Lower Fox River OU1 2005 RA Summary Report
Response to Agency/Boldt Oversight Team Comments
Summary Report Dated March 2006

January 2007

Introduction:

The following are the responses to the Agency/Boldt Oversight Team comments regarding the draft 2005 RA Summary Report. The 2005 Remedial Summary Report text and associated tables, figures and appendices have been updated and is being issued for approval. Concerns and/or limitations identified within these comments have been discussed within the Work Groups that have been operating during 2006.

General:

1. General Comment: Suggest including typical photographs to help the report's completeness and to also explain various work activities and process components.

RESPONSE: Photographs were taken and are retained in the project file for the 2005 RA Work. A photographic log will be included in an appendix of the 2006 RA Summary Report.

Section 1

2. Section 1.1, page 1: It would be appropriate to confirm that although not specifically stated in the 2005 RA Work Plan, the remedial actions conducted in 2005 are being done in order to comply with the ROD, and as such, conduct dredging to achieve the RAL of 1 ppm PCBs and a SWAC of 0.25 ppm PCBs in OU1. The report should then also evaluate the ability to achieve these goals in order to evaluate paths forward in 2006 and beyond.

RESPONSE: Section 1.1 2005 Goals, has been modified as follows:

- Conduct 2005 Remedial Action to further comply with the December 2002 Record of Decision;

The latter portion of the comment is correct as the overall objective of the ROD is to achieve a SWAC of 0.25 ppm PCBs. Achieving the SWAC and the 1 ppm RAL will be evaluated as a part of the discussions and analysis leading to the development of the final plan for OU-1.

3. Sect 1.2, page 2, last paragraph: This paragraph should be revised. The acceptance of the Contingent Remedy may be implemented following appropriate ROD determinations and actions based on a determination by DNR and EPA as to whether the changes are "fundamental" or "significant."

RESPONSE: The last sentence of Section 1.2 has been deleted and replaced with the following text:

Evaluation and selection of the contingent remedy, or an OU1-specific contingent remedy, would be evaluated and documented by the Agencies in an Explanation of Significant Differences (ESD) or a ROD Amendment, based on a determination by DNR and EPA as to whether the changes are "fundamental" or "significant."

Section 3

4. Section 3.1.1, page 9: Reconcile Table 3-1 and 3-3 numbers that do not match so we understand how to relate last year to this year's goals.

RESPONSE: Table 3-1 presented Planned 2005 dredge volumes and areas. Table 3-3 has been changed to Table 3-2 and presents Actual 2005 dredge volumes and areas. In every dredging project there will be different between Planned and Actual volumes removed and areas dredged. The 2005 Summary Report revision includes additional text to better describe the differences in each Sub-area between Planned and Actual removal volumes and areas. In addition, Table 3-1B was included which details adjustments to the planned dredge prism horizontal footprints resulting from updated survey information and operational constraints.

5. Section 3.1.1, page 9: Explain in the text the meaning of the two asterisks in Table 3-1 regarding the revised surface area. Reference later sections where this is annotated.

   RESPONSE: The double asterisks were removed from Table 3-1 as they were no longer relevant in the table subsequent to the addition of Table 3-1B. See the response above for Comment 4.

6. Section 3.1.1., page 10: Clarify intent for amount of overcut planned based on performance from 2005.

RESPONSE: As stated in this section, the overcut planned in 2005 was 6-inches based on the 2004 dredging experience. The planned over-dredge in 2006 was less than or equal to 4 inches below the 1.0 ppm PCB target elevation (i.e., the modeled 1.0 ppm PCB neat line). The target over-dredge was reduced from 6 inches based on the dredging experience in 2005 which confirmed the ability of J.F.Brennan to use the Dredgepack software automation system to limit the over-dredge to an average over-dredge of 3.5-inches (see Section 9.1, Objective No. 4, 4th bullet).

7. Section 3.1.2, page 10: The second paragraph describes the collection of 4 soil samples and 39 soil samples. This is confusing. How are they different? What is the purpose of each grouping?

RESPONSE: Section 3.1.2, the second paragraph has been revised as follows:

The additional characterization work in the dry area consisted of two sampling events. During the first sampling event, four soil samples (POG1-29 through 32) were collected from shallow test pits at three locations within Sub-area POG1. The intent of this first event was to determine PCB concentrations of the layer of larger wood chips encountered overlying native material. The second sampling event consisted of the excavation of 17 test pits and the collection of thirty-nine soil samples from the test pits for subsequent PCB concentration analysis. The objective of this sampling event was to better define the horizontal and vertical extent of PCBs in Sub-area POG1. The field work was performed by Foth & Van Dyke and the laboratory analysis was performed by Pace Analytical. Test pits were excavated and surveyed by Brennan. Additional samples for PCB delineation in POG1 shoreline areas (POG1-33 through 38) are discussed in Section 3.1.4. The sample and test pit locations are shown in Figure 3-2. The PCB concentration results and the logs of the test pits are summarized in Appendix A.

8. Section 3.1.2, page 10: The 4th paragraph describes the results of sampling in the TSCA region of Subarea POG1. Reference a summary table of PCB results. Explain the averaging techniques for purposes of determining TSCA for disposal purposes, or reference the appropriate section of the RA Work Plan or RA Design Plan for an explanation.

RESPONSE: Section 3.1.2 has been modified as follows:

To further delineate the TSCA region of Sub-area POG1, on September 1, 2005, six core samples were collected from the sub-area (POG1-20 through POG1-25). Three of the six cores were tested for PCBs. Prior to this additional core sampling, the Sub-area POG1 TSCA region had been identified and delineated by samples from only two core locations (samples POG1-8 and FR3007). The results of the PCB testing from these cores are as follows:

Table 3-1A
POG1 TSCA Area Delineation Sample Results

Sample ID	Sample Depth Interval	Total PCB Concentration (ppm)
POG1-20	0-2.7’	170
POG1-21	0-4.2’	71
POG1-22	0-2.8’	34
POG1-8	0-2.65’	49.8
FR3007	0-3.5’	190.0

Prepared by: TMK1
Checked by: DMR

Note: For POG1-20 through 22, the depth represents the sediment core penetration; however, the sediment core length recovered, which was homogenized and analyzed for PCBs, was less for each sample: 2.21’, 1.19’, and 1.46’, respectively. For POG1-8, the sample depth interval and recovery were the same value. Recovery information for core FR3007 was not available.

TSCA delineation core sample locations are presented on Figure 3-2.

The determination of whether sediment must be disposed of at a TSCA-licensed landfill was based on the average sediment PCB concentration over an interval from 12 inches above to 12 inches below the sample interval(s) containing greater than or equal to 50 ppm PCBs. Only samples with PCB concentration data were used to calculate the average sediment PCB concentration for a given sample core. Thus, for locations with no sediment above the sample interval(s) containing greater than or equal to 50 ppm PCBs, only that interval and deeper zones were included in the determination. Similarly, if there is no sediment below sample interval(s) containing greater than or equal to 50 ppm, only the zone that had sediment present was considered in the determination. This vertical core averaging process was agreed upon with the Agencies.

9. Section 3.1.4, page 13-14: The section references a summary table of PCB results from the sampling activities in POG1-B. Include in this report the remediation work in POG1-B (e.g., maps/figures, specs on geotextile and rip-rap). Submit when this work will be completed.

RESPONSE: A reference to the summary table of POG1 PCB data in Appendix A was added to Section 3.1.4, end of 1st paragraph. In addition, the POG1 PCB data for samples POG1-33 to POG1-38 has been added to the table in Appendix A.

The Work Plan for Deposit POG1-B Bank and Riprap and General Shore Protection is referenced and included as Appendix C to the report. Phase 1 of the work plan was completed in January 2006. Phase 2 of the work plan was completed in November 2006.

10. Section 3.2, page 14: Identify the SDR HDPE pipe(s) that were used for the dredge slurry pipes. Identify the manufacturer and the specifications on the impermeable silt curtain used in POG1. Note: the 3rd dredge in POG1 was different in that it did not have a GPS system for control. Explain how the upland areas of POG1 were excavated (i.e., the amphibious excavator moved the material to a stockpile at the water's edge, which was then hydraulically dredged to the dewatering pad).

RESPONSE: Section 3.2, the first sentence of the paragraph has been revised as follows:

The dredge system used to remediate Sub-area A and the southern part of Sub-area C/D2S during the 2005 RA included the following components: two 8-inch swinging ladder dredges (Dredging Supply Company), two 8-inch diesel engine driven boosters, four miles of 8-inch SDR 17 HDPE pipeline, and various shallow draft barges and boats.

The second paragraph has been revised as follows:

In order to increase production, a third dredge was added to the system in October 2005, solely to work in Sub-area POG1. The dredge system dedicated to activities in Sub-area POG1 included: one 8-inch swinging ladder dredge (Dredging Supply Company), one mile of 8-inch SDR 17 HDPE pipeline, and a 325 Caterpillar amphibious excavator with a 2.5 cubic yard bucket. Additionally, over 1,000 feet of Gunderboom PCS non-permeable turbidity barrier was installed around the northern border of Sub-area POG1 to contain any suspended solids generated by excavation and dredging operations. Similar to the dredges used for Sub-areas A and C/D2S, the dredge used for the underwater operations in Sub-area POG1 moved thought he various dredge cuts by way of pivoting spud at the rear of the dredge. However, the Sub-area POG1 dredge did not utilize articulating cutterhead technology as the submerged western and northern areas of Sub-area POG1 were to be dredged to the native clay lake bottom. The targeted dry areas of Sub-area POG1 (i.e. the brown woodchip materials) were excavated using the Caterpilar 325 amphibious excavator equipped with a 2.5 cubic yard bucket. The excavation bucket was used to pull the wood chip material that was on the upland portions of POG1 to the dredge so that it could be removed and properly disposed.

11. Section 3.3.1, page 15-16: Describe the RTK GPS surveying equipment that was used (e.g., Trimble Model?).

RESPONSE: Section 3.3.1, the following paragraph has been added:

A Real Time Kinetic (RTK) Global Positioning System (GPS) (Trimble 5700) capable of locating stations with an absolute and repeatable horizontal accuracy of ± 1 meter (m) and a vertical accuracy of ± 5 cm was used to position all sampling locations. The RTK GPS was referenced to onshore, WDNR-established survey monuments to ensure accuracy in the station location determination. The coordinate system used during the sampling activities was the NAVD 88 Datum (vertical) and Geodetic (WGS/NAD83) Datum (horizontal).

12. Section 3.3.4, page 18-19, 5th paragraph: This paragraph is contradictory. Correct the contradiction. For example, it states that if probing reveals 4 inches or more of sediments, coring was attempted. Later it says that if cores were not retained and probing revealed little or no soft sediment, it was assumed that no soft sediment existed at the location. The actual, step-wise process needs to be clarified for 2006.

RESPONSE: Section 3.3.4, 5th through 7th paragraphs have been revised as follows:

At probing locations, if the soft sediment thickness was 4 inches or greater, a core sample using 0.75-inch diameter core tubes was obtained for visual confirmation of the probing results. Where discrepancies between probing and coring results occurred, the coring result was used as the record of soft sediment thickness. If a sample could not be retained after two coring attempts, it was assumed that no soft sediment existed at that location.

Following poling and core sample collection in a DMU, the high subgrade area information was incorporated into the QA Bathymetry post-dredge isopach drawings. For designation as a high subgrade area, all core samples (or poling in the absence of core samples) needed to indicate less than 4 inches of soft sediment above an underlying hard subgrade. Areas containing 4 inches or more of soft sediment were located on project drawings and provided to the Dredging Contractor to perform clean-up passes in the specified areas.

After the completion of clean-up passes, post-dredge verification procedures were again conducted to determine whether areas were either dredged to target elevations or could be designated as high subgrade areas. In all clean-up pass situations in 2005, the first clean-up pass was sufficient and no additional clean-up passes were necessary.

13. Section 3.3.4, page 18-19: In the 7th paragraph, explanation is needed to clarify the meaning of "additional dredging areas." Note: It is assumed this means - an area that did not achieve the 95% removal criteria, as opposed to an area that did not achieve the 1 ppm RAL. In this same paragraph (the last sentence); annotate the areas with a table and/or figure where there remains more than 4 inches of soft sediment above the 1 ppm RAL following dredging.

RESPONSE: The reference to "additional dredging areas" was removed, and Section 3.3.4, 5th through 7th paragraphs have been revised as documented above in the response to Comment 12.

14. Section 3.4.2, page 20-21, 2nd paragraph: When secondary samples are described to be taken as cores in Section 3.4.1, the samples are referred to as grab samples. This implies a Ponar sample instead of a core sample. Define what is meant by "light, low-percent solids surficial sediment layer" in the last sentence. In the last sentence of the last paragraph, the text references 12 native clay samples: provide a map of these sample locations, and provide details of the test results or refer to another document containing this information.

RESPONSE: Section 3.4.1, 3rd paragraph, 1st sentence has been revised as follows:

Secondary samples typically consisted of four individual core samples, which were homogenized to form one composite sample.

Section 3.4.2, 2nd and 3rd paragraphs have been revised as follows:

Hand-coring techniques were used to obtain the post-dredge core samples. The coring device consisted of a 2-ft long, 2-inch inside diameter core barrel with a T-bar (push rod). The core barrel was pushed into the sediment until refusal with an attempt to obtain a clay plug. Once the core tube was pushed to refusal, the depth of core penetration was noted and documented on field logs.

The thickness of the sediment recovered in the core tube was measured and recorded, and the contents of the core tube were described, measured, and documented on the field log. Since it was not considered in the post-dredge elevation confirmation measurements, the majority of the light, low-percent solids surficial sediment layer (sometimes referred to as a fluff layer) was removed with the water on top of the sediment in the core and was not included in the total sediment thickness recorded. The core was then secured in an upright position until processed.

Section 3.4.2, the last paragraph has been revised as follows:

The PCB concentration value assigned to locations where less than 4 inches of soft sediment recovery occurred after two attempts was 0.0168 mg/kg, which is the average PCB concentration of 12 native clay samples from different Sub-areas within OU1 collected during pre-design sampling in 2003/2004. The locations of these 12 samples are shown on Figure 3-20A, and the analytical results are summarized in Table 3-8A.

15. Section 3.4.3, page 21 - the 2nd paragraph: Describe the procedure used to remove the liquid on top of the post-dredge verifications samples. In the last paragraph, duplicate samples are described - publish the results of duplicate samples.

RESPONSE: Section 3.4.3- the 2nd paragraph has been revised as follows:

During core processing, remaining liquid above the top of sediment material was removedfrom the sediment core by either decanting the liquid or using a stainless steel spoon. An estimate of the thickness of liquid removed was made and recorded. The sediment thickness was measured while the sample tube was vertical and recorded on the core collection and processing field log.

Section 3.4.3- the end part of the last paragraph has been revised as follows:

A duplicate sample for every 10 primary samples and for every 10 secondary samples were also processed and delivered to Pace Analytical for PCB analysis. All post-dredge PCB results, including duplicate values, are presented in Tables E-1 through E-3 in Appendix E.

16. Section 3.5, page 23: Add the reference to the table containing all of the post-dredge verification sample test results.

RESPONSE: Section 3.5.1, first paragraph has been modified as follows:

A total of 133 primary and 429 secondary core samples were obtained in 2005. In addition to the presentation of the post-dredge results on Figures 3-21, 3-22 and 3-23, all post-dredge PCB results are presented in Tables E-1 through E-3 in Appendix E.

17. Section 3.5.1, Table 3-9, page 23: Define the significance of comparing pre-dredge and post-dredge residuals concentrations.

RESPONSE: The significance of comparing pre-dredge masses and concentrations with post-dredge masses and residuals is to evaluate the PCB removal efficiency of the dredging.

Table 3-9 has been modified in the revised Summary Report.

18. Section 3.5.1, page 23-24, 4th paragraph: There is insufficient information in this paragraph. The work groups have had on-going discussions on this topic.

RESPONSE: Section 3.5.1 has been revised – significant information has been added to the section.

19. Section 3.5.1, page 23-24, last paragraph: Only the top 4 inches of a core were analyzed - list the value of PCB concentrations used to calculate PCB mass remaining for soft sediments below the encountered top 4 inches.

RESPONSE: Section 3.5.1 has been revised to include a discussion of PCB mass calculations which includes the procedure for estimating the PCB mass below the top 4 inch sample. Figure 3-23A illustrates PCB concentrations with depth.

20. Section 3.5.1 & 3.5.2, page 23-24: Define the meaning of "PCB average residual concentration." Clarify in the report the use of the term "residual." This term appears to be applied in different ways. Note: Residual normally refers to a low-solids content, often thin layer of very soft sediment (some refer to it as "fluff") lying on the bottom of an area following dredging; therefore, it is normally only used in the context of post-dredging, not pre-dredging. In Table 3-9, the term "PCB average residual concentration" should have the word "residual" omitted. Clarify that this is either the surface concentration only, or a thickness-weighted average concentration for all samples/depths. Add the pre-dredge and post-dredge range in PCB values to the table, not just the average. In the second to last paragraph, identify what sediment dry density is used to compute PCB mass, and how this value was determined. Clarify if this is an average value, or the dry density based on pre-design geotechnical characterization.

RESPONSE: In Sections 3.5, 3.5.1 and 3.5.2 of the revised Summary Report, "residual" has been replaced with "surface" in all instances referring to PCB weighted concentrations, including in Table 3-9. The pre-dredge and post-dredge range in PCB values has been added to Table 3-9. Complete PCB mass calculations have been provided in the revised Summary Report.

21. Section 3.5.2, Table 3-15, page 24-29: Based on the results reported, add narrative concluding that the surficial (0-4 inches) PCB concentration still exceeded the 1 ppm RAL in 7 of 9 core locations following one clean-up dredging pass.

RESPONSE: The following sentence was added as a third sentence in the paragraph preceding Table 3-15:

Based on the PCB results in Table 3-15, PCB concentration exceeded the 1 ppm RAL in 7 of 9 core locations following one clean-up dredging pass.

22. Section 3.5.2, page 24-29 - Re-dredging of DMU-4A: Provide conclusions as to whether re-dredging was worthwhile or not (relative to cost and achieving the RAL and SWAC). Note: based on the residual PCB concentration there was a 58% (or 65% using arithmetic average) reduction resulting from redredging. The report should more thoroughly address this question.

RESPONSE: An evaluation regarding the value of re-dredging has been provided in Section 3.5.2 of the revised Summary Report.

23. Section 3.5.2, Table 3-13, page 27 and Table 3-17, page 29: The average residual PCB concentrations in Tables 3-13 and 3-17 for the first and second dredge events were 11.3 ppm and 4.8 ppm, respectively. The arithmetic averages, which were not presented in the tables, were 15 ppm and 5.2 ppm, respectively. Clarify whether the table values were weighted averages, and if so, how were they weighted.

RESPONSE: Table 3-13 presents an area-wide average as this type of value is often viewed as a better estimator of PCB concentrations for a given area. In fact the ROD uses an area-wide average (e.g, SWAC) to communicate a clean-up objective for the site. The procedure for calculating the values presented in Table 3-13 has been presented in Appendix F of the revised Summary Report.

Section 4

24. Section 4.3, page 36-37: Include in the report site construction activities regarding the expansion of the dewatering pad (e.g., record drawings, details of the liner installation and QA).

RESPONSE: Section 4.3, 1st paragraph has been modified as follows:

The dewatering pad was expanded as part of the 2005 RA. A north-south haul road was constructed down the center of the pad with ramps on each end to enter and exit the pad. The dewatering pad expansion included construction of a PVC-lined truck decontamination area where the haul road exits the pad. The report entitled "Construction Certification for Dewatering Pad Liner Expansion" is included in Appendix I.

25. Section 4.5.1.3, page 43: Include the TSCA sediment and TCLP analytical results for the additional parameters listed in section 4.5.1.3.

RESPONSE: Table 4-6 has been added to Section 4.5.6 of the revised Summary Report which summarizes the TSCA sediment and TCLP analytical results – including parameters listed in Section 4.5.4..

26. Section 4.5.1.5, Table 4-2, page 44: The information in the table on average PCB levels and ranges collected from the geotubes needs to be corrected to be consistent with information in the rest of the report. For example, the range for POG1 is slightly greater.

RESPONSE: Section 4.5.5.1, Table 4-2, has been revised.

Section 6

27. Section 6.1, Table 6-1, page 53: This table indicates that, on average, the sand filter reduces the TSS value 4.0 ppm and that the carbon filters provide another 2.0 ppm reduction. At an average daily flow of 1.5 mgd this equates to 50 lbs of dry solids at the sand filter and 25 lbs of dry solids on the carbon each day. The use of expensive carbon as a filter medium is unlikely to be the most cost effective means to remove solids. Explain why another means of removing the solids should not be a factor for the 2006 program. Also explain, for 2006, why with backwashing of the carbon and keeping the system clean, that it will not be necessary to change carbon again in 2006. List the PCB results prior to the carbon vessels.

RESPONSE: The carbon that was replaced during 2005 was in the two lead GAC vessels that had been installed in 2004. The media was changed in these two vessels to reduce the high pressure drop across these vessels so that three dredges could operate simultaneously. The excessive pressure drop in these two vessels was caused by a combination of residual polymer, biological fouling, and sediment solids accumulation. The lead GAC vessel that had been installed in 2005 did not experience excessive pressure drop and, therefore, the media in that vessel was not replaced in 2005.

Although the GAC vessels provide additional solids filtering, the main purpose of the GAC vessels is to reduce PCBs in the effluent to below detection levels. In response to WDNR's concern about low-level mercury concentrations in the effluent, GW Partners agreed to install bag filters as another means of solids removal in an attempt to reduce the effluent mercury concentrations to meet the WDNR's performance expectations. The bag filters will reduce the solids flow to the GAC vessels. However, the bag filters are not a practical or effective technology for removal of a significant portion of the 25 pounds of dry solids per day going to the GAC. Even if the bag filters could eliminate all the sediment solids, the GAC fouling would continue as a result of residual polymer and biological growth. The cost of replacing the carbon in two GAC vessels was approximately $30,000 as compared to more than an order of magnitude higher cost for the installation and operation of the bag filters. Based on the 2005 operating experience, it is much less costly to replace the GAC media when it becomes fouled than it is to install and operate a bag filter system for additional solids removal - even if the bag filter system were capable of eliminating GAC fouling. Although GAC backwashing and the addition of chlorine to the water treatment system influent stream will reduce GAC media fouling, it will be necessary to routinely replace or clean (e.g., caustic boilout) the GAC media in the future.

28. Section 6.2 & 6.3, page 54-55: The sandfloat operations and capacity decrease. Describe why the remedy used in 2005 (sand change out) resolved the capacity reduction issue. State why it occurred and how it will be prevented in the future. Submit when this evaluation will be complete. Expand and summarize on the reports from Jenkins, U.S. Filter and Glatfelter Analytical Services.

RESPONSE: The Krofta Sandfloat's media had become progressively fouled during the 2005 RA, which decreased its hydraulic capacity. The water treatment plant's hydraulic throughput was reduced such that the plant could not keep up with the increased flows associated with operating the third dredge. Replacing the Sandfloat's media immediately increased the Sandfloat's hydraulic throughput and allowed full operation with the third dredge.

Reports from Jenkins and Glatfelter Analytical Services showed that the media fouling was likely a result of both biological growth and residual polymer. Bacterial growth begins in the dewatering pad; however, there is no practical method of controlling the growth of bacteria in the dewatering pad. Instead, biological growth in the Sandfloat was controlled by adding hypochlorite to the sump to maintain a low chlorine residual in the water treatment plant influent. Although the addition of chlorine to the water treatment system influent stream will reduce the Sandfloat media fouling, fouling by residual polymer cannot be eliminated. Therefore, it will be necessary to routinely replace or clean (e.g., caustic boilout) the Sandfloat media in the future.

29. Section 6.4, page 55: White foam on the surface of the sandfloat is described as being from biofilm. Provide documentation substantiating this. Discuss the significance of this foam concerning operations in 2006 and beyond. Provide data supporting chlorine dosing that will control bacterial growth and explain the expected effectiveness.

RESPONSE: The foam on the surface of the Sandfloat did not interfere with 2005 operations. However, its presence did alert the treatment plant operators to the existence of an issue that was later identified as biological fouling. Dosing with hypochlorite is a common, accepted method to control biological (bacterial) growths.

30. Section 6.5, page 55: Correct the statement in this section to explain that the second year (2000) SMU 56/57 project's use of bag filters, were beyond Best Demonstrated Treatment Technology Reasonable Achievable (BDTTRA). Note: the Hg performance expectations applied to OU1 were based upon the performance achieved in the 2000 56/57 project, which used the bag filters, so the bag filters are considered part of the BDTTRA.

The bag filters were also used in Deposit N. The Agencies recommended and urged the use of bag filters in both years of OU1, but allowed the design to proceed without them because the design team stated that the sand float process provided the same or better level of treatment as experienced in 56/57, thus making the bag filters unnecessary. In response to the Agency's concerns, the Work Plan stated they would evaluate the performance of the proposed design and to evaluate the need for bag filters. The OU1 effluent has not met the Hg performance expectations in 2005. Based on results of the 2005 performance, the Agency expects the 2006 RD includes the necessary modifications for adding bag filters, and that GW Partners is taking the necessary actions to implement their use in the process for 2006 and into the future.

RESPONSE: The last sentence of Section 6.5 has been replaced with the following three sentences as follows:

The second year of SMU 56/57 also had bag filters before and after the GAC units. GW Partners has agreed to install bag filters at the water treatment plant in 2006 and will coordinate the design and installation schedule with the Agencies. See Section 8.1.3 for a detailed discussion of effluent quality for the water treatment plant.

Section 7

31. Section 7.1, page 57 - Uptime discussion: More clearly refine the definition of uptime. For example, there should be a description of the fact that uptime includes cleanup pass dredging, which is not the same as production dredging. Thus, percent uptime cannot be translated into a production rate assuming the normal dredge production rates. Present uptime statistics relative to production dredging times versus cleanup pass dredging times. We know uptime was negatively impacted by geotube and WTP issues in 2005. How is this reflected in the total project uptime?

RESPONSE: As noted in Section 7.1, 1st paragraph, percent uptime is the percentage of time operating compared to the time available for operations (not including scheduled off days such as holidays and most weekends). The percent uptime includes cleanup pass dredging. The total dredge production rate necessarily includes cleanup pass dredging, as the cleanup passes were necessary to reach the target dredge elevations. Excluding cleanup pass dredging time from the percent uptime calculations would be misleading and would result in a misleading production rate.

Section 7.1, 2nd paragraph has been reworded as follows:

The total project percent uptime (equal to the dredge percent uptime) was 82.6%. The 82.6% uptime calculation includes the negative impact of the 3.3% combined downtime for the dewatering and water treatment plant operations. If adjusted to remove the effect

of the dewatering and water treatment operations, the total project percent uptime (also dredge percent uptime) would have been 85.9%. The dredging operations achieved their percent uptime without the need for a standby dredge and with two of the dredges pumping through booster pumps for the entire project.

Section 8

32. Section 8.1.1, page 63: Add an explanation for how the 38 NTU standard was established, or reference a section in the RA Work Plan and/or RA Design Plan. Identify how in 2006 the line of communications will be improved after observance of a high turbidity condition. Note: It is suggested this be simplified for 2006 in order that corrective measures be implemented more timely.

RESPONSE: The following paragraph was added to Section 8.1.1 (3rd paragraph):

The limit for dredging-induced increases in surface water total suspended solids (TSS) was an 80 ppm increase above background. Surface water turbidity was used as a surrogate for TSS based on a correlation developed from the 2004 RA. The Foth & Van Dyke Environmental Data Packet sent to the Agencies on December 14, 2004, presented a TSS/turbidity correlation, whereby, TSS = 2.108 + 0.995*(Turbidity) with (Correlation) r = 0.88. This correlation was based on surface water data from OU1 collected between October 30, 2004, and December 1, 2004. Using this correlation, an action level was set at 38 NTU (comparable to 40 TSS) difference between upstream and downstream conditions.

The 2006 River Turbidity Monitoring Communications Plan is presented in Section 4.4 of Appendix G of the 2006 RA Work Plan.

33. Section 8.1.3, page 64-65 - Hg concentrations: Discuss more completely/fully the occurrence of, and reason for the relatively high field blank Hg concentrations early and midway through the project. Also discuss the much lower field blank values at the end of the project. Include in the report a discussion of the implication of these field blank values on the evaluation of the effluent Hg data. Note: the high blank values indicate possible problems with the sampling technique.

RESPONSE: A thorough review of the sample collection procedures and discussions with field personnel and the analytical laboratory have taken place in order to better understand the variability of the mercury field blanks. The results of this investigation are presented in the revised Summary Report.

34. Section 8.1.3, page 64-65, last paragraph: The report concludes, but does not substantiate with comparative data from the demonstration projects that the

effluent Hg concentrations were the result of the background Hg concentrations, implying no better treatment could be achieved.

Include in the report data that either substantiates this conclusion or remove this conclusion from the report.

Note: conformance with the performance expectations were achieved in the 2000 56/57 project with bag filters, the report should substantiate that in fact the background Hg is higher in OU1 than 56/57, and evaluate if the bag filters would or would not result in achievement of the Hg performance expectations.

RESPONSE:

The middle portion of Section 8.1.3 has been revised as follows:

PCB, ammonia, TSS, and BOD effluent concentrations consistently met the WDNR's performance expectations of <0.1-0.5 ug/L, 67 mg/L, 5 mg/L (monthly average, 10 mg/L daily peak), and 10 mg/L, respectively. Table 8-2 summarizes the QA analytical results for WTP effluent.

Table 8-2
Summary of Laboratory Analytical Results for Water Treatment Plant Effluent

	Minimum	Maximum	Average	Standard Deviation
TSS (mg/L)	0.14	5.40	1.22	0.914
BOD (mg/L)	1.00	4.50	1.23	0.630
Ammonia Nitrogen (mg/L)	0.10	2.10	0.44	0.382
Total PCBs (ug/L)	0.12	0.18	0.12	0.007

Note: For values less than the detection limit, half the detection limit value was used for minimum, maximum, average and standard deviation calculations.

Prepared by: TMK1
Checked by: SVF

Although the low-level mercury concentrations in the effluent generally exceeded the WDNR's performance expectation of <0.2 -0.5 ng/L, it was significantly less than low-level mercury concentrations in the weep, river, and carriage water samples. The average low-level mercury concentration in the effluent was 1.31 ng/L, compared to an average low-level mercury concentration in the weep of 10.1 ng/L, in the river water of 42.7 ng/L and in carriage water of 2.53 ng/L. Table 8-3 summarizes the low-level mercury results.

Table 8-3
Summary of WTP Low-Level Mercury and QC TSS Results

Minimum		Maximum		Average		Standard Deviation	
LL Hg (ng/L)	QC TSS (mg/L)	LL Hg (ng/L)	QC TSS (mg/L)	LL Hg (ng/L)	QC TSS (mg/L)	LL Hg (ng/L)	QC TSS (mg/L)

Effluent	0.324	0.0	4.46	2.6	1.31	0.8	0.876	0.801
Carriage Water	1.24	1.5	5.01	10.2	2.53	4.3	1.484	3.437
Geotube Weep	0.921	1.7	44.90	156.0	10.05	20.9	11.645	41.805
River Water	4.89	5.0	131.00	89.0	42.69	40.0	34.357	23.933

Note: For values less than the detection limit, half the detection limit value was used for calculations.

Prepared by: TMK1
Checked by: SVF

GW Partners has agreed to install bag filters at the water treatment plant in 2006 and will coordinate the design and installation schedule with the Agencies.

35. Section 8.1.3, page 64-65, 5th paragraph: The report indicates that beginning August 8th effluent TSS samples were collected at the same time as Hg samples were collected to see if a relationship or correlation existed between the two parameters. Provide analyses of the data to demonstrate if a correlation does or does not exist.

RESPONSE: A correlation analysis between TSS and mercury has been conducted with the data and is presented in the revised Summary Report in Section 8.1.3.

36. Section 8.1.3, Table 8-3, page 65: The table shows the "minimum" Hg values for the effluent, tube weep, carriage water, and river water as <0.180 ng/l, which appear to be field blank values but not the actual sample values, none of which were <0.180 ng/l. If these values were used in calculation of the averages and standard deviations these evaluations would be an incorrect presentation of the data. Correct Table 8-3.

RESPONSE: Table 8-3 has been corrected in the revised Summary Report.

37. Section 8.2, page 66-67: Discuss the level of air sampling and make a recommendation on whether the air sampling should be increased, decreased, or left the same for 2006.

RESPONSE: Section 8.2,– a final paragraph was added:

As discussed in this section, PCB ambient air was continuously sampled during baseline sampling and when dewatered sediment was being removed from the site. Within this time period, from the end of September 2005 through the end of November 2005, twenty rounds of sampling were completed, consisting of 80 samples plus field blanks. Sampling was discontinued on November 22, 2005, as sample data showed consistent non-detect results, including during the period of Sub-area A TSCA sediment load-out. Due to the consistency of non-detect results over this entire period and during the 2004

remedial activities, it is recommended that the level of air sampling be reduced for the 2006 remedial activities.

Section 9

Section 9.1 Objectives

38. Section 9.1, Objective 4, pages 69-70: The Objective 4 discussion in section 9.1 addressed the residual PCB concentration on a percent reduction basis. One of the ROD's major Remedial Action Objectives (RAO's) is to achieve the 1.0 ppm RAL. Include in the report an evaluation of the residual sediment PCB concentrations relative to this ROD's objective(s).

RESPONSE: The overall objective of the ROD is to achieve a SWAC of 0.25 ppm. Achieving the SWAC and the 1 ppm RAL will be evaluated as part of the discussions leading to development of the final plan for OU-1.

39. Section 9.1, Objective 4, pages 69-70: The Objective 4 discussion in section 9.1 described the amount of overdredge but did not address the relationship of minimized overdredge to residual PCB concentrations. Emphasis was placed on percent PCB mass removal, and on reduction in PCB average "residual" concentration. How this performance relates to achieving the 1 ppm RAL, as required in the ROD needs to be addressed. A narrative (as a minimum) regarding compliance with the RAL (range of actual values, percentage of cores achieving, etc.) should be included. Also the report should include a discussion of how clean-up pass dredging helped overall performance.

RESPONSE: See Response to question 38.

40. Section 9.1, Objective No. 5, 2nd bullet, page 70: Discuss further the impact of blending, which decreased the variability of percent solids between tubes but also significantly increased the variability within a given tube when blending occurred.

RESPONSE: Section 9.1, Objective No. 5, 2nd bullet, has been added as follows:

- Blended coarse-grained and fine-grained sediment during slurry transport to increase dewatering potential and reduce variability of percent solids between tubes. However, since the volume of fine-grained sediment was much greater than the coarse-grained sediment and the coarse-grained sediment had a tendency to separate once introduced into the tube, the blending of the sediments had little measurable impact on the dewatering performance.

41. Section 9.1, Objective 5, page 70: The Objective 5 discussion in section 9.1 indicated that stacking the tubes probably enhanced the dewatering of the tubes. Data exists enabling the comparison of stacked versus not stacked tubes. Include a discussion documenting whether stacking did or did not result in enhanced dewatering, and to what extent.

RESPONSE: Although GW Partners could attempt to compare the dewatered solids performance of 2005 with the previous period, there is too much variability in the characteristics of the material dredged to provide a meaningful comparison. However, based on a consolidation theory, the more pressure which can be applied to the sediments during the dewatering process and the longer those sediments remain under pressure, the higher the resulting percent solids.

42. Section 9.1, Objective 6, page 71: Clearly state that the effluent Hg performance expectations were not met.

    Note: Conformance with the performance expectations were achieved in the 2000 56/57 project with bag filters, the report should substantiate that, in fact, the background Hg is higher in OU1 than 56/57, and evaluate if the bag filters would or would not result in achievement of the Hg performance expectations.

RESPONSE: Objective 6 has been modified as follows:

- Effluent water quality for PCBs, TSS, BOD and ammonia was well within WDNR treatment expectations.
- Effluent water quality for mercury did not meet WDNR performance expectations; however, 2005 RA effluent low-level mercury concentrations were on average an order of magnitude less than background river water concentrations.
- GW Partners has agreed to install bag filters at the water treatment plant in 2006 and will coordinate the design and installation schedule with the Agencies.

<u>Section 9.2 Challenges</u>

43. Section 9.2, page 71: The end of the second paragraph states "GW Partners does not believe that any of the challenges described below had a material and demonstratable impact on the cost-effectiveness of the project." The cost effectiveness of the project in 2005 needs to be evaluated with the full remediation efforts regarding OU1. We expect more details to be developed in the applicable work groups, e.g., 2006 Production Planning, etc.

RESPONSE: Comment noted.

44. Section 9.2, Challenge 1, page 72: Add to this challenge a bullet for addressing potential model misses for unpredicted low subgrades through poling being proposed.

RESPONSE: At this time, GW Partners will not add this bullet given GW Partners and the Agencies collective experience with poling activities in 2006 and subsequent discussions as outlined in the Agencies' technical memo on low subgrades entitled "LFR OU1 – POG Clarification on Defining Dredge Neat Line Using GMS", dated August 16, 2006. A copy of this memo is included in Appendix B of the revised Summary Report.

45. Section 9.2, Challenge 1, page 72: Define/quantify in the 4th strategy the meaning of "very thin" deposits.

RESPONSE: The 4th strategy of Challenge 1 had been revised as follows:

> 4. Evaluate the possibility of excluding very thin deposits over clay from initial dredging. Very thin deposits are soft sediment less than 4-inches thick.

46. Sections 3.1.3, 3.3.3, and 9.2 (Challenge 2): The description of the "No Dredge Areas" should include, or reflect the precise wording of the Agency letters accepting the request to not dredge these areas in 2005. The report needs to acknowledge that the evaluation of the benefits versus costs for dredging coarse grain, low concentration deposits will be further evaluated as part of the work group discussion supporting the work plan for 2006.

RESPONSE: Section 3.1.3, 7th paragraph, the paragraph has been modified as follows:

Actual removal volumes for the sub-areas were lower than the planned removal volumes for several reasons. Select regions of Sub-areas A and C/D2S were removed from the dredge prism and designated as "No Dredge Regions." These regions were designated by the Agencies in correspondence dated October 4, 2005 and November 1, 2005 as having the following characteristics:

- All samples in these areas have PCB concentrations less than 2 ppm, just above the RAL of 1ppm.
- The contaminated sediment deposit is relatively thin (0.5 feet or less) with underlying sand and gravel. Thus dredging these areas would be inefficient.
- Not dredging these areas would have a positive effect on the project schedule.
- Dredging these areas provides a relatively small environmental benefit relative to the effort required.

The No Dredge Regions contain 7,605 cubic yards of sediment (including the associated 6-inch overcut volumes). Section 3.3.3 discusses these No Dredge Regions in more detail. Copies of the October 4, 2005 and November 1, 2005 agency correspondence are included in Appendix B of the revised Summary Report.

RESPONSE: Section 3.3.3, 2nd sentence, the 2nd sentence now reads as follows:

These "No Dredge Regions" characteristics are discussed in Section 3.1.3.

RESPONSE: Section 9.2, Challenge 2, the first bullet was revised to read as follows:

- The benefits of dredging large areas of coarse-grained deposits meeting the "No Dredge Region" criteria (as defined in Section 3.1.3) do not outweigh the costs.

RESPONSE: Section 9.2, Challenge 2, the 2006 Strategy first point has been revised to read as follows:

1. Continue the policy of excluding coarse grained deposits meeting the "No Dredge Region" criteria as approved by the Agencies and defined in Section 3.1.3.

47. Section 9.2, Challenge 2, page 72: In the Challenge 2 discussion of section 9.2, the 2006 strategy says that near shore areas should only be dredge if they can be reasonably accessed by hydraulic dredging equipment. Modify this discussion to reflect the possibility of using other techniques in near-shore deposits (particularly with higher PCB concentrations), such as that used in POG1 where a backhoe was used to back drag sediment to where the dredge could reach it, or scheduling these areas during high water periods.

RESPONSE: GW Partners believes if the near shore areas are dredged in the spring, they will be accessible for hydraulic dredging. As such, no revisions to the text have been made.

48. Section 9.2, Challenge 2, page 72: The 1st strategy should define/quantify the meaning of "low" PCB concentrations.

RESPONSE: Section 9.2, Challenge 2, the 1st strategy has been modified as follows:

1. Continue the policy of excluding coarse grained deposits meeting the "No Dredge Region" criteria as approved by the Agencies and defined in Section 3.1.3.

49. Section 9.2, Challenge 4, page 72-73: The 2nd strategy should be clarified.

    Note: It is the intent that this will be done by increasing the percent solids (decreasing the percent water) in the thickened dredge slurry pumped into the geotubes, which should result in higher percent solids after dewatering for the same amount of time as 2004/2005, or result in a shorter period of time needed to achieve the same percent solids as 2004/2005?

    More time may not be available for dewatering in 2006 depending on annual dredge production goals and the needed cycle time to achieve pad management plans.

    In the 4th strategy, provide the rationale regarding the 60-foot circumference geotube.

    Discuss the reason(s) regarding a preference for a particular geotube manufacturer, or the minimum required physical properties of the geotube (e.g., sewn seam strength, or geotextile burst strength)?

RESPONSE: Section 9.2, Challenge 4, the 2nd strategy has been modified as follows:

2. Modify the dewatering system for the 2006 RA by installing screens/thickeners ahead of the geotextile tubes. The rotary screens will remove debris larger than 1/8 inch and separate it for immediate disposal. The thickeners will increase the sediment slurry solids content before it is pumped to the geotextile tubes. The increased solids content should reduce the amount of labor needed to help the tubes dewater during their filling phase, reduce the time needed for the tubes to dewater before stacking of the tubes can proceed, reduce the impact of a tube failure, and, possibly, enhance the polymer addition process control.

RESPONSE: Section 9.2, Challenge 4, the 4th strategy has been modified as follows:

4. Use 60' circumference geotextile tubes. The 2006 Remedial Action will use the 60' tubes in lieu of the 80' tubes to provide a greater dewatering surface area per volume compared to the previous tubes. The geotextile tubes will be constructed of Geolon GT500, which was used during the 2004 RA.

50. Section 9.2, Challenge 5, page 73: The 5th bullet statement says that "The amount of clay (organic content) in the sediment greatly affects the workability of the sediment." Note: clay and organic content are not necessarily related, so if

the point is to indicate that both clay and organic content affect workability, then omit the parenthesis and add the word "and" between clay and organic content.

RESPONSE: Section 9.2, Challenge 5, the 5th bullet statement has been revised as follows:

- The amount of clay and organic matter in the sediment greatly affects the workability of the sediment.

51. Section 9.2, Challenge 6, page 74: What will be the specific strategy with respect to other dewatering aid mechanisms employed last year versus this year, i.e., mechanical vibrators, adding weights on the bags, manual striking of the bag surface?

RESPONSE: 7. Manual striking of the geotextile tubes will be employed to help breakup the filter cake at the exterior of the tubes to aid in dewatering.

52. Section 9.2, Challenge 7, page 74: Add description of strategy for control (bypass) of thickener clear water overflow to treatment plant. How will water quality performance evaluation be accomplished for 2006? How will fouling of Krofta/GACs be managed this year? Data from last year and conclusions, if any, should have been available months ago. Will there be downtime planned for replacing media? Boil out?

RESPONSE: As stated in the 2006 Pre-Final Design Report section 3.1.3.3, "Overflow from the thickener and weep water from the geoxtextile tubes will percolate through the dewatering pad and flow to the carriage water sump before being pumped to the water treatment system. The thickener overflow may be piped so that it can also be diverted directly into the sump." See also 2006 RA Work Plan, Appendix H (Dewatering Plan) section 2.6.3. See also responses to comments 27 and 28.

53. Section 9.2, Challenge 7, page 74: Clarify more accurately the blinding of the pad for 2005. Note: based on observations in 2005, blinding of the pad was evident in more than one area.

RESPONSE: Section 9.2, Challenge 7, has been modified as follows:

- 2004 and/or 2005 activities appear to have caused blinding in several areas of the dewatering pad and this condition will need to be evaluated.

54. Section 9.2, Challenge 8, page 74: Include in the 2006 Strategy discussion the development and implementation of contingency plans for previously experienced and potential future problems, such as tube failures and thickener failures relative to tube sequencing and pad management.

RESPONSE: Section 9.2, Challenge 8, 2006 Strategy, has been modified as follows:

4. A contingency plan will be developed in the event of a tube failure in 2006.

5. Contingency plans will be developed for 2006 to include thickener unit bypass, trammel screen bypass and thickener unit consolidation.

55. Section 9.2, Challenge 9, page 75: Add to strategy: Develop a detailed start up plan that shows time for debugging thickeners and other added systems, and provides necessary training for both manual and automated operations as needed. Develop a complete contingency plan with production targets, pad management and load out if the thickeners do not perform as expected. Develop a clear organization and communication plan describing how the Agency/Oversight Team will be routinely involved in daily performance and monitoring data reporting.

RESPONSE: Section 9.2, Challenge 9, 2006 Strategy has been modified as follows:

4. A detailed schedule will be developed which will include rehabilitation of the dewatering pad, installation and start-up of the thickening units along with planned dredging areas and durations.

5. A communications plan will be developed for 2006 which will include monthly progress reports, quarterly reports, management meetings, weekly status meetings, and daily progress meetings.

<u>Other: 2006 Items to incorporate into the plan</u>

56. Clarify expectations for production targets in terms of percent uptimes of equipment and average production rates by day by area both in terms of sq ft and volume. Consider coincident uptime of all components, i.e., load out truck available to make space for new material, geotubes available, etc.

RESPONSE: The 2006 RA Work Plan, Appendix H includes a pad management plan to address the filling, storage and loadout of the PCB sediments for the 2006 RA.

57. Develop the plan detail for repair of the pad liner.

RESPONSE: The plan for repairs to the pad liner system is to mobilize a liner crew to the site as soon as possible after the evaluation of the drainage pad in Spring 2006 to make the repairs in accordance with industry standard practices.

58. Develop the plan details for insuring the geotube stacking arrangement will not present a risk for overflowing the berm in the event of a tube rupture with lower than expected percent solids inside.

RESPONSE: The 2006 RA Work Plan, Appendix H includes the management plan for the tubes to prevent overflowing the containment berm in the event of a tube failure.

59. The path forward in 2006 will require development of a new dewatering pad management plan. As part of the final plan, the load out, transportation and disposal plan, site layout, decontamination areas, etc., also need to be detailed and documented.

RESPONSE: The 2006 RA Work Plan, Appendix H includes a pad management plan to address the filling, storage and loadout of the PCB sediments.

60. While the Agency will not require solids of PCB sampling from geotube sediments for 2006, we recommend GW Partners consider taking a sufficient number of solids samples to help evaluate and optimize the pad management plan to better control costs. The Agency also recommends GW Partners consider taking routine PCB samples, possibly from the discharge of the thickener pump, to help confirm PCB mass removal.

RESPONSE: Comment noted.