



North Carolina Department of Environment and Natural Resources

Beverly Eaves Perdue, Governor

Dee Freeman, Secretary

June 2, 2011

Gwendolyn Keyes Fleming
Regional Administrator
USEPA, Region 4
Sam Nunn Federal Center
61 Forsyth Street, SW
Atlanta, Georgia 30303-8960

Dear Ms. Fleming:

Pursuant to the requirements of the federal Clean Air Act and on behalf of Governor Beverly E. Perdue, I am submitting to you and your colleagues at the U.S. Environmental Protection Agency (USEPA) the State of North Carolina's recommendations concerning the boundaries within our State of areas that either attain or do not attain the June 2, 2010 1-hour National Ambient Air Quality Standard (NAAQS) for sulfur dioxide (SO₂).

North Carolina has one monitor violating the 2010 SO₂ NAAQS located in Wilmington, North Carolina (New Hanover County). I request the USEPA consider deferring a nonattainment designation for this area until after 2012. The reason for this request is threefold. First, Southern States Chemical and WASTECH have shutdown. Southern States may resume operations, but their permit is being reopened to address the impact of the SO₂ emissions at the monitor. These two sources are located in very close proximity to the monitor. Second, the Progress Energy Sutton facility is working to convert from coal to natural gas with the next couple of years. Finally, since the beginning of 2011 the monitor has not observed an exceedance of the 2010 SO₂ standard and the 99th percentile concentration for 2011 is 48.7 parts per billion. The North Carolina Department of Environment and Natural Resources, Division of Air Quality (NCDENR) believes this clean data to date is due to the two sources that have shut down near the monitor location. It is possible for the Wilmington monitor to attain the 1-hour SO₂ standard by the end of 2012. Additionally, the NCDENR is proactively working with the largest SO₂ sources located near the monitor to determine if additional controls or permit limitations are needed to ensure continued maintenance of the 1-hour SO₂ standard.

If the USEPA determines that it cannot defer the nonattainment designation for the Wilmington, North Carolina area, then we are recommending the boundaries which are described in the enclosed package. We believe that the enclosed boundary recommendations are the most effective way to achieve the goals of cleaner air, healthier lives, a stronger economy, and more effective conservation of our land and water.

The federal Clean Air Act requires the USEPA to designate areas following promulgation of a new NAAQS, such as the June 2, 2010 1-hour standard for SO₂. The USEPA has asked states for their recommendations for boundaries by June 3, 2011. The USEPA released its guidance for area designations for the 2010 revised primary SO₂ NAAQS on March 24, 2011. The guidance stated that for identifying attainment areas that the USEPA does not believe it would be appropriate to designate areas attainment without appropriate refined dispersion modeling and, where available, air quality monitoring data indicating no violations of the NAAQS.

The USEPA's boundary guidance came out very late in the process and did not allow sufficient time for the states to implement the suggested methodology for determining designation recommendations by the submittal date of June 3, 2011. Additionally, the NCDENR does not agree with the USEPA's guidance methodology for determining attainment areas. The guidance states that only dispersion modeling can determine if an area is attaining the standard and that the dispersion modeling must use allowable emissions instead of actual emissions. The use of allowable emissions with the dispersion models would demonstrate areas that may potentially violate the standard but does not indicate if a standard has been actually violated. The NCDENR does not believe it is appropriate to determine if an area should be designated as attainment solely based on dispersion models using allowable emissions. Since the designation process historically has been based on actual ambient air quality data and not potential air quality data, the USEPA should consider if an area would have had a violation based on what emissions were actually emitted into the air. Additionally, there are cases where it could be assumed an area was in attainment of the standard based upon the actual emissions data for a county, i. e., a county with no sources of SO₂ or very small sources of SO₂.

Development and submittal of the State's recommendations on appropriate boundaries are the first steps in the process of addressing the revised SO₂ NAAQS. We understand that if the USEPA intends to designate areas that differ from the State's recommendations, the USEPA is required to notify the State by no later than 120 days prior to the final designations. In addition, it is our understanding that the USEPA plans to provide a 30-day public comment period immediately following issuance of its response letters to the states in order to consider public input in the designation process. The USEPA is requesting States provide additional information within 60 days of receiving the USEPA response letters. At that time, my staff anticipates providing supplemental information including consideration of the 2011 SO₂ monitoring data and modeling data which may indicate a revised boundary recommendation.

In developing the recommendations, staff in the NCDENR consulted with staff from the Department of Commerce, conducted meetings with elected officials and the general public in the Wilmington area on the draft staff recommendations and the USEPA's presumptive boundary. Through this process, staff sought comments from local officials, environmental organizations, business, industry, and the general public. The recommendations prepared for your review include consideration of the comments received.

Based on our public discussions and analysis, we are recommending that part of New Hanover County be designated as nonattainment for the 1-hour SO₂ standard, four counties be designated attainment due to clean monitoring data, 32 counties be designated attainment due to

having no sources or only small SO₂ sources, and the remaining 63 counties be designated unclassifiable/attainment.

The NCDENR recognizes the health impacts of SO₂. Historically, North Carolina has demonstrated its commitment to clean air. In 2002, the North Carolina's General Assembly enacted the landmark multi-pollutant legislation known as the Clean Smokestacks Act which continues to result in significant SO₂ and nitrogen oxides emissions reductions. In 2002, the SO₂ emissions from the sources subject to the Clean Smokestacks Act were 459,643 tons per year. In 2010, these sources are emitted 116,517 tons of SO₂ per year. This is a 75% reduction in SO₂ emissions to date. The NCDENR has been actively working with the sources located in the Wilmington region since the promulgation of the new 1-hour SO₂ standard to determine which sources may be causing or contributing to the violation of this standard. The State has and will continue to use its statutory authority to implement controls in the State as warranted, regardless of whether the emission sources are located within the boundary of a nonattainment area.

North Carolina is committed to protecting the health of our citizens, our environment, and our economy. Solving our SO₂ and other air quality problems is critical to achieving those goals. Improving air quality is critical to the health of our citizens, our future growth, prosperity and quality of life. We look forward to discussing these boundary recommendations with you after the USEPA has had the opportunity to review and comment on them. More detailed information and supporting data are included in the enclosed recommendation package. Thank you for your consideration of these recommendations.

Sincerely,

A handwritten signature in black ink that reads "Dee Freeman". The signature is fluid and cursive, with a long horizontal flourish at the end.

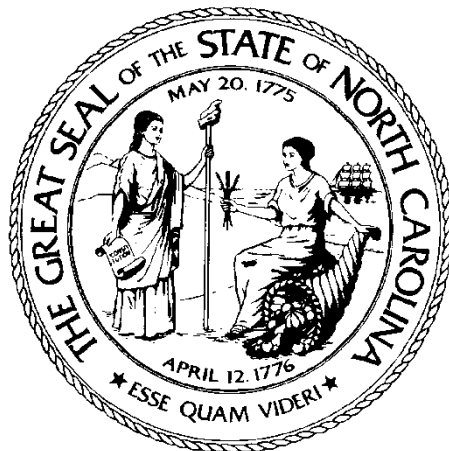
Dee Freeman

DF:lab

Enclosure

cc: The Honorable Beverly E. Perdue
The Honorable Steve Troxler
The Honorable Gene Conti
The Honorable J. Keith Crisco
Air Quality Director Sheila C. Holman

State of North Carolina's
Recommendation on Boundaries
For the 1-Hour Sulfur Dioxide
National Ambient Air Quality Standard



June 2, 2011
Governor Beverly Perdue

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Introduction

The purpose of this document is to provide the State of North Carolina's recommendation on boundaries for the 1-hour sulfur dioxide (SO₂) National Ambient Air Quality Standard (NAAQS). This package is in response to the promulgation of a revised primary 1-hour SO₂ standard by the United States Environmental Protection Agency (USEPA) on June 2, 2010. The USEPA has instructed the States to submit their recommendations for area designation boundaries by June 3, 2011. The USEPA will notify the states if they intend to modify the states' boundary recommendation no later than February, 2012. These notification letters from the USEPA will begin a 60-day period during which the States can provide additional information to support their boundary recommendation. The final designations for the primary 1-hour SO₂ standard will be made by the USEPA by June 3, 2012 and will subsequently be published in the Federal Register and codified in Code of Federal Regulations (CFR) 40 CFR 81.

Background

The Clean Air Act requires the USEPA to designate areas as nonattainment, attainment or unclassifiable following the promulgation of a new NAAQS. Historically, the designations have been based on the data collected at the ambient air monitoring stations that are operated by the State and local air programs. The data is quality assured, and then submitted to the USEPA where it becomes part of a national database. The Clean Air Act requires that the monitoring data be evaluated to determine which monitors meet the standard and which monitors violate the standard. The USEPA established the revised primary SO₂ standard at 75 parts per billion (ppb) which is attained when the three-year average of the 99th percentile of 1-hour daily maximum concentrations does not exceed 75 ppb. The Administrator has determined this is the level necessary to provide protection of public health with adequate margin of safety, especially for children, the elderly and those people with asthma. These groups are particularly susceptible to the health effects associated with breathing air containing high levels of SO₂.

The USEPA released its guidance for area designations for the 2010 revised primary SO₂ NAAQS on March 24, 2011. The guidance stated that for identifying attainment areas that the USEPA does not believe it would be appropriate to designate areas attainment without appropriate refined dispersion modeling and, where available, air quality monitoring data indicating no violations of the NAAQS. For these areas, the guidance states that the USEPA intends to designate the areas as "unclassifiable". For determining nonattainment area boundaries, the guidance stated that the USEPA expects to consider an entire county as the starting point for determining SO₂ nonattainment areas. The guidance further states that boundary recommendations should evaluate five factors: 1) air quality data; 2) emissions-related data; 3) meteorology; 4) geography/topography; and 5) jurisdictional boundaries and that dispersion modeling can be used to help evaluate a nonattainment area boundary.

The USEPA's boundary guidance came out very late in the process and did not allow sufficient time for the states to implement the suggested methodology for determining designation recommendations by the submittal date of June 3, 2011. Additionally, the North Carolina Department of Environment and Natural Resources (NCDENR) does not agree with the USEPA's guidance methodology for determining attainment areas. The guidance states that only dispersion modeling can determine if an area is attaining the standard and that the dispersion modeling must use allowable emissions instead of actual emissions. The use of allowable emissions with the dispersion models would demonstrate areas that may potentially violate the standard but does not indicate if a standard has been actually violated and is not representative of actual pollutant concentrations in the ambient air. The NCDENR does not believe it is appropriate to determine if an area should be designated as attainment or nonattainment solely based on dispersion models using allowable emissions. Since the designation process historically has been based on actual ambient air quality data and not potential air quality data, the USEPA should consider if an area would have had a violation based on the emissions actually released into the air. The NCDENR believes this historical approach more accurately reflects impacts on the environment and will direct limited state resources to actual violations of the 1-hour SO₂ standard rather than theoretical ones. The NCDENR recommends that the USEPA reconsider the use of allowable emissions for purposes of designation and also allow areas with monitors demonstrating compliance with the standard be designated attainment. Additionally, there are cases where it could be assumed an area was in attainment of the standard based upon the actual emissions data for a county, i. e., a county with no sources of SO₂ or very small sources of SO₂.

In North Carolina, there are five SO₂ monitors located in Beaufort, Forsyth, Mecklenburg, New Hanover and Wake Counties (see Figure 1). In reviewing the most recent three-year period (2008-2010), it was determined that only one monitor, located in New Hanover County, was violating the new primary SO₂ standard. The NCDENR has used the five factors outlined in the USEPA guidance to determine the appropriate nonattainment boundary recommendation. For the attainment boundary recommendation, the NCDENR used either actual air quality data or SO₂ emissions inventory data.

The next section provides a summary of the North Carolina's nonattainment and attainment boundary recommendation, which is followed by sections that detail data used to determine this recommendation.

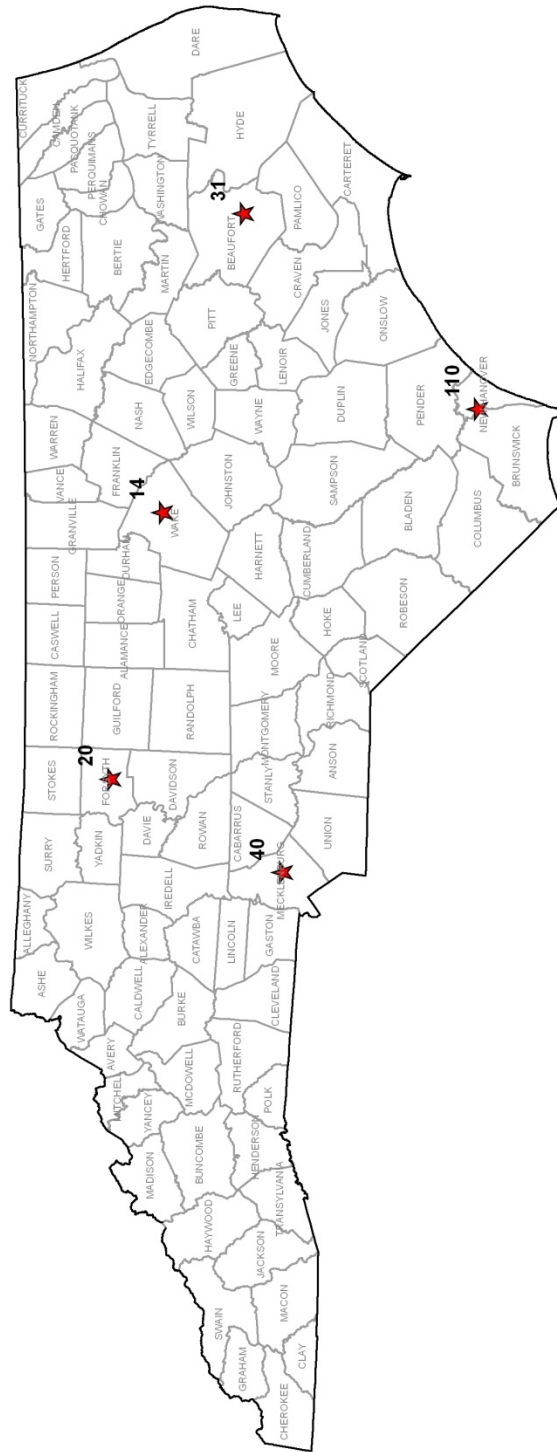


Figure 1. North Carolina's 2008-2010 1-Hour SO₂ Design Value Map
 (Note that design values are presented in parts per billion)

Summary of Recommendation

Based on the ambient air quality data, only the Wilmington, North Carolina area (New Hanover County) is measuring a violation of the revised primary SO₂ standard in North Carolina. In April 2011, the NCDENR conducted meetings in Wilmington, North Carolina, with the local elected officials and the general public. At these meetings, background information concerning the promulgation of the revised primary SO₂ standard and the implications to North Carolina were presented. Additionally, the staff presented several options for the potential nonattainment boundary (Appendix A) and requested comments from the general public and elected officials (Appendix B). The NCDENR took into consideration the comments received and made a final decision for the boundary recommendation.

The State of North Carolina requests the USEPA consider deferring a nonattainment designation for New Hanover County until after 2012. North Carolina believes this area will attain the standard by the end of 2012 for a number of reasons outlined in the following section. If the USEPA does not agree with deferring a nonattainment designation for this area until after 2012, then North Carolina recommends the portion of New Hanover County that is bordered by the Cape Fear River to the west, the Northeast Cape Fear River to the east and New Hanover/Pender County border to the north be designated nonattainment.

The State of North Carolina is recommending Beaufort, Forsyth, Mecklenburg and Wake Counties be designated as attainment for the 1-hour SO₂ standard based upon ambient air quality data. Furthermore, the North Carolina is recommending the following counties be designated attainment based upon emissions inventory data: Alleghany, Avery, Camden, Caswell, Cherokee, Chowan, Clay, Currituck, Dare, Davie, Gates, Greene, Henderson, Hyde, Jackson, Jones, Lee, Macon, Madison, Mitchell, Pamlico, Pasquotank, Pender, Perquimans, Polk, Swain, Transylvania, Tyrell, Warren, Washington, Watauga, and Yadkin.

Finally, the State of North Carolina is recommending the remaining counties, including the portion of New Hanover County outside of the recommended nonattainment area, be designated as unclassifiable/attainment for the 1-hour SO₂ standard. North Carolina believes a designation of unclassifiable/attainment is appropriate and is consistent with how designations have been made historically for the other NAAQS. The NCDENR opposes designating an area just unclassifiable since it portrays uncertainty to industry that might be looking to locate in North Carolina and could hurt the economic recovery of the State. Additionally, the NCDENR will be determining which sources may potentially violate the 1-hour SO₂ standard (primarily using dispersion modeling) and under the State rule 15A NCAC 2D .0501 "Compliance with Emission Control Standards," require the sources to either control their SO₂ emissions or take permit limitations to ensure an exceedance of the standard will not occur.

As stated earlier, the USEPA’s boundary guidance came out very late in the process and did not allow sufficient time for the states to implement the suggested methodology for determining designation recommendations by the submittal date of June 3, 2011. The State of North Carolina intends to supplement this recommendation after the NCDENR has completed additional analyses, including dispersion modeling.

The following table is North Carolina’s recommendation of areas as nonattainment, attainment or unclassifiable/attainment for the new primary 1-hour SO₂ standard. The following sections discuss in more detail the data used to determine the recommendation.

Table 1. North Carolina Recommendation for 1-Hour SO₂ Standard

Designated Area	Designated Type
<p>Wilmington, North Carolina New Hanover County (part) The portion of the county described by the Northeast Cape Fear River at the New Hanover/Pender county line, south to the Cape Fear River, the Cape Fear River north to the New Hanover/Pender county line.</p>	<p>Deferral/Nonattainment</p>
<p>Part of State Alleghany County Avery County Beaufort County Camden County Caswell County Cherokee County Chowan County Clay County Currituck County Dare County Davie County Forsyth County Gates County Greene County Henderson County Hyde County Jackson County Jones County Lee County Macon County Madison County</p>	<p>Attainment Attainment Attainment Attainment Attainment Attainment Attainment Attainment Attainment Attainment Attainment Attainment Attainment Attainment Attainment Attainment Attainment Attainment Attainment Attainment</p>

Table 1. North Carolina Recommendation for 1-Hour SO₂ Standard

Designated Area	Designated Type
Mecklenburg County	Attainment
Mitchell County	Attainment
Pamlico County	Attainment
Pasquotank County	Attainment
Pender County	Attainment
Perquimans County	Attainment
Polk County	Attainment
Swain County	Attainment
Transylvania County	Attainment
Tyrell County	Attainment
Wake County	Attainment
Warren County	Attainment
Washington County	Attainment
Watauga County	Attainment
Yadkin County	Attainment
Rest of State	
Alamance County	Unclassifiable/Attainment
Alexander County	Unclassifiable/Attainment
Anson County	Unclassifiable/Attainment
Ashe County	Unclassifiable/Attainment
Bertie County	Unclassifiable/Attainment
Bladen County	Unclassifiable/Attainment
Brunswick County	Unclassifiable/Attainment
Buncombe County	Unclassifiable/Attainment
Burke County	Unclassifiable/Attainment
Cabarrus County	Unclassifiable/Attainment
Caldwell County	Unclassifiable/Attainment
Carteret County	Unclassifiable/Attainment
Catawba County	Unclassifiable/Attainment
Chatham County	Unclassifiable/Attainment
Cleveland County	Unclassifiable/Attainment
Columbus County	Unclassifiable/Attainment
Craven County	Unclassifiable/Attainment
Cumberland County	Unclassifiable/Attainment
Davidson County	Unclassifiable/Attainment
Duplin County	Unclassifiable/Attainment
Durham County	Unclassifiable/Attainment
Edgecombe County	Unclassifiable/Attainment
Franklin County	Unclassifiable/Attainment
Gaston County	Unclassifiable/Attainment
Graham County	Unclassifiable/Attainment
Granville County	Unclassifiable/Attainment

Table 1. North Carolina Recommendation for 1-Hour SO₂ Standard

Designated Area	Designated Type
Guilford County	Unclassifiable/Attainment
Halifax County	Unclassifiable/Attainment
Harnett County	Unclassifiable/Attainment
Haywood County	Unclassifiable/Attainment
Hertford County	Unclassifiable/Attainment
Hoke County	Unclassifiable/Attainment
Iredell County	Unclassifiable/Attainment
Johnston County	Unclassifiable/Attainment
Lenoir County	Unclassifiable/Attainment
Lincoln County	Unclassifiable/Attainment
McDowell County	Unclassifiable/Attainment
Martin County	Unclassifiable/Attainment
Montgomery County	Unclassifiable/Attainment
Moore County	Unclassifiable/Attainment
Nash County	Unclassifiable/Attainment
New Hanover County (Remainder)	Unclassifiable/Attainment
Northampton County	Unclassifiable/Attainment
Onslow County	Unclassifiable/Attainment
Orange County	Unclassifiable/Attainment
Person County	Unclassifiable/Attainment
Pitt County	Unclassifiable/Attainment
Randolph County	Unclassifiable/Attainment
Richmond County	Unclassifiable/Attainment
Robeson County	Unclassifiable/Attainment
Rockingham County	Unclassifiable/Attainment
Rowan County	Unclassifiable/Attainment
Rutherford County	Unclassifiable/Attainment
Sampson County	Unclassifiable/Attainment
Scotland County	Unclassifiable/Attainment
Stanly County	Unclassifiable/Attainment
Stokes County	Unclassifiable/Attainment
Surry County	Unclassifiable/Attainment
Union County	Unclassifiable/Attainment
Vance County	Unclassifiable/Attainment
Wayne County	Unclassifiable/Attainment
Wilkes County	Unclassifiable/Attainment
Wilson County	Unclassifiable/Attainment
Yancey County	Unclassifiable/Attainment

Area Specific Recommendation on Boundaries for 1-Hour SO₂ Nonattainment

The purpose of this section is to address the criteria that the USEPA established for considering boundaries less than the full county for nonattainment designation. The criteria are outlined in the USEPA guidance “Area Designations for the 2010 Revised Primary Sulfur Dioxide National Ambient Air Quality Standards” which was released March 24, 2011. A copy of the guidance is attached in Appendix C.

The guidance instructed States to base the boundary recommendation on an evaluation of five factors: 1) air quality data; 2) emissions-related data; 3) meteorology; 4) geography/topography; and 5) jurisdictional boundaries.

Only one monitor in North Carolina is violating the 2010 revised primary SO₂ standard located in Wilmington in New Hanover County. North Carolina’s recommendation is less than the full county and the discussion that follows addresses the five factors.

Wilmington Nonattainment Area Discussion

USEPA Presumptive 1-Hour SO₂ Nonattainment Boundary

New Hanover County

North Carolina's Deferral Recommendation

The State of North Carolina requests the USEPA consider deferring a nonattainment designation for this area until after 2012. The reason for this request is threefold. First, Southern States Chemical and WASTEC have shutdown. Southern States may resume operations, but their permit is being reopened to address the impact of the SO₂ emissions at the monitor. These two sources are located in very close proximity to the monitor. Second, the Progress Energy Sutton facility is working to convert from coal to natural gas within the next couple of years. Finally, since the beginning of 2011 the monitor has not observed an exceedance of the 2010 SO₂ standard and the 99th percentile concentration for 2011 is currently 48.7 ppb. The NCDENR believes this clean data to date is due to the two sources that have shut down near the monitor location. It is possible the Wilmington monitor will attain the 1-hour SO₂ standard by the end of 2012. Additionally, the NCDENR is proactively working with the largest SO₂ sources located near the monitor to determine if additional controls or permit limitations are needed to ensure continued maintenance of the 1-hour SO₂ standard. If the USEPA does not agree with deferring a nonattainment designation for this area until after 2012, then North Carolina makes the following alternative nonattainment boundary recommendation.

North Carolina's Recommended 1-Hour SO₂ Nonattainment Boundary

The portion of the county described by the Northeast Cape Fear River at the New Hanover/Pender county line, south to the Cape Fear River, the Cape Fear River north to the New Hanover/Pender county line (Figure 2).

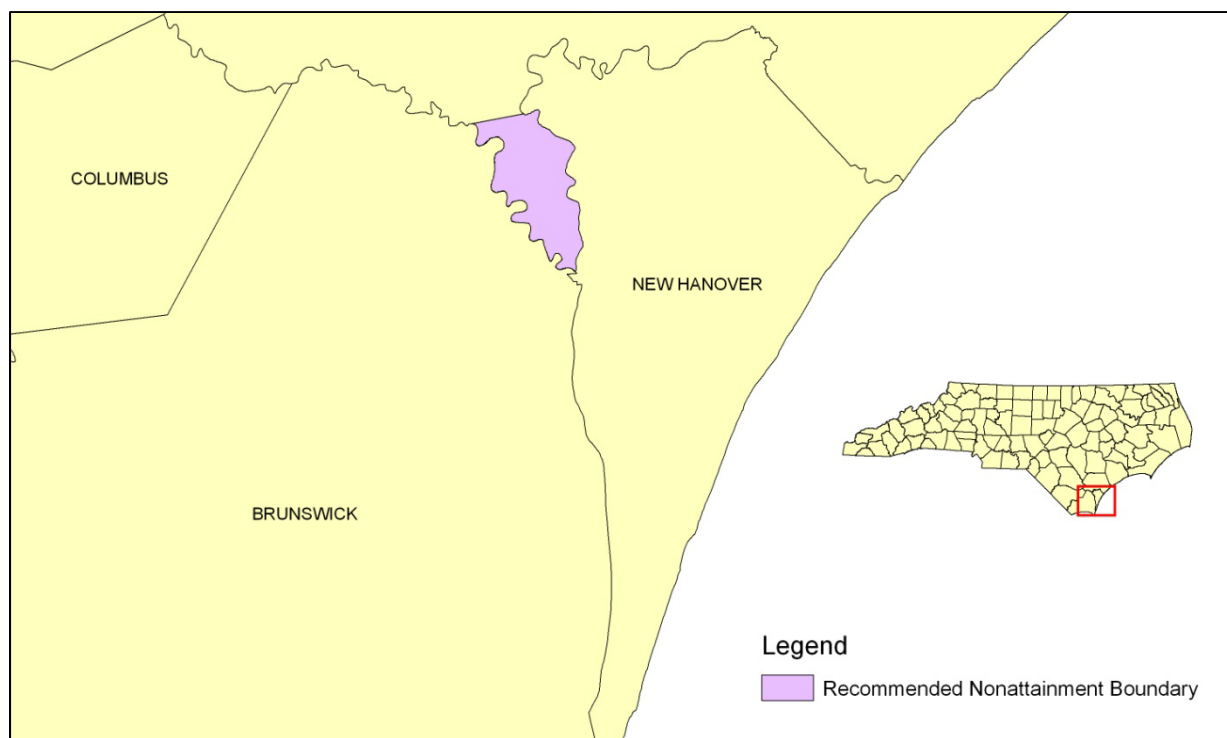


Figure 2. Recommended Nonattainment Area for Wilmington, North Carolina.

Discussion:

The SO₂ monitor located in Wilmington has a three-year design value, based on the 2008-2010 data, of 110 ppb. The monitor is located on US Highway 421 in a heavily industrialized/manufacturing area. In determining the nonattainment area boundary, the guidance stated that the pollutant arises from direct emissions and the SO₂ concentrations are highest relatively close to the source(s) and much lower at greater distances due to dispersion. Based on the five factor analysis and the fact that the SO₂ concentrations are much lower at greater distances from the emitting source due to dispersion, North Carolina has determined that less than the full county should be designated nonattainment. The five factor analysis discussion follows.

Air Quality Data

In addition to the Wilmington monitor in New Hanover County, the NCDENR operated an SO₂ monitor in 2005 at the Castle Hayne monitoring site located in the northeast corner of New Hanover County (Figure 3). This monitor ran for the full year and the 99th percentile observation was 39 ppb, well below the 1-hour SO₂ standard. The data for the Castle Hayne monitor can be found in Appendix D.

The Castle Hayne SO₂ monitor was located just southeast of Elementis Chromium, whose 2005 annual SO₂ emissions were 546 tons. In 2009, Elementis Chromium emitted 318 tons of SO₂. This is the only source in close proximity to the Castle Hayne monitoring site. The next closest facility is Barnhill Contracting, whose 2005 and 2009 annual SO₂ emissions were 11.7 tons and

7 tons, respectively. Since the Castle Hayne monitor observed SO₂ concentrations well below the 1-hour SO₂ standard, the NCDENR believes that it is reasonable to exclude this portion of New Hanover County.

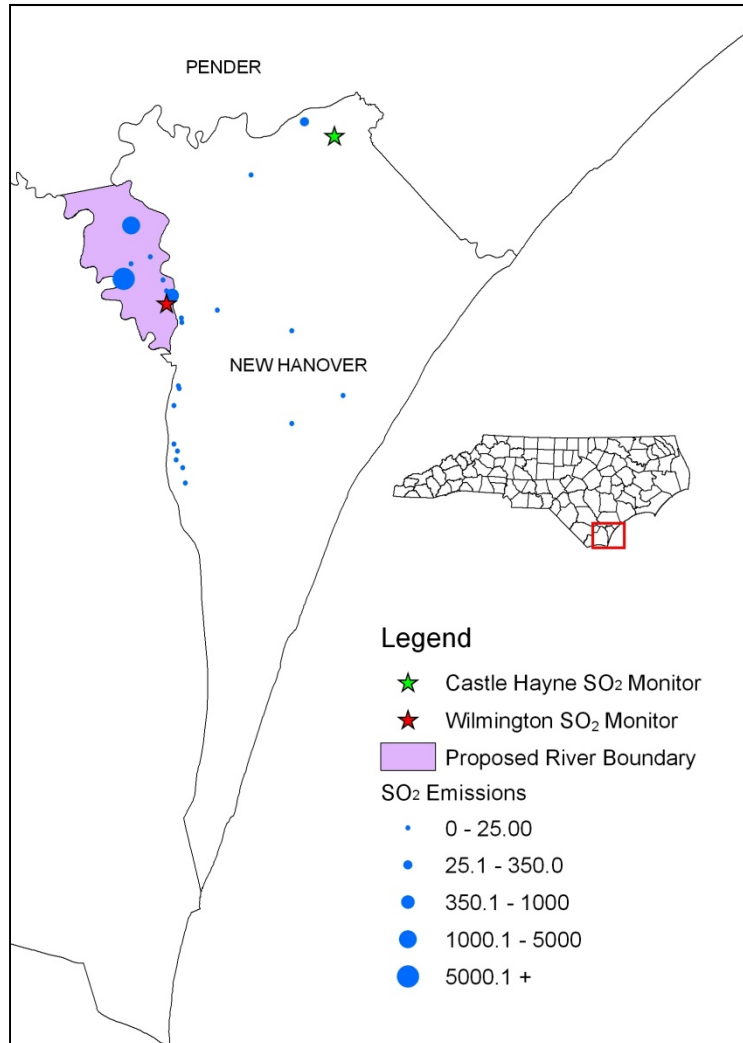


Figure 3. Monitor and Source Locations in New Hanover County

Emissions-Related Data

The top ten SO₂ emitting facilities in New Hanover County are listed in Table 2 below. The emissions reported in Table 2 are for 2009 except for National Gypsum and Vopak Terminal. For these two sources, the last reported emissions are included in the table. Five of the top ten emitters are located in the North Carolina recommended nonattainment area and these account for 98 percent of New Hanover County's total SO₂ emissions (Figure 4). Additionally, the NCDENR looked at sources located in Brunswick and Pender Counties. There are two large SO₂ sources located in Brunswick County: DAK America with 2,167 tons of SO₂ per year and CPI

USA with 1,734 tons SO₂ per year (Figure 4). Pender County does not contain any permitted SO₂ sources, therefore none of Pender County was considered for inclusion in the nonattainment boundary area.

Table 2. Top Ten SO₂ Point Sources in New Hanover County

Source	Emissions (tons/year)	Year Emissions Reported
Progress Energy - Sutton	17,947	2009
Invista S.A.R.L	2,222	2009
Southern States Chemical	872	2009
Elementis Chromium	318	2009
New Hanover County WASTEC	23	2009
National Gypsum	21	2005
Hess Corporation	12	2009
Vopak Terminal	11	2006
Fortron Industries	8	2009
Barnhill Contracting	7	2009

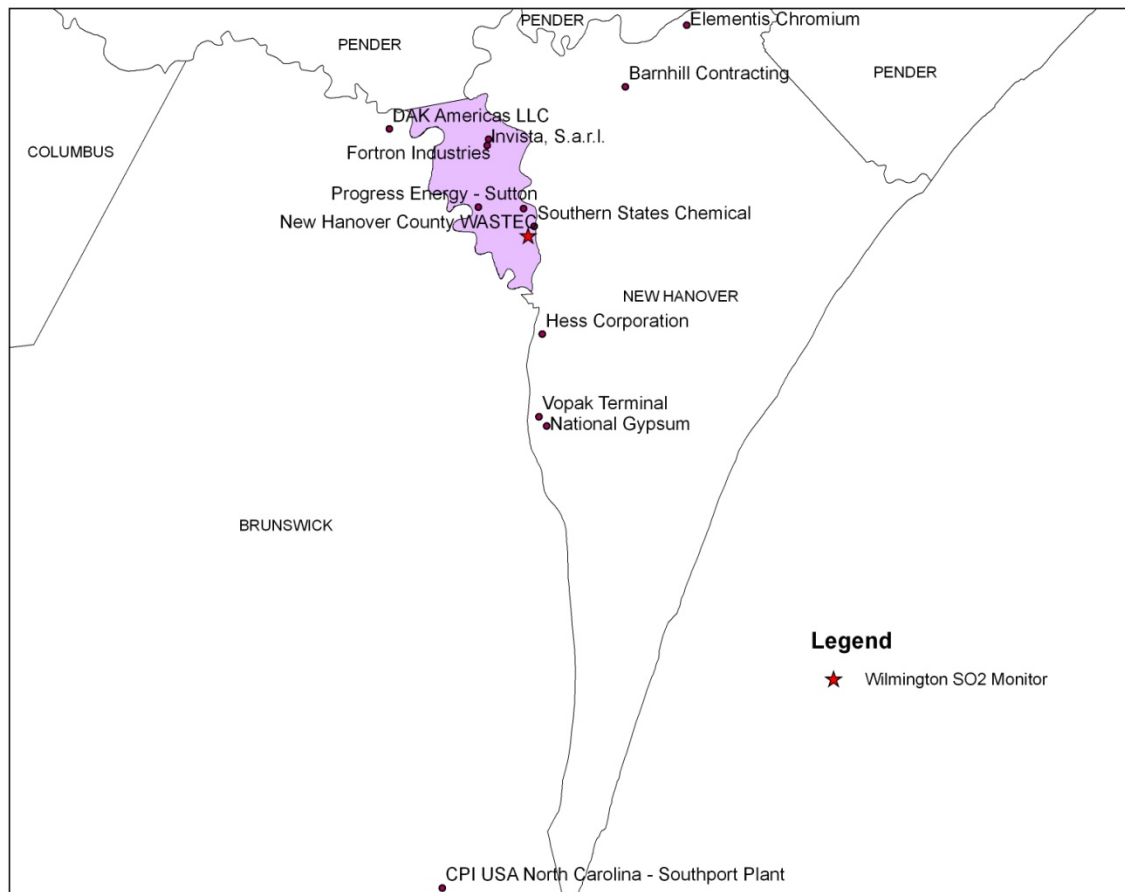


Figure 4. Location of the Top 10 SO₂ Emitters in New Hanover County and Large Sources in Brunswick County

Of the top ten sources in New Hanover County, the following are not included in the recommended nonattainment area: Elementis Chromium, National Gypsum, Hess Corporation, Vopak Terminal and Barnhill Contracting. As discussed in the Air Quality Data section, Elementis Chromium and Barnhill Contracting are located in the northeast corner of New Hanover County and this area was excluded from the boundary recommendation due to clean ambient air quality data. National Gypsum, Hess Corporation, and Vopak Terminal are all located south of the monitoring site. These are small sources of SO₂ and the NCDENR does not believe these sources contributed to the violation at the Wilmington monitor due to the meteorological data provided in the next section. Similarly, the Brunswick County source CPI USA is located south of the monitoring site and the NCDENR does not believe this source contributed to the violation at the Wilmington monitor due to the meteorological data provided in the next section. The NCDENR determined that the northeastern part of Brunswick County, where DAK America is located, should not be included as part of the nonattainment area boundary recommendation. This is due to the meteorology pollution rose discussed in the next section showing very little contribution coming from northwest of the monitoring site and the statement from the USEPA that SO₂ concentrations are much lower at greater distances due to dispersion.

The NCDENR believes the recommended nonattainment area accounts for all those sources which may have contributed to the violation.

Meteorology

The NCDENR reviewed the five-minute-average SO₂ observations for 2008 through 2010 for the Wilmington monitor. For any 5-minute-average observation greater than 75 ppb, corresponding 5-minute-average wind data was obtained from the Wilmington Airport ASOS (Automated Surface Observing System) site. Figure 5 below is a pollution rose plot of the wind data when the 5-minute-average SO₂ observations were greater than 75 ppb. This plot clearly indicates that when 5-minute-average exceedances of the standard occurred, the pollution was not coming from south of the monitor. Therefore, the North Carolina recommended nonattainment area boundary excluded areas south of the monitoring site in New Hanover County.

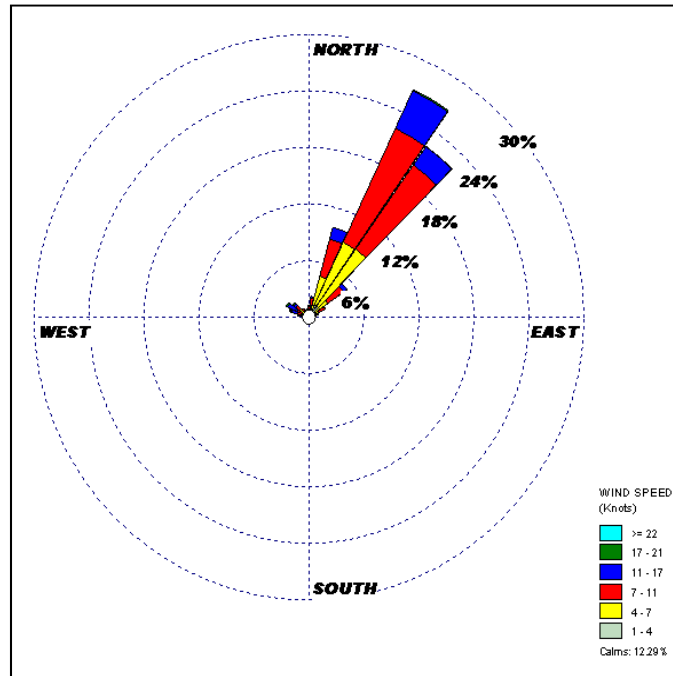


Figure 5. Pollution Rose When SO₂ 5-Minute-Average Observations > 75 ppb

Geography/Topography

Topography does not play a role in the violation at the Wilmington monitoring site. The geography of the recommended nonattainment area is a heavily industrialized area and captured the majority of the western I-2 zoned area in New Hanover County (Figure 6).

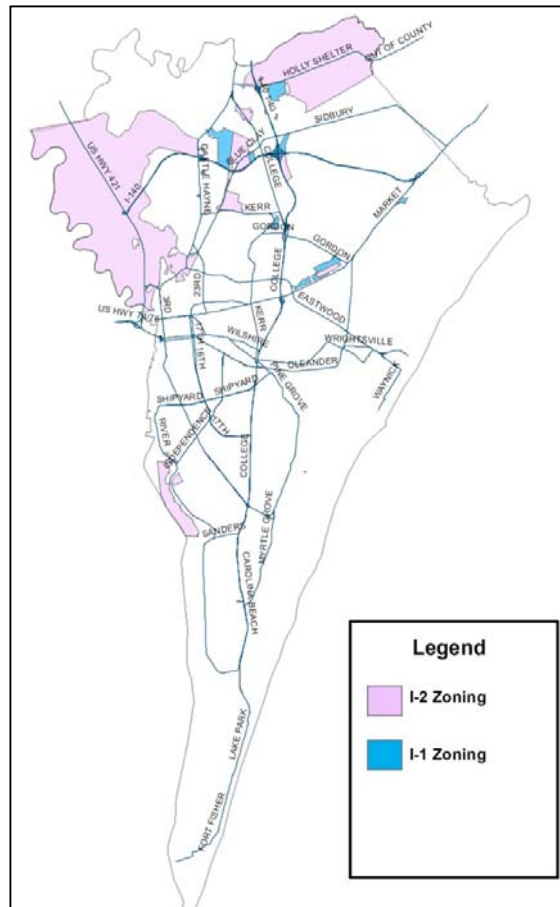


Figure 6. New Hanover County Industrial I-2 Zoning

Jurisdictional Boundary

The USEPA guidance requested clearly defined legal boundaries for carrying out the air quality planning and enforcement functions for the nonattainment area. Where existing jurisdictional boundaries are not adequate to describe the nonattainment area, other clearly defined and permanent landmarks or geographic coordinates may be used.

The NCDENR considered the northwestern I-2 zoned area as a potential nonattainment boundary based upon feedback from local elected officials. However, since the zoning boundaries could be changed over time, the NCDENR decided against this option. In reviewing the jurisdictional boundaries and permanent landmarks that could be clearly defined and taking into consideration the analysis of the first four factors, the NCDENR determined that the Northeast Cape Fear River and the Cape Fear River best defined the area contributing to the violation of the 1-hour SO₂ standard.

Conclusion

The NCDENR analyzed the five factors outlined in the USEPA guidance. This analysis determined that the southern part of New Hanover County is not contributing to the Wilmington monitor violation and the northeastern part of the County had monitoring data that demonstrated compliance with the 1-hour SO₂ standard. The NCDENR determined a nonattainment area boundary that could be clearly defined and captured 98 percent of the SO₂ emissions.

Area Specific Recommendation for Boundaries for 1-Hour SO₂ Attainment

The NCDENR does not believe it is appropriate to determine if an area should be designated as attainment or nonattainment solely based on dispersion models using allowable emissions. Since the designation process historically has been based on actual ambient air quality data and not potential air quality data, the USEPA should consider if an area would have had a violation based on emissions actually released into the air. The NCDENR believes this historical approach more accurately reflects impacts on the environment and will direct limited state resources to actual violations of the 1-hour SO₂ standard rather than theoretical ones.

Additionally, there are cases where it could be assumed an area was in attainment of the standard based upon the actual emissions data for a county, i. e., a county with no sources of SO₂ or very small sources of SO₂.

The NCDENR developed a process to identify counties that it is reasonable to assume are attaining the 1-hour SO₂ standard based on actual emissions. First, counties where there were no permitted SO₂ sources were identified. Since the guidance stated that the pollutant arises from direct emissions, it would follow that those counties with no permitted SO₂ sources would not be contributing to a violation and should be designated attainment for the SO₂ standard. Next, the counties total emissions from permitted sources were reviewed and only counties whose total SO₂ emissions were less than or equal to 25 tons per year were considered. For these counties, the facility emissions were then reviewed and any county that had a facility emitting more than 10 tons per year were removed from consideration. The remaining counties were determined to have significantly small enough sources that the NCDENR felt confident that the SO₂ standard has not been violated in those counties.

Finally, the NCDENR is recommending that counties where there is actual ambient air quality monitoring data demonstrating compliance with the 1-hour SO₂ standard be designated attainment. This is consistent with how the USEPA has made designations in the past. Additionally the design values at the four monitoring sites range from 14 to 40 ppb. Given these concentrations the NCDENR believes that the counties should be designated attainment. The NCDENR commits to performing modeling before April 2012 to further demonstrate that these four counties should be designated attainment.

The NCDENR is recommending the following counties be designated as attainment for the 1-hour SO₂ standard: Alleghany, Avery, Beaufort, Camden, Caswell, Cherokee, Chowan, Clay, Currituck, Dare, Davie, Forsyth, Gates, Greene, Henderson, Hyde, Jackson, Jones, Lee, Macon, Madison, Mecklenburg, Mitchell, Pamlico, Pasquotank, Pender, Perquimans, Polk, Swain, Transylvania, Tyrell, Wake, Warren, Washington, Watauga, and Yadkin (Figure 7).

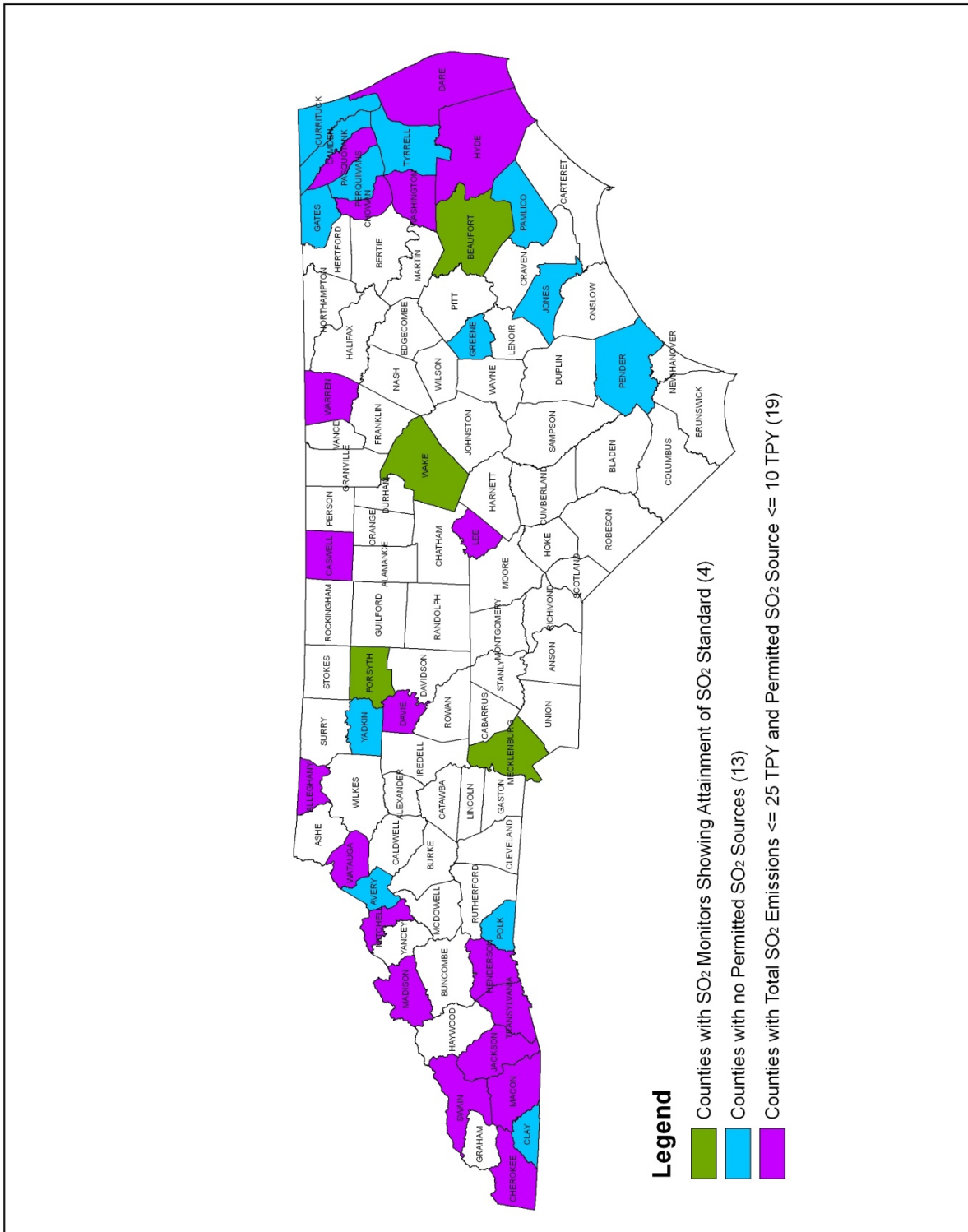


Figure 7. North Carolina’s Recommended Designation for Attainment

Alleghany County

Alleghany County is located in the northwest portion of the State. This county's total SO₂ emissions from permitted sources are estimated to be 0.4 tons per year (Table 3). The only SO₂ emitter in the county was International Pipes and Accessories, a small facility whose last reported emissions in 2007 were 0.4 tons of SO₂ per year. The NCDENR believes that the emissions in this county are significantly small enough that the county has not experienced a violation of the 1-hour SO₂ standard nor have SO₂ sources in the county contributed to a violation of the SO₂ standard. Therefore, North Carolina is recommending that this county be designated attainment.

Table 3. Alleghany County Permitted Facility Emissions (tons/year)

Facility Name	Reported SO ₂	Year
International Pipes and Accessories LLC	0.4	2007

Avery County

Avery County is located in the western part of the State. There are no permitted sources of SO₂ in this county. The NCDENR believes that this county has not experienced a violation of the 1-hour SO₂ standard and there are no SO₂ sources that would have contributed to a violation in another county. Therefore, North Carolina is recommending that this county be designated attainment.

Beaufort County

Beaufort County is located in the eastern part of the State. There is an SO₂ monitor in the county that demonstrates attainment of the 1-hour SO₂ standard. Beaufort County has only one large source of SO₂, PCS Phosphate (Table 4). The SO₂ monitor is located downwind of this facility and was sited so that it would capture the highest SO₂ concentrations from PCS Phosphate. Since this monitor is not only attaining the 1-hour SO₂ standard, but the 2008-210 design value (31 ppb) is well below the 1-hour SO₂ standard, North Carolina is recommending that this county be designated attainment.

Table 4. Beaufort County Permitted Facility Emissions (tons/year)

Facility Name	Reported SO ₂	Year
National Spinning Company - Washington	0.3	2006
Riverside Grain Company, Inc.	0.8	2009
Flanders Filters, Inc.	1.1	2009
PCS Phosphate Company Inc. - Aurora	5,236.1	2009
Total County Emissions	5238.3	

Camden County

Camden County is located in the northeast portion of the State. There are no permitted sources of SO₂ in this county. The NCDENR believes that this county has not experienced a violation of the 1-hour SO₂ standard and there are no SO₂ sources that would have contributed to a violation in another county. Therefore, North Carolina is recommending that this county be designated attainment.

Caswell County

Caswell County is located in the north central portion of the State. This county's total SO₂ emissions from permitted sources are estimated to be 6.3 tons per year (Table 5). The only SO₂ emitter in the county was W - L Construction & Paving, Inc.-Asphalt Plant #4318, a facility whose last reported emissions in 2009 were 6.3 tons of SO₂ per year. The NCDENR believes that the emissions in this county are significantly small enough that the county has not experienced a violation of the 1-hour SO₂ standard nor have SO₂ sources in the county contributed to a violation of the SO₂ standard. Therefore, North Carolina is recommending that this county be designated attainment.

Table 5. Caswell County Permitted Facility Emissions (tons/year)

Facility Name	Reported SO ₂	Year
W - L Construction & Paving, Inc.-Asphalt Plant #4318	6.3	2009

Cherokee County

Cherokee County is located in the southwestern portion of the State. This county's total SO₂ emissions from permitted sources are estimated to be 3.7 tons per year (Table 6). The largest SO₂ emitter in the county was Harrison Construction Division of APAC-Atlantic Inc., a small facility whose last reported emissions in 2009 were 3.6 tons of SO₂ per year. The NCDENR believes that the emissions in this county are significantly small enough that the county has not experienced a violation of the 1-hour SO₂ standard nor have SO₂ sources in the county contributed to a violation of the SO₂ standard. Therefore, North Carolina is recommending that this county be designated attainment.

Table 6. Cherokee County Permitted Facility Emissions (tons/year)

Facility Name	Reported SO ₂	Year
Cherokee County Landfill	0.1	2008
Harrison Construction Division of APAC-Atlantic Inc.	3.6	2009
Total County Emissions	3.7	

Chowan County

Chowan County is located in the northeast portion of the State. This county's total SO₂ emissions from permitted sources are estimated to be 0.5 tons per year (Table 7). The only SO₂ emitter in the county was Albemarle Sportfishing Boats, a small facility whose last reported emissions in 2009 were 0.5 tons of SO₂ per year. The NCDENR believes that the emissions in this county are significantly small enough that the county has not experienced a violation of the 1-hour SO₂ standard nor have SO₂ sources in the county contributed to a violation of the SO₂ standard. Therefore, North Carolina is recommending that this county be designated attainment.

Table 7. Chowan County Permitted Facility Emissions (tons/year)

Facility Name	Reported SO ₂	Year
Albemarle Sportfishing Boats	0.5	2009

Clay County

Clay County is located in the western part of the State. There are no permitted sources of SO₂ in this county. The NCDENR believes that this county has not experienced a violation of the 1-hour SO₂ standard and there are no SO₂ sources that would have contributed to a violation in another county. Therefore, North Carolina is recommending that this county be designated attainment.

Currituck County

Currituck County is located in the northeast portion of the State. There are no permitted sources of SO₂ in this county. The NCDENR believes that this county has experienced a violation of the 1-hour SO₂ standard and there are no SO₂ sources that would have contributed to a violation in another county. Therefore, North Carolina is recommending that this county be designated attainment.

Dare County

Dare County is located in the northeast portion of the State. This county's total SO₂ emissions from permitted sources are estimated to be 3.2 tons per year (Table 8). The largest SO₂ emitter in the county was RPC Contracting Inc - Kitty Hawk, a small facility whose last reported emissions in 2007 were 3.1 tons of SO₂ per year. The NCDENR believes that the emissions in this county are significantly small enough that the county has not experienced a violation of the 1-hour SO₂ standard nor have SO₂ sources in the county contributed to a violation of the SO₂ standard. Therefore, North Carolina is recommending that this county be designated attainment.

Table 8. Dare County Permitted Facility Emissions (tons/year)

Facility Name	Reported SO₂	Year
Kitty Hawk Combustion Turbine Station	0.1	2009
RPC Contracting Inc - Kitty Hawk	3.1	2007
Total County Emissions	3.2	

Davie County

Davie County is located in the central portion of the State. This county's total SO₂ emissions from permitted sources are estimated to be 10.5 tons per year (Table 9). The largest SO₂ emitter in the county was APAC-Atlantic, Inc. - Plant #13 Mocksville, a small facility whose last reported emissions in 2007 were 8.2 tons of SO₂ per year. The NCDENR believes that the emissions in this county are significantly small enough that the county has not experienced a violation of the 1-hour SO₂ standard nor have SO₂ sources in the county contributed to a violation of the SO₂ standard. Therefore, North Carolina is recommending that this county be designated attainment.

Table 9. Davie County Permitted Facility Emissions (tons/year)

Facility Name	Reported SO₂	Year
Panels, Services & Components, Inc.	0.1	2009
Funder America, Inc.	2.2	2007
APAC-Atlantic, Inc. - Plant #13 Mocksville	8.2	2007
Total County Emissions	10.5	

Forsyth County

Forsyth County is located in the central part of the State. There is an SO₂ monitor in the county that demonstrates attainment of the 1-hour SO₂ standard. The emissions inventory for the Forsyth County sources is listed in Table 10 below and was provided by the local program Forsyth County Environmental Affairs Department. Even with a county total of approximately 341 tons per year of SO₂, the Forsyth County monitor is not only attaining the revised SO₂ standard, the 2008-210 design value of 20 ppb is well below the 1-hour SO₂ standard. Therefore, North Carolina is recommending that this county be designated attainment.

Table 10. Forsyth County Permitted Facility Emissions (tons/year)

Facility Name	2009 Reported SO₂ Emissions
Oracle Flexible Packaging-Liberty (604)	0.1
Rexam Beverage Can Company	0.1
Hayworth-Miller Funeral Home	0.1
Hanesbrands, Inc.	0.1
Oracle Flexible Packaging-Phoenix (200)	0.1
FORSYTH MEMORIAL HOSPITAL	0.1
CAROLINA ART AND FRAME	0.2
North Carolina Baptist Hospitals, Inc.	0.3
Vulcan Materials - East Forsyth Quarry	0.8
Wilson-Cook Medical, Inc.	0.9
Taylor Brothers, Division of Conwood Company, L.P.	1.1
CRES TOBACCO COMPANY	1.1
Winston-Salem State University	1.9
Piedmont Landfill and Recycling Center	1.9
APAC-Atlantic, Inc., Thompson-Arthur Division	2.0
Salem Energy Systems, L.L.C.	2.3
R.J. Reynolds Tobacco Co. (Tobaccoville)	4.0
Muddy Creek Wastewater Treatment Plant	7.5
Cloverleaf Mixing, Inc.	8.4
APAC-Carolina, Inc., Thompson-Arthur Division	8.8
ARCHIE ELLEDGE WWTP	14.3
R.J. Reynolds Tobacco Company	22.2
HANES DYE AND FINISHING CO.	56.4
Corn Products International, Inc.	206.5
Total County Emissions	341.2

Gates County

Gates County is located in the northeast portion of the State. There are no permitted sources of SO₂ in this county. The NCDENR believes that this county has not experienced a violation of the 1-hour SO₂ standard and there are no SO₂ sources that would have contributed to a violation in another county. Therefore, North Carolina is recommending that this county be designated attainment.

Greene County

Greene County is located in the central part of the State. There are no permitted sources of SO₂ in this county. The NCDENR believes that this county has not experienced a violation of the 1-hour SO₂ standard and there are no SO₂ sources that would have contributed to a violation in

another county. Therefore, North Carolina is recommending that this county be designated attainment.

Henderson County

Henderson County is located in the southwest portion of the State. This county's total SO₂ emissions from permitted sources are estimated to be 9.8 tons per year (Table 11). The largest SO₂ emitter in the county was APAC-Atlantic, Inc. - Hendersonville, a small facility whose last reported emissions in 2008 were 7.3 tons of SO₂ per year. The NCDENR believes that the emissions in this county are significantly small enough that the county has not experienced a violation of the 1-hour SO₂ standard nor have SO₂ sources in the county contributed to a violation of the SO₂ standard. Therefore, North Carolina is recommending that this county be designated attainment.

Table 11. Henderson County Permitted Facility Emissions (tons/year)

Facility Name	Reported SO ₂	Year
UPM Raflatac, Inc	0.1	2009
Mills River Regional Water Treatment Fac	0.1	2009
Selee Corporation	0.1	2005
GE Lighting Solutions, LLC	0.2	2005
Cumberland Gravel & Sand Co.- Henderson County	0.6	2009
Enerdyne III LLC	0.6	2005
Wilsonart International, Inc.	0.8	2009
APAC-Atlantic, Inc. - Hendersonville	7.3	2008
Total County Emissions	9.8	

Hyde County

Hyde County is located in the northeast portion of the State. There were no SO₂ emissions reported from permitted sources. The NCDENR believes that this county has not experienced a violation of the 1-hour SO₂ standard and there are no SO₂ sources that would have contributed to a violation in another county. Therefore, North Carolina is recommending that this county be designated attainment.

Jackson County

Jackson County is located in the southwest portion of the State. This county's total SO₂ emissions from permitted sources are estimated to be 17.6 tons per year (Table 12). The largest SO₂ emitter in the county was Harrison Construction Division of APAC-Atlantic, Inc., a small facility whose last reported emissions in 2005 were 9.7 tons of SO₂ per year. The NCDENR believes that the emissions in this county are significantly small enough that the county has not

experienced a violation of the 1-hour SO₂ standard nor have SO₂ sources in the county contributed to a violation of the SO₂ standard. Therefore, North Carolina is recommending that this county be designated attainment.

Table 12. Jackson County Permitted Facility Emissions (tons/year)

Facility Name	Reported SO₂	Year
Western Carolina University	0.2	2009
T & S Hardwoods, Inc.	0.6	2006
Jackson Paper Manufacturing Company	7.1	2009
Harrison Construction Division of APAC-Atlantic, Inc.	9.7	2005
Total County Emissions	17.6	

Jones County

Jones County is located in the eastern part of the State. There are no permitted sources of SO₂ in this county. The NCDENR believes that this county has not experienced a violation of the 1-hour SO₂ standard and there are no SO₂ sources that would have contributed to a violation in another county. Therefore, North Carolina is recommending that this county be designated attainment.

Lee County

Lee County is located in the central portion of the State. This county's total SO₂ emissions from permitted sources are estimated to be 17.6 tons per year (Table 13). The largest SO₂ emitter in the county was S. T. Wooten Corporation - Sanford Asphalt Plant, a small facility whose last reported emissions in 2008 were 9.6 tons of SO₂ per year. The NCDENR believes that the emissions in this county are significantly small enough that the county has not experienced a violation of the 1-hour SO₂ standard nor have SO₂ sources in the county contributed to a violation of the SO₂ standard. Therefore, North Carolina is recommending that this county be designated attainment.

Table 13. Lee County Permitted Facility Emissions (tons/year)

Facility Name	Reported SO₂	Year
Tyson Foods Inc	0.1	2008
Caterpillar Inc., BCP Sanford	0.1	2006
City of Sanford Water Treatment Plant	0.2	2008
Moen, Inc.	0.4	2005
Noble Oil Services Inc	3.1	2007
Pfizer	4.1	2008
S. T. Wooten Corporation - Sanford Asphalt Plant	9.6	2008
Total County Emissions	17.6	

Macon County

Macon County is located in the southwest portion of the State. This county's total SO₂ emissions from permitted sources are estimated to be 12.8 tons per year (Table 14). The largest SO₂ emitter in the county was Harrison Construction Division of APAC-Atlantic Inc., a small facility whose last reported emissions in 2008 were 8.8 tons of SO₂ per year. The NCDENR believes that the emissions in this county are significantly small enough that the county has not experienced a violation of the 1-hour SO₂ standard nor have SO₂ sources in the county contributed to a violation of the SO₂ standard. Therefore, North Carolina is recommending that this county be designated attainment.

Table 14. Macon County Permitted Facility Emissions (tons/year)

Facility Name	Reported SO ₂	Year
Zickgraf Hardwood Flooring Company, LLC - Plant Z1	1.6	2008
Rhodes Brothers Paving, Inc.	2.4	2009
Harrison Construction Division of APAC-Atlantic Inc.	8.8	2008
Total County Emissions	12.8	

Madison County

Madison County is located in the western portion of the State. This county's total SO₂ emissions from permitted sources are estimated to be 0.2 tons per year (Table 15). The only SO₂ emitter in the county was McCrary Stone Service, Inc. - Crushing & Screening Plant, a small facility whose last reported emissions in 2009 were 0.2 tons of SO₂ per year. The NCDENR believes that the emissions in this county are significantly small enough that the county has not experienced a violation of the 1-hour SO₂ standard nor have SO₂ sources in the county contributed to a violation of the SO₂ standard. Therefore, North Carolina is recommending that this county be designated attainment.

Table 15. Madison County Permitted Facility Emissions (tons/year)

Facility Name	Reported SO ₂	Year
McCrary Stone Service, Inc. - Crushing & Screening Plant	0.2	2009

Mecklenburg County

Mecklenburg County is located in the south central part of the State. There is an SO₂ monitor in the county that demonstrates attainment of the 1-hour SO₂ standard. The emissions inventory for the Mecklenburg County sources is listed in Table 16 below and was provided by the local program Mecklenburg County Air Quality. Even with a county total of approximately 217 tons per year of SO₂, the Mecklenburg County monitor is attaining the revised SO₂ standard, with the

2008-2010 design value of 40 ppb, well below the 1-hour SO₂ standard. Therefore, North Carolina is recommending that this county be designated attainment.

Table 16. Mecklenburg County Permitted Facility Emissions (tons/year)

Facility Name	Estimated SO₂ Emissions (tons)
Presbyterian Hospital - Matthews	0.0
Rohm and Haas Chemicals, LLC	0.0
D.H. Griffin Grading & Crushing, LLC	0.1
MNC Holdings, LLC	0.1
C-MUD: Mallard Creek Water Reclamation Facility	0.1
Ferebee Asphalt Corp - Charlotte South Plant	0.1
Forbo Siegling, LLC	0.1
Davidson College	0.1
Duke Energy - McGuire Nuclear Station	0.1
C-MUD: McDowell Creek Wastewater Treatment Plant	0.1
Lance, Incorporated	0.1
Blythe Construction, Inc.	0.1
Blythe Construction, Inc. - North Plant	0.1
Metrolina Greenhouses, Inc.	0.1
University of North Carolina at Charlotte	0.2
Ferebee Asphalt Corporation- Statesville Rd. Plant	0.2
J.T. Russell & Sons, Inc.	0.2
C & M Recycling, Inc.	0.3
Rea Contracting - Mallard Creek	0.3
Red Clay Industries	0.4
Interstate Custom Crushing, LLC	0.4
Siemens Power Generation, Inc.	0.4
Lincoln Harris, LLC	0.6
C-MUD: Franklin Water Treatment Plant	0.9
Mallard Creek Polymers, Inc.	0.9
Novant Healthcare's Presbyterian Hospital	1.0
Huntersville Hardwoods	1.3
Charlotte Douglas International Airport	1.7
C-MUD: McAlpine Creek Wastewater Treatment Plant	1.8
IGM Resins Charlotte, Inc	1.9
Rea Contracting (069 Arrowood)	4.6
Charlotte Pipe & Foundry Company, Inc.	6.5
Gerdau Ameristeel US Inc. Charlotte Steel Mill Div	13.9
Cargill, Inc.	54.8

Table 16. Mecklenburg County Permitted Facility Emissions (tons/year)

Facility Name	Estimated SO₂ Emissions (tons)
Frito-Lay, Incorporated	123.5
Total County Emissions	217.0

Mitchell County

Mitchell County is located in the western portion of the State. This county's total SO₂ emissions from permitted sources are estimated to be 6 tons per year (Table 17). The largest SO₂ emitter in the county was United States Gypsum Company, a small facility whose last reported emissions in 2009 were 4.1 tons of SO₂ per year. The NCDENR believes that the emissions in this county are significantly small enough that the county has not experienced a violation of the 1-hour SO₂ standard nor have SO₂ sources in the county contributed to a violation of the SO₂ standard. Therefore, North Carolina is recommending that this county be designated attainment.

Table 17. Mitchell County Permitted Facility Emissions (tons/year)

Facility Name	Reported SO₂	Year
The Quartz Corp USA, K-T Feldspar Corporation	1.9	2007
United States Gypsum Company	4.1	2009
Total County Emissions	6.0	

Pamlico County

Pamlico County is located in the eastern part of the State. There are no permitted sources of SO₂ in this county. The NCDENR believes that this county has not experienced a violation of the 1-hour SO₂ standard and there are no SO₂ sources that would have contributed to a violation in another county. Therefore, North Carolina is recommending that this county be designated attainment.

Pasquotank County

Pasquotank County is located in the northeast portion of the State. This county's total SO₂ emissions from permitted sources are estimated to be 17.6 tons per year (Table 18). The largest SO₂ emitter in the county was Barnhill Contracting Company - Elizabeth City, a small facility whose last reported emissions in 2006 were 6.2 tons of SO₂ per year. The NCDENR believes that the emissions in this county are significantly small enough that the county has not experienced a violation of the 1-hour SO₂ standard nor have SO₂ sources in the county contributed to a violation of the SO₂ standard. Therefore, North Carolina is recommending that this county be designated attainment.

Table 18. Pasquotank County Permitted Facility Emissions (tons/year)

Facility Name	Reported SO₂	Year
Elizabeth City Wastewater Treatment Plant	0.4	2009
Albemarle Hospital	0.6	2009
Sanders Co Inc	0.6	2009
Parkway Ag Supply, L. L. C. - Morgans Corner	1.3	2009
J W Jones Lumber Co Inc	1.3	2009
USCG Base Support Unit Elizabeth City	2.0	2005
Interstate Custom Crushing, LLC - Pasquotank	5.2	2008
Barnhill Contracting Company - Elizabeth City	6.2	2006
Total County Emissions	17.6	

Pender County

Pender County is located in the southeast portion of the State. There are no permitted sources of SO₂ in this county. The NCDENR believes that this county has not experienced a violation of the 1-hour SO₂ standard and there are no SO₂ sources that would have contributed to a violation in another county. Therefore, North Carolina is recommending that this county be designated attainment.

Perquimans County

Perquimans County is located in the northeast portion of the State. There are no permitted sources of SO₂ in this county. The NCDENR believes that this county has not experienced a violation of the 1-hour SO₂ standard and there are no SO₂ sources that would have contributed to a violation in another county. Therefore, North Carolina is recommending that this county be designated attainment.

Polk County

Polk County is located in the western part of the State. There are no permitted sources of SO₂ in this county. The NCDENR believes that this county has not experienced a violation of the 1-hour SO₂ standard and there are no SO₂ sources that would have contributed to a violation in another county. Therefore, North Carolina is recommending that this county be designated attainment.

Swain County

Swain County is located in the western part of the State. This county's total SO₂ emissions from permitted sources are estimated to be 1.3 tons per year (Table 19). The largest SO₂ emitter in the county was HMC Paving & Construction Company, Inc., a small facility whose last reported emissions in 2007 were 1 tons of SO₂ per year. The NCDENR believes that the emissions in this

county are significantly small enough that the county has not experienced a violation of the 1-hour SO₂ standard nor have SO₂ sources in the county contributed to a violation of the SO₂ standard. Therefore, North Carolina is recommending that this county be designated attainment.

Table 19. Swain County Permitted Facility Emissions (tons/year)

Facility Name	Reported SO₂	Year
Powell Industries, Inc.	0.3	2005
HMC Paving & Construction Company, Inc.	1.0	2007
Total County Emissions	1.3	

Transylvania County

Transylvania County is located in the western portion of the State. This county's total SO₂ emissions from permitted sources are estimated to be 9.7 tons per year (Table 20). The largest SO₂ emitter in the county was APAC-Atlantic, Inc. - Transylvania County, a small facility whose last reported emissions in 2007 were 7.1 tons of SO₂ per year. The NCDENR believes that the emissions in this county are significantly small enough that the county has not experienced a violation of the 1-hour SO₂ standard nor have SO₂ sources in the county contributed to a violation of the SO₂ standard. Therefore, North Carolina is recommending that this county be designated attainment.

Table 20. Transylvania County Permitted Facility Emissions (tons/year)

Facility Name	Reported SO₂	Year
Vulcan Construction Materials, LP - Penrose Quarry	0.3	2009
Rhodes Brothers Paving, Inc. - Transylvania	2.3	2007
APAC-Atlantic, Inc. - Transylvania County	7.1	2007
Total County Emissions	9.7	

Tyrell County

Tyrell County is located in the northeast portion of the State. There are no permitted sources of SO₂ in this county. The NCDENR believes that this county has not experienced a violation of the 1-hour SO₂ standard and there are no SO₂ sources that would have contributed to a violation in another county. Therefore, North Carolina is recommending that this county be designated attainment.

Warren County

Warren County is located in the north central portion of the State. This county's total SO₂ emissions from permitted sources are estimated to be 0.5 tons per year (Table 21). The only SO₂

emitter in the County was Elberta Crate and Box Company, a small facility whose last reported emissions in 2009 were 0.5 tons of SO₂ per year. The NCDENR believes that the emissions in this county are significantly small enough that the county has not experienced a violation of the 1-hour SO₂ standard nor have SO₂ sources in the county contributed to a violation of the SO₂ standard. Therefore, North Carolina is recommending that this county be designated attainment.

Table 21. Warren County Permitted Facility Emissions (tons/year)

Facility Name	Reported SO ₂	Year
Elberta Crate and Box Company	0.5	2009

Washington County

Washington County is located in the eastern portion of the State. This county's total SO₂ emissions from permitted sources are estimated to be 1.2 tons per year (Table 22). The largest SO₂ emitter in the county was Mackeys Ferry Sawmill Inc., a small facility whose last reported emissions in 2007 were 0.8 tons of SO₂ per year. The NCDENR believes that the emissions in this county are significantly small enough that the county has not experienced a violation of the 1-hour SO₂ standard nor have SO₂ sources in the county contributed to a violation of the SO₂ standard. Therefore, North Carolina is recommending that this county be designated attainment.

Table 22. Washington County Permitted Facility Emissions (tons/year)

Facility Name	Reported SO ₂	Year
New Colony Farms, L.L.C.	0.4	2009
Mackeys Ferry Sawmill Inc.	0.8	2007
Total County Emissions	1.2	

Wake County

Wake County is located in the central part of the State. There is an SO₂ monitor in the county that demonstrates attainment of the 1-hour SO₂ standard. This county's total emissions from permitted sources were estimated to be 221 tons per year (Table 23). The largest SO₂ emitter in the county was Dorothea Dix Campus with estimated SO₂ emissions of 71 tons per year. Even with a county total of approximately 221 tons per year of SO₂, this monitor is not only attaining the revised SO₂ standard, but the 2008-210 design value is 14 ppb, which is significantly below the 1-hour SO₂ standard. Therefore, North Carolina is recommending that this county be designated attainment.

Table 23. Wake County Permitted Facility Emissions (tons/year)

Facility Name	Reported SO₂	Year
Austin Quality Foods, Inc.	0.1	2009
WakeMed	0.1	2009
Nomaco Inc - Zebulon	0.1	2009
Hanson Aggregates Southeast, LLC - Holly Springs	0.2	2009
City of Raleigh Wilders Grove Landfill	0.9	2009
NC DOA Central Heating Plant	1.1	2009
Ajinomoto AminoScience, LLC	1.7	2009
North Wake County Landfill Facility	2.1	2009
Barnhill Contracting Company	2.8	2009
Carolina Sunrock, LLC - RDU Distribution Center	4.4	2009
Rea Contracting (West Raleigh)	4.4	2009
Cargill Inc - Raleigh	15.1	2009
NCSU Central Heat Plant	47.3	2009
Metokote	0.1	2005
Biogen Idec US Limited Partnership	0.1	2008
Public Service Company of NC Inc	0.1	2006
EnWood Structures Inc	0.1	2003
Town of Cary - South Cary Water Reclamation Facility	0.1	2008
Raleigh Steam Producers, LLC	0.1	2005
Fujifilm Diosynth Biotechnologies U.S.A., LLC	0.1	2008
Wake Stone Corporation - Triangle Quarry	0.2	2007
NC DOC - Central Prison	0.2	2005
WakeMed Cary Hospital	0.2	2005
Meredith College	0.2	2006
Potters Industries L.L.C.	0.3	2008
GSK, Inc.	0.5	2007
Raleigh-Durham Airport Authority	0.7	2006
Rex Healthcare	1	2008
CP&L - Harris Nuclear Plant	2.4	2005
Fred Smith Company-Holly Springs Asphalt Plant	6.9	2008
Fred Smith Company - Westgate plant	8.5	2005
Fred Smith Company - Knightdale Asphalt Plant	8.5	2006
T R Vernal Paving, Inc.	10.2	2007
Mallinckrodt Inc	14	2005
Rea Contracting (Garner)	15.4	2006
Dorothea Dix Campus	71	2005
Total County Emissions	221.2	

Watauga County

Watauga County is located in the northwest portion of the State. This county's total SO₂ emissions from permitted sources are estimated to be 15.4 tons per year (Table 24). The largest SO₂ emitter in the county was Maymead Materials, Inc. - Brown Brothers Site, a small facility whose last reported emissions in 2007 were 10.2 tons of SO₂ per year. The NCDENR believes that the emissions in this county are significantly small enough that the county has not experienced a violation of the 1-hour SO₂ standard nor have SO₂ sources in the county contributed to a violation of the SO₂ standard. Therefore, North Carolina is recommending that this county be designated attainment.

Table 24. Watauga County Permitted Facility Emissions (tons/year)

Facility Name	Reported SO ₂	Year
Appalachian State University	3.5	2009
International Resistive Company, Inc.	0.1	2006
Watauga Wood Products, Inc.	0.7	2007
Watauga Medical Center	0.9	2005
Maymead Materials, Inc. - Brown Brothers Site	10.2	2007
Total County Emissions	15.4	

Yadkin County

Yadkin County is located in the north central part of the State. There are no permitted sources of SO₂ in this county. The NCDENR believes that this county has not experienced a violation of the 1-hour SO₂ standard and there are no SO₂ sources that would have contributed to a violation in another county. Therefore, North Carolina is recommending that this county be designated attainment.

Area Specific Recommendation for Boundaries for 1-Hour SO₂ Unclassifiable/Attainment

The State of North Carolina is recommending the remaining counties, including the portion of New Hanover County outside of the recommended nonattainment area, be designated as unclassifiable/attainment for the 1-hour SO₂ standard. North Carolina believes a designation of unclassifiable/attainment is appropriate and is consistent with how designations have been made historically for the other NAAQS. The NCDENR opposes designating an area just unclassifiable since it portrays uncertainty to industry that might be looking to locate in North Carolina and could hurt the economic recovery of the State. Additionally, the NCDENR will be determining which sources may potentially violate the 1-hour SO₂ standard and under the State rule 15A NCAC 2D .0501 "Compliance with Emission Control Standards," require the sources to either control their SO₂ emissions or take permit limitations to ensure an exceedance of the standard will not occur.

As stated earlier, the USEPA's boundary guidance came out very late in the process and did not allow sufficient time for the states to implement the suggested methodology for determining designation recommendations by the submittal date of June 3, 2011. The State of North Carolina intends to supplement this recommendation after the NCDENR has completed additional analyses, which will include dispersion modeling. This analysis may indicate some of the counties recommended as unclassifiable/attainment be changed to a recommendation of attainment.

Appendix A

Potential Boundary Options Considered

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Sulfur Dioxide Standard and Nonattainment Designation Process

April 12, 2011



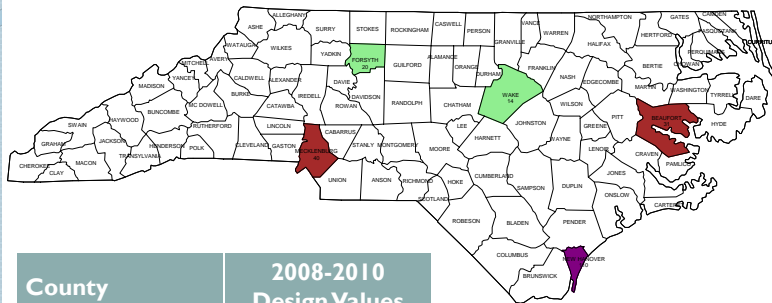
What is Sulfur Dioxide (SO₂)

- **SO₂ is a criteria pollutant specified in the Clean Air Act**
- **It is a pungent gas that is unhealthy to breathe**
 - **High levels of SO₂ can cause or worsen respiratory ailments & aggravate existing heart disease**
 - **Children, the elderly & other sensitive groups are most affected by exposures to high levels of SO₂**
- **Damages vegetation & materials such as buildings**
- **Contributes to the formation of particle pollution and acid rain**

2010 Sulfur Dioxide Standard

- **New scientific studies provide stronger evidence for link between short-term high level SO₂ exposures, ranging from 5 minutes to 24 hours, and adverse respiratory outcomes**
- **On June 2, 2010, EPA promulgated the primary NAAQS for SO₂**
 - **New 1-hour SO₂ standard of 75 ppb**
 - **Will revoke existing SO₂ standards after designations for 1-hour standard:**
 - **Annual – 30 ppb**
 - **24-hour – 140 ppb**

Current SO₂ Design Values



County	2008-2010 Design Values
New Hanover	110 ppb
Mecklenburg	40 ppb
Forsyth	20 ppb
Beaufort	31 ppb
Wake	14 ppb

Standard = 75 ppb

Designation Process

- **Clean Air Act requires States to submit nonattainment boundary recommendations within 1 year after the standard is set**
- **EPA responds back to state with their recommendations**
 - **At least 120 days before designations**
- **State can provide additional data to support their recommendations if different from EPA**
- **EPA makes final designations**
 - **EPA does not have to follow state recommendations**

What does SO₂ Nonattainment mean?

- **EPA label saying air quality does not meet a standard**
- **Once Designated:**
 - **Requires State to demonstrate how nonattainment areas will meet the standard**
 - **Requires new source review on new major industrial sources and major modifications on existing sources**
 - **Requires general conformity**
 - **Transportation conformity not required for SO₂**

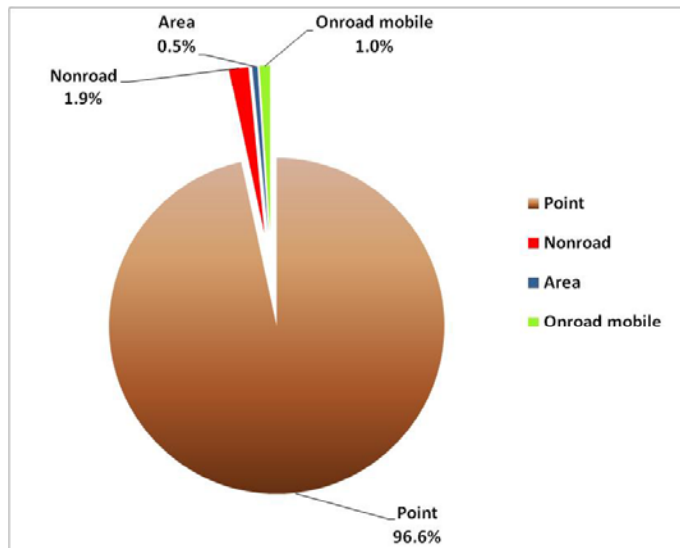
EPA Guidance Summary

- **A nonattainment area should contain the area violating the standard, as well as any adjacent areas (counties or portion thereof) that contain emissions sources contributing to the violation.**
- **Base recommendation on the evaluation of 5 factors**
 - **Air quality data**
 - **Emissions-related data**
 - **Meteorology**
 - **Geography/Topography**
 - **Jurisdictional Boundaries**

North Carolina's Process For Recommending Nonattainment Boundaries

- **Review EPA's guidance document**
- **Evaluate which monitors are violating**
- **Analyze cause/effect relationships and develop sensible boundary options**
- **Conduct public meetings**
- **Coordinate with other agencies impacted by nonattainment designations (NCDOC, and Local Governments)**

Sources of SO₂ Emissions (New Hanover, Brunswick, Pender Counties)



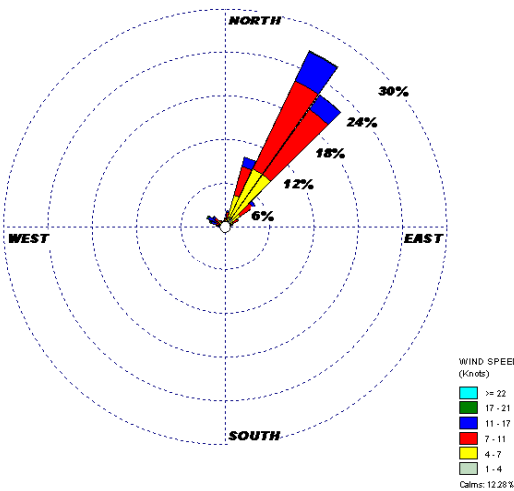
Top 10 SO₂ Point Sources in New Hanover, Brunswick & Pender

Source	Emissions (tons/year)	County
Progress Energy – Sutton	17,947	New Hanover
Invista S.A.R.L.	2,222	New Hanover
DAK Americas	2,167	Brunswick
CPI USA – Southport	1,734	Brunswick
Southern States Chemical	872	New Hanover
Elementis Chromium	318	New Hanover
New Hanover County WASTEC	23	New Hanover
Hess Corporation	12	New Hanover
Fortron Industries	8	New Hanover
Barnhill Contracting	7	New Hanover

Pollution Rose Plots

- Looked at the 5-minute-average SO₂ observations from 1/1/2008 through 12/31/2010
- 5-minute wind observations from **Wilmington airport** were gathered for 1/1/2008-12/31/2010 and matched against the corresponding SO₂ data
- Plotted wind observations when SO₂ concentrations were > 75 ppb

Wilmington Airport Wind Data When SO₂ Observations > 75 ppb 1/1/2008-12/31/2010

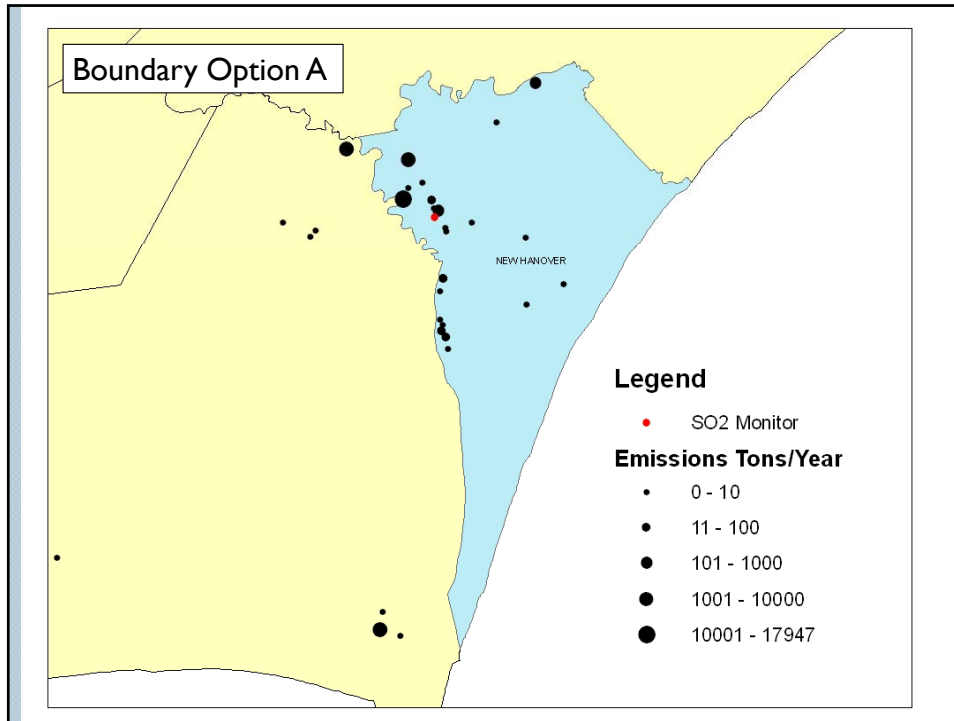


Nonattainment Boundary Options

- **NCDAQ has developed 7 different nonattainment boundary options**
 - **Option A – All of New Hanover County**
 - **Option B – All of New Hanover County & Part of Brunswick County**
 - **Option C – Northwest Township in Brunswick & Cape Fear Township in New Hanover**
 - **Option D – Cape Fear Township in New Hanover**
 - **Option E – River Boundary in New Hanover County & DAK America Property Boundary in Brunswick County**
 - **Option F – Polygon shape containing parts of Brunswick & New Hanover Counties**
 - **Option G – River Boundary in New Hanover County**

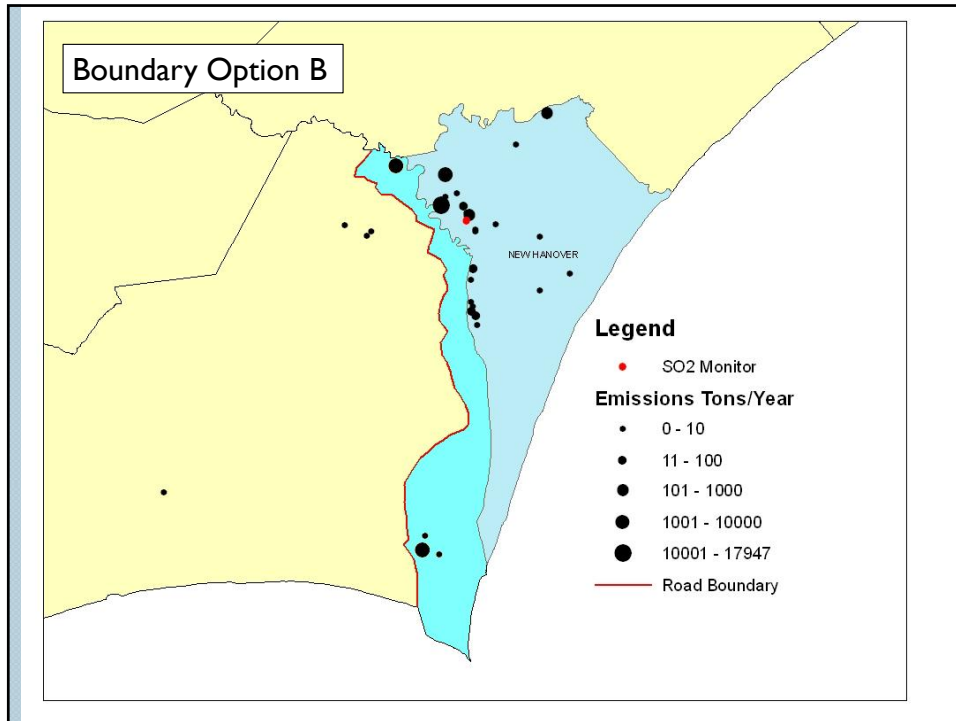
Boundary Option A New Hanover County

- **Contains ~85% of the SO₂ emissions in Wilmington Metropolitan Statistical Area (Brunswick, New Hanover, Pender Counties)**
- **Represents the EPA recommended starting point for determining SO₂ nonattainment areas**



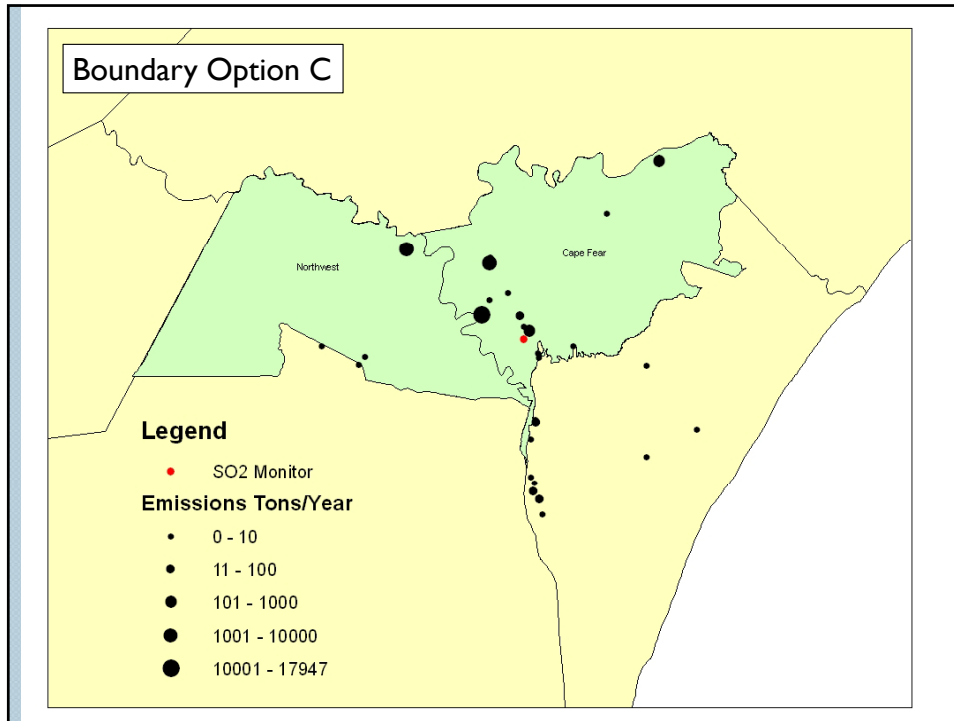
Boundary Option B
Part of Brunswick County and
all of New Hanover County

- **Contains 99.9% of the SO₂ emissions in Wilmington MSA**



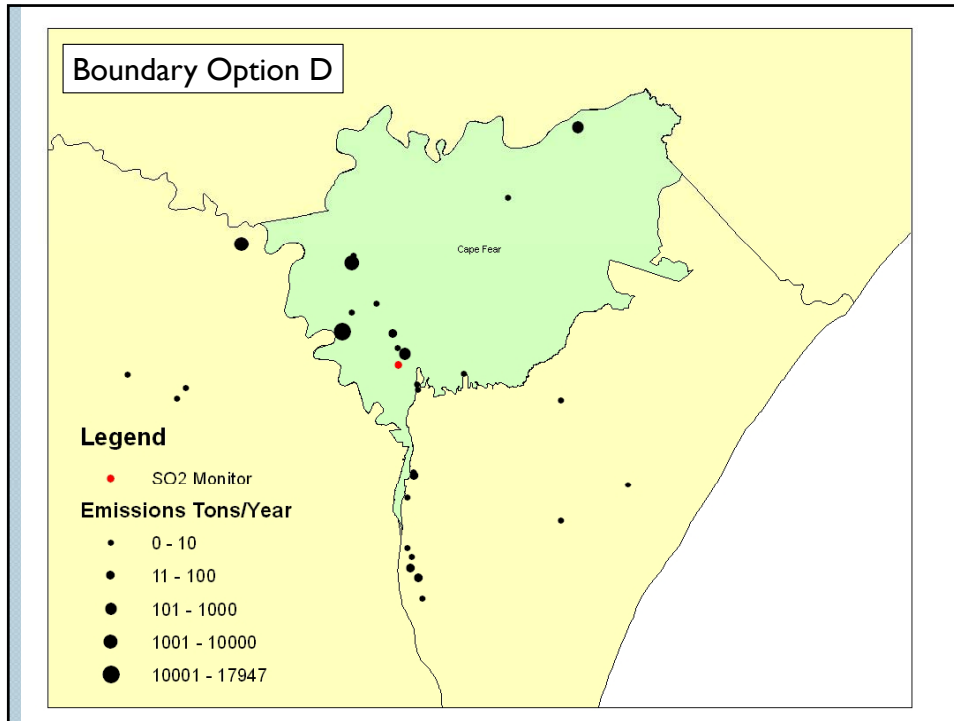
Boundary Option C
Northwest Township in Brunswick
Cape Fear Township in New Hanover

- **Contains ~93% of the SO₂ emissions in Wilmington MSA**



Boundary Option D Cape Fear Township in New Hanover County

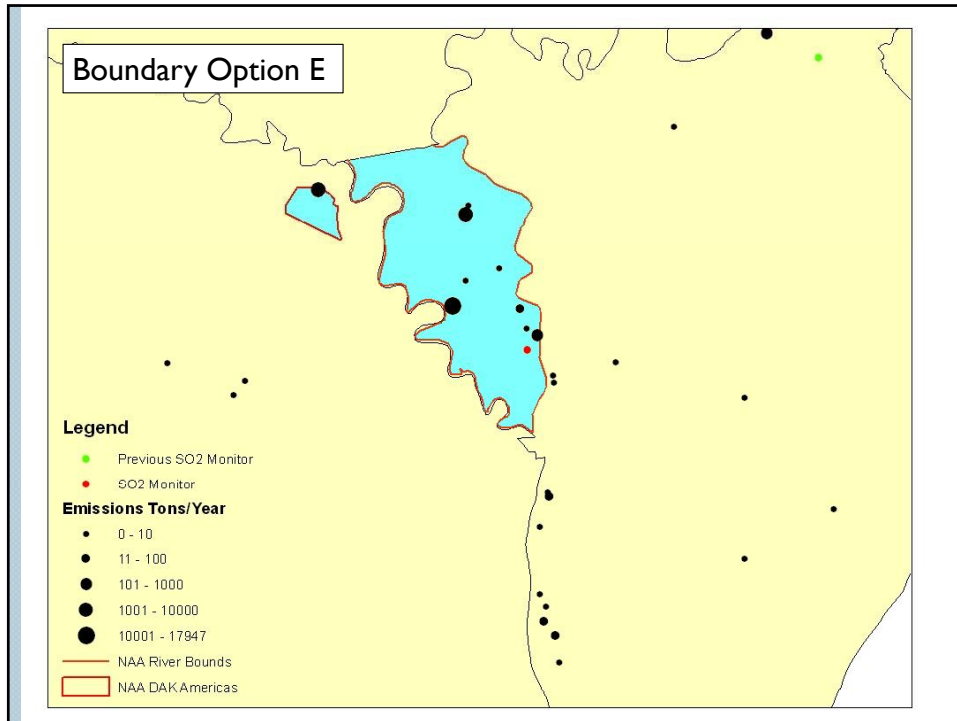
- **Contains ~84% of the SO₂ emissions in Wilmington MSA**
- **Contains ~99% of the SO₂ emissions in New Hanover County**



Boundary Option E

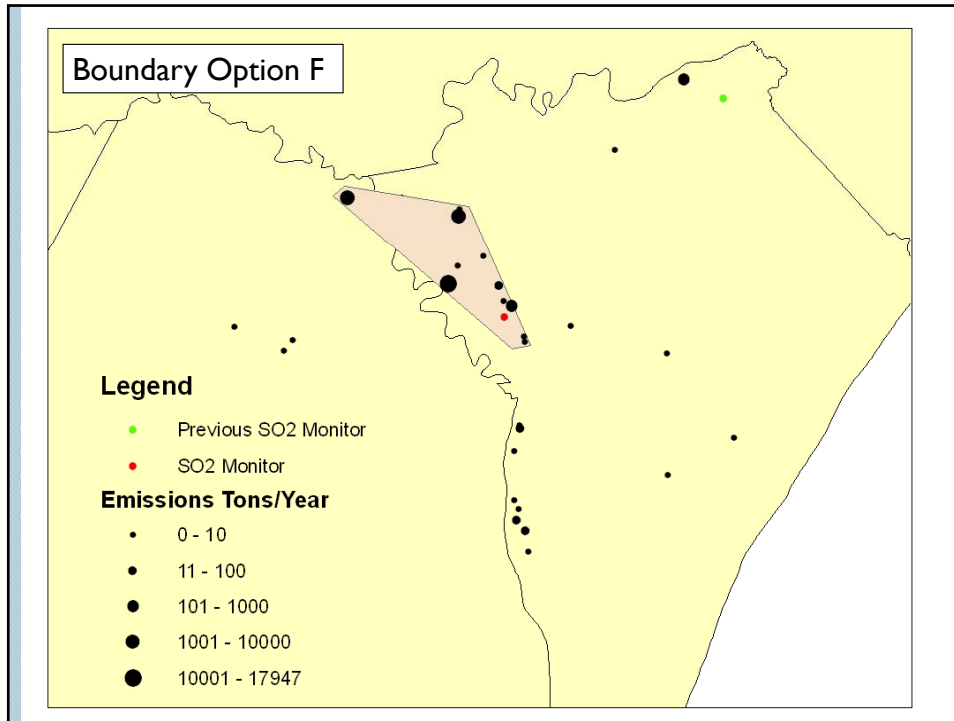
River Boundary in New Hanover and DAK America Property Boundary in Brunswick

- **Contains ~92% of the SO₂ emissions in
Wilmington MSA**
- **2005 Temporary SO₂ monitor at Castle
Hayne site had no exceedances of 1-hr
SO₂ standard**



Boundary Option F
Polygon Shape Identified by
Latitudes / Longitudes
Contains Part of Brunswick &
New Hanover Counties

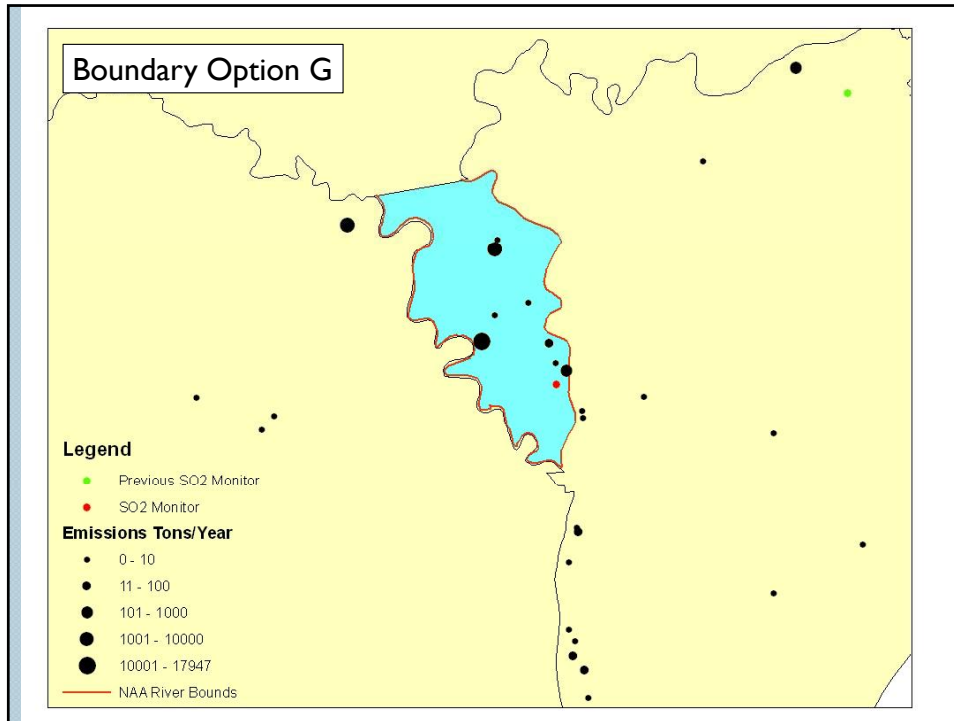
- **Contains ~92% of the SO₂ emissions in Wilmington MSA**



Boundary Option G

Boundary Between Northeast Cape Fear River and the Cape Fear River in New Hanover County

- **Contains ~83% of the SO₂ emissions in Wilmington Metropolitan Statistical Area (Brunswick, New Hanover, Pender Counties)**
- **Contains ~98% of the SO₂ emissions in New Hanover County**
- **2005 Temporary SO₂ monitor at Castle Hayne site had no exceedances of 1-hr SO₂ standard**



SO₂ Milestones

Deadline	Milestone
June 2010	EPA sets new primary SO ₂ standard
June 2011	State boundary recommendations to EPA
February 2012	EPA feedback on State recommendations
April 2012	State deadline to respond to EPA feedback
June 2012	EPA makes final designations
January 2013	New SO ₂ monitoring operational
June 2013	State Plan for Attainment areas due
February 2014	State Plan for Nonattainment areas due
August 2017	All areas attain the standard

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Comments on Potential Boundary Options

- Request comments by April 30th
- Send via email to:
 - DAQ.publiccomments@ncdenr.gov
- Send via FAX to:
 - (919) 715-7476
- Send via mail to:
Laura Boothe
Division of Air Quality
Mail Service Center 1641
Raleigh, NC 27699-1641

QUESTIONS?

Laura Boothe
Attainment Planning Branch Supervisor
◦ Laura.Boothe@ncdenr.gov
• (919) 733-1488

Brad Newland
Wilmington Regional Office Supervisor
Brad.Newland@ncdenr.gov
(910)796-7239

Copies of these slides can be found at
<http://daq.state.nc.us/planning/so2/>

Appendix B

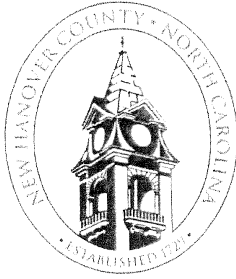
Local Government and Public
Comments Received

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NEW HANOVER COUNTY
BOARD OF COMMISSIONERS

230 GOVERNMENT CENTER DRIVE, SUITE 175
WILMINGTON, NC 28403
(910) 798-7149
(910) 798-7145 FAX
WWW.NHCGOV.COM

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Chairman
Jason R. Thompson
Vice-Chairman
Ted Davis, Jr.
Commissioner
Brian M. Berger
Commissioner
Richard G. Catlin
Commissioner
~~~  
Sheila L. Schult  
*Clerk to the Board*

April 28, 2011

Laura Boothe, Attainment Planning Branch Supervisor  
North Carolina Division of Air Quality  
Mail Service Center 1641  
Raleigh, NC 27699-1641

Re: New Hanover County Comments for Sulfur Dioxide Air Quality Nonattainment Boundary Recommendation

Dear Ms. Boothe,

Thank you for the opportunity to comment on the N.C. Division of Air Quality's potential boundary options for the sulfur dioxide (SO<sub>2</sub>) nonattainment designation as it applies to the violating monitor in New Hanover County. On behalf of New Hanover County, we respectfully submit the following comments.

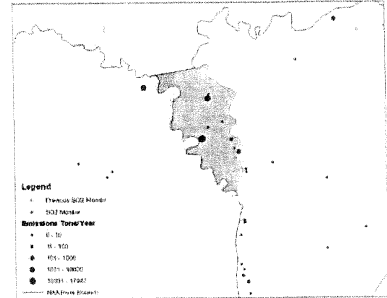
We firmly believe a boundary line should be drawn in a manner that represents the area of the County that is affected by the sulfur dioxide violation in order to adequately protect public health. We understand the health effects that result from breathing high levels of SO<sub>2</sub>, and as a county government, recognize that our primary responsibility is to protect our citizens from these impacts. To that end, the New Hanover County Board of Health recently passed an Air Quality Resolution urging state and local government officials to affirmatively endorse and implement regulatory standards that reduce air emissions that adversely impact health and the environment; reduce the proportion of populations exposed to harmful air pollutants; promote alternative modes of transportation to reduce motor vehicle emissions; and scrutinize all prospective businesses and industries that include or will result in any discharges of known or potential contaminants, pollutants and/or toxics to the environment. We also envision the economic impacts that will result from a nonattainment designation. In a time when employment rates are soaring, and many of our residents have lost their jobs and face losing their homes, we also strongly believe the importance of accurately delineating the boundary line so that it does not cause unintended economic impacts in areas of the County where the air is actually meeting the new SO<sub>2</sub> standard and public health is not being negatively impacted.

In EPA's guidance issued on March 24, 2011, EPA acknowledges that a single monitor may generally not be adequate to fully characterize ambient concentrations of SO<sub>2</sub>. EPA then goes on to state that available air quality monitoring and modeling information submitted by states will be considered, as appropriate, including data from 2011 that may become available. To assist with this, the County has contracted with an environmental firm to develop and implement a SO<sub>2</sub> ambient monitoring campaign to

gather data to provide backup information to N.C. Division of Air Quality to make a case for accurately delineating the scope of the potential nonattainment area in New Hanover County. The contractor recently started monitoring air quality concentrations at two additional locations in New Hanover County to assist with the demonstration of the geographic extent of the ambient air quality violation. Based on the statistical analysis completed, the contractor will generate S02 concentration contours for New Hanover County and recommend areas that should not be included in the nonattainment designation. In creating these contours, the contractor will also review historical ambient S02 monitoring data collected by DAQ at the monitoring location in Castle Hayne during 2005, and include this data in their analysis. The data will be available weekly as it is compiled, but the final analysis will not be completed until late June or early July of 2011. We realize that this is after your June 3, 2011 deadline to submit your recommendations for area designations to EPA, but we also understand that you will have several months thereafter to make modifications to your initial recommendation. We would hope that you would utilize the monitoring data that we will be collecting when making any preceding modifications to your initial recommendation, or to provide support for your initial recommendation.

We regret that we cannot submit our final comments on a boundary recommendation for New Hanover County until the additional monitoring data is available, however we would like to submit our preliminary comments based on the information that is currently available. Importantly, with the comments we are providing, we have purposely chose boundaries that omit the area surrounding the Wilmington International Airport. We felt that it was prudent to omit the Airport from the recommended boundary because of the General Conformity Rule that the Airport would be subject to if located within a nonattainment area.

In its guidance, EPA acknowledges that S02 concentrations are highest relatively close to the source(s) and much lower at greater distances due to dispersion. In New Hanover County, the majority of the sources of S02 (98%) are located within the Highway 421 corridor. During the presentations on April 12, N.C. Division of Air Quality staff presented a Boundary Option G that includes the Highway 421 corridor and 98% of the sources in New Hanover County. This option was also supported by existing S02 data taken in 2005 at the Castle Hayne monitoring station which did not show a violation of the 2010 S02 standard in that area. At this time, New Hanover County wishes to provide its support for Boundary Option G for the following reasons:



- The Boundary accounts for 98% of the S02 sources in New Hanover County.
- The Boundary is supported by data retrieved at the Castle Hayne monitoring station demonstrating that air quality levels were not in violation of the new standard at that monitor.
- The Boundary does not encompass the area surrounding the Wilmington International Airport.

When defining partial county boundaries, EPA in its guidance document recommends the use of well-defined jurisdictional lines such as township borders, immovable landmarks or other permanent and readily identifiable boundaries. As a secondary comment, we are also providing the following readily identifiable boundary as a possible option for a nonattainment boundary. In New Hanover County, there are two predominate areas that are zoned for heavy industry (I-2). These two areas contain the majority

of the S02 sources in New Hanover County (99%), all existing major sources of S02, and any land where a potential major S02 emitter could be established in the future. For your benefit, we have provided a map of the two predominate I-2 zoning districts in New Hanover County as a possible boundary option. While this boundary would include the monitor in Castle Hayne that exhibited air quality levels below the 2010 S02 standard, importantly, it also includes all major sources of S02 in New Hanover County without encumbering the area surrounding the Airport or other population centers.

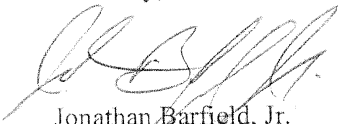
Additionally, we think it is important to note that the County is taking steps to amend the zoning ordinance so that any new high-intensity industrial uses in our I-2 district, or major expansions to existing uses, are required to go through a heightened level of review. This review would require that high-intensity industrial uses go through the process of receiving a Special Use Permit before being allowed to proceed with permitting – a process that would require two public hearings, a recommendation by the County's Planning Board and an ultimate decision by the Board of County Commissioners. The Special Use Permit would only be issued by the Board of County Commissioners if the Board found the following:

- 1) That the use will not materially endanger the public health or safety if located where proposed and approved;
- 2) That the use meets all required conditions and specifications;
- 3) That the use will not substantially injure the value of adjoining or abutting property, or that use is a public necessity; and
- 4) That the location and character of the use if developed according to the plan as submitted and approved will be in harmony with the area in which it is to be located and in general conformity with the plan of development in New Hanover County.

We felt that this information was important to include with these comments as an example of a measure we are taking from a local land-use perspective to try to prevent our air quality problem from becoming worse and to assure you that we are your partner in this effort.

Thank you again for the opportunity to comment on the proposed boundary for the S02 nonattainment designation and for taking the time to thoroughly consider New Hanover County's recommendations. We look forward to talking with you soon.

Sincerely,

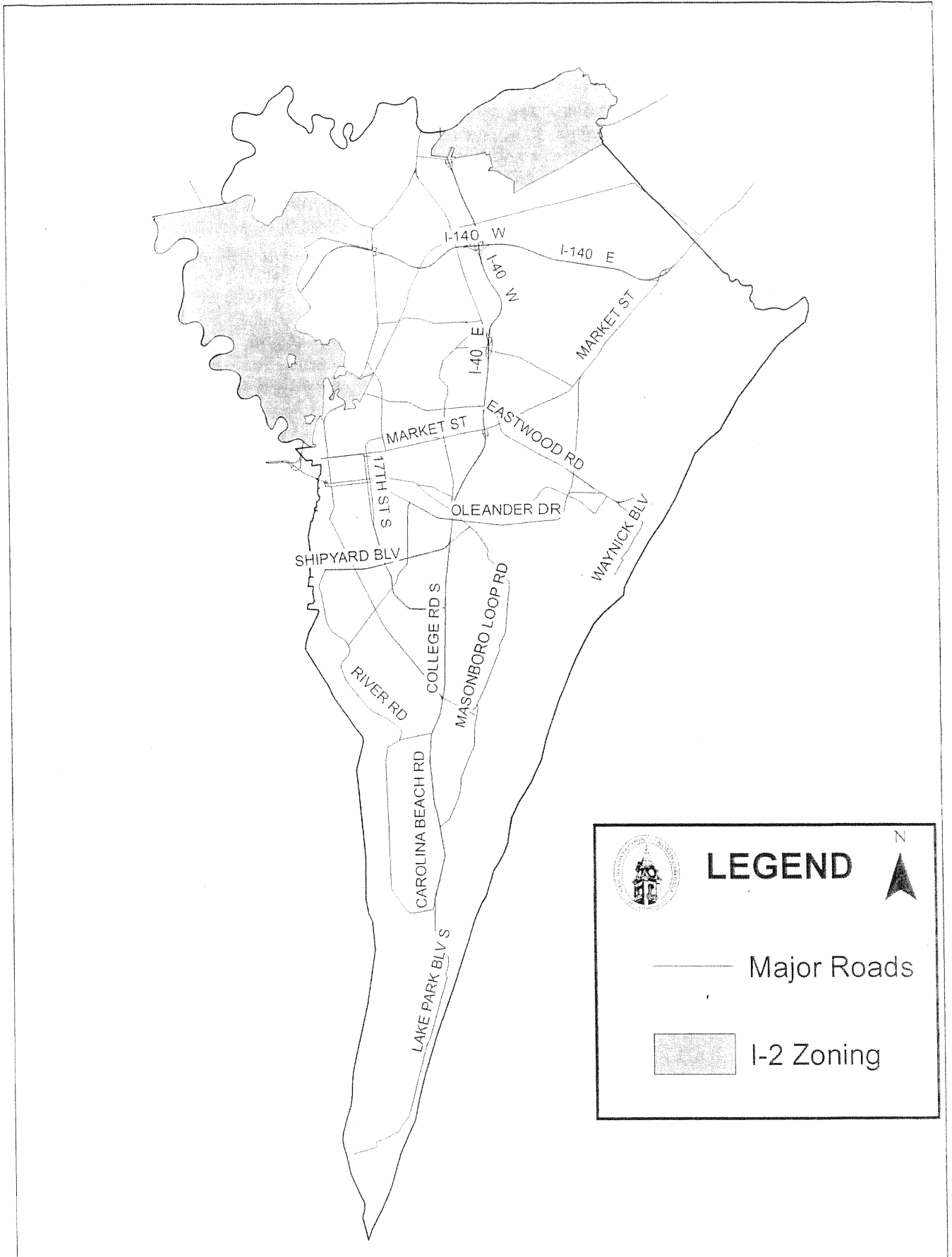


Jonathan Barfield, Jr.  
Chairman

Attachment

cc: Board of Commissioners  
Bruce Shell, County Manager  
Chris Coudriet, Assistant County Manager  
Chris O'Keefe, Planning and Inspections Director  
Shawn Ralston, Long Range Planning Manager





**Boothe, Laura**

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**From:** John, Trish, Jenna, Dain and Rebekah [TNIELSEN1@ec.rr.com]  
**Sent:** Tuesday, April 19, 2011 6:48 AM  
**To:** SVC\_DENR.DAQ.publiccomments  
**Subject:** no to new SO2 sources in New Hanover County until....

Dear Ms. Boothe:

I urge the Department of Air Quality to allow NO new major sources of SO2 in New Hanover County until the EPA has reviewed all the data and made their non-attainment designation and have approved an action plan.

We the citizens of New Hanover County and surrounding Counties are depending on the DAQ to make decisions that will be in the health and well being of our citizens.  
Of the Maps Options B would be my vote.

Thank you for your work.

You have a big responsibility to do the RIGHT thing for people and the environment, not non living, non breathing corporations.

Patricia Nielsen  
614 Robert E Lee Drive  
Wilmington, NC, 28412

910-793-9777

**Boothe, Laura**

---

**From:** david paynter [dpaynter@yahoo.com]  
**Sent:** Friday, April 22, 2011 5:06 PM  
**To:** SVC\_DENR.DAQ.publiccomments  
**Subject:** SO2 Boundaries for Wilmington, NC

Laura Boothe  
Division of Air Quality  
Raleigh, NC

In determining the boundaries for the nonattainment area for the Wilmington MSA, I would recommend using the most extensive boundaries possible. This would ensure that public health is protected as the area grows. In reviewing the NC Division of Air Quality's various options, B provides the best protection for public health. The boundaries of this option cover all of New Hanover County and the area of Brunswick County bordering the Cape Fear River. This area contains 99.9% of the SO2 emissions in the Wilmington MSA.

David Paynter  
6242 Head Rd  
Wilmington, NC 28409

**Boothe, Laura**

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**From:** Cig [cignotti@earthlink.net]  
**Sent:** Tuesday, April 26, 2011 3:04 PM  
**To:** SVC\_DENR.DAQ.publiccomments  
**Subject:** Sulfur Dioxide nonattainment New Hanover County

Attn: Laura Boothe,

I was surprised that there are only 5 NC counties currently being tested. While I am a strong supporter of clean air and water, I do believe it is paramount that we are being fair to everyone. To me, it is apparent that New Hanover County has an air quality issue. The issue is ensuring we improve the county's air quality in a reasonable manner and with a realistic time line. We did not get in this predicament over night and we won't clean it up over night. Any boundary chosen should not include the entire county or region and should be targeted near the polluting sources. Targeting the areas nearest the sources will lessen the "stigma" area and decrease the chances of crippling the local economy. The bottom line is NHC relies on tourism as its economic engine ... dirty air or water benefits no one. We can not sweep this problem under the rug. We must tackle it head on but also in a reasonable fashion with a realistic time line.

Sincerely,

David Cignotti  
Wrightsville Beach, NC

**Boothe, Laura**

---

**From:** Tina Evans [tina.evans@nc.eastersealsucp.com]  
**Sent:** Tuesday, April 26, 2011 4:25 PM  
**To:** SVC\_DENR.DAQ.publiccomments  
**Subject:** Stop Titan  
  
**Sensitivity:** Confidential

To whom it may concern, I have a deep concern for the concrete plant that is in motion to be built here in our town near Castle Hayne. Our children, their health as well as the air and water will be greatly effected by this plant. I urge all that are involved to think seriously about this before approving this project to go forth. Our children lives are at hand.

Tina Evans  
Adult & Children Services  
Wilm ICS Residential & DD Services Supv  
Easter Seals UCP NC & VA Inc.  
33 Darlington Ave Wilm,NC 28403  
(910) 790-5921 Ext 105  
Fax (910) 794-1036

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**Boothe, Laura**

---

**From:** Kayne Darrell [kaydee@ec.rr.com]  
**Sent:** Wednesday, April 27, 2011 11:24 AM  
**To:** SVC\_DENR.DAQ.publiccomments  
**Subject:** SO2 non attainment

I find it so disturbing that New Hanover County's largest source of SO2 emission is sitting right next to the soccer complex where thousands of our children are playing soccer seven days a week. I truly hope that we can avoid causing more asthma and other respiratory diseases to our children by not adding any more pollutants to our already toxic air. Please, please, for the sake of our children, do not allow any new sources of SO2 into our area until we can correct this existing problem. Our community is looking to DENR to protect us and protect our children.

Thank you  
Kayne Darrell  
5008 Castle Lakes Rd  
Castle Hayne, NC 28429

**Boothe, Laura**

---

**From:** Michele Zapple [michelezapple@yahoo.com]  
**Sent:** Wednesday, April 27, 2011 12:33 PM  
**To:** SVC\_DENR.DAQ.publiccomments

To Whom It May Concern,

Please do not allow any new sources of air pollution in Wilmington or New Hanover County. Air quality, along with water quality, is most important to our quality of life here in Wilmington. I moved my family here from Los Angeles 14 years ago, and believe me, being able to breathe, without it hurting to inhale, is important. I am not exaggerating; we used to tell our 3 children, "Just try not to take a deep breath" during air quality alerts, which had become an almost daily occurrence in our 19 years there. Our air quality is already compromised here; insist that the EPA do its job and enforce air quality before it's too late.

Thank you,  
Michele Zapple

**Boothe, Laura**

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**From:** Licia Lathan [licialathan@yahoo.com]  
**Sent:** Saturday, April 30, 2011 1:37 PM  
**To:** SVC\_DENR.DAQ.publiccomments  
**Subject:** improve our air quality

I live in Wilmington, actually more in Castle Hayne but technically Wilmington. I have learned of pollution problems already affecting the quality of life here such as high sulfur dioxide and mercury emissions. I am so angry that others are willing to make the pollution problems in this area even worse by adding to the chemicals being released by industries around here. Besides being opposed to the Titan Plant, I am opposed to any industry that will increase the release of chemicals that may harm health here. We need to reduce pollution here now! Not increase it! My 5 and 9 year old nephews would no doubt agree, as would my daughter who has fought respiratory problems nearly 18 years!

Sincerely,

Licia Lathan



*To protect and improve the water quality of the Lower Cape Fear River Basin through education, advocacy, and action.*

April 29, 2011



617 Surry Street  
Wilmington, NC 28401  
(910) 762-5606  
www.cfrw.us

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Page 1 of 1

Laura Boothe  
North Carolina Division of Air Quality  
Raleigh, NC 27699-1641

Dear Ms. Boothe,

This letter is in response to the sulfur dioxide nonattainment boundary decision under review by the NC Division of Air Quality (DAQ). I attended the information session held by DAQ in Wilmington to discuss the issue on April 12, 2011 and appreciate the time DAQ staff took to explain the process to the citizens of our region.

Cape Fear River Watch (CFRW) is the primary environmental advocacy organization for the protection and improvement of the Cape Fear River. Our 500+ members believe that a healthy environment is our right as residents of the Cape Fear region. As the Cape Fear Riverkeeper I speak for our members, our Board of Directors, and the Cape Fear River itself.

Due to the short notice of the proposed boundaries, CFRW is not able to recommend a specific option. However, I do urge DAQ to consider the issue based on a long term projection of our region's growth rather than short term "solutions" to the pending nonattainment designation.

As your presentation points out SO<sub>2</sub> is unhealthy to breathe for any amount of time, especially for sensitive groups, including children and the elderly. As anyone who spends time outdoors in our area will attest to wind speed and direction is much more variable than your wind rose plots indicate.

As the agency charged with working "with the state's citizens to protect and improve outdoor, or ambient, air quality in North Carolina for the health and benefit of all" I urge you to choose option A, B, or C. These options go the farthest in protecting air quality for our citizens.

Finally, I would urge that until the designation process is finalized, that DAQ not issue any additional air emission permits. Issuing air permits to new sources of SO<sub>2</sub> seems irresponsible and extremely short sighted. Why, when facing restriction for emitting too much of a pollutant, would DAQ choose to allow more of that pollutant to be emitted.

Again, thank you for your presentation to our community and for your careful consideration of this letter on behalf of our members.

Best regards,

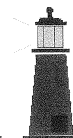
Kemp Burdette  
Cape Fear RIVERKEEPER©

*Cape Fear River Watch is a 501 c(3) nonprofit organization. Our Tax ID #is 58-2121884. Our mission is to protect and improve the water quality of the Lower Cape Fear River Basin through education, advocacy and action.*

*Financial information about this organization and a copy of its license are available from the Charitable Solicitation Licensing Section at 1-888-830-4989. The license is not an endorsement by the State.*

BRUNSWICK COUNTY  
ECONOMIC DEVELOPMENT COMMISSION

---



Laura Boothe  
Division of Air Quality  
Mail Service Center 1641  
Raleigh, NC 27699-1641

April 19, 2011

Dear Laura,

On behalf of the Brunswick County Economic Development Commission (EDC), we want to thank DENR for giving us the opportunity to comment pertaining to the options presented as to where the nonattainment designation could occur in the Wilmington region pertaining to Sulfur Dioxide emissions.

On Thursday, April 14<sup>th</sup>, the Brunswick County EDC met and discussed the nonattainment issue. We understand the importance of ensuring county citizens of a safe environment, however, we also recognize that, as shown in your presentation, most all of the major Sulfur Dioxide emissions come from industrial plants in New Hanover County. DAK is the only industry in Brunswick County near the companies in New Hanover County that exceeds the new Sulfur Dioxide emissions levels that EPA changed last summer. ADM is approximately 25 miles away.

In reviewing the seven alternatives DENR suggested, the EDC feels Option B and especially Option C would have a major adverse impact on the future economy of Brunswick County.

Option B includes the major growth corridor of Brunswick County from Leland to Southport which could affect future growth. As stated, this includes a swath of land over 25 miles long with the only industry being ADM at the end of the proposed boundary. Within that 25 mile corridor is some of the most concentrated residential growth in the county but no industries.

Option C includes most all of Brunswick County's industrial parks including the Leland Industrial Park, the International logistics Park of NC and the Mid Atlantic Logistics Center as well as major industrial sites in Northwest and Navassa. This area is the future of the Wilmington region where over 2,000 people are unemployed.

P.O. BOX 158 BOLIVIA, NC 28422 PH: (910) 253-4429 FAX: (910) 253-5326 EMAIL: [beedc@brunseo.net](mailto:beedc@brunseo.net)

Page 2  
April 19, 2011

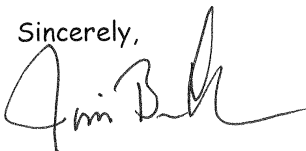
Brunswick County's Unified Development Ordinance (UDO) protects the county from allowing any polluting industries from locating in the county through zoning restrictions and requiring Use Permits for any heavy industries looking to locate here. The Use Permits requires a public hearing and close scrutiny by local and state authorities.

Option C includes two minority towns (Navassa and Northwest) that are in desperate need of job opportunities and have recently received federal and state grants to address their concerns.

As you know, if Option C is designated as nonattainment, it would greatly hinder our attempt to recruit new industry and hamper our existing industries to expand. With the high unemployment rate of over 11% in Brunswick County and thousands of people out of work in the region, it would be devastating to our local economy. The Commission hopes that with the protective requirements of the County's UDO and the fact that there is only one industry in Option C that exceeds Sulfur Dioxide levels, Option C will be dropped as an alternative.

At our meeting on April 14th, the Brunswick County EDC unanimously approved that Option G be recommended by DENR to the EPA as the nonattainment designated area for the Wilmington region for Sulfur Dioxide. Option G addresses the companies that have a major impact on the local environment. It also ensures the citizens of Brunswick County that the emissions issue will be addressed and that we can market our industrial parks and sites competitively.

Thank you again Laura for allowing the public to comment on your nonattainment area options, one of which will be recommended to the EPA. We sincerely hope that careful consideration is given as to how the nonattainment area affects Brunswick County. Feel free to contact me if you have any questions.

Sincerely,  


Jim Bradshaw  
Executive Director  
Brunswick County Economic Development Commission

P.O. BOX 158 BOLIVIA, NC 28422 PH: (910) 253-4429 FAX: (910) 253-5326 EMAIL: bcedc@brunscoco.net

# BRUNSWICK COUNTY ADMINISTRATION

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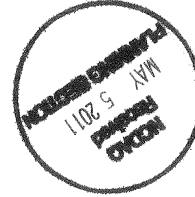
MAILING ADDRESS:

POST OFFICE BOX 249  
BOLIVIA, NORTH CAROLINA 28422

TELEPHONE  
(910) 253-2000  
(800) 442-7033

FAX  
(910) 253-2022

May 2, 2011



Ms. Laura Boothe  
N.C. Division of Air Quality  
Mail Service Center 1641  
Raleigh, North Carolina 27699-1641

RE: Sulfur Dioxide Nonattainment Area Designation

Dear Ms. Boothe:

I would like to thank you for attending a recent Board of Commissioners meeting to explain the Sulfur Dioxide Standard and Nonattainment Designation Process. Subsequent to that meeting, the Board has had the opportunity to evaluate the seven boundary options that are currently under consideration by your agency.

This is a very important matter regarding the public health and economy of our area. After a thorough evaluation of the options, on April 18, 2011 the Brunswick Board of Commissioners voted unanimously to recommend and support Option G.

Thank you for the opportunity to provide input for your consideration on the issue.

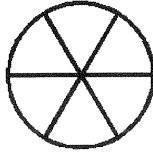
Sincerely,

A handwritten signature in black ink, appearing to read "Marty K. Lawing".

Marty K. Lawing  
County Manager



People Working



For People

April 29, 2011

Laura Boothe  
Division of Air Quality  
Mail Service Center 1641  
Raleigh, NC 27699-1641

**TOWN OF NAVASSA**

334 Main Street  
Navassa, NC 28451  
Phone: (910) 371-2432  
Fax: (910) 371-0041  
www.townofnavassa.org



**Town Council**

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Michael Ballard, **Mayor Pro Tem**  
Jerry Merrick  
Craig Suggs  
Milton Burns  
Tony Burgess

Claudia Bray, **Town Administrator**  
Charlena Alston, **Town Clerk**

Dear Laura,

On behalf of the Town of Navassa, we want to thank NCDENR for giving us the opportunity to comment pertaining to the options presented as to where the nonattainment designation could occur in the Wilmington region pertaining to Sulfur Dioxide emissions.

On Thursday, April 21<sup>st</sup>, the Navassa Town Council met and discussed the nonattainment issue. The town understands the importance of ensuring town residents of clean air and a healthy environment, but we also understand that our citizens desperately need jobs and economic development opportunities. The town feels that several of the options being considered for the Sulfur Dioxide nonattainment area would have significant adverse consequences on future development within the town. Based on the data that we have seen, the only major contributor to Sulfur Dioxide emissions in Brunswick County is the DAK Americas plant, with the vast majority of emissions originating from activities generated in New Hanover County.

In reviewing the seven alternatives NCDENR suggested, the Navassa Town Council has unanimously voted at their regularly scheduled meeting on Thursday, April 21<sup>st</sup>, to recommend that Option G be recommended by NCDENR to the EPA as the nonattainment designated area for the Wilmington region for Sulfur Dioxide. Option G addresses the companies that have a major impact on the local environment. It also ensures the citizens of Navassa that the emissions issue will be addressed and that we can market our industrially zoned land competitively.

Thank you again Laura for allowing the public to comment on the nonattainment area options. If you have any questions, please contact Travis Barnes, Town Planner at (910) 371-2432.

Best Regards,

Travis Barnes, MPA, LEED AP  
Town Planner  
334 Main Street  
Navassa, NC 28451  
tbarnes@townofnavassa.org

04/13/2011

Ms. Laura Boothe  
Division of Air Quality  
1641 Mail Service Center  
Raleigh, NC 27699-1641

Subject: New Hanover County SO<sub>2</sub> non-attainment

Dear Ms. Boothe,

I wanted to thank you for taking time from your busy schedule to address the pending SO<sub>2</sub> non-attainment boundary designation in New Hanover County. I appreciate the manner in which information was shared and the attempt to remain focused on the subject at hand during the 4/12/11 p.m. meeting.

As you can tell by the questions raised our issue is much bigger than the SO<sub>2</sub> topic of concern and therefore greatly limits "public comments", especially from industry. We being tax paying, law abiding, life-long citizens of New Hanover County are somewhat hamstrung due to our reluctance to speak in an open forum. Although our industries operate well within permitted limits, follow all applicable laws and are good community citizens some will not let facts get in the way of a misguided cause. Therefore I have the following comments:

1. EPA's reluctance to exclude emergency generation equipment greatly increases a site's potential emissions, regardless of restrictions on hours of operation.
2. Although the monitor located on the 421 corridor was tested and verified on occasion, we believe the readings to be skewed. The proximity to Wastec Incinerator and its co-mingled trash burning operation or the many pto-driven highly accelerated diesel truck engines, or the long-term idling vehicles on site do not represent the totality of New Hanover County. Granted the monitor may have shown a violation at that point, but we believe that to be worse case scenario.

With these comments in mind I would like to suggest a boundary as least intrusive as possible. Options F and G appear to capture the majority of SO<sub>2</sub> sources emissions while posing the least burdensome restrictions on industrial expansion or future growth.

Thanks for your time and consideration,

A Concerned Citizen of New Hanover County

# Appendix C

USEPA SO<sub>2</sub> Designation Guidance

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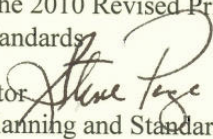
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
RESEARCH TRIANGLE PARK, NC 27711

MAR 24 2011

OFFICE OF  
AIR QUALITY PLANNING  
AND STANDARDS

**MEMORANDUM**

**SUBJECT:** Area Designations for the 2010 Revised Primary Sulfur Dioxide National Ambient Air Quality Standards

**FROM:** Stephen D. Page, Director   
Office of Air Quality Planning and Standards

**TO:** Regional Air Division Directors, Regions I-X

This memorandum provides information on the schedule and process for designating areas for the purpose of implementing the 2010 revised primary sulfur dioxide (SO<sub>2</sub>) national ambient air quality standard (NAAQS). In addition, it identifies factors EPA intends to evaluate in determining boundaries for areas designated nonattainment. We recommend that states and tribes consider and address these factors when identifying boundaries for their area designation recommendations. Please share this information with the state and tribal agencies in your Region.

On June 2, 2010, Administrator Jackson signed the revised primary SO<sub>2</sub> NAAQS (75 FR 35520, published on June 22, 2010) after review of the existing two primary SO<sub>2</sub> standards, promulgated on April 30, 1971 (36 FR 8187). EPA established the revised primary SO<sub>2</sub> standard at 75 parts per billion (ppb) which is attained when the 3-year average of the 99<sup>th</sup> percentile of 1-hour daily maximum concentrations does not exceed 75 ppb. The Administrator has determined that this is the level necessary to provide protection of public health with an adequate margin of safety, especially for children, the elderly and those with asthma. These groups are particularly susceptible to the health effects associated with breathing SO<sub>2</sub>.

General approach and schedule. Clean Air Act (CAA) section 107(d) directs states to submit their SO<sub>2</sub> designation recommendations to EPA by June 3, 2011. If EPA intends to modify any state's boundary recommendation, EPA will notify the state no later than 120 days prior to its action to promulgate designations (i.e., February 2012 for designations to be promulgated in June 2012), and the state will have an opportunity to comment on EPA's intended modifications and provide additional information for EPA to consider. Section 107(d)

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requires EPA to promulgate initial area designations by June 3, 2012, which is 2 years after promulgation of the revised primary standard. While the language in section 107 specifically addresses states, we intend to follow the same process for tribes, pursuant to section 301(d) of the CAA and the Tribal Authority Rule (40 CFR Part 49). Therefore, we intend to designate tribal areas, in consultation with the tribes, on the same schedule as state designations. If a state or tribe does not submit designation recommendations, EPA will promulgate the designations that it deems appropriate.

Sections III through VI of the preamble to the final rule promulgating the revised primary SO<sub>2</sub> NAAQS describe the approach EPA anticipates using for designations for the 1-hour SO<sub>2</sub> standard. EPA anticipates taking an analytic approach that uses both air quality monitoring and modeling information for designations. Such an approach, if adopted, would be consistent with EPA's historic practices for SO<sub>2</sub> NAAQS implementation. In that preamble we acknowledged that in some cases, monitoring data may be the more technically appropriate information for determining compliance with the 1-hour NAAQS. (See e.g., 75 FR at 35552, n. 22). We also recognized that a single monitor may generally not be adequate to fully characterize ambient concentrations of SO<sub>2</sub>, including the maximum ground level concentrations that exist around stationary SO<sub>2</sub> sources, particularly when measuring for a 1-hour standard. (See 75 FR at 35551). Refined dispersion models are able to characterize SO<sub>2</sub> air quality impacts from the modeled sources across the domain of interest on an hourly basis with a high degree of spatial resolution, thus overcoming the limitations of an approach based solely on monitoring.

Attachment 2 summarizes three possible designations and the criteria for initial designations of the 1-hour SO<sub>2</sub> primary standard that EPA expects to apply. As stated in the preamble, we do not believe it would be realistic or appropriate to expect states to complete modeling for all significant sources of SO<sub>2</sub> and assess the results in time for the designation recommendations the Act requires be submitted to EPA by June 3, 2011. (See 75 FR at 35570-71). Therefore, we do not generally expect states to provide refined dispersion modeling information along with their initial designation recommendations. However, EPA does intend to consider, as appropriate, available air quality monitoring and modeling information submitted by states or tribes in support of their recommendations.

States and tribes should identify areas as attainment, nonattainment or unclassifiable on the basis of available information. Given the currently limited network of SO<sub>2</sub> monitors, and our expectation that states will not yet have completed appropriate modeling of all significant SO<sub>2</sub> sources, we anticipate that most areas of the country will be designated "unclassifiable." If a state or tribe, following receipt of an EPA 120-day letter, has additional information that it wants EPA to consider with respect to a designation recommendation that EPA plans to modify, we request that such information be submitted within 60 days after receiving EPA's letter. This will help ensure that EPA can fully consider any such information prior to issuing final designations.

Also, although not required by statute, in order to consider public input in the designation process, we plan to provide a 30-day public comment period immediately following issuance of EPA's letters responding to the recommendations made by states and tribes. Attachment 1 is this anticipated schedule.

The preamble to the final NAAQS rulemaking includes a general discussion of states' statutory planning and emissions control responsibilities under each of the three possible designations. The CAA directs states with areas designated as "nonattainment" for SO<sub>2</sub> to develop and submit a plan within 18 months after designation providing for attainment as expeditiously as practicable, but no later than 5 years after the initial designation date. (See CAA sections 191-193). The CAA also directs states to submit by June 3, 2013, a SIP demonstrating an adequate program to implement, maintain and enforce the SO<sub>2</sub> NAAQS. Generally, these infrastructure plans for attainment areas are not expected to include an attainment demonstration. However, in light of the incomplete monitoring and modeling data available at the time of designations, for areas designated unclassifiable, we would expect states to include in these plans demonstrations of expeditious attainment and maintenance of the SO<sub>2</sub> NAAQS. EPA is developing separate guidance on developing SIP revisions for the SO<sub>2</sub> standard and we intend to seek public review and comment on that guidance document.

Identifying an area that is in violation of the SO<sub>2</sub> NAAQS. Section 107(d)(1) of the CAA defines an area as "nonattainment" if it is violating the NAAQS or if it is contributing to a violation in a nearby area. Thus, the first step in making designations is to identify through monitoring or appropriate modeling areas violating the NAAQS. In assessing whether monitoring data indicate a violation, EPA intends to use the most recent three consecutive years of quality-assured, certified air quality data in the EPA Air Quality System (AQS),<sup>1</sup> using data from Federal Reference Method (FRM) and Federal Equivalent Method (FEM) monitors that are sited and operated in accordance with 40 CFR Parts 50 and 58. Procedures for using monitored air quality data to determine whether a violation has occurred are given in 40 CFR Part 50 Appendix T, as revised in conjunction with the final rule for the 2010 SO<sub>2</sub> NAAQS. We expect that in providing their recommendations to EPA, states and tribes would review available SO<sub>2</sub> monitoring data from 2008 through 2010. Prior to EPA issuing letters to states and tribes concerning any intended modifications to their recommendations, data from 2011 may become available. If this is the case, EPA intends to also consider 2011 SO<sub>2</sub> air quality monitoring data in formulating any intended modifications to state and tribal recommendations.

Air quality monitoring data affected by exceptional events may be excluded from use in identifying a violation if they meet the criteria for exclusion, as specified in the final rule

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<sup>1</sup> This information is available on EPA's website at [www.epa.gov/ttn/airs/airsaqs/](http://www.epa.gov/ttn/airs/airsaqs/).

‘Treatment of Data Influenced by Exceptional Events’ (72 FR 13560; March 22, 2007) codified in 40 CFR Parts 50 and 51. In section VII.B of the SO<sub>2</sub> NAAQS final rule preamble, we discussed schedules for states and tribes to flag data influenced by exceptional events and submit related documentation specifically for SO<sub>2</sub> data collected from 2008 through 2010 used in the initial designations process. These schedules are contained in Table 1 of 40 CFR 50.14 and require initial data flagging by October 1, 2010 and detailed documentation submittal by June 1, 2011. This should assure that any exceptional events claim asserted by a state or tribe can be fully considered by EPA before final designations.

States and tribes may also choose to use available air quality modeling results to indicate a violation of the NAAQS. Attachment 3 provides further guidance on the appropriate refined dispersion modeling analysis that could be used to support designation recommendations. Such modeling could include using the AERMOD dispersion model, with allowable source emissions and emissions limitation credit for stacks no higher than good engineering practice. As noted above (and in the preamble to the final SO<sub>2</sub> primary NAAQS rulemaking), we recognize that it is not realistic to expect states or tribes to complete this type of modeling for all significant sources of SO<sub>2</sub> in the time available for providing designation recommendations. Where the time and resources to conduct refined dispersion modeling are limited, we believe it is reasonable to focus first on the most significant sources of SO<sub>2</sub> emissions, and on those sources that are most likely to contribute to a violation. We recognize that this approach means that all areas where SO<sub>2</sub> NAAQS violations may be occurring might not be identified in the initial round of area designations. States are expected to address any such areas in the course of developing the SIPs due by June 3, 2013.

Identifying attainment areas. EPA may initially designate an area as attainment if it is clear that it meets the SO<sub>2</sub> NAAQS. EPA does not believe it would be appropriate to do so without appropriate refined dispersion modeling and, where available, air quality monitoring data indicating no violations of the NAAQS. In the absence of information clearly demonstrating a designation of “attainment” or “nonattainment,” EPA intends to designate the area as “unclassifiable.”

Determining nonattainment area boundaries. As a pollutant that arises from direct emissions, SO<sub>2</sub> concentrations are highest relatively close to the source(s) and much lower at greater distances due to dispersion. Thus, SO<sub>2</sub> concentration patterns resemble those of other directly emitted pollutants like lead and differ from those of photochemically-formed (secondary) pollutants such as ozone. Accordingly, consistent with our approach under other NAAQS, we expect to consider the county line as the starting point for determining SO<sub>2</sub> nonattainment areas. As discussed further in Attachment 2, EPA intends to consider several factors when determining the final nonattainment boundaries. We believe it is appropriate to evaluate each potential nonattainment area on a case-by-case basis, and to recognize that area-

specific analyses conducted by states, tribes and/or EPA may support a boundary with either a larger or smaller area than the county boundary.

A nonattainment area should contain the area violating the NAAQS (e.g., the area around a violating monitor), as well as any adjacent areas (e.g., counties or portions thereof) that contain emissions sources contributing to the violation. (See CAA section 107(d)(1)(A)(i)). Consequently, we recommend that states and tribes base their boundary recommendations on an evaluation of five factors: 1) air quality data; 2) emissions-related data; 3) meteorology; 4) geography/topography and 5) jurisdictional boundaries, as well as other available data. Dispersion modeling, as discussed in Attachment 3, can be a helpful tool in this evaluation because it allows the model user to simultaneously assess multiple factors. States and tribes may identify and evaluate other relevant factors or circumstances specific to a particular area.

While EPA generally believes that in the absence of other relevant information it is appropriate to use county boundaries to define nonattainment areas, we recognize that the five-factor analysis and other information may support designating only a portion of a county as “nonattainment.” For example, a topographical feature may divide a county into two separate air basins, or contributing sources may be clustered in only a portion of a county. For defining partial county boundaries, EPA recommends the use of well-defined jurisdictional lines such as township borders, immovable landmarks such as major roadways or other permanent and readily identifiable boundaries.

Determining attainment area boundaries. In areas without a violating monitor, refined dispersion modeling could be used to help determine that an area with SO<sub>2</sub> sources is in attainment for the 1-hour SO<sub>2</sub> NAAQS. An attainment area boundary cannot contain any area that exceeds the NAAQS or any area containing sources that are causing or contributing to a violating area. (See CAA section 107(d)(1)(A)(i)). County boundaries may be appropriate for defining attainment areas in the absence of other information that would help define a more specific boundary around the modeled source(s).

While we believe this memorandum provides helpful guidance on how boundaries would be determined for SO<sub>2</sub> designations, the guidance contained herein is not binding on states, tribes the public or EPA. The final basis for determining nonattainment area boundaries will be addressed in EPA’s action to initially designate areas under the 2010 SO<sub>2</sub> standard. When EPA promulgates designations, those determinations will be final and binding on states, tribes, the public and EPA.

Attachment 1 is a timeline of key dates in the designations process for the revised 2010 SO<sub>2</sub> NAAQS. Attachment 2 identifies the primary five factors that EPA plans to consider in evaluating and making decisions on nonattainment area boundaries. Attachment 3 is the modeling guidance that states and tribes should use to support designation recommendations,

including appropriate area boundaries.

Staff members at EPA's Office of Air Quality Planning and Standards are available for assistance and consultation throughout the designations process. General questions on this guidance may be directed to Valerie Broadwell (919) 541-3310 or Doug Solomon (919) 541-4132. Modeling-related questions may be directed to James Thurman (919) 541-2703.

Attachments: 3

cc: Scott Mathias, OAQPS  
Lydia Wegman, OAQPS  
Richard Wayland, OAQPS  
Greg Green, OAQPS  
Margo Oge, OTAQ  
Kevin McLean, OGC  
Sara Schneeberg, OGC

## ATTACHMENT 1

| <b>TIMELINE FOR 2010 Primary SO<sub>2</sub> NAAQS DESIGNATION PROCESS</b>                                                                                     |                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| <b>Milestone</b>                                                                                                                                              | <b>Date*</b>                                                              |
| EPA promulgates SO <sub>2</sub> NAAQS                                                                                                                         | June 3, 2010                                                              |
| States and tribes flag exceptional event-influenced SO <sub>2</sub> monitoring data from 2008-2009                                                            | October 1, 2010                                                           |
| States and tribes flag exceptional event-influenced SO <sub>2</sub> monitoring data from 2010; provide detailed documentation to support all 2008-2010 claims | No later than June 1, 2011                                                |
| States and tribes submit recommendations for area designations to EPA                                                                                         | No later than June 3, 2011                                                |
| EPA notifies states and tribes concerning any intended modifications to their recommendations (120-day letters)                                               | o/a February 3, 2012 (no later than 120 days prior to final designations) |
| EPA publishes public notice of state and tribal recommendations and EPA's intended modifications and initiates 30-day public comment period                   | o/a February 20, 2012                                                     |
| End of 30-day public comment period                                                                                                                           | o/a March 20, 2012                                                        |
| States and tribes submit additional information to demonstrate why an EPA modification is inappropriate                                                       | o/a April 3, 2012                                                         |
| EPA promulgates final SO <sub>2</sub> area designations                                                                                                       | No later than June 3, 2012                                                |

\* o/a = on or about

Note: This schedule assumes EPA has sufficient information to promulgate designations within 2 years. In the event EPA determines that insufficient information is available to do so, the Clean Air Act allows EPA to extend the designation process, but no later than June 3, 2013.

## ATTACHMENT 2

### Determining Designations and Appropriate Area Boundaries for the 1-hour, 75 ppb SO<sub>2</sub> NAAQS

| <i>Nonattainment</i>                                                                    | <i>Attainment</i>                                                                                                                                                          | <i>Unclassifiable</i> (all other areas)                                                                                                                                          |
|-----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| An area where monitoring data or an appropriate modeling analysis indicate a violation. | An area that has no monitored violations <u>and</u> which has an appropriate modeling analysis, if needed, and any other relevant information demonstrating no violations. | An area that has no monitored violations and lacks an appropriate modeling analysis, if needed, or other appropriate information sufficient to support an alternate designation. |

Attainment area boundaries. Areas designated as “attainment” should be supported by information clearly demonstrating that there are no violations of the SO<sub>2</sub> NAAQS inside the area boundary. This could consist of appropriate air quality dispersion modeling and, where available, air quality monitoring data. As provided in Attachment 3, appropriate modeling would include using the AERMOD dispersion model, with allowable source emissions and emissions limitation credit for stacks no higher than good engineering practice. County boundaries may be appropriate for defining attainment areas in the absence of other information that would help define a more specific boundary around the modeled source(s). In the absence of information clearly demonstrating a designation of “attainment” or “nonattainment,” EPA intends to designate the area as “unclassifiable.”

Nonattainment area boundaries. EPA intends to use the county as the analytical starting point for assessing the appropriate geographic boundaries of a SO<sub>2</sub> nonattainment area. As a framework for area-specific analyses to support final boundary determinations, we intend to evaluate the five factors listed below, as well as other relevant available information. The purpose of evaluating these factors is to determine the appropriate boundaries encompassing the area meeting the CAA’s definition of “nonattainment area” i.e., an area violating the SO<sub>2</sub> standard and any nearby areas contributing to the violating area. The modeling guidance in Attachment 3 discusses how modeling could be used to address several of these factors simultaneously. When considered as a whole, results may support nonattainment boundaries that are either larger or smaller than the analytical starting point.

1. **Air quality data.** We intend to review SO<sub>2</sub> air quality monitoring data, including the design value calculated for each monitor in the area, for the most recent 3-year period. Areas where monitoring data indicate a violation of the 1-hour, 75 ppb primary SO<sub>2</sub> standard will be designated as “nonattainment.” Source-oriented modeling may also be used to assess air quality in a particular location. Attachment 3 provides further guidance on using refined dispersion modeling for this type of assessment.
2. **Emissions-related data** (location of sources and potential contribution to ambient SO<sub>2</sub> concentrations). We intend to examine allowable emissions of SO<sub>2</sub> from sources located in



and around the violating area. Significant emissions levels in a nearby area indicate the potential for the area to contribute to observed or modeled violations of the NAAQS. We intend to review data from the latest National Emissions Inventory or other relevant sources of the data, such as state inventories or inventories from other federal sources. We would also consider any additional information we receive on federally-enforceable emissions controls that are not reflected in recent inventories but which will require compliance before final designations are issued.

3. **Meteorology** (weather/transport patterns). We intend to evaluate meteorological data to help determine how weather conditions, including wind speed and direction, affect the plume of sources contributing to ambient SO<sub>2</sub> concentrations. Where feasible, we would consider results from source-oriented dispersion modeling.
4. **Geography/topography** (mountain ranges or other air basin boundaries). We intend to examine the physical features of the land that might affect the distribution of SO<sub>2</sub> over an area. Mountains or other physical features may affect the distribution of emissions, and may help define boundaries.
5. **Jurisdictional boundaries** (e.g., counties, air districts, pre-existing nonattainment areas, reservations, metropolitan planning organizations). Once the geographic area associated with the area violating the SO<sub>2</sub> standard and the nearby area contributing to violations are determined, we intend to consider existing jurisdictional boundaries for the purposes of providing a clearly defined legal boundary for carrying out the air quality planning and enforcement functions for the nonattainment area. If an existing jurisdictional boundary is used to help define the nonattainment area, it should encompass all of the area that has been identified as meeting the nonattainment definition. Where existing jurisdictional boundaries are not adequate to describe the nonattainment area, other clearly defined and permanent landmarks or geographic coordinates may be used.

EPA plans to consider these factors, along with any other relevant information, in determining whether to make modifications to the boundary recommendations made by states and tribes. The factors listed above, while generally comprehensive, are not intended to be exhaustive. States and tribes may submit additional information they believe is relevant for EPA to consider. Any information provided to support a boundary recommendation for a nonattainment area should show that: 1) violations are not occurring in nearby portions that are excluded from the recommended nonattainment area; and 2) the excluded portions do not contain emission sources that contribute to the monitored or modeled violation.

## ATTACHMENT 3

### Modeling Guidance for SO<sub>2</sub> NAAQS Designations

#### 1. Purpose

On June 2, 2010, Administrator Jackson signed a final rulemaking notice that revised the primary SO<sub>2</sub> NAAQS (75 FR 35520, published on June 22, 2010) after review of the existing two primary SO<sub>2</sub> standards, promulgated on April 30, 1971 (36 FR 8187).<sup>1</sup> EPA established the revised primary SO<sub>2</sub> standard at 75 parts per billion (ppb) which is attained when the 3-year average of the 99<sup>th</sup> percentile of 1-hour daily maximum concentrations does not exceed 75 ppb. In the final rule preamble, EPA outlined an expected analytic approach to determining compliance with the new NAAQS that would include the use of both modeling and monitoring. EPA believes this analytic approach to determining compliance with the new 1-hour NAAQS would be the generally more technically appropriate and accurate means of assessing peak 1-hour SO<sub>2</sub> concentrations, and would be consistent with historic (past and more recent) implementation practice of using models to determine compliance with the SO<sub>2</sub> NAAQS.

While this guidance explains the use of modeling for NAAQS designations, it does not preclude the fact that monitoring data may be more technically appropriate than modeling in some cases. In cases where there is complete air quality data from FRM or FEM SO<sub>2</sub> monitors, that data would be considered by EPA in designating areas as attainment or nonattainment. (See 75 FR at 35570). The guidance presented here is for cases where modeling is used in support of the designations process.

Dispersion modeling could be used in these initial designations to a limited degree (as could monitoring) but would likely be used to a larger extent subsequently as the basis for re-designation of nonattainment and unclassifiable areas to attainment. As the preamble to the rule promulgating the new 1-hour SO<sub>2</sub> NAAQS noted, EPA does not think it realistic or appropriate to expect states to complete modeling for all significant sources of SO<sub>2</sub> and assess the results in time for the designation recommendations the Act requires be submitted by June 2011. (See 75 FR at 35570-71). Therefore, we do not generally expect states to provide modeling information along with their initial designation recommendations. However, EPA does intend to consider, as appropriate, available monitoring data and modeling information submitted by states or tribes in support of their recommendations.

This guidance explains the expected application of dispersion models to support the designations process regarding:

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<sup>1</sup> EPA publicly disseminated a copy of the signed notice on June 3, 2010, and therefore treats June 2, 2010, as the date of the rule's promulgation, for purposes of the deadlines in CAA section 107(d).

1. the use of modeling to inform the nonattainment boundaries for areas with violating ambient air quality monitors if the presumptive county boundaries are not used (either to expand the boundaries outside the county or shrink the boundary within the county); and
2. The use of modeling in areas without a violating monitor as evidence of attainment of the NAAQS (showing no violations or contributions to violations of the standard).

This guidance is consistent with EPA's *Guideline on Air Quality Models*, or Appendix W to 40 CFR Part 51, and other relevant modeling guidance issued to support regulatory programs. When the need for interpretation of this guidance arises, the user should consult with the appropriate Regional Modeling Contact<sup>2</sup>.

Also as indicated in the preamble of the 1-hour SO<sub>2</sub> NAAQS final rule, we intend to issue additional guidance describing the development of an approvable 110(a)(1) implementation plans for areas designated "unclassifiable" that will include technical direction on how to conduct refined dispersion modeling to demonstrate future NAAQS attainment.

## 2. Guidance on Air Quality Models

Much of this guidance is based on EPA's *Guideline on Air Quality Models*, also published as Appendix W of 40 CFR Part 51. Appendix W is the primary source of information on the regulatory application of air quality models for State Implementation Plan (SIP) revisions for existing sources and for New Source Review (NSR) and Prevention of Significant Deterioration (PSD) programs. Air quality modeling in support of this designations process would need to employ air quality dispersion models<sup>3</sup> that properly address the source-oriented nature of SO<sub>2</sub> and, thus, should rely upon the principles and techniques in Appendix W.

Appendix W was originally published in April 1978 and was incorporated by reference in the regulations for the Prevention of Significant Deterioration of Air Quality, Title 40, Code of Federal Regulations (CFR) sections 51.166 and 52.21 in June 1978 (43 FR 26382-26388). The purpose of Appendix W guidelines is to promote consistency in the use of modeling within the air quality management process. These guidelines are periodically revised to ensure that new model developments or expanded regulatory requirements are incorporated.

Clarifications and interpretations of modeling procedures become official EPA guidance through several courses of action: 1) the procedures are published as regulations or guidelines; 2)

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<sup>2</sup> List of Regional Modeling Contacts by EPA Regional Office is available from SCRAM website at: [http://www.epa.gov/ttn/scram/guidance\\_cont\\_regions.htm](http://www.epa.gov/ttn/scram/guidance_cont_regions.htm)

<sup>3</sup> Dispersion modeling uses mathematical formulations to characterize the atmospheric processes that disperse a pollutant emitted by a source. Based on emissions and meteorological inputs, a dispersion model can be used to predict concentrations at selected downwind receptor locations.

the procedures are formally transmitted as guidance to Regional Office managers; 3) the procedures are formally transmitted as guidance to Regional Modeling Contacts as a result of a Regional consensus on technical issues; or 4) the procedures are a result of decisions by the EPA's Model Clearinghouse that effectively establish national precedent. Formally located in the Air Quality Modeling Group (AQMG) of EPA's Office of Air Quality Planning and Standards (OAQPS), the Model Clearinghouse is the single EPA focal point for the review of criteria pollutant modeling techniques for specific regulatory applications. Model Clearinghouse and related Clarification memoranda involving decisions with respect to interpretation of modeling guidance are available at the Support Center for Regulatory Atmospheric Modeling (SCRAM) website.<sup>4</sup>

Recently issued EPA guidance of relevance for consideration in modeling for designations includes:

- "Applicability of Appendix W Modeling Guidance for the 1-hour SO<sub>2</sub> NAAQS" August 23, 2010—confirming that Appendix W guidance is applicable for NSR/PSD permit modeling for the new SO<sub>2</sub> NAAQS.
- "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO<sub>2</sub> National Ambient Air Quality Standard" March 1, 2011— provides additional guidance regarding NO<sub>2</sub> permit modeling and also relevant to SO<sub>2</sub>.

The following sections will provide reference to the relevant sections of Appendix W and other existing guidance with summaries as necessary. Please refer to those original guidance documents for full discussion and consult with the appropriate EPA Regional Modeling Contact if questions arise about interpretation on modeling techniques and procedures.

### 3. Model selection

Preferred air quality models for use in regulatory applications are addressed in Appendix A of EPA's GUIDELINE ON AIR QUALITY MODELS. If a model is to be used for a particular application, the user should follow the guidance on the preferred model for that application. These models may be used without an area specific formal demonstration of applicability as long as they are used as indicated in each model summary of Appendix A. Further recommendations for the application of these models to specific source problems are found in subsequent sections of Appendix W. In 2005, the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) was promulgated as EPA's preferred near-field dispersion modeling for a wide range of regulatory applications in all types of terrain based on extensive developmental and performance evaluation.

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<sup>4</sup> The Support Center for Regulatory Atmospheric Modeling (SCRAM) website is available at: <http://www.epa.gov/ttn/scram/>.

For area designations under the 1-hour SO<sub>2</sub> primary NAAQS, AERMOD should be used unless use of an alternative model can be justified (Section 3.2, Appendix W), such as the Buoyant Line and Point Source Dispersion Model (BLP). As outlined in the August 23, 2010 clarification memo “Applicability of Appendix W Modeling Guidance for the 1-hour SO<sub>2</sub> National Ambient Air Quality Standard”, AERMOD is the preferred model for single source modeling to address the 1-hour SO<sub>2</sub> NAAQS as part of the NSR/PSD permit programs. AERMOD is appropriate to inform this designations process because SO<sub>2</sub> concentrations result from direct emissions from combustion sources so that concentrations are highest relatively close to sources and are much lower at greater distances due to dispersion. Given the source-oriented nature of this pollutant (See, e.g., 75 FR at 35570), dispersion models are the most appropriate air quality modeling tools to predict the near-field concentrations of this pollutant.

The AERMOD modeling system includes several components. The regulatory components are:

- AERMOD: the dispersion model (U.S. EPA, 2004a)
- AERMAP: the terrain processor for AERMOD (U.S. EPA, 2004b)
- AERMET: the meteorological data processor for AERMOD (U.S. EPA, 2004c)
- BPIPPRIME: the building input processor (U.S. EPA, 2004d)

and non-regulatory components are:

- AERSURFACE: the surface characteristics processor for AERMET (U.S. EPA, 2008)
- AERSCREEN: a recently released screening version of AERMOD (U.S. EPA, 2011b)

Before running AERMOD, the user should become familiar with the user’s guides associated with the modeling components listed above and the AERMOD Implementation Guide (AIG) (U.S. EPA, 2009). The AIG lists several recommendations for applications of AERMOD which would be applicable for designations modeling.

#### **4. Modeling domain**

Selection of the modeling domain is important in terms of how many sources to explicitly model and what kind of receptor network to create. Two questions may arise in model domain selection:

1. Where to center the modeling domain?, and
2. How large should the modeling domain be? (i.e., in terms of the number of sources to model and size of the receptor network in order to account for the areas of impact).

If the modeling is being performed to inform the nonattainment boundary around a violating monitor, the domain should be centered on the violating monitor. If the modeling is being done to show compliance with the NAAQS in the absence of a violating monitor, the domain should be centered on the dominant source in an area, that is, the source or sources expected to contribute the most to SO<sub>2</sub> air quality levels. In both cases, the domain should then extend to include nearby sources that are thought to cause or contribute to a potential NAAQS violation, as explained further below in Section 4.1.

The determination of sources to include in modeling is a multi-step process. If modeling is being performed for a violating monitor, the first basic step would be to gather information and analyze the emission sources within 50 km of the monitor, which is the nominal distance at which EPA considers most steady-state Gaussian plume models are applicable. In some cases where large SO<sub>2</sub> sources are scattered outside of the 50 km radius, it may be necessary to extend the modeling domain beyond 50 km or conduct multiple AERMOD modeling exercises with the overall region broken down to several AERMOD runs covering different areas of the potential nonattainment area. For these situations, consultation with the appropriate EPA Regional Modeling Contact is recommended.

#### **4.1 Determining sources to model**

As stated above, the determination of sources to explicitly model is a multi-step process:

1. The spatial distribution of all sources within 50 km of the violating monitor or dominant source should be analyzed and initially assumed to be included in refined dispersion modeling. For the purposes of designations it is reasonable to initially focus on the most significant sources of SO<sub>2</sub> emissions, e.g., sources emitting greater than 100 tons per year. Please note, however, that sources less than 100 tons can be potential contributors to a NAAQS violation, especially sources with short stacks and/or located in complex terrain (i.e., where receptor elevation is above stack height).
2. Sources should be examined and attempts made to determine if any sources can be accounted for without explicitly modeling them, i.e., use of monitored background concentrations. Accounting for such sources through the use of a background monitor will depend upon how well that monitor reflects impacts from those sources.
3. Sources found not to be representative by monitored background should also be examined through the use of screening models to see if they should or should not be included in the refined modeling. We recommend the use of EPA's new screening model AERSCREEN (U.S. EPA, 2011b) and following recommendations based on pre-existing screening guidance (U.S. EPA, 1992). For small isolated sources, screening may be useful on a source by source basis. However, for a cluster of small sources, their cumulative impact should also be assessed. Individual sources may not be significant by themselves, but together they could cause a NAAQS violation or significantly contribute to a NAAQS violation. Although AERSCREEN does not output a design value

concentration based on the 99<sup>th</sup> percentile form of the 1-hour SO<sub>2</sub> standard, it does output the overall maximum 1-hour concentration which could be used as a conservative estimate for comparison with the NAAQS and EPA's suggested interim significant impact level (SIL) for the 1-hour SO<sub>2</sub> NAAQS of 3 ppb<sup>5</sup>. If the maximum 1-hour concentration output from AERSCREEN violates the NAAQS, it does not mean that the source is in nonattainment, but that the source should be evaluated using refined dispersion modeling (See Step 3 below for more details).

Figure 1 shows a hypothetical monitor with circles of 50 km and 10 km radii centered over it. Based on this figure, an example application of these three steps is described below.

**Step 1:** Figure 1 shows facility emissions ranging from less than one ton to over 100 tons per year within 50 km of the violating monitor. Most of the smaller facilities (less than ten tons) are located north of the violating monitor. There are two 100+ ton emitters near the monitor and two 100+ ton emitters west-southwest of the monitor. At this point, it could be initially assumed that all facilities should be included in refined modeling.

**Step 2:** Determine whether any source or sources can be accounted for by a representative background monitor. In Figure 1, there are two other monitors in the area, one north and one south of the violating monitor. The northernmost monitor may be representative of the facilities north (white and yellow dots) of the violating monitor and the southern monitor may be representative of the sources southeast (white and blue dots) of the violating monitor. Background concentrations should be calculated following the guidance in Section 7 below.

**Step 3:** Screening modeling may be used to determine additional sources or combinations of sources to be excluded from refined modeling, especially smaller sources whose impacts may be largely dependent on their stack parameters (height, exit velocity, etc.). AERSCREEN could be used to eliminate such sources through screening modeling. AERSCREEN does not output an SO<sub>2</sub> design value but does output the overall maximum 1-hour concentration for an individual stack. If a facility contains more than one emission point or stack, each stack should be processed in AERSCREEN and the maximum 1-hour concentrations can be added together to represent impacts from the whole facility after running AERSCREEN. While AERSCREEN can be used with the surface characteristics of the source being screened, given the documented sensitivity of AERMOD to surface characteristics (Brode et al., 2008), it may be useful to also model the source in AERSCREEN using the surface characteristics of the meteorological site being used in the refined modeling as well, to ensure that the source is below de minimis impact levels with either set of surface characteristics.

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<sup>5</sup> The 3 ppb interim SIL for new 1-hour SO<sub>2</sub> NAAQS was provided by EPA for states to consider using for PSD program in the August 23, 2010 memorandum "Guidance Concerning the Implementation of the 1-hour SO<sub>2</sub> NAAQS for the Prevention of Significant Deterioration Program"

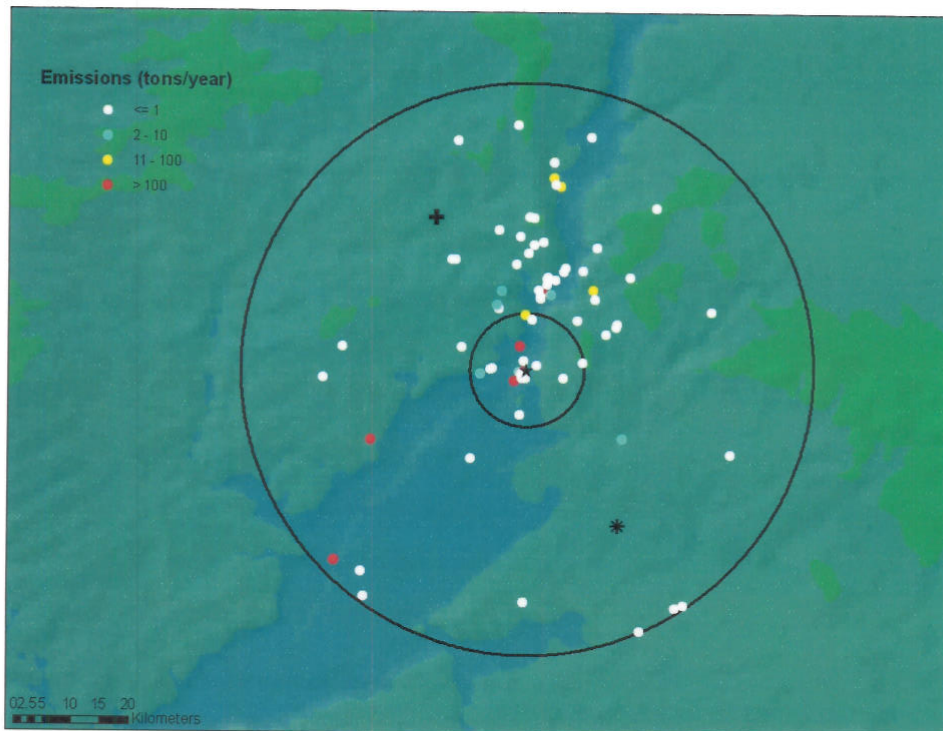


FIGURE 1. HYPOTHETICAL EXAMPLE OF VIOLATING MONITOR (STAR) WITH EMISSIONS (CIRCLES) WITHIN 50 KM (LARGE CIRCLE) AND 10 KM (INNER CIRCLE). NOTE: OTHER MONITORS ARE SHOWN BY PLUS SIGN AND ASTERISKS, WHILE SHADED CONTOURS REPRESENT TERRAIN.

When analyzing AERSCREEN output, the following general criteria could be followed:

- If the facility's maximum 1-hour concentration exceeds 75 ppb, then the source should be included in refined dispersion modeling.
- If the facility's maximum 1-hour concentration is below 75 ppb but above the suggested interim 1-hour significant impact level of 3 ppb or the state's 1-hour SIL, it should be included in the refined modeling.
- If the facility's maximum 1-hour concentration is below the suggested interim 1-hour significant impact level or the state's 1-hour SIL, that source may not have to be



included in refined modeling. However, the facility should not be excluded on the sole basis of being below the SIL without first looking at surrounding sources and their maximum 1-hour concentrations. The case may arise when there are several small sources that singularly are below the SIL but their cumulative impact may lead to concentrations that contribute to violations of the NAAQS.

In summary for the example in Figure 1, the smaller sources below 1 ton of emissions to the north of the monitor may be best represented with the use of background monitor concentrations. Other sources between 1 and 10 tons that are not represented by background monitors could be excluded based on screening results, depending on their stack parameters and terrain. The smaller sources (less than 1 ton) within 10 km of the monitor location may also screen out. The 100+ ton sources near the edge of the 50 km domain should be included in refined modeling. The largest emitters very close to the sources should be included in refined modeling as they are likely contributing to potential NAAQS violations and are not reflected in background monitors.

This is just one example of how to determine the modeling domain and sources to model. In some cases, an analysis out to 50 km may not be needed. Please consult with the appropriate EPA Regional Office modeler if there is uncertainty in deciding which sources to explicitly model, which sources to represent based on background monitoring, and/or which to exclude from refined modeling using screening modeling.

#### **4.2 Receptor grid**

The model receptor grid is unique to the particular situation and depends on the size of the modeling domain, the number of modeled sources, and complexity of the terrain. Receptors should be placed in areas that are considered ambient air (i.e., where the public generally has access) and placed out to a distance such that areas of violation can be detected from the model output to help determine the size of nonattainment areas. Receptor placement should be of sufficient density to provide resolution needed to detect significant gradients in the concentrations with receptors placed closer together near the source to detect local gradients and placed farther apart away from the source. In addition, the user should place receptors at key locations such as around facility fence lines (which define the ambient air boundary for a particular source) or monitor locations (for comparison to monitored concentrations for model evaluation purposes). The receptor network should cover the modeling domain. An example receptor grid for a single source is shown in Figure 2a with an example grid with multiple sources shown in Figure 2b. In Figure 2a, receptors are located every 50 m within one kilometer of the source and then every 100 m from one to two kilometers. From two to 10 km, the receptor spacing is 250 m and every 500 m outside of 10 km of the source. The modeling domain is centered on an isolated facility and extends out to 10 km in the east-west and north-south direction. Figure 2b shows an example grid for a multi-source area. Two sources are modeled with a fine grid of receptors 1 km (50 m spacing) around each source embedded within a 10x10

km grid (250 m spacing). The 10x10 km grid is then embedded within a 20x20 km grid with coarser spacing (500 m).

If modeling indicates elevated levels of SO<sub>2</sub> (near the standard) near the edge of the receptor grid, consideration of expanding the grid or conducting an additional modeling run centered on the area of concern should be investigated. As noted above, terrain complexity should also be considered when setting up the receptor grid. If complex terrain is included in the model calculations, AERMOD requires that receptor elevations be included in the model inputs. In those cases, the AERMAP terrain processor (U.S. EPA, 2004b) should be used to generate the receptor elevations and hill heights. The latest version of AERMAP (09040) can process either Digitized Elevation Model (DEM) or National Elevation Data (NED) data files. The AIG recommends the use of NED data since it is more up to date than DEM data, which is no longer updated (Section 4.3 of the AIG).

## **5. Source inputs**

This section provides guidance on source characterization to develop appropriate inputs for dispersion modeling with the AERMOD modeling system. Section 5.1 provides guidance on use of allowable vs. actual emission levels, Section 5.2 covers guidance on Good Engineering Practice (GEP) stack heights, Section 5.3 provides details on source configuration and source types, Section 5.4 provides details on urban/rural determination of the sources, and Section 5.5 provides general guidance on source grouping, which may be important for design value calculations.

### **5.1 Allowable vs. Actual emissions**

Consistent with past SO<sub>2</sub> modeling guidance (Section 4.5.2 of U.S. EPA (1994)) and regulatory modeling for other programs (Appendix W, Section 8.1), dispersion modeling for the purposes of designations should be based on the use of maximum allowable emissions or federally enforceable permit limits. Also consistent with past and current guidance, in the absence of allowable emissions or federally enforceable permit limits, potential to emit emissions (i.e., design capacity) should be used. Because of the short-term nature of the new SO<sub>2</sub> NAAQS, the maximum short term or hourly emission rate should be input into AERMOD for each modeled hour. As stated in the August 23, 2010 memo,

“Since short-term SO<sub>2</sub> standards ( $\leq 24$  hours) have been in existence for decades, existing SO<sub>2</sub> emission inventories used to support modeling for compliance with the 3-hour and 24-hour SO<sub>2</sub> standards should serve as a useful starting point, and may be adequate in many cases for use in assessing compliance with the new 1-hour SO<sub>2</sub> standard since issues identified in Table 8-2 of Appendix W related to short-term vs. long-term emission estimates may have already been addressed.”

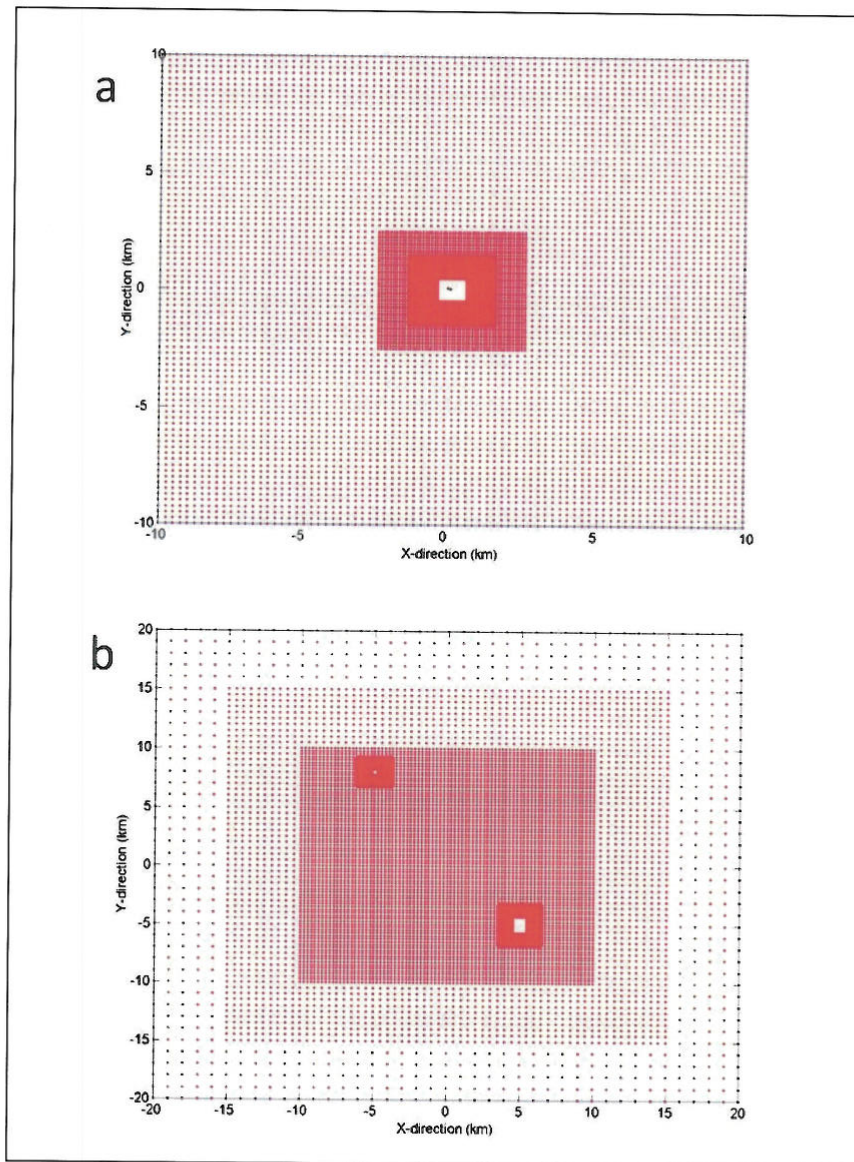


FIGURE 2. EXAMPLE RECEPTOR GRIDS WITH (A) A GRID CENTERED ON AN ISOLATED SOURCE WITH FENCELINE RECEPTORS SHOWN IN BLUE AND THE EMISSION POINTS SHOWN IN BLACK, AND (B) A GRID WITH MULTIPLE SOURCES.

The existing SO<sub>2</sub> inventories used for permitting or SIP demonstrations should contain the necessary emissions information for designations-related modeling. If short-term emissions are not readily available, they may be calculated using the methodology shown in Table 8-2 of Appendix W. For an example calculation of short term emissions, see the June 28, 2010 memorandum “Applicability of Appendix W Modeling Guidance for the 1-hour NO<sub>2</sub> National Ambient Air Quality Standard.” Although the example is for NO<sub>2</sub>, the calculation methodology would be the same for SO<sub>2</sub>.

Regarding the use of allowable emissions and modeling of intermittent emissions sources, from such sources as emergency generators and startup/shutdown emissions, the inclusion of such emissions for the purpose of modeling for SO<sub>2</sub> designations should follow the recommendations in the March 1, 2011 memo “Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO<sub>2</sub> National Ambient Air Quality Standard.” As stated in this memo, EPA believes the most appropriate data to use for compliance demonstrations for the 1-hour NO<sub>2</sub> NAAQS are those based on emissions scenarios that are continuous enough or frequent enough to contribute significantly to the annual distribution of maximum daily 1-hour concentrations. Although the referenced guidance in this memo is for NO<sub>2</sub> permit modeling, the common 1 hour averaging time and form of both the NO<sub>2</sub> and SO<sub>2</sub> standards makes this modeling guidance applicable to the 1-hour SO<sub>2</sub> NAAQS and, thus, applicable to SO<sub>2</sub> modeling in support of designations. For more details, refer to the NO<sub>2</sub> memo. If any questions arise regarding preparation of emissions inputs for dispersions modeling including intermittent emissions from sources, then users should consult the appropriate EPA Regional Modeling Contact.

## 5.2 Good Engineering Practice (GEP) stack height

Consistent with previous SO<sub>2</sub> modeling guidance (U.S. EPA, 1994) and Section 6.2.2 of Appendix W, for stacks with heights that are within the limits of Good Engineering Practice (GEP), actual heights should be used in modeling. Under EPA’s regulations at 40 CFR 51.100, GEP height, H<sub>g</sub>, is determined to be the greater of:

- 65 m, measured from the ground-level elevation at the base of the stack;
- For stacks in existence on January 12, 1979, and for which the owner or operator had obtained all applicable permits or approvals required under 40 CFR Parts 51 and 52

$$H_g = 2.5H$$

provided the owner or operator produces evidence that this equation was actually relied on in designing the stack or establishing an emission limitation to ensure protection against downwash;

For all other stacks,

$$H_g = H + 1.5L,$$

where H is the height of the nearby structure(s) measured from the ground-level elevation at the base of the stack and L is the lesser dimension of height or projected width of nearby structure(s), or

- the height demonstrated by a fluid model or a field study approved by EPA or the State/local agency which ensures that the emissions from a stack do not result in excessive concentrations of any air pollutant as a result of atmospheric downwash, wakes, eddy effects created by the source itself, nearby structures or nearby terrain features.

For more details about GEP, see the Guideline for Determination of Good Engineering Practice Stack Height Technical Support Document (U.S. EPA, 1985).

If stack heights exceed GEP, then GEP heights should be used with the individual stack's other parameters (temperature, diameter, exit velocity). For stacks modeled with actual heights below GEP, building downwash should be considered as this can impact concentrations near the source (Section 6.2.2b, Appendix W). If building downwash is being considered, the BPIPPRIME program (U.S. EPA, 2004d) should be used to input building parameters for AERMOD. More information about buildings and stacks is in Section 5.3.

### 5.3 Source configurations and source types

An accurate characterization of the modeled facilities is critical for refined dispersion modeling, including accurate stack parameters and physical plant layout. Accurate stack parameters should be determined for the emissions being modeled. Since modeling would be done with maximum allowable or potential emissions levels at each stack, the stack's parameters such as exit temperature, diameter, and exit velocity should reflect those emissions levels. Accurate locations (i.e. latitude and longitude or Universal Transverse Mercator (UTM) coordinates and datum)<sup>6</sup> of the modeled emission sources are also important, as this can affect the impact of an emission source on receptors, determination of stack base elevation, and relative location to any nearby building structures. Not only are accurate stack locations needed, but accurate information for any nearby buildings is important. This information would include location and orientation relative to stacks and building size parameters (height, and corner coordinates of tiers) as these parameters are input into BPIPPRIME to calculate building

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<sup>6</sup> Latitudes and longitudes to four decimal places position a stack within 30 feet of its actual location and five decimal places place a stack within three feet of its actual location. Users should use the greatest precision available.

parameters for AERMOD. If stack locations and or building information are not accurate, downwash will not be accurately accounted for in AERMOD.

Emission source type characterization within the modeling environment is also important. As stated in the AERMOD User's Guide (U.S. EPA, 2004a), emissions sources can be characterized as several different source types: POINT sources, capped stacks (POINTCAP), horizontal stacks (POINTHOR), VOLUME sources, OPENPIT sources, rectangular AREA sources, circular area sources (AREACIRC), and irregularly shaped area sources (AREAPOLY). Note that POINTCAP and POINTHOR are not part of the regulatory default option in AERMOD because the user must invoke the BETA option in the model options keyword MODELOPT while not including the "DFAULT" modeling option for these options to work properly. While most sources can be characterized as POINT sources, some sources, such as fugitive releases or nonpoint sources (emissions from ports, airports, or smaller point sources with no accurate locations) may be best characterized as VOLUME or AREA type sources. If questions arise about proper source characterization or typing, users should consult the appropriate EPA Regional Modeling Contact.

#### 5.4 Urban/rural determination

For any dispersion modeling exercise, the urban or rural determination of a source is important in determining the boundary layer characteristics that affect the model's prediction of downwind concentrations. Figure 3 gives example maximum 1-hour concentration profiles for a 10 meter stack (Figure 3a) and a 100 m stack (Figure 3b) based on urban vs. rural designation. The urban population used for the examples is 100,000. In Figure 3a, the urban concentration is much higher than the rural concentration for distances less than 750 m from the stack but then drops below the rural concentration beyond 750 m. For the taller stack in Figure 3b, the urban concentration is much higher than the rural concentration even as distances increase from the source. These profiles show that the urban or rural designation of a source can be quite important.

In addition, for SO<sub>2</sub> modeling, the urban/rural determination is important because AERMOD invokes a 4-hour half life<sup>7</sup> for urban SO<sub>2</sub> sources. This would only be done for urban sources when the POLLUTID keyword in AERMOD is set to "SO2" and the MODELOPT keyword includes the DFAULT option. Rural sources within the same AERMOD run would not be affected. If the DFAULT option is not included with the MODELOPT keyword, the 4-hour half life would not be used and the user would specify the 4-hour half life using the HALFLIFE or DCAYCOEFF keywords in order to account for the chemical transformation. See Section 3.2.6 of the AERMOD User's Guide (U.S. EPA, 2004a) for more details about these keywords. If the user invokes the HALFLIFE or DCAYCOEFF option, then any rural sources included in

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<sup>7</sup> Over a 4-hour period, SO<sub>2</sub> concentrations decrease by half from the initial value.

the modeling would need to be run in separate AERMOD runs so that they are not subject to the 4-hour half life. Note that if the DFAULT option is used, the rural sources would not need to be in a separate run from the urban sources. Determining whether a source is urban or rural can be done using the methodology outlined in Section 7.2.3 of Appendix W and recommendations outlined in Sections 5.1 through 5.3 in the AIG (U.S. EPA, 2009). In summary, there are two methods of urban/rural classification described in Section 7.2.3 of Appendix W.

The first method of urban determination is a land use method (Appendix W, Section 7.2.3c). In the land use method, the user analyzes the land use within a 3 km radius of the source using the meteorological land use scheme described by Auer (1978). Using this methodology, a source is considered urban if the land use types, I1 (heavy industrial), I2 (light-moderate industrial), C1 (commercial), R2 (common residential), and R3 (compact residential) are 50% or more of the area within the 3 km radius circle. Otherwise, the source is considered a rural source. The second method uses population density and is described in Section 7.2.3d of Appendix W. As with the land use method, a circle of 3 km radius is used. If the population density within the circle is greater than 750 people/km<sup>2</sup>, then the source is considered urban. Otherwise, the source is modeled as a rural source. Of the two methods, the land use method is considered more definitive (Section 7.2.3e, Appendix W).

Caution should be exercised with either classification method. As stated in Section 5.1 of the AIG (U.S. EPA, 2009), when using the land use method, a source may be in an urban area but located close enough to a body of water or other non-urban land use category to result in an erroneous rural classification for the source. The AIG in Section 5.1 cautions users against using the land use scheme on a source by source basis, but advises considering the potential for urban heat island influences across the full modeling domain. When using the population density method, Section 7.2.3e of Appendix W states, "Population density should be used with caution and should not be applied to highly industrialized areas where the population density may be low and thus a rural classification would be indicated, but the area is sufficiently built-up so that the urban land use criteria would be satisfied..." With either method, Section 7.2.3(f) of Appendix W recommends modeling all sources within an urban complex as urban, even if some sources within the complex would be considered rural using either the land use or population density method.

Another consideration that may need attention by the user and is discussed in Section 5.1 of the AIG relates to tall stacks located within or adjacent to small to moderate size urban areas. In such cases, the stack height or effective plume height for very buoyant sources may extend above the urban boundary layer height. The application of the urban option in AERMOD for these types of sources may artificially limit the plume height. The use of the urban option may not be appropriate for these sources, since the actual plume is likely to be transported over the urban boundary layer. Section 5.1 of the AIG gives details on determining if a tall stack should be modeled as urban or rural, based on comparing the stack or effective plume height to the urban boundary layer height. The 100 m stack illustrated in Figure 3b, may be such an example as the urban boundary layer height for this stack would be 189 m (based on a

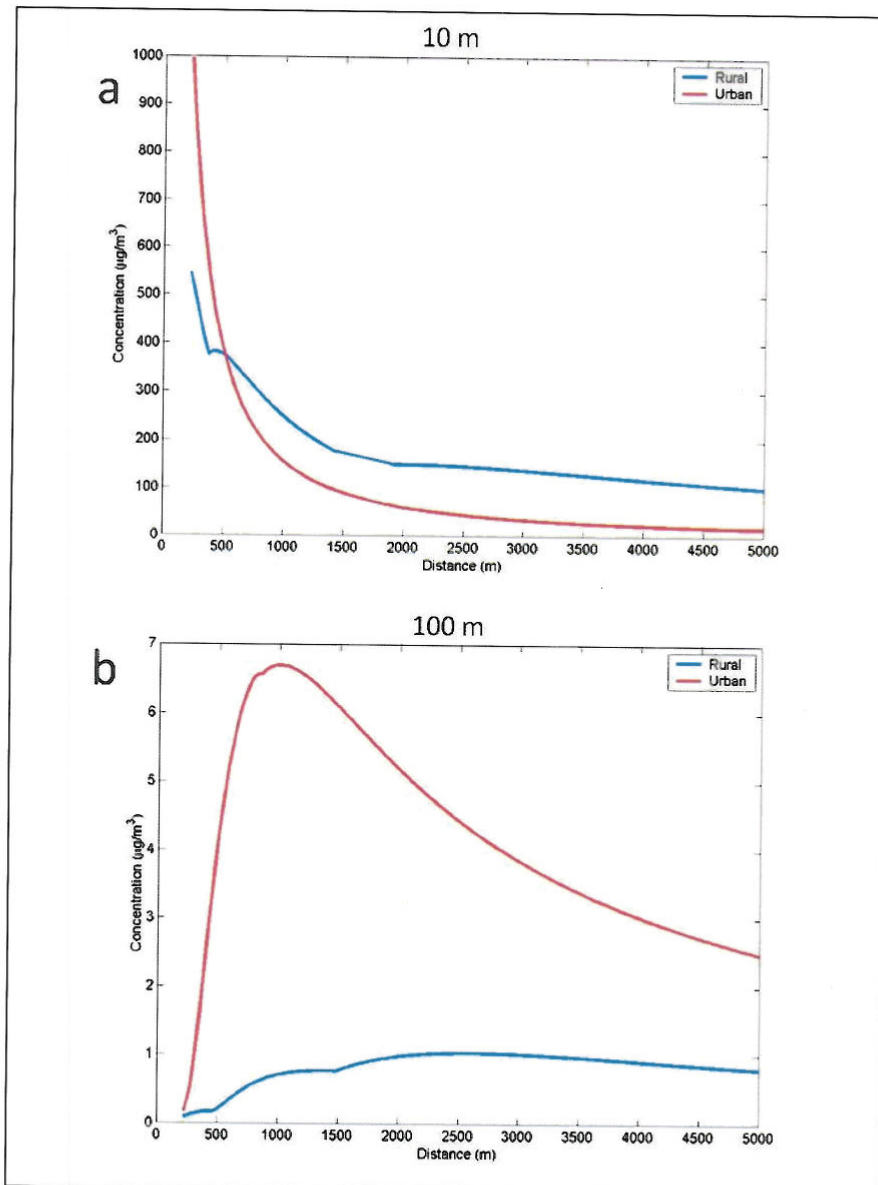


FIGURE 3. URBAN (RED) AND RURAL (BLUE) CONCENTRATION PROFILES FOR (A) 10 M BUOYANT STACK RELEASE, AND (B) 100 M BUOYANT STACK RELEASE.



population of 100,000) and equation 104 of the AERMOD formulation document (Cimorelli, et al., 2004). This equation is:

$$z_{iuc} = z_{iuo} \left( \frac{P}{P_o} \right)^{1/4} \quad (1)$$

where  $z_{iuo}$  is a reference height of 400 m corresponding to a reference population  $P_o$  of 2,000,000 people.

Given that the stack is a buoyant release, the plume may extend above the urban boundary layer and may be best characterized as a rural source, even if it were near an urban complex. Exclusion of these elevated sources from application of the urban option would need to be justified on a case-by-case basis in consultation with the appropriate EPA Regional Modeling Contact.

AERMOD requires the input of urban population when utilizing the urban option. Population can be entered to one or two significant digits (i.e., an urban population of 1,674,365 can be entered as 1,700,000). Users can enter multiple urban areas and populations using the URBANOPT keyword in the runstream file (U.S. EPA, 2004a). If multiple urban areas are entered, AERMOD requires that each urban source be associated with a particular urban area or AERMOD model calculations will abort. Urban populations can be determined by using a method described in Section 5.2 of the AIG (U.S. EPA, 2009).

### 5.5 Source groups

In AERMOD, individual emission sources' concentration results can be combined into groups using the SRCGROUP keyword (Section 3.3.11 of the AERMOD User's Guide (U.S. EPA, 2004a)). The user can automatically calculate a total concentration (from all sources) using the SRCGROUP ALL keyword. For the purposes of designations and design value calculations, source group ALL should be used, especially if all sources in the modeling domain are modeled in one AERMOD run. Design values should be calculated from the total concentrations (all sources and background). For the purposes of designations modeling, individual source contributions outputs to the total concentration may not be necessary. However, if individual facility contributions are needed for deciding which facilities to include in the nonattainment or attainment area, source groups by facility should be used. To avoid any confusion, source groups that are used to calculate the design value concentrations or determine source contributions to design values should be mutually exclusive (i.e. an emission source should not be in two source groups). This would be especially important if the design value concentrations are calculated outside of AERMOD by adding the individual groups together to calculate a total concentration (See Section 8.1 of this document for examples). If individual source groups that are used in design value concentrations are not mutually exclusive, there would be double

counting of concentrations when calculating design values either in AERMOD or outside of AERMOD.

## **6. Meteorological data**

Section 6 gives guidance on the selection of meteorological data for input into AERMOD. Much of the guidance from Section 8.3 of Appendix W is applicable to designations modeling and is summarized here. In Section 6.2.1, the use of a new tool, AERMINUTE (U.S. EPA, 2011a), is introduced. AERMINUTE is an AERMET pre-processor that calculates hourly averaged winds from ASOS (Automated Surface Observing System) 1-minute winds.

### **6.1 Surface characteristics and representativeness**

The selection of meteorological data that are input into a dispersion model should be considered carefully. The selection of data should be based on spatial and climatological (temporal) representativeness (Appendix W, Section 8.3). The representativeness of the data is based on: 1) the proximity of the meteorological monitoring site to the area under consideration, 2) the complexity of terrain, 3) the exposure of the meteorological site, and 4) the period of time during which data are collected. Sources of meteorological data are: National Weather Service (NWS) stations, site-specific or onsite data, and other sources such as universities, Federal Aviation Administration (FAA), military stations, and others. Appendix W addresses spatial representativeness issues in Sections 8.3.a and 8.3.c.

Spatial representativeness of the meteorological data can be adversely affected by large distances between the source and receptors of interest and the complex topographic characteristics of the area (Appendix W, Section 8.3.a and 8.3.c). If the modeling domain is large enough such that conditions vary drastically across the domain then the selection of a single station to represent the domain should be carefully considered. Also, care should be taken when selecting a station if the area has complex terrain. While a source and meteorological station may be in close proximity, there may be complex terrain between them such that conditions at the meteorological station may not be representative of the source. An example would be a source located on the windward side of a mountain chain with a meteorological station a few kilometers away on the leeward side of the mountain. Spatial representativeness for off-site data should also be assessed by comparing the surface characteristics (albedo, Bowen ratio, and surface roughness) of the meteorological monitoring site and the analysis area. When processing meteorological data in AERMET (U.S. EPA, 2004c), the surface characteristics of the meteorological site should be used [Section 8.3.c of Appendix W and the AERSURFACE User's Guide (U.S. EPA 2008)]. Spatial representativeness should also be addressed for each meteorological variable separately. For example, temperature data from a meteorological station several kilometers from the analysis area may be considered adequately representative, while it may be necessary to collect wind data near the plume height (Section 8.3.c of Appendix W).

Surface characteristics can be calculated in several ways. For details see Section 3.1.2 of the AIG (U.S. EPA, 2009). EPA has developed a tool, AERSURFACE (U.S. EPA, 2008) to aid in the determination of surface characteristics. The current version of AERSURFACE uses 1992 National Land Cover Data. Note that the use of AERSURFACE is not a regulatory requirement but the methodology outlined in Section 3.1.2 of the AIG should be followed unless an alternative method can be justified.

## **6.2 Meteorological inputs**

Appendix W states in Section 8.3.1.1 that the user should acquire enough meteorological data to ensure that worst-case conditions are adequately represented in the model results. Appendix W states that 5 years of NWS meteorological data or at least one year of site-specific data should be used (Section 8.3.1.2, Appendix W) and should be adequately representative of the study area. If one or more years (including partial years) of site-specific data are available, those data are preferred. While the form of the SO<sub>2</sub> NAAQS contemplates obtaining three years of monitoring data, this does not preempt the use of 5 years of NWS data or at least one year of site-specific data in the modeling. The 5-year average based on the use of NWS data, or an average across one or more years of available site specific data, serves as an unbiased estimate of the 3-year average for purposes of modeling demonstrations of compliance with the NAAQ (See the August 23, 2010 Clarification Memorandum on “Applicability of Appendix W Modeling Guidance for the 1-hour SO<sub>2</sub> National Ambient Air Quality Standard”). See the memorandum for more details on the use of 5 years of NWS data or at least one year of site-specific data and applicability to the NAAQS.

### **6.2.1 NWS data**

NWS data are available from the National Climatic Data Center (NCDC) in many formats, with the most common one in recent years being the Integrated Surface Hourly data (ISH). Most available formats can be processed by AERMET. As stated in Section 6.1, when using data from an NWS station alone or in conjunction with site-specific data, the data should be spatially and temporally representative of conditions at the modeled sources.

A recently discovered issue with ASOS is that 5-second wind data that are used to calculate the 2-minute average winds are truncated rather than rounded to whole knots. For example, a wind of 2.9 knots is reported as 2 knots, not 3 knots. To account for this truncation of NWS winds (either standard observation or AERMINUTE output), an adjustment of ½ knot or 0.26 m/s is added to the winds in stage 3 AERMET processing. For more details refer to the AERMET User’s Guide (U.S. EPA, 2004c) and/or the appropriate EPA Regional Modeling Contact.

### 6.2.1.1 AERMINUTE

In AERMOD, concentrations are not calculated for variable wind (i.e., missing wind direction) and calm conditions, resulting in zero concentrations for those hours. Since the SO<sub>2</sub> NAAQS is a one hour standard, these light wind conditions may be the controlling meteorological circumstances in some cases because of the limited dilution that occurs under low wind speeds which can lead to higher concentrations. The exclusion of a greater number of instances of near-calm conditions from the modeled concentration distribution may therefore lead to underestimation of daily maximum 1-hour concentrations for calculation of the design value.

To address the issues of calm and variable winds associated with the use of NWS meteorological data, EPA has developed a preprocessor to AERMET, called AERMINUTE (U.S. EPA, 2011a) that can read 2-minute ASOS winds and calculate an hourly average. Beginning with year 2000 data, NCDC has made freely available, the 1-minute winds, reported every minute from the ASOS network. The AERMINUTE program reads these 2-minute winds and calculates an hourly average wind. In AERMET (U.S. EPA, 2004c), these hourly averaged winds replace the standard observation time winds read from the archive of meteorological data. This results in a lower number of calms and missing winds and an increase in the number of hours used in averaging concentrations. For more details regarding the use of NWS data in regulatory applications see Section 8.3.2 of Appendix W and for more information about the processing of NWS data in AERMET and AERMINUTE, see the AERMET (U.S. EPA, 2004c) and AERMINUTE User's guides (U.S. EPA, 2011a).

### 6.2.2 Site-specific data

The use of site-specific meteorological data is the best way to achieve spatial representativeness. AERMET can process a variety of formats and variables for site-specific data. The use of site-specific data for regulatory applications is discussed in detail in Section 8.3.3 of Appendix W. Due to the range of data that can be collected onsite and the range of formats of data input to AERMET, the user should consult Appendix W, the AERMET User's Guide (U.S. EPA, 2004c), and Meteorological Monitoring Guidance for Regulatory Modeling Applications (U.S. EPA, 2000). Also, when processing site-specific data for an urban application, Section 3.3 of the AERMOD Implementation Guide offers recommendations for data processing. In summary, the guide recommends that site-specific turbulence measurements should not be used when applying AERMOD's urban option, in order to avoid double counting the effects of enhanced turbulence due to the urban heat island.

### 6.2.3 Upper air data

AERMET requires full upper air soundings to calculate the convective mixing height. For AERMOD applications in the U.S., the early morning sounding, usually the 1200 UTC (Universal Time Coordinate) sounding, is typically used for this purpose. Upper air soundings can be obtained from the Radiosonde Data of North America CD for the period 1946-1997. Upper air soundings for 1994 through the present are also available for free download from the Radiosonde Database Access website. Users should choose all levels or mandatory and significant pressure levels<sup>8</sup> when selecting upper air data. Selecting mandatory levels only would not be adequate for input into AERMET as the use of just mandatory levels would not provide an adequate characterization of the potential temperature profile.

## 7. Background concentration

The inclusion of ambient background concentrations to the model results is important in determining cumulative impacts. The modeled contribution to the cumulative analysis should follow the form of the standard and be calculated as described in Section 2.6.1.2 of the August 23, 2010 clarification memo on "Applicability of Appendix W Modeling Guidance for the 1-hour SO<sub>2</sub> National Ambient Air Quality Standard." This memo suggested a "first tier" approach to including a uniform monitored background contribution based on adding the overall highest hourly background SO<sub>2</sub> concentration from a representative monitor to the modeled design value. We recognize that this approach could be overly conservative in many cases and may also be prone to reflecting source-oriented impacts, increasing the potential for double-counting of modeled and monitored contributions. As discussed in EPA's March 1, 2011 memo "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO<sub>2</sub> Ambient Air Quality Standard," we recommend a less conservative "first tier" approach for a uniform monitored background concentration based on the monitored design values for the latest 3-year period, regardless of the years of meteorological data used in the modeling. Adjustments to this approach may be considered in consultation with the appropriate EPA Regional Modeling Contact with adequate justification and documentation of how the background concentration was calculated.

Section 8.2.2 of Appendix W gives guidance on background concentrations for isolated single sources and is also applicable for multi-source areas. One option is, as described in Section 8.2.2.b:

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<sup>8</sup> By international convention, mandatory levels are in millibars: 1,000, 850, 700, 500, 400, 300, 200, 150, 100, 50, 30, 20, 10, 7.5, 3, 2, and 1. Significant levels may vary depending on the meteorological conditions at the upper-air station

“Use air quality data in the vicinity of the source to determine the background concentration for the averaging times of concern. Determine the mean background concentration at each monitor by excluding concentrations when the source in question is impacting the monitor... For shorter time periods, the meteorological conditions accompanying concentrations of concern should be identified. Concentrations for meteorological conditions of concern, at monitors, not impacted by the source in question, should be averaged for separate averaging time to determine the average background value. Monitoring sites inside a 90° degree sector downwind of the source may be used to determine the area of impact.”

When no monitors are located in the vicinity of the sources being modeled a “regional site” (i.e., one that is located away from the area of interest but is impacted by similar natural and distant man-made sources) may be used to determine background (Section 8.2.2.c, Appendix W). In multi-source areas, background includes two components, nearby sources and other sources (Section 8.2.3 of Appendix W). Nearby sources are those sources that are expected to cause a significant concentration gradient in the vicinity of the source or sources under consideration, and should be explicitly modeled. Identification of nearby sources calls for professional judgment and consultation with the appropriate EPA Regional Modeling Contact. For other sources, such as natural sources, minor sources and distant major sources, the methodology of Section 8.2.2 should be used.

EPA’s March 1, 2011 memo “Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO<sub>2</sub> Ambient Air Quality Standard,” describes an appropriate methodology of calculating temporally varying background monitored concentrations by hour of day and season (excluding periods when the source in question is expected to impact the monitored concentration). The methodology for NO<sub>2</sub> is to use the 98<sup>th</sup> percentile concentration for each hour of the day by season and average across three years. This same methodology is applicable to SO<sub>2</sub> designations modeling based on use of the 99<sup>th</sup> percentile by hour of day and season for background concentration excluding periods when the dominant source(s) are influencing the monitored concentration (i.e., 99<sup>th</sup> percentile, or 4<sup>th</sup> highest, concentrations for hour 1 for January or winter, 99<sup>th</sup> percentile concentrations for hour 2 for January or winter, etc.). Recent updates included in AERMOD allow for the inclusion of temporally varying background concentrations in the design value calculation in combination with modeling results.

An illustrative example is shown in Figure 4. Shown are the NAAQS standard concentration, the monitor’s 3-year average design value, and 3-year averages of the 99<sup>th</sup> percentile concentrations by season and hour of day. To calculate the 99<sup>th</sup> percentile concentration for a season and hour of day combination, the second highest concentration for that combination should be selected. Also shown are 3-year averages of the 99<sup>th</sup> percentile concentration by hour of day (across all seasons), and the average concentration by hour of day

across the three years<sup>9</sup>. In this example, the winter background concentrations show a distinct diurnal variability, with less for each of the other seasons.

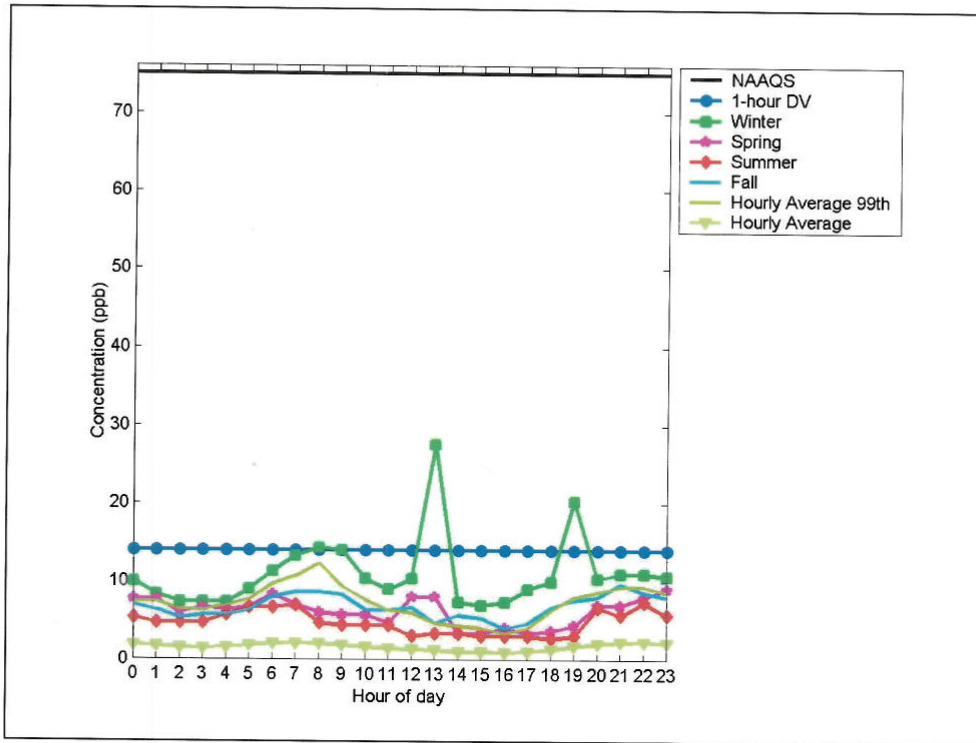


FIGURE 4. SO<sub>2</sub> MONITORED CONCENTRATIONS FOR VARIOUS AVERAGING TIMES.

It should be also noted here that the conventions regarding reporting time differ between ambient air quality monitoring, where the observation time is based on the hour-beginning convention, and meteorological monitoring where the observation is based on the hour-ending time. Thus, ambient monitoring data reported for hour 00 should be paired with meteorological data for hour 01, etc. This is important when incorporating time-varying background

<sup>9</sup> Modelers should use the 1<sup>st</sup>-highest value for more detailed pairings, such as month by hour-of-day or season by hour-of-day and day-of-week

concentrations in the AERMOD calculations, which allow for temporally varying background concentrations.

## 8. Determining design value metrics

Designations modeling will provide predictions of SO<sub>2</sub> design values at each receptor that includes contributions from all modeled sources and background. Based on the form of the 1-hour SO<sub>2</sub> NAAQS, the design value should be calculated as the average of the 99<sup>th</sup> percentile of the annual distribution of daily maximum 1-hour concentrations averaged across the modeled years.

### 8.1 Design value calculation methodology

Whether design values are calculated within AERMOD or outside of AERMOD, to calculate a design value to compare against the standard, the following steps should be followed:

1. At each receptor, for each hour of the modeled period, calculate a total concentration across all sources including background concentrations if applicable. This can be done in AERMOD using SRCGROUP ALL or by adding individual source groups outside of AERMOD, using hourly POSTFILES. If the user is totaling the concentrations outside of AERMOD, the source groups need to be mutually exclusive, i.e. no one source should be in multiple source groups.
2. From the total concentrations calculated in step 1, obtain the 1-hour maximum concentration at each receptor for each modeled day.
3. From the output of step 2, for each year modeled, calculate the 99<sup>th</sup> percentile (4<sup>th</sup> highest) daily maximum 1-hour concentration at each receptor. If modeling 5 years of meteorological data, this results in five 99<sup>th</sup> percentile concentrations at each receptor.
4. Average the 99<sup>th</sup> percentile (or 4<sup>th</sup> highest) concentrations across the modeled years to obtain a design value at each receptor.
5. Modeled source contributions to a NAAQS violation can be determined by analyzing the hourly concentrations from the individual source groups corresponding to the same hour as the 4<sup>th</sup> daily maximum 1-hour concentration from each year. (See 75 FR at 35540). For example, a receptor has a 5-year average design value of 200.8 mg/m<sup>3</sup> (or approximately 77 ppb) and AERMOD was modeled for the period January 1, 2005 through December 31, 2009 for four source groups. From the AERMOD output, the user can determine the date of the 4<sup>th</sup> highest daily maximum 1-hour concentrations that are used to calculate the 5-year average design value. Table 1 shows the 4<sup>th</sup> highest daily maximum 1-hour concentrations for each year and associated dates that are used in the design value calculation.



TABLE 1. 4<sup>TH</sup> HIGHEST DAILY MAXIMUM 1-HOUR CONCENTRATIONS ( $\mu\text{G}/\text{M}^3$ ) FOR 2005-2009.

| Date<br>(YYMMDDHH) | Concentration |
|--------------------|---------------|
| 05080101           | 200.1         |
| 06073105           | 201.5         |
| 07080403           | 207.1         |
| 08072705           | 197.1         |
| 09080104           | 198.1         |
| 5-YEAR AVG.        | 200.8         |

If output by source group is available, the user can extract each source group's concentration at each of the hours listed in Table 1. Table 2 shows example source contributions for each hour shown in Table 1 and indicates that Source 1 is the main contributor to the design value for all hours.

TABLE 2. SOURCE CONTRIBUTIONS TO 4<sup>TH</sup> HIGHEST DAILY MAXIMUM 1-HOUR CONCENTRATIONS ( $\mu\text{G}/\text{M}^3$ ) AND 5-YEAR AVERAGE DESIGN VALUES.

| Date<br>(YYMMDDHH) | TOTAL | SOURCE 1 | SOURCE 2 | SOURCE 3 | SOURCE 4 |
|--------------------|-------|----------|----------|----------|----------|
| 05080101           | 200.1 | 155.1    | 25.1     | 1.5      | 18.4     |
| 06073105           | 201.5 | 157.4    | 26.2     | 0.5      | 17.4     |
| 07080403           | 207.1 | 161.5    | 20.5     | 2.1      | 23.0     |
| 08072705           | 197.1 | 159.2    | 23.1     | 1.7      | 13.1     |
| 09080104           | 198.1 | 155.3    | 22.6     | 2.0      | 18.2     |
| 5-YEAR AVG.        | 200.8 | 157.7    | 23.5     | 1.6      | 18.0     |

## 8.2 Running AERMOD and implications for design value calculations

Recent enhancements to AERMOD include options to aid in the calculation of design values for comparison with the  $\text{SO}_2$  NAAQS. These enhancements include:

- The output of daily maximum 1-hour concentrations by receptor for each day in the modeled period for a specified source group. This is the MAXDAILY output option in AERMOD.
- The output, for each rank specified on the RECTABLE output keyword, of daily maximum 1-hour concentrations by receptor for each year for a specified source group. This is the MXDYBYYR output option.
- The MAXDCONT option, which shows the contribution of each source group to the high ranked values for a specified target source group, paired in time and space. The user can specify a range of ranks to analyze, or specify an upper bound rank, i.e. 4<sup>th</sup> highest, and a lower threshold value, such as the NAAQS for the target source group. The model will

process each rank within the range specified, but will stop after the first rank (in descending order of concentration) that is below the threshold, specified by the user. A warning message will be generated if the threshold is not reached within the range of ranks analyzed (based on the range of ranks specified on the RECTABLE keyword). This option may be needed to aid in determining which sources to include in a nonattainment area.

Ideally, all explicitly modeled sources, receptors, and background should be modeled in one AERMOD run for all modeled years. In this case, the use of the one of the above output options can be used in AERMOD to calculate design values for comparison to the NAAQS and determine the area's attainment status and/or inform attainment/nonattainment boundaries. The use of these options in AERMOD allows AERMOD to internally calculate concentration metrics that can be used to calculate design values and therefore lessen the need for large output files, i.e. hourly POSTFILES.

However, there may be situations where a single AERMOD run with all explicitly modeled sources is not preferred. These situations often arise due to runtime or storage space considerations during the AERMOD modeling. Sometimes separate AERMOD runs are done for each facility or group of facilities, or by year, or the receptor network is divided into separate sub-networks. In some types of these situations, the MAXDAILY, MXDYBYR, or MAXDCONT output option may not be an option for design value calculations, especially if all sources are not included in a single run. If the user wishes to utilize one of the three output options, then care should be taken in developing the model inputs to ensure accurate design value calculations.

Situations that would effectively preclude the use of the MAXDAILY, MXDYBYR, and MAXDCONT option to calculate meaningful AERMOD design value calculations include the following examples:

- Separate AERMOD runs for each source or groups of sources.
  - Designations modeling includes 10 facilities for five years of NWS data and each facility is modeled for five years in a separate AERMOD run, resulting in 10 separate AERMOD runs.
- Separate AERMOD runs for each source and each modeled year.
  - 10 facilities are modeled for 5 years of NWS data. Each facility is modeled separately for each year, resulting in fifty individual AERMOD runs.

In the two situations listed above, the MAXDAILY, MXDYBYR, or, MAXDCONT option would not be useful as the different AERMOD runs do not include a total concentration with contributions from all facilities. In these situations the use of hourly POSTFILES, which can be quite large, and external post-processing would be needed to calculate design values.

Situations that may use the MAXDAILY, MXDYBYR, or, MAXDCONT option but may necessitate some external post-processing afterwards to calculate a design value include:

- The receptor network is divided into sections and an AERMOD run, with all sources and years, is made for each network.
  - A receptor network of 20,000 receptors is divided into four 5,000 receptor sub-networks. Ten facilities are modeled with five years of NWS data in one AERMOD run for each receptor network, resulting in four AERMOD runs. After the AERMOD runs are complete, the MAXDAILY, MXDYBYR, or, MAXDCONT results for each network can be re-combined into the larger network.
- All sources and receptors are modeled in an AERMOD run for each year.
- Ten facilities are modeled with five years of NWS data. All facilities are modeled with all receptors for each year individually, resulting in five AERMOD runs. MAXDAILY, MXDYBYR, or, MAXDCONT output can be used and post-processed to generate the necessary design value concentrations. The receptor network is divided and each year is modeled separately for each sub-network with all sources.

Ten facilities are modeled with five years of NWS data for 20,000 receptors. The receptor network is divided into four 5,000 receptor networks. For each sub-network, all ten facilities are modeled for each year separately, resulting in twenty AERMOD runs. MAXDAILY, MXDYBYR, or, MAXDCONT output can be used and post-processed to generate the necessary design value concentrations.

#### **9. Use of modeling results to inform nonattainment/attainment boundaries**

Dispersion modeling is a tool that could be used to examine the spatial extent of potential violations of the 1-hour SO<sub>2</sub> NAAQS. Thus, in accordance with this guidance, refined dispersion modeling could be used to inform boundary determinations in support of the SO<sub>2</sub> designations process, i.e.

1. For an area that contains a violating monitor, modeling could be used to inform decisions on the appropriate nonattainment boundary in conjunction with other factors listed in Attachment 2.
2. For an area without a violating monitor, modeling could be used as evidence of an area's attainment status and also to inform decisions on the appropriate (attainment or nonattainment) boundary.

The shape and size of the nonattainment or attainment area is recommended by the state and either adopted or modified by EPA. For initial designations, it is expected that states will focus on areas with violating monitors. If a county contains a violating monitor, that county would be

considered in nonattainment. If there are no violating monitors and no dispersion modeling results to show attainment or nonattainment, that county would generally be considered unclassifiable.

### 9.1 Nonattainment area boundaries

For nonattainment areas (those with a violating monitor), modeling could be used to refine the nonattainment area boundaries from the presumptive county boundaries in conjunction with other factors such as those listed in Attachment 2. This could include reducing the nonattainment area from the presumptive county to a smaller area or expanding the boundary beyond the county if sources outside the county contribute to a NAAQS violation in the county. A nonattainment area boundary should contain the area that exceeds the NAAQS and include sources that may cause or contribute to a NAAQS exceedance. Figure 4 shows a hypothetical example of modeling of an area that exceeds the NAAQS (either through monitoring or modeling). In each panel of Figure 5, the black dot represents the emission source. In Figure 5a, the contours in orange and red are design values that exceed the NAAQS. Figures 5b-5d show different approaches to establishing the nonattainment boundary so that the orange and red contours are within the boundary. In Figure 5b, the hypothetical nonattainment boundary is a circle, centered on the area shown as violating the NAAQS, while Figure 5c shows the hypothetical nonattainment boundary as a rectangle. Finally, Figure 5d shows a hypothetical nonattainment boundary as an irregular polygon in shape, perhaps based on jurisdictional boundaries or other landmarks such as roads.

Figure 6 illustrates a hypothetical example for a multi-source situation that is in nonattainment. In the example, there are five sources (denoted by blue dots) in a modeling domain that covers four counties (A, B, C, and D). The modeling domain is centered on the violating monitor (star). The orange contour represents concentrations above the NAAQS. As in the single source example shown in Figure 5, the nonattainment area could be circular, rectangular, or irregularly shaped using jurisdictional boundaries. In this example, the hypothetical nonattainment boundary would be defined by the northern portion of County A and the southern portion of County C. Since multiple sources are involved, the hypothetical nonattainment boundary should be extended to cover those sources that cause or contribute to a NAAQS violation. In this hypothetical example, Sources 2 and 5 are the largest contributing sources to the potential NAAQS violation so the nonattainment boundaries would include those two sources.

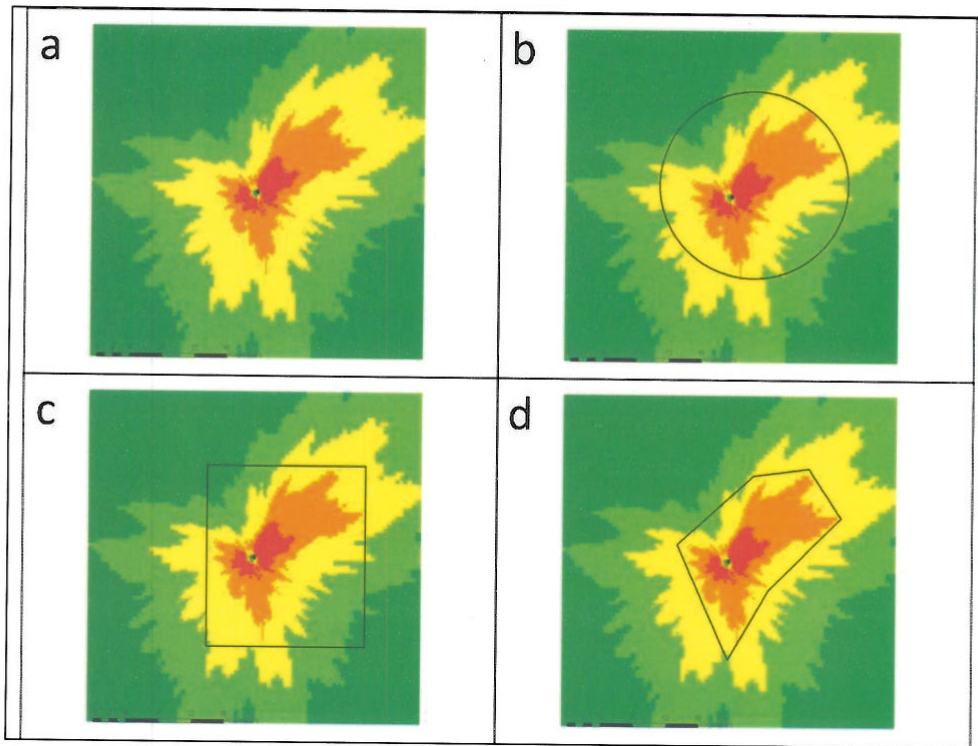


FIGURE 5. HYPOTHETICAL EXAMPLE OF A MODELED NAAQS VIOLATION (RED AND ORANGE CONTOURS) AND POSSIBLE NONATTAINMENT AREA BOUNDARIES DEFINED BY (B) CIRCLE, (C) RECTANGLE, AND (D) AN IRREGULAR POLYGON.

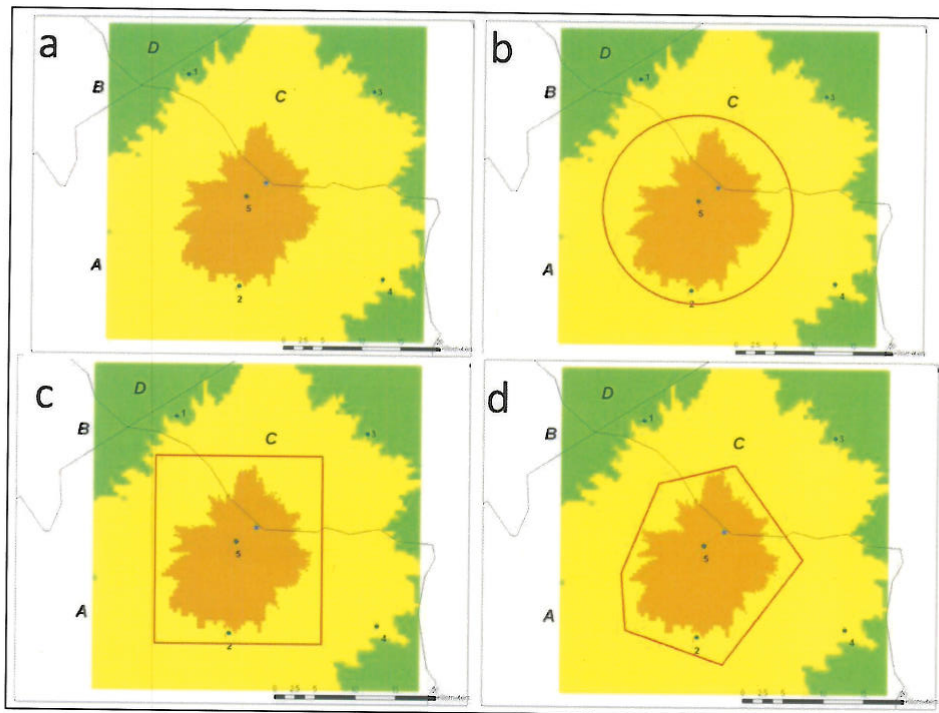


FIGURE 6. HYPOTHETICAL EXAMPLE OF A MULTI-SOURCE AREA WITH MODELED NAAQS VIOLATIONS (ORANGE CONTOUR) AND POSSIBLE NONATTAINMENT AREA BOUNDARIES DEFINED BY (B) CIRCLE, (C) RECTANGLE, AND (D) AN IRREGULAR POLYGON.

## 9.2 Attainment area boundaries

In areas without a violating monitor, modeling could be used to help determine that an area with SO<sub>2</sub> emitting sources is in attainment for the 1-hour SO<sub>2</sub> NAAQS. An attainment area boundary could not contain any area that exceeds the NAAQS or any area containing sources that are causing or contributing to a violating area. When considering attainment area boundaries, there will be no predicted area of violation from dispersion modeling so that other factors would need to be considered if the boundary is not determined by using the county presumptive boundary. Figure 7 illustrates a group of sources where a monitored design value does not exceed the NAAQS and modeling also does not show any concentration levels in excess of the NAAQS. In this case, the state could recommend that county A be considered attainment, since the monitor and modeling do not show violations of the NAAQS. Also, if there are other

sources in the remaining three counties (i.e., B, C, or D) and their modeled concentration levels do not show violations of the NAAQS, then these counties could also be recommended as part of the attainment area.

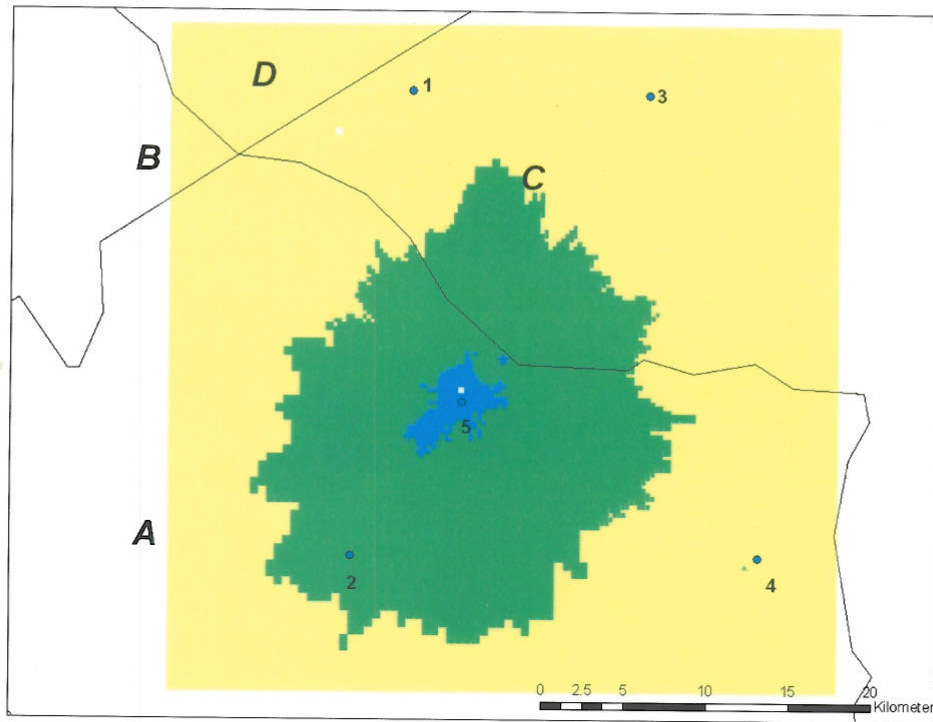


FIGURE 7. HYPOTHETICAL EXAMPLE FOR AN AREA WITH A MONITOR (STAR) THAT DOES NOT VIOLATE THE NAAQS AND MODELING RESULTS FOR SOURCES (BLUE DOTS) THAT DO NOT SHOW A VIOLATION OF THE NAAQS.

### 10. Documentation

It is expected that the state would submit a modeling and analysis protocol that details the methodology and model inputs before commencement of the modeling exercise. This information should support the states' recommended designations, and provide a basis for EPA's evaluation of the recommendations. The protocol should include the following:

- Characterization of the nonattainment problem or characterization of the modeled area in absence of a violating monitor,
- An emissions analysis around the violating monitor or area under consideration for designations in absence of a violating monitor, and
- Methodology for preparing air quality and meteorology inputs including choice of meteorological data and representativeness of the data.

Additionally, the documentation should include:

- Summary and analysis of modeling results, and
- Provision of modeling data inputs and outputs in electronic form.

A meeting with the appropriate EPA Regional Modeling Contact and other technical and planning staff to discuss the modeling and analysis protocol is recommended before submitting the protocol and beginning any refined modeling.

## 11. Summary

In summary, we emphasize the following key points of this modeling guidance:

- AERMOD is EPA's preferred near-field dispersion model for regulatory applications and is applicable for SO<sub>2</sub> designations modeling consistent with EPA's *Guideline on Air Quality Models*, also published as Appendix W of 40 CFR Part 51.
- Sources should be modeled with maximum allowable 1-hour or short-term emission rates in the designations modeling based on continuous operations at the source.
- Modeling should be done with five years of representative NWS meteorological data or at least one year of site specific meteorology.
- Background concentrations can be included as:
  - "First tier" approach based on monitored design values added to modeled design values; or
  - Temporally varying based on the 99<sup>th</sup> percentile monitored concentrations by hour of day and season added to modeled design values.
- Dispersion modeling results could be used to inform the nonattainment or attainment areas in conjunction with other designations factors.
- States should submit a modeling and analysis protocol that details the methodology and model inputs before commencement of the modeling exercise. This information should support the states' recommended designations, and provide a basis for EPA's evaluation of the recommendations.



- At any time during the designations process when there are questions regarding modeling or interpretation of this guidance, the appropriate EPA Regional Modeling Contact should be consulted.

## 12. References

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# Appendix D

Castle Hayne SO<sub>2</sub> Monitoring Data

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Castle Hayne 2005 SO2 Monitoring Data  
(Sorted by Date)

| STATE CODE | COUNTY CODE | COUNTY NAME | SITE ID | PARAMETER CODE | COLLECTION DATE | DURATION DESC | UNIT DESC         | ARITHMETIC MEAN (24-hour avg) | NUM DAILY OBS | PCT DAILY OBS | MAX HOUR | MAX VALUE (1-hour avg) | DAILY CRITERIA IND |
|------------|-------------|-------------|---------|----------------|-----------------|---------------|-------------------|-------------------------------|---------------|---------------|----------|------------------------|--------------------|
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/1/2005        | 1 HOUR        | Parts per billion | 1.17                          | 23            | 96            | 10       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/2/2005        | 1 HOUR        | Parts per billion | 0.43                          | 23            | 96            | 09       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/3/2005        | 1 HOUR        | Parts per billion | 0.67                          | 9             | 38            | 08       | 3                      | N                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/4/2005        | 1 HOUR        | Parts per billion | 1.89                          | 9             | 38            | 15       | 5                      | N                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/5/2005        | 1 HOUR        | Parts per billion | 5.26                          | 23            | 96            | 11       | 29                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/6/2005        | 1 HOUR        | Parts per billion | 2.48                          | 23            | 96            | 23       | 11                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/7/2005        | 1 HOUR        | Parts per billion | 2.61                          | 23            | 96            | 09       | 9                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/8/2005        | 1 HOUR        | Parts per billion | 0.61                          | 23            | 96            | 21       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/9/2005        | 1 HOUR        | Parts per billion | 1.17                          | 23            | 96            | 09       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/10/2005       | 1 HOUR        | Parts per billion | 5.96                          | 23            | 96            | 08       | 19                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/11/2005       | 1 HOUR        | Parts per billion | 1.04                          | 23            | 96            | 12       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/12/2005       | 1 HOUR        | Parts per billion | 2.91                          | 23            | 96            | 10       | 26                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/13/2005       | 1 HOUR        | Parts per billion | 0.00                          | 23            | 96            | 01       | 0                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/14/2005       | 1 HOUR        | Parts per billion | 0.52                          | 23            | 96            | 23       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/15/2005       | 1 HOUR        | Parts per billion | 2.35                          | 23            | 96            | 08       | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/16/2005       | 1 HOUR        | Parts per billion | 0.83                          | 23            | 96            | 01       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/17/2005       | 1 HOUR        | Parts per billion | 4.78                          | 23            | 96            | 06       | 15                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/18/2005       | 1 HOUR        | Parts per billion | 1.94                          | 17            | 71            | 01       | 4                      | N                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/19/2005       | 1 HOUR        | Parts per billion | 5.52                          | 23            | 96            | 11       | 24                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/20/2005       | 1 HOUR        | Parts per billion | 2.83                          | 23            | 96            | 09       | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/21/2005       | 1 HOUR        | Parts per billion | 3.26                          | 23            | 96            | 19       | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/22/2005       | 1 HOUR        | Parts per billion | 1.43                          | 23            | 96            | 22       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/23/2005       | 1 HOUR        | Parts per billion | 3.57                          | 23            | 96            | 06       | 9                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/24/2005       | 1 HOUR        | Parts per billion | 6.74                          | 23            | 96            | 21       | 25                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/25/2005       | 1 HOUR        | Parts per billion | 3.87                          | 23            | 96            | 01       | 10                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/26/2005       | 1 HOUR        | Parts per billion | 6.13                          | 23            | 96            | 11       | 21                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/27/2005       | 1 HOUR        | Parts per billion | 4.61                          | 23            | 96            | 08       | 13                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/28/2005       | 1 HOUR        | Parts per billion | 4.13                          | 23            | 96            | 05       | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/29/2005       | 1 HOUR        | Parts per billion | 1.39                          | 23            | 96            | 06       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/30/2005       | 1 HOUR        | Parts per billion | 0.70                          | 23            | 96            | 15       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/31/2005       | 1 HOUR        | Parts per billion | 3.87                          | 23            | 96            | 08       | 10                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/1/2005        | 1 HOUR        | Parts per billion | 0.95                          | 19            | 79            | 03       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/2/2005        | 1 HOUR        | Parts per billion | 0.26                          | 23            | 96            | 06       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/3/2005        | 1 HOUR        | Parts per billion | 0.13                          | 23            | 96            | 06       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/4/2005        | 1 HOUR        | Parts per billion | 3.61                          | 23            | 96            | 10       | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/5/2005        | 1 HOUR        | Parts per billion | 4.91                          | 23            | 96            | 07       | 11                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/6/2005        | 1 HOUR        | Parts per billion | 2.09                          | 23            | 96            | 08       | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/7/2005        | 1 HOUR        | Parts per billion | 1.26                          | 23            | 96            | 10       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/8/2005        | 1 HOUR        | Parts per billion | 2.87                          | 23            | 96            | 11       | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/9/2005        | 1 HOUR        | Parts per billion | 5.09                          | 23            | 96            | 11       | 14                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/10/2005       | 1 HOUR        | Parts per billion | 2.86                          | 22            | 92            | 01       | 9                      | Y                  |

Castle Hayne 2005 SO2 Monitoring Data  
(Sorted by Date)

| STATE CODE | COUNTY CODE | COUNTY NAME | SITE ID | PARAMETER CODE | COLLECTION DATE | DURATION DESC | UNIT DESC         | ARITHMETIC MEAN (24-hour avg) | NUM DAILY OBS | PCT DAILY OBS | MAX HOUR | MAX VALUE (1-hour avg) | DAILY CRITERIA IND |
|------------|-------------|-------------|---------|----------------|-----------------|---------------|-------------------|-------------------------------|---------------|---------------|----------|------------------------|--------------------|
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/11/2005       | 1 HOUR        | Parts per billion | 2.83                          | 23            | 96            | 04       | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/12/2005       | 1 HOUR        | Parts per billion | 4.35                          | 23            | 96            | 09       | 21                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/13/2005       | 1 HOUR        | Parts per billion | 2.87                          | 23            | 96            | 14       | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/14/2005       | 1 HOUR        | Parts per billion | 2.00                          | 23            | 96            | 20       | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/15/2005       | 1 HOUR        | Parts per billion | 0.60                          | 20            | 83            | 03       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/16/2005       | 1 HOUR        | Parts per billion | 4.83                          | 23            | 96            | 12       | 20                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/17/2005       | 1 HOUR        | Parts per billion | 2.13                          | 23            | 96            | 10       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/18/2005       | 1 HOUR        | Parts per billion | 1.83                          | 23            | 96            | 9        | 9                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/19/2005       | 1 HOUR        | Parts per billion | 1.57                          | 23            | 96            | 11       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/20/2005       | 1 HOUR        | Parts per billion | 3.96                          | 23            | 96            | 12       | 19                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/21/2005       | 1 HOUR        | Parts per billion | 2.91                          | 23            | 96            | 08       | 13                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/22/2005       | 1 HOUR        | Parts per billion | 1.70                          | 23            | 96            | 02       | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/23/2005       | 1 HOUR        | Parts per billion | 1.91                          | 23            | 96            | 19       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/24/2005       | 1 HOUR        | Parts per billion | 0.65                          | 23            | 96            | 01       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/25/2005       | 1 HOUR        | Parts per billion | 1.78                          | 23            | 96            | 09       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/26/2005       | 1 HOUR        | Parts per billion | 2.96                          | 23            | 96            | 11       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/27/2005       | 1 HOUR        | Parts per billion | 1.91                          | 23            | 96            | 11       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/28/2005       | 1 HOUR        | Parts per billion | 0.35                          | 23            | 96            | 23       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/1/2005        | 1 HOUR        | Parts per billion | 2.05                          | 19            | 79            | 07       | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/2/2005        | 1 HOUR        | Parts per billion | 2.82                          | 22            | 92            | 08       | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/3/2005        | 1 HOUR        | Parts per billion | 2.35                          | 20            | 83            | 08       | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/4/2005        | 1 HOUR        | Parts per billion | 2.77                          | 22            | 92            | 12       | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/5/2005        | 1 HOUR        | Parts per billion | 5.23                          | 22            | 92            | 03       | 14                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/6/2005        | 1 HOUR        | Parts per billion | 3.86                          | 22            | 92            | 21       | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/7/2005        | 1 HOUR        | Parts per billion | 7.86                          | 22            | 92            | 02       | 38                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/8/2005        | 1 HOUR        | Parts per billion | 1.95                          | 22            | 92            | 12       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/9/2005        | 1 HOUR        | Parts per billion | 3.45                          | 22            | 92            | 13       | 14                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/10/2005       | 1 HOUR        | Parts per billion | 2.05                          | 22            | 92            | 14       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/11/2005       | 1 HOUR        | Parts per billion | 6.23                          | 22            | 92            | 07       | 14                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/12/2005       | 1 HOUR        | Parts per billion | 3.23                          | 22            | 92            | 07       | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/13/2005       | 1 HOUR        | Parts per billion | 4.41                          | 22            | 92            | 02       | 14                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/14/2005       | 1 HOUR        | Parts per billion | 2.16                          | 19            | 79            | 17       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/15/2005       | 1 HOUR        | Parts per billion | 2.83                          | 18            | 75            | 16       | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/16/2005       | 1 HOUR        | Parts per billion | 2.05                          | 22            | 92            | 06       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/17/2005       | 1 HOUR        | Parts per billion | 0.64                          | 22            | 92            | 03       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/18/2005       | 1 HOUR        | Parts per billion | 1.45                          | 22            | 92            | 19       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/19/2005       | 1 HOUR        | Parts per billion | 2.18                          | 22            | 92            | 02       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/20/2005       | 1 HOUR        | Parts per billion | 2.64                          | 22            | 92            | 20       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/21/2005       | 1 HOUR        | Parts per billion | 1.73                          | 22            | 92            | 02       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/22/2005       | 1 HOUR        | Parts per billion | 1.14                          | 22            | 92            | 09       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/23/2005       | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 21       | 5                      | Y                  |



Castle Hayne 2005 SO2 Monitoring Data  
(Sorted by Date)

| STATE CODE | COUNTY CODE | COUNTY NAME | SITE ID | PARAMETER CODE | COLLECTION DATE | DURATION DESC | UNIT DESC         | ARITHMETIC MEAN (24-hour avg) | NUM DAILY OBS | PCT DAILY OBS | MAX HOUR | MAX VALUE (1-hour avg) | DAILY CRITERIA IND |
|------------|-------------|-------------|---------|----------------|-----------------|---------------|-------------------|-------------------------------|---------------|---------------|----------|------------------------|--------------------|
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/24/2005       | 1 HOUR        | Parts per billion | 1.58                          | 19            | 79            | 07       | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/25/2005       | 1 HOUR        | Parts per billion | 1.41                          | 22            | 92            | 02       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/26/2005       | 1 HOUR        | Parts per billion | 1.23                          | 22            | 92            | 03       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/27/2005       | 1 HOUR        | Parts per billion | 0.27                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/28/2005       | 1 HOUR        | Parts per billion | 1.82                          | 22            | 92            | 21       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/29/2005       | 1 HOUR        | Parts per billion | 2.00                          | 22            | 92            | 08       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/30/2005       | 1 HOUR        | Parts per billion | 1.45                          | 22            | 92            | 09       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/31/2005       | 1 HOUR        | Parts per billion | 0.77                          | 22            | 92            | 15       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/1/2005        | 1 HOUR        | Parts per billion | 0.36                          | 22            | 92            | 07       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/2/2005        | 1 HOUR        | Parts per billion | 1.77                          | 22            | 92            | 11       | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/3/2005        | 1 HOUR        | Parts per billion | 2.14                          | 22            | 92            | 21       | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/4/2005        | 1 HOUR        | Parts per billion | 3.64                          | 22            | 92            | 08       | 10                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/5/2005        | 1 HOUR        | Parts per billion | 1.63                          | 19            | 79            | 11       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/6/2005        | 1 HOUR        | Parts per billion | 5.73                          | 22            | 92            | 10       | 67                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/7/2005        | 1 HOUR        | Parts per billion | 0.45                          | 22            | 92            | 18       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/8/2005        | 1 HOUR        | Parts per billion | 0.00                          | 22            | 92            | 02       | 0                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/9/2005        | 1 HOUR        | Parts per billion | 0.23                          | 22            | 92            | 18       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/10/2005       | 1 HOUR        | Parts per billion | 0.91                          | 22            | 92            | 02       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/11/2005       | 1 HOUR        | Parts per billion | 1.32                          | 22            | 92            | 10       | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/12/2005       | 1 HOUR        | Parts per billion | 0.82                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/13/2005       | 1 HOUR        | Parts per billion | 0.00                          | 22            | 92            | 02       | 0                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/14/2005       | 1 HOUR        | Parts per billion | 0.68                          | 22            | 92            | 22       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/15/2005       | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/16/2005       | 1 HOUR        | Parts per billion | 1.05                          | 22            | 92            | 19       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/17/2005       | 1 HOUR        | Parts per billion | 1.09                          | 22            | 92            | 08       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/18/2005       | 1 HOUR        | Parts per billion | 7.05                          | 22            | 92            | 09       | 63                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/19/2005       | 1 HOUR        | Parts per billion | 7.05                          | 19            | 79            | 12       | 39                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/20/2005       | 1 HOUR        | Parts per billion | 9.00                          | 22            | 92            | 11       | 25                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/21/2005       | 1 HOUR        | Parts per billion | 5.86                          | 22            | 92            | 02       | 14                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/22/2005       | 1 HOUR        | Parts per billion | 6.68                          | 22            | 92            | 07       | 44                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/23/2005       | 1 HOUR        | Parts per billion | 2.27                          | 22            | 92            | 22       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/24/2005       | 1 HOUR        | Parts per billion | 1.82                          | 22            | 92            | 07       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/25/2005       | 1 HOUR        | Parts per billion | 2.36                          | 22            | 92            | 04       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/26/2005       | 1 HOUR        | Parts per billion | 1.91                          | 22            | 92            | 08       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/27/2005       | 1 HOUR        | Parts per billion | 2.50                          | 22            | 92            | 07       | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/28/2005       | 1 HOUR        | Parts per billion | 2.00                          | 22            | 92            | 20       | 9                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/29/2005       | 1 HOUR        | Parts per billion | 1.77                          | 22            | 92            | 09       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/30/2005       | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/1/2005        | 1 HOUR        | Parts per billion | 1.32                          | 22            | 92            | 05       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/2/2005        | 1 HOUR        | Parts per billion | 1.28                          | 18            | 75            | 11       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/3/2005        | 1 HOUR        | Parts per billion | 1.59                          | 22            | 92            | 07       | 3                      | Y                  |

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|------------|-------------|-------------|---------|----------------|-----------------|---------------|-------------------|-------------------------------|---------------|---------------|----------|------------------------|--------------------|
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/4/2005        | 1 HOUR        | Parts per billion | 1.14                          | 22            | 92            | 10       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/5/2005        | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/6/2005        | 1 HOUR        | Parts per billion | 0.95                          | 22            | 92            | 22       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/7/2005        | 1 HOUR        | Parts per billion | 3.14                          | 22            | 92            | 13       | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/8/2005        | 1 HOUR        | Parts per billion | 2.55                          | 22            | 92            | 02       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/9/2005        | 1 HOUR        | Parts per billion | 1.73                          | 22            | 92            | 07       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/10/2005       | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/11/2005       | 1 HOUR        | Parts per billion | 0.82                          | 22            | 92            | 04       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/12/2005       | 1 HOUR        | Parts per billion | 2.77                          | 22            | 92            | 09       | 9                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/13/2005       | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/14/2005       | 1 HOUR        | Parts per billion | 0.95                          | 22            | 92            | 14       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/15/2005       | 1 HOUR        | Parts per billion | 3.00                          | 22            | 92            | 07       | 11                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/16/2005       | 1 HOUR        | Parts per billion | 1.84                          | 19            | 79            | 07       | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/17/2005       | 1 HOUR        | Parts per billion | 0.86                          | 22            | 92            | 03       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/18/2005       | 1 HOUR        | Parts per billion | 0.86                          | 22            | 92            | 03       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/19/2005       | 1 HOUR        | Parts per billion | 0.95                          | 22            | 92            | 07       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/20/2005       | 1 HOUR        | Parts per billion | 1.05                          | 22            | 92            | 13       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/21/2005       | 1 HOUR        | Parts per billion | 0.64                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/22/2005       | 1 HOUR        | Parts per billion | 1.27                          | 22            | 92            | 12       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/23/2005       | 1 HOUR        | Parts per billion | 3.27                          | 22            | 92            | 09       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/24/2005       | 1 HOUR        | Parts per billion | 2.32                          | 22            | 92            | 08       | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/25/2005       | 1 HOUR        | Parts per billion | 0.95                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/26/2005       | 1 HOUR        | Parts per billion | 2.14                          | 22            | 92            | 08       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/27/2005       | 1 HOUR        | Parts per billion | 4.63                          | 19            | 79            | 10       | 19                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/28/2005       | 1 HOUR        | Parts per billion | 5.41                          | 22            | 92            | 10       | 25                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/29/2005       | 1 HOUR        | Parts per billion | 1.45                          | 22            | 92            | 08       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/30/2005       | 1 HOUR        | Parts per billion | 0.82                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/31/2005       | 1 HOUR        | Parts per billion | 0.95                          | 22            | 92            | 19       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/1/2005        | 1 HOUR        | Parts per billion | 0.73                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/2/2005        | 1 HOUR        | Parts per billion | 0.59                          | 22            | 92            | 05       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/3/2005        | 1 HOUR        | Parts per billion | 2.86                          | 22            | 92            | 12       | 10                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/4/2005        | 1 HOUR        | Parts per billion | 3.09                          | 22            | 92            | 10       | 11                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/5/2005        | 1 HOUR        | Parts per billion | 2.32                          | 22            | 92            | 08       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/6/2005        | 1 HOUR        | Parts per billion | 3.23                          | 22            | 92            | 09       | 10                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/7/2005        | 1 HOUR        | Parts per billion | 3.05                          | 19            | 79            | 10       | 17                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/8/2005        | 1 HOUR        | Parts per billion | 1.14                          | 22            | 92            | 12       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/9/2005        | 1 HOUR        | Parts per billion | 0.82                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/10/2005       | 1 HOUR        | Parts per billion | 0.64                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/11/2005       | 1 HOUR        | Parts per billion | 0.91                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/12/2005       | 1 HOUR        | Parts per billion | 0.55                          | 22            | 92            | 03       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/13/2005       | 1 HOUR        | Parts per billion | 0.82                          | 22            | 92            | 02       | 1                      | Y                  |

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|------------|-------------|-------------|---------|----------------|-----------------|---------------|-------------------|-------------------------------|---------------|---------------|----------|------------------------|--------------------|
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/14/2005       | 1 HOUR        | Parts per billion | 4.23                          | 22            | 92            | 06       | 15                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/15/2005       | 1 HOUR        | Parts per billion | 4.79                          | 19            | 79            | 09       | 9                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/16/2005       | 1 HOUR        | Parts per billion | 2.23                          | 22            | 92            | 12       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/17/2005       | 1 HOUR        | Parts per billion | 1.45                          | 22            | 92            | 08       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/18/2005       | 1 HOUR        | Parts per billion | 1.27                          | 22            | 92            | 10       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/19/2005       | 1 HOUR        | Parts per billion | 1.45                          | 22            | 92            | 09       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/20/2005       | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/21/2005       | 1 HOUR        | Parts per billion | 1.59                          | 22            | 92            | 16       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/22/2005       | 1 HOUR        | Parts per billion | 2.73                          | 22            | 92            | 23       | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/23/2005       | 1 HOUR        | Parts per billion | 2.55                          | 22            | 92            | 14       | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/24/2005       | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/25/2005       | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/26/2005       | 1 HOUR        | Parts per billion | 1.27                          | 22            | 92            | 16       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/27/2005       | 1 HOUR        | Parts per billion | 2.00                          | 10            | 42            | 08       | 6                      | N                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/28/2005       | 1 HOUR        | Parts per billion | 1.00                          | 0             | 0             | 12       | 1                      | N                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/29/2005       | 1 HOUR        | Parts per billion | 1.77                          | 22            | 92            | 13       | 4                      | N                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/30/2005       | 1 HOUR        | Parts per billion | 3.77                          | 22            | 92            | 11       | 12                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/1/2005        | 1 HOUR        | Parts per billion | 1.73                          | 22            | 92            | 12       | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/2/2005        | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/3/2005        | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/4/2005        | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/5/2005        | 1 HOUR        | Parts per billion | 2.23                          | 22            | 92            | 8        | 14                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/6/2005        | 1 HOUR        | Parts per billion | 3.32                          | 22            | 92            | 3        | 12                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/7/2005        | 1 HOUR        | Parts per billion | 2.73                          | 22            | 92            | 7        | 16                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/8/2005        | 1 HOUR        | Parts per billion | 2.32                          | 22            | 92            | 11       | 10                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/9/2005        | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/10/2005       | 1 HOUR        | Parts per billion | 1.41                          | 22            | 92            | 8        | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/11/2005       | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/12/2005       | 1 HOUR        | Parts per billion | 3.22                          | 18            | 75            | 10       | 12                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/13/2005       | 1 HOUR        | Parts per billion | 1.86                          | 22            | 92            | 6        | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/14/2005       | 1 HOUR        | Parts per billion | 1.82                          | 22            | 92            | 10       | 11                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/15/2005       | 1 HOUR        | Parts per billion | 1.55                          | 22            | 92            | 17       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/16/2005       | 1 HOUR        | Parts per billion | 3.91                          | 22            | 92            | 8        | 13                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/17/2005       | 1 HOUR        | Parts per billion | 4.00                          | 22            | 92            | 14       | 13                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/18/2005       | 1 HOUR        | Parts per billion | 4.73                          | 22            | 92            | 13       | 16                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/19/2005       | 1 HOUR        | Parts per billion | 3.77                          | 22            | 92            | 13       | 10                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/20/2005       | 1 HOUR        | Parts per billion | 3.86                          | 22            | 92            | 6        | 10                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/21/2005       | 1 HOUR        | Parts per billion | 3.32                          | 19            | 79            | 10       | 10                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/22/2005       | 1 HOUR        | Parts per billion | 6.73                          | 22            | 92            | 10       | 33                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/23/2005       | 1 HOUR        | Parts per billion | 1.05                          | 22            | 92            | 17       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/24/2005       | 1 HOUR        | Parts per billion | 1.14                          | 22            | 92            | 10       | 2                      | Y                  |

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|------------|-------------|-------------|---------|----------------|-----------------|---------------|-------------------|-------------------------------|---------------|---------------|----------|------------------------|--------------------|
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/25/2005       | 1 HOUR        | Parts per billion | 2.05                          | 19            | 79            | 10       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/26/2005       | 1 HOUR        | Parts per billion | 2.55                          | 22            | 92            | 5        | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/27/2005       | 1 HOUR        | Parts per billion | 2.59                          | 22            | 92            | 7        | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/28/2005       | 1 HOUR        | Parts per billion | 1.50                          | 22            | 92            | 16       | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/29/2005       | 1 HOUR        | Parts per billion | 1.00                          | 20            | 83            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/30/2005       | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/31/2005       | 1 HOUR        | Parts per billion | 1.18                          | 22            | 92            | 9        | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/1/2005        | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/2/2005        | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/3/2005        | 1 HOUR        | Parts per billion | 1.77                          | 22            | 92            | 17       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/4/2005        | 1 HOUR        | Parts per billion | 1.86                          | 22            | 92            | 9        | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/5/2005        | 1 HOUR        | Parts per billion | 1.41                          | 22            | 92            | 8        | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/6/2005        | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/7/2005        | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/8/2005        | 1 HOUR        | Parts per billion | 1.00                          | 18            | 75            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/9/2005        | 1 HOUR        | Parts per billion | 1.00                          | 9             | 38            | 2        | 1                      | N                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/10/2005       | 1 HOUR        | Parts per billion | 1.13                          | 8             | 33            | 19       | 2                      | N                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/11/2005       | 1 HOUR        | Parts per billion | 2.55                          | 22            | 92            | 13       | 15                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/12/2005       | 1 HOUR        | Parts per billion | 2.50                          | 22            | 92            | 8        | 13                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/13/2005       | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/14/2005       | 1 HOUR        | Parts per billion | 6.41                          | 22            | 92            | 8        | 33                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/15/2005       | 1 HOUR        | Parts per billion | 2.95                          | 22            | 92            | 9        | 13                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/16/2005       | 1 HOUR        | Parts per billion | 2.73                          | 22            | 92            | 8        | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/17/2005       | 1 HOUR        | Parts per billion | 2.05                          | 22            | 92            | 8        | 10                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/18/2005       | 1 HOUR        | Parts per billion | 1.18                          | 22            | 92            | 16       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/19/2005       | 1 HOUR        | Parts per billion | 1.64                          | 22            | 92            | 9        | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/20/2005       | 1 HOUR        | Parts per billion | 2.09                          | 22            | 92            | 7        | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/21/2005       | 1 HOUR        | Parts per billion | 2.77                          | 22            | 92            | 2        | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/22/2005       | 1 HOUR        | Parts per billion | 1.53                          | 17            | 71            | 12       | 3                      | N                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/23/2005       | 1 HOUR        | Parts per billion | 1.23                          | 22            | 92            | 7        | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/24/2005       | 1 HOUR        | Parts per billion | 1.05                          | 22            | 92            | 7        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/25/2005       | 1 HOUR        | Parts per billion | 1.36                          | 22            | 92            | 7        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/26/2005       | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/27/2005       | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/28/2005       | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/29/2005       | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/30/2005       | 1 HOUR        | Parts per billion | 1.55                          | 22            | 92            | 18       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/31/2005       | 1 HOUR        | Parts per billion | 4.50                          | 22            | 92            | 11       | 16                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/1/2005        | 1 HOUR        | Parts per billion | 1.53                          | 19            | 79            | 7        | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/2/2005        | 1 HOUR        | Parts per billion | 1.48                          | 23            | 96            | 8        | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/3/2005        | 1 HOUR        | Parts per billion | 1.70                          | 23            | 96            | 8        | 3                      | Y                  |

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|------------|-------------|-------------|---------|----------------|-----------------|---------------|-------------------|-------------------------------|---------------|---------------|----------|------------------------|--------------------|
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/4/2005        | 1 HOUR        | Parts per billion | 1.57                          | 23            | 96            | 7        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/5/2005        | 1 HOUR        | Parts per billion | 1.26                          | 23            | 96            | 2        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/6/2005        | 1 HOUR        | Parts per billion | 1.04                          | 23            | 96            | 23       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/7/2005        | 1 HOUR        | Parts per billion | 1.00                          | 23            | 96            | 1        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/8/2005        | 1 HOUR        | Parts per billion | 1.00                          | 23            | 96            | 1        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/9/2005        | 1 HOUR        | Parts per billion | 1.09                          | 23            | 96            | 9        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/10/2005       | 1 HOUR        | Parts per billion | 1.65                          | 23            | 96            | 12       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/11/2005       | 1 HOUR        | Parts per billion | 1.30                          | 23            | 96            | 8        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/12/2005       | 1 HOUR        | Parts per billion | 1.00                          | 23            | 96            | 1        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/13/2005       | 1 HOUR        | Parts per billion | 3.68                          | 19            | 79            | 19       | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/14/2005       | 1 HOUR        | Parts per billion | 6.58                          | 19            | 79            | 2        | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/15/2005       | 1 HOUR        | Parts per billion | 3.63                          | 16            | 67            | 2        | 7                      | N                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/16/2005       | 1 HOUR        | Parts per billion | 1.52                          | 23            | 96            | 1        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/17/2005       | 1 HOUR        | Parts per billion | 3.74                          | 23            | 96            | 9        | 10                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/18/2005       | 1 HOUR        | Parts per billion | 3.65                          | 23            | 96            | 4        | 9                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/19/2005       | 1 HOUR        | Parts per billion | 3.04                          | 23            | 96            | 9        | 11                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/20/2005       | 1 HOUR        | Parts per billion | 1.00                          | 23            | 96            | 1        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/21/2005       | 1 HOUR        | Parts per billion | 1.09                          | 23            | 96            | 16       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/22/2005       | 1 HOUR        | Parts per billion | 1.04                          | 23            | 96            | 8        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/23/2005       | 1 HOUR        | Parts per billion | 1.35                          | 23            | 96            | 9        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/24/2005       | 1 HOUR        | Parts per billion | 2.00                          | 23            | 96            | 9        | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/25/2005       | 1 HOUR        | Parts per billion | 1.00                          | 23            | 96            | 1        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/26/2005       | 1 HOUR        | Parts per billion | 1.52                          | 23            | 96            | 16       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/27/2005       | 1 HOUR        | Parts per billion | 2.05                          | 20            | 83            | 1        | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/28/2005       | 1 HOUR        | Parts per billion | 1.43                          | 23            | 96            | 7        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/29/2005       | 1 HOUR        | Parts per billion | 2.09                          | 23            | 96            | 9        | 9                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/30/2005       | 1 HOUR        | Parts per billion | 1.96                          | 23            | 96            | 7        | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/1/2005       | 1 HOUR        | Parts per billion | 1.22                          | 23            | 96            | 7        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/2/2005       | 1 HOUR        | Parts per billion | 1.57                          | 23            | 96            | 13       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/3/2005       | 1 HOUR        | Parts per billion | 1.17                          | 23            | 96            | 7        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/4/2005       | 1 HOUR        | Parts per billion | 1.04                          | 23            | 96            | 10       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/5/2005       | 1 HOUR        | Parts per billion | 1.00                          | 23            | 96            | 1        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/6/2005       | 1 HOUR        | Parts per billion | 1.00                          | 19            | 79            | 1        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/7/2005       | 1 HOUR        | Parts per billion | 1.00                          | 23            | 96            | 1        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/8/2005       | 1 HOUR        | Parts per billion | 2.57                          | 23            | 96            | 14       | 15                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/9/2005       | 1 HOUR        | Parts per billion | 1.70                          | 23            | 96            | 9        | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/10/2005      | 1 HOUR        | Parts per billion | 1.04                          | 23            | 96            | 21       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/11/2005      | 1 HOUR        | Parts per billion | 1.30                          | 23            | 96            | 1        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/12/2005      | 1 HOUR        | Parts per billion | 1.61                          | 23            | 96            | 1        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/13/2005      | 1 HOUR        | Parts per billion | 1.74                          | 23            | 96            | 6        | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/14/2005      | 1 HOUR        | Parts per billion | 1.10                          | 20            | 83            | 1        | 2                      | Y                  |

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|------------|-------------|-------------|---------|----------------|-----------------|---------------|-------------------|-------------------------------|---------------|---------------|----------|------------------------|--------------------|
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/15/2005      | 1 HOUR        | Parts per billion | 2.65                          | 23            | 96            | 9        | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/16/2005      | 1 HOUR        | Parts per billion | 1.35                          | 23            | 96            | 13       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/17/2005      | 1 HOUR        | Parts per billion | 1.74                          | 23            | 96            | 8        | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/18/2005      | 1 HOUR        | Parts per billion | 4.17                          | 23            | 96            | 10       | 16                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/19/2005      | 1 HOUR        | Parts per billion | 3.83                          | 23            | 96            | 12       | 23                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/20/2005      | 1 HOUR        | Parts per billion | 5.61                          | 23            | 96            | 12       | 26                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/21/2005      | 1 HOUR        | Parts per billion | 2.22                          | 23            | 96            | 10       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/22/2005      | 1 HOUR        | Parts per billion | 3.87                          | 23            | 96            | 14       | 11                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/23/2005      | 1 HOUR        | Parts per billion | 1.52                          | 23            | 96            | 8        | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/24/2005      | 1 HOUR        | Parts per billion | 1.04                          | 23            | 96            | 23       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/25/2005      | 1 HOUR        | Parts per billion | 4.17                          | 23            | 96            | 8        | 9                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/26/2005      | 1 HOUR        | Parts per billion | 2.87                          | 23            | 96            | 7        | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/27/2005      | 1 HOUR        | Parts per billion | 1.37                          | 19            | 79            | 11       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/28/2005      | 1 HOUR        | Parts per billion | 1.30                          | 23            | 96            | 10       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/29/2005      | 1 HOUR        | Parts per billion | 3.13                          | 23            | 96            | 9        | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/30/2005      | 1 HOUR        | Parts per billion | 1.57                          | 23            | 96            | 9        | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/31/2005      | 1 HOUR        | Parts per billion | 2.22                          | 23            | 96            | 10       | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/1/2005       | 1 HOUR        | Parts per billion | 1.09                          | 23            | 96            | 10       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/2/2005       | 1 HOUR        | Parts per billion | 1.78                          | 23            | 96            | 8        | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/3/2005       | 1 HOUR        | Parts per billion | 2.22                          | 23            | 96            | 13       | 11                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/4/2005       | 1 HOUR        | Parts per billion | 2.83                          | 23            | 96            | 9        | 13                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/5/2005       | 1 HOUR        | Parts per billion | 2.04                          | 23            | 96            | 9        | 11                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/6/2005       | 1 HOUR        | Parts per billion | 2.22                          | 23            | 96            | 10       | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/7/2005       | 1 HOUR        | Parts per billion | 1.30                          | 23            | 96            | 8        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/8/2005       | 1 HOUR        | Parts per billion | 1.65                          | 20            | 83            | 12       | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/9/2005       | 1 HOUR        | Parts per billion | 4.74                          | 23            | 96            | 10       | 16                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/10/2005      | 1 HOUR        | Parts per billion | 4.83                          | 23            | 96            | 6        | 14                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/11/2005      | 1 HOUR        | Parts per billion | 1.74                          | 23            | 96            | 9        | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/12/2005      | 1 HOUR        | Parts per billion | 2.30                          | 23            | 96            | 11       | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/13/2005      | 1 HOUR        | Parts per billion | 1.00                          | 23            | 96            | 1        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/14/2005      | 1 HOUR        | Parts per billion | 1.61                          | 23            | 96            | 9        | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/15/2005      | 1 HOUR        | Parts per billion | 1.13                          | 23            | 96            | 15       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/16/2005      | 1 HOUR        | Parts per billion | 1.00                          | 23            | 96            | 1        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/17/2005      | 1 HOUR        | Parts per billion | 1.65                          | 23            | 96            | 1        | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/18/2005      | 1 HOUR        | Parts per billion | 2.70                          | 23            | 96            | 9        | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/19/2005      | 1 HOUR        | Parts per billion | 2.57                          | 23            | 96            | 8        | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/20/2005      | 1 HOUR        | Parts per billion | 1.09                          | 23            | 96            | 1        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/21/2005      | 1 HOUR        | Parts per billion | 1.25                          | 20            | 83            | 21       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/22/2005      | 1 HOUR        | Parts per billion | 4.13                          | 23            | 96            | 10       | 9                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/23/2005      | 1 HOUR        | Parts per billion | 4.74                          | 23            | 96            | 20       | 13                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/24/2005      | 1 HOUR        | Parts per billion | 7.65                          | 23            | 96            | 3        | 16                     | Y                  |

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|------------|-------------|-------------|---------|----------------|-----------------|---------------|-------------------|-------------------------------|---------------|---------------|----------|------------------------|--------------------|
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/25/2005      | 1 HOUR        | Parts per billion | 2.83                          | 23            | 96            | 1        | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/26/2005      | 1 HOUR        | Parts per billion | 1.70                          | 23            | 96            | 8        | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/27/2005      | 1 HOUR        | Parts per billion | 1.09                          | 23            | 96            | 2        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/28/2005      | 1 HOUR        | Parts per billion | 1.00                          | 23            | 96            | 1        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/29/2005      | 1 HOUR        | Parts per billion | 1.00                          | 23            | 96            | 1        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/30/2005      | 1 HOUR        | Parts per billion | 2.17                          | 23            | 96            | 15       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/1/2005       | 1 HOUR        | Parts per billion | 2.35                          | 23            | 96            | 16       | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/2/2005       | 1 HOUR        | Parts per billion | 4.74                          | 23            | 96            | 16       | 11                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/3/2005       | 1 HOUR        | Parts per billion | 2.43                          | 23            | 96            | 9        | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/4/2005       | 1 HOUR        | Parts per billion | 3.13                          | 23            | 96            | 10       | 14                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/5/2005       | 1 HOUR        | Parts per billion | 2.40                          | 20            | 83            | 2        | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/6/2005       | 1 HOUR        | Parts per billion | 2.17                          | 23            | 96            | 11       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/7/2005       | 1 HOUR        | Parts per billion | 2.30                          | 23            | 96            | 13       | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/8/2005       | 1 HOUR        | Parts per billion | 3.13                          | 23            | 96            | 9        | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/9/2005       | 1 HOUR        | Parts per billion | 1.35                          | 23            | 96            | 12       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/10/2005      | 1 HOUR        | Parts per billion | 2.57                          | 23            | 96            | 23       | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/11/2005      | 1 HOUR        | Parts per billion | 5.09                          | 23            | 96            | 3        | 12                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/12/2005      | 1 HOUR        | Parts per billion | 4.13                          | 23            | 96            | 9        | 15                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/13/2005      | 1 HOUR        | Parts per billion | 4.04                          | 23            | 96            | 10       | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/14/2005      | 1 HOUR        | Parts per billion | 4.96                          | 23            | 96            | 2        | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/15/2005      | 1 HOUR        | Parts per billion | 1.57                          | 23            | 96            | 1        | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/16/2005      | 1 HOUR        | Parts per billion | 2.65                          | 23            | 96            | 9        | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/17/2005      | 1 HOUR        | Parts per billion | 2.26                          | 23            | 96            | 11       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/18/2005      | 1 HOUR        | Parts per billion | 1.35                          | 23            | 96            | 15       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/19/2005      | 1 HOUR        | Parts per billion | 3.85                          | 20            | 83            | 14       | 9                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/20/2005      | 1 HOUR        | Parts per billion | 2.39                          | 23            | 96            | 11       | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/21/2005      | 1 HOUR        | Parts per billion | 3.70                          | 23            | 96            | 11       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/22/2005      | 1 HOUR        | Parts per billion | 3.22                          | 23            | 96            | 10       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/23/2005      | 1 HOUR        | Parts per billion | 3.65                          | 23            | 96            | 13       | 14                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/24/2005      | 1 HOUR        | Parts per billion | 5.39                          | 23            | 96            | 9        | 19                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/25/2005      | 1 HOUR        | Parts per billion | 2.87                          | 23            | 96            | 20       | 15                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/26/2005      | 1 HOUR        | Parts per billion | 5.43                          | 23            | 96            | 6        | 11                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/27/2005      | 1 HOUR        | Parts per billion | 3.13                          | 23            | 96            | 9        | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/28/2005      | 1 HOUR        | Parts per billion | 2.39                          | 23            | 96            | 13       | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/29/2005      | 1 HOUR        | Parts per billion | 2.35                          | 20            | 83            | 7        | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/30/2005      | 1 HOUR        | Parts per billion | 3.70                          | 23            | 96            | 14       | 16                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/31/2005      | 1 HOUR        | Parts per billion | 3.52                          | 23            | 96            | 18       | 7                      | Y                  |

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| STATE CODE | COUNTY CODE | COUNTY NAME | SITE ID | PARAMETER CODE | COLLECTION DATE | DURATION DESC | UNIT DESC         | ARITHMETIC MEAN (24-hour avg) | NUM DAILY OBS | PCT DAILY OBS | MAX HOUR | MAX VALUE (1-hour avg) | DAILY CRITERIA IND |
|------------|-------------|-------------|---------|----------------|-----------------|---------------|-------------------|-------------------------------|---------------|---------------|----------|------------------------|--------------------|
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/6/2005        | 1 HOUR        | Parts per billion | 5.73                          | 22            | 92            | 10       | 67                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/18/2005       | 1 HOUR        | Parts per billion | 7.05                          | 22            | 92            | 09       | 63                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/22/2005       | 1 HOUR        | Parts per billion | 6.68                          | 22            | 92            | 07       | 44                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/19/2005       | 1 HOUR        | Parts per billion | 7.05                          | 19            | 79            | 12       | 39                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/7/2005        | 1 HOUR        | Parts per billion | 7.86                          | 22            | 92            | 02       | 38                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/22/2005       | 1 HOUR        | Parts per billion | 6.73                          | 22            | 92            | 10       | 33                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/14/2005       | 1 HOUR        | Parts per billion | 6.41                          | 22            | 92            | 8        | 33                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/5/2005        | 1 HOUR        | Parts per billion | 5.26                          | 23            | 96            | 11       | 29                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/12/2005       | 1 HOUR        | Parts per billion | 2.91                          | 23            | 96            | 10       | 26                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/20/2005      | 1 HOUR        | Parts per billion | 5.61                          | 23            | 96            | 12       | 26                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/24/2005       | 1 HOUR        | Parts per billion | 6.74                          | 23            | 96            | 21       | 25                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/20/2005       | 1 HOUR        | Parts per billion | 9.00                          | 22            | 92            | 11       | 25                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/28/2005       | 1 HOUR        | Parts per billion | 5.41                          | 22            | 92            | 10       | 25                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/19/2005       | 1 HOUR        | Parts per billion | 5.52                          | 23            | 96            | 11       | 24                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/19/2005      | 1 HOUR        | Parts per billion | 3.83                          | 23            | 96            | 12       | 23                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/26/2005       | 1 HOUR        | Parts per billion | 6.13                          | 23            | 96            | 11       | 21                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/12/2005       | 1 HOUR        | Parts per billion | 4.35                          | 23            | 96            | 09       | 21                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/16/2005       | 1 HOUR        | Parts per billion | 4.83                          | 23            | 96            | 12       | 20                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/10/2005       | 1 HOUR        | Parts per billion | 5.96                          | 23            | 96            | 08       | 19                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/20/2005       | 1 HOUR        | Parts per billion | 3.96                          | 23            | 96            | 12       | 19                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/27/2005       | 1 HOUR        | Parts per billion | 4.63                          | 19            | 79            | 10       | 19                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/24/2005      | 1 HOUR        | Parts per billion | 5.39                          | 23            | 96            | 9        | 19                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/7/2005        | 1 HOUR        | Parts per billion | 3.05                          | 19            | 79            | 10       | 17                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/7/2005        | 1 HOUR        | Parts per billion | 2.73                          | 22            | 92            | 7        | 16                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/18/2005       | 1 HOUR        | Parts per billion | 4.73                          | 22            | 92            | 13       | 16                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/31/2005       | 1 HOUR        | Parts per billion | 4.50                          | 22            | 92            | 11       | 16                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/18/2005      | 1 HOUR        | Parts per billion | 4.17                          | 23            | 96            | 10       | 16                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/9/2005       | 1 HOUR        | Parts per billion | 4.74                          | 23            | 96            | 10       | 16                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/24/2005      | 1 HOUR        | Parts per billion | 7.65                          | 23            | 96            | 3        | 16                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/30/2005      | 1 HOUR        | Parts per billion | 3.70                          | 23            | 96            | 14       | 16                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/17/2005       | 1 HOUR        | Parts per billion | 4.78                          | 23            | 96            | 06       | 15                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/14/2005       | 1 HOUR        | Parts per billion | 4.23                          | 22            | 92            | 06       | 15                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/11/2005       | 1 HOUR        | Parts per billion | 2.55                          | 22            | 92            | 13       | 15                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/8/2005       | 1 HOUR        | Parts per billion | 2.57                          | 23            | 96            | 14       | 15                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/12/2005      | 1 HOUR        | Parts per billion | 4.13                          | 23            | 96            | 9        | 15                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/25/2005      | 1 HOUR        | Parts per billion | 2.87                          | 23            | 96            | 20       | 15                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/9/2005        | 1 HOUR        | Parts per billion | 5.09                          | 23            | 96            | 11       | 14                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/5/2005        | 1 HOUR        | Parts per billion | 5.23                          | 22            | 92            | 03       | 14                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/9/2005        | 1 HOUR        | Parts per billion | 3.45                          | 22            | 92            | 13       | 14                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/11/2005       | 1 HOUR        | Parts per billion | 6.23                          | 22            | 92            | 07       | 14                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/13/2005       | 1 HOUR        | Parts per billion | 4.41                          | 22            | 92            | 02       | 14                     | Y                  |



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|------------|-------------|-------------|---------|----------------|-----------------|---------------|-------------------|-------------------------------|---------------|---------------|----------|------------------------|--------------------|
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/21/2005       | 1 HOUR        | Parts per billion | 5.86                          | 22            | 92            | 02       | 14                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/5/2005        | 1 HOUR        | Parts per billion | 2.23                          | 22            | 92            | 8        | 14                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/10/2005      | 1 HOUR        | Parts per billion | 4.83                          | 23            | 96            | 6        | 14                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/4/2005       | 1 HOUR        | Parts per billion | 3.13                          | 23            | 96            | 10       | 14                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/23/2005      | 1 HOUR        | Parts per billion | 3.65                          | 23            | 96            | 13       | 14                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/27/2005       | 1 HOUR        | Parts per billion | 4.61                          | 23            | 96            | 08       | 13                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/21/2005       | 1 HOUR        | Parts per billion | 2.91                          | 23            | 96            | 08       | 13                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/16/2005       | 1 HOUR        | Parts per billion | 3.91                          | 22            | 92            | 8        | 13                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/17/2005       | 1 HOUR        | Parts per billion | 4.00                          | 22            | 92            | 14       | 13                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/12/2005       | 1 HOUR        | Parts per billion | 2.50                          | 22            | 92            | 8        | 13                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/15/2005       | 1 HOUR        | Parts per billion | 2.95                          | 22            | 92            | 9        | 13                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/4/2005       | 1 HOUR        | Parts per billion | 2.83                          | 23            | 96            | 9        | 13                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/23/2005      | 1 HOUR        | Parts per billion | 4.74                          | 23            | 96            | 20       | 13                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/1/2005        | 1 HOUR        | Parts per billion | 3.77                          | 22            | 92            | 11       | 12                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/6/2005        | 1 HOUR        | Parts per billion | 3.32                          | 22            | 92            | 3        | 12                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/12/2005       | 1 HOUR        | Parts per billion | 3.22                          | 18            | 75            | 10       | 12                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/11/2005      | 1 HOUR        | Parts per billion | 5.09                          | 23            | 96            | 3        | 12                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/6/2005        | 1 HOUR        | Parts per billion | 2.48                          | 23            | 96            | 23       | 11                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/5/2005        | 1 HOUR        | Parts per billion | 4.91                          | 23            | 96            | 07       | 11                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/15/2005       | 1 HOUR        | Parts per billion | 3.00                          | 22            | 92            | 07       | 11                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/4/2005        | 1 HOUR        | Parts per billion | 3.09                          | 22            | 92            | 10       | 11                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/14/2005       | 1 HOUR        | Parts per billion | 1.82                          | 22            | 92            | 10       | 11                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/19/2005       | 1 HOUR        | Parts per billion | 3.04                          | 23            | 96            | 9        | 11                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/22/2005      | 1 HOUR        | Parts per billion | 3.87                          | 23            | 96            | 14       | 11                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/3/2005       | 1 HOUR        | Parts per billion | 2.22                          | 23            | 96            | 13       | 11                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/5/2005       | 1 HOUR        | Parts per billion | 2.04                          | 23            | 96            | 9        | 11                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/2/2005       | 1 HOUR        | Parts per billion | 4.74                          | 23            | 96            | 16       | 11                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/26/2005      | 1 HOUR        | Parts per billion | 5.43                          | 23            | 96            | 6        | 11                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/25/2005       | 1 HOUR        | Parts per billion | 3.87                          | 23            | 96            | 01       | 10                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/31/2005       | 1 HOUR        | Parts per billion | 3.87                          | 23            | 96            | 08       | 10                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/4/2005        | 1 HOUR        | Parts per billion | 3.64                          | 22            | 92            | 08       | 10                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/3/2005        | 1 HOUR        | Parts per billion | 2.86                          | 22            | 92            | 12       | 10                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/6/2005        | 1 HOUR        | Parts per billion | 3.23                          | 22            | 92            | 09       | 10                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/8/2005        | 1 HOUR        | Parts per billion | 2.32                          | 22            | 92            | 11       | 10                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/19/2005       | 1 HOUR        | Parts per billion | 3.77                          | 22            | 92            | 13       | 10                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/20/2005       | 1 HOUR        | Parts per billion | 3.86                          | 22            | 92            | 6        | 10                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/21/2005       | 1 HOUR        | Parts per billion | 3.32                          | 19            | 79            | 10       | 10                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/17/2005       | 1 HOUR        | Parts per billion | 2.05                          | 22            | 92            | 9        | 10                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/17/2005       | 1 HOUR        | Parts per billion | 3.74                          | 23            | 96            | 9        | 10                     | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/7/2005        | 1 HOUR        | Parts per billion | 2.61                          | 23            | 96            | 09       | 9                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/23/2005       | 1 HOUR        | Parts per billion | 3.57                          | 23            | 96            | 06       | 9                      | Y                  |

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|------------|-------------|-------------|---------|----------------|-----------------|---------------|-------------------|-------------------------------|---------------|---------------|----------|------------------------|--------------------|
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/10/2005       | 1 HOUR        | Parts per billion | 2.86                          | 22            | 92            | 01       | 9                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/18/2005       | 1 HOUR        | Parts per billion | 1.83                          | 23            | 96            | 10       | 9                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/28/2005       | 1 HOUR        | Parts per billion | 2.00                          | 22            | 92            | 20       | 9                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/12/2005       | 1 HOUR        | Parts per billion | 2.77                          | 22            | 92            | 09       | 9                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/15/2005       | 1 HOUR        | Parts per billion | 4.79                          | 19            | 79            | 09       | 9                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/18/2005       | 1 HOUR        | Parts per billion | 3.65                          | 23            | 96            | 4        | 9                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/29/2005       | 1 HOUR        | Parts per billion | 2.09                          | 23            | 96            | 9        | 9                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/25/2005      | 1 HOUR        | Parts per billion | 4.17                          | 23            | 96            | 8        | 9                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/22/2005      | 1 HOUR        | Parts per billion | 4.13                          | 23            | 96            | 10       | 9                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/19/2005      | 1 HOUR        | Parts per billion | 3.85                          | 20            | 83            | 14       | 9                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/28/2005       | 1 HOUR        | Parts per billion | 4.13                          | 23            | 96            | 05       | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/4/2005        | 1 HOUR        | Parts per billion | 3.61                          | 23            | 96            | 10       | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/14/2005       | 1 HOUR        | Parts per billion | 2.00                          | 23            | 96            | 20       | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/22/2005       | 1 HOUR        | Parts per billion | 1.70                          | 23            | 96            | 02       | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/6/2005        | 1 HOUR        | Parts per billion | 3.86                          | 22            | 92            | 21       | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/12/2005       | 1 HOUR        | Parts per billion | 3.23                          | 22            | 92            | 07       | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/15/2005       | 1 HOUR        | Parts per billion | 2.83                          | 18            | 75            | 16       | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/3/2005        | 1 HOUR        | Parts per billion | 2.14                          | 22            | 92            | 21       | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/27/2005       | 1 HOUR        | Parts per billion | 2.50                          | 22            | 92            | 07       | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/24/2005       | 1 HOUR        | Parts per billion | 2.32                          | 22            | 92            | 08       | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/2/2005        | 1 HOUR        | Parts per billion | 1.73                          | 22            | 92            | 12       | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/15/2005      | 1 HOUR        | Parts per billion | 2.65                          | 23            | 96            | 9        | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/26/2005      | 1 HOUR        | Parts per billion | 2.87                          | 23            | 96            | 7        | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/31/2005      | 1 HOUR        | Parts per billion | 2.22                          | 23            | 96            | 10       | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/6/2005       | 1 HOUR        | Parts per billion | 2.22                          | 23            | 96            | 10       | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/5/2005       | 1 HOUR        | Parts per billion | 2.40                          | 20            | 83            | 2        | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/10/2005      | 1 HOUR        | Parts per billion | 2.57                          | 23            | 96            | 23       | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/28/2005      | 1 HOUR        | Parts per billion | 2.39                          | 23            | 96            | 13       | 8                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/20/2005       | 1 HOUR        | Parts per billion | 2.83                          | 23            | 96            | 09       | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/8/2005        | 1 HOUR        | Parts per billion | 2.87                          | 23            | 96            | 11       | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/13/2005       | 1 HOUR        | Parts per billion | 2.87                          | 23            | 96            | 14       | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/24/2005       | 1 HOUR        | Parts per billion | 1.58                          | 19            | 79            | 07       | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/2/2005        | 1 HOUR        | Parts per billion | 1.77                          | 22            | 92            | 11       | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/22/2005       | 1 HOUR        | Parts per billion | 2.73                          | 22            | 92            | 23       | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/28/2005       | 1 HOUR        | Parts per billion | 1.50                          | 22            | 92            | 16       | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/21/2005       | 1 HOUR        | Parts per billion | 2.77                          | 22            | 92            | 2        | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/13/2005       | 1 HOUR        | Parts per billion | 3.68                          | 19            | 79            | 19       | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/14/2005       | 1 HOUR        | Parts per billion | 6.58                          | 19            | 79            | 2        | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/15/2005       | 1 HOUR        | Parts per billion | 3.63                          | 16            | 67            | 2        | 7                      | N                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/29/2005      | 1 HOUR        | Parts per billion | 3.13                          | 23            | 96            | 9        | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/12/2005      | 1 HOUR        | Parts per billion | 2.30                          | 23            | 96            | 11       | 7                      | Y                  |

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|------------|-------------|-------------|---------|----------------|-----------------|---------------|-------------------|-------------------------------|---------------|---------------|----------|------------------------|--------------------|
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/7/2005       | 1 HOUR        | Parts per billion | 2.30                          | 23            | 96            | 13       | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/13/2005      | 1 HOUR        | Parts per billion | 4.04                          | 23            | 96            | 10       | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/14/2005      | 1 HOUR        | Parts per billion | 4.96                          | 23            | 96            | 2        | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/16/2005      | 1 HOUR        | Parts per billion | 2.65                          | 23            | 96            | 9        | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/27/2005      | 1 HOUR        | Parts per billion | 3.13                          | 23            | 96            | 9        | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/31/2005      | 1 HOUR        | Parts per billion | 3.52                          | 23            | 96            | 18       | 7                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/1/2005        | 1 HOUR        | Parts per billion | 1.17                          | 23            | 96            | 10       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/8/2005        | 1 HOUR        | Parts per billion | 0.61                          | 23            | 96            | 21       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/23/2005       | 1 HOUR        | Parts per billion | 1.91                          | 23            | 96            | 19       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/26/2005       | 1 HOUR        | Parts per billion | 2.96                          | 23            | 96            | 11       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/20/2005       | 1 HOUR        | Parts per billion | 2.64                          | 22            | 92            | 20       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/28/2005       | 1 HOUR        | Parts per billion | 1.82                          | 22            | 92            | 21       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/23/2005       | 1 HOUR        | Parts per billion | 2.27                          | 22            | 92            | 22       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/24/2005       | 1 HOUR        | Parts per billion | 1.82                          | 22            | 92            | 07       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/29/2005       | 1 HOUR        | Parts per billion | 1.77                          | 22            | 92            | 09       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/8/2005        | 1 HOUR        | Parts per billion | 2.55                          | 22            | 92            | 02       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/23/2005       | 1 HOUR        | Parts per billion | 3.27                          | 22            | 92            | 09       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/5/2005        | 1 HOUR        | Parts per billion | 2.32                          | 22            | 92            | 08       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/16/2005       | 1 HOUR        | Parts per billion | 2.23                          | 22            | 92            | 12       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/26/2005       | 1 HOUR        | Parts per billion | 1.27                          | 22            | 92            | 16       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/27/2005       | 1 HOUR        | Parts per billion | 2.00                          | 10            | 42            | 08       | 6                      | N                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/15/2005       | 1 HOUR        | Parts per billion | 1.55                          | 22            | 92            | 17       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/26/2005       | 1 HOUR        | Parts per billion | 2.55                          | 22            | 92            | 5        | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/5/2005        | 1 HOUR        | Parts per billion | 1.41                          | 22            | 92            | 8        | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/16/2005       | 1 HOUR        | Parts per billion | 2.73                          | 22            | 92            | 8        | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/24/2005       | 1 HOUR        | Parts per billion | 2.00                          | 23            | 96            | 9        | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/26/2005       | 1 HOUR        | Parts per billion | 1.52                          | 23            | 96            | 16       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/27/2005       | 1 HOUR        | Parts per billion | 2.05                          | 20            | 83            | 1        | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/21/2005      | 1 HOUR        | Parts per billion | 2.22                          | 23            | 96            | 10       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/14/2005      | 1 HOUR        | Parts per billion | 1.61                          | 23            | 96            | 9        | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/30/2005      | 1 HOUR        | Parts per billion | 2.17                          | 23            | 96            | 15       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/21/2005      | 1 HOUR        | Parts per billion | 3.70                          | 23            | 96            | 11       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/22/2005      | 1 HOUR        | Parts per billion | 3.22                          | 23            | 96            | 10       | 6                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/4/2005        | 1 HOUR        | Parts per billion | 1.89                          | 9             | 38            | 15       | 5                      | N                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/15/2005       | 1 HOUR        | Parts per billion | 2.35                          | 23            | 96            | 08       | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/21/2005       | 1 HOUR        | Parts per billion | 3.26                          | 23            | 96            | 19       | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/6/2005        | 1 HOUR        | Parts per billion | 2.09                          | 23            | 96            | 08       | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/11/2005       | 1 HOUR        | Parts per billion | 2.83                          | 23            | 96            | 04       | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/1/2005        | 1 HOUR        | Parts per billion | 2.05                          | 19            | 79            | 07       | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/2/2005        | 1 HOUR        | Parts per billion | 2.82                          | 22            | 92            | 08       | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/3/2005        | 1 HOUR        | Parts per billion | 2.35                          | 20            | 83            | 08       | 5                      | Y                  |

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|------------|-------------|-------------|---------|----------------|-----------------|---------------|-------------------|-------------------------------|---------------|---------------|----------|------------------------|--------------------|
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/4/2005        | 1 HOUR        | Parts per billion | 2.77                          | 22            | 92            | 12       | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/23/2005       | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 21       | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/11/2005       | 1 HOUR        | Parts per billion | 1.32                          | 22            | 92            | 10       | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/7/2005        | 1 HOUR        | Parts per billion | 3.14                          | 22            | 92            | 13       | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/16/2005       | 1 HOUR        | Parts per billion | 1.84                          | 19            | 79            | 07       | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/23/2005       | 1 HOUR        | Parts per billion | 2.55                          | 22            | 92            | 14       | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/10/2005       | 1 HOUR        | Parts per billion | 1.41                          | 22            | 92            | 8        | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/13/2005       | 1 HOUR        | Parts per billion | 1.86                          | 22            | 92            | 6        | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/19/2005       | 1 HOUR        | Parts per billion | 1.64                          | 22            | 92            | 9        | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/20/2005       | 1 HOUR        | Parts per billion | 2.09                          | 22            | 92            | 7        | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/9/2005       | 1 HOUR        | Parts per billion | 1.70                          | 23            | 96            | 9        | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/8/2005       | 1 HOUR        | Parts per billion | 1.65                          | 20            | 83            | 12       | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/18/2005      | 1 HOUR        | Parts per billion | 2.70                          | 23            | 96            | 9        | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/19/2005      | 1 HOUR        | Parts per billion | 2.57                          | 23            | 96            | 8        | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/1/2005       | 1 HOUR        | Parts per billion | 2.35                          | 23            | 96            | 16       | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/3/2005       | 1 HOUR        | Parts per billion | 2.43                          | 23            | 96            | 9        | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/8/2005       | 1 HOUR        | Parts per billion | 3.13                          | 23            | 96            | 9        | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/20/2005      | 1 HOUR        | Parts per billion | 2.39                          | 23            | 96            | 11       | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/29/2005      | 1 HOUR        | Parts per billion | 2.35                          | 20            | 83            | 7        | 5                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/14/2005       | 1 HOUR        | Parts per billion | 0.52                          | 23            | 96            | 23       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/18/2005       | 1 HOUR        | Parts per billion | 1.94                          | 17            | 71            | 01       | 4                      | N                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/22/2005       | 1 HOUR        | Parts per billion | 1.43                          | 23            | 96            | 22       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/30/2005       | 1 HOUR        | Parts per billion | 0.70                          | 23            | 96            | 15       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/7/2005        | 1 HOUR        | Parts per billion | 1.26                          | 23            | 96            | 10       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/17/2005       | 1 HOUR        | Parts per billion | 2.13                          | 23            | 96            | 10       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/19/2005       | 1 HOUR        | Parts per billion | 1.57                          | 23            | 96            | 11       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/27/2005       | 1 HOUR        | Parts per billion | 1.91                          | 23            | 96            | 11       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/8/2005        | 1 HOUR        | Parts per billion | 1.95                          | 22            | 92            | 12       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/10/2005       | 1 HOUR        | Parts per billion | 2.05                          | 22            | 92            | 14       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/14/2005       | 1 HOUR        | Parts per billion | 2.16                          | 19            | 79            | 17       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/29/2005       | 1 HOUR        | Parts per billion | 2.00                          | 22            | 92            | 08       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/25/2005       | 1 HOUR        | Parts per billion | 2.36                          | 22            | 92            | 04       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/26/2005       | 1 HOUR        | Parts per billion | 1.91                          | 22            | 92            | 08       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/26/2005       | 1 HOUR        | Parts per billion | 2.14                          | 22            | 92            | 08       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/30/2005       | 1 HOUR        | Parts per billion | 1.77                          | 22            | 92            | 13       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/25/2005       | 1 HOUR        | Parts per billion | 2.05                          | 19            | 79            | 10       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/27/2005       | 1 HOUR        | Parts per billion | 2.59                          | 22            | 92            | 7        | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/3/2005        | 1 HOUR        | Parts per billion | 1.77                          | 22            | 92            | 17       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/4/2005        | 1 HOUR        | Parts per billion | 1.86                          | 22            | 92            | 9        | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/17/2005      | 1 HOUR        | Parts per billion | 1.74                          | 23            | 96            | 8        | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/25/2005      | 1 HOUR        | Parts per billion | 2.83                          | 23            | 96            | 1        | 4                      | Y                  |

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|------------|-------------|-------------|---------|----------------|-----------------|---------------|-------------------|-------------------------------|---------------|---------------|----------|------------------------|--------------------|
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/6/2005       | 1 HOUR        | Parts per billion | 2.17                          | 23            | 96            | 11       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/17/2005      | 1 HOUR        | Parts per billion | 2.26                          | 23            | 96            | 11       | 4                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/3/2005        | 1 HOUR        | Parts per billion | 0.67                          | 9             | 38            | 08       | 3                      | N                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/9/2005        | 1 HOUR        | Parts per billion | 1.17                          | 23            | 96            | 09       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/11/2005       | 1 HOUR        | Parts per billion | 1.04                          | 23            | 96            | 12       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/29/2005       | 1 HOUR        | Parts per billion | 1.39                          | 23            | 96            | 06       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/1/2005        | 1 HOUR        | Parts per billion | 0.95                          | 19            | 79            | 06       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/24/2005       | 1 HOUR        | Parts per billion | 0.65                          | 23            | 96            | 01       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/25/2005       | 1 HOUR        | Parts per billion | 1.78                          | 23            | 96            | 09       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/16/2005       | 1 HOUR        | Parts per billion | 2.05                          | 22            | 92            | 06       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/18/2005       | 1 HOUR        | Parts per billion | 1.45                          | 22            | 92            | 19       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/19/2005       | 1 HOUR        | Parts per billion | 2.18                          | 22            | 92            | 02       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/22/2005       | 1 HOUR        | Parts per billion | 1.14                          | 22            | 92            | 09       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/5/2005        | 1 HOUR        | Parts per billion | 1.63                          | 19            | 79            | 11       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/1/2005        | 1 HOUR        | Parts per billion | 1.32                          | 22            | 92            | 05       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/3/2005        | 1 HOUR        | Parts per billion | 1.59                          | 22            | 92            | 07       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/9/2005        | 1 HOUR        | Parts per billion | 1.73                          | 22            | 92            | 07       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/22/2005       | 1 HOUR        | Parts per billion | 1.27                          | 22            | 92            | 12       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/29/2005       | 1 HOUR        | Parts per billion | 1.45                          | 22            | 92            | 08       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/8/2005        | 1 HOUR        | Parts per billion | 1.14                          | 22            | 92            | 12       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/21/2005       | 1 HOUR        | Parts per billion | 1.59                          | 22            | 92            | 16       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/31/2005       | 1 HOUR        | Parts per billion | 1.18                          | 22            | 92            | 9        | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/18/2005       | 1 HOUR        | Parts per billion | 1.18                          | 22            | 92            | 16       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/22/2005       | 1 HOUR        | Parts per billion | 1.53                          | 17            | 71            | 12       | 3                      | N                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/23/2005       | 1 HOUR        | Parts per billion | 1.23                          | 22            | 92            | 7        | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/30/2005       | 1 HOUR        | Parts per billion | 1.55                          | 22            | 92            | 18       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/1/2005        | 1 HOUR        | Parts per billion | 1.53                          | 19            | 79            | 7        | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/2/2005        | 1 HOUR        | Parts per billion | 1.48                          | 23            | 96            | 8        | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/3/2005        | 1 HOUR        | Parts per billion | 1.70                          | 23            | 96            | 8        | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/10/2005       | 1 HOUR        | Parts per billion | 1.65                          | 23            | 96            | 12       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/30/2005       | 1 HOUR        | Parts per billion | 1.96                          | 23            | 96            | 7        | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/2/2005       | 1 HOUR        | Parts per billion | 1.57                          | 23            | 96            | 13       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/13/2005      | 1 HOUR        | Parts per billion | 1.74                          | 23            | 96            | 6        | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/16/2005      | 1 HOUR        | Parts per billion | 1.35                          | 23            | 96            | 13       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/23/2005      | 1 HOUR        | Parts per billion | 1.52                          | 23            | 96            | 8        | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/30/2005      | 1 HOUR        | Parts per billion | 1.57                          | 23            | 96            | 9        | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/2/2005       | 1 HOUR        | Parts per billion | 1.78                          | 23            | 96            | 8        | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/11/2005      | 1 HOUR        | Parts per billion | 1.74                          | 23            | 96            | 9        | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/15/2005      | 1 HOUR        | Parts per billion | 1.13                          | 23            | 96            | 15       | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/17/2005      | 1 HOUR        | Parts per billion | 1.65                          | 23            | 96            | 1        | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/21/2005      | 1 HOUR        | Parts per billion | 1.25                          | 20            | 83            | 21       | 3                      | Y                  |

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|------------|-------------|-------------|---------|----------------|-----------------|---------------|-------------------|-------------------------------|---------------|---------------|----------|------------------------|--------------------|
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/26/2005      | 1 HOUR        | Parts per billion | 1.70                          | 23            | 96            | 8        | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/15/2005      | 1 HOUR        | Parts per billion | 1.57                          | 23            | 96            | 1        | 3                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/2/2005        | 1 HOUR        | Parts per billion | 0.43                          | 23            | 96            | 09       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/16/2005       | 1 HOUR        | Parts per billion | 0.83                          | 23            | 96            | 01       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/15/2005       | 1 HOUR        | Parts per billion | 0.60                          | 20            | 83            | 03       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/28/2005       | 1 HOUR        | Parts per billion | 0.35                          | 23            | 96            | 23       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/17/2005       | 1 HOUR        | Parts per billion | 0.64                          | 22            | 92            | 03       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/21/2005       | 1 HOUR        | Parts per billion | 1.73                          | 22            | 92            | 02       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/25/2005       | 1 HOUR        | Parts per billion | 1.41                          | 22            | 92            | 02       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/26/2005       | 1 HOUR        | Parts per billion | 1.23                          | 22            | 92            | 03       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/30/2005       | 1 HOUR        | Parts per billion | 1.45                          | 22            | 92            | 09       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/31/2005       | 1 HOUR        | Parts per billion | 0.77                          | 22            | 92            | 15       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/7/2005        | 1 HOUR        | Parts per billion | 0.45                          | 22            | 92            | 18       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/10/2005       | 1 HOUR        | Parts per billion | 0.91                          | 22            | 92            | 02       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/14/2005       | 1 HOUR        | Parts per billion | 0.68                          | 22            | 92            | 22       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/16/2005       | 1 HOUR        | Parts per billion | 1.05                          | 22            | 92            | 19       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/17/2005       | 1 HOUR        | Parts per billion | 1.09                          | 22            | 92            | 08       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/2/2005        | 1 HOUR        | Parts per billion | 1.28                          | 18            | 75            | 11       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/4/2005        | 1 HOUR        | Parts per billion | 1.14                          | 22            | 92            | 10       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/6/2005        | 1 HOUR        | Parts per billion | 0.95                          | 22            | 92            | 22       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/14/2005       | 1 HOUR        | Parts per billion | 0.95                          | 22            | 92            | 14       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/19/2005       | 1 HOUR        | Parts per billion | 0.95                          | 22            | 92            | 07       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/20/2005       | 1 HOUR        | Parts per billion | 1.05                          | 22            | 92            | 13       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/31/2005       | 1 HOUR        | Parts per billion | 0.95                          | 22            | 92            | 19       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/17/2005       | 1 HOUR        | Parts per billion | 1.45                          | 22            | 92            | 08       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/18/2005       | 1 HOUR        | Parts per billion | 1.27                          | 22            | 92            | 10       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/19/2005       | 1 HOUR        | Parts per billion | 1.45                          | 22            | 92            | 09       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/23/2005       | 1 HOUR        | Parts per billion | 1.05                          | 22            | 92            | 17       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/24/2005       | 1 HOUR        | Parts per billion | 1.14                          | 22            | 92            | 10       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/10/2005       | 1 HOUR        | Parts per billion | 1.13                          | 8             | 33            | 19       | 2                      | N                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/24/2005       | 1 HOUR        | Parts per billion | 1.05                          | 22            | 92            | 7        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/25/2005       | 1 HOUR        | Parts per billion | 1.36                          | 22            | 92            | 7        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/4/2005        | 1 HOUR        | Parts per billion | 1.57                          | 23            | 96            | 7        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/5/2005        | 1 HOUR        | Parts per billion | 1.26                          | 23            | 96            | 2        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/6/2005        | 1 HOUR        | Parts per billion | 1.04                          | 23            | 96            | 23       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/9/2005        | 1 HOUR        | Parts per billion | 1.09                          | 23            | 96            | 9        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/11/2005       | 1 HOUR        | Parts per billion | 1.30                          | 23            | 96            | 8        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/16/2005       | 1 HOUR        | Parts per billion | 1.52                          | 23            | 96            | 1        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/21/2005       | 1 HOUR        | Parts per billion | 1.09                          | 23            | 96            | 16       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/22/2005       | 1 HOUR        | Parts per billion | 1.04                          | 23            | 96            | 8        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/23/2005       | 1 HOUR        | Parts per billion | 1.35                          | 23            | 96            | 9        | 2                      | Y                  |

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|------------|-------------|-------------|---------|----------------|-----------------|---------------|-------------------|-------------------------------|---------------|---------------|----------|------------------------|--------------------|
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/28/2005       | 1 HOUR        | Parts per billion | 1.43                          | 23            | 96            | 7        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/1/2005       | 1 HOUR        | Parts per billion | 1.22                          | 23            | 96            | 7        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/3/2005       | 1 HOUR        | Parts per billion | 1.17                          | 23            | 96            | 7        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/4/2005       | 1 HOUR        | Parts per billion | 1.04                          | 23            | 96            | 10       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/10/2005      | 1 HOUR        | Parts per billion | 1.04                          | 23            | 96            | 21       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/11/2005      | 1 HOUR        | Parts per billion | 1.30                          | 23            | 96            | 1        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/12/2005      | 1 HOUR        | Parts per billion | 1.61                          | 23            | 96            | 1        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/14/2005      | 1 HOUR        | Parts per billion | 1.10                          | 20            | 83            | 1        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/24/2005      | 1 HOUR        | Parts per billion | 1.04                          | 23            | 96            | 23       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/27/2005      | 1 HOUR        | Parts per billion | 1.37                          | 19            | 79            | 11       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/28/2005      | 1 HOUR        | Parts per billion | 1.30                          | 23            | 96            | 10       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/1/2005       | 1 HOUR        | Parts per billion | 1.09                          | 23            | 96            | 10       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/7/2005       | 1 HOUR        | Parts per billion | 1.30                          | 23            | 96            | 8        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/20/2005      | 1 HOUR        | Parts per billion | 1.09                          | 23            | 96            | 1        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/27/2005      | 1 HOUR        | Parts per billion | 1.09                          | 23            | 96            | 2        | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/9/2005       | 1 HOUR        | Parts per billion | 1.35                          | 23            | 96            | 12       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 12/18/2005      | 1 HOUR        | Parts per billion | 1.35                          | 23            | 96            | 15       | 2                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/2/2005        | 1 HOUR        | Parts per billion | 0.26                          | 23            | 96            | 03       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 2/3/2005        | 1 HOUR        | Parts per billion | 0.13                          | 23            | 96            | 06       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 3/27/2005       | 1 HOUR        | Parts per billion | 0.27                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/1/2005        | 1 HOUR        | Parts per billion | 0.36                          | 22            | 92            | 07       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/9/2005        | 1 HOUR        | Parts per billion | 0.23                          | 22            | 92            | 18       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/12/2005       | 1 HOUR        | Parts per billion | 0.82                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/15/2005       | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/30/2005       | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/5/2005        | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/10/2005       | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/11/2005       | 1 HOUR        | Parts per billion | 0.82                          | 22            | 92            | 04       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/13/2005       | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/17/2005       | 1 HOUR        | Parts per billion | 0.86                          | 22            | 92            | 03       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/18/2005       | 1 HOUR        | Parts per billion | 0.86                          | 22            | 92            | 03       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/21/2005       | 1 HOUR        | Parts per billion | 0.64                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/25/2005       | 1 HOUR        | Parts per billion | 0.95                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 5/30/2005       | 1 HOUR        | Parts per billion | 0.82                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/1/2005        | 1 HOUR        | Parts per billion | 0.73                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/2/2005        | 1 HOUR        | Parts per billion | 0.59                          | 22            | 92            | 05       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/9/2005        | 1 HOUR        | Parts per billion | 0.82                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/10/2005       | 1 HOUR        | Parts per billion | 0.64                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/11/2005       | 1 HOUR        | Parts per billion | 0.91                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/12/2005       | 1 HOUR        | Parts per billion | 0.55                          | 22            | 92            | 03       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/13/2005       | 1 HOUR        | Parts per billion | 0.82                          | 22            | 92            | 02       | 1                      | Y                  |

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|------------|-------------|-------------|---------|----------------|-----------------|---------------|-------------------|-------------------------------|---------------|---------------|----------|------------------------|--------------------|
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/20/2005       | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/24/2005       | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/25/2005       | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 02       | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/29/2005       | 1 HOUR        | Parts per billion | 1.00                          | 12            | 50            | 12       | 1                      | N                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/3/2005        | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/4/2005        | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/9/2005        | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/11/2005       | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/29/2005       | 1 HOUR        | Parts per billion | 1.00                          | 20            | 83            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 7/30/2005       | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/1/2005        | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/2/2005        | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/6/2005        | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/7/2005        | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/8/2005        | 1 HOUR        | Parts per billion | 1.00                          | 18            | 75            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/9/2005        | 1 HOUR        | Parts per billion | 1.00                          | 9             | 38            | 2        | 1                      | N                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/13/2005       | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/26/2005       | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/27/2005       | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/28/2005       | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 8/29/2005       | 1 HOUR        | Parts per billion | 1.00                          | 22            | 92            | 2        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/7/2005        | 1 HOUR        | Parts per billion | 1.00                          | 23            | 96            | 1        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/8/2005        | 1 HOUR        | Parts per billion | 1.00                          | 23            | 96            | 1        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/12/2005       | 1 HOUR        | Parts per billion | 1.00                          | 23            | 96            | 1        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/20/2005       | 1 HOUR        | Parts per billion | 1.00                          | 23            | 96            | 1        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 9/25/2005       | 1 HOUR        | Parts per billion | 1.00                          | 23            | 96            | 1        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/5/2005       | 1 HOUR        | Parts per billion | 1.00                          | 23            | 96            | 1        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/6/2005       | 1 HOUR        | Parts per billion | 1.00                          | 19            | 79            | 1        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 10/7/2005       | 1 HOUR        | Parts per billion | 1.00                          | 23            | 96            | 1        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/13/2005      | 1 HOUR        | Parts per billion | 1.00                          | 23            | 96            | 1        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/16/2005      | 1 HOUR        | Parts per billion | 1.00                          | 23            | 96            | 1        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/28/2005      | 1 HOUR        | Parts per billion | 1.00                          | 23            | 96            | 1        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 11/29/2005      | 1 HOUR        | Parts per billion | 1.00                          | 23            | 96            | 1        | 1                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 1/13/2005       | 1 HOUR        | Parts per billion | 0.00                          | 23            | 96            | 01       | 0                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/8/2005        | 1 HOUR        | Parts per billion | 0.00                          | 22            | 92            | 02       | 0                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 4/13/2005       | 1 HOUR        | Parts per billion | 0.00                          | 22            | 92            | 02       | 0                      | Y                  |
| 37         | 129         | New Hanove  | 0002    | 42401          | 6/28/2005       | 1 HOUR        | Parts per billion | 0.00                          | 0             | 0             | 02       | 0                      | N                  |