Worldwide Facilities Group
Environmental & Regulatory Support
Remediation Team

July 26, 2007

Mr. Peter Ramanauskas
Project Manager
U.S. EPA, Region 5
Waste, Pesticide and Toxins Division
77 West Jackson Boulevard DW-8J
Chicago, IL 60604-3590

Re: GMC Powertrain Saginaw Metal Casting Operations, MID-041-793-340
RCRA Facility Investigation Phase 1C Report
Responses to U.S. EPA Comments Dated May 24, 2007

Dear Mr. Ramanauskas:

Enclosed please find GMs responses to U.S. EPA comments from a letter dated May 24, 2007 on the RCRA Facility Investigation (RFI) Phase 1C Report for the Saginaw Metal Casting Operations (SMCO) Facility in Saginaw, Michigan dated March 9, 2007.

Please call me at 248-753-5799 if you have any questions regarding these responses.

Sincerely,

Cheryl R. Hiatt

Cheryl R. Hiatt
Project Coordinator

MC/ev/17075/16

c.c.: Mr. George Bruchmann, MDEQ-WMD Lansing
Mr. Terry Walkington, MDEQ-WMD Bay City
Ms. Rhonda Klann, MDEQ-RRD Bay City
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Signature: Cheryl R. Hiatt

Name: Cheryl R. Hiatt

Title: Project Coordinator

Date: July 26, 2007

July 26, 2007 Ref. No. 017075-16

RESPONSES TO U.S. EPA COMMENTS DATED MAY 24, 2007 ON THE RCRA PHASE 1C RFI REPORT (REVISED) DATED MARCH 9, 2007

RFI REPORT COMMENTS

1. U.S. EPA Comment

Referring to Section 5.4, sediment and surface water should be noted as being screened versus ecological risk screening criteria. This was in fact done as the Appendix B ecological risk assessment references such criteria (note that the sediment screening units in Table B-4 are incorrect (mg/L)). The text of the RFI report should reflect this as well. Statements such as "Sediment sample results from the Phase 1C investigation did not exceed the current sediment screening criteria within IU H." are misleading and should be changed.

Response

The screening criteria referred to in Section 5.4 (Michigan Act 451, Part 201 Generic Industrial Direct Contact Criteria and Michigan Act 451, Part 201 Generic Industrial Groundwater Contact Criteria) were used as a conservative initial first screening tool to identify potential contaminants of concern (COCs). After this initial screening these potential COCs were further evaluated via either a human health risk assessment (Appendix A) or an ecological risk assessment (Appendix B).

The screening methodology of sediment and surface water data is consistent with the methodology used in the screening of the Phase 1A data (Phase 1A RCRA Facility Investigation (RFI) Report and Phase 1B RFI Workplan, Saginaw Metal Casting Operations, Saginaw, Michigan, EMCON, April 19, 2000):

"Because Part 201 criteria do not address surface water or sediments, the Part 201 direct soil contact criteria were used as screening levels for sediment and the Part 201 drinking water criteria were used as screening levels for surface water. These criteria were used to ensure that all potentially significant concentrations in the Phase 1A data (and somewhat more) were identified for review as discussed above. However in the baseline risk assessment that will be completed at the completion of the field investigation, potential exposures to sediments and surface water will be evaluated for only reasonably expected exposures..."

The screening approach of using Direct Contact Criteria as an initial screening tool for sediment has been consistently used throughout the RFI process.

Table B-4 will be corrected and the units will be changed from mg/L to mg/kg.

The Phase RFI Report will be revised to incorporate this clarification.

2. **U.S. EPA Comment**

The text of the third bullet on page 50 states that facility-wide evaluation of hexavalent chromium in groundwater is consistently below criteria and/or present at trace levels. What about the Phase 1B results which calls out hexavalent chromium as a COC?

Response

Samples were analyzed for total chromium during the Phase 1A. Since Michigan Act 451, Part 201 does not provide specific criteria for total chromium (criteria available for trivalent and hexavalent), the total chromium data was screened against the more conservative hexavalent chromium criteria and exceedances were identified.

To further refine the evaluation of the chromium data during the Phase 1B, the chromium was speciated and analyzed for chromium trivalent and total chromium (allowing chromium hexavalent to be calculated).

Samples from 8 monitoring wells reported hexavalent chromium at concentrations ranging from non-detect to 17 µg/L. The Michigan Part 201 drinking water criteria for hexavalent chromium is 100 µg/L and the Michigan Part 201 GSI criteria for hexavalent chromium is 11 µg/L. The GSI criteria was marginally exceeded at two locations, one in IU A and one in IU B (The laboratory reporting limit for hexavalent chromium is 10 µg/L).

The Phase 1A RFI Report and Phase 1B RFI Workplan states that, "Chromium speciation was added to the list of parameters for Phase 1B to support interpretation of data for human health risk assessment because the human health toxicity and mobility of chromium varies by valence." Hexavalent chromium was not added as a COC but to allow for appropriate evaluation of the chromium data.

The RFI Report will be revised to incorporate the discussion above and to remove the word "consistently".

3. **U.S. EPA Comment**

Referring to Other Soil Investigations on page 67, what was the outcome of this additional investigative work (#8 Mold Line)? What did the results show? This should be incorporated into the RFI text as it has bearing on environmental decisions for the site. Similar comment for "other" investigations at IU G, pages 89 and 96; and IU H, page 102.

Response

All data from the "other" investigations for IU D is presented in the databox figures and has also been included in the human health and ecological risk assessments.

The following will be added to Section 10.1.1 "Other Soil Investigations".

"On June 20, 2004, an oil/water mixture was identified beneath the plant building near the #8 Mold Line during an excavation to install a new footer. The oil/water mixture was pumped out and contained in drums and disposed of off-Facility-. A total of 28 soil and concrete samples including two QA/QC samples were also collected between June 29 and July 2, 2004 and submitted for PCB analysis. Six soil samples were collected by hand from within the previously excavated footing area. Seven soil borings were advanced in the area surrounding the excavation in the vicinity of #8 Mold Line utilizing a direct push Geoprobe and hand held split spoon direct push (jack-hammer techniques). Seventeen soil and concrete samples were collected from these seven boring locations. Two additional soil borings were advanced northeast of the #8 Mold Line at locations of potential future footer excavations. A total of five soil samples were collected from these four boring locations.

The soil samples collected from the excavation reported total PCB results ranging from 7.3 mg/kg to 3,500 mg/kg. The soil/concrete samples collected from the borings in the vicinity of the excavation reported total PCBs ranging from ND to 2,800 mg/kg. The soil samples collected from the borings located northeast of the #8 Mold Line were non-detect for PCBs. All sample locations and analytical results were provided in the August 2004 Monthly Progress Report and are included in the RFI Report.

A perforated pipe was installed around the base of the new footer within the excavation with a riser pipe to the surface. The excavation was backfilled and the concrete floor was replaced. The riser pipe is monitored monthly for water level and the presence of oil. If oil collects in the riser, it is removed after monitoring is complete."

Data from the "other" investigations for IU G has been presented in the databox figures and has also been included in the human health and ecological risk assessments.

The following text will be added to Section 13.1.1.

"As a part of a potential purchasers due diligence, additional soil and groundwater sampling was conducted in IU G. Twenty-five soil samples and seven groundwater samples were collected by AKT Peerless between January 29 and February 5, 2004. Of the 25 soil samples collected, three samples reported manganese concentrations ranging from 2,040 mg/kg to 2,980 mg/kg, above the Michigan Part 201 soil industrial commercial (II, III, IV) particulate inhalation criterion (1,500 mg/kg). The sample results were used by the potential purchaser in their Baseline Environmental Assessment (BEA). The BEA was submitted to the MDEQ in 2004."

The following text will be added to Section 13.1.2.

"As a part of a potential purchasers due diligence, additional soil and groundwater sampling was conducted in IU G. Twenty-five soil samples and

seven groundwater samples were collected by AKT Peerless between January 29 and February 5, 2004. Six groundwater samples exceeded the Michigan Part 201 Industrial Commercial II, III, and IV Drinking Water Criteria for a variety of parameters including: pH, iron, iron (dissolved), aluminum, aluminum (dissolved), ammonia, arsenic and arsenic (dissolved). The groundwater sample for pH at MW-04864 also exceeded the Michigan Part 201 GSI Criteria. The sample results were used by the potential purchaser in their BEA. The BEA was submitted to the MDEQ in 2004."

All data from the "other" investigations for IU H has been presented in the databox figures and has also been included in the human health and ecological risk assessments. The following text will be added to Section 14.1.3 "Other Soil Investigations".

"As part of the "other " investigation completed at IU G, an upgradient monitoring well (MW-05443) located in IU H was also sampled. Arsenic, arsenic (dissolved), iron and iron (dissolved) were reported at 0.021, 0.02, 26.3, and 22.3 mg/L, respectively, exceeding the Michigan Part 201 Industrial Commercial II, III and IV Drinking Water Criteria (arsenic criteria is 0.01 mg/L and iron criteria is 0.3 mg/L)."

The Phase 1C RFI Report will be revised to include the information as indicated above.

4. **U.S. EPA Comment**

Referring to the Phase IB section on page 75, specific constituents that were the focus of Phase IB sampling are identified based on previous investigation results. For example, 1,1,1-tetrachloroethane is listed as a target constituent, but it is not listed as a Phase 1A detection. Similar comment for PCB. If these were detected in Phase 1A sampling, it should be stated. If detected in pre-RFI data, that should also be stated. Similar comment for IU D (page 65).

Response

In reference to IU E (page 74), 1,1,1-tetrachloroethane should read 1,1,1-trichloroethane (1,1,1-TCA). 1,1,1-TCA was detected in Phase 1A soil samples collected from MW-02320 at a concentration of 4.8 mg/kg and 8.5 mg/kg (duplicate) which is below the screening criteria. However, 1,1-dichloroethene (1,1-DCE) was reported above the Phase 1A soil screening criteria in a soil sample from MW-02320. Since, 1,1,1-TCA is a parent product of 1,1-DCE and since it was detected in the same general location, 1,1,1-TCA was also carried forward as part of the entire VOC scan.

PCBs are listed on page 73 of the Phase 1C as exceeding the screening criteria during the Phase 1A in IU E and therefore PCBs were included in the Phase 1B Work Plan.

VOCs, SVOCs and metals were detected in pre-RFI investigations in IU E.

Formaldehyde was added in the Phase 1B in IU D based on a review of RFI data for IU I – the Classified Sand Staging Area. The majority of available laboratory analytical data for this area is from the classified sand stockpile sampling and former quench slag and casting sand sampling. Evaluation of these data indicated the presence of formaldehyde based on TCLP and SPLP analysis. During the Phase 1A activities formaldehyde was reported above the Phase 1A soil screening criteria within IU I. Since foundry sand was encountered Facility-wide during Phase 1A activities, formaldehyde was then added Facility-wide in the Phase 1B Work Plan for all IUs.

In addition, ammonia-nitrogen was also added to the Phase 1B parameter list for selected soil and groundwater samples in IUs B, D, G, H, and I, to confirm the source of ammonia detected during previous earlier non-RFI plant investigations in IU G. The most likely source of ammonia-nitrogen is believed to be waste management from the former print room operations.

Lastly, pre-RFI investigative activities had identified fluoride in IU G in the vicinity of the Former (Original and Replacement) Calcium Carbide Desulfurization Slag RCRA Treatment Units (G.4 and G.5, respectively). On July 28, 2000, in a conference call between GM and U.S. EPA, U.S. EPA expressed concern regarding historical concentrations of fluoride in groundwater which had exceeded the maximum contaminant level (MCL) at the Former Nodular Iron Plant in the vicinity of G.4 and G.5. Therefore, as part of the first and second Amendments to the April 19, 2000 Phase 1A RFI Report and Phase 1B RFI Work Plan, fluoride was included in the parameter list for IUs E, G, H, and I.

The Phase 1C RFI Report will be revised to include the above information.

5. **U.S. EPA Comment**

PCBs in the IU H Stormwater Ditch and Secondary Settling Basin sediments have not been delineated to 1 mg/kg as intended by Phase 1C work. There is no mention of this in the RFI on page 98. Sediment samples taken during Phase 1C work continue to show detections above 1 mg/kg. GM should perform additional sediment delineation work in areas where sediments are not delineated to 1 mg/kg to effectively evaluate ecological risk. It is unknown whether sediment PCB levels increase or decrease near the currently elevated locations. Additionally, it does not seem that the 2005 metals analysis was performed using the AVS-SEM method. The ecological risk assessment should be rerun considering the 2005 metals results to represent worst-case AVS-SEM results.

Response

With respect to the stormwater ditch, the U.S. EPA approved Phase 1C Work Plan states that the,

> "The PCBs concentration detected from the sediment sample collected at H7 exceeds 1 mg/kg. Two additional sediment samples will be collected, one upstream and one downstream of H7 (H7A and H7B), for the purpose of

delineating PCBs concentrations in the stormwater ditch located at the northwest boundary of IU-G as presented in Table 2 and on Figure H.1."

The concentration detected at H7 was 2.9 mg/kg. Sediment samples H7A and H7B were collected on January 19, 2005 and reported similar total PCB results of 3.64 J mg/kg (H7A) and 2.56 J mg/kg (H7B). These results are assumed to be representative of the stormwater ditch due to their consistent nature. Delineation of compounds to 1 mg/kg is generally completed for natural water bodies with well defined sources(s) and is not recommended for industrial basins/stormwater ditches that are most likely thoroughly mixed.

With respect to the secondary settling basins, the U.S. EPA approved Phase 1 C work Plan states,

> "Four additional sediment samples will be collected from within the secondary settling basin located in IU H (H8-04, H9-04, H10-04, and H11-04) for the purpose of characterization of PCBs, lead, and manganese concentrations as presented in Table 2 and on Figure H.1."

The Phase 1C was not intended to delineate the PCBs within the sediments in IU H to 1 mg/kg, but rather to obtain sufficient data to support completion of the HHRA and ERA. Sufficient data was collected to complete these risk assessments.

The AVS and SEM analyses were not conducted for 2005 sediment samples. AVS-SEM data were collected for sediments from the Secondary Settling Pond, Water Reservoir, and North Ditch in 1998 only. These data were used in the ERA to make predictions regarding metals toxicity using the U.S. EPA (2005) approach (refer to Section 7.4 and Table B-15 of the ERA). The 2005 analytical results for metals cannot be used to make predictions regarding metals toxicity and bioavailability using the AVS-SEM method because the metals must be simultaneously extracted to perform a valid prediction of the binding of the metals to the AVS. Due to variability in the sediment biogeochemistry that is likely over time, it cannot be assumed that the conditions where AVS was measured in 1998 would be the same or similar to those that were present in 2005. Therefore, GM believes it is appropriate to only use the 1998 AVS-SEM analysis to make interpretations regarding metals toxicity.

Based on the above clarification, no changes to the RFI Report are proposed.

6. **U.S. EPA Comment**

The text of the Phase 1C groundwater investigation on page 101 states that this round of sampling was done to further investigate "previous detections" of ammonia and SVOCs. However, neither of these are listed as exceeding criteria in Phase 1A or 1B sampling. Were the "previous detections" below criteria?

Response

All previous detections in IU H for ammonia and SVOCs were below RFI screening criteria. However, ammonia and SVOCs were added due to their presence above screening criteria in adjacent IU I.

Based on the above clarification, no changes to the RFI Report are proposed.

7. **U.S. EPA Comment**

The 3rd paragraph under Phase 1C is missing nickel in the list of the three metals exceeding criteria.

Response

The text on the 3rd paragraph will be revised to include nickel.

8. **U.S. EPA Comment**

Referring to the last two bullets on page 109, should these state that the constituents have not been delineated? What would be the potential sources for the ammonia, fluoride, and pentachlorophenol detections at IU I?

Response

The last two bullets on page 109, refer specifically to ammonia and antimony. Therefore, the text of the second last bullet on page 109 will be revised to state, "Ammonia has not been delineated; however, adequate data exists for the HHRA and ERA"
The text of the last bullet on page 109 has been revised to state, "Antimony has not been delineated; however, adequate data exists for the HHRA and ERA"

Ammonia had been previously detected in pre-RFI plant investigations. Ammonia was first sampled in the RFI as part of the Phase 1B activities in 2001. Ammonia was detected in 11 monitoring wells in IU I and ranged in concentrations from 0.05 to 40.2 mg/L. It is believed that the source of the ammonia is the waste management from the former Print Room located in the former Nodular Iron Plant.

Fluoride was also first sampled in the RFI as part of the Phase 1B activities in 2001 at the request of U.S. EPA (see Response to Comment 4 above) at IU I and was detected in 13 monitoring wells at concentrations ranging from 0.6 to 20.2 mg/L. An ASTM leaching analysis was conducted in 1985 for both the Quench Slag Pile and the Metals Reclamation Staging Area. A review of the ASTM leaching analysis indicted that low levels of fluoride were present in the leachate of these materials, and are therefore believed to be the likely source of fluoride detections at IU I.

Pentachlorophenol (PCP) was analyzed for in 1998, 2000, 2001, and 2005 at IU I. However, it was only detected at three monitoring wells in December 2001 at concentrations ranging from 1.3 to 6.3 µg/L.

Based on the above clarification, the revisions of the last two bullets on page 109 and the associated conclusions, are proposed.

9. **U.S. EPA Comment**

The IU I conclusions on page 110 state that with the exception of manganese in soil, constituents have been delineated to screening criteria. There is no discussion of elevated pH in the soils of IU I beyond the statement that leachable pH exists in the range of 9.01 to 11.84. These data were obtained using analysis via SW-846 Method 9045C. Section 3.5 of that method states that "Samples with very low or very high pH may give incorrect readings on the meter. For samples with a true pH of >10, the measured pH may be incorrectly low." The effect can vary from a tenth of a pH unit up to as much as 2.5 standard units. This is known as the "alkaline error". As such, there is a possibility that the soils in that area can leach at RCRA Corrosive Hazardous Waste levels (>12.5). Figure 15.2 shows that the area is not fully bounded to below screening criteria. The RFI document does not identify this area as a source area even though the Phase 1C sampling was conducted to evaluate that possibility. The area of the Former Quench Slag Pile is a source of elevated groundwater pH and must be addressed.

Response

Although the method identifies a potential for interference and error in samples with high pH values, the specific impact is dependent on the sample matrix and type of measurement system (electrode) utilized. The glass electrodes used in modern day laboratories have no measurable impact on pH measurement until true pH exceeds 14. The pH measurements performed by CAS was completed utilizing a "Thermoelectron Ross sure-flow combination pH probe: designed for low sodium error, stability, and high performance for soil pH determination" minimizing the alkaline error. Using current equipment, the accuracy of the reported data is expected to be within the precision of the method (0.1 SU). This has been confirmed in discussions with the leading pH probe manufacturer.

The following text will be added to Section 15.2.

> "The vadose zone in the area of the Former Quench Slag Pile is a source of elevated groundwater pH. Groundwater impacted by pH appears to be stable and will be monitored as part of the groundwater monitoring plan that will be developed for the Facility. "

GM will evaluate practical approaches to reducing elevated pH in soil.

10. **U.S. EPA Comment**

Page 113, Phase 1B groundwater investigation states that this round of sampling was done to further investigate "previous detections" of VOCs, SVOCs. However, neither of these are listed as exceeding criteria in Phase 1A sampling. Were the "previous detections" below criteria?

Response

Previous detections of VOCs and SVOCs in IU J were below criteria.

Based on the above clarification, no changes to the RFI Report are proposed.

11. **U.S. EPA Comment**

Page 119: There appear to be two typos in the first paragraph: "???" and "'what' constituents".

Response

The first paragraph on Page 119 in the Phase 1C RFI Report will be replaced with the following paragraph:

"The HHRA concluded that the potential exposures to routine workers, maintenance workers, trespassers, off-Facility residents are not significant. However, there is the potential for unacceptable risks to a hypothetical construction worker from exposures to soil beneath the No. 8 Mold Line area and shallow groundwater in IU G. In addition, there is a potential for unacceptable exposures to off-Facility construction workers if off-Facility migration of overburden groundwater from IU G were to occur; and the potential for unacceptable exposures from high pH in shallow groundwater."

12. **U.S. EPA Comment**

According to a letter from GM dated October 4, 2005, certain constituents detected at the SMCO landfill wells, which are not believed to be related to landfill activities, are to be addressed under RCRA Corrective Action activities. The RFI should discuss these constituents, their sources and what activities are proposed to address them.

Response

The October 4, 2005 letter refers to data from a 2004 Summary Report by the plant. This data was included in the Phase 1C RFI databox figures and incorporated in the HHRA and ERA. The 2004 quarterly sampling occurred on March 11, June 1 to 3, August 17 and 18, and November 9 and 10. The constituents specifically mentioned in the letter included: benzene, 2-butanone, 1,2-dichloropropane, formaldehyde, and carbon disulfide. Of these constituents, only formaldehyde and carbon disulfide were reported

in the landfill monitoring wells in IU J. The other constituents were reported in an upgradient bedrock well in IU I which is not part of the landfill monitoring program. The presence of these detections in the landfill wells prompted further sampling at an upgradient bedrock well (MW-97948) in IU I. Benzene, 2-butanone, 1,2-dichloropropane, formaldehyde, and carbon disulfide were reported in samples from monitoring well MW-97948 at levels below Michigan Part 201 Drinking Water Criteria.

The results included in the Phase 1C RFI databox figures incorporate all COCs that have exceeded screening criteria at least once across the entire Facility. The data from the IU J landfill wells from the 2004 Annual Summary Report combined with facility-wide historical data did not show any exceedances of screening criteria for formaldehyde or carbon disulfide. The results for monitoring well MW-97948 from the 2004 Annual Summary Report also did not show exceedances of screening criteria for the listed constituents; however, benzene and 1,2-dichloropropane in the upgradient bedrock well remained present in the IU I databox figure due to historical exceedances (December 1998).

The landfill leachate was sampled on four occasions in 2004 (March 11, June 2, August 17, and November 19). On all four occasions the aforementioned parameters were not detected above the reporting criteria in the landfill leachate. The SMCO landfill is surrounded by glacial clay deposits allowing little if any outward migration of groundwater or leachate from the landfill. Therefore, it is likely that the groundwater is hydraulically contained within the landfill. Since VOCs were not detected in the landfill leachate it supports the fact that the SMCO landfill is not the source of the VOCs detected in the landfill wells.

The possible sources of the constituents were outlined in the 2004 Summary Report. As this is an upgradient well the impacts at this well are expected to be associated with an off-Facility source.

The Phase 1C RFI Report will be revised to include the detail presented above in a new section (section 2.4 OTHER INVESTIGATIONS). The new section will provide detail on "Other Investigations" that were completed outside the RFI.

APPENDIX A - BASELINE HUMAN HEALTH RISK ASSESSMENT

1. U.S. EPA Comment

Is children's exposure considered in this risk assessment? If not, please provide justification for this omission.

Response

Yes, the assessment of off-Facility residential exposures included consideration of exposures during childhood. As discussed in Section 2.9.1 of Attachment 2 to Appendix A, "Potential exposure of off-facility residents ... is also conservatively

evaluated by summing the intakes for children age 1-6 and adults age 7-31." The exposure factors used in the risk assessment are summarized on the table entitled "Attachment 2.2: Exposure Factors".

2. U.S. EPA Comment

It is unclear why the risk assessment does not provide a cumulative risk estimate for each receptor that sums various risks associated with exposure to soil, groundwater, vapor intrusion, surface water, and sediment. For instance, on-Facility routine workers were evaluated for potential exposure to outdoor soil via direct contact, and to soil and groundwater via vapor intrusion to indoor air, but no table adding these risks could be found. The risk assessment should present a summary of the overall risk analysis for each receptor at each IU, identify those IU's that pose a risk above the agreed upon target risk of 10^{-4}, and identify the risk-driving exposure pathways and contaminants of concern. These risks should be presented in a clear manner in tables at the end of Appendix A.

Response

During the preparation of risk assessments (including streamlined risk assessments), ENVIRON considers which risk estimates for individual pathways, if any, should be summed in accordance with USEPA guidance in Risk Assessment Guidance for Superfund (RAGS), Part A. The considerations pertinent to the risk assessment for routine workers at this Facility are discussed below.

The risk estimates for potential exposure of routine workers were presented separately for direct contact with soil and for vapor intrusion because these exposure pathways do not exist at the same time. Routine workers have a potential for direct contact exposure to surface soil, as explained in Section 5.4.3. The potential for direct contact with surface soil would exist only if surface soil at an exposure area is exposed (i.e., not under gravel, pavement, or buildings). In this case, workers would not have a potential for exposure via vapor intrusion in the same area. Conversely, if an exposure area is covered by a building, then routine workers would have a potential for exposure via vapor intrusion but not via direct contact with surface soil. As such, summing the risk estimates for direct contact with outdoor soil and vapor intrusion would not be appropriate. Clarification will be added to the Uncertainty Analysis section of the risk assessment (Section 5.7 of Appendix A).

3. U.S. EPA Comment

The HHRA makes text references to Figure 2.X. There do not appear to be any Figure 2's in the document. These should apparently be references to Figure 1.X.

Response

The references to Figure 2.X will be revised to reference Figure 1.X.

4. U.S. EPA Comment

Page A-1: Please mention in the opening text that GM is utilizing a streamlined risk assessment approach, in addition to the text that states 'The risk evaluation methods applied in this evaluation are based on USEPA human health risk assessment guidance...." It is also recommended that some discussion included in the Uncertainty Analysis regarding the effects that the streamlined risk assessment approach may have on uncertainty.

Response

The requested text is already included in the sentence cited in this comment. The sentence states, "The risk evaluation methods applied in this evaluation are based on USEPA human health risk assessment guidance and *are consistent with those that have been used and are currently in use to streamline the evaluation of data during RCRA facility investigations (RFIs) at other GM facilities* (ENVIRON 2003b)." (emphasis added)

A discussion of the more significant effects of the streamlining approach is included in the Uncertainty Analysis (Section 5.7 of Appendix A). For example, Section 5.7.1 discusses the effects of using maximum concentrations instead of 95% UCLs, as follows: "As explained in Section 5.4, the use of maximum concentrations for all constituents introduces more conservatism than necessary for RME estimates because it assumes simultaneous worst-case exposure to all constituents constantly, when the RME would not likely have all constituents at worst-case concentrations at all times."

5. U.S. EPA Comment

Page A-9 - A-19: Please include a reference that will provide additional information regarding the criteria that was used for identifying the various investigative units.

Response

As discussed in Section 5.0 of the DOCC and in Part I, Section 3.3 of the RFI Work Plan, the Investigative Units correspond to operational areas at the Facility. This clarification will be added to Section 3.2 (page A-9).

6. U.S. EPA Comment

Page A-12: Please check the 2004 values for the Part 201 cleanup criteria against the updated 2006 Part 201 cleanup criteria for potential changes in values.

Response

The 2006 Part 201 cleanup criteria were reviewed in comparison with the 2004 values. The 2006 Part 201 criteria did not include any updates of the 2004 Part 201 criteria that were used in the report.

7. **U.S. EPA Comment**

Page A-13: Why weren't routine worker exposures to LNAPL included in the site conceptual model and discussed in the text? The last sentence of this section indicates that GM may do additional evaluation of this area. The U.S. EPA recommends performing an evaluation of LNAPL saturation and mobility throughout the previously delineated LNAPL area in order to evaluate source removal options beyond those presented in the original IM work plan. The RFI report should present a discussion of the previously delineated extent of LNAPL and identify what the LNAPL is. It may be a source of the vinyl chloride and cis-l,2-DCE present in IU B groundwater. Please present a discussion of the vertical and horizontal extent of organics groundwater contamination in IU B. The VAP wells indicate that contamination extends to nearly 50 feet bgs. A figure showing 3 dimensional extent of the LNAPL and organics groundwater plume would also be useful.

Response

The extent of LNAPL was identified using the data from 31 geoprobe borings installed in this area during RFI activities in 2001. The horizontal extent of LNAPL was determined by the presence or absence of LNAPL in the borings as determined based on visual observations. Soil data from this area, including data from MW00305 (see soil boring SB00305), were evaluated in the risk assessment. No measurable thickness of LNAPL has been observed in IU B since early 2003. For these reasons, quantitative risk assessment of potential exposures to the LNAPL is not warranted. Additional monitoring has been proposed by GM, and if LNAPL is observed then assessment of potential exposures to this LNAPL will be performed.

The presence of vinyl chloride and cis-1,2-DCE in groundwater in IU B was evaluated in the risk assessment. The LNAPL does not appear to be a significant source of vinyl chloride or cis-1,2-DCE in the groundwater at IU B. In fact, the LNAPL has no measurable concentration of hazardous constituents, and data for groundwater under the LNAPL show no constituents dissolving into groundwater at significant concentrations. As discussed in the RFI Report, a sample of LNAPL was collected at monitoring well MW-00305 in December 2002 and analyzed for VOCs and PCBs. As summarized in the RFI Report and in the attached table, no constituent was detected in the sample. A sample of water under the LNAPL layer in MW-00305 was collected in January 2003. As summarized in the RFI Report and in the attached table, only a few constituents were detected and their concentrations are all below the screening criteria for groundwater.

8. U.S. EPA Comment

Page A-14 states that in order to minimize worker exposure to manganese via particulate inhalation, the lease agreement requires that the area containing manganese at concentrations of potential concern be covered with 2-feet of gravel, or that operations be restricted from this portion of the lease area by construction a fence round the designated sample locations and placing 6-inches of clean topsoil with vegetative cover. Has this been done?

Response

Both areas are currently covered. One area is covered by a sand pile instead of gravel. However, if the pile is moved, the area will be covered with the gravel or restricted from future operations.

9. U.S. EPA Comment

Page A-15: Page A-15 is followed by page A-18 which followed by A-16 and A-17. Please reorder pages and adjust text accordingly.

Response

Future versions of the Phase 1C RFI Report will be corrected to have text pages in the correct order.

10. U.S. EPA Comment

Page A-19: The text that reads "The parcels of the 700-acre Facility that are no longer required for GM's continued operation have been or are likely to be sold for commercial and/or industrial uses" does not necessarily reflect past real estate dealings. For instance, a portion of the IU G was transferred for redevelopment as a halfway house. What assurances does the U.S. EPA have that other portions won't be transferred for other residential uses? Institutional controls preventing future residential use will be required because on-site residential risks have not been evaluated in the risk assessment.

Response

GM will evaluate the need for institutional controls to restrict land use during its preparation of the Corrective Measures Proposal. GM plans to place a deed restriction on the areas of the Facility owned by GM to limit future land use to the Michigan Part 201 Industrial and Commercial II, III, IV categories.

11. U.S. EPA Comment

Page A-19: Please identify the number of feet that residences are located from the facility property line.

Response

Residences are located south (upgradient) of the Facility, across Washington Avenue from the Facility, according to the Saginaw Future Land Use Map. Zoning maps show that: at IU B, residences are at least 90 feet from the facility; at IU D, residences are at least 100 feet from the facility, and at IU I, residences are at least 80 feet from the facility boundary.

12. U.S. EPA Comment

Page A-24: The text states that there are "... 4 domestic water supply wells located within 1 mile of the Facility." Further, "the water well records do not indicate if these wells are currently in use." Please provide additional information regarding these wells, including whether there was my follow-up by the facility regarding use of these wells. Also, page 12 of Table A4-1 indicates that "officials in the City of Saginaw were unaware of any groundwater drinking wells." Is this the extent of the private well investigation? Additional investigation would appear to be warranted, particularly given the concern for future off-site exposure to groundwater (see page 12 - Table A4-1).

Response

Information gathered during the RFI confirmed that there is no known use of groundwater from the upper water bearing zone. Wells constructed into the bedrock aquifer exist in the area of the facility, including the four domestic wells discussed on Page A-24 of the Report (See attached well construction logs). Of these four wells, the Flores well has no pump installed and the Tucker well has been abandoned (per item 15 from log). The Gonzales and Jackson wells both have pumps; further investigation of these two wells could be performed, however, the RFI did not identify any facility-related contamination in the bedrock aquifer. Therefore, additional investigation does not appear warranted.

13. U.S. EPA Comment

Page A-29: Please justify the following approach: "...data collected for the purpose of characterizing one IU may be used to support the evaluation of risks associated with exposures in an adjacent IU." Please identify the IU's where this approach was used.

Response

As shown in the tables provided in Attachment 2 of the HHRA, this approach was used when calculating the 95% UCL for antimony in IU D because soil sample locations in

IU B are closer to the exposure area than other soil sampling locations in IU D. Because the samples from IU B were collected in an area adjoining IU D, the data from these samples can be used to quantify the exposure concentration in this area of the facility. The samples used for this calculation are shown on Figure 1 (attached).

Also, all of IU A and part of IU E were combined to represent the Lease Area, and the maximum soil concentrations among these areas were used to calculate the upper-bound risk estimates for the Lease Area.

14. U.S. EPA Comment

Page A-31 - A-32: Was any sampling of private wells conducted? This would provide additional information regarding the concern over constituents in the lower aquifer groundwater.

Response

No sampling of private wells was conducted during the RFI. All off-Facility groundwater data were collected from monitoring wells. Concentrations above residential screening criteria are not believed to be attributable to the Facility because they were found in upgradient wells.

15. U.S. EPA Comment

Page A-35 - A-37 (as per phone call with GM and contractor on 4/10/07 - revision submitted by contractor on 4/13/07): The risk assessment isn't providing a clear idea of the exposed populations. For instance, on page A-36, the text states that "On-facility receptors include routine workers, construction workers, maintenance workers, redevelopment workers, and trespassers." The text goes on to describe three exposure scenarios- routine workers, construction workers, and trespassers, leaving out the other two scenarios. On page A-35, the scenarios are listed as routine workers, construction workers, maintenance workers, and trespassers, leaving out the redevelopment workers that are listed on page A-36. The conceptual site model in Table A4-1 lists routine workers, occasional excavation/maintenance workers, residents, and trespassers as potential on-site exposure scenarios. This confuses the issue even more - why are the residents of the Halfway House, which is on the facility, included as an on-facility exposed population in the conceptual site model in Table A4-1, but never mentioned in the text as such?

In addition. the text states that construction workers are a potentially exposed population, while the site conceptual model does not mention construction workers. There are two types of maintenance workers described in the site conceptual model in the risk assessment. The first type of maintenance worker is the "occasional maintenance worker" and the second type of maintenance worker is the "occasional excavation/maintenance worker." This type of nomenclature is confusing because the risk assessment refers to two different exposures by the same basic name. It is

necessary to rename these scenarios and maintain consistency between the text and site conceptual model when describing the scenarios. One population should be the maintenance worker, who performs occasional and limited subsurface activities, while the other population should be the construction worker, who performs activities associated with excavation.

Response

This comment was discussed with USEPA on April 10, 2007. As agreed during this call, revised pages and tables with clarifications were sent to USEPA on April 13, 2007 to address this comment.

16. **U.S. EPA Comment**

Page A-39: Please provide a specific section number and explanation for the text that states "As discussed in Section 3, the surface water characterization data collected during the RFI show that the extent of potentially significant releases to surface water does not extend to any off-Facility areas.

Response

The text quoted in this comment was referring current conditions based on information presented in Section 3.3.2, which said, "As demonstrated in the Evaluation of Phase 1B RFI Saginaw River Sediment and Surface Water Data ("River Assessment Report"; ENVIRON 2001; GM 2002), the data do not provide any indication of Facility-related influence on sediment or surface water concentrations relative to reference sampling locations that were selected in consultation with USEPA and MDEQ. Therefore, sediment and surface water conditions in the Saginaw River are not discussed further in this report." The text on page A-39 will be revised to provide this clarification, as follows: "As discussed in Section 3.3.2, the ..."

17. **U.S. EPA Comment**

Page A-42: Was the Saginaw River sampled for contaminants? Which concentration was used in the following calculations: "These predicted river concentrations are considered conservative upper-bound estimates since the evaluation.....3) assumed the maximum concentration detected in groundwater would enter the River...."

Response

As discussed in Section 3.3.2, GM had collected sediment and surface water samples from the Saginaw River in August 2000 to determine whether the Facility has had a discernible effect on the River's sediment and surface water quality. Because the sediment and surface water data showed no effects from the Facility, the risk assessment focused its evaluation on the potential for effects from the future discharge of on-Facility groundwater to the Saginaw River. As such, the discussion cited in this comment was

referring to the use of on-Facility groundwater data to predict concentrations in the Saginaw River. Specifically, the text explained that the maximum concentrations detected in groundwater were conservatively used to predict surface water concentrations.

18. U.S. EPA Comment

Page A-45/Page A-46/Table A5-2: Please explain and justify the approach specified in the following statement- "In certain cases, these estimates were conservatively based on RFI data collected in the area immediately surrounding the location exhibiting the highest concentrations of one or more of these constituents (i.e., delineation data) rather than all data across the exposure area." The site conceptual model does not match the text on this point. Please justify why it was appropriate to divide IU D into exposure areas.

Response

The text cited in this comment was referring to the calculation of 95% UCLs that used data from only the portion of an exposure area that is in the vicinity of the highest detected concentration. As noted in the text, this approach is conservative, because it calculates the 95% UCL by combining the highest concentration with fewer lower concentrations than are available in the whole exposure area. By using fewer lower concentrations, the resulting 95% UCL will be higher, or more conservative, than a 95% UCL that is calculated using additional lower concentrations measured across the entire IU.

This approach was applied as a conservative measure to calculate 95% UCLs for constituents in outdoor soil at IU D, because IU D is large (approximately 66 acres) and contains the active SMCO plant building, which extends essentially from the northern boundary of the unit to the southern boundary. The configuration of the outdoor areas is such that workers could be predominantly exposed to outdoor soil on one side of the building. As such, calculating a 95% UCL using data from only one side of the building around the highest concentration gives a higher or more conservative 95% UCL. The samples used for this calculation are shown on Figure 2 (attached).

19. U.S. EPA Comment

Page A-46: Please change the following sentence- "Based on the results of this risk evaluation, the potential exposures of on-Facility outdoor routine workers are not expected to be significant" to read "Based on the results of this risk evaluation, the potential exposures of on-Facility outdoor routine workers (to outdoor soil) are not expected to be significant."

Response

The text on page A-46 will be revised to provide the requested clarification.

20. U.S. EPA Comment

Page A-46: Based on the following sentence "The significance of potential exposure of on-Facility routine workers to constituents in soil and groundwater via vapor intrusion is assessed using appropriate occupational air standards as well as bounding RME risk estimates calculated based on URFs and RfCs." The following statement outlines the Region 5 RCRA policy on screening constituent concentrations in indoor air.

- *For site remedial decisions beyond the EI determinations (e.g., RFI determinations; CMS requirement; Statement of Basis). OSHA-PEL values will not be recognized as the appropriate health based screening levels for indoor air within on-site industrial buildings. EPA's risk-based screening levels for exposure to air contaminants will be applied according to the document titled: "DRAFT GUIDANCE FOR EVALUATING THE VAPOR INTRUSION TO INDOOR AIR PATHWAY FROM GROUNDWATER AND SOILS (http://www.epa.gov/correctiveaction/eis/vapor/complete.pdf). The RP may apply this guidance to demonstrate that vapor intrusion to indoor air is not a complete exposure pathway for an on-site building(s). If vapor intrusion of all applicable contaminants cannot be eliminated as a pathway of concern by the screening procedures recommended in the guidance, then additional work to address the pathway will be required. The additional work could include vapor migration modeling using site-specific parameters, soil gas sampling, sub-slab sampling, indoor air sampling, or a combination of these approaches.*

It appears that OSHA-PELs were used in the screening process for this facility. Please remove the PELs from this document. Was EPA guidance used in developing the second set of air standards?

Response

This comment does not explain EPA's rationale for accepting the use of OSHA PELs for EI determinations and then not accepting their use in determining when corrective measures are warranted. GM is also not aware of any written EPA policy that explains the rationale for this position. In principle, GM believes that the use of OSHA PELs should be evaluated in the same manner as other aspects of future land use in decisions about the need for corrective measures. The evaluation would be analogous to the evaluation of whether an assumption of future industrial land use rather than residential land use is appropriate in making remedial decisions at a particular site. Just as the assumption of future industrial land use is not rejected automatically in RCRA corrective action decisions, the assumption of OSHA applicability also should not be rejected automatically.

However, as discussed on page A-46, the significance of potential exposure of on-Facility indoor routine workers to constituents in soil and groundwater via vapor intrusion was assessed using both appropriate occupational air standards as well as bounding RME risk estimates calculated based on URFs and RfCs.

21. U.S. EPA Comment

Page A-46: A reference needs to be included for the "standard vapor intrusion pathway assessment methodology", and further review will be necessary before EPA will accept this methodology.

Response

The phrase quoted in this comment was referring to the model described by Johnson and Ettinger in their 1991 journal article, which USEPA recommends for screening-level evaluations. Both the Johnson and Ettinger model and USEPA's recommendation to use the model were discussed in Section 5.4.5.1 (on page A-41). Details of the vapor intrusion modeling calculations are provided in Attachment 2 (Section 2.5.3) of the Report.

22. U.S. EPA Comment

Page A-50: The streamlined risk assessment agreement between GM and EPA regarding using risk calculated for one scenario as a representative risk estimate for another scenario is that the routine worker scenario can be used as a surrogate for the trespasser scenario or the construction worker scenario, provided an explanation of exposure for the latter two scenarios reveals less exposure than the routine worker exposure. An extensive evaluation was done by the GM contractor before EPA accepted this methodology. However, EPA never agreed to allow the following in assessments on GM sites: "Potential exposure of trespassers to sediment is evaluated indirectly using exposure estimates for maintenance workers" and "Potential exposure of trespassers to surface water is evaluated indirectly using exposure estimates for maintenance workers." This proposed methodology will require further discussions.

Response

The use of risk estimates for maintenance workers' exposure to on-Facility sediment and surface water as surrogate risk estimates for trespassers' exposure to the same media is based on the same principle that GM demonstrated for using routine worker soil exposure risk estimates as surrogates for trespasser soil exposure risk estimates. The attached table entitled *High-End Exposure Factors for Maintenance Workers and Trespassers* has been prepared to facilitate USEPA review of how this principle applies to the case for trespasser exposure to on-Facility sediment and surface water. The attached table shows the exposure factors that were used in the baseline risk assessment to evaluate maintenance workers' exposure to sediment and surface water in the on-Facility ponds and ditches. Also shown on the table are exposure factors that would provide a conservative estimate of trespassers' exposure to the same media. As shown on the table, the trespassers are conservatively assumed to be adolescents ages 9 to 18 and trespass onto the Facility 2 days/week. They are also conservatively assumed to be in sediment and surface water for 1 hour each time they trespass when the air temperature

is 70°F or higher. These exposure assumptions for the trespassers are based on the same considerations that GM has used for this type of scenario in baseline risk assessments at other GM facilities. The table shows the resulting normalized intakes (normalized to a chemical concentration of 1 mg/kg or 1 mg/L) for these exposure factors for both the maintenance workers and trespassers. Comparison of these normalized intakes shows that the normalized intakes for maintenance workers are all higher than those for trespassers, which means that it is appropriate to use risk estimates for the maintenance workers as surrogate risk estimates for the trespassers.

23. U.S. EPA Comment

Page A-50: GM agreed that, as part of their streamlined risk approach, they would not use surrogate numbers for off-site residents. The reasoning was that exposures for off-site residents cannot be controlled and that it would be difficult to definitively say that the exposure would be less than a particular surrogate scenario. The statement that "Potential exposures of off-Facility residents to on-Facility soil in the future via windblown dust and vapor is evaluated indirectly using exposure estimates for routine workers...." And "Based on the risk estimates for on-Facility routine workers, these potential exposures of off-Facility residents are not significant" does not appear to be in line with the agreement reached between GM and EPA.

Response

The use of risk estimates for routine workers' exposure to outdoor soil as surrogate risk estimates for off-Facility residents' exposure to windblown particulates and vapors from on-Facility soil is consistent with the streamlined risk assessment approach as applied in risk assessments conducted for other GM facilities. The appropriateness of this usage was demonstrated in Attachment 1 of ENVIRON's November 2003 document entitled Health-Based Evaluation of Data to Streamline RCRA Facility Investigations (RFIs) at General Motors Facilities. As noted on page A1-7 of the document, "Furthermore, the results for the construction scenario can be interpreted to mean that the PRGs are also protective of off-Facility residential receptors that might be exposed via inhalation of PM10 or vapors during on-Facility construction/excavation activities, since off-Facility air concentrations would be lower than on source air concentrations due to air dispersion."

24. U.S. EPA Comment

Page A-51: Please change the following sentence: "Therefore, the potential exposures of residents at IU G- Tricap are not significant" to read "Therefore, the potential exposures of residents to soil at IU G-Tricap are not significant." Please change the following sentence: "Therefore, potential exposures of off-Facility residents are not significant" to read "Therefore, potential exposures of off-Facility residents to indoor air vapors from groundwater are not significant."

Response

The text on page A-51 will be revised to provide the requested clarifications.

25. **U.S. EPA Comment**

Page A-56: Please provide justification for the upper end of the recommended range of screening criteria for industrial worker exposure to lead (750 to 1,750 mg/kg). Some additional referencing at the 2003 EPA document would clarify this point. The stated criteria for protection of routine worker exposure to lead in soil of 1,000 mg/kg is comparable to the Region 5 RCRA Corrective Action recommended value of 1,100 mg/kg.

Response

USEPA calculated the criterion of 1,750 mg/kg using a baseline blood lead level of 1.7 µg-Pb/dL and a geometric standard deviation (GSD) of 1.8, as shown in Figure 2 of its January 2003 guidance on assessing risk associated with adult exposure to lead in soil (OSWER #9285.7-54). The discussion on page A-56 will be revised to provide this clarification.

26. **U.S. EPA Comment**

Page A-62: There appears to be two different types of routine worker scenarios from the text on this page. "The evaluation of risks associated with on-Facility outdoor routine worker exposures to surface soil...." and "The evaluation of risks associated with on-Facility indoor routine worker exposures to volatile constituents in soil...." The conceptual site model only lists one routine worker scenario. Please change the conceptual site model or the text so there is consistency throughout the risk assessment.

Response

The conceptual site model (Table A4-1) will be revised to clarify that the potential exposure of routine workers was evaluated for both outdoor soil and vapor intrusion.

27. **U.S. EPA Comment**

Table A4-1: For all IUs listed in the table, please supplement the information presented in the second column with information on the status of UST (e.g. closure approved by MDEQ, tanks removed closure pending, status unknown, etc.). This information is present for some USTs, but not others.

Response

Table A4-1 will be revised to provide the requested information.

28. U.S. EPA Comment

Table A5-8 contains screening results for the various environmental media at the GM Saginaw site. Six different columns in these tables are labeled "Ratio of Maximum Concentration to (risk-based screening criteria)." This column label is a misnomer for the screening tables that contain calculations involving inorganics because the maximum concentration is not the actual number that is being used in the numerator. For inorganics, the listed site-specific background is subtracted from the maximum concentration in the specific IU and the difference is used as the numerator in the ratio. Please change the column heading or include a footnote on the tables to reflect the actual numbers being used in the calculation.

Response

Table A5-8 is entitled "Assessment of Shallow Groundwater Discharge to Saginaw River", and as such, compared estimated maximum surface water concentrations to various criteria. No Facility-specific background was subtracted from measured groundwater concentrations in estimating the maximum surface water concentrations for any of the constituents on this table.

29. U.S. EPA Comment

Attachment 2-17: This section indicates that a soil ingestion rate of 200 mg/day was used for construction workers. Assuming that this is the scenario that involves excavation of soil, this value differs from the 330 mg/day value recommended in EPA's Supplemental Soil Screening Guidance for workers involved in excavation activities. The agreement between EPA and GM was as that two risk values would be calculated, using each of these values.

Response

Risk calculations that use a soil ingestion rate of 330 mg/day for construction workers were inadvertently omitted from Appendix A. The attached table (Table A5-1b) compares the results of these calculations with the results in Table A5-1 of Appendix A (which will be renumbered as Table A5-1a). As shown on Table A5-1b, using a soil ingestion rate of 330 mg/day does not change the risk assessment conclusions; all cumulative cancer risk estimates are still well below 10-4 and the only HI higher than 1 is still the one for IU D.

APPENDIX B - ECOLOGICAL RISK ASSESSMENT

1. U.S. EPA Comment

Section 3.2.3 indicates that all chemicals detected in groundwater are evaluated for the migration of groundwater to surface water pathway. Does this mean chemicals were evaluated merely if they were detected in site groundwater or only if they were over the GSI criteria? The RFI notes that mercury was detected above GSI at IU E, but mercury is not listed in the eco risk assessment Table B-5 for "Area E". Confirm that all chemicals are included in the eco risk assessment as required.

Response

The evaluation of the migration of chemicals in groundwater to surface water (Section 3.2.3 and Table B-5) included all of the chemicals that were detected in groundwater. However, dissolved concentrations of metals were used preferentially if both total and dissolved concentrations in groundwater were available. Dissolved concentrations of metals are preferred over total concentrations of metals to be consistent with the U.S. EPA Region 5 ESLs for surface water, which are reported in dissolved form. This is because the free ion metal, which is best represented by the dissolved concentrations, is the form that is most toxic to aquatic organisms. EPA indicates that the RFI notes that mercury was detected above the GSI at IU E. Only total mercury was detected in IU E and dissolved mercury was not detected, therefore, mercury was not included in Table B-5.

2. U.S. EPA Comment

Section 3.2.3, Migration from Groundwater to Surface Water, Page B-20: This section needs to be expanded to address other mechanisms for subsurface transport of contaminants (e.g., PCBs) to Saginaw River sediment.

Response

Sediment sampling conducted in 2000 in the Saginaw River upstream and downstream of the Facility showed no impacts from the Facility (Environ 2001). Therefore, direct assessment of exposure to River surface water and sediment was not evaluated as part of the ERA. Given this, the only mechanism for subsurface transport of contaminants to Saginaw River is the potential transport of contaminants in groundwater to Saginaw River. This mechanism of contaminant transport was evaluated in the ERA (refer to Section 3.2.3 of the ERA). There are no other mechanisms for subsurface transport of contaminants, including PCBs, from groundwater to Saginaw River sediment.

3. U.S. EPA Comment

Section 3.2.3 Migration from Groundwater to Surface Water, Page B-20, 1st and 2nd Paragraphs: Use of the 90-day 10-year (90Q10) low flow is only intended for

evaluating wildlife criteria (i.e., PCBs). Justification is lacking on the use of an eight year data set to construct the 90Q10 (i.e., 10-year period of record). The 90Q10 low flow needs to be recalculated using the following USGS Stations for the 90Q10 low flow estimation:

04145000 - Shiawassee; 1941-2006
04149000 - Flint; 1940-2006
04151500 - Cass; 1936-2006
04156000 - Tittabawassee; 1937-2006

For the remaining contaminants which are compared to chronic aquatic life criteria, the exposure concentrations in Table 5-B need to based on the 7-day 10-year (7Q10) low flow. A 7Q10 low flow value of 460 cfs has been estimated for the Saginaw River by the Michigan DEQ. The exposure concentrations in Table 5-B need to be recalculated for all chemicals based on this 7Q10 low flow except PCBs.

Response

GM recognizes that the 7Q10 is often used in discharge permits and waste load allocations. Thus, GM will evaluate the use of the 7Q10 low flow value as recommended by EPA for the groundwater to surface water discharge scenario for SMCO. GM will recalculate the exposure concentrations for all chemicals (except PCBs), if the 7Q10 value is determined to be both protective and reasonable for risk assessment purposes.

GM will also review the dataset that was used by the U.S. Geological Survey (USGS) to construct the low flow to determine why two years of data are missing. The USGS Station that was used in the calculations was USGS 04157000, Saginaw River at Saginaw, Michigan. GM believes this station to be more representative of flow in the vicinity of SMCO than flows measured on the tributaries listed by EPA. However, the locations of the USGS stations recommended by EPA will be evaluated along with the Saginaw gauging station location to determine the most appropriate dataset to predict in-river surface water concentrations at SMCO. The groundwater to surface water discharge model and Table B-5 will be revised if necessary based on this evaluation.

4. **U.S. EPA Comment**

Section 3.2.3 Migration from Groundwater to Surface Water, Page B-21, 3rd Paragraph: Since PCBs have been detected in groundwater and Saginaw River sediments (Evaluation of Phase 1B RFI Saginaw River Sediment and Surface Water Data, 2001), the intent of the statement "... PCBs are not likely to be mobile in groundwater ..." is not clear. The last sentence needs to he removed from this paragraph since this information does not change the fact that PCBs were detected in groundwater and Saginaw River sediments.

Response

During the RFI, PCBs were reported at very low concentrations (all results were below the reporting limit and were estimated, or J-qualified) in groundwater samples collected in IUs B, D, E, G, and G-Tricap, where the predicted surface water concentrations exceeded the U.S. EPA Region ESL in Table B-5. Therefore, it is likely that the low levels of PCBs in groundwater at these IUs are not a current source of PCBs to Saginaw River sediments. In addition, sediment sampling in 2000 in the River upstream and downstream of the Facility showed no impacts from the Facility (Environ 2001).

The third paragraph in Section 3.2.3 will be revised accordingly. In addition, the last sentence of the third paragraph of Section 3.2.3 will be deleted.

5. **U.S. EPA Comment**

Section 3.2.3 Migration from Groundwater to Surface Water, Page B-21, 4th Paragraph: The Evaluation of Phase 1B RFI Saginaw River Sediment and Surface Water Data, 2001 states that PCBs were detected in Saginaw River sediment. If an improved estimate of PCB transport (other than groundwater) to the Saginaw River is needed, please offer a suggestion otherwise delete this paragraph.

Response

Paragraph will be deleted.

6. **U.S. EPA Comment**

Section 3.2.3 Migration from Groundwater to Surface Water, Page B-21, 5th Paragraph: The groundwater and subsurface pathways to the river also need to be evaluated if Saginaw River sediment and/or fish tissue contain PCBs (see comment 1). Information from the 2001 Saginaw River needs to be included in this discussion.

Response

Sediment sampling in 2000 in the River upstream and downstream of the Facility showed no impacts from the Facility (Environ 2001). Therefore, the Saginaw River is not included as a part of this ERA. Although direct assessment of exposure to River surface water and sediment were not conducted for the ERA, the potential for Facility groundwater discharge to Saginaw River was evaluated (refer to Section 3.2.3 of the ERA).

7. **U.S. EPA Comment**

Section 3.3 Assessment and Measurement Endpoints: The avian receptors need to include the belted kingfisher (this avian aquatic carnivore will have greater

contaminant exposure based on smaller body weight and higher prey ingestion rate) in addition to or as a replacement for the great blue heron. The belted kingfisher needs to be included in the exposure characterization.

Response

According to the U.S. Fish and Wildlife Service (1985) Habitat Suitability Index Model, the belted kingfisher feeds primarily on fish that they catch in clear water. There are no fish in the Secondary Settling Pond or Water Reservoir. Therefore, assessing exposure of belted kingfisher would be appropriate for the North Ditch only, which contained fish in 1997. As recommended by EPA, GM will evaluate belted kingfisher exposure for the North Ditch in addition to the great blue heron and the ecological risk assessment, including Section 3.3, will be revised accordingly.

8. **U.S. EPA Comment**

Section 4.2 Food-Web Models, Page B-27, 3rd paragraph: The detection limit for PCBs can not be found in this report or the 2001 Saginaw river report. Since detection limits are used for comparison to the ESL benchmarks, all detection limits need to be clearly presented in this report (e.g., Tables B-3, B-4, and B-5) and the location identified in this paragraph.

Response

The detection limits for PCBs and the other chemicals are provided in Tables B-3 and B-4. The values qualified by "U" are the detection limits. A footnote about "U" qualifier will be added to Tables B-3 and B-4. Only detected chemicals were evaluated in the groundwater to surface water discharge screening (Table B-5). Detection limits for PCBs and other chemicals in groundwater can be found in Appendix D, the analytical data reports, and Appendix E, the E:DAT.

9. **U.S. EPA Comment**

Section 5 4 Derivation of TRVs, Page B -36, Last paragraph

The U.S. EPA 2005, Ecological Soil Screening Level (Eco-SSL) reports are a preferred source for both NOAEL and LOAEL TRVs and need to be incorporated into this risk assessment (i.e., Table B-8). Although most of the TRVs from the Eco-SSL reports are lower than those listed in Table B-8, some are higher. For chemicals not listed in the Eco-SSL reports, the basis for selecting sources (e.g., ECOTOX Database) needs to be explained. The TRVs (mg of chemical/ kg body weight/ day) from the Eco-SSL reports are listed below:

	Avian		*Mammal*	
Chemical	*NOAEL*	*LOAEL*	*NOAEL*	*LOAEL*
Antimony	-----	-----	*0.059*	*0.590*

Chemical	Avian NOAEL	LOAEL	Mammal NOAEL	LOAEL
Arsenic	*2.24*	-----	*1.04*	*1.66*
Barium	-----	-----	*51.8*	*121*
Beryllium	-----	-----	*0.532*	-----
Cadmium	*1.47*	*2.37*	*0.770*	*1.0*
Chromium+3 (unbounded)	*2.66*	*2.78*	*2.40*	*2.82*
Chromium+6	-----	-----	*5.66*	*12.0*
Cobalt	*7.61*	*7.8*	*7.33*	*10.9*
Copper	*4.05*	*4.68*	*5.60*	*9.34*
Lead	*1.63*	*1.94*	*4.70*	*5.0*
Nickel	*6.71*	*11.5*	*1.70*	*2.71*

Response

The basis for selecting the sources for TRVs is explained in Section 5.4 of the ERA. To derive TRVs, a literature review was conducted to compile a database of toxic effects levels for the representative receptors or surrogate species. Whenever possible, source studies were selected that report effects of chronic dietary exposure on survival, growth, or reproduction. This is consistent with EPA guidance for selecting assessment and measurement endpoints (U.S. EPA 1997). Several factors were weighted in the review of toxicological literature for selecting the most appropriate TRV, such as criteria related to ecological relevance (e.g., the use of laboratory organisms or domesticated species, ecological relevance of the study endpoints, route and duration of exposure) and criteria related to study design and reporting (e.g., standardization of definitions and methods, study design and statistical robustness). The source studies for each of the TRVs are cited in Table B-8.

GM will evaluate the suitability of the studies that form the basis of the TRVs used in the Eco-SSL documents as provided in EPA's comment. If more appropriate TRVs are available from these sources, the TRVs in Table B-8 will be revised, and the ERA will be revised accordingly.

10. **U.S. EPA Comment**

Section 6 Risk Characterization: The discussion need to be expanded to include the lowest adverse effect level (LOAEL) endpoint especially when the no adverse effect level endpoint is exceeded (HQ > 1). This will bracket the risk estimates. When risk exceeds the LOAEL endpoint a sever effect endpoint may be needed to bracket the risk estimates. This section will need to be revised in response to these comments.

Response

GM will revise the ERA to include an evaluation of HQs for LOAELs where the HQ is greater than one for the comparison to the NOAELs. This evaluation will be incorporated in Section 7, the Uncertainty Analysis.

11. **U.S. EPA Comment**

Table B-3, Ecological Screening Levels (ESLs) for Surface Water: Although ESLs were not posted for aluminum and manganese, criteria are available as follows:

a) The EPA ambient water quality criteria for aluminum are 87 ug/L for chronic and 750 ug/L for acute. EPA recognizes that this chronic criteria is below natural levels of aluminum.

b) A Tier II value (alternate chronic criteria) for manganese is 80 ug/L. A Tier II secondary value (alternate acute criteria) is not available for manganese, but could be developed.

Response

Comment noted. Table B-3 will be updated accordingly. The addition of these screening values to the ERA does not change the conclusions of the ERA.

12. **U.S. EPA Comment**

Table B-4. Ecological Screening Levels (ESLs) for Sediment:

a) The units for the sediment ESLs in Table B-4 are incorrectly expressed as mg/L. When contaminants are in a solid media, the solid media (e.g., sediment or soil) unit needs to be presented as weight. The sediment ESL units need to be expressed as ug/kg or mg/kg in Table B-4.

b) A sediment ESL for bis(2-ethylhexyl)phthalate is listed as 182 ug/kg (see ESL table, bottom of page 9). This value needs to be inserted into Table B-4.

c) Sediment ESLs for the isomers of Cresol (also known as Methylphenol) are available for insertion into Table B-4.

d) Although ESLs were not posted for aluminum and manganese, sediment benchmarks are available (aluminum, effect range low = 13,500 mg/kg, see Appendix 3A in EPA 905-R96-008 and manganese, lowest effect level = 460 mg/kg, see reference in note "t" of the ESL table) and need to be presented in the ecological risk assessment report.

Response

Comment noted. Table B-4 will be updated accordingly. The addition of these ESLs and other benchmarks to the ERA does not change the conclusions of the ERA.

13. **U.S. EPA Comment**

Table B-5. Notes: Reference to a MCL has no application to the ecological risk assessment and needs to be deleted from this table.

Response

Comment noted. The maximum concentration limit (MCL) was not used in Table B-5 and reference to it will be deleted from Table B-5.

14. **U.S. EPA Comment**

Table B-8, TRV Units: The TRV units for the NOAEL and LOAEL endpoints need to be listed in this table

Response

Comment noted. The units for the TRVs (NOAELs and LOAELs) are mg of chemical/kg body weight/day. The TRV units will be added to Table B-8.

APPENDIX D - DATA QUALITY REPORTS

1. **U.S. EPA Comment**

Three laboratories generated data in support of this project - STL (North Canton), Columbia Analytical Services, and TriMatrix. We have no recent demonstration of performance from the latter two labs and recent Performance Evaluation sample results should be submitted. Data and case narratives only seem to have been presented in behalf of Columbia, not the other labs.

Response

The environmental laboratory for the RFI sample analysis, as detailed in the Quality Assurance Project Plan (QAPP) is Columbia Analytical Services in Kelso, Washington (CAS). TriMatrix provided analysis of a single soil sample submitted for backfill evaluation. The backfill was used to fill the excavations created during the PCB IM. STL provided analysis supporting property transfers as well as PCB IM verification.

Proficiency test (PT) results for CAS and TriMatrix associated with the most current sample analysis dates and matrix will be provided in the revised RFI Report. In addition, data and case narratives will be provided for TriMatrix and STL.

2. U.S. EPA Comment

Referring to Kathy Shaw's memorandum dated July 1, 2005 regarding Columbia Analytical Services' data, of 100 groundwater, 97 soil, 6 sediment and 15 QC samples, several VOCs and metals data points had to be rejected. Was rejected data was properly excluded from the main body Phase 1C report? What effect did any rejected data have on achieving Phase 1C objectives' for bounding out appropriate COCs (e.g. vinyl chloride)?

Response

The rejected data was properly excluded by indicating rejected values in the Phase 1C Report tables and databox figures with an 'R'. This method has been used previously and has been approved by the U.S. EPA.

The rejected sample results are presented on the Phase 1C Report databox figures for IUs B, D, G, and I. The rejected sample results were from select samples collected in 2000 and 2005. The rejected sample results from 2000 were not re-sampled in subsequent events since it was determined the additional data was not required to meet the RFI objectives.

Rejected samples from the 2000 sampling event included monitoring well MW-96939 in IU I, soil borings SB-02211, SB-02407, and SB-02510 in IU D, and soil boring SB-00408a in IU B. Rejected COCs included: hexavalent chromium at monitoring well MW-96939, antimony and hexavalent chromium at soil borings SB-02211 and SB-02407, antimony at soil boring SB-02510, and PCBs at soil boring SB-00408a. Investigation activities after 2000 did not propose re-sampling these areas as it was determined that the data was not required to meet the RFI objectives. All investigation activities were approved by U.S. EPA. The HHRA and ERA used valid data and did not include the rejected data.

Rejected samples from the 2005 sampling event included two monitoring wells, MW-06445 in IU I and MW-04433 in IU G, both of which have rejected nickel. Historical data shows that there were no detections of nickel prior to the 2005 sampling event at monitoring wells MW-06445 and MW-04433 and therefore, nickel is not expected to be an issue.

Vinyl chloride has not been rejected in any RFI samples.

Based on the above clarification, no changes to the RFI Report are proposed.

3. U.S. EPA Comment

A series of percent recovery results surrogate monitoring compounds (e.g. - surrogates) seemed out of control from SVOCs sample to sample. (For example. pp. 549 to 582 in the largest 600+ page file report.) Here, percent recoveries ranged from as low as 8 % for terphenyl-d14 on up to over 1,925 % in a continuing calibration standard. Please incorporate a discussion in the report as to how this (and any other) apparent out of control data set(s) impeded attainment of any project objectives.

Response

The referenced percent recoveries for the surrogate compounds do not apply to samples as they are pertain to the calibration standards. The calibration standards include concentrations at multiple levels to establish the relative response factor used to determine surrogate concentrations in actual samples. The percent recovery provided should be ignored.

Based on the above clarification, no changes to the RFI Report are proposed.

4. U.S. EPA Comment

Was SVOC data affected in groundwater samples which exhibited high pH? If the lab did not monitor pH levels during the extraction procedure for SVOC, the analytical results may be inaccurate. Groundwater metals results may also be very low due to formation of hydroxide precipitates from high pH groundwater.

Response

The SVOC extraction of groundwater samples by U.S. EPA SW-846 Methods (3000, 3510, and 3520) and as stated in the laboratories standard operating procedures (SOP) includes an initial pH measurement and adjustment to less than 2 standard units (SU) with sulfuric acid for the acid extractables (phenols) and then adjusted to a pH of greater than 11 SU with sodium hydroxide for the base/neutral extractables.

Groundwater samples analyzed for metals were preserved in the field to a pH of less than 2 SU with nitric acid, dissolving any hydroxide precipitates. This pH was verified upon receipt by the laboratory with further adjustments if necessary.

Based on the above clarification, no changes to the RFI Report are proposed.

TABLE 1

ANALYTICAL DATA FOR SAMPLE OF LNAPL FROM MW-0035 SMCO PLANT SAGINAW, MICHIGAN

Well Location:		*MW-00305*
Sample Date:		*12/17/2002*
IU:		*B*
Sample Matrix Code:		*LNAPL*
Parameters	*Units*	
VOAs		
1,1,1-Trichloroethane	mg/kg	1.2 U
1,1,2,2-Tetrachloroethane	mg/kg	1.2 U
1,1,2-Trichloroethane	mg/kg	1.2 U
1,1-Dichloroethane	mg/kg	1.2 U
1,1-Dichloroethene	mg/kg	1.2 U
1,2-Dichloroethane	mg/kg	1.2 U
1,2-Dichloropropane	mg/kg	1.2 U
2-Butanone (Methyl Ethyl Ketone)	mg/kg	R
2-Hexanone	mg/kg	47 U
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	mg/kg	R
Acetone	mg/kg	R
Benzene	mg/kg	1.2 U
Bromodichloromethane	mg/kg	1.2 U
Bromoform	mg/kg	1.2 U
Bromomethane (Methyl Bromide)	mg/kg	1.2 U
Carbon disulfide	mg/kg	1.2 U
Carbon tetrachloride	mg/kg	1.2 U
Chlorobenzene	mg/kg	1.2 U
Chloroethane	mg/kg	R
Chloroform (Trichloromethane)	mg/kg	1.2 U
Chloromethane (Methyl Chloride)	mg/kg	1.2 U
cis-1,2-Dichloroethene	mg/kg	1.2 U
cis-1,3-Dichloropropene	mg/kg	1.2 U
Dibromochloromethane	mg/kg	1.2 U
Ethylbenzene	mg/kg	1.2 U
m&p-Xylene	mg/kg	1.2 U
Methylene chloride	mg/kg	4.7 U
o-Xylene	mg/kg	1.2 U
Styrene	mg/kg	1.2 U
Tetrachloroethene	mg/kg	1.2 U
Toluene	mg/kg	1.2 U
trans-1,2-Dichloroethene	mg/kg	1.2 U
trans-1,3-Dichloropropene	mg/kg	1.2 U
Trichloroethene	mg/kg	1.2 U
Vinyl chloride	mg/kg	1.2 U

TABLE 3

ANALYTICAL DATA FOR SAMPLE OF WATER UNDER LNAPL FROM MW-0035 SMCO PLANT SAGINAW, MICHIGAN

Well Location:		*MW-00305*
Sample Date:		*1/3/2003*
IU:		*B*
Sample Matrix Code		*Water from Under LNAPL*
Parameters	*Units*	
VOAs		
1,1,1-Trichloroethane	ug/L	0.5 U
1,1,2,2-Tetrachloroethane	ug/L	0.5 U
1,1,2-Trichloroethane	ug/L	0.5 U
1,1-Dichloroethane	ug/L	0.5 U
1,1-Dichloroethene	ug/L	0.5 U
1,2-Dichloroethane	ug/L	0.5 U
1,2-Dichloropropane	ug/L	0.5 U
2-Butanone (Methyl Ethyl Ketone)	ug/L	R
2-Hexanone	ug/L	20 U
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	ug/L	R
Acetone	ug/L	**5.4 J**
Benzene	ug/L	0.5 U
Bromodichloromethane	ug/L	0.5 U
Bromoform	ug/L	0.5 U
Bromomethane (Methyl Bromide)	ug/L	0.5 U
Carbon disulfide	ug/L	0.5 U
Carbon tetrachloride	ug/L	0.5 U
Chlorobenzene	ug/L	0.5 U
Chloroethane	ug/L	0.5 U
Chloroform (Trichloromethane)	ug/L	0.5 U
Chloromethane (Methyl Chloride)	ug/L	0.5 U
cis-1,2-Dichloroethene	ug/L	0.5 U
cis-1,3-Dichloropropene	ug/L	0.5 U
Dibromochloromethane	ug/L	0.5 U
Ethylbenzene	ug/L	0.5 U
m&p-Xylene	ug/L	0.5 U
Methylene chloride	ug/L	2 U
o-Xylene	ug/L	0.5 U
Styrene	ug/L	0.5 U
Tetrachloroethene	ug/L	0.5 U
Toluene	ug/L	0.5 U
trans-1,2-Dichloroethene	ug/L	0.5 U
trans-1,3-Dichloropropene	ug/L	0.5 U
Trichloroethene	ug/L	0.5 U
Vinyl chloride	ug/L	0.5 U

TABLE 3

ANALYTICAL DATA FOR SAMPLE OF WATER UNDER LNAPL FROM MW-0035 SMCO PLANT SAGINAW, MICHIGAN

Well Location:		*MW-00305*
Sample Date:		*1/3/2003*
IU:		*B*
Sample Matrix Code		*Water from Under LNAPL*
Parameters	*Units*	
SVOAs		
1,2,4-Trichlorobenzene	ug/L	10 U
1,2-Dichlorobenzene	ug/L	10 U
1,3-Dichlorobenzene	ug/L	10 U
1,4-Dichlorobenzene	ug/L	10 U
2,2'-oxybis(1-Chloropropane) (bis(2-chloroisopropyl) ether)	ug/L	10 U
2,4,5-Trichlorophenol	ug/L	10 U
2,4,6-Trichlorophenol	ug/L	10 U
2,4-Dichlorophenol	ug/L	10 U
2,4-Dimethylphenol	ug/L	10 U
2,4-Dinitrophenol	ug/L	25 U
2,4-Dinitrotoluene	ug/L	10 U
2,6-Dinitrotoluene	ug/L	10 U
2-Chloronaphthalene	ug/L	10 U
2-Chlorophenol	ug/L	10 U
2-Methylnaphthalene	ug/L	10 U
2-Methylphenol	ug/L	10 U
2-Nitroaniline	ug/L	25 U
2-Nitrophenol	ug/L	10 U
3,3'-Dichlorobenzidine	ug/L	25 U
3-Nitroaniline	ug/L	25 U
4,6-Dinitro-2-methylphenol	ug/L	25 U
4-Bromophenyl phenyl ether	ug/L	10 U
4-Chloro-3-methylphenol	ug/L	10 U
4-Chloroaniline	ug/L	10 U
4-Chlorophenyl phenyl ether	ug/L	10 U
4-Methylphenol	ug/L	10 U
4-Nitroaniline	ug/L	25 U
4-Nitrophenol	ug/L	25 U
Acenaphthene	ug/L	**1**
Acenaphthylene	ug/L	10 U
Anthracene	ug/L	10 U

TABLE 3

ANALYTICAL DATA FOR SAMPLE OF WATER UNDER LNAPL FROM MW-0035 SMCO PLANT SAGINAW, MICHIGAN

Well Location:		***MW-00305***
Sample Date:		***1/3/2003***
IU:		***B***
Sample Matrix Code		***Water from Under LNAPL***
Parameters	***Units***	
Benzo(a)anthracene	ug/L	10 U
Benzo(a)pyrene	ug/L	10 U
Benzo(b)fluoranthene	ug/L	10 U
Benzo(g,h,i)perylene	ug/L	10 U
Benzo(k)fluoranthene	ug/L	10 U
bis(2-Chloroethoxy)methane	ug/L	10 U
bis(2-Chloroethyl)ether	ug/L	10 U
bis(2-Ethylhexyl)phthalate	ug/L	10 U
Butyl benzylphthalate	ug/L	10 U
Carbazole	ug/L	10 U
Chrysene	ug/L	10 U
Dibenz(a,h)anthracene	ug/L	**0.76**
Dibenzofuran	ug/L	**0.4**
Diethyl phthalate	ug/L	10 U
Dimethyl phthalate	ug/L	10 U
Di-n-butylphthalate	ug/L	10 U
Di-n-octyl phthalate	ug/L	10 U
Fluoranthene	ug/L	**1.1**
Fluorene	ug/L	**1**
Hexachlorobenzene	ug/L	10 U
Hexachlorobutadiene	ug/L	10 U
Hexachlorocyclopentadiene	ug/L	10 U
Hexachloroethane	ug/L	10 U
Indeno(1,2,3-cd)pyrene	ug/L	**1**
Isophorone	ug/L	10 U
Naphthalene	ug/L	10 U
Nitrobenzene	ug/L	10 U
N-Nitrosodi-n-propylamine	ug/L	10 U
N-Nitrosodiphenylamine	ug/L	10 U
Pentachlorophenol	ug/L	25 U
Phenanthrene	ug/L	10 U
Phenol	ug/L	10 U
Pyrene	ug/L	**1**

TABLE 3

ANALYTICAL DATA FOR SAMPLE OF
WATER UNDER LNAPL FROM MW-0035
SMCO PLANT
SAGINAW, MICHIGAN

Well Location:		*MW-00305*
Sample Date:		*1/3/2003*
IU:		*B*
Sample Matrix Code		*Water from Under LNAPL*
Parameters	***Units***	
PCBs		
Aroclor-1016 (PCB-1016)	ug/L	0.2 U
Aroclor-1221 (PCB-1221)	ug/L	0.4 U
Aroclor-1232 (PCB-1232)	ug/L	0.2 U
Aroclor-1242 (PCB-1242)	ug/L	0.2 U
Aroclor-1248 (PCB-1248)	ug/L	0.2 U
Aroclor-1254 (PCB-1254)	ug/L	0.2 U
Aroclor-1260 (PCB-1260)	ug/L	0.2 U
Total PCBs	ug/L	0.4 U
Metals		
Aluminum	ug/L	**20.6 J**
Antimony	ug/L	50 U
Arsenic	ug/L	**3.4 J**
Barium	ug/L	**114**
Beryllium	ug/L	5 U
Cadmium	ug/L	5 U
Chromium Total	ug/L	5 U
Copper	ug/L	10 U
Lead	ug/L	2 U
Manganese	ug/L	**199**
Nickel	ug/L	20 U
Vanadium	ug/L	10 U
Zinc	ug/L	**11.6**
Field Parameters		
Conductivity Field	umhos/cm	**1080**
Dissolved Oxygen, Field	mg/L	**8.48**
Oxidation reduction potential	millivolts	**66**
pH Field	s.u.	**8.14**
Temperature, Field	Deg C	**3.54**
Turbidity	NTU	**4.96**

SAGINAW COUNTY
DEPARTMENT OF PUBLIC HEALTH
protecting and promoting the public's health since 1928

'd CRA
NOV 1 6 2005

Natasha J. V. Couloumis, M.P.H.
Health Officer

Neill D. Varner, D.O., M.P.H.
Medical Director

17075

November 10, 2005

Michael R. Tomka, P.E.
Conestoga-Rovers & Associates
651 Colby Drive
Waterloo, Ontario, Canada N2V 1C2

RE: Freedom of Information Request
GM Saginaw Metal Casting Operations Facility
Saginaw County, Michigan

Dear Mr. Tomka:

In response to the above referenced request, please find enclosed the well logs within a 1 mile radius of the facility.

Future file searches could be expedited if additional information is provided with your request. Information such as property owner, vacant or developed land, name of business (if applicable), and whether the site is commercial or residential would be greatly appreciated. Any future request, please submit a full address of where to send responses to.

Should you have any questions concerning this matter, please feel free to contact this office at (989) 758-3685.

Sincerely,

For Natasha J. V. Couloumis, M.P.H.
Health Officer

Steven J. Alworden/amm

Steven J. Alworden, R.S.
Senior Environmental Health Specialist

SJA:amm

GEOLOGICAL SURVEY SAMPLE No.

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

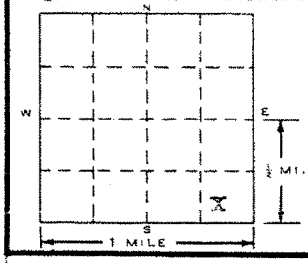
1 LOCATION OF WELL

County	Township Name	Fraction	Section Number	Town Number	Range Number
Saginaw	Buena Vista	SE¼SE ¼SE ¼	8	12 N/S	5 E/W

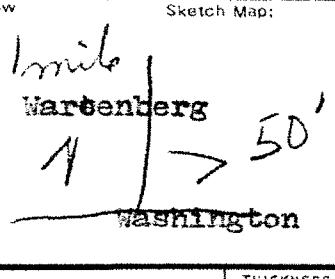
Distance And Direction from Road Intersections
.1 N. of Washington at 1734 Wartenberg.
E. side, 50' from road

Street address & City of Well Location

Locate with "X" in section below



Sketch Map:



3 OWNER OF WELL:
Address: Antonio Flores
1734 Wartenberg
Saginaw, Mich.

4 WELL DEPTH: (completed) 127 ft. Date of Completion 7-5-78

5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Jetted ☐ Bored ☐ ____

6 USE: ☒ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☐ Test Well ☐ ____

7 CASING: Threaded ☒ Welded ☐
Diam. 2 in. to 84 ft. Depth
____ in. to ____ ft. Depth
Height: Above/Below Surface 1 ft.
Weight 3.75 lbs./ft.
Drive Shoe? Yes ☐ No ☒

2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
top soil	1	1
soft clay	79	80
sandstone, shale pockets	3	83
sandstone	to bottom	
USE A 2ND SHEET IF NEEDED		

8 SCREEN:
Type: ____ Dia.: ____
Slot/Gauze ____ Length ____
Set between ____ ft. and ____ ft.
Fittings:

9 STATIC WATER LEVEL
14 ft. below land surface

10 PUMPING LEVEL below land surface
____ ft. after ____ hrs. pumping 5 g.p.m.
____ ft. after ____ hrs. pumping ____ g.p.m.

11 WATER QUALITY in Parts Per Million:
Iron (Fe) ____ Chlorides (Cl) ____
Hardness ____ Other ____

12 WELL HEAD COMPLETION: ☐ In Approved Pit ☒ Pitless Adapter ☐ 12" Above Grade

13 Well Grouted? ☒ Yes ☐ No ☐ Neat Cement ☐ Bentonite ☒ drilling
Depth: From ____ ft. to ____ ft.

14 Nearest Source of possible contamination
____ feet ____ Direction ____ Type
Well disinfected upon completion ☐ Yes ☐ No

15 PUMP: ☒ Not installed
Manufacturer's Name Myers
Model Number HC50 HP ½ Volts 115
Length of Drop Pipe 42 ft. capacity ____ G.P.M.
Type: ☐ Submersible ☒ Jet ☐ Reciprocating

16 Remarks, elevation, source of data, etc.

17 WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Everett Cragg & Sons, Inc. 0711
REGISTERED BUSINESS NAME REGISTRATION NO.
Address 7765 McCarty Rd. Saginaw, Mich.
Signed Everett Cragg Date 9-3-78
AUTHORIZED REPRESENTATIVE

D67d 100M (Rev. 12-68)

LOCAL HEALTH DEPT. COPY

GEOLOGICAL SURVEY NO

M[illegible]AN DEPARTMENT OF PUBLIC HEA[illegible]

WATER WELL AND PUMP RECORD

PART 127 ACT 368, P.A. 1978

PERMIT NUMBER

1 LOCATION OF WELL

County	Township Name	Fraction	Section Number	Town Number	Range Number
Saginaw	Buena Vista	1/4 1/4 1/4	8	12 N N/S	5E E/W

Distance And Direction From Road Intersection

Job. 1815 N. 24th St. Saginaw Mi.

Street Address & City of Well Location

Locate with "X" in Section Below — Sketch Map

N / S / W / E — 1 MILE — 1/2 MI.

3 OWNER OF WELL Paul Gonzales

Address 617 S. ninth St., Saginaw Mi.

Address Same As Well Location? ☐ Yes ☐ No

4 WELL DEPTH (completed) 110 ft — Date of Completion 10-7-82

5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Auger ☐ Jetted ☐

6 USE ☒ Domestic ☐ Type I Public ☐ Type III Public ☐ Irrigation ☐ Type IIa Public ☐ Heat pump ☐ Test Well ☐ Type IIb Public ☐

7 CASING Diameter ☐ Steel ☐ Threaded ☒ Plastic ☐ Welded

5" in. to 95 ft. depth

____ in. to ____ ft. depth

Grouted Drill Hole Diameter 6 in. to 95 ft. depth

____ in. to ____ ft. depth Shale packer

Height Above/Below Surface ____ ft. Weight ____ lbs/ft. Drive Shoe ☐ Yes ☐ No

2 FORMATION DESCRIPTION

FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Clay	0	50
sandy Clay	20	70
Clay	25	95
Black shale	5	100
White sand stone	10	110

USE A 2ND SHEET IF NEEDED

8 SCREEN ☒ Not installed

Type ____ Diameter ____ Slot/Gauze ____ Length ____

Set between ____ ft. and ____ ft.

FITTINGS ☐ K-Packer ☐ Lead Packer ☐ Bremer Check ☐ Blank above screen ____ ft. Other ____

9 STATIC WATER LEVEL 10 ft. below land surface ☐ Flow

10 PUMPING LEVEL below land surface

10 ft. after 1 hrs. pumping at 400 G.P.H.

____ ft. after ____ hrs. pumping at ____ G.P.M.

11 WELL HEAD COMPLETION ☐ Pitless adapter ☐ 12" above grade ☐ Basement offset ☐ Approved pit

12 WELL GROUTED? ☐ No ☐ Yes From 0 to 95 ft.

☐ Neat cement ☒ Bentonite ☐ Other + Drill Cuttings

No. of bags of cement ____ Additives ____

13 Nearest source of possible contamination

Type ____ Distance ____ ft. Direction ____

Well disinfected upon completion? ☐ Yes ☐ No

14 PUMP ☐ Not Installed ☒ Pump Installation Only

Manufacturer's name ____

Model number ____ HP ____ Volts ____

Length of Drop Pipe ____ ft. capacity ____ G.P.M.

TYPE ☐ Submersible ☒ Jet 2 Pipe Jet

PRESSURE TANK

Manufacturer's name ____

Model number ____ Capacity ____ Gallons

15 Remarks, elevation, source of data, etc.

16 WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

McCullough Well Drilling

REGISTERED BUSINESS NAME — REGISTRATION NO.

Address 1[illegible] N. Clio Rd., Clio Mi.

Signed Stanley McCullough — AUTHORIZED REPRESENTATIVE — Date 10-7-82

TAX NO:

MICHIGAN DEPARTMENT OF PUBLIC HEALTH
WATER WELL AND PUMP RECORD

PERMIT NO: 94-216W

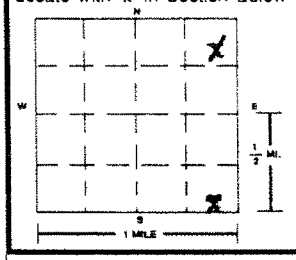
1. LOCATION OF WELL

County	Township Name	Fraction	Section No.	Town No.	Range No.
Saginaw	Buena Vusta	SE 1/4 SE 1/4 SE 1/4	8	12 N	5 E

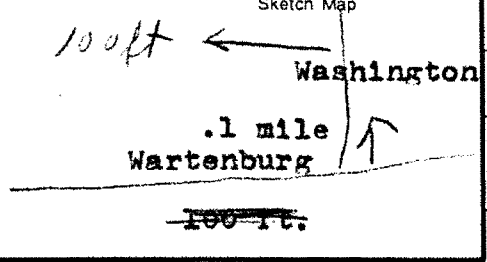
Distance and Direction from Road Intersection
1733 Wartenburg, .1 mile north of Washington, west side, 100 ft. from road

Street Address & City of Well Location

Locate with 'x' in Section Below



Sketch Map



3. OWNER OF WELL
Address: Jessie Tucker
534 S. 16th
Saginaw, Mich. 48601
Address Same as Well Location ☐ Yes ☒ No

4. WELL DEPTH: 119 ft. | Date Completed: 8/19/94 | ☐ New Well ☒ Replacement Well

5. ☐ Cable Tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow Rod ☐ Auger/Bored ☐ Jetted ☐ _____

6. USE: ☒ Household ☐ Type I Public ☐ Type III Public ☐ Irrigation ☐ Type IIa Public ☐ Heat Pump ☐ Test Well ☐ Type IIb Public ☐ _____

7. CASING: ☐ Steel ☐ Threaded ☒ Plastic ☒ Welded ☐ Other _____
Diameter: 5 in. to 86 ft. depth; _____ in. to _____ ft. depth
BORE HOLE: Diameter: _____ in. to _____ ft. depth; _____ in. to _____ ft. depth
Height: Above/Below Surface: 1 ft
Weight SDR17 lbs./ft.
☐ Drive Shoe ☒ Shale Packer

2. FORMATION DESCRIPTION

FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Top soil	1	1
Soft clay	69	70
Clay, stones	8	78
Clay, fine gravel	4	82
Sandstone	to bottom	

USE A 2ND SHEET IF NEEDED

8. SCREEN: ☒ Not Installed ☐ Gravel-Packed
Type _____ Diameter _____
Slot/Gauze _____ Length: _____
Set Between _____ ft. and _____ ft.
FITTINGS: ☐ K-Packer ☐ Bremer Check
☐ Blank Above Screen _____ ft. Other _____

9. STATIC WATER LEVEL:
5 ft. Below Land Surface ☐ Flowing

10. PUMPING LEVEL: Below Land Surface
_____ ft. After _____ hrs. Pumping at 25 G.P.M.
☐ Plunger ☐ Bailer ☒ Air ☐ Test Pump

11. WELL HEAD COMPLETION:
☒ Pitless Adapter ☐ 12" Above Grade
☐ Basement Offset ☐ Well House

12. WELL GROUTED? ☐ No ☒ Yes From _____ to _____ ft.
☐ Neat Cement ☒ Bentonite ☐ Other _____
No. of Bags _____ Additives _____

13. NEAREST SOURCE OF POSSIBLE CONTAMINATION:
Type septic Distance 75 ft. Direction south
Type _____ Distance _____ ft. Direction _____

14. PUMP: ☐ Not Installed ☐ Pump Installation Only
Manufacturer's Name Myers
Model Number 2N51-12 HP 1/2 Volts 230
Length of Drop Pipe 45 ft. Capacity 12 G.P.M.
TYPE: ☒ Submersible ☐ Jet ☐ Other _____
PRESSURE TANK:
Manufacturer's Name Amtrol Well X Trol
Model Number 202 Capacity 6 Gallons

15. ABANDONED WELL PLUGGED? ☐ Yes ☒ No believed to be under drive way
Casing Diameter _____ in. Depth _____ ft.
PLUGGING MATERIAL: ☐ Neat Cement ☐ Bentonite Slurry ☐ Cement/Bentonite Slurry ☐ Concrete Grout ☐ Bentonite Chips
No. of Bags _____ Casing Removed? ☐ Yes ☐ No

16. REMARKS: (Elevation, Source of Data, etc.)

17. DRILLING MACHINE OPERATOR:
☐ Employee ☐ Subcontractor
Name _____

AUG 30 94

15. WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Everett Cragg & Sons, Inc. 73-0711
REGISTERED BUSINESS NAME REGISTRATION NO.
Address 7765 McCarty Rd. Saginaw, Mich.
Signed Jerome Cragg AUTHORIZED REPRESENTATIVE Date 8-22-94

GW-2-228 9/93

LOCAL HEALTH DEPT. COPY

Authority: Act 368 PA 1978
Completion: Required
Penalty: Conviction of a violation of any provision is a misdemeanor.

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

GEOLOGICAL SURVEY NO

WATER WELL AND PUMP RECORD

PART 127 ACT 368, P A 1978

PERMIT NUMBER

1 LOCATION OF WELL

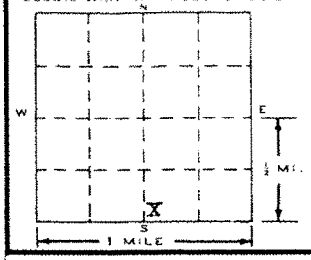
County	Township Name	Fraction	Section Number	Town Number	Range Number
Saginaw	Buvena Vista	SW ¼ SW ¼ SE ¼	8	12 N/S	5 E/W

Distance And Direction From Road Intersection

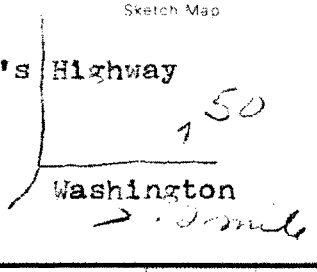
.2 mile east of Veterans' Memorial Highway at 2953 N. Washington, north side, 50' from road

Street Address & City of Well Location

Locate with "X" in Section Below



Sketch Map



3 OWNER OF WELL

William A. Jackson

Address 2953 N. Washington
Saginaw, Mich.

Address Same As Well Location? [X] Yes [ ] No

4 WELL DEPTH (completed)

127 ft

Date of Completion 3-14-85

5

[ ] Cable tool [XX] Rotary [ ] Driven [ ] Dug
[ ] Hollow rod [ ] Auger [ ] Jetted [ ]

6 USE

[X] Domestic [ ] Type I Public [ ] Type III Public
[ ] Irrigation [ ] Type IIa Public [ ] Heat pump
[ ] Test Well [ ] Type IIb Public [ ]

7 CASING

Diameter [X] Steel [X] Threaded [ ] Plastic [ ] Welded

2 in to 93 ft depth
in to ft depth

Grouted Drill Hole Diameter
in to ft depth
in to ft depth

Height Above Surface 1 ft

Weight 3.25 lbs /ft

Drive Shoe [ ] Yes [X] No

2 FORMATION DESCRIPTION

FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Top soil	1	1
soft clay	79	80
clay, stones	7	87
Linestone, sandstone	5	92
sandstone, shale pockets	to bottom	

USE A 2ND SHEET IF NEEDED

8 SCREEN

[X] Not Installed

Type Diameter
Slot/Gauze Length
Set between ft and ft
FITTINGS [ ] K-Packer [ ] Lead Packer [ ] Bremer Check
[ ] Blank above screen ft Other

9 STATIC WATER LEVEL

8 ft below land surface [ ] Flow

10 PUMPING LEVEL below land surface

ft after hrs pumping at 2 G P M
ft after hrs pumping at G P M

11 WELL HEAD COMPLETION

[X] Pitless adapter [ ] 12" above grade
[ ] Basement offset [ ] Approved pit

12 WELL GROUTED?

[ ] No [X] Yes From to ft

[ ] Neat cement [ ] Bentonite [X] Other drilling

No of bags of cement Additives

13 Nearest source of possible contamination

Type septic Distance 50 ft Direction north

Well disinfected upon completion? [ ] Yes [ ] No

14 PUMP

[ ] Not Installed [ ] Pump Installation Only

Manufacturer's name (owner's) Myers

Model number HC 50 HP ½ Volts 215

Length of Drop Pipe 42 ft capacity G P M

TYPE [ ] Submersible [X] Jet

PRESSURE TANK

Manufacturer's name owner's

Model number Capacity Gallons

15 Remarks, elevation, source of data, etc

16 WATER WELL CONTRACTOR'S CERTIFICATION

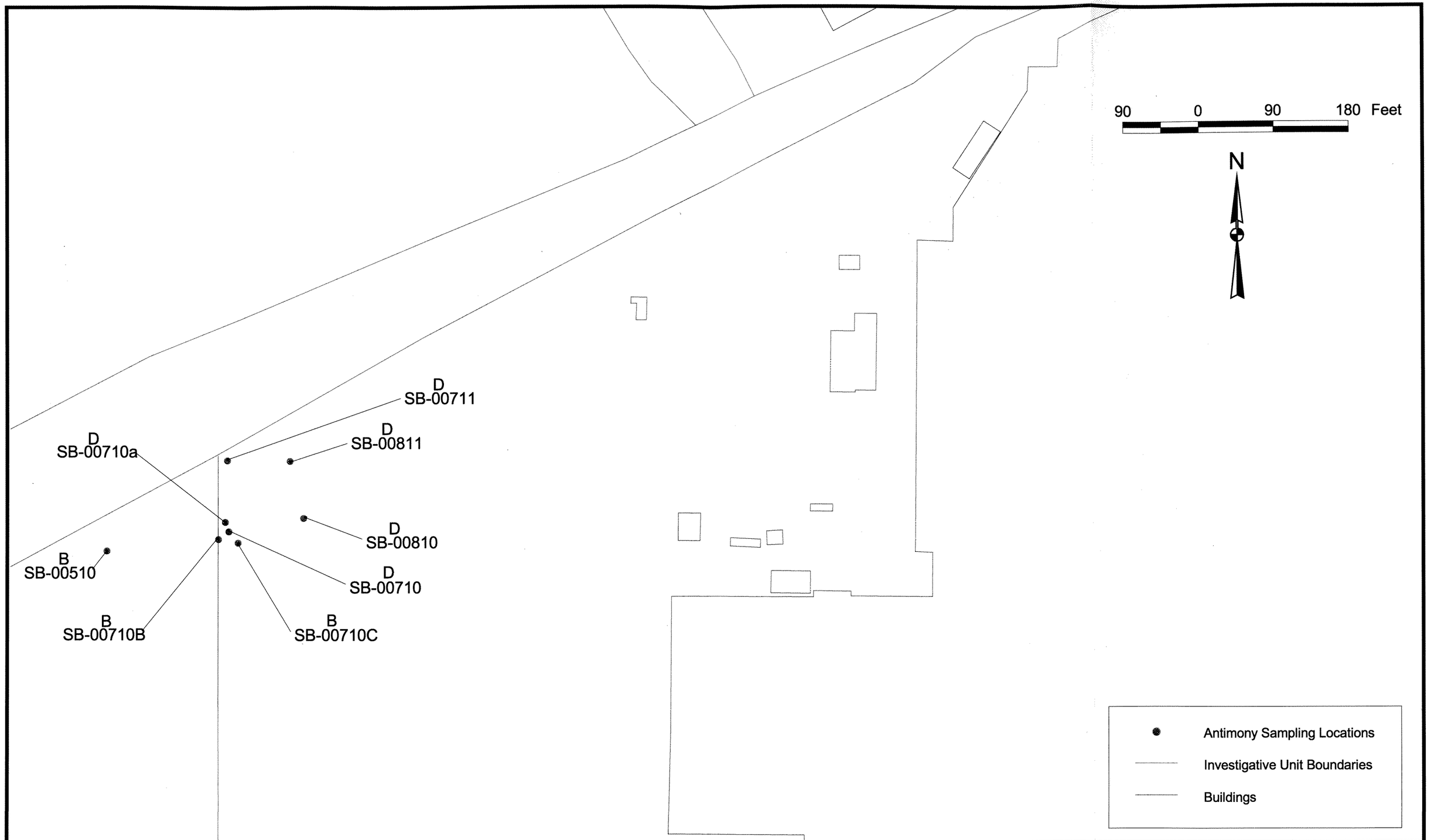
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief

Everett Cragg & Sons, Inc. 73-0711
REGISTERED BUSINESS NAME REGISTRATION NO

Address 7765 McCarty Rd. Saginaw, Mich.

Signed Howe Cragg Date 3-16-85
AUTHORIZED REPRESENTATIVE

D678 (Rev 10-80)



ENVIRON

Date: 7/13/2007

Soil Samples Used to Calculate Antimony UCL For IU D
GM SMCO, Saginaw, Michigan

Figure 1
Arcview Plot

200 0 200 400 Feet

N

IU D Manganese West Locations

IU D Manganese East Locations

Investigative Unit Boundaries

Buildings

ENVIRON

Date: 7/13/2007

Soil Samples Used to Calculate Manganese UCLs for IU D
GM SMCO, Saginaw, Michigan

Figure 2

Arcview Plot

High-End Exposure Factors for Maintenance Workers and Trespassers
GM SMCO, Saginaw, Michigan

			On-Facility		On and Off-Facility	
			Industrial		Trespassers	
Environmental Pathways			Maintenance Workers for Outfalls/ Ponds		Adolescent Trespassers	
Sediment Ingestion [1]						
Ingestion Rate	mg-sed./day	**IR**	50	b	50	e
Fraction Contacted	unitless	**FC**	0.5		0.125	
Exposure Frequency	days/year	**EF**	12	e	24	e
Exposure Duration	years	**ED**	25	b	10	e
Body Weight	kg	**BW**	70	a	51	c
Averaging Time, cancer	days	**AT_c**	25,550	a	25,550	a
Averaging Time, noncancer	days	**AT_{nc}**	9,125	a	3,650	a
Intake, cancer	kg-sed/kg/day		**4.19E-09**		**1.15E-09**	
Intake, noncancer	kg-sed/kg/day		**1.17E-08**		**8.06E-09**	
Sediment Dermal Contact [1]						
Adherence Factor	mg-sed./cm^2	**AD**	0.2	d	0.2	d
Skin Surface Area	cm^2/day	**SA**	3,300	d	3,950	a, e
Absorption Fraction	unitless	**AF**	chem-spec		chem-spec	
Fraction Contacted	unitless	**FC**	0.5		0.125	
Exposure Frequency	days/year	**EF**	12	e	24	e
Exposure Duration	years	**ED**	25	b	10	e
Body Weight	kg	**BW**	70	a	51	c
Averaging Time, cancer	days	**AT_c**	25,550	a	25,550	a
Averaging Time, noncancer	days	**AT_{nc}**	9,125	a	3,650	a
Intake, cancer	kg-sed/kg/day		**5.54E-02**		**1.82E-02**	
Intake, noncancer	kg-sed/kg/day		**1.55E-01**		**1.27E-01**	
Surface Water Incidental Ingestion [1]						
Drinking Rate	L-water/hr	**DR**	0.005	e	0.005	e
Exposure Time	hours/day	**ET**	4	e	1	e
Exposure Frequency	days/year	**EF**	12	e	24	e
Exposure Duration	years	**ED**	25	b	10	e
Body Weight	kg	**BW**	70	a	51	c
Averaging Time, cancer	days	**AT_c**	25,550	a	25,550	a
Averaging Time, noncancer	days	**AT_{nc}**	9,125	a	3,650	a
Intake, cancer	L-water/kg/day		**3.35E-06**		**9.21E-07**	
Intake, noncancer	L-water/kg/day		**9.39E-06**		**6.45E-06**	
Surface Water Dermal Contact [1]						
Skin Surface Area	cm^2	**SA**	3,300	d	3,950	c
Permeability	cm/hour	**K_p**	chem-spec		chem-spec	
Conversion Factor	L/cm^3	**CF**	0.001		0.001	
Exposure Time	hours/day	**ET**	4	e	1	e
Exposure Frequency	days/year	**EF**	12	e	24	e
Exposure Duration	years	**ED**	25	b	10	e
Body Weight	kg	**BW**	70	a	51	c
Averaging Time, cancer	days	**AT_c**	25,550	a	25,550	a
Averaging Time, noncancer	days	**AT_{nc}**	9,125	a	3,650	a
Intake, cancer	L-water/kg/day		**2.21E-03**		**7.28E-04**	
Intake, noncancer	L-water/kg/day		**6.20E-03**		**5.09E-03**	

Notes:

[1] Contact rates are based on wading in streams/ponds.

References:

a. Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part A) Interim Final (EPA 1989)

b. Human Health Evaluation Manual, Supplemental Guidance: "Standard default exposure factors." OSWER Directive 9285.6-03 (EPA 1991)

c. Exposure Factors Handbook (EPA 1997)

d. Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual: Part E, Supplemental Guidance for Dermal Risk Assessment, Interim Final (EPA 2001)

e. Based on professional judgment and site-specific considerations as follows:

- Maintenance Workers for Outfalls/Ponds: The exposure frequency is based on one day per month. The exposure time in the outfall/pond is assumed to be 4 hours/day. The incidental water drinking rate is based on 10% of the drinking rate for swimming.

- Trespasser: The Trespasser is assumed to be an adolescent youth, and the body weight and skin surface area are accordingly selected. Exposure frequency and duration are based on two events/week for 3 months when the air temperature is above 70 F for 1(years (Flint data, NOAA 2004). Exposure time in the stream/ponds at the site is assumed to be 1 hour/event. The soil/sediment/surface water ingestion rate is assumed to be equal to that of an adult routine or maintenance worker.

Table A5-1b: Upper Bound Cumulative Risk and HI for Construction Worker Contact with Soil
GM SMCO, Saginaw, Michigan

On/Off-site	Area	ENVIRON Construction Worker Risk	ENVIRON Construction Worker HI	EPA Construction Worker Risk	EPA Construction Worker HI
On-site	B	5E-06	7E-01	7E-06	7E-01
On-site	D	9E-05	**1E+01**	1E-04	**2E+01**
On-site	E	1E-06	5E-01	2E-06	5E-01
On-site	F	9E-07	8E-02	1E-06	8E-02
Off-Site	G	2E-07	1E-02	2E-07	1E-02
On-site	G	1E-06	1E-01	2E-06	1E-01
On-site	G-Tricap	1E-06	4E-01	1E-06	4E-01
On-site	H	7E-07	1E-01	9E-07	1E-01
On-site	I	2E-06	5E-01	2E-06	5E-01
On-site	J	1E-07	9E-03	2E-07	1E-02
On-site	Lease Area	2E-06	9E-01	3E-06	9E-01
On-site	G-Corvus	2E-06	5E-01	3E-06	5E-01
Notes:					
ENVIRON construction worker is assumed to ingest 200 mg/day of soil.					
EPA construction worker is assumed to ingest 330 mg/day of soil.					