North Carolina
(15A NCAC 02D, 02H, 02Q)

The Division of Air Quality plans to monitor for these constituents, in relation to shale gas operations:

Criteria pollutants: Ozone, fine particles, nitrogen dioxide, sulfur dioxide.

Toxic pollutants: volatile organic compounds (VOCs) and aldehydes (formaldehyde, acetaldehyde).

The specific VOCs which will be monitored are as follows: Propene, Freon 12, Freon 22, Freon 114, Chloro Methane (Methylchloride), Isobutene, Vinyl chloride, 1,3-Butadiene, Bromomethane, Chloroethane, Freon 11, Pentane, Ethanol, Isoprene, Acrolein, 1,1-Dichloroethene (Vinylidene chloride), Freon 113, Methyl Iodide, Isopropyl Alcohol, Carbon Disulfide, Acetonitrile, Methylene chloride, Cyclopentane, MTBE, Hexane, Methacrolein, Vinyl Acetate, 1,1-Dichloroethane, Methyl Vinyl Ketone, Methyl Ethyl Ketone, 1,2 Dichloroethene, Chloroform, 1,1,1-Trichloroethane (Methyl chloroform), Cyclohexane, Carbon Tetrachloride, Benzene, 1,2-Dichloroethane (ethylene dichloride), 1-Butanol, Trichloroethylene, 2-Pentanone, 3-Pentanone, 1,2-Dichloropropane, 1,4-Dioxane, Bromodichloromethane, trans-1,3 Dichloropropene, Methyl Isobutyl Ketone, Toluene, cis-1,3 Dichloropropene, 1,1,2-Trichloroethane (vinyl trichloride), Ethylpropylketone, Tetrachloroethylene (perchloroethylene), Methyl Butyl Ketone, Dibromoethane, Chlorobenzene (phenylchloride), Ethylbenzene, m- & p-Xylene, o-Xylene, Styrene, Bromoform, 1,1,2,2-Tetrachloroethane, 1,3,5-Trimethylbenzene (mesitylene), 1,2,4-Trimethylbenzene (pseudocumene), m-Dichlorobenzene, 1,2,3-Trimethylbenzene, p-Dichlorobenzene, Benzylchloride, o-Dichlorobenzene, and 1,2,4-Trichlorobenzene.

Buncombe, Forsythe, and Mecklenburg Counties perform their own monitoring.

Colorado

The State "Air Pollution Control Division" is the regulatory authority.

- No requirement for air monitoring at oil and gas sites (50,000+ active wells)
- Ambient monitoring is conducted at specific locations, in the vicinity of oil and gas operations
  - Wattenberg Field
  - Denver-Julesburg Basin
- Completion operations (i.e. hydraulic fracturing) have the highest emissions, but are short term (only a few days per well)
- Garfield County (Western Colorado) is conducting air quality studies with Colorado State University.
- Monitoring procedures and parameters seem similar to North Carolina.

U.S. Environmental Protection Agency

- Most immediate focus is on "criteria" pollutants
    - Ozone
    - Fine particles
    - Nitrogen dioxide
    - Sulfur dioxide
- Ambient Air Monitoring Program
    - Performed by State and Local Agencies
    - Determine highest concentrations expected to occur in a given area
    - Determine representative concentrations in areas of high population density
    - Determine the impact on ambient pollution levels of specific sources
    - Determine general background concentration levels.
- Air Monitoring Stations
    - State and Local Monitoring Network (SLAMS)
        - 4,000 station, based on needs of states and locals
    - National Air Monitoring Network (NAMS)
        - Subset of SLAMS
        - Emphasis on urban areas
    - Special Purpose Monitoring Stations (SPMS)
        - Special studies by state and locals
        - Temporary stations
        - Supplement permanent stations
    - Photochemical Assessment Monitoring Network (PAMS)
        - Ozone monitoring
        - Specific areas identified as "serious, severe, or extreme"