Draft
Air Quality Analysis Protocol

Detroit River International Crossing

Environmental Impact Statement

May 31, 2007

1. Introduction

Under the National Environmental Policy Act (NEPA), federal agencies are required to identify and describe the potential impacts to the human and natural environments as a result of their action(s), including those to air quality. This paper describes the air quality analysis that will be performed for the Detroit River International Crossing Study (DRIC) Environmental Impact Statement (EIS).

The DRIC Study is a bi-national effort to identify solutions that support the regional, state, provincial and national economies, while addressing civil and national defense and homeland security needs of the busiest trade corridor between the United State and Canada. The Practical Alternatives all call for a new bridge between Windsor, Ontario and the Delray community of Detroit, Michigan.

2. Analysis Elements

This Air Quality Protocol provides a framework for interagency consultation to define the elements of the Air Quality Technical Report that will be developed to support the DRIC Environmental Impact Statement. The technical report will cover:

1. An introduction that explains recent steps to improve air quality and past and future trend data;
2. A comparative analysis of the air quality effects of the Practical Alternatives in the DEIS, consistent with the National Environmental Policy Act;
3. Information on Mobile Source Air Toxics (MSATs);
4. For the DEIS information on the region's attainment status with respect to air quality standards, and for the FEIS analyses that show project conformity to the Clean Air Act. Conformity analysis will cover:
   - > General conformity (if applicable); and,
   - > Transportation conformity. Project-level conformity determinations must meet several criteria (see 40 CFR 93.109(b)), including:
     - ✓ Regional analysis for ozone, carbon monoxide (CO), and particulate matter ($PM_{2.5}$ and PM_{10}) [1] as demonstrated by coming from currently conforming transportation plan and TIP; and,
     - ✓ Hotspot conformity:
       - CO (quantitative)
       - $PM_{2.5}$ (qualitative)
       - PM_{10} (qualitative)
5. Construction impacts.

These topics are expanded upon in the following sections.

[1] $PM_{2.5}$ refers to particulate matter that is 2.5 micrometers or smaller in size. Sources of $PM_{2.5}$ include fuel combustion from automobiles, power plants, wood burning, industrial processes, and diesel-powered vehicles such as buses and trucks. These fine particles are also formed in the atmosphere when gases such as sulfur dioxide, nitrogen oxides, and volatile organic compounds (all of which are also products of fuel combustion) are transformed in the air by chemical reactions. Fine particles are of concern because they are so small they are able to penetrate to the deepest parts of the lungs, where the body has difficulty expelling them. PM_{10} refers to particulate matter that is up to 10 micrometers in size and includes roadway dust.

3. Introduction and Background

This section will provide a brief primer on the Clean Air Act and the National Ambient Air Quality Standards (NAAQS, also referred to as the Standards). It will include recent measures by the U.S. Environmental Protection Agency (EPA) to improve air quality and show general trends nationally and at selected local monitors. Additional trend information will be provided in the sections on Mobile Source Air Toxics (MSATs) and hotspot analysis. The introduction will also point out that the proposed project will not generate more cross-border traffic (and air pollution) than the No Action Alternative until such time as existing cross-border capacity is reached without the project. Up to the date when existing capacity is exceeded, a new bridge would simply divert traffic. After that date, the capacity of a new crossing will allow the total amount of cross border traffic to increase, compared to the no action condition.

4. Practical Alternatives Comparison

The analysis of the Practical Alternatives to be presented in the DRIC DEIS will rely on a comparison of vehicle miles and hours of travel, as these relate to air quality emissions. The Practical Alternatives provide an alternative path to cross the border between the U.S. and Canada, and, therefore, shorten the travel distance and time paths for some drivers. The Practical Alternatives may be expected to serve travel patterns with different effectiveness, although in comparison to the range of the Illustrative Alternatives, they are relatively narrow in their regional variation. All practical alternatives "land" in Delray, a sub-area of Southwest Detroit bounded by Zug Island and the Ambassador Bridge, and I-75 and the Detroit River (Figure 1). The differences in travel time and distance will be reported as the basis of comparison among alternatives, to the extent that the travel demand model reveals them. Data will be available for both autos and trucks. Analysis will examine peak and off-peak data for a base condition (2004), year of opening (2013), and horizon year (2035). Base year conditions (2004) do not include the Ambassador Bridge Gateway project that will reconfigure the traffic patterns there by 2009 and greatly reduce some localized congestion. The Gateway project will be included in the 2013 and 2035 no action and build analyses. (It is noted that the 2013 data will be derived from 2015 model runs.)

5. Mobile Source Air Toxics

The Mobile Source Air Toxics (MSATs) presentation in the EIS will follow the February 3, 2006 Federal Highway Administration (FHWA) "Interim Guidance on Air Toxic Analysis in NEPA Documents," and any updates thereto. There will be a discussion of what MSATs are and actions EPA has taken to reduce them through cleaner fuels and engines. National trend data and other information from Appendix C of the February 3, 2006 Guidance will be presented for the priority MSATs.

Consistent with the Guidance, the DRIC work will involve a quantitative analysis to differentiate alternatives. A pollutant burden analysis will be performed for the No Action and Practical Alternatives for 2004, 2013, and 2035 (again, the 2013 data will be derived from 2015 model runs). The year of opening (2013) will represent the year of highest project emissions. EPA's measures to control fuels and engines are substantially reducing emissions over time, even as vehicle miles of travel increase, because the proportion of "cleaner" vehicles on the road is increasing. As 2013 is the earliest year of project operation, it represents the year of highest emissions.

The analyses will segregate bridge/plaza emissions from those of the I-75 connector-link and will separate the emissions of cars and trucks.

The EIS will document pertinent air quality reports/information developed by others, such as the Detroit Exposure and Aerosol Research Study (DEARS) analysis and the Detroit Air Toxics Initiative (DATI) Risk Assessment Report.

6. Project Conformity to the Clean Air Act

The EPA has set National Ambient Air Quality Standards to protect public health and welfare. The Standards are used as the basis for determining an area's air quality designation (i.e., status as "attainment" or "nonattainment"). A nonattainment area is one that does not meet a particular standard in the NAAQS. So, an area may be classified nonattainment for one or more pollutants and attainment for others. A nonattainment area is reclassified as attainment when it achieves the standard and EPA approves a maintenance plan for that pollutant. Such areas are given a "maintenance" designation, requiring them to demonstrate continued compliance with a specific standard.

The Air Quality Technical Report and DEIS will present the Standards in tabular form and discuss the attainment status of the area with respect to each pollutant and specific standard within the NAAQS.

While the DEIS will cover the attainment status of the area for NAAQS pollutants and conformity needs, conclusions related to conformity will be included only in the FEIS, once a Preferred Alterative is recommended. A conformity determination takes several forms when applying the Clean Air Act. EPA has promulgated two sets of regulations to implement the conformity requirements of the Clean Air Act: 1) Transportation Conformity Regulations, which apply to highways and mass transit and establish the criteria and procedures for determining whether transportation plans, programs, and projects funded under title 23 U.S.C. or the Federal Transit Act conform with the State Implementation Plan (58 FR 62188); and, 2) the General Conformity Regulations, which apply to other Federal projects.

6.1 General Conformity

For General Conformity, *de minimis* (threshold) emission levels for fine particle pollution ($PM_{2.5}$ and PM_{10}) have been set to determine when General Conformity requirements apply (40 CFR 93.153). The DRIC is a transportation project; therefore, it is logical that transportation conformity applies. But, DRIC is unique in that it has a plaza. There, trucks will idle as they queue for toll payment and customs inspection - both primary and, potentially, secondary. Therefore, plaza activity will be examined in terms of General Conformity to determine whether *de minimis* levels of 100 tons a year are exceeded for $PM_{2.5}$ or PM_{10}. This analysis must take into consideration that the activity on a new DRIC plaza results in a corresponding reduction in activity that would otherwise occur on the nearby Ambassador Bridge plaza.

Because of the scale of the DRIC project, the *de minimis* threshold will also be applied to construction activities to determine whether PM_{10} dust levels exceed 100 tons in any construction year.

6.2 Transportation Conformity

This subsection describes how transportation plan and TIP conformity and hotspot analysis will be addressed in the Air Quality Technical Report to support a project-level conformity determination.

6.2.1 Transportation Plan and TIP Conformity Analysis

The Clean Air Act requires each state to have a *State Implementation Plan* (SIP) to demonstrate how it will attain and/or maintain federal air quality standards. SEMCOG, the Southeast Michigan Council of Governments, collaborates with the Air Quality Division of the Michigan Department of Environmental Quality (DEQ) on the work needed to prepare and/or update a SIP. SEMCOG is responsible for mobile source (transportation) emissions in Southeast Michigan. SEMCOG's *2030 Regional Transportation Plan* (RTP) and TIP must undergo a quantitative analysis demonstrating that emissions levels associated with implementing planned transportation projects are below designated emissions level limits (budgets) set forth in the SIP. In so doing, SEMCOG is managing and facilitating the transportation air quality conformity process in Southeast Michigan. The DRIC project is subject to air quality transportation conformity review

through SEMCOG's inclusion of any DRIC Preferred Alternative roadway improvements in its RTP.

Air quality conformity analyses for mobile sources in Southeast Michigan currently involve: ozone precursors (volatile organic compounds and nitrogen oxides), carbon monoxide (CO), and $PM_{2.5}$ (and its precursor nitrogen oxide). SEMCOG's review of the DRIC proposed project will occur after a Preferred Alternative has been identified. The project must be come from a currently conforming plan and TIP before a Record of Decision can be issued. The consultant team will provide information to SEMCOG to be processed in SEMCOG's model.

A portion of Detroit that includes the proposed new DRIC project bridge and plaza is a maintenance area for PM_{10}. In the maintenance plan, SEMCOG, MDEQ and EPA concluded that mobile source PM_{10} emissions are not a significant contributor to regional PM_{10} emissions, and SEMCOG is not required to consider PM_{10} in its regional conformity analyses. However, because no similar determination was made with respect to whether mobile source PM_{10} emissions contributed to localized hotspot problems, a PM_{10} hotspot analysis is required, as discussed below.

6.2.2 **Hotspot Analysis – CO, $PM_{2.5}$ and PM_{10}**

Hotspot conformity analysis is designed to evaluate whether there are air quality impacts on a smaller scale than an entire nonattainment or maintenance area. It relates a project to the Standards on a more localized basis. Conformity to the purpose of the SIP means that transportation activities will not cause new air quality violations, worsen existing violations, or delay timely attainment of the Standards. The carbon monoxide (CO) analysis is done on a quantitative basis, to determine whether estimated project concentrations of CO exceed the established one-hour and/or eight-hour standards. If they do not, the project conforms. Hotspot conformity for $PM_{2.5}$ and PM_{10} is done on a qualitative basis until appropriate methods and modeling guidance are available for quantitative analysis.

6.2.2.1 CO Hotspot Analysis

Carbon monoxide is a colorless, odorless, poisonous gas produced by incomplete combustion. Advances in engine design have substantially reduced CO emissions in recent years. Traffic information for each alternative is combined with information about roadway geometry and traffic flow conditions to determine the concentrations of CO at sensitive receptors, i.e., hotspots. Sensitive receptors are locations where humans might be expected to be present. This analysis is done with a computer program called CAL3QHC. This program requires emission factors for various types of vehicles operating under various speeds and conditions (such as ambient temperature and fuel type), expressed in grams per mile. These emission factors are generated using the U.S. EPA-approved model, MOBILE6.2. Input parameters to the MOBILE6.2 model, such as the vehicle fleet mix and age, are drawn from SEMCOG, which develops those data in consultation with EPA and the Michigan Department of Environmental Quality (MDEQ).

DRIC CO analysis locations will include points at the perimeter of the plaza and along the north side of I-75 where ramps from the plaza connect to I-75 and people are present near the hotspot. The north side of I-75 (unlike the south side) is predominantly residential. Also included will be intersections expected to be at Level of Service (LOS) D or worse. CAL3QHC modeling receptors will be located per EPA guidance. While there is little local congestion, the changes

proposed at interchanges might shift traffic in such a way that the LOS could locally decline. An extensive traffic microsimulation model – VISSIM – will be used to detect such changes.

6.2.2.2 $PM_{2.5}$ Hotspot Analysis

This subsection addresses the change in the air quality regulatory background resulting from the publication of the "Final Rule for $PM_{2.5}$ and PM_{10} Hotspot Analyses in Project-Level Transportation Conformity Determinations," which appeared in the March 10, 2006, *Federal Register*. Subsequent to the publication of the Final Rule, EPA and FHWA jointly issued "Transportation Conformity Guidance for Qualitative Hotspot Analysis in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas," March 29, 2006.

The $PM_{2.5}$ air quality analysis will use Method B as outlined in the March 2006 Joint Guidance. The analysis will begin with a description of the background conditions (current and future) without the proposed project, followed by an analysis of change introduced by the proposed project. The future analysis years will be the year of peak emissions, 2013, and the horizon year of SEMCOG's RTP. The analysis will rely on air quality studies and data from available sources, as identified through the interagency consultation process. Some elements of the analysis will be area-wide and general in nature; other elements will be site specific.

In order to demonstrate conformity to the purpose of the SIP, the analysis must show in a qualitative manner that the proposed project will not cause new air quality violations, worsen existing violations, or delay timely attainment. The analysis and resulting conclusions will be reviewed through the interagency consultation process.

The qualitative $PM_{2.5}$ hotspot analysis in the Air Quality Technical Report will cover:

- Project Description
- Method Chosen (B)
- Emissions Considered ($PM_{2.5}$)
- Background No Action Conditions – base (2004) and future (2013 and RTP horizon year)
- Project Conditions – future (2013 and RTP horizon year)
- Documentation of Public Involvement
- Mitigation (if needed)
- Conclusions

The elements are described in greater detail below.

<u>Project Description and Method Chosen</u>

The Practical Alternatives will be described in the DEIS and the Preferred Alternative will be described in the FEIS. The technical report that documents each will include introductory paragraphs that summarize the $PM_{2.5}$ attainment status, and the use of Method B of the new guidance as the means of the qualitative analysis. Local areas of housing and one high school are present in the area and will be located for easy reference on a graphic with reference to the project.

No Action Conditions - Base (2004) and Future (2013 and RTP Horizon Year)

Conditions without the proposed project will be described. References will be made, as appropriate, to sections of the EIS that cover traffic, land use and the cumulative impacts of non-project actions. Conditions in Canada will be covered, insofar as these relate to indirect and cumulative impacts covered under transboundary impacts.[2] The noted EIS sections will address development trends in the Delray area and the traffic expected to result. The Air Quality Technical Report will also describe meteorology, including seasonal conditions, as it influences air quality.

Materials and studies on regional air quality will be summarized, including information from MDEQ, EPA, and SEMCOG. SEMCOG's input to Michigan's SIP has placed emphasis on a document entitled "Weight of Evidence for Southeast Michigan $PM_{2.5}$ Attainment Strategy" (WOE). This is a working document that is regularly updated as additional information becomes available. It draws from other documentation and ongoing analyses. It explores the subjects of inventories, monitoring and modeling. In particular, it notes recent actions related to $PM_{2.5,}$ such as:

- A Consent Order issued by the Michigan Department of Environmental Quality to Severstal North America, Inc. that operates steel production facilities just to the west of the Dearborn air quality monitor that has registered the highest $PM_{2.5}$ levels in the state. This order will result in significantly lower $PM_{2.5}$ levels from this industry.
- A Consent Decree entered into by EPA with Marathon Oil Company, which will substantially reduce nitrogen oxides and sulfur dioxide emissions at their Detroit refinery southwest of the DRIC project area.
- Improvements planned at US Steel south of Zug Island.

The WOE references work by the Lake Michigan Air Directors Consortium (LADCO), which issued two reports on March 31, 2006, "Midwest Urban Organics Study: Lessons Learned" and "Integration of Results for the Upper Midwest Urban Organics Study." These and other relevant studies will be reviewed for information related to meteorology (including prevailing winds), the pollutant contributions of mobile and non-mobile sources, and their spatial distributions.

Monitoring data that reflect pollutant type by sources (mobile vs. non-mobile) will be presented, to the extent possible. Information will be presented from pertinent air quality reports by others, such as the Detroit Exposure and Aerosol Research Study (DEARS) analysis and the Detroit Air Toxics Initiative (DATI) Risk Assessment Report, as appropriate.

Project Conditions - Future (2013 and RTP Horizon Year)

Future traffic changes, especially diesel traffic, will be described with graphics and tables. The qualitative hotspot analysis will examine: 1) the proposed new bridge over the Detroit River together with the plaza; and, 2) intersections at I-75 interchanges that experience diversions of traffic from the project that push them to a Level of Service (LOS) of D or worse. It is important to consider that splitting traffic between the project and the Ambassador Bridge splits the $PM_{2.5}$ as well. The proposed project will not generate more cross-border traffic than the No Action Alternative until existing cross-border capacity is reached without the project. Up to the date

[2] Transboundary impact analysis is required by the Council for Environmental Quality as stated in "Guidance on NEPA Analysis for Transboundary Impacts," July 1 1997.

when existing capacity is exceeded, a new bridge would simply divert traffic. After that date, the capacity of a new crossing will allow the total amount of cross border traffic to increase, compared to the no action condition. With that in mind, the qualitative hotspot analysis for particulates will compare overall project VMT and VHT and the change with a new crossing.

Bridge/Plaza – Travel is designed to be free flow across the Detroit River on the proposed new crossing and then from the plaza to I-75. There will be delay at the plaza; so one focus of the hotspot analysis will be at toll collection and U.S. Customs inspection booths.

Intersections - There is little traffic in Delray, and almost no congestion. The exceptions are Fort Street, along the north edge of Delray, and Clark Street, on Delray's east side, where all heavy truck traffic entering the U.S. by way of the Ambassador Bridge now accesses the U.S. freeway system. That congestion will be eliminated by the Ambassador Bridge Gateway Project, which by 2009 will provide direct ramp connections to the interstate system. The Gateway Project will eliminate roadway congestion on Fort and Clark streets in Delray.

The DRIC project will likely close some streets that cross over I-75, and interchanges will be closed or reconfigured. These actions will shift traffic and could cause service level reductions to LOS D or worse. The traffic micro-simulation analysis will reveal any such intersections/hotspots.

Documentation of Public Involvement

There has been and will continue to be extensive public involvement, and it will be documented in the EIS. Air quality has been a recurrent topic at public meetings. References will be made in the hotspot analysis to the relevant EIS section that chronicles the public involvement efforts, especially as they relate to air quality issues. This section will also report on interagency consultation efforts.

Mitigation

Mitigation will be addressed in the FEIS, if it is determined that mitigation is required.

Conclusions

A concluding section of the $PM_{2.5}$ hotspot analysis will document how the requirements of the rules on project-level transportation conformity are met (see 40 CFR 93.109(b)). Project conditions will be compared to conditions without the project on a qualitative basis. There will be a conclusion related to the likelihood of the project contributing to a $PM_{2.5}$ violation of daily or annual standards. The analysis and conclusions will be subject to interagency consultation.

6.2.2.3 PM_{10} Hotspot Analysis

The PM_{10} hotspot analysis will be substantially the same as the $PM_{2.5}$ hotspot analysis. The major difference relates to roadway dust, which consistent with the Guidance must be considered in all PM_{10} hotspot analyses. Roadway dust is not in a SEMCOG inventory for PM_{10} emissions. The re-entrained dust will be discussed in terms of the vehicle miles of travel.

The PM_{10} hotspot analysis will address construction. However, in accordance with 93.123(c)(5), emissions from construction-related activities can be considered temporary, if they occur only

during the construction phase and last five years or less at any individual site. This is expected to be the case. Temporary emissions are not required to be included in hot-spot analyses.

7. Construction

The document will address the duration and nature of construction, which will represent a series of projects spread over time – interchange ramps, plaza, and bridge. (Note the plaza will be constructed incrementally. Not all the booths will be developed initially.) An example of construction sequencing will be displayed graphically.

MDOT's Standard Construction Specification Sections 107.15(A) and 107.19 will apply to control fugitive dust during construction and cleaning of haul roads.

References

MDEQ. 2006. "2005 Annual Air Quality Report". Air Quality Division.

U.S. EPA. 2006. "Transportation Conformity Guidance for Qualitative Hot-spot Analysis in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas," EPA-410-B-06-902. March 2006.

FHWA. 2006. "Interim Guidance on Air Toxic Analysis in NEPA Documents." February 3, 2006.

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