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FACSIMILE TRANSMISSION COVERSHEET

DATE: _____ TIME: _____

TO: MR. DOUGLAS TOMCHUK

AT: USEPA - REGION II

RE: HUDSON RIVER REASSESSMENT - PHASE II

FAX NO. 212-264-7611 PHONE NO. _____

NUMBER OF PAGES (INCLUDING COVERSHEET): 6

FROM: G. W. PUTMAN

FAX NO. above PHONE NO. _____

MESSAGE: Record of my comments at the July 10 STC meeting, as requested by Chairman NICHOLSON plus some additional remarks in respect to the Phase 2 sampling plan. Hard copy follows by mail.

July 22, 1992

Mr. Douglas J. Tomchuk, Project Manager
U.S. Environmental Protection Agency
Region II - Room 747
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G.W. Putman - Comment/Recommendations re: Phase 2 Work Plan and Sampling Plan, Hudson River Reassessment RI/FS

1. Text 3-2-1; 3-2-2, and 3-2-3. Transect Sampling, PCB Equilibrum, and Flow-averaged Sampling.

While the goals of these subtasks have merit, parts of the project design are dubious. It is not clear that this design can furnish the intended information to be derived from the sampling events, and an assumption that the Thompson Island pool controls or dictates the PCB discharge from Area B is questionable.

Some of the problems or complications for these subtasks, as described, are:

1) High flow regime samples of 3.2.1 could be a problem. Clear differences in PCB transport mechanisms exist at high vs. low river discharges, and the same applies to the inference of "source" (pg. 3-4, 5).

2) Suspended sediment and PCB concentrations at high discharges are notoriously sensitive to timing of the discharge cycle, and vary much more than the discharge itself. Furthermore, historical data indicate that the PCB flux varies among stations with the sequence of high discharge events in a given year, and thus may influence the perception of "source".

3) If low flow PCB loading reflects desorption or diffusion from sediments, then it is dependent on flow path length and other factors (e.g. temperature) as well as congener pattern and concentration. If high flow PCB loading reflects a derivation primarily via suspended or scoured sediment, then sediment sources and dynamics are considerations.

An emphasis on sampling the Thompson Island pool and remnant deposits is obviously germane to initial PCB loading, but an assumption of continuity to the discharge flux at Troy is not warranted. The Battenkill and Hoosic Rivers are important sources of sediment loading to the Hudson; other tributaries and the Champlain Canal are contributors as is reflected in increased downstream sediment loading and change in sediment character at constant discharge. Tributary sediment loads may adsorb PCB from the water column and become potential "sinks" via downstream deposition at high flow, and act as subsequent "sources" via desorption at low flow.

Beyond the Thompson Island a pool dynamic sediment adsorption effect during discharge events will complicate the idea of PCB source identification as described on pages 3-6 and 7; it is by no means clear that the PCB equilibrium study can resolve this point.

4) Flow-averaged sampling further confuses the picture by combining low and high flow events, and is entirely at the mercy of the inherent variability of the discharge record. It is not clear what is to be accomplished by compositing samples and waiting weeks before filtration (for equilibrium partitioning) when existing data suggests non-equilibrium dynamics in general for PCB release or readsorption.

Averaged results, such as Figure 3.6, can be very misleading in inferences of "source" and transport dynamics. Cursory reference to Fig. 3.6 would suggest a significant PCB "source" between the Thompson Island dam and Schuylerville. In fact, because of down-stream PCB readsorption and sediment deposition, the entire river reach --Thompson Island dam to Waterford-- can be looked on as a "source" in order to maintain the mean PCB contents as noted.

II. Text 5.3.2 Sediment Erodibility

I do not agree that sediment scour potential in flood discharge events can be simply characterized on the basis of bed material, and hence cohesion, reduced to laboratory measurements of shear stress. During the 1975-76 100-year flood event the Thompson Island pool was predominantely a site of deposition, not erosion, as is shown by the radioactive tracer chronology, sediment stratigraphy, and overall lack of erosional discontinuity. Much of the reason may have been "choking" by sediment from the unstable remnant deposits above Rogers Island, but in principle the same situation still exists there, in lesser degree, and continues to exist below the Thompson Island pool with respect to flood discharges from the Battenkill and Hoosic Rivers (see data of 1983 and 1987 flood events).

Overall, the sediment "stratigraphy" and chronology from cores of record in "hot spots" suggests annual deposition increments from flood events with resuspension, if it occurs, being restricted to this annual sediment. Evidence of scour/resuspension in other sediment areas has not been documented as to style and scope, and is essential information to any model of sediment erosion potential. I also have a problem with how both the probability distributions of critical stress and variation at different localities will be determined, and incorporated into a model with allowance for upstream sediment loading and seasonal discharge history. Please note that in the historic data, sediment loading in high discharge events is strongly influenced by position in an annual sequence, as well as by flow rate and discharge cycle.

Obviously, areas of the river bottom exist with little or no deposition, or only coarse sediment, but these should not be confused with potential "erodibility".

III. General, and Recommendations

In my opinion, Phase 2 sampling devotes too much effort at the Thompson Island pool and not enough downstream in Area B in assessing PCB contaminated sediment in the upper Hudson, and too much sampling effort in the upper Hudson relative to assessing the lower

Hudson. Much effort has already been directed at the Thompson Island pool and its buried "hotspots" as potential PCB sources; while certainly some follow-up sampling for comparison is indicated, I question the scope, especially more low resolution coring.

Existing data (summarized in Phase 1), indicates that uppermost or surficial river sediment is the PCB "source" at low flow conditions wherein the bulk is transported. In my view the monitor station discharge and loading record indicates that the entire Ft. Edward to Troy dam reach is a potential "source" via desorption/diffusion. On the other hand, properly timed monitoring of prior high flow events (e.g. April, 1987) suggests an upstream PCB source at Rogers Island, with most of the downstream reach to Troy acting as a "sink". In this case, the contribution of the Thompson Island pool is debateable, but the remnant deposits can be called into question.

1) Both of these situations require an assessment outside the Thompson Island pool. Phase 2 provides water column and transect station sampling in the remnant deposits area, but transect stations below the Thompson Island dam cannot be used to full advantage. If transect sampling at high flow is made on the Hoosic River near Lock 4, then sampling above the Hoosic at Stillwater should be made for comparison with the downstream station at mile 160 to evaluate the effect of Hoosic discharge. Likewise, a station above the Battenkill (Lock 5), and at the Federal dam (Troy) could considerably enhance the information gained.

2) High resolution coring is needed in at least one locality between Ft. Miller and Stillwater. Some historic high resolution (1" segments) cores, analyzed by the NYSDEC (Tofflemire and Quinn, 1979; incl. Cs 137) were located in this reach and could be used for comparison. For example, Core 12-1, 30+ in., was located at Lock 5 near Schuylerville. At least 25 high resolution cores (NA1 "winter" 1977 cores) were reportedly archived (and data filed for a reported 230 others; Tofflemire, Quinn, and Hague, NYSDEC Tech. Paper 56, 57; 1979) and would also be useful for sediment characterization relative to the

geophysical survey. To date, however, this core data has not been located or was not made available for phase 1.

In any event, this is too long a river stretch to omit in the context of the purpose of the proposed core locations (Fig. 2.4). I suggest the four core locations in the Thompson Island pool be cut to three or two.

3) Unless a better rationale can be provided for more low resolution coring in the Thompson Island pool (Analysis of variance ?) I do not see how this task contributes much, particularly in relation to existing data.

4) Transect station sampling for "high flow" events should commence on the rise of the event and not delay one to two days (Appendix pg. A-9). A daily continuation of sampling would yield maximum information, but the critical timing for PCB and suspended sediment concentrations is on the rise cycle of the event (C. Barnes, personal communication). This can be determined by upstream monitoring of discharge, but admittedly will be difficult for stations above Rogers Island. An advance stipulation that sampling events will be 4-6 weeks apart (p. A-8) will probably not permit sampling of three true high flow events (p. A-9); high flow at Ft. Edward being defined as about 12,000 cfs for a consistent increase in the concentration of suspended sediment.

5) With a split of high resolution cores between the upper and low Hudson (and a better distribution in the latter), it is incongruous, in respect to the core-water sample rationale used, not to have any direct water column sampling in the lower Hudson.