



Memorandum

To: James Killian, WDNR Ref. No.: 058505

SD For

From: Glenn Turchan, Julie Charlton/aj/27 Date: February 17, 2016

CC: Linda Hanefield, WDNR; Will Myers, WDNR; Stephen Galarneau, WDNR; James Amrhein, WDNR; Shawn Wenzel, WDNR; Tim Whittaker, City of Janesville; Kim Tucker-Billingslea, GM; Shelly Deitner GHD

**Re: Response to WDNR Comments dated February 5, 2016
Sediment Investigation Work Plan
GM Janesville Assembly Plant
1000 General Motors Drive
Janesville, Wisconsin**

WDNR Comment No. 1:

Sample Parameters/testing:

- *The selected PAH compounds should be reported individually, as well as summation of these individual PAHs reported as Total PAH.*
- *The second core interval (.5 to 2') should also include PAH analysis.*
- *The document should include referenced tables listing the TLC-VOCs, PAHs, and metal TALs.*
- *Please provide rationale as to why TCLP testing would be run only on the third segment interval, and not each segment individually or a full-core composite.*

GHD/Ramboll Response:

Comment noted. The selected PAH compounds (parent and alkylated) will be reported individually as well as a summation of the individual parent PAHs reported as Total PAH.

TCL-SVOC analysis is proposed for all three core intervals (0 to 0.5 ft, 0.5 to 2 ft, and 2 ft to refusal) and includes parent PAHs. A list of the compounds included in the TCL-SVOC analysis is provided in Table 1. The selected parent PAH compounds are indicated in yellow under TCL-SVOCs.

As requested, Table 1 presents the selected TLC-VOCs, alkylated PAHs, and metal TALs that will be included in the analysis, in addition to the TCL-SVOCs mentioned above.

The composite sediment sample from the 2 to 6 feet (or refusal) interval is being submitted for TCLP analysis to characterize the sediment for disposal purposes. It is anticipated that the top two feet of

sediment will be less impacted than the deeper interval. Therefore, to be conservative, only the deeper interval will be submitted for TCLP analysis. This information will be used to assess remedial alternatives.

WDNR Comment No. 2:

Sample Preparation/Handling

- *Compositing of the 3rd layer (2' to x'), while acceptable, will not act to accurately delineate vertical limits of any contamination below 2'. Pending results of this investigation, additional sampling may be required to define the full degree and extent of contamination at the site.*
- *There is no discussion of how or where individual sediment cores will be processed. Transport, method of extrusion, segmentation, compositing, and logging need to be detailed in this document.*

GHD/Ramboll Response:

Comment noted. Additional sampling may be required to fully delineate the extent of contamination.

A core processing area will be established on shore prior to commencing field activities. An experienced GHD geologist will be on site to process and log the cores. The contractor will transport the cores from the sample location to the core processing area.

A trailerable coring vessel will be utilized for sediment collection activities. The coring vessel will be positioned at each sampling location using a sub-meter DGPS with either spuds or by anchoring. All sample points will be located and coordinates provided to WDNR (referenced to NAVD88 vertical datum). The coring vessel is outfitted with an A-Frame, electric winch, generator, and all necessary sediment collection tools. Sediment cores will be collected using a Rossfelder® or PVL submersible vibracore unit. Additional sampling devices such as a van Veen sampler and a Piston corer will be on hand to be used if necessary.

Sediment cores will be advanced to a depth of 6 ft or until refusal is encountered. Cores with less than 6 ft of recovery will be resampled; however, smaller intervals may be accepted based on field conditions. Cores will be sub-sectioned into intervals (0 to 0.5 ft, 0.5 to 2 ft; 2 to 6 ft).

A photograph of the vessel is provided in Attachment A. Note that should unfavourable weather conditions prevent usage of the coring barge described above (e.g. frozen surface, heavy ice flows, or shallow water depths) a non-motorized barge will be utilized. The portable barge will be floated out to the sample locations and cores will be collected using a portable manually driven vibracore.

Field Procedures. Sediment core samples will be collected using an electrically powered vibracorer which is lowered through the water column under winch control and penetrates the sediment by means of its weight and powered vibration.

The following steps outline the procedures for using a vibracorer in the field.

1. Maneuver the sampling vessel to the proposed sampling location using DGPS and deploy a marker buoy at the location; record the water depth using a lead line or calibrated fathometer.
2. Check to ensure that the metal core barrel is securely fastened to the powerhead of the vibracorer and insert a decontaminated core liner inside the metal core barrel.

3. Insert a core catcher into the end of the barrel so that the catcher fingers will extend into the core liner, and then screw the cutter head onto the bottom of the core barrel until the shoulder snugs against the end of the core barrel. Tighten the cutter head with a spanner or strap wrench.
4. Start the electrical generator, but **DO NOT** yet energize the corer.
5. Signal the winch operator to hoist the corer and swing it over the stern or side of the vessel at the marked sampling location. Reposition the vessel if necessary. Record the water depth using a lead line or calibrated fathometer.
6. Signal the winch operator to lower the corer through the water column. Determine the depth of the corer in the water column and track its subsequent penetration into the sediment by either marking the winch line in 1 ft increments or by attaching a flexible tape measure to the powerhead.
7. When the cutter head is within approximately 10 ft of the bottom, energize the corer by actuating the circuit breaker on the generator control panel.
8. Slow the descent speed of the corer in order to determine when the core nose enters the sediment. Maintain tension on the winch line throughout the coring process to keep the corer from toppling over. The worker monitoring the penetration of the corer into the sediment will signal the winch operator when to pay out more line.
9. If refusal is encountered or if the measured distance to the tip of the core nose indicates that project depth has been reached, stop paying out line and de-energize the corer. Do not power down the generator. Refusal is indicated by less than 6 inches of penetration in a given 30-second interval.
10. Signal the winch operator to bring the winch line taut. Maneuver the boom or the boat until the winch pulley is directly above the corer, as indicated by the winch line being as close to true vertical as possible.
11. Record the position of the actual coring location. The navigation antenna may be mounted on the winch boom near the pulley to place it directly over the corer.
12. Signal the winch operator to retrieve the corer. If the corer is stuck in the bottom, energize the power head while maintaining tension on the winch line. To reduce the risk of losing sediment from the core barrel, de-energize the corer as soon as it shows any sign of vertical movement. As soon as retrieval of the corer is underway, power down the generator. Swing the corer over the deck and lower it to a holding rack. Note and record the length of smearing on the outside of the core barrel, which gives an indication of the amount of penetration.
13. Use a spanner or strap wrench to unscrew the cutter head and remove it. The catcher may stay inside the cutter head or remain attached to sediment inside the core liner. Retain any sediment in the cutter head and core catcher for examination and possible use.
14. Pull the core liner approximately 6 inches out of the core barrel, remove the catcher, if necessary, and immediately cap the bottom end of the core liner with a plastic cap. Secure the bottom cap with duct tape.
15. Extract the core liner entirely from the core barrel, and immediately cap the top of the core liner.

16. If the core is to be cut into sections, draw a mark on the outside of the core liner where the cut will be made to cut off the bottommost section. Apply duct tape and use a permanent marker to mark the sections on both sides of the location of the future cut. Mark arrows pointing toward the top end of the core, write the core ID, write date and time, and indicate the depth interval spanned by the sections in terms of feet below mudline.
17. Cut the core at the section boundary using a saws-all loaded with a decontaminated blade. Another person will be at the ready to immediately cap both the exposed ends and secure with duct tape.
18. Repeat the cutting procedure if more sections need to be cut.
19. Remove the cap from the top end of the top-most section and drain the water. Draining may be accomplished by drilling a hole through the core liner just above the top of the sediment or by gently tipping the section to empty the water out the top. Care must be taken to avoid loss of sediments during decanting, particularly "soupy" sediments with high water content.
20. After decanting, cut off the excess plastic tubing, cap the end at the sediment interface, and secure the cap with duct tape.
21. Evaluate the appearance and length of the core sample by examination through the clear plastic core liner. Note any stratigraphic intervals or other salient features on the core collection log sheet.
22. Store the core sections at 4°C ($\pm 2^\circ\text{C}$) in a refrigerator or iced cooler for subsampling and further processing (see below).
23. Complete any additional entries on the coring field form.

Core Acceptance Criteria. Acceptance criteria for sediment core samples are as follows:

- The core penetrated to target depth;
- The core did not suffer significant sample-induced compaction or loss of material (i.e., recovery greater than 60 percent, as measured by recovery length divided by penetration length);
- Cored material did not extend out the top of the core tube or contact any part of the sampling apparatus at the top of the core tube; and
- There are no obstructions in the cored material that might have blocked the subsequent entry of sediment into the core tube, which may have resulted in an incomplete and biased core section.

If sample acceptance criteria are not achieved, the sample will be rejected and a repeated deployment will be made within 20 ft of the original location. If redeployment does not result in an acceptable sample according to these criteria, the Project Manager will be contacted to discuss relocating the proposed core sample.

Core Processing. The following steps outline the general procedures to be followed when cores are split, logged, and subsampled for laboratory analysis.

1. All equipment coming into contact with sediment will be decontaminated before use with each sample to avoid cross contamination.

2. Cut the core liner longitudinally on opposite sides using a small jig or reciprocating saw. Pull away the top half of the core liner to expose the sediment sample.
3. Log and describe the sediment on a core log form according to standard ASTM soil description procedures. Core logs should include:
 - a. Visual grain size classification;
 - b. Color;
 - c. Consistency (stiffness or denseness);
 - d. Odor;
 - e. Presence of debris;
 - f. Presence of biological activity (e.g., detritus, shells tubes, bioturbation, live or dead organisms);
 - g. Presence of oil sheen; and
 - h. Any other unusual or distinguishing characteristics.
4. After the sediment description is complete, subsample the core on two foot intervals (based on in situ conditions). The ex situ core intervals will be corrected for compaction, and therefore may be somewhat less than two feet in actual length.
5. Homogenize each depth interval using a stainless steel mixing spoon or an electric drill with a stainless steel paddle.
6. Collect samples of the homogenized sediment as appropriate for chemical analysis. Label sample jars and place them in refrigerators or coolers with blue ice to maintain sediment at 4°C until dispatched under chain of custody to the appropriate laboratory. Samples designated for archiving will be frozen for possible future analysis.

WDNR Comment No. 3:

Sampling Procedures:

- *Sampling boat draft should be able to accommodate water depths ranging from 2 to 3 feet.*
- *The document states that water depths will be recorded with use of a weighted tape. Given the potential velocities of the river at this location, solid-rod bathymetric measures should be considered. In any case, precautions are to be taken to ensure the tape weight or rod foot doesn't sink into the sediment bed.*
- *Given the relatively shallow water depths, it is unclear if the check-valve or ball valve coring apparatus will be able to create sufficient vacuum to retain material. It is suggested that piston-type coring apparatus also be available if possible.*
- *Methods should include determination of thickness of sediment body at each sample location and computation of % recovery of sample with relation to measurable soft-sediment thickness.*
- *There is no discussion of sample location verification or recording. Sub-meter accuracy or better is required for GPS equipment used for waypoint navigation as well as recording final sample*

location. Manual land surveying methods, referenced to local horizontal control monuments (NAD83 datum), may also be used. Sample locations are to be logged in geographic coordinates on same field form as core geologic information, as well as reported in data summary tables.

- *It is recommended that the sample area be expanded to include the entire extent of the soft sediment deposit along the southeast shore of the river adjacent to and upstream of the GM property as identified in orange and red in Figure 1: Topography/bathymetry and sediment thickness and types for the Monterey Dam as found in the “Monterey Dam Impoundment Sediment Report” by Interfluve (2015). At the very least, sampling should be expanded to include the in-water area extending to the eastern boundary of the GM property immediately adjacent to the water.*
- *Water surface elevation should be surveyed and recorded, referencing nearby established survey benchmarks. In addition to recording BGS depths for each sediment sample, translated elevations (referenced to NAVD88 vertical datum) should be recorded as well as used in the creation of any mapping product.*

GHD/Ramboll Response:

See Response to Comment No. 2. The coring vessel requires 2 to 2.5 feet of water to float and 4 feet to run its engine.

Water depths will be recorded using both a lead line and a calibrated fathometer.

The contractor will have additional sediment sampling devices on hand (e.g. van Veen, Ekman, Piston corer, etc.) to be utilized as necessary.

Sediment cores will be advanced to a depth of 6 ft or until refusal is encountered. Penetration depth and depth of core recovery will be recorded at each sample location. This will allow for determination of percent recovery (as measured by recovery length divided by penetration length) and sediment thickness at each location.

Comment regarding expansion of the sampling area is noted. Additional sampling may be required, in the future, to fully delineate the extent of contamination.

All sampling points will be located using sub-meter DGPS and will be provided to WDNR referenced to NAVD88 vertical datum. Sample locations will be logged on the same field form as the core geologic information, as requested. The field form will also record the weather, wind conditions, water depth, penetration depth, and depth of core recovery. See Attachment B.

WDNR Comment No. 4:

Reporting

- *The document states that the data evaluation report will include a risk-based assessment. Because acceptable aquatic risk-based assessments must include toxicity testing of benthic invertebrate, any site-specific risk assessment component of this work should be developed and reviewed separately from this initial sediment chemistry investigation work.*

GHD/Ramboll Response:

The initial sediment investigation is being conducted in order to characterize the sediment. The resulting data will support a screening-level ecological risk analysis, analogous to Step 3A of USEPA's (1997) Ecological Risk Assessment Guidance for Superfund (i.e., refinement of preliminary contaminants of concern). Laboratory toxicity testing may be performed at a later date to support the ecological risk assessment, and results will be presented in a separate document.

WDNR Comment No. 5:

Schedule

- *The Department requires review and approval of the Final Sampling Plan prior to mobilization.*
- *The Department requests a minimum 24-hour notice prior to mobilization. Please include all people listed on this email in the mobilization notice.*

GHD/Ramboll Response:

GM LLC/GHD will provide WDNR with a minimum of 24 hour notice prior to commencing any sampling activities. This notice will be provided to all respective parties indicated above.

Table 1

**Selected TCL-VOCs, TCL-SVOCs, PAHs, and TAL Metals
GM Janesville Assembly Plant
Janesville, Wisconsin**

Parameter	Analytes	Targeted Reporting Limits	Units
Target Compound List (TCL) Volatile Organic Compounds (VOC)	1,1,1-Trichloroethane	1.0	µg/L
	1,1,2,2-Tetrachloroethane	1.0	µg/L
	1,1,2-Trichloroethane	1.0	µg/L
	1,1-Dichloroethane	1.0	µg/L
	1,1-Dichloroethene	1.0	µg/L
	1,2,4-Trichlorobenzene	1.0	µg/L
	1,2,4-Trimethylbenzene	1.0	µg/L
	1,2-Dibromo-3-chloropropane (DBCP)	2.0	µg/L
	1,2-Dibromoethane (Ethylene dibromide)	1.0	µg/L
	1,2-Dichlorobenzene	1.0	µg/L
	1,2-Dichloroethane	1.0	µg/L
	1,2-Dichloropropane	1.0	µg/L
	1,3,5-Trimethylbenzene	1.0	µg/L
	1,3-Dichlorobenzene	1.0	µg/L
	1,4-Dichlorobenzene	1.0	µg/L
	2-Butanone (Methyl ethyl ketone) (MEK)	10	µg/L
	2-Hexanone	10	µg/L
	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	10	µg/L
	Acetone	10	µg/L
	Benzene	1.0	µg/L
	Bromodichloromethane	1.0	µg/L
	Bromoform	1.0	µg/L
	Bromomethane (Methyl bromide)	1.0	µg/L
	Carbon disulfide	1.0	µg/L
	Carbon tetrachloride	1.0	µg/L
	Chlorobenzene	1.0	µg/L
	Chloroethane	1.0	µg/L
	Chloroform (Trichloromethane)	1.0	µg/L
	Chloromethane (Methyl chloride)	1.0	µg/L
	cis-1,2-Dichloroethene	1.0	µg/L
	cis-1,3-Dichloropropene	1.0	µg/L
	Cyclohexane	1.0	µg/L
	Dibromochloromethane	1.0	µg/L
	Dichlorodifluoromethane (CFC-12)	1.0	µg/L
	Ethylbenzene	1.0	µg/L
	Isopropyl benzene	1.0	µg/L
	Methyl acetate	10	µg/L
	Methyl cyclohexane	1.0	µg/L
	Methyl tert butyl ether (MTBE)	1.0	µg/L
	Methylene chloride	1.0	µg/L
	Styrene	1.0	µg/L
	Tetrachloroethene	1.0	µg/L
	Toluene	1.0	µg/L
	trans-1,2-Dichloroethene	1.0	µg/L
	trans-1,3-Dichloropropene	1.0	µg/L
	Trichloroethene	1.0	µg/L
	Trichlorofluoromethane (CFC-11)	1.0	µg/L
	Trifluorotrchloroethane (CFC-113)	1.0	µg/L
	Vinyl chloride	1.0	µg/L
	Xylenes (total)	2.0	µg/L

Table 1

**Selected TCL-VOCs, TCL-SVOCs, PAHs, and TAL Metals
GM Janesville Assembly Plant
Janesville, Wisconsin**

TCL Semi-Volatile Organic Compounds (SVOC)			
PAHs - analyzed in Denver - do not duplicate in TCL list	1,1'-Biphenyl	5	µg/L
	2,2'-oxibis(1-Chloropropane)	5	µg/L
	2,4,5-Trichlorophenol	5	µg/L
	2,4,6-Trichlorophenol	4	µg/L
	2,4-Dichlorophenol	10	µg/L
	2,4-Dimethylphenol	5	µg/L
	2,4-Dinitrophenol	20	µg/L
	2,4-Dinitrotoluene	5	µg/L
	2,6-Dinitrotoluene	5	µg/L
	2-Chloronaphthalene	5	µg/L
	2-Chlorophenol	5	µg/L
	2-Methylnaphthalene	5	µg/L
	2-Methylphenol	5	µg/L
	2-Nitroaniline	20	µg/L
	2-Nitrophenol	5	µg/L
	3,3'-Dichlorobenzidine	1	µg/L
	3-Nitroaniline	20	µg/L
	4,6-Dinitro-2-methylphenol	20	µg/L
	4-Bromophenylphenyl ether	5	µg/L
	4-Chloro-3-methylphenol	5	µg/L
	4-Chloroaniline	10	µg/L
	4-Chlorophenyl phenyl ether	5	µg/L
	4-Methylphenol	5	µg/L
	4-Nitroaniline	20	µg/L
	4-Nitrophenol	20	µg/L
	Acenaphthene	5	µg/L
	Acenaphthylene	5	µg/L
	Acetophenone	5	µg/L
	Anthracene	5	µg/L
	Atrazine	3	µg/L
	Benzaldehyde	5	µg/L
	Benzo(a)anthracene	1	µg/L
	Benzo(a)pyrene	1	µg/L
	Benzo(b)fluoranthene	1	µg/L
	Benzo(e)pyrene		
	Benzo(g,h,i)perylene	1	µg/L
	Benzo(k)fluoranthene	1	µg/L
	bis(2-Chloroethoxy)methane	5	µg/L
	bis(2-Chloroethyl)ether	1	µg/L
	bis(2-Ethylhexyl)phthalate	5	µg/L
Butylbenzylphthalate	5	µg/L	
Caprolactam	10	µg/L	
Carbazole	10	µg/L	
Chrysene	1	µg/L	
Dibenz(a,h)anthracene	2	µg/L	
Dibenzofuran	4	µg/L	
Diethylphthalate	5	µg/L	
Dimethylphthalate	5	µg/L	
di-n-Butylphthalate	5	µg/L	
di-n-Octylphthalate	5	µg/L	
Fluoranthene	1	µg/L	
Fluorene	5	µg/L	
Hexachlorobenzene	0.2	µg/L	
Hexachlorobutadiene	1	µg/L	

Table 1

**Selected TCL-VOCs, TCL-SVOCs, PAHs, and TAL Metals
GM Janesville Assembly Plant
Janesville, Wisconsin**

TCL Semi-Volatile Organic Compounds (SVOC) PAHs - analyzed in Denver - do not duplicate in TCL list	Hexachlorocyclopentadiene	5	µg/L
	Hexachloroethane	5	µg/L
	Indeno(1,2,3-cd)pyrene	2	µg/L
	Isophorone	5	µg/L
	Naphthalene	5	µg/L
	Nitrobenzene	3	µg/L
	N-Nitroso-di-n-propylamine	5	µg/L
	N-Nitrosodiphenylamine (diphenylamine)	5	µg/L
	Pentachlorophenol	5	µg/L
	Perylene		
	Phenanthrene	2	µg/L
	Phenol	5	µg/L
	Pyrene	5	µg/L
	Alkalated PAHs to Knoxville lab Isotope dilution	C1-benzanthracene/chrysenes	1
C1-fluoranthenes/pyrenes		1	
C1-fluorenes		1	
C1-naphthalenes		1	
C1-phenanthrenes/anthracenes		1	
C2-benzanthracene/chrysenes		1	
C2-fluorenes		1	
C2-naphthalenes		1	
C2-phenanthrenes/anthracenes		1	
C3-benzanthracene/chrysenes		1	
C3-fluorenes		1	
C3-naphthalenes		1	
C3-phenanthrenes/anthracenes		1	
C4-benzanthracene/chrysenes		1	
C4-naphthalenes		1	
C4-phenanthrenes/anthracenes		1	
TAL Metals (less earth metals)		Antimony	2
	Arsenic	5	mg/kg
	Barium	100	mg/kg
	Beryllium	1	mg/kg
	Cadmium	1	mg/kg
	Chromium	5	mg/kg
	Cobalt	7	mg/kg
	Copper	2	mg/kg
	Lead	3	mg/kg
	Manganese	15	mg/kg
	Mercury	0.2	mg/kg
	Nickel	20	mg/kg
	Selenium	5	mg/kg
	Silver	0.2	mg/kg
Thallium	1	mg/kg	
Vanadium	4	mg/kg	
Zinc	20	mg/kg	

Attachment A Normandeau Photos





Attachment B Sediment Core Log

