

Air Monitoring Instrumentation

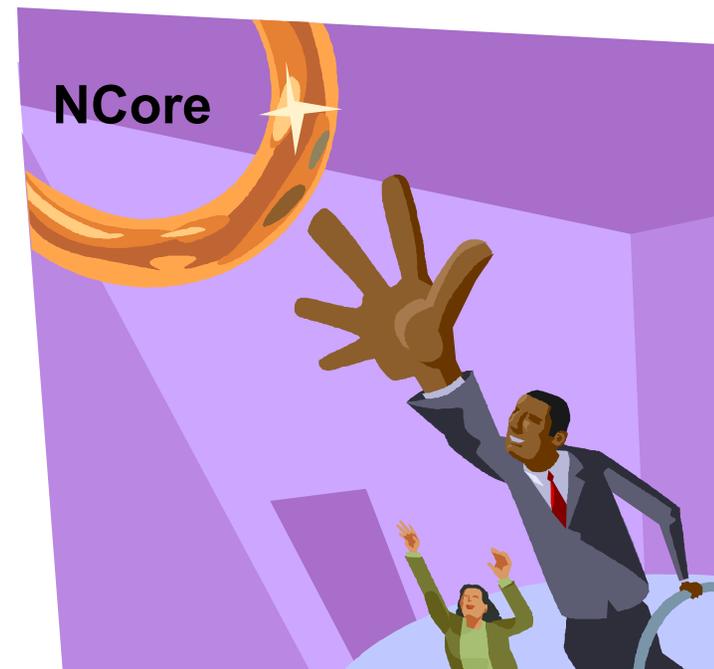
Precursor/Trace
Gas/Calibration
Systems Training



Overview of NCore Aspects of the
Monitoring Rule

Goals of the Today's Workshop

- NCore monitoring rule requirements.
- NCore monitoring objectives and network design implications
- Meeting the data quality objectives.
- Technological and procedural requirements.
- Challenges of NCore-type site operations.
- Follow-up issues.



Today's Agenda

8:00-8:45	Weinstock	Overview of NCore Aspects of the Monitoring Rule
8:45-10:00 then BREAK	Mikel	Technical Support of NCore Site Monitoring Activities
10:20-11:00	Papp	Meeting the Quality Objectives of the NCore Monitoring Program
11:00-11:30	Weinstock	Data Acquisition Considerations in NCore
11:30-12:00 then LUNCH	Watkins Mikel	Preparing for the New Meteorological Monitoring Requirements
1:30-3:00 then BREAK	<u>Vendors:</u> Ecotech Thermo Electron Teledyne-API	Trace Level Methods for the NCore Monitoring Program CO (Rhys Evans) SO ₂ (Frank Duckett) NO _y (David Neuschuler)
3:20-3:50	Vendors	Question and Answer period
3:50-4:15	Weinstock	EPA's Experience in Operating the Burdens Creek Site
4:15-5:15	State & Local Agency Staff	Tales from the NCore Pilot Site Operators (Jimmy Werner, Seth Cloran, Ryan Auvil)
5:15-5:30	Weinstock	Wrap-up and Discussion of Training Needs, upcoming NAQC.

NCore Station Attributes

- Collocation of multiple pollutant and supporting measurements.
- Robust suite of filter-based PM samplers.
- Emphasis on continuous operating instruments.
- Use of high-sensitivity precursor gas monitors.
- Diversity of representative site locations.
- Leverage with existing multipollutant networks.



**Candidate NCore Site 361010003
Pinnacle Park, New York**

Relating NCore Monitoring System Objectives to other Ambient Networks

Objective	Monitor Types	Example Analyses/Rationale
Public reporting (continuous PM _{2.5} and ozone)	Local sites (primary) NCore sites (secondary)	direct reporting through AIRNow
Emission strategy development (trace gases, PM _{2.5} speciation, VOCs*)	NCore sites (primary)	model evaluation, source apportionment and other observational models
Assessing effectiveness of emission reductions and AQ trends (trace gases, PM _{2.5} speciation, VOCs*)	NCore sites (primary) Local sites (secondary)	time series comparisons to emissions projections
Support health assessments and NAAQS reviews (trace gases, O ₃ , PM _{2.5} and PM _{10-2.5} (mass and species))	NCore sites (primary) Research and local sites (secondary)	ambient input to exposure models; direct association analyses
Compliance (NAAQS comparisons) (PM _{2.5} and O ₃)	Local sites (primary) NCore sites (secondary)	point and spatial field comparisons to NAAQS
Science support (all pollutants)	Research sites (primary) NCore sites (secondary)	methods evaluation, size distribution analyses, diagnostic analysis (model processes, particle formation)
Ecosystem assessment (NO _y , HNO ₃ *, NH ₃ *, O ₃)	NCore sites	mass balance analysis, deposition calculations

* Not required in NCore regulation

Other Aspects of NCore Network Requirements

- Between 62 and 71 stations must be operational by **January 1, 2011**.
 - NCore monitoring plan due **July 1, 2009** as part of annual monitoring network plan. Items that can be negotiated:
 - Selection of two versus three stations in listed States.
 - Delegation of required sites between State and local agencies.
 - Operation of additional sites by States, local agencies, and/or Tribes.
 - Urban versus rural locations.
 - NO_y and meteorological measurements (more later).
 - NCore sites are approved at Administrator level.
- Ultimate size of deployed network: ~75 stations.

NCore Parameter Requirements

Measurements	Comments
PM _{2.5} FRM mass	typically 24 hr. average every 3 rd day
PM _{2.5} speciation	Organic and elemental carbon, major ions and trace metals (24 hour average; every 3 rd day)
PM _{10-2.5} FRM mass	typically 24 hr. average every 3 rd day
PM _{10-2.5} speciation	typically 24 hr. average every 3 rd day
continuous PM _{2.5} mass	1 hour reporting interval
ozone (O ₃)	all gases through continuous monitors
carbon monoxide (CO)	capable of trace levels (low ppb and below) where needed
sulfur dioxide (SO ₂)	capable of trace levels (low ppb and below) where needed
nitrogen oxide (NO)	capable of trace levels (low ppb and below) where needed
total reactive nitrogen (NO _y) ¹	capable of trace levels (low ppb and below) where needed
surface meteorology ²	wind speed and direction, temperature, relative humidity

¹ In areas with negligible expected difference between NO_y and NO_x measured concentrations, the Administrator may allow for waivers that permit NO_x monitoring to be substituted for the required NO_y monitoring at applicable NCore sites.

² The requirement for meteorological monitoring can be waived by the Administrator if the NCore site is not suitable for representative meteorological measurements due to the site's physical surroundings and it is possible for nearby meteorological measurements to fulfill this data requirement.

NCore Methods

- For SO₂, CO, NO₂, O₃, PM_{2.5}, or PM_{10-2.5}:
 - Must be a FRM or FEM, or an Approved Regional Method (ARM) for any monitors *intended for comparison with applicable NAAQS*.
 - Alternative SO₂, CO, NO₂, O₃, PM_{2.5}, or PM_{10-2.5} methodologies can be proposed for monitors not intended for NAAQS comparison. Such techniques must be detailed in the network description required by §58.10 and subsequently approved by the Administrator.
 - Not an issue for NO_y monitors (no applicable NAAQS).
- FRM or FEM trace-level SO₂ and CO monitors are becoming more widely available, so this issue is becoming less significant over time.
 - <http://www.epa.gov/ttn/amtic/criteria.html>
- The use of trace-level monitors is an integral part of meeting NCore data objectives. They are highly recommended in areas where the concentration of some pollutants are low.
 - Includes rural sites, background and transport sites, and many sites in urban areas where SO₂, NO₂, and CO levels have declined significantly over time.

NCore Site Placement

- Design Issues
 - Need sites that are representative of ambient concentrations over an extensive area.
 - Urban scale or larger. Neighborhood scale if location is representative of many similar neighborhoods.
 - Do not want to be influenced by local emission sources that are not impacting the entire urban or rural area.
- Collocated with PAMS, NATTS, CASTNET, and STN sites where possible.
- Logistical Issues
 - Long term sites with reasonable assurance of 5+ year “permission” period.
 - Room for multiple gas monitors and associated equipment, integrated samples, meteorology.
 - Ground footprint allows accessibility for TTP audit vehicle.

Appropriate For NCore? - Cast Your Vote

SITE #1	SITE #2	SITE #3	SITE #4
<ul style="list-style-type: none"> •Urban location. •Impacted by mobile source emissions. •Approximately 1km downwind from major Interstate corridor. •Located on school property bordering residential neighborhood. •Existing STN station. 	<ul style="list-style-type: none"> •Urban location. •Impacted by mobile and point source emissions. •Approximately 200m from a major point source. •Located in a fire station parking lot. •Existing PM station. •Room for shelter expansion. 	<ul style="list-style-type: none"> •Rural location. •Impacted by some wind-blown dust and crustal PM. •Approximately 500m from a medium-sized animal feeding operation. •Located within a small State park. •Potential new site location. 	<ul style="list-style-type: none"> •Rural location. •Affected by transport from a large urban area. •No nearby emission sources. •Site at elevation of approximately 1000m in an area of rolling terrain near mountains. •Potential new site. •Limited road access & utilities.

Appropriate For NCore?

SITE #1: YES	SITE #2: NO	SITE #3: NO	SITE #4: MAYBE
<ul style="list-style-type: none"> •Urban location. •Impacted by mobile source emissions. •Approximately 1km downwind from major Interstate corridor. •Located on school property bordering residential neighborhood. •Existing STN station. 	<ul style="list-style-type: none"> •Urban location. •Impacted by mobile and point source emissions. •Approximately 200m from a major point source. •Located in a fire station parking lot. •Existing PM station. •Room for shelter expansion. 	<ul style="list-style-type: none"> •Rural location. •Impacted by some wind-blown dust and crustal PM. •Approximately 500m from a medium-sized animal feeding operation. •Located within a small State park. •Potential new site location. 	<ul style="list-style-type: none"> •Rural location. •Affected by transport from a large urban area. •No nearby emission sources. •Site at elevation of approximately 1000m in an area of rolling terrain near mountains. •Potential new site. •Limited road access & utilities.

Status Of NCore Pilot Program

- We have information on approximately 70 existing and potential NCore site locations. Some of these sites have equipment in varying stages of installation and operation.
- Regions are negotiating with States about some of these locations. Final proposed NCore sites must be included in July 1, 2009 plan but earlier approvals would be optimal.
- OAQPS is developing an AMTIC-based web tool to help organize information about NCore sites and serve as an outreach tool for potential data users. How you can help:
 - Insure that all fields in AQS are completed for candidate sites.
 - Follow-up on data request sent through Regions last summer for GPS-obtained coordinates, site and cardinal direction photographs (8 sectors), currently operating parameters.
 - Please forward information to Kevin Cavender at: (cavender.kevin@epa.gov) – (919)-541-2364.
 - Web tool should become available December 2006.

The screenshot displays the NCore Network Web Tool interface. The top navigation bar includes the EPA logo and the text "U.S. Environmental Protection Agency". The main header reads "TTNWeb - Technology Transfer Network".

The page is titled "Candidate NCore Site 361010003". Under "Basic Site Information", the following details are provided:

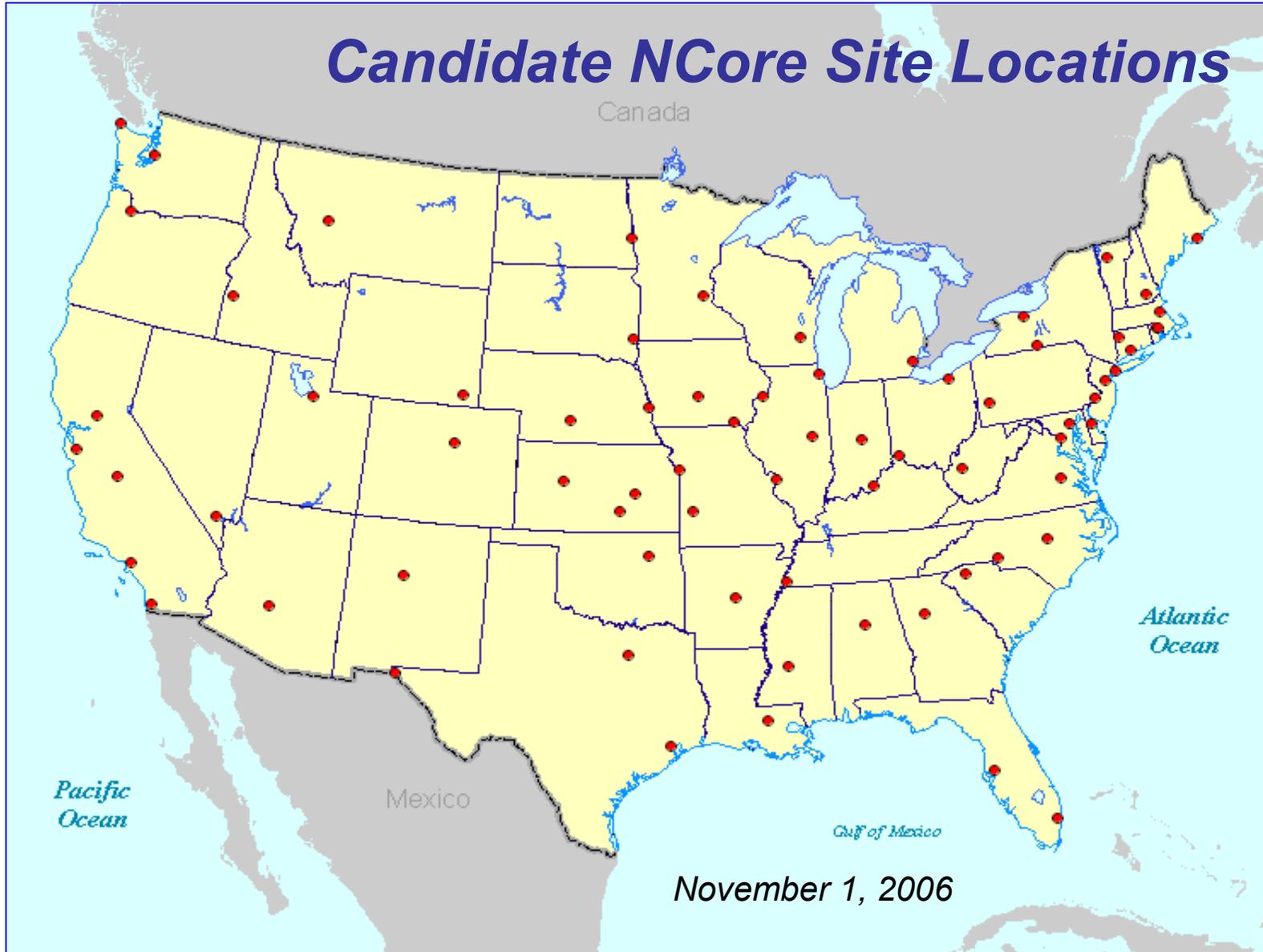
- Name: Pinnacle Park
- AIRS ID: 361010003
- Street Address: 1904 PINNACLE ROAD
- City: Pinnacle Park
- State: New York
- Operating Organization: NA
- Scale or representativeness: RURAL

A photograph of the site is shown on the right. Below the site information, there are sections for "Site Photographs" and "Map". The "Site Photographs" section includes a photo of a grassy field with a road. The "Map" section provides a satellite view of the area.

At the bottom of the page, there is a "Trusted sites" indicator.

NCore Network Web Tool

Candidate NCore Site Locations



OAQPS Precursor Gas Team

Supporting NCore Implementation

- Products and deliverables
 - ✓ Method Fact Sheets complete
 - ✓ Lab and field testing complete
 - ✓ Testing tables available
 - ✓ Instrument Specific SOPs complete
 - ✓ CO, SO₂, NO_y, calibration system
 - ✓ [Technical Assistance Document \(TAD\)](#)
 - ✓ Field operations are ongoing at Burden's Creek site
 - ✓ DQOs – development in progress
 - ✓ Training workshops delivered during 2005 and 2006
- Information located on EPA's web site at: www.epa.gov/ttn/amtic/precursor.html
- Real-time data available from EPA field site (inquire for access information)
 - <http://66.15.176.186/envidasweb/>



NCore To-Do List for Monitoring Agencies

- Work with Regions and OAQPS to finalize sites
- Discuss and resolve funding issues
- Instrument procurement
 - Trace level monitors
 - Calibration equipment
 - Meteorological equipment
 - Review data acquisition needs
- Attend related training workshops and conferences
- Proceed with instrument deployment
 - Draft specific SOP's and revise QAPP's based on operational experience
 - Start reporting data to AQS based on agency experience and internal QC/QA procedures.

