

Carbon Sampler Replacement using the URG 3000N in the EPA Chemical Speciation Network

IMPROVE Steering Committee Meeting
September 5, 6, 2007

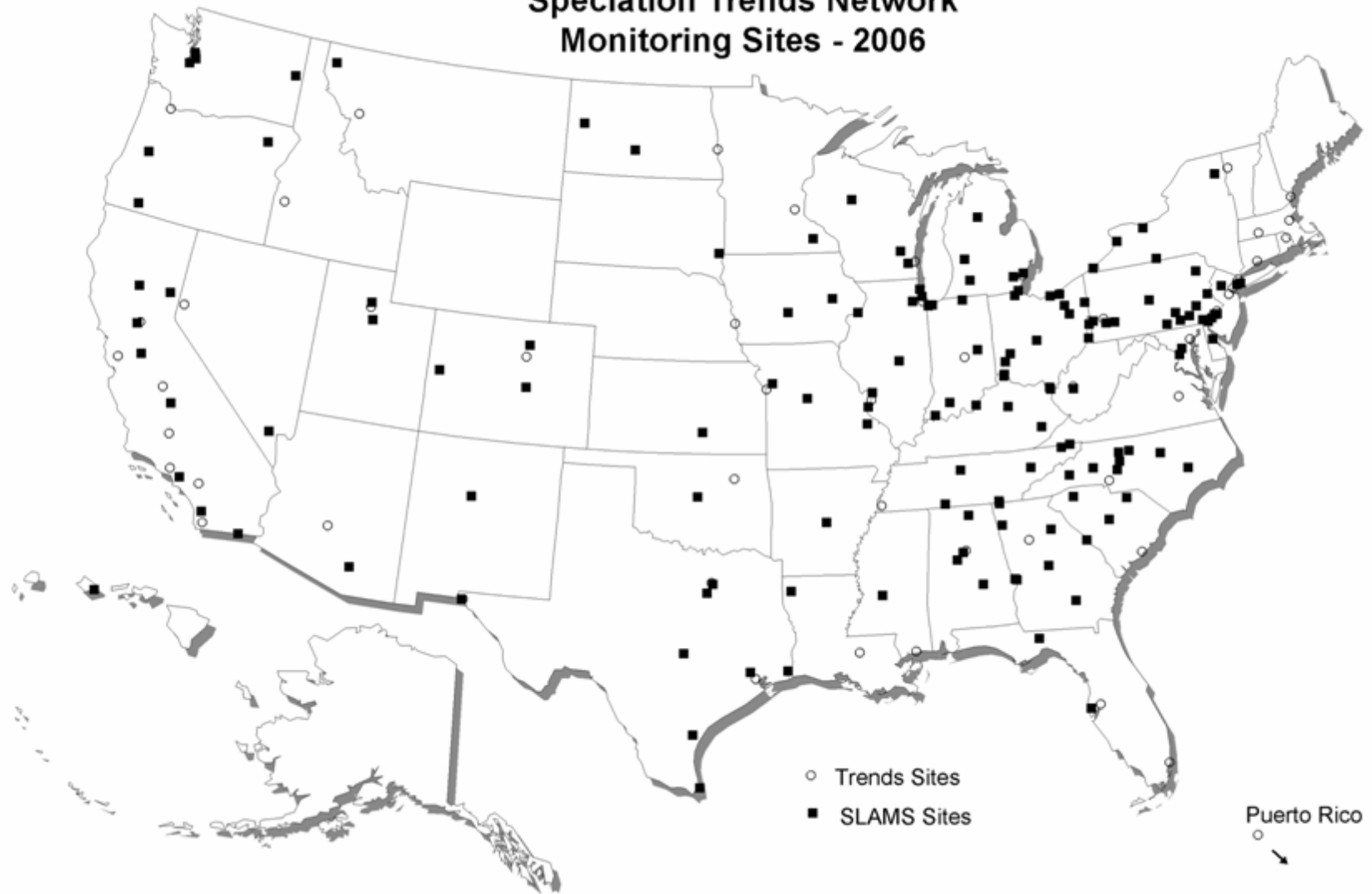
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INTRODUCTION

In April 2005, the Clean Air Scientific Advisory Committee, (CASAC) gave strong general support for making changes to the EPA Urban Speciation and Trends Network (STN) to improve comparability with rural IMPROVE PM_{2.5} carbon concentration data.

<http://www.epa.gov/sab/pdf/casac-05-006.pdf>

Speciation Trends Network Monitoring Sites - 2006



The IMPROVE and CSN programs differ in various aspects of data collection and analysis.

- The CSN program uses the MetOne SASS in most cases. Flow Rate of 6 lpm on a 47 mm Quartz Filter.
- CSN Channel 3 Filters are Analyzed for Carbon using Total Optical Transmittance (TOT).
- The IMPROVE program uses the Version II IMPROVE Sampler. Flow Rate of 22.8 lpm on a 25 mm Quartz Filter.
- IMPROVE Module C Filters are Analyzed for Carbon using Total Optical Reflection (TOR).

Result of CASAC Recommendations

- Convert all of the Trends and supplemental sites (about 184 sites total) to IMPROVE carbon sampling and analysis protocols over a two to three year period.
- Joann Rice, EPA OAQPS Project Leader, and Team Select 57 sites for Initial Installation, Phase I.
- Solomon Ricks, EPA OAQPS Project Leader, and Team Select 64 sites for Phase II Installations.
- Cooperative Process of Considering CSN Sampling Requirements with inputs from OAQPS, States, URG Corporation and Air Resource Specialists (ARS) Ensued.

Scope of Work

ARS

- Purchase, Install and Calibrate the Sampler at the Sites.
- Train the operator(s).
- Develop Firmware.

URG

- Modify Design
- Fabricate Samplers

The Development of the URG 3000N

- States Requested, EPA Implemented Mass Flow Control over the pre-existing IMPROVE Critical Orifice.
- The Probe Height was Adjusted to be Consistent with STN protocol
- A Self Supporting Stand was Designed for the Controller and the “Module C”.
- With the Addition of the MFC, Many Changes to the Firmware were initiated.
- Name of Sampler Changes from Module C to URG 3000N

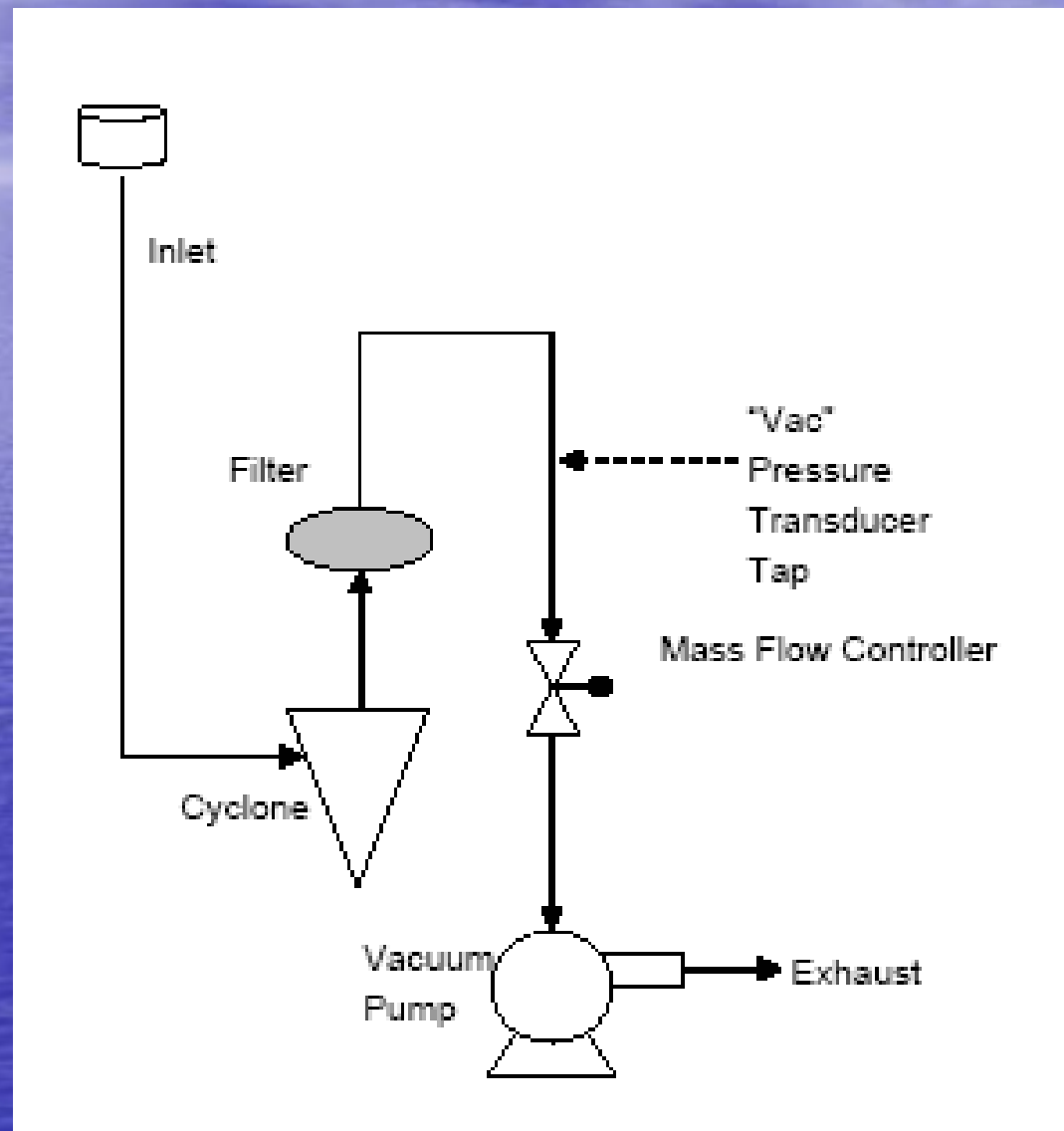
URG 3000N Firmware Changes

- Continuous Mass Flow Control.
- Logging of 15-minute Averages of Flow Rate, Flow CV, Temperature, Barometric Pressure, System Vacuum and Elapsed Time.
- Semi-Automatic 3-Point Calibration, Audit, Leak Checks and Filter Changes.
- Operation Files Saved to Compact Flash Media.

URG 3000N



Cyclone & Inlet





URG 3000N Aerosol Sampler Module with Removable Filter Cassette and Four Cartridges.

Controller Keypad Corded to Reach the Module



Pump Enclosure



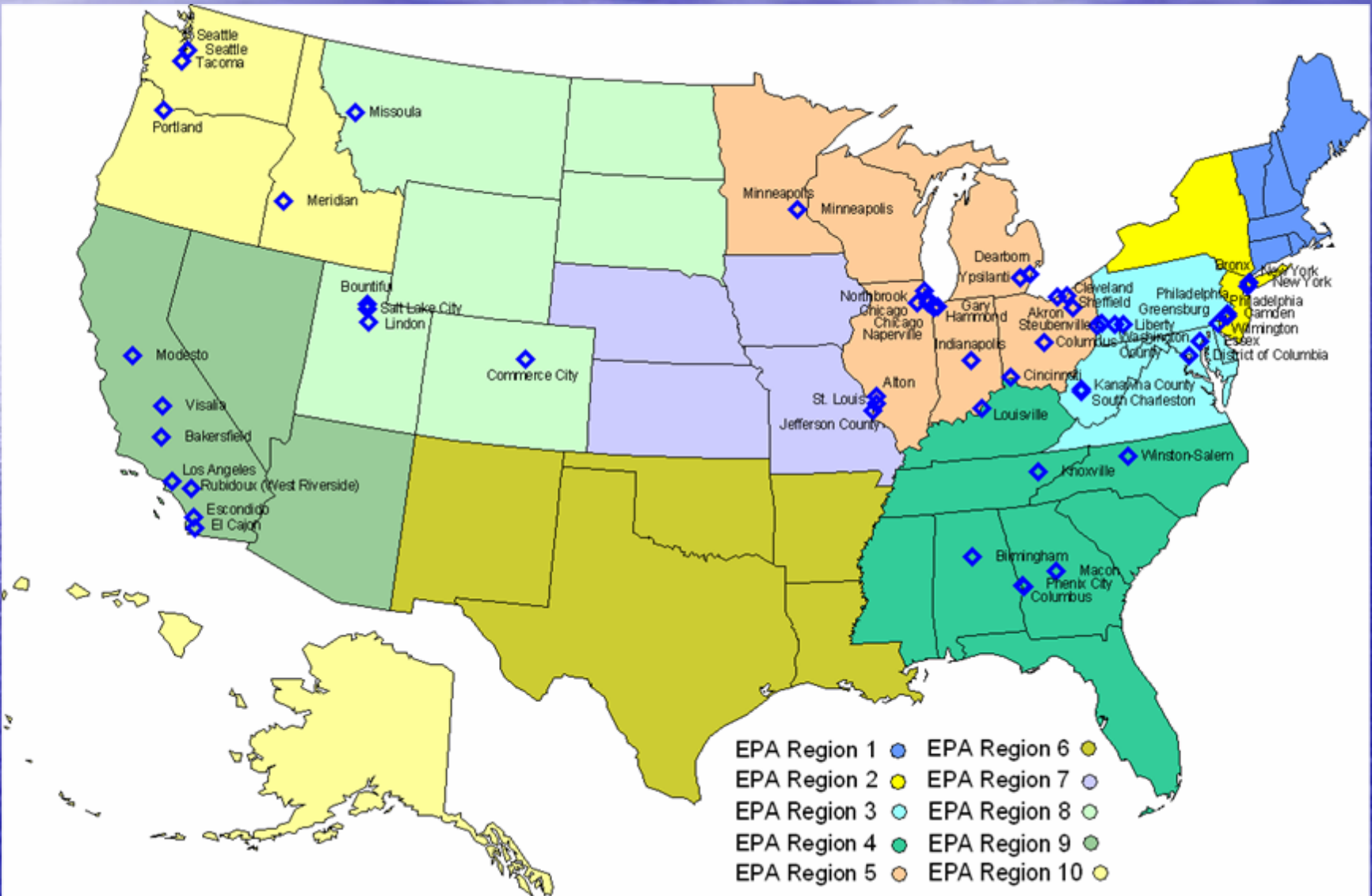
Progress

- 57 URG 3000N Samplers were Installed March/April 2007 at Selected CSN sites and Sampling began on May 3, 2007.
- CSN MetOne SASS carbon channel was discontinued after two months of colocated operations.

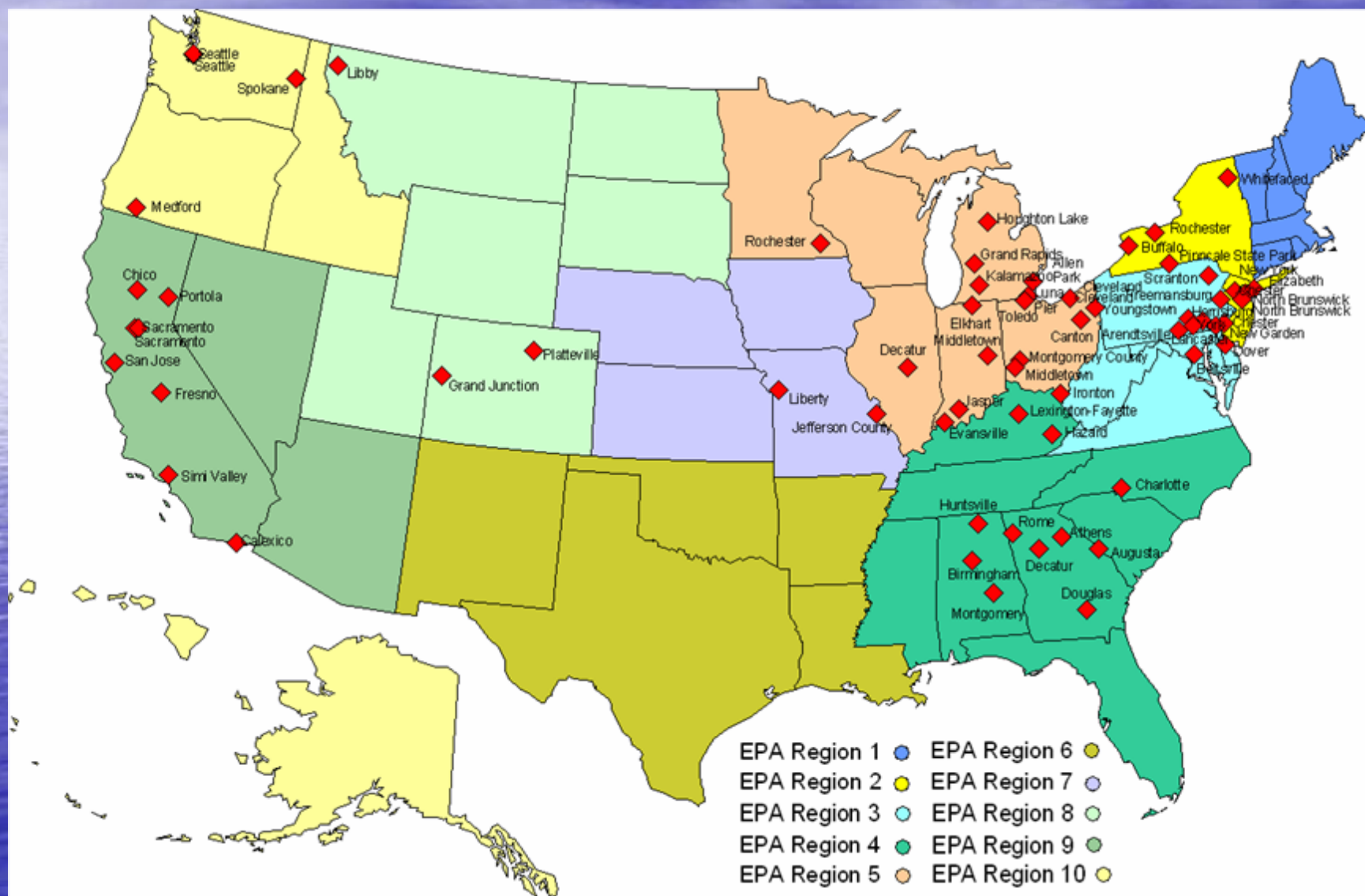
....Progress

- Collection and analysis of the carbon filter samples ***parallel*** IMPROVE methods, but ***retain*** the CSN's quality assurance (QA) requirements.
- EPA Developed Sampler Protocols (QAPP)
- RTI is Managing Filter Handling.
- DRI is Managing Analysis the Carbon Filters.
- Phase II Installations could began January 2008.

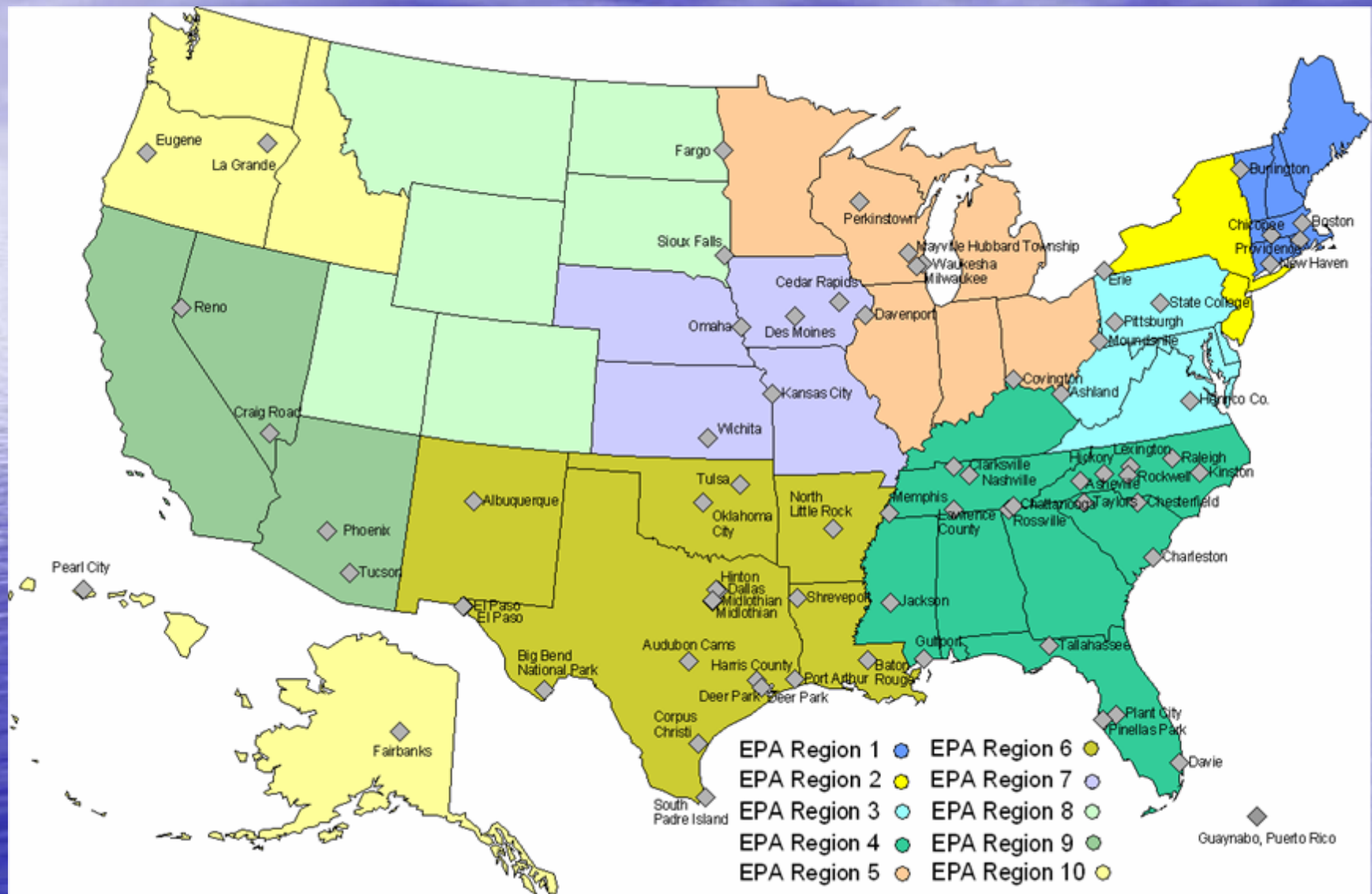
Phase I Sites (56)



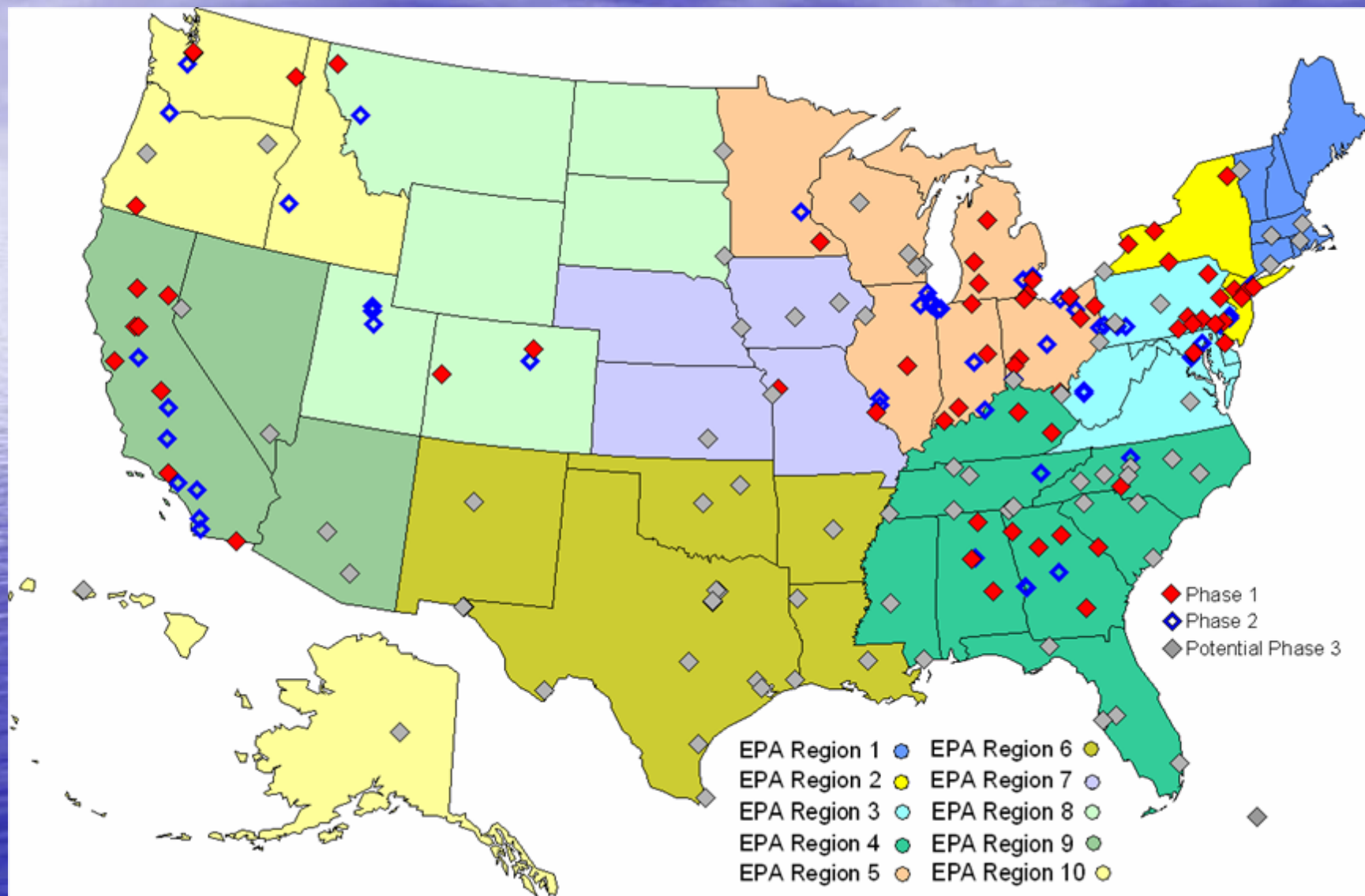
Phase II Sites (64)



Phase III Candidate Sites



CSN Sites



The URG-3000N at the Naperville, IL site.



FINAL NOTES

- ARS is Expecting a Contract to Proceed with Phase II Purchasing and Installation by October 2007.
- Phase III ???
- Information Distribution at:
<http://epa.gov/ttn/amtic/specurg3000.html>
- Interim SOP's at:
<http://www.epa.gov/ttn/amtic/specguid.html>