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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

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SUBJECT: Review of Draft Remedial Investigation/Endangerment Assessment Report
Hi-Mill Manufacturing Company, Highland, MI

FROM: Dr. Luanne Vanderpool, Geologist
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I received for geological review the Draft Remedial Investigation/Endangerment Assessment Report for Hi-Mill Manufacturing Company. Below are my comments for your consideration.

1. Figure 2-1 does not clearly differentiate between background soil sample points, off-grid soil sample points and surface water/sediment sample points. Distinctive symbols and a legend is needed to identify TB, BG, and OG sample points on this map. No WL sample points are located on this figure. Where are they?

2. Section 2.1.4, page 27
According to the RI report, wells were constructed with three foot or five foot screen lengths. Which wells were which? The report needs a table located in the body of the text which gives screen length and depth of screen for each well. As it currently stands, this information is buried and obscured within Appendix F.

   For monitoring well DW1, Appendix F does not contain definite information on screen length. According to the well construction notes, the bottom of screen was set at 83 feet. The notes omit information on depth of the bottom of the riser pipe. However, the notes state that the sand filter pack extends from a depth of 92 feet to a depth of 41 feet. The filter pack should extend only a couple feet above the screen interval. If the screen length is 5 feet (or less) why is the filter pack so long?

3. Section 2.1.6
The report states that slug tests results are summarized in Appendix G. While indeed the results are summarized in a table in the appendix, where are the slug test data and calculations? The raw data, plots of the data, and calculations should be included in the appendix.

Why were only falling head slug tests done? Standardly both rising and falling head tests are done. Were any falling head tests done in monitoring wells which screened the water table? Falling head tests are inappropriate in such situations; only rising head tests are valid.

4. Section 3.2, page 37
In paragraph 5 the RI Report states that field observations do not indicate a direct connection between the Target Pond and the shallow wetland north of M-59. Was this observation made when surface water levels were high? On a site visit I made to Hi-Mill in April of 1989, I observed water levels above the base of the culvert in the Target Pond. This suggests the possibility of a direct connect seasonally, or during high water levels.

5. Section 3.5, Hydrogeologic Units
At the bottom of page 47, the RI report states "Six distinct hydrogeologic units were encountered..." The report then proceeds to list and describe 7 hydrogeologic zones.

6. Section 3.5, Hydraulic Potential
Figure 3-3 should include as part of the map legend the contour interval used in the figure.

During a discussion of the shallow well potentiometric map a mound is explained as being a result of the contouring program, and otherwise unjustified by data. What contouring algorithm was used? Was there no way to contour the data so as to better fit the actual data? Why include a misleading contour map?

According to section 3.5, monitoring well SW-17 is screened in hydrogeologic zone III. All the other SW type monitoring wells are screened in hydrogeologic zones I and/or II. Why has SW-17 been included in Figure 3-3 where its presence created an anomaly that required explanation. SW-17 should have been included on Figure 3-4 with IW-1 through IW-5. The IW type wells and SW-17 are all screened within the same hydrogeologic zone.

7. Section 4.1.1, page 55
The contract has defined as a background criteria the upper 95% confidence interval on the mean concentration of background samples. This is a reasonable strategy to use. However, the report proceeds to define the 95% confidence interval as equally the mean plus twice the standard deviation. Where did this come from? It is wrong! The confidence interval is defined as a function of the number of samples included in the mean ("n") and the value of a statistical distribution ("t" or the student's t distribution). The upper confidence interval is:

$$\text{mean} + t_{95\%,\,n-1} \times \text{standard deviation} / \sqrt{n}$$

For a mean based upon 7 samples and a 95% confidence interval, the calculates out as mean plus 0.73 times the standard deviation. This is quite different from twice the standard deviation.

Table 4-1 must be redone to correctly calculate the BC's. All subsequent data interpretations that compare concentrations to the background criteria must be re-examined and modified where needed. This is likely to result in some substantial changes.

8. Section 4.1.1, page 56
There are numerous and continual discrepancies between concentration values in the text on this page and in referenced Table 4-1. Which is correct?

9. Figure 4-1 and 4-2
Both of these contour maps of copper concentration lack any indicate in the legend of contour interval. The contour interval should be included in every contour map.

10. Section 4.1.1, page 65
The contractor states that the highest concentration of silver found is 3.8 mg/kg. In fact Table 4-2 shows one sample location with 12.5 mg/kg and another location with 22.5 mg/kg of silver.

11. Section 4.1.1, TAL Organics
As mentioned before, the calculation of the 95% confidence interval for the background criteria has been done incorrectly. Table 4-3 will have to be re-done. When the confidence interval is correctly calculated, there will be more sample points with concentrations above background.

Why has no table been included in the body of the text summarizing TAL organic soil samples with concentrations above background?

In the second line of the first paragraph on page 66, the text reads 9 sample locations; the number is 10.

12. Section 4.1.2
In the first paragraph of this section, reference is made to Appendix J showing TCL volatile organic detections in soils. Appendix J contains VOA results for groundwater, not for soils. The soil data is not in the appendices at all.

13. Table 4-5
According to the text in Section 4.1.3, Table 4-5 is supposed to contain reported detection of organics for both background and non-background locations. The table is incomplete. It contains no results for background sample points.

14. Section 4.2.1, Short List Metals
Is the chromium measured total chromium or hexavalent chromium. It should always be clearly stated which is being measured.

In this paragraph, the maximum detected concentration of nickel is flagged with an asterisk. What is the significance of the asterisk? Other concentrations on subsequent pages are also flagged with an asterisk.

15. Table 4-7
Why are concentrations given in this table in units of mg/l instead of ug/l? Section 4.2.2 of the text, which refers to this table, uses units of ug/l. Units of ug/l is standardly used for groundwater concentrations.

16. Section 4.3.1, Inorganics
Does this paragraph refer to surface water samples or sediment samples or both? It is not clear from the text.

17. Section 4.3.1, page 78
On pages 78 and 80 the report discusses concentrations detected in surface water samples. Where is this data? It does not appear in any appendix.

Was background established for the surface water samples?

The text of the RI Report should include a summary table of surface water analysis results.

18. Table 4-8
Again the background criteria based upon the 95% upper confidence interval were incorrectly calculated. The statistical analysis in Table 4-8 must be corrected.

What were the detection limits for nickel? Did they vary for different samples? The BP samples with detects as large as 46.8 mg/kg are flagged U. Yet TP-01 (duplicate) has a detected value of only 12.2 mg/kg which is not flagged U.

There are numerous inconsistencies between values given in Table 4-8 and reference made to the table on page 81. For example for the BC of chromium, the table gives 47.28 mg/kg, the text reads 50.65 mg/kg. Another example is copper, maximum detection in the background pond is 42.6 mg/kg on the table and 37.1 mg/kg in the text; maximum detection in the target pond is 1860 mg/kg(TP-11) on the table and only 256 mg/kg in the text.

19. Page 81
Is the "Target Wetland" the same as the "Target Pond"?

20. Section 4.4.1
In the first paragraph of this section, the contractor states that an area between the production facility and the target wetland, which contains elevated levels of metals, has not been fully defined. Is additional work planned to fully define this area?

The contractor proposes to omit from further consideration metals whose levels were measured as greater than background in three or fewer samples. I am uncomfortable simply ignoring these metals. If an argument can be made that they are in all cases associated with some other contaminant that is being addressed perhaps this shortcut could be condoned. Some good justification is required.

21. Section 4.4.2, Groundwater
According to the RI report, no background ground-water location has been established. Why is there none. This is a data gap that should be filled. Are there any plans to establish background for groundwater?

22. Section 4.0 presented data on the nature and extent of contamination. This was done with tables of data and verbal descriptions. With the exception of surface soil concentrations of metals, no maps showing contaminant distributions were produced. As the old quote says, a picture is worth a thousand words! A few pictures (maps) showing extent of contamination would nicely support all the tables of analytical results.

23. Section 6.2.5
This section summarizes the selection of the various chemicals of concern at the site. The background criteria must be re-calculated (as mentioned previously) and the analytical data re-evaluated before any short list of chemicals of concern can be finalized.

24. Section 6.6
Where is this section? According to page 92 this section will provide a summary of the findings of the baseline risk assessment. The section is not present, nor is it included in the table of contents.

25. Section 7.0
Where is this section? According to Section 1.3, this section presents a summary of the nature and extent of contamination, data limitations. recommendations for future work and recommended remedial action objectives. There is no mention of this section in the table of contents. These are important elements of the RI report. The RI report is incomplete without these things.

My above comments generally fall into three categories. First are the numerous but relatively minor comments related to report presentation: editing errors, discrepancies between text and tables or appendices, incomplete figure legends, omission of maps showing contaminant distributions. Second is the substantive issue of the flawed calculation of the background criteria and the consequent disqualification of interpretations based on the erroneous background criteria. Third is the lack of any conclusion to this report; there is no synthesis, no conceptual model of contaminant movement, no discussion of data limitations and data gaps, no proposal of any additional studies. All of which are needed. This last critique may be explained by the massive oversight omitting Section 7 from the RI Report.

I hope these comments are of some assistance to you. If you have questions about any of these issues or required additional help, please call me at 3-9296.

c.c. S. Ostrodka