



JENNIFER M. GRANHOLM  
GOVERNOR

STATE OF MICHIGAN  
DEPARTMENT OF ENVIRONMENTAL QUALITY  
LANSING



April 16, 2008

VIA E-MAIL and U.S. MAIL

Mr. Greg Cochran, Director  
Michigan Dioxin Initiative  
Michigan Operations  
The Dow Chemical Company  
1790 Building, Washington Street  
Midland, Michigan 48674

Dear Mr. Cochran:

SUBJECT: 2008 Interim Response Activities (IRAs)/Pilot Corrective Action Plans (PCAPs)  
Notice for the Tittabawassee River and Saginaw River; The Dow Chemical  
Company (Dow); MID 000 724 724

The Michigan Department of Environmental Quality (MDEQ) has determined that IRAs for portions of the Tittabawassee River are necessary in accordance with Conditions XI.B.9. and XI.G. of the hazardous waste management facility operating license (License) issued to Dow on June 12, 2003, pursuant to Part 111, Hazardous Waste Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451). In some cases these IRAs are a continuation of work that Dow began implementing in 2007 as IRAs and federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) removal actions.

Pursuant to Condition XI.G.1. of the License, Dow is required to submit written IRA Work Plan(s) to the Chief of the Waste and Hazardous Materials Division (WHMD) for review and approval within 60 days of this notification. Condition XI.B.9. of the License provides that the WHMD Chief may require Dow to implement IRAs to prevent, minimize, or mitigate injury to public health, safety, welfare, or the environment in accordance with Condition XI.G. of the License at any of the specific off-site area(s) identified in Condition XI.B.2. of the License (which includes the Tittabawassee River and Saginaw River sediments and/or floodplain) at any time during the corrective action process where information indicates that injury has, or may have, resulted directly or indirectly from the facility. Condition XI.G. of the License requires such activities to conform with, or be substantively equivalent to, the IRA provisions of Part 201, Environmental Remediation, of Act 451, and Conditions XI.G.1.-XI.G.7. of the License.

Consistent with discussions held between Dow and the MDEQ in 2007, and most recently on March 25, 2008, the MDEQ supports the implementation of certain IRAs, once approved, as PCAPs. If successful, the information obtained from implementation of these PCAPs may be used to address areas that require IRAs and/or possibly final corrective actions in other portions of the Tittabawassee River and Saginaw River.

### **Specific IRAs/PCAPs Required by this Notification**

At this time, the MDEQ has determined that the following IRAs are necessary for the Tittabawassee River and Saginaw River. Additional IRAs may be required by the MDEQ, during 2008 and beyond, consistent with the conditions of Dow's License.

#### 1. Reach D

Dow recently notified the U.S. Environmental Protection Agency (U.S. EPA) and the MDEQ that the performance-based work required by the July 2007 CERCLA Removal Order was complete and that Dow would begin restoration activities at Reach D beginning in April 2008. During the March 25, 2008, meeting between Dow and the MDEQ, Dow was notified by the MDEQ that additional corrective action work would be necessary at the Reach D area because elevated levels of dioxins and furans continue to be present. In addition, other contaminants of concern, such as chlorobenzenes and hexachlorobutadiene, which were not specifically addressed by the CERCLA removal action, remain at levels that require further interim response work. Dow and the MDEQ agreed to a follow-up meeting with the U.S. EPA to further discuss these issues; that meeting took place on April 3, 2008.

During the meeting on April 3, 2008, the MDEQ, Dow, and the U.S. EPA agreed that in order to close out work under the CERCLA Removal Order, for which the U.S. EPA Superfund Program has the lead role, Dow would complete a number of "micro removals" to address high levels of residual dioxin contamination followed by verification sampling in these areas. As agreed at this meeting, the verification sampling is to include analysis for dioxins and furans, as well as: (a) the list of other contaminants of concern (that were not the risk driver for the CERCLA removal action) and (b) detailed descriptions of the sampled media to distinguish resuspended sediments versus bottom sediments.

Once the micro removals have been completed to close out the work required under the CERCLA Removal Order, work to address any remaining elevated levels of dioxins and furans, as well as any other contaminants of concern, would be conducted under an IRA Work Plan approved by the MDEQ as the lead agency. This work is also to include additional delineation of contamination in the Reach D area and probable additional sediment removal and/or capping and maintenance and monitoring. Although not discussed during the meeting on April 3, 2008, it may appropriate to evaluate this area as a candidate for the design and operation of a sediment trap, depending on the results of the additional characterization work and the nature of the remaining contaminants.

#### 2. Tittabawassee Bank Stabilization IRA/PCAP

Large areas of bank erosion are present along the Tittabawassee River. In many cases these eroding areas are highly contaminated with dioxins and furans. Consistent with the U.S. EPA's February 12, 2002, *Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites*, OSWER Directive 9285.6-08, and in follow up to the MDEQ's 2007 requirement to conduct IRAs on eroding banks in the upper six miles of the Tittabawassee River Study Area, the MDEQ is now requiring Dow to prioritize and propose at least three significant initial areas where bank stabilization will be implemented in 2008. In addition to controlling active sources of contamination early, the goal of these projects would be to evaluate the effectiveness of bank stabilization technologies for further use along the Tittabawassee River. Monitoring before and after bank stabilization will be necessary for this evaluation.

As previously discussed with Dow, the MDEQ and the Natural Resource Damage Assessment (NRDA) Trustees believe that it is important to evaluate technologies that have a "softer footprint" and are less intrusive than what was proposed and implemented by Dow on Reach J/K in response to the CERCLA Removal Order. That being said, it is recognized that there may be circumstances similar to the Reach J/K work, where Dow may need to remove highly contaminated riverbank and overbank soils so they are not a direct contact hazard and are no longer acting as a continuing source of contamination to the Saginaw Bay watershed.

The MDEQ has identified several areas that are of high concern along the upper and middle Tittabawassee River, and we would like to discuss these areas with Dow in light of the data that was submitted on March 1, 2008 (2007 Tittabawassee River Characterization Report), and April 1, 2008 (River Bank Stabilization Pilot Corrective Action Project Report for the Tittabawassee River). The MDEQ considers this work to be a very high priority. Without controls to stabilize or remove active eroding bank sources, any other areas in the river channel or on the floodplain that have had remedial actions completed are at risk of becoming recontaminated.

### 3. Saginaw River Sediment Trap Pilot

Ongoing studies that have been conducted under the Alternative Dispute Resolution/NRDA process have demonstrated the merits of designing and proceeding with a pilot sediment trap on the Saginaw River. The February 1, 2008, Saginaw River and Bay Scope of Work (SRB SOW) Approval with Modifications requires Dow to begin removing sediments from the Saginaw River as an IRA. Consistent with the SRB SOW Approval with Modifications, Dow is required to develop and submit a work plan to begin removing sediments from the Sixth Street Turning Basin Area as an IRA. Additionally, this IRA will be used to refine the sediment trap design to maximize the effectiveness of this IRA concept for future use.

### 4. Tittabawassee In-Channel Deposits

During the implementation of the sampling plans to characterize contaminated sediments in the Tittabawassee River during 2006 and 2007, Dow identified a number of areas where high levels of contamination are present in river sediments. As part of the GeoMorph™ Pilot Site Characterization Report, Upper Tittabawassee River and Floodplain Soils IRA/PCAP Process that was approved on May 3, 2007, Dow is required to initiate IRAs by conducting step-out sampling where sediment concentrations exceed 10,000 parts per trillion (ppt) toxic equivalent (TEQ). Following step-out sampling, Dow and the MDEQ will then conduct further evaluation of the IRA/PCAP areas to determine if further IRAs are necessary. These activities may include removal, capping, or otherwise stabilizing the high concentration deposit(s).

In the cases of the Reach L and Reach J/K deposits, Dow has asserted that these deposits are stable in the short term and are unlikely to be remobilized by routine river events. Dow has not proposed removal, capping, or stabilization of these deposits as IRAs. The MDEQ has reviewed Dow's evaluation and determined that (1) additional information is necessary to complete the PCAP/IRA evaluations conducted by Dow and (2) a new IRA is required for the Reach J/K deposit to remove or cap surface sediments where concentrations of dioxins and furans are present in excess of 10,000 ppt TEQ and to develop plans to remove or stabilize the remaining high concentration deposits in Reaches J/K and L. If the MDEQ determines, based on the collection of the data described below, that either of the remaining high concentration deposits are not stable in the short term, the MDEQ will

require Dow to implement the already developed plan(s) to remove or stabilize the remaining high concentration material. The MDEQ is requiring Dow to develop these plans so that additional IRA work, beyond removal or capping of the surface sediments that are greater than 10,000 ppt TEQ, can be completed during 2008, if necessary.

Dow is required to collect the information described below early in the 2008 field season in order to determine if it will be necessary to remove or otherwise stabilize one or both of these high concentration deposits in advance of the implementation of a final remedy:

- Characterization of the deposits for other potential constituents of interest (PCOIs). Samples of the high TEQ material and the "cap" material need to be evaluated for the other Dow-related PCOIs. Note that the diffusion modeling conducted in the Dow analysis is likely to be more appropriate for the nondioxin PCOIs.
- Bedload and suspended load sampling conducted on, and adjacent to, upstream and downstream of the Reach L and Reach J/K deposits.
- Repetition of high resolution bathymetry in late spring of 2008 so that the geometry of the deposit and adjacent thalweg can be compared to 2007 conditions.
- In-channel measurements to evaluate the stability and movement of the deposit (i.e., scour chains and elevation surveys of the top of sediment) over the spring.

Should the short-term stability of these deposits be confirmed with this additional study, a performance monitoring program must be developed, approved, and established to evaluate the continued existence of these stable conditions or for determination of stability changes and identification of other necessary measures to prevent mobilization of contaminants from these deposits.

Also, the following additional information on the modeling that was conducted to evaluate the potential for scour must be provided to the MDEQ by June 1, 2008:

- Does the modeling take into account the upstream bridge structures at Gordonville Road for the upper Reach L deposit?
- What were the results of the model for the 7-year to 10-year flood event and typical/nonflood flow conditions (especially given the presence of the upstream constricting bridge structures)?
- What would be the effect of ice damming and/or ice scour on the upper Reach L deposit, especially given the proximity of the Gordonville Road bridge structure?

The above information will also be useful in the future evaluation of in-channel deposits and for the Tittabawassee River Remedial Investigation Work Plan.

Any removal and/or stabilization of these deposits will need to be sequenced with the removal and/or stabilization of upstream in-channel and eroding bank deposits to prevent recontamination of these areas after response activities have been completed.

5. Work Plan to Address the Disturbance and Management of Soils in Areas with Potential Dioxin/Furan Contamination and Provision of Extent of Contaminated Floodplain Notification to Miss Dig

Based upon the dioxin and furan investigation results to date that show the portions of the Tittabawassee River floodplain that are contaminated with greater than 1,000 ppt TEQ dioxins and furans, Dow is required submit the "Appendix C - Work Plan to Address the Disturbance and Management of Soils in Areas with Potential Dioxin/Furan Contamination" portion of the Communications IRA Work Plan that was deferred for later review and approval at the time the Communications IRA Work Plan was approved in October 2004. In particular, as part of this IRA, Dow is to provide a notification to the Miss Dig system of the areas where safety and soil handling precautions should be taken by utility workers, residents, etc., for any construction activities in these areas. Upon request, the MDEQ can provide Dow with a copy of the previous working draft of the Appendix C language.

In conjunction with this IRA, the MDEQ also requires Dow to submit a work plan for working with the MDEQ to develop and print the informational pamphlet, *Management of Disturbed Soils and Dredged Sediments*, required in Section 2.2, Informational Materials to be Developed, of the February 2004 Communications IRA Work Plan that was approved with modifications by the MDEQ on October 7, 2004.

**Areas Where Follow-Up IRAs are Likely to be Necessary in the Near Future**

6. Follow Up on Exposure Unit Sampling Areas

The MDEQ, in coordination with the U.S. EPA and the Michigan Department of Community Health (MDCH), is conducting an independent assessment of certain areas along the Tittabawassee River where the MDEQ has determined that there is high potential for human exposure to dioxins and furans at levels that may require additional IRAs beyond those implemented by Dow in 2005 and 2006. Following the review of sampling results and data interpretation for sampling that is currently being conducted at the Riverside Boulevard Area and the West Michigan Park Area, the MDEQ, in consultation with the U.S. EPA, the MDCH, and the federal Agency for Toxic Substances and Disease Registry, will determine what additional actions, if any, need to be initiated as IRAs.

Although the MDEQ is not requiring additional IRAs in these areas at this time, it is quite possible, based on initial chemical characterization information, that IRAs beyond those completed in 2005 and 2006 by Dow will be required in the near future.

**Schedule**

As noted above, Condition XI.G.1. of the License requires Dow to submit a written IRA Work Plan to the Chief of the WHMD for review and approval within 60 days after the licensee receives written notification by the WHMD Chief that IRAs are necessary. Accordingly, the IRA/PCAP Work Plan for Reach L must be submitted to this office by June 16, 2008. In the meantime, the MDEQ remains available to meet with Dow to discuss the specific technical requirements of these IRAs.

To schedule a follow-up meeting or if you have any questions regarding this notification, please contact Mr. Al Taylor, Hazardous Waste Section, WHMD, at 517-335-4799 or via e-mail at [taylora@michigan.gov](mailto:taylora@michigan.gov).

Sincerely,



George W. Bruchmann, Chief  
Waste and Hazardous Materials Division  
517-373-9523

cc: Mr. Ben Baker, Dow  
Mr. David Gustafson, Dow  
Mr. Peter Wright, Dow  
Mr. Ralph Dollhopf, U.S. EPA, Region 5  
Mr. Greg Rudloff, U.S. EPA, Region 5  
Ms. Kathleen Cavanaugh, Michigan Department of Attorney General  
Mr. Robert Reichel, Michigan Department of Attorney General  
Mr. Jim Sygo, Deputy Director, MDEQ  
Mr. Frank Ruswick, Senior Policy Advisor, MDEQ  
Ms. Liane Shekter Smith, MDEQ  
Ms. De Montgomery, MDEQ  
Mr. Steve Buda, MDEQ  
Mr. Terry Walkington/Ms. Trisha Peters, MDEQ  
Ms. Cheryl Howe, MDEQ  
Dr. Deb MacKenzie-Taylor, MDEQ  
Mr. Al Taylor, MDEQ  
Off-Site Correction Action File