

HUDSON RIVER PCB REASSESSMENT  
COMMUNITY INTERACTION PROGRAM

SCIENTIFIC AND TECHNICAL COMMITTEE

THURSDAY, AUGUST 12, 1991

10:00 AM

LATHAM, NEW YORK

MINUTES

On August 12, 1991, a meeting of the Hudson River Scientific and Technical Committee (STC) was held at 10:00 AM at the Holiday Inn in Latham, New York. The purpose of the meeting was to continue the discussion with the committee members begun at the previous meeting on the major aspects of the proposed Phase 2A sampling program. This meeting would place particular emphasis on the geophysical survey, water column monitoring and high resolution coring in the Lower Hudson. A discussion of the role of the committee in the Hudson River PCB Reassessment RI/FS process was also on the agenda. The following committee members attended the meeting:

D. Abramowicz	General Electric
J. Bonner	TAMU, College Station, TX
R. Bopp	NYSDEC
B. Bush	NYSDOH
K. Darmer	Hydrologist, Delmar, NY
J. Davis	N.Y. Attorney General's Office
G. Putman	SUNY-Albany
G. Raggio	Simultec
G-Y. Rhee	NYSDOH

In addition, the following persons attended the meeting as observers or presenters:

K. Berger	NYSDEC
F. Csulak	NOAA
A. DiBernardo	TAMS Consultants

E. Garvey	TAMS Consultants
J. Haggard	General Electric
D. Tomchuk	US EPA

The meeting was begun by Mr. D. Tomchuk who explained the purpose and agenda for the meeting. This was followed by a short presentation by Dr. Garvey covered the major tasks of the Phase 2A Sampling Plan. During the presentation by Dr. Garvey, Mr. Tomchuk indicated that it did not appear likely that all of the tasks proposed for Phase 2A could be implemented this fall. Mr. DiBernardo indicated that it was felt by EPA and TAMS that the geophysical survey, the water column sampling and the high resolution coring in the Lower Hudson were the best candidates for implementation this year, although the implementation of the other tasks was not completely ruled out. The remaining tasks, as well as other possible tasks would be left for the spring of 1992 as part of Phase 2B.

#### Discussion of the Proposed Geophysical Survey of the Upper Hudson

Dr. Garvey then continued the presentation on the details of the Phase 2A tasks. Mr. DiBernardo indicated that the scope of the planned geophysical survey had been narrowed somewhat due to budget constraints based on an overall budget for the task of \$200,000. The current plan was to survey all accessible areas between Baker's Falls and mile point 182 (roughly lock 5) using side scan sonar, bathymetry and sub-bottom profiling techniques. From river mile 182 to 163, additional areas of interest would be similarly surveyed, paying particular attention to shallow areas where depositional environments were likely. In all 36 of the 40 previously defined hot spots would be surveyed plus roughly 10 additional miles of the river would be surveyed where no hot spots had been indicated.

Mr. Raggio asked for additional explanation of the level of effort given to the various aspects of the survey, i.e., side-scan sonar, bathymetry and sub-bottom profiling. Dr. Garvey explained that the side scan sonar data would be collected on multiple tracks run parallel to shore, each roughly 1 to 2 miles long, depending on navigational constraints. Each of these tracks would be separated by 40 m with the side scan sonar equipment surveying a swath of about 75 m. This would yield bottom coverage for the river of about 150%, ensuring that the edges of each swath overlapped and that

the bottom of the river would be completely surveyed. During the side scan sonar tracks, the bathymetry and sub-bottom profiling equipment would also be run. In addition, bathymetric/sub-bottom profiles would also be generated from tracks run perpendicular to the shore line spaced about 150 m apart. This would effectively generate a wire net of bathymetry and sub-bottom data. (Figure 1 is a sketch of the survey tracks as described at the meeting.) To ensure proper interpretation of the geophysical data collected in this manner, about 2 hrs of each 10 hr day would be set aside for confirmatory sampling using either a hand corer or a grab sampler. These materials would be visually examined for sediment texture and stratification for calibration of both the side-scan sonar and the sub-bottom profiling survey data and then returned to the river. The confirmatory sampling locations would be selected based on the day's geophysical results and placed using the same navigational controls and precision as that for the geophysical surveys so that the two sets of data could be directly correlated and mapped.

Throughout these discussions, several of the committee members expressed their opinions, concerns and other information they had obtained concerning the proposed geophysical survey. The following is a summary of the discussions and suggestions obtained from the committee. Unless noted, the suggestions are from one to several individuals and do not represent a consensus on the part of the committee:

- No member of the committee had major objections to the geophysical survey. Several felt that the survey had much to offer by providing a "map" of the river sediments. It was unclear whether the geophysical data could be extended to predict or correlate with PCB levels.
- All members agreed that the confirmatory samples collected during the geophysical survey be archived for analysis in the future and that the standard EPA holding time of 14 days be waived. Some members suggested that some simple analytical procedures be performed as well.
- The final sampling "philosophy" of the coring efforts scheduled in the spring should be based on the results of the geophysical survey.
- A major flood would require a second geophysical survey in the spring but much information could be obtained on sediment transport should such an event occur.

- The confirmatory sampling to be done as part of the geophysical survey may run into some problems using a hand corer since many locations will be too hard to penetrate.
- The geophysical survey should emphasize the near-shore materials since these have been historically neglected and may represent important PCB deposits if they consist of fine muds as initial investigation suggests.

The following paragraphs describe the discussions and suggestions from the committee members on the geophysical survey in greater detail:

Dr. Abramowicz indicated that he was concerned about the ability to correlate the patterns of sedimentation described by the geophysical study to sediment PCB accumulations on the basis of the proposed coring. He felt that this would be a research effort. His experience in sampling in a hot spot at the northern end of the Thompson Island Pool indicated very poor correlation among sediments spaced on very small (12 ft or less) sampling grids. He questioned whether the proposed level of exploratory coring (30 to 50 cores) would be sufficient to demonstrate a statistical correlation between the geophysical sediment classification and the measured sediment PCB levels.

Dr. Bush stated that he had spoken with Brad Butman of the U.S.G.S. at Woods Hole concerning the use of side-scan sonar techniques in the New Bedford Harbor study. Mr. Butman indicated that the technique had proven invaluable in their understanding of the problems there. Dr. Bush also indicated that his experience in random sampling from areas near Griffin Island (in the Thompson Island Pool) and Ft. Miller that he noted no substantial sample variation in contaminant patterns or concentration. Dr. Bush also suggested that a diver be considered to directly examine the areas surveyed with the geophysical techniques. In response to the last point, Dr. Garvey indicated that the geophysical surveying would also include an examination of some bottom areas using a remotely controlled underwater vehicle equipped with a video camera. This technique should satisfy the potential need raised by Dr. Bush.

Dr. Bopp noted that the emphasis of the geophysical survey had changed somewhat in its reduced scope, with less effort assigned to areas which are poorly documented than was originally planned. In response, Dr. Garvey and Mr. DiBernardo indicated that additional geophysical work could be scheduled for Phase 2B if the proposed

effort proved successful and that about one third of the currently proposed effort would be in areas with little existing information.

Dr. Bopp also indicated that the large sample variability found in the GE sampling surveys was probably to be expected since the area consisted largely of mixed sands where recent deposition would be confined to the uppermost few inches and reworking after deposition might be important. On the other hand, Dr. Bush's sampling efforts were confined to large muddy areas where recent deposits would be fairly thick and homogeneous. Thus, he was not surprised at the poor GE data correlation vs Dr. Bush's well correlated data. He emphasized that accounting for stratigraphy using a method such as radionuclide measurement would provide an important key to understanding these sediments. Dr. Bopp also indicated that most of the documented hot spots were similar to the GE study area so that a correlation between the geophysical survey and the sediment PCB burden may be difficult to establish in these areas.

Dr. Rhee inquired as to the other uses of the geophysical data besides attempting to tie it to the PCB measurements. Dr. Garvey indicated that the data from the survey had many potential uses involving the understanding of areas and volumes of sediment susceptible to scour during a flood event, estimating river areas amenable to dredging and correlating historic data with noted large-scale bottom features. Dr. Rhee also expressed great concern about the use of hand corer to obtain samples since much of the bottom would be too difficult to penetrate. He suggested the use of a vibra-corer for sample collection, instead. Dr. Garvey responded that the equipment required for a vibra-coring operation would necessarily require a larger boat, thereby limiting the extent of the geophysical survey. In those cases where a hand corer did not obtain a sample, a grab sampler would be used instead. The importance of obtaining cored sediments in hard to penetrate areas was generally less than in easily penetrated regions since presumably, the sub-bottom profiling signals would also be unable to penetrate these sediments. Thus, there would be no need to calibrate the sub-bottom profiling results using the cored sediments in these areas.

A number of the members inquired as to the details which could be obtained in the very near shore environment. The 1984-85 survey by the NYSDEC did not collect samples within 20 ft of shore while the May, 1991 limited side-scan survey and grab sampling indicated that much of the materials in this area consisted of fine muds.

This material is likely to contain substantial levels of PCBs. Dr. Bopp indicated that this area should be considered for greater geophysical survey density and greater confirmatory sampling. Dr. Garvey indicated that every effort would be made to examine the near shore sediments but that there were some potential constraints. These were posed by the minimum draft required by the boat and by the limitations of the side-scan sonar in shallow water where reflection off the air-water interface can interfere with the reflections off the river bottom. These limitations would not apply to the confirmatory sampling since the samples could be collected while wading. The exact physical limitations of the geophysical survey were better known by Dr. Flood who would be advised of the committee members concerns.

Dr. Bonner suggested that in planning the geophysical work it is important to consider the spatial resolution of the data in terms of the questions to be answered. For example, in modelling a resolution of 0.5 km was sufficient while in dredging a resolution of 50 ft would probably be sufficient. In response, Dr. Garvey indicated that the resolution of the proposed survey was based on the results of the May 1991 survey, which indicated that a survey swath of 75 m was necessary in order properly classify the sedimentological regimes. Due to the variable nature of the bottom conditions, less resolution than this did not permit accurate classification. Mr. DiBernardo indicated that one of the goals of the geophysical survey was to produce a map of the sedimentological regimes, with a limited number of classifications. Dr. Garvey indicated that the current plan was to have the first results of the geophysical survey available a few weeks after the completion of the survey, with better maps produced 1 to 2 months later and final maps produced in less than 6 months.

The question of using the map generated from the geophysical data to design a sampling program was discussed at some length by the members of the committee. The question of whether to sample stochastically or in a deterministic fashion was raised. The general consensus was that the map itself should be used to determine the sampling "philosophy" and the sampling locations. By having the map available over the winter, the opinions and insights of the committee could be obtained before finalizing the sampling locations rather than making the final choices in the field or under much more hurried conditions. Dr. Garvey also suggested that the map could also be compared with the historic data and used to gain some additional insight on where sampling would be useful, without necessarily trying to correlate the two data sets on a statistical basis.

The committee also discussed the use of the confirmatory samples collected during the geophysical survey. A general consensus was reached that the samples should be archived for later analysis and not be discarded. Several rapid measurements were suggested for these samples, including grain size analysis using a coulter counter and total organic carbon. (Dr. Bonner offered to provide TAMS with information on the coulter counter technique.) In particular, Dr. Bonner indicated that for sediment transport modelling, the silt and clay fraction would need to be divided into a minimum of 16 size categories and that the analysis be done without drying the sample. Dr. Bopp indicated that the samples should be sectioned and jarred in the field. Several members indicated that the confirmatory samples should also be held for possible PCB analysis at some point in the future since it was more important to have samples which could be directly correlated with the geophysical conditions measured than to worry about the arbitrary holding times imposed by the EPA. The final sample analytical procedures to be performed should be decided in the future on the basis of other data obtained and possible natural events. During this discussion, Mr. DiBernardo noted that the daily cost of the field effort was expected to run about \$7000. Thus, based on a ten hour day, the current plan would spend about \$1400 per day collecting the confirmatory samples.

It was also noted during the discussion that a major flood between the fall geophysical work and the late spring sampling would require another geophysical survey. However, much would be gained in such a case since it would then be possible to document the changes in the river bottom sediments as a result of the flood event, directly addressing the issue of sediment scour. It was also suggested that the confirmatory samples collected this fall be analyzed for PCBs using an EPA-approved non-congener specific analysis. However, this data might prove confusing since it would be difficult to compare with the subsequent congener-specific data to be obtained in the spring. Finally, the number of samples to be collected on a daily basis was discussed. It was felt by some members that as many as 6 cores or grab samples could be obtained per day. For 15 days of field work, this would yield samples from a maximum of 90 locations.

The committee also asked about the status of the procedure for obtaining congener-specific analysis in sediments. Dr. Garvey explained that TAMS was currently exploring sample preparation techniques which were shown to quantitate all

congeners, including the monochlorobiphenyls. Dr. Garvey also explained that there were some special considerations involved in satisfying EPA Superfund analytical criteria but that the final technique would be selected soon. Dr. Garvey indicated that the intention was to follow the techniques developed by Dr. Bopp at the Lamont-Doherty Geological Observatory but these techniques had not been proven for the monochlorobiphenyls. If these techniques could be used then comparability between the historic analyses and the proposed analyses could be assured. Dr. Bopp was currently attempting to prove that his techniques would properly reproduce the monochlorobiphenyl levels. Dr. Bush suggested that the standard soxlet extraction described in EPA procedure 608 be adapted since this would not require any special approvals from EPA. Dr. Bonner indicated that at Texas A&M, a new technique for PCB extraction had been developed using a supercritical fluid extraction. Several members of the committee agreed that the analysis still requires a lot of judgement from the analyst and that the selection of a good laboratory was very important.

While on the subject of comparability of measurements, the analyses conducted by the U.S.G.S. were brought up. Dr. Bopp indicated that the U.S.G.S. had changed their analytical technique for PCBs about 1.5 years ago to a capillary based analysis. However, NYSDEC has been unable to obtain a description of the technique.

The meeting was then adjourned for lunch and reconvened at 1:30.

#### Discussion of the Role of the Scientific and Technical Committee

Upon reconvening, Mr. Tomchuk began a discussion of the role of the committee. A memorandum outlining EPA's definition of the role of the committee was circulated among the members for their review. The members indicated that the memo covered most of their questions but that at least one issue still remained to be resolved. Both Dr. Bopp and Dr. Abramowicz indicated that a more succinct statement of the responsibilities of the committee was needed. They pointed out that the committee was not a scientific review board and had no official decision-making powers but simply served in an advisory role to the EPA and its contractors. The statement from the EPA needed to indicate this and that the final decisions made by the EPA were not subject to approval by the committee. In general, most of the members of the committee agreed with Drs. Bopp and Abramowicz. Dr. Putman suggested that the committee be called an advisory panel but Mr. Tomchuk indicated that the federal



regulations concerning a group labelled as an "advisory" committee or panel were quite burdensome and arduous.

After this discussion, the committee discussed the next meeting date. The next meeting of the committee was set for Tuesday, Sept. 24, 1991 at 10 AM. The meeting was to be held in the Albany area although the final arrangements remained to be settled. The details would be provided in a notice to all members in the upcoming week. The meeting itself would be centered on a discussion of the Phase 1 report. An update of the status of the Phase 2A Sampling Plan was also requested for the meeting. In order to address the major points raised by the committee members on the Phase 1 report, the members of the committee were asked to submit their major comments about one week before the scheduled meeting. The final details for submission of comments for discussion would be given in the meeting notice.

During the above discussions, the members requested that the minutes be available as soon as possible after any given meeting and before any subsequent meeting. They also suggested that the minutes be written fairly rigorously so many view points will be recorded.

#### Discussion of the Water Column Sampling Program

The discussions on water column sampling centered around the goal of the sampling program and the techniques needed. Dr. Garvey indicated that the goal of the program currently proposed was to identify PCB source areas in the Upper Hudson. Current data indicate that on an annual basis, the majority of the PCB load transported by the Upper Hudson originates above Rogers Island. There are several possibilities for this source, such as the Bakers Falls Pool, surface runoff from the remnant deposits, ground water seepage, and diffusion from contaminated river sediments. The program was designed to delineate the region of the river where the current base load originates, under both low flow and high flow conditions. The program was also intended to measure the effect, if any, of the recent remedial work in the remnant deposit area on riverine PCB levels.

While most members agreed with the goal of the program, several scientists were concerned as whether the sampling program as designed could achieve the goal. The comments from the committee are summarized below. It should again be noted that

the comments below represent opinions from one or more committee members but do not necessarily have the endorsement of the entire committee:

- In order to ensure that the same parcel of water was sampled at each station, a dye should be injected into the river and tracked at each station. This would guarantee that the water parcel being sampled was exactly the same. It would also generate a great deal of information on mixing in the river, an essential parameter for modelling river transport.
- Winter transects, if planned, represent very difficult conditions to monitor since ice transported by the river serves to stir the bottom.
- In the area above Rogers Island, it is likely that the river PCB levels will be quite heterogeneous in any given cross section both vertically and horizontally. Some thought should be given to collecting samples in this reach since it is unlikely that a single point sample will be meaningful without consideration of this heterogeneity.
- Time integrated samples should be considered as well to smooth the inherent variability found in the riverine PCB levels.
- Studies during major flow events should consider monitoring flow and suspended matter to ensure that the center of the flow pulse is measured and to determine the conditions when the critical shear stress for sediment resuspension is achieved.
- A written version of the sampling activities should be submitted to the committee members which outlined the objective of the sampling effort as well as most of the details.

The discussions which lead to the above comments are summarized in the following paragraphs:

Dr. Abramowicz inquired as to the possibility of the collection of time-integrated samples since these would avoid taking many samples in order to characterize the riverine transport. Dr. Garvey explained that there is a concern based on historic data that the water column and suspended matter PCB levels are not in equilibrium. The collection of time integrated samples would potentially allow sufficient time for these media to reach equilibrium and thus the results would not reflect true river conditions. The lack of equilibrium would be important in establishing the area and nature of the PCB source(s) in the Upper Hudson.

There was a discussion on a time-integrating sampler which was currently available. Drs. Bopp and Bush discussed the sampler at length. Dr. Bopp indicated that the unit was useful in a qualitative sense, for example, comparing PCB levels among different rivers, but could not be used for quantitative analysis.

Dr. Bush indicated that high flow event sampling in the winter may be very treacherous in the region between Bakers Falls and Rogers Island. This area consists largely of rapids which will be difficult to access. In addition, ice carried by the flow serves to churn much of the waters of the Upper Hudson and will make sampling difficult. He also indicated that the length of the high flow events in the Upper Hudson can be very short, typically about 2 days.

Dr. Putman indicated the need to consider cross sectional variation in PCB levels in the flow, particularly in the region where the load enters the river. In these regions, the small plumes created by the sources or source areas may not be sufficiently mixed. Thus single point sampling may show poor reproducibility and may not reflect the actual PCB loading. To clarify these potential problems, cross sectional sampling along both vertical and horizontal lines should be considered.

Dr. Bonner expressed the need for the water column sampling to be certain of the water parcel being sampled. He suggested using a dye and a CTD meter to track the water parcel. The dye could be injected into the river above Bakers Falls and tracked as it passed each sampling point. The sample would be collected as the CTD indicated the maximum dye level had been reached. The CTD could also be used to show vertical and horizontal variability in the flow cross section in terms of dye, temperature and suspended matter. This data could be used to obtain a dispersion coefficient for the flow, a parameter required for sediment transport modelling.

The CTD could also be used to monitor the river during high flow events. The CTD in conjunction with the U.S.G.S. hydrograph at one of the four hydrographic stations in the Upper Hudson could be used to indicate the flow conditions when scour of the river bottom began to occur. This data could then be used to calculate the critical shear stress for the river sediments, an important input for any sediment transport model. He envisioned two types of water column sampling. For low flow conditions, a dye would be injected and tracked down river by moving from point to point and

measuring dye levels as the plug passed downstream. For high flow conditions, several monitoring points would be required, probably one at each of the U.S.G.S. hydrographic stations. Each station would require its own CTD to record the changes in suspended matter load and to sample at the maximum flow conditions.

As noted by several members of the committee, the only potential problem with the use of a dye in the Upper Hudson is obtaining the necessary permits to release it into the river. Dr. Bonner also noted that such a study was probably essential as part of preparation for any dredging which might be done in the Hudson. The CTD units were commercially available and probably could be rented as needed. Dr. Putman indicated that the U.S.G.S. uses depth integrated sampling because of their concerns about vertical homogeneity. Dr. Bonner indicated he would send some information on CTDs and their use to TAMS.

Dr. Bopp raised a concern over the measurement of PCB transport for the purposes of determining the flow/transport relationship since the range of data would be very limited and would not necessarily apply over wide ranges in flow.

There was a disagreement among several members of the committee as to when the majority of PCB transport takes. Historically, all agreed that the spring runoff event represented the vast majority of the PCB mass transport on an annual basis. However, Dr. Putman felt that currently the transport was greatest during low flow conditions, particularly during summer when diffusion from the sediments was greatest. Dr. Bopp indicated that his data suggested that the spring was still the dominant transport season, with the high flow events accounting for most of the transport. However, he also pointed out that his data only covered dichlorobiphenyls and heavier PCBs. The transport variability for the monochlorobiphenyls was poorly known. Dr. Bush had some data on water column levels for 1989 and 1990 which would be worth exploring for understanding the transport better.

Mr. Raggio indicated that bedload transport may be important as well. Under conditions where the river bed is displaced but no net change occurs in the configuration of the bottom, it is possible to displace PCB-laden sediments with cleaner ones, moving the more contaminated sediments downstream and resulting in slow, long term PCB transport in "steps" which would go unmeasured.

A short discussion on the sample handling techniques followed the discussion on the sampling scheme. Several members agreed that the filtering upon collection was important and that the methods developed by Dr. Bopp at Lamont-Doherty including the use of a 0.7 um glass fiber filter were acceptable. Dr. Rhee inquired as to the possible use of a nucleopore filter instead of the glass fiber filter. Dr. Bopp indicated that it could be done with such a filter but the number of filters and the amount of time required to handle a 20 liter sample were far greater than that required for a glass fiber filter. Dr. Bush suggested that the filters be handled in the same manner as the sediments for PCB analysis, perhaps using EPA method 608 soxlet extraction.

Dr. Bonner suggested and most members agreed that a written description of the sampling tasks along with an outline of their objectives be submitted to the committee for review.

Dr. Bush indicated that he had several multiplate studies in the Upper Hudson which might provide some useful insight on variations in water column PCB levels and would forward the information to EPA.

#### Discussion of the Proposed High Resolution Coring for the Lower Hudson

The last task to be discussed at the meeting was the high resolution coring effort for the Lower Hudson. Dr. Garvey gave a brief description of the program, summarizing the presentation given at the July 11 meeting. Dr. Garvey indicated that the technique being developed for sediment PCB analysis would be needed here so that these samples could be examined for the monochlorobiphenyls as an indicator of in situ degradation. Drs. Bopp and Abramowicz both indicated that it would be difficult to detect the monochlorobiphenyls in these sediments because of the very low concentrations. However, there were other congener measurements which could be used as indicators of in situ degradation instead. Dr. Rhee indicated that he had found such indications in some samples from both the Upper and the Lower Hudson. Dr. Bush inquired as to the correlation of the proposed coring locations with historic locations. Dr. Garvey indicated that all but two locations (river miles 115 and 130) had historic cores. Dr. Bush indicated that he had found two potentially important depositional zones near these two locations which might suit the program's needs.

The last topic discussed at the meeting was the question of opening the committee to new members. A number of scientists were suggested for this purpose, including some who had worked on the New Bedford Harbor study and the Great Lakes PCB study. However, all members were in agreement that new members should be brought into the committee as needed.

The meeting was adjourned at about 5:15 PM.