Work Scope for Flow and Solids Monitoring

This Work Scope describes the Workplan for Monitoring of Flow and Solids being developed to support the *Remedial Investigation Scope of Work for Corrective Action Beyond the Facility Boundary Tittabawassee River and Floodplain* submitted by Dow to Michigan Department of Environmental Quality (MDEQ) on August 11, 2003. This Workplan is one element of Dow's efforts to develop the current understanding of river sediment and floodplain conditions, and will form part of the basis for future hydrodynamic and sediment transport modeling of the site.

Understanding how sediments move between the river and floodplain is a crucial first step in developing a focused work plan for determining the extent, distribution, and fate of dioxin in Tittabawassee River and floodplain. As a highly hydrophobic contaminant, dioxin is typically strongly associated with solids found in the water column, sediment bed, and floodplain soils. Consequently, an understanding of dioxin transport through the Tittabawassee River and floodplain requires basic knowledge about the extent, distribution, and movement of solids through the system.

Currently, there are limited data describing the distribution and movement of sediments and other solids. The study proposed in this Workplan will serve as the first step toward improving the understanding of sediment dynamics. These studies are intended only to provide a screening-level assessment of sediment dynamics, which will serve as a reconnaissance survey supporting future work efforts. Since the information collected in this effort will initially define the location of sediment deposition, it will also be useful in guiding decisions on further characterization of the river sediment and floodplain for dioxins and furans.

The study described in the Workplan is to be performed in two parts: first, monitoring will be conducted to explore flow and solids transport under varying flow conditions, and second, a poling study will be completed in order to explore the location and depths of soft sediment throughout the Tittabawassee.

The primary study objectives for the flow and solids monitoring effort are to:

- Improve the understanding of solids deposition and transport through the river system; and
- Provide preliminary data supporting an assessment of the stability of river and floodplain sediments.

Specifically, the data will be used to help preliminarily determine, at high and low flows, what mass of solids is imported from points upstream of The Dow Chemical Company, solids gained (from erosion) or lost (to deposition) in each part of the river and floodplain, and/or solids exported to the Saginaw River.

The second Workplan element, a poling study, will be used to determine sediment location and thickness throughout the river. This work will be conducted in order to provide data supporting the following objectives:

- Determine which parts of the river have historically been erosive or depositional;
- Determine what volume of cohesive sediment there is in each reach of the Tittabawassee River; and
- Preliminarily identify how areas of cohesive sediment correlate with substrate suitable for fish habitat.

The data collected from each of these Workplan elements should assist in the design of other RI Workplans prepared as part of Dow's RCRA Operating License Off-site Corrective Action Condition, such as further characterization of the location and level of dioxins and furans in floodplain soil and sediment.

The Flow and Solids Monitoring Work Plan specific for this Work Scope will include:

- A summary of project objectives, describing how this investigation will fit into the development of a conceptual model for the site and provide support for future hydrodynamic and sediment transport modeling;
- A Quality Assurance Project Plan (QAPP) that describes specific procedures for ensuring that data collected meets specific quality objectives;
- A Health and Safety Plan (HASP) that includes safety precaution information and emergency procedures;
- A detailed description of procedures planned for collection of water column stage/flow and solids data, floodplain stratigraphic measurements, and sediment thickness data, including specific plans for mobilization to monitor a wet-weather high flow event;
- A summary of field documentation procedures that will be followed to ensure recording of all information pertinent to sampling activities, and proper maintenance of sample chain of custody;
- A summary of sample collection, handling, and shipping procedures;
- A description of data quality objectives and requirements; and
- A schedule for implementation of the investigation.

As indicated in the attached schedule (Figure 1), the Flow and Solids Monitoring Workplan will be available for review by MDEQ by October 15, 2003 as illustrated in the attached schedule. After review and approval by MDEQ, the Workplan will be implemented. A Flow and Solids Monitoring report that will describe the results of the investigation, implications for the development of a conceptual model of the site, and recommendations for further investigation will be available for MDEQ review by January 14, 2004.

Figure 1. Schedule for Workplan Development and Implementation.

Task Name	Duration	Start	Finish
Workplan Development	33 days	9/1/03	10/3/03
MDEQ Review of Workplan	6 days	10/15/03	10/20/03
Initiate Workplan Activities	1 days	10/20/03	10/20/03
Field Reconnaissance	1 days	10/20/03	10/20/03
Install Stage Gages	3 days	10/20/03	10/22/03
Stage Gaging	54 days	10/23/03	12/15/03
Flow/Solids Measurements	54 days	10/23/03	12/15/03
Floodplain Stratigraphy: Deploy Clay Markers	1 days	10/20/03	10/20/03
Recover Clay Marker Core (1st round)	1 days	6/7/04	6/7/04
Recover Clay Marker Core (2nd round)	1 days	12/6/04	12/6/04
Recover Clay Marker Core (3rd round)	1 days	6/6/05	6/6/05
Recover Clay Marker Core (4th round)	1 days	6/5/06	6/5/06
Sediment Poling Study	24 days	10/20/03	11/12/03
Data Analysis and Reporting	31 days	12/15/03	1/14/04
Review and Planning for Refined Flow/Solids Characterization	29 days	1/21/04	2/18/04
Spring High-Flow Gaging and Measurements	52 days	3/1/04	4/21/04
Detailed Flow and Solids Characterization			
Continued level monitoring			
Sediment and Floodplain Contaminant Sampling and Geochronological Coring