

# 11.0 Air Quality

## 11.1 Introduction

This chapter of the plan addresses compliance with the federal regulations that govern air quality requirements. For a more in-depth discussion on the conformity determination, please refer to Appendix H (Shelby County Conformity Demonstration) and Appendix I (DeSoto County Conformity Demonstration).

## 11.2 Background

The 1990 Clean Air Act Amendments (CAAA), Tennessee Transportation Conformity Rules, and Mississippi Conformity Rules require transportation plans, transportation improvement programs (TIP), and transportation projects to conform to the purpose of the Tennessee SIP. Conformity to a SIP means that federal funds will not be spent on projects that cause or contribute to any new violations of the National Ambient Air Quality Standards (NAAQS); increase the frequency or severity of NAAQS violations; or delay timely attainment of the NAAQS or any required interim milestone. The Transportation Equity Act for the 21st Century (TEA-21) and its successor legislations, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) and Moving Ahead for Progress in the 21st Century (MAP-21) reinforce the need for coordinated transportation and air quality planning through the metropolitan planning provisions. This conformity determination was prepared based on the Carbon Monoxide (CO) and 2008 8-hour Ozone NAAQS.

Conformity analysis was done to demonstrate that the Shelby County non-attainment and maintenance area as well as Desoto County non-attainment area supports the implementation of the financially constrained Livability 2040 Regional Transportation Plan (RTP) by contributing to improved air quality and will therefore not jeopardize Shelby County's or Desoto County's attainment of the 8-hour ozone NAAQS or Shelby County's carbon monoxide NAAQS. The conformity determination was performed according to procedures prescribed by the following federal and state regulations: United States Federal Register, Volume 69, Page 40004 (69 FR 40004); United States Code of Federal Regulations, Title 40, Parts 51 and 93 (40 CFR 51 and 93, i.e. Transportation Conformity Rule Requirements); the Tennessee and Mississippi Transportation Conformity Rules; and Metropolitan Planning Organization (MPO) Planning Regulations (23 CFR 450) implementing MAP-21 Requirements. For each transportation plan (RTP), program (Fiscal Year 2014-2017 TIP), and Federal Highway Administration (FHWA)/Federal Transit Administration (FTA) project to be found to conform, the MPO and United States Department of Transportation (USDOT) must demonstrate that the applicable criteria and procedures have been satisfied (40 CFR 93.109-a). The following criteria for non-attainment areas are found to be applicable and are described as:

1. The TIP and RTP must pass an emissions budget test with a budget that has been found to be adequate by the Environmental Protection Agency (EPA) for transportation conformity purposes, or an interim emissions test;
2. The conformity determinations must be based upon the most recent planning assumptions;
3. The conformity determinations must be based upon the latest emission estimation model available;
4. MPOs and state departments of transportation must provide reasonable opportunity for consultation with state air agencies, local air quality and transportation agencies, USDOT, and the EPA;

5. Timely implementation of Transportation Control Measures (TCM) in the applicable SIP must be provided for (Shelby County); and
6. The conformity determination must comply with MAP-21 and MPO Planning Regulations.

Conformity Determination was conducted from the Shelby and DeSoto Counties' portions of the Livability 2040 RTP and the FY 2014-2017 TIP. The Marshall and Fayette Counties' portion of the Memphis MPO are in attainment with all EPA standards, therefore all transportation projects are exempted. EPA's Motor Vehicle Emissions Simulator (MOVES) version MOVES2014 model was used to derive emissions as required by the EPA. An interagency consultation process was conducted throughout the development of the conformity determination documents. The details of the consultation process can be found in Appendix H and Appendix I.

### **11.2.1 Ozone (O<sub>3</sub>)**

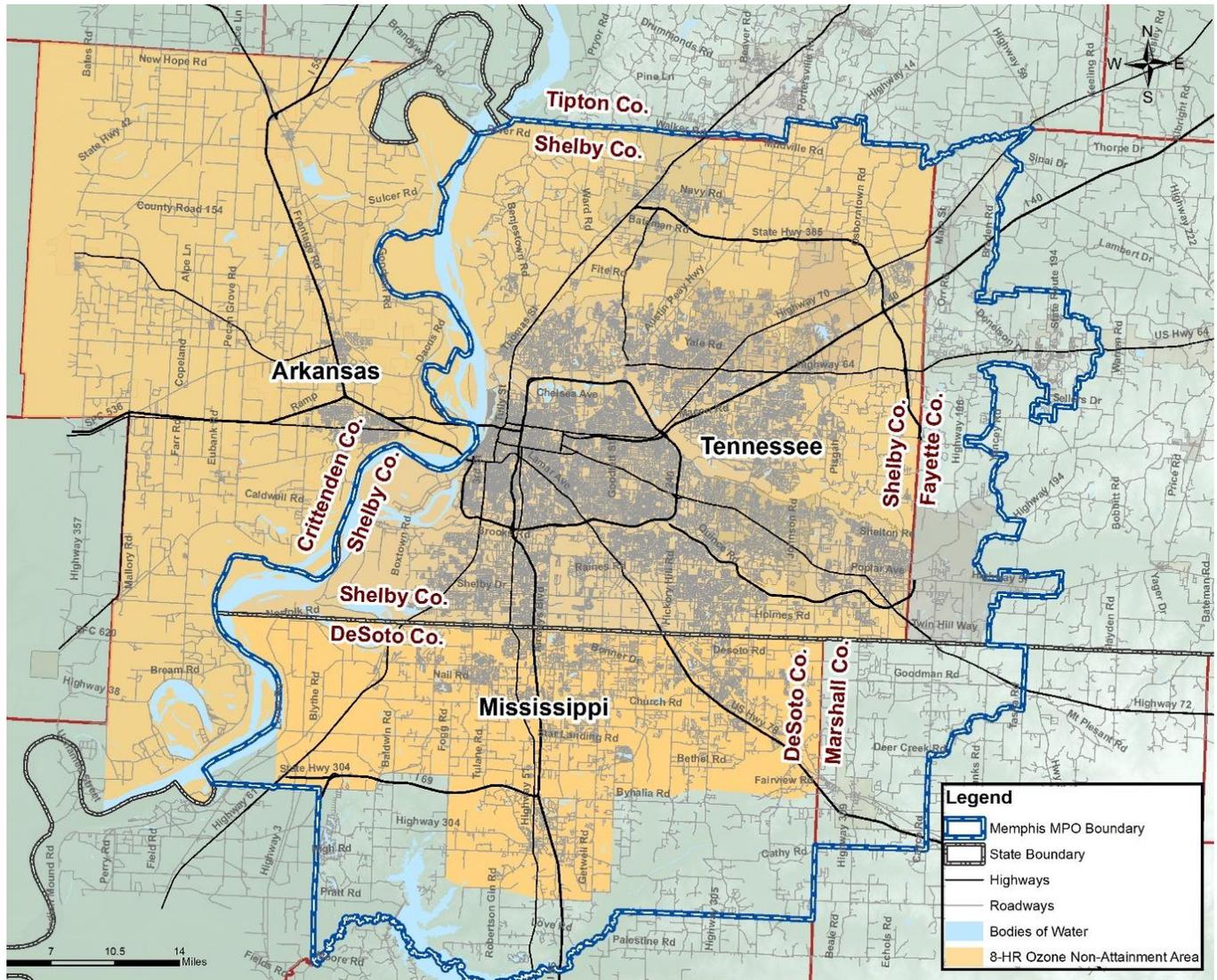
#### **Shelby County and Desoto County**

On April 30, 2004 the United States Environmental Protection Agency (EPA) designated Memphis, TN-AR as a 1997 8-hour ozone moderate non-attainment area (69 FR 23858). Included in this designation were two counties: Shelby, TN and Crittenden, AR. The 8-hour ozone area designation was effective on June 15, 2004. On September 15, 2004 EPA reclassified the area from moderate to marginal. This reclassification indicated the area was expected to reach attainment sooner than originally anticipated. Following this reclassification, the Memphis, TN-AR area was able to demonstrate attainment of the 1997 8-hour ozone standard in January 2010 (75 FR 56, January 4, 2010). EPA designated Memphis, TN-MS-AR as a 2008 8-hour ozone marginal non-attainment area effective July 20, 2012. The final ruling was published in the Federal Register (77 FR 30088) on May 21, 2012. Included in this designation were Crittenden County, AR in the West Memphis MPO area and Shelby County, TN, and the portion of DeSoto County, MS in the Memphis Urban Area Metropolitan Planning Organization (MPO) boundary. The 2008 8-hour ozone SIP Requirements Rule revoked the 1997 8-hour ozone standards for all purposes, including transportation conformity on April 6, 2015.

#### **DeSoto County**

Desoto County was designated marginal non-attainment for Ozone for the 2008 8-hour ozone standards, effective July 20, 2012. The same month EPA issued the companion guidance to the Conformity Rule that addresses ozone and air quality standards. The guidance further clarified how conformity determinations and the regional emissions analyses that support them are completed in existing and new non-attainment and maintenance areas. The guidance noted that states in a multi-state area have the option of submitting SIPs with budgets for their own portion of the area that, when taken together, meet the applicable Clean Air Act requirement. Where states have done so and EPA has found such budgets adequate or approved, the MPO or MPOs in each state with such budgets can determine conformity completely independently of the other states. Furthermore, all affected agencies need to be included in the decision-making process for the area as required by the conformity rule described in the Code of Federal Regulations, Title 40, Part 93, Section 105 (40 CFR 93.105). During the interagency consultation process, it was decided that DeSoto County would not be judged within the overall SIP budget established for Shelby County, but would instead be subject to an independent conformity demonstration using the interim emissions test. Therefore this conformity determination was conducted separately for Shelby and DeSoto Counties of the 2008 8-hour ozone non-attainment area. See **Figure 11.1** for ozone non-attainment area for 2008 HR standards.

Figure 11.1 Memphis, TN-MS-AR 2008 8-Hour Ozone Non-Attainment Area



### Carbon Monoxide (CO)

On March 3, 1978, EPA designated Shelby County, TN, a moderate (less than 12.7 parts per million) non-attainment area for carbon monoxide (CO). Due to improvements in ambient air quality, EPA redesignated Shelby County to attainment for the CO standard on August 31, 1994. EPA's reclassification of the Memphis non-attainment area to attainment status for the CO standard was published in 59 FR 44958 (August 31, 1994). Shelby County entered into two 10-year maintenance periods for CO during which the area would have to demonstrate continued compliance with the 1990 CAAs.

Shelby County's attainment status for CO was revisited in the second 10-year maintenance plan for CO and the motor vehicle emission budget (MVEB) contained in it. The approval of the 10 year maintenance plan for CO for Shelby County was documented in 71 FR 62384 (October 25, 2006) and had an effective date of December 26, 2006. In addition to a new budget value established for the MVEB in the 10 year plan, the last year of the plan is now 2017. The 2017 MVEB for CO is 839,990 tons/day. It is required that a conformity demonstration be made for the last year of the maintenance plan, which in the case of Shelby County is 2017.

## 11.3 Interagency Consultation and Public Participation

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Interagency consultation is the central coordinating mechanism for public agency involvement and input to the conformity determination. The conformity determination must be made according to the requirements of 40 CFR 93.105, 40 CFR 93.112, and 23 CFR 450. Since the conformity determination for Shelby County is being done concurrently with DeSoto County, consultation and requirements for both Tennessee and Mississippi were considered.

The Memphis MPO coordinated its activities for this conformity determination with numerous stakeholders and review agencies, including Shelby County, Shelby County Health Department, DeSoto County, Tennessee Department of Environment and Conservation (TDEC) Division of Air Pollution Control, Mississippi Department of Environmental Quality (MDEQ), TDOT, MDOT, FHWA, FTA, EPA, and other necessary agencies. The Memphis MPO held teleconference calls and email correspondence to discuss the issues pertinent to the Shelby County Conformity Demonstration (e.g., latest planning assumptions). Verbal and written comments from these calls have been addressed (see Appendix H and Appendix I). To more fully communicate the assumptions being made as a part of the conformity analysis, a pre-consensus plan was developed for the ozone and CO analyses. This document, titled "Livability 2040 Regional Transportation Plan Air Quality Conformity Demonstration Pre-consensus," was reviewed by the interagency consultation group and modified based on comments received.

The Memphis Urban Area MPO's Public Participation Plan, adopted on November 20, 2014, specifies procedures to ensure public involvement in the planning process. All Transportation Policy Board (TPB) and ETC meetings are open to the public for comments on any item. The public was notified of the opportunities to comment on this conformity demonstration. All comments received from the public, committee members, and review agencies were addressed; these are provided in Appendix C.

## 11.4 Methodology and Results

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The Clean Air Act (CAA) requires EPA to regularly update its mobile source emission models. EPA continuously collects data and measures vehicle emissions to make sure the Agency has the best possible understanding of mobile source emissions. This assessment, in turn, informs the development of EPA's mobile source emission models. MOVES represent the Agency's most up-to-date assessment of on-road mobile source emissions. MOVES also incorporates several changes to EPA's approach to mobile source emission modeling based upon recommendations made to the Agency by the National Academy of Sciences. In addition to the MOVES model, the Memphis MPO's Travel Demand Model was used to estimate the vehicle miles travelled (VMT) information. The emissions factors are based on a number of inputs including temperature, presence of inspection and maintenance programs, and vehicle type mix. It was determined that the emissions estimates for CO and the ozone precursors, Volatile Organic Compound (VOC) and Oxide of Nitrogen (NO<sub>x</sub>) are lower than the corresponding emission budgets for each horizon year. More details, including the detailed calculation methodology, are provided in Appendix H and Appendix I.

| Analysis Year | Shelby County Emissions (Tons/Day) |         |                 |         |                      |         |
|---------------|------------------------------------|---------|-----------------|---------|----------------------|---------|
|               | VOC                                |         | NO <sub>x</sub> |         | Carbon Monoxide (CO) |         |
|               | Budget                             | Modeled | Budget          | Modeled | Budget               | Modeled |
| 2017          | 18.323                             | 11.440  | 55.173          | 31.468  | 839.990              | 124.197 |
| 2020          | 18.323                             | 9.040   | 55.173          | 22.611  | 839.990              | 105.485 |
| 2021          | 13.817                             | 8.656   | 54.445          | 21.504  | 839.990              | 101.077 |
| 2030          | 13.817                             | 5.203   | 54.445          | 11.541  | 839.990              | 61.410  |
| 2040          | 13.817                             | 3.898   | 54.445          | 10.675  | 839.990              | 45.290  |

| Pollutant       | Desoto County Emissions (Tons/Day) |       |       |       |
|-----------------|------------------------------------|-------|-------|-------|
|                 | 2011 <sup>a</sup>                  | 2020  | 2030  | 2040  |
| VOC             | 5.178                              | 1.783 | 1.197 | 1.031 |
| NO <sub>x</sub> | 8.969                              | 4.318 | 2.810 | 2.984 |

<sup>a</sup>Baseline Analysis Year.

## 11.5 Conclusion

The analysis indicates that projected emissions levels based on the projects contained in the Memphis Urban Area Livability 2040 Regional Transportation Plan (RTP) and FY 2014-2017 Transportation Improvement Program (TIP) meets the conformity tests for both Shelby and Desoto Counties for Ozone and Shelby County for Carbon Monoxide (CO). It is the determination of this analysis that the FY 2014-2017 TIP and the RTP conform under 8-hour ozone National Ambient Air Quality Standards and the CO National Ambient Air Quality Standards.