

Hydrogen Sulfide Regulatory Practice in Other States

By Steve Schliesser, February 6, 2003

An issue raised by the Air Quality Committee was how hydrogen sulfide (H₂S) rules were regulated and enforced in comparable states. In response we contacted four states: South Carolina, Georgia, Minnesota and Wisconsin. These states show similar, pertinent characteristics to NC, including:

- Occurrence of paper/pulp mills and other H₂S-emissive industries, and
- Reasonably progressive air toxics programs with H₂S air quality standards.

South Carolina Hydrogen Sulfide Air Quality Program

SC adopted an acceptable air concentration (AAC) standard for H₂S:

- 100 ppb (140 mg/m³) 24-hour average at plant property line

SC air toxics standards became effective in June 1991. Existing facilities were given two years to demonstrate initial compliance. After the effective date, all facilities that construct, modify, or add to a source of toxic air pollutants must demonstrate compliance prior to commencing construction. There are exemptions for some changes (i.e., *de minimis* increases, MACT exemptions, etc.). The demonstration is most often done via computer modeling, although ambient monitoring is an option. The modeling demonstration is required to be submitted by the company with the construction permit application. The parameters (i.e., emission rates, stack heights, diameters, etc.) used to demonstrate compliance are incorporated into the permit as "Attachment A." This makes the modeled parameters enforceable. Sometimes record keeping and reporting are required to show on-going compliance with the modeled parameters. A performance test is not required in most cases.

The SC toxics standard has a MACT exemption. This means that facilities have an exemption from state air toxics regulations once an emissions unit complies with the MACT standard, regardless if they couldn't meet the state standard are not.

Three of SC seven pulp/paper mills have modeled H₂S in the past. However, only one of these mills reported H₂S emissions from the wastewater treatment area (185 pounds/hour). The other H₂S emissions came from scrubber stacks and recovery boilers. For the other two mills, the majority of the H₂S came from recovery boilers, smelt dissolving tanks, and lime kilns. Each was able to meet the current concentration limit. [SC information provided by Ms. Rhonda B. Thompson, Manager of Air Toxics Section, Bureau of Air Quality – SCDHEC; (803) 898-4391; thompsrb@dhec.sc.gov]

Georgia Hydrogen Sulfide Air Quality Program

GA has guidelines for ambient impact assessment of toxic air pollutant emissions, as revised in 1998. The guidelines are used to review all air quality applications for new or modified facilities, and may be used in any situation where approved ambient monitoring data are not available. An exemption can be granted; the Director may approve an application that includes the installation of new source maximum available control technology if it is *infeasible* to comply with the guideline. The following steps are employed in the toxics guideline demonstration:

1. Facility derives an Acceptable Ambient Concentration (AAC) for each toxic air pollutant by using an EPA, OSHA, ACGIH, or NIOSH exposure limit, and applying a safety factor prescribed in the guidelines.
2. Facility estimates maximum ground level concentration (MGLC) by dispersion modeling with 5 years of meteorological data; they first use Screen3 model; and adjust averaging times for MGLC and AAC to be the same.
3. Facility determines impact by comparing MGLC to AAC;
 - If $MGLC < AAC$, then pollutant impact is considered insignificant.
 - If $MGLC > AAC$, then perform ISC3 modeling.
 - Only if $MGLC > AAC$ with ISC modeling is there an indication of potential adverse TAP impact; then facility may either increase stack height, add controls, or otherwise reduce emissions.

For a guideline copy, see <http://www.air.dnr.state.ga.us/sspp/titlev/other/toxguide.pdf>.

Minnesota Hydrogen Sulfide Air Quality Program

In 1969 the MN legislature adopted a H₂S ambient air standard:

- 50 ppb (70 mg/m³) One-half hour average not to be exceeded over 2 times a year
- 30 ppb (42 mg/m³) One-half hour average not to be exceeded

Fifteen years ago the open-air wastewater treatment systems (current practice in NC) for the MN pulp/paper industry were found to be ineffective in meeting the H₂S ambient air standard. In response, industry installed activated sludge systems. Since they have further reduced H₂S emissions by adding covers and high-rate oxygenated systems to the activated sludge units. Based on modeling, MN pulp/paper industry meets the H₂S ambient air standard.

The MN animal feedlot rules were last amended in 1978. Due to a trend toward fewer but larger animal farms, the legislature authorized the state air agency to develop an initiative in 1997 in response to increasing odor complaints from animal operations, most of which were hog farms. Science indicated that the main constituent of the odor from MN hog lagoons was H₂S. The state agency obtained official and unofficial H₂S monitors. The unofficial monitors are used the most as screening tools for determining

sources with H₂S above the health-based level; the official monitors are used sparingly for enforcement only. When the level at the property line is above 30 ppb according to the screening monitor, the facility is considered to have the “potential to exceed the H₂S standard.”

In such a situation the source typically enters into an understanding agreement, a public but unenforceable document with plans to resolve the problem. After the source installs a mitigation technology, the state agency re-monitors to demonstrate compliance. In addition, the state agency has an H₂S work group delivering proactive outreach and education, including a web page filled with helpful documents and links on their rules and available mitigation technologies (see <http://www.pca.state.mn.us/hot/feedlots.html>). As in NC, the state university conducts research in developing alternative cost-effective mitigation technologies and updates the state agency and end users regularly.

Wisconsin Hydrogen Sulfide Air Quality Program

In 1988 the MN legislature adopted an acceptable air concentration (AAC) standard for H₂S:

- 240 ppb (336 mg/m³) 24-hour average

The AAC is defined to be 2.4% of the 10 ppm H₂S threshold limit value-time weighted average established by the American Conference of Governmental Industrial Hygienists.

The Wisconsin air toxics program is structured (similarly to NC) with conservative emission rate values. The emission rates are merely threshold levels above which further demonstration of compliance is required by dispersion modeling. Wisconsin has no specific requirements for wastewater treatment systems for pulp/paper mills.

Their air program does not have any CAFO specific regulations on H₂S from lagoons, etc. Their wastewater program includes a CAFO permit program that does impose requirements that indirectly affect air emissions. They are considering reopening their storage lagoon requirements, perhaps adding a requirement for covers. For a copy of WS toxics rules, see <http://www.dnr.state.wi.us/org/aw/air/reg/NR400toc.htm>.