

DETROIT AIR TOXICS INITIATIVE

FINAL GRANT REPORT

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Background

In October 2003, the Michigan Department of Environmental Quality (MDEQ), Air Quality Division (AQD), initiated the Detroit Air Toxics Initiative (DATI), a project focused on assessing and reducing risks from air toxics in the Detroit area. This project was funded by a grant award of \$100,000 from the U.S. Environmental Protection Agency's (EPA) Fiscal Year 2003 Community Assistance and Risk Reduction Initiative.

The Detroit Air Toxics Initiative included two components; one to assess the health risks from exposure to air toxics in the Detroit area, and the other to select and implement a project to help reduce identified risks.

The risk assessment phase of the project utilized air monitoring and emission inventory data that had been developed or collected from several past or ongoing initiatives in the area. This phase of the project focused on characterizing the risks from air toxics in the Detroit area, and identifying pollutants and sources of greatest concern. The information from the risk assessment phase also established a baseline that will be used to measure results of risk reduction activities and control measures implemented in the future.

The risk reduction phase of the project involved identifying and prioritizing risk reduction activities. The information from the risk assessment phase of the Detroit Air Toxics Initiative was used to help focus the list of possible risk reduction activities, and select a project for funding.

A stakeholder group consisting of representatives of community and environmental based groups, federal, state, and local government, industry, and academia provided assistance with the Detroit Air Toxics Initiative. The stakeholder group provided advice and feedback on the design and development of the technical risk assessment document, as well as a plain language summary prepared for the general public, and also helped facilitate communications regarding the project to the local community. The stakeholder group also helped identify and prioritize recommendations on funding potential risk reduction activities.

Risk Assessment Phase of Project

The risk assessment phase of the project was completed in November 2005. Data on over 200 chemicals were evaluated during this phase of the project, and from this list of chemicals, 15 were identified as contributing the most to risks in the Detroit area. These 15 compounds included the following: methylene chloride, naphthalene, benzene, acrylonitrile, formaldehyde, 1,4-dichlorobenzene, arsenic, carbon tetrachloride, 1,3-butadiene, acetaldehyde, cadmium, nickel, manganese, acrolein, and diesel particulate matter.

The details of the risk assessment methodologies and findings from this phase of the project are provided in the November 2005 document, "Detroit Air Toxics Initiative, Risk Assessment Report." In addition to this document, a technical summary of the risk assessment report was prepared, as well as a plain language summary for the general public. Since some parts of the

Detroit area include a large number of citizens that speak primarily Spanish or Arabic, translations into these languages were also done for the plain language summary.

All of the documents relating to the risk assessment phase of the project can be found on the MDEQ website at: <http://www.michigan.gov/deq/>. To get to the DATI documents, click on Air, then Air Toxics, followed by Detroit Air Toxics Initiative. Alternatively, the DATI risk assessments can be accessed directly at the following locations:

Risk Assessment Report

[http://www.michigan.gov/documents/DATI - COMPLETE FINAL REPORT 11-9-05 142053 7.pdf](http://www.michigan.gov/documents/DATI_COMPLETE_FINAL_REPORT_11-9-05_142053_7.pdf)

Technical Summary

[http://www.michigan.gov/documents/Technical Summary Final 11-9-05 142055 7.pdf](http://www.michigan.gov/documents/Technical_Summary_Final_11-9-05_142055_7.pdf)

Public Summary (English)

[http://www.michigan.gov/documents/Public Summary Final 11-9-05 142054 7.pdf](http://www.michigan.gov/documents/Public_Summary_Final_11-9-05_142054_7.pdf)

Public Summary (Spanish)

[http://www.michigan.gov/documents/deq/DATI spanish 215850 7.pdf](http://www.michigan.gov/documents/deq/DATI_spanish_215850_7.pdf)

Public Summary (Arabic)

[http://www.michigan.gov/documents/deq/DATI Arabic 215848 7.pdf](http://www.michigan.gov/documents/deq/DATI_Arabic_215848_7.pdf)

Risk Reduction Phase of Project

The goal of the risk reduction phase of the project was to reduce the risks from air toxics in the Detroit area by funding a specific project selected with the assistance of the DATI Stakeholder Group. The grant provided \$30,000 to be used for a risk reduction project.

Using the results of the risk assessment phase of the project, 10 air toxics were identified as a priority for focusing on risk reduction activities because these air toxics were associated with the highest risk. The criteria used in developing the top 10 air toxics included: 1) estimated risks greater than 10 in a million (1×10^{-6}) for pollutants that were carcinogenic, and 2) hazard quotients greater than one for non-cancer effects.

To help identify sources of priority pollutants, available emissions inventory data were evaluated, and a draft document prepared that summarized this information. Although this draft document entitled, "Volume II: Identifying Potential Sources of Risk and Hazard Risk Drivers for Risk Reduction Efforts," was not completed as a final document, the information was helpful in characterizing sources of priority pollutants. Appendix A includes a summary pie chart and table taken from that draft report for emissions inventory data from Wayne County. The pie chart shows that of the emissions for the original 15 compounds of concern identified from the DATI Risk Assessment Report, 79 percent were from mobile sources, 20 percent from area sources, and 1 percent from major sources. The table shows that for these 15 compounds, two were emitted primarily from major sources, six were emitted primarily from area sources, six were emitted primarily from mobile sources, and one was emitted about equally from major and area sources.

To begin the process of selecting a risk reduction project, an initial list of possible risk reduction activities was developed for consideration by the Stakeholder Group. This initial list of projects is provided in Appendix B. During discussions on the risk reduction projects, the Stakeholder Group indicated that since the results of the risk assessment showed that the risks from air toxics were greatest in the southwest Detroit area, it would be best to try and develop a project that would be focused on reducing risks in this area.

To get additional input from the southwest Detroit community on possible risk reduction projects, a meeting was held in the Delray area of Detroit on August 15, 2005. Representatives of Southwest Detroit Environmental Vision and People's Community Services helped organize and facilitate this meeting. At this meeting, community members expressed a significant amount of concern regarding the Detroit waste water treatment plant (WWTP) and its associated sewage sludge incinerator. Projects suggested from community members included monitoring air toxics around the WWTP and sewage sludge incinerator, targeting area sources in the Delray neighborhood for risk reduction, and hiring an individual to pursue additional sources of money such as grants, private sector funding, etc. to fund larger risk reduction projects in Detroit.

The three suggestions for projects from the community, along with a fourth one that was later added dealing with reduction of diesel emissions at a railroad switchyard were identified as priorities for develop detailed project proposals. After discussion with staff from EPA Region 5, however, the projects focused on monitoring around the Detroit WWTP and hiring an individual to pursue additional funding sources were determined to be inconsistent with the purpose identified in the grant work plan for this money. Therefore, these ideas were dropped from further consideration. Two ideas, targeting area sources and locomotive diesel emissions were selected to develop final project proposals. The project proposals developed included the following: 1) Compliance assistance and education/outreach for gasoline distribution and auto body shops in southwest Detroit to achieve reductions in the air emissions of DATI compounds of potential concern, and 2) Reducing locomotive diesel emissions at railroad switchyards. These project proposals are included in Appendix C.

The final project selected focused on reduction of locomotive diesel emissions at a railroad switchyard. The original project proposal was to retrofit a switchyard locomotive that operates in the southwest Detroit area with idle reduction technology. However, at that same time work was ongoing to select the DATI risk reduction project, development of a supplemental environmental project for a major enforcement case involving retrofitting most all of the switchyard locomotives in the Detroit area with idle reduction technology was also underway. To avoid any duplication of efforts, the DATI risk reduction proposal was modified from installation of idle reduction technology to the installation of horsepower reduction technology on a switchyard locomotive. The detailed proposal for this project is included as Appendix D.

CSX Transportation was selected to install the horsepower reduction technology on one of their switchyard locomotives that operates at switchyards that are part of the Conrail Shared Assets in the Detroit area. These switchyards include primarily the Dearborn, Livernois and River Rouge Yards.

Installation of the horsepower reduction technology occurred at the end of September 2006, and the locomotive began operating in the Detroit area in October 2006. In mid-December 2006, CSX replaced this locomotive with another that was also equipped with similar horsepower reduction equipment, and operated it in the Detroit area until May 2007. Operation of these retrofitted locomotives for this period of time resulted in an estimated reduction of 0.08 tons of diesel particulate matter and 2.19 tons of nitrogen oxides. Since the time the retrofitted

locomotives operated in the Detroit area (67 percent of the year) fell short of the goal of 80 percent of the year, CSX committed to an additional year of operation with the 80 percent goal and a follow up report on emission reduction achievements.

Stakeholder Group

The DATI Stakeholder Group was an essential component of the project. Participants on the Stakeholder Group included representatives of community and environmental based groups, federal, state, and local government, industry, and academia. A complete listing of members of the Stakeholder Group is found in Appendix E.

The first meeting of the Stakeholder Group was on February 3, 2004. The Stakeholder Group met periodically for approximately two years to provide assistance on the risk assessment and risk reduction phases of the DATI project. In addition to face to face meetings, the Stakeholder Group also held conference calls, and communicated on issues through e-mail.

Throughout the process, the Stakeholder Group provided valuable feedback and comments on many issues including development and design of the risk assessment study protocol, review of draft versions of the Risk Assessment Report, Technical Summary, and Public Summary; development of a list of possible risk reduction projects, prioritization of the risk reduction projects, and selection of the risk reduction project to receive funding. The assistance of the Stakeholder Group was essential in developing and implementing the objectives of the grant in a manner that best met the needs of the community.

Follow Up and Further Efforts to Address Air Toxics

The findings of the DATI Risk Assessment Report resulted in additional issues for follow up and further efforts to address air toxics that went beyond the resources provided by the grant funding. These included additional efforts related to air toxics monitoring, risk assessment, and risk reduction activities.

Because of the high risk levels associated with measured levels of methylene chloride at Allen Park, and naphthalene and benzene at South Delray during 2001–2002, the AQD initiated follow up monitoring in these areas. The AQD also conducted investigations in the areas and evaluated available data to try and identify possible sources of these pollutants. Follow-up monitoring for methylene chloride at Allen Park during 2002–2003 and in 2005 showed the levels of this pollutant had decreased significantly since the 2001-2002 time period. Monitoring for benzene and naphthalene in 2005 also showed that these two pollutants had decreased significantly since the earlier time period. The reduction of benzene and naphthalene was attributed to the shutdown of a coal tar processing facility in the area. No sources of the high levels of methylene chloride were identified in the Allen Park area.

Manganese was one of the pollutants identified as a priority for risk reduction based on the results of the DATI Risk Assessment Report. Monitored levels of manganese at four sites in the Detroit area were 1.5 to 5.5 times greater than the chronic health benchmark value for this pollutant. As a result of this finding, the MDEQ included an initiative in its FY07 Strategic Plan to address environmental impacts of manganese in southeast Michigan. One of the objectives of this initiative is to analyze and reduce, where possible, emissions of manganese from existing sources. An internal workgroup has been established to develop recommendations to achieve this objective. Work is currently ongoing for this project.

While the DATI risk reduction project funded through this grant targeted reduction of diesel particulate matter from a switchyard locomotive, additional efforts are needed to further reduce this pollutant in the Detroit area, as well as the rest of Michigan. The AQD has been pursuing various initiatives to reduce diesel emissions such as partnering with other organizations to retrofit school buses with diesel oxidation catalysts through the Clean School Bus program, seeking diesel emissions reductions through supplemental environmental projects for enforcement cases, and pursuing use of Congestion Mitigation Air Quality funding for diesel emission reduction projects. The AQD will continue to work on these efforts and pursue partnerships with other organizations with goal of reducing diesel emissions in Michigan.

During the process of working on the DATI project, the Stakeholder Group recognized that the funds of \$30,000 provided by the grant for a risk reduction project was not adequate to address all concerns with air toxics in the Detroit area. The Stakeholder Group recommended that the AQD pursue development of an overall strategy that would focus on reduction of the 15 air toxics identified from the Risk Assessment Report as contributing the most to potential health risks. The initiatives related to manganese and diesel particulate matter discussed above are consistent with this recommendation. As resources allow, further efforts toward a more comprehensive strategy will be pursued.

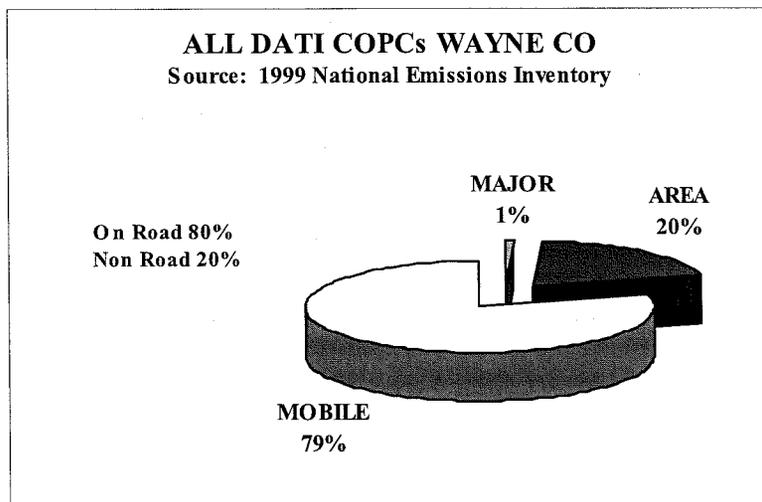
The DATI Risk Assessment Report provided a baseline measurement for monitored levels of air toxics in the Detroit area and associated health risks for the time period of 2001 – 2002. This baseline can be used to measure results of risk reduction activities and control measures implemented after this timeframe. The AQD recently received approval for a grant proposal through EPA's FY07 Community-Scale Air Toxics Ambient Monitoring funds. This data analysis grant will include among other things an updated risk assessment of air toxics in the Detroit area to allow a comparison of changes that have occurred over the past five years.

Conclusion

The AQD successfully completed the objectives of the grant commitment and associated work plan for the Detroit Air Toxics Initiative. As a result of this project, the risks from air toxics in the Detroit area were characterized and the findings provided in several documents including a detailed risk assessment report, as well as technical and plain language summary documents. A risk reduction project targeting diesel emissions from a switchyard locomotive operating in the Detroit area was selected and successfully implemented, resulting in estimated reductions of 0.08 tons per year of diesel particulate matter and 2.19 tons per year of nitrogen oxides for the first year of operation. Additional emission reductions are expected in the second year of operation. In follow up to work for this grant, the AQD is also continuing efforts to further address air toxics in the Detroit area.

**APPENDIX A:
SOURCES OF DATI COMPOUNDS OF POTENTIAL CONCERN (COPC)
IN WAYNE COUNTY**

The following chart and table were taken from the June 24, 2005 draft document, "Detroit Air Toxics Initiative. Volume II: Identifying Potential Sources of Risk and Hazard Risk Drivers for Risk Reduction Efforts":



DATI COPCs Grouped by Source for Wayne County Emissions		
Major Source	Area Source	Mobile Source
Acrylonitrile Arsenic Compounds* Manganese Compounds	1,4-Dichlorobenzene Arsenic Compounds* Cadmium Compounds Carbon Tetrachloride Methylene Chloride Naphthalene Nickel Compounds	1,3-Butadiene Acetaldehyde Acrolein Benzene Diesel Particulate Matter Formaldehyde

*Arsenic Emissions are split fairly evenly between major and area sources.

Source: NATA 99 National Emissions Inventory

**APPENDIX B:
INITIAL LIST OF POTENTIAL RISK REDUCTION ACTIVITIES**

**DRAFT
Detroit Air Toxics Initiative
Potential Risk Reduction Projects
June 24, 2005**

Hire contractor to perform environmental audits at facilities emitting large amounts of manganese, and provide recommendations on emission reduction possibilities.

Establish health risk goals for the compounds of concern identified from the DATI Risk Assessment Report. With a stakeholder group, develop a plan for meeting goals over a specified period of time, and work with local businesses, sources, government, etc. to achieve goals.

Promote energy efficiency/conservation programs or initiatives. Fund incentives for participation in these programs.

Hire contractor to seek out additional funding sources for air toxics risk reduction projects, such as finding grant opportunities and writing proposals, or recruiting private sponsors.

Fund diesel retrofits for diesel powered vehicles or equipment such as buses, trucks, and off-road equipment. Possible options include fully funding the retrofits or trying to find those owner/operators who would be willing to match the funding, so a greater number of vehicles or equipment could be retrofitted.

Hire contractor to work with owners and operators of diesel powered trucks, buses, and off road equipment to encourage them to voluntarily retrofit their vehicles with emission controls. This could include such things as organizing and holding conference or meeting with targeted audience, preparing and distributing educational materials, and media campaigns.

Gas can exchange program. Provide low emission gas cans in exchange for old gas cans.

Provide funding to owners/operators of diesel powered vehicles or equipment to pay cost differential between price of regular diesel fuel and biodiesel fuel.

Pursue anti-idling rules with contractor assistance.

Hire contractor to promote voluntary anti-idling programs or policies.

Fund idle reduction initiatives (e.g. truck stop electrification).

Hire contractor to promote car pooling, van pooling, and other commuter related options such as public transportation, flex hours, work at home options, etc. Promote the "Best Workplace for Commuters" program (www.bwc.gov). Provide funding for incentives for these programs.

Provide funding for cost differential to purchase alternative fuel vehicles.

Work with city planners, MDOT, SEMCOG, and others to improve in-city traffic management and traffic flow.

Pursue legislation/regulations for a diesel truck inspection program, similar to that in Connecticut. Connecticut has established a program to test diesel trucks along the roadside. The opacity test program measures diesel smoke. Most commercial motor vehicles over 26,000 pounds gross vehicle weight are subject to this testing, which is performed randomly in conjunction with safety or weight inspections. Operators of vehicles that do not meet the smoke opacity standards are subject to fines and are required to get the vehicle repaired.

Additional Studies/Information to Help with Future Risk Reduction Activities

Fund contractor to perform work to identify source of elevated levels of acrylonitrile at North Delray site.

Pursue regulations to require reporting of air toxic emissions or promote voluntary reporting to MAERS.

**APPENDIX C:
RISK REDUCTION PROPOSALS FOR FURTHER CONSIDERATION**

PROPOSAL #1: TARGETING AREA SOURCES IN SOUTHWEST DETROIT
February 22, 2006

PROPOSAL #2: RAILROAD SWITCHYARD DIESEL EMISSION REDUCTIONS
February 17, 2006

**DATI RISK REDUCTION PROJECT PROPOSAL #1:
TARGETING AREA SOURCES IN SOUTHWEST DETROIT
February 22, 2006**

TITLE

Compliance Assistance and Education / Outreach for Gasoline Distribution and Auto Body Shops in Southwest Detroit to Achieve Reductions in the Air Emissions of DATI Compounds of Potential Concern

FUNDING AND LEVEL OF EFFORT

Funding: approximately \$25,000 (the remaining funding from the USEPA's fiscal year 2003 Community Assistance and Risk Reduction Initiative grant)

Duration: the final deadline is September 30, 2006

BACKGROUND

The Detroit Air Toxics Initiative (DATI) is a project initiated by the Michigan Department of Environmental Quality (MDEQ), Air Quality Division (AQD), and funded through the USEPA's fiscal year 2003 Community Assistance and Risk Reduction Initiative. The risk assessment phase of this project has been recently completed. The information from that phase of the project is available in three documents, including a Risk Assessment Report, Technical Summary, and a Public Summary. Additionally, the "DATI Volume II: Source Identification of Compounds of Potential Concern" ("DATI II") has been drafted. That document summarizes available emission inventory data for the compounds of concern identified through the risk assessment phase of the DATI project. The DATI Stakeholder Group has assisted the MDEQ in the generation of these documents. Guided by the findings of the DATI project, MDEQ and the Stakeholder Group (and additional interested community members) have discussed ideas and prioritization viewpoints for potential mitigation of air toxics concerns in the Detroit area.

Area sources (gas stations, dry cleaners, auto body shops, etc.) can be sources of air emissions of the DATI compounds of potential concern (COPCs). There is no emissions inventory for individual area sources. However, the MDEQ-AQD (2005) DATI II report found that at the Wayne County-wide level, area source emissions were estimated to predominate the total emissions for several of the DATI COPCs. Regulated source categories of facilities which meet the USEPA criteria for *major* sources (10 tons/year of air emissions of any HAP, or 25 tons/year of air emissions of total HAPs) are subject to regulations under Section 112 of the CAAA, including NESHAPS (MACT standards) and residual risk assessment. New and modified air pollution emission sources are subject to regulation under the MDEQ-AQD's air toxics rules, unless they are exempt based on the process type or the low emission rate criteria. The air toxics rules entail the requirement for the best available control technology, and risk assessment, for ambient air impacts of toxic air contaminants (TACs). Existing area sources which do not meet the EPA criteria for major sources, and which are not subject to the MDEQ-AQD air toxics rules, can nevertheless contribute to "hot spots" in communities. EPA has included 70 area source categories in the air toxics source category list. EPA had developed control technology standards for 15 of those, and is under court ordered deadlines for another five. For the remaining 50, it is unclear when EPA may develop control technology standards. It is unknown if the standards will result in health protective emission reductions for individual facilities or for their cumulative impacts on air quality in the Detroit area.

The community group, Southwest Detroit Environmental Vision (SDEV), has recently identified area sources in the Delray area of Southwest Detroit, including some initial information on the substances potentially emitted based on general source category emissions information from the NEI. This is useful in suggesting what source category(s) or specific sources to focus upon. They identified 49 facilities and possible COPCs emitted, as follows:

- Gas stations (n=8; benzene)
- Auto repair and metal processing (n=26; acrylonitrile, methylene chloride, cadmium, manganese, nickel)
- Petroleum-related (n=1; benzene)
- Miscellaneous manufacturing (n=9; cadmium, manganese, nickel)
- Miscellaneous (n=7; no COPCs specified)

The MDEQ has developed education / outreach and compliance assistance materials for several types of sources, providing information on reducing air emissions. Those include:

- Stage 1 vapor recovery at gas stations (available late March, 2006)
- Auto body shops
- Dry cleaners
- Wood furniture manufacturing
- Solvent degreasing
- Lithographic printing

The MDEQ has made these materials available, and in some cases conducted workshops to help disseminate the information to attendees. However, the effectiveness may be substantially improved if further efforts were made to approach facility owners and operators and present the information. Follow-up contact can determine if operations were modified and emissions were likely reduced. In some cases, the operational changes are based on regulatory requirements (e.g., Stage 1 gasoline vapor recovery). In other cases, the guidance includes best management practices and pollution prevention techniques that go beyond what is required by regulations (e.g., auto body shops).

Gasoline Stage 1 Vapor Recovery Requirements:

Gasoline vapor and benzene (a gasoline constituent and a DATI COPC) are carcinogenic by inhalation. Effective on January 1, 1983, vapor control systems must be in place for gasoline tanker trucks and gasoline stations in Detroit and other major metropolitan areas in Michigan (Natural Resources and Environmental Protection Act, Part 55, Rule 336.1601). Despite that requirement, MDEQ is concerned that such systems are not fully present and operational.

At gasoline stations, vapor recovery is required during the loading of gasoline from tanker trucks to gasoline station storage tanks ("Stage 1"). During loading of the storage tanks, the vapors from the tanks are transferred to the tanker truck rather than escaping through the vent pipe. The tanker truck returns the vapors to the terminal where they can be recovered as gasoline. For an average tanker load of 10,000 gallons, vapor recovery captures about 10 gallons of gasoline during unloading.

Compliance assistance has been recognized by MDEQ as an important step in addressing noncompliance, in conjunction with compliance inspections by MDEQ Staff. The MDEQ Environmental Assistance Center is developing a brochure on vapor recovery requirements, targeting gasoline station owners and gasoline tanker truck drivers. The brochure is designed

to help them understand the Stage 1 requirements, and it includes self-inspection checklists. MDEQ Staff will soon finalize and promote the guidance at a planned Expo for gasoline station operators in late March 2006. This compliance assistance effort may have a much greater effect if followed by education / outreach to help improve the understanding of the regulations and utilization of the brochure.

Auto Body Shops:

The autobody compliance assistance self-audit workbook and checklist targets facilities that perform collision repair, painting, paint stripping or sanding, body work, and antique restoration that are not required to obtain a Permit to Install from MDEQ-AQD (under Rule 287(c)). The Rule 287(c) permit-to-install exemption applies to certain surface coating operations with low potential for VOC emissions to air (e.g., they must use less than 200 gallons/month of paints and solvents and meet certain other criteria). These facilities may be required to apply for other use permits under other programs. There are approximately 800 licensed auto body shops in Detroit. Although single facilities may meet the exemption criteria, these sources may singly or collectively contribute to VOC emissions that have the potential to adversely affect human health and/or the environment at the local level. The compliance assistance materials developed by DEQ for this sector have been widely distributed, but there are no requirements to submit self-audit information to the Department. It is currently not known how effective these materials have been in achieving reductions in air emissions.

DESCRIPTION OF PROJECT

The work involved in this project would be to target the gasoline stations and their supplying tanker trucks, and auto body shops in the Delray Community in Southwest Detroit (and potentially a broader area as funding allows) to pursue emission reduction strategies for these sources. A contractor, using available and appropriate materials developed by DEQ or other sources, will assist businesses and identify ways to reduce emissions. This work will include site visits to all subject area sources in the targeted geographic area. The contractor will share relevant information and provide follow-up to gauge the effectiveness of the outreach. For Stage 1 vapor recovery, this effort can utilize the brochure which is currently under development. For the auto body sector, there can be a much broader range of activities, materials used, and COPCs emitted, therefore the effort will be more site-specific. The auto body shop emissions will be qualitatively evaluated to the extent practicable based on site-by-site evaluations of actual operations, processes, product use, and throughputs. This aspect of the project will also include identification of existing guidance for controlling or reducing the emissions of COPCs. Control options for auto body shops could include installing control equipment, upgrading or maintaining existing control equipment, changing products or work practices, pollution prevention steps, etc. Such efforts should be focused upon those area sources which emit one or more of the targeted COPCs.

The MDEQ would provide oversight to a contractor to perform these activities. The MDEQ would also provide available relevant information that will assist them in this project. The contractor would disseminate the appropriate guidance to the targeted area sources and provide technical expertise in the application of emission reduction alternatives, with a particular focus on the DATI COPCs. The effort would require interaction with facility owners / operators to obtain needed information and to provide applicable and useful guidance. MDEQ staff would need to participate, to exercise their authority to help obtain information from sources as needed. The contractor shall coordinate with existing and ongoing MDEQ initiatives which provide information on emission reduction options and ideas for specific facilities and operations.

The contractor shall perform follow-up contact with facility owners / operators to determine if activities or equipment were modified and if particular COPC emissions were likely reduced. The success of the project will be measured by documenting a list of the facilities contacted, their activities associated with COPC air emissions, the information provided to them, and their subsequent actions (if any) to utilize the information and reduce emissions.

DATI RISK REDUCTION PROJECT PROPOSAL #2
RAILROAD SWITCHYARD DIESEL EMISSION REDUCTIONS
February 17, 2006

TITLE

Reducing locomotive diesel emissions at railroad switchyards.

FUNDING AND LEVEL OF EFFORT

Funding: Approximately \$25,000 (the remaining funding from the USEPA's fiscal year 2003 Community Assistance and Risk Reduction Initiative grant)

Duration: the final deadline is September 30, 2006.

BACKGROUND

The Detroit Air Toxics Initiative (DATI) is a project initiated by the Michigan Department of Environmental Quality (MDEQ), Air Quality Division (AQD), and funded through the USEPA's fiscal year 2003 Community Assistance and Risk Reduction Initiative. The risk assessment phase of this project has been recently completed. The information from that phase of the project is available in three documents, including a Risk Assessment Report, Technical Summary, and a Public Summary. Additionally, the "DATI Volume II: Source Identification of Compounds of Potential Concern" ("DATI II") has been drafted. That document summarizes available emission inventory data for the compounds of concern identified through the risk assessment phase of the DATI project. The DATI Stakeholder Group has assisted the MDEQ in the generation of these documents. Guided by the findings of the DATI project, MDEQ and the Stakeholder Group (and additional interested community members) have discussed ideas and prioritization viewpoints for potential mitigation of air toxics concerns in the Detroit area.

The DATI Risk Assessment Report found that diesel emissions may be a significant cancer risk driver in the Detroit area, although a relatively high degree of uncertainty is associated with attempts to quantify the levels of diesel emissions (diesel particulate matter) and the associated cancer risk levels. Diesel emissions also pose a hazard of respiratory irritancy and can aggravate asthma conditions and trigger asthma attacks.

Diesel emissions include gaseous components and fine particulate matter. The MDEQ operates an air pollution monitoring station in Dearborn, located on property immediately north of the Salina School. This monitor has recorded unusually high levels of fine particulate matter (PM_{2.5}) on a consistent basis. The specific contributions and sources have not been determined. However, a local and potentially significant contributor is the CSX railroad switchyard, at 2001 Industrial Street, Dearborn. This is located a few hundred feet west of the Dearborn monitor. This switchyard includes 29 tracks. Train activity includes locomotives which are "yard" locomotives (a.k.a. "switchyard" locomotives) and "road" locomotives (a.k.a. "freight" locomotives). The former include six locomotives which operate continuously, each having a single diesel engine burning approximately 200 gallons/day. The "road" locomotives each have two diesel engines; there may be six to ten coming into the switchyard each day. These engines are kept running while the train's boxcars are disassembled and reassembled. All of these activities occur 24 hrs/day, 7 days/week. Figures 1-3 show the areas west, southwest, and south of the Dearborn monitor, respectively. Besides the CSX railroad

switchyard, there are others operated by Norfolk/Southern (19400 Prospect, Melvindale) and Conrail (2975 Livernois, Detroit, and 1575 Coolidge, River Rouge).

The Southeast Michigan Ozone Study (SEMOS) Workgroup is attempting to address the high PM2.5 levels in SE Michigan. They have noted that the diesel engines operating at the CSX switchyard may be significant contributors to the unusually high PM2.5 levels at the Dearborn monitor. It is unclear at this time if the SEMOS Workgroup intends to pursue quantitative estimates of the CSX switchyard's diesel PM emissions and impacts at the Dearborn monitor, but some collaboration may be possible.

DESCRIPTION OF PROJECT

This project will focus on reducing diesel emissions by reducing idling of diesel locomotive engines at a switchyard in Detroit.

Idle reduction technologies are available and have been used on locomotives at switchyards in other parts of the country. These technologies generally include automatic shut-down start up systems and auxiliary engines. The auxiliary engine operates in place of the main engine when idling is necessary due to weather conditions, keeping the engine warm in cold weather and powering locomotive cab heaters. Lower emissions result from shutting down the main engine and operating a smaller efficient engine to do the same job. An automatic shut-down/start up system can also be installed on locomotive engines so the shut down of the main engine does not depend on an operator, but occurs automatically under appropriately set conditions.

In addition to reducing diesel emissions, idle reduction technology also reduces fuel consumption which provides a cost savings to the railroad company.

The estimated cost for an auxiliary engine is around \$30,000 and about \$7,000 for an automatic shut-down/start up system. Installing both on a locomotive engine would cost about \$40,000.

Two examples of idle reduction projects for switchyard locomotives include the following:

- *Vancouver, WA Switchyard Locomotive Idle Reduction Project*
(http://www.swcleanair.org/pdf/EPA_LocomotiveCaseStudy.pdf).
- *Case Study: Chicago Locomotive Idle Reduction Project (EPA420-R-04-003)*
(<http://www.epa.gov/SmartwayLogistics/documents/420r04003.pdf>)

In the Vancouver project, three switchyard locomotive engines were retrofitted with idle reduction equipment for a total cost of \$122,500. Benefits of the project included significant fuel savings, reduced idling hours, and a reduction of 9 tons per year of NOx and PM combined.

For this project, AQD will contact the railroad companies with switchyards in the Detroit area to determine interest in participating in a diesel emission reduction project. Selection of the railroad company and switchyard for the project will consider interest, switchyard location, any current or planned idle reduction activities, and matching funding support. Grant funding will be used to purchase idle reduction equipment. In selecting the railroad switchyard for the project, significant weight will be given to any matching funding provided as the available grant money does not appear adequate to purchase both an auxiliary engine and automatic shut-down start up system.

Success of the project will be measured by estimating the number of idling hours reduced and reductions in emissions. Emission reductions will be estimated using available EPA guidance and emission factors for switchyard locomotive idling.

Figure 1: View to the west of the Dearborn AQD monitor. In the foreground to the right is an automotive shop. In the middle distance is the CSX railroad switchyard. More distant is the Severstal Steel facility (blast furnaces are in the middle of this view) and, to the right, the Ford Rouge plant. (Photo taken 4/23/04.)

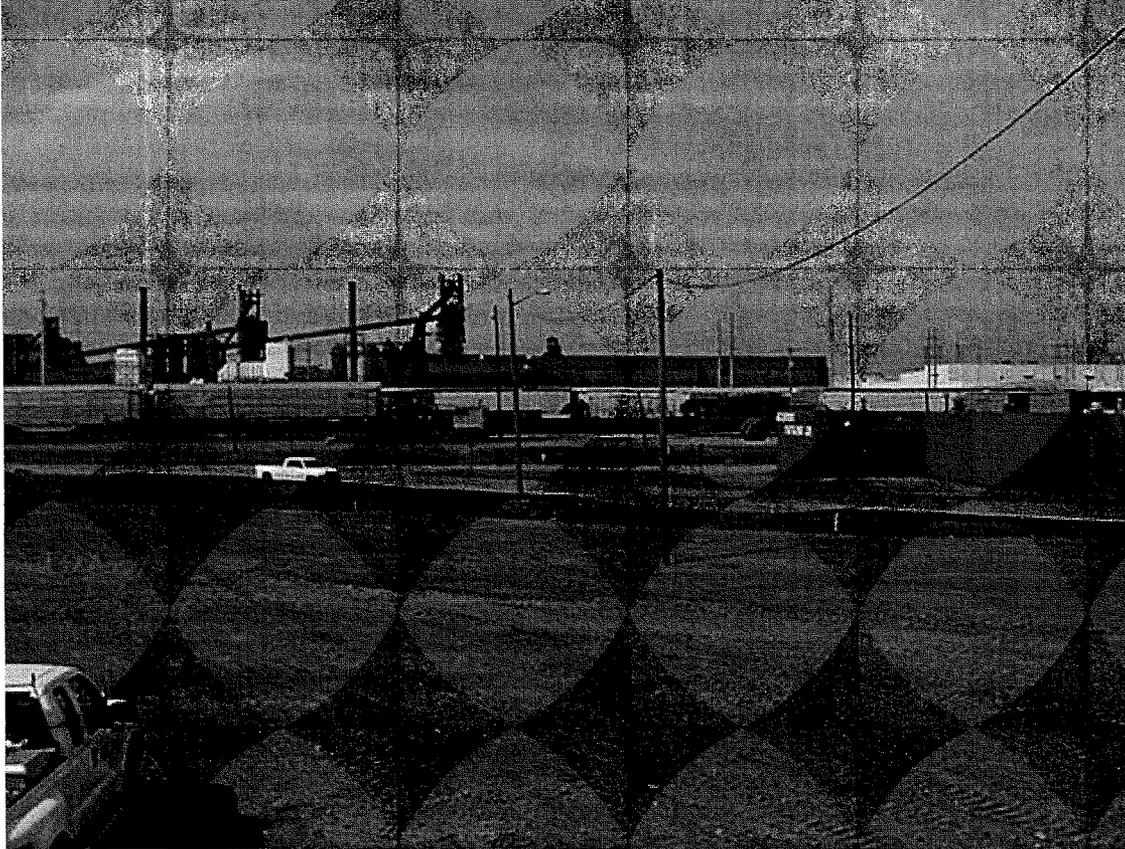


Figure 2: View to the SW of the Dearborn monitor. In the foreground is Wyoming Street. In the middle distance is the railroad switching yard. In the background is the Severstal Steel facility. (Photo taken in 2001.)

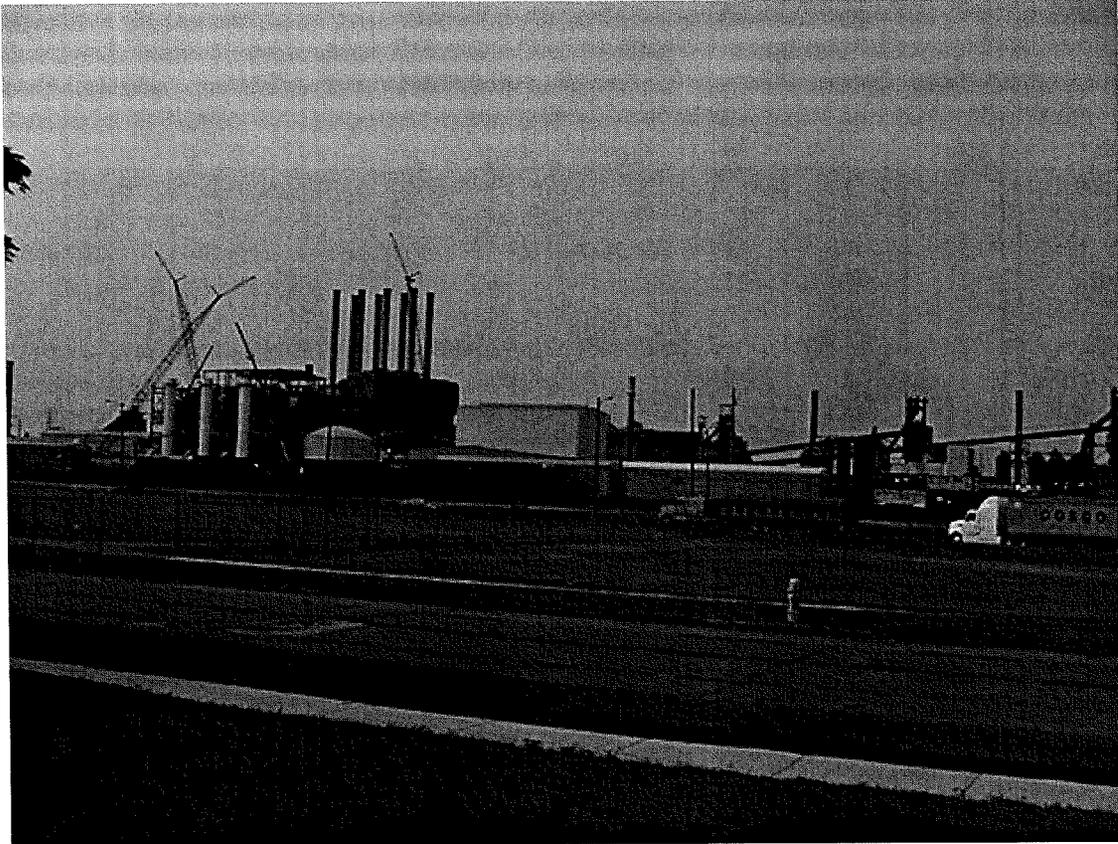
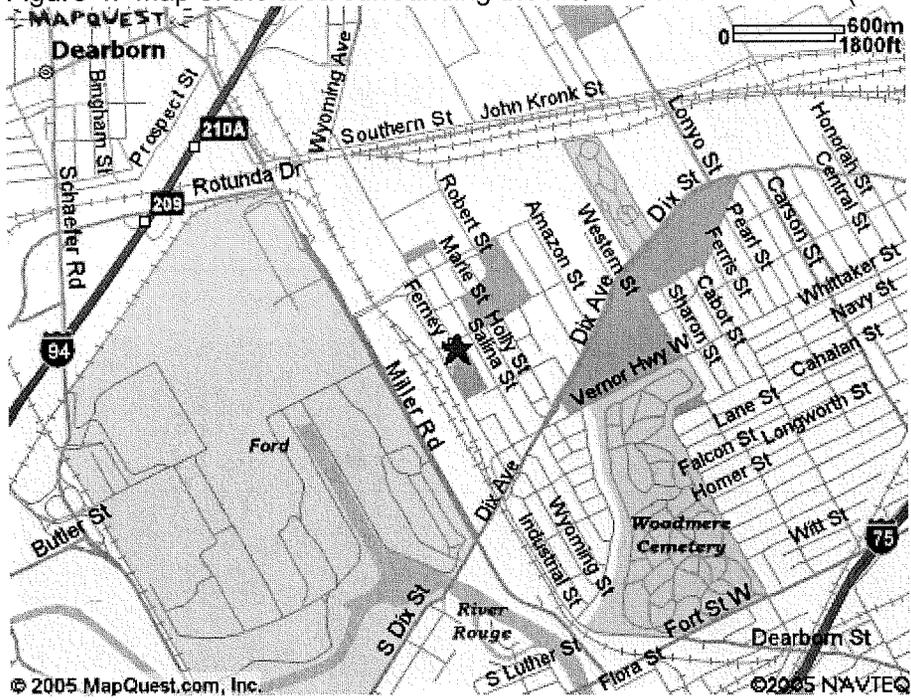


Figure 3: View from the AQD Dearborn monitor to the south, showing the Salina School's two buildings. (Photo taken 4/23/04.)



Figure 4: Map of the area surrounding the AQD Dearborn monitor (at center).



APPENDIX D

Railroad Switchyard Diesel Emissions Reduction Project – Installation of Locomotive Horsepower Reduction Technology September 20, 2006

Purpose

The purpose of this grant is to provide funding to CSX Railroad to purchase and install equipment to reduce the horsepower (HP) of a switchyard locomotive engine from 3000 HP to approximately 2200 HP. This reduction in horsepower will result in reduced diesel emissions and reduced exposure and health risks from these emissions. This grant is being awarded to complete the risk reduction phase of the Detroit Air Toxics Initiative (DATI). The DATI is a project that has been funded by a grant awarded to the Michigan Department of Environmental Quality (MDEQ) from the US Environmental Protection Agency's Fiscal Year 2003 Community Assistance and Risk Reduction Initiative.

Project Description

This project will focus on reducing diesel emissions from a switchyard locomotive engine in the Detroit area. Railroad companies sometimes utilize older freight locomotives to operate in their switchyards, where the horsepower of the engine exceeds what is required for the work. The use of this higher horsepower engine results in excessive diesel fuel consumption and emissions. Diesel emission reductions for this project will be accomplished by retrofitting a switchyard locomotive with equipment to reduce the horsepower (HP) of the engine from 3000 HP to approximately 2200 HP. The money provided for this project will fund the purchase of the necessary equipment and labor cost to install the equipment.

The switchyard locomotive to be retrofitted operates at switchyards that are part of the Conrail Shared Assets in the Detroit area. These switchyards include primarily the Dearborn, Livernois, and River Rouge Yards.

Emission estimates of particulate matter (PM) and nitrogen oxides (NOx) will be provided for the selected switchyard locomotive, including estimates prior to and after installation of the horsepower reduction technology. This information will demonstrate the emission reductions achieved from application of the horsepower reduction technology.

Workplan and Schedule

CSX will identify to MDEQ the switchyard locomotive to be retrofitted by a mutually agreed upon date. This will include the locomotive number and/or other appropriate identifying information.

CSX will provide MDEQ the estimated emissions of particulate matter and NOx for 1) baseline before application of the horsepower reduction technology, and 2) after application of the technology. This information shall be provided by a mutually agreed upon date and include the methodology for estimating emissions.

CSX will purchase and install the horsepower reduction technology by September 30, 2006. CSX will provide MDEQ appropriate proof of purchase for the equipment.

CSX agrees to operate the retrofitted locomotive in the Detroit area for at least one year after installation of the horsepower reduction technology. During this year the retrofitted locomotive will operate in the Detroit area for at least 80% of its operational time.

CSX will provide MDEQ with a report by November 30, 2007 that provides the following information:

- Actual time the locomotive operated in the Detroit area for the one year period following installation of the horsepower reduction technology.
- Estimated PM and NOx emission rates and reductions for this one year period, based on actual time operating in the Detroit area.
- Any problems CSX encountered with the horsepower reduction equipment during the one-year period following installation of the equipment, and resolution of the problems.

Budget

A total of \$23,500 is provided for purchase of the horsepower reduction equipment and labor costs for installation. These costs include the following:

- Equipment Costs: \$17,500
- Labor Costs: \$6,000

APPENDIX E
DETROIT AIR TOXICS INITIATIVE STAKEHOLDER GROUP

Community/Environmental Group Representatives

Katherine Edgren, Community Action Against Asthma, University of Michigan, School of Public Health
Jeff Gearhart, Ecology Center
Lisa Goldstein, Southwest Detroit Environmental Vision
Dana Guyet, People's Community Services
Kathryn Savoie, Arab Community Center for Economic and Social Services (ACCESS)
Donele Wilkins, Detroiters Working for Environmental Justice

Government Representatives

Joyce Hargrove, Detroit Dept. of Health and Wellness Promotion
Chuck Hersey (and Elena Berg), Southeast Michigan Council of Governments
Jaime Julian, U.S. Environmental Protection Agency (USEPA) Region 5
Josephine Powell, Director, Wayne Co. Dept. of Environment
Olga Savic, Chief of Staff for Steve Tobocman, State Representative
Smita Srivastava, City of Detroit, Dept. of Environmental Affairs

Industry and Municipal Facility Representatives

Vimala Anishetty, Ford Motor Co.
Jeff Bruestle, Marathon Ashland Petroleum
Alan Greenberg (representing Detroit Regional Chamber), Horizon Environmental
Karen Kavanaugh, SW Detroit Business Association
Louise Lieberman, Detroit Water and Sewerage Dept. (DWSD)-
Mike Rodenberg, DTE Energy
Del Rector (representing DWSD), NTH Consultants, Ltd.
Jim Volanski, U.S. Steel Corp., Great Lakes Works
Don Windeler, Severstal North America

Academia Representative

Dr. Peter Warner, Wayne State University, Dept. of Occupational and Environmental Science

MDEQ, AQD Representatives

Catherine Simon, Robert Sills, Mike Depa, Margaret Sadoff, Anne Kim, Mary Ann Heindorf,
Ann Chevalier, John Lamb, Mina McLemore