

DIOXIN AND DOW IN MIDLAND MICHIGAN

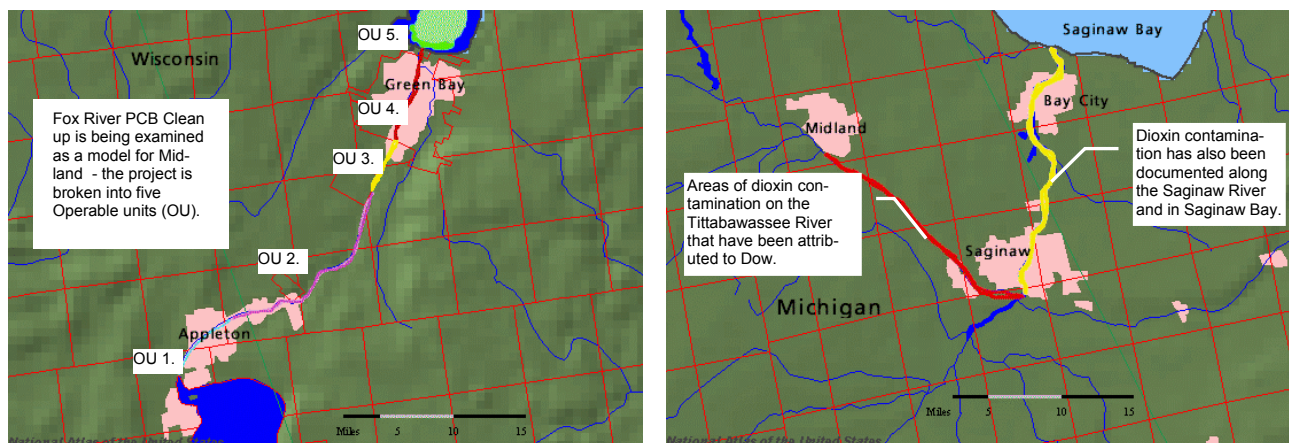


Figure 14. Geographic Comparison of the Fox River/Green Bay and Midland Contamination Cases

(Sources: Maps – USGS; Contamination areas – Wisconsin DNR & Michigan DEQ.)

The Tittabawassee River

Dow’s headquarters has been in Midland, Michigan since the company’s founding in 1897 and its facility there has been producing chlorinated compounds and associated chemicals for most of that tenure. This section analyses the status of dioxin pollution in Midland and surrounding waterways.

In 2001 the state of Michigan’s Department of Environmental Quality (DEQ) investigated a preliminary finding of high dioxin levels downstream from Dow Chemical. The DEQ found dioxin contamination downstream from Dow’s facility in excess of the state of Michigan’s “Residential Direct Contact Criteria” of 90 parts-per-trillion for dioxin. In its 2003 10K report to shareholders, Dow reported the following:

“Similar to the Freeport site, in the early days of operations at the Midland site, manufacturing wastes were usually disposed of on-site, resulting in soil and groundwater contamination, which has been contained and managed on-site under a series of RCRA permits and regulatory agreements. The most recent Hazardous Waste Operating License for the Midland site, issued in 2003, also included provisions for the Company to conduct an investigation to determine the nature and extent of off-site contamination from historic Midland site operations. The scope of the investigation includes Midland area soils; Tittabawassee and Saginaw River sediment and floodplain soils; and Saginaw Bay. On December 31, 2003, the Company had an accrual of \$54 million for environmental remediation and investigation associated with the Midland site. In 2003, the Company spent \$8 million on environmental remediation at the Midland site.”¹¹² 2003 Dow Chemical 10K filed on Feb.20th 2004

Testing in the area has found downstream locations contaminated with dioxin which will probably be the responsibility of Dow Chemical to

remediate. There is reason to believe, given the costs of similar contamination cases, that the ultimate costs of cleanup, and other resulting liabilities, could be substantially in excess of the amount accrued.

Study samples of the sediment in the Tittabawassee River show contamination in the entire 22 mile stretch from Dow's facility downstream to the confluence with the Saginaw River. Samples of dioxins and furans in the river sediment show levels of contamination up to 2100 ppt TEQ^{xviii}. More recent sampling has confirmed widespread contamination throughout the floodplain, including in the backyards and gardens of residents living along the river. One recent sample in a neighbor's backyard was 5,600 ppt, more than 60 times the state cleanup standard and samples registering 7261 ppt, have been discovered in soil at a wildlife refuge at the confluence of the Tittabawassee and Saginaw rivers.

Flooding over the years has deposited the dioxins on private properties along the river, including farms. As a result over 300 plaintiffs have joined in filing a class action lawsuit against Dow seeking damages for lost property value and the establishment of a medical monitoring trust fund for residents.

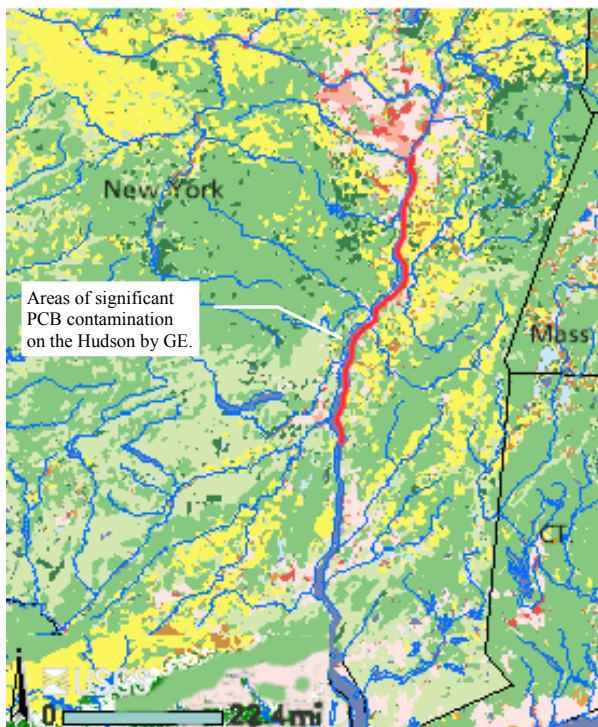


Figure 15. Hudson River Contamination

(Source: NOAA)

Extensive studies of wildlife along the Tittabawassee show high levels of dioxin contamination accumulating up the food chain.¹¹³ Studies found dioxin in the bodies of fish and fish-eating carnivores as well as in chicken eggs along the river. The state urged residents to take precautions such as wearing face masks when mowing grass and showering after yard work.¹¹⁴ The state will soon begin a pilot investigation to test the blood of residents along the Tittabawassee floodplain to find out to what extent the dioxin may be working its way into the human population.¹¹⁵ There are more than 2000 parcels of land along the 22 mile stretch of the river between Midland and Saginaw that could potentially be affected by the contamination.

The remediation costs are likely to be considerable given the projected cleanup costs at similar sites. State officials are looking at other sites to help

^{xviii} TEQ stands for Total Toxic Equivalence and measures the concentrations of dioxins and furans which have varying levels of toxicity. TEQ measures toxicity based on 2,3,7,8 TCDD (See above) which has the highest toxicity level rated at "1" and its variants, known as "congeners" are measured as equal to or as a fraction of that. (See dioxin section above for a complete discussion of dioxin as a toxicant.)

design cleanup plans and obtain an estimate for the potential costs of cleaning up the river.

PCB cleanup on the Fox River in Wisconsin, which the Michigan Dept. of Environmental Quality is studying as a similar case has costs projected to exceed \$300 million.¹¹⁶ (See Figure 14 above.) The remediation on the Fox River is broken up into 5 “Operable Units” (OU) along the length of the cleanup site. Costs for remedial action at OU’s 3 & 4 are estimated at \$284 million and costs at OU 5 at \$39.6 million. Costs for OU 1 & 2 had not been estimated at the time of publication.

The Saginaw River and Saginaw Bay

The Tittabawassee River flows into the Saginaw River which in turn flows into Saginaw Bay, and eventually to Lake Huron. This leads to the question of whether dioxin contamination from Dow’s Midland facility extends into the Saginaw River and Bay. State officials have been examining sediment in the Saginaw and dioxin has indeed been found in concentrations above Michigan safe levels in the lower Saginaw and Saginaw Bay. However a number of known and suspected additional sources are located on the lower Saginaw as well. These include three General Motors facilities and two waste water treatment plants.¹¹⁷ (See map on page 44.) The DEQ is currently conducting a four year study of the Saginaw River and floodplain to determine attribution for the contamination. The study is due to be completed by mid-June 2007, although remediation plans may begin prior to completion of the study. There have also been decades of research¹¹⁸ on wildlife that nest on islands near the mouth of Saginaw Bay. Those studies have shown elevated levels of dioxin in birds, and consequent health impacts. In addition, there are state fish advisories on several species of fish in Lake Huron as a result of dioxin contamination.

General Electric’s PCB contamination on the Hudson River (NY) provides the most well-known model that investors might consider in estimating what the full costs of remediation on the Tittabawassee and Saginaw might end up costing Dow. Remediation is projected to cost General Electric \$500 million. In addition, GE spent decades fighting expensive legal battles with regulators at an additional cost of some \$200 million. The Hudson project is certainly larger than the current scope of the Tittabawassee/Saginaw case. Both are roughly 50 miles in length, but the Hudson has lower levels of contamination extending another 40 miles. However, contamination of Saginaw Bay and the greater ease of navigation on the Hudson, a cost-reducing factor, may ultimately make the two cases relatively comparable.

Disclosure

SEC disclosure by the company has underreported the scale and scope of the contamination around Midland, and does not mention any lawsuits pending against the company regarding contamination, the number of properties involved, nor does it even mention that dioxin is the contaminant.

According to recent assessments by the Michigan Dept. of Environmental Quality, portions of property subjected to frequent flooding by the Tittabawassee River contain elevated concentrations of dioxin. Concentrations ranging as high as 5,660 parts per trillion (ppt) of dioxin toxic equivalence (TEQ) were identified within frequently flooded portions of these properties. The DEQ has currently established that dioxin concentrations below 90 ppt TEQ in soil are acceptable for human direct contact for residential property.¹¹⁹ Court proceedings and state environmental assessments of contaminated sediments and properties have been ongoing since 2001, however, Dow's financial reporting has not reflected the situation to the degree known nor the likelihood that the cost of remediation far exceeds its current level accruals dedicated to cleanup costs in Midland. As mentioned above, the Fox river cleanup plans, which represent a comparable case, currently range above \$300 million indicating that if similar expenditures are required, current accruals for Midland remediation may have to increase by some 450%.

This will be a long-term issue for investors to track. Given the contamination on the Tittabawassee, (See the following page) Dow will certainly be included in the list of responsible parties for dioxin contamination of the Saginaw River and Saginaw Bay. Legal costs could be a factor given that there are a several responsible parties on the Saginaw and class action suits by a large number of plaintiffs have been filed regarding property damage. Again, similar issues of sediment contamination remediation have been costly, drawn-out affairs, so investors should keep an eye on developments in this case as they emerge and track company accruals.

Tittabawassee and Saginaw Rivers, and Saginaw Bay Sediment and Floodplain Soil Data in ppt TEQ

Figure 1 - WHO Mammalian

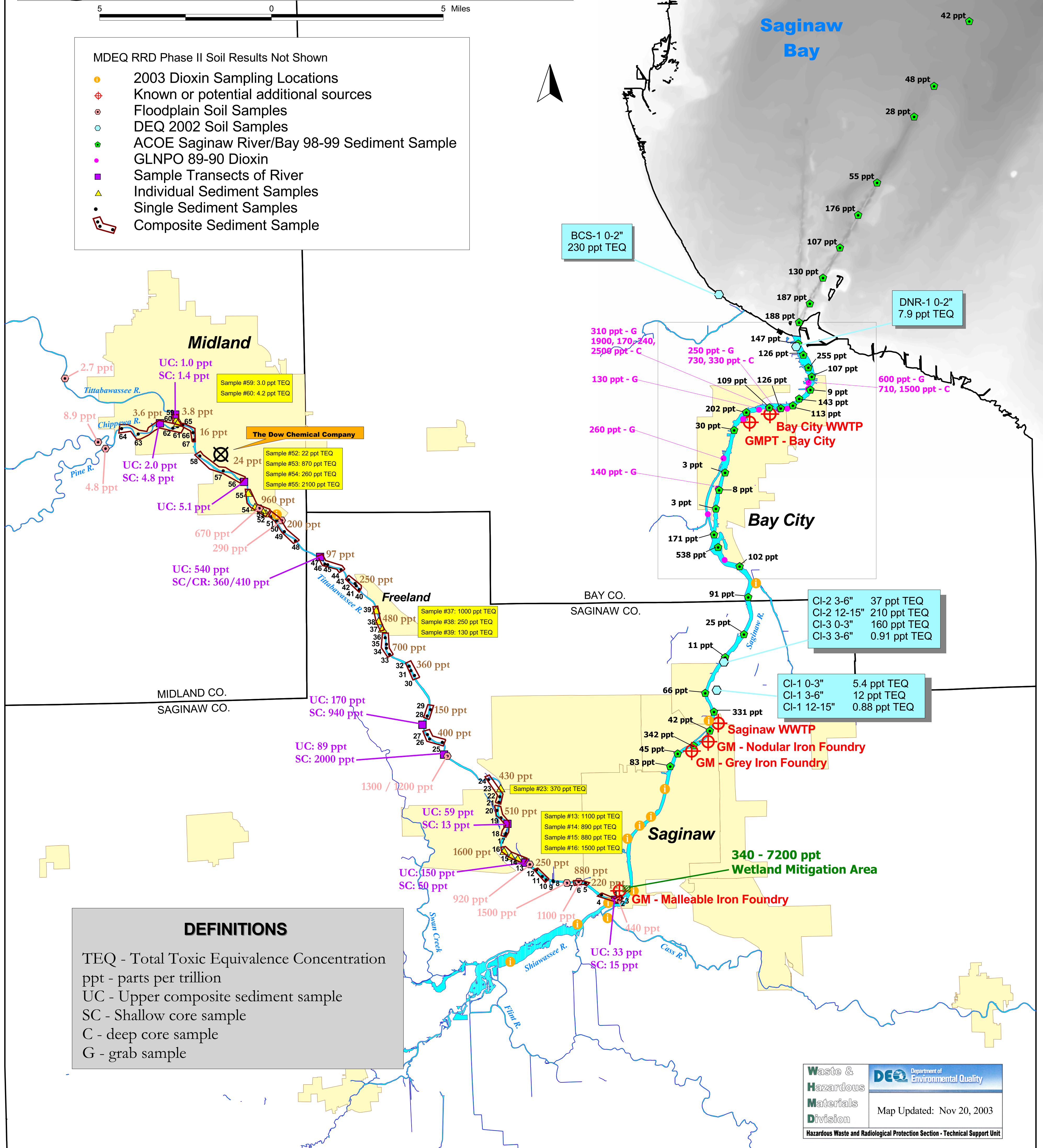


Figure .16 Soil and Sediment Contamination on the Tittabawassee and Saginaw
 (Source: Michigan Department of Environmental Quality)