UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II

DATE:

SUBJECT: Ecological Risk Assessment for Onondaga Lake

FROM: Christopher A. Stitt, Environmental Scientist
Hazardous Waste Support Branch (DESA-HWSB)

TO: Robert Nunes, Remedial Project Manager
New York Remediation Branch (ERRD-NYRB)

As per your request, we have reviewed the "Baseline Ecological Risk Assessment" (BERA), dated April 2001, and prepared by Exponent, for the Onondaga Lake site located in Syracuse, Onondaga County, New York. We provide the following comments.

General Comments

The development of the Onondaga Lake Sediment Quality (OLSQVs) values based on Site specific Apparent Effects Thresholds (AETs) is unacceptable. The specific manner in which the toxicity values were employed in developing the AETs is inappropriate, and more consideration should be given to other measures of toxicity than those used when developing the OLSQVs. The chemical data associated with the lowest significant laboratory test for toxicity should be used to develop a single set of AETs. A No Observed Adverse Effect Level (NOAEL) based on literature values or site specific data should also be developed. The range between these two values sets should be evaluated based on impacts to the benthic invertebrate community and by incorporating the other site specific information that has been developed such as Hazard Quotients and Toxicity Reference Values (TRVs). This weight of evidence approach should then be used in establishing the OLSQVs. By way of example of the problems encountered, a quick spot check found that the TRV selected for methylmercury in fish may not be the most conservative value available. In Jarvinen and Ankley (1998) there are two values cited, which may be appropriate, that are lower than the Lowest Observed Adverse Effect Level (LOAEL) TRV used in this BERA. A review of the original literature may be necessary to determine if these lower values are appropriate for use in this BERA and if so then changes should be made. It would also be appropriate to review the other TRVs used in this BERA if there is a reasonable chance that somewhat lower TRV may influence the conclusions regarding ecological risk.

The probabilistic analysis did not have a finalized and approved work plan prior to its inclusion in the BERA. All required elements from the EPA Probabilistic Risk Assessment guidance need to be included in the work plan. Also, the Tier 1 and 2 analysis was not approved prior to the submission of the BERA.

It is unclear why no piscivorous fish species were evaluated as receptors for the BERA. These species would seem to be integral and important components of the food chain that is being considered in the BERA. In addition to the ingestion exposure route, the whole body tissue residue contaminant concentrations should be compared to literature-based effects concentrations.

Specific Comments

1. Page xxiii,
   a. 1st ¶, 3rd sentence - Remove the word "important."
   b. 2nd ¶, 4th sentence - The definition of the purpose of the ERA should come from ERAGS or other ecological risk assessment guidance not from the Probabilistic Risk Assessment Guidance.

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2. Page xxiv,
   a. 6th bullet, last sentence - Without data to support this, the statement should be removed.
   b. 7th bullet - This text should also list all the COCs that exceed NYSDEC sediment screening values.

3. Page xxv,
   a. 5th bullet, 1st sentence - This sentence needs rewording.
   b. last two bullets - If any of the researchers suggest that the site-related COCs or processes could be potential causes of the reduction in reproducing fish species or the absence of reptiles and amphibians, they should be included here.

4. Page xxvii, 6th bullet - This bullet should indicate if whole body or fillet samples were collected for chemical analysis.

5. Page xxxv, 1st full ¶, 4th sentence - Benthic invertebrates may be transferring COCs through the food chain in their role as prey to higher organisms.

6. Page xxxvii, 1st ¶, 1st sentence - New York State has class designations on surface water bodies and corresponding water quality values for these designations which should be incorporated into the assessment.

7. Table ES-2 - The method by which the COCs were selected in the specific receptors should be provided.

8. Table ES-4 - All HI exceedances greater than one should be highlighted for both the NOAEL and LOAEL comparisons.

9. Page 1-1, last ¶, 1st sentence - Use the ERAGS definition of the objective of a baseline risk assessment not the definition from the Probabilistic Risk Assessment guidance.

10. Page 1-2, 3rd ¶, 2nd sentence - Since no formal presentation of a SLERA was prepared, it cannot be stated that the ERAGS steps have been conducted already.

11. Page 1-3, last ¶ - The lack of field ecological data is based on the fact that the ERAGS process was not properly followed. The BERA looks at individual risks and extrapolates this information to populations and communities.

12. Figure 1-5 - This figure indicates that Steps 1 - 4 of the ERAGS process were completed in 1990 to 1991. If this is so, the written documentation should have been sent to NYSDEC for review and approval at that time.

13. Page 3-9, 1st bullet, last sentence - This sentence should reference Table 3-2 not 3-3.

14. Table 3-11 - The mammal species that have been observed near Onondaga Lake should be indicated on this table.

15. Page 4-5,

a. Section 4.2, 1st ¶ - Use the ERAGS definition for the goal of an ERA rather than one from the Probabilistic Risk Assessment guidance.

b. last bullet - Another specific objective of the BERA should be to determine whether concentrations of COCs in sediments exceed NYSDEC sediment screening values.

16. Page 6-1, Section 6.1, 3rd ¶, 3rd sentence - This sentence should indicate what percent frequency of detection value was used to determine that a contaminant was removed as a COC. Contaminants should not be eliminated as COCs based on "low frequencies of exceedance of screening values." If during the SLERA, contaminant concentrations are greater than the appropriate screening values causing an HI greater than one, the contaminant should be carried through Step 3 of the ERAGS process.

17. Page 6-3, Section 6.3.3

a. 3rd sentence - This sentence must acknowledge that fish are also exposed to COCs through the ingestion of smaller fish.

b. 6th sentence - This sentence must acknowledge that complete exposure pathways exist for piscivorous fish as well as mammals and birds.

18. Page 6-4, Section 6.5 - All measurement endpoints involving comparison of COC concentrations in sediment to criteria should include comparison to NYSDEC sediment screening values.

19. Page 6-6, Section 6.4, Measurement Endpoints - An important measurement endpoint for the protection and maintenance of local populations and communities of fish that must be added here and evaluated is the comparison of measured and/or modeled dietary doses of COCs in fish based on measured concentrations of COCs in lake media (surface water, sediment, and prey) to TRVs.

20. Page 6-7, Section 6.6 - All risk questions involving comparison of COC concentrations in sediment to criteria should include comparison to NYSDEC sediment screening values.

21. Table 6-3 - The method by which the COCs were selected in the specific receptors should be provided. There should be text in the document describing the procedure to select these COCs.

22. Page 8-1, Section 8.1.1 - Both the text and bullets should discuss the distributions of maximum metal concentrations as well as mean concentrations and include the most stringent (federal or state) surface water quality criteria for comparison.

23.Page 8-6, Section 8.1.2 - This section needs to include a discussion of the chemical concentrations for the chemicals and stressors of concern in the sediments taken at a depth of 15cm and a comparison of these concentrations to the most stringent (federal or state) sediment screening values.

24. Page 8-18, Section 8.2.3.5, 1st ¶, 3rd sentence - These receptors were also selected to be representative of other species observed and expected at the site. This fact should be added to the text.

25. Page 8-23, Section 8.2.3.11 - COC exposure from background sources should not be taken into account when calculating the risk estimates for ecological receptors. Information on background concentrations and exposures are evaluated after the risk assessment is completed during the risk management phase.

26. Page 8-24, Section 8.2.3.13 - References need to be included here for the two equations and justification provided for their use in the ecological risk assessment.

27. Figure 8-1 through 8-10 - The most stringent (federal or state) surface water quality criteria should be presented on all of these figures.

28. Figures 8-13 through 8-18 - The most stringent (federal or state) sediment screening values should be presented on all of the figures.

29. Page 9-31, Section 9.7.1 - The whole body levels of contaminants in fish should also be compared to the tissue residue levels listed in the document titled "Linkage of Effects of Tissue Residues: Development of a Comprehensive Database for Aquatic Organisms Exposed to Organic and Inorganic Chemicals" by Alfred Jarvinen and Gerald Ankley. See the General Comments above for more information.

30. Tables 9-10 and 9-11 - These tables must include the TRVs used in the deterministic risk assessment calculations.

31. Page 10-18, Section 10.1.3 - All of the discussions involving probabilistic risk assessment results and background risks have to be moved to another section of the document preferably the Uncertainty Section.

32. Page 10-53, last ¶ - Since the ecological risk assessment excluded the analysis of piscivorous fish as receptors of concern, the statements in this paragraph are not necessarily true. If there were potential ecological risks to piscivorous fish in the lake, they may not be characterized by confined subpopulations which could increase the potential number of individuals exposed.

33. Figure 10-8 - Exceedances of NYSDEC sediment screening values should also be depicted on this figure.

We hope these comments have been helpful. The BTAG and/or DESA is interested in reviewing any future documents pertaining to this site. If you have any questions, comments, or require further information, please contact me at (732) 321-6676.

cc: Gina Ferreira, DEPP-SPMMPB
John Cantilli, DEPP-WPB
Steve Ferreira, DEPP-SPMMPB
Lisa Rosman, NOAA
Charles Merckel, USFWS