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AIR QUALITY STAKEHOLDERS OF CUMBERLAND COUNTY

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Fayetteville Technical Community College

Mr. Steven Schultz
Cape Fear Valley Health Systems

Ms. Denise Sykes
Towns of Falcon, Godwin, Linden and Wade

Mr. Stephen Waters
Barnhill Contracting Co.

August 9, 2004

Ms. Kay Prince
US Environmental Protection Agency
Region 4
61 Forsyth St. S.W.
Atlanta, GA 30303-8960

Dear Ms. Prince:

On behalf of the Air Quality Stakeholders of Cumberland County, I am submitting our Bi-Annual Progress Report.

If you have any questions or if I can provide any additional information please contact me or Mrs. Maurizia Chapman at the above address.

Sincerely,

Nancy Roy, AICP
Director, Cumberland County Planning & Inspections Department
Technical Committee Chair

CC: Richard Schutt, USEPA w/enclosures
Sheila Holman, NCDAQ w/enclosures
Air Quality Stakeholders of Cumberland County
Air Quality Technical Committee Members

**Bi-Annual Progress Report
Of the
Early Action Compact
In the Fayetteville Metropolitan Statistical Area
North Carolina**



**Planning Today
for Clean Air
Tomorrow**

A joint effort by USEPA Region 4, North Carolina Department of Environment and Natural Resources, and the Cumberland County Board of Commissioners, Town of Falcon, City of Fayetteville, Fort Bragg Military Reservation, Town of Godwin, Town of Hope Mills, Town of Linden, Pope Air Force Base, Town of Spring Lake, Town of Stedman and Town of Wade and the Fayetteville Area Metropolitan Planning Organization

June 30, 2004

“People in the News” Radio Show	March 1, 2004
Cumulus Media Radio Show	May 6, 2004
Advertisements in “Up & Coming Weekly” Magazine (It is estimated that 34,000 people a week read this magazine totaling 68,000 for the two weeks.)	June 9 & 23, 2004

Strategies Selection and Approval

Through the Stakeholders’ and Public involvement process, the Fayetteville Metropolitan Statistical Area submitted to all of the County’s jurisdictions and Fort Bragg a list of proposed strategies to be implemented in the efforts to decrease NOx and VOC emissions.

While reviewing the strategies to be implemented, the Early Action Compact and Milestones were carefully reviewed. This area is very supportive of the Early Action Compact process and wishes for a healthful environment and high quality of life for its citizens. Many of the jurisdictions within the Fayetteville MSA have strategies that have already been or will be implemented and enforced during this year. Logistically, many of the selected strategies are long term and require more time to fully develop and implement. Realizing that ordinances and new program implementations take time, we maintain the December 2005 deadline, to assure that all of our efforts will be fully completed by the EAC deadline.

Upon implementation of the strategies, the EAC binds local areas to submit semi-annual reports to the EPA until 2007 and to perform modeling for the year 2012. The EAC signed by this area includes modeling for the year 2017, ten years after designation.

The Fayetteville MSA will continue to monitor and report on accomplishments beyond 2007 and will compile and submit such report during the review and update of the MPOs Long Range Transportation Plan, whether required every five years, as currently set, or every three years, if modified in the Reauthorization of TEA-21, the current Transportation Bill, to the year 2019.

Early Action Plan Review and Approval Process

After selection of the strategies to be included in the Early Action Plan, the Plan was then assembled and distributed to all committee members. The plan was reviewed at the March 10, 2004 Technical Committee Meeting and the March 18, 2004 Stakeholder Committee Meeting. Both meetings included a discussion and review period before voting on the Plan. The Technical Committee and Stakeholder Committee both approved the plan by consensus.

Air Quality Week

In May 2004, we initiated our first annual Air Quality Week. Air Quality Week was recognized May 2-8, 2004, based on the beginning of the ozone season. An Air Quality Week proclamation was distributed to the local governing bodies and organizations. The following groups adopted the proclamation:

- City of Fayetteville
- Town of Hope Mills
- Town of Godwin
- Town of Stedman
- Town of Falcon
- Town of Wade
- Town of Linden
- The Cumberland County Business Council and its affiliated organizations

All of these groups encouraged their members and citizens to practice activities that improve the Air Quality of the area. Along with the proclamations, an Air Quality Week display was set up in the Cumberland County Courthouse and included the top three posters selected in the Air Quality Poster Contest.

Future plans for Air Quality Week are currently being discussed. Additional activities we would like to include are a Public Transit Day, where all public service employees are encouraged to take public transportation to work that day; and a brown bag day, where all citizens are encouraged to bring their lunch to work instead of traveling to eat.

Air Quality Poster Contest

The Air Quality Poster Contest was open to all Cumberland County, Fort Bragg, and Pope AFB students grades kindergarten through 5th. A total of 739 students participated from all across the county. Each school submitted one winner. These winners competed for the top three places overall with 1st Place receiving \$100, 2nd Place receiving \$75, and 3rd Place receiving \$50. Each student participating in the event received a certificate, and the top three students from each school were awarded ribbons. These awards were presented by an Air Quality Stakeholder during the school's end of year Awards Day. At the awards presentation, the Stakeholders provided air quality information to the students, teachers, and parents attending the ceremonies.

The staff and Stakeholders are in the initial stages of publishing a 2004/2005 Air Quality Calendar using the top13 entries. Approximately 500 to 1000 calendars will be printed and then distributed to the schools and throughout the community. Overall, we consider our first Air Quality Poster Contest to have been a success, and we learned a great deal for our future contests.



**AIR QUALITY STAKEHOLDERS OF
CUMBERLAND COUNTY
SELECTED
OZONE CONTROL STRATEGIES
UPDATE**

**AIR QUALITY STAKEHOLDERS OF CUMBERLAND COUNTY
SELECTED OZONE CONTROL STRATEGIES UPDATE**

STRATEGY	STRATEGY DESCRIPTION	ESTIMATE OF NOX REDUCTIONS (if available)	IMPLEMENTATION DATE	ADOPTING JURISDICTIONS
LAND USE				
<p>Landscape Ordinance</p>	<p>Require landscaping of major nonresidential developments within the MSA, including retrofitting older developments</p>	<p>It is believed that this strategy will lower NO_x emissions.</p> <p>The emission reductions are not currently quantifiable, but this strategy is directionally correct.</p>	<p>December 2005 – County-wide</p> <p>December 2003 – Fort Bragg implements the Sustainable Installation Design Guide.</p> <p>Ongoing The City of Fayetteville has a landscape ordinance for new nonresidential development.</p> <p>June 2004 The City of Fayetteville passed a buffer/landscape ordinance effective June 30, 2004.</p>	<p>Cumberland County City of Fayetteville Falcon Godwin Hope Mills Linden Spring Lake Stedman Wade Fort Bragg</p>
<p>Conduct a Smart Growth Audit</p>	<p>Conduct a benchmark land use assessment and compare it with Smart Growth policies. To complete in conjunction with new Zoning Ordinance and Land Use Plans</p>	<p>It is believed that this strategy will lower NO_x emissions.</p> <p>The emission reductions are not currently quantifiable, but this strategy is directionally correct.</p>	<p>December 2005</p>	<p>Cumberland County City of Fayetteville Falcon Godwin Hope Mills Linden Spring Lake Stedman Wade</p>

**AIR QUALITY STAKEHOLDERS OF CUMBERLAND COUNTY
SELECTED OZONE CONTROL STRATEGIES UPDATE**

STRATEGY	STRATEGY DESCRIPTION	ESTIMATE OF NOX REDUCTIONS (if available)	IMPLEMENTATION DATE	ADOPTING JURISDICTIONS
LAND USE				
<p>Transit/Pedestrian/Mixed Use Oriented Development</p>	<p>Add a mixed-use alternative to zoning ordinance along transit lines and include sidewalks, shade trees, benches, and landscaping as well as bike paths/lanes, which will increase the desirability of walking and biking and promote the use of transit.</p> <p>Work with schools and parks to facilitate pedestrian crossing from subdivisions to schools.</p> <p>Fort Bragg is building upon existing mixed used development by adding pedestrian trails and sidewalks.</p>	<p>NO QUANTIFICATION-base line and extensive study would be required to obtain NOx emission reductions for Cumberland County.</p> <p>NOx reductions are supported by the Portland, Oregon study cited on Page 18 of “Improving Air Quality Through Land Use Activities” www.epa.gov/otaq/transp/landguid.htm</p> <p>Portland Oregon study supports 8% decrease in VMT and NOX emissions decrease of 6%.</p>	<p>December 2005</p> <p>Ongoing at Fort Bragg</p> <p>UPDATE Cumberland County released plans in June 2004 for mixed-use development that would allow for more innovative developments that would reduce congestion, encourage open space and landscape, and allow for more sidewalks and buffers between different land uses.</p>	<p>Cumberland County City of Fayetteville Falcon Godwin Hope Mills Linden Spring Lake Stedman Wade Fort Bragg</p>
<p>Infill Development</p>	<p>Promote infill and brownfield development in urban areas, to utilize existing infrastructure and to decrease and/or maintain VMTs.</p> <p>Strengthening the downtown area. Economic Incentives are available for businesses in the downtown area through the Downtown Loan Program and Historic Properties, a public/private partnership.</p>	<p>It is believed that this strategy will lower NO_x emissions by decreasing VMT (promotes Pedestrian Transit and Mass Transit Use).</p> <p>The emission reductions are not currently quantifiable, but this strategy is directionally correct.</p>	<p>Ongoing City of Fayetteville allows Zero Lot Line Subdivision Development encouraging infill development.</p> <p>Fort Bragg will continue to redevelop existing urban land use. The majority of projects are built on the currently developed sites instead of new, undisturbed sites.</p>	<p>Cumberland County City of Fayetteville Falcon Godwin Hope Mills Linden Spring Lake Stedman Wade Fort Bragg</p>

**AIR QUALITY STAKEHOLDERS OF CUMBERLAND COUNTY
SELECTED OZONE CONTROL STRATEGIES UPDATE**

STRATEGY	STRATEGY DESCRIPTION	ESTIMATE OF NOX REDUCTIONS (if available)	IMPLEMENTATION DATE	ADOPTING JURISDICTIONS
LAND USE				
Shared Parking Facilities and Connectivity	This will reduce the amount of impervious surface, which contributes to the heat island effect and reduces the amount of stop and go traffic.	It is believed that this strategy will lower NO _x emissions by decreasing VMT. The emission reductions are not currently quantifiable, but this strategy is directionally correct.	December 2005 The City of Fayetteville has used shared parking facilities successfully and hopes to expand their efforts in the near future.	Cumberland County City of Fayetteville Falcon Godwin Hope Mills Linden Spring Lake Stedman Wade
Urban Reforestation/ Green Space	Public Works Commission has policies to maintain tree coverage in watershed areas and seek to expand land acquisition for preservation of the watershed. NC Forest Services will seek annual grant funding to plant at least 100 trees. Cumberland County to complete a public green space inventory of the entire county. Conservation Subdivision Option	It is believed that this strategy will lower NO _x emissions by reducing the heat island affect. The emission reductions are not currently quantifiable, but this strategy is directionally correct.	Ongoing 2004 250 trees have been planted throughout Pope AFB and Fayetteville. 353 trees have been planted on Fort Bragg.	Cumberland County City of Fayetteville Falcon Godwin Hope Mills Linden Spring Lake Stedman Wade

The following is from the EPA Air and Radiation Office of Transportation and Air Quality “Improving Air Quality Through Land Use Activities”, EPA420-R-01-001, January 2001.

The physical characteristics and patterns of land development in a region can affect air quality by influencing the travel mode choices citizens have available to them. Development patterns that locate jobs, housing and recreation in closer proximity to each other, can mean shorter and fewer car and truck trips, thus reducing vehicle miles traveled (VMT) and likely reducing motor vehicle emissions. Other development patterns have the potential to improve or mitigate air quality problems by providing and promoting alternatives to vehicular travel, such as mass transit, walking, or biking. The most significant urban form features that can affect travel activity are:

- *Density = infill*
- *Land Use Mix – incorporating different land uses (e.g. recreation, housing, employment, shopping) with a development, a neighborhood, or a region.*

**AIR QUALITY STAKEHOLDERS OF CUMBERLAND COUNTY
SELECTED OZONE CONTROL STRATEGIES UPDATE**

- *Transit Accessibility – locating high-density commercial and residential development around transit stations, also known as “transit oriented development,” or TOD.*
- *Pedestrian-Environment/ Urban Design Factors – features that improve the pedestrian environment such as sidewalks, clearly marked crosswalks, shade trees, benches, and landscaping; also refers to features that improve the bicycling environment such as bike paths and dedicated bike lanes, bike parking and clear signs.*
- *Regional Patterns of Development – patterns of dispersion, centralization, or clustering of activities within a metropolitan area, as well as the relationship of development to highway and transit systems; involves the interrelationships between employment and residential development and the transportation connection between sets of origin and destination points*

The air quality impacts of land use activities on transportation depend on numerous factors, including density and location of development, amount of development, mix of uses, and access to transportation alternatives. The interaction of these factors is complex, and due to the variations from one development project to another, each development needs to be analyzed individually. Studies have been conducted in Portland, Oregon; Sacramento and Los Angeles, California; Baltimore, Maryland; and Washington, DC that support VMT reduction associated with land use strategies over a 20 year time horizon.

**AIR QUALITY STAKEHOLDERS OF CUMBERLAND COUNTY
SELECTED OZONE CONTROL STRATEGIES UPDATE**

STRATEGY	STRATEGY DESCRIPTION	ESTIMATE OF NOX REDUCTIONS (if available)	IMPLEMENTATION DATE	ADOPTING JURISDICTIONS
MOBILE SOURCES				
Alternative Fuels and AF Vehicles	<p>Fort Bragg has developed a plant to convert its fleet to Bio-Diesel 20 and Ethanol E85. This project includes an AF fueling station.</p> <p>185 vehicles will be converted to B20 (100,000 gallons of diesel fuel).</p> <p>158 Flexible Fuel vehicles to use approximately 55,000 gallons of E85 per year.</p>	<p>CACPS was used to get these approximate reductions:</p> <p>VOC = 326 lbs. Per year This strategy shows a slight increase in NOx emissions (102 lbs./yr), however it also shows reductions in all other pollutants and PM, which could be a potential problem for this area</p> <p>NOx = 2261 lbs. Per year VOC = 3261 lbs. Per year</p>	<p>December 2005</p> <p>So far, a total of 25 off-road vehicles and diesel powered machinery have been switched over to B-20. Since January 1, 2004, approximately 5000 gallons of B-20 has been used.</p>	Fort Bragg
Idling Restrictions	Festival Park will include electrical outlets for use to reduce truck idling during festivals.	<p>It is expected that this project will decrease NOx emissions.</p> <p>Emission reductions will be quantified upon project completion and based upon events scheduled.</p>	October 2005	City of Fayetteville Falcon Godwin Linden Stedman Wade
Retrofitting Diesel School Buses	Fort Bragg has received a grant to fund retrofitting of school buses serving the Fort Bragg Schools.	It is expected that this project will decrease NOx emissions as well as PM, CO, and HC.	<p>Summer 2004</p> <p>Plans call for the retrofit to be complete in August 2004.</p>	Fort Bragg

The Fayetteville MSA reviewed many AF and AFV possibilities, but, because the infrastructure is not in place at this time and developing it would be cost prohibitive and it could not be implemented by December 2005, no other governments agreed to participate. Mobile source strategies will be reviewed and evaluated for long range planning in this area.

**AIR QUALITY STAKEHOLDERS OF CUMBERLAND COUNTY
SELECTED OZONE CONTROL STRATEGIES UPDATE**

STRATEGY	STRATEGY DESCRIPTION	ESTIMATE OF NOX REDUCTIONS (if available)	IMPLEMENTATION DATE	ADOPTING JURISDICTIONS
TRANSPORTATION				
Using Intelligent Transportation Systems (ITS) and Dynamic Message Signs (DMS) for Congestion Management and Ozone Alerts	<p>Project U-3635 Closed Loop Signal System will provide a new area-wide closed loop signal system.</p> <p>Dynamic Message Signs will be installed at congested intersections/corridors.</p> <p>Expansion of existing continuous flow right turn lanes in the urbanized area.</p>	<p>It is expected that this project will decrease NOx emissions by decreasing traffic congestion.</p> <p>It is currently difficult to quantify this effort, however other examples of this system have shown anywhere from 0-20% reductions in traffic congestion resulting in less idling, travel time, and, as a result, NOx</p>	<p>2004 is expected completion year for Project U-3635.</p>	<p>Cumberland County City of Fayetteville Hope Mills</p>
Enhance Mass Transit System	<p>Redesign routes to be more convenient to riders.</p> <p>Increase frequency of transit services to 15 minutes.</p> <p>Fort Bragg initiated a shuttle service providing service around the post and connecting with municipal transit.</p> <p>Since entering the EAC process, Fort Bragg and FAST have worked together to start a Saturday Express Shuttle to transport troops to and from Cross Creek Mall on Saturdays.</p>	<p>CACPS was used to get an approximate reduction: VOC = 17,698 lbs per year NOx = 5,533 lbs per year</p> <p>CACPS was used to get an approximate reduction: VOC = 147 lbs per year NOx = 54 lbs per year</p>	<p>December 2005 – FAST The plan for the new transit system has been presented to the following jurisdictions: Fayetteville City Council: January 12, 2004 Town of Spring Lake Commissioners: March 22, 2004 Town of Hope Mills Commissioners: April 19, 2004 Cumberland County Commissioners: May 3, 2004</p> <p>Ongoing – Fort Bragg Fort Bragg's shuttle service is averaging between 500-600 passengers per week while the Express Shuttle is averaging around 30 riders each Saturday.</p>	<p>City of Fayetteville Fort Bragg</p>

**AIR QUALITY STAKEHOLDERS OF CUMBERLAND COUNTY
SELECTED OZONE CONTROL STRATEGIES UPDATE**

STRATEGY	STRATEGY DESCRIPTION	ESTIMATE OF NOX REDUCTIONS (if available)	IMPLEMENTATION DATE	ADOPTING JURISDICTIONS
TRANSPORTATION				
Formulate Car and Van Pooling Increase Rural Transportation Paratransit	Development of Database to connect riders. Vanpooling and carpooling programs are being advertised by transit provider. Rural transportation is currently being expanded to connect outlying areas of the county and smaller municipalities.	It is believed that this strategy will lower NO _x emissions. Quantification will be provided when implemented.	December 2004	City of Fayetteville Falcon Godwin Stedman Wade
Encourage Park and Ride for Large Events	FAST and Private Transportation providers (i.e. Festival of Flight) are providing shuttle at nominal cost to public. Fort Bragg provides internal transportation services for large on-post events at no cost to the rider.	Emission reductions will be quantified for each event and included in semi-annual updates.	Ongoing FAST continues to work with groups who are putting on events where park and ride could be beneficial. Fort Bragg requires park and ride, carpooling, or public transit for access to many of their events.	City of Fayetteville Fort Bragg

**AIR QUALITY STAKEHOLDERS OF CUMBERLAND COUNTY
SELECTED OZONE CONTROL STRATEGIES UPDATE**

STRATEGY	STRATEGY DESCRIPTION	ESTIMATE OF NOX REDUCTIONS (if available)	IMPLEMENTATION DATE	ADOPTING JURISDICTIONS
CONSERVATION				
<p>Use renewable energy sources when available (i.e. solar and methane)</p>	<p>Cumberland County Landfill harvests methane and through a contract with Biomass Energy, sells the energy to Cargill Inc., a local industry. Cargill Inc. is using 1000 cubic feet/minute of landfill gas. Biomass Energy estimates that this usage can be increased to 1600 cubic feet/minute over the next 4-5 years. Cargill has initiated discussions with the North Carolina Division of Air Quality to modify operations in order to fully utilize the methane gas available.</p> <p>Encourage residents and businesses to support NC Green Power, a nonprofit program working to encourage development of renewable energy sources. A \$4.00 contribution purchases one block of green power (equivalent to 100 kilowatt-hours).</p>	<p>Estimated NOx reduction = 5 tons per year.</p> <p>AP42, Table 2.4-5 was used to obtain emission reduction estimates. NOx savings were approximated using the flare NOx emission rate of 40 lb/million cubic feet, 252 million cubic feet/min of landfill gas usage (which is 600 cubic feet/minute multiplied by 7000 operating hours per year).</p> <p>Update: Working with NC Green Power to obtain the number of blocks of green power purchased by Cumberland County Residents.</p>	<p>Ongoing</p> <p>Spring 2004 – Promote during AQ outreach, include link on County website. PWC is a NC Green Power partner.</p>	<p>Cumberland County</p> <p>Countywide</p>
<p>Retrofitting of public buildings.</p> <p>Encourage construction of energy efficient buildings.</p>	<p>Through the “Guaranteed Energy Savings Contract”, the County will engage a company to evaluate and upgrade buildings equipment and material to increase energy efficiency.</p> <p>PWC is a member of the “Good Cents” Housing Program. Participating builders receive heat pump rebates and free listing of energy efficient homes for sale in the local newspaper and on the PWC website. Smaller municipalities are also promoting the “Good Cents” Housing Program.</p> <p>Fort Bragg is currently implementing energy reduction per Executive Order 13123 and as part of its Sustainability Plan by partnering with Honeywell Corporation to retrofit buildings on Fort Bragg (replacing inefficient interior/ exterior lighting, installing new HVAC systems with energy controls for optimum building performance. Fort Bragg also constructs new homes and retrofits older homes to meet “ENERGY STAR” standards.</p>	<p>It is believed that this strategy will lower NO_x emissions by reducing the output needed from fossil fuel plants to heat and cool homes and public building.</p> <p>We are still trying to quantify emission reductions, but feel this strategy is directionally correct.</p>	<p>December 2004 – “Guaranteed Energy Savings Contract” Request for Proposals have been sent out for 12 county buildings. The company will be chosen in July.</p> <p>Ongoing – Promotion of “Good Cents” Housing Program</p> <p>Ongoing – Fort Bragg</p>	<p>Cumberland County City of Fayetteville Falcon Godwin Linden Spring Lake Stedman Wade Fort Bragg</p>

**AIR QUALITY STAKEHOLDERS OF CUMBERLAND COUNTY
SELECTED OZONE CONTROL STRATEGIES UPDATE**

STRATEGY	STRATEGY DESCRIPTION	ESTIMATE OF NOX REDUCTIONS (if available)	IMPLEMENTATION DATE	ADOPTING JURISDICTIONS
CONSERVATION				
Encourage Construction and Use of Energy Efficient Equipment. Promote Purchase of “Green”/ less polluting products.	Fort Bragg is implementing energy reduction strategies including low NOX burners in new major emission sources, is increasing the use of water-based paints to reduce VOC emissions and has installed a paint booth which uses only water-based paint, and is researching alternatives to replace two incinerators.	These strategies will lower NOx and VOC emissions. Research efforts will include emission reductions.	Ongoing – specified under current contract. Summer 2004 –initiate research on alternatives for the incinerators.	Fort Bragg.

Landfill gas-to-energy projects provide environmental value by capturing methane emissions from landfills and displacing fossil fuel. Landfill gas is an attractive renewable energy alternative for many applications because of its 24 X 7 availability and high capacity factor (between 95 and 98%).

Burning landfill gas converts methane into carbon dioxide, and therefore dramatically reduces the impact on climate change by reducing greenhouse gas (GHG) emissions. Landfill gas (LFG) procurement is both an opportunity for corporations to reduce their GHG emissions footprint and to create a more diversified energy portfolio.

The World Resources Institute published a report, *Corporate Guide to Green Power Markets*. “Opportunities with Landfill Gas” is Installment 2 of this report. The Group has found that the most environmentally and economically attractive use of landfill gas, particularly in the absence of policy incentives such as production tax credits, is a medium-Btu “direct use” application, which Cargill, Inc. is currently using.

**AIR QUALITY STAKEHOLDERS OF CUMBERLAND COUNTY
SELECTED OZONE CONTROL STRATEGIES UPDATE**

STRATEGY	STRATEGY DESCRIPTION	ESTIMATE OF NOX REDUCTIONS (if available)	IMPLEMENTATION DATE	ADOPTING JURISDICTIONS
AWARENESS				
Student Outreach through Education Systems	<p>Ongoing effort using the “GLOBE” program, a worldwide hands-on, primary and secondary school-based educational science program. This is a cooperative effort, led in the US by a federal interagency program supported by NASA (National Aeronautics & Space Administration), NSF (National Science Foundation), EPA (Environmental Protection Agency) and the U.S. State Department. There are currently 9,000 teachers in our area who are trained and present the program that promotes environmental stewardship and research.</p> <p>Staff, Air Quality Stakeholders, and Technical Committee members are also providing classroom presentations upon request.</p>	<p>It is believed that this strategy will lower NO_x emissions.</p> <p>The emission reductions are not currently quantifiable, but this strategy is directionally correct.</p>	<p>Ongoing</p> <p>UPDATE Six Cumberland County teachers are to participate in a program with NASA to validate the ozone measured from a satellite using ground level ozone measurements. Training is scheduled for September 2004.</p>	<p>Cumberland County City of Fayetteville Falcon Godwin Linden Stedman Wade</p>
Public Education/Outreach at Community Events & Churches	<p>Ongoing effort through the Speakers Bureau. Staff and volunteers participate in festivals, fairs, community meetings, etc to provide information on air quality and the individual measures that can be taken to improve the air we breathe.</p>	<p>It is believed that this strategy will lower NO_x emissions.</p> <p>The emission reductions are not currently quantifiable, but this strategy is directionally correct.</p>	<p>Ongoing</p> <p>Events listed under Meetings and Public Involvement Activities, above.</p>	<p>Cumberland County City of Fayetteville Falcon Godwin Linden Spring Lake Stedman Wade</p>
Speakers Bureau	<p>Participation in radio/television programs to reach the general public with air quality information and tips, advertise meetings and involve the local newspapers and churches in disseminating information to increase public awareness and participation in implementing voluntary reduction strategies.</p>	<p>It is believed that this strategy will lower NO_x emissions.</p> <p>The emission reductions are not currently quantifiable, but this strategy is directionally correct.</p>	<p>Ongoing</p> <p>We are encouraging and recruiting more individuals from within this organization to present Air Quality Information to different groups.</p>	<p>Cumberland County City of Fayetteville Falcon Godwin Linden Spring Lake Stedman Wade</p>
Air Quality Web Page	<p>Maintained and updated by FAMPO (Fayetteville Metropolitan Planning Organization). Provides information on upcoming meetings, seasonal air quality tips, the Early Action Compact program and other relevant topics.</p>	<p>It is believed that this strategy will lower NO_x emissions. This strategy is directionally correct.</p>	<p>Ongoing</p> <p>The Air Quality Web Page is being updated to be user-friendlier as well as include more information appropriate for all ages.</p>	<p>Cumberland County for all participating agencies</p>

**AIR QUALITY STAKEHOLDERS OF CUMBERLAND COUNTY
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STRATEGY	STRATEGY DESCRIPTION	ESTIMATE OF NOX REDUCTIONS (if available)	IMPLEMENTATION DATE	ADOPTING JURISDICTIONS
AWARENESS				
Promote Bus Ridership for Youth	<p>Fayetteville Area System of Transit (FAST) is promoting bus tours for children of all ages, educating them on how to use the transit system and the benefits of using transit (including air quality and health issues).</p> <p>Various organizations have tours for groups (i.e. Boys and Girls Club) that include giving them free bus passes.</p>	<p>It is believed that this strategy will lower NO_x emissions by increasing future mass transit use and decreasing VMT.</p> <p>The emission reductions are not currently quantifiable, but this strategy is directionally correct.</p>	Ongoing	City of Fayetteville
Air Quality Educational System at the local libraries.	<p>Air Quality handouts and flyers available at all branches.</p> <p>Children's summer program.</p>	<p>It is believed that this strategy will lower NO_x emissions.</p> <p>The emission reductions are not likely quantifiable, but this strategy is directionally correct.</p>	<p>Ongoing</p> <p>UPDATE An Air Quality display was set up at the main library for the month of June 2004 and handouts are available at all branches.</p>	Cumberland County for all participating agencies
Air Quality poster/essay contest for schools.	Air Quality related contest to raise air awareness.	<p>It is believed that this strategy will lower NO_x emissions.</p> <p>The emission reductions are not likely quantifiable, but this strategy is directionally correct.</p>	<p>Ongoing</p> <p>UPDATE The first-annual Air Quality Poster Contest was held this past school year and was open to all Cumberland County, Fort Bragg and Pope AFB school systems. 739 students participated.</p> <p>Spring 2005 Next year's poster/essay contest will be open to all public and private schools in the area and the theme will be based around the "Ten Simple Steps for Improving Air Quality".</p>	<p>Cumberland County for all participating agencies</p> <p>Fort Bragg</p>

**AIR QUALITY STAKEHOLDERS OF CUMBERLAND COUNTY
SELECTED OZONE CONTROL STRATEGIES UPDATE**

STRATEGY	STRATEGY DESCRIPTION	ESTIMATE OF NOX REDUCTIONS (if available)	IMPLEMENTATION DATE	ADOPTING JURISDICTIONS
AWARENESS				
Discourage Open Burning on Ozone Alert Days (orange or above)	Representation on OBOT (NC DAQ Open Burning Outreach Team). Will assist NCDAQ in distributing outreach material targeted to reduce open burning.	<p>It is believed that this strategy will lower NO_x emissions.</p> <p>The emission reductions are not likely quantifiable, but this strategy is directionally correct.</p> <p>OBOT will provide materials for public outreach efforts.</p>	<p>Ongoing</p> <p>UPDATE The new state law, effective July 1, 2004, bans open burning on code orange or above days in forecast areas such as the Fayetteville area.</p>	<p>Cumberland County City of Fayetteville Falcon Godwin Linden Spring Lake Stedman Wade</p>

**NORTH CAROLINA
DEPARTMENT OF THE ENVIRONMENT
AND NATURAL RESOURCES DIVISION
OF AIR QUALITY SEMIANNUAL REPORT
FOR THE FAYETTEVILLE
METROPOLITAN STATISTICAL AREA**

JUNE 2004

1 Introduction

As a requirement of the Early Action Compacts (EACs), the progress report due June 30, 2004, must include a status report regarding the air quality modeling. This report satisfies this requirement. Discussed in this report is an overview of the changes in the emission inventories and the air quality modeling results.

2 Emissions Inventories

Emissions modeling performed by NCDAQ estimates NO_x and VOC emissions for an average summer day, given specific meteorological and future year conditions and using emission inputs based on emission inventories that include anticipated control measures. The biogenic emissions are kept at the same level as the episodic biogenic emissions since these emissions are based on meteorology. Projections for 2007 take into account all State and Federal control measures expected to operate at that time, including Federal vehicle emissions controls, NO_x SIP Call controls, and North Carolina Clean Smokestacks controls.

The modeling emission inventories changed since the last progress report for both the current year and the 2007 attainment year. These revisions were made to address errors that were found and the use of better available data.

Current Year (2000) Inventory Changes

The changes in the current year point source emission inventories included:

- using actual 2000 emissions data for sources in North Carolina when available,
- corrections to Alabama and Illinois emissions modeling files to remove duplicate sources, and
- inclusion of dropped CEM emissions data.

The current year mobile source emission inventory was changed to correct:

- the vehicle miles traveled data in South Carolina,
- the vehicle age distribution that was used in North Carolina,
- the mobile input files for North Carolina so that the modeled temperatures were used to calculate the emission factors.

The current year nonroad mobile source emission inventory was changed to reflect changes in EPA's NONROAD mobile model. The NONROAD mobile model was re-run for all counties within the 36-km modeling domain. The changes to the inventory were minor, but NCDAQ wanted to use the most recent data available for this modeling project. There were no changes made to the current year area source or biogenic source emission inventories.

Attainment Year (2007) Inventory Changes

The changes in the 2007 attainment year point source emission inventories included:

- growing the North Carolina 2000 emissions data to 2007,
- correction of stack temperatures in the North Carolina emission files,
- using the latest North Carolina utility emissions according to the Clean Smokestacks Act compliance plan update,
- corrections to Alabama and Illinois emissions modeling files to remove duplicate sources,
- growing the other States non-utility current year emissions to 2007 via EGAS growth factors, and
- using the Clear Skies modeling emission files for the other States utilities.

The 2007 attainment year mobile source emission inventory was changed to correct:

- the vehicle age distribution that was used in North Carolina,
- the mobile input files for North Carolina so that the modeled temperatures were used to calculate the emission factors.

The 2007 attainment year nonroad mobile source emission inventory was changed to reflect changes in EPA's NONROAD mobile model. The NONROAD mobile model was re-run for all counties within the 36-km modeling domain. Again, the changes to the inventory were minor, but NCDAQ wanted to use the most recent data available for this modeling project. Also, the airport projection factors were updated for the three major airports in North Carolina, as well as the airport in Forsyth County. The updated projection information was obtained from the Federal Aviation Administration (FAA).

For area sources the 2007 attainment year inventory was changed to apply North Carolina's open burning rule, and apply federal control strategies expected to be in place by 2007. There were no changes made to the biogenic source emission inventory.

Updated Emission Inventories

The emissions summary for both the 2000 current year and 2007 attainment year for the EAC area is listed in Table 2-1. These emissions represent typical weekday emissions and are reported in tons per day.

Table 2-1: Estimated NOx and VOC emissions

Source	NOx Emissions		VOC Emissions	
	2000	2007	2000	2007
Point	2.37	2.50	4.89	5.72
Area	0.51	0.54	11.54	12.12
Nonroad	6.48	5.84	4.25	3.36
Mobile	28.43	18.74	17.68	11.22
Biogenic	0.40	0.40	46.20	46.20
Total Emissions	38.19	28.01	84.57	78.62

The total predicted NOx emissions for the EAC area decreased by approximately 26%, from 38 tons per day (TPD) in 2000 to 28 TPD in 2007. The total predicted VOC emissions for the EAC area decreased by approximately 7%, from 85 TPD in 2000 to 79 TPD in 2007.

There are few VOC or NOx control measures expected for area and point sources in the Fayetteville EAC area, resulting a slight increase in emissions between the two years. However, there are significant decreases in highway mobile source VOC and NOx emissions which results in the overall total emissions to decrease for both VOC and NOx in the Fayetteville EAC area.

3 Control Measures

Several control measures already in place or being implemented over the next few years, will reduce point, highway mobile, and nonroad mobile sources emissions. These control measures were modeled for 2007 and are discussed in the Sections below.

3.1 State Control Measures

3.1.1 Clean Air Bill

The 1999 Clean Air Bill expanded the vehicle emissions inspection and maintenance program from 9 counties to 48, and improved the testing method. Vehicles will be tested using the onboard diagnostic system, which will indicate NOx emissions, among other pollutants. The previously used tailpipe test did not measure NOx. The inspection and maintenance program was instituted in Cumberland County on July 1, 2003.

3.1.2 NOx SIP Call Rule

North Carolina's NOx SIP Call rule will reduce summertime NOx emissions from power plants and other industries by 68% by 2006. The North Carolina Environmental Management Commission adopted rules requiring the reductions in October 2000.

3.1.3 Clean Smokestacks Act

In June 2002, the N.C. General Assembly enacted the Clean Smokestacks Act, requiring coal-fired power plants to reduce annual NO_x emissions by 78% by 2009. These power plants must also reduce annual sulfur dioxide emissions by 49% by 2009 and by 74% in 2013. The Clean Smokestacks Act could potentially reduce NO_x emissions beyond the requirements of the NO_x SIP Call Rule. One of the first state laws of its kind in the nation, this legislation provides a model for other states in controlling multiple air pollutants from old coal-fired power plants.

3.1.4 Open Burning Bans

In June 2004, the Environmental Management Commission approved a new rule that would ban open burning during the ozone season on code orange and code red ozone action days for those counties that NCDAQ forecasts ozone.

3.2 Federal Control Measures

3.2.1 Tier 2 Vehicle Standards

Federal Tier 2 vehicle standards will require all passenger vehicles in a manufacturer's fleet, including light-duty trucks and Sports Utility Vehicles (SUVs), to meet an average standard of 0.07 grams of NO_x per mile. Implementation will begin in 2004, and most vehicles will be phased in by 2007. Tier 2 standards will also cover passenger vehicles over 8,500 pounds gross vehicle weight rating (the larger pickup trucks and SUVs), which are not covered by current Tier 1 regulations. For these vehicles, the standards will be phased in beginning in 2008, with full compliance in 2009. The new standards require vehicles to be 77% to 95% cleaner than those on the road today. Tier 2 rules will also reduce the sulfur content of gasoline to 30 ppm by 2006. Most gasoline currently sold in North Carolina has a sulfur content of about 300 ppm. Sulfur occurs naturally in gasoline but interferes with the operation of catalytic converters in vehicle engines resulting in higher NO_x emissions. Lower-sulfur gasoline is necessary to achieve Tier 2 vehicle emission standards.

3.2.2 Heavy-Duty Gasoline and Diesel Highway Vehicles Standards

New EPA standards designed to reduce NO_x and VOC emissions from heavy-duty gasoline and diesel highway vehicles will begin to take effect in 2004. A second phase of standards and testing procedures, beginning in 2007, will reduce particulate matter from heavy-duty highway engines, and will also reduce highway diesel fuel sulfur content to 15 ppm since the sulfur damages emission control devices. The total program is expected to achieve a 90% reduction in PM emissions and a 95% reduction in NO_x emissions for these new engines using low sulfur diesel, compared to existing engines using higher-content sulfur diesel.

3.2.3 Large Nonroad Diesel Engines Proposed Rule

The EPA has proposed new rules for large nonroad diesel engines, such as those used in construction, agricultural, and industrial equipment, to be phased in between 2008 and 2014. The proposed rules would also reduce the allowable sulfur in nonroad diesel fuel by over 99%. Nonroad diesel fuel currently averages about 3,400 ppm sulfur. The proposed rules limit nonroad diesel sulfur content to 500 ppm in 2007 and 15 ppm in 2010. The combined engine and fuel rules would reduce NO_x and particulate matter emissions from large nonroad diesel engines by over 90 %, compared to current nonroad engines using higher-content sulfur diesel.

3.2.4 Nonroad Spark-Ignition Engines and Recreational Engines Standard

The new standard, effective in July 2003, will regulate NO_x, HC and CO for groups of previously unregulated nonroad engines. The new standard will apply to all new engines sold in the US and imported after these standards begin and large spark-ignition engines (forklifts and airport ground service equipment), recreational vehicles (off-highway motorcycles and all-terrain-vehicles), and recreational marine diesel engines. The regulation varies based upon the type of engine or vehicle.

The large spark-ignition engines contribute to ozone formation and ambient CO and PM levels in urban areas. Tier 1 of this standard is scheduled for implementation in 2004 and Tier 2 is scheduled to start in 2007. Like the large spark-ignition, recreational vehicles contribute to ozone formation and ambient CO and PM levels. They can also be a factor in regional haze and other visibility problems in both state and national parks. For the off-highway motorcycles and all-terrain-vehicles, model year 2006, the new exhaust emissions standard will be phased-in by 50% and for model years 2007 and later a 100%. Recreational marine diesel engines over 37 kW are used in yachts, cruisers, and other types of pleasure craft. Recreational marine engines contribute to ozone formation and PM levels, especially in marinas. Depending on the size of the engine, the standard for will begin phase-in in 2006.

When all of the standards are fully implemented, an overall 72% reduction in HC, 80% reduction in NO_x, and 56% reduction in CO emissions are expected by 2020. These controls will help reduce ambient concentrations of ozone, CO, and fine PM.

4 MODELING STATUS

4.1 Status of Current Modeling

Modeling completed to date include: the base case model evaluation/validation runs, the current year modeling runs and the 2007 future year modeling runs. The results of these modeling runs can be viewed at the NCDAQ modeling website:

<http://www.cep.unc.edu/empd/projects2/NCDAQ/PGM/results/>

NCDAQ still needs to complete the 2012 and 2017 future year modeling runs with the updated emission inventories.

4.2 Modeling Results

The base case model runs for all three episodes met the validation criteria set by the EPA. The model evaluation statistics can be viewed at the NCDAQ modeling website cited above.

An example (July 14, 1995) of the 8-hour ozone modeling results for the 2000 current year and 2007 future year are displayed in Figures 4.2-1 and 4.2-2, respectively. One can see a significant decrease in the 8-hour ozone maximums between the current year and the future year. These decrease were the results of the all of the controls listed in Section 3 that are expected to be in place by 2007. The 1996 and 1997 episodes show similar results. Additional modeling results can be viewed on the NCDAQ modeling website cited above.

Figure 4.2-1 2000 current year 8-hour ozone maximum for July 14, 1995.

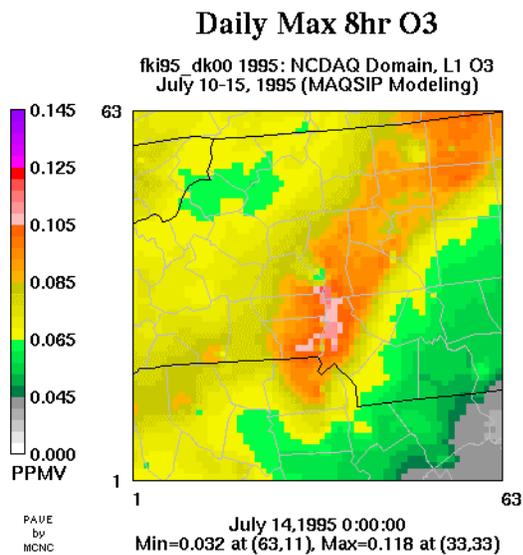
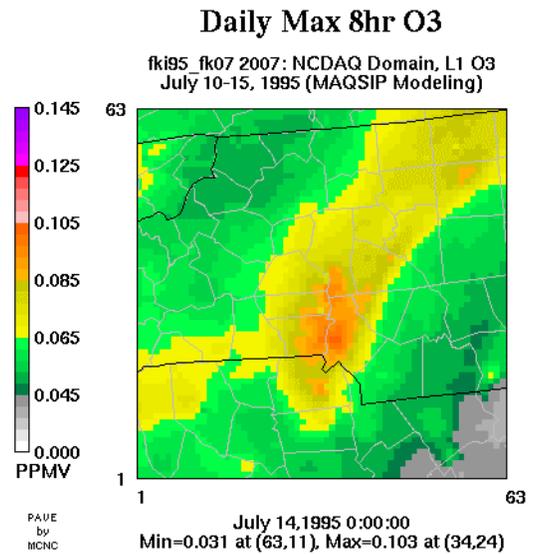


Figure 4.2-2 2007 future year 8-hour ozone maximum for July 14, 1995.



4.3 Geographic Area Needing Further Controls

The current draft version of EPA's attainment test was applied to the modeling results. In very basic and general language the attainment guidance states if the future year design value for a given monitor is below 0.085 parts per million (ppm) then the monitor passes the attainment test. The future year design value of a monitor is calculated by multiplying the current year design value of a monitor by a relative reduction factor (Equation 4.3-1).

$$DVF = DVC \times RRF$$

Equation 4.3-1

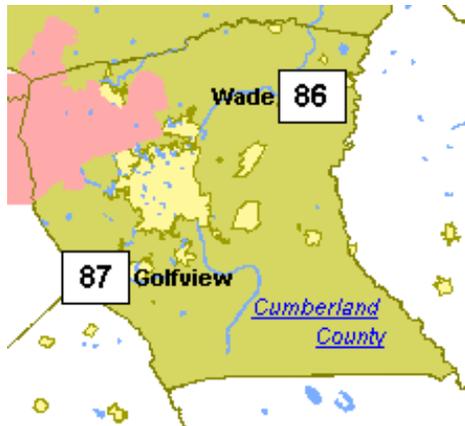
Where DVF is the Future year Design Value,
DVC is the Current year Design Value, and
RRF is the relative reduction factor.

The Current year Design Value (DVC) in the attainment test framework is defined as the higher of: (a) the average 4th highest value for the 3-yr period used to designate an area “nonattainment”, and (b) the average 4th highest value for the 3-yr period straddling the year represented by the most recent available emissions inventory. In this exercise, the DVC used to designate an area nonattainment will be 2001-2003 and the DVC straddling the year represented by the most recent available emissions inventory is 1999-2001. The higher of those two values is shown in Table 4.3-1 as the DVC. The relative reduction factor (RRF) is calculated by taking the ratio of the future year modeling 8-hour ozone daily maximum to the current year modeling 8-hour ozone daily maximum “near” the monitor averaged over all of the episode days (Equations 4.3-2).

$$\text{RRF} = \frac{\text{mean future yr. 8-hr daily max "near" monitor "x"}}{\text{mean current yr. 8-hr daily max "near" monitor "x"}} \quad \text{Equation 4.3-2}$$

There are two ozone monitors in Cumberland County. One of the monitors is located northeast of Fayetteville (Wade) and the other is southeast of Fayetteville (Golfview). The location of these monitors are shown in Figure 4.3-1.

Figure 4.3-1: Cumberland County's Ozone Monitor



The results of applying the attainment test showed all monitors in the EAC area in attainment of the 8-hour ozone NAAQS in 2007. These results are displayed in Table 4.3-1 below.

Table 4.3-1 Attainment Test Results for the EAC Area

Monitor	DVC (ppm)	RRF	DVF (ppm)
Wade	0.088	0.89	0.078
Golfview (Hope Mills)	0.087	0.89	0.077

It appears from these results that the expected controls already in place will result in attainment of the 8-hour ozone NAAQS.

4.4 Remaining EAC Schedule

Emissions Modeling Schedule	
7/9/2004	Submit 2012 future maintenance emissions
7/16/2004	Submit 2017 future maintenance emissions

AQ Modeling Schedule	
7/23/2004	2012 future maintenance AQ runs done
8/2/2004	2017 future maintenance AQ runs done

General Schedule	
7/7/2004	Preliminary "concept" presented to AQC
7/9/2004	Share MOBILE inputs w/ DOT and MPOs (95,96,97,00,07,12,17)
7/30/2004	Draft MOBILE documentation to DOT and MPOs
8/6/2004	EAC modeling complete
8/20/2004	Comments from DOT/MPOs due
9/1/2004	Final documentation complete
9/9/2004	AQC meeting
10/19-22/2004	Public Hearings
10/29/2004	Public comment period ends
12/3/2004	Submit EAC SIPs

4.5 Anticipated Resource Constraints

The resource constraint of most concern is the funding needed to implement some of the local control measures. NCDAQ and the local EAC areas are both looking for grant opportunities to help fund EAC initiatives.