BOSCH BRAKING SYSTEMS CORPORATION

BOSCH

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3737 Red Arrow Highway
St. Joseph, MI 49085-9217

July 24, 1997

Mr. Kenneth Glatz
US Environmental Protection Agency
Region 5
77 West Jackson Boulevard
Chicago, IL 60604-3590

RE: Final Edits to Surface Water and Sediment Sampling Report

Dear Mr. Glatz:

As we discussed during our conference call of July 10, 1997, W&C has made the final changes to the Surface Water and Sediment Sampling Report as outlined in our February 10, 1997 response to comment letter. The revised pages are attached. We now believe that this report is final and can be submitted to the public repository. Please note, AlliedSignal Braking Systems was acquired by Bosch Braking Systems in June of 1996. The Surface Water and Sediment Sampling Report was completed prior to the transfer, therefore, the text has not been changed from AlliedSignal to Bosch.

Please call me with any questions or concerns regarding this deliverable or any other subject concerning this project.

Sincerely,

BOSCH BRAKING SYSTEMS

Greg Kerr
Manager, Health, Safety and Environmental Quality

Attachment:

cc: William Harmon, MDEQ
David Tarnowski, Bosch
Guy Vaillancourt, W&C

by Hickory Creek. Dune sand deposits are mapped by the MGS in the area of the plant, chiefly along the present-day shoreline of Lake Michigan. Windblown sand forms the current lake shore bluff along the lake.

At an elevation of between 560 and 580 feet above MSL, the soil type changes to interlayered clayey silts and silty sands with occasional gravel. This unit is discontinuous and is most prevalent under the eastern side of the ASBS property. When present, this fine-grained unit ranges in thickness from approximately zero to 20 feet. The hydraulic conductivity (K) values of the silt/clay layers are generally 10^{-5} cm/sec with occasional 10^{-6} cm/sec values in the clay units (W&C, 1995a). The interlayered silty sands have K values ranging from 10^{-4} to 10^{-5} cm/sec (W&C, 1995a). Groundwater movement through this interlayered unit would occur principally within the more conductive thin silty sand layers.

The next unit encountered below this interlayered clayey silt and silty sand is a stiff clay to silty clay. The clay unit is most prevalent at the center of the site near the wastewater treatment building, ranging in thickness from 10 to 12 feet. The clay thins out to the north and south, disappearing completely at both the south and north boundaries of the plant. The K value of this unit was measured at 10^{-6} cm/sec (W&C, 1995a).. This unit has a significantly lower permeability than the sands located stratigraphically above, and will act as a hydraulic barrier to the vertical migration of groundwater and/or contaminants.

Below the clay is a clayey silt with silty sand layers. The K values of the silty sand layers within this unit were measured in the 10^{-4} cm/sec range (W&C, 1995a).

4.5 IDENTIFICATION OF GROUNDWATER USERS

Potential groundwater users were identified in the residential area closest to the facility and adjacent to Hickory Creek. Maiden Lane transects the parcel into two approximately equal areas (see Appendix A, Figure A-1). The area north of Maiden Lane (Area A, see Figure A-2) consists of two subdivisions, Crest View Manor and Hickory Creek Manor No. 4. The area south of Maiden Lane (Area B, see Figure A-3) consists of the Hickory Creek Manor No. 5 subdivision and three other properties (Lot Nos. 8, 8.1, and 8.2; see Figure A-1).

To identify residences not potentially connected to public water, tax maps were obtained and compared to the names on the Public Works Department water billing records. A total of four properties were identified within the study area that did not have water billing records. These residences were conservatively assumed to obtain their water through private wells (see Figures A-1, A-2, and A-3). These properties are located within three subdivisions and along Maiden Lane Road for a total of 69 properties. Only one property was identified in the Crestview subdivision that was not connected to public water and was, therefore, assumed to have a private well:

- Elsie Stowers - 3504 Crestview Road, St. Joseph, MI 49085 (north of Maiden Lane, southwest corner of Crest View and Nash).

An additional area to be evaluated included the three large properties east of Hickory Creek Manor No. 5. According to the St. Joseph Public Works Department, the three properties listed below do not have public water billing records.

- Franklin Mundt (Property Owner) - 4130 Cleveland Ave., Stevensville, MI 49127. Property located south of Maiden Lane at Lot No. 8.1.

- Charles Lawrick - 1962 Maiden Lane, St. Joseph, MI 49085 (south of Maiden Lane, Lot No. 8.2).

- Nancy Winslow - 1998 Maiden Lane, St. Joseph, MI 49085 (south of Maiden Lane, Lot No. 8).

Having identified these residences as potentially not being connected to public water, ASBS will contact these people in an attempt to confirm their water source(s). If the water source is a private on-site well, then ASBS, in conjunction with MDEQ and EPA, will offer to sample their well(s) for VOC(s).

point for the Eastern Plume and groundwater moving from the east side of Hickory Creek. The creek has incised the upper 45 feet of the sand unit, including the upper 15 feet of the saturated thickness. This accounts for the numerous seeps observed along both the east and west cut banks of the creek, where the groundwater elevation intercepts the land surface.

Water elevations measured relative to the surface water of the creek (see Table 3-1) indicate that groundwater is moving from the subsurface up through the stream bed material into the surface water. Head measurements collected over the past year (see Table 2-2) from the nested piezometer pairs -PZ-1 and PZ-2 indicate strong upward gradients within the deeper aquifer in the vicinity of the creek. The head measurement data collected from piezometer pair PZ-2 does not have as strong an upward gradient as PZ-1 but does generally have upward gradients. In general, deep groundwater is moving to the surface and discharging to the creek (see Figure 5-1). This interpretation is supported by the field parameters collected during the shallow groundwater sampling (see Table 4-3). Dissolved oxygen (DO) concentrations measured at three surface water locations (SW-2, SW-3, and SW-5) were in the 6.2 ppm to 8.6 ppm range. DO concentrations of the shallow groundwater ranged from 0.9 ppm to 3.2 ppm. Clearly, low DO concentrations measured throughout the Eastern Plume are present directly below the creek. As the poorly oxygenated groundwater moves up through the stream bed sediment it is mixed with the highly oxygenated surface water, resulting in a surface water DO that meets MDNR DO requirements for coldwater fish.

Sediments. As the dissolved constituents move up through the stream bed, organic and inorganic compounds would be expected to adsorb to the organic and inorganic material in the sediments. As the poorly oxygenated groundwater mixes with the highly oxygenated surface water, the reduction potential is reduced. This would be expected to cause

dissolved inorganic elements to oxidize and precipitate from solution. Mechanical downstream sediment transport of adsorbed elements and other solid phase constituents is an important off-site transport mechanism. However, based on the results of the sediment analyses, concentrations are well below those that would be considered a potential risk to human health or the environment. These concentrations are most likely the result of natural in situ processes including biodegradation, attenuation, volatilization, adsorption or dilution.

Surface Water. Dissolved plume contaminants and desorbed sediment contaminants may be present in the surface water. Only one surface water sampling location (SW-2) contained detectable concentrations of VOCs. Of the three VOCs reported, only, cis-1,2-DCE (1.6 ug/l) is known to be associated with the Eastern Plume. This concentration is below any of the standards or criteria set by MDNR as protective of Hickory Creek. This concentration is most likely the result of natural in situ processes including attenuation, volatilization, adsorption, and/or dilution.

Five inorganic elements were reported in surface water above CRDLs: calcium, magnesium, manganese, and sodium. None of these elements were detected at concentrations which exceed MDNR requirements for Hickory Creek.

5.3 POTENTIAL RECEPTORS

The possible receptors along Hickory Creek include potential groundwater and surface water users. Municipal drinking water has been supplied to industries (there are no residences between Hickory Creek and the plant) along the path of the plume, thereby minimizing the risk of human exposure. A minimum number of potential groundwater users have been identified on the east side of Hickory Creek (see Subsection 4.5). The majority of the residences evaluated on that side of the creek are connected to public water.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The following is a summary of the findings and interpretations of the data collected during the Surface Water and Sediment Investigation. The nature of the dissolved phase of contaminants at the site include organic compounds associated with the manufacture of braking systems and inorganic elements apparently leached from natural soils by reducing conditions within the plume.

The major site-related contaminants are TCE and its degradation products, 1,2-DCE and vinyl chloride. These contaminants are moving off-site in the Eastern Plume. Based on the information obtained from Hickory Creek during this investigation it was concluded that the Eastern Plume is discharging to the creek. However, the concentrations of plume-related chemicals detected in sediments and surface waters are below MDNR and MDEQ media-specific requirements for the sediment and surface water in Hickory Creek.

Apparently, natural in situ processes (biodegradation, attenuation, adsorption, volatilization, and dilution) are reducing the concentration of both plume-related VOCs and inorganics to concentrations that meet media-specific guidance for both sediments and surface water.

6.1 CONCLUSIONS

The objective of the Surface Water and Sediment Investigation was to characterize the nature and extent of potential contaminants in the surface water and sediments of Hickory Creek, and to identify potential groundwater users on the East side of Hickory Creek. To fulfill these project objectives the following tasks were completed:

- Collected groundwater elevations from the existing monitoring well network to evaluate groundwater flow directions.

- Collected shallow groundwater samples from six temporary well points installed through the stream bed to evaluate the nature of plume-related chemicals as they enter the creek.

- Groundwater samples collected from directly below the Hickory Creek streambed exceeded MDEQ generic GSI values for vinyl chloride, cis-1,2-DCE, arsenic, manganese, and zinc. However, based on additional MDEQ guidance (Memorandum #17) allowing for the mixing effects of the stream, these chemicals meet the MDEQ generic GSI requirements.

- Collected five surface water and sediment samples from along Hickory Creek.

- Compared water billing records to tax records on the east side of Hickory Creek to identify potential groundwater users.

- Collect groundwater samples from three residential wells east of Hickory Creek.

Based on the results of this investigation the following conclusions are presented:

- Possible off-site receptors include human and ecological groundwater and surface water users.

- A comparison of surface water and sediment results with identified regulatory standards show neither organic or inorganic compounds exceeded their respective criteria or standard concentrations.

- There are currently no groundwater users along the plume between the plant and Hickory Creek.

- Additionally, the interpretation of this data indicates that, based on groundwater elevation on the east side of Hickory Creek and the seeps observed along the east cut bank, the groundwater on the east side is discharging to Hickory Creek.

- A comparison of residential groundwater sample results with both state and federal drinking water standards indicates that site-related industrial chemical are not present in the tested wells.

- Without a groundwater exposure pathway there is no exposure, therefore, the likelihood of human exposure by ingestion of groundwater is remote.

- Concentrations or both organic and inorganic chemicals identified in the surface water and sediments are below identified regulatory standards and are therefore assumed to be protective of both human health and the environment.

6.2 RECOMMENDATIONS

Based on previous studies and the results of the Surface Water and Sediment investigation, the following recommendations are presented:

- Produce an RI report, including a summary of previous investigations, updated site conceptual models, ARAR identification, and a risk assessment.

- Initiate the Phase I feasibility study, including technology identification/screening and development of alternatives for the Eastern and Western Plumes.

PRIVATE WELL USE QUESTIONNAIRE

1. Name:_____ Date:_____

2. The address of **this residence** in the City of St. Joseph, MI:

   _____

3. Is there or has there ever been a private well on this property? Yes___ No__ Don't Know__

   If your answer to #3 is NO or DON'T KNOW, please go to the end of the questionnaire. You do **not** have to complete the rest of the survey.

4. We will be contacting you to discuss sampling your well. Please provide us with:

   Your day phone number: (____)_____

   Your night phone number: (____)_____

   Other address and phone numbers at which you may be contacted: _____

   _____

   a. When could a field worker most easily contact you to arrange the sampling?

   Day Phone: (__)_____ Night Phone: (__)_____

5. Have you changed your **source** of water since being at this address? Yes___ No ____

6. Do you have records regarding the well depth or construction? Yes ___ No ___
   (Please Attach Installation Log If Available)

   a. When was this well installed? _____
   (Month & Year)

   b. Total well depth:. _____

   c. Total length of casing: _____

7. Has this well ever been tested? Yes ___ No ___

   If YES, please indicate:

   The date it was last tested: _____ Don't Know _____
   (Month & Year)

   Who tested it?_____

   What was it tested for? Nitrates ___ Bacteria ___ Other ____
   Don't Know ___

   The results were: _____
   (Please Attach copy if available)

PRIVATE WELL USE QUESTIONNAIRE (continued)

8. Do you use any type of in home water treatment or filtration device for your water?
Yes ___ No. ___

If YES, please check type. Water softener ___ Filter ___

Other type: _____

9. What type of plumbing is in your home? Please check type.

Copper ___ Plastic ___ Steel ___ Galvanized ___ Don't Know ___

Other type:_____

10. What source(s) of water do you use for drinking and cooking? Please check source.

Municipal or city water ___ Well Water ___ Bottled water ___

Other source: _____

11. How long have you lived at this address? _____

12. Is you stay seasonal? Yes ___ No ___ If yes, seasonal months _____ to _____.

13. Are you currently using water from a private well at this address? Yes ____ No ____

If YES, please check uses.

Drinking or cooking ___	Garden water ___	Industrial ___
Bathing or showering ___	Lawn Watering ___	Agricultural ___
Car washing ___	Swimming pool ___	

Other uses _____

If NO, please indicate:

When you stopped using the well. _____
(Month & Year)

The reason why you stopped using the well.

Water quality ___ Well ran dry ___ Equipment failure ___

Public health recommendation ___

Other reasons:_____

If this well has been sealed, plugged or pulled. Yes ___ No ___ Don't Know ___

PRIVATE WELL USE QUESTIONNAIRE (continued)

14. Is it possible to take a water sample from the outside of this home or business if you are not available? Yes ___ No ___

If YES, please describe the location of the outside spigot.

_____

_____

OTHER INFORMATION

Is there any additional information not covered in the answers listed above that you would like to provide about this private well? If so, please do so in the space below.

_____

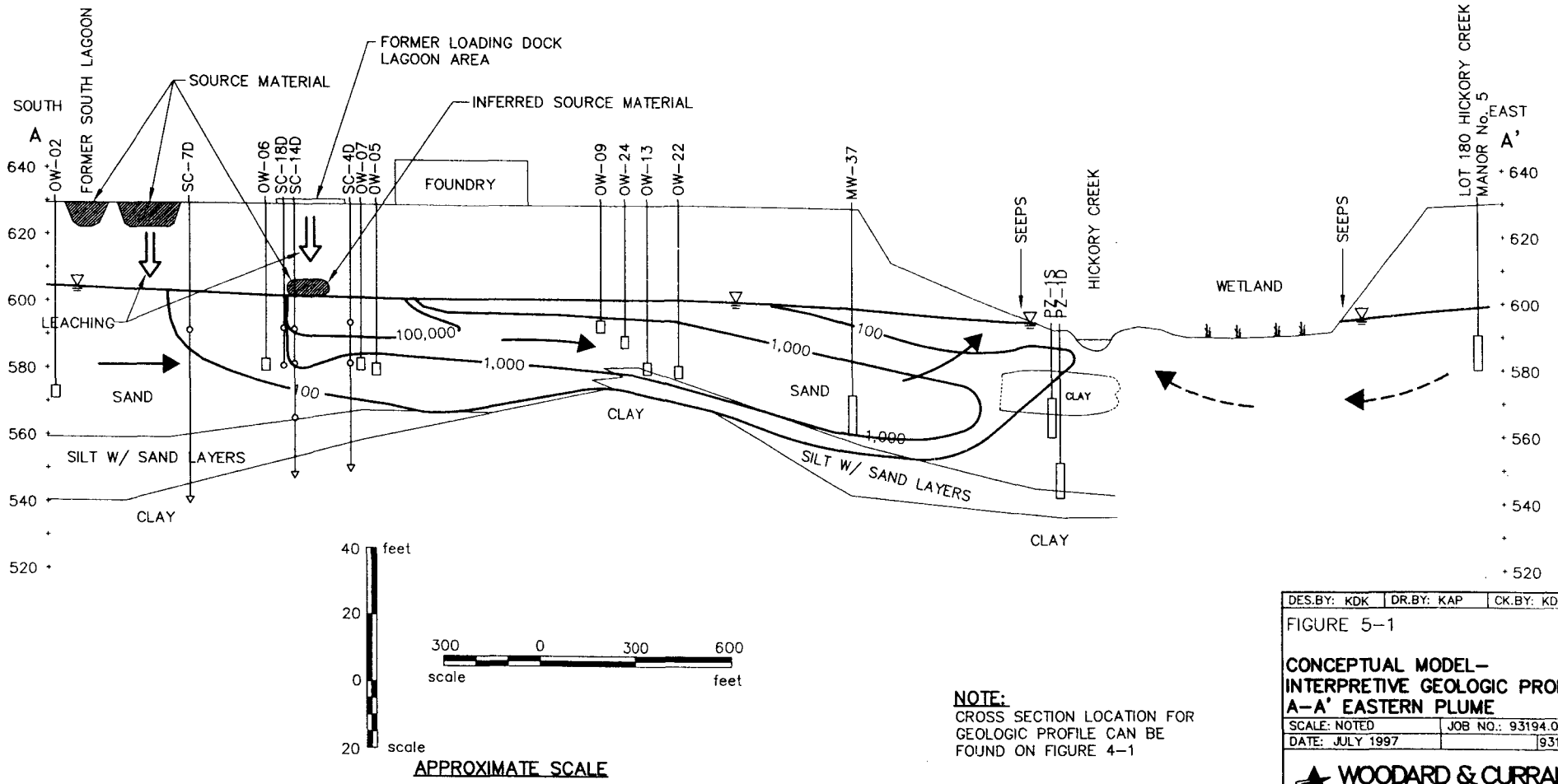
_____

_____

_____

THE END

THANK YOU VERY MUCH FOR YOUR TIME AND COOPERATION



NOTE:
CROSS SECTION LOCATION FOR GEOLOGIC PROFILE CAN BE FOUND ON FIGURE 4-1

DES.BY: KDK	DR.BY: KAP	CK.BY: KDK

FIGURE 5-1

CONCEPTUAL MODEL-INTERPRETIVE GEOLOGIC PROFILE A-A' EASTERN PLUME

SCALE: NOTED	JOB NO.: 93194.05
DATE: JULY 1997	93194F60

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