**CHAPTER 7**
**EVALUATION OF CONTROL STRATEGIES AND TECHNICAL ASSESSMENTS FOR EARLY ACTION COMPACT LOCAL PLANS**
**March 31, 2004 Milestone**

**Region: 3**

## *Area:* Northern Shenandoah Valley Region (Winchester/Frederick County), VA

***CONTROL STRATEGIES***:

*1. Does the control strategy describe one or more local or state measures that are specific, quantitative quantified and permanent, above and beyond what is already required?:* Yes
*Comment field:*
Northern Shenandoah Valley (NSV) Early Action Plan (EAP) contains two sets of emission reduction strategies, local and state/Regional/National. Local Strategies are divided into two phases due to implementation timing. Strategies listed in Phase I will be implemented no later than December 31, 2005. The following are the Phase I stategies: Ozone Action Days/Public Awareness, VMT Reduction Programs, Open Burning Restrictions, Engine Idling Restrictions, School Bus/Heavy Duty Fleets Retrofits, and Voluntary Industrial Reductions. Strategies in Phase II will act as contingency measures. Strategies listed under State/Regional/National at the state level include three significant action: The state NOx SIP Call Program, the state National Low Emission Vehicle program and to adress local emissions, the state recently adopted RACT controls for industries in the area specifically adopted to support the Early Action Plan.
*2. Does the plan indicate when the dates by which the measures will be adopted? :* Yes
*Comment field:*
The Phase I strategies were adopted by the City of Winchester's Common Council on January 27, 2004 and by the Frederick County Board of Supervisors on November 12, 2003. The Commonwealth of Virginia adopted RACT controls for the industries in the NSV area on Ocotber 2003.
*3. Does the plan quantify emissions reductions , to the extent possible, for each measure when quantification procedures are available?:* Yes
*Comment field:*
See p.26; Appendix D of the Plan
*4. Does the plan include the methodology or procedure and assumptions used to estimate the emissions reductions? :* Yes
*Comment field:*

*5. Does the plan identify an implementation schedule, including dates, for each measure? :* Yes
*Comment field:*
Strategies in Phase I will be implemented as quickly as possible, but no later then December 31, 2005.
*6. Does the plan address emissions growth at least 5 years beyond December 31, 2007? (Maintenance for Growth):* Yes
*Comment field:*
Phse II strategies represent the contingency portion of the EAP. One or more of the following

strategies could be implemented after 2005 as backstops: OTC Portable Container Rule, OTC AIM Rule, OTC Mobile Equipment Repair and Refinishing Rule, Solvent Cleaning Operations Rule, and Truck Stop Electrification.

***TECHNICAL ASSESSMENT***:
*1. Are representative episodes modeled that were reflective of a typical ozone season exceedance that meets the EPA episode selection guidance to ensure that representative meteorological regimes are considered?:* Yes
*Comment field:*
Eleven episode days were modeled (August 8-18, 1999) representing a typical regional scale episode for this area.
*2. Does the plan include MOBILE6 and NONROAD model data as the basis for the emissions inventory?:* Yes
*Comment field:*

*3. Is local modeling used to develop the attainment control strategy?:* Yes
*Comment field:*
A 12 kilometer grid was used for the local modeling. A sensitivity analysis for 36 and 12 kilometer(km)grid resolution was performed that showed very little variation in predicted ozone concentration when going from 36 km to 12 km. Additionally, ozone concentration gradients in the area of concern are rather small, providing further justification for the use of 12 km grids in the local modeling demonstration.
*4. Does the plan include documentation of the modeling system (i.e., meteorological, emissions, air qualitymodels, biogenic processor) used in the local demonstration?:* Yes
*Comment field:*
The Comprehensive Air Quality Model with Extensions (CAMx) version 4.02, the National Center for Atmospheric Research (NCAR)/Penn State Mesoscale Model (MM5),BEIS3 and the Sparse Matrix Operator Kernel Emissions (SMOKE) model represent the modeling platform used in the attainment demonstration. The plan included sufficient documentation for the modeling system.
*5. Was the base case model performance evaluation documented and acceptable and consistent with EPAguidance?:* Yes
*Comment field:*

*6. Was a modeling protocol submitted? :* Yes
*Comment field:*

*7. Does the modeling demonstrate that all ozone design values are less than 85 ppb?:* Yes
*Comment field:*
The 2007 predicted design value for the Frederick monitor is 73 ppb.
*8. If the modeling does not demonstrate that all design values are less than 85 ppb, was acceptable weight of evidence provided and consistent with EPA guidance that shows the area will attain the 8-hour ozone standard by December 31, 2007?: -*
*Comment field:*
N/A

***DOES THE EARLY ACTION COMPACT PLAN MEET THE MARCH 31, 2004 MILESTONE?****:* Yes-Area is designated nonattainment - effective September 30, 2005

## *Region:* 3

## *Area:* Roanoke Area, VA

***CONTROL STRATEGIES****:*

*1. Does the control strategy describe one or more local or state measures that are specific, quantitative quantified and permanent, above and beyond what is already required?:* Yes

*Comment field:*

Roanoke Early Action Plan (EAP) contains two sets of emission reduction strategies, local and state/Regional/National. The control strategies listed will be implemented no later than December 31, 2005. The plan contains a total of 17 control measures that are identified, quantified and documented. The following are the local stategies: Heavy Duty Diesel and diesel equipment strategies, air quality action days, public education and stationary source strategies, and lawn and garden rquipment strategies including open burning bans/restrictions. Strategies listed under State/Regional/National at the state level include three significant action: The state NOx SIP Call Program, the state National Low Emission Vehicle program and to adress local emissions, the state recently adopted RACT controls for industries in the area.

*2. Does the plan indicate when the dates by which the measures will be adopted? :* Yes

*Comment field:*

A resolution was signed by the Roanoke Area on February 19, 2004, adopting all the local control measures listed in the Early Action Plan.

*3. Does the plan quantify emissions reductions , to the extent possible, for each measure when quantification procedures are available?:* Yes

*Comment field:*

*4. Does the plan include the methodology or procedure and assumptions used to estimate the emissions reductions? :* Yes

*Comment field:*

*5. Does the plan identify an implementation schedule, including dates, for each measure? : -*

*Comment field:*

Strategies will be implemented as quickly as possible, but no later than December 31, 2005.

*6. Does the plan address emissions growth at least 5 years beyond December 31, 2007? (Maintenance for Growth):* Yes

*Comment field:*

The plan includes a maintenance for growth section, but it has not been completed. However, the plan included supporting information to support the assumption that the area will remain in attainmnet after the predicted attainmnet date of 2007.

***COMPLETENESS CHECKLIST FOR EVALUATING TECHNICAL ASSESSMENT****:*

*1. Are representative episodes modeled that were reflective of a typical ozone season exceedance that meets the EPA episode selection guidance to ensure that representative meteorological regimes are considered?:* Yes

*Comment field:*

Eleven episode days were modeled (August 8-18, 1999) representing a typical regional scale

episode for this area.
*2. Does the plan include MOBILE6 and NONROAD model data as the basis for the emissions inventory?:* Yes
*Comment field:*

*3. Is local modeling used to develop the attainment control strategy?:* Yes
*Comment field:*
A 12 kilometer (km) grid was used for the local modeling. Sensitivity modeling for grid resolutions of 36 and 12 km was performed that showed very little variation in predicted ozone concentration when going from 36 km to 12 km. Additionally, ozone concentration gradients in the area of concern are rather small, providing further justification for the use of 12 km grids in the local modeling demonstration.
*4. Does the plan include documentation of the modeling system (i.e., meteorological, emissions, air qualitymodels, biogenic processor) used in the local demonstration?:* Yes
*Comment field:*
The Comprehensive Air Quality Model with Extensions (CAMx) version 4.02, the National Center for Atmospheric Research (NCAR)/Penn State Mesoscale Model (MM5), BEIS3 and the Sparse Matrix Operator Kernel Emissions (SMOKE) model represent the modeling platform used in the attainment demonstration. The plan includes sufficient documentation for the modeling system.
*5. Was the base case model performance evaluation documented and acceptable and consistent with EPAguidance?:* Yes
*Comment field:*

*6. Was a modeling protocol submitted? :* Yes
*Comment field:*

*7. Does the modeling demonstrate that all ozone design values are less than 85 ppb?:* Yes
*Comment field:*
The predicted 2007 design value for the Roanoke monitor is 70 ppb.
*8. If the modeling does not demonstrate that all design values are less than 85 ppb, was acceptable weight of evidence provided and consistent with EPA guidance that shows the area will attain the 8-hour ozone standard by December 31, 2007?: -*
*Comment field:*
N/A
***DOES THE EARLY ACTION COMPACT PLAN MEET THE MARCH 31, 2004 MILESTONE?****:* Yes-Area is designated nonattainment - effective September 30, 2005

## *Region:* 3
## *Area:* The Eastern Pan Handle Region (Martinsburg Area), WV
***CONTROL STRATEGIES***

*1. Does the control strategy describe one or more local or state measures that are specific, quantitative quantified and permanent, above and beyond what is already required?:* Yes
*Comment field:*

The Eastern Panhandle Region of West Virginia plan includes the following control measures: Ozone Action Days Program, Public Awareness Program, Bicycle and Pedestrian Measures, Voluntary Idling Reduction Measures, Voluntary Partnership with the Ground Freight Industry, Open Burning Reduction Proogram(increased compliance), and School Bus Engine Retrofit already begun continue thru 2001.
*2. Does the plan indicate when the dates by which the measures will be adopted? :* Yes
*Comment field:*
On March 25, 2004, the Eastern Panhandle Region of West Virginia resolved to officially approve, endorse and adopt the control measures listed in the Ozone Early Action Plan.
*3. Does the plan quantify emissions reductions , to the extent possible, for each measure when quantification procedures are available?:* Yes
*Comment field:*

*4. Does the plan include the methodology or procedure and assumptions used to estimate the emissions reductions? :* Yes
*Comment field:*
See 12/03 Progress Report.
*5. Does the plan identify an implementation schedule, including dates, for each measure? :* Yes
*Comment field:*
Control measures will be implemented as quickly as possible, but no later than December 31, 2005.
*6. Does the plan address emissions growth at least 5 years beyond December 31, 2007? (Maintenance for Growth):* Yes
*Comment field:*
The following measures will be evaluated for inclusion in the Early Action Plan, should need arise: WVDEP RACT and RACM, Alternative Fules Program, Truck Stop Electrification, and Lower RVP Gasoline.

***TECHNICAL ASSESSMENT**:*
*1. Are representative episodes modeled that were reflective of a typical ozone season exceedance that meets the EPA episode selection guidance to ensure that representative meteorological regimes are considered?:* Yes
*Comment field:*
Eleven episode days were modeled (August 8-18, 1999) representing a typical regional scale episode for this area.
*2. Does the plan include MOBILE6 and NONROAD model data as the basis for the emissions inventory?:* Yes
*Comment field:*

*3. Is local modeling used to develop the attainment control strategy?:* Yes
*Comment field:*
A 12 kilometer (km) grid was used for the local modeling. Sensitivity modeling for grid resolutions of 36 and 12 km was performed that showed very little variation in predicted ozone concentration when going from 36 km to 12 km. Additionally, ozone concentration gradients in the area of concern are rather small, providing further justification for the use of 12 km grids in

the local modeling demonstration.
*4. Does the plan include documentation of the modeling system (i.e., meteorological, emissions, air qualitymodels, biogenic processor) used in the local demonstration?:* Yes
*Comment field:*
The Comprehensive Air Quality Model with Extensions (CAMx) version 4.02, the National Center for Atmospheric Research (NCAR)/Penn State Mesoscale Model (MM5), BEIS3 and the Sparse Matrix Operator Kernel Emissions (SMOKE) model represent the modeling platform used in the attainment demonstration. The plan includes sufficient documentation for the modeling system.
*5. Was the base case model performance evaluation documented and acceptable and consistent with EPAguidance?:* Yes
*Comment field:*

*6. Was a modeling protocol submitted? :* Yes
*Comment field:*

*7. Does the modeling demonstrate that all ozone design values are less than 85 ppb?:* Yes
*Comment field:*
The predicted 2007 design value for the Frederick monitor is 73 ppb.
*8. If the modeling does not demonstrate that all design values are less than 85 ppb, was acceptable weight of evidence provided and consistent with EPA guidance that shows the area will attain the 8-hour ozone standard by December 31, 2007?:* -
*Comment field:*
N/A
***DOES THE EARLY ACTION COMPACT PLAN MEET THE MARCH 31, 2004 MILESTONE?****:* Yes- The Frederick Area is designated nonattainment - effective September 30, 2005

## *Region:* 3
## *Area:* Washington County (West of Washington, DC), MD

***CONTROL STRATEGIES***
*1. Does the control strategy describe one or more local or state measures that are specific, quantitative quantified and permanent, above and beyond what is already required?:* Yes
*Comment field:*
The Washington County, MD Early Action Plan provided a detailed list of all the control measures for the Washington County and are grouped by the following: Highway sources - VMT and Trip Reduction Measures, Trffic Flow Improvements, Vehicle Acquisitions, State Control Measures, Federal Control Measures; Area Sources; Off-Road Sources; and Stationary Sources.
*2. Does the plan indicate when the dates by which the measures will be adopted? :* Yes
*Comment field:*
A Public Hearing was held on February 25, 2004 and on March 26, 2004, the Washington County Commissioners finalized the local control measures that are included in the Early Action Plan.
*3. Does the plan quantify emissions reductions , to the extent possible, for each measure when quantification procedures are available?:* Yes
*Comment field:*

*4. Does the plan include the methodology or procedure and assumptions used to estimate the emissions reductions? :* Yes
*Comment field:*

*5. Does the plan identify an implementation schedule, including dates, for each measure? :* Yes
*Comment field:*
No later than December 31, 2005.
*6. Does the plan address emissions growth at least 5 years beyond December 31, 2007? (Maintenance for Growth):* Yes
*Comment field:*
The plan includes a maintenance for growth section, but it has not been completed. However, the plan included supporting information to support the assumption that the area will remain in attainmnet after the predicted attainmnet date of 2007.

***TECHNICAL ASSESSMENT****:*
*1. Are representative episodes modeled that were reflective of a typical ozone season exceedance that meets the EPA episode selection guidance to ensure that representative meteorological regimes are considered?:* Yes
*Comment field:*
Eleven episode days were modeled (August 8-18, 1999) representing a typical regional scale episode for this area.

*2. Does the plan include MOBILE6 and NONROAD model data as the basis for the emissions inventory?:* Yes
*Comment field:*

*3. Is local modeling used to develop the attainment control strategy?:* Yes
*Comment field:*
A 12 kilometer (km) grid was used for the local modeling. Sensitivity modeling for grid resolutions of 36 and 12 km was performed that showed very little variation in predicted ozone concentration when going from 36 km to 12 km. Additionally, ozone concentration gradients in the area of concern are rather small, providing further justification for the use of 12 km grids in the local modeling demonstration.
*4. Does the plan include documentation of the modeling system (i.e., meteorological, emissions, air qualitymodels, biogenic processor) used in the local demonstration?:* Yes
*Comment field:*
The Conprehensive Air Quality Model with Extensions (CAMx) version 4.02, the National Center for Atmospheric Research (NCAR)/Penn Stare Mesoscale Model (MM5), BEIS3 and the Sparse Matrix Operator Kernel Emissions (SMOKE) model represent the modeling platform used in the attainment demonstration. The plan includes sufficient dicumentation for the modeling system.
*5. Was the base case model performance evaluation documented and acceptable and consistent with EPAguidance?:* Yes
*Comment field:*

*6. Was a modeling protocol submitted? :* Yes
*Comment field:*

*7. Does the modeling demonstrate that all ozone design values are less than 85 ppb?:* Yes
*Comment field:*
The predicted 2007 design value for the Hagerstown monitor is 75.4 ppb.
*8. If the modeling does not demonstrate that all design values are less than 85 ppb, was acceptable weight of evidence provided and consistent with EPA guidance that shows the area will attain the 8-hour ozone standard by December 31, 2007?: -*
*Comment field:*
N/A
***DOES THE EARLY ACTION COMPACT PLAN MEET THE MARCH 31, 2004 MILESTONE?****:* Yes- Washington County is designated nonattainment - effective date deferred until September 30, 2005

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## *Region:* 4
## *Area:* Augusta-Aiken EAC, (Augusta, Georgia portion)

**CONTROL STRATEGIES**

1. Does the control strategy describe one or more local or state measures that are specific, quantified and permanent, above and beyond what is already required?

Yes: An open burning ban and Stage I Vapor Recovery will be implemented at the state level in Richmond and Columbia counties.

Additionally, local measures such as truck stop electrification, school bus conversions and retrofits, and voluntary smog alert programs will be pursued.

2. Does the plan indicate the dates by which the measures will be adopted?

Yes: Open burning ban and Stage I vapor recovery will be implemented by May 2005.

3. Does the plan quantify emissions reductions for each measure when quantification procedures are available?

Yes: The open burning ban emission reduction estimates are 0.71 tpd for NOx and 1.75 tpd for VOC. The Stage I Vapor Recovery emission reduction estimates are 1.61 tpd VOC for 2007 and 1.81 tpd VOC for 2012.

4. Does the plan include the methodology or procedure and assumptions used to estimate the emissions reductions? Describe briefly (comment field).

No - not shown for the 2 measures mentioned above.
Section 3 discusses the development of emission inventories.

5. Does the plan identify an implementation schedule, including dates, for each measure?

Yes: Open burning ban and Stage I Vapor Recovery will be implemented by May 2005.

6. Does the plan address emissions growth at least 5 years beyond December 31, 2007? (Maintenance for Growth)

Yes: Emission inventories and modeling developed for the year 2012.

**TECHNICAL ASSESSMENT**

1. Are representative episodes modeled that were reflective of a typical ozone season exceedance that meets the EPA episode selection guidance to ensure that representative meteorological regimes are considered?

Yes: Cartesian Regression Tree (CART) analysis used to identify representative regimes. Two meteorological regimes were identified for Augusta. The episode modeled for this area included only one day from one of the meteorological regimes. The maximum concentration was 89 ppb. One episode was modeled: August 11-20, 2000.

2. Does the plan include MOBILE6 and NONROAD model data as the basis for the emissions inventory?

Yes.

3. Is local modeling used to develop the attainment control strategy?

Yes: Nested grids of 4/12/36 km and 35 vertical layers were used in the MM5 meteorological model. Nested grids of 4/12/36 km nested grids and 13 vertical layers were used in the CMAQ air quality modeling. SMOKE is used to process the emissions.

4. Does the plan include documentation of the modeling system (i.e., meteorological, emissions, air quality models, biogenic processor) used in the local demonstration?

Yes/No Comment field:

5. Was the base case model performance evaluation documented and acceptable and consistent with EPA guidance?

Yes: Model performance for the one hour ozone concentrations was submitted and were acceptable. The model performance for the 8-hr statistics are needed for each EAC area.

6. Was a modeling protocol submitted?

No.

7. Does the modeling demonstrate that all ozone design values are less than 85 ppb?

Yes.

| monitor location | 1999-2001 ambient design values | 2007 modeled design values | 2012 modeled design values |
|---|---|---|---|
| | | FDV | FDV |
| Richmond | 87 | 75 | 71 |
| Edgefield | 81 | 70 | 66 |
| Aiken | 86 | 74 | 70 |
| Barnwell | 83 | 70 | 67 |

8. If the modeling does not demonstrate that all design values are less than 85 ppb, was acceptable weight of evidence provided and consistent with EPA guidance that shows the area will attain the 8-hour ozone standard by December 31, 2007?

NA

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**DOES THE EARLY ACTION COMPACT PLAN MEET THE MARCH 31, 2004 MILESTONE?**

Yes–Area is designated attainment, effective June 15, 2004.

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***Region:*** **4 CHATTANOOGA EAC (Georgia Portion) - Catoosa County and Walker County**

**CONTROL STRATEGIES**

1. Does the control strategy describe one or more local or state measures that are specific, quantified and permanent, above and beyond what is already required?

Yes: An open burning ban and Stage I Vapor Recovery will be implemented at the state level in the Chattanooga (GA) area in Catoosa and Walker counties.

Additionally, Catoosa and Walker counties will pursue local measures such as truck stop electrification projects, school bus conversions and retrofits, and voluntary smog alert programs.

2. Does the plan indicate the dates by which the measures will be adopted?

Yes: "EPD will adopt control measures, identified through this process and deemed necessary for attaining the 8-hour ozone standard, into an Early Action SIP as expeditiously as possible."

3. Does the plan quantify emissions reductions for each measure when quantification procedures are available?

Yes: Open burning ban emission reduction estimates are 0.18 tpd NOx and 0.64 tpd VOC. Stage I Vapor Recovery emission reduction estimates are 0.81 tpd VOC in 2007 and 0.93 tpd VOC in 2012.

4. Does the plan include the methodology or procedure and assumptions used to estimate the emissions reductions? Describe briefly (comment field).

Yes: Section 3 describes the emission processing and development of emission inventories.

5. Does the plan identify an implementation schedule, including dates, for each measure?

Yes: "EPD will adopt control measures, identified through this process and deemed necessary for attaining the 8-hour ozone standard, into an Early Action SIP as expeditiously as possible."

6. Does the plan address emissions growth at least 5 years beyond December 31, 2007? (Maintenance for Growth)

Yes: Section 3 contains emission inventories for the year 2012

**TECHNICAL ASSESSMENT**

1. Are representative episodes modeled that were reflective of a typical ozone season exceedance that meets the EPA episode selection guidance to ensure that representative meteorological

regimes are considered?

Yes: Cartesian Regression Tree (CART) analysis used to identify representative regimes. Three regimes were identified for Chattanooga. Two exceedance days that represent two of the three key exceedance meteorological regimes for Chattanooga, with a range of 8-hour ozone exceedance concentrations from 98.1 to 105.5 were modeled. One episode was modeled: August 11-20, 2000.

2. Does the plan include MOBILE6 and NONROAD model data as the basis for the emissions inventory?

Yes.

3. Is local modeling used to develop the attainment control strategy?

Yes: Nested grids of 4/12/36 km and 35 vertical layers were used in the MM5 meteorological model. Nested grids of 4/12/36 km nested grids and 13 vertical layers were used in the CMAQ air quality modeling. The Chattanooga area is within the 12 km grid. SMOKE is used to process the emissions.

4. Does the plan include documentation of the modeling system (i.e., meteorological, emissions, air quality models, biogenic processor) used in the local demonstration?

Yes: Air quality, meteorological and emissions models used are CMAQ, MM5 and SMOKE (Mobile 6 and NONROAD2002). BEIS3 database used to process biogenic emissions. EGAS4.0 used in developing future emissions.

5. Was the base case model performance evaluation documented and acceptable and consistent with EPA guidance?

Yes: Model performance for the one hour ozone concentrations was submitted and were acceptable. The model performance for the 8-hr statistics are needed for each EAC area.

6. Was a modeling protocol submitted?

No.

7. Does the modeling demonstrate that all ozone design values are less than 85 ppb?

Yes.

| monitor location | 1999-2001 ambient design values | 2007 modeled design values | 2012 modeled design values |
|---|---|---|---|
| | | FDV | FDV |

| | | | |
|---|---|---|---|
| Sequoyah | 93 | 81 | 79 |
| Chattanooga VAAP | 92 | 81 | 79 |
| Meigs Co. | 93 | 81 | 79 |

8. If the modeling does not demonstrate that all design values are less than 85 ppb, was acceptable weight of evidence provided and consistent with EPA guidance that shows the area will attain the 8-hour ozone standard by December 31, 2007?

Comment field: Not applicable

**CONCLUSION:** The Chattanooga EAC is to be commended on developing an attainment demonstration that appears to adequately conform with the draft 8-hour ozone modeling guidance. Although the attainment test is passed for Chattanooga using the 12-km-based modeling, more refined modeling based on more days and meteorological conditions**,** as presented in the 4-km based modeling in TN's submittal for Chattanooga, does not suggest that attainment would be achieved in 2007. The future year attainment modeling conducted by Tennessee does not demonstrate attainment in 2007 because it does not predict a future design value that is less than 85 ppb. Since this modeled attainment test was not passed by Tennessee's 4-km-based modeling, the Agency then considered many items as supplemental quantitative and qualitative analyses and information to support the modeled strategy in the demonstration of attainment for the Chattanooga EAC area in 2007. Some new innovative weight of evidence approaches (e.g., meteorological adjustment methodology) have potential merit, but more documentation and analysis are needed for our review. The modeling analysis conducted by Georgia was considered as a part of this additional weight of evidence. When Georgia's analysis was reviewed, in conjunction with Agency-recommended metrics and other analyses and data, it was also concluded that attainment in 2007 was not likely. At a minimum, the percent improvements in high 8-hour ozone concentrations from the baseline should meet or exceed Agency-recommended levels in the weight of evidence analysis. (These percent improvements were also not achieved in the Tennessee modeling.) Because the maximum modeled future design value is above the NAAQS, and the spatial improvement for Agency-recommended metrics did not meet EPA's level of acceptance, the WOE analyses for the Chattanooga area is not sufficient to indicate attainment in 2007. Finally, an assessment on the adequacy and feasibility of implementation of the controls used in the modeling is needed to complete the review of the attainment demonstration.

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**DOES THE EARLY ACTION COMPACT PLAN MEET THE MARCH 31, 2004 MILESTONE?**

No– Catoosa County, GA is designated nonattainment, effective date deferred until June 15, 2004.

Walker County is designated attainment, effective June 1, 2004
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**Region: 4 Desoto County, MS portion of Memphis EAC**

**CONTROL STRATEGIES**

1. Does the control strategy describe one or more local or state measures that are specific, quantified and permanent, above and beyond what is already required?

Yes: DeSoto County commits to implement local controls including road maintenance activities, use of solvent based paints, low emission vehicles, Texas Gas point source controls, and idling reductions. State of Mississippi is considering NOx RACT, VOC RACT, Stage 1 vapor controls, and open burning restrictions on ozone action days.

2. Does the plan indicate the dates by which the measures will be adopted?

Yes: All local measures are to be implemented by ozone season 2005.

3. Does the plan quantify emissions reductions for each measure when quantification procedures are available?

Yes: Two control measures are quantified. Texas Gas has committed to running the reciprocating engines at 90% of rated load during the ozone season for a reduction in NOx of 0.45 tpd. Idling emission reductions will obtain a 0.1 tpd reduction of NOx emissions.

4. Does the plan include the methodology or procedure and assumptions used to estimate the emissions reductions? Describe briefly (comment field).

No: However, all air emission estimates were derived from EPA's 1999 National Emission Inventory. Further details regarding emission reductions and quantification are available in the modeling analysis and technical support document for the Memphis, TN area.

5. Does the plan identify an implementation schedule, including dates, for each measure?

Yes: Ozone season 2005.

6. Does the plan address emissions growth at least 5 years beyond December 31, 2007? (Maintenance for Growth)

Yes: The modeling analysis and technical support document discuss maintenance in 2012.

**TECHNICAL ASSESSMENT**

1. Are representative episodes modeled that were reflective of a typical ozone season exceedance that meets the EPA episode selection guidance to ensure that representative meteorological regimes are considered?
Yes/No Comment field:

2. Does the plan include MOBILE6 and NONROAD model data as the basis for the emissions inventory?

Yes/No Comment field:

3. Is local modeling used to develop the attainment control strategy?

Yes/No Comment field.

4. Does the plan include documentation of the modeling system (i.e., meteorological, emissions, air quality models, biogenic processor) used in the local demonstration?

Yes/No Comment field:

5. Was the base case model performance evaluation documented and acceptable and consistent with EPA guidance?

Yes/No Comment field:

6. Was a modeling protocol submitted?
Yes/No Comment field:

7. Does the modeling demonstrate that all ozone design values are less than 85 ppb?

Yes/No Comment field:

8. If the modeling does not demonstrate that all design values are less than 85 ppb, was acceptable weight of evidence provided and consistent with EPA guidance that shows the area will attain the 8-hour ozone standard by December 31, 2007?

Yes/No Comment field:

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**DOES THE EARLY ACTION COMPACT PLAN MEET THE MARCH 31, 2004 MILESTONE?**

No. The Tennessee and Arkansas portions of the Memphis area are designated nonattainment, effective June 15, 2004.

Desoto County, MS is designated attainment, effective June 15, 2004.
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***Region:*** **4**

## *Area:* THE MOUNTAIN AREA OF WESTERN NC EAC

**City of Asheville, Buncombe County, Haywood County, and Madison County**

**CONTROL STRATEGY**

1. Does the control strategy describe one or more local or state measures that are specific, quantified and permanent, above and beyond what is already required?

Yes: Several control measures already in place or being implemented over the next few years will reduce point, highway mobile, and nonroad mobile sources. These control measures were modeled for 2007. The Clean Air Bill, the Clean Smokestacks Act, open burning ban, Tier 2 Vehicle Standards, Heavy-Duty Gasoline And Diesel Highway Vehicles Standards, Large Nonroad Diesel Engines Proposed Rule are examples.
Local measures include tree planting, eliminating non-essential travel during ozone action days, encouraging mowing to non- ozone action day.

2. Does the plan indicate the dates by which the measures will be adopted?

Yes: The Clean Air Bill was adopted in 1999. Clean Smokestacks was adopted in 2002. Others will be phased in through 2005.

3. Does the plan quantify emissions reductions for each measure when quantification procedures are available?

No; however, a comparison of emissions by pollutant and source category is available for the years 2000 and 2007.

4. Does the plan include the methodology or procedure and assumptions used to estimate the emissions reductions? Describe briefly (comment field).

Yes: A detailed description of the development of emission inventories and modeling techniques is provided.

5. Does the plan identify an implementation schedule, including dates, for each measure?

Yes: Several control measures have already been implemented and the remaining measures will be phased in through 2005.

6. Does the plan address emissions growth at least 5 years beyond December 31, 2007? (Maintenance for Growth)

Yes: Future year inventories for 2010 and 2012 are provided and the state is in the process of developing a 2017 future year emission inventory.

We will continue to work with this area to strengthen the plan.

**TECHNICAL ASSESSMENT**

1. Are representative episodes modeled that were reflective of a typical ozone season exceedance that meets the EPA episode selection guidance to ensure that representative meteorological regimes are considered?

Yes: The following historical episodes were selected to model because they represent typical meteorological conditions in North Carolina when high ozone is observed throughout the State: July 10-15, 1995, June 20-24, 1996, June 25-30, 1996 and July 10-15, 1997. The methodologies suggested in EPA's draft modeling guidance were applied to the extent possible when attempting to choose episodes. The episode selection criterion was compromised to some extent by the need to simultaneously model multiple areas in NC. First NC DAQ considered a mix of episodes reflecting a variety of meteorological scenarios which frequently correspond with observed 8-hour daily maxima > 84 ppb at different monitoring sites. An analysis of each ozone episode was made using several sources of air quality and meteorological data to determine the episodes that would contribute the most to the modeling effort. Secondly, the state considered periods in which observed 8-hour daily maximum concentrations were within 10 ppb of each area's design value. Finally, the temporal and spatial distribution of ozone throughout NC was also an important consideration. Also, the need to study the cumulative effects of ozone build-up over a number of days was recognized

2. Does the plan include MOBILE6 and NONROAD model data as the basis for the emissions inventory?

Yes: The 2000 current year and 2007 and 2010 future years inventories were developed using the NONROAD2002 and MOBILE6.2 models.

3. Is local modeling used to develop the attainment control strategy?

Yes: NCDAQ is using a 36, 12, 4 km nested grid configuration with 26 vertical layers in MM5. For one episodes, MAQSIP was run using a 36, 12, 4 km nested grid configuration with 16 layers. For the other 3 episodes, MAQSIP was run with 26 layers – matching the MM5 vertical structure.

4. Does the plan include documentation of the modeling system (i.e., meteorological, emissions, air quality models, biogenic processor) used in the local demonstration?

Yes: Air quality, meteorological and emissions models are MAQSIP, MM5 and SMOKE, respectively. BEIS-3 used to process biogenic emissions.

5. Was the base case model performance evaluation documented and acceptable and consistent with EPA guidance?

Yes.

6. Was a modeling protocol submitted?

Yes.

7. Does the modeling demonstrate that all ozone design values are less than 85 ppb?

Yes: 2007 design values are 71, 76, 79 and 80 ppb for the Waynesville, Bent Creek, Purchase Knob and Fry Pan monitors. 2010 design values are 67, 71, 71 and 73 ppb for the Waynesville, Bent Creek, Purchase Knob and Fry Pan monitors. 2017 modeling to be developed.

8. If the modeling does not demonstrate that all design values are less than 85 ppb, was acceptable weight of evidence provided and consistent with EPA guidance that shows the area will attain the 8-hour ozone standard by December 31, 2007?

NA

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**DOES THE EARLY ACTION COMPACT PLAN MEET THE MARCH 31, 2004 MILESTONE?**

Yes– The Mountain Area of Western NC (Asheville area) is designated attainment, effective June 15, 2004.

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**Region: 4**

## *Area:* FAYETTEVILE EAC, NC

**Cumberland County**

**CONTROL STRATEGY**

1. Does the control strategy describe one or more local or state measures that are specific, quantified and permanent, above and beyond what is already required?

Yes: Several control measures already in place or being implemented over the next few years will reduce point, highway mobile, and nonroad mobile sources. These control measures were modeled for 2007. The Clean Air Bill, the Clean Smokestacks Act, open burning ban, Tier 2 Vehicle Standards, Heavy-Duty Gasoline And Diesel Highway Vehicles Standards, Large Nonroad Diesel Engines Proposed Rule are examples.

Local measures include converting 185 vehicles at Fort Bragg to biodiesel; using electrical outlets at Festival Park for truck idling; retrofitting diesel school buses at Fort Bragg; using intelligent transportation system; and implementing energy reduction at Fort Bragg.

2. Does the plan indicate the dates by which the measures will be adopted?

Yes: The Clean Air Bill was adopted in 1999. Clean Smokestacks was adopted in 2002. Others will be phased in through 2005. A detailed schedule of implementation is included.

3. Does the plan quantify emissions reductions for each measure when quantification procedures are available?

Yes

4. Does the plan include the methodology or procedure and assumptions used to estimate the emissions reductions? Describe briefly (comment field).

Yes: using CACPS and AP-42. Also, a detailed description of the development of emission inventories and modeling techniques is provided.

5. Does the plan identify an implementation schedule, including dates, for each measure?

Yes: Several control measures have already been implemented and the remaining measures will be phased in through 2005.

6. Does the plan address emissions growth at least 5 years beyond December 31, 2007? (Maintenance for Growth)

Yes: Future year inventories for 2010 and 2012 are provided and the state is in the process of developing a 2017 future year emission inventory.

**TECHNICAL ASSESSMENT**

1. Are representative episodes modeled that were reflective of a typical ozone season exceedance that meets the EPA episode selection guidance to ensure that representative meteorological regimes are considered?

Yes: The following historical episodes were selected to model because they represent typical meteorological conditions in North Carolina when high ozone is observed throughout the State: July 10-15, 1995, June 20-24, 1996, June 25-30, 1996 and July 10-15, 1997. The methodologies suggested in EPA's draft modeling guidance were applied to the extent possible when attempting to choose episodes. The episode selection criterion was compromised to some extent by the need to simultaneously model multiple areas in NC. First, NC DAQ considered a mix of episodes reflecting a variety of meteorological scenarios which frequently correspond with observed 8-hour daily maxima > 84 ppb at different monitoring sites. An analysis of each ozone episode was made using several sources of air quality and meteorological data to determine the episodes that would contribute the most to the modeling effort. Secondly, the state considered periods in which observed 8-hour daily maximum concentrations were within 10 ppb of each area's design value. Finally, the temporal and spatial distribution of ozone throughout NC was also an important consideration. Also, the need to study the cumulative effects of ozone build-up over a number of days was recognized

2. Does the plan include MOBILE6 and NONROAD model data as the basis for the emissions inventory?

Yes: The 2000 current year and 2007 and 2010 future years inventories were developed using the NONROAD2002 and MOBILE6.2 models.

3. Is local modeling used to develop the attainment control strategy?

Yes: NCDAQ is using a 36, 12, 4 km nested grid configuration with 26 vertical layers in MM5. For one episodes, MAQSIP was run using a 36, 12, 4 km nested grid configuration with 16 layers. For the other 3 episodes, MAQSIP was run with 26 layers – matching the MM5 vertical structure.

4. Does the plan include documentation of the modeling system (i.e., meteorological, emissions, air quality models, biogenic processor) used in the local demonstration?

Yes: Air quality, meteorological and emissions models are MAQSIP, MM5 and SMOKE, respectively. BEIS-3 used to process biogenic emissions.

5. Was the base case model performance evaluation documented and acceptable and consistent with EPA guidance?

Yes.

6. Was a modeling protocol submitted?

Yes.

7. Does the modeling demonstrate that all ozone design values are less than 85 ppb?

Yes: 2007 design values are 80 and 78 ppb for the Wade and Golfview (Hope Mills) monitors. 2010 design values are 74 and 73 ppb for the Wade and Golfview monitors. 2017 modeling to be developed.

8. If the modeling does not demonstrate that all design values are less than 85 ppb, was acceptable weight of evidence provided and consistent with EPA guidance that shows the area will attain the 8-hour ozone standard by December 31, 2007?

Yes/No Comment field:

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**DOES THE EARLY ACTION COMPACT PLAN MEET THE MARCH 31, 2004 MILESTONE?**

Yes– The Fayetteville area is designated nonattainment - effective date deferred until September 30, 2005

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**Region 4: THE TRIAD EAC (Greensboro-Winston-Salem-High Point), NC**
**Alamance County, Caswell County, Davidson County, Davie County, Forsyth County, Guilford County, Randolph County, Rockingham County, Stokes County, Surry County, Yadkin County**

**CONTROL STRATEGIES**

1. Does the control strategy describe one or more local or state measures that are specific, quantified and permanent, above and beyond what is already required?

Yes: Several control measures already in place or being implemented over the next few years will reduce point, highway mobile, and nonroad mobile sources. These control measures were modeled for 2007. The Clean Air Bill, the Clean Smokestacks Act, open burning ban, Tier 2 Vehicle Standards, Heavy-Duty Gasoline And Diesel Highway Vehicles Standards, Large Nonroad Diesel Engines Proposed Rule are examples.

There are several local measures that have been apopted and/or implemented - converting biodiesel in Greensboro for all on and off road vehicles; school bus diesel retrofits; replace new gasoline engines that meet California standard; building up t o20 Park and Ride lots; RJ Reynolds eliminated use of coal fired boilers; no idling policy for Guilford county school buses and implementing energy efficiency in schools and public buildings.

2. Does the plan indicate the dates by which the measures will be adopted?

Yes: The Clean Air Bill was adopted in 1999. Clean Smokestacks was adopted in 2002. Others will be phased in through 2005. A detailed schedule of implementation is included.

3. Does the plan quantify emissions reductions when quantification procedures are available for each measure?

Yes: In addition, a comparison of emissions by pollutant and source category is available for the years 2000 and 2007.

4. Does the plan include the methodology or procedure and assumptions used to estimate the emissions reductions? Describe briefly (comment field).

Yes: A detailed description of the development of emission inventories and modeling techniques is provided.

5. Does the plan identify an implementation schedule, including dates, for each measure?

Yes: Several control measures have already been implemented and the remaining measures will be phased in through 2005.

6. Does the plan address emissions growth at least 5 years beyond December 31, 2007?

(Maintenance for Growth)

Yes: Future year inventories for 2010 and 2012 are provided and the state is in the process of developing a 2017 future year emission inventory.

**TECHNICAL ASSESSMENT**

1. Are representative episodes modeled that were reflective of a typical ozone season exceedance that meets the EPA episode selection guidance to ensure that representative meteorological regimes are considered?

Yes: The following historical episodes were selected to model because they represent typical meteorological conditions in North Carolina when high ozone is observed throughout the State: July 10-15, 1995, June 20-24, 1996, June 25-30, 1996 and July 10-15, 1997. The methodologies suggested in EPA's draft modeling guidance were applied to the extent possible when attempting to choose episodes. The episode selection criterion was compromised to some extent by the need to simultaneously model multiple areas in NC. First the NC DAQ considered a mix of episodes reflecting a variety of meteorological scenarios which frequently correspond with observed 8-hour daily maxima > 84 ppb at different monitoring sites. An analysis of each ozone episode was made using several sources of air quality and meteorological data to determine the episodes that would contribute the most to the modeling effort. Secondly, the state considered periods in which observed 8-hour daily maximum concentrations were within 10 ppb of each area's design value. Finally, the temporal and spatial distribution of ozone throughout NC was also an important consideration. Also, the need to study the cumulative effects of ozone build-up over a number of days was recognized, so episodes of extended duration were given preference over single day exceedance.

2. Does the plan include MOBILE6 and NONROAD model data as the basis for the emissions inventory?

Yes: The 2000 current year and 2007 and 2010 future years inventories were developed using the NONROAD2002 and MOBILE6.2 models.

3. Is local modeling used to develop the attainment control strategy?

Yes: NCDAQ is using a 36, 12, 4 km nested grid configuration with 26 vertical layers in MM5. For one episodes, MAQSIP was run with 16 layers. For the other 3 episodes, MAQSIP was run with 26 layers – matching the MM5 vertical structure.

4. Does the plan include documentation of the modeling system (i.e., meteorological, emissions, air quality models, biogenic processor) used in the local demonstration?

Yes: Air quality, meteorological and emissions models are MAQSIP, MM5 and SMOKE, respectively. BEIS-3 used to process biogenic emissions.

5. Was the base case model performance evaluation documented and acceptable and consistent with EPA guidance?

Yes.

6. Was a modeling protocol submitted?

Yes.

7. Does the modeling demonstrate that all ozone design values are less than 85 ppb?

No: The following table present the future design values for the Triad area in 2007. Future design values are below 85 ppb for all monitors except the Cooleemee monitor.

| Monitor Name | DVC (ppm) | RRF | DVF (ppm) |
|---|---|---|---|
| Bethany | 0.091 | 0.880 | 0.080 |
| Cherry Grove | 0.090 | 0.860 | 0.077 |
| **Cooleemee** | **0.096** | **0.910** | **0.087** |
| Hattie Avenue | 0.094 | 0.880 | 0.082 |
| McLeansville | 0.090 | 0.860 | 0.077 |
| Pollirosa | 0.082 | 0.880 | 0.072 |
| Shiloh Church | 0.089 | 0.870 | 0.077 |
| Sophia | 0.085 | 0.870 | 0.073 |
| Union Cross | 0.093 | 0.870 | 0.080 |

8. If the modeling does not demonstrate that all design values are less than 85 ppb, was acceptable weight of evidence provided and consistent with EPA guidance that shows the area will attain the 8-hour ozone standard by December 31, 2007?

Yes:

- **2010 modeling** 2010 modeling that was developed for another project by NC DAQ indicates the area attaining. NC DAQ believes this is because the main violating monitor, i.e., Cooleemee, is primarily affected by transport from the Charlotte area. 2010 is the expected date the State believes Charlotte will be required to attain the NAAQS for regular 8-hr ozone nonattainment areas. The 2010 attainment test results are below. These preliminary results indicate that the expected State and Federal control measures already in place by 2010 results in all monitors in the Triad EAC area attaining the 8-hour ozone NAAQS; including the Cooleemee monitor which was still above the 0.085 ppm threshold with the 2007 modeling.

| Monitor Name | DVC (ppm) | RRF | DVF (ppm) |
|---|---|---|---|
| Bethany | 0.091 | 0.82 | 0.074 |
| Cherry Grove | 0.090 | 0.81 | 0.072 |

| | | | |
|---|---|---|---|
| Cooleemee | 0.096 | 0.85 | 0.081 |
| Hattie Avenue | 0.094 | 0.83 | 0.078 |
| McLeansville | 0.090 | 0.83 | 0.074 |
| Pollirosa | 0.082 | 0.83 | 0.068 |
| Shiloh Church | 0.089 | 0.83 | 0.073 |
| Sophia | 0.085 | 0.82 | 0.069 |
| Union Cross | 0.093 | 0.83 | 0.077 |

- **Analysis of frequency of impacts from other source regions** Cooleemee is frequently impacted by pollution from both the Triad or Charlotte metropolitan areas, with Charlotte being the predominant source region. Reductions in Charlotte will lead to reductions in ozone concentrations and future design values at Cooleemee.
- **Alternative methods to determine the current year design value in applying the attainment test** Seven different ways of developing the current year design value was presented and used with the modeled relative reduction factors to predict 2007 future design values. The values range from 83 ppb to 86 ppb and indicates the likelihood of developing many different design values depending on the selection criterion. The average and median of these seven approaches was 84 ppb. This design values was proposed to support the area attaining in 2007 with an acceptable control strategy. This metric is too variable, that is probably why there was a need to use the average or median of the many different options to determine a current design value. By not assessing each option in the attainment test, the credibility of the approach is lessened. There are probably even more ways the current design values could be developed. Depending on which options is used there, should be a rationale why it is better than that recommended in the draft guidance.
- **Three EPA recommended modeled-based analyses:** (1) Relative change in surface grid-hours > 84ppb, (2) Relative change in the number of grid cells with predicted 8-hr daily maxima > 84ppb and (3) Relative change in the total difference (ppb-hr) of hourly predictions > 84ppb. The percent reductions indicated by these metrics were all **greater than 95% for 2007** and at or **near100% in 2010.** EPA's recommends a "large" reduction such as greater than 80% should be achieved.
- **Two state derived modeled-based analyses:** (1) Relative change in the total difference (ppb-hr) of the predicted 8-hr daily maxima > 84 ppb and (2) Air Quality Index counts of the Green, Yellow, Orange, and Red categories for the 2000, 2007, and 2010 modeling output masks. Large reductions of **greater than 95% in 2007** and at or **near100% in 2010** were indicated for the first metric. Orange or red air quality index counts were reduced from 2,406 grid cells in 2000 to 100 grid cells in 2007.
- **Updates to 2007 inventory and modeling:** Additional emission reductions will be incorporated and modeled for the 2007 control strategy: statewide point source decreases (2 tpd NOX from RJ Reynolds, 7 tpd NOX @ Duke Energy's Marshall facility), mobile source updates of 100 tpd NOX across state, open burning ban (reductions depend on application of rule effectiveness and rule penetration), negotiations with Charlotte and Duke to get other reductions downwind of Triad. All should bring Cooleemee monitor into attainment ins final modeling analysis.

Conclusions: The Triad EAC is to be commended on developing an attainment demonstration

that appears to adequately conform with the draft 8-hr modeling guidance. Even though a future year design value that is less than 85 ppb was not predicted, the weight of evidence analysis appears to support a demonstration of attainment in 2007. A relatively large future design value (i.e., 87 ppb) is predicted at only one of 9 monitors in the Triad area. The Agency considered many submitted items as supplemental quantitative and qualitative analyses and information to support the modeled strategy in the demonstration of attainment for the Triad EAC area in 2007. It is our understanding that additional modeling to correct emission inventory concerns, inclusion of local controls and additional controls in the Charlotte North Carolina are expected to predict attainment for the area. Spatially within the local modeling area, only a few grid cells or 8-hr daily maximum ozone concentrations remain above 85 ppb in the current modeling. The percentage improvement in the EPA-recommended weight of evidence metrics are all above 90% . It is our expectation that any remodeling for this area will only improve the submittal such that the future design value will be less than that submitted or below 85 ppb. The WOE analyses is sufficient to indicate that attainment will likely occur in 2007.

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DOES THE EARLY ACTION COMPACT PLAN MEET THE MARCH 31, 2004 MILESTONE?

Yes– The Triad Area (Greensboro-Winston Salem-High Point) is designated nonattainment - effective date deferred until September 30, 2005

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**Region 4: UNIFOUR EAC (Hickory-Morganton-Lenoir), NC: Alexander County, Burke County, Caldwell County, and Catawba County,**

**CONTROL STRATEGIES**

1. Does the control strategy describe one or more local or state measures that are specific, quantified and permanent, above and beyond what is already required?

Yes: Several control measures already in place or being implemented over the next few years will reduce point, highway mobile, and nonroad mobile sources. These control measures were modeled for 2007. The Clean Air Bill, the Clean Smokestacks Act, open burning ban, Tier 2 Vehicle Standards, Heavy-Duty Gasoline And Diesel Highway Vehicles Standards, Large Nonroad Diesel Engines Proposed Rule are examples.

Only possible local measures include land development and transportation strategies.

2. Does the plan indicate the dates by which the measures will be adopted?

Yes: The Clean Air Bill was adopted in 1999. Clean Smokestacks was adopted in 2002. Others will be phased in through 2005. A detailed schedule of implementation is included.

3. Does the plan quantify emissions reductions for each measure when quantification procedures are available?

No; however, a comparison of emissions by pollutant and source category is available for the years 2000 and 2007.

4. Does the plan include the methodology or procedure and assumptions used to estimate the emissions reductions? Describe briefly (comment field).

No, however a detailed description of the development of emission inventories and modeling techniques is provided.

5. Does the plan identify an implementation schedule, including dates, for each measure?

Yes: Several control measures have already been implemented and the remaining measures will be phased in through 2005.

6. Does the plan address emissions growth at least 5 years beyond December 31, 2007? (Maintenance for Growth)

Yes: Future year inventories for 2010 and 2012 are provided and the state is in the process of developing a 2017 future year emission inventory.

**CONCLUSION -** We will continue to work with the area to strengthen the plan.

**TECHNICAL ASSESSMENT**

1. Are representative episodes modeled that were reflective of a typical ozone season exceedance that meets the EPA episode selection guidance to ensure that representative meteorological regimes are considered?

Yes: The following historical episodes were selected to model because they represent typical meteorological conditions in North Carolina when high ozone is observed throughout the State: July 10-15, 1995, June 20-24, 1996, June 25-30, 1996 and July 10-15, 1997. The methodologies suggested in EPA's draft modeling guidance were applied to the extent possible when attempting to choose episodes. The episode selection criterion was compromised to some extent by the need to simultaneously model multiple areas in NC. First, NC DAQ considered a mix of episodes reflecting a variety of meteorological scenarios which frequently correspond with observed 8-hour daily maxima > 84 ppb at different monitoring sites. An analysis of each ozone episode was made using several sources of air quality and meteorological data to determine the episodes that would contribute the most to the modeling effort. Secondly, NC DAQ considered periods in which observed 8-hour daily maximum concentrations were within 10 ppb of each area's design value. Finally, the temporal and spatial distribution of ozone throughout NC was also an important consideration. Also, the need to study the cumulative effects of ozone build-up over a number of days was recognized

2. Does the plan include MOBILE6 and NONROAD model data as the basis for the emissions inventory?

Yes: The 2000 current year and 2007 and 2010 future years inventories were developed using the NONROAD2002 and MOBILE6.2 models.

3. Is local modeling used to develop the attainment control strategy?

Yes: NCDAQ is using a 36, 12, 4 km nested grid configuration with 26 vertical layers in MM5. For one episodes, MAQSIP was run using a 36, 12, 4 km nested grid configuration with 16 layers. For the other 3 episodes, MAQSIP was run with 26 layers – matching the MM5 vertical structure.

4. Does the plan include documentation of the modeling system (i.e., meteorological, emissions, air quality models, biogenic processor) used in the local demonstration?

Yes: Air quality, meteorological and emissions models are MAQSIP, MM5 and SMOKE, respectively. BEIS-3 used to process biogenic emissions.

5. Was the base case model performance evaluation documented and acceptable and consistent with EPA guidance?

Yes.

6. Was a modeling protocol submitted?

Yes.

7. Does the modeling demonstrate that all ozone design values are less than 85 ppb?

Yes: 2007 design values are 77 ppb for the two monitors at Lenoir and Taylorsville. 2010 design values are 71 and 72 ppb for Lenoir and Taylorsville, respectively. 2017 modeling to be developed later.

8. If the modeling does not demonstrate that all design values are less than 85 ppb, was acceptable weight of evidence provided and consistent with EPA guidance that shows the area will attain the 8-hour ozone standard by December 31, 2007?

Yes/No Comment field:

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**DOES THE EARLY ACTION COMPACT PLAN MEET THE MARCH 31, 2004 MILESTONE?**

Yes– The Unifour (Hickory) area is designated nonattainment - effective date deferred until September 30, 2005

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**Region 4: SOUTH CAROLINA -STATE WIDE**
**Appalachian, Catawba, Pee Dee, Waccamaw, Santee Lynches, Berkeley-Charleston-Dorchester, Low Country, Lower Savannah, Central Midlands, and Upper Savannah**

**CONTROL STRATEGIES**

1. Does the control strategy describe one or more local or state measures that are specific, quantified and permanent, above and beyond what is already required?

Yes. Local modeling with only federal controls, indicate all areas in South Carolina will attain the 8-hour National Ambient Air Quality Standard by 2007. The Jeff Holmstead memo, dated November 14, 2002, indicates that the Early Action Compact (EAC) areas must adopt local controls that are needed for attainment. In addition to the local modeling that indicates attainment, the South Carolina Department of Health and Environmental Control (SCDHEC) has revised the Prohibition of Open Burning Regulation to reduce statewide NOx, PM, and CO emissions. SCDHEC has also proposed a NOx Control Regulation to help control the growth of NOx emissions statewide and sources not currently subjected to the NOx control requirements.

2. Does the plan indicate the dates by which the measures will be adopted?

Yes. All of the local measures are to be implemented by April 2005. These efforts should assist the State in achieving the 8-hour standard by December 31, 2007 and maintaining it beyond 2012. **Prohibition of Open Burning and NOx Control Regulations** - Initial approval was granted on October 9, 2003; Informational forum was held on November 24, 2003; Final approval was granted on January 8, 2004 and the proposed regulations were submitted to the state legislature. These regulations are anticipated to be approved during the 2004 Legislative Session.

3. Does the plan quantify emissions reductions for each measure when quantification procedures are available?

No but emission reduction strategies are quantified as "directionally sound" and others are currently being evaluated. The state anticipates the cumulative impact of the adopted measures will assist in maintaining the ozone standard.

The Upstate counties of **Anderson, Greenville, and Spartanburg** as well as the Central Midlands county of **Richland** provide detailed current assessments of emission reductions.

4. Does the plan include the methodology or procedure and assumptions used to estimate the emissions reductions? Describe briefly.

No estimates for control measures but all air emissions estimates were derived from a statewide 8-hour ozone modeling analysis which shows that all areas of South Carolina will attain the 8-hour ozone standard by 2007.

5. Does the plan identify an implementation schedule, including dates, for each measure?

Yes. Implemented by April 2005.

**Oconee** - Considered measures to be implemented in May 2005 are Tree Planting, Tree Saving Pilot Transportation Program, Revise Purchasing Policy, and Reduce Waste and Energy Use.

6. Does the plan address emissions growth at least 5 years beyond December 31, 2007? (Maintenance for Growth)

Yes. The emissions strategies are anticipated to assist the state in achieving and maintaining the ozone standard beyond 2012.

**TECHNICAL ASSESSMENT**

1. Are representative episodes modeled that were reflective of a typical ozone season exceedance that meets the EPA episode selection guidance to ensure that representative meteorological regimes are considered?

Yes Comment field: Cartesian Regression Tree (CART) analysis used to identify representative regimes. One multi-day episode was modeled: 18 – 22 May 1998.

2. Does the plan include MOBILE6 and NONROAD model data as the basis for the emissions inventory?

Yes Comment field: see number 4

3. Is local modeling used to develop the attainment control strategy?

Yes Comment field. Nested grids of 4/12/36 km were used in the MM5 meteorological used in the UAM-V air quality models.

4. Does the plan include documentation of the modeling system (i.e., meteorological, emissions, air quality models, biogenic processor) used in the local demonstration?

Yes Comment field: Nested grids of 4/12/36/108 km and 22 vertical layers were used in the MM5 meteorological model. Nested grids of 4/12/36 km nested grids were used in the UAM-V air quality modeling. BEIS2+ is used to process biogenic emissions.

5. Was the base case model performance evaluation documented and acceptable and consistent with EPA guidance?

Yes Comment field: Model performance varies by day and within the sub-regions. Statistical performance measures are generally within EPA recommended ranges. There is no consistent

bias toward over-or under-prediction for the 1- and 8-hr concentrations.

6. Was a modeling protocol submitted?

Yes Comment field:. The protocol was submitted in a previous EAC milestone.

7. Does the modeling demonstrate that all ozone design values are less than 85 ppb?

Yes Comment field: Observed and future design values (FDV) (ppb) for sites in the South Carolina EAC area are calculated using the higher of the design values for the 1997-1999 and 2001-2003 time periods. The current year modeled is 1998. No areas qualified for application of the screening attainment test. The following table provides the 2007 and 2012 future design values for the South Carolina monitoring sites:

**1997-1999, 2001-2003 8-hour ozone design values and 2007, 2012, and 2017 estimated ozone design values for South Carolina ozone monitors.**

| County | Monitor Name | 1997-1999 Design Value (ppb) | 2001-2003 Design Value (ppb) | 2007 Estimated Design Value (ppb) | 2012 Estimated Design Value (ppb) | 2017 Estimated Design Value (ppb) |
|---|---|---|---|---|---|---|
| Abbeville | Due West | 87 | 82 | 78 | 70 | |
| Aiken | Jackson | 89 | 81 | 73 | 73 | |
| Anderson | Powdersville | 96 | 86 | 84 | 81 | |
| Barnwell | Barnwell | 88 | 78 | 71 | 71 | |
| Berkeley | Bushy Park | 79 | 72 | 70 | 67 | |
| Charleston | Army Reserve | 76 | 71 | 66 | 66 | |
| Charleston | Cape Romain | 80 | 72 | 71 | 68 | |
| Cherokee | Cowpens | 91 | 84 | 81 | 78 | |
| Chester | Chester | 92 | 85 | 83 | 77 | |
| Colleton | Ashton | 83 | 77 | 68 | 66 | |
| Darlington | Pee Dee | 88 | 82 | 77 | 75 | |
| Edgefield | Trenton | 86 | 80 | 72 | 70 | |
| Oconee | Long Creek | 87 | 84 | 74 | 72 | |
| Pickens | Clemson | 91 | 85 | 81 | 77 | |

| | | | | | |
|---|---|---|---|---|---|
| Richland | Parklane | 89 | 80 | 79 | 77 |
| Richland | Sandhill | 91 | 85 | 80 | 77 |
| Richland | Congaree Bluff | 72 | 77 | 651 | 631 |
| Spartanburg | N. Spartanburg Fire Station | 93 | 87 | 82 | 81 |
| Union | Delta | 83 | 81 | 74 | 67 |
| Williamsburg | Indiantown | 75 | 71 | 62 | 61 |
| York | York | 87 | 84 | 78 | 75 |

1 Since the Congaree Bluff design value for 2001-2003 is higher than the 1997-1999 design value, the 2001-2003 design value was used in the estimated design value calculation for 2007 and 2012.

8. If the modeling does not demonstrate that all design values are less than 85 ppb, was acceptable weight of evidence provided and consistent with EPA guidance that shows the area will attain the 8-hour ozone standard by December 31, 2007?
Yes Comment field:

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**DOES THE EARLY ACTION COMPACT PLAN MEET THE MARCH 31, 2004 MILESTONE?**

Greenville-Anderson-Spartanburg and Columbia are designated nonattainment-deferred; effective until September 30, 2005.

Rest of state is designated attainment, effective June 15, 2004.
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**Region 4: CHATTANOOGA EAC (Tennessee Portion)**
**Hamilton County, Meigs County, Marion County**

**CONTROL STRATEGY**

1. Does the control strategy describe one or more local or state measures that are specific, quantified and permanent, above and beyond what is already required?

Yes: In Hamilton, Meigs, and Marion counties and open burning ban(Hamilton), Stage I Vapor Recovery, cetane to diesel, anti-idling(statewide) , transit, and ozone action day controls will be implemented..

2. Does the plan indicate the dates by which the measures will be adopted?

Yes: However plan indicates that some local measures may not be implemented until ozone season 2007. Implementation is 2007 is not consistent with EPA guidance. The plan indicates that implementation is ozone season 2005. Local jurisdictions understand that measures are to be implemented on a schedule that concurs with the schedule in the attainment demonstration modeling.

All of the measures are supported in a resolution. Resolution of local board implements ozone burning ban in Hamilton county as of May 15, 2004. It is unclear how the cetane additive will be implemented. Probably should not include in modeling. However, effect is negligible. Recommend including and allowing local program to continue effort to implement program as WOE. Meigs efforts are underway now.

3. Does the plan quantify emissions reductions for each measure when quantification procedures are available?

Yes: Emission reductions are quantified for area, nonroad mobile, and onroad mobile source categories. The open burning ban and Stage I Vapor Recovery control account for the majority of emission reductions.

Yes: Emissions reductions are provided for the measures that are modeled. Concerns exist on the feasibility of implementing some of the controls. Some concerns include how is an open burning ban modeled if this it is subject to intermittent controls (i.e., ozone action days) is too much credit being taken in the modeling; how is the cetane additive to diesel fuel being implemented as a voluntary measure or regulation (if regulation then very problematic); others. Cetane additive to diesel fuels was modeled as a part of the 2007 attainment strategy in Hamilton and Marion Counties. The reductions modeled totaled 0.149 tpd NOx. Conversations with the State of Tennessee indicated that these reduction are not being considered. The removal of these emissions from the strategy, should not affect the modeling results.

4. Does the plan include the methodology or procedure and assumptions used to estimate the emissions reductions?

Yes: All air emission estimates were derived from EPA's 1999 National Emission Inventory. Further details regarding emission reductions and quantification are available in the modeling analysis and technical support document.

The plan uses estimates from the Nashville area technical support document prepared by Dr. Wayne Davis and Dr. Terry Miller. Estimated emission reductions are prorated based on population or VMT depending on reduction. Recommend that this be made clear in any future submittals.

5. Does the plan identify an implementation schedule, including dates, for each measure?

Yes: No later than 2007 ozone season. This is not consistent with EPA guidance which specifies 2005 implementation.

6. Does the plan address emissions growth at least 5 years beyond December 31, 2007? (Maintenance for Growth)

Yes: The modeling analysis and technical support document discuss maintenance in 2012.

**TECHNICAL ASSESSMENT**

1. Are representative episodes modeled that were reflective of a typical ozone season exceedance that meets the EPA episode selection guidance to ensure that representative meteorological regimes are considered?

Yes: Cartesian Regression Tree (CART) analysis used to identify representative regimes. Eleven exceedance days that represent two of the three key exceedance meteorological regimes for Chattanooga, with a range of 8-hour ozone exceedance concentrations from 85 to 107 ppb and an average 8-hour ozone exceedance concentration of 93 ppb were modeled. Three different episodes were modeled: 29 August – 9 September 1999, 16-22 June 2001 and 4-10 July 2002.

2. Does the plan include MOBILE6 and NONROAD model data as the basis for the emissions inventory?

Yes: see number 4. Need to review inputs to make sure that the correct RVP was used. RVP should be 9.0 unless local data indicates lower value.

3. Is local modeling used to develop the attainment control strategy?

Yes: Nested grids of 4/12/36/108 km and 22 vertical layers were used in the MM5 meteorological model. Nested grids of 4/12/36 km nested grids and 11 vertical layers were used in the UAM-V air quality modeling.

4. Does the plan include documentation of the modeling system (i.e., meteorological, emissions, air quality models, biogenic processor) used in the local demonstration?

Yes: Air quality, meteorological and emissions models used are UAM-V, MM5 and EPS2.5 (Mobile 6.2 and NONROAD2002). BEIS2 with BELD3 database used to process biogenic emissions.

5. Was the base case model performance evaluation documented and acceptable and consistent with EPA guidance?

Yes: No apparent systematic biases were indicated in the model performance.

6. Was a modeling protocol submitted?

Yes.

7. Does the modeling demonstrate that all ozone design values are less than 85 ppb?

No: Observed and future design values (FDV) (ppb) for sites in the Chattanooga EAC area calculated using a 15-km and 9-cell definition for determining the modeled concentrations near a monitor are indicated in the following table. 8-hr modeling guidance recommends use of 15-km definition. The current year modeled is 2001. Design values from the 2000–2002 and 2001–2003 years are used to predict the future quality design values. The higher of the two design values will be used to comply with the attainment test. The screening test was applied for one location and was passed with a FDV of 84 ppb. However,

| monitor location | 2000-2002 ambient design values | 2007 modeled design values | | 2001-2003 ambient design value | 2007 modeled design values | |
|---|---|---|---|---|---|---|
| | | FDV 15-km (49-cells) | FDV 9-cell | | FDV 15-km | FDV 9-cell |
| Sequoyah | 93 | **85** | **85** | 87 | 79 | 80 |
| Chattanooga VAAP | 92 | 84 | **85** | 88 | 80 | 81 |
| Meigs Co. | 93 | **85** | **85** | 88 | 81 | 80 |

8. If the modeling does not demonstrate that all design values are less than 85 ppb, was acceptable weight of evidence provided and consistent with EPA guidance that shows the area will attain the 8-hour ozone standard by December 31, 2007?

Yes: Several WOE analyses were submitted four of which relied on the modeling data:

- The modeled attainment was applied using the 2001-2003 design values. These design values are 4-6 ppb lower than that used in the EPA-recommended way of applying the attainment test. These lower current design values result all monitors indicating attainment with design values well below 84 ppb.
- 8-hr ozone exceedance exposure. This is a measure of the "excess" simulated 8-hour

concentration that is greater than 85 ppb. The difference between the maximum simulated 8-hour ozone concentration and 85 ppb is calculated and summed for each grid cell and day within a specified grid or subregion and time period. The units are ppb, with grid-cell and day implied. A **75%** reduction was indicated.

- Three other metrics as defined in the DRAFT EPA 8-hr modeling were analyzed. (EPA DRAFT guidance recommends an 80% reduction as large and possible target): 1) number of grid cells hours with ozone greater than 84 ppb which resulted in a **60%** reduction. 2) number of grid cells with 8-hour ozone concentrations greater than 84 ppb which indicated a **64%** reduction, and 3) the sum of the excess concentrations greater than 84 ppb for the hourly ozone values which indicated a **70%** reduction.
  The number of grid cells with hourly or 8-hr ozone concentrations greater than 84 ppb is reduced by about 60%. The amount of ozone greater than this value is reduced by an even greater percentage (about 70-75%). These metrics indicate a sizeable reductions in modeled hourly and 8-hr ozone values for the current modeling.
- Design value, trend and attainment test analysis using normalized or meteorologically adjusted data for Sequoyah monitor to determine a "more" appropriate design value to use in the modeled attainment test. CART used to adjust meteorology. This analysis indicates that less variation occurs in the design values in the more recent years with the meteorological adjustment. Using a design value of 86 ppb, as taken from this analysis, in the modeled attainment test would result in a 2007 future design value of **79 ppb**. The extrapolated design value trend indicated a FDV below 85 ppb by 2004.
- The modeled attainment test was also developed for the Sequoyah monitor by limiting days based on model performance and observed exceedances. These days are used to calculate the relative reduction factors. Using only observed exceedance days results in a FDV of **84 ppb**. Using only days with good model performance does not change the FDV, since model performance is generally very good for the Chattanooga sites.
- Regional scale modeling by the GA Dept. of Natural Resources and US EPA Clear Skies national scale modeling predict even lower FDV for the Chattanooga area of **81 ppb** and **79 ppb**, respectively. These results further support the area attaining in 2007.

**CONCLUSION:** The Chattanooga EAC is to be commended on developing an attainment demonstration that appears to adequately conform with the draft 8-hour ozone modeling guidance. Although the attainment test is passed for Chattanooga using the 12-km-based modeling, more refined modeling based on more days and meteorological conditions**,** as presented in the 4-km based modeling in TN's submittal for Chattanooga, does not suggest that attainment would be achieved in 2007. The future year attainment modeling conducted by Tennessee does not demonstrate attainment in 2007 because it does not predict a future design value that is less than 85 ppb. Since this modeled attainment test was not passed by Tennessee's 4-km-based modeling, the Agency then considered many items as supplemental quantitative and qualitative analyses and information to support the modeled strategy in the demonstration of attainment for the Chattanooga EAC area in 2007. Some new innovative weight of evidence approaches (e.g., meteorological adjustment methodology) have potential merit, but more documentation and analysis are needed for our review. The modeling analysis conducted by Georgia was considered as a part of this additional weight of evidence. When Georgia's analysis was reviewed, in conjunction with Agency-recommended metrics and other analyses and data, it was also

concluded that attainment in 2007 was not likely. At a minimum, the percent improvements in high 8-hour ozone concentrations from the baseline should meet or exceed Agency-recommended levels in the weight of evidence analysis. (These percent improvements were also not achieved in the Tennessee modeling.) Because the maximum modeled future design value is above the NAAQS, and the spatial improvement for Agency-recommended metrics did not meet EPA's level of acceptance, the WOE analyses for the Chattanooga area is not sufficient to indicate attainment in 2007. Finally, an assessment on the adequacy and feasibility of implementation of the controls used in the modeling is needed to complete the review of the attainment demonstration.

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**DOES THE EARLY ACTION COMPACT PLAN MEET THE MARCH 31, 2004 MILESTONE?**

No– The Chattanooga area is designated nonattainment, effective June 15, 2004.
(Hamilton County and Meigs County, TN; and Catoosa County, GA are designated nonattainment)

**Marion County**, TN and Walker County, GA are designated attainment, effective June 15, 2004.

**Region 4: TENNESSEE - HAYWOOD COUNTY EAC**

**CONTROL STRATEGY**

1. Does the control strategy describe one or more local or state measures that are specific, quantified and permanent, above and beyond what is already required?

Yes: volunteer education/outreach program to change driving behavior.

Additionally, local measures are discussed such as no idle rule for school buses, air quality action days, and stop open burning on ozone action days will be pursued. However, none of these measures is adopted.

2. Does the plan indicate the dates by which the measures will be adopted?

No.

3. Does the plan quantify emissions reductions for each measure when quantification procedures are available?

No- area demonstrated attainment based upon 2001-2003 ozone design value at .081ppm.

4. Does the plan include the methodology or procedure and assumptions used to estimate the emissions reductions? Describe briefly (comment field).

No.

5. Does the plan identify an implementation schedule, including dates, for each measure?

No.

6. Does the plan address emissions growth at least 5 years beyond December 31, 2007? (Maintenance for Growth)

No- only the 1999 NEI is provided

**CONCLUSION**

Haywood County, TN is attaining the 8-hour ozone standard. We will continue to work with the state to strengthen the plan.

**TECHNICAL ASSESSMENT**

1. Are representative episodes modeled that were reflective of a typical ozone season exceedance

that meets the EPA episode selection guidance to ensure that representative meteorological regimes are considered?

Yes: maybe  Comment field: Of the three episodes modeled in the ATMOS modeling project (i.e., 29 August – 9 September 1999, 16-22 June 2001 and 4-10 July 2002) only the July 2007 episodes captures widespread exceedances in these EAC areas. No specific information on the specific days in this episode that are representative of exceedances in these counties was presented in the submittal.

2. Does the plan include MOBILE6 and NONROAD model data as the basis for the emissions inventory?

Yes: see number 4

3. Is local modeling used to develop the attainment control strategy?

Yes: Nested grids of 4/12/36/108 km and 22 vertical layers were used in the MM5 meteorological model. Nested grids of 4/12/36 km nested grids and 11 vertical layers were used in the UAM-V air quality modeling.

4. Does the plan include documentation of the modeling system (i.e., meteorological, emissions, air quality models, biogenic processor) used in the local demonstration?

Yes: Air quality, meteorological and emissions models used are UAM-V, MM5 and EPS2.5 (Mobile 6.2 and NONROAD2002). BEIS2 with BELD3 database used to process biogenic emissions.

5. Was the base case model performance evaluation documented and acceptable and consistent with EPA guidance?

Yes: No apparent systematic biases were indicated in the model performance.

6. Was a modeling protocol submitted?

Yes.

7. Does the modeling demonstrate that all ozone design values are less than 85 ppb?

No: Modeled attainment information was not included in the ATMOS technical support documentation for these areas.

8. If the modeling does not demonstrate that all design values are less than 85 ppb, was acceptable weight of evidence provided and consistent with EPA guidance that shows the area will attain the 8-hour ozone standard by December 31, 2007?

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**DOES THE EARLY ACTION COMPACT PLAN MEET THE MARCH 31, 2004 MILESTONE?**

Yes– Haywood County is designated attainment, effective June 15, 2004.

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**Region 4: TENNESSEE - KNOXVILLE EAC**
**Anderson County, Blount County, Jefferson County, Loudon County, Knox County Sevier County, and Union County**

**CONTROL STRATEGIES**

1. Does the control strategy describe one or more local or state measures that are specific, quantified and permanent, above and beyond what is already required?

Yes: A combination of controls on area, nonroad mobile, onroad mobile, and point may be implemented in all participating counties. Examples include: open burning ban(State proposed), less emitting construction equipment, truck stop electrification, traffic flow improvement, and ozone action day alerts.

2. Does the plan indicate the dates by which the measures will be adopted?

Yes: However plan indicates that some local measures may not be implemented until ozone season 2007. Implementation is 2007 is not consistent with EPA guidance. The plan indicates that implementation is ozone season 2005. Local jurisdictions understand that measures are to be implemented on a schedule that concurs with the schedule in the attainment demonstration modeling.

3. Does the plan quantify emissions reductions for each measure when quantification procedures are available?

Yes: Emission reductions are quantified for point, area, nonroad mobile, and onroad mobile source categories in the modeling analysis and technical support document. Quantification procedures are based on report by Dr. Wayne T. Davis titled "Estimates of Potential Emission Reductions for the Nashville Ozone Early Action Compact Area." Emissions were extrapolated for Knoxville based on population and VMT. A final SIP revision would require local calculations.

4. Does the plan include the methodology or procedure and assumptions used to estimate the emissions reductions? Describe briefly (comment field).

Yes: All air emission estimates were derived from EPA's 1999 National Emission Inventory. Further details regarding emission reductions and quantification are available in the modeling analysis and technical support document.

5. Does the plan identify an implementation schedule, including dates, for each measure?

Yes: No later than 2007 ozone season. -not consistent with EPA guidance, which specifies 2005 implementation.

6. Does the plan address emissions growth at least 5 years beyond December 31, 2007? (Maintenance for Growth)

Yes: The modeling analysis and technical support document discuss maintenance in 2012.

**TECHNICAL ASSESSMENT**

1. Are representative episodes modeled that were reflective of a typical ozone season exceedance that meets the EPA episode selection guidance to ensure that representative meteorological regimes are considered?

Yes: Cartesian Regression Tree (CART) analysis used to identify representative regimes. Eighteen exceedance days that represent four of the five key exceedance meteorological regimes as well as other high ozone regimes were modeled for Knoxville, with a range of 8-hour ozone exceedance concentrations from 86 to 104 ppb and an average 8-hour ozone exceedance concentration of 95 ppb were modeled. Three different episodes were modeled: 29 August – 9 September 1999, 16-22 June 2001 and 4-10 July 2002.

2. Does the plan include MOBILE6 and NONROAD model data as the basis for the emissions inventory?

Yes: see number 4

3. Is local modeling used to develop the attainment control strategy?

Yes: Nested grids of 4/12/36/108 km and 22 vertical layers were used in the MM5 meteorological model. Nested grids of 4/12/36 km nested grids and 11 vertical layers used in the UAM-V air quality modeling.

4. Does the plan include documentation of the modeling system (i.e., meteorological, emissions, air quality models, biogenic processor) used in the local demonstration?

Yes: Air quality, meteorological and emissions models used are UAM-V, MM5 and EPS2.5 (Mobile 6.2 and NONROAD2002). BEIS2 with BELD3 database used to process biogenic emissions. VMT calculations were derived from TDOT and the local MPO travel model.

5. Was the base case model performance evaluation documented and acceptable and consistent with EPA guidance?

Yes: No apparent systematic biases were indicated in the model performance.

6. Was a modeling protocol submitted?

Yes.

7. Does the modeling demonstrate that all ozone design values are less than 85 ppb?

No: Observed and future design values (FDV) (ppb) for sites in the Knoxville EAC area calculated using a 15-km and 9-cell definition for determining the modeled concentrations near a monitor are indicated in the following table. 8-hr modeling guidance recommends use of 15-km definition. The current year modeled is 2001. Design values from the 2000–2002 and 2001–2003 years are used to predict the future quality design values. The higher of the two design values will be used to comply with the attainment test. No areas qualified for application of the screening attainment test.

| monitor location | 2000-2002 ambient design values | modeled design values | | 2001+-2003 ambient design value | modeled design values | |
|---|---|---|---|---|---|---|
| | | FDV 15-km (49-cells) | FDV 9-cell (4 km) | | FDV 15-km | FDV 9-cell (4 km) |
| E. Knoxville | 92 | **85** | 84 | 88 | 81 | 81 |
| **Spring Hill** | 96 | **90** | **89** | 92 | **86** | **86** |
| Jefferson Co. | 95 | **87** | **86** | 91 | 83 | 83 |
| Anderson CO. | 92 | 83 | **85** | 87 | 79 | 80 |
| Cove Mtn * | 96 | **86** | **86** | 92 | 83 | 82 |
| Clingman's Dome * | 98 | **89** | **87** | 92 | 83 | 82 |
| Cades Cove * | 79 | 70 | 70 | 76 | 68 | 68 |
| Look Rock * | 94 | 84 | 84 | 93 | 83 | 84 |

* Elevated monitor sites in Great Smokey Mountains National Park

8. If the modeling does not demonstrate that all design values are less than 85 ppb, was acceptable weight of evidence provided and consistent with EPA guidance that shows the area will attain the 8-hour ozone standard by December 31, 2007?

No: Two scenarios were used in applying the definition of "near"a monitor in the attainment test. One involved the use of 15-km as recommended in the guidance. Using this recommendation, five of the eight Knoxville area monitors predict a future design value greater than 84 ppb, the highest being 90 ppb. According to the draft 8-hr modeling guidance, additional emission reductions probably need to be modeled before using a weight of evidence (WOE) analysis to support a control strategy that demonstrates attainment in 2007. The guidance states that it is doubtful that more qualitative arguments and analyses can be presented for such a high predicted future design value. A weight of evidence analysis was presented in the submittal as follows.

Several WOE analyses were submitted; four of which relied on the modeling data. Some are specifically discussed in the submittal as a weight of evidence analysis and some are presented as alternative considerations and thus could be considered as a WOE.

- The attainment test was applied using a 9-cell area around the monitor. The submittal states that the use of a more limited (i.e., 9- cell/4 km radius) influence radius accommodates or nearly accommodates the geographic and meteorological variability and observed concentration gradients. (There could be more documentation to support this statement.) It should ensure that the monitor sites are considered independently from one another and preserves the site-specific nature of the attainment-demonstration exercise. Five of the eight monitors still are not predicting attainment with this particular application of the attainment test. However, the highest future design value is now **89 ppb**. This one ppb change or improvement in the design value is insufficient to support an attainment in 2007 and the considerable additional analyses are needed to support it. The future design remains very high with respect to the level of the 8-hr NAAQS.
- The modeled attainment was applied using the 2001-2003 design values. The guidance states that the design values used in the designation process could be used. However, the higher of the designation design values and those more associated with the current year modeling should be used in the attainment test. The 2001-2003 design values are 3-5 ppb lower than that used in the EPA-recommended way of applying the attainment test. These lower current design values result in only one violating monitor (i.e., Spring Hill) which has a much lower future design value, however, it continues to indicate nonattainment, i.e., **86 ppb**.
- The modeled attainment test was also developed for the Spring Hill monitor by limiting days based on model performance and observed exceedances. These days are used to calculate the relative reduction factors (RRFs). Using only observed exceedances days reduces the number of days available for the RRFs but the FDV is unchanged. Selecting only days with good model performance gives a FDV of **91 ppb**. This result does not support attainment but does support the need to model additional emission reductions.
- 8-hr ozone exceedance exposure. This is a measure of the "excess" simulated 8-hour concentration that is greater than 85 ppb. The difference between the maximum simulated 8-hour ozone concentration and 85 ppb is calculated and summed for each grid cell and day within a specified grid or subregion and time period. The units are ppb, with grid-cell and day implied. A **85%** reduction from the current year to future year was indicated and represents a sizeable reduction.
- Three other metrics as defined in the DRAFT EPA 8-hr modeling were analyzed. (EPA DRAFT guidance recommends an 80% reduction as large and possible target): 1) number of grid cells hours with ozone greater than 84 ppb which resulted in a **59%** reduction. 2) number of grid cells with 8-hour ozone concentrations greater than 84 ppb which indicated a **66%** reduction, and 3) the sum of the excess concentrations greater than 84 ppb for the hourly ozone values which indicated a **76%** reduction.
  All four of these metrics appear to varying information on improvement in ozone reductions. The number of grid cells with hourly 8-hr ozone concentrations greater that 84 ppb is reduced by about **60%.** The amount of ozone greater than this value is reduced by an even greater percentage. These metrics indicate sizeable reductions in modeled 8-hr ozone from the current year modeling. The results from these three metrics indicate an average improvement of **67%**. However, given the high predicted design values, these three metrics should be as large as that recommended in the guidance.
- Design value, trend and attainment test analysis using normalized or meteorologically

adjusted data for the Spring Hill monitor to determine a "more" appropriate design value to use in the modeled attainment test. CART used to adjust meteorology. This analysis indicates that less variation occurs in the design values in the more recent years with the meteorological adjustment. Using a design value of 93 ppb, as taken from this analysis, in the modeled attainment test would result in a 2007 future design value of **87 ppb**. This indicates that additional controls are for Knoxville to attain in 2007. Also, the linear extrapolation may not be the best method predict a future design value.

Conclusions: The Knoxville EAC is to be commended on developing an attainment demonstration that appears to adequately conform with the draft 8-hr modeling guidance. However, the future year attainment demonstration needs more analysis. The Agency considered many items as supplemental quantitative and qualitative analyses and information to support the modeled strategy in the demonstration of attainment for the Knoxville EAC area in 2007. Some new innovative weight of evidence approaches (e.g., meteorological adjustment methodology) have potential merit but more documentation and analysis are needed for review. Because of the large future design values predicted in many of the weight of evidence analyses, the pervasiveness of nonattainment in monitor network, and the relatively small percent improvements in high 8-hr concentrations from the baseline, the WOE analyses are not sufficient to indicate that attainment will occur in 2007. Six WOE analyses could be considered for the Knoxville attainment demonstration. Four of the six analyses do not support the modeled strategy. Two analyses could support the demonstration for attainment but are not sufficient to demonstrate that attainment will occur in 2007. Finally, an assessment on the adequacy and feasibility of implementation of the controls used in the modeling is needed to complete the review of the attainment demonstration.

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**DOES THE EARLY ACTION COMPACT PLAN MEET THE MARCH 31, 2004 MILESTONE?**

No– The Knoxville area is designated nonattainment, effective June 15, 2004

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**Region 4: TENNESSEE - MEMPHIS EAC**
**Fayette County, Tipton County, Shelby County**

**CONTROL STRATEGIES**

1. Does the control strategy describe one or more local or state measures that are specific, quantified and permanent, above and beyond what is already required?

Yes: A combination of local and state controls on area, nonroad mobile, onroad mobile, and point sources will be implemented in all participating counties. Examples include: Stage I Vapor Recovery, open burning ban(both may be adopted by state), less emitting construction equipment, truck stop electrification, traffic flow improvement, and ozone action day alerts. Fayette county is going to low Reid vapor pressure. In Tipton county, Solae is switching to alternative fuel.

2. Does the plan indicate the dates by which the measures will be adopted?

Yes: However plan indicates that some local measures may not be implemented until ozone season 2007. Implementation is 2007 is not consistent with EPA guidance. The plan indicates that implementation is ozone season 2005. Local jurisdictions understand that measures are to be implemented on a schedule that concurs with the schedule in the attainment demonstration modeling.

3. Does the plan quantify emissions reductions for each measure when quantification procedures are available?

Yes: Emission reductions are quantified for point, area, nonroad mobile, and onroad mobile source categories in the modeling analysis and technical support document. Based on discussions with Tennessee, the estimates are interpolations from the Nashville estimates performed by the University of Tennessee.

4. Does the plan include the methodology or procedure and assumptions used to estimate the emissions reductions? Describe briefly (comment field).

Yes: also, all air emission estimates were derived from EPA's 1999 National Emission Inventory. Further details regarding emission reductions and quantification are available in the modeling analysis and technical support document.

The plan uses estimates from the Nashville area technical support document prepared by Dr. Wayne Davis and Dr. Terry Miller. Estimated emission reductions are prorated based on population or VMT depending on reduction. Recommend that this be made clear in any future submittals.

5. Does the plan identify an implementation schedule, including dates, for each measure?

Yes: No later than 2007 ozone season. This is not consistent with EPA guidance.

6. Does the plan address emissions growth at least 5 years beyond December 31, 2007? (Maintenance for Growth)

Yes: The modeling analysis and technical support document discuss maintenance in 2012.

**TECHNICAL ASSESSMENT**

1. Are representative episodes modeled that were reflective of a typical ozone season exceedance that meets the EPA episode selection guidance to ensure that representative meteorological regimes are considered?

Yes: Cartesian Regression Tree (CART) analysis used to identify representative regimes. Ten exceedance days that represent two of the three key exceedance meteorological regimes were modeled for Memphis, with a range of 8-hour ozone exceedance concentrations from 86 to 106 ppb and an average 8-hour ozone exceedance concentration of 94 ppb were modeled. Three different episodes were modeled: 29 August – 9 September 1999, 16-22 June 2001 and 4-10 July 2002.

2. Does the plan include MOBILE6 and NONROAD model data as the basis for the emissions inventory?

Yes: see number 4

Need to review inputs to make sure that the correct RVP was used. RVP should be 7.8 in Shelby and 9.0 for other counties. Also, without the Mobile and NONROAD input files we can only assume that it was done properly. This needs to be improved for any final SIP submittal.

3. Is local modeling used to develop the attainment control strategy?

Yes: Nested grids of 4/12/36/108 km and 22 vertical layers were used in the MM5 meteorological model. Nested grids of 4/12/36 km nested grids and 11 vertical layers used in the UAM-V air quality modeling.

4. Does the plan include documentation of the modeling system (i.e., meteorological, emissions, air quality models, biogenic processor) used in the local demonstration?

Yes: Air quality, meteorological and emissions models used are UAM-V, MM5 and EPS2.5 (Mobile 6.2 and NONROAD2002). BEIS2 with BELD3 database used to process biogenic emissions.

5. Was the base case model performance evaluation documented and acceptable and consistent with EPA guidance?

Yes: No apparent systematic biases were indicated in the model performance.

6. Was a modeling protocol submitted?

Yes.

7. Does the modeling demonstrate that all ozone design values are less than 85 ppb?

No: Observed and future design values (FDV) (ppb) for sites in the Memphis EAC area calculated using a 15-km and 9-cell definition for determining the modeled concentrations near a monitor are indicated in the following table. 8-hr modeling guidance recommends use of 15-km definition. Design values from the 2000–2002 and 2001–2003 years are used to predict the future quality design values. The 2001-2003 design values are used in the 8-hr ozone designation process. The 2000-2002 Crittenden County, Arkansas design value represents the highest design value for the Memphis area. The current year modeled is 2001. The guidance recommends that the higher of the two design values should be used to comply with the attainment test. No areas qualified for application of the screening attainment test.

| monitor location | 2000-2002 ambient design values | 2007 modeled design values | | 2001-2003 ambient design value | 2007modeled design values | |
|---|---|---|---|---|---|---|
| | | FDV 15-km (49-cells) | FDV 9-cell | | FDV 15-km | FDV 9-cell |
| Edmond Orgil Park, TN | 90 | 82 | 83 | 89 | 81 | 82 |
| Orgil Park, TN | 87 | 82 | 82 | 84 | 79 | 79 |
| **Marion, AR** | 94 | **88** | **88** | 92 | **86** | **86** |
| DeSoto , MS | 86 | 80 | 81 | 81 | 75 | 76 |

8. If the modeling does not demonstrate that all design values are less than 85 ppb, was acceptable weight of evidence provided and consistent with EPA guidance that shows the area will attain the 8-hour ozone standard by December 31, 2007?

No: Several WOE analyses were submitted four of which relied on the modeling data. Some are specifically discussed in the submittal as a weight of evidence analysis and some are presented as alternative considerations and thus could be considered as a WOE.

- The attainment test was applied using a 9-cell area around the monitor. The submittal states that the use of a more limited (i.e., 9- cell/4 km radius) influence radius accommodates or nearly accommodates the geographic and meteorological variability and observed concentration gradients. (There could be more documentation to support this statement.) It should ensure that the monitor sites are considered independently from one another and preserves the site-specific nature of the attainment-demonstration exercise. The Marion monitor in Crittenden County, Arkansas continues to violate the 8-hr ozone NAAQS. The future design value is unchanged, i.e., **88 ppb**.
- The modeled attainment was applied using the 2001-2003 design values. This is the period

that is being used in the 8-hr ozone designation process for some areas. The guidance states that the design values used in the designation process could be used. However, the higher of the designation design values and those more associated with the current year modeling should be used in the attainment test. These design values are 1-4 ppb lower than that used in the EPA-recommended way of applying the attainment test. These lower current design values result in the one violating monitor having a lower future design value that is still in violation of the 8-hr NAAQS, i.e., **86 ppb. Although less that the 88 ppb design value, nonattainment is still not indicated with the use of a 2001-2003 design value.**

- The modeled attainment test was also developed for the Marion monitor by limiting days based on model performance and observed exceedances. These days are used to calculate the relative reduction factors. **The attainment test results and FDV was not changed from that in the above table** because model performance is acceptable for most days and all high ozone days. The design value remain in noncompliance with the NAAQS.
- 8-hr ozone exceedance exposure. This is a measure of the "excess" simulated 8-hour concentration that is greater than 85 ppb. The difference between the maximum simulated 8-hour ozone concentration and 85 ppb is calculated and summed for each grid cell and day within a specified grid or subregion and time period. The units are ppb, with grid-cell and day implied. A **59%** reduction was indicated.
- Three other metrics as defined in the DRAFT EPA 8-hr modeling were analyzed. (EPA DRAFT guidance recommends an 80% reduction as large and possible target): 1) number of grid cells hours with ozone greater than 84 ppb which resulted in a **48%** reduction. 2) number of grid cells with 8-hour ozone concentrations greater than 84 ppb which indicated a **46%** reduction, and 3) the sum of the excess concentrations greater than 84 ppb for the hourly ozone values which indicated a **54%** reduction.
  All four of these metrics appear to provide similar information, that the amount of ozone in excess of the 8-hour ozone standard is reduced within the EAC area by about 50 percent. This is less than the 80% EPA-recommended value that would represent a "large" improvement fro these metrics.
- Design value, trend and attainment test analysis using normalized or meteorologically adjusted data for Marion County, Arkansas monitor to determine a "more" appropriate design value to use in the modeled attainment test. CART used to adjust meteorology. This analysis indicates that less variation occurs in the design values in the more recent years with the meteorological adjustment. Using a design value of 90 ppb, as taken from this analysis, in the modeled attainment test would result in a 2007 future design value of **84 ppb**. The extrapolated design value trend remains above **85 ppb** in 2007.

Since the extrapolated met-adjusted design value air quality trends analysis does not indicate a future design value less than 85 ppb, the proposal states that attainment would still be indicated since this approach cannot account for future emission reductions. However, any trends analysis should also include an emissions trends analysis to correspond with the air quality analysis. This would illustrate improvements in air quality that are being accompanied by decreases in emissions in the local area. Otherwise, any air quality trends analysis that does not indicate a future design value that complies with the NAAQS could state that compliance would occur if regional controls were considered.

Also, just as the draft guidance recommends that the attainment test should be applied at every monitor in the air quality monitor network, met-adjusted design values and trends analysis should be developed for each monitor in the network. Even though the Marion monitor is the current area-wide design value monitor, this has not been the case in the most recent past. The submittal should discuss why such a short time period is either statistically significant or why a longer time period should not be used in the analysis. Finally, an error analysis is developed when CART is applied. These results on how this analysis model performs in this area and for this purpose should be also discussed. Additional documentation is needed.

- **Additional Controls Not Modeled**: The submittal file of local measures being used in the EAC modeling provides additional information on sources of emission reductions that were not included in the modeling.
  - It states that 2.23 tpd of NOX and 0.017 tpd VOC reductions could be achieved from the temporary shutdown of the PCS Nitrogen, Inc. facility in Shelby county. Emission reduction credit that can be used to support the WOE analysis has to be permanent, and is not allowed for temporary changes in operations.
  - Many emission reductions are expected from changes at the Memphis International Airport. Some have already occurred and other are expected after construction. These include electrification at gates, FedEx conveyor System at gates, hybrid fueling, a new underground fuel pipeline for FedEx, automated vehicle identification system (AVI) and planned consolidated ground transport facility. There were no estimates of the amount of reductions in NOX and/or VOC that could be achieved from these operation changes.
  - Voluntary emission reductions from the Memphis Light Gas & Water Energy Efficiency Initiatives. Emission reductions of 10.2 tpy NOX are expected with this 5-year voluntary program. The documentation needed to review this program was not submitted, therefore, we cannot comment on its impact to the control strategy and improvement to air quality.
  - In order for these types of WOE to be considered to support the modeled strategy, there should be some documentation to support any estimates of the amount and type of permanent reductions that are expected and their impact on improving air quality.

**Conclusions**: The Memphis EAC is to be commended on developing an attainment demonstration that appears to adequately conform with the draft 8-hr modeling guidance. However, the future year attainment demonstration needs more analysis. The Agency considered many items as supplemental quantitative and qualitative analyses and information to support the modeled strategy in the demonstration of attainment for the Memphis EAC area in 2007. Some new innovative weight of evidence approaches (e.g., meteorological adjustment methodology) have potential merit but more documentation and analysis are needed for our review. Because of the large future design values predicted in many of the weight of evidence analyses and the relatively small percent improvements in high 8-hr concentrations from the baseline, the WOE analyses are not sufficient to indicate that attainment will occur in 2007. Finally, an assessment on the adequacy and feasibility of implementation of the controls used in the modeling is needed

to complete the review of the attainment demonstration.

**********

**DOES THE EARLY ACTION COMPACT PLAN MEET THE MARCH 31, 2004 MILESTONE?**

No – The Memphis area is designated nonattainment, effective June 15, 2004

**********

**Region 4: TENNESSEE - NASHVILLE EAC**
**Cheatham County, Davidson County, Dickson County, Robertson County, Rutherford County, Sumner County, Williamson County, and Wilson County**

**CONTROL STRATEGIES**

1. Does the control strategy describe one or more local or state measures that are specific, quantified and permanent, above and beyond what is already required?

Yes: A combination of controls on area, and nonroad mobile sources may be implemented in all participating counties. Examples include: open burning ban(state proposed), HOV lane expansion, rideshare, trip reduction, traffic signal synchronization, and new rail service.

2. Does the plan indicate the dates by which the measures will be adopted?

Yes: However plan indicates that some local measures may not be implemented until ozone season 2007. Implementation is 2007 is not consistent with EPA guidance. The plan indicates that implementation is ozone season 2005. Local jurisdictions understand that measures are to be implemented on a schedule that concurs with the schedule in the attainment demonstration modeling.

3. Does the plan quantify emissions reductions for each measure when quantification procedures are available?

Yes for various control measures. Also, emission reductions are quantified for area and onroad mobile source categories in the modeling analysis and technical support document.

4. Does the plan include the methodology or procedure and assumptions used to estimate the emissions reductions? Describe briefly (comment field).

Yes for various control measures. Also, all air emission estimates were derived from EPA's 1999 National Emission Inventory. Further details regarding emission reductions and quantification are available in the modeling analysis and technical support document.

5. Does the plan identify an implementation schedule, including dates, for each measure?

Yes: No later than 2007 ozone season.This in not consistent with EPA guidance which specifies 2005 implementation.

6. Does the plan address emissions growth at least 5 years beyond December 31, 2007? (Maintenance for Growth)

Yes: The modeling analysis and technical support document discuss maintenance in 2012.

**TECHNICAL ASSESSMENT**

1. Are representative episodes modeled that were reflective of a typical ozone season exceedance that meets the EPA episode selection guidance to ensure that representative meteorological regimes are considered?

Yes: Cartesian Regression Tree (CART) analysis used to identify representative regimes. Twelve exceedance days that represent four of the five key exceedance meteorological regimes were modeled for Memphis, with a range of 8-hour ozone exceedance concentrations from 85 to 110 ppb and an average 8-hour ozone exceedance concentration of 98 ppb were modeled. Three different episodes were modeled: 29 August – 9 September 1999, 16-22 June 2001 and 4-10 July 2002.

2. Does the plan include MOBILE6 and NONROAD model data as the basis for the emissions inventory?

Yes: see number 4

3. Is local modeling used to develop the attainment control strategy?

Yes: Nested grids of 4/12/36/108 km and 22 vertical layers were used in the MM5 meteorological model. Nested grids of 4/12/36 km nested grids and 11 vertical layers used in the UAM-V air quality modeling.

4. Does the plan include documentation of the modeling system (i.e., meteorological, emissions, air quality models, biogenic processor) used in the local demonstration?

Yes: Air quality, meteorological and emissions models used are UAM-V, MM5 and EPS2.5 (Mobile 6.2 and NONROAD2002). BEIS2 with BELD3 database used to process biogenic emissions.

5. Was the base case model performance evaluation documented and acceptable and consistent with EPA guidance?

Yes: No apparent systematic biases were indicated in the model performance.

6. Was a modeling protocol submitted?

Yes.

7. Does the modeling demonstrate that all ozone design values are less than 85 ppb?

Yes: Observed and future design values (FDV) (ppb) for sites in the
Nashville EAC area calculated using a 15-km and 9-cell definition for determining the modeled concentrations near a monitor are indicated in the following table. 8-hr modeling guidance recommends use of 15-km definition. The current year modeled is 2001. Design values from the

2000–2002 and 2001–2003 years are used to predict the future quality design values. The higher of the two design values will be used to comply with the attainment test. No areas qualified for application of the screening attainment test.

| monitor location | 2000-2002 ambient design values | modeled design values | | 2001-2003 ambient design value | modeled design values | |
|---|---|---|---|---|---|---|
| | | FDV 15-km (49-cells) | FDV 9-cell | | FDV 15-km | FDV 9-cell |
| E. Nash. Health Cntr | 71 | 66 | 67 | 71 | 66 | 67 |
| Percy Priest Dam | 80 | 75 | 73 | 77 | 72 | 71 |
| Rutherford Co. | 84 | 77 | 76 | 80 | 73 | 72 |
| Rockland | 88 | 81 | 82 | 86 | 79 | 80 |
| Wright's Farm | 87 | 82 | 80 | 82 | 77 | 76 |
| Fairview | 87 | 80 | 79 | 84 | 77 | 76 |
| Lebanon | 85 | 76 | 76 | 82 | 74 | 73 |
| Dickson Co. | Na | Na | Na | Na | Na | Na |

8. If the modeling does not demonstrate that all design values are less than 85 ppb, was acceptable weight of evidence provided and consistent with EPA guidance that shows the area will attain the 8-hour ozone standard by December 31, 2007?

N/A

**********

DOES THE EARLY ACTION COMPACT PLAN MEET THE MARCH 31, 2004 MILESTONE?

Yes– The Nashville area is designated nonattainment - effective date deferred until September 30, 2005

**********

**Region 4: TENNESSEE - PUTNAM EAC**

**CONTROL STRATEGIES**

1. Does the control strategy describe one or more local or state measures that are specific, quantified and permanent, above and beyond what is already required?

Yes: Volunteer education/outreach program to change driving behavior.

Additionally, possible local measures that may be adopted such as no idle rule for school buses, air quality action days, encourage accelerated replacement of newer low emitting vehicles for on and off-road HDDV and buses, support of Cetane diesel fuel additives and stop open burning on ozone action days will be pursued.

2. Does the plan indicate the dates by which the measures will be adopted?

No.

3. Does the plan quantify emissions reductions for each measure when quantification procedures are available?

No- area demonstrated attainment based upon 2001-2003 ozone design value at .082ppm.

4. Does the plan include the methodology or procedure and assumptions used to estimate the emissions reductions? Describe briefly (comment field).

No.

5. Does the plan identify an implementation schedule, including dates, for each measure?

No.

6. Does the plan address emissions growth at least 5 years beyond December 31, 2007? (Maintenance for Growth)

No- only the 1999 NEI is provided

**CONCLUSION**

Putnam County is attaining the 8-hour ozone standard. We will continue to work with the state to strengthen the plan.

**TECHNICAL ASSESSMENT**

1. Are representative episodes modeled that were reflective of a typical ozone season exceedance that meets the EPA episode selection guidance to ensure that representative meteorological regimes are considered?

Yes-maybe: Of the three episodes modeled in the ATMOS modeling project (i.e., 29 August – 9 September 1999, 16-22 June 2001 and 4-10 July 2002) only the July 2007 episodes captures widespread exceedances in these EAC areas. No specific information on the specific days in this episode that are representative of exceedances in these counties was presented in the submittal.

2. Does the plan include MOBILE6 and NONROAD model data as the basis for the emissions inventory?

Yes: see number 4

3. Is local modeling used to develop the attainment control strategy?

Yes: Nested grids of 4/12/36/108 km and 22 vertical layers were used in the MM5 meteorological model. Nested grids of 4/12/36 km nested grids and 11 vertical layers were used in the UAM-V air quality modeling.

4. Does the plan include documentation of the modeling system (i.e., meteorological, emissions, air quality models, biogenic processor) used in the local demonstration?

Yes: Air quality, meteorological and emissions models used are UAM-V, MM5 and EPS2.5 (Mobile 6.2 and NONROAD2002). BEIS2 with BELD3 database used to process biogenic emissions.

5. Was the base case model performance evaluation documented and acceptable and consistent with EPA guidance?

Yes: No apparent systematic biases were indicated in the model performance.

6. Was a modeling protocol submitted?

Yes.

7. Does the modeling demonstrate that all ozone design values are less than 85 ppb?

No: Modeled attainment information was not included in the ATMOS technical support documentation for these areas.

8. If the modeling does not demonstrate that all design values are less than 85 ppb, was acceptable weight of evidence provided and consistent with EPA guidance that shows the area

will attain the 8-hour ozone standard by December 31, 2007?

**********

**DOES THE EARLY ACTION COMPACT PLAN MEET THE MARCH 31, 2004 MILESTONE?**

Yes– Putnam County, TN is designated attainment, effective June 15, 2004..

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**Region 4: TENNESSEE - Johnson City-Kingsport-Bristol (Tri-Cities) EAC**
**Carter County, Hawkins County, Sullivan County, Unicoi County, and Washington County**

**CONTROL STRATEGIES**

1. Does the control strategy describe one or more local or state measures that are specific, quantified and permanent, above and beyond what is already required?

Yes: intelligent transportation systems; traffic signal upgrades; improvements to transit system; and develop bikeway/greenway projects are contained in the modeling analysis technical support documentation.

Open burning ban on residential garbage, yard water and land clearing; and ozone action days to reduce VMT 1%,

2. Does the plan indicate the dates by which the measures will be adopted?

Yes: Local measures are to be implemented by ozone season of 2007

3. Does the plan quantify emissions reductions for each measure when quantification procedures are available?

Yes: Emission reductions are quantified for area source categories in the modeling analysis and technical support document (Table 7-4e, page 7-23)

4. Does the plan include the methodology or procedure and assumptions used to estimate the emissions reductions? Describe briefly (comment field).

Yes: All air emission estimates were derived from EPA's 1999 National Emission Inventory. Further details regarding emission reductions and quantification are available in the modeling analysis and technical support document

5. Does the plan identify an implementation schedule, including dates, for each measure?

Yes: no later than 2007 ozone season

6. Does the plan address emissions growth at least 5 years beyond December 31, 2007? (Maintenance for Growth)

Yes: the modeling analysis and technical support document discuss maintenance in 2012.

**TECHNICAL ASSESSMENT**

1. Are representative episodes modeled that were reflective of a typical ozone season exceedance that meets the EPA episode selection guidance to ensure that representative meteorological regimes are considered?

Yes: Five exceedance with a range of 8-hour ozone exceedance concentrations from 87 to 101 ppb and an average 8-hour ozone exceedance concentration of 92 ppb were modeled.

2. Does the plan include MOBILE6 and NONROAD model data as the basis for the emissions inventory?

Yes: see number 4

3. Is local modeling used to develop the attainment control strategy?

Yes: Nested grids of 4/12/36/108 km and 22 vertical layers were used in the MM5 meteorological model. Nested grids of 4/12/36 km nested grids and 11 vertical layers used in the UAM-V air quality modeling.

4. Does the plan include documentation of the modeling system (i.e., meteorological, emissions, air quality models, biogenic processor) used in the local demonstration?

Yes: Air quality, meteorological and emissions models used are UAM-V, MM5 and EPS2.5 (Mobile 6.2 and NONROAD2002). BEIS2 with BELD3 database used to process biogenic emissions.

5. Was the base case model performance evaluation documented and acceptable and consistent with EPA guidance?

Yes: No apparent systematic biases were indicated in the model performance.

6. Was a modeling protocol submitted?

Yes.

7. Does the modeling demonstrate that all ozone design values are less than 85 ppb?

Yes: Observed and future design values (FDV) (ppb) for sites in the
Tri-Cities EAC area calculated using a 15-km and 9-cell definition for determining the modeled concentrations near a monitor are indicated in the following table. 8-hr modeling guidance recommends use of 15-km definition. Design values from the 2000–2002 and 2001–2003 years are used to predict the future quality design values. The higher of the two design values will be used to comply with the attainment test. No areas qualified for application of the screening attainment test.

| monitor location | 2000-2002 ambient design values | modeled design values | | 2003-2003 ambient design value | modeled design values | |
|---|---|---|---|---|---|---|
| | | FDV 15-km (49-cells) | FDV 9-cell | | FDV 15-km | FDV 9-cell |
| Kingsport | 92 | 84 | 84 | 86 | 79 | 78 |
| Blountville | 90 | 83 | 83 | 86 | 80 | 79 |

8. If the modeling does not demonstrate that all design values are less than 85 ppb, was acceptable weight of evidence provided and consistent with EPA guidance that shows the area will attain the 8-hour ozone standard by December 31, 2007? N/A

**********

DOES THE EARLY ACTION COMPACT PLAN MEET THE MARCH 31, 2004 MILESTONE?

Yes– The Johnson City-Kingsport-Bristol, TN (Tri-Cities) area is designated nonattainment - effective date deferred until September 30, 2005

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***Region: 6***
***Area: Crittenden County, AR (portion of Memphis area)***

See evaluation for the Tennessee local plan for Memphis, which is included elsewhere in this document.

**********

**DOES THE EARLY ACTION COMPACT PLAN MEET THE MARCH 31, 2004 MILESTONE?**

No – The Crittenden County, Arkansas portion of the Memphis area is designated nonattainment, effective June 15, 2004

**********

***Region: 6***
***Area: Austin-San Marcos, TX***

1. Does the control strategy describe one or more local or state measures that are specific, quantitative quantified and permanent, above and beyond what is already required?:

Yes - Examples of some of the local and state-assisted control strategies include: Inspection and Maintenance (I&M) for two EAC area counties, Idling Restrictions on Heavy-Duty Diesels (14,000 lbs or more), Commute Emission Reduction Program, Low Emission Gas Cans, Stage I Vapor Recovery Requirement Change, Degreasing Controls, Autobody Refinishing Controls, restricting VOC content in cutback asphalt to 7% and require BACT for all new sources that emit more than 100 TPY.

2. Does the plan indicate when the dates by which the measures will be adopted?

Yes - Some dates are specifically written into the Clean Air Action Plan. Other dates are dependent on state action but the area commits to implementation of all SIP enforceable measures by December 31, 2005.

3. Does the plan quantify emissions reductions , to the extent possible, for each measure when quantification procedures are available?:

Yes- See Clean Air Action Plan and associated appendices. Documents and presentations are available at the following website.

http://www.capco.state.tx.us/Clean_Air/CAPCOairquality/news.htm

4. Does the plan include the methodology or procedure and assumptions used to estimate the emissions reductions?

Yes - See Clean Air Action Plan and associated appendices.

5. Does the plan identify an implementation schedule, including dates, for each measure?

Yes - Dates and schedules are provided in the Clean Air Action Plan and the appendices were practicable. Some specific dates are dependent on action taken at the State level.

6. Does the plan address emissions growth at least 5 years beyond December 31, 2007? (Maintenance for Growth):

Yes - Please see Chapter 6 of the Austin-Round Rock Clean Air Action Plan.

**COMPLETENESS CHECKLIST FOR EVALUATING TECHNICAL ASSESSMENT**:
1. Are representative episodes modeled that were reflective of a typical ozone season exceedance that meets the EPA episode selection guidance to ensure that representative meteorological regimes are considered?

Yes - The Austin-Round Rock Clean Air Plan includes the conceptual model for the area and the modeling protocol that were developed and included episode selection. The the area has followed EPA guidance on episode selection for ozone modeling and established practices in regulatory photochemical modeling.

2. Does the plan include MOBILE6 and NONROAD model data as the basis for the emissions inventory?

Yes - The Austin-Round Rock Clean Air Plan has extensive documentation that can be found at the following web site. http://www.capco.state.tx.us/Clean_Air/CAPCOairquality/news.htm

3. Is local modeling used to develop the attainment control strategy?

Yes - The modeling system (MM5 and CAMx) used a 36/12/4 km grid with the 36 km grid covering the Central States and the 4 km CAMx grid (fine grid) covering much of central texas. Many of the control measures implemented have been quantified and modeled.

4. Does the plan include documentation of the modeling system (i.e., meteorological, emissions, air qualitymodels, biogenic processor) used in the local demonstration?

Yes- The Austin-Round Rock Clean Air Plan has extensive documentation that can be found at the following web site. http://www.capco.state.tx.us/Clean_Air/CAPCOairquality/news.htm

5. Was the base case model performance evaluation documented and acceptable and consistent with EPAguidance?

Yes- Performance measures are generally within EPA limits. A number of graphical analyses (daily maximum tile plots, ozone modeling movies, etc.) were conducted in conjunction with modeling statistics to access basecase model performance. The plots generally imply that the ozone is being generated in right areas and the right magnitudes with some general underprediction bias. CAMx 8-hour and 1-hr statistics also indicate reasonably good model performance in spite of slight underprediction based on the negative values for normalized bias. Normalized bias and gross error statistics were calculated for observed values over 60 ppb. See the San Antonio Clean Air Plan and it's Appendix E for more information.

6. Was a modeling protocol submitted?

Yes - The Austin-Round Rock Clean Air Plan, included the development and submittal of both conceptual model for the area and the modeling protocol that included episode selection.

7. Does the modeling demonstrate that all ozone design values are less than 85 ppb?

Yes - The area modeled a future year DV of 84 ppb or less at all the monitors before and after controls.

8. If the modeling does not demonstrate that all design values are less than 85 ppb, was acceptable weight of evidence provided and consistent with EPA guidance that shows the area will attain the 8-hour ozone standard by December 31, 2007?:

Modeling demonstrated attainment in the future year and additional Weight of Evidence was

provided.

**DOES THE EARLY ACTION COMPACT PLAN MEET THE MARCH 31, 2004 MILESTONE?**: Yes-Area is designated attainment, effective June 15, 2004

***Region:*** **6**

## *Area:* Northeast Texas Area (Longview-Marshall-Tyler Area), TX

***CONTROL STRATEGIES***:

*1. Does the control strategy describe one or more local or state measures that are specific, quantitative quantified and permanent, above and beyond what is already required?:* Yes

*Comment field:*

Yes. Eastman and Huntsman Chemical Company's LDAR (Leak Detection and Recovery) Program for HRVOC's. Also, internal combustion engines used in naturla gas production will install NOx controls as part of the Texas Emissions Reduction Plan(TERP). Also, under TERP 2 backhoe excavators with cleaner burning units. The cities of Tyler and Longview are carrying out energy efficiency improvements. The area will work with the state to clarify if any of these measures would have been required by federal or state measures or if they are beyond what would have been required.

*2. Does the plan indicate when the dates by which the measures will be adopted? :* Yes

*Comment field:*

Yes. Before 2004 ozone season for Eastman's reductions; some of Huntsman's reductions will be in place by 2005 and more will be in place by 2008.

*3. Does the plan quantify emissions reductions , to the extent possible, for each measure when quantification procedures are available?:* Yes

*Comment field:*

Yes.

* 0.63 tons / day HRVOC's (Eastman's Polyethylene and Utilities and Feedstocks Divisions) * 0.23 tons / day HRVOC's (Eastman's Early implementation of LDAR HRVOC reductions under ethylene MACT regulations * 29 tons / year by 2005, increasing to 44 tons / year by 2008 (VOC's) (Huntsman's Improved LDAR program)

*4. Does the plan include the methodology or procedure and assumptions used to estimate the emissions reductions? :* Yes

*Comment field:*

Yes. In general terms only. See Permits 47007, 48588 and 4890 for Eastman and Permit # 18105 for Huntsman.

*5. Does the plan identify an implementation schedule, including dates, for each measure? :* Yes

*Comment field:*

Yes. See answers to items #2 and #3.

*6. Does the plan address emissions growth at least 5 years beyond December 31, 2007? (Maintenance for Growth):* Yes

*Comment field:*

Yes. NETAC developed emission inventories for 2012. NETAC projected NOx emissions to decline further between 2007 and 2012, leading to a further decrease in ozone levels in Northeast Texas. NETAC's maintenance for growth analysis indicated that Northeast Texas will still be attaining the 8-hour standard in 2012.

**TECHNICAL ASSESSMENT**:

*1. Are representative episodes modeled that were reflective of a typical ozone season exceedance that meets the EPA episode selection guidance to ensure that representative meteorological*

*regimes are considered?:* Yes
*Comment field:*
Yes. The modeled episode is 8/15/99 -> 8/22/99. The two spin up days were 8/13/99 -> 8/14/99. This episode includes combined influences from a high regional ozone background and local emissions, and includes a complete cycle of transport winds followed by local stagnation, returning to transport winds at the end of the episode. This is a typical pattern for 8-hour ozone levels in Northeast Texas.
*2. Does the plan include MOBILE6 and NONROAD model data as the basis for the emissions inventory?:* Yes
*Comment field:*
Yes. MOBILE6 and NONROAD2002 were used.
*3. Is local modeling used to develop the attainment control strategy?:* No
*Comment field:*
No. A MM5/CAMx modeling system was developed and the modeled attainment demonstration indicated the Northeast Texas region will remain in attainment without the addition of local measures. However, the area is implementing local control measures (VOC reductions) at the Eastman and Huntsman chemical plants as part of their LDAR program. They intend to model the effects of these measures in the near future, although the reduction in the 2007 design value resulting from these measures is anticipated to be very small.
*4. Does the plan include documentation of the modeling system (i.e., meteorological, emissions, air qualitymodels, biogenic processor) used in the local demonstration?:* Yes
*Comment field:*
Yes, several modeling reports and presentations were produced documenting these issues with the exception that no modeling of local EAC control strategies has been currently conducted. Itemized here is a brief list of models used in developing the modeling system: Meteorological input: MM5 Emission input: EPS2x, MOBILE6, NONROAD2002 Air Quality modeling: CAMx 4.03 Biogenic processor: GloBEIS3.1 Documentation available in the Northeast Texas 2004 Final Clean Air Action Plan on NETAC's website: www.netac.org/netacreports.htm
*5. Was the base case model performance evaluation documented and acceptable and consistent with EPAguidance?:* Yes
*Comment field:*
Yes. Performance measures are generally within EPA limits and show that high ozone levels in Northeast Texas resulted from local emissions, combined with a regional background and transport of ozone. A number of graphical analyses (daily maximum tile plots, ozone modeling movies, etc.) were conducted in conjunction with modeling statistics to access basecase model performance. Quantile-Quantile plots indicate a relatively high correlation coefficient (r2 = .7614) between observed and predicted peaks in the data, implying acceptable model performance. The plots generally imply that the ozone is being generated in areas predicted by the model for reasons that are relatively well understood. CAMx 8-hour and 1-hr summary statistics also indicate reasonably good model performance in spite of slight underprediction based on the negative values for normalized bias. Normalized bias and gross error statistics were calculated for observed values over 60 ppb.
*6. Was a modeling protocol submitted? :* Yes
*Comment field:*

Yes. See ENVIRON's Aug. 8, 2003 report entitled: MODELING PROTOCOL: Ozone Modeling for the Northeast Texas Early Action Compact.

*7. Does the modeling demonstrate that all ozone design values are less than 85 ppb?:* Yes
*Comment field:*
Yes.
Monitor Preliminary 2003 DV's Modeled RRF 2007 DV (2001-2003 data) Longview 82 ppb .981 80 ppb Tyler 81 .954 77 Karnack 84 .966 81 Waskom 84 .974 82 Karnack and Waskom monitors have only 2-years (2002-2003) worth of monitoring for their DV's. No local EAC control measures were included in the attainment test modeling. The modeling demonstrates attainment relying solely on measures already enforceable, including substantial NOx reductions at local point sources by NETAC as part of the local area's 1-hour ozone attainment SIP. The NOx -limited status of the Northeast Texas area and the future year emission inventory trends to 2012 seems to indicate that the area will remain in attainment through 2012. Between 1999 and 2002, anthropogenic NOx emissions in Northeast Texas had decreased by 18% and are projected to decrease by 21% by 2007 and 29% by 2012. These reductions result primarily in decreases in point source NOx in the early years and decreases in mobile sources in the later years. In addition, all sites show ozone decreases from 1999 to 2003 as NOx reductions were implemented, implying a connection between the NOx reductions and the decreases in ozone. These trends downward in monitored ozone during this period (1999-2003) could be from both changes in emissions and differences in meteorology. EPA remains somewhat concerned that the modeled attainment demonstration for 2007 combines a 1999 meteorological episode with a design value for the year 2003 (2001-2003 monitored data) which seemed to have been a meteorologically less-conducive period for ozone formation (especially 2001). Choosing the 2003 design value lessens the margin for safety in the future year modeling and could lead to overestimation of the actual reductions of ozone levels in the future due to the point-source NOx reductions that the NETAC area put in place under their 1-hr Ozone SIP.
*8. If the modeling does not demonstrate that all design values are less than 85 ppb, was acceptable weight of evidence provided and consistent with EPA guidance that shows the area will attain the 8-hour ozone standard by December 31, 2007?: -*
*Comment field:*
All DV's are below 85 ppb. No additional weight of evidence was submitted.
***DOES THE EARLY ACTION COMPACT PLAN MEET THE MARCH 31, 2004 MILESTONE?****:* Yes- The Longview-Marshall-Tyler Area is designated attainment, effective June 1, 2004

*Region:* 6

## *Area:* Oklahoma City Area, OK

***CONTROL STRATEGIES**:*

*1. Does the control strategy describe one or more local or state measures that are specific, quantitative quantified and permanent, above and beyond what is already required?:* Yes

*Comment field:*

The area has identified a list of Transportation Control Measures (TCMs) in their submittal. The area is continuing to work with the state to quantify the actual emission reductions due to these measures and will include this work in the SIP that the state is scheduled to submit to EPA by December 31st, 2004. The area will also work with the state in the future to clarify if these TCMs are beyond what was already required for the area. The area also included the removal of expiring and non-renewed permitted sources as reduction in emissions but will need to document if these are above and beyond what is already required.

However, as noted below, measures are not quantified. EPA will work with this area to ensure that EAC measures are quantified prior to SIP submission in December 2004 in order to be eligible for continued deferral.

*2. Does the plan indicate when the dates by which the measures will be adopted? :* Yes

*Comment field:*

Some of the individual TCMs have completion dates. The area will continue to identify dates for all the TCMs and work on getting the commitment for TCMs into a SIP.

*3. Does the plan quantify emissions reductions , to the extent possible, for each measure when quantification procedures are available?:* No

*Comment field:*

The area is continuing to estimate the emission reductions from TCMs and will include this information in the SIP submited from ODEQ to EPA.

*4. Does the plan include the methodology or procedure and assumptions used to estimate the emissions reductions? :* No

*Comment field:*

See comment #3.

*5. Does the plan identify an implementation schedule, including dates, for each measure? :* Yes

*Comment field:*

Some of the individual TCMs have completion dates. The area will continue to identify dates for all the TCMs and work on getting the commitment for TCMs into a SIP.

*6. Does the plan address emissions growth at least 5 years beyond December 31, 2007? (Maintenance for Growth):* No

*Comment field:*

The area is continuing to work with ODEQ and the contractor to develop a maintenance for growth emission inventory and address emissions growth potential impacts out to 2012.

CONTROL STRATEGY CONCLUSION : The EPA will continue working with the state to quantify emission reductions from the control measures in order to strengthen the plan. We recognize that the area is monitoring attainment.

***TECHNICAL ASSESSMENT**:*

*1. Are representative episodes modeled that were reflective of a typical ozone season exceedance*

*that meets the EPA episode selection guidance to ensure that representative meteorological regimes are considered?:* Yes
*Comment field:*
A conceptual model for high ozone was conducted, which included evaluation of 10 years of high ozone in Oklahoma, to aid in picking a representative episode. The episode modeled was August 13 through September 1st, 1999. ODEQ and EPA Region 6 representatives worked together to ensure that an episode was chosen that met EPA's guidance.
*2. Does the plan include MOBILE6 and NONROAD model data as the basis for the emissions inventory?:* Yes
*Comment field:*
MOBILE6 and NONROAD specific data was utilized for Oklahoma and Texas and emissions from EPA's national modeling for TIER II were utilized for other states in the modeling domain.
*3. Is local modeling used to develop the attainment control strategy?:* Yes
*Comment field:*
The modeling system (MM5 and CAMx) used a 36/12/4 km grid with the 36 km grid covering the Central States and the 4 km CAMx grid (fine grid) covers approximately 2/3 of Oklahoma. Current modeling does not incorporate the modeling of any local TCM emission reductions. The state and local area have agreed to work with the contractor to quantify the emission reductions and evaluate the reductions using the modeling system.
*4. Does the plan include documentation of the modeling system (i.e., meteorological, emissions, air qualitymodels, biogenic processor) used in the local demonstration?:* Yes
*Comment field:*
The State has followed the general procedures recommended in the EPA guidance documents. All methodologies and procedures were documented and submitted to EPA. Most of these documents are posted on ODEQ's website at http://www.deq.state.ok.us/AQDnew/whatsnew/SIP/EAC.htm.
*5. Was the base case model performance evaluation documented and acceptable and consistent with EPAguidance?:* Yes
*Comment field:*
Performance measures are generally within EPA limits. A number of graphical analyses (daily maximum tile plots, ozone modeling movies, etc.) were conducted in conjunction with modeling statistics to access basecase model performance. The plots generally imply that the ozone is being generated in right areas and the right magnitudes with some general underprediction bias. CAMx 8-hour and 1-hr statistics also indicate reasonably good model performance in spite of slight underprediction based on the negative values for normalized bias. Normalized bias and gross error statistics were calculated for observed values over 60 ppb.
*6. Was a modeling protocol submitted? :* Yes
*Comment field:*
The State developed and submitted a modeling protocol to EPA.
*7. Does the modeling demonstrate that all ozone design values are less than 85 ppb?:* Yes
*Comment field:*
The current year Design Value (1998-2000) was below 85 (83-84 ppb at the three monitors) and using this as a basis to calculate the Future year Design Value (FDV), the FDV was estimated to be 79-80 ppb at the three ozone monitors in the Oklahoma City area.
*8. If the modeling does not demonstrate that all design values are less than 85 ppb, was*

*acceptable weight of evidence provided and consistent with EPA guidance that shows the area will attain the 8-hour ozone standard by December 31, 2007?:* Yes
*Comment field:*
The area was modeling that the area would reach attainment utlizing the current year period 1998-2000 and provided additional weight of evidence in evaluation of other DV periods that the area would still be in attainment.
***DOES THE EARLY ACTION COMPACT PLAN MEET THE MARCH 31, 2004 MILESTONE?****:* Yes- The Oklahoma City area is designated attainment, effective June 1, 2004

## *Region:* 6
## *Area:* San Antonio Area, TX

***CONTROL STRATEGIES****:*
*1. Does the control strategy describe one or more local or state measures that are specific, quantitative quantified and permanent, above and beyond what is already required?:* Yes
*Comment field:*
Although the modeling attainment demonstration in the San Antonio Clean Air Plan demonstrated attainment without additional control strategies beyond State and Federal measures that are already enforceable, the area did commit to additional specific, quantified and permanent controls per the Protocol. These control measures include regulating degreasing equipment constructed before 1994; lowering Reid vapor pressure to7.2; and requiring Stage 1 vapor recovery for gas stations dispensing 25,000-125,000 gallons/month. The full Alamo Area Council of Governments plan can be found at http://www.aacog.com/sip/

*2. Does the plan indicate when the dates by which the measures will be adopted? :* Yes
*Comment field:*

*3. Does the plan quantify emissions reductions , to the extent possible, for each measure when quantification procedures are available?:* Yes
*Comment field:*
Emission reductions are calculated and discussed in the Clean Air Plan in Chapter 5; see Table 5.3 and the appendices for additional detail.
*4. Does the plan include the methodology or procedure and assumptions used to estimate the emissions reductions? :* Yes
*Comment field:*
Emission reductions are calculated and discussed in the Clean Air Plan in Chapter 5; see Table 5.3 and the appendices for additional detail.
*5. Does the plan identify an implementation schedule, including dates, for each measure? :* Yes
*Comment field:*

*6. Does the plan address emissions growth at least 5 years beyond December 31, 2007? (Maintenance for Growth):* Yes
*Comment field:*
The San Antonio Clean Air Plan Chapter 6 and Appendix L is devoted to Maintenance for Growth.

***TECHNICAL ASSESSMENT***:

*1. Are representative episodes modeled that were reflective of a typical ozone season exceedance that meets the EPA episode selection guidance to ensure that representative meteorological regimes are considered?:* Yes

*Comment field:*

The San Antonio Clean Air Plan Appendices A and J include the conceptual model for the area and the modeling protocol that were developed and included episode selection. The the area has followed EPA guidance on episode selection for ozone modeling and established practices in regulatory photochemical modeling.

*2. Does the plan include MOBILE6 and NONROAD model data as the basis for the emissions inventory?:* Yes

*Comment field:*

The San Antonio Clean Air Plan Appendices C-F include detailed information of the base year and future year inventories.

*3. Is local modeling used to develop the attainment control strategy?:* Yes

*Comment field:*

The modeling system (MM5 and CAMx) used a 36/12/4 km grid with the 36 km grid covering the Central States and the 4 km CAMx grid (fine grid) covering much of central texas. Many of the control measures implemented have been modeled.

*4. Does the plan include documentation of the modeling system (i.e., meteorological, emissions, air qualitymodels, biogenic processor) used in the local demonstration?:* Yes

*Comment field:*

The San Antonio Clean Air Plan has very extensive documentation included in the Plan and the attached Appendices.

*5. Was the base case model performance evaluation documented and acceptable and consistent with EPAguidance?:* Yes

*Comment field:*

Performance measures are generally within EPA limits. A number of graphical analyses (daily maximum tile plots, ozone modeling movies, etc.) were conducted in conjunction with modeling statistics to assess basecase model performance. The plots generally imply that the ozone is being generated in the right areas and the right magnitudes with some general underprediction bias. CAMx 8-hour and 1-hr statistics also indicate reasonably good model performance in spite of slight underprediction based on the negative values for normalized bias. Normalized bias and gross error statistics were calculated for observed values over 60 ppb. See the San Antonio Clean Air Plan and it's Appendix E for more information.

*6. Was a modeling protocol submitted? :* Yes

*Comment field:*

The San Antonio Clean Air Plan Appendices A and J respectively, include the conceptual model for the area and the modeling protocol that were developed and included episode selection.

*7. Does the modeling demonstrate that all ozone design values are less than 85 ppb?:* Yes

*Comment field:*

The area modeled a future year DV of 84 ppb or less at all the monitors before and after controls. See Chapter 5 of the Plan and Appendix H.

*8. If the modeling does not demonstrate that all design values are less than 85 ppb, was acceptable weight of evidence provided and consistent with EPA guidance that shows the area*

*will attain the 8-hour ozone standard by December 31, 2007?:* -
*Comment field:* Modeling demonstrated attainment in the future year and additional Weight of Evidence was provided. See Chapter 4, 5, and 6 of the Plan.

***DOES THE EARLY ACTION COMPACT PLAN MEET THE MARCH 31, 2004 MILESTONE?****:* Yes- The San Antonio Area is designated nonattainment - effective September 30, 2005

***Region:*** **6**

## *Area:* San Juan County (Farmington Area), NM

***CONTROL STRATEGIES****:*

*1. Does the control strategy describe one or more local or state measures that are specific, quantitative quantified and permanent, above and beyond what is already required?:* No

*Comment field:*

The area has not committed to a permanent control strategy. However, the area is monitoring attainment of the 8-hour ozone standard. There 2001-2003 design value is 74, well below the 8-hr standard. The area has completed SIP quality modeling and has developed complete emissions intentories for the area. Voluntary measures have been submitted.

*2. Does the plan indicate when the dates by which the measures will be adopted? : -*

*Comment field:*

Not applicable

*3. Does the plan quantify emissions reductions , to the extent possible, for each measure when quantification procedures are available?: -*

*Comment field:*

Not applicable

*4. Does the plan include the methodology or procedure and assumptions used to estimate the emissions reductions? : -*

*Comment field:*

Not applicable

*5. Does the plan identify an implementation schedule, including dates, for each measure? : -*

*Comment field:*

Not applicable

*6. Does the plan address emissions growth at least 5 years beyond December 31, 2007? (Maintenance for Growth):* Yes

*Comment field:*

***TECHNICAL ASSESSMENT****:*

*1. Are representative episodes modeled that were reflective of a typical ozone season exceedance that meets the EPA episode selection guidance to ensure that representative meteorological regimes are considered?:* Yes

*Comment field:*

The State has very much followed EPA guidance on 8-hour ozone modeling and established practice in regulatory photochemical modeling. Four multiple day episodes, which have elevated ozone levels and represent variety meteorological conditions, were selected. They are June 4-8, 2002, June 16-19, 2002, June 30-July 2, 2002 and July 16-18, 2002.

*2. Does the plan include MOBILE6 and NONROAD model data as the basis for the emissions inventory?:* Yes

*Comment field:*

For the State of New Mexico and all other areas outside Colorado, the area, on and off-road mobile sources were based on EPA NEI99 Version 2. Meanwhile, the EPA MOBILE6 model was used to develop mobile emissions for the State of Colorado, and the Colorado area and off-road sources were based on the information provided by the Colorado Department of Public Health

and Environment..
*3. Is local modeling used to develop the attainment control strategy?:* Yes
*Comment field:*
The photochemical modeling studies were conducted locally with technical assistance from a modeling contractor (i.e., Alpine Geophysics/Environ)
*4. Does the plan include documentation of the modeling system (i.e., meteorological, emissions, air qualitymodels, biogenic processor) used in the local demonstration?:* Yes
*Comment field:*
The State has very much followed the general procedures recommended in the EPA guidance documents. All methodologies and procedures were well documented and submitted to EPA.
*5. Was the base case model performance evaluation documented and acceptable and consistent with EPAguidance?:* Yes
*Comment field:*
The State developed and submitted a modeling protocol to EPA.

*6. Was a modeling protocol submitted? :* Yes
*Comment field:*
The CAMx 1-hr and 8-hr ozone performance results exhibit a level of performance for all four episodes that was well within EPA's recommended criteria in all but a few cases.
*7. Does the modeling demonstrate that all ozone design values are less than 85 ppb?:* Yes
*Comment field:*
The 2007 DV's ranged from a low of 56.34 ppb to a maximum of 74.78 ppb.

*8. If the modeling does not demonstrate that all design values are less than 85 ppb, was acceptable weight of evidence provided and consistent with EPA guidance that shows the area will attain the 8-hour ozone standard by December 31, 2007?:* -
*Comment field:*
Not applicable
***DOES THE EARLY ACTION COMPACT PLAN MEET THE MARCH 31, 2004 MILESTONE?****:* Yes- The San Juan County, NM Area is designated attainment, effective June 15, 2004

***Region:*** **6**
***Area:*** **Shreveport-Bossier City Area, LA**

***CONTROL STRATEGIES****:*
*1. Does the control strategy describe one or more local or state measures that are specific, quantitative quantified and permanent, above and beyond what is already required?:* Yes
*Comment field:*
Yes
* Installation of intelligent transportation systems to synchronize and improve traffic signals by end of 2003. (Emission reductions in tons/day: NOx = 0.0095 VOC = 0.048) * General Motors plant in Caddo Parish installed new VOC abatement system as part of their new product line in October 2003. (Emission reductions in tons/day: VOC = 1.37 ) * Center Point Energy has submitted a permit modification to reduce NOx and VOC emission by 90 % at natural gas processing plant in Bossier Parish, to be in place by the end of 2005. (Emission reductions in tons/day: NOx = 2.56 VOC = 0.135) * Installation of a gas collection system on the City of Shreveport's municipal solid waste landfill. The landfill gas is piped to a local General Motors facility for use as boiler fuel. Pipeline began operations in November, 2003. (Emission reductions in tons/day: NOx = ? VOC = ? ) * City of Shreveport will enter into a 20 year contract in 2004 with Johnson Controls, Inc. for purpose of installing energy conservation equipment in 33 city buildings by December, 2005, with the majority of installation completed in 2004. (Emission reductions in tons/day: NOx = ? VOC = ? ) * City of Shreveport will purchase and place in operation a hybrid electric bus as one of its operating 46 public transit buses, resulting in reduced Nox and VOC emissions in 2005. (Emission reductions in tons/day: NOx = 0.002 VOC = ?) The area will work with the state to clarify if any of these measures would have been required by federal or state measures or if they are beyond what would have been required.
*2. Does the plan indicate when the dates by which the measures will be adopted? :* Yes
*Comment field:*
Yes See answers to #1
*3. Does the plan quantify emissions reductions , to the extent possible, for each measure when quantification procedures are available?:* Yes
*Comment field:*
Yes See answers to #1
*4. Does the plan include the methodology or procedure and assumptions used to estimate the emissions reductions? :* Yes
*Comment field:*
Yes. The details are included in modeling presentations and reports that can be found at the City of Shreveport website: http://www.ci.shreveport.la.us/AirQuality/Router.htm
*5. Does the plan identify an implementation schedule, including dates, for each measure? :* Yes
*Comment field:*
Yes.
*6. Does the plan address emissions growth at least 5 years beyond December 31, 2007? (Maintenance for Growth):* Yes
*Comment field:*
Yes. Emission inventories were developed for 2007 and 2012. The UAM-V modeling system was applied to the "current" year of 2000 and the two future years (2007 and 2012). In addition to the

2007 baseline scenario, emissions for 2012 were developed to assess the effects of growth and as an evaluation of expected maintenance of the standard five years beyond 2007.

***TECHNICAL ASSESSMENT***:

*1. Are representative episodes modeled that were reflective of a typical ozone season exceedance that meets the EPA episode selection guidance to ensure that representative meteorological regimes are considered?:* Yes

*Comment field:*

Yes. The three episodes considered were: 8/5/99 -> 8/9/99; 7/13/00 -> 7/17/00; and 7/24/00 -> 7/28/00. Each episode includes two start-up/ramp-up days and one clean out day. The contractor chose the three episodes for analysis and modeling of the 8-hour ozone NAAQS, based on use of the CART analysis technique, in which days within the 1996-2002 time frame were classified according to meteorological and air quality parameters.

*2. Does the plan include MOBILE6 and NONROAD model data as the basis for the emissions inventory?:* Yes

*Comment field:*

Yes. MOBILE6.2, NONROAD2002a, EPS2.5 AND BEIS2+ (with BELD3 data set). Area and non-road source emissions for all states included in the Shreveport modeling domain were generated based on the 1999 NEI Ozone Season Daily estimates. County-level emissions estimates for the majority of non-road source emissions were developed using EPA's Draft NONROAD2002a model with the monthly maximum, minimum and average temperatures (calculated from the 1970-2000 30-year historical averages) by state for the episode period. Aircraft, commercial marine and locomotives were not included in the NONROAD model, and the emissions for these categories were taken from the 1999 NEI Version 2 data. Modifications were made to the 1999 NEI data to correct the possible errors or make some improvements to the database.

The county-level emission estimates for the on-road mobile source emissions were developed using MOBILE6.2. The MOBILE6.2 input files were used to generate the emission factors for total organic gases (TOG), NOx, and CO. The county-level emissions were calculated for each vehicle class and roadway classification by multiplying the appropriate emission factor from MOBILE6.2 by the county-level VMT for that vehicle class and roadway classification using the program MVCALC.

*3. Is local modeling used to develop the attainment control strategy?:* Yes

*Comment field:*

Yes, although the modeled attainment demonstration indicated the area will remain in attainment through 2007 and beyond, without the addition of local control measures, as a result of state and federal measures that are already on the books. Shreveport and the CACAC identified local emission reduction measures for inclusion in the Shreveport AQIP and for evaluation in the control strategy modeling analysis. These measures are listed in answer #1. Although the effect of these local measures is measurable in the analysis, it is not enough to reduce the 2007 design value from its modeled 84ppb to 83 ppb, because of the "rounding off" procedure.

*4. Does the plan include documentation of the modeling system (i.e., meteorological, emissions, air qualitymodels, biogenic processor) used in the local demonstration?:* Yes

*Comment field:*

Yes. Several modeling reports and presentations were produced documenting these issues.

Itemized here is a brief list of models used in developing the modeling system: Meteorological input: MM5 Emissions input: EPS2.5, MOBILE6.2, NONROAD2002 Biogenic processor: BEIS2+ (with BELD3.1 database) although additional description of how the BEIS2 and the BELD3 database are integrated will be done by the contractor for modeling conducted here and other areas. Air Quality: UAM-V The details are included in modeling presentations and reports that can be found at the City of Shreveport website: http://www.ci.shreveport.la.us/AirQuality/Router.htm

*5. Was the base case model performance evaluation documented and acceptable and consistent with EPAguidance?:* Yes

*Comment field:*

Yes. Performance measures are generally within EPA limits. Accuracy, Normalized bias and Gross Error are within EPA 1-hour ranges except for underestimation on Normalized Bias and Gross Error plots for 8/99 and 7/00 episodes. A number of graphical analyses (daily maximum tile plots, ozone modeling movies, etc.) were conducted in conjunction with modeling statistics to access basecase model performance. Eight-hour domain-wide Average Accuracy for the urban (4 km) grid is within EPA recommended range, except for an overestimation on 7/27/00.

*6. Was a modeling protocol submitted? :* Yes

*Comment field:*

Yes. Protocol is described in detail in SAI's Sept. 2, 2003 report entitled: Appendix A: Early Action Compact Modeling Analysis for the Shreveport-Bossier City Metropolitan Statistical Area and is described further in their March 31, 2004 technical support document entitled: Early Action Compact Ozone Modeling Analysis for the Shreveport-Bossier City Metropolitan Statistical Area.

*7. Does the modeling demonstrate that all ozone design values are less than 85 ppb?:* Yes

*Comment field:*

Yes. The latest three years of monitoring data shows that the Shreveport-Bossier City MSA is currently below 85 ppb. The 2007 base-case modeling results indicate that future 8-hour ozone design values will be 74 ppb and 84 ppb at the Caddo and Shreveport monitors respectively.

*8. If the modeling does not demonstrate that all design values are less than 85 ppb, was acceptable weight of evidence provided and consistent with EPA guidance that shows the area will attain the 8-hour ozone standard by December 31, 2007?:* -

*Comment field:*

All DV's less than 85 ppb.

***DOES THE EARLY ACTION COMPACT PLAN MEET THE MARCH 31, 2004 MILESTONE?****:* Yes- The Shreveport-Bossier City Area is designated attainment, effective June 15, 2004

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***Region:*** **6**
***Area:*** **Tulsa Area, OK**

***CONTROL STRATEGIES****:*
*1. Does the control strategy describe one or more local or state measures that are specific, quantitative quantified and permanent, above and beyond what is already required?:* Yes
*Comment field:*
Yes. The area has identified a list of Transportation Control Measures (TCMs) in their submittal. The area is continuing to work with the state to quantify the actual emission reductions due to these measures and will include this work in the SIP that the state is scheduled to submit to EPA by December 31st, 2004. The area will also work with the state in the future to clarify if these TCMs are beyond what was already required for the area. The area also included the removal of expiring and non-renewed permitted sources as reduction in emissions but will need to document if these are above and beyond what is already required. The area also included a voluntary measure of 7.8 RVP gasoline.
However, as noted below, measures are not quantified. EPA will work with this area to ensure that EAC measures are quantified prior to SIP submission in December 2004 in order to be eligible for continued deferral.
*2. Does the plan indicate when the dates by which the measures will be adopted? :* Yes
*Comment field:*
Yes, Some of the individual TCMs have completion dates. The area will continue to identify dates for all the TCMs and work on getting the commitment for TCMs into a SIP.

*3. Does the plan quantify emissions reductions , to the extent possible, for each measure when quantification procedures are available?:* No
*Comment field:*
No, The area is continuing to estimate the emission reductions from TCMs and will include this information in the SIP submited from ODEQ to EPA.
*4. Does the plan include the methodology or procedure and assumptions used to estimate the emissions reductions? :* No
*Comment field:*
No, See comment #3.
*5. Does the plan identify an implementation schedule, including dates, for each measure? :* Yes
*Comment field:*
Yes, Some of the individual TCMs have completion dates. The area will continue to identify dates for all the TCMs and work on getting the commitment for TCMs into a SIP.
*6. Does the plan address emissions growth at least 5 years beyond December 31, 2007? (Maintenance for Growth):* No
*Comment field:*
No, The area is continuing to work with ODEQ and the contractor to develop a maintenance for growth emission inventory and address emissions growth potential impacts out to 2012.

***TECHNICAL ASSESSMENT**:*

*1. Are representative episodes modeled that were reflective of a typical ozone season exceedance that meets the EPA episode selection guidance to ensure that representative meteorological regimes are considered?:* Yes

*Comment field:*

Yes, A conceptual model for high ozone was conducted, which included evaluation of 10 years of high ozone in Oklahoma, to aid in picking a representative episode. The episode modeled was August 13 through September 1st, 1999. ODEQ and EPA Region 6 representatives worked together to ensure that an episode was chosen that met EPA's guidance.

*2. Does the plan include MOBILE6 and NONROAD model data as the basis for the emissions inventory?:* Yes

*Comment field:*

Yes, MOBILE6 and NONROAD specific data was utilized for Oklahoma and Texas and emissions from EPA's national modeling for TIER II were utlized for other states in the modeling domain.

*3. Is local modeling used to develop the attainment control strategy?:* Yes

*Comment field:*

Yes, The modeling system (MM5 and CAMx) used a 36/12/4 km grid with the 36 km grid covering the Central States and the 4 km CAMx grid (fine grid) covers approximately 2/3 of Oklahoma. Current modeling only incorporates the modeling of emission reductions due to 7.8 RVP gasoline and the canceling of the expiring/non-renewal permits.

*4. Does the plan include documentation of the modeling system (i.e., meteorological, emissions, air qualitymodels, biogenic processor) used in the local demonstration?:* Yes

*Comment field:*

Yes. The State has followed the general procedures recommended in the EPA guidance documents. All methodologies and procedures were documented and submitted to EPA. Most of these documents are posted on ODEQ's website at http://www.deq.state.ok.us/AQDnew/whatsnew/SIP/EAC.htm.

*5. Was the base case model performance evaluation documented and acceptable and consistent with EPAguidance?:* Yes

*Comment field:*

Yes. Performance measures are generally within EPA limits. A number of graphical analyses (daily maximum tile plots, ozone modeling movies, etc.) were conducted in conjunction with modeling statistics to access basecase model performance. The plots generally imply that the ozone is being generated in right areas and the right magnitudes with some general underprediction bias. CAMx 8-hour and 1-hr statistics also indicate reasonably good model performance in spite of slight underprediction based on the negative values for normalized bias. Normalized bias and gross error statistics were calculated for observed values over 60 ppb.

*6. Was a modeling protocol submitted? :* Yes

*Comment field:*

Yes, the State developed and submitted a modeling protocol to EPA.

*7. Does the modeling demonstrate that all ozone design values are less than 85 ppb?:* No

*Comment field:*

No, Using the observed 1998-2000 8-hour ozone Design Values the projected future-year 8-hour ozone DVs at the Tulsa (85.2 ppb) and Skiatook (87.5 ppb) monitors both exceed 85 ppb.

*8. If the modeling does not demonstrate that all design values are less than 85 ppb, was acceptable weight of evidence provided and consistent with EPA guidance that shows the area will attain the 8-hour ozone standard by December 31, 2007?:* Yes
*Comment field:*
Yes,
Additional modeling will be done before the state submits a SIP to EPA. Currently the three WOE ozone modeling metrics have been evaluated in comparison with EPA's DRAFT 8-hour ozone modeling guidance. Reductions of 63% to 74% in all three modeling metrics are seen for the 2007 modeling Control Strategy 5. The contractor has indicated that results for the 2007 Base Case and other 2007 strategies are similar. Although the reductions in the air quality metrics are not as large as the 80% suggested by EPA, several additional modeling refinements have been identified that may strengthen the modeling WOE component. Among other WOE components, the area utilized the RRFs with different Design Value periods (other than current year) that indicated that the area would likely reach attainment if other DVs were considered. The contracter is is hopeful that additional refinement will get the modeling metrics above the 80% level included in EPA's guidance. The area is currently monitoring attainment with the latest three year period (2001-2003). The area and the state have committed to continue refining the modeling evaluation, other WOE analyses, and develop contingency measures which may include additional reductions of emissions. Based on EPA's evaluation, and as noted above, refinements of attainment demo are needed. We recognize that this area is monitoring attainment of the 8-hr ozone standard. EPA will continue working with this area to strengthen the plan.
***DOES THE EARLY ACTION COMPACT PLAN MEET THE MARCH 31, 2004 MILESTONE?****:* Yes- The Tulsa, OK area is designated attainment, effective June 15, 2004

***Region:*** **8**
***Area:*** **Denver Area, CO**

**CONTROL STRATEGIES**:

*1. Does the control strategy describe one or more local or state measures that are specific, quantitative quantified and permanent, above and beyond what is already required?:* Yes
*Comment field:*
The modeling demonstration relied in part on national measures such as Tier II and non-road engine emission reductions. The State modeled a RVP of gasoline of 8.1 psi, additional VOC reductions will be realized by Region 8's action to have 7.8 psi RVP required as per EPA's national rules regarding RVP.
Local controls: Controls for Oil Field Condensate VOC Emissions: The EAC Ozone Action Plan includes an amendment to Regulation No. 7 to require the reduction of flash emissions of volatile organic compounds from condensate collection, storage, processing and handling operations. The rule requires the installation of air pollution control technology to achieve at least a 47.5% reduction from uncontrolled emissions of volatile organic compounds from new and existing oil and gas exploration and production operations, natural gas compressor stations, and natural gas drip stations located within the 8-hour ozone control area designated by EPA. The rule includes an exemption if total emissions are less 30 tons per year. Controls for Stationary Engines: The EAC Ozone Action Plan includes an amendment to Regulation No. 7 to require the installation of controls on new and existing rich burn and lean burn natural gas fired stationary reciprocating internal combustion engines (RICE) larger than 500 horsepower located in the 8-hour ozone control area. In this case, controls installed for uncontrolled rich burn RICE shall be non-selective catalyst reduction and an air fuel ratio controller or other equally effective air pollution control technology, and for uncontrolled lean burn RICE shall be oxidation catalyst reduction, or other equally effective air pollution control technology. Existing lean burn RICE may obtain an exemption upon demonstration that cost of emissions control will exceed $5000/ton of VOC reduced. Controls for Dehydrators: The EAC Ozone Action Plan includes an amendment to Regulation No. 7 to require the reduction of emissions of volatile organic compounds from new and existing dehydration towers at oil and gas operations with emissions in excess of 15 tons per year. Controls for the Automobile Inspection and Readjustment Program (I/M): The EAC Ozone Action plan includes an amendment to Regulation No. 11 to reduce the coverage of the remote sensing clean screen area in order to reduce the disbenefit of the program and to reflect the practical reality of potential coverage. No more than 50 percent of the fleet of gasoline vehicles in the enhanced program area will be evaluated with remote sensing during any twelve-month period after December 31, 2005. Previously adopted state-only regulations establishing hydrocarbon limits and requiring gas cap pressure checks are hereby included. Further information regarding the Denver EAC ozone plan is available on the Denver Regional Air Quality Council's (RAQC) website at: http://www.raqc.org/ozone/EAC/ozone-eac.htm and the U.S. EPA Air Docket, Docket no. 2003-0090.
*2. Does the plan indicate when the dates by which the measures will be adopted? :* Yes
*Comment field:*
The Colorado Air Quality Control Commission (AQCC) held a public hearing on March 11, 2004,

and March 12, 2004, to consider the Denver EAC ozone plan, the revisions to Colorado's Regulation No. 7 (for the control of VOCs), the revisions to Colorado's Regulation No. 11(for motor vehicle I/M), and the Technical Support Documentation (TSD) for the EAC Plan. The Colorado AQCC approved these SIP materials after the conclusion of the public hearing on March 12, 2004.

*3. Does the plan quantify emissions reductions , to the extent possible, for each measure when quantification procedures are available?:* Yes

*Comment field:*

Controls for Oil Field Condensate VOC Emissions:

Reduction of flash emissions of volatile organic compounds from condensate collection, storage, processing and handling operations. Emission Reductions – estimated as 55 tons per day (tpd) in VOCs. Reciprocating internal combustion engine (RICE) controls: Approximately 5.5 tpd VOC and 19 tpd NOx reductions. Dehydrator controls: Approximately 0.5 tpd VOC reductions. Mobile sources: Total reductions as estimated by MOBILE6.2 (with the application of the I/M program and gas cap pressure test): Approximately 44 tpd VOC reductions, and approximately 38 tpd NOx reductions.

*4. Does the plan include the methodology or procedure and assumptions used to estimate the emissions reductions? :* Yes

*Comment field:*

Full emission inventory information is provided in the summary tables of the EAC plan (ref. Tables 7a and 8a) and in the applicable sections of the TSD. The entire TSD is available on the State's website at: http://apcd.state.co.us/documents/eac and at the U.S. EPA Air Docket, Docket no. 2003-0090.

*5. Does the plan identify an implementation schedule, including dates, for each measure? :* Yes

*Comment field:*

The Denver EAC ozone plan utilizes emission reductions realized through the implementation of the Colorado AQCC adopted revisions to Colorado Regulation No. 7 (see sections XII.A., XII.B., XII.C. and XVI.A. and Colorado Regulation No. 11 (Part A, IV.D, Part F, IV). The only issue identified is with the implementation schedules in Regulation No. 7, section XII.A.1.a and XII.A.1.b. Section XII.A.1.a states that "For calendar year 2005 such emissions shall be reduced by 37.5% from uncontrolled actual emissions." However, XII.A.1.b states "For calendar year 2006 and each caledar year thereafter such emissions shall be reduced by 47.5% from uncontrolled actual emissions." The revisions to these Regulations were adopted/approved by the Colorado AQCC simultaneously with their adoption/approval of the Denver EAC ozone plan on March 12, 2004.

(Note - on 4/6/04 Region 8 was advised by the Colorado Attorney General's Office that they would provide a clarifying statement for EPA's docket.) The following clarification and implementation examples were provided by the Colorado Attorney General's Office to Region 8 on April 6, 2004: Section XII.A.1 of Regulation No. 7 requires oil and gas operators to install control equipment on condensate tanks to reduce total VOC emissions in calendar year 2005 by 37.5%, and reduce total VOC emissions in calendar year 2006 by 47.5%. In order to achieve these reductions, operators will have the necessary controls installed long before the December 31, 2005 deadline in the EAC. The requirement in section XII.A.1.b to reduce 2006 emissions by 47.5% is by itself sufficient to meet the minimum requirement for the EAC. This is best illustrated by an example. Assume that an operator has 100 identical condensates in the Denver 8-hour

Control area and intends to use flares that will reduce emissions from one well by 95%. In order to comply with the requirement to reduce 2006 emissions by 47.5%, the operator will obviously have to operate flares on 50 of the tanks throughout calendar year 2006, i.e. continuously beginning at midnight on December 31, 2005 thus meeting the minimum requirement of the EAC. More importantly, however, the requirement in section XII.A.1.a for the operator to reduce 2005 emissions by 37.5% means that the entire network of flares will have to be installed and operating by the beginning of the 2005 ozone season. Assume for a moment that the operator in my example could install the entire system in a single day. In order to comply with the requirement to reduce 2005 emissions by 37.5%, the operator would have to install and begin operating all 50 flares on or about March 18, 2005. The operator, of course, cannot actually install 50 flares in a single day. The installation of the flares must be phased-in - that is why the rule requires fewer reductions in 2005 than are required for 2006. In order to achieve the requisite reductions, the operator must conform to a schedule with March 18, 2005 as the mid-point for the commencement of operation of the flares. Beginning March 18, 2005, each day of delay in the installation of a flare, must be offset by an equal and corresponding installation of a flare before March 18, 2005. An operator who begins on January 1, 2005 installing and operating flares at a steady and consistent pace on track to have 50% of the flares installed and operating by March 18, 2005 would have to have 100% of the flares installed and operating by about June 2, 2005 - the approximate beginning of the 2005 ozone season. Any delays in such a construction schedule will only increase the need to install the remaining flares earlier than June 2, 2005 in order to make up for the delays. Failure to do so means that the operator will be in violation of the requirement to install the flares and reduce 2005 emissions by 37.5%. Thus, there can be no doubt that Regulation No. 7 requires the installation of controls in time to meet the December 31, 2005 deadline.

*6. Does the plan address emissions growth at least 5 years beyond December 31, 2007? (Maintenance for Growth):* Yes

*Comment field:*

Excerpt from the Colorado AQCC adopted/approved Denver EAC ozone plan of March 12, 2004: "H. 2012 Maintenance Year Emission Inventory and Maintenance Demonstration EPA's Early Action Compact Protocol guidance requires that areas demonstrate long-term maintenance of the 8-hour ozone NAAQS through the year 2012. Although photochemical modeling analysis is required for the 2007 attainment demonstration, a simple comparison of emission inventories is sufficient to demonstrate maintenance. For this plan, the 2007 control case emission inventory, which is supported by a weight of evidence determination of attainment, is compared with the 2012 inventory. When total emissions in 2012 are less than total emissions in 2007 that are supported by a determination of attainment, continued maintenance is demonstrated. The 2012 inventories assume that the 2007 control measures remain in place throughout the maintenance period through 2012. The 2012 inventory also accounts for federal emission control measures taking effect from 2007 through 2012. The 2007 control case inventories for the 8 county area and the 11 county area and the 2012 maintenance inventories are presented previously in Tables 7a & 7b and 8a & 8b."

**TECHNICAL ASSESSMENT**:

*1. Are representative episodes modeled that were reflective of a typical ozone season exceedance*

*that meets the EPA episode selection guidance to ensure that representative meteorological regimes are considered?:* Yes
*Comment field:*
Episode selection is documented in the State's website at http://apcd.state.co.us/documents/eac/EPISODE%20SELECTION.pdf and at the U.S. EPA Air Docket, Docket no. 2003-0090. The State followed EPA guidance in episode selection. Monitored ozone data from 1999 to 2002 was used to identify elevated 8-hour ozone episodes. Particular emphasis was placed on episodes that exceeded the 8 hour ozone standard. Several of the selected episodes could not be used in the EAC because of poor model performance related to convective meteorological conditions.
*2. Does the plan include MOBILE6 and NONROAD model data as the basis for the emissions inventory?:* Yes
*Comment field:*
The March 12, 2004 Denver EAC ozone plan incorporates emissions as calculated with MOBILE6.2 and EPA's NONROAD model. Additional information, other than the brief descriptions and emission summaries provided in the ozone plan, is found in the State's TSD. Please got to:
http://apcd.state.co.us/documents/eac and the U.S. EPA Air Docket, Docket number 2003-0090.
*3. Is local modeling used to develop the attainment control strategy?:* Yes
*Comment field:*
The Denver EAC ozone plan incorporated modeling specific to this region of the nation - Colorado is not part of the NOx SIP Call area. The following modeling appendices can be found at the State's website for the TSD at:
http://apcd.state.co.us/documents/eac and the U.S. EPA Air Docket, Docket no. 2003-0090: Appendix A-Modeling Protocol, Episode Selection, and Domain Definition (1.89 mb) Appendix B-Episode Selection for the Denver Early Action Ozone Compact (1.19 mb) Appendix C-Emission Inventories for the Ozone State Implementation Plan Wildfire Emission Inventory Appendix D-Evaluation of MM5 Simulations of the Summer '02 Denver Ozone Season and Embedded High 8-hr Ozone Episodes (3.47 mb) Appendix E-Development of the 2002 Base Case Modeling Inventory (1.52 mb) Appendix F-Development of the 2007 Base Case Modeling Inventory (700 mb) Appendix G- Preliminary Photochemical Base Case Modeling and Model Performance (928 kb) Appendix H-Preliminary Photochemical Base Case Modeling and Model Performance Evaluation for the Summer '02 Denver Ozone Season and Embedded High 8-Hour Ozone Episodes (2.9 mb) Appendix I-Update of Ozone Modeling to Support Denver 8-hour Ozone Early Action Compact 2007 Control Strategy Evaluation (0.9 mb) Appendix J-2007 Base Case, Control Strategy and Sensitivity Analysis Modeling (2.82 mb) Appendix K- 2007 Emission Reduction Sensitivity Modeling Appendix L 2007 Control Strategy Modeling for the Denver EAC Appendix M-2003 Ambient Monitoring Study Data Appendix N-Weight of Evidence to Support Attainment Demonstration (6.50 mb) Appendix O-Modeling Review Panel-Stakeholder Process
*4. Does the plan include documentation of the modeling system (i.e., meteorological, emissions, air qualitymodels, biogenic processor) used in the local demonstration?:* Yes
*Comment field:*
The Denver EAC ozone describes the modeling system and refers to the State's TSD for specific information. The following modeling appendices can be found at the State's website at:

http://apcd.state.co.us/documents/eac and the U.S. EPA Air Docket, Docket no. 2003-0090: Appendix A-Modeling Protocol, Episode Selection, and Domain Definition (1.89 mb) Appendix B-Episode Selection for the Denver Early Action Ozone Compact (1.19 mb) Appendix C-Emission Inventories for the Ozone State Implementation Plan Wildfire Emission Inventory Appendix D-Evaluation of MM5 Simulations of the Summer '02 Denver Ozone Season and Embedded High 8-hr Ozone Episodes (3.47 mb) Appendix E-Development of the 2002 Base Case Modeling Inventory (1.52 mb) Appendix F-Development of the 2007 Base Case Modeling Inventory (700 mb) Appendix G- Preliminary Photochemical Base Case Modeling and Model Performance (928 kb) Appendix H-Preliminary Photochemical Base Case Modeling and Model Performance Evaluation for the Summer '02 Denver Ozone Season and Embedded High 8-Hour Ozone Episodes (2.9 mb) Appendix I-Update of Ozone Modeling to Support Denver 8-hour Ozone Early Action Compact 2007 Control Strategy Evaluation (0.9 mb) Appendix J-2007 Base Case, Control Strategy and Sensitivity Analysis Modeling (2.82 mb) Appendix K- 2007 Emission Reduction Sensitivity Modeling Appendix L 2007 Control Strategy Modeling for the Denver EAC Appendix M-2003 Ambient Monitoring Study Data Appendix N-Weight of Evidence to Support Attainment Demonstration (6.50 mb) Appendix O-Modeling Review Panel-Stakeholder Process

*5. Was the base case model performance evaluation documented and acceptable and consistent with EPAguidance?:* Yes

*Comment field:*

The State evaluated model performance using techniques that are consistent with EPA guidance. Model performance for the July 2002 episodes generally did not meet EPA's performance goals due to complex meteorological conditions, and these episodes were not used in subsequent EAC modeling. The June 2002 episodes did meet the EPA performance goals, with the highest concentration episodes demonstrating somewhat better performance than the lower concentration periods. The base case model evaluation studies are available at:
http://apcd.state.co.us/documents/eac and the U.S. EPA Air Docket, Docket no. 2003-0090:
Appendix G- Preliminary Photochemical Base Case Modeling and Model Performance (928 kb)
Appendix H-Preliminary Photochemical Base Case Modeling and Model Performance Evaluation for the Summer '02 Denver Ozone Season and Embedded High 8-Hour Ozone Episodes (2.9 mb)

*6. Was a modeling protocol submitted? :* Yes

*Comment field:*

Refer to Appendix A of the State's TSD for documentation of the modeling protocol that was submitted to Region 8. Go to: http://apcd.state.co.us/documents/eac and the U.S. EPA Air Docket, Docket no. 2003-0090:
Appendix A-Modeling Protocol, Episode Selection, and Domain Definition (1.89 mb)

*7. Does the modeling demonstrate that all ozone design values are less than 85 ppb?:* No

*Comment field:*

The projected 8 hour ozone design value for 2007 (after controls) was
86 ppb at the Rocky Flats monitor. The projected 2007 concentrations at two other high concentration ozone monitoring sites (NREL and Chatfield) had predicted ozone concentrations less than 85 ppb. The final ozone attainment modeling is shown in:
http://apcd.state.co.us/documents/eac and the U.S. EPA Air Docket, Docket no. 2003-0090:
Appendix I-Update of Ozone Modeling to Support Denver 8-hour Ozone Early Action Compact 2007 Control Strategy Evaluation (0.9 mb) Appendix J-2007 Base Case, Control Strategy and

Sensitivity Analysis Modeling (2.82 mb) Appendix J-2007 Base Case, Control Strategy and Sensitivity Analysis Modeling (2.82 mb)

*8. If the modeling does not demonstrate that all design values are less than 85 ppb, was acceptable weight of evidence provided and consistent with EPA guidance that shows the area will attain the 8-hour ozone standard by December 31, 2007?:* Yes

*Comment field:*

The State has submitted a Weight Of evidence Demonstration that provides the minimum analyses that are recommended in EPA guidance. EPA's Region 8 has checked "yes" for this question in that the State did submit a Weight Of Edvidence demonstration. EPA is reviewing the submittal and has not yet made a decision as to whether the WOE plan is acceptable. Major elements in the State's WOE materials of interest include:

A trends analysis that shows that if the extreme high temperature summer of 2003 is excluded, both emissions and ozone concentrations have been trending lower over the 1993 to 2003 period. An analysis demonstrating a greater than 80 percent improvement in the number of grid cells and grid hours over 84 ppb when comparing the base case scenario to the 2007 control scenario. An analysis showing that for the highest base case ozone days, when model performance is best, attainment at Rocky Flats is demonstrated. However, the attainment test fails at Rocky Flats when basecase modeling days between 70 and 80 ppb are included in the analyses. The Weight of evidence information is available at:

http://apcd.state.co.us/documents/eac

and the U.S. EPA Air Docket, Docket no. 2003-0090: Appendix N-Weight of Evidence to Support Attainment Demonstration (6.50 mb)

*DOES THE EARLY ACTION COMPACT PLAN MEET THE MARCH 31, 2004 MILESTONE?:* Yes- The Denver area is designated nonattainment - effective date deferred until September 30, 2005