
290 Broadway, Rm 1831
New York, New York 10007

FF-1

November 2, 1998

Doug Tomchuk
U.S. EPA
Sediment Projects/Caribbean Team
290 Broadway
New York, NY 10007

Dear Doug:

Thank you for the opportunity to review the September 1998 Hudson River PCBs Reassessment RI/FS Phase 3 Feasibility Scope of Work. The following comments are submitted by the National Oceanic and Atmospheric Administration (NOAA).

Background

The Hudson River Reassessment is divided into three phases. Phase I was the Interim Characterization and Evaluation. Phase 2, which is ongoing, consists of Further Site Characterization and Analysis. The Feasibility Study is conducted under Phase 3 . The subject document, the Feasibility Study (FS) Scope of Work (SOW), focuses on PCB-contaminated Hudson River sediment between Hudson Falls and the Federal Dam at Troy ("the Upper Hudson").

Summary

The Feasibility Study describes potential remedial alternatives for reducing environmental and human health PCB exposure. Remedial Action Objectives (RAOs) and General Response Actions (GRAs) will be developed. RAOs will be developed to reduce risk to human and ecological receptors, achieve water quality criteria and meet other applicable or relevant and appropriate requirements (ARARs).

Geochemical and ecological models will be employed to investigate the spatial extent of remedial actions and the anticipated reduction in biota PCB body burdens. Remedial scenarios to be tested range from "no action", removal or isolation based on various concentrations or inventories of sediment PCBs, removal by grain-size type, dredging bank to bank, hot-spot removal, and nearshore vs offshore variations. The FS report will integrate modeling, human health risk assessment and ecological risk assessment conclusions and ARARs.

Comments

1.1 The authors of the FS SOW present a concise and clear description of the approach to document and evaluate potential remedial alternatives for Hudson River PCB-contaminated sediment. The SOW is relatively thorough. However, the assessment of remedial alternatives for the Upper Hudson does not evaluate their impact on the entire Hudson River Superfund site, excluding the portion of the site between Poughkeepsie and the Battery. In addition, only the impact of "select" remedial alternatives will be evaluated for the Mid-Hudson (freshwater portion of the Hudson River from the Federal Dam in Troy to Poughkeepsie. Although it may be true that remedial actions in the Upper Hudson may affect Upper Hudson biota to a greater extent than those in the Lower Hudson, biota in the lower river may also be substantially affected. As pointed out in the Data Evaluation and Interpretation Report (EPA 1997), approximately one-half of the PCB loading to the New York/New Jersey Harbor originates from the Upper Hudson River PCB load. By not fully evaluating the potential reduction in risk associated with different remedial alternatives throughout the entire Hudson River Superfund site, critical information to support the remedial decision-making process will not be available. NOAA strongly urges EPA to reconsider this decision and include the entire site in the evaluation of remedial alternatives.

1.2 Page 11 Section 2.2. Para 1: This paragraph combines target contaminant concentration limits for human and ecological receptors. The last sentence identifies FDA limits as an example of acceptable PCB level in fish and other biota. FDA are inappropriate criteria for ecological thresholds.

1.3 Page 13 Section 2.2 Para 2: Remedial action alternatives in the Upper Hudson will be evaluated to assess their capacity to reduce risk to biota (and their consumers) in the Upper and Mid-Hudson. The estuarine portion of the Hudson between Poughkeepsie and the Battery has been excluded from these modeling efforts. The basis for this decision is the assumption that remedial actions in the Upper Hudson will have less of an effect on the Lower Hudson biota than resident Upper Hudson biota. However, any substantial change in PCB loading from the Upper Hudson would be expected to impact the entire river. Because the PCB body burdens in fish from the lower portion of the estuary are considerably lower than in the Mid or Upper Hudson, reduction in PCB loading may result in a more rapid recovery for fish and other biota in this section of the river, even though the magnitude of the change may be smaller. The importance of quantitative information on the effects of all remedial options over the entire site should not underestimated.

1.4 Page 16 Section 2.2 Last Bullet: All of the other goals are quite specific and applicable, but the last seems too ill defined to be useful, because it is not based on any specific, readily quantifiable criteria.

1.5 Page 16 Section 2.3: NOAA does not agree with listing "Monitored Natural Attenuation" as an alternative that is distinct from the "No Action" alternative. There appears to be no discernible difference between"no action" and "monitored natural attenuation" other than syntax. Typically, any response action should be monitored to determine effectiveness and attainment of remedial action objectives (RAOs). Historically, the "No Action" alternative was selected as the preferred alternative when either there was no current or potential threat to human health or the environment or when the no action option would achieve the RAOs within a equivalent time frame to a more active remedy. Dilution, dispersion, sorption, transformation or volatilization of contaminants identified as *in situ* processes do not (a) prevent or eliminate the exchange of PCBs between media, (b) remove all routes of exposure, (c) impede the redistribution of the contaminants within and throughout the river or (d) preclude negative impacts associated with contaminant bioavailability.

1.6 Page 22 Section 3.2 Item 2: It is stated that "sediment cleanup levels will be established on the basis of current sediment inventories, proximity to shore and human receptors, and potential for re-release." Availability to ecological receptors should be included as well.

1.7 Page 26 Section 4.1: The second bullet and third paragraph are internally contradictory with each other and with the first paragraph on page 17. If the site poses no current or potential threat to human health, then fish advisories or a fish ban would not be in effect. Furthermore, fishing bans/advisories are not "remedial" in nature whether they exist currently or are implemented in the future.

1.8 Table 1 lists potential chemical-specific ARARs and critieria, advisories and guidance. A separate heading should be added for groundwater, the authority being the NYS Standards, 6 NYCRR 703.6. The maximum allowable concentration of PCBs of 0.09 ug/l. Under the Sediment heading, include other freshwater sediment guidelines (Smith et al. 1996, Ingersoll et al. 1996, EPA 1996, Washington Department of the Ecology (1997). Most are referenced in the September 1998 Ecological Risk Assessment SOW.

1.9 Table 2 lists the Endangered Species Act as an ARAR. Shortnose sturgeon are not limited to the Esopus Meadows area in the Lower Hudson estuary. They have been recorded in the Hudson River between km 38 and km 239. Their distribution varies seasonally and by life stage and reproductive condition (Bain 1997). Also, the Migratory Bird Treaty Act (1972) should be added to this table. It provides for protection of native species from unregulated and unintentional takings including poisoning from hazardous wastes.

1.10 In the first row and column of Table 3, "Clean" is missing from "Water Act".

1.11 The remedial technology column in Table 4 should contain a monitoring component for each general response action.

Thanks you for your continual efforts in keeping NOAA apprised of the progress at this site. Please contact me at (212) 637-3259 or Jay Field at (206) 536-6404 should you have any questions or would like further assistance.

Sincerely,

Lisa Rosman

Lisa Rosman
NOAA Coastal Resource Coordinator

References

Bain, M 1997 Atlantic and shortnose sturgeons of the Hudson River: comon and divergent life history attributes. Environmental Biology of Fishes 48:347-358.

EPA, 1996. Calculation and evaluation of sediment effect concentrations for the amphipod *Hyalella azteca* and the midge *Chironomus riparius*. EPA Report No. 905-R96-008. September 1996.

EPA 1997. Phase 2 Report, Further Site Characterization and Analysis, Volume 2C - Data Evaluation and Interpretation Report,Hudson River PCB Reassessment RI/FS, February 1997.

Ingersoll, C.G., P.S. Haverland, E.L. Brunson, T.J. Canfield, F.J. Dwyer, C.E. Henke, N.E. Kemble, D.R. Mount, and R.G. Fox, 1996. Calculation and evaluation of sediment effect concentrations for the amphipod *Hyalella azteca* and the midge *Chironomus riparius*. *J. Great Lakes Res.* 22(3): 602-623.

Migratory Bird Treaty Act 1972. 16 USC 703-712 and 50 CFR 20.71.

Persaud, D., R. Jaagumagi, and A. Hayton, 1993. Guidelines for the protection and management of aquatic sediment quality in Ontario. Ontario Ministry of the Environment and Energy. August 1993.

Smith, S.L., D.D. MacDonald, K.A. Keenleyside, C.G. Ingersoll, and L.J. Field 1996. A preliminary evaluation of sediment quality assessment values for freshwater ecosystems. *J. Great Lakes Res.* 22(3): 624-638.

Washington State Department of Ecology, 1997. Creation and Analysis of Freshwater Sediment Quality Values in Washington State, Publication No. 97-323a. July 1997.

cc: Mindy Pensak, DESA/HWSB
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STATE

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New York State Department of Environmental Conservation
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Phone: (518) 457-1741 FAX: (518) 457-7925

November 9, 1998

Mr. Douglas Tomchuk
United States Environmental Protection Agency
Region II
290 Broadway - 20th Floor
New York, NY 10007-1866

Re: Hudson River PCBs Site Reassessment RI/FS
Site No.: 5-46-031

Dear Mr. Tomchuk:

The following comments are on the Hudson River PCBs Reassessment RI/FS, Phase 3 Feasibility Study Scope of Work and Phase 2 Ecological Risk Assessment Scope of Work, dated September 1998.

Feasibility Study Scope of Work

1.1 Section 1, Page 3. The text states, "computer models will be employed to assist in the selection of remedial objectives as well as to assess the likely success of any remedial action in attaining these goals." Generally, the remedial action objectives are based on applicable or relevant and appropriate requirements (ARARs) and/or risk assessment findings. Models are generally used to assist in predicting whether specific remedial measures will enable the goals to be achieved. The scope of work should explain how the computer models will be used to select remedial objectives.

1.2 Section 1.2, Page 5. The Scope of Work should clearly state that all of the exposure routes found to be of concern in the Human Health Risk Assessment (HHRA) are addressed in the Feasibility Study.

1.3 Section 2.2 Page 12 and 13 and Section 4. We suspect that the depositional areas just south of Remnant Site 3 and adjacent to Remnant Site 4 contain PCB contaminated sediments. Remedial alternatives should include consideration of such areas above Rogers Island.

1.4 Section 2.2 Page 15 and 16. The DEC piscivorus wildlife criteria (0.1 ppm in whole fish) must be included in the Final Selection of Remedial Action Objectives, particularly where the reference to the 'desired level in fish' occurs.

1.5 Section 2.2 Page 15. The second bullet on the page cites cancer risk as the basis for determination of acceptable PCB levels in near-shore sediments. This bullet should be clarified to indicate that the basis for determination of acceptable PCB levels in near-shore sediments will be based on any appropriate risks, cancer or non-cancer, as determined in the HHRA.

1.6 Section 2.3. The report between Section 2.3 (Development of Remedial Action Objectives and General Response Actions, page 17) and Section 4 (Development, Screening and Detailed Analysis Remedial Alternatives, page 26) is not consistent as to whether institutional controls are part of a no action alternative. This apparent discrepancy needs to be clarified.

1.7 Section 2.3 Page 17. The term "on-site" as used in conjunction with identifying general response actions should be more clearly defined. As it is currently defined in the text, one might conclude that the superfund site includes a 2-mile corridor along either bank of the river.

1.8 Table 1 Potential Chemical -Specific ARARS and Criteria, Advisories and Guidance state that the inclusion of the U.S. Food and Drug Administration tolerance limit for PCBs in fish (2 ppm) as an ARAR is relevant and appropriate but that its consideration in the RI/FS is to be determined. This is confusing and should be clarified. Regardless of what is done with the Table, the FDA tolerance limit should be used as an ARAR.

Ecological Risk Assessment Scope of Work

Page 1, at bottom and top of Page 2 - The removal of the Fort Edward Dam is overstated as a defining event for the impact on contaminating the Hudson River. The write-up on page 3 of the Feasibility Study Scope of Work provides a better perspective on the dam removal and this should be reiterated in place of the referenced passage in the Ecological Risk Assessment Scope of Work.

Page 5, fourth bullet - It is recommended that this passage be revised for clarity to read as follows: Estimated PCB concentrations in the diets of fish eating birds and mammals at the site are similar to or higher than dietary concentrations recommended by USFWS or NYSDEC (TAMS/Gradient, 1991).

Page 11, last line - Explain a little further about the 'whorled pogonia.' Is this a plant or animal?

Page 12 & 13, Section 2.2 Contaminants of Concern - There needs to be some rationale provided for limiting the discussion to PCBs. If this is to be an 'ecological assessment,' recognition at least of the existence of other contaminants in the system is in order.

Page 16, 'Measurement endpoints', third bullet - 'PCB body burdens' are not included in the measurement endpoints as listed in Table 1. For example, on the second page of the table the only species mentioned that would have body burdens measured is the tree swallow. Where actual Hudson River samples which provide body burden data are not available, literature values may be used. Also, please note that other species of animals mentioned may not be feeding in the river and hence, may not be accumulating high levels or may not be impacted.

Table 1 - Why is the short nose sturgeon listed as a forage species? If it is truly endangered, is it expected to comprise a large part of the food base for piscivorus species? Under piscivorus fish at the bottom of the first page, it would be more accurate to recognize many of these as omnivorous. Any piscivorus habits of the species may be functions of life stage and size.

Page 20, paragraph 4 - There are data available on PCBs in mink for New York State in Foley et al. The full citation is available if desired. In the next paragraph, Palmer and Fowler are not in the literature cited section, whereas Hornshaw et al. from the paragraph above is in the literature cited. On page 21, the Gilbert 1989 citation is not in the literature cited section either.

Page 31, section 3.3.5 - More data on bald eagles may soon be available based on ongoing NYSDEC research. If this will be of use, please let us know.

Throughout Sections 3, 4 and 5, the assessment approach described is 'linear.' The focus is almost exclusively on the river, not as an ecosystem, but as a north-south geographic feature. The species outlined for the Ecological Risk Assessment are considered to derive their energy from the river itself and there is little weight given to some of the most productive habitats or ecological zones. Except for some forage species and benthic invertebrates the shallow, near shore littoral areas are not evaluated. There is no mention of the transition zone from aquatic to terrestrial habitats and likewise the riparian, wetted perimeter, and flood plain habitats are absent from discussion. Reptiles, amphibians, soil invertebrates (e.g., earthworms, burrowing insect larvae), mammals (e.g., shrews and moles), birds such as woodcock form a diverse complex array of organisms inhabiting these peripheral habitats which may be larger in spatial extent than those directly associated with the river. In addition then to the direct exposure to animals in these habitats, there is the re-exposure to the aquatic system of PCB running off the surface of the flood-plain. Although the concentrations are relatively low, it represents a widespread surficial phenomenon which should be taken into account in the risk assessment.

On page 53, paragraph 2 - This paragraph should be rewritten and expanded for clarity. Otherwise eliminate it since it does not impart useful information.

If you have any questions on the above, please call me at (518) 457-5637.

Sincerely,

William T. Ports, P.E.
Project Manager
Bureau of Central Remedial Action
Division of Environmental Remediation

Enclosure

cc: John Davis, NYSDOL
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LOCAL

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SARATOGA COUNTY

ENVIRONMENTAL MANAGEMENT COUNCIL

PETER BALET — CHAIRMAN
GEORGE HODGSON — DIRECTOR

November 2, 1998

Mr. Douglas Tomchuk
U.S. Environmental Protection Agency
290 Broadway 20th Floor
New York, New York 10007

Dear Doug:

Enclosed you will find Saratoga County EMC's comments on EPA's Phase 2 Ecological Risk Assessment Scope of Work and Phase 3 Feasibility Study Scope of Work for the Hudson River PCB Reassessment RI/FS, both dated September, 1998, prepared by David Adams, SCEMC, Member-at-Large.

The principal comment on the Ecological Risk Assessment Scope of Work is that due to the highly qualitative nature of the Risk Assessment, it should be confined to those areas (water and sediment) and species (invertebrates and fish) for which Hudson River data are available.

The principal comments on the Feasibility Study Scope of Work are that the sediments significant as a source of PCBs to the food chain must first be identified before possible remedial action are defined, and that the elimination of PCB inflows to the river and subsequent monitoring of the river's recovery should be added to the list of possible remedial action.

Sincerely,

GH

Peter Balet
Chairman

PB/cts
Encls.

400116

(518) 884-4778

cc: Ms. Carol Browner, Administrator, USEPA
Ms. Jeanne Fox, Regional Administrator, Region 2, USEPA
Mr. Richard Caspe, Director, ERRD, Region 2, USEPA
Mr. William McCabe, Deputy Director, ERRD, Region 2, USEPA
Ms. Ann Rychlenski, Public Affairs Specialist, Region 2, USEPA
The Honorable Gerald Solomon
The Honorable Alphonse D'Amato
The Honorable Daniel Moynihan
The Honorable George Pataki
Mr. John Cahill, Commissioner, NYSDEC
Mr. Stuart Buchanan, Region 5 Director, NYSDEC
The Saratoga County Board of Supervisors
Mr. David Wickerham, Administrator, Saratoga County
Hudson River PCB Liaison Group Chairs
SCEMC members & staff

HUDSON RIVER PCSs REASSESSMENT RI/FS
COMMENTS ON PHASE 3 FEASIBILITY STUDY
SCOPE OF WORK, DATED SEPTEMBER, 1998
Prepared by David D. Adams, Member-at-Large
Saratoga County Environmental Management Council

1.1 1. Section 2, P. 9: Provisions should be made for the inclusion as a possible remedial action the elimination of any significant in-flow of PCBs to the river, particularly the in-flow in the vicinity of the GE Hudson Falls Plant site, with followup monitoring over a suitable time period to determine if stopping the in-flow of PCBs allows the river to recover.

1.2 2. Section 2.2, P. 10: Consideration should be given to the probability that the real source of PCBs is the continuing in-flow of PCBs to the river with the sediments acting as an intermediary path of storage and transport to the food chain.

1.3 3. Section 2.2, P. 11: If the PCBs in the buried sediments are determined not be be a source of PCBs to the water columns and the food chain, would "ARARs or other criteria" still be a basis for considering removal of the buried PCBs?

1.4 4. Section 2.2, P. 12: Before defining what remedial action to evaluate for sediment, it is first necessary to determine which sediments are significant contributors of PCBs to the water column and the food chain. Also, see comment "1" for another scenario that needs to be evaluated.

1.5 5. Section 2.2, PP 13 & 14: Are the "Mid-Hudson" and "Lower-Hudson" different regions of the river or the same? Will results from the Lower-Hudson models be used in the decision for remedial action in the Upper Hudson?

1.6 6. Section 2.2, P. 13: Fig. 1 shows the Scour Model output going directly to the Feasibility Study. Shouldn't the Scour Model output instead be an input to the HUDTOX fate and tra[illegible]t model?

1.7 7. Section 2.2, P. 16: How are areas of high PCB concentration "at or near the surface" to be determined? The high resolution core data are inadequate as there are far too few samples and the low resolution core data, besides also being of inadequate sample size, are impossible to use for this purpose as the homogenization of the upper 9-12" of there cores has destroyed any ability to determine PCB concentrations in the active surface layer which is probably only about 2 inches deep. See EMC's previous comments on EPA's Low Resolution Core report.

1.8 8. Section 2.3, P. 17: Why is it necessary to use a two-mile wide swath from each river bank to define "on-site"? It is the EMC's understanding of the Superfund process that EPA can take any remedial action it deems appropriate "on-site" without the need for considering other laws or regulations such as those governing hazardous waste landfills.

Defining "on-site" including a corridor extending two (2) miles on each side of the river appears necessary only to give EPA an option to site a landfill for dredged material without going through the normal permitting process.

1.9 9. Section 2.3, P. 18: The "response action" identified in Comment "1" should be included.

1.10 10. Section 3.1, P. 21: It would seem to make more sense to make Table 4 reflect the current situation rather than including technologies that have already been eliminated from consideration.

1.11 11. Section 3.2, P. 21: Evaluation criteria for remedial action should be added for ecological damage to the Hudson River system and for impacts to Hudson River communities and people including economic impacts as these are important aspects of any remedial action.

1.12 12. Section 4.2, P. 27: Only doing a "qualitative" evaluation of the risk of resuspension and air-born PCBs due to remedial actions is inadequate for the ecological system of the Hudson River and for the population exposed to these risks. A more thorough evaluation is needed to be sure action like the evacuation of people isn't required to protect against exposure to PCBs during a remedial action.

1.13 13. Section 5, P. 31: Is the implication in the last paragraph of this section that the Feasibility Study Report will not make any recommendations correct?

1.14 14. Table 1: What is the use of standards for PCB concentrations that are below the normal detection limit of 300 ppt (e.g. .001 ppt & .12 ppt for surface water)?

GENERAL ELECTRIC

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November 2, 1998

Mr. Douglas Tomchuk
USEPA – Region 2
290 Broadway – 20th Floor
New York, N.Y. 10007-1866

RE: FS SOW Comments

Dear Mr. Tomchuk:

The General Electric Company ("GE") is pleased to submit the enclosed comments on the Scope of Work for the Hudson River PCBs Superfund Site Feasibility Study ("SOW").

The SOW has several shortcomings. Most important, it is not focused on the three central questions posed at the beginning of the reassessment that EPA set out to answer, namely:

1.1

- When will PCB levels in fish meet human health and ecological risk criteria under continued No Action?
- Can remedies other than No Action significantly shorten the time required to achieve acceptable risk levels?
- Would buried PCBs become "reactivated" following a major flood?

Without focusing on these issues, the Agency will be unable to evaluate whether any remedial alternative in the Upper River can achieve meaningful risk reduction materially faster than No Action. Instead of directing its analysis towards defined risk reduction, which must be the focus of the Feasibility Study, the SOW confuses mass removal with risk reduction.

The SOW raises other important issues as well:

1.2 • It is improperly biased toward large-scale and intrusive remedies – namely, dredging – even though other nature-friendly, nondisruptive remedies exist and ought to be equally considered;

1.3 • It does not call for an adequate analysis of the effectiveness of dredging to achieve remedial objectives in a river system of this size or complexity;

1.4 • It does not properly incorporate the present and future benefits from GE's continued source control and clean-up work at Hudson Falls;

1.5 • Its proposed method for analyzing remedial alternatives diverges from the requirements of the National Contingency Plan;

1.6 • It arbitrarily seeks to expand the Hudson River Superfund Site without need or justification; and,

1.7 • It proposes a Feasibility Study that will not quantitatively evaluate the short-term risk resulting from implementation of remedial alternatives, some of which could take years to complete.

1.8 Based on these and other deficiencies (discussed in attached comments), we urge the Agency to submit the Feasibility Study to an independent peer review panel. EPA has already committed to the peer review process to ensure the Hudson River remedial decision is based on sound science. The document that results from this SOW is central to the Agency's remedial decision. Accordingly, it is not enough that only the documents that preceed this upcoming report will be reviewed by independent scientists. The Feasibility Study, too, ought to be subject to a review by independent experts.

If you would like to discuss these comments in greater detail, please do not hesitate to contact me.

Sincerely,

Melvin B. Schweiger /MSE

Melvin B. Schweiger

cc: Richard Caspe
William McCabe
Melvin Hauptman
John Cahill
Douglas Fischer
Albert DiBernardo

COMMENTS OF GENERAL ELECTRIC COMPANY ON HUDSON RIVER PCBS REASSESSMENT RI/FS PHASE 3 FEASIBILITY STUDY SCOPE OF WORK

November 2, 1998

TABLE OF CONTENTS

I. Introduction and Executive Summary

General Electric Company ("GE") welcomes this opportunity to submit comments on the "Hudson River PCBs Reassessment RI/FS Phase 3 Feasibility Study Scope of Work" ("SOW"). These comments present a number of major issues.

1.9

1. *The Agency established an appropriate remedial goal for the Hudson River PCBs Superfund Site ("Site") through three central questions posed at the beginning of this reassessment. The remedial objectives listed in the SOW diverge from this goal.*

The questions as originally set forth were:

- When will PCB levels in fish populations recover to levels meeting human health and ecological risk criteria under continued No Action?
- Can remedies other than No Action significantly shorten the time required to achieve acceptable risk levels?
- Are there contaminated sediments now buried and effectively sequestered from the food chain that are likely to become "reactivated" following a major flood, possibly resulting in an increase in contamination of the fish population?

The Feasibility Study ("FS") must be directed at answering these questions. First, EPA must determine the PCB concentration in fish that constitutes an acceptable level of risk. Second, relying on the knowledge of the exposure pathways of PCBs to fish derived from its fate, transport and bioaccumulation models, the Agency must identify an array of possible remedial alternatives that would achieve the defined acceptable risk level. This is an important step; knowledge of the source of PCBs (buried vs. surficial sediments; upstream source vs. TIP) is essential to selection of a remedial alternative. Third, because "No Action" at this Site encompasses natural recovery, all possible remedial alternatives must be compared to "No

Action" to evaluate whether any will achieve the defined acceptable risk level at a materially earlier date than would "No Action."

Risk reduction is the proper remedial goal at this Site. Because most of the PCBs are not bioavailable, mass removal does not equate to risk reduction and violates the National Contingency Plan ("NCP") mandate of cost effectiveness here. EPA's remedy selection must not be driven by a vague affinity for mass removal, but by achieving a defined, targeted concentration of PCBs in fish that is deemed acceptable materially faster than would occur naturally. The logic of the remedial selection process directs this order of procedure.

1.10

2. *The SOW is improperly biased toward the consideration of large-scale and intrusive remedies – namely, dredging; other nature-friendly, nondisruptive remedial alternatives get little or no discussion but deserve far more thorough evaluation.*

In considering large-scale and intrusive remedial alternatives, such as dredging, careful consideration must be given to their actual performance at other sites. First, there must be assurance that dredging in the Hudson would be focused on the actual source of PCBs to fish and the water column. Remediation of PCBs in locations that do not predominantly affect fish, such as the so-called "hot spots," will accomplish little or nothing. Second, the efficacy of dredging must be demonstrated, which is a difficult task given both the limited experience and the paucity of post-dredging analysis at other sites. Third, in light of the consistent pattern of remedial dredging at other sites taking far longer to implement and costing far more than was anticipated, realistic construction schedules and cost estimates must be developed. Fourth, the destructive ecological impacts of dredging must be accurately weighed in the remedial calculus. Finally, the practical feasibility of dredging must be addressed.

1.11 3. *EPA can not expand the Site down the river or along its shorelines without providing a reasoned explanation.*

The SOW provides neither a practical need nor a logical justification for the expansion of the Site by 160 square miles.

1.12 4. *The evaluation of the monitored natural attenuation alternative must consider the significant factors that affect recovery of the Hudson.*

These factors include burial of sediments containing PCBs by cleaner solids; PCB dechlorination in the river; and control of the upstream source, which must precede the commencement of any downstream remedy.

1.13 5. *The application of applicable or relevant and appropriate requirements ("ARARs") and "To Be Considered" benchmarks ("TBCs") at this Site should be constrained by the voluminous site-specific information.*

This information includes the quantitative PCB fate, transport and bioaccumulation models that are being prepared by EPA and GE and the baseline human health and ecological risk assessments for the Site. In addition, many of the requirements identified in the SOW are not properly considered ARARs or TBCs for this Site for legal reasons or because of insufficient data and analysis to support them.

II. The Remedial Analysis Must Assess Whether Remedial Alternatives Can Achieve a Meaningful Reduction in Risk in Materially Less Time Than No-Action

1.14 The fundamental remedial goal at all Superfund sites is derived from the core instruction in section 121(b)(1) of the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"), 42 U.S.C. § 9621(b)(1), that remedial actions be "protective of human health and the environment." See also 40 C.F.R. § 300.430(a)(1)(i) ("The national goal of the remedy selection process is to select remedies that are protective of human health and the environment"). To translate this broad goal to this Site, EPA posed the three questions set out above. These questions properly characterize what should be the overriding question of the Agency's remedial analysis: Will any remedial alternative achieve the targeted, defined and, measurable reduction in risk to humans or biota from PCBs in fish materially faster than would occur under No Action within the time frame for which the models can reliably forecast conditions?

The best tools for answering the three questions are the quantitative fate, transport and bioaccumulation models that the Agency is developing. When properly calibrated and validated, these models have important uses beside projecting the No Action scenario: (1) to identify the source(s) and pathways, of PCBs to fish (*e.g.*, the upstream source vs. the Thompson Island Pool ("TIP") sediments; surface sediments vs. buried sediments), and (2) to screen possible remedial alternatives. Once the analyses are complete, EPA should then be able to use the models to distinguish one source of PCBs from another, identify which is the primary source, and assess and quantitatively compare the risk-reduction benefits of various remedial alternatives, including natural recovery. Because "No Action" will achieve the acceptable risk level in time, a central criterion for remedy selection is whether the remedy will materially accelerate the date at which the desired risk level is achieved. If models show that a remedial alternative cannot materially accelerate the achievement of the risk target, it must be rejected. The goal of remediation must be acceleration of the achievement of the target risk level.[1]

For example, assume the models predict that PCB levels in fish after 20 or 30 years under the No Action scenario will be X. Under one remedial alternative, the models predict that PCB levels in fish after the same time period will be Y. If the risks from human consumption of fish with X concentrations of PCBs are not materially different from the risks of human consumption of fish with Y concentrations, then this remedial alternative has not met the basic test at this Site and should be excluded from further consideration. EPA's site-specific fate, transport and bioaccumulation models make this sort of analysis possible because they permit the risk manager to calculate PCB levels in fish directly instead of using inferior and indirect measurements of PCB levels in other media (*e.g.*, sediment and the water column) which are assumed to lead to an acceptable PCB concentration in fish. To be sure, the baseline risk assessments and ARARs will provide numerical criteria at the direct points of exposure, such as fish, water (for direct human contact or consumption), or sediment (for direct human contact). By providing a direct link to evaluate a specific action against a specific remedial goal (*e.g.*, PCB

[1] EPA cannot utilize CERCLA to achieve goals unrelated to the protection of human health and the environment, such as increasing the depths of navigational channels. Thus, the statement in the SOW that "[r]emoval, rather than containment (capping) or *in situ* treatment will be considered the preferred action for contaminated sediments within the limits of the navigation channel, if necessary," (SOW at 18) is improper. Any action selected with the intent of increasing the depth of navigational channels, rather than attaining risk-derived objectives, would be inconsistent with the NCP.

concentrations in fish), however, the models make indirect remedial criteria, such as sediment concentrations intended to achieve a protective level in fish, unnecessary.

Unfortunately, the SOW's proposed use of the models does not consistently match this approach. On the one hand, the SOW correctly states that the "main point of the modeling is to provide a basis on which to evaluate various remedial action scenarios in view of attaining acceptable PCB body burdens in fish within an acceptable time frame" (SOW at 15). Here, EPA makes clear that the model should be used to compare the relative effectiveness over time of different remedial alternatives to achieve a pre-determined remedial action objective -- acceptable PCB body burdens in fish. A few pages earlier, however, the SOW suggests that EPA will back into this process by selecting an arbitrary list of remedial scenarios first (*i.e.*, those set out on pages 12 and 13) and then inputing these scenarios to the models to develop a list of potential remedial objectives. This approach is backwards; one must first establish remedial objectives and then develop and evaluate remedial scenarios for their ability to meet them.

Thus, the basic focus of EPA's remedial analysis must be comparative risk reduction over time. Remedial alternatives not aimed at reduction of risk to acceptable levels should be eliminated from consideration. Quantitative models provide the primary tool upon which to make this analysis.[2]

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[2] The SOW suggests that EPA may abandon its modeling effort: "due to the scale and complexity of PCB contamination in the Hudson, there remain a number of less well-understood issues or parameters which may add a degree of uncertainty to model output. As a result, the model output cannot be used as the sole basis for the selection of remedial action objectives" (SOW at 14). EPA must not abandon the best quantitative tool for making rational and informed decisions in favor of some unspecified criteria that may be subject to even greater uncertainty. Instead, EPA is obliged to assess the uncertainty associated with the model and determine what assumptions and parameters are most critical in controlling achievement of the remedial action objectives.

(continued...)

Unfortunately, the remedial objectives identified at pages 15-16 of the SOW are not focused on reduction of risk to acceptable levels. While the first two listed objectives (achieving PCB levels in fish protective of human health and achieving PCB levels in near-shore sediments that protect against direct human contact) fall squarely within the risk reduction framework, they do not contain an element of time. The remaining three (reducing "ecological risk" generally, reducing water column concentrations of PCBs to water quality standards, and reducing the inventory of PCBs) neither relate to achieving a defined level of acceptable risk nor reference the time element. Further, they are too vague to be useful. Almost any remedial action could satisfy these criteria, and almost any remedial action might be disqualified from consideration because it could not.

The SOW's focus on goals other than risk reduction is also evident from the proposed remedial scenarios set out on pages 12-13. These scenarios involve the removal or isolation of sediments based on one of four criteria:

- PCB levels (M/L^3) exceeding a threshold value,
- PCB inventory (M/L^2) exceeding a threshold value,
- location (*i.e.*, the NYSDEC hot spots; NYSDEC dredge locations; bank-to-bank within the TIP), or
- sediment type (*i.e.*, fine-grained sediments).

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[2] (...continued)
Abandoning the models in favor of subjective analyses of data would not reduce uncertainty; it would increase it. Any remedial decision made without substantial reliance on quantitative models that can project the effectiveness of remedial alternatives over an extended period of time will be arbitrary and capricious.

These criteria are all based on the false notion that remediation in the areas of greatest PCB mass -- mass reduction -- will maximize risk reduction. This presumption is false. Risk reduction will be achieved by reducing PCB flux to the water column and exposure of biota to PCBs, not by simply removing an arbitrary quantity of contaminated sediments. This is because: (1) most of the PCB mass is sequestered from the water column in deep sediments; (2) water column PCB flux is controlled by PCB concentrations in surface sediments, not local, buried deposits of PCB mass; and (3) biotic exposure to PCBs is driven by PCB concentrations in surface sediments, not local, buried deposits of PCB mass. At this Site, mass removal does not equate to risk reduction.

Most of the PCB mass is sequestered from the water column in subsurface sediments.

GE's 1991 sediment PCB data, EPA's Phase 2 high resolution coring, and GE's 1998 sediment coring all demonstrate that PCB concentrations are highest in buried sediments or those sediments greater than 10 cm below the sediment-water interface (GE 1997; 1998). The 100-year flood model described in EPA (1996a) demonstrates that contaminated sediments more than several centimeters below the sediment-water interface are not affected by extreme flood events. GE's own modeling effort confirms this.

PCB concentrations in surface sediments, not local, buried regions of PCB mass, control the PCB flux to the water column.

Flux to the water column occurs via diffusion from sediment pore water and event-driven resuspension of surface sediments. Surface sediment pore water PCB concentrations are controlled by the PCB concentrations in sediment organic matter (*i.e.*, mg PCB/kg organic carbon) because PCBs preferentially adsorb to this component of the sediment. Local areas of PCB deposits (*i.e.*, the so-called *hot spots* or regions of fine sediment) are not regions of highest

PCB concentration in sediment organic matter. In fact, surficial sediment organic carbon-normalized PCB concentrations are similar in and out of the so-called *hot spots* as well as between coarse-and fine-grained areas (QEA 1998a). The diffusive flux of PCBs is similar across the various sediments, and a remedial program that targets areas of PCB mass can only reduce the diffusive flux of PCBs to the water column in proportion to the fraction of total sediment surface remediated. Since the so-called *hot spots* comprise only a small part (on the order of 10%) of the total sediment surface area in the Upper Hudson, simply targeting the hot spots for removal will not achieve meaningful risk reduction. Furthermore, the regions of high PCB mass tend to be the depositional regions of the river and, therefore, are not the dominant components of the erosive flux to the water column.

PCB concentrations in surface sediments, not local, buried areas of PCB mass control exposure of biota to PCBs.

Biota derive their PCBs partially from the water column (and thus from both upstream sources and diffusive flux from surface sediments) and partially from the ingestion of sediments by deposit-feeding invertebrates. Deposit feeders, such as worms, consume a certain amount of sediment organic matter each day to fulfill their energy requirements. The PCB dose they receive depends on the PCB concentration in the organic matter. Because this average concentration in organic matter is similar in and out of the areas of buried PCB mass, the dose to the food web does not come preferentially from high PCB mass areas.

EPA must consider the mechanisms and routes of PCB transfer and bioaccumulation when analyzing possible remedial actions. Thus, EPA must not emphasize sediment PCB mass removal, but must focus on the risk-related goals of: (1) elimination of ongoing sources that contribute to surface sediment contamination; (2) broad-scale reduction of PCB flux from surface sediments by natural and active remediation; and (3) stabilization of areas subject to erosion, if necessary, to reduce downstream transport.

III. Remedial Technologies

A. The SOW Is Improperly Skewed Toward Large-Scale Remediation Through Dredging

1.15 The SOW is improperly biased toward large-scale remediation projects involving removal of sediments. This bias is evident from its screening out certain technologies as infeasible because of the assumed large-scale of remediation, while not acknowledging that a large-scale remedial action would call into question the feasibility of remedial dredging.

EPA has eliminated potential technologies based on a premature judgment that they are inappropriate or infeasible for a large cleanup when, in fact, the size of the cleanup has not yet been determined. For example:

- "several technologies were screened out based on the scale of the potential cleanup effort"
- "solvent extraction of PCBs in sediments was eliminated as an *in-situ* treatment option based on the large scale of the remediation required"
- "centrifuge techniques were eliminated as a potential sediment pretreatment/dewatering process based on the anticipated large volumes of sediment to be treated."

SOW at 21 (emphasis supplied). As the SOW acknowledges: "[t]he actual volume to be remediated will of course be dependent on the selected remedial action objectives and will be determined in Phase 3 after the final selection of objectives is made by EPA" (SOW at 21). Thus, EPA's elimination of technologies on the grounds that they are inappropriate for the scale of remediation is improper and suggests that the Agency has already determined that it wishes to pursue a large-scale remediation project.

While EPA has used the assumed large-scale of remediation to screen out certain treatment technologies, it failed to analyze removal technologies (dredging) in the same manner. Table 1 presents estimated removal volumes associated with 8 of the 10 remedial scenarios set out in on pages 12-13 (two cannot be estimated due to insufficient characterization data). As an initial matter, the SOW provides no explanation for how these remedial scenarios were identified and selected. For example, on what basis were the PCB target levels used to define the different scenarios (*e.g.*, 1 ppm, 10 ppm, 50 ppm) selected? On what basis were the areas for remediation (*e.g.*, hot spots in the TIP, hot spots elsewhere, bank to bank) identified? Why has EPA focused on mass reduction instead of risk reduction?

In any event, it must be acknowledged that even the smallest of these remedial scenarios is six to nine times larger than any remedial dredging project accomplished in the United States to date. Yet, their inclusion in the SOW suggests that the Agency has already concluded that removal or capping of sediment at this scale is technically feasible. This assumption is misplaced and must await the screening of technologies and remedial alternatives in the FS. GE's analysis shows that most of the ten remedial scenarios are technically infeasible for this Site for several reasons: they all would take years or decades to implement; the ability to dredge to low cleanup levels (*e.g.*, 1 ppm PCBs) in a river has never been demonstrated; isolation (capping) of such extensive areas in a river has not been demonstrated.

To inject reality into its evaluation of remedial scenarios, the SOW must evaluate what has and has not been accomplished at other sites where remedial dredging has been implemented (discussed further in the next Section). For example, consider that the average size of a single NYSDEC hot spot is 7.7 acres (309 total acres divided by 40 hot spots). A <u>single</u> 7.7

acre hot spot dredged to a 3 foot depth would generate 36,400 cy of sediment, more material than has been removed at all but a handful of remedial dredging projects to date. Applying average monthly removal rates of 3,000 to 8,000 cy, derived from ten of the 14 actual dredging projects implemented to date (those for which such data are available), illustrates that removal time for one such hot spot would be 4.5 to 12 operating months - one to two construction years. Further, one hot spot in the Hudson typically is one construction project, distinct from each successive hot spot. EPA presents these potential scenarios as routine removals, assuming they be accomplished in a single, broad sweep. This would not be the case.[3]

Recognition of these factors and assessing and incorporating them into the analysis of remedial alternatives is vital to a credible FS.

B. Specific Comments on Remedial Technologies

1.16

1. Remedial Dredging Has Not Been Demonstrated to be Effective in Reducing Risk

The SOW's apparent bias toward large-scale dredging seems to be premised on the assumption that remedial dredging has proven to be effective in reducing risk. An exhaustive

[3] To illustrate, consider the construction requirements and factors for a single hot spot, each with unique logistical characteristics, and geographical and physical constraints. These requirements include: (1) obtaining permits and access agreements; (2) siting and constructing land-based dewatering and water-treatment facilities and a TSCA disposal site; (3) constructing access roads across private shoreline property for certain hot spots; (4) installing sheetpile or silt curtains adjacent to the hot spots, as the case may be; (5) selecting, making available, and providing access for the removal equipment; (6) identifying and implementing methods and means of removing and managing rocks, boulders, vegetation, and debris; (7) identifying and implementing the means of transport of the removed material to land-based dewatering or disposal sites (*e.g.*, pipelines, barges, or trucks); and (8) designing and putting in place pre-, during, and post-dredging monitoring programs.

examination of the 27 sediment remediation projects in progress or completed in the United States undermines this assumption:[4]

- Remedial dredging was performed at fourteen of the 27 projects; eleven used dry excavations (after temporary diversion of the water). Two were natural recovery. Combined removal volume for all of these projects was 1,350,000 cubic yards (cy), a volume about equal to the <u>smallest</u> of the ten removal scenarios identified by EPA.

- At least eight different types of sediment target goals have been identified for the 27 sites. While this could be attributed to the complexity and unique features at each site, it is symptomatic of the confusion surrounding the subject of sediment remediation and the absence of a clearly articulated remedial goal for sediment sites.

- Overall costs for removal projects ranged from $83 to $1,670 per cubic yard, with a median of about $350 to 400 per cubic yard. (Navigational dredging typically costs $1 to $10 per cubic yard). The high costs are typically due to a combination of low production rates (*i.e.*, extended time for implementation due to the inefficiency of remedial dredging) and high disposal costs

- Treatment was seldom a component of disposal. Two projects employed incineration; two projects, in part, used thermal desorption. The predominant method of disposal (17 of the 24 removal projects) was in commercial landfills. Disposal in near-shore confined disposal facilities was employed at two projects. At three projects, removed material is being stockpiled pending a final disposal decision.

- Specialty dredges or excavators were generally not used on the 24 removal projects. Thus, recent claims of substantial advances in dredging equipment are not borne out. This is not surprising in that specialty dredges tend to focus only on improving limited aspects of the remedial dredging process (such as minimizing

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[4] GE, with the assistance of Applied Environmental Management and Blasland, Bouck & Lee, has been collecting information about and preparing a documented analysis of lessons learned from sites where sediment remediation has been implemented. GE anticipates that this document will be completed soon, and we intend to submit it to EPA, for inclusion in the Administrative Record. The Agency must consider this information in its remedial analysis for the Site.

resuspension or allowing passage of larger-size solids) and, by their nature and due to their specialized features, tend to have low production rates.[5]

These 27 projects underscore the important problems and limitations of not only the technologies employed but also the process by which these projects were selected and implemented.

First, the objectives of remedial dredging are often not presented in terms of measurable benefits to human health or the environment, but typically focus on achieving a reduction in PCB mass or a target contaminant concentration level. As we show above, mass removal can not be equated to risk reduction. If the contamination is buried so that it is effectively not bioavailable, mass removal may remove the protective layer and leave higher concentrations of contaminants in the bioavailable surface layer. Unless the source of contaminants has been controlled, the sediments will be re-contaminated in a few years and no long-term benefit will be derived.

Second, it is rare to find post-dredging monitoring data that determines whether the objective (such as reduced contaminant concentrations in fish) has been met. At sites where post-dredging measurements are available, target concentration levels in sediments have often not been attained.

Third, the schedule and costs of implementing dredging are typically far greater than originally estimated, in part because the production rates are dramatically lower than originally estimated. The reduction in production rates results from several factors: the need for care in removal to keep resuspension to a minimum; the need to make several passes because target concentration levels have not been achieved with the first pass (or ever); and the presence

[5] Tables 2 and 3 present additional data concerning these projects.

of impediments to dredging, such as rocks, vegetation and debris. An additional factor reducing the speed with which remedial dredging projects can be implemented is the inability of the land-based dewatering and treatment facilities to process the amount of material removed. Indeed, remedial dredging projects always generate significant volumes of water that must be treated.

Fourth, the short- and long-term ecological impacts of remedial dredging are not addressed in any systematic manner. This is a particularly important issue for the Hudson because the areas that EPA has identified as potentially subject to dredging (SOW at 12-13) are predominantly shallow shoreline and backwater areas which provide important ecological functions. Dredging in these areas can result in direct mortality of valued organisms, including submerged aquatic vegetation, aquatic invertebrates, juvenile and adult fish, reptiles, and amphibians. Similarly, the need to provide a staging area for equipment to support the dredging operations has the potential to adversely impact riparian soils and vegetation and riparian habitat. Resuspension of sediment and contaminants also remains an issue that must be squarely addressed.

Fifth, the practical difficulty of implementing a remedial dredging program is often not considered. These issues, again, are very important to the Hudson. As EPA is aware, there has been fierce public opposition to remedial dredging and to the siting of a dewatering/treatment facility and landfill near the Upper Hudson River. A prior attempt by New York State to site a landfill to support a dredging project was successfully blocked by a local citizens group's lawsuit in a case that was decided by New York's highest court. The remedial alternatives set out at pages 12-13 are orders of magnitude greater than any previously attempted remedial dredging project. Any of them is likely to provoke vigorous public and political opposition and to present unprecedented logistical problems.

In short, EPA must not prematurely assume that remedial dredging is feasible, will achieve risk-based goals, can be performed in a cost-effective and timely manner and will be deemed acceptable by the State of New York and the local community. EPA must carefully examine the information from other sites where remedial dredging has been implemented and recognize that the Hudson presents fundamentally different site-specific considerations that must be practically and carefully evaluated.[6]

1.17

2. Engineered Capping

An alternative to removal by remedial dredging often considered is in-site confinement of contaminants by placement of an engineered cap. There are few sites where such caps have actually been employed, and questions remain about their effectiveness. Additionally, many of the same logistical, access and physical constraints associated with remedial dredging apply equally to the construction of engineered caps.

An engineered cap is designed to: (1) accomplish short and long-term isolation of chemical contaminants; (2) compensate for consolidation of both the underlying sediments as well as the cap materials after placement; (3) protect against bioturbation, erosion, or groundwater intrusion, and (4) be hydraulically compatible with the waterway. Multi-layer cap designs typically include: (1) rocks or cobbles to serve as a top, armor layer; (2) geotextile to act as a

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[6] As part of its remedial analysis, EPA must also consider H.R. Rep. 105-769 (Conference Report for VA-HUD FY 1999 Appropriations Bill), which directs EPA not to select dredging as a remedy at contaminated sediment sites until the National Academy of Science issues its report on sediment remediation technologies. See H.R. Rep. 105-769 at 271-72 (1998).

divider between layers, to limit mixing of cap materials between layers, and to limit intrusion of biota by bioturbation; (3) sandy upper layers, which are readily placed, relatively stable, and resistant to burrowing organisms; and (4) fine-grained lower layers, which promote binding (adsorption) with the contaminants at the sediment surface.

In-situ capping for remediation of sediment has been accomplished at a handful of freshwater sites but not in an extended stretch of river, such as the Hudson. Capping was rejected at New Bedford Harbor, the GM Massena site and the Manistique River primarily because of concerns about the permanence of an engineered cap and uncertainty about the types of materials to be used, their sequence and thickness, and the cap's potential effectiveness. Additional concerns include the potential for advection (by groundwater intrusion) and bioturbation (burrowing organisms).

1.18

3. Thin-Layer Capping

Sediment broadcasting or thin-layer capping is an alternative to engineered capping. The goal of sediment broadcasting is to accelerate the natural recovery of the system by increasing the rate of contaminant burial over a broad area, thus reducing the bioavailability of the contaminants. Sediment broadcasting, in essence, augments the natural burial processes. An important design element in sediment broadcasting is the solids mix, which must be selected based on river hydraulics. An advantage of sediment broadcasting is that it is less intrusive than either dredging or engineered capping, and thus has the potential for reduced adverse impacts to the environment. While innovative, EPA should consider thin-layer capping as a remedial alternative, since it focuses on the source of PCBs to fish (surface sediments), is ecologically-friendly, and will not present the community acceptability issues associated with the large-scale removal.

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1.19

4. <u>Stabilization</u>

Stabilization of sediments in specific areas of the river also should be evaluated as a remedial technology. Stabilization might involve the addition of rip-rap or other stabilizing materials along transitional zones between coarse-grained and fine-grained sediment deposits.

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IV. The SOW Attempts to Expand The Site By 160 Square Miles Without Providing a Practical Need or Legal Justification

1.20 The SOW, in one sentence, unilaterally attempts to expand substantially the scope of the "Site," apparently to avoid the New York State permitting process to site and approve a treatment, storage or disposal facility to manage dredge spoils removed during a dredging project. The SOW states that for purposes of dredging, "'on-site' refers to a corridor including the Upper River and extending two miles from either bank." SOW at 17.

When the Site was listed on the NPL, the Agency included only the upper river itself, not any adjacent lands. GE recognizes that, for purposes of implementing remedial actions, the NCP defines "on-site" to mean "the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action." 40 C.F.R. § 300.5. Nevertheless, the SOW provides no justification for expanding the Site by two miles on each side of the River to encompass lands that are not impacted by PCBs and which have no relationship to the PCBs found in the river.

The expansion of the Site appears to be an attempt by EPA to avail itself of the "permit exemption" found in CERCLA § 121(e)(1) ("[n]o Federal, State, or local permit shall be required for the portion of any removal or remedial action conducted entirely onsite"). This provision allows the Agency to avoid the procedural requirements associated with implementation of a remedy, including the need to apply for and obtain necessary permits or approvals. As the Agency well knows, a person seeking to site a landfill or treatment facility to accept dredge spoils in New York State would normally need to submit a permit application to NYSDEC, proceed through public hearings and government and community scrutiny to ensure that the proposed landfill meets all applicable legal and environmental requirements and then ultimately obtain a permit. Prohibitions established by state law (against siting a landfill in certain agricultural lands or in a floodplain, for instance) would normally have to be satisfied, as would certain applicable requirements established by local governments. Before taking so drastic a step to foreclose public scrutiny, the Agency must demonstrate both the necessity and relationship of these areas to PCB-impacted areas in the River. EPA has done neither. Fierce public opposition to a landfill along the Hudson has blocked previous attempts to site such a facility. A single, unsupported sentence in the SOW should not be used to bypass the public scrutiny demanded by state law designed to balance legitimate community and environmental concerns raised by projects exactly like this. Community acceptance is an important principle at Superfund sites.

V. The SOW Does Not Describe or Apply the NCP Analytical Criteria Accurately or Appropriately

A. Given Improving Conditions, the "No Action" Alternative can be Effective in the Long-Term

1.21

An important consideration in the analysis of remedial alternatives is to assess the long-term effectiveness of each alternative. As the NCP explains, this analysis involves, in part, an assessment of the degree to which each alternative reduces the volume, toxicity, mobility and propensity to bioaccumulate. 40 C.F.R. § 300.430(e)(9)(iii)(c)(1). The SOW, however, seems to use the long-term effectiveness criteria inappropriately to favor sediment removal. First, the SOW states that EPA "prefers those processes which degrade contaminants" and implies that this factor outweighs natural attenuation and No Action (SOW at 17). Second, the SOW states that removal of sediment would be more effective over the long-term than capping or No Action: "long-term effectiveness will consider the degree to which the contamination is effectively isolated from the river over a long period of time" (SOW at 30).

Both these discussions of long-term effectiveness misconstrue the NCP criterion and understate the long-term effectiveness of the No Action/natural attenuation alternative. The No Action alternative, through natural attenuation, reduces the toxicity, bioavailability and mobility of sediment-bound PCBs (GE 1996; 1997; 1998). Toxicity is reduced through dechlorination. Bioaccumulation potential is reduced through dechlorination and burial. Mobility is also reduced through burial, as the results of EPA's 100-year flood model demonstrate. In fact, the 100-year flood model provides a persuasive analysis of the long-term effectiveness of the No Action alternative. Capping alternatives, moreover, have the potential to accelerate the reduction in bioaccumulation and reduction in mobility of sediment-bound PCBs. EPA must not use the long-term effectiveness criterion to favor removal of sediments over natural attenuation or capping.

1.22 B. Short-Term Risks Associated with a Remediation Project Must Be Identified and Quantified and Cannot Be Qualitatively Dismissed

Another important aspect in the consideration of alternatives is to assess the short-term effectiveness and risks associated with the implementation of each alternative. While EPA intends to consider the long-term effectiveness of each alternative using the quantitative fate, transport and bioaccumulation models, the SOW indicates that the Agency does not intend to analyze the short-term risks with the same degree of specificity. For example:

> [s]hort-term risks associated with the period of remediation are much more difficult to quantify due to the lack of information on the nature of PCB release during this time. Although both resuspension and air-borne releases may take place during removal and treatment, the ultimate fate of these materials will not be well-known . . . As a result, any risks . . . will be handled qualitatively only.

SOW at 27. EPA must examine the short-term risks quantitatively.

As an initial matter, the SOW incorrectly implies that short-term risks are limited to the effects of PCB releases by resuspension and air-borne releases. There are numerous other short-term risks associated with any remedial action. For example, any large construction and transportation project has the potential to create risks to the community and the workers. Actuarial data is available to estimate the predicted number of major injuries and deaths that are likely to occur during such a project. In addition, as explained previously, there is a significant potential for severe ecological harm during and following remediation, particularly for the massive projects identified in the SOW. These risks need to be considered and compared to the hypothetical reduction in risk to be obtained by any project.

Furthermore, the SOW appears to ignore or downplay the potential for short-term risks. For example, the SOW states that the models will be "run assuming various remedial actions have taken place" (SOW at 12). This approach effectively avoids consideration of short-term risks. As the SOW notes, short-term risks include resuspension and downstream transport of bottom sediments, and temporary increases in water column PCB concentrations as PCBs sequestered in the sediments are released to the water column during remediation. These processes may result in a short-term increase in PCB levels in fish, and consequently, human health and ecological risks. The short-term risks associated with the larger scenarios may negate much of the long-term risk reduction achieved by remediation, particularly when compared against other, less intrusive options, such as source control and natural attenuation. For this reason, remediation-related processes, such as sediment resuspension, increased water column PCBs, and downstream PCB transport, need to be incorporated into the model projections and the FS process.

Moreover, "short-term," in the case of some of the removal scenarios listed on pages 12 and 13, is likely to mean years and possibly decades. A quantitative assessment of risk of implementation is thus essential to judge the effectiveness of a remedial alternative when compared to No Action. The extended time frames likely required to implement the remedial scenarios set out on pages 12-13 have two critical consequences. First, the timing and scale of the impact of remediation on fish PCB body burdens relative to No Action will be increased compared to other, less extensive actions which can be implemented in less time. This obviously reduces the actual benefits of remediation, a fact that will be ignored if the actions are assumed to have taken place instantaneously, as currently proposed. Second, it is important to consider the length of time for implementation of a remedial action when comparing its outcome with No Action. For example, if the models predict that fish PCB body burdens would decline below the target remedial action objective within ten years under the No Action scenario, but it requires ten years to perform a remedial scenario, the benefits to be derived by the remediation would, in fact, be non-existent.

To account for the short-term risk and the time required to perform remediation, the EPA needs to parameterize the models with real world data and quantify:

- sediment resuspension during dredging,
- redistribution of PCBs within the system during and post dredging,
- achievable sediment cleanup levels, and
- start dates and durations for the different remedial scenarios.

Information from remedial dredging at other sites, combined with available information at this Site, should be used to develop input data for the models.

C. The Feasibility of Remedial Alternatives Must be Carefully Assessed

1.23 The definition of "technical feasibility" is critical to the screening of technologies. The definition on page 20 -- "[t]echnologies or process options will be determined to be technically infeasible based on study area-specific factors" -- is too narrow and vague. Greater specificity is required. Criteria that should be considered for assessing "technical feasibility" include whether the technology (1) has been successfully demonstrated at full-scale, (2) is exorbitantly costly,[7] (3) is unacceptably risky to implement, or (4) is incapable of achieving the targeted goal and, even if demonstrated at full scale, can be applied to be a project far larger and more complicated than any project completed to date. Technologies that fail to satisfy one of these criteria must be judged technically infeasible.

[7] The SOW's use of the term "relative cost" of technologies as one of the screening criteria (SOW at 21) is incorrect. The NCP directs that technologies can be eliminated if their costs are "grossly excessive" compared to their overall effectiveness. 40 C.F.R. § 300.430(e)(7)(iii).

VI. The Monitored Natural Attenuation Alternative Must Incorporate Burial, Dechlorination and Source Control

1.24 The SOW states that "[n]atural attenuation could occur by *in situ* processes such as biodegradation, dispersion, dilution, sorption, volatilization, and chemical and biological stabilization, transformation, or destruction of PCBs" (SOW at 17). This discussion of natural attenuation ignores three significant factors affecting natural recovery: (1) burial of PCB contaminated sediments by clean sediment, (2) PCB dechlorination, and (3) control and reduction of upstream sources of PCBs. These factors must be incorporated into the quantitative modeling framework.

A. Burial of PCB-Containing Sediments by Clean Solids

Burial of PCB-containing sediment represents an important natural recovery process because exposure of aquatic organisms to PCBs in the Upper Hudson River is through PCBs found in surface sediments, not PCBs at depth. Burial is the process by which clean solids entering the Upper Hudson River from upstream and from tributaries settle within depositional zones and effectively sequester sediment containing elevated PCB concentrations from the food chain and from the impacts of a flood event. Rigorous data and modeling analysis conducted by both EPA and GE show that widespread burial is occurring within the Upper Hudson River. These analyses include:

- tributary and river solids balance calculations (LTI 1998),
- rigorous sediment transport modeling (GE 1998),
- deposition rates estimated from ^{137}Cs dating of EPA's high resolution cores (EPA 1997),
- ^{7}Be presence in EPA low resolution cores (GE 1998), and

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- PCB concentration and composition profiles obtained from EPA high resolution cores (EPA 1997) and 1998 GE cores (QEA 1998b).

Previous Phase 2 reports (EPA 1997; 1998) focus on the buried PCBs in the so-called *hot spots* and claim that these PCBs are finding their way into the water column and fish. As we have explained previously (GE 1996; 1997; 1998), these reports provide no cogent explanation of how such PCBs become available to the river. In fact, other than erosion, there is no known mechanism for making buried PCBs bioavailable, and EPA's own 100-year flood model demonstrates that even the maximum-design flood does not displace a significant amount of sediment or PCBs. The FS must recognize that burial is an important aspect of natural attenuation.

B. PCB Dechlorination

PCB dechlorination is an important natural recovery process. PCB dechlorination involves the microbially mediated removal of meta- and para-chlorines from the biphenyl molecule and results in the depletion of highly chlorinated PCB congeners with a corresponding increase in lower-chlorinated PCBs. The principal products of this process are ortho-substituted mono- and dichlorinated PCBs. Although PCB dechlorination may not represent a significant mass loss mechanism (EPA 1997), this is not its chief benefit. Dechlorination does have a dramatic effect on the physiochemical and toxicological properties of PCBs including: reduced toxicity, reduced carcinogenicity, and reduced bioaccumulation potential (GE 1997). Therefore, PCB dechlorination results in meaningful risk reduction and should be considered in the assessment of natural attenuation of Hudson River PCBs.

C. Upstream Source Control

Control of the most important PCB source in the upper Hudson is perhaps the most significant element of the river's natural recovery, and it must be carefully considered in any credible evaluation of the efficacy of remedial alternatives. The SOW's limited discussion of GE's major source-control activities at Hudson Falls and their beneficial results for the river suggests that EPA is not closely following GE's work and does not fully appreciate the benefits of controlling the source and the magnitude of the clean-up and monitoring program. Indeed, the SOW marches out the same flawed and so-vague-as-to-be-useless conclusion initially presented in the DEIR that the TIP sediments are "a major, if not the major" source of PCBs to the water column in the upper Hudson (SOW at 10). GE submitted extensive comments on the DEIR more than 18 months ago, challenging the soundness of its conclusions and demonstrating the importance of source control. EPA has not responded to these comments, and the SOW does not even acknowledge that the DEIR's conclusions have been called into question. The importance of the Hudson Falls source to PCB dynamics in the Upper Hudson River is obvious, and its impact must be evaluated against each remedial alternative.

The mathematical models being developed by EPA and GE represent the best means of assessing the impact of plant site sources and their control on surface sediment and biota PCB levels. When calibrated with the 20 years of water column, sediment, and biota PCB data, the models can assess the impact of plant site loadings on PCBs in the TIP sediments and water column and simulate the impact of plant site source control by making varied assumptions regarding the PCB concentrations at the upstream boundary of the model. These assumptions may include projection of PCB loadings in the river at the Fort Edward Station at 1980s levels, current levels and zero. In this manner, the models can simulate the effects of past and future source control efforts, and the results can be compared to other remedial action scenarios and No Action.

VII. EPA Can Not Justify Upper River Remediation Based on Presumed Benefits to the Lower River

1.25 The SOW does not explain how conditions in the lower river will be used in the evaluation of remedial alternatives. As GE has previously advised EPA, the Company believes that the Superfund Site is limited to the area above the Federal Dam at Troy and does not include the lower river. We base this view on the administrative record supporting the addition of the Site to the NPL, which limited its analysis to the upper Hudson. EPA cannot expand the Site by more than 150 miles without proceeding first through notice and comment rulemaking. See, e.g., U.S. v. Ascarco, Inc., No. CV96-0122-N-EIL (D. Idaho Sep. 30, 1998) (post-rulemaking statements cannot change scope and size of site from the description provided in the NPL record).

The SOW, however, repeats EPA's intention to consider the lower river part of the Site and implies that the Agency may seek to justify remediation in the upper river based on benefits to the lower river: "the USEPA Reassessment and Thomann/Farley models will be used to examine the impact of possible remedial actions in the Upper Hudson River on PCB levels in fish and water in both the Upper Hudson River and Mid-Hudson River" (SOW at 6). If this statement reflects the Agency's intent to consider the potentially adverse impacts on PCB levels in lower river biota from upper river remediation, then GE does not take issue with the proposed approach. If, however, EPA is seeking to justify upper river remediation based on presumed benefits to the lower river, then the Agency's approach is objectionable. In light of the significant other sources of PCBs to biota in the lower river, EPA cannot use perceived benefits there to justify remediation in the upper river unless EPA expands its analysis and considers alternatives to address all PCB sources in the lower river. The SOW indicates that EPA does not intend to conduct an analysis of such actions in the lower river.

VIII. EPA Should Not Blindly Apply ARARs and TBCs at the Site

A. EPA Should Give Preference to Site-Specific Information

1.26 CERCLA and the NCP direct EPA to give preference to site-specific information over the rote application of ARARs and TBCs. In order to assess ARARs, one must understand the remedial goals for the Site. As we explained above, the central question at this Site is to determine whether a remedial action will achieve a defined level of risk from fish consumption or direct contact with the river materially faster than No Action. If a regulatory requirement is designed to achieve the same end, then it is reasonable to identify that requirement as a potential ARAR or TBC for the Site. Where the goals of the remediation and the requirement diverge, however, that requirement can be disqualified from further consideration. For example, drinking water standards might qualify as ARARs because they are designed to protect human health through the consumption of water.

Nevertheless, many ARARs or TBCs that meet the basic "consistency" test were adopted for non-remedial purposes and apply to a variety of circumstances not necessarily relevant to the Hudson River. For instance, a general water quality standard may be designed to protect an aquatic or terrestrial species not found in or near the Hudson. Many general standards are based on outdated data that do not reflect current scientific information. For instance, EPA lowered its estimate of the carcinogenicity of PCBs a few years ago. A number of PCB standards are based on PCB carcinogenicity but have not been amended to reflect this reassessment. The quality of the data on which a benchmark is based is particularly a problem for TBCs, which, by definition, are not promulgated requirements and have not been subject to the type of rigorous review to which most ARARs are put. In such circumstances, EPA should emphasize the wealth of site-specific information in its possession and being developed when determining remedial standards for the Hudson.

Such an approach is consistent with and mandated by CERCLA. CERCLA does not require mechanical application of ARARs. Rather, as expressed by section 121(b)(1), the overriding goal of CERCLA is to ensure that remedial actions are protective of human health and the environment. The ARARs requirement, which was added as part of the 1986 amendments to CERCLA, originally derived from EPA's "Compliance With Other Laws" policy and the 1985 NCP. Congress intended, and EPA has consistently interpreted, ARARs as surrogates to help ensure that this overriding goal is met and that a consistent level of protection is achieved:

> EPA has determined that the requirements of other Federal environmental and public health laws . . . will generally guide EPA in determining the appropriate extent of cleanup at CERCLA sites as a matter of policy. These laws were enacted with the goal of protecting public health and the environment. Regulations developed under these laws have imposed requirements that EPA and other Federal agencies deemed necessary to protect public health and the environment. Because protection of public health and the environment is also the goal of CERCLA response actions, other Federal environmental and public health laws will normally provide a baseline or floor for CERCLA responses.[8]

ARARs are requirements promulgated under environmental laws that are legally applicable or otherwise relevant and appropriate to the particular circumstances of the site. 40

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[8] 50 Fed. Reg. 47917 (Nov. 20, 1985); see also "Superfund Amendments and Reauthorization Act of 1986 Conference Report," H.R. Rep. 99-962, 99th Cong. 2d Sess. ("The general standard is that remedial actions must attain a degree of cleanup . . . at a minimum that assures protection of human health and the environment"); 50 Fed. Reg. 5865 (Feb. 12, 1985) ("other environmental requirements often provide critical guidance in determining the appropriate level of cleanup at a CERCLA site"); 53 Fed. Reg. 51422 (Dec. 21, 1988) ("The overriding mandate of the Superfund program is to protect human health and the environment"); 55 Fed. Reg. 8712-8713 (Mar. 9, 1990) (explaining that remedial action "goals," typically based on ARARs, are a subset of and are intended to implement the more general remedial action "objectives").

C.F.R. §§ 300.5, 300.400(g). TBCs are unpromulgated advisories, criteria or guidance "useful" to develop a remedy. 40 C.F.R. § 300.400(g)(3). Congress recognized that there would be circumstances where it would not make sense to apply these requirements rigidly and provided EPA flexibility to account for such circumstances. 42 U.S.C. § 9621(d)(4) (identifying circumstances when application of ARARs should be avoided). Congress never intended the ARARs requirement to supplant reliance on site-specific information:

> [T]he section is not intended to trigger rigid imposition of standards. . . . For the Administrator to determine control levels at sites without reference to how standards under other environmental laws come into play could lead to absured [sic] and costly results that could drain the Fund and jeopardize the national cleanup effort without achieving any additional meaningful protection of human health and the environment. That is not how the NCP currently operates and that is not the intent of this section.

H.R. Rep. No. 253, 99th Cong., 1st Sess., pt. 1, at 98 (1985) (House Committee on Energy and Commerce).

EPA has also recognized the benefit of relying on site-specific information instead of general standards that may not best reflect the circumstances of a site:

> CERCLA requires that all Superfund remedies be protective of human health and the environment but provides no guidance on how this determination is to be made other than to require the use of ARARs as remediation goals, where these ARARs are related to protectiveness. Under CERCLA (as under other environmental statutes), EPA relies heavily on information concerning the contaminant toxicity and the potential for human exposure to support its decisions concerning "protectiveness." EPA's risk assessment methods provide a framework for considering site-specific information in these areas in a logical and organized way. . . EPA disagrees with the commenter who advocates national cleanup standards, however, because the specific concentrations developed for one site may not be appropriate for another site because of the nature of the site, the waste, and the potential exposures as noted

> above. . . . [B]ecause these standards [ARARs] are established on a national or statewide basis, they may not adequately consider the site-specific contamination . . . and, therefore, are not the sole determinant of protectiveness.

55 Fed. Reg. 8709 (Mar. 9, 1990).

This basic preference for site-specific information is expressed most clearly in the fourth ARAR "waiver," 42 U.S.C. § 9621(d)(4)(D). This provision provides that site-specific studies should be used where they provide information that will allow achievement of the same goals and level of protection as the ARAR. The Conference Report accompanying the 1986 Amendments to CERCLA explains:

> Subsection (d)(4)(D) allows the selection of a remedial action that does not comply with a particular Federal or State standard or requirement of environmental law, where an alternative provides the same level of control as that standard or requirement through an alternative means of control. . . . [A]n alternative standard may be risk-based if the original standard was risk-based.

H.R. Rep. 962, 99th Cong., 2d Sess. at 247 (1986). This "waiver" is particularly appropriate for the Hudson, where EPA has collected voluminous site-specific data, is intending to prepare detailed human health and ecological risk assessments and is developing fate, transport and bioaccumulation models that are intended to allow prediction of the outcome of various remedial alternatives. EPA should rely on data and analyses of this sort and not blindly apply generally applicable or relevant state and federal regulatory requirements to devise the appropriate remedy for the Site.

B. <u>EPA Should Reject Many of the Proposed ARARs or TBCs</u>

Not only should EPA give preference to site-specific data and analyses, the rote application of ARARs or TBCs is also inappropriate for technical, policy and legal reasons.

First, it does not make sense to apply ARARs or TBCs developed for other purposes and circumstances as a basis for establishing remediation standards. Sediment criteria intended as screening tools do not make appropriate cleanup standards.

Second, many of the ARARs and TBCs cannot and should not be applied here because they do not reflect the most reliable toxicologic information concerning PCBs, nor do they take into account the differences in toxicity among PCB congeners. Many criteria and standards for PCBs are based on outdated toxicological information concerning PCBs and do not reflect EPA's recent decision to lower substantially the cancer-slope factor for PCBs (EPA 1996b). Equally important, it would be inappropriate to rely on ARARs that do not take into account the substantial dechlorination of PCBs in the river, as well the differential uptake and depuration of congeners by fish and other biota. Standards and benchmarks applied to the Hudson must be relevant to the PCB congeners and biota actually present in the Hudson at the time any proposed remedy would be undertaken. Given the different toxicity and effects of a specific congener, it would be arbitrary to consider a remedy based on standards derived from analysis of a particular Aroclor, say Aroclor 1260, when congeners other than those found in that Aroclor are being addressed. The requirement must be applicable and relevant to the specific chemicals found at the site.

EPA has recognized that the Agency should not apply ARARs in such circumstances, but should rely on the most current information available to the Agency:

> CERCLA 121(d)(2) requires that, in determining whether a FWQC [Federal water quality criteria] is relevant and appropriate, the latest information available be considered. Thus, a FWQC may be relevant but not appropriate if its scientific basis is not current. EPA's recommended RfDs and cancer potency factors, which are

> based on the EPA's evaluation of the latest information, should be used when a FWQC does not reflect current information.

53 Fed. Reg. 51442 (Dec. 12, 1988). The Agency must base its remedial analysis on the most current toxicological information on PCBs and take into account the substantial modification of PCBs in the River and fish.

In this context, we review below several of the ARARs and TBCs listed in Tables 1 and 2 of the SOW.[9]

1. <u>Surface Water Criteria</u>

Table 1 of the SOW identifies New York's PCB water quality standards ("WQS") based on human health protection (fish consumption) (0.000001 ug/l) and wildlife protection (0.00012 ug/l) as potential ARARs. These standards are set forth at 6 NYCRR 703 and NYSDEC TOGS 1.1.1 (June 1998) but should not be applied as ARARs for the following reasons:

- The SOW correctly recognizes that a primary goal of the remedial action objectives ultimately selected for the Hudson is reduction of concentrations of PCBs in fish to acceptable levels. SOW at 15. Virtually all of the site-specific modeling work being performed at the site is focused on this goal. <u>See</u> SOW at 12-15. Applying the human health (fish consumption) and wildlife protection WQS as ARARs would be inconsistent with this objective because the State WQS, which were derived from acceptable fish contamination levels, are generic standards. Applying the WQS as ARARs would in effect substitute generic standards for the standards that will be developed from the site-specific work that is being undertaken.

- The human health (fish consumption) and wildlife protection WQS are wholly inappropriate for application to the Hudson. These WQS were derived using bioaccumulation factors that were developed for the pelagic food web typical of

[9] We do not present any comments on "action-specific" ARARs and TBCs listed in Tables 1 and 2 because such requirements will be only triggered when and if a particular remedial option might be implemented. Thus, any comments on such requirements would be premature.

the Great Lakes, and are irrelevant to the largely benthic food web of the Hudson River.

Table 1 of the SOW also lists "Federal Water Pollution Control Act and Ambient Water Quality Control" as a TBC. These criteria are not relevant where a state has adopted applicable water quality standards, as New York has. EPA only uses the Federal Ambient Water Quality Control criteria to promulgate standards for the states that do meet the CWA requirements. See 40 C.F.R. §§ 131.21 -.22. In this case, EPA has approved New York State's water quality standards, so the Federal Ambient Water Quality Control criteria are neither applicable nor relevant and appropriate in New York.

Table 1 also lists the Safe Drinking Water Act maximum contaminant level ("MCL") and goal ("MCLG") for PCBs as a relevant and appropriate requirement for the Site, although it fails to identify how the MCL and MCLG would be used in the context of remedial decisionmaking. MCLs and MCLGs should not be used to establish cleanup levels, because compliance with these is measured after treatment, not at the source of drinking water. 40 C.F.R. §§ 141.2 (defining a MCL as "the maximum permissible level of a contaminant in water which is delivered to any user of a public water system"), 141.24(f)(2) (directing community water systems to measure compliance with MCLs after treatment). The statutory provision directing attainment of MCLGs (42 U.S.C. § 121(d)(2)(A), does not change the fundamental fact that attainment of MCLs and MCLGs is measured at the tap, not at the source.

Finally, the Toxic Pollutant Effluent Standards for PCBs, contained in 40 C.F.R. § 129.105, listed in Table 1 as "applicable" requirements, are neither applicable nor relevant to the Site. These requirements apply to certain discharges of PCBs by manufacturers of PCBs or PCB-containing electrical capacitors or transformers. 40 C.F.R. § 129.105. To GE's knowledge, none of these activities currently takes place on the Hudson. Contrary to the statement in Table 1, these requirements do not establish a generally applicable ambient water quality criterion for PCBs. Rather, this criterion is relevant only in establishing more stringent effluent limits for PCB/electrical equipment manufacturers where the ambient water quality criterion is not being met. 40 C.F.R. § 129.7; 42 Fed. Reg. 2588, 2610-11 (ambient water quality criteria in Part 129 are used to establish effluent limits and to provide a mechanism to tighten such limits). In any event, this criterion was developed in 1976 and is clearly not based on the most current information available.

2. Sediment Criteria

The SOW identifies three potential TBCs for sediments: NYSDEC's "Technical Guidance for Screening Contamination Sediment," NOAA's "Potential for Biological Effects of Sediment Sorbed Contaminants," and the TSCA Spill Cleanup Policy. None of these is a valid TBC for the Site.

First, the sediment criteria in NYSDEC's Technical Guidance should not be considered because they are not intended to establish cleanup levels and are technically flawed. As the title of NYSDEC's guidance indicates, these target levels are to be used for screening purposes to determine whether additional investigation or remediation is required. Id. at 17-18. The 1997 supplement emphasizes that the "sediment criteria are not cleanup standards. The sediment criteria represent [NYSDEC's] best reasonable estimate of contaminant levels below which significant adverse impacts are not expected." Accordingly, the sediment criteria should not and are not intended to be used as sediment cleanup levels.

Further, the technical basis for establishing the criteria is suspect. The document lists eight limitations in the equilibrium partitioning methodology it uses for determining sediment criteria, warning that equilibrium partitioning "is not a highly accurate procedure in and of itself." Id. at 8-9. Indeed, EPA's Science Advisory Board has cautioned against the use of equilibrium partitioning to establish cleanup levels, believing that they are only valid to establish conservative screening levels to identify sites which warrant more in-depth investigation. E.g., EPA SAB "Evaluation of the Equilibrium Partitioning (EqP) Approach for Assessing Sediment Quality" (EPA-SAB-EPEC-90-006), February 1990; EPA SAB "Evaluation of Superfund Ecotox Threshold Benchmark Values for Water and Sediment" (EPA-SAB-EPEC-LTR-97-009), August 1997.

Second, the NOAA document does not provide "technical guidance for use in establishing sediment cleanup levels," as claimed in the SOW, and is not properly considered a TBC. The cited study was intended as a screening mechanism to prioritize sediment sites sampled in NOAA's "National Status and Trends" ("NS&T") program, not as general guidance for developing "cleanup" levels at other sites. This document plainly states that the values developed in this study "were not intended for use in regulatory decisions or any other similar applications." Id. at 2. Similarly, the document states that the "ER-L" and "ER-M" values "are not to be construed as NOAA standards or criteria," id. at 1, but are "intended only for use by NOAA as general guidance in evaluating the NS&T Program data." Id. at 7.

Finally, the TSCA Spill Cleanup Policy is not intended to provide guidance on sediment cleanup levels. The numerical cleanup standards set out in the Spill Policy do not apply to spills "that result in direct contamination of surface water." 40 C.F.R. § 761.122(d)(2)(i). The

Spill Policy also is not applicable because it applies only to spills that occur after May 4, 1987. 40 C.F.R. § 761.120(a).[10]

3. Air Criteria

The SOW identifies a number of federal and state "air" criteria as potential ARARs. Most of these, as the SOW notes, may only be applicable in the context of implementing certain remedies, and, consequently, we will not address them here. The SOW, however, also identifies as TBCs "applicable to emissions of PCBs from the Hudson River (e.g., volatilization)" two New York State target levels for PCB concentrations in the air: 0.01 g/m^3 as a "Short-term Guideline Concentration" ("SGC"), and 0.00045 g/m^3 as an "Annual Guideline Concentration" ("AGC"), found in a NYSDEC pamphlet entitled "Draft New York State Air Guide-1: Guidelines for the Control of Toxic Ambient Air Contaminants" ("Draft Air Guide"). As an initial matter, these guideline concentrations bear no relevance to the core remedial objectives, particularly in light of the complete lack of data showing any potential risks from "volatilization" of PCBs from the river. In any event, the Draft Air Guide contains the following caveat about the use of these TBCs:

> The word guideline is stressed because these values are developed to aid in the regulatory decision making process. . . [T]hey have not undergone the rigorous regulatory scrutiny that would be afforded a proposed Federal or State standard.
>
> New York State has not proposed adoption of these "guideline values" as standards [because, among other reasons,] a significant portion of the AGCs and SGCs are interim guidelines based on

[10] The cleanup standards set out in the recently promulgated PCB "Megarule," 63 Fed. Reg. 35383 (June 29, 1998) also do not apply to the site. See 63 Fed. Reg. 35448 (reprinting new 40 C.F.R. § 761.61(a)(1), which states that the cleanup standards do not apply to sediments in marine or freshwater ecosystems).

> occupational values, and do not reflect the extensive toxicological review necessary to establish a standard . . .

Draft Air Guide at 13 (emphasis in original). As the Draft Air Guide emphasizes, these guideline values are meant merely to aid in decision-making and are not legally enforceable. In any event, these guidelines are not based on and do not reflect the most recent cancer slope factor for PCBs.

IX. Miscellaneous Comments

1.27 Page 2: The Landfill/Treatment Facility Siting Survey (TAMS 1997), cited at the top of page 26, is not included in the list of Phase 2 reports, but should be made part of the Responsiveness Summary to be released later this year.

1.28 Page 3: The SOW states that a "substantial portion of these sediments were stored in relatively quiescent areas of the river." No basis for this statement is presented. The use of the term "stored" is inappropriate. No specific stretch of river is identified. No data are offered to support the characterization of the term "relatively quiescent."

1.29 Page 3 / 4: The SOW claims that loading of PCBs to the Upper Hudson continued due primarily to "erosion of contaminated remnant deposits, discharges of PCBs via bedrock fractures from the GE Hudson Falls plant, and erosion from contaminated deposits above the water line near the GE Fort Edward plant outfall." There is no data that show significant PCB loading originating from the remnant deposits nor from the area "above the water line" near the Fort Edward site. In fact, the available data indicate the PCB loading from this segment of the river originates near the Hudson Falls site. This speculation should be eliminated from the SOW.

1.30 Page 4: The SOW states that in "September 1991, high PCB concentrations were again detected in Hudson River water." It is not clear here what events are being compared.

Page 4. The PCB removals from within the Allen Mill were accomplished by GE. 1.31

1.32 Page 5. The term "changing loading" should be "decreased loading."

1.33 Page 7. While EPA acknowledges the usefulness of comments received from the public and interested parties, it fails to recognize that when the Community Interaction Program (CIP) was established, GE and other participants expected that EPA would offer responses to comments in a timely way. EPA has not responded to the voluminous comments, and as a result, the CIP process is a monologue, not a dialogue among interested parties.

1.34 Page 10: In the discussion of the preliminary risk assessment prepared as part of the Phase 1 report, it is claimed that PCBs were determined to be the contaminant of primary concern. This statement is misleading in that it suggests the Phase 1 Report included an analysis of other contaminants in the river. It did not. This claim must be acknowledged as a unsubstantiated assumption.

Page 16: 1.35 GE questions the basis for the statement that the Agency intends to assume that the target maximum PCB concentration in sediment is in the range of 1 to 50 mg/kg. This statement is premature.

Page 26: The term "fishing ban" is no longer appropriate for the Upper Hudson. 1.36

REFERENCES

Environmental Protection Agency, 1996a. *Phase 2 Report - Review Copy, Further Site Characterization and Analysis. Volume 2B - Preliminary Model Calibration Report.* Hudson River PCBs Reassessment RI/FS. October, 1996.

Environmental Protection Agency, 1996b. *PCBs: Cancer Dose-Response Assessment and Application to Environmental Mixtures.* EPA/600/P-96/001. September, 1996.

Environmental Protection Agency, 1997. *Phase 2 Report - Review Copy, Further Site Characterization and Analysis, Volume 2C - Data Evaluation and Interpretation Report.* Hudson River PCBs Reassessment RI/FS. February, 1997.

Environmental Protection Agency, 1998. *Phase 2 Report - Review Copy, Further Site Characterization and Analysis, Volume 2C-A. Low Resolution Sediment Coring Report, Addendum to the Data Evaluation and Interpretation Report.* Hudson River PCBs Reassessment RI/FS. July, 1998.

General Electric Company, 1996. *Comments of General Electric Company on Phase 2 Report - Review Copy, Further Site Characterization and Analysis, Volume 2B - Preliminary Model Calibration Report.* Hudson River PCBs Reassessment RI/FS. October, 1996.

General Electric Company, 1997. *Comments of General Electric Company on Phase 2 Report-Review Copy, Further Site Characterization and Analysis. Volume 2C. Data Evaluation and Interpretation Report.* Hudson River PCBs Reassessment RI/FS, February, 1997.

General Electric Company, 1998. *Comments of General Electric Company on Phase 2 Report-Review Copy, Further Site Characterization and Analysis. Volume 2C-A. Low Resolution Sediment Coring Report, Addendum to the Data Evaluation and Interpretation Report.* Hudson River PCBs Reassessment RI/FS, July, 1998.

HydroQual. 1997. *Hudson River PCB DNAPL Transport Study.* Prepared by HydroQual. Inc. for the General Electric Company, Corporate Environmental Programs. Albany, NY. June. 1997.

LimnoTech. Inc. 1998. Memorandum from Penelope Moskus and Mike Erickson of LimnoTech to Doug Tomchuk of the USEPA dated September 1, 1998 regarding Preliminary mainstream and tributary TSS load estimates for the upper Hudson River between Ft. Edward and Federal Dam

Quantitative Environmental Analysis, LLC, 1998a. *Thompson Island Pool Sediment PCB Sources.* Prepared for General Electric Company Corporate Environmental Programs. Albany, New York. March, 1998.

Quantitative Environmental Analysis, LLC, 1998b. *Thompson Island Pool Sediment Coring Program.* Prepared for General Electric Company Corporate Environmental Programs. Albany, New York. June, 1998.

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