70422

HUDSON RIVER PCB REASSESSMENT RI/FS
COMMUNITY INTERACTION PROGRAM

HUDSON RIVER PCB OVERSIGHT COMMITTEE MEETING
NEW PALTZ, NY
OCTOBER 20, 1993

On October 20, 1993, the Hudson River PCB Oversight Committee met in New Paltz, NY at 7:30 PM at the Town Hall. The agenda and sign-in sheets are provided as Attachments 1 and 2. Although a general reminder was given, a number of the more than 30 attendees did not sign in. Committee members attending were:

William McCabe, Deputy Director, ERRD, USEPA Region II, HROC Chairperson
Douglas Tomchuk, ERRD Project Manager, USEPA Region II
Ann Rychlenski, Community Relations Coordinator, External Programs Division, CIP Steering Committee Chairperson
Stephen Hammond, Director, Bureau of Central Remedial Action, NYSDEC
Alan Rockmore, Director, Bureau of Construction Services, NYSDEC
Dr. William Nicholson, Mt. Sinai Medical Center, STC Facilitator
John King, New York State Thruway Office of Canals
G. Anders Carlson, NYSDOH
Judy Schmidt-Dean, Chairperson, Citizen Liaison Group
Paul McDowell, Designated Representative, Agricultural Liaison Group
Bridget Barclay, Chairperson, Environmental Liaison Group
Sharon Ruggi, Citizen Liaison Group
Albert DiBernardo, TAMS Consultants, Inc.
Peter Lanahan, GE
Diane Wehner, Coastal Resource Coordinator, NOAA

Mr. McCabe (EPA, HROC Chairperson) welcomed the committee and discussed the agenda for the evening. He also addressed two issues that have been repeatedly raised.

1. There have been suggestions to defer work in the Reassessment until the Hudson Falls source has been addressed. EPA does not agree with this approach. Based on data included in the presentations, it is believed that relative contributions of the Hudson Falls and sediment sources can be determined. EPA will not suspend its study.

2. There have been a number of requests for release of data. It is EPA's policy not to release unvalidated data. However, some preliminary data will be shared in meetings such as this to keep the HROC informed.

The floor was then opened for brief reports of activities by the HROC member groups.

S. Hammond (NYSDEC)

- NYSDEC supports the Reassessment going forward; sound science and engineering can answer many questions in regard to the site.
- NYSDEC has broken activities at the Hudson Falls area into 3 operable units:
  - OU-1 PCB-contaminated soils farthest from the river; Consent Order just signed with GE for design/remedial phase.
  - OU-2 Evaluation of pathways (bedrock, pipes and bedding, etc.) to the river; presently in RI phase.
  - OU-3 Abandoned Allens Mills building and environs; presently in RI phase, IRM underway by GE to remove highly contaminated sediments from the upper raceway and race tunnel.
- A major hydroelectric redevelopment program is underway at Hudson Falls. This includes dam rehabilitation and raising, as well as construction of a new powerhouse. NYSDEC is actively involved with both GE and the power developer to ensure good communication and coordination between the remedial work and project development.

A. Rockmore (NYSDEC - Project Sponsor Group)

- Their consultant completed in June the technical report to support the Department's application for Site 10 and the dredging project. They are awaiting results of the Reassessment before going forward. One copy of the report has been released under FOIL to GE.

A. Carlson (NYSDOH)

- They continue to work with all groups involved in RI and Reassessment activities, especially with Fish and Wildlife in regard to the fish issue and overall health concerns.

P. Lanahan (GE)

- An intensive and difficult sampling program to locate contaminated sediment in the abandoned mill was begun after elevated concentrations of PCBs were detected in the river in 1991/92. They are currently in the process of removing those sediments under the Consent Order. While they expect most to be removed this construction season, some may remain until next year. Levels of PCBs in the river have returned to former low levels of around 20 parts per trillion.

- There is a need to differentiate the relative contributions to the fish from the mill source and old sediments. While they believe congener "fingerprinting" can be used to accomplish this, they don't believe the evaluation will be simple, and that a chemistry-sensitive risk assessment must be done. Modeling performed by EPA must also take account of the chemistry.

D. Wehner (NOAA)

- NOAA participated with EPA in scoping some of the details of the Reassessment; they are pleased that fish tissue analyses were incorporated in the ecological risk assessment. NOAA staff participated in fish sampling with EPA and NYSDEC this summer.
- NOAA recently received funding to conduct additional analyses not funded by EPA. They are hoping to have the results available to be used in the Reassessment.

B. Barclay (Environmental Liaison Group)

- They are interested in hearing specifics on how new information from work on the Hudson Falls source will be factored into the Reassessment, particularly any changes in sampling programs and modeling assumptions planned in order to incorporate current knowledge.
- They would like to hear an update of the Phase 2 and Phase 3 schedule and progress toward ultimate completion of the project.

J. King (NYS Thruway Office of Canals)

- Maintenance dredging activity was conducted this summer to remove 4,000 to 5,000 cy of coarse grained sediments from below Lock C-4 originating from the Hoosic River. In the spring, channel depth was limited to about 3 feet of water at normal pool which blocked any navigation; in particular, loads of JP-4 traveling north were held up for several weeks. Analytical results from sampling of the sediments removed showed no detections of PCBs.

Next, A. DiBernardo (TAMS) introduced project and technical presentations for the evening and noted a change in sequence from the agenda.

Five technical presentations were made by project team members, as follows:

- Data Quality Management - S. Chapnick
- Modeling - J. Butcher

- Feasibility Study - B. Fidler
- Ecological Assessment - H. Chernoff
- Geochemistry/Project Results - E. Garvey

Copies of slides/handouts from each presentation are provided as Attachments 3 through 7.

D. Tomchuk (EPA Project Manager) reported on project plans and schedule:

- There are two more investigative programs to be undertaken - Low Resolution Coring and Archived Sample Analysis.
- The schedule has been adjusted to accommodate a slower pace necessitated by the increased modeling effort upon which other tasks depend. The Phase 2 Report will be issued in five separate volumes. Vol. 1 - Data Quality Management Report and Vol. 2 - Field Investigation Report are due to EPA in March 1994; following EPA review, they will be released to the public. Vols. 3 through 5 - Ecological Risk Report, Human Health Risk Report and Modeling Report are due to EPA in July 1994; subsequent to EPA review and release, a public meeting for Phase 2 will be held. The FS Report, along with reporting on Low Resolution Coring, are due to EPA in October 1994.
- In response to B. Barclay's request, the program has incorporated sampling locations which account for the upstream source input; GE data are being incorporated into the database which adds to the understanding of baseline conditions for modeling.

Following presentations, the meeting was opened to questions from HROC members. Questions and answers are summarized following:

- P. Lanahan (GE) noted that new information about the upstream source and ongoing remedial work complicate attempts to understand the system; the situation is further complicated by a new understanding of PCB chemistry. They believe there are insufficient historical data to adequately assess the system and that, therefore, it is difficult to assess priorities for remediation.

  Q - (P. Lanahan) Which problem will be addressed first? How will remedial priorities be established?

  A - (D. Tomchuk) The Hudson Falls source is being addressed by NYSDEC and GE under consent agreements - that process is moving forward. The Reassessment is dealing with contaminated sediments at the same time and will continue on that track. Both sources are accounted for in the Reassessment program.

Q - (P. Lanahan) How much uncertainty is there in the modeling being proposed? How much confidence is appropriate in the model as a decision-making tool, given all the uncertainties?

A - (J. Butcher) Quantification of the uncertainty is a major concern of the team. The model being used is very well constrained as toxic substance/surface water quality models go. The quantity and quality of analytical data are good and many parameters are constrained.

Q - (P. Lanahan) How will the two sources be differentiated? How do you compare a source that caused PCB levels in fish to jump 200 percent with the historic contribution of the sediments?

A - (J. Butcher) The model can be calibrated with a variable upstream source, across a wide range of forcing conditions.

Q - (P. Lanahan) The bottom line for GE is: there needs to be more dialog on what the data mean; they would like to see EPA data sets in order to further dialog so that the conclusions will be acceptable to all members.

A - (W. McCabe) It is EPA's absolute policy not to release unvalidated data, but will share preliminary results in informal settings such as this HROC meeting. EPA is willing to have further meetings with GE now that some issues have been resolved with NYSDEC. A. DiBernardo suggested that discussions about modeling assumptions should center around the modeling work plans, which have not yet been released but will provide access to details for anyone interested. D. Tomchuk noted that the next STC meeting, scheduled for January, is to be focused on modeling. It will be appropriate to release the documents to the STC and the public (following EPA review) prior to that meeting.

Q - (B. Barclay) What is the nature of these documents? How are they different from the Phase 2 Work Plan?

A - (A. DiBernardo) These documents address the individual modeling programs for the Thompson Island Pool, between TIP and Federal Dam, below Federal Dam (i.e., revisiting Thomann model), and bioaccumulation modeling. (J. Butcher, D. Tomchuk) These documents contain the technical approach for modeling and provide a lot more detail than the Phase 2 Work Plan.

Q - (P. Lanahan) Can the Work Plans be reviewed prior to the start of modeling? If not, the modeling assumptions are eliminated from discussion.

A - (A. DiBernardo) EPA must commence work now in order to meet the project schedule. As discussion proceeds in regard to assumptions and direction we will modify the program as appropriate, based on input received, as has been the case for other aspects of the project. The modeling contractor has been on board for only 1 1/2 months; it is not too late to discuss these things.

Q - (W. Nicholson) Concerning the NYC source, no Cs-137 dating information was shown in the presentation for downstream cores. However, the shape of the total PCB distribution with depth paralleled very closely the upstream distribution attributed to the dam release. It would seem that either the NYC release was coincident with the upstream release or results from the upstream release showing a different distribution of di/tri/tetra chlorinated congeners than in the downstream core may be due to different salinity conditions which alter dechlorination patterns.

A - (E. Garvey) There must be a separate NYC source due to the presence of very highly chlorinated congeners (e.g., octo, nona, deca) in downstream sediments which do not occur in upstream sediments. These congeners cannot be created in situ. There is the possibility that the PCB maximum in the upper river was augmented by additional releases in the harbor about the same time; this derives from other data relating to maximum PCB usage in the NYC area and the nation in the late 60s and early 70s. However, we are interested in the last 10 years of deposition in order to make an assessment whether "snapshots" collected by USGS, NYSDEC are valid over time. The sediments represent a long-running average (approximately annual) of PCB levels and, if consistent, allow prediction of the future.

Q - (W. Nicholson) Does the High Resolution Coring program take account of the 1991/92 release?

A - (E. Garvey) The HRC program (September/October 1992) was conducted just as the release was ending (spike appeared July through October 1992). This program weighs more heavily the spring runoff event when about 50 percent of transport occurs, providing a mass-integrated average. Any large changes would not likely appear until the following

spring. A mass balance over a full year would be required to see how important the summer 1992 spike is versus transport for the whole year.

Q - (P. Lanahan) To what extent can you assess the contribution of the bioavailable layer of sediments? With a scour event, there will be transport - we could be analyzing sediments that look bad at first, but may have minimal impact on the fish.

A - (H. Chernoff) We are examining the fish on a congener-specific basis. We have sampled both resident and mobile species to account for spatial variations in the fish. Until results are received we have to defer a detailed answer.

Q - (P. Lanahan) Is there a historic database of congener-specific analyses for fish?

A - (H. Chernoff) Historic data are largely on an Aroclor basis. (J. Butcher) We are undertaking a specific effort to determine the relationship between congener analyses and historic Aroclor measurements in the Archived Sample program. (E. Garvey) In fact, the methods will be run side by side on the same archived sample extracts. (D. Tomchuk) We are forced to rely on analysis of past conditions to make decisions for the future; the future is not observable. Just as we saw a spike in 1991/92 and a large scour event the next spring, some other event could occur next year. We have to analyze the past and draw conclusions from that.

Q - (P. McDowell) Is it possible to fingerprint sources of PCBs in fish as for sediments? The fish are critical for assessment. Can other sources (e.g., NYC or Hudson Falls) thwart a return to fishing in upper Hudson after cleanup of the upper Hudson sediments?

A - (H. Chernoff) We are hoping to be able to perform similar fingerprinting but we are aware that this is more complex in fish due to possible biological processes involved. We are reviewing the literature for the most recent congener-specific work. (J. Butcher) Also, we are addressing mobile species like striped bass in order to assess the effects of sources below the salt front.

Q - (P. McDowell) The site has been described as the entire river but the model is being focused primarily on Study Areas A&B. What is the focus of the cleanup?

A - (D. Tomchuk) The project has been scoped to deal with sediments in the upper river. We will take information from the lower Hudson into account as well as adding sampling locations in the upper Hudson to account for the Hudson Falls source.

Q - (B. Barclay) How far upstream has the NYC source affected the river?

A - (J. Butcher, E. Garvey) This is a clear issue. Upstream transport is limited by the extent of the salt front, i.e., Cornwall, except under drought conditions when it may extend as far as Poughkeepsie.

Q - (B. Barclay) What is the status of the Reassessment in regard to the Thomann model? There have been some criticisms, e.g., the erroneous assumption that striped bass only travel as far north as Poughkeepsie.

A - (J. Butcher) We are exploring use of the model. (A. DiBernardo) There is a concern with calibration/verification issues; we have not been able to reproduce Thomann's published results at a level of confidence we are comfortable with. If this issue remains unresolved we will probably abandon the attempt to use the model. We will not create a new model. (D. Tomchuk) We had not originally planned to use the Thomann model but expanded the program to explore its use.

Q - (P. McDowell) The data quality discussions raised his level of confidence in the program. Can the quality assurance mechanisms be applied to data originating from historical sources or GE?

A - (S. Chapnick) Obviously we cannot change data. However, there are two ways we are addressing this issue:

1. Historical data collection activities are being compared with strict data quality objectives for this program to provide a qualitative statement of quality.

2. We are performing a reanalysis of archived samples using stricter data quality objectives and new analytical methods. Historical and new results will be compared to provide a quantitative evaluation of quality in regard to precision, accuracy and sensitivity.

Q - (P. McDowell) Can the uncertainty in the historic data be factored into the database?

A - (S. Chapnick) Each piece of data in the database is accompanied by a qualifier code alerting the user to any uncertainty. Data validation reports explain uncertainty or bias in detail. If any piece of data does not meet basic data quality objectives, it will not even be included in the database for use. (A. DiBernardo) We also have available the original chromatograms from Bopp's analyses which allow our review.

Q - (A. DiBernardo) P. Lanahan earlier stated that GE was providing unvalidated data to EPA. It was our understanding that data provided by GE has been validated. Is this correct?

A - (P. Lanahan) Historic data packages provided have been validated. However, new data for remnant deposit monitoring and other programs are provided weekly as received from the lab prior to GE review or validation.

Q - (P. Lanahan) Is it possible for HROC members to participate in an agenda planning session for the January STC meeting on modeling and could that be a two-day rather than one-day meeting?

A - (D. Tomchuk) EPA is proposing a one-day STC meeting on modeling specifically. To open the meeting up to other questions would require EPA to bring in other experts besides those being provided. (A. DiBernardo) Modeling alone has many issues associated with it. (W. McCabe) STC is available as an arm of HROC to evaluate issues. EPA will entertain suggestions for such evaluation.

Q - (S. Hammond) It was mentioned that the model will be started at the north end of Rogers Island. As an observation, this seems an easy way to handle the difficulty of a floating hydrophobic substance such as PCBs entering at Hudson Falls by allowing a "mixing zone." How will the Reassessment look at the remnant deposit sites above Rogers Island and is there fish contact in the water column in this area that may show the results?

A - (J. Butcher) One reason for starting the model at Rogers Island is, in fact, to allow a mixing zone. Also, this is a historic monitoring point for flow and PCBs and the target of the Reassessment is sediment in the Thompson Island Pool; the remnant deposits are a separate issue and are being addressed separately. There is no sudden sharp increase in water column PCB levels just above or below Rogers Island; it is not believed that the selection of boundary location will make a significant difference in estimation of levels in fish.

Q - (S. Ruggi) How has EPA been receiving its information in regard to action being taken at Bakers Falls [i.e., GE Hudson Falls Plant site]? Has STC been receiving information and has EPA been involved?

A - (D. Tomchuk) EPA has not been an active player in deciding what to do. NYSDEC has the lead. He receives and reviews weekly and other periodic reports. He is regularly in contact with Bill Ports, NYSDEC contact for both Reassessment and Hudson Falls. The information is not provided directly to the STC.

Q - (S. Ruggi) What is EPA doing to utilize information from Hudson Falls work in the Reassessment; how will it be factored in? At what point in the modeling will the source be turned off?

A - (J. Butcher) The model can be run under a variety of conditions, with the source active and inactive. The model is sufficiently sophisticated to handle a number of interactive effects. The model does not provide "the answer" but is a management tool.

Q - (A. Carlson) There is concern on the part of NYSDOH that the various mechanisms affecting the fish be incorporated into the modeling effort such that equilibrium conditions are adequately represented. Do we have enough information to describe interactions between sediments and water column and between the water column and the fish?

A - (J. Butcher) The expansion in the complexity of the modeling program due to new information about the system has been accompanied by an increase in the modeling expertise to manage the complexity. We do not contend that there are full equilibrium conditions at Rogers Island. However, we need to avoid trying to deal with floating free product without real data. The model will be able to treat the disequilibrium in sediment dissolved organic carbon/sorbed phases. Where sufficient data are available we will examine these issues.

Q - (B. Barclay) Regardless of its current status, the Hudson Falls source represents a significant amount of material released during the 1991/92 spike which is now in the surface layers of the sediments over top of dechlorinated sediments. Effects on upper river fish have been noted. Will you be able to quantify the additional load added to the inventory in the Thompson Island Pool beyond that shown in the 1984 survey?

A - (J. Butcher) This source may or may not have been active prior to changes resulting in the release in 1991/92; however, the total mass release is quite small relative to the mass released due to the removal of the dam in 1973 and resident in the Thompson Island Pool.

Q - (B. Barclay) Will there be an opportunity to get better information prior to release of the ecological risk assessment as to whether PCB levels in the upper Hudson have had any effect on lower Hudson fish?

A - (H. Chernoff) In addition to EPA sampling efforts, NYSDEC annual fish collection information is available.

Q - (B. Barclay) Will EPA be using the oral reference doses for PCBs recently incorporated in IRIS?

A - (D. Tomchuk) Yes, EPA plans to use the reference dose recently published. There is some dispute as to the validity of those numbers. Challenges can occur after the numbers appear in IRIS. Peer review is planned at the request of GE. The status of the numbers will be reviewed as the project continues and the appropriate path will be taken. If necessary, the project team will pursue development of reference doses as was done for Phase 1.

Q - (P. Lanahan) Does EPA plan to use Monte Carlo methods in the risk assessment?

A - (D. Tomchuk) Use of these methods requires sufficient data. Where appropriate, these methods will be used.

The meeting was adjourned by W. McCabe at 11:40 PM.

10.9220

Attachment 1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, NEW YORK 10278-0012

HUDSON RIVER PCBs SITE
REASSESSMENT RI/FS
HUDSON RIVER PCB OVERSIGHT COMMITTEE
OCTOBER 20, 1993, 7:30 PM
NEW PALTZ, NEW YORK

AGENDA

Welcome and Introduction (10 min)	Bill McCabe, USEPA Deputy Director
Agency/Citizen Activities Relating to the Hudson River (20 min)	Committee Members
Reassessment Status Update: (90 min)	
Introduction	Al DiBernardo, TAMS Project Manager
Ecological Assessment	Helen Chernoff, TAMS
Feasibility Study	Bruce Fidler, TAMS
Geochemical	Ed Garvey, TAMS
Modelling	Jon Butcher, Cadmus
Quality Assurance/ Database Management	Susan Chapnick, Gradient
Summary of Reassessment Activities (10 min)	Douglas Tomchuk, USEPA Project Manager
Discussion	Facilitated by: Bill McCabe, USEPA
Closing and Adjournment	Bill McCabe, USEPA

PRINTED ON RECYCLED PAPER

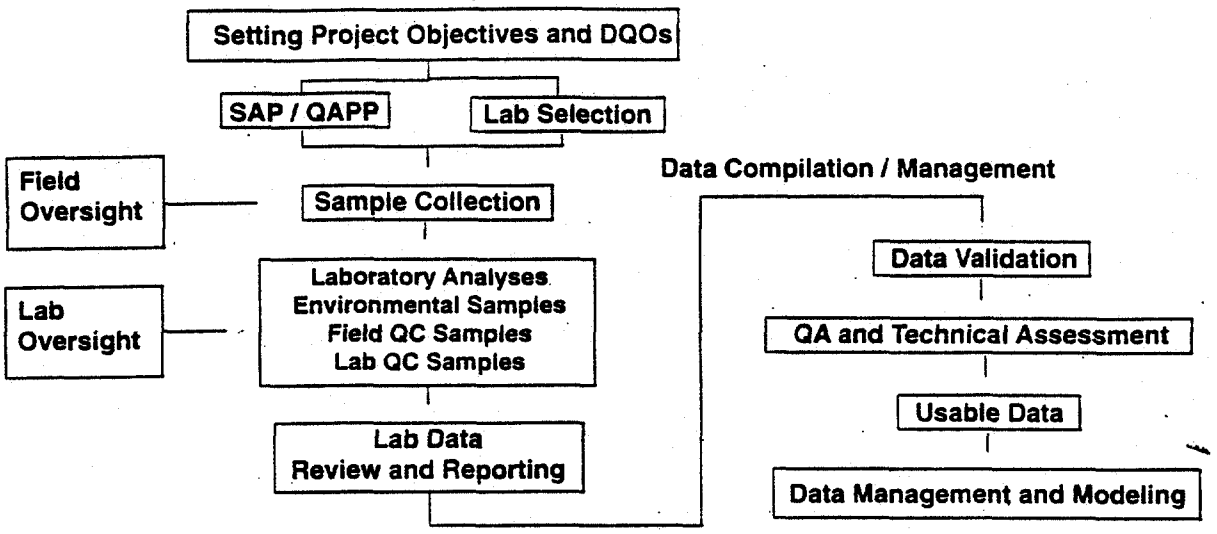
Attachment 2

HUDSON RIVER PCBs REASSESSMENT RI/FS
COMMUNITY INTERACTION PROGRAM
HUDSON RIVER PCBs OVERSIGHT COMMITTEE MEETING
NEW PALTZ, NY
OCTOBER 20, 1993

PLEASE PRINT CLEARLY

NAME	ADDRESS (INCL. ZIP)	ORGANIZATION/ AFFILIATION
Christine Costa	GE Corporate Dr Albany NY 12203	GE
William T Potts	NYSDEC 50 Wolf Rd Albany NY 12233	NYSDEC
Stephen Hammond	NYSDEC Albany	NYSDEC - DHWR
Alan Rockmore	NYSDEC - Alb	DEC - DHWR
Anders Carlson	NYS DOH Albany 12208	
TAY FIELD	NOAA/HAZMAT SEATTLE, WA	NOAA
V. T. Carlencia	PO Box 11 Saratoga Springs NY 12866	GE Corporate Saratoga Co EMC
Cara Lee	Scenic Hudson 9 Vassar St Pok NY 12601	

QUALITY ASSURANCE MANAGEMENT



APPROACH TO QUALITY ASSURANCE

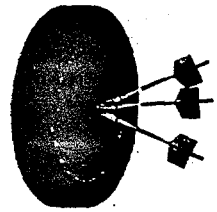
- Integrate QA throughout the program
- Proactive - QA oversight and corrective actions
- Define data needs to meet uses
  - Sampling locations
  - Media (water, sediment, particulates, biota)
  - Chemical and physical testing

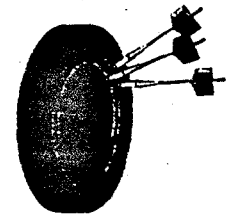
SAMPLING AND ANALYSIS PLAN (SAP) QUALITY ASSURANCE PROJECT PLAN (QAPP)

- Ensure consistent, high quality data
  - Project approach
  - Project team organization
  - Sampling procedures and custody
  - Project-specific methods: PCB-congeners and others
  - Calibration procedures and criteria
  - Field / laboratory audits; corrective action
  - Data reduction, validation, reporting

DEFINE QA OBJECTIVES

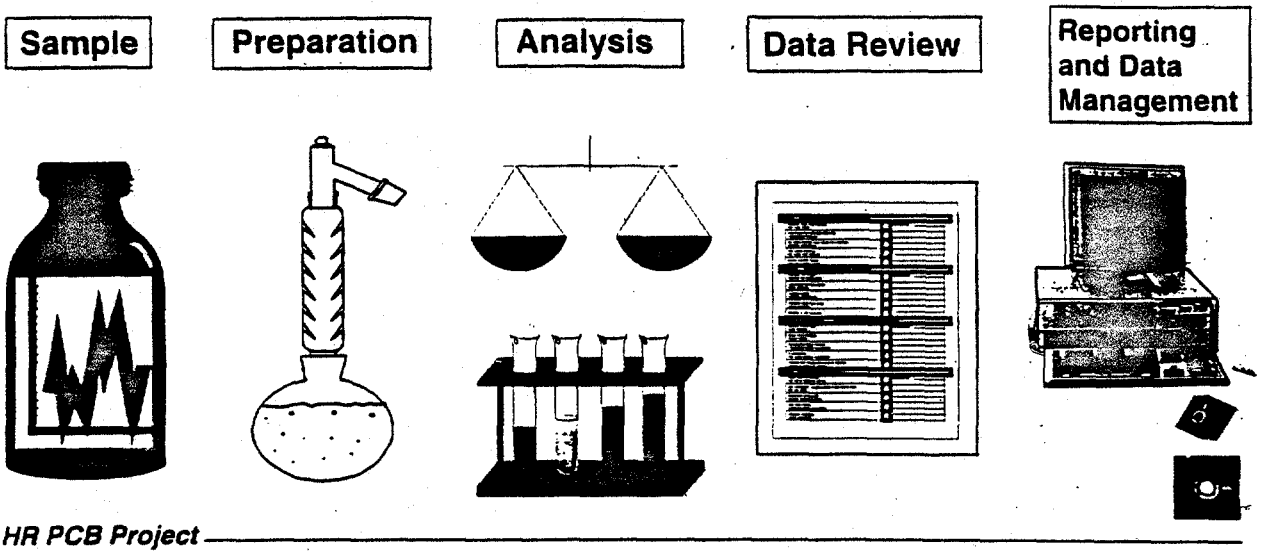
- Quality assurance objectives for measurement data
  - Precision - variability, reproducibility
  - Accuracy - bias
  - Representativeness - site conditions, heterogeneity
  - Comparability - methods
  - Completeness - amount of data collected
  - Sensitivity - detection levels





LABORATORY SELECTION

- On-site comprehensive laboratory audit by experienced analytical chemists

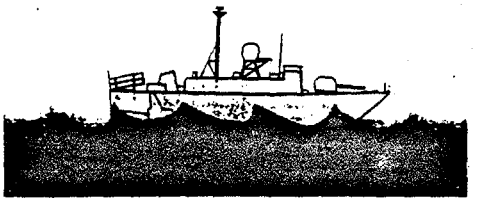


LABORATORY QA OVERSIGHT

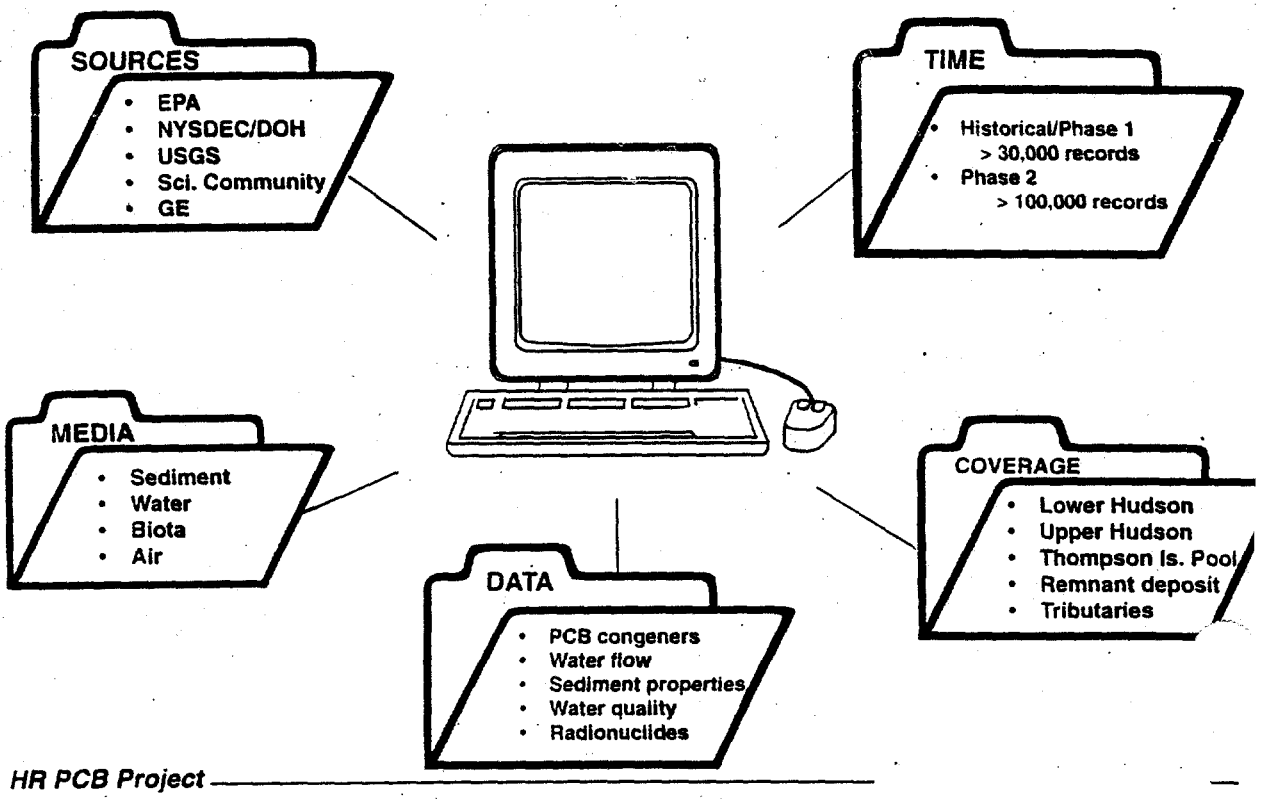
- Monitor key program criteria
- Conduct unannounced laboratory audits
- Blind spike samples = performance evaluations
- Ongoing review of sample analyses
- Real-time implementation of corrective action

ON-SITE FIELD QA OVERSIGHT

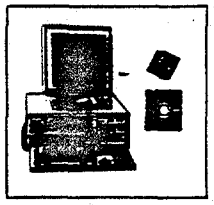
- Verify documentation and chain-of-custody
- Verify sampling techniques
  - Decontamination
  - Field QC (blanks, duplicates)
- Verify field measurement procedures
- Containers, preservation, handling, shipment



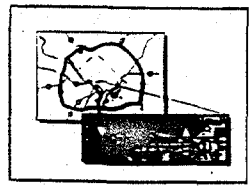
DATABASE MANAGEMENT SYSTEM



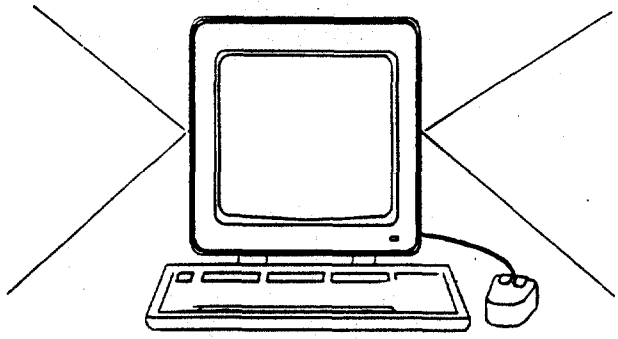
DATABASE MANAGEMENT SYSTEM

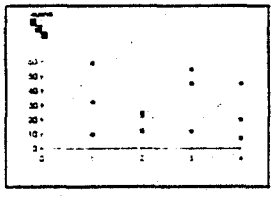


Modeling

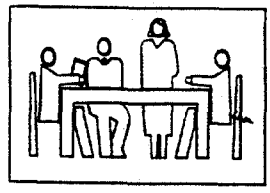


Mapping



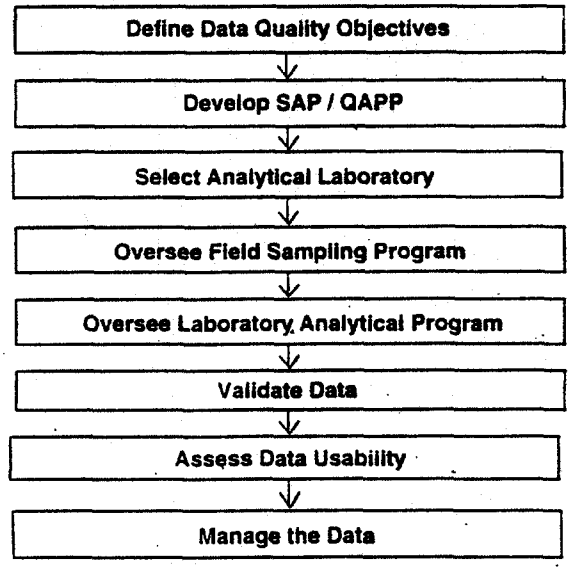


Data Analysis and Statistics



Project Team Decisions

SUMMARY: DATA QUALITY MANAGEMENT PROGRAM



ROLE OF MODELING IN THE REASSESSMENT

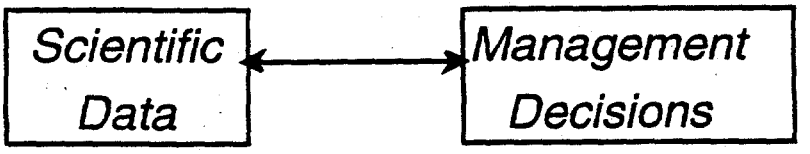
- Predict Future Conditions
- Evaluate Possible Effects of Remedial Actions
- Provide a Rational Basis for Management Decisions

The modeling effort is focused on practical issues keyed to the management and decision needs of the Reassessment.

Attachment 4 1 of 9

KEY QUESTIONS ADDRESSED BY MODELING

- When will PCB levels in fish reach acceptable levels under No Action?
- Can remedial actions significantly shorten the time needed to reach acceptable levels?
- Are buried contaminants likely to be "reactivated" by a major flood event?



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ORGANIZATION OF THE MODELING EFFORT

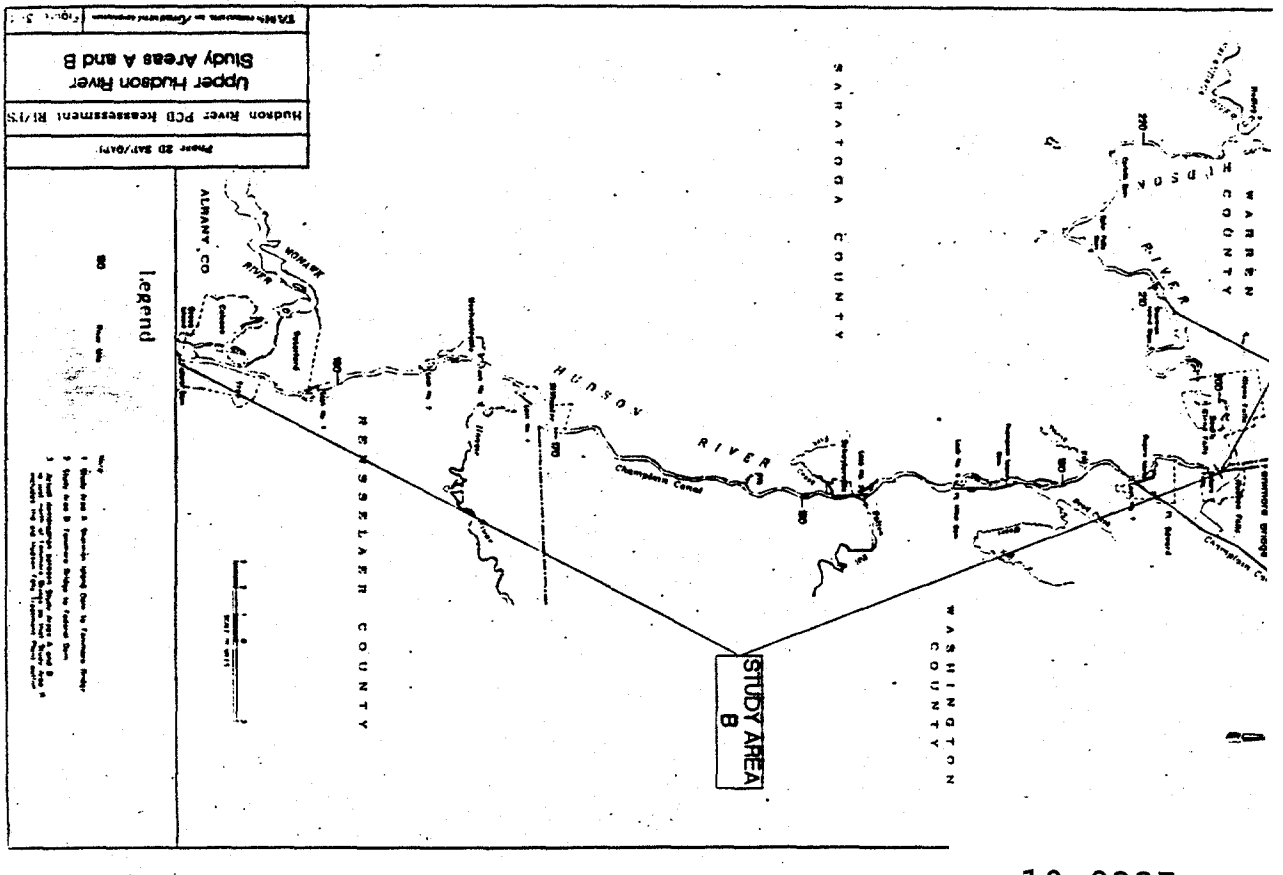
Data Collection

Fate and Transport Modeling
LTI-LimnoTech

Bioaccumulation Modeling
Menzie-Cura & Cadmus

Predicted Human & Ecological Risk

Choice of Remedial Options



FATE AND TRANSPORT MODELING

- Long-Term Mass Balance Model: Average effects on scale of decades and river reaches.
- Short-Term Event Model: Event-driven model of contaminated sediment erosion in the Thompson Island Pool
- Linked Short- and Long-Term Models: Assess long-term impacts of flood events

FISHERIES/BIOACCUMULATION MODELING

- Empirical BAF Models: Relate historic body burden to PCBs in water and sediment
- Equilibrium Food Web Model: Steady-state approximation of food chain accumulation using current data collection effort
- Revisit Thomann's Striped Bass model for the Lower Hudson

Tools to link predicted environmental concentrations to PCB levels in biota

SEDIMENT PCB STORES

- What mass of PCBs is stored in Thompson Island Pool sediments?
- How have PCB mass and congener type changed over time?
- 1984 NYSDEC Survey provides a baseline for current investigations

NYSDEC estimated that the total PCB mass in the Thompson Island Pool sediments in 1984 was 23,200 kilograms (51,156 pounds)

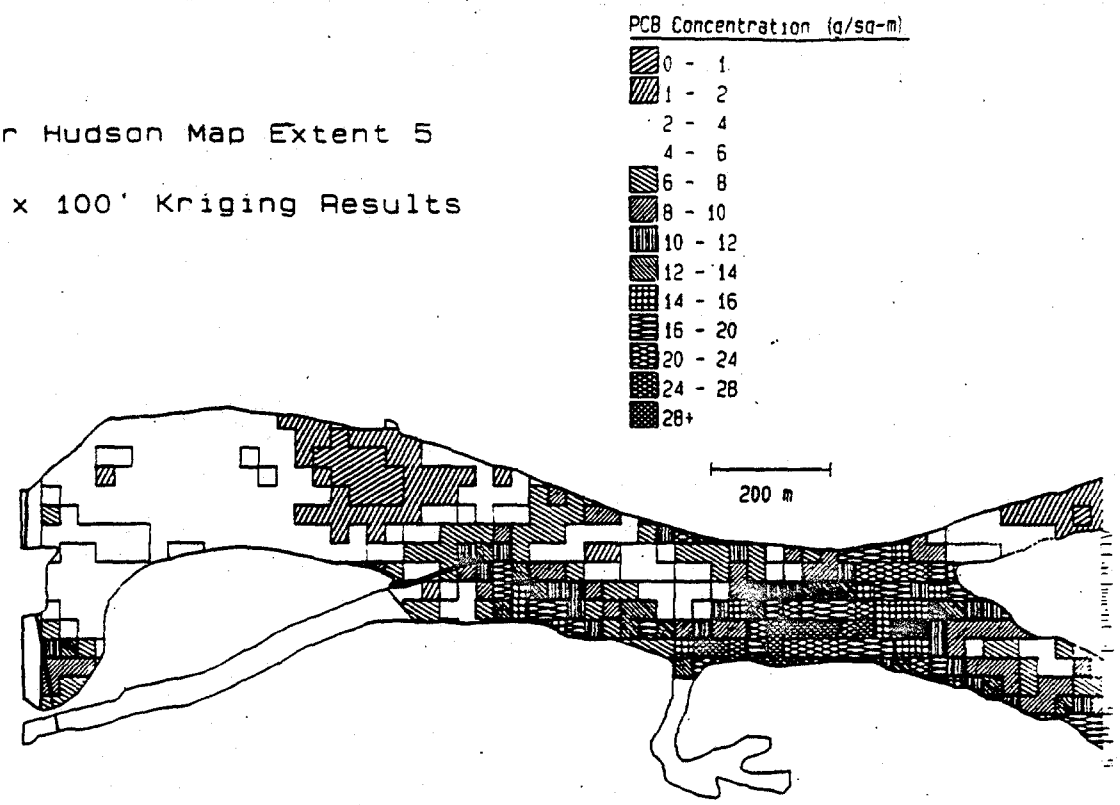
GEOSTATISTICAL (KRIGING) ANALYSIS

- PCB distribution shows "hotspots" (spatial correlation); also high random variability
- How do we get from point measurements to areal average?
- Use observed spatial correlation pattern to guide interpolation: Kriging

Kriging is a technique to develop minimum-variance, unbiased estimators for spatially correlated phenomena.

Upper Hudson Map Extent 5

100' x 100' Kriging Results



APPROACH

- Incorporate Phase 1
- Update Technology Information
- Utilize Previous Work
- Allow FS Process to Provide Solution

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TREATMENT

- Bioremediation
- Soil Washing
- Solvent Extraction
- Dechlorination
- Thermal Desorption
- Incineration
- Solidification / Stabilization

DREDGING OPTIONS

- Bank to Bank
- "Hot Spots"
- Behind Dams (Sediment Sinks)

- Remedial Action Objectives
- General Response Actions
- Remedial Technologies and Process Options
- Remedial Alternatives
- Detailed Analysis of Alternatives

RESPONSE ACTIONS/ ALTERNATIVES CATEGORIES

- No Action or Institutional Actions
- Containment (Capping)
- In Situ Treatment
- Removal / Disposal
- Removal / Ex Situ Treatment / Disposal

DISPOSAL OPTIONS

Treated or Untreated Dredge Spoils

- Offsite TSCA Landfill
- Upland TSCA Landfill
- Contained Aquatic Disposal
- Near-shore Confined Disposal Facility (TSCA)
- In-river Confined Disposal Facility (TSCA)
- Upland Confined Disposal Facility (TSCA)

Treated or Low Concentration Dredge Spoils

- Offsite Sanitary Landfill
- Beneficial Use - Sanitary Landfill Cover

HR PCB Project

HUDSON RIVER PHASE 3 REPORT - FEASIBILITY STUDY
INITIAL TECHNOLOGY SCREENING

GENERAL RESPONSE	REMEDIAL TECHNOLOGY	PROCESS OPTION	DESCRIPTION	SCREENING COMMENTS
NO ACTION	NONE	NONE	No remedial or institutional actions.	Required for consideration by NCP
INSTITUTIONAL ACTIONS	MONITORING	WATER COLUMN SAMPLING	Surface water sampling in space or time series at strategic locations.	Potentially applicable.
		SEDIMENT CORING	High resolution coring with analysis for dioxin bearing strata.	Potentially applicable.
		FISH SAMPLING	Periodic sampling of fish flesh to determine trends in PCB uptake and edibility.	Potentially applicable.
		BIOTA SAMPLING	Periodic sampling of benthic and other organisms at strategic locations to determine trends in PCB uptake and species abundance and diversity.	Potentially applicable.
		GROUNDWATER SAMPLING	Installation and periodic sampling of monitoring wells near known or suspected source areas.	Potentially applicable.
		AIR SAMPLING	Periodic or continuous monitoring of airborne PCBs and PCB-bearing particulates at strategic locations to determine emissions and inventory losses.	Potentially applicable; however not be necessary with a well-designed water column monitoring program.
	SITE USE RESTRICTIONS	FISHING BAN	Continuation of existing fishing bans.	Potentially applicable.
		LIMIT *RECREATIONAL* USE	Restrict swimming and boating on the river.	Potentially applicable.
		SEDIMENT REMOVAL CONTROLS	Establish operational restrictions on sediment removal activities to control sediment resuspension and downstream transport. Could result in limits on channel maintenance by NYS Thruway Authority and Canals in contravention of current state constitutional requirements.	Potentially applicable.

PRELIMINARY

PRELIMINAR

INITIAL TECHNOLOGY SCREENING

GENERAL RESPONSE	REMEDIAL TECHNOLOGY	PROCESS OPTION	DESCRIPTION	SCREENING COMMENTS
REMOVAL TECHNOLOGIES	ENVIRONMENTAL DREDGING	MECHANICAL	Sediments removed by direct mechanical force. Types include dipper, bucket (clamshell, orange peel, gradall dragline and bucket ladder), and ladder dredges. Watertight bucket is available for clamshell to reduce sediment resuspension. Sediment is placed in scows, trucks, or hopper barges, or slurried and pumped.	Watertight clamshell potentially applicable with proper operational controls. Other types not applic- due to excessive resuspension contaminated sediment.
		HYDRAULIC	Centrifugal pumps used to dredge sediments in slurry form. Types include trailing suction, plain suction, dustpan, cutterhead, matchbox, Refresher, Clean-up, waterless, Delta, ooze, and horizontal auger (i.e., Mudcat). Sediment may be placed in hoppers or scows, or pumped for sidecast discharge or through a floating pipeline.	Cutterhead and Mudcat are potentially applicable. Others are too large, inappropriate for the types and depths of sediments to be encountered, or not widely available in the US.
		PNEUMATIC	For pneumatic pump types, hydrostatic pressure differential causes soft or loosened sediments to flow into multiple cylinders under atmospheric pressure or vacuum. Compressed air forces sediment to the surface; check valves maintain direction of flow. Near in situ density removal is possible for soft materials. Discharge is normally through a floating pipeline. Types include Pneuma and Oozer (which may also be equipped with special suction and cutter heads). Airlift types use compressed air to generate currents up a tube which draw sediments to the surface.	Not applicable to the range of sediment types or depths to be encountered. Not widely available in the US.
		EXCAVATION — CONVENTIONAL EQUIPMENT	Conventional equipment (clamshell, dragline, gradall, backhoe, bulldozer, etc.) used to remove sediment as a shore-based operation.	Not applicable. Not feasible for practical application. Potentially useful as a component of a dredging program for near-shore areas which are shallow or otherwise inaccessible to dredging vessels.

PRELIMINARY DRAFT PRELIM

HUDSON RIVER PHASE 3 REPORT - FEASIBILITY STUDY

INITIAL TECHNOLOGY SCREENING

GENERAL RESPONSE	REMEDIAL TECHNOLOGY	PROCESS OPTION	DESCRIPTION	SCREENING COMMENTS
EX SITU TREATMENT	DECHLORINATION	KOMPEG (GRC)	Contaminants are extracted from the soil surface into the reagent phase where the PCBs are dechlorinated. The reagents are potassium hydroxide and polyethylene glycol. PCB concentrations of 440-7,300 ppm have been reduced 99% in sediments.	Potentially applicable.
		B.E.S.T. (RCC)	Triethylamine (TEA) solvent used to separate the PCB/oil fraction from the sediment. The extract is heated to remove the water. TEA is steam stripped from the PCB and oil. The contaminants are destroyed by incineration or other means. Over 97% removal efficiency using 3 extraction steps has been obtained.	Potentially applicable.
	SOLVENT EXTRACTION	L.E.E.P. (ART INTL.)	PCBs are leached from sediments using acetone, then concentrated in kerosene by liquid-liquid extraction Acetone is recycled, kerosene is destroyed with the PCBs. 99.9% PCB removal was achieved in a study using sediments with initial concentration 33,600 ppm.	Potentially applicable.
		PROPANE EXTRACTION (CF SYSTEMS)	Uses liquified CO_2 and hydrocarbon gasses, such as propane and butane, as the extracting medium. PCB removal efficiencies of 90% were achieved in New Bedford Harbor sediments with initial concentrations of 350 - 2,500 ppm.	Potentially applicable.
		ACUREX SOLVENT WASH PROCESS	Removes 50% of PCBs per wash down to a residual level of 2 ppm using proprietary freon-type solvents tailored to the particular sediment. At least 60% solids required for feed.	Not applicable. Fine-grained sediment causes materials handling difficulties - may remain in solvent after settling.
		OH MATERIALS EXTRACTION PROCESS	Methanol used as the extraction solvent. Dried treated sediment is spread out in the open air and periodically turned until methanol remnants are degraded. Efficiencies to 97% are claimed. Solvent is recycled using activated carbon or incinerated. Field testing is underway.	Not applicable. Fine-grained material and water in the feed present difficulties.

PRELIMINARY DRAFT PRELI

DESIGN OF HUDSON RIVER ECOLOGICAL RISK ASSESSMENT

- Quantitative Assessment of a Known Contaminant (PCBs) with Historical Data Available
- Concerns of Government Agencies and the Public

ECOLOGICAL EFFECTS

- Individual Organisms
  - Upper and Lower Hudson River
- Populations
  - Upper Hudson River, Thompson Island Pool
- Communities
  - Upper Hudson River, Thompson Island Pool
- Food Chain/Web
  - Modeling

COORDINATION

- USEPA
- NYSDEC
- NOAA

Discussion of Work Plan: September 1992

Field Reconnaissance: May 1993

Field Sampling: August 1993

FIELD SAMPLING EFFORT

- USEPA - Sediment, Benthic Invertebrates and Water Column Sampling
- NYSDEC/NOAA - Resident and Mobile Fish Species Sampling

19 Stations Total

- 10 Stations in Upper Hudson
  (5 in Thompson Island Pool)
- 9 Stations in Lower Hudson
  (4 Nat'l Estaurine Sanctuaries)

SUMMARY OF ECOLOGICAL SAMPLES

Parameter	Number of Samples
Sediment	
PCB	117
TOC	99
TIC	40
TC/TN	40
Metals	41
Grain Size	97
Benthic Invertebrates	
Sorting	66
PCB & Lipid Content	135
Biomass	52
Abundance & Diversity	52

DECISION MAKING TOOLS

- Do current levels of PCBs in the Hudson River have the potential to cause adverse health effects in the biota ?

- If so, can we estimate the time required for PCB concentrations to drop to acceptable risk levels ?

Hudson River Geochemical Investigation

- Geophysical Investigation
- High Resolution Coring Program
- Water Column Monitoring

Hudson River Geochemical Investigation

- Geophysical Investigation
  - Survey and confirmatory sampling completed
  - Sediments classified based on acoustic signals
  - Large areas of fine-grained sediments appear to correlate with previously defined "Hot Spots" in southern portion of pool
  - Northern portion of pool appears heterogeneous on small scale
  - Areas below TI Dam show similar relationship between fine grained material and "Hot Spots"

Hudson River Geochemical Investigation

- High Resolution Coring
  - Cores collected from 28 locations through the Hudson Valley
  - Preliminary analysis of core data replicates features demonstrated by Bopp et al
  - Core data shows extensive dechlorination at depth in Upper Hudson and absence of dechlorination in Lower Hudson
  - Sediments collected below the salt front show presence of higher chlorinated congeners not found in Upper River sediments

Hudson River Geochemical Investigation

- Water Column Monitoring
  - Transects successfully track individual water parcels
  - Flow Average and Transect studies show good agreement
  - Source of upstream PCB loading varies between TI Pool and Bakers Falls source
  - TI Pool signal is readily defined by its congener pattern, even when upriver source is present
  - Third transect shows evidence of substantial scour event below the Hoosic River

Hudson River Geochemical Investigation

- Summary