

Region 6 Air Monitoring  
Network Assessments –  
A Status Report

# Presentation by

- Donna Ascenzi, Chief, Air Quality Analysis Section
- Mark Sather, Air Quality Analysis Section
- Jan Moneysmith, Air Quality Analysis Section

U. S. Environmental Protection Agency  
Region 6, Dallas

# Regional Monitoring Strategy Meetings

- The EPA hosted a regional monitoring strategy meeting in Dallas in May of 2001.
- A second regional monitoring strategy meeting was held in Austin in May of 2002.
- Regional monitoring network assessments were also discussed at the regional air monitoring meeting in Oklahoma City in May of 2003.

# Regional Monitoring Strategy Discussions

- Numerous group conference calls have also been conducted over the past two years, and individual discussions have been held with the 5 states and one local program in Region 6.
- The States came in with their initial assessments and recommendations; Region 6 reviewed and sent out comment letters.
- The States responded to our comments and in most cases made significant changes.

# Regional Monitoring Network Assessment

- We reviewed other Regional tools (e.g. the detailed correlation analyses by Region 5).
- Region-wide correlation analysis not conducted in Region 6 because it would have been inappropriate to compare our very diverse ecoregions both west-east and north-south across the Region 6 States.
- Dave Sullivan (TCEQ) – when looking at hourly ozone values, because of the strong repeating diurnal patterns, it is fairly easy to get high correlations.

# Regional Monitoring Network Assessment (cont.)

- Many factors have to be studied and considered when evaluating specific monitoring sites; too simplistic to base a monitoring decision just on a regional correlation analysis.
- For Region 6 ozone monitoring network assessment many detailed analyses were conducted looking at (1) long term data back to the mid 1980's, (2) trends not only in exceedance days but also close call days (for both 1-hour and 8-hour), (3) trends in site by site design values, (4) long term met. data trends including temp., ws, wd, precip., and (5) GIS maps.

## Example Ozone and Ozone Precursor Monitoring Network Assessment (Arkansas)

- No VOC sites, 1 NO<sub>x</sub> site. Region 6 recommended a new location for sampler (used to be at the high ozone site); State has moved the sampler to a higher NO<sub>x</sub> concentration site closer to downtown Little Rock which should provide better ozone precursor information.

## Ozone Monitoring Recommendations

- Current site in Crittenden Co. measures peak ozone concentrations for Arkansas citizens downwind of the Memphis area. This site has current 1999-2001 design values which are over the 8-hour standard (92 ppb) and right at the 1-hour standard (124 ppb).

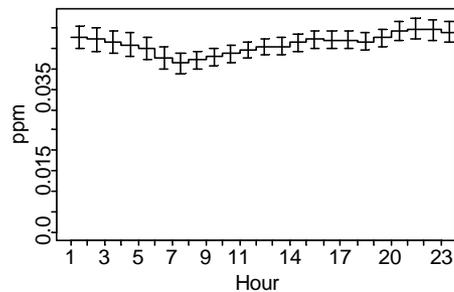
Recommendation: Maintain site.

# Ozone Monitoring Recommendations (cont.)

- The Ozark National Forest site in Newton Co. is an excellent background rural site for the NE section of the South Central U.S. This site represents a “true” reference rural site as defined by the Saylor et. al. criterion (Saylor, R.D.; Chameides, W.L.; Cowling, E.B. *J. Geophys. Res.* **1998**, 103, 31 137-31 141). Note the generally flat diurnal profile on the next slide, and thus a negligible impact from locally generated ozone. Recommendation: Maintain site.
- The Ouachita National Forest site in Montgomery Co. is showing a significant influence of anthropogenic pollution sources. Note the strong dip in morning ozone concentrations in the diurnal profile on the next slide. Recommendation: Because of local anthropogenic pollution this site does not meet the Saylor et. al. criterion of a “true” reference rural site. If this is the goal for this site, the site would have to be relocated away from those sources.
- The State and National Forest Service have both concurred with this assessment and another site would be preferred; currently checking to see if phone lines could go into the nearby Caney Creek IMPROVE site.

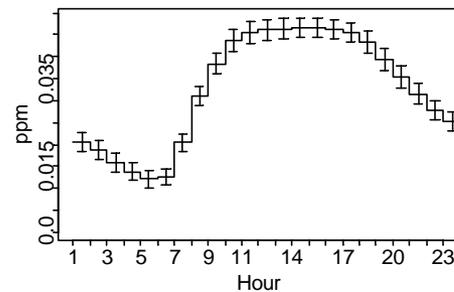
# ozone diurnal profiles (June-August)

ozark national forest  
All Days: Hour 1 to Hour 23  
Ozone



Data from: ozarks.2001.aq.1hr

ouachita national forest  
All Days: Hour 1 to Hour 23  
Ozone

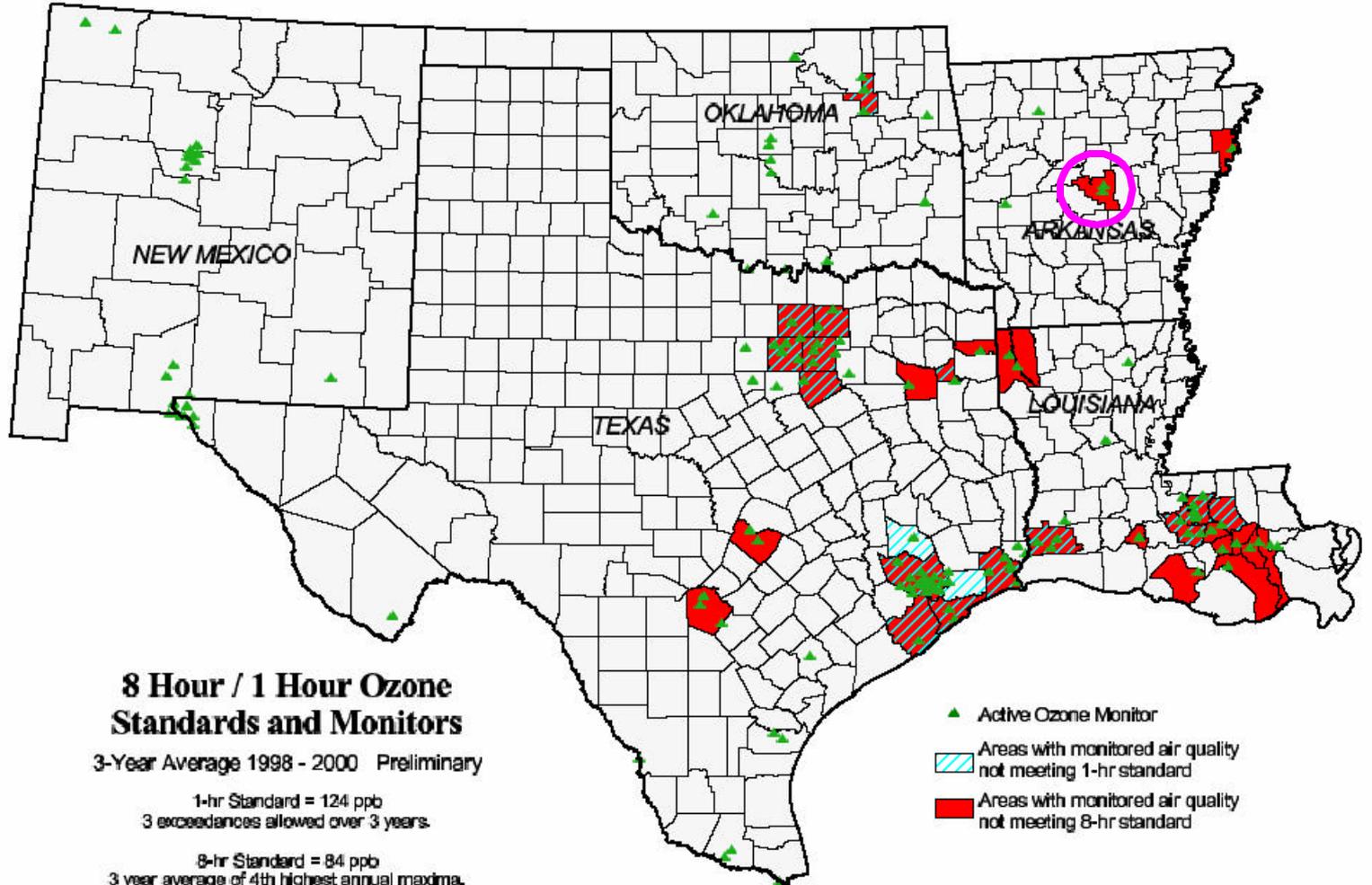


Data from: ouachita.2001.aq.1hr

Includes data from 6/1 to 8/31.  
No time period excluded.

## Ozone Monitoring Recommendations (cont.)

- U.S. EPA Region 6 conducted detailed ozone/meteorological data analyses for the two ozone sites in Little Rock, which are close together as seen on the map in the next slide.



## 8 Hour / 1 Hour Ozone Standards and Monitors

3-Year Average 1998 - 2000 Preliminary

1-hr Standard = 124 ppb  
3 exceedances allowed over 3 years.

8-hr Standard = 84 ppb  
3 year average of 4th highest annual maxima.

Source: US EPA AIRS Database

100 0 100 200 Miles



The areas shown above are recognized by EPA Region 6 as of April 2, 2001.

-  Active Ozone Monitor
-  Areas with monitored air quality not meeting 1-hr standard
-  Areas with monitored air quality not meeting 8-hr standard



EPA Region 6  
GIS Support Team  
Dallas, Texas  
4/2/01



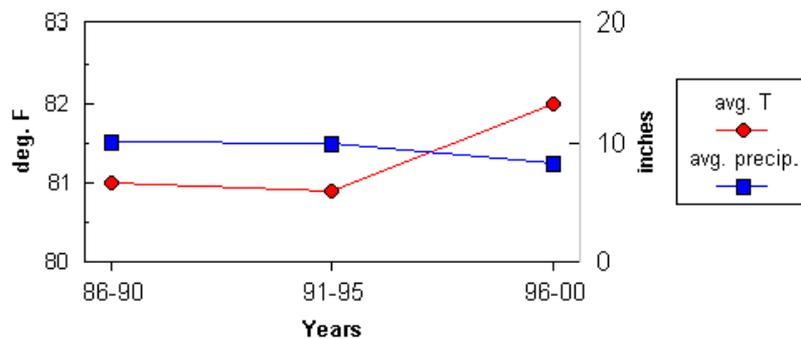
# Ozone Monitoring

## Recommendations (cont.)

- Robust trends analyses were conducted from 1986-2001, looking at 1-hour/8-hour ozone design values, # hours above the 1-hour/8-hour standards, # hours close to (i.e. within 12%) of the 1-hour/8-hour standards, and ambient temperature/precipitation summary data.
- Ozone data were downloaded from AIRS and the meteorological data were gathered from the National Climatic Data Center (NCDC) web site.
- The next two slides show the results of the analyses with the first slide exhibiting 5-year trends and the second slide displaying the year to year details.

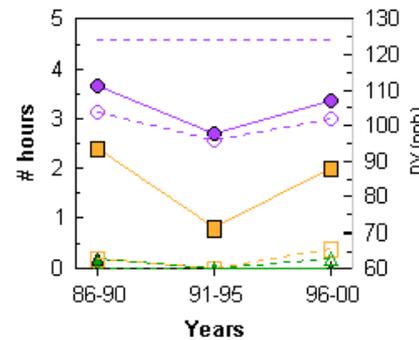
# Little Rock NLR Airport Site Ozone/Meteorological Data Trends June-August 75% minimum data capture

### Ambient Temperature/Precipitation Trends All Hours



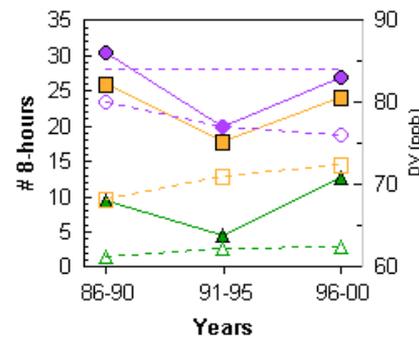
Little Rock NLR Airport Site AIRS # = 05-119-1002; Parr site AIRS # = 05-119-0007  
DV = design value, T= temperature; all met. data from NCDC  
Parr site ozone data collection began 6/23/86

### 1-Hour Ozone Trends 0800-1900 LST



avg. 3-year running DV  
 1-hour standard  
 avg. # hours 109 < x < 125 ppb  
 avg. # hours > 124 ppb  
 parr dv  
 parr cc  
 parr exc

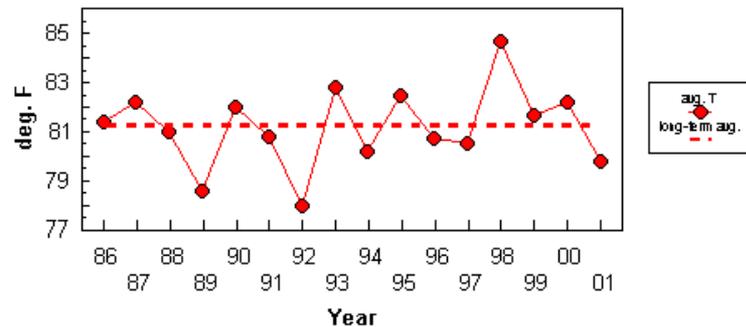
### 8-Hour Ozone Trends 0800-1900 LST



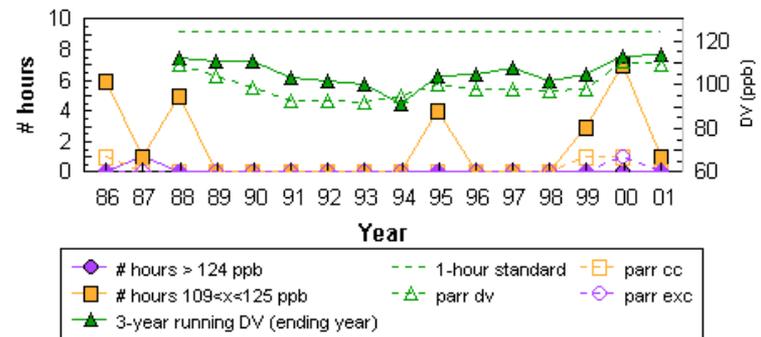
avg. 3-year running DV  
 8-hour standard  
 avg. # 8-hours 74 < x < 85 ppb  
 avg. # 8-hours > 84 ppb  
 parr dv  
 parr cc  
 parr exc

# Little Rock NLR Airport Site Ozone/Meteorological Data Trends June-August 75% minimum data capture

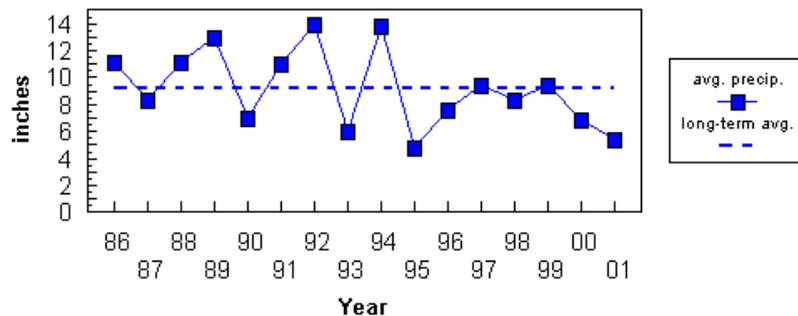
**Ambient Temperature Trend**  
All Hours



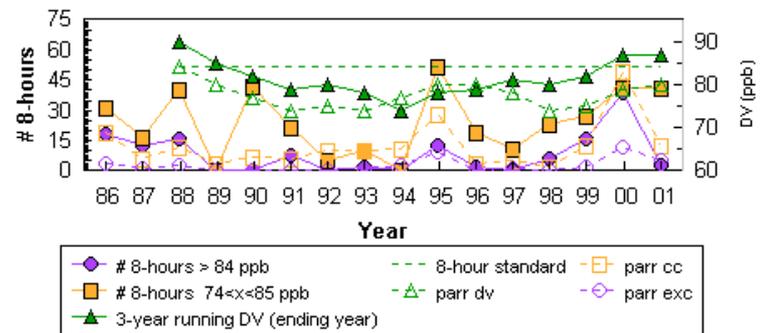
**1-Hour Ozone Trends**  
0800-1900 LST



**Precipitation Trend**  
All Hours



**8-Hour Ozone Trends**  
0800-1900 LST



Little Rock NLR Airport Site AIRS # = 05-119-1002; Parr site AIRS # = 05-119-0007  
DV = design value, T = temperature; all met. data from NCDC  
Parr site ozone data collection began 6/23/86

## Interpretation of Data Analyses

- The NLR Airport site is almost always higher in ozone concentration than the Parr site, which is located further south in North Little Rock. For the 1-hour ozone standard, the NLR Airport design value was higher than the Parr site for every three year rolling period except for 1992-1994, a low year for both sites and both well under the standard.
- Similarly for the 8-hour ozone standard, the NLR Airport is usually higher than the Parr site (79% of the time from 1986-2001) and the NLR Airport site has always had the higher 8-hour design value at levels close to or above the standard.

# Recommendation for Little Rock Ozone Monitoring

- Based on the 1-hour/8-hour ozone trends analyses, and on the current Monitoring Strategy Regulatory Review Workgroup proposal for 2-3 ozone NAMS in the Little Rock area, the recommendation is to: (A) maintain the NLR Airport ozone site which has a 1999-2001 8-hour ozone design value of 87 ppb, above the current standard of 84 ppb, and (B) consider relocating the Parr ozone sampler to another area of Little Rock which might be experiencing 8-hour ozone levels close to or over the standard (modeling data could help here).
- The State has decided to keep an ozone sampler at the PARR site, which has become a multi-pollutant site measuring O<sub>3</sub>, NO<sub>x</sub>, CO, SO<sub>2</sub>, PM-2.5, PM-10, PM-2.5 speciation, and air toxics.
- The State has added an O<sub>3</sub> sampler at their laboratory which is in South Little Rock.
- Passive ozone monitoring is proposed this summer for west Pulaski Co., and the other 3 counties in the Little Rock MSA which currently have no ozone monitoring data information.

# Ozone Network Assessment in Corpus Christi, TX

- Two close together ozone samplers in Corpus Christi were recommended to be maintained based on both being the design value site about half the time each since the late 1980's.

# Goals of air monitoring

- Compliance with the NAAQS
- Population exposure/public awareness (e.g. AQI)
- Accountability for progress in emissions control programs
- Emission control program development
- Environmental welfare assessments
- Research

# What is Ncore

- The national core (Ncore) sites are slated to replace National Air Monitoring Stations (NAMS) and State and Local Air Monitoring Stations (SLAMS).
- There will be levels 1, 2 and 3 Ncore sites, ranging from research-oriented and multi-instrumented stations to single instrument monitoring stations.

# Network Assessments

- The state and local programs developed detailed network assessments, going beyond the usual annual network review.
- In many cases air monitors were identified for deactivation.
- The network assessments were reviewed by EPA Region 6 staff and comments provided.

# Arkansas

- Arkansas operates a very small ambient air monitoring network, including:
  - ◆ One CO monitor in Little Rock
  - ◆ Two NO<sub>2</sub> monitors in Little Rock
  - ◆ Six ozone monitors, with three in Little Rock. One is located in West Memphis near the border with Tennessee.

# Arkansas

- Arkansas operates 21 PM-2.5 sites. Two sites have been recommended for deactivation, one near the Upper Buffalo IMPROVE site and the other in Texarkana, where the TCEQ operates a monitor.
- Several TEOM continuous PM-2.5 monitors are operated, with one being added in Fayetteville.

# Arkansas

- Only two PM-10 sites are operated.
- There are no lead monitors in Arkansas.

# Arkansas PM2.5 Network

- Several areas in Arkansas initially appeared to be possible PM-2.5 nonattainment areas, including: Little Rock, West Memphis, Crossett and Stuttgart.
- However data for the years 2000 to 2002 show the state to be in attainment or unclassifiable.

# Louisiana

- Louisiana operates

- ◆ 28 ozone sites
- ◆ 12 NO<sub>2</sub> sites
- ◆ 6 SO<sub>2</sub> sites
- ◆ 3 CO sites
- ◆ 6 PM-10 sites
- ◆ 22 PM-2.5 FRM sites, 6 continuous PM-2.5
- ◆ One lead site

# Louisiana

- Louisiana recommended the deactivation of the PM-10 and PM-2.5 monitors located at the Water Plant in New Orleans and the Evangeline site in Baton Rouge.
- The EPA expressed concern about deactivating the Evangeline site as it had recorded the highest PM-2.5 annual averages in 2000 and 2001.

# Louisiana

- The LDEQ has proposed to add three continuous PM-2.5 monitors at Kenner near New Orleans, City Park in New Orleans, and Capitol in Baton Rouge.

# New Mexico

- PM-2.5 – 8 FRM sites, 6 continuous sites
  - ◆ Relocate the Hobbs FRM site
  - ◆ No change to the continuous sites
- PM-10 – 15 FRM sites, 6 continuous FEM sites
  - ◆ Discontinue the PERA FRM site
  - ◆ Relocate the Bayard and Hobbs FRM sites
  - ◆ No change to the continuous sites

# New Mexico

- SO<sub>2</sub> – 9 sites, 8 active
  - ◆ Discontinue La Union
  - ◆ Discontinue Sunland Park
  - ◆ Discontinue/relocate Airport site
  - ◆ Discontinue/relocate Bayard site

# New Mexico

- NO<sub>2</sub> – 9 sites
  - ◆ Discontinue Holman site (Las Cruces)
  - ◆ Discontinue Chaparral site
  - ◆ Further evaluate the Artesia site

# New Mexico

- Ozone – 13 sites
  - ◆ Discontinue the Holman site
  - ◆ Discontinue the Bosque Farms site
  - ◆ Further evaluate the Chaparral site

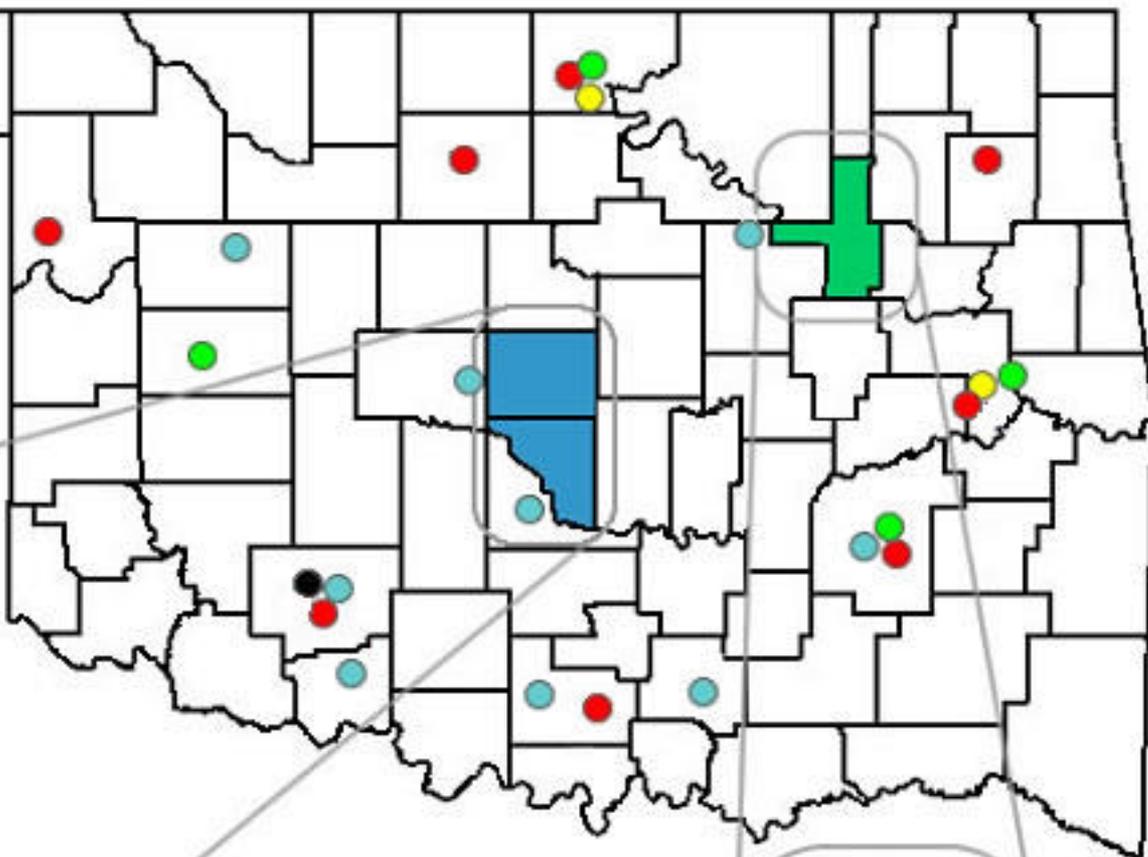
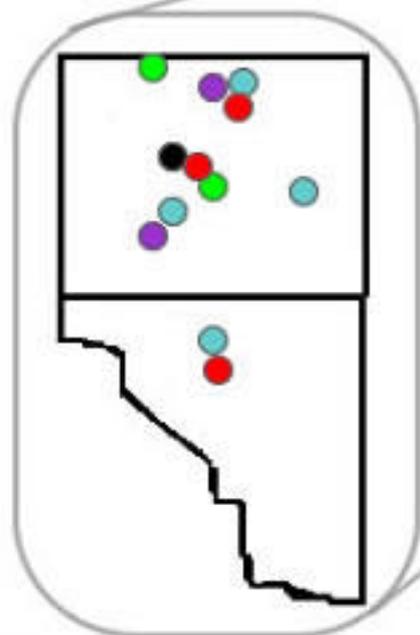
# New Mexico

- CO – 3 sites
  - ◆ No changes recommended
  - ◆ Two discontinued at the end of 2000 at Farmington and Las Cruces

# New Mexico

- The NMED has participated in the Ambient Air Toxics Pilot Monitoring Program
- Sites were operated at Rio Rancho (primary) and Bernalillo (background).
- Additional short-term organic compound sampling is planned for the Four Corners region to sample for ozone precursors.

# Oklahoma Monitoring Network



- Ozone
- Sulfur Dioxide
- Nitrogen Dioxide
- Carbon Monoxide
- Particulate Matter 10
- Particulate Matter 2.5



# Oklahoma

- Recommends deactivating two PM-2.5 sites, one in Oklahoma City and one in Tulsa. Two other sites will be designated as core sites.
- A continuous PM-10 monitor has been deployed to Muskogee.
- There is no lead monitoring in Oklahoma.

# Oklahoma

- Three CO sites are recommended for deactivation.
- One ozone site has been added, no other changes are recommended at this time.
- One SO<sub>2</sub> site is recommended for deactivation.
- Three NO<sub>x</sub> sites are recommended for deactivation.

# Texas

- 2 ozone sites have been added in the Austin area.
- Many “ozone light” stations have been added throughout the state to aid in ozone mapping. These sites do not undergo rigorous quality assurance/control activities.

# Texas

- One CO site in Brownsville recommended for deactivation.
- Two SO<sub>2</sub> sites to be added, one in NW San Antonio and the second in north Austin. These sites track power plant emissions.
- A NO<sub>y</sub> site to be added at Conroe, north of Houston.

# Texas

- 33 PM-2.5 sites are recommended for deactivation. Many of these sites will be replaced with TEOM continuous monitors. This will leave about 20 FRM sites.
- 14 PM-10 sites are recommended for deactivation. One will be added in El Paso, and another is recommended by EPA to be retained in El Paso. El Paso is a PM-10 nonattainment area.

# Texas

- 9 lead monitoring sites are recommended for deactivation. The EPA recommends that 3 be retained, one is the NAMS in Houston and the other two at lead maintenance areas.