UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

SR-6J

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Nandra Weeks
GeoSyntec Consultants
2258 Riverside Avenue
Jacksonville, FL 32204

Subject: U.S. EPA Comments on the Revised Draft Report Biological Assessment of the Little Vermilion River Adjacent to Matthiessen and Hegeler Zinc Company Site, LaSalle, Illinois, November 2010

Dear Ms. Weeks,

Below please find the comments on the above referenced document. If you have any questions or comments, please feel free to contact me at 312-886-0214.

Sincerely,

Demaree Collier
Remedial Project Manager

cc: R. Berggreen – GeoSyntec (electronic only)
J. Knoepfle – SulTRAC (electronic only)
J. Chapman – U.S. EPA (electronic only)
R. Lange – IEPA (electronic only)
C. Smith – IEPA – (electronic only)

U.S. EPA Technical Comments on the Revised Draft Report Biological Assessment of the Little Vermilion River Adjacent to Matthiessen and Hegeler Zinc Company Site LaSalle, Illinois

November 2010

1) **Section 2.0 - METHODS - p. 3:**

The method for macroinvertebrate sampling was inconsistent with the IEPA protocol (IEPA 2007) cited in the Field Sample Plan (FSP). Comparison of site macroinvertebrate Index of Biological Integrity (mIBI) values with IEPA " 'best value' (macroinvertebrates) based on IEPA's study and assessment of … macroinvertebrate communities in stream systems that are least disturbed by human impacts and similar in watershed/habitat characteristics to the Little Vermilion River" are invalid and should be removed from the Biological Assessment.

Is the "reference reach … beyond any influence of the Matthiessen and Hegeler Zinc Company Site" outside of the deposition zone of air-borne chemicals from the site? If not, this, and similar statements, should be restated to indicate the reference reach was uninfluenced by the site except for possible air deposition.

2) **Section 2.4 - Benthic Macroinvertebrate Community Sampling - p. 13-14:**

The statements following "The split river design…" are incorrect and should be revised.

"The IEPA protocol also assumes a certain percentage of the full wetted width is comprised of bank zone habitats and bottom zone habitats (IEPA, 2007). For example: if full wetted width of the stream falls in the designated range of 10-29 feet, the assumed width of each bank zone is 20 percent of the full wetted width. The split river study design complicates the precise application of this feature. With one bank zone and one-half the bottom zone (i.e., one-half the full stream wetted width) subject to sampling, emphasis was placed on allocating sample jabs proportionately among habitats actually present throughout the discrete east and west sample reach halves."

The split river study design has no impact on the allocation of bank-zone and bottom-zone sampling. The sampled segments of the LVR fall within the 30-59 ft mean wetted width category for which the assumed width of bank zone is 15 % of wetted width per bank, and the sampling-effort allocation is 6 bank-zone dips and 14 bottom-zone dips (IEPA 2007 Table 1). Over the entire wetted width, bank-zone dips are 30 % of the total 20 dips per reach, identical to the assumed proportion of bank-zone habitat (15 % per bank * 2 banks per reach). When reaches are divided longitudinally, the bank- and bottom-zone proportions are unchanged (15 % per bank ÷ 0.5 wetted width = 30 % bank-zone habitat per split reach).

3) **Section 3.1.2 - Habitat Assessment for Macroinvertebrate Sampling - p.24:**

According to the table Macroinvertebrate Community Sampling Effort by Habitat Type, the specified allocation of 6 bank-zone and 14 bottom-zone dips occurred at only 2 sample locations, CAR002East and CAR002West. Bank-zone habitat was undersampled in CAR001East (20 % of total), and oversampled in CAR001West (35 %), CAR003East (60 %) and West (40 %), and CAR004East (55 %) and West (50 %) compared to IEPA (2007) protocol (30 % of total dips for LVR wetted width). In other words, bank-zone habitat was oversampled in most locations by as much as 2-fold compared to IEPA (2007) protocol, and was undersampled by one-third at one location.

Sample allocation by visual estimation was inconsistent with the IEPA protocol (IEPA 2007) cited in the FSP.

> 'Sampling of different habitats was made proportional to the visual estimation of the different habitats within a particular LVR sample reach. For example; if by visual estimation ¾ of the habitat in a particular reach was composed of coarse substrates, then ¾ of the samples for that reach were collected from coarse substrates, and so on. '

Contrary to the example given in which habitat proportions are estimated over a sampling reach in aggregate, the IEPA (2007) protocol requires *separate* evaluations of the proportions of 3 bank-zone habitats (used to allocate the 6 bank-zone dips among bank-zone habitats) and 4 bottom-zone habitats (used to allocate the 14 bottom-zone dips among bottom-zone habitats).

Compliance with IEPA (2007) sampling protocols is a necessary condition for comparing site-specific mIBI values with IEPA threshold values based on these protocols. With the possible exceptions of CAR002East and CAR002West (depending on whether the within bank-zone and bottom-zone habitat dips were allocated according to IEPA (2007) protocol), this condition was not met and comparisons with IEPA threshold values should be removed from the document.

4) **Section 3.1.2 - Habitat Assessment for Macroinvertebrate Sampling - p.25:**

As noted above, the "more even" ratio of bank- and bottom-zone jabs at CAR003 and CAR004 is contrary to IEPA (2007) protocol.

The statement that "the resulting data are deemed suitable for calculating mIBI scores based on comparison of the multi-metric values to IEPA-established 'best values' for the purposes of evaluating ecological conditions adjacent to, and upstream of, the Site" is incorrect. Failure to follow IEPA (2007) sampling protocol invalidates comparison with "best values" based on the required protocols.

5) **Section 3.2.5 - Fish Community Index of Biotic Integrity (fIBI)** p. 30-31

The presented rationale for calculating adjusted fIBI scores does not reflect the reasons discussed in the 10/5/10 Springfield meeting with IEPA. Inclusion of adjusted fIBI scoring was not "to provide some analysis of uncertainty associated with the somewhat lower fish sample counts", as incorrectly stated in the Revised Draft Report. The underlying issue is incompatibility in fish sampling methods. IEPA stated that the fish sampling method used at the site, backpack electroshocking, was not used by IEPA in any of the 40-ft wide streams that make up the database for developing regional fIBI values. IEPA expressed concern that backpack electroshocking may have resulted in relatively less efficient sampling that could reduce the reliability of the proportional metrics that contribute to the final fIBI value. The same issue of potentially unreliable proportional metrics arises when stream segments are undersampled, and the adjusted fIBI procedure is used to evaluate fish communities excluding the influence of proportional metrics. IEPA recommended including the adjusted fIBI as a line of evidence whether the sampling method implemented at the site may have resulted in lower sampling efficiency compared to IEPA practices in comparably sized streams. As explicitly stated at the meeting, the rationale for including the adjusted fIBI calculation was not because the total numbers of fish collected were considered inadequate at the site. The outcome of the adjusted fIBI indicates that sampling method differences did not introduce significant errors in proportional metrics. Revise text wherever the adjusted fIBI is discussed.

6) **Section 3.3.6 - Macroinvertebrate Index of Biotic Integrity (mIBI) - p. 38-43:**

This section should be removed because of lack of compliance with IEPA (2007) sampling protocols that does not allow for the use of IEPA mIBI.

7) **Section 3.3.6, Page 38, Paragraph 2:**

This section describes the mIBI used to analyze the macroinvertebrate data. The paragraph states that metric values were converted to standardized scores. The appropriate IEPA reference should be provided to support this action.

8) **Section 3.3.6, Page 39, Paragraphs 0 and 1:**

This portion of the section overviews the mIBI and the MBI results. The discussion of MBI results refers to a "preliminary assessment value of 5.9." The origin and significance of this value are not clear at this portion of the report. The comparison to this benchmark should be accompanied by a discussion of the origin of this value and how it is to be used in assessing potential impacts at the site.

9) **Section 3.3.6.2, Pages 44 and 45:**

This section describes the statistical evaluation of the Shannon- Wiener Macroinvertebrate Diversity Indices (*H'*) and Simpson's Index of Diversity (*Ds*) values between the upstream reference location and the downstream locations. It would also be helpful to provide a comparison at each station between the data from the east and west sides. This information could be used later in the report to support the discussion on the differences between east and west sides of the river.

10) **Section 3.3.7 - Macroinvertebrate Community Assessment Summary - p. 46-47:**

Remove mIBI discussions.

11) **Section 3.3.7, Page 47, Paragraph 1:**

This paragraph discusses the number of taxa observed at various sampling locations, and includes a statement that at certain reaches the number of taxa was "high." Based on comments received during the meeting, this terminology about a high number of taxa should be replaced in the analysis with a reference to the percentage of taxa where comparison to IEPA's best value occurs.

12) **Section 3.3.7, Page 47, Paragraph 2:**

This paragraph discusses the lower metric scores for the Number of Ephemeroptera Taxa and Percent Scraper. The discussion notes that Ephemeroptera are sensitive to metals in the water and sediment, but also indicates that effect(s) of metals concentrations on the Ephemeroptera are inconclusive at CAR001 and CAR002. However, this statement of "inconclusiveness" is not accompanied by comparisons of metals concentrations in sediment or surface water at these sites with concentrations of metals in the same media at other locations. This information should be provided to support the conclusion.

13) **Section 3.4 - Discussion of Combined Fish and Macroinvertebrate Community Assessment Results - p. 48-49:**

Remove mIBI discussions.

14) **Section 3.5, Page 50, Paragraph 1:**

This section discusses the mussel tissue analysis and notes the potential source of the elevated metal concentrations in the tissue. The text here should specify whether or not the mussels were allowed to purge their guts prior to analysis.

References

IEPA. 2007. Methods of Sampling Macroinvertebrates in Streams. Illinois Environmental Protection Agency Bureau of Water. Draft 04/11/2007.