

Monitoring Network Design and Changes

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Air Quality Analysis Section

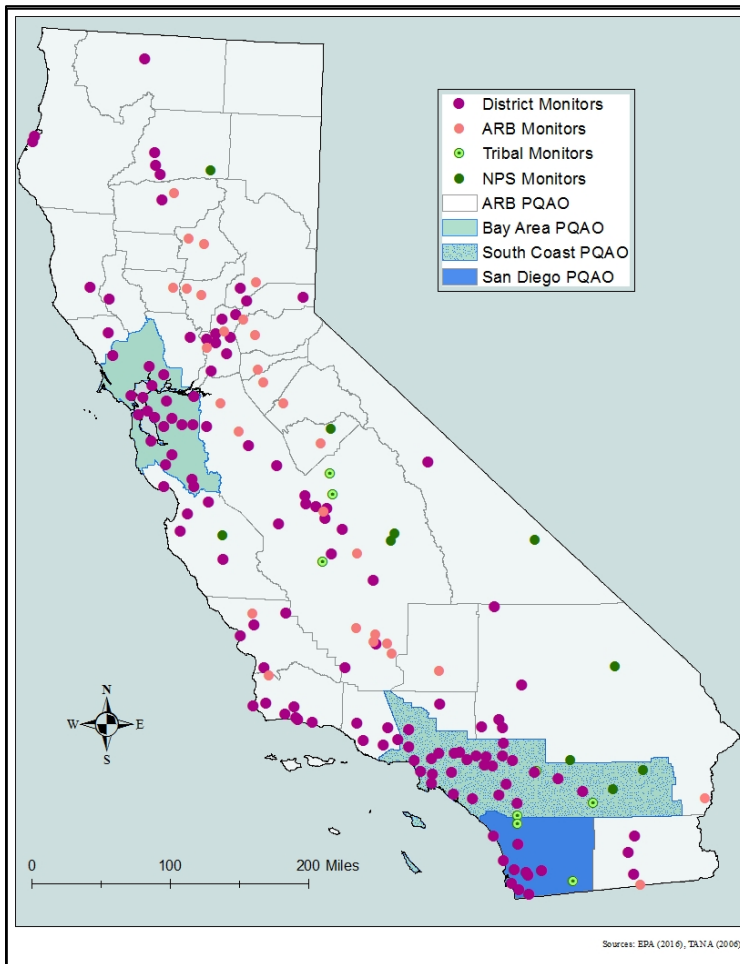
ARB Air Quality Planning & Science Division

Outline

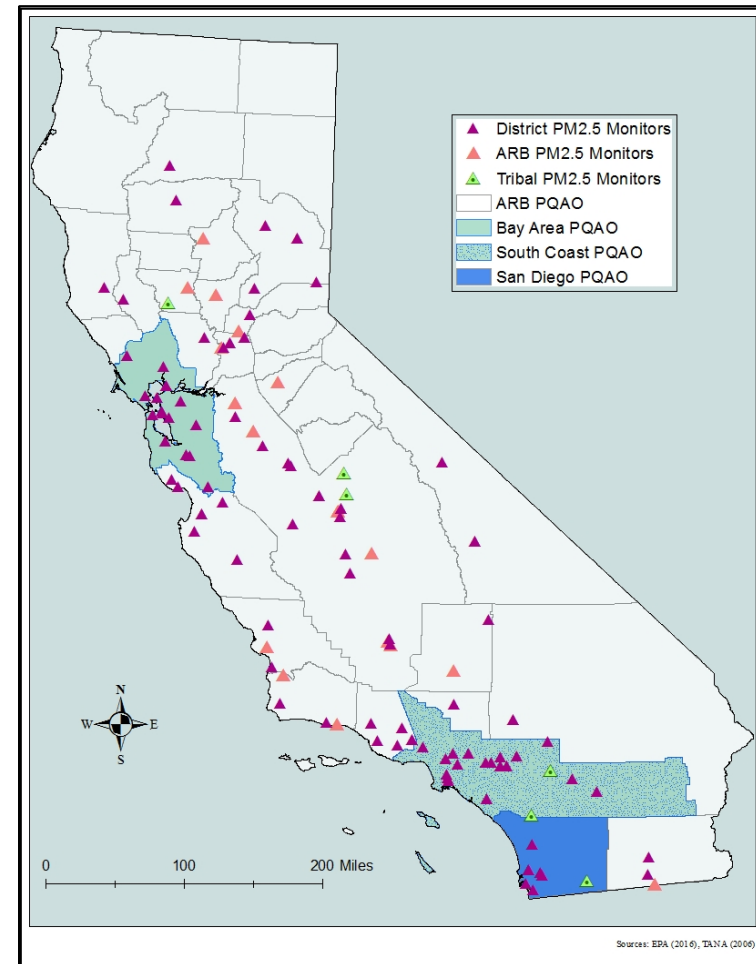
- **California Monitoring Network**
- **Reasons for Air Monitoring**
- **Federal Monitoring Requirements**
- **Monitor Changes/Shutdown**
- **Exercise: Site Relocation vs. Shutdown**
- **Questions**

California Monitoring Network: Joint Responsibilities

Ozone



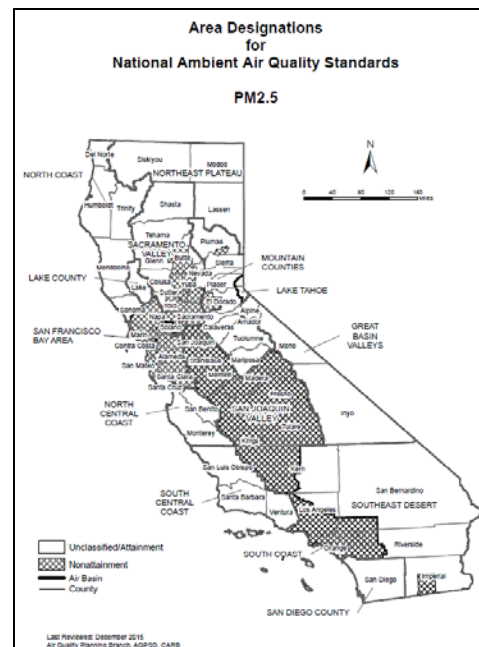
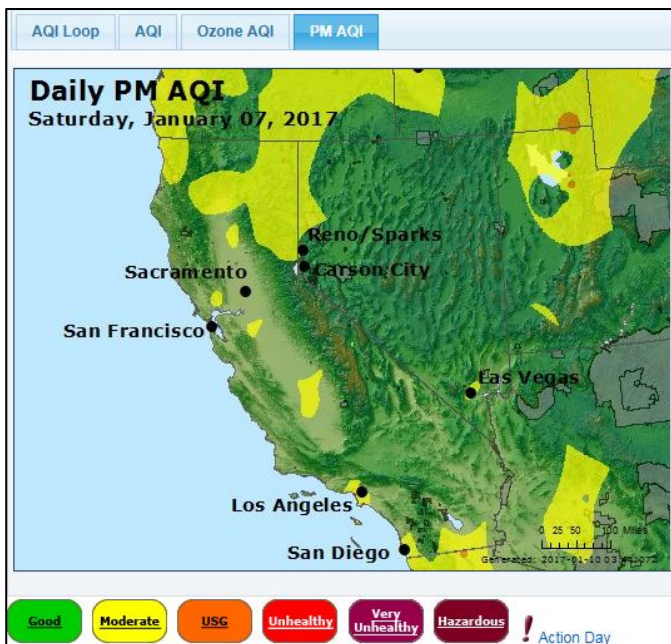
PM2.5



- ARB provides critical oversight and QA services for all districts

Why is monitoring conducted?

- Public information
- Determine compliance with state and federal standards
- Support air quality research



Federal Monitoring Requirements: Minimum Monitoring Requirements

- **40 CFR 58: Ambient Air Quality Surveillance**
- **40 CFR 58, Appendix D: Network Design Criteria**
 - **Varies by pollutant and location**
 - **Based on population, air quality, and emissions**

<http://www.ecfr.gov>

Federal Monitoring Requirements:

Example: Ozone Minimum Monitoring Requirements

Metropolitan Statistical Area population	3-year design value concentrations $\geq 85\%$ of any Ozone NAAQS	3-year design value concentrations $< 85\%$ of any Ozone NAAQS
>10 million	4	2
4 - 10 million	3	1
350,000 - <4 million	2	1
50,000 - <350,000	1	0

- MSA: Sacramento-Roseville-Arden Arcade
- Population: 2,149,127
- Design Value: 0.081 ppm
- Design Value = 116 percent of 0.070 ppm NAAQS

HOW MANY MONITORS ARE REQUIRED?

2

Federal Monitoring Requirements:

Example: PM_{2.5} Minimum Monitoring Requirements

Population	DV exceeds $\geq 85\%$ of any NAAQS	DV exceeds $< 85\%$ of any NAAQS
> 1 million	3 sites	2 sites
500,000 - 1 million	2 sites	1 sites
50,000 - <500,000	1 sites	0 sites

- MSA: Chico
- Population: 220,000
- Design Value: 29 $\mu\text{g}/\text{m}^3$ (24-hour) and 9.3 $\mu\text{g}/\text{m}^3$ (Annual)
- Design Value = 83% (24-hour) and 77% (Annual)

HOW MANY MONITORS ARE REQUIRED?

0

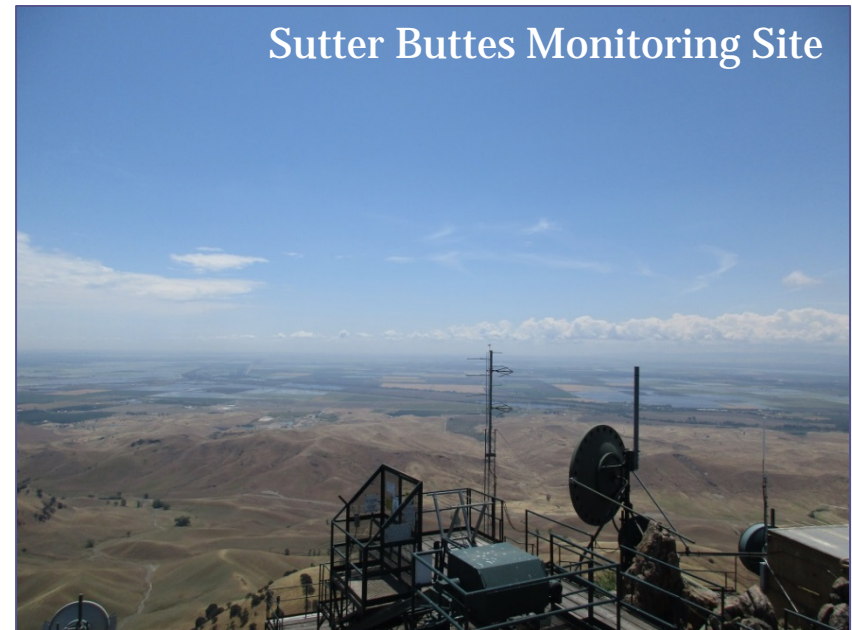
Why are there more than the minimum number of monitors?

Additional Federal Requirements

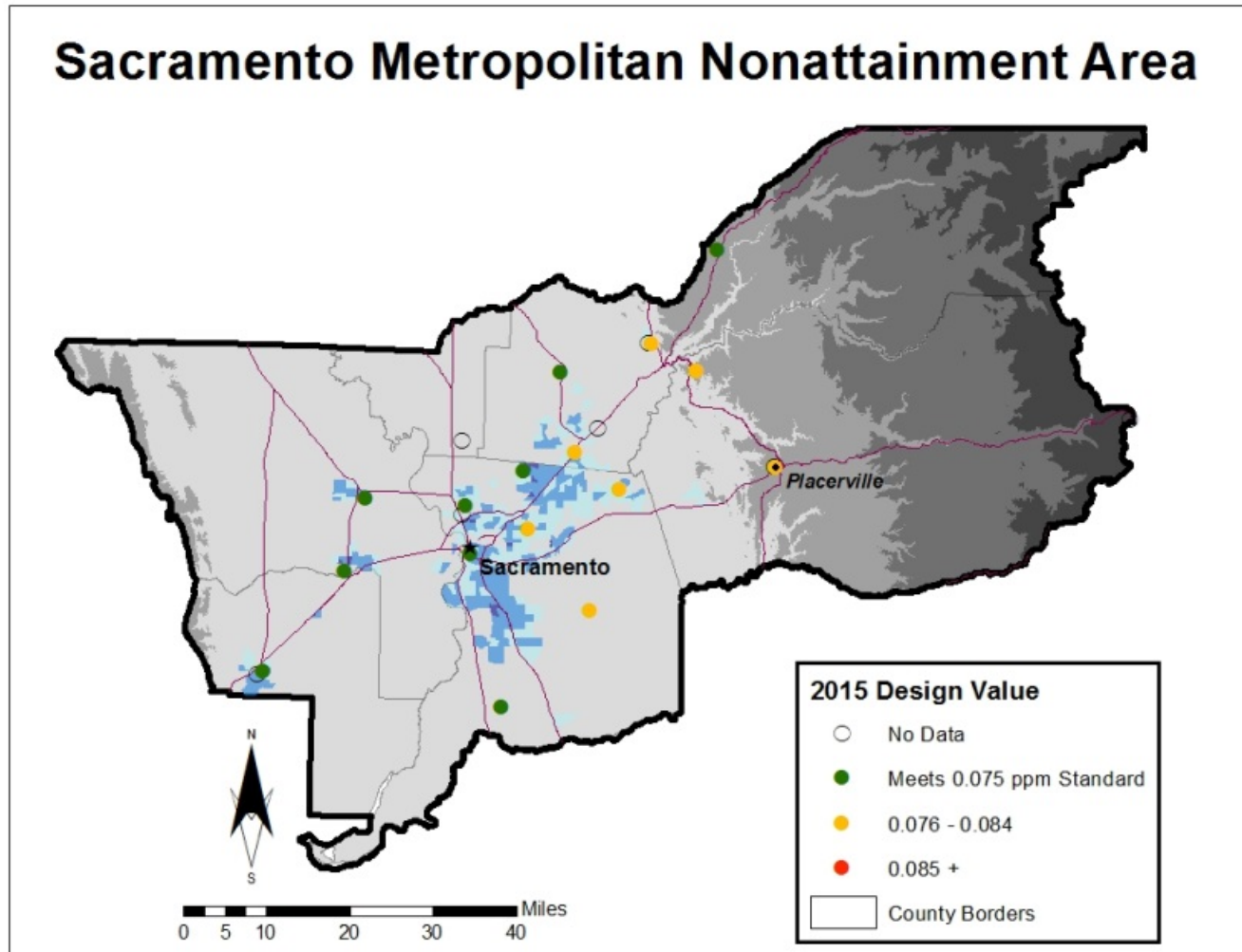
- Required by State Implementation Plans (SIP)
- Sensitive populations
- Highest concentration
- Background and Transport
- Collocation (PM_{10} , $PM_{2.5}$)
- Continuous Monitoring ($PM_{2.5}$)
- Code of Federal Regulations (CFR)
- Regional Administrators

Additional Network Design Requirements

- **Complexity of terrain**
- **Meteorology**
- **Geographic size**
- **Adjacent monitors**
- **Formation mechanisms**
- **Distribution of emissions**

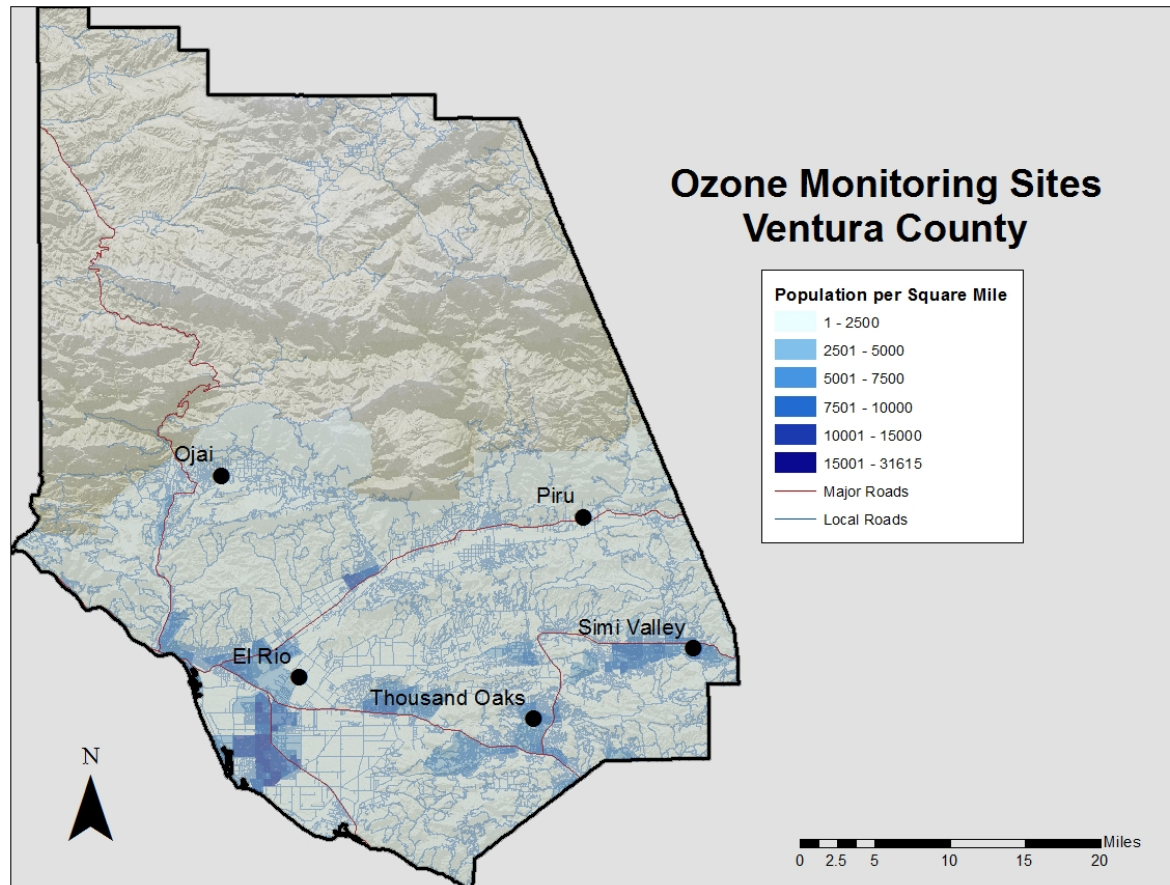


Example: Sac Metro Ozone Nonattainment Area Changes in High Concentration Site



Example: Ventura County

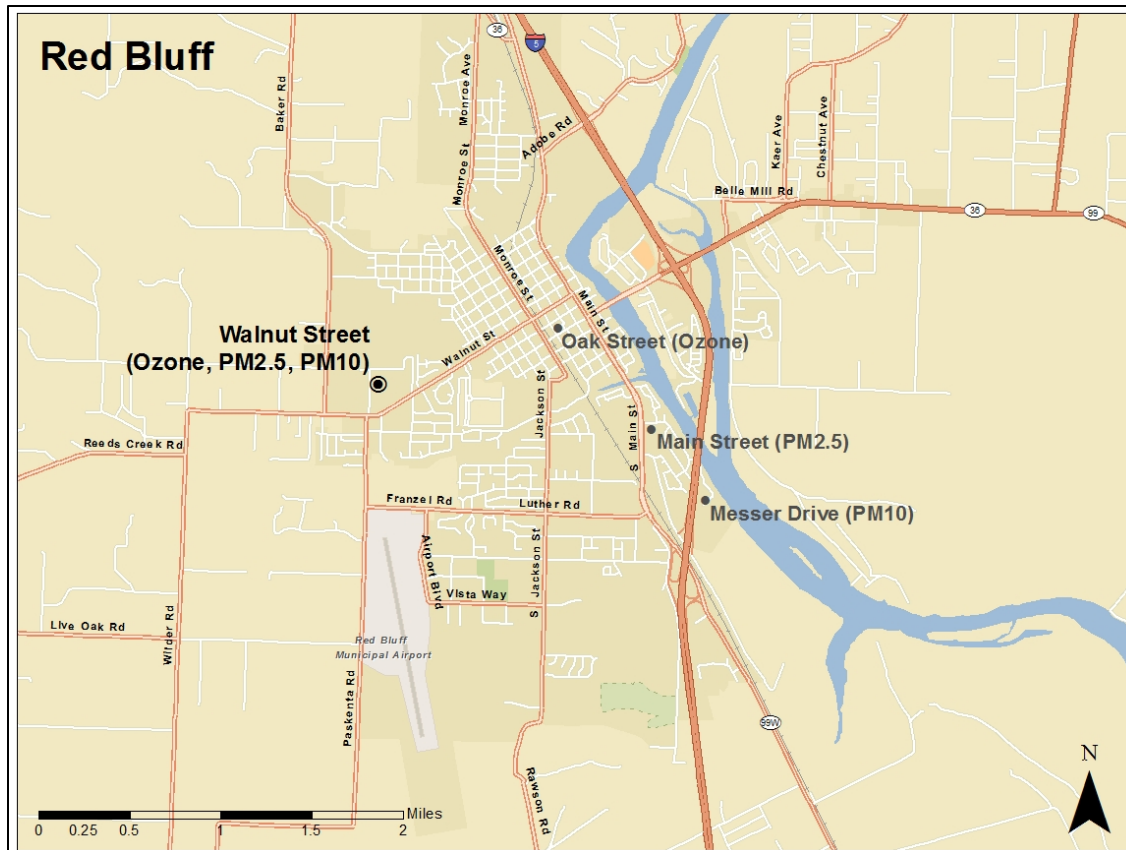
Terrain and Population Distribution



Balancing Needs vs. Resources

- Utility of multi-pollutant measurements
- Utility of long-term data sets
- Informational monitoring (non-FEM)
- Public requests
- Political pressures
 - **Networks address dynamic needs**
 - **Quality, not quantity**

Example: Tehama Monitor Consolidation



- Three sites combined into one
- Reduced:
 - Monitor downtime
 - Staff travel time
 - Maintenance
 - Site accessibility
 - Shelter temperature and humidity issues
 - Site location leases

Making Changes to the Network

**The secret to change is to focus all of your energy not on fighting the old,
but on building the new.**

- Socrates

Time for a change...



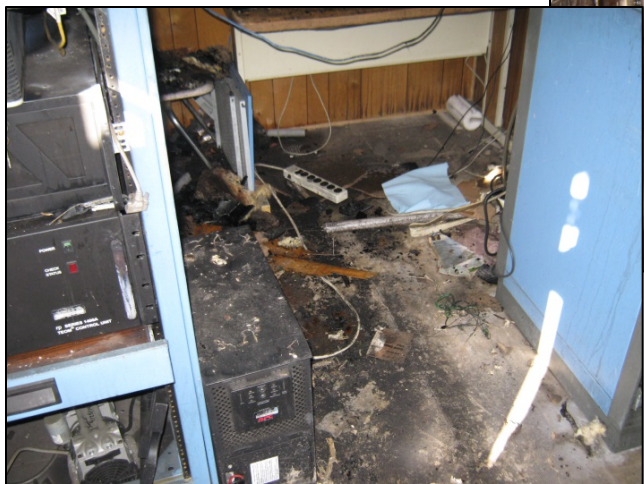
What needs to be considered before the change?

Checklist for Monitor Change

- What is driving the change?
- How will the data be used?
- How will change affect minimum monitoring requirements?
- How will change affect collocation requirements?
- Can the new monitor be audited with current resources?
- How will change affect data uploading?
- How will the change affect data certification?
- Are the operation principles well understood or is additional training needed?
- What support is necessary to make the monitor change?
- Does the change require EPA approval?
- Has ARB AQPSD been notified?
- Has ARB MLD been notified?

Time for a bigger change...

Photos courtesy of Nathan Trevino, SJVAPCD



Relocate or Shutdown?

- Is the monitor specifically required by an attainment or maintenance plan?
- How will Appendix D requirements be affected?
 - Max concentration site?
 - Minimum monitoring requirements?
- Has the monitor shown attainment in the last five years?
- What is the probability that the monitor will exceed 80 percent of the NAAQS in the next three years?

Group Exercise: Shutdown or Relocate?



- Moe Avenue monitoring site
- Irreparably damaged



Group Exercise: Shutdown or Relocate?

- **List factors to consider**
- **List reasons to support shutdown**
- **List reasons to support relocation**
- **What actions are necessary if there is monitor downtime?**

Shutdown or Relocate?

- **Factors to consider**
 - How are minimum monitoring requirements impacted?
 - Are any of the monitors part of a federally required program?
 - Is this a design value site?
 - Are any of the monitors required by a SIP or maintenance plan?
 - Are any of the monitors critical to State or local program implementation?
- **Support for shutdown**
- **Support for relocation**
- **Actions that are necessary if there is monitor downtime**
 - Temporary shutdown in AQS
 - Null code in AQS (use the correct one)
 - Notify ARB – AQPSD and MLD
 - Notify Region 9

Questions

