Comments from Randy Waite to Integrated Nitrogen Committee 9/23/09

Comment 1: Target recommendation 1 should make note of the stationary source rules that are currently in place or are proposed. Below is a short list of stationary source rules that will likely lead to reductions in NOx emissions from stationary sources as well as an excerpt from a write-up that was developed for the Chesapeake Bay Air Workgroup.

Stationary Source Rules affecting NOx Emissions:

Section 129 Rules

- Hospital/Medical/Infectious Waste Incinerators
- Commercial/Industrial Solid Waste Incinerators
- Sewage Sludge Incinerators
- Other Solid Waste Incinerators
- Large Municipal Waste Incinerators
- Small Municipal Waste Incinerators

NSPS

- Petroleum Refineries
- Utility Boilers
- Industrial Boilers
- Portland Cement Plants
- Nitric Acid Plants

NESHAP
Reciprocating Internal Combustion Engines (RICE) NESHAP

Exerpt from Chesapeake Bay Air Workgroup:

The most prominent examples of nitrogen emission control programs are:

a) Clean Air Interstate Rule (CAIR)
   i) Developed to control emissions from electric utilities to help states meet ozone and fine particulate standards. The CAIR has been remanded to EPA by the D.C. Circuit. CAIR and the annual NOx budget program under CAIR began in 2009, and remain in place until replaced by EPA with a rule that is consistent with the Court's opinion. This means that in States which have allowed controls such as selective catalytic reduction to operate only during the ozone season, those controls will now in most cases need to be operated year-round.
   ii) It is unclear how the replacement rule will compare to the remanded CAIR. However, EPA anticipates that NOx emissions reductions close to those, or potentially greater than, originally projected will occur.
   iii) CAIR had been estimated to reduce nitrogen loading to the Chesapeake Bay by 10 million pounds per year upon full implementation.

b) National Ambient Air Quality Standards

i) NAAQS are ambient standards designed to improve air quality for the protection of human health and welfare. As national standards, they are not targeted specifically to the Chesapeake Bay; however, in implementing the ozone, PM2.5, and NOx standards, the Chesapeake Bay may benefit if NOx reductions are necessary to meet the standards.

ii) States will be required over the next few years to develop State Implementation Plans (SIPs) under the ozone standard promulgated by EPA in 2008. These SIPs could result in additional NOx reductions.

iii) The secondary standard for NOx is currently under review. Secondary standards are set to protect against known or anticipated adverse effects to public welfare, such as eutrophication in coastal waters such as the Chesapeake Bay. One of the challenges for this review is to clarify the relationship between ambient NOx concentrations and deposition.

iv) If the TMDL allocations being developed for the tributaries include an allocated level to atmospheric inputs, those levels may be helpful in developing or implementing future secondary NOx NAAQS.

c) Stationary Source Rules

i) Multiple rules under the Section 129 solid waste combustion standards and the Section 111 new source performance standards (NSPS) have NOx reduction benefits and would be reviewed in the future as new technologies emerge. These categories include municipal waste combustion, hospital/medical/infectious waste incineration, electric utilities, industrial boilers, refineries, cement plants, and reciprocating internal combustion engines;

ii) The proposed amendments to the NESHAP for stationary RICE are estimated to reduce NOx emissions by 79,000 tons per year nationwide in the year 2013 through the application of non-selective catalytic reduction to existing four-stroke rich burn stationary RICE.

iii) For spark ignition engines, EPA estimates its final new source performance standard, issued in 2007, will reduce nationwide NOx emissions by 77,000 tons per year, when fully implemented in 2015.

Comment 2: Regarding “Text Box 2: Economic Impacts and Metrics for Chesapeake Bay” (pages 87-90), this is a good example of the use of the nitrogen cascade combined with economics; however, some qualifiers to the data may be in order. The Chesapeake Bay is receiving increased attention due to the Executive Order signed in May. In reading the original article by Drs. Moomaw and Birch, it is clear that the emissions and control cost data are from the time of the NOx SIP Call proposal. While the text box in the SAB INC report serves as an illustrative example, the figures can also be taken out of context of the data. For example, many of the stationary and mobile source programs that have been implemented since the NOx SIP Call are continuing to reduce NOx deposition to the Bay and its watershed. Implementing even newer control technologies would change the costs used in this example. This combination of less deposition combined with higher cost controls could significantly change the tradeoff curves suggested in the example. I would recommend adding data dates to the figures and tables to make the inputs more transparent. I would also recommend a qualifier statement in the text that "these numbers will and have changed over time as new regulations are implemented."

Comments from Doug Grano to Integrated Nitrogen Committee 9/23/09

Regarding climate, the report includes nitrous oxide and ozone formation impacts on climate, but omits the equally important indirect impact of NOx emissions on methane, which has a large cooling impact. The impact of nitrate aerosols is also cooling. According to the IPCC, the net impact of NOx emissions is cooling. I've noted 2 places in the draft where the discussion should be expanded to include these impacts.

P21
20 The greater the inputs of Nr to the landscape, the greater the potential for negative effects, caused by
21 greenhouse gas production, ground level ozone, acid deposition, and Nr overload that can contribute
22 to climate change, degradation of soils and vegetation, acidification of streams, lakes and rivers,
23 estuarine and coastal eutrophication, hypoxia and habitat loss.

Comment: This seems to say Nr emissions have only negative effects. For climate impacts, N_2O emissions are certainly warming. However, Nr emissions also lead to atmospheric nitrate formation which has a significant cooling impact. More importantly, NOx emissions indirectly shorten the lifetime of methane, which also has a cooling effect (which is much stronger than the warming effect of NOx emissions due to ozone formation). [IPCC 2007 WGI]

P100-101
40 Six major atmospheric effects are associated with increased NOx and NH_3 emissions, and two
1 with N_2O emissions (Galloway et al., 2003). For NOx and NH_3 emissions they are: (1) fine PM
2 decreases atmospheric visibility; (2) elevated ozone concentrations enhance the greenhouse
3 potential of the atmosphere; (3) ozone and fine particulate matter have serious impacts on human
4 health (Brunekreef et al. 2005, Brook et al. 2003,Pope 2000a, 2000b Pope et al. 1995, Pope
5 2009); (4) NH_3 plays an important role in the direct and indirect effects of aerosols on radiative
6 forcing and thus on global climate change (Seinfeld and Pandis 1998, Penner et al. 2001;
7 Lelieveld et al. 2001; Myhre, 2009); (5) ozone deposition can decrease productivity of crops,
8 forests, and natural ecosystems; and (6) atmospheric deposition of NH NH_3, NOy, and organic
9 forms of Nr can contribute to ecosystem acidification, fertilization, and eutrophication. For N_2O
10 they are: (1) the greenhouse effect in the troposphere and, (2) O_3 depletion in the stratosphere.

Comment: These effects need to include the fact that NOx emissions indirectly shorten the lifetime of methane, which has a significant cooling effect (which is much stronger than the warming effect of NOx emissions due to ozone formation). In addition, to the point that fine PM reduces visibility, it could be noted that the same particles have a cooling effect. Further, as ozone decreases forest productivity, it also decreases carbon sequestration (Sitch, et. al. 2007).