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8-Hour Ozone Reclassification Request for Kent and Queen Anne's County Maryland

- 5% Reclassification Bump Down -
Clean Air Act Section 181 (a) (4)

(FINAL)

July 15, 2004

Prepared for:

U.S. Environmental Protection Agency

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Executive Summary

Section 181 (a) (4) of the Clean Air Act (CAA) states that an ozone nonattainment area may be reclassified in another category if the design value in the area were 5 percent greater or 5 percent less than the level on which the classification was based.

Kent and Queen Anne's County were recently classified as Moderate Nonattainment area under the new 8-hr ozone standard. Based on CAA Section 181 (a) (4) Maryland would like to request that these two counties be "bumped down" from a Moderate Nonattainment area to a Marginal Nonattainment area. The monitoring values for the Millington air quality monitor (located in Kent County) shows that these counties are within the prescribed 5% allowable design value that is eligible for a "bump down". A Moderate Nonattainment area with an 8-hr design value of 0.096 or less is eligible for a "bump down" and the 2003 Design Value for the Millington monitor is 0.095. Therefore, Maryland is making the formal request that Kent and Queen Anne's Counties be reclassified from a Moderate 8-hr Ozone Nonattainment area to a Marginal 8-hr Ozone Nonattainment area.

In addition to the monitoring data there are numerous other compelling statistics that point to these two counties being more of a Marginal Nonattainment area than a Moderate Nonattainment area. The counties attainment of the 1-hr standard, ozone violation statistics, pollution transport arguments, the mix of sources and air pollutants in the area, emission reductions over time, and trends in demographics were all reviewed during the development of this reclassification request.

Kent and Queen Anne's Counties were classified as a marginal nonattainment area under the 1-hr ozone standard. (The two counties have since attained the 1-hr ozone standard and MDE has submitted a redesignation request to USEPA). No emission reduction requirements were associated with this classification. However, since Maryland is part of the Ozone Transport Region, some control strategies were required. These included NO_x and VOC RACT, Stage II Vapor Recovery or equivalent reductions, Enhanced Vehicle Inspection and Maintenance Program in qualifying areas, and a lower major source threshold. Further, Maryland chose to include these nonattainment counties in a number of other non-mandated control strategies including reformulated fuels Phase I and II, lower RVP requirements, NLEV and controls on auto refinishing and degreasing. Adding these "severe" area controls to a Marginal 1-hr Nonattainment area was not a simple task as shown by the number of OTC states that originally opted in to some of these programs and then decided to opt out as the costs and politics surrounding these programs created a great deal of pressure. Maryland is proud of our achievement in keeping these controls in rural counties, as we believe the emission benefits to be substantial. The high level of emissions control achieved in these rural counties already is a major factor in requesting the bump down. Very few, if any, cost-effective controls remain available in these rural and economically fragile counties.

Maryland believes that the marginal classification is appropriate for these counties under the 8-hour standard also. The marginal classification allows Maryland more latitude in selecting appropriate additional controls for these counties that complement the stringent controls already in place. Maryland has shown this initiative under the 1-hour process and will continue to pursue clean air under the 8-hour standard including the adoption of beneficial controls in Kent and Queen Anne's County.

In combination, Maryland believes that the science and statistical information available combined with historical actions make a strong case that both Kent and Queen Anne's Counties should be reclassified to a Marginal 8-hr nonattainment area.

Part One: Review of Monitoring Data for Kent and Queen Anne's Counties

Per EPA guidance the following calculation is used to determine if an area is eligible for a bump down from a higher to a lower ozone classification. Tom Helms of USEPA presented the following slides to STAPPA/ALAPCO on April 28, 2004.

Translation of Section 182, Table 1 ... from 1 to 8-hr values

NEW TABLE 1... CLASSIFICATION FOR 8-HOUR OZONE NAAQS			
Area class		8-hour design value (ppm ozone)	Attainment Date (years after effective date of nonattainment designation for 8-hour NAAQS)
Marginal	from	0.085	3
	up to*	0.092	
Moderate	from	0.092	6
	up to*	0.107	
Serious	from	0.107	9
	up to*	0.120	
Severe-15	from	0.120	15
	up to*	0.127	
Severe-17	from	0.127	17
	up to*	0.187	
Extreme	equal to or above	0.187	20

** but not including*

Calculation of 5% Percent ...

Classification for 8-Hour NAAQS		
Area class		8-hour DV (ppm ozone)
Marginal	from	0.085
	up to*	0.092
Moderate	from	0.092
	up to*	0.107
Serious	from	0.107
	up to*	0.120
Severe-15	from	0.120
	up to*	0.127
Severe-17	from	0.127
	up to*	0.187
Extreme	equal to or above	0.187

* but not including

- For an area to be eligible for a bump down (or bump up) under section 181(a)(4), the **area's design value must be within 5% of the next lower (or higher) classification.**
- **Example #1** ... an area with a moderate design value of 0.096 ppm (or less) would be eligible to request a **bump down** because 5% less than 0.096 ppm is 0.091 ppm ... a marginal design value.
- **Example #2** ... an area with a moderate design value of 0.102 ppm (or more) would be eligible for a **bump up** because 5% more than 0.102 ppm is 0.107 ppm, a serious design value.

Calculation of Five Percent ...

- The following areas may be eligible to request a **bump down** :



- **moderate areas** with design value of **0.096 ppm** or less;
- **serious areas** with design value of **0.112 ppm or less**; and
- **severe-17 areas** with design value of **0.133 ppm or less.**

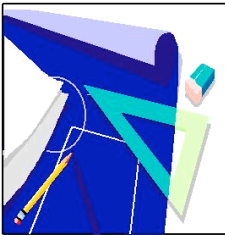
-
- For **bump ups**, the following areas may be eligible:



- **marginal areas** with a design value of **0.088 ppm** or more;
- **moderate areas** with a design value of **0.102 ppm** or more; and
- **serious areas** with a design value of **0.115 ppm** or more.

More ...

How EPA bump ups and down work under 5% provision?



Bump Ups

- Marginal areas with a DV of 88 ppb or more
- Moderate areas with a DV of 102 ppb or more
- Serious areas with a DV of 115 ppb or more
- Severe-15 areas with a DV of 121 ppb or more
- Severe-17 areas with a DV of 179 ppb or more

Bump Downs

- Moderate areas with a DV of 96 ppb or less
- Serious areas with a DV of 112 ppb or less
- Severe-15 areas with a DV of 126 ppb or less
- Severe-17 areas with a DV of 133 ppb or less
- Extreme areas with a DV of 196 ppb or less

Which areas could EPA bump down under 5% provision?



- 16 Moderate to Marginal (96 design value cutpoint):**
 - Boston MA (95)
 - Boston/Portsmouth MA/NH (95)
 - Greater CT (95)
 - Kent/Queen Anne's MD (95)
 - Muskegon MI (95)
 - RI (95)
 - Ventura (95)
 - Poughkeepsie NY (94)
 - Richmond VA (94)
 - Springfield MA (94)
 - Greensboro NC (93)
 - Cass Co MI (93)
 - La Porte IN (93)
 - Lancaster PA (92)
 - Memphis TN (92)
 - St Louis MO/IL (92)
- 2 Serious to Moderate (112 design value cutpoint):**
 - Riverside (Coachella V.) CA (108)
 - Sacramento CA (107)
- Severe-17 to serious (133 design value cutpoint)**
 - Los Angeles CA (131)

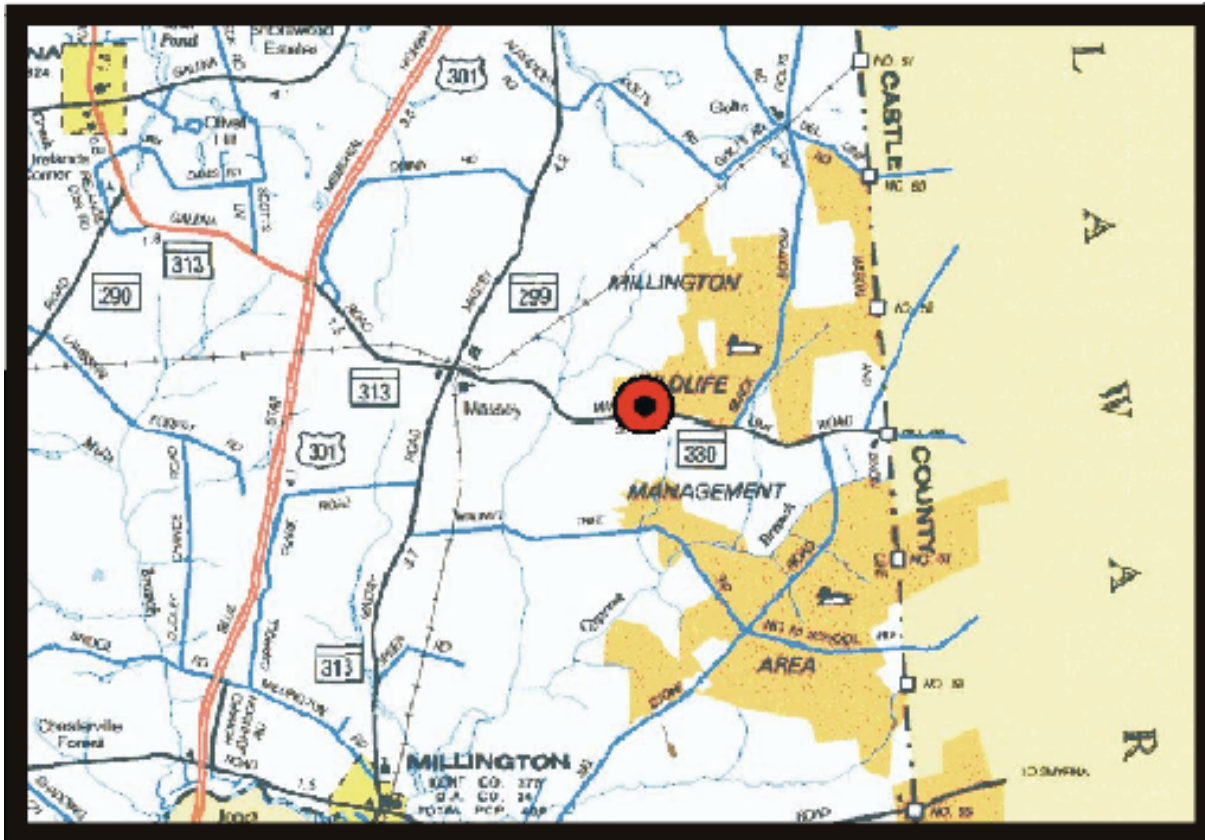
Below is a summary table showing the 2003 design value data for the Millington Monitor (location shown in Map 1).

Maryland's 8 Hour Ozone Design Values- Eastern Shore for 2003

Site	Year	% data capture	1st MAX	2nd MAX	3rd MAX	4th MAX	Design Value
Millington							
Kent Co.	2001	98%	0.106	0.103	0.097	0.096	
	2002	100%	0.115	0.105	0.104	0.103	
	2003	100%	0.109	0.108	0.092	0.086	0.095ppm

As noted in the above table the 2003 8-hr Ozone Design Value of the Millington Monitor is 0.095 which is below the 5% Moderate to Marginal Bump Down Threshold of 0.096. Based on the data available Kent and Queen Anne's Counties are eligible for a reclassification. Therefore, Maryland is making the formal request that Kent and Queen Anne's Counties be reclassified from a Moderate 8-hr Ozone Nonattainment area to a Marginal 8-hr Ozone Nonattainment area.

Map 1: Millington Ozone Monitoring Site in Kent County



Part Two: Review of Additional Data to Support Reclassification Request

USEPA listed the following Bump Down Criteria that will be reviewed during the analysis of a reclassification request:

- Request by the State
- Discontinuity
- Attainment
- Emissions Reductions
- Trends (near and long term trends in emissions and air quality, growth projections, and vehicle miles traveled)
- Years of Data
- Subpart 1 vs. Subpart 2
- Limitations on Bump Downs

The Maryland Department of the Environment (MDE) has reviewed each of the criteria and finds the following:

Request by the State

Through the submission of this document the state of Maryland is formally requesting that the USEPA reclassify both Kent and Queen Anne's County as a Marginal Nonattainment area under the 8-hour Ozone Standard.

Discontinuity

If granted, Maryland's reclassification request would not establish a discontinuous nonattainment structure in Maryland. Both the Washington DC and Baltimore Nonattainment areas would remain Moderate Nonattainment areas and the Chesapeake Bay divides these areas from Kent and Queen Anne's Counties. Whether comparing emissions or demographics there are very few connections between the remaining Moderate Nonattainment areas and Kent and Queen Anne's Counties. The main culprit in the monitoring values in Millington is pollution transport meaning that all the control measures being implemented to the south and west of these two rural eastern shore counties will help with attainment.

Attainment

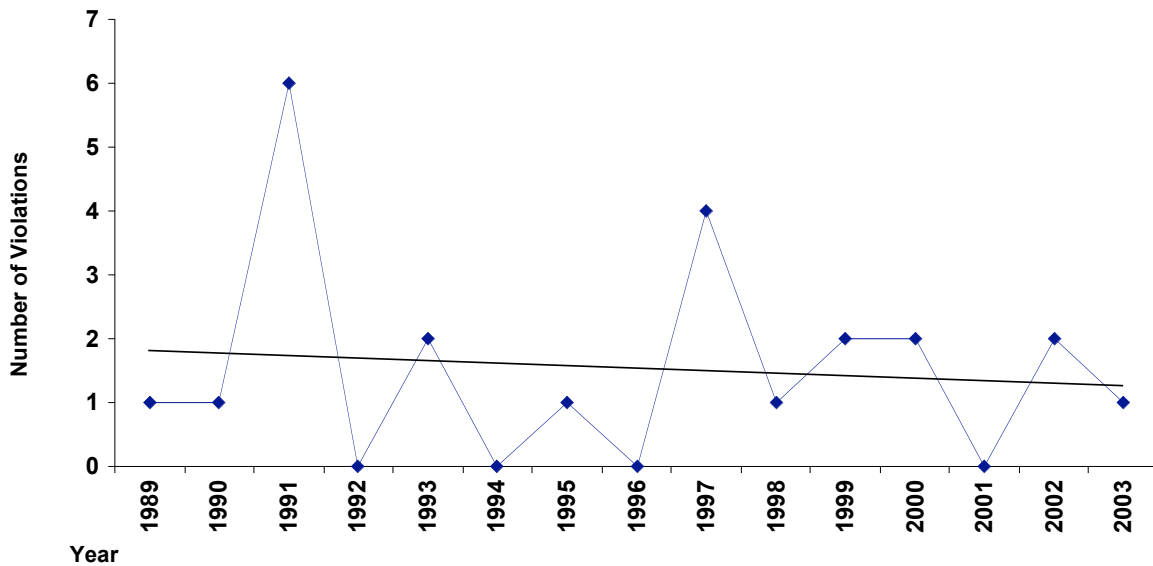
The MDE believes that early attainment of the 8-hr Ozone Standard is possible based on the following factors: reduced transport emissions, monitoring trends showing an improvement in air quality, the recent attainment of the 1-hr ozone standard in these two counties, and the proposed benefits of recent EPA modeling (for Clear Skies Initiative) show attainment of the standard in the 2010 timeframe.

Transport Emissions: reductions made under the 1-hr ozone standard like the required installation of SCR from the NOx SIP Call, the new mobile diesel rules, and early reduction progress for the 8-hr ozone standard will all assist Kent and Queen Anne's Counties in attaining the new standard. Lacking any large emission sources, the MDE believes that the main culprit in bad air quality for these two counties is transport primarily from the west and south. Reductions

in transport emissions will greatly impact the monitored values at Millington and we believe the timing of the NOx SIP Call implementation and the Federal mobile rules will show substantial benefits.

Monitoring Trends: for the 1-hr Ozone Standard show that the total number of violations in Millington are decreasing with time. These improvements in monitored values are expected to continue with time allowing an earlier attainment of the new standard.

Trend in Number of Exceedances of the 1-hour Standard for Ozone at the Millington Monitor Between 1989 and 2003

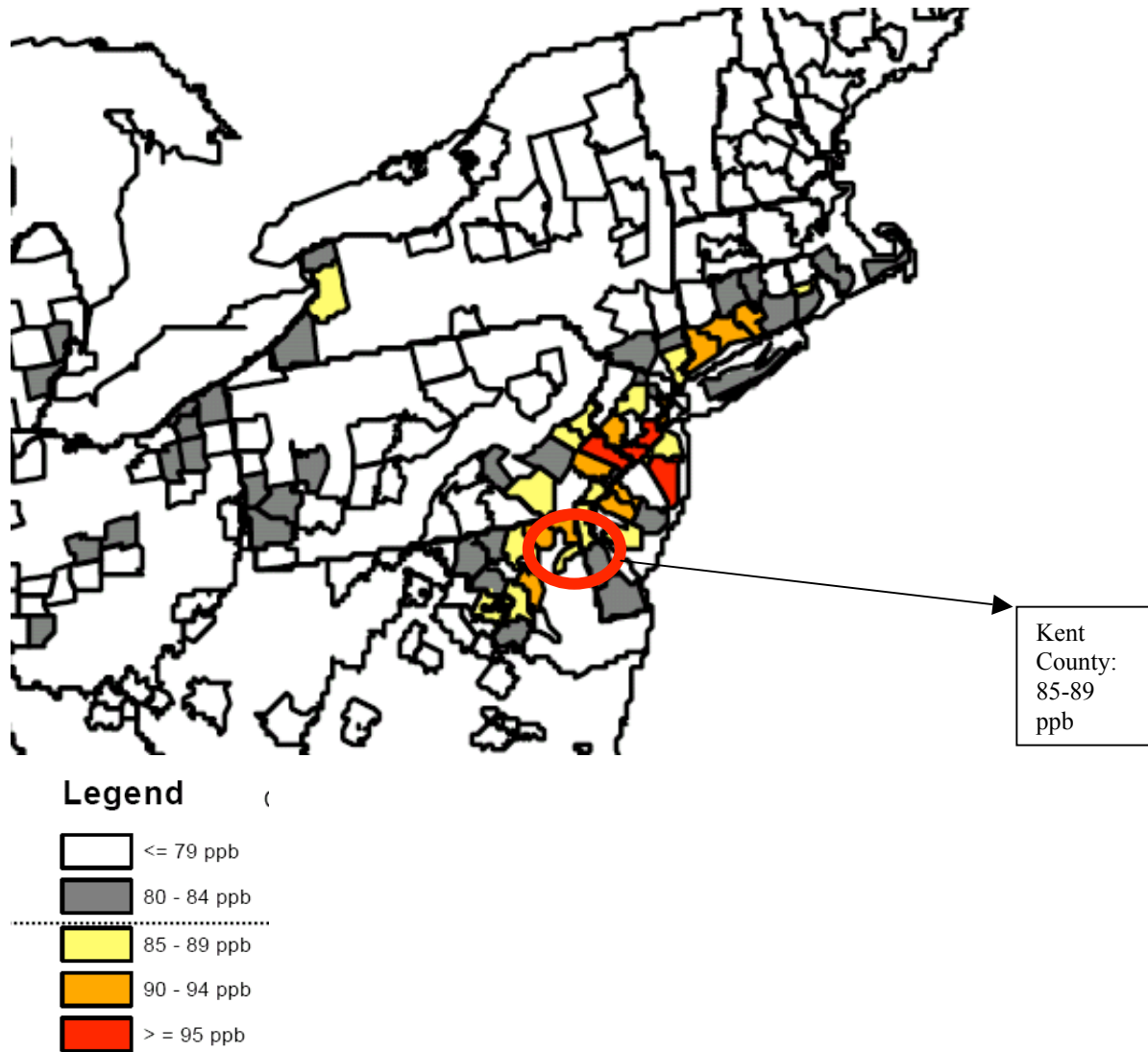


Attainment of the 1-hr Ozone Standard: In early 2004 the MDE submitted a redesignation request to USEPA showing that Kent and Queen Anne’s Counties attained the 1-hr Ozone Standard based on 2001-2003 ozone season data. Being the first two counties in the state to attain the 1-hr standard there is reason to believe our progress in ozone controls will continue under the 8hr standard.

EPA Modeling Efforts: During the development of the Clear Skies Initiative in 2003/4 the EPA completed some air quality modeling showing the projected ozone benefits for the nation. The results of this modeling demonstration show that under a base case scenario where only the current Clean Air Act requirements are implemented a 5-10 ppb ozone reduction can be expected at the Millington monitor by 2010. Under this scenario with a 2003 design value of 0.095 a 10 ppb benefit will get us very close to the new standard.

MDE Modeling Efforts: Attached to this document is a modeling document prepared under the Early Action Compact Submittal for these two counties that shows that implementing local controls in these two counties could indeed assist with attainment of the 8-hour ozone standard in the 2007 timeframe.

EPA Clear Skies Modeling (Base Case Scenario): 8Hr Ozone Benefits in 2010



Emissions Reductions

Kent and Queen Anne’s Counties were classified as a marginal nonattainment area under the 1-hr ozone standard (Maryland has found that these two counties are now in attainment of the 1-hr ozone standard and have submitted a redesignation request to USEPA).

No emission reduction requirements were associated with this classification. However, since Maryland is part of the Ozone Transport Region, some control strategies were required. These included NO_x and VOC RACT, Stage II Vapor Recovery or equivalent reductions, Enhanced Vehicle Inspection and Maintenance Program in qualifying areas, and a lower major source threshold. Maryland chose to include these nonattainment counties in a number of other non-mandated control strategies including reformulated fuels Phase I and II, lower RVP requirements, NLEV and controls on auto refinishing and degreasing. The high level of

emissions control achieved in these rural counties already is a major factor in requesting the bump down. Very few, if any, cost-effective controls remain available in these rural and economically fragile counties.

Most of the Severe Nonattainment area controls being applied to the Washington and Baltimore regions were adopted statewide meaning that while these two rural counties were classified as marginal most of their control requirements mirrored a severe nonattainment area. In essence, where applicable, severe area controls have already been implemented in Kent and Queen Anne's Counties. Implementing these rules statewide was not an easy process for Maryland. Many states in the OTR were initially interested in adopting some of the more difficult rules like reformulated fuels and enhanced I/M but decided to opt out of these programs as the economic and political pressures were very intense. Maryland is proud of our successful implementation of these programs in rural counties like Kent and Queen Anne's, as we believe the emission benefits from these programs have been a significant help for Maryland and the region.

The following are state and federal emission reduction strategies adopted since 1990 that are included in this plan.

Stationary Point Sources

- Reasonably Available Control Technology (RACT) regulations
- New Source Review (NSR)
- Emissions certification requirements
- NO_x SIP call
- NO_x Reduction and Trading

Stationary Area Sources

- Automobile refinish coatings
- Consumer products
- Degreasing
- Architectural and industrial maintenance coatings (AIM)
- Tank truck unloading

Highway Vehicles

- Federal Motor Vehicle Control Program (FMVCP) including onboard control of evaporative and refueling emissions
- Lower Reid Vapor Pressure (RVP) for gasoline
- Reformulated gasoline
- Enhanced Vehicle Emissions Inspection/Maintenance
- National Low Emission Vehicle (NLEV) program
- EPA's heavy-duty diesel engine standards (2004 program)
- EPA's Tier 2/low sulfur gasoline program for light-duty vehicles

Nonroad Sources

- EPA rules for large and small compression-ignition engines
- EPA rules for smaller spark-ignition engines
- EPA rules for recreational spark-ignition marine engines

Before reviewing the various permanent and enforceable emission reduction measures that have led to lower levels of ozone in Kent and Queen Anne's Counties, it is important to have a good understanding of the ozone precursors inventory for the two jurisdictions. Tables 1 and 2 present the 1990 base year emissions inventories for VOC and NOx, the precursors of ozone (1990 Base Year Inventory, September 1993).

Table 1: 1990 Base Year Ozone Precursor Emissions Inventory, VOC Emissions Summary in Tons per Day

Source of VOCs	Point	Area	Non-road Mobile	On-road Mobile	Total
Kent Co.	0	4.52	1.66	1.90	8.08
Queen Anne's Co.	0.24	5.17	1.79	4.70	11.90
Total	0.24	9.69	3.45	6.60	19.98

Table 2: 1990 Base Year Ozone Precursor Emissions Inventory, NOx Emissions Summary in Tons per Day

Source of NOx	Point	Area	Non-road Mobile	On-road Mobile	Total
Kent Co.	0	0.35	0.77	1.90	3.02
Queen Anne's Co.	0	0.37	1.00	5.40	6.77
Total	0	0.72	1.77	7.30	9.79

A number of permanent and enforceable measures have caused emission reductions in Kent and Queen Anne's Counties. These reductions are from all source sectors.

A major portion of the decrease in ozone precursors is due to the Federal Motor Vehicle Control Program (FMVCP) Tier 1 tailpipe standards. Over a period of time, older, poorer performing on-road vehicles have gradually been replaced with newer vehicles that must meet increasingly more stringent tailpipe standards.

In 1997 and 1998, new emissions standards for non-road mobile sources took effect, leading to additional permanent and enforceable reductions in Kent and Queen Anne's Counties. The major emissions categories in these counties are farm equipment, lawn and garden equipment and recreational boats. Nonroad VOC and NOx emissions are expected to decline due primarily to implementation of the following Federal permanent and enforceable measures and remain in check with additional Tier 3 standards that will be implemented in the future:

- Tier 1, Tier 2, and Tier 3 compression-ignition standards for diesel engines greater than 50 horsepower;
- Tier 1 and Tier 2 compression-ignition standards for diesel engines below 50 horsepower;

- Phase 1 and Phase 2 of the spark-ignition standards for gasoline engines less than 25 horsepower; and
- Recreational spark-ignition marine engine controls.

Total emissions from area sources will decrease as well in the two counties, the largest categories being tank truck unloading, degreasing, architectural surface coatings, and commercial and consumer solvents. State regulations address emissions from tank truck unloading and degreasing. The tank truck unloading regulation, COMAR 26.11.13.04(C) 4 was adopted on March 26, 1993 and went into effect on November 15, 1993. The degreasing regulation, COMAR 26.11.19.09, was adopted on May 12, 1995 and became effective on June 5, 1995. Federal regulations for reformulating architectural coatings and consumer solvents will also result in lower emissions.

There is very little industry in the two counties and thus point source emissions are very low. Growth in point sources will be controlled through the new source review program requirement for offsets. Any major sources that wish to locate in Kent or Queen Anne's Counties will need to procure emissions offsets at a ratio of 1.15 to 1 for NOx and VOCs. This will limit new point source emissions that would result from industry growth in these two counties in the future.

It is important to note that in addition to reductions caused by all of the measures outlined above, background concentrations of ozone in Kent and Queen Anne's Counties will decrease as a result of the many ozone precursor reduction strategies being implemented in the Baltimore and Washington D.C. severe nonattainment areas via transport

MDE's calculations of future emissions of VOCs and NOx from stationary and mobile sources demonstrate that future emissions will continue to decrease with time.

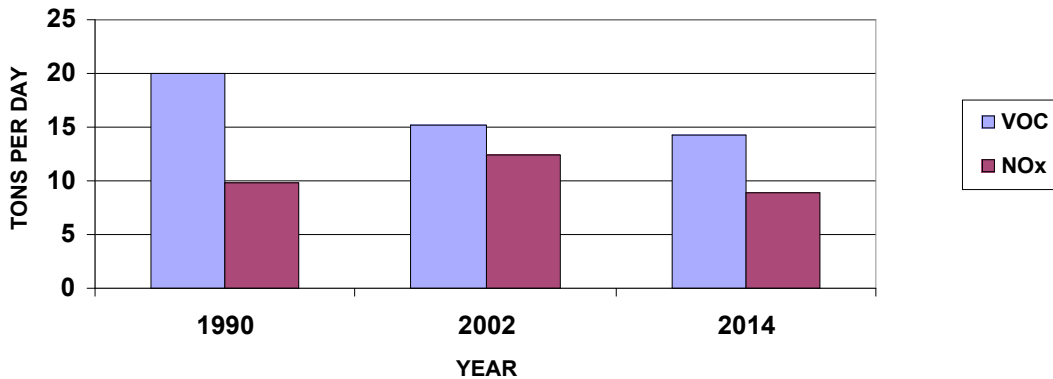
Table 3: Base Year and Projected VOC Emissions Inventories for the Kent and Queen Anne's County Region

Source Category	2002 VOC Emissions (Tons per Day)	2014 Projected VOC Emissions (Tons per Day)
On-road Mobile	4.91	2.09
Non-road Mobile	5.91	6.59
Area	4.33	5.34
Point	0.12	0.16
Total	15.26	14.18

Table 4: Base Year and Projected NOx Emissions Inventories for the Kent and Queen Anne's County Region

Source Category	2002 NOx Emissions (Tons per Day)	2014 Projected NOx Emissions (Tons per Day)
On-road Mobile	7.7	2.92
Non-road Mobile	3.22	4.15
Area	1.46	1.75
Point	0.07	0.09
Total	12.45	8.91

Figure 5: Base Year and Projection Year Emissions for Kent and Queen Anne's Counties



Throughout the 1990's, there has been a growing understanding of the extent to which long-range transport contributes to ozone nonattainment, especially along the East Coast of the United States. Incoming ozone transported from upwind areas needs to be reduced for areas like Kent and Queen Anne's Counties to continue to meet the federal air standards. To reduce both long-range and short-range transport, Maryland has implemented the NOx SIP Call. In 2004, most other states required to implement the NOx SIP Call will have complied with this requirement. Tier 2 tailpipe standards for vehicles will also be implemented throughout the nation. EPA has performed modeling for the NOx SIP Call that shows these measures will reduce ozone transport to the Kent and Queen Anne's region substantially.

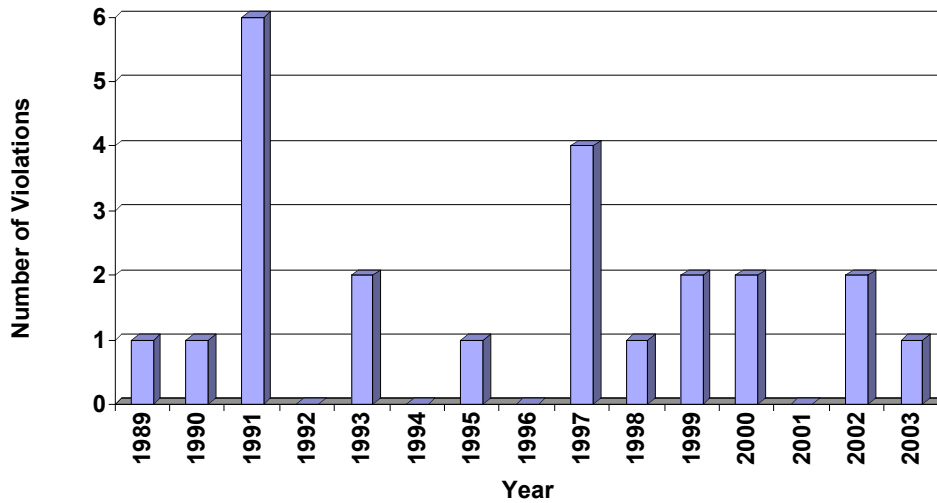
Trends

Emissions – see section above

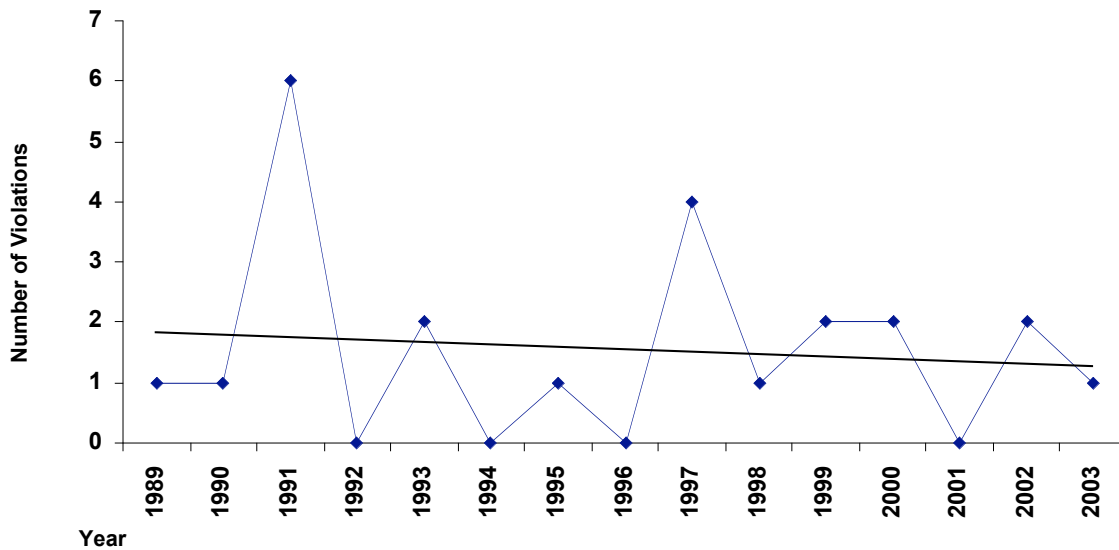
Air Quality

The 2003 8-hr Design Value for the Millington monitor is 0.095 which is .010 ppm above the 8 hr standard. However, when you look at the progress Maryland made with respect to the 1-hr standard at the same monitoring site you can see that overall air quality has vastly improved.

Number of Exceedances of the 1-hour Standard for Ozone at the Millington Monitor Between 1989 and 2003



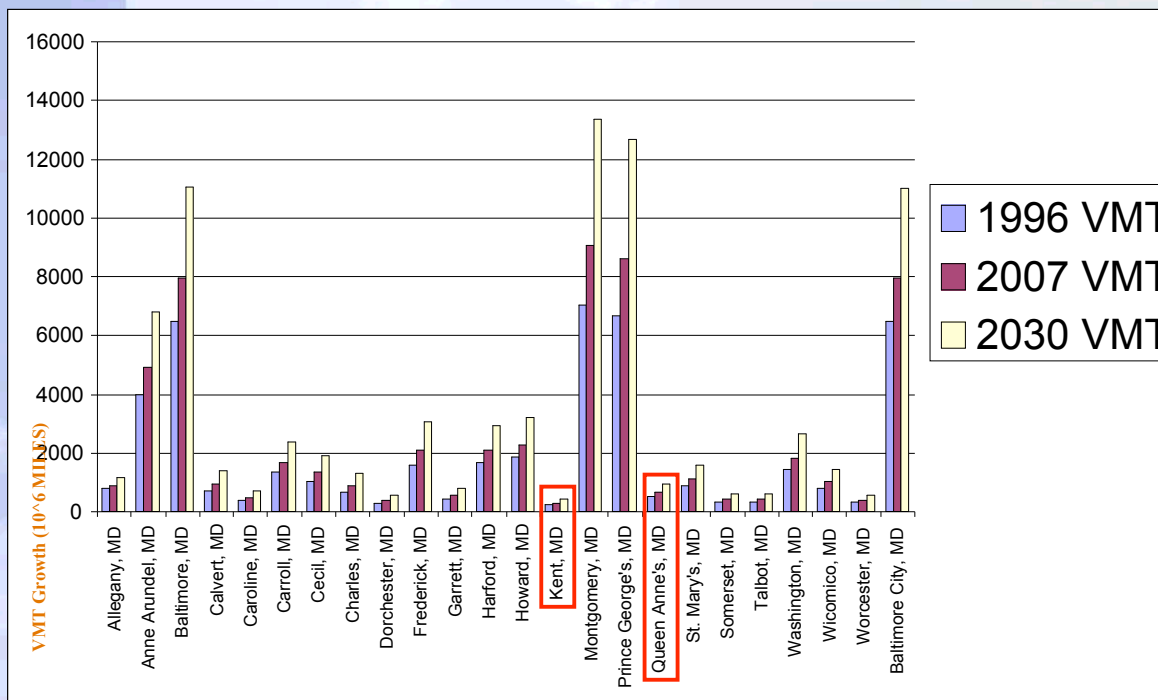
Trend in Number of Exceedances of the 1-hour Standard for Ozone at the Millington Monitor Between 1989 and 2003



Vehicle Miles Traveled (VMT)

While VMT is expected to increase slightly over time (see attached graphic) the expected growth is very small when compared to other nonattainment counties in Maryland.

8-hr Ozone Nonattainment (NAA) Counties Expected Growth in Vehicle Miles Traveled



Kent & Queen Anne's Population Projections

The Maryland Department of Planning has calculated growth rates for all Maryland counties. Kent County, where the Millington monitor is located, has the smallest population of any Maryland county with a 2000 Census total of 19,197. It is projected to remain at low levels for the foreseeable future with a 2005-estimated population of 19,650 people. Queen Anne's County has a larger population (40,563 as of the 2000 Census) and is growing at a faster rate but still less than the growth rate of some of the metropolitan Baltimore and Washington counties. The Queen Anne's County projected population for 2005 is 44,600. Neither county is projected to have a population greater than 60,000 people by 2030.

Years of Data

Other than for the purpose of historical trends analysis the MDE supports the use of 2001-2003 air quality data for this reclassification request.

Subpart 1 vs. Subpart 2

The MDE is not requesting a move from CAA Subpart 2 to Subpart 1 (classification schemes) as part of this reclassification request.

Limitations on Bump Downs

The MDE is requesting a Bump Down of one classification (Moderate to Marginal).