June 1, 2012 (Updated October 29, 2013)
Consolidated Question and Answer Document
Approved Work Plan for Cleanup of Midland Area Soils

This Question and Answer document (Q&A) was prepared by the Michigan Department of Environmental Quality (DEQ) to provide Midland area residents and other interested parties with information about the steps that The Dow Chemical Company (Dow) will be taking to address dioxin contamination in the city of Midland. Please note that this Q&A document has been updated and replaces the February 15, 2012, original Q&A and the April 5, 2012, Supplement. Telephone numbers and program names were updated October 29, 2013. The Q&A was updated based on additional questions, public comments, and changes to the proposed Midland Interim Response Activity Plan Designed to Meet Criteria (Work Plan) as the DEQ worked toward review and approval of the Work Plan submitted by Dow as part of the corrective action requirements under its Hazardous Waste Management Facility Operating License (License) issued in 2003 under Part 111, Hazardous Waste Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451).

Background Information

In February of 2012, the DEQ announced having reached agreement with Dow on a proposed plan to resolve the historic issue of dioxin contamination in the city of Midland residential soils. The proposed Work Plan was public noticed on March 11, 2012, a public hearing was held on April 17, 2012, and the public comment period closed on April 25, 2012. The DEQ conducted a formal review of the Work Plan and worked with Dow to revise the Work Plan based on public comments and the DEQ review. A revised Work Plan was submitted May 25, 2012, for final regulatory review. The DEQ approved the Work Plan on June 1, 2012. The Notice of Final Decision and Responsiveness Summary identify the changes that were made in the approved Work Plan.

Dow will sample residential properties near Dow's Michigan Operations manufacturing site in Midland for the presence of dioxins. Sampling will determine where remediation (cleanup) may be required. This process will proceed systematically and is expected to take about five years.

Dioxins are a family of chemicals comprising 75 different types of dioxin compounds and 135 related compounds called furans. They are unintended by-products of certain industrial processes and also occur due to activities such as backyard burning of household trash.

Dioxin contamination in the city of Midland that is the subject of this approved Work Plan is the result of airborne emissions from historic waste management practices at Dow. Emissions released into the air from incinerators used in Dow's manufacturing operations contained dioxins, which ended up in the soil downwind of the plant. Dioxin emissions from Dow's Michigan Operations site have decreased dramatically over the years as processes were modernized. Dow's rotary kiln incinerator now enables 99.999 percent efficiency in eliminating chemical emissions.

This Q&A deals only with work being done by Dow to address contamination for which Dow is responsible in Midland Area Soils and does not address contamination that may be present from other sources.

This Q&A applies primarily to residential and "residential-like" properties, which includes parks, schools, daycare and elder care facilities, and other properties where people may come into contact with and be exposed to soil that may be contaminated with dioxin. This Q&A only addresses specific questions or comments received about commercial, industrial, and other types of property with nonresidential uses.

This Q&A does not address contamination in and along the Tittabawassee River. For information related to the Tittabawassee River, Saginaw River, and Saginaw Bay Site, please go to www.epa.gov/region5/cleanup/dowchemical/.

Property-specific questions are not answered in this document. Property-specific questions can be directed to Dow at:

Dow's Midland Resolution Center
1008 Jefferson Avenue
Midland, Michigan
www.midlandresolution.com
989-638-7002 or toll free at 888-778-2306

Questions can be directed to the DEQ through:

Al Taylor, DEQ Project Coordinator
DEQ, Office of Waste Management and Radiological Protection
P.O. Box 30241
Lansing, Michigan 48909
taylora@michigan.gov
517-614-7335

Questions about Why Cleanup is Necessary

1. **Why is soil sampling and cleanup being conducted?**
   Soil samples collected in the city of Midland indicate that, in some locations, there is dioxin contamination above the state's generic residential cleanup level and possibly above the proposed site-specific cleanup level of 250 parts per trillion (ppt) for residential properties in the city of Midland. Dow needs to take additional soil samples so that they can be tested in a laboratory to determine if there is dioxin on individual residential properties above the proposed Midland site-specific cleanup level of 250 ppt. This site-specific cleanup level will be used as an action level to trigger cleanup activities. This sampling effort is referred to as the remediation design because it will be used to identify where Dow must carry out remediation activities, meaning the cleanup.

2. **Are there other chemicals besides dioxins and furans to be concerned about?**
   The data from soil samples that have been collected in the city of Midland in the past have been carefully evaluated. The DEQ has determined that any other soil contamination in the Midland community that is attributable to Dow's historical waste management practices

will be addressed when dioxin contamination above the Midland site-specific action level of 250 ppt is removed. Other contaminants, such as arsenic, can be found in the same places as dioxin, which is why removing soil to address dioxin will also be likely to remove other substances found in soil at the same location.

3. **Why is this being done now? Why has this taken so long?**
   - Dow and the DEQ have worked very hard to reach an agreement on the components of a cleanup plan to assure that contamination caused by Dow's historical waste management activities will be dealt with in the city of Midland in a way that protects the public health and the interests of property owners.
   - Scientific studies have been conducted by Dow to gather information that allows for an assessment of other potential contaminants released by Dow, the depth of contamination, and the type of soil sampling that will be appropriate for remediation design sampling of residential properties.
   - Dow and the DEQ evaluated the scientific information available for developing a site-specific action level/cleanup level of 250 ppt for dioxin that will apply to soil on residential properties in Midland.
   - Changes to the state cleanup law, known as "Part 201," that were made in December 2010 were key to reaching a conceptual agreement between Dow and the DEQ on how to move forward with soil sampling and cleanup.
   - The DEQ's focus now is on working with Dow and the residents of Midland on implementing the Work Plan.

4. **When specifically did the Dow incinerator stop releasing elevated levels of dioxins?**
   Dow's incineration history is described in Section 2.0 of the Work Plan. To summarize, Dow began burning liquid organic tar wastes on-site as early as the 1930s in tar burners that vented directly to the atmosphere. Some tars were also burned periodically for energy recovery in Dow's previously-operated on-site coal-fired power plant for a time until the 1980s. Solid wastes were burned without any pollution controls prior to 1948 when a rotary kiln incinerator was placed into service. Improvements to air pollution controls on the tar burners and rotary kiln incinerator were made over several decades to reduce emissions, but it was not until the 1988-1990 time period that Dow's modernized 703 and 830 Incinerators demonstrated the achievement of four to five nines (i.e., 99.99 to 99.999 percent) destruction efficiency. It was at this time that the DEQ had reliable data that indicated that elevated levels of dioxins were no longer being released from on-site incineration.

   The 703 and 830 Incinerators were replaced by Dow's 32 Incinerator in 2003, further reducing dioxin emissions from incineration. The 32 Incinerator was designed to comply with the federal Hazardous Waste Combustor Maximum Achievable Control Technology (MACT) rule that was issued in 2005. These requirements stemmed from a 1999 federal joint Clean Air Act/Resource Conservation and Recovery Act of 1976 (RCRA) rule that promulgated more stringent hazardous waste combustor emissions standards using a MACT approach for dioxins, furans, mercury, cadmium, lead, particulate matter, hydrogen chloride, chlorine gas, hydrocarbons, carbon monoxide, and several low-volatile metals.

   There is extensive ongoing monitoring to ensure that unacceptable levels of dioxins and other pollutants are not being released through the 32 Incinerator stack. As part of this monitoring, comprehensive performance testing must be conducted roughly every five

years. Testing in 2003 and 2009 demonstrated that dioxin and furan emissions were substantially below federal and state emission requirements.

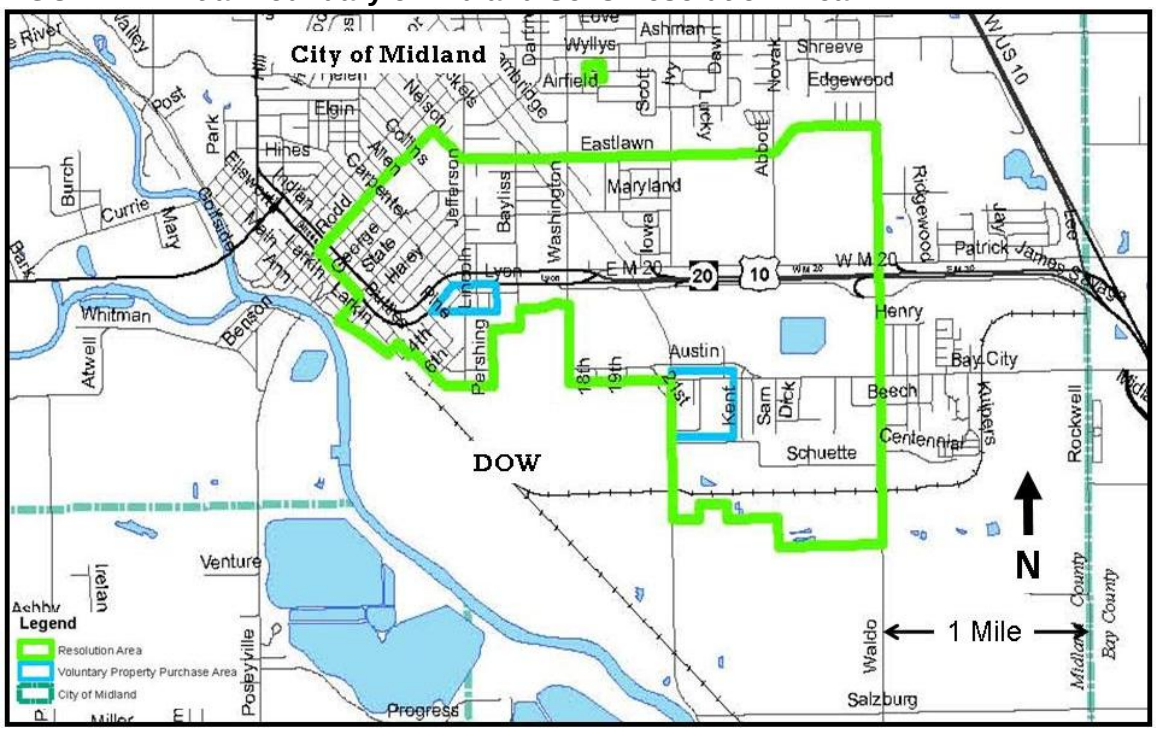
Another environmental monitoring program that is being done under Dow's License requires the sampling of soil boxes that ring the site every six months for dioxins and furans. From this monitoring, we are able to get a trend analysis of the dioxin levels from air releases due to burning and production processes on the plant site, as well as trackout from the facility. There are much higher levels of dioxins and furans on the plant site than are present outside the plant site and we do not want those getting off-site either. If a high level of dioxins or furans is seen in the soil box monitoring, that triggers a process where an investigation occurs on-site and practices are changed to prevent the additional release of dioxin above acceptable levels.

5. **A commenter stated that it was mentioned during the public hearing presentation that the incineration is at five nines and that that it has been a while since they worked on incinerator issues, but they recalled that the goal was to achieve six nines efficiency. The commenter stated that it was the first they had heard that five nines is acceptable rather than six nines.**
State and federal combustion regulations require six nines (99.9999 percent) destruction for incineration of a number of dioxin-contaminated wastes from specific manufacturing processes (hazardous waste numbers F020, F021, F022, F023, F026, and F027, commonly referred to as F020-series wastes). Rather than incinerating certain F020-series wastes in its on-site 32 Incinerator, Dow sends such wastes off-site for management. Although Dow does incinerate other dioxin-contaminated wastes on-site, they do not fall under the F020-series hazardous waste classifications so they are allowed to be incinerated at five nines (99.999 percent) efficiency pursuant to Dow's Renewable Operating Permit (ROP) Permit Number MI-ROP-A4033-2011a issued under state law by the DEQ, Air Quality Division, on April 11, 2011, and revised April 12, 2012. Incineration of F020-series wastes in Dow's 32 Incinerator is prohibited under the ROP and License.

Questions about Where Soil Sampling and Cleanup Will Happen

6. **Where will the sampling and cleanup happen?**
   - The area where remediation design sampling will occur starts near the boundary of the Dow Michigan Operations site on the south, extends to the north as far as Eastlawn Drive, as far west as Rodd Street, and as far east as Waldo Road.
   - A smaller area to the southeast of the intersection of Washington and Ashman Streets will also be sampled.
   - Figure 1, below, is a map showing the initial investigation areas.
   - The "footprint" of these areas will be refined as the remediation design sampling program is implemented and more sampling information becomes available. If the remediation design sampling shows that a larger area must be sampled to identify areas that exceed the site-specific action level of 250 ppt, the initial sampling area will be expanded.
   - Sampling will generally begin in areas closest to Dow's Michigan Operations site and move out from there in phases.
   - The area where cleanup activities will be undertaken is referred to as the Resolution Area – the area where actions will be taken to resolve the historic issue of dioxin contamination in city of Midland residential soils.

FIGURE 1 - Initial Boundary of Midland Soils Resolution Area



7. **How was the initial remediation design sampling boundary for the Resolution Area selected?**
   The first area where remediation design sampling will happen was determined based on existing soil sampling data. As more soil data are collected and a better understanding of the areas where there is dioxin in soil in excess of the 250 ppt site-specific action level is developed, it is expected that the boundary of the area where remediation design sampling occurs will change.

8. **If I live in the remediation design sampling area does that mean my property needs to be cleaned up?**
   Not necessarily. The need for cleanup will be determined based on the results of the remediation design sampling. If the sampling results from your property show dioxin is not present above the 250 ppt site-specific action level, it is not necessary for cleanup to be done on your property.

9. **If my property is outside of the Resolution Area where remediation design sampling is done, is my soil safe?**
   - Yes. After remediation design sampling is complete, a final boundary for the Resolution Area will be drawn to identify properties needing cleanup. Properties outside that boundary are not believed to be contaminated by Dow's activities.
   - The cleanup being done by Dow is required to address only the contamination that it caused. If you know that there is contamination on your property from another source, you must still take appropriate actions.

10. **I have a park behind my house that we use like our backyard. Will it get cleaned up, too?**
Parks and schools will be sampled and the cleanup will be implemented in the same manner as for residential homes in the neighborhood (all of the same requirements apply, including the 250 ppt site-specific action level).

11. **Why did I get a letter stating that my property needs to be cleaned up, but the letter my neighbors got said their property did not need cleanup? Does the amount of contamination vary that much from one property to another?**
Property owners who participate in the soil sampling process will receive the results of remediation design sampling by mail so that they know if cleanup work is needed on their property. It is possible that adjacent or nearby properties will show different results, so not all properties in a neighborhood that undergo soil sampling may require cleanup. Each property owner will have the opportunity to speak with representatives from the DEQ and Dow about their own sampling results. Data gathered over the past few years shows that there is a significant amount of variation in the levels of dioxin contamination from property to property. This variation is one reason why it is necessary to conduct soil sampling to determine if and where cleanup is needed. The amount of dioxin contamination that is found through remediation design sampling will depend on many factors, such as how much the surface of the land has been disturbed in the past. Disturbing the land surface may have removed contamination or mixed contamination in with deeper soils, which can result in lower dioxin levels being present in the current surface soils.

12. **Will my property get cleaned up if the results for my property are close to, but not over the 250 ppt site-specific action level?**
Cleanup activities will not be conducted on properties where test results show dioxin levels in soil samples below the 250 ppt site-specific action level. However, this decision will be made in a way that allows Dow and the DEQ to be very confident that concentrations of dioxin on the property are below the site-specific action level of 250 ppt. The process will allow us to say that we are at least 95 percent sure, based on statistical evaluation of the data, that the site-specific action level is not exceeded.

13. **Can I opt to have my property cleaned up even if it is not selected for cleanup as a result of the remediation design sampling process?**
Yes, but you would have to arrange for your own contractors and do the work at your own expense. If the remediation design sampling does not show that the site-specific action level is exceeded on your property then cleanup work is not necessary for your property.

14. **What if contamination related to Dow is found at a later date outside of the area that is determined to need cleanup based on this remediation design sampling work?**
Sampling and cleanup activities would be conducted in the same manner as outlined in the Work Plan. Soil sampling would be done followed by any necessary cleanup work.

15. **Is Dow's Michigan Operations plant site part of the Resolution Area?**
No. The Resolution Area does not include the plant site, but Dow is required to conduct corrective action to address contamination at the plant site under the terms of its License. The License is issued by the DEQ under state and federal hazardous waste management laws. Dow is required to address all contamination on the plant site, including past, present, and future releases.

16. **Was the soil in the "greenbelt" between Patrick and Fournie Streets already remediated?**
The DEQ is not aware of any remediation activities in this area. The Work Plan has this area scheduled for sampling and any necessary cleanup in 2012 and 2013.

17. **The old railroad track that left the Dow plant site, going north into the Resolution Area, may have transported contamination. What's going to be done to assess and clean up the old railroad track?**
Partial cleanup was done in the area of the old railroad tracks on Dow-owned property in 2011. Further investigation off of the Dow-owned property is scheduled to be conducted during the 2012 activities and additional cleanup will be done if the cleanup level appropriate to the land use is exceeded (990 ppt for nonresidential; 250 ppt proposed for residential).

18. **I have heard that there were high levels of dioxin found at the Eastlawn School in the 1970s or 1980s. Is this true? What will be done to address this along with other schools and playgrounds?**
The only sample data the DEQ is aware of at Eastlawn School was a single sample taken in 1996 that shows the concentration was 100 ppt of dioxin. All schools, playgrounds, gardens, and other properties in the Resolution Area where children are present, or areas where people engage in activities like those at residential properties, will be tested and cleaned up if they exceed the proposed residential action level of 250 ppt. As remediation design sampling is conducted, if soil concentrations are exceeding the 250 ppt action level at properties in the initial Resolution Area directly south of Eastlawn School, then the school property will also be included in the design sampling area to determine if cleanup is necessary.

19. **Samples were taken from my property in 2006. I was told that this was part of a "blinded" study where the location of the sample would not be revealed when the sample was analyzed. Was information from this study used in developing this cleanup plan? Do you already know whether properties that were sampled in 2006 exceed the 250 ppt action level? Why were the results of that study "blinded?"**
    - In 2006, Dow, the DEQ, and the city of Midland negotiated an agreement to blind soil samples taken to support a bioavailability study. Blinding means that Dow and the DEQ knew the general locations of where the soil samples were taken (blocks of 10 properties with at least 3 to 5 properties allowing soil sampling), but not the specific parcel that was analyzed for dioxin and other contaminants. The agreement contained provisions to promptly unblind the sample location of any residential sample that exceeded an interim action level of 1,000 ppt dioxin.
    - Blind sampling is not an ordinary part of conducting studies related to a cleanup, and the DEQ has not used it in other places. Midland presented an unusual situation because it had a very large geographic area that was potentially involved in soil sampling and cleanup activities on private property, much of it residential property. The 2006 soil sampling to support a bioavailability study was one of a number of studies necessary to develop a site-specific cleanup plan. Because of the scope of the project, the investigation and cleanup process would take years to complete.
    - City of Midland representatives asked Dow and the DEQ to adopt the blinding process for the 2006 soil sampling after they received feedback from residents who were concerned about soil sampling in the city. Some residents and city of Midland representatives were concerned that property owners who learned their properties were contaminated by participating in the 2006 soil sampling would have had

additional legal obligations until a cleanup was completed. In addition, at that time, state law would have treated property cleaned up to a site-specific level (e.g., 250 ppt) as still contaminated. Part 201, Environmental Remediation, Act 451, was amended in December 2010 so that property cleaned up to a DEQ-approved site-specific level is no longer considered contaminated.

- The DEQ agreed to the blinding process in order to proceed with the collection of necessary information and to prevent further delay in the process to conduct any necessary cleanup of Midland Area Soils. The 2006 soil sampling provided key information on soil characteristics and information on the general locations and levels of dioxin in Midland Area Soils. The soil test results were also used to support the development of the 250 ppt site-specific cleanup criterion for residential properties in Midland.
- The DEQ and Dow will learn the exact location for all of the blinded soil test results after the 250 ppt site-specific cleanup criterion is approved. That information will be considered as the work plans for 2013 through 2017 are developed by Dow and approved by the DEQ. Properties that tested above 250 ppt for dioxin as part of the blind soil sampling program will not automatically require a cleanup. Those properties that previously tested above 250 ppt will be included in the remediation design sampling program, which will determine whether a cleanup is necessary.
- The sampling data that is proposed to be collected as part of the 2012 Work Plan (the design sampling) will be much more useful for determining the need for cleanup because it will provide more specific and representative information for each property.

20. **I participated in the 2006 blinded soil sampling program. Can I get information regarding the soil samples taken from my property?**
Yes. The city of Midland has informed the DEQ that it will be sending letters to the owners of the properties where soil samples were taken as part of the blinded soil sampling program in 2006. Not all of the samples that were collected were analyzed for dioxin. The letter will provide instructions concerning how to ask for information on whether soil samples from that property were tested for dioxin and, if so, receive the results. Soil results will not be provided by the city to property owners who do not wish to receive this information.

21. **A few people raised concerns for sample design and concentrations close to the 250 ppt action level, including whether they could request resampling.**
Properties where data show dioxin concentrations of 250 ppt or less are not considered contaminated and do not need to be cleaned up by Dow. The Work Plan is designed to assure that the data from soil samples will conservatively represent the conditions at each property and that measured concentrations of 250 ppt or less are safe. The action level itself is based on protective assumptions about exposure – it is designed to protect the most exposed and most sensitive people, including children. The soil sampling process is designed to best represent the conditions on each property by combining samples from multiple locations on the property. In addition, three combined samples will be taken from each property as part of the sampling design. If the first sample that is tested is in a range between 220 and 280 ppt, additional samples will be analyzed to give a high degree of confidence (95 percent) that soil concentrations above 250 ppt will be identified and cleaned up.

22. **Can a property owner decline to allow sampling if they have knowledge that the area has been disrupted by water/sewer line installation, etc. and they believe this has altered the location of contamination?**
The DEQ encourages every property owner in the Resolution Area to participate in the sampling and, if necessary, the cleanup process. However, it is up to the property owner to decide whether to allow sampling and/or cleanup to occur on his or her property. Water or sewer line installation is likely to have affected only a small portion of a property. Testing of the entire property will provide the best information to determine if the action level is exceeded and cleanup for the whole property is necessary.

23. **Several houses in a commenter's neighborhood were moved from locations closer to Dow during times when chemical emission releases were regularly occurring. Can considerations be made to adjust testing on those properties to include those specific houses as well?**
Soil sampling for properties that had houses moved onto them will be the same as those with houses that were built in place. Although the DEQ does not have details of when and where this occurred, the anecdotes that have been relayed indicate this occurred more than 40 years ago and, therefore, any dust in the house should be related to the soil at the current location of the houses. The Work Plan was revised to address the potential for cleaning of duct work in houses where appropriate. At this time, the DEQ does not anticipate that testing will need to be adjusted for relocated houses.

Questions about the Site-specific Action Level/Cleanup Level – How Clean is Clean and Dioxin Health Effects?

24. **What is the site-specific action level? Why is it different from the 90 ppt cleanup level that has been talked about in the past?**
- The proposed site-specific action level for dioxins and furans in the city of Midland is 250 ppt. This Midland site-specific action level was developed through coordination between the DEQ and Dow. The site-specific action level is a trigger for cleanup actions and is a site-specific cleanup criterion under Michigan law.
- Dow's License and Michigan law allow for the calculation of a site-specific cleanup level to be used in place of a state-wide generic cleanup level, which is why the 250 ppt site-specific action level can be adopted just for this cleanup in the city of Midland.
- The site-specific cleanup level incorporates data from the Midland area into the calculation of the cleanup level, replacing some of the standard assumptions with data about exposure to dioxin in soil taken from scientific studies related to Midland soils. These site-specific assumptions are more accurate for Midland than the standard assumptions used to calculate generic cleanup levels, which have to cover many different situations in order to apply across the entire state.

25. **Where did the 250 ppt come from? How did the DEQ decide that 250 ppt dioxin was the appropriate action level? Where can the Midland-specific data and information that was used to establish the 250 ppt action level be reviewed?**
The basis for the DEQ's determination that 250 ppt dioxin is an acceptable action level is contained in the attached June 1, 2012, document entitled "DEQ Basis of Decision and Response for a Site-Specific Residential Direct Contact Cleanup Criterion (SSRDCC) for Dioxins/Furans (D/F) Toxic Equivalents (TEQ) for Midland Area Soils." As detailed in the attachment, the DEQ conducted extensive reviews of available scientific information about the risks posed by dioxins and also carefully reviewed site-specific information provided by

Dow to determine that 250 ppt action level for dioxin would protect the public according to the requirements of state law. This information includes a large body of data in the scientific literature, assessments conducted by national and international public health organizations, and documentation of studies conducted by Dow to determine how dioxin that is present in soil in Midland is expected to be absorbed into the bodies of people who are exposed. The June 1, 2012 document, a Midland Action Level Fact Sheet, and other information about Midland Area Soils cleanup is available at: http://www.michigan.gov/deq/0,4561,7-135-3307_29693_21234-271213--,00.html.

26. **The 250 ppt was based on site-specific criteria involving the analysis of Midland soils – are Midland soils that much different than soils in other communities in Michigan?**
    - Michigan's environmental cleanup law requires the DEQ to establish cleanup criteria for residential and nonresidential land use throughout Michigan using standard assumptions. These assumptions include things such as frequency and duration of exposures, the toxic properties of hazardous substances, and the level of risk that is deemed, by law, to be acceptable. Criteria developed with the standard assumptions are called "generic" criteria for use across the entire state.
    - The law also allows for site-specific criteria, which are essentially a refinement of the generic criteria, because they use site-specific exposure information instead of some of the standard assumptions.
    - In the case of Midland soils, the data that Dow developed show that some of the standard assumptions are more conservative than what actually occurs in Midland. For example, studies of Midland soil have been done to evaluate the absorption of dioxin by animals that are exposed in their feed and that is used to determine human absorption of dioxin. Taking this data into account is not less protective, it is simply a more thorough and site-specific approach to developing the action level/criterion.
    - Some of the Midland soils site-specific considerations that were approved by the DEQ actually are more conservative than the standard assumptions that are made to address conditions across the entire state. An example of a factor that was used for the site-specific Midland calculation (that is more conservative than the standard assumption) is the number of days without frozen soils or snow cover in Midland.

    Refer to the attached document for the details of the DEQ's review and the final inputs that were used to calculate the 250 ppt dioxin action level.

27. **The cleanup number proposed is based on a cancer potency value that is half as protective as the number used at the national level. A commenter stated that they believe Midland should be protected at the same level as others across the country.** This commenter is referencing a 156,000 $(mg/kg\text{-}day)^{-1}$ cancer slope factor developed by the U.S. Environmental Protection Agency (EPA) in 1984 based on a study of toxicity in rats (Kociba et al, 1978). The DEQ used a 75,000 $(mg/kg\text{-}day)^{-1}$ cancer toxicity value for both the generic cleanup criteria for dioxin and the Midland site-specific cleanup criterion calculation. This cancer slope factor was developed for an EPA Great Lakes Water Quality Guidance (GLWQG) in 1995. This was based on a 1991 reevaluation of the pathology slides by an independent Pathology Working Group from the same rat study (Kociba et al, 1978) and is considered to represent the best available information. A copy of the 1995 EPA GLWQG document is found at: http://www.michigan.gov/documents/deq/deq-whm-hwp-dow-EPA-820-B-95-006_251912_7.pdf

28. **On February 17, 2012, one day after the 250 ppt was announced for soils in Midland, the EPA released the noncancer portion of the dioxin reassessment. For the first time ever, the Agency established a reference dose (RfD) for dioxin. This RfD translates to a soil concentration of approximately 50 ppt.**
The DEQ used the new EPA RfD announced February 17, 2012, to evaluate the proposed Midland Action Level to make sure that the value developed based on cancer risk would also be protective for noncancer risk. A copy of that detailed review, the June 1, 2012, document entitled "DEQ Basis of Decision and Response for a Site-Specific Residential Direct Contact Cleanup Criterion (SSRDCC) for Dioxins/Furans (D/F) Toxic Equivalents (TEQ) for Midland Area Soils" is attached.

29. **The cleanup number proposed is also based on the presumption that all soils in the area share common characteristics that make dioxin less of a concern for people. A commenter stated that they believe that this assertion has not been demonstrated to be true in all cases.**
The DEQ has determined that the Midland Area Soils are sufficiently similar to the Midland soil tested for bioavailability to make remedial decisions. Dow collected 337 soil samples that were distributed around Midland in 2006. These samples were analyzed for physical and chemical properties including grain size distribution and total organic carbon. These soil characteristics were compared to those of the Midland soil used for the bioavailability study. A comparison table is provided below.
    - The total organic carbon of the Midland bioavailability study soil (3.14 percent) is very close to the mean (3.4 percent) and median (3.16 percent) of the 2006 samples. It is expected that higher total organic carbon would result in lower bioavailability.
    - For the grain size distribution, the Midland bioavailability study soil has more sand (~10 percent) and less silt (~4 percent) and clay (~5.5 percent) than the 2006 study mean and median. It is expected that the coarser grained soils (i.e., those with more sand) would have higher bioavailability.

    The bioavailability values used for calculating the Midland site-specific cleanup level are likely to represent the average or slightly above average bioavailability for Midland soils. These bioavailability values are combined with other average and high-end exposure parameters to represent a reasonable maximum exposure.

		Bioavailability Study Soil Dow Corporate Center, CC-S-27 7/8/2004	Summary Statistics for 2006 Soil Sampling Study to Support a Bioavailability Study			
Soil Parameters	Units		Mean Concentration	Median Concentration	Standard Deviation	# of Detects/ Samples
Total Organic Carbon	%	3.14	3.4	3.16	1.5	337/337
Grain Size						
Sand	%	87.4	77.36	78	10.47	337/337
Silt	%	12.1	16.47	16	7.14	337/337
Clay	%	0.5	6.17	6	4.73	337/337

30. **Why is Dow digging up 12 inches of soil**? **Is that enough to be sure that the contamination is removed?**
In the past couple years, Dow and the DEQ have worked together to collect scientific data regarding how deep dioxin is found in the soil. Dow has taken many soil samples at different depths in 12 areas near Dow's Michigan Operations site. Based on the results of those samples, the DEQ was able to determine that the contamination above the 250 ppt site-specific action level is limited to the top 12 inches of soil. Consequently, the DEQ and Dow determined that, for areas where dioxin is higher than 250 ppt, the top 12 inches of soil would have to be removed to protect the public health.

31. **Will samples be taken to confirm that soil left after cleanup is at or below 250 ppt?**
No. Based on the information from many samples that have been taken in the past, we can be highly confident that contamination is not likely to be present below 12 inches. It is not necessary to do confirmation sampling on each property.

32. **If my property was sampled and does not need cleanup, is the soil safe?**
- Yes, the soil is safe for residential use in the city of Midland.
- The cleanup being done by Dow is required to address only the contamination that it caused. If you know that there is contamination on your property from another source, you must still take appropriate actions.

33. **I remember hearing that all of the people in Times Beach, Missouri were moved out of their homes in the 1980s because of dioxin contamination. Why isn't it necessary to do that in Midland?**
A lot more is known today about the risks posed by dioxin than was known in the 1980s when dioxin contamination was discovered in Times Beach. Some of the concentrations found in Times Beach were much higher than any levels known to exist in residential areas of Midland.

The proposed 250 ppt action level for Midland Area Soils has been developed using the best, current scientific information about dioxin. This includes information that is specific to the mixture of dioxins that is found in Midland, their bioavailability from Midland Area Soils, the household dust concentration as related to outdoor soil in Midland, and the climate in Midland. Knowing how dioxin came to be present in the affected Midland neighborhoods and that the contamination is present only in shallow soils, allows us to determine that we can protect the public health by removing the surface soils in areas where soil concentrations exceed the 250 ppt action level. Relocation can be very disruptive to a community, and relocation is not necessary to assure that Midland residents are safe.

34. **Is it safe to eat fruits and vegetables that we grow in our garden?**
Yes. Dioxin remains attached to soil particles, so as long as vegetables and fruit are washed and/or peeled to remove the soil, they are safe to eat. Dioxins are not absorbed into vegetables or fruit, or the trees and shrubs in your yard.

35. **Is there anything I need to do to keep my pet safe from exposure to dioxin in soil? What about people who play with pets who have been in contact with soil in our yard?**
Although the cleanup criterion has been developed to be protective of human health and is not specific to pets' behavior, it is reasonable to expect that most pets would also be protected by the cleanup level since other animals have similar responses to dioxin.

However, it is always prudent to minimize exposure to contamination, so you may want to consider making sure that you wipe off muddy paws before a pet comes into the house to avoid tracking contaminated soil inside. Also, since significant human exposure can come from ingesting contaminated dirt on our hands, hand washing is an important way to minimize exposure to dirt on pets that spend time outdoors. Keeping cats indoors and bathing or wiping down dogs and other pets that spend time outdoors can also help minimize potential exposure to both your pets and your family.

36. **The contamination, which contains many chemicals, but is characterized by dioxin-like compounds, threatens not only the health of residents, but also the food web. The cleanup number in Midland is based on the presumption that no one in Midland will ever raise chickens or other animals for food within the city limits. A commenter stated that they think that this indefinite limit on future uses in the community is unwise and potentially unsafe.**
Neither the generic residential cleanup criteria for all chemicals nor the Midland site-specific residential cleanup criterion consider food-chain exposures. Typical residential use does not include raising animals for food, although that can be considered under the cleanup law, as appropriate. A recent proposal to change a city of Midland ordinance to allow residents to raise chickens was defeated. The ordinance that prevents the raising of chickens (and other animals products for human consumption) will need to be part of the overall remedy implemented by Dow. The current ordinance, or a modification if one is necessary, will be reviewed by the DEQ before it is approved to make sure it is enforceable, that it is clear to readers of the ordinance and future officials that it is necessary as an exposure control due to releases of dioxin, and that it includes a provision to notify the DEQ prior to any changes to the ordinance.

37. **Do I need to be concerned about health effects from dioxin exposure that has occurred in the past? Will health testing be provided as part of this work?**
    - Under the authority of Michigan's hazardous waste management act (Act 451), the DEQ is responsible for ensuring that Dow properly manages hazardous waste it generates and ensuring that Dow is responsible for cleaning up any on-site or off-site releases of contaminants. The Michigan Department of Community Health can conduct public health assessments and consultations at sites of environmental contamination through a grant funded by the Agency for Toxic Substances and Disease Registry, the federal agency that conducts these evaluations.
    - The DEQ is not able to answer specific medical questions or conduct health assessments. It is generally difficult to connect residential environmental exposures to health effects. Also, the kinds of health problems that are potentially associated with exposure to dioxin (e.g., cancer, effects on development and reproductive function, interference with hormones and the immune system, heart disease, diabetes, thyroid and skin conditions) are common in the general population, so it is especially hard to know whether there is a link between environmental exposure and a specific disease. The DEQ focus is on making sure that owners of properties that exceed the action level of 250 ppt are given a chance to get their property cleaned up so that exposures do not continue. More information on the potential health effects of dioxin can be found at the following Web sites:
        - U.S. Environmental Protection Agency (EPA) Dioxin Risk Assessment Information
        - Agency for Toxic Substances and Disease Registry (ATSDR), Chlorinated Dibenzo-p-dioxins Information
        - National Institute of Environmental Health Sciences, Dioxins
        - Food and Drug Administration (FDA), Dioxin Web Page

- World Health Organization (WHO) Dioxins and Their Effects on Human Health

- Health testing is not part of the work that is planned to be done to resolve the dioxin soil contamination in Midland Area Soils. If you are concerned about whether your health has been affected, talk with your physician. To locate a physician with experience with chemical exposures, you may contact the Association of Occupational and Environmental Clinics. This organization has contact information for this type of clinic by state: via http://www.aoec.org/directory.htm, call 888-347-2632, or e-mail AOEC@AOEC.org. If you need help finding a local physician, you can contact Patient Referral Services at Mid-Michigan Medical Center, telephone 989-837-9090.

38. **A commenter wanted to know if in addition to bioavailability studies in rats and young pigs, have there been laboratory tests in people or tests of people in the vicinity where release of elevated levels of dioxin were present? Was a study done on their blood to see if it affected them health wise?**
    - A study on human bioavailability of dioxin in corn oil showed that it was very similar to the bioavailability of dioxin in corn oil from rat studies. Based on this information, rats are a good surrogate for dioxin bioavailability in humans.
    - There has been an exposure study by the University of Michigan looking at the blood levels for the general population in the Midland/Saginaw area and compared them to the general population in the Jackson/Calhoun area. This study included 48 participants in the Midland Plume, 37 of which had soil and dust concentration information. This study did not look at health effects. There have also been studies of other groups of people as described further below.

39. **How is human testing done – by fat testing vs. blood testing or bone marrow?**
    Blood or serum testing is currently used to measure dioxin levels in people. In the past, human testing was done using fat samples since dioxins are concentrated in that tissue. As analytical capabilities improved, blood testing became available. A fairly large volume of blood is necessary to measure typical dioxin levels in most people. A fact sheet on blood testing is available from the Michigan Department of Community Health at: http://www.michigan.gov/documents/Blood_Testing_for_Dioxins_119419_7.pdf

40. **Are there any studies on dioxin levels in hot spots on dioxins found in human and animals, generation after generation?**
    There have been studies of exposure to different dioxin levels in both humans and animals. Studies in humans have included groups of people with occupational exposures, accidental or intentional poisoning, exposures in areas where there have been known releases, and typical general population exposures of other groups of people in various areas of the world. These different human and animal studies have shown that humans will accumulate higher levels of dioxins than most laboratory animals with the same exposure per body weight.

    Some of these studies have evaluated health effects in both humans and animals. These studies have shown that there are similar health effects in both humans and animals. Recent human studies have provided very valuable information on both long-term cancer effects and noncancer effects related to elevated exposure to dioxin. This includes studies of groups of people in Seveso, Italy who were exposed to dioxin after an explosion at a chemical plant in 1976. The exposed people included adults and children whose health has been followed since the accident, including some studies of their children born about 20 years later. Some of these studies were used by the EPA to develop the recently released reference dose.

41. **Can houses (wood, cement, plastic, etc.) be tested? Why test dirt rather than plants, animals, and humans?**
Testing is focused on soil because skin contact with soil and accidentally swallowing soil are the main ways that people are exposed to dioxin in the environment. Contamination that is present on concrete or wood surfaces is believed to present less potential for exposure and, in any case, is not likely to be greater than the concentrations found in soil. The purpose of the testing that will be done by Dow under their Work Plan is to determine where it is necessary to clean up contaminated soil. Testing of plants, animals, or humans does not provide information that can be used to design the cleanup. By removing contaminated soil, the primary exposure is reduced or eliminated, making residential properties safe for unrestricted use.

42. **Why is dirt and plant testing done vs. animal and human testing?**
Different types of testing are done for different reasons. There have been a lot of studies looking at plants and uptake from contaminated soils that show little uptake into the plant. There may be some soil adhered to the outside of the plant, but the dioxins do not move into the plant. If a resident has a garden and wants to eat their vegetables, wash them off. When using vegetables such as carrots and potatoes that grow below the ground surface, peel them and wash them. Dioxins are not taken up into the vegetable itself, so washing and/or peeling will prevent exposure to dioxin in the soil that adhered to the vegetable.

Animal testing can be done to evaluate risks from consumption of the animal products by people. This can include testing of fish, wild game, and livestock, especially in areas with known contamination. We do know there are elevated levels of dioxin in wild game (e.g., turkey, deer liver) from the Tittabawassee River floodplain. We have also seen elevated levels of dioxin in chicken eggs when chickens were allowed to forage in areas with contaminated soils in the floodplain. This shows that dioxin is taken up by animals that are eating crops or foraging where they can pick up contaminated soil. Animal testing can also be done to evaluate ecological risks.

Human testing is conducted to see what kind of levels there are in humans. This has included people with past occupational exposures, people who live in areas near accidents or other known releases, and other groups of people to see what type of blood levels they have. See Question #41 for more about this.

43. **The Work Plan is based on an action level of 250 ppt. If that action level is later determined to be too high (not protective), will the Work Plan change for properties where design sampling results are below 250 ppt?**
The action level is based on the best scientific information available to the DEQ. It takes into account the most recent information about health risks posed by dioxin and also Midland-specific information about climate, exposure to soil, and the potential for dioxin in soil to be absorbed into the bodies of people who are exposed. If scientific information about the risks posed by dioxin changes in the future, the DEQ will consider whether it is necessary to revisit the cleanup that is being done under the Work Plan. Dow is required, as a condition of its License, to provide for corrective action that is protective.

44. **The proposed cleanup number is based on human health concerns and is not designed to be protective of ecosystems. This is inconsistent with the requirement of the RCRA corrective action and permit programs that require adverse risks to the environment evaluated and controlled.**
The proposed Midland Action Level is intended to be protective of human health at residential properties. It was not developed to be protective of all ecosystems in the Midland area. An evaluation of ecological risk for the various ecosystems in the Midland area will be conducted to determine if further actions are necessary to address ecological risks (e.g., for more sensitive ecosystems). If necessary, these actions may be a part of the Natural Resource Damage restoration process. Further corrective action on residential properties that have received a cleanup is not expected to be necessary, since the post cleanup soil concentrations are expected to be very low.

45. **The cleanup number is not fully protective of health and the environment.**
The cleanup of residential soils to address direct contact is only one component of the corrective action for Midland Area Soils. Additional components include an extensive evaluation of other chemicals and exposure pathways, plus an evaluation of ecological risk to determine if additional actions will be required. Additional corrective action may include local zoning ordinances and/or deed restrictions to control exposure at nonresidential properties and to address food chain pathways (e.g., a prohibition on raising chickens in the city of Midland).

46. **Dow is not doing enough for home owners affected by the situation.**
The DEQ has authority under the law and Dow's License to require management of wastes in a manner to prevent current and future releases of contaminants and require cleanup of contaminated media from past, current, and future releases. As part of that authority, the DEQ has worked with Dow to develop this Work Plan for cleanup of the contaminated soils in Midland and will ensure that Dow addresses all of its corrective action obligations. Some issues, such as concerns about past health impacts or property values, are not intended to be addressed as part of the cleanup process.

47. **A Tittabawassee River resident expressed concern that the proposed Midland site-specific action levels of 250 ppt for soil and the soil sampling design plan for affected properties will be used as a pilot program to address all properties owners affected by dioxin contamination including those along the river(s).**
The site-specific action level of 250 ppt was developed for soils in the city of Midland. Some of the site-specific information, such as the bioavailability values and the soil/dust ratio, is not appropriate for the Tittabawassee River floodplain because it does not reflect conditions there. The EPA does recommend the use of incremental composite sampling designs for evaluation of dioxin contaminated soils (see Web link below). The Work Plan that Dow submitted addresses incremental composite sampling that follows these EPA recommendations and also considers the results of a pilot study that is specific to Midland. Since the source, distribution, and type of deposition of the dioxin contamination in the Tittabawassee River and on the floodplain is different, the type of sampling and/or decision unit for the river may be different from that used in Midland.
http://epa.gov/superfund/health/contaminants/dioxin/pdfs/Dioxin%20UFP%20QAPP%20UserGuide.pdf

Questions about the Cleanup Process – What Will Happen and Who Will Decide?

48. **Why should I participate in the remediation design sampling and cleanup program?** By participating in the remediation design sampling program, you will know whether your property meets the Midland site-specific action level. If the design data from your property shows that concentrations are higher than the site-specific action level of 250 ppt of dioxin, then your property is eligible to be cleaned up at Dow's expense. The remediation will result in your property being cleaned up to remove contamination that is above the site-specific action level of 250 ppt for dioxin. Allowing the remediation design sampling and cleanup to proceed will protect you and your family from risks of being exposed to dioxin in soil and also will eliminate other obligations you would otherwise have under state environmental laws. (See Question #93)

49. **If my property needs to be cleaned up, who will decide exactly what work is done?** Dow will be required to remove a minimum of 12 inches of soil from your property, with exceptions for soil that is very close to buildings, mature trees, or other structures and permanent features. Dow will be responsible for working directly with property owners to determine the details of how the work will be accomplished, what restoration work will be done at each property, and so forth. The DEQ has included examples of some common situations in this Q&A (see Questions #79 through #90). However, there are many things that will need to be considered in developing the plans for individual properties so it is not possible to address all of the potential issues in this Q&A. If property that you own needs to be cleaned up, you should plan to discuss your questions and concerns with the Dow representatives.

50. **When will the work be done? When is my property scheduled for sampling and possible cleanup?**
    - Dow's Work Plan for the design and remediation work will include a detailed schedule. This Work Plan will be the outline that will be followed for soil sampling and cleanup activities.
    - Soil sampling activities are expected to begin in June 2012. Cleanup activities will be completed in the same year that soil sampling is conducted. As a result, properties that are sampled in 2012 will be cleaned up in 2012; properties that are sampled in 2013 will be cleaned up in 2013, etc. It is expected that it may to take up to six years for soil sampling and cleanup activities to be finished in the entire Resolution Area (although the work could be completed sooner).
    - The schedule being developed will go neighborhood by neighborhood in a systematic fashion, generally addressing properties closest to Dow's Michigan Operations site first. These areas are expected to have higher levels of contamination than properties further from the Michigan Operations site. The schedule is designed to get cleanup done on the properties with the highest levels of dioxin first.
    - Some of the properties that are closest to the Dow site had "early actions" conducted in 2005 and 2006 to reduce the potential for the exposure of residents to contamination. These properties are scheduled to be subject to soil sampling and cleanup during 2013, the second year of the cleanup plan.
    - A Web site is being developed by Dow that will allow residents to see the areas that are scheduled for sampling and cleanup and to track progress on a neighborhood-by-neighborhood basis.

51. **How will communication and coordination with property owners work?**
    - The soil sampling and cleanup will be done through Dow and its contractor work force. Property owners will be contacted individually so that Dow can explain the soil sampling protocol and ask property owners to agree to allow access to conduct the soil sampling. Once soil sampling is complete, the results of laboratory testing of the soil samples will be communicated by Dow to property owners. If the laboratory test results show that the soil taken from the property has dioxin that is higher than the 250 ppt site-specific action level, Dow will discuss necessary cleanup actions with the property owner and request the property owner's consent for access to do that cleanup work.
    - Dow has established a Web site where residents can get information and ask questions. You can find the Web site at www.midlandresolution.com. In addition, Dow has opened the Midland Resolution Center office at 1008 Jefferson Avenue, Midland. Dow invites people who have questions to drop in at the Resolution Center during business hours or contact them by telephone at 989-638-7002 or toll free at 888-778-2306.
    - More information about the cleanup process and the Work Plan can be found at www.midlandresolution.com and www.michigan.gov/deqdioxin or by contacting Mr. Al Taylor, Office of Waste Management and Radiological Protection, DEQ, at 517-614-7335 or taylora@michigan.gov.

52. **How will property owners get the results from remediation design sampling that is done on their property? Will someone be available to explain the result?**
    Yes, the result of the remediation design sampling will be available in a report that will be mailed to the property owner by Dow approximately one month after the remediation design sampling is done. Dow will submit the remediation design sampling results to the DEQ at the same time that they are sent to the property owner. Dow will schedule meetings with the owner of any residential or residential-like property where laboratory tests indicate that there is more than 250 ppt of dioxin found in soil samples (higher than the site-specific action level) so that they can discuss cleanup activities with the property owner. The DEQ and Dow will be available to answer any questions the property owner has about the result of the remediation design sampling.

53. **I live in a home that I rent. Will Dow provide me with the remediation design sampling data and information about cleanup plans? Does my landlord have to have my permission to let Dow onto the property for sampling and/or cleanup?**
    Information about the results of the remediation design sampling will be provided to property owners, not tenants or other property occupants. It is the responsibility of the property owner to communicate with tenants and lessees about the soil sampling results and make sure that tenants and lessees know that they have given permission for Dow to do the sampling and/or cleanup work. The DEQ encourages property owners to share this important information with tenants and lessees. Since the terms of rental and lease agreements vary greatly, the DEQ cannot answer questions about whether your landlord needs your permission for work to be done. You should review your rental/lease agreement to determine whether the property owner must communicate with you about this issue.

    Renters, lessees, and others will be able to get general information about the cleanup process and schedule on the Web site that Dow has set up to provide the public with information about the progress of its work. The Web site is www.midlandresolution.com.

54. **Can I have the remediation design sampling or cleanup work done earlier than the schedule calls for? (e.g., I am in the process of selling my house.) What if I don't want to have the work done now? Can the work be done later? Will Dow pay for the work being done later?**
    - No, work will not be performed earlier than it is scheduled. In 2012, Dow has proposed to sample and clean up approximately 100 properties. Sampling of other properties will follow the sequence established in the schedule for soil sampling and cleanup. Soil sampling and cleanup activities will go neighborhood-by-neighborhood in a systematic fashion.
    - Soil sampling and any necessary cleanup work will only be conducted with express consent from the property owner. If the property owner chooses not to have work done when it is proposed, Dow will put money into a fund that will be available so that the work can be done at a later date at Dow's expense.

55. **Who is paying for the work?**
    Dow is required to conduct cleanup and restoration work at its expense. Property owners are not being asked to pay the cost of cleaning up or restoring properties that have been cleaned up as part of this project.

56. **Will local contractors be hired?**
    The DEQ understands that Dow intends to hire as many local contractors as possible to complete this work.

57. **What will owners be told about the results of soil samples taken from their property during remediation design sampling? Will the result just say whether the property is above or below the 250 ppt action level, or will we get results for each soil sample that was taken at different places in our yard?**
    Dow will give each property owner a single numerical result that provides the concentration of dioxin in soil on their property. Individual soil samples that are taken from locations around the property will be combined before they are analyzed, so there will only be one result for each property. The process of combining several samples from one property is called "compositing" or "incremental composite sampling." The compositing process gives a more representative picture of the soil on your property rather than analyzing the individual samples. If the initial composite sample is close to 250 ppt, then two additional composite samples will be analyzed, and the three results will be used to be 95 percent sure that the representative concentration is below the action level. The final result will be provided to the property owner.

58. **If my property is tested and it is well above the 250 ppt action level, is there a point where Dow would be required to purchase our property?**
    No. Michigan's environmental law does not require a liable party to purchase property that is affected by contamination that it caused. The cleanup of residential properties in the Resolution Area is designed to assure that residents will be safe. Dow has voluntarily decided to offer to purchase property that is currently being used for residential purposes but that is located in an area where commercial and industrial activities dominate the land use in order to facilitate redevelopment of that property in a way that is consistent with the surrounding land use. Note that if these properties are not purchased then they will be sampled and cleaned up, as necessary, in the same manner that other properties in the Resolution Area are being addressed.

59. **Will sampling be done in the future to confirm that the cleanup was complete and that my property has not become re-contaminated?**
The dioxin contamination being addressed by this program was caused by historical operations at Dow's Midland plant. The DEQ has determined that changes in Dow's operational practices have reduced the release of dioxins so that re-contamination resulting from Dow's regular operations is not a concern. Monitoring is done on an on-going basis to assure that no airborne dioxins are leaving the Dow Midland plant at levels that can contaminate off-site properties. As a result, continued testing of residential properties is not necessary. Testing would only be required in the future if there is a new and unexpected problem at Dow's Midland plant. Routine monitoring that is conducted under Dow's License will help us know if that occurs.

60. **If a land owner agrees to allow soil removal, can they decline to have the cleanup done in wooded areas on their property, even though they border another's property? In this example, neighborhood children play in the wooded area.**
- Yes, a property owner can decline to have sampling and/or cleanup done in wooded sections of his or her property. Cleanup work can only be done by Dow with the property owner's permission. Property owners should be aware that if design sampling shows that a property, or portion of a property, has dioxin concentrations that exceed 250 ppt, and then they will have "Due Care" obligations for that property, including the obligation to prevent unacceptable exposure for people who use their property. See Question #93 for additional information about Due Care obligations.
- Parents and caregivers who are concerned about exposure that may result from children playing on property that is not cleaned up should consider taking steps to minimize that exposure. This may include encouraging children not to play in these areas and/or taking other steps such as hand washing. Information about ways to minimize exposure can be found at: http://www.michigan.gov/documents/deq/deq-whm-hwp-dow-Reducing-Exposure-Home_251917_7.pdf.

61. **Will Dow be required to clean the interior of homes where design sampling shows that dioxin levels exceed the 250 ppt action level (e.g., carpets, walls, and heating ducts) as was done previously with houses and day cares close to the plant?**
Although interior cleaning was not included in the proposed Work Plan, Dow and the DEQ have further considered potential circumstances where the soil concentrations may be high enough to result in indoor dust concentrations that could pose unacceptable risk. In the approved Work Plan, a property-by-property evaluation will be conducted that considers the soil concentration prior to cleanup and how much of the property has clean soil. This information will be used to calculate if the indoor dust could result in unacceptable risk. If so, interior duct cleaning will be offered to the property owners.

62. **A few commenters were concerned that the cleanup process would increase exposure to dioxin by disturbing the contaminated soil. They wanted to know what steps will be taken to reduce the release of dioxin during the cleanup process.**
Dioxin is not volatile (i.e., it does not become a gas when exposed to air or disturbed by activities such as digging). Because dioxin remains tightly bound to the soil particles, with adequate control of dust and trackout, the excavation and disposal or safe reuse of soil will remove dioxin from the affected properties without creating exposure in other ways such as inhalation. Dow will be required, with DEQ oversight, to control dust, trackout, and other conditions that could redistribute contamination in the neighborhoods where work will be done.

Questions about the Cleanup Work and How It Will Affect Owners/Residents

63. **If my property needs to be cleaned up, will it be returned to the same or better condition?**
Yes. Dow has committed to restore all properties where it conducts a cleanup.

64. **Will I have to move out of my home during the work? Will Dow pay for me to move out of my home during the cleanup if I want to?**
No. Dow has told the DEQ that it intends to make this as easy as possible for all property owners and occupants so that no one will need to move out of their homes during the remediation design soil sampling and cleanup process.

65. **How long will it take to get my yard cleaned up once work begins?**
Dow has committed to work safely and quickly to complete the cleanup activities that need to occur and to return your property to its normal state. It is not possible to give a specific time period since the time required will depend on how extensive the cleanup and restoration work is, how large the property is, and so forth. However, soil sampling work can begin as early as April of each year except 2012, when sampling will begin after June 1. Any necessary cleanup will be completed during the same construction season (generally no later than October 15) that year. For example, a property that is sampled in 2012 and determined to need cleanup, will be cleaned up by October 15, 2012.

66. **What happens after the cleanup work is done?**
- Dow will provide follow-up care to assure that plants and grass get properly established.
- The DEQ will provide each property owner with follow-up correspondence that confirms that contamination related to Dow has been cleaned up and the property owner does not have additional obligations with respect to that contamination.

67. **When soil is removed, what will it be replaced with?**
Dow will place clean soil and plant grass in areas that are disturbed as part of the cleanup. Dow will also replace other vegetation including flowers and shrubs that are removed as part of this work.

68. **How do I know that the soil Dow is putting on my property is clean (uncontaminated)?**
The soil will be tested prior to use.

69. **A commenter stated that their yard's soil is much different than a block away – will soil replaced match organic matter level, percolation rate, pH, nutrients, etc.?**
Dow will be responsible for working directly with property owners to determine the details of how the work will be accomplished and what restoration work will be done at each property. A cleanup plan specific to each property will be developed and reviewed with the property owner. The replacement soil will be tested prior to use to demonstrate that it is not contaminated and that it has appropriate topsoil characteristics. Dow has committed to restore all properties to the same or better condition where it conducts cleanups.

70. **Where will replacement dirt come from?**
New topsoil and backfill will be imported from a location that is outside the area possibly impacted by releases from Dow. To ensure that backfill and topsoil are suitable for use,

they will be tested to make sure that both are uncontaminated and that the topsoil has appropriate soil characteristics to assure topsoil quality. The top four to six inches will be topsoil.

71. **Where will the contaminated soil go?**
Soil removed as part of cleanup activities will be taken to Dow's industrially-zoned Michigan Operations site and used as fill dirt, if possible. The soil that is used on Dow's property will be covered so that it does not erode. Soil not used on the Dow Michigan Operations site will be disposed of in the city of Midland landfill.

72. **If the License requires on- and off-site cleanup, how can contaminated soils removed from yards in the city be used for fill inside the plant (Dow being right along the river)? What happened to soil and dioxins during floods (regarding soil moved onto Dow property)?**
The soils on industrial properties can have higher concentrations without posing a risk to public health because exposures on those properties are different than at residential properties (e.g., children are not typically present; see also the answer to Question #111). As a result, the nonresidential direct contract criterion for dioxin is 990 ppt. Under Michigan law, it is permissible to relocate soils from the residential setting to an industrial setting where the exposure is different as long as the soil concentrations do not exceed the nonresidential criterion. The residential soils in Midland are much lower in concentration than many places on the Dow Midland plant site. These less contaminated soils will be used to cover much higher soil concentrations to decrease the exposure to the Dow plant workers and decrease the levels that may be eroding or emitted as fugitive dust. The soil would need to be placed on the plant site in a way that prevents runoff to the river, including during flooding events. In addition, Dow captures site groundwater and surface water (runoff) and treats it before discharge to the Tittabawassee River. In addition, Dow captures site groundwater and surface water (runoff) to treat it before discharge to the Tittabawassee River as part of the on-site corrective action program to contain plant site contamination.

73. **How close to my house and sidewalks will Dow be digging during the cleanup?**
Typically, digging will be at least one foot away from or angled away from existing structures or features so that they are protected. The cleanup plan for a particular property will depend on property-specific circumstances and will be reviewed with the property owner.

74. **Will Dow water the new lawns and plants to make sure they get established? What will be done if soil is being removed from a property where there is an in-ground sprinkler system already in place?**
Dow is committed to returning yards to their pre-cleanup condition, as much as possible. This may require irrigating grass and other vegetation. Dow will provide the equipment, materials, and labor to accomplish this task. Existing irrigation systems will be restored as part of this process.

75. **Who pays for watering the lawn and new plants after a cleanup?**
Dow will pay for watering the lawn and new plants that are replaced. The specific way(s) in which this will be done has not yet been determined. The cost of watering the lawn and new plants will be covered by Dow until vegetation is reestablished.

76. **Where can I park during this work?**
If work affects parking, Dow will make arrangements for parking and will inform the affected residents about where they can park.

77. **Will this work disrupt mail delivery, package delivery, water, electric, sewer, cable television, telephone, or other services at my property?**
Dow has committed to doing the work in a way that is minimally disruptive. Dow will contact MISS DIG before work begins in order to identify utilities that need to be protected. We do not expect that there will be an impact on services at your property.

78. **Do I have to have insurance to cover any injuries to workers or damage that could happen during the sampling and/or cleanup work?**
No, you do not need to have insurance in connection with the sampling and/or cleanup work. Dow will provide all necessary insurance to address injuries or damage caused by sampling and/or cleanup work.

79. **I have big flower garden in my yard. Will Dow replace all of my plants?**
Yes, if your property requires cleanup. A cleanup plan specific to each property will be developed and reviewed with the property owner. Dow will work to protect unique or ornamental features to the extent possible.

80. **I have a very large old tree in my yard – will it get destroyed? Will Dow replace my trees?**
Dow's Work Plan calls for conducting the work in a manner to preserve mature trees. A cleanup plan specific to each property will be developed and reviewed with the property owner. Dow will work to protect unique or ornamental features to the extent possible.

81. **Will Dow move fences as part of the cleanup?**
No. Typically, digging will stop at least one foot away from existing fences and similar structures to protect them from damage. The cleanup plan for a particular property will depend on property-specific circumstances and will be reviewed with the property owner. The small amount of contaminated soil that may be left adjacent to fences, porches, and other structures will not result in significant exposure to dioxin.

82. **Will Dow be digging under my porch/deck during the cleanup?**
No. It is unlikely that significant exposure will occur to soil that is under decks and/or porches, so it is not necessary to remove that soil. In the cases where decks are elevated to the degree that they reasonably allow for use of the ground beneath them, excavation will be completed to the extent necessary and practical. In some cases, new cover and/or a barrier may be placed to reduce contact to the existing soils.

83. **Is Dow going to excavate my paved or concrete driveway or sidewalk?**
No. Soil is generally removed before pavement or concrete is placed, so it is not necessary to tear up existing paved surfaces to remove the underlying soil.

84. **What if I have a gravel or unpaved driveway**?
If the property requires cleanup, unpaved driveways will be removed and replaced with similar material.

85. **How should home owners with pets manage their pets during the cleanup time (e.g., fenced yard and two dogs)? What can home owners do during excavation and while grass is being established?**
Residents with pets may need to take some precautions to protect their pets during the cleanup process. They will want to discuss these precautions with Dow and their contractors as part of the sampling and cleanup planning processes. Considerations may include walking pets on a leash or keeping pets inside the house or otherwise contained during sampling and cleanup activities. Dow is planning to reestablish lawns with sod, so this should allow residents and their pets to enjoy the use of their yards again as soon as possible.

86. **How will this work affect birds and wildlife that visit my yard?**
While the work will disturb the surface of your yard and some noise will be associated with the work, we expect that any effects on birds or wildlife will be temporary and that they will resume visiting your yard when the work is complete. If you know of a wildlife nest on your property, you can identify it to Dow when you discuss the cleanup plan. It is possible that the work can go on around the nest rather than destroying it, while still providing a cleanup that is protective.

87. **Will soil have to be removed if I have a crawlspace or "Michigan basement" with dirt walls and/or floors?**
No. The DEQ has determined that dioxin contamination is limited to the top 12 inches of soil on residential properties; therefore, it should not be necessary to remove soil from crawlspaces or "Michigan basements." The DEQ believes it is reasonable to conclude that contaminated soil was removed at the time the home was built and the crawlspace or basement was dug and has been protected from additional deposition by being covered by the house.

88. **My property is next door to a property where a cleanup is being performed**. **Will cleanup on that property contaminate my property? Is it safe for me to be there during work?**
Cleanup work will not contaminate other properties. Dow has expressed a commitment to doing all work as safely and as efficiently as possible to make this as easy as possible on all property owners, residents, and their neighbors. Property owners and other residents will not need to leave their homes while work is underway. The DEQ will periodically audit the work being conducted by Dow to ensure that the work is being performed in an appropriate manner.

89. **Will cleanup activities on nearby properties cause dust or run off of contamination that could contaminate my property if my property has already been cleaned up or did not need cleanup?**
No. Dow's Work Plan will require the work to be done in a way that minimizes dust, runoff, track out, and other things that could result in contaminated soil moving off properties where cleanup work is being done. Dow has done similar work in an area along the Tittabawassee River and demonstrated that these things can be effectively controlled.

90. **Will my property be protected from contamination that could result from dust, runoff, or trackout from nearby commercial properties in the Resolution Area that are not being cleaned up?**
Yes. The need for additional controls for nonresidential properties adjacent to residential areas will be evaluated on a case-by-case basis.

91. **What kind of equipment will be used to do the soil removal and replacement work at my home? Do I need to be concerned about diesel exhaust from this equipment?**
Dow has committed to doing this work in a way that results in minimum disruption for property owners and occupants. Small excavators and "bobcats" will be used to remove, replace, and grade soil, in addition to hand tools such as shovels and rakes. Dump trucks will be used to transport soil. While there will be some noise and exhaust from the equipment while work is ongoing, Dow has said it will do its best to minimize inconvenience and keep the time over which these disruptions occur to a minimum.
    - The DEQ has asked and Dow has agreed to use "green cleanup" practices including minimizing diesel exhaust emissions to the degree practical for this project.
    - The DEQ acknowledges the risks associated with diesel exhaust but believes that the limited exposure that will occur during the cleanup process is insignificant. The benefit of getting the dioxin removed greatly outweighs the short-term exposure to diesel exhaust. Anyone who is concerned because they have a special sensitivity to diesel exhaust should consider remaining indoors while work is done at their property.

Questions about Giving Access for Work to be Done, Property Restrictions, and Disclosing Information about Contamination or Cleanup

92. **If I give Dow access to my property to do the remediation design sampling does Dow automatically get access to do cleanup work?**
No. Dow will obtain access to private property for remediation design sampling separately from the access it requests for cleanup work. Giving Dow access for remediation design sampling does not commit you to allowing Dow to do cleanup work on your property. The DEQ encourages property owners to provide reasonable cooperation to Dow for the work that it will be doing.

93. **What happens if I do not grant consent for property access? Will I be forced by the government to have my yard cleaned up?**
No. Dow will only conduct dioxin cleanup work on property where the owner agrees to allow the work. If soil sampling shows that your property needs cleanup and you do not give Dow permission to do the cleanup, Dow will put money into a fund that will be available to do the cleanup work in the future. However, if the remediation design sampling data show that cleanup work is needed and you decline to allow Dow to do that work you will have other obligations concerning the dioxin found on your property. Those obligations include:

    - Disclosure about contamination: The state law that regulates contaminated property (known as Part 201) requires that you disclose information about the contamination to any person to whom you are transferring an interest in the property (e.g., if you are selling, renting, getting a mortgage).
    - "Due care" obligations: Part 201 requires that you not do anything that will make it more expensive or more difficult for Dow to clean up the contamination at a later date, or that will cause the contamination to migrate off your property. These restrictions are referred to as "preventing exacerbation." Part 201 also requires that you provide reasonable cooperation to someone who is conducting cleanup work and comply with and not impede any use restrictions that are put in place to address contamination.

You should be sure that you understand these responsibilities if you decide not to allow Dow to do the cleanup work.

94. **Will there be any restrictions on the use of my property after the cleanup is completed**?
No. Restrictions are not necessary once the contaminated soil is removed. In addition, your property will not be a "facility," a term used in the state law that governs cleanups to refer to property that is contaminated. These answers deal only with contamination that was related to releases from Dow. If your property has restrictions in place to deal with contamination from other sources, those restrictions will need to remain in place.

95. **Will there be any restrictions on my property if I do not allow access for sampling?**
- The DEQ encourages all property owners within the remediation area to participate in the sampling/remediation program.
- No restrictions will apply to your property if you do not have information indicating that your property is contaminated.
- Dow will retain an obligation to conduct investigation and any necessary remediation of your property related to any contamination it may have caused on your property.
- If you sell or otherwise transfer an interest in your property, and you are aware of environmental contamination on the property, you may be required by real estate laws to disclose that information and that Dow has a continuing obligation to investigate the conditions of your property to determine the need for a cleanup.

96. **How does the cleanup affect my property value?**
The DEQ cannot provide specific information about property values. However, it is reasonable to conclude that having cleanup work done will improve property values because it reduces/eliminates any uncertainty about whether the property is contaminated by Dow activities.

97. **If I allow sampling on my property and the results are above the 250 ppt site-specific action level, do I have to disclose that information if I sell the property before remediation is done?**
Yes. The state law that governs environmental cleanup (Part 201) requires that a person "who has knowledge that their property is a facility" must disclose information about the general nature and extent of contamination. If you have received information about soil sampling that shows dioxin concentrations in soil on your property are above the site-specific action level of 250 ppt, you must disclose that information to a prospective purchaser or other person to whom you are transferring an interest in your property, such as lessee or a mortgage lender.

98. **If I allow sampling on my property and the results are above 250 ppt, do I have to disclose that information if I sell the property after remediation is done?**
No. You may want to disclose that your property was part of the cleanup to resolve any questions that the buyer may have about potential contamination the property. However, if your property is cleaned up, it is no longer a "facility" and the disclosure requirements of Part 201 do not apply. You only have to make a disclosure if you know that your property is contaminated at the time you sell it or transfer an interest in it.

99. **Is my property a "facility" if it is in the remediation design sampling area but it has not been sampled?**

No, unless you have knowledge that your property is contaminated by a source other than Dow. The cleanup being done by Dow is required to address only the contamination that it caused. If you know that there is contamination on your property from another source, you must still take appropriate actions.

100. **Will I get a letter or some type of proof that my yard is no longer contaminated?**
Yes. The DEQ will provide you with a letter confirming that the cleanup has been done and that the property is not a "facility" as a result of contamination that was caused by Dow. If the remediation design sampling results indicate that no action is required, the DEQ will also provide you with a letter to that effect. The cleanup being done by Dow is required to address only the contamination that it caused. If you know that there is contamination on your property from another source, you must still take appropriate actions.

101. **If the results for my property are less than 250 ppt or I allow the cleanup to be done, will this be noted on the deed to my property?**
No. Nothing will be filed with your deed or property record as part of this process for properties that do not require soil cleanup or that are cleaned up. If the results of design sampling on your property show less than the 250 ppt action level, you will receive a letter from the DEQ that confirms that cleanup was not necessary and that your property is not contaminated. If cleanup is done on your property, you will receive a letter from the DEQ that confirms that dioxin contamination was removed.

102. **Will my decision to participate in the remediation design sampling and cleanup program affect my property taxes?**
Property taxes and tax assessments are local issues that are the responsibility of the city of Midland. Questions about property taxes on property in the city of Midland should be directed to the city.

103. **If I decline to participate in the cleanup program now and Dow puts money into the fund so that work can be done in the future, how will future owners know this is an option? Will there be a notice on the deed for my property to notify future owners?**
Dow will be required to have an ongoing program to monitor all properties where the owner declines to allow sampling and all properties where the 250 ppt action level is exceeded and the owner declines to allow cleanup work to be done at this time. Part of that monitoring will include reviewing property transaction records. If property records show that the property was sold, Dow will contact the new owner to explain the options for sampling and/or cleanup. Dow's Work Plan indicates "Properties where owners decline participation in the program, wooded areas with limited current use, and potentially some nonresidential properties will have the remedy deferred and funding placed into a Trust. These properties will be monitored for change in ownership and/or changes in use. If changes in ownership or use are identified the owners will be advised of options for cleanup. A Monitoring Plan for these properties will be submitted prior to completion of the project that will identify specific properties subject to monitoring and provide methods and details of monitoring, which may include a deed notice on the property." This proposal will be considered as part of the review process when it is submitted near the completion of the project.

Please note, however, that if the remediation design sampling data shows that cleanup work is needed and you decline to allow Dow to do that work you will have Due Care obligations concerning the dioxin found on your property. See Question #93 for additional

information about Due Care obligations. You should be sure that you understand these responsibilities if you decide not to allow Dow to do the cleanup work.

104. **If I agree to let Dow do sampling or cleanup work on my property, will that affect any legal claims or lawsuits that I may have against Dow? Will Dow require a release of claims in exchange for consent to do cleanup work?**
No. Dow has informed the DEQ that it will not require property owners to provide any release, or to give up any of their rights, as part of the process of granting access for sampling or cleanup.

Public Access to Information about Property in the Resolution Area

105. **Will the information about sampling results from my property, or my decision whether to allow cleanup work to be done if my property is eligible, be available to the public?**
Information about the remediation design sampling and cleanup work schedules will be posted on the Internet in a way that does not provide information about specific parcels. The schedule will be presented for neighborhoods and will not reveal which properties will be sampled or cleaned up. Dow will be required to document the work it has done in reports that it will submit to the DEQ. Those reports will contain property-specific information and will be subject to disclosure if a person makes a request to the DEQ under the Michigan Freedom of Information Act. Examples of information that would be disclosed, if requested, include the address of the property; the name and address of the person to whom the letter was sent; the results of the remediation design sampling; the general nature of the cleanup work that was done (if the property owner gives consent for cleanup); the fact that the property owner declined to have remediation design sampling and/or cleanup work done (if the property owner declined). The specific access forms and the property-specific cleanup plan that is signed by the property owner will not be included in materials submitted by Dow to the DEQ and will not be subject to disclosure through Freedom of Information Act requests.

Questions about DEQ Oversight

106. **What if Dow exits Midland (such as what happened when Velsicol left St. Louis)?**
Dow's corrective action obligations under state and federal law are ongoing, regardless of whether Dow has a continued presence in Midland. Dow, as a corporation, has to maintain their corrective action obligations for the Midland plant site. If Dow ceased to be viable and could not meet their corrective action obligations then the Midland plant site could become a Superfund site. However, under the Work Plan, a trust fund provides financial assurance to complete the work related to Midland soils in the event that Dow cannot meet its corrective action obligations.

107. **A Tittabawassee River property owner asked if residents are considered collateral damage and expendable in the eyes of the DEQ and EPA? What value do the agencies place on a human life?**
The DEQ and EPA are working within the state and federal laws that provide these agencies authority to require cleanup of contamination for the protection of human health. Starting in 2005, the DEQ required Dow to offer interim measures to minimize exposure to soils at properties presumed to have the contamination based on limited data until a final

cleanup was completed both in Midland and along the Tittabawassee River. Currently, the DEQ is requiring Dow to clean up residential properties in Midland to protect human health. The EPA has also required Dow to offer further early actions based on additional sampling data that showed where higher concentrations are on residential properties along the Tittabawassee River. These early actions by the EPA on residential properties started in 2008 and are ongoing in a prioritized manner. Higher concentration properties are being addressed earlier than those with lower concentrations of dioxin, to the extent possible.

Cleanup actions to address environmental contamination can take a long time, especially when the affected areas are large, such as the soils in Midland and the Tittabawassee River and its floodplain. It takes time to determine where the contamination is located and how best to clean it up. Since there are large areas impacted in Midland, the cleanup work will take several years and must be prioritized first for areas that are most likely to have the highest contamination. In addition, the EPA, in consultation with the DEQ, has approved a process to complete remediation by working in an upstream-to-downstream manner along the Tittabawassee River in order to minimize recontamination once an area is cleaned up.

108. **A Tittabawassee River property owner expressed puzzlement as to why they were receiving the public notice pertaining to Midland Area Soils when they are not directly affected.**
The commenter received a copy of the public notice pertaining to Midland Area Soils because their name is on the Dow facility mailing list maintained by the DEQ, Office of Waste Management and Radiological Protection. Individuals on the mailing list receive public notices pertaining to all licensing and corrective action matters. Anyone can be removed or added to the Dow facility mailing list by contacting Ms. Lindacarol Leiter at leiterl@michigan.gov or at 517-284-6562.

109. **A commenter stated that they believe this historic cleanup should be done once, and done right, so that this issue can finally be resolved for the community for a safe and protective cleanup.**
The DEQ agrees that this cleanup should be done once and done right, but should also not be delayed. If there is new information that requires a reevaluation of the work after it is completed, Dow will continue to have corrective action obligations under state and federal law.

Specific Questions Asked about Nonresidential Properties

110. **What is being done to address commercial and industrial properties in the Resolution Area?**
- Under state law there are different cleanup criteria for properties in nonresidential use (e.g., commercial and industrial) properties. The nonresidential soil direct contact criterion for dioxin is 990 ppt. Residential properties require a higher standard of cleanup than nonresidential properties due, in part, to residents' outdoor activity. For example, children may be present at residential or "residential like" properties (parks, schools, daycare centers, etc.) and there is generally more contact with soil from activities like gardening. In comparison, workers at nonresidential properties tend to have less contact with soil and may spend most of their time indoors.

- Current available data shows that no soil removal is necessary at commercial and industrial properties located in the Resolution Area. This will be verified with additional sampling that will be conducted in 2012.
- In areas where higher levels of contamination are expected or observed, Dow will be required to assess whether it is necessary to implement measures on commercial and industrial properties that are near residential properties in order to assure that contamination is not transported onto the residential properties through runoff, trackout, etc.

111. **With respect to the generic criterion of 990 ppt for nonresidential property, what does the term "generic" refer to? Is it specifically in reference to the generically acceptable levels of dioxin levels on commercial/industrial properties?**
Michigan has generic (i.e., statewide) cleanup levels for residential and nonresidential use. These cleanup levels are intended to be protective of individuals with reasonably high exposures for each of the land uses. The exposure includes small amounts of soil that are accidently swallowed during hand-to-mouth activities, soil stuck onto food items, and swallowing dust that gets into the nose, mouth, or throat, plus soil that comes in contact with skin. As an example of the assumptions that are made for nonresidential criteria, the exposure values include working at the same place for 21 years, soil exposure for 245 days per year for accidental swallowing, and 160 days per year for skin contact. Significant amounts of soil are assumed to stick to the skin (based on measurements that have been made of actual soil exposures experienced by construction/utility workers).

112. **During the public hearing, it was stated that the data shows that nonresidential property levels are all below the 990 ppt, which was then contradicted by a statement that there is "a small area near former railroad track" that requires additional evaluation because levels above the 990 ppt were identified. Have all property owners in those areas already been contacted? If a property owner has not been contacted, are they to assume that their property has been tested and the levels are below the 990 ppt? If the property has been tested, will the test results be shared with the property owner? If the property has not been tested, what level of assurance does Dow have that the actual levels are below 990 ppt?**
There are several sources of data that indicate that nonresidential property levels are likely to be below 990 ppt. Sampling conducted in 2006 (at many properties in the Resolution Area) included both residential and nonresidential properties in Midland where the property owners consented to the sampling. The maximum concentration from this sampling effort was a location with 950 ppt on Dow-owned property located due east of the plant. Sampling conducted in 2010 and 2011 in 12 areas around the northern and eastern boundaries of the plant, but on Dow-owned property in close proximity to the fence line, also demonstrated levels below 990 ppt. This was based on average concentrations per area with many sampling locations per area. To the DEQ's knowledge, there has not been any sampling on residential or nonresidential private property other than samples collected as part of the 2006 study mentioned above. Property owners included in the 2006 study were given an opportunity to receive the results for their property or block of properties.

There is an area on Dow-owned property south of Austin Road where levels were found that exceed the nonresidential cleanup criterion of 990 ppt. The chemical makeup of the dioxins found in that area has a different "fingerprint" that is an indication that the contamination there comes from a different source than the soil contamination in Midland. Dow will be required to do additional sampling along the railroad tracks north of Austin

Road and properties next to the tracks to determine the extent of contamination associated with this alternate source of contamination.

Additional sampling in nonresidential areas that are not in close proximity to residential areas will be necessary to determine the extent of contamination. This sampling will be used to confirm that nonresidential properties are below 990 ppt and to determine where institutional controls will be necessary to assure that the property will remain in industrial/commercial use.

113. **Could the DEQ more clearly define what is meant by "appropriate institutional controls" of nonresidential properties? Does "future residential use" equate to single family dwellings only? Will there be additional regulatory controls placed on these privately owned properties that will limit the types of business activities that can be conducted on the site?**
Different mechanisms can be used to reliably restrict the future land use so that residential or residential-like uses do not occur on property that is currently nonresidential unless additional evaluation (sampling and/or cleanup, as necessary) is done to assure that such a proposed use is safe. The most common form of this type of control is a restrictive covenant on the property deed. This type of restriction is under the direct control of the property owner. When a large number of properties need reliable restrictions, local ordinances, such as a zoning ordinance, could be considered. There are specific requirements related to enforceability and notification if local ordinances are used to achieve land use controls. The restriction would include any form of dwelling and any use that would have soil-related activities that could be similar to residential use (e.g., daycare centers). In some cases, where nonresidential property is in an area that is zoned to allow residential use, it could be addressed by the trust fund being set up by Dow for future sampling and cleanup, as necessary, when the land use changes to residential or residential-like.

114. **It was implied that there is only a requirement of disclosure IF the property owner has knowledge -- therefore, if the property owner has no knowledge of the actual dioxin/furan levels on their properties, they have no legal obligation to disclose. What impact are actions taken today going to have on the future transfer/sale of the properties in this area? What action(s) is Dow taking to assure nonresidential property owners within the Resolution Area that current and future environmental issues related to dioxins/furans will be Dow's responsibility?**
The DEQ cannot speculate about how these actions may affect future transfer or sale of properties in the area. The DEQ's focus is on providing people with information about the current requirements for disclosure. Dow will continue to have corrective action obligations for any contamination, including contamination of nonresidential properties, that is related to releases from Dow (past, current, or future) that require cleanup under state or federal law.

115. **A commenter noted that there was some discussion of the containment precautions that will be required for the process of removing the top 12 inches of contaminated soils in identified properties. How will those types of environmental concerns impact property owners in the area if in the future they need to apply for permit(s) to make renovations/maintenance that requires digging/concrete removal (e.g., replacement of an existing parking lot)? Who would be responsible for the additional costs? Or would this be covered by the "don't know, don't ask, don't tell" approach?**

If a property is cleaned up by Dow under the approved Work Plan or determined by design sampling not to require cleanup, there would not be any restrictions on future relocation of soil from that property. Keep in mind that property owners may still need to get permits that are unrelated to the presence of contamination (e.g., for digging in a wetland). If owners have nonresidential property in the Resolution Area with dioxin concentrations above 250 ppt, Michigan law imposes restrictions on the relocation of contaminated soil. Information about soil relocation restrictions is available at http://www.michigan.gov/documents/deq/deq-whm-hwp-dow-TR-Advisory-dioxin-Color-Final_251808_7.pdf. DEQ staff can also answer questions about those restrictions and how they will affect work done on such property. In general, soil can only be relocated on property that is similarly contaminated. Use restrictions and/or exposure barriers would be required at the new location. Deed restrictions or zoning ordinances that are developed as part of the overall remedial action in Midland will have to address the applicability of soil relocation restrictions. With respect to the issue of additional costs, a property owner has the right to recover from the liable party costs associated with contamination that is not caused by the property owner.

116. **A commenter noted that it was implied that the DEQ and Dow have determined, based on the nonresidential status of a site, that there are no human health safety issues related to dioxins/furans that a business and property owner need to be concerned about. Is it appropriate to share the informational materials (Health Questions and Reducing Exposure at Home) provided at the public hearing with employees working at a nonresidential property in the Resolution Area? Are any additional actions required or recommended?**
The informational materials that this commenter refers to would be appropriate for most worker situations related to dioxin contaminated soils. These materials have been used for communicating hazards for construction/utility activities in areas along the Tittabawassee River that exceed the nonresidential cleanup level. The DEQ encourages other business owners to be proactive in sharing this information with their employees.