SARATOGA COUNTY
ENVIRONMENTAL MANAGEMENT COUNCIL
PETER BALET
CHAIRMAN
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March 13, 2000

Dr. Grace Luk, Professor, Civil Engineering
Ryerson Polytechnic University
350 Victoria Street
Toronto, Ontario, Canada M5B 2K3

RE: Charge for Peer Review 3
Specific Question 11

Dear Dr. Luk:

This letter is written to express my concern over Specific Question 11. The question appears innocent enough but must be taken in the context of several concerns about the Low Resolution Coring Report (LRC). Because I am not sure you have been provided with the LRC report and EPA's response to comments on the report, I am sending you this letter to assist in your review. Serious questions have been raised about the conclusions EPA presented in the LRC report. Further, the EPA response to these questions has been less than adequate. Finally, there is the inadequate attempt by EPA to justify the differences between the LRC report and the Revised Baseline Modeling Report (RBMR) on pages 140 and 141 of the RBMR.

Examples of the more significant comments I submitted on the LRC and a discussion of the inadequacy of the EPA responses are shown in the attachment to this letter. The examples are taken from my letter of October 1, 1999 to John Wanska of the GAO. This letter was in response to a request from the GAO for examples of what I considered to be failures on EPA's part to reply responsibly and completely to comments. The thrust of these comments is that EPA had insufficient data to draw conclusions about movement of PCBs from the hot spots in the Thompson Island Pool (TIP), and EPA used what data it had improperly. Also, that EPA improperly used a homogenized 9in. upper core segment to draw the conclusion that burial of PCBs is not occurring.

These inadequacies of the LRC report are then compounded by the discussion in Section 7.4.4 on pp. 140 and 141 of the RBMR. First, on p. 140, EPA maintains that a direct comparison of HUDTOX and LRC findings is impossible due to different assumptions and spatial scales (the LRC dealt only with cohesive sediment while HUDTOX considers both cohesive and non-cohesive areas). But HUDTOX considers the two types of sediment separately so it is not at all clear why HUDTOX results for the cohesive sediment can not be compared to the LRC conclusions. Second, on p. 141, EPA maintains the 9% loss of PCBs from the TIP calculated by HUDTOX shows consistency with the LRC best estimate of 45% from the hotspots because the 9% is within the 4 to 59% range in the LRC. To say 9% and 45% are consistent on this basis seems amazing. What would be the probability that the value in the LRC would truly lie at one extreme of the range? Finally, in the last paragraph, EPA repeats the same misleading type

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statement used in the LRC about the poolwide change in sediment bed depth. This change has no bearing on the question of burial because burial is only expected in the cohesive sediments. The increase in the cohesive sediment of 6.5 cm. in 10 years from the HUDTOX model is in reasonable agreement with the 0.8cm/yr. value calculated by the GE/QEA model. (As an aside, I hope you have had the time to review GE's model so we can have the benefits of your thoughts on how the models compare.) EPA states that the 6.5cm. increase is small compared to the "surface" layer depth of 23 cm., the depth of the upper 9 in. layer in the LRC. Simply because EPA used a 23cm. upper layer in the LRC does not make this the "surface" layer, at least not in the important sense of what is the active surface layer for PCB interchange with the water column. This active layer is much more likely in the range of 5cm. or 2in., making a change of 6.5cm. quite important and indicative that burial is occurring. Burial, of course, would be consistent with the continued presence of hotspots. Without burial, how could the hotspots continue to exist?

Coming back to the original concern over Question 11, one must wonder if EPA is seeking vindication of the conclusions reached from EPA's geochemical approach as set forth in the Data Evaluation and Interpretation report and the LRC report. These reports showed a distinct bias towards remedial action based on lack of burial in the TIP hotspots and these hotspots being the major source of PCBs to the food chain. These conclusions are in direct contradiction to the results from HUDTOX. The HUDTOX results show burial is occurring, all of the contaminated sediment contributes PCBs to the food chain, and long term PCB levels are governed by the input of PCBs from upstream of the TIP. EPA's geochemical approach has discounted the importance of upstream PCB inputs. To conclude that the geochemical-based conclusions are correct for the present situation would seem to require EPA to refute its own model. This would then raise the question of how EPA can justify saying its model is inadequate to model the present situation but is satisfactory to predict the future, something the geochemical model can not do. It is very important that Question 11 be given close scrutiny.

Sincerely,

David D. Adams, P.E.

David D. Adams, P.E. MP
Member-At-Large, SCEMC
Member, Government Liaison Committee, C.

Enc.

cc: Mr. Doug Tomchuk, Project Manager, USEPA
Mr. Darryl Decker, Chr; Government Liaison Committee, CIP
SCEMC Members

ATTACHMENT

Selected Comments By David D. Adams From Letter To John Wanska, GAO, Dated October 1, 1999.

Following are EPA's responses to SCEMC comments on EPA's Low Resolution Coring Report (LRCR) which are followed by SCEMC's discussion of why EPA's response was inadequate. The complete text of EPA's responses can be found in EPA's Responsiveness Summary for Volume 2C-A, Low Resolution Sediment Coring Report dated February, 1999.

Comment #2. ***P.1-7 & P.2-1: Before any conclusions can be drawn from the low resolution coring (LRC) data, a statistical analysis must be done which predicts the ability of the small number of samples taken by EPA in only a few locations to adequately estimate the PCB mass over a large area with very large spatial variations in PCB concentrations. This analysis should include consideration of the fact that the mean values from the NYSDEC data are based upon an order of magnitude greater number of samples than the EPA data. Page 1-7 states the LRC program wasn't designed to duplicate the extensive spatial coverage of the NYSDEC program. Page 2-1 dramatically quantifies this statement by showing that EPA had only 60 core sampling sites in the TIP in the vicinity of the 1984 NYSDEC locations vs. 1200 NYSDEC core sites. The meager number of EPA cores hardly seems sufficient to quantify the PCB inventory (and therefore changes to the inventory as put forth later in the report) in the face of existing data which show very large spatial variation in PCB concentrations over very short distances in the TIP. EPA's data also shows this variation as can be seen in Plate 4-23 which indicates a 100:1 difference in concentration in nearby samples and variations of 10:1 in most, if not all, of Plates 4-21 to 4-28. Certainly, the scope of the EPA sampling program is not sufficient to justify the "alarming" statements made by EPA to the public which accompanied the release of the report and called for a study of immediate remedial action.***

EPA's response to this comment is found on pp. LRC-40 & 41 of the Responsiveness Summary, Responses LL-1.2 & 1.3. These responses completely miss the major thrust of our comment which is that before drawing conclusions about differences between individual samples taken in 1984 and in 1994 and by inference differences in PCB inventory it is first necessary to show statistically that the 1984 and 1994 populations are different. This can be evaluated by a statistical method, such as the analysis of variance, which can compare two populations of different sample size. Considering the known large spatial variation in PCB concentration over very short distances in the Thompson Island Pool (TIP), it is first necessary to show that the total 1994 data set is significantly different from the 1984 data set before conclusions can be drawn (as EPA does in Vol. 2C-A) about changes in PCB inventory in the TIP. This same comment was made by one of the peer reviewers of Vol. 2C-A. Also, the EPA responses contradict the LRC report itself. The responses say the LRC study was not "designed to create a 1994 inventory" (Response to LL-1.2) and later in LL-1.3 "the LRC for the TI Pool inventory is a point-to-point comparison between sixty 1984 cores or grabs and sixty 1994 cores, not a Thompson Island Pool inventory estimate comparison." However the point-to-point comparisons are used in the LRC report to calculate the change in the PCB inventory in the TIP "hotspots" between 1984 and 1994, precisely the purpose EPA said in the responses was not the purpose of the 1994 data.

Comment #6. ***P.2-16: The statement that the presence of PCB maxima in the top-most core layer shows that PCB burial is not occurring is not justified. High resolution core profiles have shown relatively low PCB concentrations in the first few inches of sediment with the PCB concentration then rising rapidly to a peak before declining to a low level or zero. Inspection of Fig. 2-7 shows that most of the PCB mass in both of these cores would occur within the top 9 inches (about 23 cm) of the cores but yet relatively low PCB concentrations within 2 plus inches of the sediment-water interface. Burial may or may not be occurring (the presence of "hot spots" would seem to indicate it is) but reasoning from the presence of a maximum PCB concentration in an upper 9" core segment cannot be used to make such a conclusion.***

EPA's response first says (Response to LL-1.7 on p. LRC-20) that not all the cores from fine grained areas of the Hudson River have a profile of PCB concentration which peak at depth below the water/sediment interface. However, all of the high resolution cores taken by EPA in the fine grained areas show this profile of the peak PCB concentration at depth and EPA fails to show any high resolution core data to support their position that the peak is not always at depth, making EPA's response little more than speculation. EPA presents only speculation and not facts to refute the fact that what high resolution core data are available show that the peak PCB concentrations occur several inches below the surface and well below what even EPA today admits is the "active" sediment depth (~ 2") involved in PCB interchange between sediment and the water column. EPA also does nothing factual to refute the observation in the comment that the PCB concentration profiles in the high resolution cores are such that mixing the top 9" in these cores would result in the maximum PCB concentration in this top 9" segment even though the PCB concentration in the top 2" of the cores is relatively low and the peak concentrations are well below this depth. EPA presents no factual information in its response to refute the comments contentions that EPA has misused the LRC data to draw conclusions not supported by the LRC data. Instead, EPA repeats the conclusions from the LRC report our comment takes issue with and brings in other extraneous statements, again not substantiated by facts, such as the effect of prop wash disturbance of sediment.

Comment #15. ***P.4-21: The discussion on P. 4-21 about corrections needed for the grab samples is another illustration of uncertainty in the EPA comparison of 1994 data to earlier data. There is no way of knowing if the extrapolation to 12" is valid or not. It is suggested the grab samples not be included in the analysis. Also, using the concentration of the second layer of the 1994 LRC samples to extend 9" cores to 12" is questioned. Based upon the sharp PCB concentration gradient in the range of 9-12" seen in the high resolution cores, this method of extending from 9" to 12" may greatly underestimate the LWA (Length Weighted Average) in the 1994 data.***

EPA's response, LL-1.17, on p. LRC-65 does not address the suggested deletion of the grab samples from the data analysis due to the inability to know if the extrapolation from the unknown depth of the grab samples (presumed to be 4") to 12" sediment depth is valid. Also, no data or calculations are presented to support EPA's contention that the LWA PCB concentration values calculated by extrapolating the 9" core concentrations to 12" using the data from the next deeper core segment are acceptable since "the PCB maxima are typically found in the uppermost core segment." This statement needs justification not provided by EPA because high resolution core data shows high concentration gradients in the 9 – 12" range of sediment depth and not in the 0-9" range.

Comment #17. ***P.4-22: Any comparison of PCB inventory based upon the 1976-78 and 1994 data is made uncertain by the lack of solid specific weight (SSW) data for the 1976-78 data. The statement here that total PCBs and SSW show very strong correlation is in contradiction to the statement on P. 3-18 that SSW showed a weak trend with PCB concentration. Also the range of variation in the data in Fig. 3-15 and 4-17 is very large making conclusions about correlations uncertain and no 2σ or 3σ values are given for the SSW to PCB values shown in Table 4-3. EPA needs to do more to show why the SSW values used for the 1976-78 data are reasonable to use, including a level of uncertainty, to make comparisons of PCB inventories between 1976-78 and 1994 meaningful.***

EPA's response, LL-1.19, is on p. LRC-66 of the Responsiveness Summary. While the response acknowledges the validity of the comment about the correlation of total PCBs and SSW, EPA fails to provide any information on uncertainty ranges. EPA's reliance on LWA comparisons for support is questionable given the issues raised in Comment #15 above.