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HUDSON RIVER PCB REASSESSMENT
COMMUNITY INTERACTION PROGRAM

JOINT MEETING OF THE HUDSON RIVER OVERSIGHT AND
SCIENCE AND TECHNICAL COMMITTEES
WEDNESDAY, MAY 15, 1991
6:00 PM
ALBANY, NEW YORK

MINUTES

On May 15, 1991, a joint meeting of the Hudson River Oversite Committee (HROC) and the Scientific and Technical Committee (STC) was held at 6:00 PM at the Desmond Americana Hotel in Albany, New York. The purpose of the meeting was to advise the committee members of the progress to date on the Phase 1 investigation and the soon-to-be released Phase 1 report. The following committee members attended the meeting:

D. Abramowicz	Chair, Science & Technical Committee
J. Bonner	TAMU, College Station, TX
R. Bopp	NYSDEC
T. Borden	Chair, Agricultural Liaison Group
I. Carcich	NYSDEC, Project Sponsor Group
J. Claussen	GE, Manager, Hudson Project Team
K. Darmer	Hydrologist, Delmar, NY
J.D. Davis	N.Y. Attorney General's Office
C. Deppe	Co-Chair, Environmental Liaison Group
A. DiBernardo	Project Manager, TAMS Consultants
K. Finkelstein	NOAA, Boston MA
G. Pavlou	HROC Chair, Deputy Director, ERRD, U.S. EPA, Region 2
W.T. Ports	NYSDEC
G.H. Putman	SUNY-Albany
A. Rychlenski	Steering Committee Chair and Community Relations Coordinator, U.S. EPA, Region 2
J. Schmidt-Dean	Chair, Citizen Liaison Group
A. Secord	U.S. Fish and Wildlife
D. Tomchuk	Project Manager, U.S. EPA, Region 2

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

J. Behan	Clifton Park, NY
M. Belia	Glens Falls, NY
K. Berger	NYSDEC

D. Blazey	U.S. EPA, Region 2
F. Cantelmo	TAMS Consultants
E. Garvey	TAMS Consultants
M. Green	Adidy, NY
J. Haggard	Albany, NY
M. Hauptman	Section Chief, U.S. EPA, Region 2
L. Johnson	U.S. EPA, Region 2
D. Kent	Clearwater, Poughkeepsie, NY
P. Lanahan	GE, Albany, NY
Y. Lowney	Gradient Corp.
D. Merrill	Gradient Corp.
G. Raggio	Concord, MA
S. Ruggi	Hudson Falls, NY
S. Shulhof	GE - CR&D
P. Simon	U.S. EPA, Region 2

Introductory Speakers - G. Pavlou and A. DiBernardo

The meeting began with opening remarks from Mr. G. Pavlou of the USEPA, Region 2. In his remarks, Mr. Pavlou gave a general overview of the Phase 1 investigation with particular attention to the preliminary risk assessment to be contained in the soon-to-be released Phase 1 report. He explained that the risk assessment would follow accepted EPA procedures and would address those areas of the Hudson River where sufficient data exist to permit the preliminary quantification of risk. He also indicated that the report would be made available for review by the public in July, after its initial review by EPA. Mr. Pavlou emphasized that the risk assessment contained in the Phase 1 report was preliminary and would be adjusted later as new data become available.

Mr. Pavlou went on to say that the preparation of a preliminary risk assessment at this point in a site investigation was not unusual or inconsistent with EPA policies and regulations. The preliminary risk assessment was not intended to be a final statement on site-related risks but rather was intended as a tool to guide the subsequent site investigation. He explained that the preliminary risk assessment would be used to define data quality objectives for the subsequent site investigation along with other standard considerations. In this manner, existing data would be assessed as to their current usefulness and additional data needs would be identified to provide the basis for an informed decision at the completion of the project. In this process, the quality, age and reliability of the existing data are always considered. Mr. Pavlou emphasized that the assessment in the final report would be based upon the most current and valid information.

Upon completion of his opening remarks, Mr. Pavlou introduced Mr. A. DiBernardo of TAMS Consultants. Mr. DiBernardo explained the format of the soon-to-be released Phase 1 report. He then explained that the four remaining speakers in the evening's

program would cover select sections of the report. He explained that because of the breadth of the Phase 1 investigation, it would be impossible to cover the contents of the entire report in a single evening. Mr. DiBernardo then introduced Dr. F. Cantelmo of St. John's University/TAMS Consultants, the first of the evening's technical speakers.

Dr. F. Cantelmo

Dr. Cantelmo presented an overview of the aquatic resources of the Upper and Lower Hudson. His treatment was not meant to be exhaustive but covered the major concerns and identified current unknown areas. Dr. Cantelmo's presentation consisted of a series of transparencies covering the Hudson's aquatic resources. The topics covered by Dr. Cantelmo included the following: organic resources to the Hudson River, major benthic freshwater invertebrates, dominant fish of the Upper Hudson River, dominant phytoplankton of the Lower Hudson, dominant macrophytes in the Lower Hudson, invertebrates of the Lower Hudson, resident fish of the Lower Hudson, and migratory fish of the Lower Hudson.

During his presentation, Dr. Cantelmo indicated that the Upper Hudson is capable of supporting a diverse fish fauna. However, current knowledge is not sufficient to define whether the energy input to the base of the food web is derived from primary production within the river itself or whether the energy is derived from production in the watershed. However, based on several studies of invertebrate and fish populations in the Upper Hudson over the last several years, it would appear that the quality of aquatic life in the Upper Hudson has improved from the seventies to the eighties. In the Lower Hudson, Dr. Cantelmo explained that much of the fish population is supported by consumption of invertebrates. The variations in environmental conditions both spatially and temporally increase the likelihood of supporting a diverse fisheries resource in the Lower Hudson. He also explained that adult migratory fish species largely feed on pelagic zooplankton and other fish while resident adult fish species feed on more temporally stable benthic invertebrates. In concluding, Dr. Cantelmo indicated that the success of any given species in the river in any given year was largely dependent upon the temporal and spatial distributions of its primary food source and thus substantial variations in numerical fish abundance and spawning success were to be expected.

Dr. Cantelmo's presentation was followed by a short question and answer period. Several questions were raised by the audience and are summarized below along with the speaker's response:

1. Was there a reference station for the studies of the Upper Hudson?

   No, there were none found in the literature.

2. Does the fact that the river flow is modulated potentially effect the fish populations?

There is no evidence to support this but the possibility exists.

Dr. D. Merrill

Following Dr. Cantelmo's presentation, the next speaker Dr. D. Merrill of Gradient Corporation was introduced by Mr. Pavlou. Dr. Merrill's presentation covered the current status of the Phase 1 evaluation of existing data for the Upper Hudson. The presentation included discussions of the following: the sources of data and the current status of the data base; the analysis of data for the various media of concern, including sediment, water and biota and the trends of these data with time; and the conclusions of the Phase 1 analysis of these data.

During his presentation, Dr. Merrill explained that the current data base consisted of greater than 11,000 measurements of PCBs in media associated with the Hudson, including about 3,500 sediment measurements and greater than 7,000 fish and biota measurements. Of the fish and biota measurements, about 1,900 were from the Upper Hudson. He also indicated that a limited amount of data existed on air, plant and groundwater PCB levels.

Dr. Merrill then presented the results of the Phase 1 analysis of these data, which yielded several important conclusions. Based on the analysis of the flow data from several U.S.G.S. hydrological stations located in the Upper Hudson basin, an estimate of the 100 year peak flood flow at Ft. Edward was made which was substantially lower than that previously reported. The new estimate was about 44,000 cfs as compared to a previous estimate of 52,400 cfs from FEMA (1984). Flows of the latter scale would be expected to occur with a frequency greater than one in 500 years based on the current analysis. This result has important implications concerning the possibility of a major scour event in the Upper Hudson and its implications for the PCB contamination in the remainder of the river.

Dr. Merrill then presented the results of the analysis of the water column data collected by the U.S.G.S . Based on a bias-corrected load calculation for PCB transport in the Upper Hudson, current results indicated that the PCB load has decreased exponentially since the late 1970's, with a half life of about 3 years. In addition, the analysis of PCB loads at several locations in the Upper Hudson between Ft. Edward and Waterford, N.Y. indicates that the current PCB load is constant throughout this reach and suggests that this loading originates north of Ft. Edward and not within the reach of the river where the "Hot Spots" are located. This is different from conditions in the river measured in the late 1970's and early 1980's where the majority of PCB load was generated between Ft. Edward and Schuylerville, the region of the Upper Hudson containing most of the "Hot Spots". This result suggests that an additional source may exist above the Ft. Edward area whose characteristics are completely unknown.

The last set of results presented by Dr. Merrill was derived from the analysis of the biota data, largely collected by the NYSDOH. The analysis showed that the PCB levels in fish were generally shifting with time from less chlorinated to more chlorinated PCB congeners on the basis of the shift in reported PCB levels as Aroclor 1016 to Aroclor 1254. The data on PCB levels in fish corrected for lipid content yielded a time trend similar to that seen in the water column data collected by the U.S.G.S., i.e., an exponential decrease with a half life of about 3.5 years. This similarity suggests a possible close tie between the water column and fish PCB levels. Lastly, an analysis of mean water column PCB levels and mean lipid-corrected fish PCB levels showed a strong linear correlation between the two, although much of the correlation was based on the earliest data points with the highest PCB levels.

Upon completion of his presentation, several questions were raised by the audience concerning the following:

1. Would the data base be made available to the public?

   Yes, upon completion and review by EPA.

2. Has the total mass in the Upper Hudson been compared to the mass transported by the river?

   This issue is currently being examined.

3. What would be the frequency of occurrence of 60,000 cfs flood?

   Our estimates suggest that this would occur with a frequency of greater than one in 500 years. The difference between the current estimates and earlier studies results from the exclusion of high flow data collected prior to the construction of the dam on the Sacandaga River and partially due to calculation of flows at different river locations. The earlier studies were done for points downstream of Ft. Edward.

4. What do you believe the source of the current PCB baseload to be?

   The sediments which remain upstream of the Ft. Edward dam area or possibly other bottom sediments.

5. What are the current water column concentrations in the Ft. Edward area?

   About 0.5 ppb.

6. Can you speculate on the result of a possible flood of a similar scale as the 1976 flood on riverine PCB levels?

We are currently exploring this and any speculation would be inappropriate at this time.

7. Was the calculation of fish PCB levels for the purposes of the preliminary risk assessment based on the data trends?

   Yes, the method extrapolated the recent trends into the future and estimated an average PCB level.

After the question and answer period, the meeting was interrupted for a 15 minute break. Following the break, the next speaker, Dr. E. Garvey was introduced by Mr. DiBernardo.

Dr. E. Garvey

The presentation by Dr. Garvey dealt with the sources of PCBs in the Lower Hudson, specifically the region between the Federal dam at Troy and the Narrows. In particular, Dr. Garvey's discussions covered seven different source types including: flow from the Upper to the Lower Hudson at Troy, other tributaries to the Lower Hudson, sewage discharge, combined sewer overflow & storm water discharge, landfill leachate, atmospheric deposition and direct releases.

Dr. Garvey indicated that in general, these sources were poorly defined in terms of the mass and type of PCBs released to the river, with the exception of the flow from the Upper Hudson. For this source, the PCB loads could be well defined on the basis of existing measurements by the U.S.G.S. Currently, the source from the Upper Hudson was estimated to be 1.3 to 2.4 lb/day. The contributions by the remaining sources were based on very limited data and in some cases were based solely on model estimates. The estimates of the remaining sources ranged from 1.8 to 4.6 lb/day for sewage discharges to 0 to 0.6 lb/day for landfill leachate. On this basis, Dr. Garvey indicated that currently the contributions by other sources to the Lower Hudson may be as large or greater than that from the Upper Hudson.

As a further means of comparison, Dr. Garvey summarized the results of two studies of PCB inputs to the Lower Hudson. The first study (Thomann et al., 1987) calculated loads for 1980 and suggested that the Upper Hudson constituted about 50% of the total loading, estimated to be 10.3 lb/day of a total of 19 lb/day. Next in importance for 1980 were the contributions from other tributaries and sewage at 2.3 and 2.5 lb/day, respectively. The other study (Hydroqual, 1991) estimated sources for 1987. In this study, the combination of the Upper Hudson and all other tributaries accounted for about 50% of the total input, i.e., 4 out of 8 lb/day. Sewage input was still important at 1.8 lb/day.

The last results presented by Dr. Garvey were those from the river sediments from Bopp and Simpson, 1989. In this study river sediment was examined to determine deposition

chronology. From these chronologies, Bopp and Simpson were able to estimate that in the region of the river near Manhattan, about 50% of the PCBs in the sediment were derived from the Upper Hudson flow and 50% were derived from local inputs not found in the northern portions of the Lower Hudson. On this basis, they inferred that the loadings must be similarly distributed, which generally agrees with the range of estimates from input studies.

Upon completion of his presentation, Dr. Garvey answered several questioned raised by the audience, which are summarized as follows:

1. Does the fact that the sediment curves at river miles 88.6 and -1.7 have the same half life suggest anything?

   The similarity in the curves is typical for inputs directly to the water column and suggests that historically the Upper Hudson source term was the dominant factor in controlling water column PCB levels in the Lower Hudson.

2. Is the conclusion that their are additional sources to the Lower Hudson based only on the two cores presented?

   These cores do not represent the only data available for this conclusion. In fact there are many samples collected from the river in these general locations which show the concentration difference and thus support the existence of an additional source(s) below the salt front. This is also suggested by the distributions of homologues which suggest a different mixture of PCBs at River Mile -1.7 as compared to River Mile 88.6.

3. Is the estuary, in general, a deposition environment?

   Only about 40% is considered depositional.

4. Does the core analysis take into account variations in the density of the sediment?

   In general, sediment density variations are unimportant, but essentially it is.

5. How can only a limited number of cores be used to estimate the sediment inventory in the Lower Hudson?

   The purpose of these cores is not to estimate sediment mass but instead to examine historic water born transport in a sample which can record this information.

After the completion of Dr. Garvey's portion of the program, Ms. Y. Lowney was introduced by Mr. Pavlou.

Ms. Y. Lowney

The presentation by Ms. Y. Lowney covered the process of conducting a risk assessment, with the goal for the Phase 1 report being the assessment of the quantity, quality and limitations of the data available. Ms. Lowney described the four step risk assessment process as follows:

- Hazard identification
- Dose-response relationship
- Exposure assessment
- Estimation of risks

For the purposes of the investigation, PCBs were identified as the only site-related hazard.

Ms. Lowney then discussed the dose-response relationship for PCBs in terms of both threshold (non-carcinogenic) and non-threshold (carcinogenic) effects. Current PCB response factors are conservatively based on those derived from Aroclor 1260, generally believed to be the most toxic blend of commercially produced PCBs. The current factor for non-threshold effects is 7.7 $(mg/kg\text{-}day)^{-1}$, based on the classification of PCBs as B2 carcinogens (i.e., probable human carcinogens based on animal studies). Ms. Lowney also indicated that research on PCBs is continuing and will be incorporated into the final risk assessment as appropriate.

Ms. Lowney then explained the next step in the risk assessment process, the exposure assessment. This assessment is dependent upon the chosen pathway of exposure since this defines the amount of contaminated media, the contaminant concentration in that media, the frequency and duration of exposure and the absorption of the contaminant from the media for a potential human receptor. Several pathways will be addressed in the Phase 1 risk assessment including exposures to river water, river sediments, and fish. Because of uncertainties associated with the source of the PCBs in the pathway, Ms. Lowney indicated it is unlikely that exposure PCBs via ingestion of farm crops, dairy products or livestock will be addressed. Ms. Lowney indicated that the actual risk calculations would be completed in time for the Phase 1 report.

On the basis of the work completed to date, Ms. Lowney presented the following conclusions:

1. Because tap water levels in Waterford were below instrument detection limits (< 0.5 ppb) and therefore below the federal Maximum Contaminant Limit of 5 ppb (Total PCBs), no tap water exposure scenario would be evaluated in the risk assessment.

2. Recreational river use would be broken down by age group due to anticipated differences in river usage according to age. Exposure point concentrations for

river sediments are needed since the historic data base deals with the "Hot Spots" and does not quantify levels typical to shoreline materials.

3. Fish consumption will be addressed on the basis that people will continue to ignore the fishing ban, as has been noted in previous studies. The most current data covers fish levels to 1988. The FDA-established level of 2 ppm in fish is not acceptable to EPA.

Upon completion of her presentation, Ms. Lowney and Mr. Pavlou answered several questions from the audience which are summarized here:

1. What is being done to determine the health risks of fish consumption and recreational use in the Lower Hudson?

   The current intent is to address these risks only quantitatively for the Phase 1 report. These risks may be addressed in subsequent reports.

2. Are PCBs carcinogenic or not?

   PCBs have been demonstrated to be carcinogens in animal studies. Presumably, they will also cause cancer in humans. Recent studies appear to support this presumption.

3. Why is a risk assessment being performed now when the most recent data is from 1988?

   This data is considered sufficiently recent and of sufficient quality for the purposes of a preliminary risk assessment.

4. Will risks due to fish ingestion be quantified using Aroclor 1260 risk factors, when in fact, most fish levels are quantified as total PCBs?

   Current EPA policy is assume that all PCBs exhibit the toxicity of the Aroclor 1260 mixture and therefore the Aroclor 1260 risk factor will be used unless EPA policy is changed.

Upon completion of the question and answer period, Mr. Pavlou adjourned the meeting at about 9:30 PM.