

Quality Assurance/Quality Control (QA/QC)  
Analysis for  
Lake Michigan Air Directors Consortium (LADCO)  
Midwestern Tribal Counties Non-Road Mobile, On-  
Road Mobile and Area Sources Data

FINAL – 9/23/2004

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## **I) EXECUTIVE SUMMARY**

This report describes the steps taken by the Institute for Tribal Environmental Professionals (ITEP) to check the quality, completeness and reasonableness of existing emission inventory (EI) data for every county that intersects or is directly adjacent to a Minnesota, Wisconsin, or Michigan Native American reservation (Midwestern tribal counties). The data set compiled for this project includes 1999 National Emission Inventory (NEI) and state supplied data for all source classification codes (SCCs) reported for point, area, non-road mobile and on-road mobile sources for Midwestern tribal counties.

### **1) Tribal Review of Compiled Data Set**

All of the tribes located in Minnesota, Wisconsin and Michigan were given the opportunity to review the data compiled for the counties intersecting or adjacent to their reservations. Several tribes requested additional information on sources further from their boundaries and on SCCs not included in the original reports. Seven tribes provided feedback on the datasets. Tribes questioned why several facilities that they considered point sources were not included in the NEI. It is believed that the reporting thresholds for the states may preclude the inclusion of smaller sources that are of interest to the tribes in the NEI. Tribes also provided information on the addresses, locations, and operational status of several facilities.

Tribal feedback indicated that activity levels for the following area sources may be different on reservations than they are in the surrounding counties:

- Rangeland and agricultural burning
- Burn barrels
- Wood stoves

One tribe mentioned an interest in gas station emissions, another asked for additional information on pesticide and fertilizer application and another mentioned concerns about emissions from docked petroleum tankers.

Several tribes responding about on-road mobile sources felt that activity would be the same both on and off the reservation because the tribe's infrastructures are integrated with local municipalities. Other tribes expressed that there may be differences due to fewer miles of roads on the reservation or more tourist traffic in certain seasons. Only two tribes stated that they had traffic counts for their reservations roads.

Several tribes stated that non-road mobile activity on their reservations would likely be different than the activity in the surrounding counties. Two tribes expressed that they would not expect a significant difference in non-road mobile vehicle activity on and off the reservation. Tribes mentioned boats, snowmobiles, motorcycles and all terrain vehicles (ATVs) as the most common types of non-road vehicles on their reservations.

### **2) Reasonableness and Comparability**

Data compiled for this project representing the Midwestern tribal counties were compared against non-metropolitan statistical area counties in Michigan, Minnesota, Wisconsin, Illinois, Indiana, Ohio, Missouri and Pennsylvania to check for

reasonableness. The greatest obstacle to assessing the reasonableness of area, non-road mobile and on-road mobile emission estimates in this project was judging how much variation between states was reasonable. Due to the unknown precision and accuracy of the emissions estimates, the analyses conducted were limited to relative comparisons of the compiled data.

### **Area Source Reasonableness**

Variation between state's emissions reported for the Stationary Source Fuel Combustion, Industrial and Commercial/Institutional Boiler and Engine Types area source types raised a question about different states having different reporting thresholds for reporting these sources as point sources. The United States Environmental Protection Agency's (U.S. EPA's) Emission Factor and Inventory Group (EFIG) confirmed that the point and area components of the 1999 NEI for these types of sources had not been reconciled. These area source types comprise 87% of SO<sub>2</sub> and 59% of NO<sub>x</sub> Midwestern tribal counties area emissions and could be the source of considerable error in the emission inventory overall.

The Northeast States for Coordinated Air Use Management (NESCAUM) did detailed internal combustion (IC) engine surveys in New York City and Fairfield County, Connecticut in an effort to improve their inventory for this source type. Their results suggest that neither the survey/estimation methodology, nor current state permitting systems can be relied upon for comprehensive coverage of the existing population of small generators. The NESCAUM report provides some emission estimates that suggest that the majority of the NO<sub>x</sub> emissions estimates from industrial natural gas boilers and IC engines compiled from this study are reasonable. However, the high outlier counties may be significantly overestimating emissions from this source type.

Because small diesel generators are often located near or in densely populated areas and because their emissions tend to be released closer to the ground, operation of these engines pose particular public health concerns. The tribes' review of the data compiled for this project suggests that they are concerned with sources of this type and magnitude. Further work to improve the inventory for these sources types is recommended.

Other area source classes indicating substantial variability across the states include:

- Stationary Source Fuel Combustion, Residential
- Mobile Sources, Paved and Unpaved Roads
- Solvent Utilization, Non-Industrial Commercial Pesticide Application
- Misc. Area Sources, Agricultural Crops Tilling

The tribal review of the 1999 NEI indicated that some tribes were interested in emissions from these sources. Tribes developing good estimates of activity and emissions from these SCCs could increase the accuracy of the inventory. Other important area source types that may benefit from improved estimates are solvent use in dry cleaning, prescribed fire and wildfire.

### **Non-Road Mobile Source Reasonableness**

Variation between states was observed for 2-stroke gasoline pleasure craft, outboard motors and personal watercraft. Additional research on the sources and

accuracy of the activity data would be useful for verifying the accuracy of the emissions estimates for these source types.

Unusually high outliers, especially for per capita emission values, were noted for several non-road mobile source types. Further investigation into the activity data for these counties may yield information on the accuracy of these estimates.

Data on snowmobile registration collected from the American Council of Snowmobile Associations suggests that snowmobile use is substantially underestimated for Michigan, overestimated for Minnesota, and slightly underestimated for Wisconsin in the 1999 NEI. Using more current data on vehicle population could improve the accuracy of emissions estimates from snowmobiles.

Several tribes expressed an interest in emissions from agricultural activities on and near their reservations. The precision and accuracy of emissions estimates from diesel agricultural tractors may benefit from a closer look at local activity rates.

### **On-Road Mobile Source Reasonableness**

The total vehicle miles traveled (VMT), and therefore emissions distributions for many of the on-road mobile sources appear similar enough that differences could be accounted for by variations in actual activity. The only exception to this was for Rural Minor Collector and Rural Local road types, where more variation between states was observed. Geographic analysis indicated that for Rural Local, Rural Minor Arterial and Rural Other Principle Arterial road types, WI counties had higher per capita VMT values than the counties directly adjacent in other states. For Rural Major Collector and Rural Minor Collector road types, per capita VMT and emissions values are higher in MI and IN counties than in counties in the directly adjacent states. Investigation into the cause of these variations could improve the precision of the inventory.

### **3) Fond du Lac Emission Inventory Comparison with ITEP's Compilation of 1999 NEI data for The Fond du Lac Reservation**

The EI for the Fond du Lac (FDL) Band of Chippewa Reservation, prepared by Barr Engineering (Barr), was compared to the information compiled by ITEP from the 1999 NEI, version 2. ITEP's compilation of the 1999 NEI data found 8 point sources with locations on the FDL reservation that were not included in the FDL EI. Although FDL has specified that these points are not located on the reservation, FDL may want to include them in future inventory efforts based on their level of emissions and distance from the reservation.

The comparison of small stationary sources inventoried for the FDL EI with the related 1999 NEI area source SCCs suggests that both the FDL and 1999 NEI data are reasonable when compared to each other for the following source types:

- Fuel Combustion, Commercial/Institutional, Natural Gas, Boilers and IC Engines
- Fuel Combustion, Commercial/Institutional, Distillate Oil, Boilers and IC Engines
- Storage and Transport, Petroleum Products, Gasoline Service Stations, Stage 2:  
Total

The FDL EI also reports emissions in area source categories. Comparison of the paved and unpaved road particulate matter emission estimates from the FDL EI and the 1999 NEI do not provide evidence for the reasonableness or representativeness of either set of estimates. This analysis suggests that it would benefit FDL and the regional

inventory to collect better activity data for this source type. Comparison of the FDL EI and 1999 NEI prescribed burning estimates suggest that the FDL EI and 1999 NEI data are reasonable when compared to each other. Finally, FDL should consider either quantifying the number and magnitude of sand and gravel mining operations on their reservation or confirming that they are absent from the reservation in future EI efforts.

Barr listed air pollution sources not included in the current FDL EI. Several have been identified by ITEP as needing improvement for the regional inventory:

- Stationary Source Fuel Combustion, Residential
- Solvent Utilization, Non-Industrial Commercial Pesticide Application
- Misc. Area Sources, Agricultural Crops Tilling

Analysis of the FDL EI suggests that FDL consider including activity levels for on-road engines in future inventory efforts. On-road mobile source and agricultural emissions are listed by Barr as “probably the largest segment of emissions still to be addressed” for future FDL EI efforts. FDL should consider an inventory of road and vehicle types and vehicle activity levels on its reservation for future inventory efforts.

#### ***4) Oneida Nation Emission Inventory Comparison with ITEP’s Compilation of 1999 NEI data for The Oneida Nation Reservation***

The 2002 EI conducted by the Oneida Nation Reservation was compared to the information compiled by ITEP from the 1999 NEI, version 2. ITEP’s review of the 1999 NEI did not identify any point sources with locations on the Oneida Nation Reservation that were not included in the Oneida Nation EI. Four of the 34 total point sources in the Oneida Nation EI had no reported emissions. For future inventory efforts, the Oneida Nation could continue to attempt to obtain activity data for those facilities for which the activity data were unavailable in the 2002 EI.

The comparison of emissions from commercial pesticide use, coal combustion for commercial heating, natural gas combustion for commercial heating, wildfires, prescribed burns, agricultural tilling, and unpaved roads in the Oneida Nation EI with the related 1999 NEI area SCCs suggests that the 2002 Oneida Nation EI and the 1999 NEI data do not appear reasonable when compared to each other. The Oneida Nation inventoried a limited number of sources of commercial pesticide use and commercial heating. The Oneida Nation could investigate if there are additional sources of these emissions on their reservation. It may also be beneficial for the tribe to determine if commercial fuel usage data for the reservation can be obtained from the local fuel distributors. The analysis on wildfires and prescribed burning emissions suggests that it would benefit the regional inventory to collect local data on the land area burned. Additionally, the Oneida Nation may want to consider investigating other sources of fuel load and emission factors for prescribed burning, specifically for brush and grasslands. For all of these source types, it is possible that the actual activity levels on the reservation are different than those in the surrounding counties, causing the disparities in the emissions estimates.

The comparison of emissions from fuel oil combustion for residential heating, natural gas combustion for residential heating, residential open burning of solid waste, and paved roads suggest that the 2002 Oneida Nation EI and the 1999 NEI data are reasonable when compared to each other. Although the data for residential open burning of solid waste are reasonable, it could benefit both the Oneida Nation EI and the regional inventory to collect locally derived activity data.

Emissions from non-road and on-road mobile sources for the Oneida Nation EI could not be compared to the 1999 NEI data since the Oneida Nation EI does not break the emissions down by fuel type. For future EI efforts, the Oneida Nation could consider allocating the emissions by fuel type as well as equipment type for non-road mobile sources and by fuel type and road classification for on-road mobile sources.

## **5) Recommendations**

ITEP developed a list of detailed recommendations based on the findings of this report. These recommendations were developed to reflect priorities for the regional inventory in tandem with the tribes EI needs. Table 1 details these recommendations.

Implementing the recommendations of this report will involve three groups of participants.

- Tribes – To protect local air quality, tribes may elect to complete an EI as an air quality management tool. Tribal staff have the best knowledge of local sources of air pollution however, they often have limited staff time and resources to conduct EI work. No tribe is compelled to participate in this project.
- ITEP – ITEP remains under contract to the U.S. EPA’s Office of Air Quality Planning and Standards to assist with the development of tribal emission inventories. ITEP’s mission is to build the capacity of tribes to conduct their own environmental work, therefore ITEP staff will be available to provide guidance and technical assistance to tribal staff conducting EI work. Assistance can vary from assisting tribes in including and budgeting personnel in grant work plans to conduct EI work, to providing detailed assistance on how to collect activity data for a particular source type. ITEP will endeavor to give all participating tribes equal access to assistance.
- LADCO – Funding is available to the tribes through LADCO to assist with inventory development. LADCO’s primary objective for this effort is to develop and maintain reliable EIs for tribal lands in the upper Midwest for those tribes who have interest, ability and resources.

To further the implementation of the recommendations, ITEP provided training to the LADCO area tribes on conducting an EI using the newly developed Tribal Emission Inventory Software Solution (TEISS) in the summer of 2004.

Table 1 – Tribal EI Recommendations for Tribes located in Minnesota, Wisconsin and Michigan  
For LADCO Tribal Emission Inventory Project

Source Type and Issue	Data Needed	Options for Collecting Data	Recommendations
Uncertainty on point source reporting thresholds makes comparison across states for point sources difficult. <u>Industrial and Commercial/Institutional Boilers, All Fuel Types</u> are an example.	Numbers of Boilers, fuel type used, quantity of fuel used. Information on other larger point sources of concern to tribes	Tribal Staff with guidance from ITEP, contractors, interns at tribe with guidance from ITEP.	Tribes should be consulted for their preferences on how data should be collected. Point source thresholds need to be documented for each state. As tribes begin collecting data, they need to be sure to specify what their point source thresholds are and why they were selected.
<u>Gas Stations</u> - Several tribes expressed interest in collecting information on gas stations on and/or within their exterior boundaries.	Number of fuel dispensing facilities on reservations, estimates of how much of each type of fuel they sell.	Tribal Staff with guidance from ITEP, contractors, interns at tribe with guidance from ITEP.	If tribes wish to collect this data for their reservations, they can express a preference on how the data should be collected.
<u>Non-road vehicle emissions</u> - Variation across state boundaries was noted for sources such as boats, personal water craft, ATVs, off-road motorcycles, construction and agricultural equipment.	Number of vehicles operating on reservations, average hours of use of these vehicle types on reservations.	Tribal Staff with guidance from ITEP, contractors, interns at tribe with guidance from ITEP, through LADCO's existing Non-Road mobile source work.	LADCO is currently working on rebuilding the activity data and updating inputs for these non-road source types. LADCO should communicate with tribes on the progress of this work and provide opportunities for tribes to review and comment on the work. Provide the tribes with the updated data when it is complete. If tribes wish to collect this data for their reservations, they can express a preference on how the data should be collected.
<u>Non-road vehicle emissions- Snowmobiles</u> - Registration data obtained from states suggests that this source is underestimated.	Number of vehicles operating on reservations, average hours of use of these vehicle types on reservations.	Tribal Staff with guidance from ITEP, contractors, interns at tribe with guidance from ITEP.	If tribes wish to collect this data for their reservations, they can express a preference on how the data should be collected.

Table 1 (cont.)

Source Type and Issue	Data Needed	Options for Collecting Data	Recommendations
<p><u>Open burning of Solid Waste</u> - Some tribes expressed that the use of burn barrels may be more prevalent on reservation than off.</p>	<p>Is open burning occurring on the reservation and if so, an estimate of how much waste is being burned.</p>	<p>Tribal Staff with guidance from ITEP, contractors, interns at tribe with guidance from ITEP.</p>	<p>Tribes should be consulted for their preferences on how data should be collected.</p>
<p><u>Reservation Boundaries</u> - Several tribes noted that the tribal boundaries obtained from the Bureau of Indian Affairs (BIA) were not accurate.</p>	<p>Correct boundaries should be supplied by the tribe whenever possible, as geographic information system (GIS) files.</p>	<p>Tribes should specify what geographic area their inventory covers for each source type. LADCO should use BIA boundaries except when tribes are able to supply alternate boundaries that are acceptable to U.S. EPA.</p>	<p>Tribes wishing to supply boundaries different than the BIA boundaries should supply LADCO with GIS files containing the boundaries they want to use for their emission inventory.</p>
<p><u>Forest Wildfire and Prescribed Burning for Forest Management and Agriculture</u> - Most of the 1999 NEI data for Misc. Area Sources, Forest Wildfires and Prescribed Burning for Forest Management was copied from a previous version of the NEI and is out of date.</p>	<p>Location and sizes of burns, fuel types, smoke management practices.</p>	<p>Include Tribes in LADCO's study on this source type. Communicate with tribes on progress of work and provide opportunity for tribes to comment and review work.</p>	<p>Tribes wishing to be included in LADCO's study on this source type should contact LADCO.</p>
<p><u>Residential Fuel Combustion, All Fuel Types</u> - Variation across state boundaries was noted for these sources.</p>	<p>Reservation population, estimates of % of homes using various fuel types and how much fuel is used in the average home.</p>	<p>Tribal Staff with guidance from ITEP, contractors, interns at tribe with guidance from ITEP.</p>	<p>Tribes should be consulted for their preferences on how data should be collected.</p>
<p><u>Dry Cleaners</u> - Only Wisconsin reported emissions from dry cleaners in the 1999 NEI.</p>	<p>Are dry cleaning establishments present on reservation, and if so, how many?</p>	<p>Tribal Staff with guidance from ITEP, contractors, interns at tribe with guidance from ITEP, ITEP could collect through phone calls to tribes.</p>	<p>Each tribe should determine if this source is of interest to them. If they wish to collect this data, they can express a preference on how the data should be collected.</p>

Table 1 (cont.)

Source Type and Issue	Data Needed	Options for Collecting Data	Recommendations
<p><u>Paved and Unpaved Roads</u> - Both PM from roads being traveled and emissions from vehicles traveling the roads.</p>	<p>Miles of each road type on reservation and vehicle miles traveled.</p>	<p>Tribal Staff with guidance from ITEP, contractors, interns at tribe with guidance from ITEP, through LADCO's existing On-Road mobile source work.</p>	<p>LADCO is currently working on an extensive effort to upgrade on-road mobile source data in this region. Tribes will be notified of the findings and supplied with data upon request. Tribes can express preference on how to collect miles of road type and VMT on their reservations for road dust estimates, if they wish to collect this data.</p>

## II) INTRODUCTION

This report describes the steps taken to check the quality, completeness and reasonableness of existing EI data for every county that intersects or is directly adjacent to a Minnesota, Wisconsin, or Michigan Native American reservation (Midwestern tribal counties). The data set compiled for this project includes 1999 NEI and state supplied data for all SCCs reported for point, area, non-road mobile and on-road mobile sources for Midwestern tribal counties.

Once the data were compiled, it was sorted into subsets for each tribe. Each tribe received a report of all point sources on or adjacent to their reservations and area, on-road mobile and non-road mobile data for all counties intersecting or adjacent to their reservations. Tribes were asked to review the data and supply any comments or suggestions. The comments and suggestions received are summarized in this report.

Further analyses were conducted to compare emission estimates for Midwestern tribal counties to emissions estimates for non-tribal counties in MI, MN, WI and other Midwestern states that are not associated with Native American reservations. These analyses were conducted to discover any differences in emission or activity rates between Midwestern tribal counties and other similar counties and to highlight any variances in emission rates related only to differences in state estimation methods. The results of these analyses are intended to be useful in focusing future inventory development and improvements.

## III) DATA SET

### 1) *Data Sources*

Nineteen hundred and ninety-nine (1999) NEI data for Michigan, Minnesota, and Wisconsin were downloaded from the U.S. EPA website (<ftp://ftp.epa.gov/pub/EmisInventory/finalnei99ver2/criteria/datafiles/>) for area, non-road mobile, on-road mobile, and point criteria pollutant sources. The files were dated 11/17/2002.

The counties that are intersecting or adjacent to (within 1 mile of tribal boundaries) tribal lands were identified by looking at internet census maps (<http://www.census.gov/geo/www/maps/tbtrmaps.htm>) and atlases, and through speaking with tribal representatives. The corresponding area, non-road mobile, and on-road mobile data were extracted and stored in the LADCO Tribes database in the NEI Input Format (NIF) Version 2.0. Through a geographic information system (GIS) intersection, it was determined which point sources were on or adjacent to (within 5 miles of tribal boundaries) tribal lands. These data were extracted and stored in the LADCO Tribes database in the NIF Version 2.0.

Through this process, it was noticed that many of the throughput values were null for the area sources. Additionally, some throughputs had units that were not defined in the NIF code tables. It was noted that many of these data came directly from EPA, not the states. In order to clarify these throughput issues, it was suggested that EPA's Area Source Emission Model (ASEM) be consulted. From ASEM, ITEP was able to extract throughput values for 33 SCCs that were included in the NEI for Michigan, Minnesota,

and Wisconsin. For two of the SCCs (2311020000 and 2311030000), throughputs for all records were complete in the NEI and the throughputs from ASEM were checked against the throughputs in the NEI as a quality control measure. Throughputs were also provided in ASEM for three additional SCCs (2311010000, 2325000000, and 2294000000), however the throughputs were very complicated and would require time and effort beyond the scope of this project to extract and present to the tribes in a comprehensible format.

Often, the throughputs that were extracted from ASEM were broken up into several fields that needed to be multiplied together to get the complete throughput value that was multiplied by the emission factor to determine the emissions. This multiplication was performed when necessary and the resulting throughput value was entered into the LADCO Tribes database. In some cases, the throughput values given in ASEM and therefore incorporated into the NEI tables were in units that were not included in the NIF code tables. These units often made little sense, for example ton2/lb. When this was the case, the throughput was converted to units that would facilitate tribal review, such as tons. As a quality control measure, whenever a change was made to the original throughput from the NEI, such as entering a value which was otherwise null or changing the units, it was checked that these corrected throughput values multiplied by the emission factor listed in the NEI, when available, equaled the emissions. When possible, additional data from ASEM concerning how throughputs were calculated was provided by ITEP on the tribal reports. Specific data uploads and conversions are described in detail in [Appendix A](#).

## **2) SCCs not in EPA Table**

The following seven SCCs were present in the data, but were not represented in the EPA SCC table (<http://www.epa.gov/ttn/chief/codes/index.html#scc>):

- 2280002100-8 records
- 2280002200-36 records
- 2280003100-8 records
- 2280003200-36 records
- 2285002006-41 records
- 2285002007-7 records
- 2285002008-10 records

An internet search of the EPA website was conducted and information on these SCCs was found in Emission Inventory Improvement Program (EIIP) documentation ([www.epa.gov/ttnchie1/eiip/techreport/volume09/commrnves.pdf](http://www.epa.gov/ttnchie1/eiip/techreport/volume09/commrnves.pdf) and [www.epa.gov/ttnchie1/eiip/techreport/volume09/locomotives.pdf](http://www.epa.gov/ttnchie1/eiip/techreport/volume09/locomotives.pdf)). These SCCs and their descriptions were incorporated into the “SCC\_APR2002” table in the LADCO Tribes database as follows (strMEASURE, strMATERIAL, and strACTION fields were left null):

- 2280002100-“strSCC1\_DESC”=Mobile Sources, “strSCC3\_DESC”= Marine Vessels, Commercial, “strSCC6\_DESC”=Diesel, “strSCC8\_DESC”=Port Emissions

- 2280002200-“strSCC1\_DESC”=Mobile Sources, “strSCC3\_DESC”= Marine Vessels, Commercial, “strSCC6\_DESC”=Diesel, “strSCC8\_DESC”=Underway Emissions
- 2280003100-“strSCC1\_DESC”=Mobile Sources, “strSCC3\_DESC”= Marine Vessels, Commercial, “strSCC6\_DESC”=Residual, “strSCC8\_DESC”=Port Emissions
- 2280003200-“strSCC1\_DESC”=Mobile Sources, “strSCC3\_DESC”= Marine Vessels, Commercial, “strSCC6\_DESC”=Residual, “strSCC8\_DESC”=Underway Emissions
- 2285002006-“strSCC1\_DESC”=Mobile Sources, “strSCC3\_DESC”= Railroad Equipment, “strSCC6\_DESC”=Diesel, “strSCC8\_DESC”=Line Haul Locomotives: Class I Operations
- 2285002007--“strSCC1\_DESC”=Mobile Sources, “strSCC3\_DESC”= Railroad Equipment, “strSCC6\_DESC”=Diesel, “strSCC8\_DESC”=Line Haul Locomotives: Class II/III Operations
- 2285002008--“strSCC1\_DESC”=Mobile Sources, “strSCC3\_DESC”= Railroad Equipment, “strSCC6\_DESC”=Diesel, “strSCC8\_DESC”=Line Haul Locomotives: Passenger Trains

### **3) Wisconsin Null Throughputs**

Wisconsin was the only state to supply throughput values to replace the null values in the 1999 NEI data. Grant Hetherington of Wisconsin’s Department of Natural Resources provided throughput data for all Wisconsin counties in an Excel spreadsheet for the following SCCs: 2102004000, 2102006000, 2102007000, 2102008000, 2103004000, 2103005000, 2103006000, 2103007000, 2103011000, 2104001000, 2104004000, 2104006000, 2104007000, 2104011000. Data were formatted to NIF and uploaded into the “sngActualThroughput,” “strThroughputUnitNumerator,” and “intMaterial” fields of tblAreaPE. A total of 406 records were updated.

### **4) Non-Road Mobile Vehicle Count**

Since only a few non-road mobile SCCs were provided in the NEI, activity data in the form of vehicle (equipment) count were provided to ITEP by LADCO. These counts are from NONROAD Model output files.

## **IV) TRIBAL REVIEW OF COMPILED DATA**

### **1) Data Sets Prepared for Tribes**

Each tribe in Michigan, Minnesota, and Wisconsin was sent the following emissions data from the 1999 NEI: 1) point sources of criteria pollutants that were on or within 5 miles of their reservation, 2) area sources for the counties that are adjacent to or intersect their reservation, 3) on-road mobile sources for the counties that are adjacent to or intersect their reservation, and 4) non-road mobile sources for the counties that are adjacent to or intersect their reservation. A guidance document accompanied each tribal dataset that explained the data, provided guidance how to review the data, and solicited

input from tribal staff ([Appendix B](#)). Each data set also included a checklist to help verify the location of point sources relative to tribal land. An example checklist is included in [Appendix B](#).

### **Little River Band of Ottawa**

After the data reports had been mailed to the tribes, the Little River Band of Ottawa noticed that reservation boundaries were incorrect on the map provided to ITEP by the U.S. EPA. The tribe submitted their own shape coverage, adding 6 more point sources and one more county (Oceana County, MI) to the reports. Throughputs were modified with ASEM data as described above for the following SCCs: 2610000100, 2610000400, 2610000500, 2610030000, 2801700001, 2801700003, 2801700004, 2801700005, 2801700006, 2801700007, 2801700008, 2801700009, 2801700010, 2805001000, 2805020000, 2805025000, 2805030000, 2805035000, 2805040000, 2805045001, 2810001000 (throughput in units of ton<sup>2</sup>/lb), 2810015000 (throughput in units of ton<sup>2</sup>/lb), 2810030000 (throughput null). The new reports were submitted to the tribe as a replacement.

### **Mille Lacs Band of Ojibwe**

After the data reports had been mailed to the tribes, the Mille Lacs Band of Ojibwe noticed that reservation boundaries were incorrect on the map provided to ITEP by the U.S. EPA. The tribe submitted their own shape coverage, adding 1 more point source and two more counties (Burnett County, WI and Morrison County, MN) to the reports. Throughputs were modified with ASEM data as described above for the following SCCs (Burnett County was already in the database for another tribe, so throughputs had already been modified, the following modifications apply only to Morrison County): 2610000100, 2610000400, 2610000500, 2610030000, 2801700001, 2801700003, 2801700004, 2801700005, 2801700006, 2801700007, 2801700008, 2801700009, 2801700010, 2805001000, 2805020000, 2805025000, 2805030000, 2805035000, 2805040000, 2805045001, 2810001000 (throughput in units of ton<sup>2</sup>/lb), 2810015000 (throughput in units of ton<sup>2</sup>/lb), 2810030000 (throughput in units of ton<sup>2</sup>/lb). The new reports were submitted to the tribe as a replacement.

### **Bay Mills Band Indian Community**

After the data reports had been mailed to the tribes, the Bay Mills Band Indian Community noticed that reservation boundaries were incorrect on the map provided to ITEP by the U.S. EPA. The tribe submitted their own shape coverage, adding 1 point source (originally there were no point sources). Additionally, the tribe was interested in Canadian data. Two Canadian point sources were found to be within the 5-mile buffer of the reservation and a report on these sources was generated. An area report (includes area, on-road mobile, and non-road mobile sources) for the Ontario province was also generated, at the request of the tribe. The new reports were submitted to the tribe as a replacement.

### **Extended Boundaries**

The following tribes asked ITEP to extend the buffer used for point sources: Prairie Island Indian Community (15 miles), Menominee Indian Tribe (10 miles), Little

River Band of Ottawa (10 miles), and Bad River Band of Chippewa (50 miles). Reports were generated from 1999 NEI criteria summary data file (<ftp://ftp.epa.gov/pub/EmisInventory/finalnei99ver2/criteria/summaries/>) and were submitted to the tribes. Additionally, a hazardous air pollutants (HAPs) report was generated for Bad River Band of Chippewa for the 50-mile buffer from the 1999 NEI HAPs summary data file (<ftp://ftp.epa.gov/EmisInventory/draftnei99ver3/haps/summaries/>). Leech Lake Band of Ojibwe was interested in Canadian point data and two Canadian point sources were found to be within 120 miles of the reservation. A report for these two sources was generated and submitted to the tribe.

### **Additional SCCs**

Two tribes requested additional area SCCs that were not included in the original reports. The Grand Traverse Band of Indians was interested in pesticide emissions. There are two SCCs addressing pesticide application available for the related county, 2461800000 and 2465800000. 2461800000 was included in the original report, however it was also included in the additional SCC report for the tribe's reference. The Leech Lake Band of Ojibwe was interested in gas stations. There are four SCCs addressing petroleum and petroleum product transport available for the related counties, 2501050120, 2501060050, 2501060100, and 2501060201. 2501060100 was included in the original report, however it was also included in the additional SCC report for the tribe's reference.

## ***2) Tribe's Review and Comments***

Seven tribes (three tribes from Wisconsin, two from Michigan, and two from Minnesota) provided feedback on the dataset they received. The following is a summary of their comments and a brief discussion regarding the comments where appropriate.

### **Point Sources**

Two tribes commented on missing data for facilities listed such as addresses and throughputs, and two tribes questioned why some point sources they had identified were not included in the NEI database. One tribe indicated that a major source (a coal burning power plant) listed in the NEI had discontinued operations.

Missing addresses are inherent, but not widespread in the NEI database. In one case, several facilities associated with a tribe were missing addresses. Throughputs are not a required field in the NEI database so they were commonly unavailable. The absence of facilities in the NEI that tribes were interested in appears to be the result of the reporting thresholds (CO = 1000 tons/yr; SO<sub>x</sub>, NO<sub>x</sub>, VOC, and PM<sub>10</sub> = 100 tons/yr; Pb = 5 tons/yr). These thresholds represent the state and national perspective on emissions that are significant enough to track individually. In contrast, tribes appear to be interested in tracking much smaller sources that may be impacting land under their jurisdiction. Seven tribes returned the point source checklist that accompanied the data sent to them. The responses received from these tribes are included in Table 2.

## **Area Sources**

List the area sources in which you think that the throughputs would be very different on the reservation than they are in the surrounding counties.

Area sources cited by tribes included prescribed burning of grass in Spring, burn barrels, wood stoves, and non-tribal agricultural activity. One tribe stated that they need more time to look through the data.

Are there any types of area sources that you feel are important on your reservation, but are not included on this list?

One tribe was very interested in gas stations because they estimate there are roughly 120 businesses (including resorts) selling petroleum products on the reservation, and numerous facilities just outside the reservation. One tribe was interested in emissions from burn barrels. One tribe questioned whether VOC emissions were too low, considering the amount of agriculture land in the area, and the tribe was interested in obtaining more data regarding pesticide and fertilizer application. This tribe was also concerned about emissions from petroleum tankers that dock 15 miles south of the reservation.

## **On-Road Mobile Sources**

Do you think that the on-road mobile source throughputs would be very different on the reservation than they are in the surrounding counties?

Two tribes stated that they felt that on- versus off-reservation throughputs would be roughly the same because the tribe's infrastructure is integrated with local municipalities. One tribe felt there were more traffic emissions off-reservation because there are less miles of road on the reservation. One tribe felt this relation might fluctuate throughout the year, with relatively more on-road mobile sources present in the summer. One tribe stated that their reservation is in a tourist area and there is a state highway that goes through the reservation.

Does your tribe's land have more miles of road or less than the surrounding counties? Please explain or give numbers if you have them.

One tribe felt they have more unpaved roads than surrounding counties, as well as numerous unpaved trails used as roads and temporary logging roads. Three tribes stated there are less miles of road on the reservation relative to the surrounding counties.

Do roads on your tribe's lands have more or less traffic than roads in the surrounding counties?

Two tribes stated that there is less traffic on roads on the reservation relative to surrounding counties, in one case because tribal land holdings are less developed. One tribe stated that road traffic on the reservation is commonly associated with recreation, but overall is roughly equal to surrounding counties. One tribe stated that their reservation is in a tourist area and there is a state highway that goes through the reservation.

Table 2. Specific Point Source Feedback from LADCO Tribes

Facility Name	State	County	ITEP ID	Comments
Listed Facilities Tribes Commented On				
LARSON-JUHL, INC.	Wisconsin	ASHLAND	R54522	New Address: 800 Sum Rd, Ashland, WI, 54806
GREAT LAKES GAS TRANS - DEER RIVER	Minnesota	ITASCA	R37763	On land owned by non-tribal member within exterior boundaries of reservation
DMK INC.-STATIONARY PLANT-SHAWANO	Wisconsin	SHAWANO	R55774	Facility is 10-15 miles from reservation, rather than 1-5 miles from reservation
MORTON SALT & PERFORMANCE CHEM. DIVS. OF MORTON	Michigan	MANISTEE	R36340	On land owned by non-tribal member within exterior boundaries of reservation
SHELL WESTERN E&P INC. - MAN SULFUR PLT	Michigan	MANISTEE	R36345	Within 1 mile of reservation rather than on reservation
AZTEC PRODUCING COMPANY, INC.	Michigan	MANISTEE	R36348	On land owned by non-tribal member within exterior boundaries of reservation
INTERGLAS CORP	Michigan	MANISTEE	R36357	Facility is closed, located on land owned by non-tribal member within exterior boundaries of reservation
GENERAL CHEMICAL INDUSTRIAL PRODUCTS INC.	Michigan	MANISTEE	R36339	Facility is closed, located on land owned by non-tribal member within exterior boundaries of reservation
FAB-LITE INC.	Michigan	MANISTEE	R36356	Facility is on land owned by non-tribal member within exterior boundaries of reservation, rather than 1-5 miles from reservation
AITKIN PUBLIC UTILITIES COMMISSION GENER	Minnesota	AITKIN	R37235	Facility is 10-15 miles from reservation and decommissioned 9/02, rather than <1 mile from reservation
BUCKLEY CONSTRUCTION II – NONMETALLIC	Minnesota	MILLE LACS	R37888	On land owned by non-tribal member within exterior boundaries of reservation
UNITED POWER ASSOCIATION - ROCK LAKE	Minnesota	PINE	R37971	Facility is 5-10 miles from reservation, rather than 1-5 miles from reservation
IMATION ENTERPRISES CORP	Minnesota	PINE	R37972	Facility is 5-10 miles from reservation, rather than 1-5 miles from reservation

Table 2 (cont.)

Facility Name	State	County	ITEP ID	Comments
GRAND CASINO HINCKLEY	Minnesota	PINE	R37973	Located on reservation, rather than 1-5 miles from reservation
Un-listed Facilities Tribes Commented On				
SANDY LAKE SAND & GRAVEL	Minnesota	---	---	Facility is 1-5 miles from reservation; AIRS#: 27-001-2700100019; facility is within exterior boundaries of reservation per 1855 treaty, but off-reservation according to BIA
POTLATCH OSB PLANT	Minnesota	---	---	Facility is 1-5 miles from reservation

Does your tribe have traffic counts for any of its roads?

Two tribes stated that they have these data, but one tribe was unable to obtain the data in time to incorporate it in their response. Two tribes stated they do not have traffic counts for their roads. One tribe was unsure, but they included vehicle counts from a state agency for two major roads through the reservation.

### **Non-Road Mobile Sources**

Do you think that the non-road mobile source vehicle counts would be very different on the reservation than they are in the surrounding counties?

One tribe stated that non-road mobile vehicle counts on the reservation would likely be different from surrounding counties. This tribe tracks recreational vehicles owned and operated on the reservation by tribal members. Two tribes state that there might be a difference between non-road mobile vehicle counts on the reservation versus surrounding counties. One tribe felt that any difference would likely be most pronounced during summer months when boat usage is high. They also stated that snowmobile usage varies annually depending on snow conditions. One of these tribes also stated that they track recreational vehicles owned and operated on the reservation by tribal members, although some vehicles may be unaccounted for, but they do not track recreational use on the reservation by non-tribal members. Two tribes stated they felt there was not a significant difference between non-road mobile vehicle use on the reservation versus surrounding counties. One of these tribes felt that emissions estimated for 2-stroke motorcycles, ATVs, recreational specialty vehicles, and all watercraft were probably unrealistically low for summer months. One tribe questioned how marine traffic was accounted for in non-road mobile sources.

Does the tribe have any way to estimate how many of these types of vehicles are operated on the tribe's lands?

Two tribes track recreational vehicle use on the reservation by tribal members, but not non-tribal members. Four tribes stated that they do not have these data. Two tribes pointed out the difficulty of collecting robust data because many of the users are tourists or part-time residents. One tribe felt the estimated emissions are likely somewhat conservative.

## **V) COMPARISON WITH DATA FROM OTHER RURAL MIDWESTERN COUNTIES**

For QA/QC purposes, ITEP downloaded 1999 NEI data from non-Metropolitan Statistical Area (non-MSA) counties in Michigan, Minnesota, and Wisconsin that are not overlapping or adjacent to reservations. Additionally, ITEP downloaded 1999 NEI data from non-MSA counties in Illinois, Indiana, Ohio, Missouri, and Pennsylvania. The data were downloaded from the EPA website (<ftp://ftp.epa.gov/pub/EmisInventory/finalnei99ver2/criteria/datafiles/>) for area, non-road mobile, and on-road mobile criteria pollutant sources. None of the modifications described in Section III for the Midwestern tribal counties were made to these data, except for the use of non-road mobile vehicle counts for non-MSA counties in Michigan, Minnesota, and Wisconsin for data analysis purposes.

Some of the QA/QC reports required the use of population and area data. County population data were downloaded from the U.S. Census 2000, [http://factfinder.census.gov/servlet/DTGeoSearchByListServlet?ds\\_name=DEC\\_2000\\_SF1\\_U&\\_lang=en&\\_ts=75923092265](http://factfinder.census.gov/servlet/DTGeoSearchByListServlet?ds_name=DEC_2000_SF1_U&_lang=en&_ts=75923092265) (Fact Finder, Detailed Tables, Census Summary File 1). Reservation population data were also compiled from the U.S. Census 2000. County area data were calculated by ITEP from U.S. Census Bureau Tiger files and reservation area data were calculated by ITEP from Bureau of Indian Affairs (BIA) files. The population and area data compiled for this project are included in [Appendix C](#).

The analyses described in this section were conducted on the top pollution producing SCCs compiled for this project. The top pollution producing SCC list for each pollutant (PM10, PM2.5, CO, NOX, VOC, SO2, NH3) for the entire area and non-road mobile data set was compiled by first totaling emissions for all SCCs for all the Midwestern tribal counties (a), then summing emissions for the individual SCCs for all Midwestern tribal counties (b). The summed individual SCC (b) was divided by total (a) to determine top emitters for each pollutant-SCC pair. The top pollution producing SCC lists for area and non-road mobile sources are included in [Appendix D](#). On-road mobile SCCs were grouped to summarize emissions from gas and diesel engines separately for the 6 rural road types. The top SCC lists were checked against any comments received from tribes during the assessment on sources they believe are important, and include any source types mentioned by tribes.

### **1) Completeness**

The entire LADCO Tribe database developed for this project was checked for invalid codes, missing data and out-of-range dates as described in the “LADCO Tribe Database QA Check” included as [Appendix E](#) to this report.

The entire data set downloaded from EPA for the Midwestern tribal counties was checked against the EPA complete SCC table. The list summarizing the SCCs not included in this data set is presented in [Appendix F](#).

### **2) Reasonableness**

Information was summarized graphically to compare the Midwestern tribal counties and other rural Midwestern counties. Data compiled in this project representing the Midwestern tribal counties were compared against non-MSA counties in Michigan, Minnesota, Wisconsin, Illinois, Indiana, Ohio, Missouri and Pennsylvania (as directed by LADCO) to check for reasonableness. For each SCC-pollutant pair, total annual emissions, per capita emissions and/or emissions per unit area were compared as appropriate.

### **Area Source Reasonableness**

QA/QC procedures to determine reasonableness were conducted on the top 20 area SCCs. Each SCC was analyzed only for the pollutant(s) to which it contributed more than 5% of the total emissions of that pollutant for Midwestern tribal counties area sources. The SCCs, pollutants and the type of analysis conducted are summarized in Table 3. Analysis details for area sources are included in [Appendix G](#).

Table 3: Area Source Analysis Summary

SCC and description	Pollutant(s)	% of total Midwestern counties inventory	Statistics	Scatter plot	Geographic Analysis
2102002000: Stationary Source Fuel Combustion, Industrial, Bituminous/Subbituminous Coal, Total, All Boiler Types	NOx, SO2	25.2% NOx, 18.6% SO2	X	X	X
2102004000: Stationary Source Fuel Combustion, Industrial, Distillate Oil, Total, Boilers and IC Engines	SO2	5.50%	X	X	X
2102006000 - Stationary Source Fuel Combustion, Industrial, Natural Gas, Total Boilers and IC Engines	NOx	13.90%	X	X	X
2102008000 - Stationary Source Fuel Combustion, Industrial, Wood, Total All Boiler Types	SO2	20.70%	No, too few states reporting	X	X
2103002000 - Stationary Source Fuel Combustion, Commercial/Institutional, Bituminous/Subbituminous Coal, Total All Boiler Types	SO2	16.30%	X	X	X
2103004000 - Stationary Source Fuel Combustion, Commercial/Institutional, Distillate Oil, Total Boilers and IC Engines	SO2	20.20%	X	X	X
2103006000 - Stationary Source Fuel Combustion, Commercial/Institutional, Natural Gas, Total Boilers and IC Engines	NOx	11.20%	X	X	X
2104004000 - Stationary Source Fuel Combustion, Residential, Distillate Oil, Total All Combustor Types	NOx, SO2	4.1% NOx, 11.0% SO2	X	X	X
2104006000 - Stationary Source Fuel Combustion, Residential, Natural Gas, Total All Combustor Types	NOx	11.5%	X	X	X
2104008001 - Stationary Source Fuel Combustion, Residential, Wood, Fireplaces General	VOC	9.3%	X	X	X
2294000000 - Mobile Sources, Paved Roads, All Paved Roads, Total Fugitives	PM2.5	12.30%	X	X	X

Table 3 (cont.)					
SCC and description	Pollutant(s)	% of total Midwestern counties inventory	Statistics	Scatter plot	Geographic Analysis
2296000000 - Mobile Sources, Unpaved Roads, All Unpaved Roads, Total Fugitives	PM2.5	29.10%	X	X	X
2420000000 - Solvent Utilization, Dry Cleaning, All Processes, Total All Solvent Types	VOC	21.80%	X	X	X
2461800000 - Solvent Utilization, Miscellaneous Non-Industrial Commercial, Pesticide Application, All Processes, Total All Solvent Types	VOC	5.06%	X	X	X
2501060100 - Storage and Transport, Petroleum and Petroleum Product Storage, Gasoline Service Stations, Stage 2 Total	VOC	5.13%	X	X	X
2610000500 - Waste Disposal, Treatment, and Recovery, Open Burning, All Categories, Land Clearing Debris	NOx	5.80%	X	X	X
2610030000: Waste Disposal, Treatment, and Recovery, Open Burning, Residential, Household Waste	PM2.5	4.50%	X	X	No, Less than 5% of total emissions
2801000003 - Miscellaneous Area Sources, Agriculture Production, Crops Agriculture, Crops Tilling	PM2.5	24.00%	X	X	X
2810001000: Miscellaneous Area Sources, Other Combustion, Forest Wildfires, Total	NOx	2.10%	X	No, prelim. plots showed no correlation	No, Less than 5% of total emissions
2810015000: Miscellaneous Area Sources, Other Combustion, Prescribed Burning for Forest Management, Total	NOx	2.10%	X	No, prelim. plots showed no correlation	No, Less than 5% of total emissions

X = Analysis completed.

## Stationary Source Fuel Combustion, Industrial and Commercial/ Institutional Boiler and Engine Types

Variation between states was noted in the NO<sub>x</sub> and SO<sub>2</sub> emissions reported for the Stationary Source Fuel Combustion SCCs for Industrial and Commercial/ Institutional boiler and engine types (2102XXXXXX and 2103XXXXXX). Geographic variation was observed, as exemplified in Figure 1 for SCC 2102006000, Industrial Natural Gas Combustion Per Capita NO<sub>x</sub> Emissions. Variation was also observed in statistical measures for these populations, exemplified in Figure 2 for SCC 2103004000, Commercial/Institutional Distillate Oil Combustion SO<sub>2</sub> Emissions. The sources of these emission estimates varied, some states reported them to the NEI, others had no records in the NEI, and others were copied by EFIG from a previous version of the NEI into the 1999 NEI. ITEP questioned EFIG about how emissions are apportioned between the area source and point source SCCs for these categories. Were some states reporting all or most of these emissions as point sources? Upon questioning, Roy Huntley, Environmental Engineer at EFIG responded in personal communication that EFIG had not reconciled the point and area criteria pollutant emissions for these source types for the 1999 NEI. This issue calls into question the accuracy of the emission estimates for this group of SCCs, which account for 86.88% (17,666 tpy) of Midwestern tribal area source emissions of SO<sub>2</sub> and 59.44% (15,373 tpy) of NO<sub>x</sub> emissions. Double-counting may be an issue where EFIG has copied information from previous versions of the NEI for these area source SCCs.

Examination of box plots, scatter plots and geographic distributions of emissions for the 2102XXXXXX and 2103XXXXXX SCCs are described in [Appendix G](#). Comparisons between states vary depending on the SCC-pollutant pair being analyzed, therefore it is difficult to develop any general conclusions regarding this group of SCCs. Since they comprise such a large percentage of the area source inventory, further investigation into the reconciliation of the point and area source inventory should be undertaken.

NESCAUM did detailed IC engine surveys in New York City and Fairfield County, Connecticut in an effort to improve their inventory for this source type. This effort and the results are described in the June 2003 report titled "Stationary Diesel Engines in the Northeast: An Initial Assessment of the Regional Population, Control Technology Options and Air Quality Policy Issues". Although the population of Fairfield County, Connecticut is higher (882,000) than the non-MSA counties included in this study, the emission estimates derived from the NESCAUM study can be used to gauge the accuracy of emissions estimates. The NO<sub>x</sub> emissions for natural gas IC engines in Fairfield County, Connecticut were listed in the NESCAUM document as 60 tons NO<sub>x</sub>/year. The median and 75% quantile values for NO<sub>x</sub> emissions from Industrial Natural Gas Boilers and IC Engines for the states analyzed in this study were mostly below 60 tons NO<sub>x</sub>/year, indicating reasonableness. The outlier values for NO<sub>x</sub> emissions from this SCC in the counties compared for this study were several hundred to more than a thousand tons NO<sub>x</sub>/year. The NESCAUM study suggests these values may be unreasonably high.

Figure 1 2102006000: Industrial Natural Gas Combustion Per Capita NOX Emissions Map

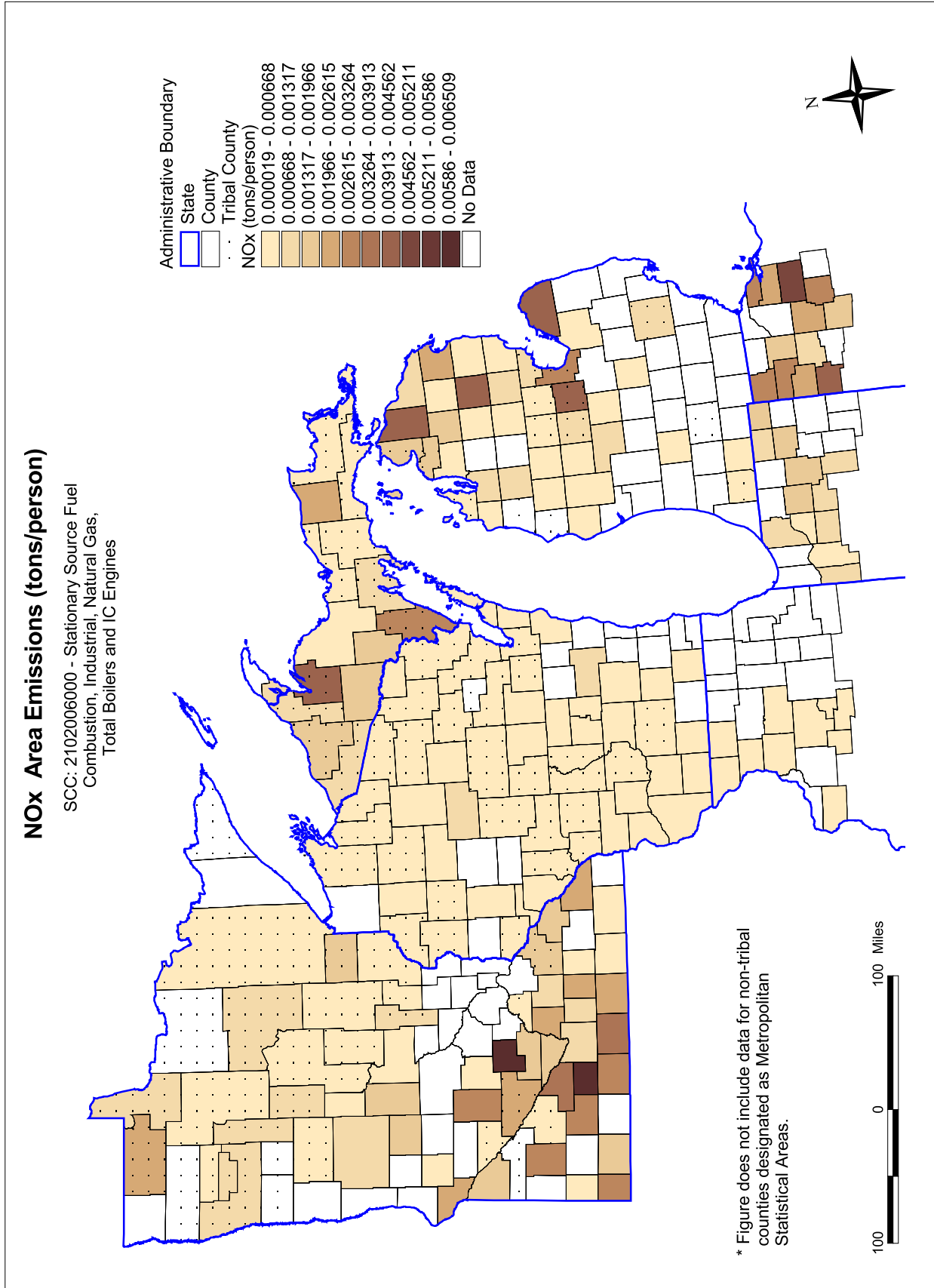
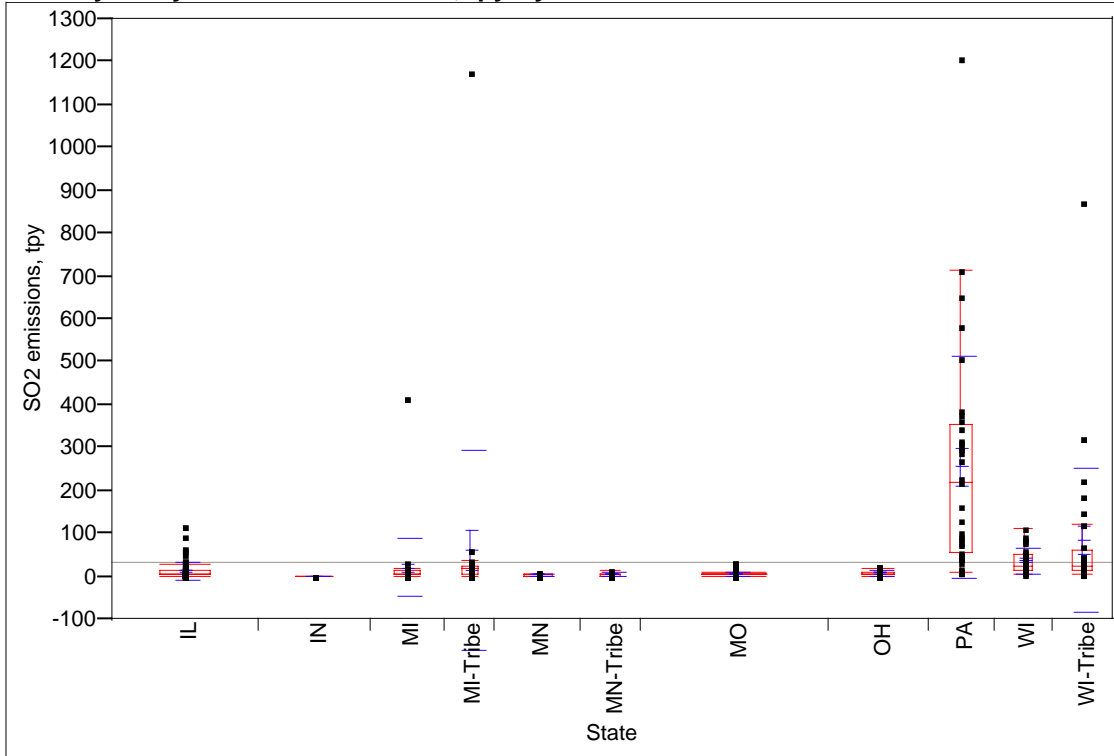


Figure 2

**2103004000: Stationary Source Fuel Combustion, Commercial/Institutional, Distillate Oil, Total, Boilers and IC Engines**

**Oneway Analysis of SO2 emissions, tpy By State**



**Quantiles**

Level	Minimum	10%	25%	Median	75%	90%	Maximum
IL	0.12	2.97	2.97	5.93	14.84	33.238	115.73
IN	0.01	0.01	0.02	0.04	0.06	0.124	0.21
MI	1.43	2.048	3.68	4.91	12.59	21.004	416.99
MI-Tribe	1.23	3.174	4.555	16.79	22.035	45.406	1176.14
MN	1.51	1.51	1.51	1.51	3.3775	6	9.01
MN-Tribe	1.51	1.51	1.51	3	6	10.36	15.02
MO	0.12	0.706	2.82	2.82	5.64	14.1	33.85
OH	0.23	2.42	3.63	7.26	9.69	16.95	21.79
PA	8.96	15.496	54.24	221.25	355.96	626.178	1209.49
WI	3.12	8.46	14.135	22.7	53.415	87.69	111.73
WI-Tribe	4.23	7.56	15.135	25.15	59.98	222.57	874.7

**Means and Std Deviations**

Level	Number	Mean	Std Dev	Std Err Mean	Lower 95%	Upper 95%
IL	73	13.429	20.269	2.372	8.7	18.16
IN	55	0.051	0.048	0.006	0.0	0.06
MI	37	19.388	67.573	11.109	-3.1	41.92
MI-Tribe	25	62.026	232.490	46.498	-33.9	157.99
MN	42	2.865	1.954	0.301	2.3	3.47
MN-Tribe	30	4.256	3.527	0.644	2.9	5.57
MO	93	5.531	6.206	0.644	4.3	6.81
OH	49	7.708	5.407	0.772	6.2	9.26
PA	33	254.879	258.668	45.028	163.2	346.60
WI	29	36.449	30.137	5.596	25.0	47.91
WI-Tribe	29	84.799	169.253	31.429	20.4	149.18

### Stationary Source Fuel Combustion, Residential

Examination of box plots, scatter plots and geographic distributions of emissions for the 2104XXXXXX SCCs indicates substantial variability across the states. Figure 3 illustrates the most extreme variation in geographic distribution of VOC per capita emissions in this group of SCCs, for SCC 2104008001, Residential Wood Combustion, Fireplaces, General. The differences observed for this group of SCCs may reflect actual differences among the states in the occurrence of the various types of residential fuel combustion, states using different SCCs for reporting emissions or different estimation methods and emission factors being used. The analyzed SCCs in this group account for 11.21% (2297 tpy) of Midwestern tribal area source emissions of SO<sub>2</sub>, 19% (5062 tpy) of Midwestern tribal area source emissions of NO<sub>x</sub>, and 9.3%(19,736 tpy) of Midwestern tribal area source emissions of VOC.

### Mobile Sources, Paved and Unpaved Roads

Unpaved roads, SCC 2296000000, PM<sub>2.5</sub> emissions show variability between groups of states, suggesting that states may be using different emission estimation methods and emission factors to estimate emissions for this SCC. It is possible that the differences observed in these distributions reflect actual differences among the states in the VMT on unpaved roads, road silt loadings and other factors. Geographic analysis indicates an abrupt change in tpy/square mile at the WI and MN border, with values lower in WI.

Paved roads, SCC 2294000000, PM<sub>2.5</sub> emissions show more similarity than those observed for unpaved roads. Geographic analysis does not indicate any abrupt changes across state lines.

These two SCCs account for 41.3% of Midwestern tribal area source PM<sub>2.5</sub> emissions. Further data collection supporting unpaved roads emissions estimates could improve the accuracy of these estimates.

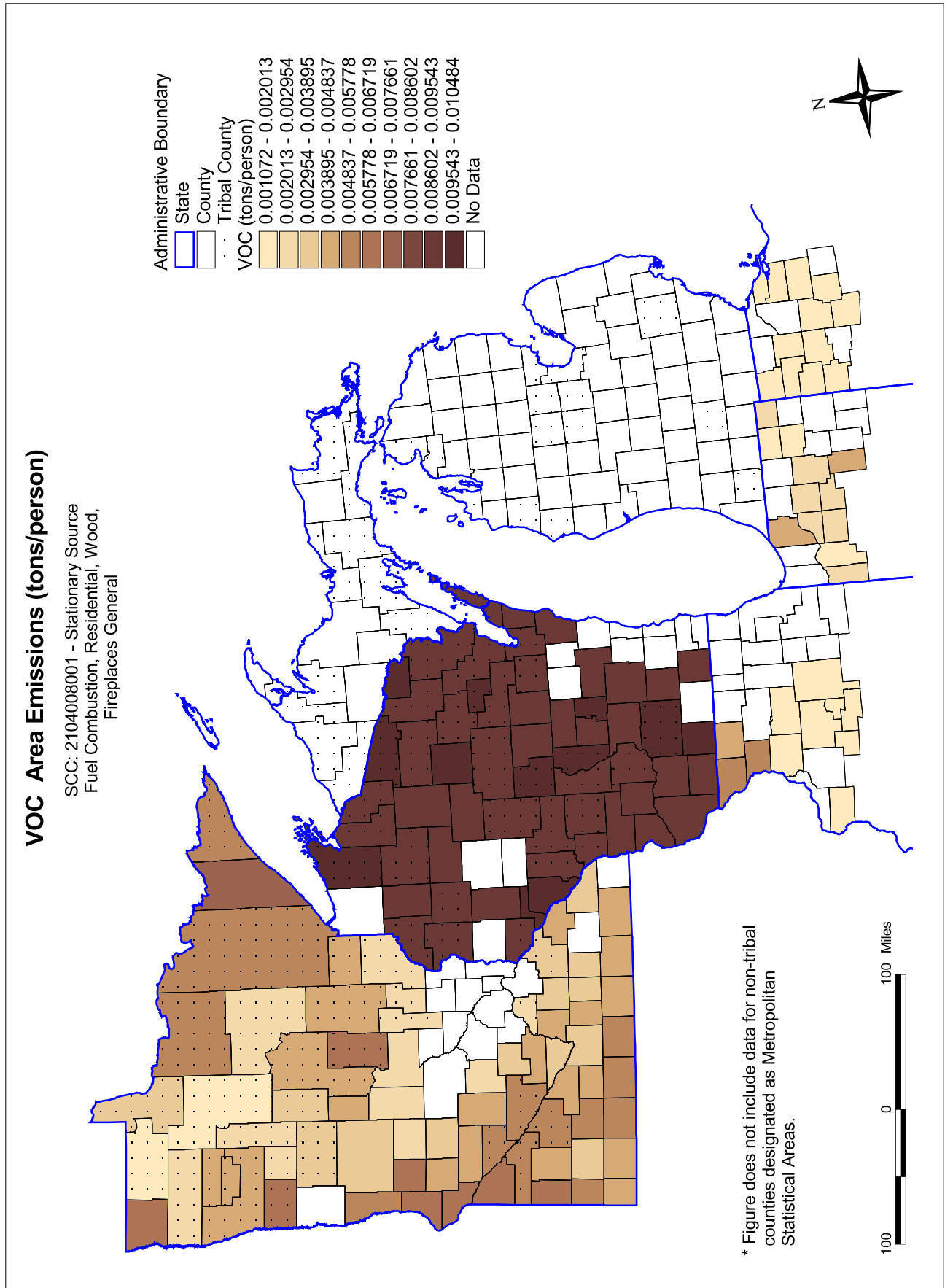
### Solvent Utilization, Dry Cleaning

Only WI reported emissions for this SCC, 2420000000. With just one state reporting, this SCC is the first ranked emitter of VOCs for Midwestern tribal area sources. Developing estimates for this SCC in other states will be important for developing an accurate estimate of VOC emissions for this region.

### Solvent Utilization, Non-Industrial Commercial Pesticide Application

Both the statistics and scatter plot indicate variation in total VOC emissions values across states for this SCC, 2461800000. This SCC produces 5.1% of Midwestern tribal area source VOC emissions. The differences observed in the distributions may reflect actual differences among the states in the occurrence of this type of pesticide application. The total emissions for all states are within the same order of magnitude, with the exception of one high outlier. The map does not show any significant variations across state boundaries. Estimates should be compared against any available studies of area source pesticide emissions to check their relative accuracy.

Figure 3 2104008001: Residential Wood Combustion in Fireplaces Per Capita VOC Emissions Map



#### Petroleum and Petroleum Product Storage, Gasoline Service Stations, Stage 2

Both the statistics and scatter plot indicate similarity in total emissions values across states for this SCC, 2501060100. This SCC produces 5.1% of Midwestern tribal area source VOC emissions. The differences observed in the distributions may reflect differences among the states in the activity levels, emission factors or methods used to estimate these emissions. The total emissions for all states are within the same order of magnitude. The map does not show any significant variations across state boundaries.

#### Waste Disposal, Open Burning, Land Clearing Debris

Both the statistics and scatter plot indicate similarity in total emissions values across states for this SCC, 2610000500. This SCC produces 5.8% of Midwestern tribal area source NO<sub>x</sub> emissions. The differences observed in the distributions may reflect differences among the states in the activity levels, emission factors or methods used to estimate these emissions. The map does not show any significant variations across state boundaries.

#### Waste Disposal, Open Burning, Residential

Both the statistics and scatter plot indicate similarity in per capita emissions values across states for this SCC, 2610030000. This SCC produces 4.5% of Midwestern tribal area source PM<sub>2.5</sub> emissions. The differences observed in the distributions may reflect differences among the states in the activity levels, emission factors or methods used to estimate these emissions.

#### Misc. Area Sources, Agricultural Crops Tilling

Both the statistics and scatter plot indicate variability in total emissions values across states for this SCC, 2801000003. This SCC produces 24% of Midwestern tribal area source PM<sub>2.5</sub> emissions. The differences observed in these distributions may reflect differences among the states in the activity levels, emission factors or methods used to estimate these emissions. The map does not show any significant variations across state boundaries. Estimates should be compared against any available studies of area source crop tilling emissions to check their relative accuracy.

#### Misc. Area Sources, Forest Wildfires

The statistics indicate some similarity in total emissions values across states for this SCC, 2810001000. This SCC produces 2.1% of Midwestern tribal area source NO<sub>x</sub> emissions. The differences observed in these distributions may reflect differences among the states in the activity levels, emission factors or methods used to estimate these emissions. Estimates should be compared against any available studies of area source forest wildfire emissions to check their relative accuracy.

#### Misc. Area Sources, Prescribed Burning for Forest Management

The statistics indicate some similarity in total emissions values across states for this SCC, 2810015000. This SCC produces 2.1% of Midwestern tribal area source NO<sub>x</sub> emissions. The differences observed in these distributions may reflect differences among the states in the activity levels, emission factors or methods used to estimate these

emissions. Estimates should be compared against any available studies of area source prescribed burning emissions to check their relative accuracy.

### **Non-Road Mobile Source Reasonableness**

QA/QC procedures to determine reasonableness were conducted on 10 non-road mobile SCCs. Each SCC was analyzed only for the pollutant(s) to which it contributed more than 5% of the total emissions of that pollutant for Midwestern tribal counties non-road mobile sources. The SCCs, pollutants and the type of analysis conducted are summarized in Table 4. All of the non-road mobile source emissions analyzed for this report were submitted to the NEI by one of two U.S. EPA consultants, E.H. Pechan and Associates or ERG. Analysis details for non-road mobile sources are included in [Appendix H](#).

Table 4: Non-Road Mobile Source Analysis Summary

SCC and description	Pollutant(s)	% of total Midwestern counties inventory	Statistics	Scatter plot	Geographic Analysis
2260001020: Mobile Sources, Off-Highway Vehicle, Gasoline, 2-Stroke, Recreational Equipment, Snowmobiles	PM2.5, VOC	PM2.5 = 10.25% VOC = 34.91%	X	X	X
2267003020 - Mobile Sources, LPG Industrial Equipment, Forklifts	NOx	5.14%	X	X	X
2270005015: Mobile Sources, Off-Highway Vehicle, Diesel, Agricultural Equipment, Agricultural Tractors	NOx, PM2.5, SO2	PM2.5 = 22.27% NOx = 17.05% SO2 = 17.47%	X	X	X
2280002100 - Mobile Sources, Marine Vessels Commercial, Diesel, Port Emissions	NOx, PM2.5, SO2	PM2.5 = 7.79% NOx = 19.28% SO2 = 7.81%	No, too few counties reporting	X	X
2280002200 - Mobile Sources, Marine Vessels, Commercial Diesel, Underway Emissions	NOx	7.35%	X	X	X
2280003100 - Mobile Sources, Marine Vessels, Commercial, Residual, Port Emissions	NOx, SO2	NOx = 5.14% SO2 = 24.44%	No, too few counties reporting	X	X
2280003200 - Mobile Sources, Marine Vessels, Commercial, Residual, Underway Emissions	SO2	13.37%	X	X	X
2282005010: Mobile Sources, Pleasure Craft, Gasoline, 2-Stroke, Outboard	PM2.5, VOC	PM2.5 = 15.25% VOC = 22.46%	X	X	X
2282005015: Mobile Sources, Pleasure Craft, Gasoline, 2-Stroke, Personal Water Craft	PM2.5, VOC	PM2.5 = 7.48% VOC = 12.13%	X	X	X
2285002006: Mobile Sources, Railroad Equipment, Diesel, Line Haul Locomotives, Class I Operations	NOx	8.48%	X	X	X

X = analysis completed.

### Mobile Sources, 2-Stroke Gasoline Snowmobiles

The statistics for this SCC, 2260001020, indicate similarity in the distributions for IN, OH and PA, all of which have lower total annual and per capita emissions and are the southern-most states included in this study. The remaining state in southern part of this study, IL, has anomalously high values and a uniquely linear relationship between population and total annual emissions. IL reports emissions for this SCC for only 4 counties. The regions in the northern part of the study area, MI, MI-Tribe, MN, MN-Tribe, WI and WI-Tribe, have similar distributions. Figure 4 illustrates the geographic distribution of per capita VOC emissions. The total VOC emissions vs. population scatter plot for the northern states indicates a logarithmic relationship between the variable with emissions increasing as population decreases, exemplified in Figure 5. Each of these states has 2 to 4 high outliers. The highest outlier found was for Keweenaw County, MI.

Several snowmobile industry websites were consulted to assess the accuracy of the vehicle population data supplied for this SCC for MI, WI and MN. The American Council of Snowmobile Associations (<http://www.snowmobileacsa.org>) (ACSA) was consulted as a source of snowmobile registration numbers. The ACSA gives a listing of the number of registered snowmobiles in many states. The list, dated August 9, 2000 (with no source referenced) supplied the following numbers:

Michigan – 359,302 registered snowmobiles

Minnesota – 279, 738 registered snowmobiles

Wisconsin – 222, 854 registered snowmobiles

The NEI activity data (vehicle populations) for all counties, including MSA counties, provided by LADCO for this project supplied the following numbers:

Michigan – 311,928 vehicles

Minnesota – 293,268 vehicles

Wisconsin – 215,717 vehicles

These numbers suggest that snowmobile vehicle population in the 1999 NEI is substantially underestimated for Michigan, overestimated for Minnesota, and slightly underestimated for Wisconsin.

The ACSA website states that “Studies reveal that snowmobilers generally ride close to home. On day trips, snowmobilers typically travel 30 to 75 miles to favorite riding areas...” and “for overnight trips, distances traveled normally range between 100 and 150 miles per day.”

These quotes suggest that most registered snowmobiles are probably used within the state where they are registered, except in cases where the registered vehicles are located close to state boundaries. If this is the case, the spatial allocation for snowmobile use in each state, and therefore emissions, would match fairly closely the states where vehicles are registered.

### Mobile Sources, Liquefied Petroleum Gas (LPG) Forklifts

The statistics for this SCC, 2267003020, indicate similarity between the states in the per capita emissions from this SCC. The differences observed in the distributions may reflect differences among the states in activity levels used to estimate these emissions.

Figure 4 2260001020: Snowmobile Per Capita VOC Emissions Distributions Map

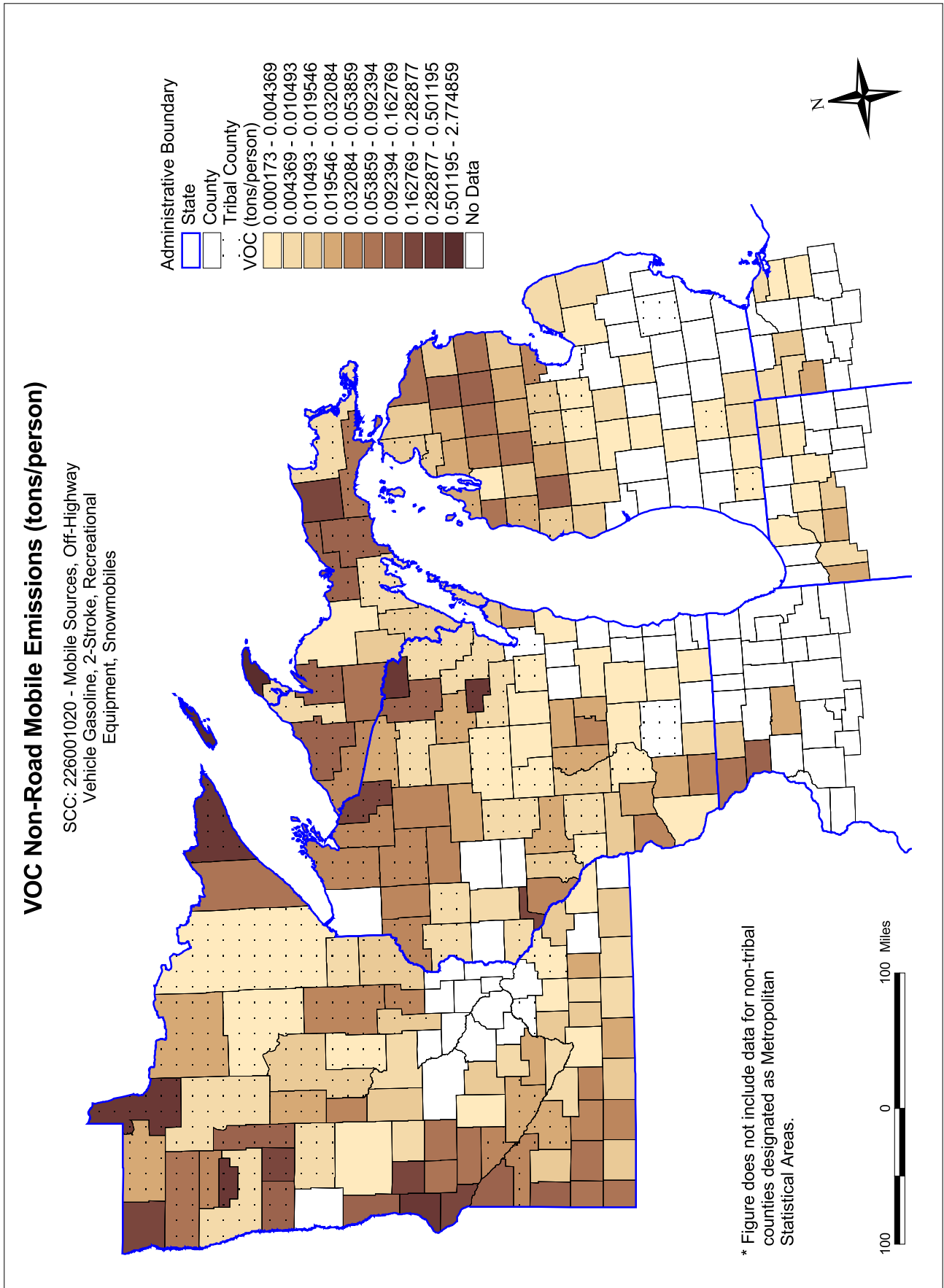
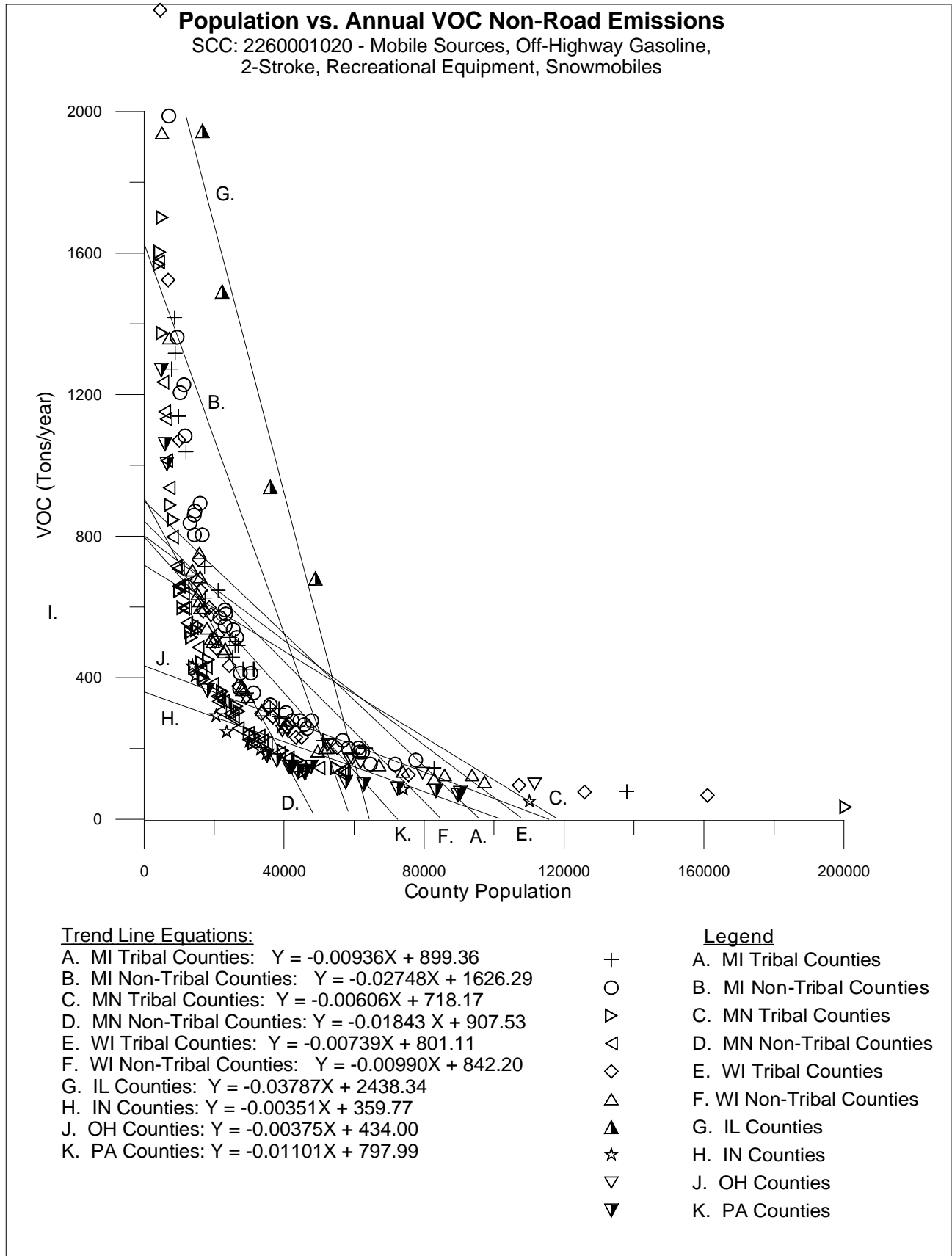


Figure 5 2260001020: Snowmobile VOC Emissions vs. Population Plot



#### Mobile Sources, Diesel Agricultural Tractors

The counties of PA and MI-Tribe have the lowest values for total annual emissions for this SCC, 2270005015. The remaining states are roughly similar, although MN, MN-Tribe and IL have somewhat higher values than the other states. The differences observed in the distributions may reflect differences among the states in activity levels used to estimate these emissions.

#### Mobile Sources, Commercial Marine Vessels, Diesel and Residual, Port Emissions

The total emissions for these SCCs, 2280002100 and 2280003100, vary between counties and states. This may be a result of varying port activities. All counties reported for these SCCs are located on the Great Lakes coasts, with the exception of the inland Itasca County, MN.

#### Mobile Sources, Commercial Marine Vessels, Diesel and Residual, Underway Emissions

The statistics for both total annual and per capita emissions indicate variations between the states for these two SCCs, 2280002200 and 2280003200. For both SCCs, IL, IN, MO and OH have higher 75% quantiles. PA has the lowest values reported for any state for both SCCs. The variations observed between states may reflect differences in the activity levels used to estimate these emissions.

#### Mobile Sources, 2-Stroke Gasoline Pleasure Craft, Outboard Motors

Variations between states for this SCC, 2282005010, for total emissions and vehicle populations suggest that additional research on the sources and accuracy of the activity data would be useful for verifying the accuracy of the emissions estimates. Figure 6 illustrates the variation in vehicle population between the reporting states. The statistics suggest that the MI and MN tribal counties have substantially higher median values for vehicle population than the non-tribal counties in these states.

#### Mobile Sources, 2-Stroke Gasoline Pleasure Craft, Personal Water Craft

Variations between states for this SCC, 2282005015, for total emissions and vehicle populations suggest that additional research on the sources and accuracy of the activity data would be useful for verifying the accuracy of the emissions estimates.

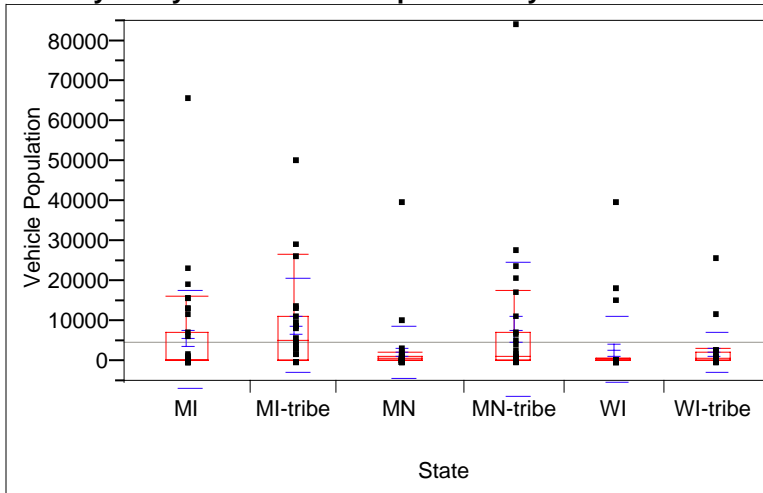
#### Mobile Sources, Diesel Line Haul Locomotives, Class I Operations

The per capita NO<sub>x</sub> annual emissions map for this SCC, 2285002006, does not show any abrupt changes across state boundaries. The variations observed between states may reflect differences in the activity levels used to estimate these emissions.

Figure 6

**2282005010: Mobile Sources, Pleasure Craft, Gasoline, 2-Stroke, Outboard**

**Oneway Analysis of Vehicle Population By State**



**Quantiles**

Level	Minimum	10%	25%	Median	75%	90%	Maximum
MI	14	76	108	212	7213	17164	66479
MI-tribe	42	91	314	5252	11227	28138	50670
MN	34	264	360	599	1190	3086	40144
MN-tribe	17	68	437	1267	7441	24405	84759
WI	8	64	213	443	543	15620	40082
WI-tribe	64	145	290	668	2158	3406	26184

**Means and Standard Deviations**

Level	Number	Mean	Std Dev	Std Err Mean	Lower 95%	Upper 95%
MI	37	5612.17	12233.1	2011.1	1533	9691
MI-tribe	25	8955.58	11705.4	2341.1	4124	13787
MN	37	2170.85	6668.6	1096.3	-53	4394
MN-tribe	29	7973.81	16728.0	3106.3	1611	14337
WI	29	2924.68	8384.3	1556.9	-265	6114
WI-tribe	29	2303.03	5147.5	955.9	345	4261

## **On-Road Mobile Source Reasonableness**

On-road mobile SCCs were grouped to summarize emissions from gas and diesel engines separately for the 6 rural road types. Through this analysis, it was observed that the diesel vehicle emission and VMT distribution patterns were the same as the distribution patterns observed for gasoline vehicles for each road type. The only difference between the two distributions was the magnitude of the emission and VMT values, with gasoline values always higher than the diesel values. This indicates that diesel vehicle VMT values may have been developed as a percentage of gasoline or total VMT. For this reason, gasoline and diesel vehicles are summarized together in this section. It was also observed, through plots for several of the SCCs, that the pollutants appeared directly scaled to VMT for all states, therefore, only VMT statistics were analyzed. Analysis details for on-road mobile sources are included in [Appendix I](#).

### Rural Interstate, Gasoline and Diesel, All Vehicle Types

The total VMT, and therefore emissions, distributions for SCCs 22010xx11x and 22300xx11x appear similar enough that differences could be accounted for by variations in activity rates. The maps indicate that emissions are correctly located along interstate routes, as shown in Figure 7.

### Rural Other Principle Arterial, Gasoline and Diesel, All Vehicle Types

The total VMT, and therefore emissions, distributions for SCCs 22010xx13x and 22300xx13x appear similar enough that differences could be accounted for by variations in actual activity. The map indicates that per capita VMT and emissions values are higher in WI than in the directly adjacent counties in MI's Upper Peninsula.

### Rural Minor Arterial, Gasoline and Diesel, All Vehicle Types

The total VMT, and therefore emissions, distributions for SCCs 22010xx15x and 22300xx15x appear similar enough that differences could be accounted for by variations in actual activity. The map indicates that per capita VMT and emissions values are higher in WI than in the directly adjacent counties in MI's Upper Peninsula.

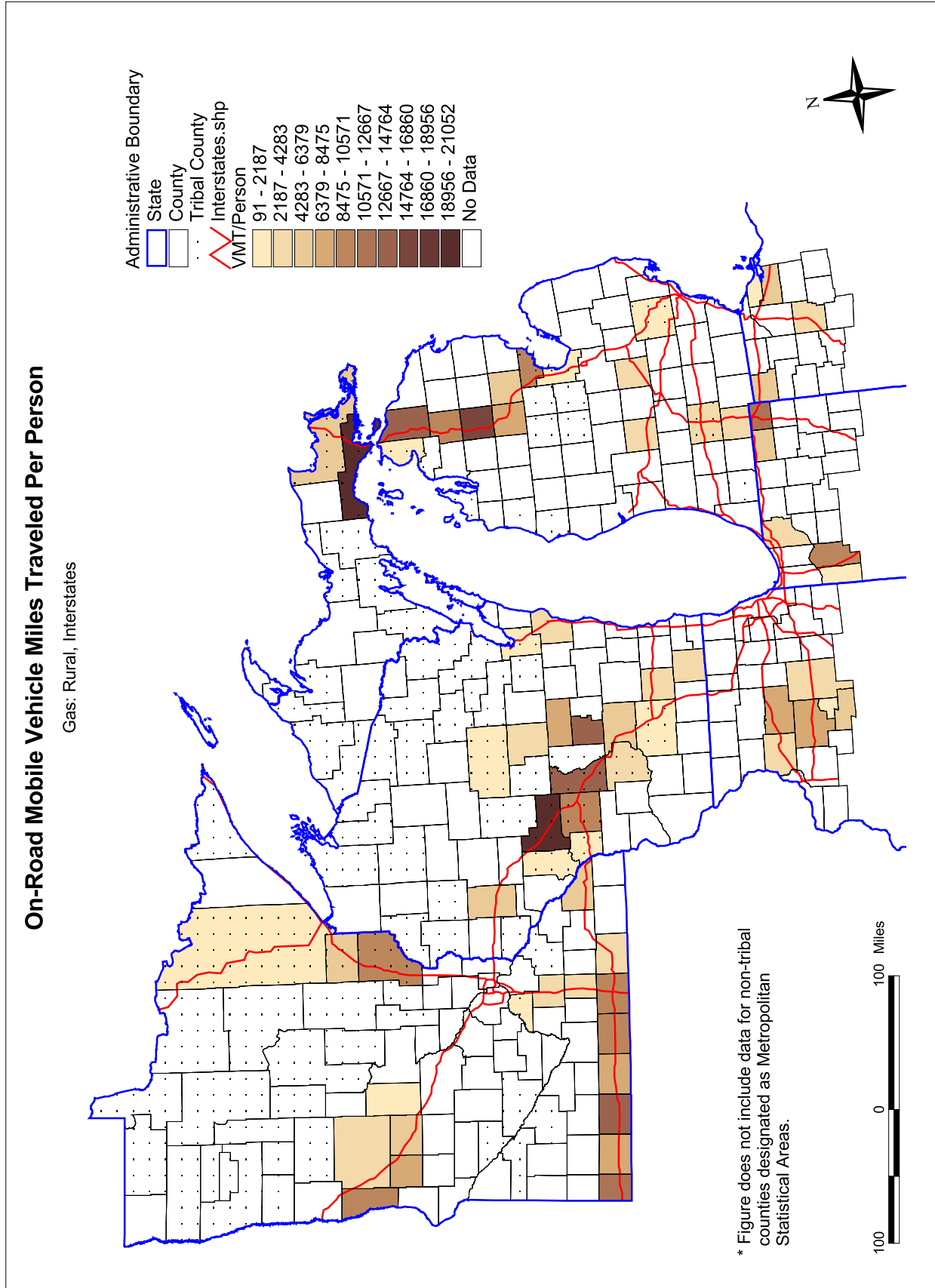
### Rural Major Collector, Gasoline and Diesel, All Vehicle Types

The total VMT, and therefore emissions, distributions for SCCs 22010xx17x and 22300xx17x appear similar enough that differences could be accounted for by variations in actual activity. The map indicates that per capita VMT and emissions values are higher in MI and IN than in the directly adjacent states.

### Rural Minor Collector, Gasoline and Diesel, All Vehicle Types

The total VMT, and therefore emissions, distributions for SCCs 22010xx19x and 22300xx19x appear somewhat different across the states. The differences could be accounted for by variations in actual activity or in methods used to estimate VMT. The map indicates that per capita VMT and emissions values are higher in MI and IN than in the directly adjacent states.

Figure 7 22010xx11x: Rural Interstate, Gasoline Vehicles Per Capita VMT Map



### Rural Local, Gasoline and Diesel, All Vehicle Types

The total VMT, and therefore emissions, distributions for SCCs 22010xx21x and 22300xx21x appear somewhat different across the states. The differences could be accounted for by variations in actual activity or in methods used to estimate VMT. The map indicates that per capita VMT and emissions values are higher in WI than in the directly adjacent states.

### **3) Reasonableness Conclusions**

The greatest obstacle to assessing the reasonableness of all area, non-road mobile and on-road mobile emissions estimates in this project was judging how much variation between states was reasonable. For most of the source classes analyzed there was variation in the emissions reported by each state for their non-MSA counties. The distributions of county emissions for each state varied from those observed for other states. Many of the source classes exhibited high outliers for total and/or per capita emission values within one or more state groups. The only way to determine the validity of the outliers would be to investigate the activity levels for that source class for each outlier county. In many cases, no activity data was available for analysis.

Emissions for many of the source classes and states analyzed in this project were submitted by EFIG from 1999 NEI version 1.5. This version of the 1999 NEI was grown by EFIG and/or its contractors from the 1996 NEI. The origin of the 1996 NEI data was not investigated for this report, therefore the original source of much of the states data remains unclear.

Due to the unknown precision of the emissions estimates, as described above, the analyses conducted were limited to relative comparisons of the compiled data. Conclusions regarding the relative accuracy of the estimates were drawn where possible and any questions arising about precision are noted.

### **Area Source Reasonableness Conclusions**

Variation between states emissions reported for the Stationary Source Fuel Combustion, Industrial and Commercial/ Institutional Boiler and Engine Types SCCs raised a question about the different states reporting all, most, or some of these emissions as point sources. EFIG staff related in personal communication that they had not reconciled the point and area criteria pollutant emissions for these source types for the 1999 NEI. The accuracy of the emission estimates for this group of SCCs, which account for 86.88% (17,666 tpy) of SO<sub>2</sub> and 59.44% (15,373 tpy) of NO<sub>x</sub> Midwestern tribal area source emissions, is therefore questionable. Double-counting may be an issue where EFIG has copied information from previous versions of the NEI for these area SCCs. Since these SCCs comprise such a large percentage of the area source inventory, further investigation into the reconciliation of the point and area source inventory should be undertaken. In future emission inventory efforts, care should be taken to document how these emissions are resolved into point and area SCCs.

The tribal review of the 1999 NEI data revealed an interest in how these source classes were resolved in the reported point source emissions. Several tribes noted that sources they were interested in appeared to be missing from the point source inventory. The absence of these facilities in the NEI appeared to be the result of the reporting

thresholds (CO = 1000 tons/yr; SO<sub>x</sub>, NO<sub>x</sub>, VOC, and PM<sub>10</sub> = 100 tons/yr; Pb = 5 tons/yr). These thresholds represent the state and national perspective on emissions that are significant enough to track individually. In contrast, tribes appear to be interested in tracking much smaller sources that may be impacting land under their jurisdiction. By focusing on these source classes, tribes could make a significant contribution to the accuracy of the inventory.

Other area source classes indicating substantial variability across the states include:

- Stationary Source Fuel Combustion, Residential
- Mobile Sources, Paved and Unpaved Roads
- Solvent Utilization, Non-Industrial Commercial Pesticide Application
- Misc. Area Sources, Agricultural Crops Tilling

The tribal review of the 1999 NEI indicated that some tribes were interested in emissions from these sources. Tribes developing good estimates of activity and emissions from these SCCs could increase the overall accuracy of the inventory.

Another area source class of interest is Solvent Utilization, Dry Cleaning. With just one state reporting (WI), this SCC is the first ranked emitter of VOCs for Midwestern tribal area sources. Developing estimates for this SCC in other states will be important for developing an accurate estimate of area source VOC emissions for this region.

Most of the 1999 NEI data for Misc. Area Sources, Forest Wildfires and Prescribed Burning for Forest Management was copied from a previous version of the NEI. The accuracy of any year's inventory would be improved by developing better estimates of actual activity under these sources for that year.

## **Non-Road Mobile Source Reasonableness Conclusions**

All of the non-road mobile source emissions analyzed for this report were submitted to the NEI by one of two EPA consultants, E.H. Pechan and Associates or ERG. Accordingly, the variation between states is less pronounced than the variation observed for most area SCCs.

Variation between the states was noted for both Mobile Sources, 2-Stroke Gasoline Pleasure Craft, Outboard Motors and Mobile Sources, 2-Stroke Gasoline Pleasure Craft, Personal Water Craft. Additional research on the sources and accuracy of the activity data would be useful for verifying the accuracy of the emissions estimates for these SCCs.

Unusual outliers, especially for per capita emission values, were noted for several other non-road mobile SCCs. The unusually well correlated relationship between decreasing county populations and increasing snowmobile emissions suggests that this relationship may have been oversimplified in the modeling used to develop these emissions estimates. Data on snowmobile registration collected from the ACSA suggests that snowmobile use may be substantially underestimated for Michigan, overestimated for Minnesota, and slightly underestimated for Wisconsin in the 1999 NEI.

During review of the 1999 NEI data, several tribes expressed interest in emissions created by agricultural activities on and near their reservations. The precision of emissions estimates from Mobile Sources, Diesel Agricultural Tractors may benefit from a closer look at local activity rates on and near reservations.

## **On-Road Mobile Source Reasonableness Conclusions**

The total VMT, and therefore emissions, distributions for many of the on-road mobile sources appear similar enough that differences could be accounted for by variations in actual activity. The only exception to this was for Rural Minor Collector and Rural Local road types, where more variation between states was observed. Geographic analysis indicated that for Rural Local, Rural Minor Arterial and Rural Other Principle Arterial road types WI counties had higher per capita VMT values than the counties directly adjacent in other states. For Rural Major Collector and Rural Minor Collector road types, per capita VMT and emissions values are higher in MI and IN counties than in counties in the directly adjacent states. Investigation into the cause of these variations could improve the precision of the inventory.

### **4) Temporal Profiles**

The tons/day emissions were compared for any area SCC in which both an emission for an average day in the ozone season and an annual emission were reported. To determine the tons/day emissions for the entire year, the annual emission values were divided by 365. This analysis is summarized in [Appendix J](#). County/SCC/pollutants with more than 0.005 tons/day variance between ozone season and entire year values are highlighted. Similar tables developed for non-road mobile and on-road mobile sources are included in [Appendix K](#) and [Appendix L](#), respectively.

### **5) Summary Tables**

To aid in review, analysis and reference of the data set, several summary tables were developed. Emissions were summed by state for all Midwestern tribal counties and non-MSA counties that are not overlapping or adjacent to reservations for top area, top non-road mobile, and on-road mobile rural roads sources. Table 5 (below) compares the Midwestern tribal counties emissions to this statewide total. For the Midwestern tribal counties area sources, a table summarizing statistics including the count, sum, average, maximum, minimum and standard deviation of emissions for all counties reporting within each state is included in [Appendix M](#). Similar tables developed for non-road mobile and on-road mobile sources are included in [Appendix N](#) and [Appendix O](#), respectively.

Total emissions for each of the top area source SCCs were summed for all counties intersecting or adjacent to each tribe's reservation. The table summarizing this information is included in [Appendix P](#). Similar tables developed for non-road mobile and on-road mobile sources are included in [Appendix Q](#) and [Appendix R](#), respectively.

For non-road mobile sources, a table summarizing vehicle population, per capita vehicles and county areas was developed for the Midwestern Tribal Counties and is included in [Appendix S](#). For on-road mobile sources, a table summarizing VMT, per capita VMT and county areas is included in [Appendix T](#).

Table 5: Comparison of the Midwestern Tribal County Emissions to Statewide Emissions for Top Area SCCs, Top Non-Road Mobile SCCs, and On-Road Mobile Rural Roads SCCs

Source Type by Pollutant	MI Tribal (tons/yr)	MI Statewide (tons/yr)*	MI Tribal Percentage of Statewide	MN Tribal (tons/yr)	MN Statewide (tons/yr)*	MN Tribal Percentage of Statewide	WI Tribal (tons/yr)	WI Statewide (tons/yr)*	WI Tribal Percentage of Statewide
<b>CO</b>									
Area	32,968	60,139	55%	66,823	91,190	73%	128,039	201,603	64%
Non-Road Mobile	83,636	194,939	43%	89,879	174,040	52%	59,057	119,632	49%
On-Road Mobile	219,468	532,554	41%	230,747	524,401	44%	350,417	655,535	53%
<b>NH3</b>									
Area	113	180	63%	46	97	47%	104	170	61%
Non-Road Mobile	285	432	66%	126	340	37%	235	407	58%
On-Road Mobile	744	1,808	41%	765	1,713	45%	1,185	2,215	53%
<b>NOX</b>									
Area	6,186	9,504	65%	4,476	9,547	47%	13,888	22,251	62%
Non-Road Mobile	16,509	36,134	46%	31,911	62,547	51%	12,944	27,481	47%
On-Road Mobile	30,023	72,776	41%	30,238	69,085	44%	47,735	89,366	53%
<b>PM10-PRI</b>									
Area	83,882	209,354	40%	250,087	587,296	43%	98,264	192,857	51%
Non-Road Mobile	1,997	4,664	43%	3,414	6,951	49%	1,500	3,294	46%
On-Road Mobile	912	2,216	41%	937	2,099	45%	1,453	2,716	53%
<b>PM2.5-PRI</b>									
Area	19,200	45,549	42%	49,226	112,299	44%	27,140	50,453	54%
Non-Road Mobile	1,838	4,291	43%	3,139	6,390	49%	1,379	3,029	46%
On-Road Mobile	726	1,765	41%	747	1,671	45%	1,157	2,164	53%
<b>SO2</b>									
Area	6,153	8,943	69%	1,353	2,673	51%	11,770	18,883	62%
Non-Road Mobile	2,143	4,835	44%	3,912	7,069	55%	1,262	2,792	45%
On-Road Mobile	1,063	2,584	41%	1,093	2,448	45%	1,692	3,165	53%
<b>VOC</b>									
Area	9,823	19,108	51%	18,400	38,191	48%	78,891	130,191	61%
Non-Road Mobile	35,104	82,712	42%	40,082	71,663	56%	22,165	45,809	48%
On-Road Mobile	14,998	36,548	41%	15,533	34,629	45%	23,392	43,707	54%

\* Statewide emissions include all Midwestern tribal counties summed with non-MSA counties that are not overlapping or adjacent to reservations.

## **VI) FOND DU LAC EMISSION INVENTORY COMPARISON WITH ITEP'S COMPILATION OF 1999 NEI DATA FOR THE FOND DU LAC RESERVATION**

The EI conducted by Barr Engineering (Barr) for the FDL Reservation was compared to the information compiled by ITEP from the 1999 NEI, version 2. Geographic analysis by ITEP identified point sources listed in the 1999 NEI with release points located within the reservation boundaries. Area source data were compiled from the 1999 NEI for selected area source categories for the two counties that overlap the FDL Reservation, Carlton County and St. Louis County.

### **1) Large Stationary Sources**

FDL's EI Preparation Plan stated "for purposes of this inventory, any stationary source with actual emissions of less than one ton per year of any criteria pollutant will not be included. However, the threshold for mercury and dioxin emissions will be anything above one pound per year because very small amounts of these pollutants can be of concern." The EI Preparation Plan also identified three point sources that would be included in the initial EI:

- Sappi (paper mill)
- USG (gypsum board factory)
- Diamond Brands (wood utensil and match factory)

In FDL's EI, the Minnesota Pollution Control Agency's (MPCA) air emissions web site (<http://www.pca.state.mn.us/air/emissions/emissearch.cfm>) was searched to identify larger facilities. Searches performed for the surrounding cities of Carlton, Duluth, Esko, Wrenshall, and Cloquet produced actual emissions information for the following facilities whose air emissions are high enough to require that they obtain air emission permits and submit annual air emissions reports to the MPCA:

- Sappi Cloquet, LLC (formerly Potlatch)
- HearthMark, Inc. (formerly Diamond Brands Inc.)
- USG Interiors
- Great Lakes Gas Transmission

ITEP's search of the 1999 NEI for sources on the FDL reservation found Potlatch, Diamond Brands, USG Interiors and Great Lakes Gas Transmission. Additionally, ITEP identified the following 8 point sources in the 1999 NEI with locations on the reservation, that were not included in the FDL EI:

- Conoco, Wrenshall Terminal
- Specialty Minerals, Inc., Cloquet
- Moose Lake Powerplant
- Glacier Paving, Inc.
- Ulland Brothers, Inc., North (Portable source)

- Duluth Air National Guard Base
- Albrook High School, Saginaw
- Duluth Petroleum Products Terminal

In correspondence with ITEP, FDL has specified that these 8 point sources are not located on the reservation, with the possible exception of Ulland Brothers, Inc., since it is a portable source. ITEP downloaded the preliminary 2002 NEI data from the U.S. EPA website and determined that the locations of these sources had been corrected in this later version of the NEI. None of these 8 point sources appear to be located on the FDL reservation in the preliminary 2002 NEI.

## **2) Small Stationary Sources**

In the FDL EI, smaller facilities in and around the reservation were initially identified using a database provided by QwestDex<sup>®</sup>, a directory for the area telephone services provider. The database listed all businesses with phone service in the cities of Carlton, Duluth, Esko, Wrenshall, and Cloquet and provided a Standard Industrial Classification (SIC) code for each business. Sources of interest included local gas stations, dry cleaners, area schools, print shops, body shops, the Carlton/Cloquet airport, and the Black Bear Casino. The FDL EI did not include facilities likely to use fuel for comfort heating if the facility activities, beyond seasonal heating, would not be expected to generate air emissions. The text of the FDL EI, which describes in more detail the methods of collecting activity data and estimating emissions, is attached to this report in [Appendix U](#).

The FDL EI's review of facilities within the five-mile radius determined that 43 companies should receive a notification letter stating the Fond du Lac Reservation's desire to obtain air emissions-related information and informing operators of a pending follow-up phone survey. Within a week of mailing the notification letter, Barr initiated a phone survey of all companies on the notification list. Some facilities contacted did not respond to information requests by mail or by phone. As a result, the emissions for these facilities were based on available information from similar operations. For example, average natural gas use for several comparable facilities was used to provide an estimate for a facility choosing not to respond to the survey.

Table 6 is the FDL EI's table summarizing all emissions quantified in the EI. None of the small stationary sources identified in the FDL EI were listed as point sources in the 1999 NEI. ITEP therefore assumes that all of these sources would be included in area source categories in the 1999 NEI. Table 7 relates each of the small stationary sources identified in FDL's EI with an area source SCC.

ITEP's compilation of area source emissions from the 1999 NEI included emissions from both Carlton and St. Louis Counties. The total area for these two counties is 7,664 square miles and the reservation area is 158 square miles, or approximately 2% of the land area of the counties. The total population for the two counties is 232,199 and the reservation population is 3,728, or approximately 2% of the population of the counties. The communities included in the FDL EI for small stationary sources are all located in Carlton County, so only the Carlton County emissions are used for comparison. The population of Carlton County is 31,671. The reservation population is 12% of Carlton County's population.

Table 6: Fond Du Lac Emission Inventory Summary Table (Note: Table references are for the Fond du Lac EI)

Category/Facility Name	Pollutant	Point Source?	Location with Respect to FDL		Actual Throughputs (lb/unit)		Emission Factor (lb/unit)		Actual Emissions (lb/yr)	Actual Emissions (ton/yr)
			On	Off						
<b>Wood Products Industry</b>										
Hearthmark Inc <sup>[1]</sup>	CO	Yes		x	----	----	----	----	189,620	94.8
	NOx	Yes		x	----	----	----	----	20,920	10.5
	PM 10	Yes		x	----	----	----	----	55,540	27.8
	PM	Yes		x	----	----	----	----	55,540	27.8
	SO2	Yes		x	----	----	----	----	1,040	0.5
	VOC	Yes		x	----	----	----	----	7,660	3.8
<b>Sappi Cloquet LLC<sup>[2]</sup></b>										
	CO	Yes		x	----	----	----	----	4,720,500	2360.3
	NOx	Yes		x	----	----	----	----	2,290,240	1145.1
	PM 10	Yes		x	----	----	----	----	886,260	443.1
	PM	Yes		x	----	----	----	----	886,260	443.1
	SO2	Yes		x	----	----	----	----	836,560	418.3
	VOC	Yes		x	----	----	----	----	211,680	105.8
<b>Mineral Products Industry</b>										
<b>USG Interiors Inc - Cloquet<sup>[3]</sup></b>										
	CO	Yes		x	----	----	----	----	153,340	76.7
	NOx	Yes		x	----	----	----	----	182,540	91.3
	PM 10	Yes		x	----	----	----	----	562,080	281.0
	PM	Yes		x	----	----	----	----	562,080	281.0
	SO2	Yes		x	----	----	----	----	1,100	0.6
	VOC	Yes		x	----	----	----	----	25,140	12.6

Table 6 (cont.)

Category/Facility Name	Pollutant	Point Source?	Location with Respect to FDL		Actual Throughputs (lb/unit)		Emission Factor (lb/unit)		Actual Emissions (lb/yr)	Actual Emissions (ton/yr)
			On	Off						
<b>Fuel Combustion</b>				x						
Great Lakes Compressor Station No. 5 - Cloquet <sup>[4]</sup>	CO	Yes	x		----	----	----	----	252,962 (est'd)	126.5
	NOx	Yes	x		----	----	----	----	989,160	494.6
	PM 10	Yes	x		----	----	----	----	15,640	7.8
	PM	Yes	x		----	----	----	----	15,640	7.8
	SO2	Yes	x		----	----	----	----	440	0.2
	VOC	Yes	x		----	----	----	----	5,920	3.0
	Lead	Yes	x		----	----	----	----	----	----
	Mercury	Yes	x		----	----	----	----	----	----
	Dioxins	Yes	x		----	----	----	----	----	----
Black Bear Casino <sup>[5]</sup>	CO	Yes	x		24.73	MMscf/yr	84	lb/MMscf	2,077.5	1.04
(Natural Gas Usage)	NOx	Yes	x		24.73	MMscf/yr	100	lb/MMscf	2,473.2	1.24
	PM 10	Yes	x		24.73	MMscf/yr	7.6	lb/MMscf	188.0	0.09
	PM	Yes	x		24.73	MMscf/yr	7.6	lb/MMscf	188.0	0.09
	SO2	Yes	x		24.73	MMscf/yr	0.6	lb/MMscf	14.8	0.01
	VOC	Yes	x		24.73	MMscf/yr	5.5	lb/MMscf	136.0	0.07
	Lead	Yes	x		24.73	MMscf/yr	5.00E-04	lb/MMscf	0.0124	0.00
Black Bear Casino <sup>[5]</sup>	CO	Yes	x		1,894.1	MMBtu/yr	0.95	lb/MMBtu	1,799.4	0.90
(Fuel Oil No. 2 Usage)	NOx	Yes	x		1,894.1	MMBtu/yr	4.41	lb/MMBtu	8,352.9	4.18
	PM 10	Yes	x		1,894.1	MMBtu/yr	0.31	lb/MMBtu	587.2	0.29
	PM	Yes	x		1,894.1	MMBtu/yr	0.31	lb/MMBtu	587.2	0.29
	SO2	Yes	x		1,894.1	MMBtu/yr	0.29	lb/MMBtu	549.3	0.27
	VOC	Yes	x		1,894.1	MMBtu/yr	0.35	lb/MMBtu	662.9	0.33

Table 6 (cont.)

Category/Facility Name	Pollutant	Point Source?	Location with Respect to FDL		Actual Throughputs (lb/unit)		Emission Factor (lb/unit)		Actual Emissions (lb/yr)	Actual Emissions (ton/yr)
			On	Off						
School District ISD# 094 <sup>[6]</sup>	CO	Yes	x	x	31.87	MMBtu/yr	84	lb/MMscf	2,676.8	1.34
(Natural Gas Usage)	NOx	Yes	x	x	31.87	MMBtu/yr	100	lb/MMscf	3,186.7	1.59
	PM 10	Yes	x	x	31.87	MMBtu/yr	7.6	lb/MMscf	242.2	0.12
	PM	Yes	x	x	31.87	MMBtu/yr	7.6	lb/MMscf	242.2	0.12
	SO2	Yes	x	x	31.87	MMBtu/yr	0.6	lb/MMscf	19.1	0.01
	VOC	Yes	x	x	31.87	MMBtu/yr	5.5	lb/MMscf	175.3	0.09
	Lead	Yes	x	x	31.87	MMBtu/yr	5.00E-04	lb/MMscf	0.016	8.0E-06
School District ISD# 094 <sup>[6]</sup>	CO	Yes	x		99.03	MMBtu/yr	0.95	lb/MMBtu	188.2	0.09
(No. 2 Fuel Oil Usage -	NOx	Yes	x		99.03	MMBtu/yr	4.41	lb/MMBtu	873.4	0.44
From U of M Forestry Center)	PM 10	Yes	x		99.03	MMBtu/yr	0.31	lb/MMBtu	61.4	0.03
	PM	Yes	x		99.03	MMBtu/yr	0.31	lb/MMBtu	61.4	0.03
	SO2	Yes	x		99.03	MMBtu/yr	0.29	lb/MMBtu	57.4	0.03
	VOC	Yes	x		99.03	MMBtu/yr	0.35	lb/MMBtu	69.3	0.03
<b>Petroleum-Related Industry</b>										
Gas Station(s) <sup>[7]</sup>	VOC	Yes		x	1,351,317	gal/yr	See Table 9	See Table 9	15,810	7.9
<b>Chemical Process Industry</b>										
Chemstar Products Co <sup>[8]</sup>	VOC	Yes		x	NA	NA	NA	NA	600	0.30
<b>Manufacturing</b>										
Body Shop(s) <sup>[9]</sup>	VOC	Yes		x	1,687.0	gal/yr	See Table 6	See Table 6	5,578.2	2.8

Table 6 (cont.)

Category/Facility Name	Pollutant	Point Source?	Location with Respect to FDL		Actual Throughputs (lb/unit)		Emission Factor (lb/unit)		Actual Emissions (lb/yr)	Actual Emissions (ton/yr)
			On	Off						
<b>Area Sources</b>										
Paved Roads <sup>[10]</sup>	PM 10	No	x		13,072,026	miles/yr	1.48	lb/VMT	19,300,000	9,650
	PM		x		13,072,026	miles/yr	1.48	lb/VMT	19,300,000	9,650
Unpaved Roads <sup>[11]</sup>	PM 10	No	x		8,714,684	miles/yr	1.35	lb/VMT	7,900,000	3,950
	PM		x		8,714,684	miles/yr	1.35	lb/VMT	7,900,000	3,950
Prescribed Burning <sup>[12]</sup>	CO	No	x		300	acres/yr	3804	lbs/acre	1,141,200	571
	PM 10		x		300	acres/yr	345	lbs/acre	103,500	52
	PM		x		300	acres/yr	345	lbs/acre	103,500	52
<b>INSIGNIFICANT ACTIVITIES</b>										
Print Shop(s) <sup>[14]</sup>	VOC	Yes		x	877.7	lb/yr	NA	NA	877.7	0.44
<b>Fuel Combustion</b>										
Cloquet Carlton County Airport <sup>[13]</sup>	CO	Yes		x	1.06	MMscf/yr	84	lb/MMscf	89.0	0.04
	NOx	Yes		x	1.06	MMscf/yr	100	lb/MMscf	106.0	0.05
	PM 10	Yes		x	1.06	MMscf/yr	7.6	lb/MMscf	8.1	0.00
	PM	Yes		x	1.06	MMscf/yr	7.6	lb/MMscf	8.1	0.00
	SO2	Yes		x	1.06	MMscf/yr	0.6	lb/MMscf	0.6	0.000
	VOC	Yes		x	1.06	MMscf/yr	5.5	lb/MMscf	5.8	0.00
	Lead	Yes		x	1.06	MMscf/yr	5.00E-04	lb/MMscf	5.30E-04	2.65E-07
	Mercury	Yes		x	----	----	----	----	----	----
Redi-Mix Asphalt Plants <sup>[15]</sup>	Dioxins	Yes		x	----	----	----	----	----	----
	----	Yes	x		----	----	----	----	----	----

Table 6 (cont.)

Category/Facility Name	Pollutant	Point Source?	Location with Respect to FDL		Actual Throughputs (lb/unit)		Emission Factor (lb/unit)		Actual Emissions (lb/yr)	Actual Emissions (ton/yr)
			On	Off						
School District ISD# 093 <sup>[6]</sup>	CO	Yes		x	7.90	MMscf/yr	84	lb/MMscf	1326.6	0.66
	NOx	Yes		x	7.90	MMscf/yr	100	lb/MMscf	1579.2	0.79
	PM 10	Yes		x	7.90	MMscf/yr	7.6	lb/MMscf	120.0	0.06
	PM	Yes		x	7.90	MMscf/yr	7.6	lb/MMscf	120.0	0.06
	SO2	Yes		x	7.90	MMscf/yr	0.6	lb/MMscf	9.5	0.005
	VOC	Yes		x	7.90	MMscf/yr	5.5	lb/MMscf	86.9	0.04
	Lead	Yes		x	7.90	MMscf/yr	5.00E-04	lb/MMscf	7.90E-03	3.95E-06
School District ISD# 099 <sup>[6]</sup>	CO	Yes		x	4.51	MMscf/yr	84	lb/MMscf	757.99	0.38
	NOx	Yes		x	4.51	MMscf/yr	100	lb/MMscf	902.4	0.45
	PM 10	Yes		x	4.51	MMscf/yr	7.6	lb/MMscf	68.580	0.03
	PM	Yes		x	4.51	MMscf/yr	7.6	lb/MMscf	68.580	0.03
	SO2	Yes		x	4.51	MMscf/yr	0.6	lb/MMscf	5.414	0.003
	VOC	Yes		x	4.51	MMscf/yr	5.5	lb/MMscf	49.630	0.02
School District ISD# 0100 <sup>[6]</sup>	Lead	Yes		x	4.51	MMscf/yr	5.00E-04	lb/MMscf	4.51E-03	2.26E-06
	CO	Yes		x	4.51	MMscf/yr	84	lb/MMscf	758.0	0.38
	NOx	Yes		x	4.51	MMscf/yr	100	lb/MMscf	902.4	0.45
	PM 10	Yes		x	4.51	MMscf/yr	7.6	lb/MMscf	68.6	0.03
	PM	Yes		x	4.51	MMscf/yr	7.6	lb/MMscf	68.6	0.03
	SO2	Yes		x	4.51	MMscf/yr	0.6	lb/MMscf	5.4	0.003
<b>Area Sources</b>	VOC	Yes		x	4.51	MMscf/yr	5.5	lb/MMscf	49.6	0.02
	Lead	Yes		x	4.51	MMscf/yr	5.00E-04	lb/MMscf	4.51E-03	2.26E-06
Burn Barrels <sup>[16]</sup>	Dioxins	No	x		1,700,000	lb waste/yr	1712	ng TEQ/kg waste	0.0029	1.46E-06

**Table 6 (cont.)**

Category/Facility Name	Pollutant	Point Source?	Location with Respect to FDL		Actual Throughputs (lb/unit)		Emission Factor (lb/unit)		Actual Emissions (lb/yr)	Actual Emissions (ton/yr)
			On	Off						
Dry Cleaner(s) <sup>[17]</sup>	VOC	Yes		x	270	lb perc/yr	1	lb/lb	270	0.14
Sand & Gravel Mining <sup>[18]</sup>	PM	No	x		----	----	----	----	----	----
Carlton Sanitary Landfill <sup>[19]</sup>	Mercury	No		x	----	----	----	----	----	----
Safety-Kleen Corp <sup>[20]</sup>	VOC	Yes		x	----	----	----	----	----	----
<b>TOTALS</b>	CO									3,234
	NOx									1,751
	PM 10									14,412
	PM									14,412
	SO2									420
	VOC									137
	Lead									0.00002
	Mercury									0.0E+00
	Dioxins									1.5E-06

**Notes**

[1] Actual emissions data from the MPCA's website at <http://www.pca.state.mn.us/air/emissions/emissearch.cfm>; See also Table 3.

[2] Actual emissions data from the MPCA's website at <http://www.pca.state.mn.us/air/emissions/emissearch.cfm>; See also Table 3.

[3] Actual emissions data from the MPCA's website at <http://www.pca.state.mn.us/air/emissions/emissearch.cfm>; See also Table 3.

- [4] Actual emissions data from the MPCA's website at <http://www.pca.state.mn.us/air/emissions/emissearch.cfm>; See also Table 3. CO emissions were not available from Great Lakes Gas for 2001. An estimate was calculated (indexed) based upon the the CO and NOx emissions reported for the year 2000.
- [5] Actual emissions information for Black Bear Casino is provided in Table 5.
- [6] See Table 14 for emissions related information from the local school districts.
- [7] See Table 9 for annual gasoline throughput and emissions information.
- [8] Data is based on actual reported 2000 EPA TRI data. Chemstar total on-site releases for 2000 were 600 lbs of propylene oxide.
- [9] See Table 6 for annual materials use by area body shops.
- [10] See Table 11 for the development of paved road particulate emission estimates.
- [11] See Table 10 for the development of unpaved road particulate emission estimates.
- [12] Prescribed burning emission estimates are summarized in Table 12.
- [13] See Table 4 for Airport fuel use information.
- [14] Actual print shop materials use is provided in Table 13.
- [15] Information for area redi-mix asphalt plants is pending.
- [16] Burn barrel assumptions and information is provided in Tables 7a and 7b.
- [17] See Table 8 for area dry cleaners perchloroethylene use information.
- [18] Sand & gravel mining information is pending.
- [19] Area landfill information is pending; however, covered landfills are expected to be negligible sources of mercury emissions.
- [20] Saftey Kleen (Cloquet) indicated no reportable emissions from their local operation per Stacey Anninson, MN Contact for Safety-Kleen environmental affairs.

Table 7. FDL EI's Small Stationary Sources Compared to Associated Area Source SCC Emissions Reported in the 1999 NEI

Area SCC and description	FDL Small Stationary Sources	FDL total reported emissions, tons/year	Carlton County 1999 NEI, v. 2 emissions	Ratio of FDL Emissions/Carlton Co. Emissions	Ratio of FDL Reservation/Carlton Co. Population
2103006000 Fuel Combustion-- Commercial/Institutional-- Natural Gas--Boilers and IC Engines	Black Bear Casino School Districts: ISD #93, ISD #94, ISD #99, ISD #100 Carlton County Airport	CO: 3.84 NOx: 4.57 PM10: 0.35 SO2: 0.027 VOC: 0.25	CO: 2.45 NOx: 13.44 PM10: 1.56 SO2: 0.08 VOC: NR	CO: 1.57 NOx: 0.34 PM10: 0.22 SO2: 0.34	0.12
2103004000 Fuel Combustion-- Commercial/Institutional-- Distillate Oil--Boilers and IC Engines	Black Bear Casino emergency generators School District ISD #94	CO: 0.99 NOx: 4.6 PM10: 0.32 SO2: 0.30 VOC: 0.37	CO: 0.35 NOx: 0.7 PM10: 0.30 SO2: 3.0 VOC: NR	CO: 2.83 NOx: 6.57 PM10: 1.10 SO2: 0.10	0.12
2501060100 Storage and Transport--Petroleum Products-- Gasoline Service Stations--Stage 2: Total	Gas Stations (5)	VOC: 7.9	VOC: 102.49	VOC: 0.08	0.12

NR = Not reported

Note: The communities included in the FDL EI for small stationary sources are all located in Carlton County.

The FDL EI's emission estimates for the small stationary sources are based on reported or estimated fuel usage and were calculated using AP-42 emission factors and methods. Because the FDL EI estimates are based on actual activity data or activity data estimated based on similar local facilities, it is assumed that the activity data are accurate. Assuming that the 1999 NEI emissions were also calculated using AP-42, the estimates from the FDL EI and the 1999 NEI Carlton County emissions should be comparable when scaled for area and/or population. For the three area source SCCs in Table 7, population could be a surrogate, therefore the ratio of emissions could be expected to be similar to the ratio of population. Since these data are estimates, and the method, emission factors and source of activity data used to calculate the Carlton County emissions are unknown, the data are considered to be comparable if the ratio of population is within the same order of magnitude as the ratio of emissions. Using that criteria, the emissions estimates for CO for SCC 2103006000 and for CO and NO<sub>x</sub> for SCC 2103004000 are lower than would be expected in the 1999 NEI data. Overall, this comparison suggests that both the FDL and 1999 NEI data are reasonable when compared to each other.

### **3) Area Sources**

The FDL EI estimates emissions for PM<sub>10</sub> for paved roads and unpaved roads and for CO and PM<sub>10</sub> for prescribed burning. Burn barrel (open burning of residential household waste) emissions were calculated only for dioxins. Because this report does not cover hazardous air pollutants such as dioxin, the FDL EI burn barrel emissions will not be addressed here.

#### **Paved and Unpaved Roads**

Barr was unsuccessful in obtaining the following road data from the BIA for the FDL EI:

- Vehicle miles traveled on paved and unpaved roadways
- Number of roads blacktopped
- Mean vehicle weight (tons)
- Mean vehicle speed
- Number of travel lanes for each road

Alternately, road emission estimates were based upon 2000/2001 state and federal census data and EPA AP-42 factors. Census data provided average total miles traveled within Minnesota in 2001 as well as an average number of people over the age of 16 on the reservation in 2000. Calculations assumed all those 16 and over were driving their own vehicle. Census data, in combination with emission factors from EPA AP-42, Sections 13.2.1-3 and 13.2.2-2, provided an estimate of PM and PM<sub>10</sub> emissions from roadways located within the reservation. However, in reviewing the EI, ITEP staff discovered that the emissions were miscalculated due to a conversion factor error and an incorrect equation. ITEP recalculated the emissions using information provided in the EI and EPA AP-42, Section 13.2.1, October 2002 and Draft Section 13.2.2, October 2001, since these were the versions of AP-42 referenced in the EI. This resulted in a decrease in paved roads PM<sub>10</sub> emissions from 9,661 tons to 21.2 tons, and an increase in unpaved

roads PM<sub>10</sub> emissions from 3,950 tons to 12,173 tons. Table 8 compares these recalculated emissions with those compiled by ITEP from the 1999 NEI.

Barr noted in their report that, while the roadway particulate emissions were estimated using accepted EPA (AP-42) methodology, the methodology does not yet consider published data suggesting that approximately 90 percent of PM<sub>10</sub> generated by vehicles passing over road surfaces settles out within 50 meters of the road side.<sup>1</sup> The “Documentation for the Final 1999 National Emissions Inventory (Version 3.0) for Criteria Air Pollutants and Ammonia” states that various levels of controls were assumed for both paved and unpaved roads, with control efficiencies ranging from 75% to 96% and rule penetrations of 50% to 75% depending on rural or urban status and attainment status.

Table 8: FDL EI and 1999 NEI Paved and Unpaved Road Emission Comparisons

SCC and Source Description	Corrected FDL EI PM10 Emissions, tons/year	Corrected FDL EI PM10 Emissions Reduced by 90%, tons/year	1999 NEI PM10 emissions for two counties overlapping FDL Reservation, tons/year
2294000000 – All Paved Roads	21.2	2.1	2,390
2296000000 – All Unpaved Roads	12,173	1,217	25,416

Because the FDL EI Paved and Unpaved Road emissions are based on reports of overall VMT for the state of Minnesota and not on vehicle counts or road miles present on the FDL Reservation, it is expected that these estimates may not be accurate. The significant variance between the PM<sub>10</sub> emissions calculated in the FDL EI and those compiled from the 1999 NEI demonstrate that the actual emissions of PM<sub>10</sub> from these source types are uncertain. Additionally, the unpaved road emissions for FDL are high in comparison to the paved road emissions. The unpaved road emissions in the 1999 NEI are about ten times the paved road emissions, while the FDL unpaved road emissions are over 500 times the paved road emissions. Part of this difference could be attributed to there being more unpaved roads on the reservation. It is, however, doubtful that the magnitude of difference in the unpaved road VMTs between the FDL Reservation and the counties is great enough to cause that significant of a difference in the ratios of paved to unpaved road emissions. Barr estimated the surface moisture and material silt content values used in calculating the unpaved road emissions from the range of source conditions that EPA used in developing the unpaved road emission calculation, which are presented in AP-42, Section 13.2.2, Unpaved Roads. Barr chose the lowest end of the range for surface moisture content in order to represent the worst-case scenario. Barr estimated the surface silt content to be 15 %, which is approximately the middle of the range. In the Related Information file for this section of AP-42, there is a table of default surface material silt content values used by EPA to calculate unpaved road emissions for

<sup>1</sup> Air & Waste Management Association/Davis, W.T.; Air Pollution Engineering Manual, 2nd Edition; John Wiley & Sons; 2000; Page 125.

the NEI. The silt content value for the state of Minnesota is 2.6 %. Use of the low surface moisture content and high surface material silt content values may have resulted in unreasonably high unpaved road emissions for the FDL Reservation. It would benefit FDL to investigate sources of locally derived surface moisture and silt content data. Additionally, it would benefit FDL and the regional inventory to collect better activity data for miles of paved and unpaved roads and vehicle miles traveled.

### Prescribed Burning

Prescribed burning is a normal, scheduled activity on FDL reservation land and a source of fugitive combustion emissions. Barr’s discussions with the Forest Service indicated that the preferred method of quantifying these emissions is through the use of a model named First Order Fire Emission Monitoring, Version 5.0 (FOFEM). The input parameters for the model were obtained from Mr. Vern Northrup with the Fond du Lac forestry staff.

Table 9 compares the emissions calculated by Barr for the FDL EI with those compiled by ITEP from the 1999 NEI.

Table 9: FDL EI and 1999 NEI Prescribed Burning Emission Comparisons

SCC and Source Description	FDL EI Emissions, tons/year	1999 NEI emissions for two counties overlapping FDL Reservation, tons/year	Ratio of FDL Emissions over St.Louis+Carlton County Emissions	Ratio of FDL Reservation Land Area Over St.Louis+Carlton County Land Area
2810015000 – Prescribed Burning for Forest Management	CO: 571 PM10: 52	CO: 6937 PM10: 675	CO: 0.08 PM10: 0.08	0.02

ITEP’s compilation of area source emissions from the 1999 NEI included emissions from both Carlton and St. Louis Counties. The total area for these two counties is 7,664 square miles and the reservation area is 158 square miles, or approximately 2% of the land area of the counties.

Since these data are estimates, and the method, emission factors and source of activity data used to calculate the 1999 NEI county emissions are unknown, the data are considered to be comparable if the ratio of land areas is within the same order of magnitude as the ratio of emissions. This criteria suggests that both the FDL and 1999 NEI data are reasonable when compared to each other.

#### 4) Sources Not Covered in the FDL EI

Barr lists the following examples of air emission sources within the boundary of the initial inventory effort that were not included in the inventory:

- Agricultural activities (possibly field work, harvesting, feedlots, crop dusting, etc.)
- Mobile sources (engine emissions from cars, trucks, buses, heavy duty equipment, farm equipment, local aircraft, etc.)
- Mining (sand and gravel pits)

- Road construction activities (including asphalt plants)
- General construction activities
- Residential wood burning
- Small engine sources (recreational equipment or vehicles, lawn and garden equipment, etc.)
- Consumer products use (residential painting/finishing, aerosol product dispensing, etc.)
- Food preparation (possibly restaurant grill venting, outdoor grilling, meat smoking, etc.).

Barr expressed belief that small engines, consumer product use, and food preparation sources were expected to represent fairly insignificant emission totals (<1 ton per year). Barr expressed in the FDL EI that sand and gravel mining activities can represent significant emission sources; however, found it unclear whether this activity was occurring on the reservation. Barr stated in the FDL EI that “Agricultural activities and mobile sources are fairly large categories with potentially significant emissions. Quantifying such emissions tends to rely on wide-ranging estimates, which may be difficult to develop; however, agricultural and mobile source emissions probably represent the largest segment of emissions still to be addressed.”

## ***5) Conclusions and Recommendations Based on Comparison of FDL EI with the 1999 NEI Data***

ITEP’s compilation of the 1999 NEI data found 8 point sources with locations on the FDL reservation that were not included in the FDL EI. Although FDL has specified that these points are not located on the reservation, FDL may want to include them in future inventory efforts based on their level of emissions and distance from the reservation. The comparison of the small stationary sources inventoried for the FDL EI with the related 1999 NEI area source SCCs suggests that both the FDL and 1999 NEI data are reasonable when compared to each other. Comparison of the paved and unpaved road particulate matter emission estimates from the FDL EI and the 1999 NEI do not provide evidence for the reasonableness or representativeness of either set of estimates. This analysis suggests that it would benefit FDL and the regional inventory to collect better activity data for miles of paved and unpaved roads and vehicle miles traveled. Additionally, it would benefit FDL to investigate sources of locally derived surface moisture and material silt content values. The errors in the equations used to calculate paved and unpaved road emissions for the FDL reservation should also be corrected. Comparison of the FDL EI and 1999 NEI prescribed burning estimates suggest that the FDL EI and 1999 NEI data are reasonable when compared to each other. It is unclear if Barr attempted to locate and quantify sand and gravel pit mining on the FDL reservation for this emission inventory. FDL should consider either quantifying the number and magnitude of these types of operations on their reservation or confirming that they are absent from the reservation in future EI efforts.

Of the sources Barr listed as air pollution sources within the boundary of their inventory effort for FDL that were not included in the current FDL EI, several have been identified by ITEP as needing improvement for the regional inventory. These include:

- Stationary Source Fuel Combustion, Residential
- Solvent Utilization, Non-Industrial Commercial Pesticide Application
- Misc. Area Sources, Agricultural Crops Tilling

Although Barr lists non-road engines, consumer product use and food preparation sources as “expected to represent fairly insignificant emission totals (<1 ton per year),” they do not cite any evidence or data to support this conclusion. ITEP’s analysis of reasonableness for non-road mobile sources suggested that variation between states was observed for 2-stroke gasoline pleasure craft (outboard motors and personal watercraft) and snowmobiles. FDL could consider including activity levels for these types of non-road engines in future inventory efforts.

On-road mobile source emissions are listed by Barr, along with agricultural emissions, as “probably the largest segment of emissions still to be addressed” for future FDL EI efforts. FDL should consider an inventory of road types and vehicle activity levels on its reservation for future inventory efforts.

## **VII) ONEIDA NATION EMISSION INVENTORY COMPARISON WITH ITEP’S COMPILATION OF 1999 NEI DATA FOR THE ONEIDA NATION RESERVATION**

The 2002 EI conducted by the Oneida Nation was compared to the information compiled by ITEP from the 1999 NEI, version 2. The Oneida Nation EI reports emissions from point, area, non-road mobile, on-road mobile, and biogenic sources. In the data set compiled by ITEP, geographic analysis identified point sources listed in the 1999 NEI with release points located within the reservation boundaries. Non-point source data were compiled from the 1999 NEI for selected source categories for the two counties that overlap the Oneida Nation Reservation, Brown and Outagamie Counties. Because this report does not cover biogenic sources, these emissions will not be addressed here. The emissions summary table from the Oneida Nation EI is attached to this report in [Appendix V](#).

### **1) Point Sources**

The Oneida Nation EI lists 34 point sources. Emissions are not reported for 4 of the point sources, due to unavailable data, negligible emissions, or the facility being closed. To compare the Oneida EI with the 1999 NEI, it is necessary to assess whether the Oneida EI has included facilities on their list of point sources which would be included in area source categories in the 1999 NEI. Of the 30 point sources that emissions are reported for, 22 are classified as Industrial/Commercial Point Sources and the remaining 8 are classified as Gasoline Distribution Sources. ITEP assumes that the Gasoline Distribution Sources would be represented in the storage and transport of petroleum products area source categories in the 1999 NEI. For 5 of the Industrial/Commercial Point Sources, the only emissions reported in the EI are from commercial heating. ITEP therefore assumes that these point sources would be included in the commercial fuel combustion area source categories in the 1999 NEI. ITEP

assumes that emissions from several other Oneida Nation EI point sources would be included in the area source categories of the 1999 NEI. These include emissions from 2 fire departments (motor vehicle practice burns) and 3 golf courses (commercial pesticide application).

After removing those facilities likely to be included in area source categories for the NEI, the remaining 12 point sources are:

- Anamax Corporation
- Ashwaubenon Auto Repair
- Calwis Company, Inc.
- Dave's Auto Body
- Fort Howard Sludge Lagoon
- G & K Services
- MSW Transfer Station Construction
- Oneida Print Shop
- R & D Services
- Reliance Machine
- Structural Components Corporation
- Valley Excavating

ITEP's search of the 1999 NEI for sources on the Oneida Nation reservation found G & K Services and Structural Components Corporation. These were the only two sites found on the reservation in the 1999 NEI. However, this search identified Anamax Corporation as being within 1 mile of the reservation. None of the other point sources identified in the Oneida Nation EI were found in the 1999 NEI. The Oneida Nation has released the data they developed on point sources located on the reservation to be included in future versions of the NEI.

## **2) Area Sources**

The area source categories, including those representing point sources that ITEP assumed would be included in the area source categories in the 1999 NEI, reported in the Oneida Nation EI are:

- Motor vehicle fires
- Commercial pesticide use
- Commercial natural gas heating
- Commercial coal heating
- Gasoline distribution
- Agricultural fertilizer use
- Agricultural harvesting
- Agricultural pesticide use
- Agricultural tilling
- Architectural surface coating
- Consumer and commercial solvent use
- Wildfires
- Permitted grass and brush burning
- Residential open burning of municipal solid waste

- Residential woodstoves
- Residential natural gas heating
- Residential propane heating
- Residential fuel oil heating
- Residential coal heating
- Structure fires
- Paved and unpaved road dust

The paved and unpaved road dust emissions are reported in the Mobile Sources spreadsheets of the Oneida Nation EI. They are summed with the mobile vehicle emissions and were extracted by ITEP for the purpose of comparing with the 1999 NEI.

ITEP's compilation of non-point source emissions from the 1999 NEI included emissions from Brown, Outagamie, and Shawano Counties. However, Shawano County is an adjacent county to the reservation, rather than an intersecting county, so emissions from Shawano County are not compared to Oneida Nation EI emissions. When emissions estimates cannot be compared directly, they are compared using surrogates, such as land area or population. The Oneida Nation EI includes spreadsheets on land area and population, which distribute the total reservation land area and population to the section of the reservation overlapping Brown or Outagamie Counties. The total reservation land area and population data are comparable, but not identical, to the land area data calculated from BIA files and the US Census 2000 reservation population data. For purposes of this report, the Oneida Nation EI reservation land area and population data set is used instead of the land area and population data determined from BIA files and US Census 2000 data, since it is assumed to be the more accurate of the two sets. Land area data for Brown and Outagamie Counties are calculated by ITEP from the US Census Bureau Tiger files and population data are from the US Census 2000 estimates. The land use and population data are compared in Tables 10, 11, and 12.

Table 10: Oneida Nation, Brown County, and Outagamie County Land Area (Square Miles)

Data Source	Reservation Land Area in Brown County	Brown County Land Area	Reservation Land Area in Outagamie County	Outagamie County Land Area	Total Reservation Land Area	Total Brown and Outagamie Counties Land Areas
Oneida Nation EI	41	NR	60	NR	101	NR
Calculated from BIA or U.S. Census Bureau Tiger Files	NR	533.6	NR	642.7	102	1,176

NR = Not Reported

Table 11: Oneida Nation, Brown County, and Outagamie County Population

Data Source	Reservation Population in Brown County	Brown County Population	Reservation Population in Outagamie County	Outagamie County Population	Total Reservation Population	Total Brown and Outagamie Counties Population
Oneida Nation EI	17,276	NR	3,978	NR	21,254	NR
U.S. Census 2000	NR	226,778	NR	160,971	21,319	387,749

NR = Not Reported

Table 12: Oneida Nation Land Area and Population Percentages of Brown and Outagamie Counties

	Percent of Brown County	Percent of Outagamie County	Percent of Total Brown and Outagamie Counties
Reservation Land Area	8 %	9 %	9 %
Reservation Population	8 %	2 %	5 %

Several of the area sources reported in the Oneida Nation EI are not covered in this report and are therefore not compared to the emissions in the 1999 NEI. The following area sources from the Oneida Nation EI are covered in this report and compared to 1999 NEI data:

- Commercial pesticide use
- Commercial coal heating
- Commercial natural gas heating
- Residential fuel oil heating
- Residential natural gas heating
- Wildfires
- Permitted grass and brush burning
- Residential open burning of municipal solid waste
- Agricultural tilling
- Paved and unpaved road dust

Although this report does cover Stage 2 emissions from gasoline service stations, the Oneida Nation EI does not include Stage 2 emissions in the gasoline distribution spreadsheet, so a comparison was not performed for this source. Additionally, lead emissions are reported in the Oneida Nation EI for most sources. Because this report does not cover lead, these emissions will not be addressed here.

### Commercial Pesticide Use

The Oneida Nation EI reports VOC emissions from pesticide use on 3 golf courses. The tribe was unable to obtain activity data from one of the golf courses. Therefore, to represent the worst-case scenario, the tribe assumed that emissions for this golf course were the same as those for the golf course with the highest emissions in the area. In reviewing this EI, ITEP identified an error in the calculations due to an incorrect unit conversion. ITEP recalculated emissions, which resulted in a decrease in total VOC emissions for this source from 0.17 tons to 0.15 tons. All of the golf courses are located in Brown County, therefore only the 1999 NEI Brown County emissions are used for comparison. Table 13 compares the emissions calculated in the Oneida Nation EI (corrected by ITEP) with those compiled by ITEP from the 1999 NEI.

Table 13: 2002 Oneida Nation EI and 1999 NEI Commercial Pesticide Use Emission Comparison

Area SCC and description	Oneida Nation total reported VOC emissions, tons/year	Brown County 1999 NEI, v. 2, VOC emissions, tons/year	Ratio of Oneida Nation Emissions/Brown Co. Emissions	Ratio of Oneida Nation Land Area (Brown Co.)/Brown Co. Land Area
2461800000 Solvent Utilization--Commercial--Pesticide Application--Total: All Solvent Types	0.15	189.1	0.0008	0.08

The Oneida Nation EI's emission estimates for commercial pesticide use were calculated using EIIP methods. Because the Oneida Nation EI estimates are based on actual activity data or activity data estimated based on similar local facilities, it is assumed that the activity data are accurate. Since the 1999 NEI emissions may not have been calculated using EIIP methods, the estimates from the Oneida Nation EI and the 1999 NEI Brown County emissions may not be comparable. To compare these emissions, land area was used as a surrogate for these data. Since these data are estimates, and the method, emission factors and source of activity data used to calculate the Brown County emissions are unknown, the data are considered to be comparable if the ratio of land area is within the same order of magnitude as the ratio of emissions. Using that criteria, the emissions are higher than would be expected in the 1999 NEI data. This comparison suggests that the Oneida Nation and 1999 NEI data are not reasonable when compared to each other.

Besides possible variations in the emission calculation methods, the difference between the Oneida Nation and 1999 NEI data may be due to the limited instances of commercial pesticide use that the Oneida Nation inventoried. The Oneida Nation only inventoried the golf course sector of commercial pesticide application. It would benefit the Oneida Nation and the regional inventory to determine if there are additional sources of commercial pesticide use on the reservation. It is also possible that there is less commercial pesticide use on the reservation than in the surrounding counties.

### **Commercial Heating (Coal and Natural Gas)**

The Oneida Nation reports natural gas commercial heating emissions from 10 facilities and reports bituminous coal commercial heating emissions from 1 facility. The tribe was unable to obtain the amount of natural gas consumed for 8 of these facilities. For these facilities, the tribe estimated the consumption based on the average of the 2 known consumption values and the square footage of the buildings. All of the facilities, except for one facility using natural gas in the section of the reservation that overlaps Outagamie County, are in the section of the reservation that overlaps Brown County. Therefore, emissions for the one facility in the section of the reservation that overlaps Outagamie County were compared to the 1999 NEI data for Outagamie County and the emissions for the remaining facilities were compared to 1999 NEI data for Brown County, as shown in Table 14. Activity data for natural gas commercial heating were available and are compared in Table 15. The Oneida Nation EI reports natural gas commercial heating activity data and the Wisconsin Department of Natural Resources supplied the activity data for Brown and Outagamie Counties.

Table 14: 2002 Oneida Nation EI and 1999 NEI Commercial Heating Emission Comparison

Area SCC and description	Oneida Nation total reported emissions (Brown Co.), tons/year	Brown Co. 1999 NEI, v. 2, emissions, tons/year	Ratio of Oneida Nation Emissions (Brown Co.)/ NEI Brown Co. Emissions	Ratio of Oneida Nation Population (Brown Co.)/ Brown Co. Population	Oneida Nation total reported emissions (Outagamie Co.), tons/year	Outagamie Co. 1999 NEI, v. 2, emissions, tons/year	Ratio of Oneida Nation Emissions (Outagamie Co.)/ NEI Outagamie Co. Emissions	Ratio of Oneida Nation Population (Outagamie Co.)/ Outagamie Co. Population
2103002000 Fuel Combustion--Commercial--Coal--Boilers and IC Engines	CO: 0.01 NOx: 0.03 PM10: 0.03 SO2: 0.12 VOC: ND	CO: 0.56 NOx: 38.08 PM10: 5.73 SO2: 297.02 VOC: 0.07	CO: 0.02 NOx: 0.0008 PM10: 0.005 SO2: 0.0004	0.08	No Sources	CO: 0.37 NOx: 25.37 PM10: 3.96 SO2: 205.28 VOC: 0.05	Not Applicable	0.02
2103006000 Fuel Combustion--Commercial--Natural Gas--Boilers and IC Engines	CO: 0.45 NOx: 0.53 PM10: NR SO2: ND VOC: 0.03	CO: 178.7 NOx: 212.74 PM10: 25 SO2: 1.3 VOC: 11.27	CO: 0.003 NOx: 0.002 VOC: 0.003	0.08	CO: ND NOx: 0.01 PM10: NR SO2: ND VOC: ND	CO: 119.05 NOx: 141.72 PM10: 17.24 SO2: 0.9 VOC: 7.51	NOx: 0.00007	0.02

NR = Not reported, ND = Negligible emissions (less than 0.01 tons/year)

Table 15: 2002 Oneida Nation EI and 1999 NEI Commercial Natural Gas Heating (SCC 2103006000) Activity Data Comparison

	Oneida Nation EI (Brown Co.)	Brown County 1999 NEI, v. 2	Oneida Nation EI (Outagamie Co.)	Outagamie County 1999 NEI, v. 2
Activity Data (million cubic feet natural gas)	10.627	3,744.872	0.117	2,489.718
Population	17,276	226,778	3,978	160,971
Per Capita Activity Data (million cubic feet/person)	0.0006	0.02	0.00003	0.02

The Oneida Nation EI's emission estimates for commercial heating were calculated using AP-42 emission factors and methods. Because the Oneida Nation EI estimates are based on actual activity data or activity data estimated based on similar local facilities, it is assumed that the activity data are accurate. Assuming that the 1999 NEI emissions were also calculated using AP-42, the estimates from the Oneida Nation EI and the 1999 NEI Brown and Outagamie County emissions should be comparable. To compare these emissions, population was used as a surrogate for these data. The data are considered to be comparable if the ratio of population is within the same order of magnitude as the ratio of emissions. Using that criteria, only the CO emissions estimates for commercial coal heating, SCC 2103002000, are comparable. All other emissions are higher than would be expected in the 1999 NEI data. Overall, this comparison suggests that the Oneida Nation and 1999 NEI data are not reasonable when compared to each other.

The difference between the Oneida Nation and 1999 NEI data may be due to the limited instances of commercial heating that the Oneida Nation inventoried. The Oneida Nation per capita commercial natural gas use values calculated in Table 15 are several orders of magnitude less than those calculated for Brown and Outagamie County. The Oneida Nation only included commercial heating emissions for 11 of their 34 point sources. For some sources, such as the sand pit, there are probably not any commercial heating emissions. However, for the other sources where potential commercial heating emissions do occur, it would benefit the Oneida Nation and the regional inventory to collect activity data or estimate emissions based on the building size. Additionally, it may be beneficial for the tribe to contact the coal and natural gas distributors to determine if commercial fuel usage data for the reservation can be obtained. It is also possible that there is less commercial heating occurring on the reservation than in the surrounding counties.

### **Residential Heating (Fuel Oil and Natural Gas)**

The Oneida Nation calculated residential heating emissions from several different fuels, which include natural gas, propane, fuel oil, coal, and wood incinerated in woodstoves. However, only fuel oil and natural gas are covered in this report, so only emissions for these two fuel sources will be compared. Table 16 compares the fuel oil and natural gas residential heating emissions calculated in the Oneida Nation EI with those compiled by ITEP from the 1999 NEI. For these sources, the Oneida Nation EI does not allocate emissions to the portion of the counties that the reservation overlaps. Emissions for the entire reservation will be compared to the sum of the emissions for Brown and Outagamie Counties.

Table 16: 2002 Oneida Nation EI and 1999 NEI Residential Heating Emission Comparison

Area SCC and description	Oneida Nation total reported emissions, tons/year	Brown Co. 1999 NEI, v. 2 emissions, tons/year	Outagamie Co. 1999 NEI, v. 2 emissions, tons/year	Sum of Brown and Outagamie Co. emissions, tons/year	Ratio of Oneida Nation emissions/Sum of Brown and Outagamie Co. emissions	Ratio of Oneida Nation Population/Sum of Brown and Outagamie Co. Population
2104004000 Fuel Combustion--Residential--Distillate Oil--Total: All Combustor Types	CO: 0.42 NOx: 1.51 PM10: NR SO2: 6.04 VOC: 0.06	CO: 12.9 NOx: 46.44 PM10: 22.38 SO2: 69.1 VOC: 6.43	CO: 9.44 NOx: 33.99 PM10: 40.79 SO2: 125.67 VOC: 4.7	CO: 22.34 NOx: 80.43 PM10: 63.17 SO2: 194.77 VOC: 11.13	CO: 0.02 NOx: 0.02 SO2: 0.03 VOC: 0.005	0.05
2104006000 Fuel Combustion--Residential--Natural Gas--Total: All Combustor Types	CO: 5.52 NOx: 12.96 PM10: NR SO2: 0.08 VOC: 0.76	CO: 106.64 NOx: 250.61 PM10: 39.72 SO2: 2.05 VOC: 14.66	CO: 78.05 NOx: 183.43 PM10: 22.16 SO2: 1.19 VOC: 10.73	CO: 184.69 NOx: 434.04 PM10: 61.88 SO2: 3.24 VOC: 25.39	CO: 0.03 NOx: 0.03 SO2: 0.02 VOC: 0.03	0.05

NR = Not reported

The Oneida Nation EI's emission estimates for the residential heating were calculated using AP-42 emission factors and methods. Because the Oneida Nation EI estimates are based on actual activity data, it is assumed that the activity data are accurate. Assuming that the 1999 NEI emissions were also calculated using AP-42, the estimates from the Oneida Nation EI and the 1999 NEI Brown and Outagamie County emissions should be comparable. To compare these emissions, population was used as a surrogate for these data. The data are considered to be comparable if the ratio of population is within the same order of magnitude as the ratio of emissions. Using that criteria, the emissions estimates for both distillate oil and natural gas residential heating from the Oneida Nation EI and the 1999 NEI data are reasonable when compared to each other.

## **Land Burning**

The Oneida Nation EI reports emissions from wildfires, permitted grass fires, and permitted grass and brush fires. There is a separate category for prescribed burning in the EI, however, there are no reported emissions. Therefore, for the purposes of this report, ITEP assumes that the permitted grass fires and permitted grass/brush fires emissions would be the most comparable to the 1999 NEI prescribed burning emissions category. Additionally, emissions for the permitted grass fires were only reported for 0.0046 reservation acres overlapping Outagamie County, which resulted in emissions of less than 0.01 tons for each of the pollutants reported. These emissions are negligible when compared to emissions reported from grass/brush fires, therefore for purposes of this report, they will not be compared to the 1999 NEI data. The Oneida Nation EI reports PM10 emissions for wildfires, however, it also reports "no data" for the PM10 emission factor. ITEP assumes that the PM10 emissions reported are in error. Therefore, they will not be compared in this report. Table 17 compares all other emissions from land burning activities.

For wildfires, ITEP identified that the 1999 NEI emissions for Brown County were provided by the state of Wisconsin for CO, NO<sub>x</sub>, and VOC and that EPA's Area Source Emission Model (ASEM) was used to calculate PM10 and SO<sub>2</sub> emissions. Therefore, two different sets of activity data were potentially used to calculate emissions. Since only CO, NO<sub>x</sub>, and VOC emissions are compared in this report, the activity data in the Oneida Nation EI should be compared to the activity data used by the state. However, the state activity data are not available in the 1999 NEI. Conversely, for Outagamie County, ASEM was used to calculate emissions for all pollutants. The available activity data and emission factors are compared in Table 18. Prescribed burning emissions for both Brown and Outagamie Counties for all pollutants were calculated from EPA's ASEM. Activity data and emission factors are therefore available for comparison and are provided in Table 19.

Table 17: 2002 Oneida Nation EI and 1999 NEI Land Burning Emission Comparison

Area SCC and description	Oneida Nation total reported emissions (Brown Co.), tons/year	Brown Co. 1999 NEI, v. 2 emissions, tons/year	Ratio of Oneida Nation Emissions (Brown Co.)/ NEI Brown Co. Emissions	Ratio of Oneida Nation Land Area (Brown Co.)/Brown Co. Land Area	Oneida Nation total reported emissions (Outagamie Co.), tons/year	Outagamie Co. 1999 NEI, v. 2 emissions, tons/year	Ratio of Oneida Nation Emissions (Outagamie Co.)/NEI Outagamie Co. Emissions	Ratio of Oneida Nation Land Area (Outagamie Co.)/ Outagamie Co. Land Area
2810001000 Misc. Area Sources--Other Combustion--Forest Wildfires--Total	CO: 154.35 NOx: 4.37 PM10: ER SO2: NR VOC: 26.41	CO: 11.55 NOx: 0.33 PM10: 1.88 SO2: 0.02 VOC: 1.98	CO: 13.36 NOx: 13.24  VOC: 13.34	0.08	CO: 38.59 NOx: 1.09 PM10: ER SO2: NR VOC: 6.6	CO: 21.57 NOx: 0.62 PM10: 2 SO2: 0.02 VOC: 2.96	CO: 1.79 NOx: 1.76  VOC: 2.23	0.09
2810015000 Misc. Area Sources--Other Combustion--Prescribed Burning for Forest Management--Total	CO: 0.90 NOx: NR PM10: 0.11 SO2: NR VOC: 0.12	CO: 31.02 NOx: 0.54 PM10: 3.02 SO2: 0.02 VOC: 1.38	CO: 0.03  PM10: 0.04  VOC: 0.09	0.08	CO: 0.25 NOx: NR PM10: 0.03 SO2: NR VOC: 0.03	CO: 39.08 NOx: 0.68 PM10: 3.8 SO2: 0.02 VOC: 1.74	CO: 0.006  PM10: 0.008  VOC: 0.02	0.09

NR = Not reported, ER = Not included in this report due to an error in EI

Table 18: 2002 Oneida Nation EI and 1999 NEI Activity and Emission Factor Comparison for Wildfires (SCC 2810001000)

	Oneida Nation (Brown Co.)	1999 NEI Brown Co.	Oneida Nation (Outagamie Co.)	1999 NEI Outagamie Co.
Activity Data (tons of fuel burned)	2,200	NR	550	308.11
Fuel Load (tons/acre)	11	NR	11	11
Land Burned (acres)	200	NR	50	28.01
Total Land Area (acres)	26,202.528	341,484.8	38,405.092	411,308.8
Ratio of Acres Burned/Total Acres	0.008	NA	0.001	0.00007
Emission Factors (lb/ton)	CO: 140.32 NOx: 3.97 PM10: NR SO2: NR VOC: 24.01	CO: NR NOx: NR PM10: 13 SO2: 0.15 VOC: NR	CO: 140.32 NOx: 3.97 PM10: NR SO2: NR VOC: 24.01	CO: 140 NOx: 4 PM10: 13 SO2: 0.15 VOC: 19.2

NR = Not reported, NA = Not applicable

Table 19: 2002 Oneida Nation EI and 1999 NEI Activity and Emission Factor Comparison for Prescribed Burning (SCC 2810015000)

	Oneida Nation (Brown Co.)	1999 NEI Brown Co.	Oneida Nation (Outagamie Co.)	1999 NEI Outagamie Co.
Activity Data (tons of fuel burned)	12.88	215.7118	3.542	271.7725
Fuel Load (tons/acre)	70	8.67	70	8.67
Land Burned (acres)	0.184	24.871	0.0506	31.335
Total Land Area (acres)	26,202.528	341,484.8	38,405.092	411,308.8
Ratio of Acres Burned/Total Acres	0.000007	0.00007	0.000001	0.00008
Emission Factors (lb/ton)	CO: 140 NOx: NR PM10: 17 SO2: NR VOC: 19	CO: 287.6 NOx: 5 PM10: 28 SO2: 0.15 VOC: 12.8	CO: 140 NOx: NR PM10: 17 SO2: NR VOC: 19	CO: 287.6 NOx: 5 PM10: 28 SO2: 0.15 VOC: 12.8

NR = Not reported

The Oneida Nation EI's emission estimates for land burning were calculated using AP-42 emission factors and methods. Because the Oneida Nation EI estimates are based on actual activity data, it is assumed that the activity data are accurate. To compare these emissions, land area was used as a surrogate for these data. The data are considered to be

comparable if the ratio of land area is within the same order of magnitude as the ratio of emissions. Using that criteria, none of the emissions estimates for wildfires, SCC 2810001000, are comparable. All emissions are lower than would be expected in the 1999 NEI data. The fuel load and emission factors used in the Oneida Nation EI and those from ASEM used to generate the 1999 NEI emission data for Outagamie County are comparable, except for the VOC emission factor. AP-42 Section 13.1, Wildfires and Prescribed Burning, reports a VOC emission factor expressed as methane. ITEP assumes that ASEM uses a correction factor for VOCs, which would account for the differences in VOC emission factors used in the Oneida Nation EI and the Outagamie County data.

Since the emission and load factors are comparable, ITEP concludes that the differences in the estimates of acreage burned in wildfires accounts for the differences in emissions between the Oneida Nation and Outagamie County. The ratio of land burned to total land coverage is more than an order of magnitude smaller for Outagamie County than it is for the section of the reservation overlapping Outagamie County. According to the additional criteria source information downloaded from the EPA's Clearinghouse for Inventories & Emission Factors (CHIEF) website for 1999 NEI version 2 data, the U.S. Department of Interior (DOI) agencies and the U.S. Forest Service (USFS) are the sources for the acreage burned by wildfires used in ASEM. The state-level data supplied by these agencies are allocated to the county-level using the proportion of land cover types in the county. Since the acreage burned by wildfires in the Oneida Nation EI is based on local estimates, it is believed to be more accurate than the acreage used for Outagamie County. Since activity data and CO, NO<sub>x</sub>, and VOC emission factors are not available for the 1999 NEI Brown County data, the source of the variation in the emissions between the portion of the Oneida Nation Reservation overlapping Brown County and the 1999 NEI Brown County emissions cannot be determined. It should be noted that actual wildfire activity may have varied between the 2 years being compared, 2002 for the Oneida Nation EI and 1999 for the NEI.

For prescribed burning, SCC 2810015000, emissions from the Oneida Nation EI for the portion of the reservation overlapping Brown County and emissions from the 1999 NEI for Brown County are within the same order of magnitude. However, only VOC emissions from the Oneida Nation EI for the portion of the reservation overlapping Outagamie County and VOC emissions from the 1999 NEI for Outagamie County are within the same order of magnitude. CO and PM<sub>10</sub> emissions are higher than would be expected in the 1999 NEI data. There is much variation between fuel loads and emission factors used in the Oneida Nation EI and the 1999 NEI data for Brown and Outagamie Counties. Although both emissions were calculated using AP-42 emission factors, the Oneida Nation EI uses AP-42 Section 2.5, Open Burning, and the 1999 NEI data uses AP42, Section 13.1, Wildfires and Prescribed Burning.

The ratio of land consumed by prescribed burns to total land coverage is more than an order of magnitude larger for Outagamie County than it is for the portion of the reservation overlapping Outagamie County. According to the additional criteria source information downloaded from the EPA's CHIEF website for 1999 NEI version 2 data, the U.S. DOI agencies and USFS are the sources of acreage consumed by prescribed burns used in ASEM. The state-level data supplied by these agencies are allocated to the county-level using the proportion of land cover types in the county. Since the acreage consumed by prescribed burns in the Oneida Nation EI is based on information from the

local fire departments, it is believed to be more accurate than the acreage used for Outagamie County. The variations in emission factors, load factors, activity data and actual activity levels could all be contributing sources to the differences in the emissions between the portion of the Oneida Nation Reservation overlapping Outagamie County and the 1999 NEI Outagamie County emissions.

### Residential Open Burning of Municipal Solid Waste

The Oneida Nation EI reports emissions from residential open burning of municipal solid waste for portions of the reservation overlapping both Brown and Outagamie Counties. The 1999 NEI includes only emissions for Outagamie County. Therefore, only the emissions from the portion of the reservation that overlaps Outagamie County are used for the comparison in Table 20. ITEP identified that ASEM was used to calculate the 1999 NEI emissions for Outagamie County. Activity data and emission factors are therefore available for comparison and are provided in Table 21. Waste burning population data and the pounds of waste burned per person, also provided in Table 21, were obtained from the additional criteria source information downloaded from the EPA’s CHIEF website for 1999 NEI version 2 data.

Table 20: 2002 Oneida Nation EI and 1999 NEI Residential Open Burning of Municipal Solid Waste Emission Comparison

Area SCC and description	Oneida Nation total reported emissions (Outagamie Co.), tons/year	Outagamie County 1999 NEI, v. 2 emissions tons/year	Ratio of Oneida Nation Emissions (Outagamie Co.)/Outagamie Co. Emissions	Ratio of Oneida Nation Population (Outagamie Co.)/Outagamie Co. Population
2610030000 Waste Disposal, Treatment, and Recovery--Open Burning--Residential--Household Waste	CO: 28.6 NOx: 2.02 PM10: NR SO2: 0.34 VOC: 10.09	CO: 310.94 NOx: 21.95 PM10: 139.01 SO2: 3.66 VOC: 109.75	CO: 0.09 NOx: 0.09 SO2: 0.09 VOC: 0.09	0.02

Table 21: 2002 Oneida Nation EI and 1999 NEI Activity and Emission Factor Comparison for Residential Open Burning of Municipal Solid Waste (SCC 2610030000)

	Oneida Nation (Outagamie Co.)	1999 NEI Outagamie County
Activity Data (tons of waste burned)	672.84	7,316.35
Waste Generated (tons/year)	2,403.01	26,129.81
Fraction of Waste Burned	0.28	0.28
Per Capita Waste Generated (lb/person/day)	3.31	3.31
Waste Burning Population	3,978	43,256
Total Population	3,978	160,971
Ratio of Waste Burning Population/Total Population	1	0.27
Emission Factors (lb/ton)	CO: 85 NOx: 6 PM10: NR SO2: 1 VOC: 30	CO: 85 NOx: 6 PM10: 38 SO2: 1 VOC: 30

NR = Not reported

The Oneida Nation EI's emission estimates for open burning of municipal solid waste were calculated using AP-42 emission factors and methods. To compare the emissions to 1999 NEI data for Outagamie County, population was used as a surrogate for these data. The data are considered to be comparable if the ratio of population is within the same order of magnitude as the ratio of emissions. Using that criteria, all of the emissions are comparable for all pollutants. The emission factors used in the Oneida Nation EI are the same as those from ASEM used to generate the 1999 NEI emission data for Outagamie County.

Although this comparison suggests that both the Oneida Nation and 1999 NEI data are reasonable when compared to each other, the slightly smaller than expected emissions in the 1999 NEI for Outagamie County may be explained by the activity data. According to the waste burning population value, the Oneida Nation assumes that all of the population is burning waste, while the 1999 NEI Outagamie emissions are based on 27 % of the population burning waste. According to the additional criteria source information downloaded from the EPA's CHIEF website for 1999 NEI version 2 data, the percentage of the population that burns waste is the rural percentage of the population. Since Brown County has an urban population of greater than 80 percent, no residential open burning of municipal solid waste emissions are calculated by ASEM. The Oneida Nation as well as the regional inventory may be improved if more specific activity data on open burning of municipal solid waste were obtained. This could be achieved by surveying to determine what percentage of the population burned waste and how much waste was burned.

### **Agricultural Tilling**

The Oneida Nation EI reports PM10 and PM2.5 emissions from agricultural tilling for portions of the reservation overlapping both Brown and Outagamie Counties. Table 22 compares the emissions calculated in the Oneida Nation EI with those compiled by ITEP from the 1999 NEI for Brown and Outagamie Counties.

Table 22: 2002 Oneida Nation EI and 1999 NEI Agricultural Tilling Emission Comparison

Area SCC and description	Oneida Nation total reported emissions (Brown Co.), tons/year	Brown Co. 1999 NEI, v. 2 emissions, tons/year	Ratio of Oneida Nation Emissions (Brown Co.)/ NEI Brown Co. Emissions	Ratio of Oneida Nation Land Area (Brown Co.)/ Brown Co. Land Area	Oneida Nation total reported emissions (Outagamie Co.), tons/year	Outagamie Co. 1999 NEI, v. 2 emissions, tons/year	Ratio of Oneida Nation Emissions (Outagamie Co.)/NEI Outagamie Co. Emissions	Ratio of Oneida Nation Land Area (Outagamie Co.)/ Outagamie Co. Land Area
2801000003 Misc. Area Sources-- Agriculture Production-- Crops--Tilling	PM10: 7.6 PM2.5: 1.52	PM10: 2872.47 PM2.5: 574.49	PM10: 0.003 PM2.5: 0.003	0.08	PM10: 12.93 PM2.5: 2.59	PM10: 3419.56 PM2.5: 683.91	PM10: 0.004 PM2.5: 0.004	0.09

The Oneida Nations EI's emission estimates for agricultural tilling were calculated using EIIP methods. Because the Oneida Nation EI estimates are based on actual activity data, it is assumed that the activity data are accurate. Since the 1999 NEI emissions may not have been calculated using EIIP methods, the estimates from the Oneida Nation EI and the 1999 NEI may not be comparable. To compare these emissions, land area was used as a surrogate for these data. Since these data are estimates, and the method, emission factors and source of activity data used to calculate the 1999 NEI emissions are unknown, the data are considered to be comparable if the ratio of land area is within the same order of magnitude as the ratio of emissions. Using that criteria, the emissions are higher than would be expected in the 1999 NEI data. This comparison suggests that the Oneida Nation and 1999 NEI data are not reasonable when compared to each other. Since activity and emission factor data are not available for the 1999 NEI data, the source of the variation in the agricultural tilling emissions between the Oneida Nation EI and the 1999 NEI emissions cannot be specifically identified. The difference could be attributed to any combination of variation in the emission methods, emission factors, activity data or actual activity levels.

### **Paved and Unpaved Roads Fugitive Emissions**

The Oneida Nation EI reports PM10 and PM2.5 emissions from paved and unpaved roads, including both fugitive and vehicle emissions. The emissions from fugitive dust were calculated together with the vehicle emissions in the spreadsheets. ITEP had to perform additional calculations to extract the fugitive dust portion of the emissions. In doing so, ITEP identified several incorrect cell references and errors in the formulas used to calculate the fugitive dust emission factors. ITEP recalculated emissions, which resulted in an increase in total (the sum of fugitive and vehicle) PM10 emissions for paved roads from 681.42 tons to 683.11 tons, and from 12.76 tons to 15.52 for unpaved roads. Total (the sum of fugitive and vehicle) PM2.5 emissions for paved roads increased from 158.98 tons to 161.18, and for unpaved roads, emissions increased from 1.92 to 2.33. The Oneida Nation EI does not explicitly allocate emissions to the portion of the counties that the reservation overlaps. Since the vehicle and fugitive emissions were combined into a single calculation in the EI, it would take additional effort to allocate emissions to the portion of the counties that the reservation overlaps. For the purposes of this report, the emissions corrected by ITEP for the entire reservation will be compared to the sum of the emissions for Brown and Outagamie Counties, as is presented in Table 23.

Table 23: 2002 Oneida Nation EI and 1999 NEI Paved and Unpaved Roads Fugitive Emission Comparison

Area SCC and description	Oneida Nation total reported emissions, tons/year	Brown Co. 1999 NEI, v. 2 emissions, tons/year	Outagamie Co. 1999 NEI, v. 2 emissions, tons/year	Sum of Brown and Outagamie Co. emissions, tons/year	Ratio of Oneida Nation emissions/Sum of Brown and Outagamie Co. emissions	Ratio of Oneida Nation Land Area/Sum of Brown and Outagamie Co. Land Area
2294000000 Mobile Sources--Paved Roads--All Paved Roads--Total: Fugitives	PM10: 667.08 PM2.5: 148.55	PM10: 3368.86 PM2.5: 842.22	PM10: 2213.68 PM2.5: 553.42	PM10: 5582.54 PM2.5: 1395.64	PM10: 0.12 PM2.5: 0.11	0.09
2296000000 Mobile Sources--Unpaved Roads--All Unpaved Roads--Total: Fugitives	PM10: 15.51 PM2.5: 2.33	PM10: 861.89 PM2.5: 129.28	PM10: 1012.71 PM2.5: 151.91	PM10: 1874.6 PM2.5: 281.19	PM10: 0.008 PM2.5: 0.008	0.09

The Oneida Nation EI's estimates for paved and unpaved road fugitive emissions were calculated using AP-42 emission factors and methods. Because the Oneida Nation EI estimates are based on actual activity data, it is assumed that the activity data are accurate. Assuming that the 1999 NEI emissions were also calculated using AP-42, the estimates from the Oneida Nation EI and the 1999 NEI Brown and Outagamie County emissions should be comparable. To compare these emissions, land area was used as a surrogate for these data. The data are considered to be comparable if the ratio of land area is within the same order of magnitude as the ratio of emissions. Using that criteria, emissions estimates for paved roads, SCC 2294000000, are comparable while those for unpaved roads, SCC 2296000000, are not comparable. Unpaved fugitive road emissions are higher than would be expected in the 1999 NEI data. Since activity and emission factor data are not available for the 1999 NEI data, the source of the variation in the unpaved road emissions between the Oneida Nation EI and the 1999 NEI emissions cannot be specifically identified. Some possible reasons for the variation could be any combination of differences in VMT on unpaved roads, road surface material silt content or moisture content, mean vehicle weight or speed, and emission calculation methods.

### **3) Non-Road Mobile Sources**

The Oneida Nation EI reports emissions for several non-road mobile sources, including agricultural, airport, commercial, construction and mining, industrial, residential and commercial lawn and garden, and recreational equipment. The Oneida Nation used the EPA's NONROAD Emission Model to calculate emissions for Brown and Outagamie Counties. The county-level emissions were then allocated to the reservation by multiplying the emissions by the ratio of reservation land area to county land area. Emissions from railroads and pleasure craft were excluded from the EI since there are no railroads or lakes and rivers suitable for pleasure craft use on the reservation. Since the emissions reported in the Oneida Nation EI are not broken down by fuel type, emissions from the Oneida Nation EI cannot be compared to the 1999 NEI data for Brown and Outagamie Counties. For future EI efforts, it would benefit both the Oneida Nation and the regional inventory if these emissions were reported by fuel type as well as equipment type.

### **4) On-Road Mobile Sources**

The Oneida Nation used the EPA's MOBILE6 Emission Model and locally developed vehicle miles traveled data to calculate on-road mobile vehicle emission factors and emissions. In addition to the traditional on-road mobile vehicle emissions by road classifications, the EI also reports emissions from idling buses at casinos. The Oneida Nation EI reports emissions for each road classification separately, however the emissions for gasoline and diesel fueled vehicles are lumped together. Therefore, the Oneida Nation on-road mobile vehicle emissions cannot be compared to the 1999 NEI data for Brown and Outagamie Counties. For future EI efforts, it would benefit both the Oneida Nation and the regional inventory if these emissions were reported separately by vehicle fuel type.

## **5) Conclusions and Recommendations Based on Comparison of Oneida Nation EI with the 1999 NEI Data**

ITEP's review of the 1999 NEI did not identify any point sources with locations on the Oneida Nation Reservation that were not included in the Oneida Nation EI. Of the 34 total point sources in the Oneida Nation EI, 4 of them had no associated emissions due to unavailable data, negligible emissions, or the facility being closed. For those facilities for which the Oneida Nation was unable to obtain activity data, the Oneida Nation could continue to attempt to obtain the activity data for future inventory efforts. Additionally, the Oneida Nation could report emissions for any of the closed facilities that may open in the future. The Oneida Nation has released their reservation point source data to be included in a future version of the NEI.

The comparison of emissions from commercial pesticide use, coal combustion for commercial heating, natural gas combustion for commercial heating, wildfires, prescribed burns, agricultural tilling, and unpaved roads for the Oneida Nation with the related 1999 NEI area SCCs suggests that the 2002 Oneida Nation EI and the 1999 NEI data do not appear reasonable when compared to each other. For commercial pesticide use and commercial heating, the Oneida Nation inventoried a limited number of sources. The Oneida Nation could investigate if there are other sources of these emissions on their reservation. Additionally, the Oneida Nation EI only reports commercial heating emissions for 11 of their 34 point sources. From the description of the point sources in the EI without reported commercial heating emissions, it appears that many of the facilities would be heated. The Oneida Nation could investigate whether or not these facilities are heated by on-site combustion equipment. If activity data cannot be obtained for these facilities that are heated, the Oneida Nation could estimate fuel usage based on the building size. It may also be beneficial for the tribe to contact the local fuel distributors to determine if commercial fuel usage data for the reservation can be obtained. The analysis on wildfires and prescribed burning emissions suggests that it would benefit the regional inventory to collect better activity data for the area of land consumed. Additionally, the Oneida Nation may want to consider investigating other sources of fuel load and emission factors for prescribed burning, specifically for brush and grasslands, which would be potentially more applicable than AP-42 Section 2.5, Open Burning. For all of these source types, it is possible that the actual activity levels on the reservation are different than those in the surrounding counties.

The comparison of emissions from fuel oil combustion for residential heating, natural gas combustion for residential heating, residential open burning of solid waste, and paved roads suggest that the 2002 Oneida Nation EI and the 1999 NEI data are reasonable when compared to each other. Although the data for residential open burning of solid waste are reasonable, it could benefit both the Oneida Nation EI and the regional inventory to collect better activity data on the percentage of the population burning waste and the amount of waste being burned.

Emissions from non-road and on-road mobile sources for the Oneida Nation EI could not be compared to the 1999 NEI data since the Oneida Nation EI does not break the emissions down by fuel type. For future EI efforts, it is recommended that the Oneida Nation allocate the emissions by fuel type as well as equipment type for non-road mobile sources and by fuel type and road classification for on-road mobile sources.

## Appendix A: Data Uploads and Conversions

### Specific Data Uploads from ASEM

2104008001--All throughputs null for Wisconsin counties, updated 29 “sngActualThroughput” records with “Activity” records from ASEM database, “strThroughputUnitNumerator” with TON, “intMaterial” with 15, and “strMaterialIO” with I in tblAreaPE.

2104008002, 2104008003, 2104008004, 2104008010-- Throughput null for one Wisconsin county (CountyFIP=053), updated 1 “sngActualThroughput” record with the “Activity” record from ASEM database, “strThroughputUnitNumerator” with TON, “intMaterial” with 15, and “strMaterialIO” with I in tblAreaPE for each SCC.

2104008030-- Throughput null for one Wisconsin county (CountyFIP=053), updated 1 “sngActualThroughput” record with the “Activity” record from ASEM database multiplied by 2.4782731 (unknown what factor represents, determined by dividing recorded NEI throughputs by ASEM Activity records—it looks like the records in the ASEM database may be reversed for 2104008030 and 2104008050, 1 divided by 2.4782731 equals 0.4035), “strThroughputUnitNumerator” with TON, “intMaterial” with 15, and “strMaterialIO” with I in tblAreaPE.

2104008050-- Throughput null for one Wisconsin county (CountyFIP=053), updated 1 “sngActualThroughput” record with the “Activity” record from ASEM database multiplied by 0.4035327 (unknown what factor represents, determined by dividing recorded NEI throughputs by ASEM Activity records—it looks like the records in the ASEM database may be reversed for 2104008030 and 2104008050-1 divided by 2.4782731 equals 0.4035), “strThroughputUnitNumerator” with TON, “intMaterial” with 15, and “strMaterialIO” with I in tblAreaPE.

2610000100, 2610000400-- Throughput in units of ton2/lb for all counties, updated 79 “sngActualThroughput” records with the “Activity” record multiplied by the “Activity2” record multiplied by the “Activity3” record multiplied by the “Activity4” record from the ASEM database and “strThroughputUnitNumerator” with TON in tblAreaPE for both SCC.

2610000500, 2610030000-- Throughput in units of ton2/lb for all counties, updated “sngActualThroughput” records with the “Activity” record multiplied by the “Activity2” record from the ASEM database and “strThroughputUnitNumerator” with TON in tblAreaPE. Updated the following number of records: 2610000500 (82), 2610030000 (81).

2801700001, 2801700002, 2801700003, 2801700004, 2801700005, 2801700006, 2801700007, 2801700008, 2801700009, 2801700010-- Throughput in units of ton2/lb for all counties, updated “sngActualThroughput” records with the “Activity” record from the ASEM database and “strThroughputUnitNumerator” with TON in tblAreaPE. Updated

the following number of records: 2801700001 (82), 2801700002 (1), 2801700003 (82), 2801700004 (82), 2801700005 (57), 2801700006 (80), 2801700007 (61), 2801700008 (82), 2801700009 (82), 2801700010 (82).

2805001000—Throughput in units of HEAD for all counties, but the numbers seem to be in units of 1000 Head from looking at the numbers from the Census of Agriculture data. There are no appropriate units for this situation in the tblUnit-Codes so the units will be recorded as THOUSAND, which is not in tblUnit-Codes, since the “intMaterial” is recorded with the code for Head of Cattle. Updated 83 “strThroughputUnitNumerator” records with THOUSAND in tblAreaPE.

2805020000, 2805025000, 2805030000, 2805035000, 2805040000, 2805045001— Throughput in units of TONHEAD/LB for all counties. There are no appropriate units for this situation in the tblUnit-Codes so the units will be recorded as HEAD, which is not in tblUnit-Codes. Updated “sngActualThroughput” records with the “Activity” record from the ASEM database and “strThroughputUnitNumerator” with HEAD in tblAreaPE. Updated the following number of records: 2805020000 (83), 2805025000 (69), 2805030000 (82), 2805035000 (82), 2805040000 (76), 2805045001 (74).

2810001000, 2810015000, 2810030000-- Throughput null or in units of ton2/lb for all counties, updated 83 “sngActualThroughput” records with the “Activity” record multiplied by “Activity2” record from the ASEM database and “strThroughputUnitNumerator” with TON in tblAreaPE for each SCC. In cases in which the throughput values were null, the “intMaterial” and “strMaterialIO” fields were also null and were updated as follows: 2810001000-updated 30 (some Michigan and some Wisconsin) “intMaterial” with 124, and “strMaterialIO” with I, 2810015000-updated 9 (Michigan) “intMaterial” with 944, and “strMaterialIO” with I, 2810030000-updated 54 (some Michigan and some Wisconsin) “intMaterial” with 124, and “strMaterialIO” with I.

## **Appendix B**

### **Tribal Review Instructions for the National Emission Inventory (NEI) Criteria Pollutant Data**

#### Point Source Data

Enclosed, you will find a document titled “Point Sources Checklist”. If your time is limited, please at least fill out this checklist. The NEI often contains inaccurate information on location of point sources. For example, it may show a factory being located on your tribe’s lands when in fact it is located outside your boundaries. A map has been included in this packet, showing you where the NEI has identified point sources within your boundaries or within 5 miles of your boundaries. The point source data file is titled “Point.pdf”, if there are no point sources within 5 miles of your boundaries, this file will not be included on your CD. The “point\_map.pdf” is an electronic copy of the map we used of your reservation boundaries for this project.

You may be receiving another set of point source data from ITEP over the next month. If your reservation has any point sources of hazardous air pollutants (HAPs) on it or within 3.1 miles of your boundaries, you will receive an additional data set detailing the HAPs emissions. The HAPs work is being done under a separate project with the U.S. Environmental Protection Agency’s Office of Air Quality Planning and Standards.

Steps for completing the point source data checklist:

1. Check the map. Look to see where they have placed point sources. Check the appropriate box on the enclosed point source data checklist. (For example, if the facility is truly located inside of your boundaries, then check the first box.)
2. After completing the checklist, fax it to Matt Anders at (928) 523-1266.
3. Review the “Point.pdf” file included on the enclosed CD.
  - Point sources on the data sheets have their names and addresses listed above the thick bold line.
  - Each point source is grouped into one or more emission units, which are identified by a “unit ID number”. You do not need to review this information.
  - Each emission unit has one “emission release point ID” and “release type” associated with it, these do not require your review.
  - The “SCC code” describes what type of process is producing the emissions. Each process is dated, following the format YYYYMMDD (19990101 means January 1, 1999). In many records, emissions are given in tons per average day and in tons per entire period, which is often 19990101 – 19991231 (entire year of 1999). The pollutant emissions found on these sheets are PM10-PRI; PM2.5-PRI; CO; NOX; VOC; SO2; NH3. Definitions of these pollutants are found in Table 1 on page 4.
  - In some cases a “throughput” is listed. For example if the SCC describes an industrial boiler - diesel fuel, the throughput would tell how many gallons of diesel fuel are burned in that boiler in that time period. Many of the point sources did not supply information on throughput, so it is blank.
4. If you have direct knowledge about the point source, check the “SCC code”. Does it match your information about the activities at that facility? If you have information that suggests the emissions are not correct, please print the page for that point source, mark your corrections on it and fax it to Matt Anders at ITEP.
5. If you do not have additional information on the point sources, looking at the SCC codes and emission numbers will tell you what kind of air pollution-producing activities are taking place at each facility. It will also tell you how much pollution and what kind of pollution is being released by each source on or near your reservation.
6. If you have comments or corrections include them on the attached reply form.
7. Finally, review the “Point Control Equip.pdf”. This section will tell you what type of air pollution control devices are in use at each of the point sources listed. If you have information that this data

is incorrect, please print the page for that point source, mark your corrections on it and fax it to Matt Anders at ITEP.

## Area Sources

ITEP has compiled the area sources believed to be most significant in your area. The data is organized by county, your data set includes all of the counties that overlap and are adjacent to your tribe's land. Area sources represent emissions-producing activities that occur in small amounts at many locations. For example, an SCC code describing "stationary source fuel combustion-industrial-bituminous/subbituminous coal - all boiler types" will give an estimate of the amount of emissions coming from all boilers of that type that are spread across the county. If several small businesses, schools or government buildings in the county have this kind of boiler, they will be lumped together as an area source instead of including them individually as point sources.

Steps for completing the area source data review:

1. Review the "Area.pdf" file included on the enclosed CD.
  - Area sources on the data sheets are identified by county name above the thick bold line.
  - The "SCC code" describes what type of process is producing the emissions. Each of these processes is dated, following the format YYYYMMDD (19990101 means January 1, 1999).
  - In some cases a "throughput" is listed near the "SCC code". For example if the SCC describes "stationary source fuel combustion-residential-wood-fireplaces-insert", the throughput would give EPA's estimate of how many tons of wood are burned in fireplace inserts in that time period in that county. Some of the area sources do not have information on throughput, so it is blank. Definitions of the throughput units are in the "Area Thruput Desc.pdf" file.
  - Do the throughputs seem reasonable to you? For example: The SCC describing open burning of residential solid waste may have a "throughput" estimating 3,000 tons of household waste is produced in a given county per year, and that 28% of that waste is burned. You may have records for your tribe showing that your reservation alone produces 3,000 tons of waste per year and that 100% of it is taken to a transfer station. If you have additional information or comments about the area source data, please print the page for that area source, mark your corrections on it and fax it to Matt Anders at ITEP.
2. Please include any general comments or corrections on the attached reply form.

## On-Road Mobile Sources

On-road mobile sources are listed by county in the NEI. Your data set includes all of the counties that are overlapping or adjacent to your tribe's reservation. Please note that these mobile sources are organized by type of vehicle and road type. They do not include off-road vehicles.

Steps for completing the on-road mobile source data review:

1. Review the "OnRoad Mobile.pdf" file included on the enclosed CD.
  - The "SCC code" describes what type of process is producing the emissions. Each of these processes is dated, following the format YYYYMMDD (19990101 means January 1, 1999).
  - In some cases a "throughput" is listed near the "SCC code". If information is included please review the throughput data and make sure it matches the information you possess.
  - For example: A throughput of 2.518, with units of 1000 miles per day, for heavy duty diesel vehicles on rural local roads may be listed. This would mean that around 25 heavy duty diesel vehicles travel 100 miles a day on rural local roads; that 100 heavy duty diesel vehicles

- travel 25 miles a day on local rural roads; or any other combination that would multiply out to 2,518 miles per day.
2. One of the best ways to check the accuracy of these throughputs is if your tribe has vehicle counts for the roads on your reservation.
  3. Please include any comments or corrections on the attached reply form.
  4. If you have any additional information or comments about the on-road mobile source data, please print the appropriate page, make a note on it and fax to Matt Anders at ITEP.

## Non-Road Mobile Sources

Non-road mobile sources are listed by county in the NEI. Your data set includes all of the counties that are overlapping or adjacent to your tribe's reservation. Please note that these non-road mobile sources are organized by vehicle or equipment type.

Steps for completing the non-road mobile source data review:

1. Review the "NonRoad Mobile.pdf" file included on the enclosed CD.
  - The "SCC code" describes what types of vehicles or equipment are producing the emissions. Each of these processes is dated, following the format YYYYMMDD (19990101 means January 1, 1999).
  - Each SCC code has a vehicle count. If EPA did not include this information the vehicle count may be blank.
  - Review the vehicle count. For example: is it reasonable to believe that there are 790 2-stroke off-road motorcycles in the county? Is it reasonable to believe that there are 11,500 2-stroke personal water craft in the county?
2. Please include any comments or corrections on the attached reply form.
3. If you have any additional information or comments about the on-road mobile source data, please print the appropriate page, make a note on it and fax to Matt Anders at ITEP.

Table 1: Pollutants

Abbreviation	Pollutant Full Name
PM10-PRI	Particulate Matter, less than or equal to 10 micrometers, "coarse" particles
PM2.5-PRI	Particulate Matter, less than or equal to 2.5 micrometers, "fine" particles
CO	Carbon Monoxide
NOX	Nitrogen Oxides
VOC	Volatile Organic Compounds
SO2	Sulfur Dioxide
NH3	Ammonia

\* A source is considered a major source of air pollution under the Clean Air Act if it emits more than 100 tons/year of any of the above pollutants, in an area designated "in-attainment" for that pollutant.

**Fax to Matt Anders,  
ITEP (928) 523-1266**

From:  
Date:  
Phone:  
Fax:

Reply Form for Tribal Review of NEI Data

**Point Sources**

Please record any general comments or questions regarding the point sources. Use an additional page if necessary. Write specific comments on point sources on the page related to that source and fax that page back to ITEP as well.

**Area Sources**

Write any specific comments on each area source on the page related to that source and fax that page back to ITEP.

List the area sources in which you think that the throughputs would be very different on the reservation than they are in the surrounding counties.

Are there any types of area sources that you feel are important on your reservation, but are not included on this list? If yes, please list the types of area sources below.

**On-Road Mobile Sources**

Do you think that the on-road mobile source throughputs would be very different on the reservation than they are in the surrounding counties? Please explain.

Does your tribe's land have more miles of road or less than the surrounding counties?

Yes                       No  
Please explain or give numbers if you have them.

Do roads on your tribe's lands have more or less traffic than roads in the surrounding counties? Please explain

Does your tribe have traffic counts for any of its roads?

Yes

No

### **Non-Road Mobile Sources**

Do you think that the non-road mobile source vehicle counts would be very different on the reservation than they are in the surrounding counties? Please explain.

Does the tribe have any way to estimate how many of these types of vehicles are operated on the tribe's lands?

### Example of a Point Source Checklist

**Point Sources Checklist for      Bad River Band of Chippewa**

PLEASE CHECK ONE BOX FOR EACH SOURCE:

	Source located on your tribe's reservation or trust lands	Source located on land owned by a non-tribal member within your tribe's exterior reservation boundaries	Source is not located within the tribe's exterior reservation boundaries
NORTHERN STATES POWER CO-BAY FRONT GEN STN FRONT STREET ASHLAND, WI Map ID: R54524 Location in NEI: 1 to 5 Miles From Reservation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LARSON-JUHL, INC. 422 3RD ST W ASHLAND, WI Map ID: R54522 Location in NEI: 1 to 5 Miles From Reservation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MEMORIAL MEDICAL CENTER 1615 MAPLE LN ASHLAND, WI Map ID: R54521 Location in NEI: 1 to 5 Miles From Reservation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BAYSIDE TIMBER CORPORATION 7 11TH AVE E AND CO RD A ASHLAND, WI Map ID: R54527 Location in NEI: 1 to 5 Miles From Reservation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
WASHBURN IRON WORKS 112 E BAYFIELD ST WASHBURN, WI Map ID: R54554 Location in NEI: 1 to 5 Miles From Reservation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Appendix C: Population and Area Data for LADCO Tribal  
Counties and Reservations**

## Appendix D: Top Pollution Producing Source Classification Codes for Area and Non-Road Mobile Sources

### Area Sources

SCC	Description	NOx, tpy	NOx rank	SO2, tpy	SO2 rank	PM2.5, tpy	PM2.5 rank	VOC, tpy	VOC rank
2102002000	Stationary Source Fuel Combustion--Industrial--Bituminous/Subbituminous Coal--Total: All Boiler Types	6692	1	3818	3	X	>20	X	>20
2102004000	Stationary Source Fuel Combustion--Industrial--Distillate Oil--Total: Boilers and IC Engines	624	10	1133	6	X	>20	X	>20
2103002000	Stationary Source Fuel Combustion--Commercial/Institutional--Bituminous/Subbituminous Coal--Total: All Boiler Types	629	9	3354	4	X	>20	X	>20
2103004000	Stationary Source Fuel Combustion--Commercial/Institutional--Distillate Oil--Total: Boilers and IC Engines	316	16	4138	2	X	>20	X	>20
2102006000	Stationary Source Fuel Combustion--Industrial--Natural Gas--Total: Boilers and IC Engines	3685	2	X	>20	X	>20	X	>20
2102008000	Stationary Source Fuel Combustion--Industrial--Wood--Total: All Boiler Types	229	18	4247	1	X	>20	X	>20
2104004000	Stationary Source Fuel Combustion--Residential--Distillate Oil--Total: All Combustor Types	1100	6	2256	5	654	16	X	>20
2104006000	Stationary Source Fuel Combustion--Residential--Natural Gas--Total: All Combustor Types	3060	3	42	13	835	14	X	>20
2104007000	Stationary Source Fuel Combustion--Residential--Liquified Petroleum Gas (LPG)--Total: All Combustor Types	453	13	X	>20	X	>20	X	>20
2104008001	Stationary Source Fuel Combustion--Residential--Wood--Fireplaces: General	902	7	X	>20	458	18	19736	2
2104008010	Stationary Source Fuel Combustion--Residential--Wood--Woodstoves: General	368	15	53	12	4068	6	6967	8
2294000000	Mobile Sources--Paved Roads--All Paved Roads--Total: Fugitives	X	>20	X	>20	13827	3	X	>20
2296000000	Mobile Sources--Unpaved Roads--All Unpaved Roads--Total: Fugitives	X	>20	X	>20	32825	1	X	>20
2420000000	Solvent Utilization--Dry Cleaning--All Processes--Total: All Solvent Types	X	>20	X	>20	X	>20	46200	1

SCC	Description	NOx, tpy	NOx rank	SO2, tpy	SO2 rank	PM2.5, tpy	PM2.5 rank	VOC, tpy	VOC rank
2501060100	Storage and Transport--Petroleum and Petroleum Product Storage--Gasoline Service Stations--Stage 2: Total	X	>20	X	>20	X	>20	10866	3
2461800000	Solvent Utilization--Miscellaneous Non-industrial: Commercial--Pesticide Application: All Processes--Total: All Solvent Types	X	>20	X	>20	X	>20	10703	4
2610000500	Waste Disposal, Treatment, and Recovery--Open Burning--All Categories--Land Clearing Debris (use 28-10-005-000 for Logging Debris Burning)	1532	5	X	>20	5210	4	3555	15
2610030000	Waste Disposal, Treatment, and Recovery--Open Burning--Residential--Household Waste (use 26-10-000-xxx for Yard Wastes)	876	8	146	9	5078	5	4377	12
2801000003	Miscellaneous Area Sources--Agriculture Production - Crops--Agriculture - Crops--Tilling	X	>20	X	>20	27025	2	X	>20
2810001000	Miscellaneous Area Sources--Other Combustion--Forest Wildfires--Total	553	12	22	17	1728	12	X	>20
2810015000	Miscellaneous Area Sources--Other Combustion--Prescribed Burning for Forest Management--Total	561	11	17	20	2827	11	X	>20

5th ranked VOC is 2104008000, Total Woodstoves and Fireplaces, did not include in list since these are both included individually. Where pollutant tpy = X, that pollutant is not one of the top 20 pollutant producers for the SCC.

Appendix D (cont.): Top Pollution Producing Source Classification Codes for Area and Non-Road Mobile Sources

**Non-Road Mobile Sources**

SCC	Description	NOx, tpy	NOx rank	SO2, tpy	SO2 rank	PM2.5, tpy	PM2.5 rank	VOC, tpy	VOC rank
2280002100	Mobile Sources--Marine Vessels, Commercial--Diesel--Port Emissions	17881.24	1	810.28	4	691.91	4	X	<20
2270005015	Mobile Sources--Off-highway Vehicle Diesel--Agricultural Equipment--Agricultural Tractors	15813.68	2	1811.65	2	1979.24	1	2196.88	7
2285002006	Mobile Sources--Railroad Equipment--Diesel--Line Haul Locomotives: Class I Operations	7864.13	3	233.07	8	175.77	9	X	<20
2280002200	Mobile Sources--Marine Vessels, Commercial--Diesel--Underway Emissions	6824.78	4	309.3	5	264.08	6	X	<20
2280003100	Mobile Sources--Marine Vessels, Commercial--Residual--Port Emissions	4770.24	5	2535.05	1	191.34	8	X	<20
2282005010	Mobile Sources--Pleasure Craft--Gasoline 2-Stroke--Outboard	605.11	20	X	<20	1355.54	2	27714.46	2
2260001020	Mobile Sources--Off-highway Vehicle Gasoline, 2-Stroke--Recreational Equipment--Snowmobiles	X	<20	136.01	13	911.11	3	43089.01	1
2282005015	Mobile Sources--Pleasure Craft--Gasoline 2-Stroke--Personal Water Craft	X	<20	X	<20	664.69	5	14971.3	3
2280003200	Mobile Sources--Marine Vessels, Commercial--Residual--Underway Emissions	1872.6	11	1386.45	3	95.65	16	X	<20
2268003020	Mobile Sources--CNG--Industrial Equipment--Forklifts	X	<20	X	<20	X	<20	X	<20
2268006020	Mobile Sources--CNG--Commercial Equipment--Gas Compressors	X	<20	X	<20	X	<20	X	<20

SCC	Description	NOx, tpy	NOx rank	SO2, tpy	SO2 rank	PM2.5, tpy	PM2.5 rank	VOC, tpy	VOC rank
2268005060	Mobile Sources--CNG--Agricultural Equipment--Irrigation Sets	X	<20	X	<20	X	<20	X	<20
2268006005	Mobile Sources--CNG--Commercial Equipment--Generator Sets	X	<20	X	<20	X	<20	X	<20
2260001010	Mobile Sources--Off-highway Vehicle Gasoline, 2-Stroke--Recreational Equipment--Motorcycles: Off-road	X	<20	X	<20	X	<20	5665.59	4
2260001030	Mobile Sources--Off-highway Vehicle Gasoline, 2-Stroke--Recreational Equipment--All Terrain Vehicles	X	<20	X	<20	X	<20	2427.01	5

Where pollutant tpy = X, that pollutant is not one of the top 20 pollutant producers for the SCC.

## Appendix E: LADCO Tribe Database QA Check

### LADCO Database QA Check (Tribal Counties in MI, MN, WI)

Note: Data checked against EPA NIF version 2 code tables, updated in April of 2002 (<http://www.epa.gov/ttn/chief/nif/index.html#ver2> and <http://www.epa.gov/ttn/chief/codes/index.html#scc>) unless otherwise noted.

#### Area TR

- Invalid State/County FIPs Code
  - Checked against EPA NIF code tables
    - Pass, qryLADCOBQA\_AreaTR\_FIPsInvalid returns 0 records
- Duplicate keys (state/county FIPs)
  - Already checked, these are primary keys in table.

#### Area EP

- Invalid State/County FIPs Code
  - Already checked, entering a State/County FIPs Code not already in Area TR is prohibited by database (relationship between Area TR and Area EP State and County FIPs is one to many)
- Duplicate keys
  - Already checked, State FIPs, County FIPs, and SCC are primary keys in table.
- Missing SCC
  - Already checked, SCC is one of the primary keys
- Invalid SCC
  - Checked against EPA SCC tables
    - Pass, qryLADCOBQA\_AreaEP\_SCCInvalid returns 0 records

#### Area PE

- Invalid State/County FIPs Code
  - Checked against EPA NIF code tables
    - Pass, qryLADCOBQA\_AreaPE\_FIPsInvalid returns 0 records
- Duplicate keys
  - Already checked, State FIPs, County FIPs, SCC, Start Date, and End Date are primary keys in table.
- Invalid or out of range Start or End Dates
  - Start dates checked to make sure they are between 19990101 and 19991230 and End dates checked to make sure they are between 19990102 and 19991231
    - Pass, qryLADCOBQA\_AreaPE\_DatesInvalid returns 0 records

## **Area EM**

- Invalid State/County FIPs Code
  - Checked against EPA NIF code tables
    - Pass, qryLADCOBQA\_AreaEM\_FIPsInvalid returns 0 records
- Duplicate keys
  - Already checked, State FIPs, County FIPs, SCC, Start Date, End Date, and Pollutant Code are primary keys in table.
- Invalid or out of range Start or End Dates
  - Start dates checked to make sure they are between 19990101 and 19991230 and End dates checked to make sure they are between 19990102 and 19991231
    - Pass, qryLADCOBQA\_AreaPE\_DatesInvalid returns 0 records
- Missing SCC
  - Already checked, SCC is one of the primary keys
- Missing Pollutant Code
  - Already checked, Pollutant Code is one of the primary keys
- Missing Emission Unit
  - Checked
    - Pass, qryLADCOBQA\_AreaEM\_UnitNull returns 0 records
- Missing Emission Type
  - Checked
    - Pass, qryLADCOBQA\_AreaEM\_EmissTypeNull returns 0 records
- Missing Actual Emissions
  - Checked
    - Pass, qryLADCOBQA\_AreaEM\_EmissNull returns 0 records
- Invalid Pollutant Code
  - Checked against EPA NIF code tables
    - Pass, qryLADCOBQA\_AreaEM\_PollCodeInvalid returns 0 records
- Invalid Emission Unit
  - Checked against EPA NIF code tables
    - Pass, qryLADCOBQA\_AreaEM\_UnitInvalid returns 0 records
- Invalid Emission Type
  - Checked against EPA NIF code tables
    - Pass, qryLADCOBQA\_AreaEM\_EmissTypeInvalid returns 0 records
- Record in Area EM has no match to record in Area EP by SCC
  - Checked
    - Pass, qryLADCOBQA\_AreaEM\_Orphan returns 0 records

## **NonRoadMobile TR**

- Invalid State/County FIPs Code
  - Checked against EPA NIF code tables
    - Pass, qryLADCOBQA\_NonRoadTR\_FIPsInvalid returns 0 records
- Duplicate keys (state/county FIPs)
  - Already checked, these are primary keys in table.

### ***NonRoadMobile EP***

- Invalid State/County FIPs Code
  - Checked against EPA NIF code tables
    - Pass, qryLADCOBQA\_NonRoadEP\_FIPsInvalid returns 0 records
- Duplicate keys
  - Already checked, State FIPs, County FIPs, and SCC are primary keys in table.
- Missing SCC
  - Already checked, SCC is one of the primary keys
- Invalid SCC
  - Checked against EPA SCC tables
    - FAIL, qryLADCOBQA\_NonRoadEP\_SCCInvalid returns 146 records (for reporting to the tribes, information on these SCCs was found in Emission Inventory Improvement Program (EIIP) documentation, 2280-commercial marine vessels, 2285-locomotives)
      - 2280002100-8 records
      - 2280002200-36 records
      - 2280003100-8 records
      - 2280003200-36 records
      - 2285002006-41 records
      - 2285002007-7 records
      - 2285002008-10 records

### ***NonRoadMobile PE***

- Invalid State/County FIPs Code
  - Checked against EPA NIF code tables
    - Pass, qryLADCOBQA\_NonRoadPE\_FIPsInvalid returns 0 records
- Duplicate keys
  - Already checked, State FIPs, County FIPs, SCC, Start Date, and End Date are primary keys in table.
- Invalid or out of range Start or End Dates
  - Start dates checked to make sure they are between 19990101 and 19991230 and End dates checked to make sure they are between 19990102 and 19991231
    - Pass, qryLADCOBQA\_NonRoadPE\_DatesInvalid returns 0 records

### ***NonRoadMobile EM***

- Invalid State/County FIPs Code
  - Checked against EPA NIF code tables
    - Pass, qryLADCOBQA\_NonRoadEM\_FIPsInvalid returns 0 records
- Duplicate keys
  - Already checked, State FIPs, County FIPs, SCC, Start Date, End Date, Pollutant Code, and Emission Type are primary keys in table.

- Invalid or out of range Start or End Dates
  - Start dates checked to make sure they are between 19990101 and 19991230 and End dates checked to make sure they are between 19990102 and 19991231
    - Pass, qryLADCOBQA\_NonRoadEM\_DatesInvalid returns 0 records
- Missing SCC
  - Already checked, SCC is one of the primary keys
- Missing Pollutant Code
  - Already checked, Pollutant Code is one of the primary keys
- Missing Emission Unit
  - Checked
    - Pass, qryLADCOBQA\_NonRoadEM\_UnitNull returns 0 records
- Missing Emission Type
  - Already checked, Emission Type is one of the primary keys
- Missing Actual Emissions
  - Checked
    - Pass, qryLADCOBQA\_NonRoadEM\_EmissNull returns 0 records
- Invalid Pollutant Code
  - Checked against EPA NIF code tables
    - Pass, qryLADCOBQA\_NonRoadEM\_PollCodeInvalid returns 0 records
- Invalid Emission Unit
  - Checked against EPA NIF code tables
    - Pass, qryLADCOBQA\_NonRoadEM\_UnitInvalid returns 0 records
- Invalid Emission Type
  - Checked against EPA NIF code tables
    - Pass, qryLADCOBQA\_NonRoadEM\_EmissTypeInvalid returns 0 records
- Record in NonRoadMobile EM has no match to record in NonRoadMobile EP by SCC
  - Checked
    - Pass, qryLADCOBQA\_NonRoadEM\_Orphan returns 0 records

### ***Mobile TR***

- Invalid State/County FIPs Code
  - Checked against EPA NIF code tables
    - Pass, qryLADCOBQA\_MobileTR\_FIPsInvalid returns 0 records
- Duplicate keys (state/county FIPs)
  - Already checked, these are primary keys in table.

### ***Mobile PE***

- Invalid State/County FIPs Code
  - Already checked, entering a State/County FIPs Code not already in MobileTR is prohibited by database (relationship between Mobile TR and Mobile PE State and County FIPs is one to many)
- Duplicate keys

- Already checked, State FIPs, County FIPs, SCC, Start Date, and End Date are primary keys in table.
- Invalid or out of range Start or End Dates
  - Start dates checked to make sure they are between 19990101 and 19991230 and End dates checked to make sure they are between 19990102 and 19991231
    - Pass, qryLADCOBQA\_MobilePE\_DatesInvalid returns 0 records
- Invalid SCC
  - Checked against EPA SCC tables
    - Pass, qryLADCOBQA\_MobilePE\_SCCInvalid returns 0 records

### **Mobile EM**

- Invalid State/County FIPs Code
  - Checked against EPA NIF code tables
    - Pass, qryLADCOBQA\_MobileEM\_FIPsInvalid returns 0 records
- Duplicate keys
  - Already checked, State FIPs, County FIPs, SCC, Start Date, End Date, Pollutant Code, and Emission Type are primary keys in table.
- Invalid or out of range Start or End Dates
  - Start dates checked to make sure they are between 19990101 and 19991230 and End dates checked to make sure they are between 19990102 and 19991231
    - Pass, qryLADCOBQA\_MobileEM\_DatesInvalid returns 0 records
- Missing SCC
  - Already checked, SCC is one of the primary keys
- Missing Pollutant Code
  - Already checked, Pollutant Code is one of the primary keys
- Missing Emission Unit
  - Checked
    - Pass, qryLADCOBQA\_MobileEM\_UnitNull returns 0 records
- Missing Emission Type
  - Already checked, Emission Type is one of the primary keys
- Missing Actual Emissions
  - Checked
    - Pass, qryLADCOBQA\_MobileEM\_EmissNull returns 0 records
- Invalid Pollutant Code
  - Checked against EPA NIF code tables
    - Pass, qryLADCOBQA\_MobileEM\_PollCodeInvalid returns 0 records
- Invalid Emission Unit
  - Checked against EPA NIF code tables
    - Pass, qryLADCOBQA\_MobileEM\_UnitInvalid returns 0 records
- Invalid Emission Type
  - Checked against EPA NIF code tables
    - Pass, qryLADCOBQA\_NonRoadEM\_EmissTypeInvalid returns 0 records
- Record in Mobile EM has no match to record in Mobile PE by SCC
  - Checked
    - Pass, qryLADCOBQA\_MobileEM\_Orphan returns 0 records

**Appendix F: List of SCCs Not Included in Midwestern Tribal Counties  
Data Set**

## [Appendix G: Area Source Reasonableness Analyses](#)

(see “Appendix G” folder)

## **Appendix H: Non-Road Mobile Source Reasonableness Analyses**

(see “Appendix H” folder)

## **Appendix I: On-Road Mobile Source Reasonableness Analyses**

(see “Appendix I” folder)

## Appendix J: Area Source Temporal Profile Summary Table

**Appendix K: Non-Road Mobile Source Temporal Profile Summary Table**

**Appendix L: On-Road Mobile Source Temporal Profile Summary Table**

**Appendix M: Midwestern Tribal Counties Area Sources Statistics  
Summary Table**

**Appendix N: Midwestern Tribal Counties Non-Road Mobiles Sources  
Statistics Summary Table**

**Appendix O: Midwestern Tribal Counties On-Road Mobile Sources  
Statistics Summary Table**

**Appendix P: Top Area Source SCC/Pollutant Emissions By Tribe**

**Appendix Q: Top Non-Road Mobile Source SCC/Pollutant Emissions  
By Tribe**

**Appendix R: Top On-Road Mobile Source SCC/Pollutant Emissions By Tribe**

**Appendix S: Non-Road Mobile Source Vehicle Population, County  
Population and Area Summary Table**

**Appendix T: On-Road Mobile Source VMT, County Population and Area Summary Table**

**Appendix U: Air Emissions Inventory for the Fond du Lac Reservation**

(see “Appendix U” folder)

**Appendix V: Air Emissions Summary Table for the Oneida Nation Reservation**

(see “Appendix V” folder)