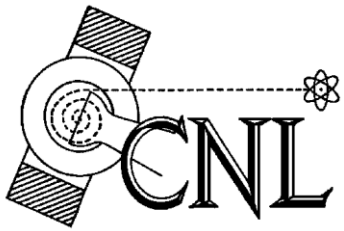
IMPROVE
Particle Monitoring Network:
Status Report to
IMPROVE Steering Committee

Chuck McDade
Crocker Nuclear Laboratory
University of California, Davis
Presented at Incline Village, Nevada
October 2012



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IMPROVE Network
Fall 2012

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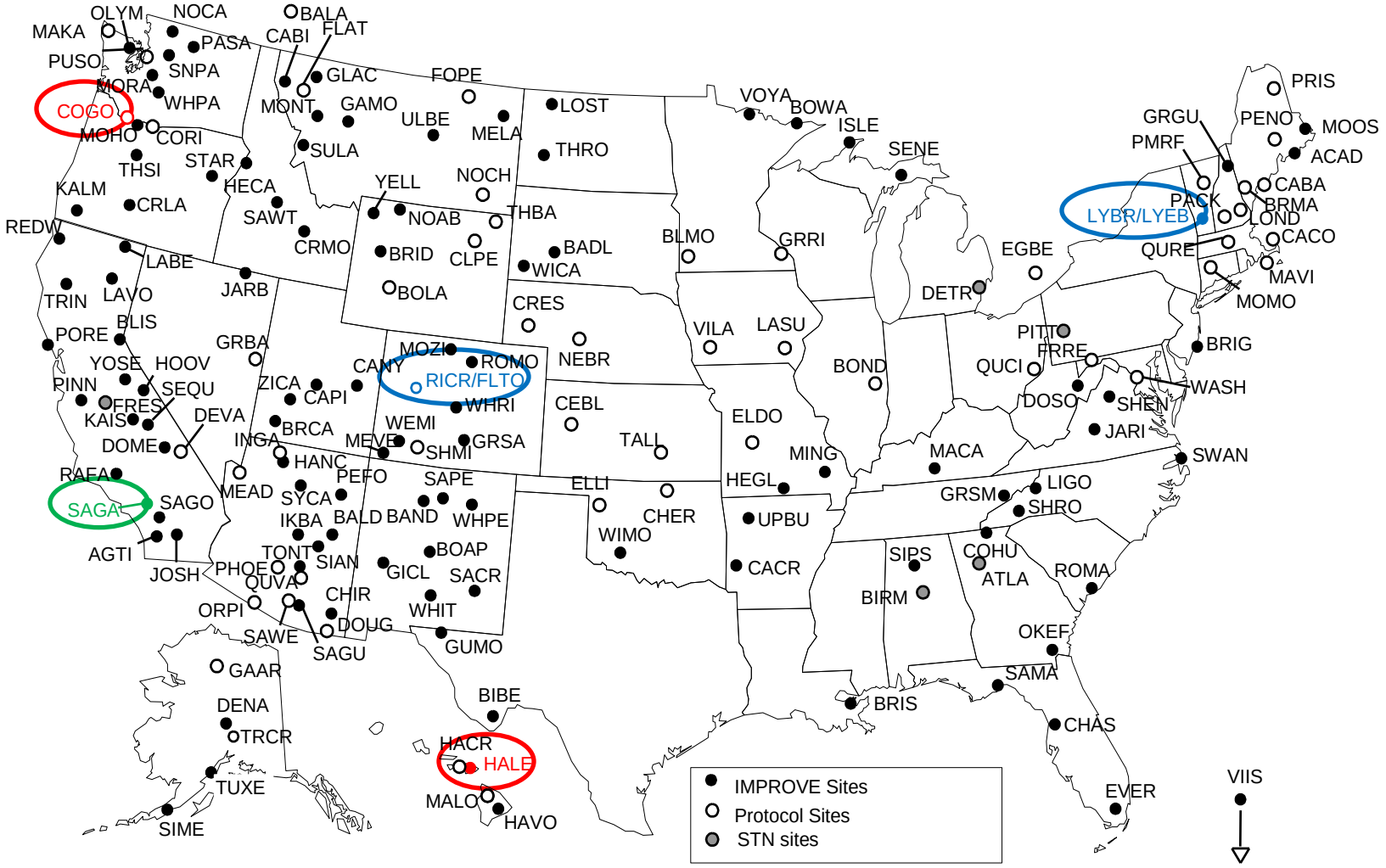

Site Move, October 2011
RICR1 to FLTO1

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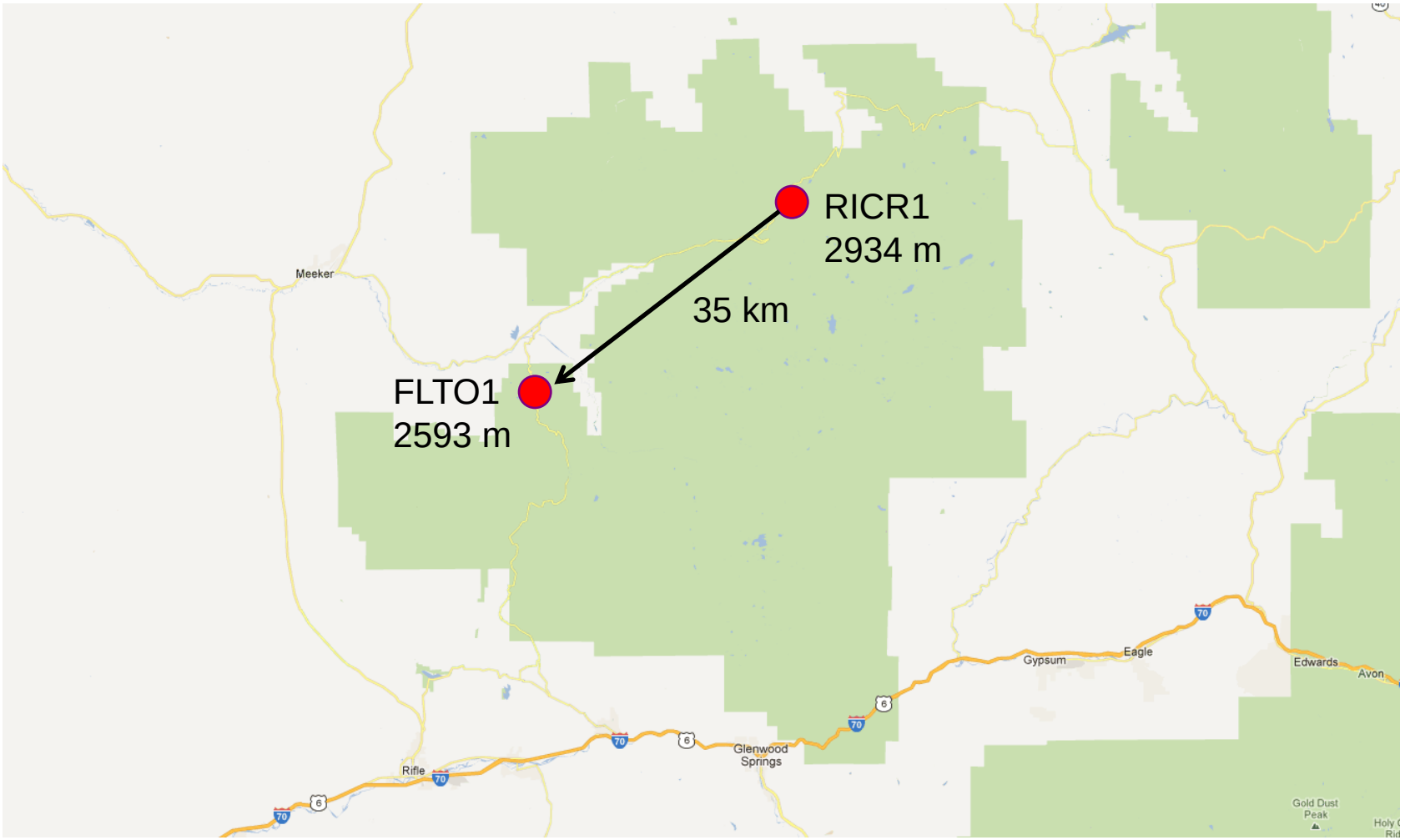

View from RICR1

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View from FLTO1

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Site Move, December 2011
LYBR1 to LYEB1

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View from LYBR1

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View from LYEB1

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San Gabriel Site Replaced in September 2011

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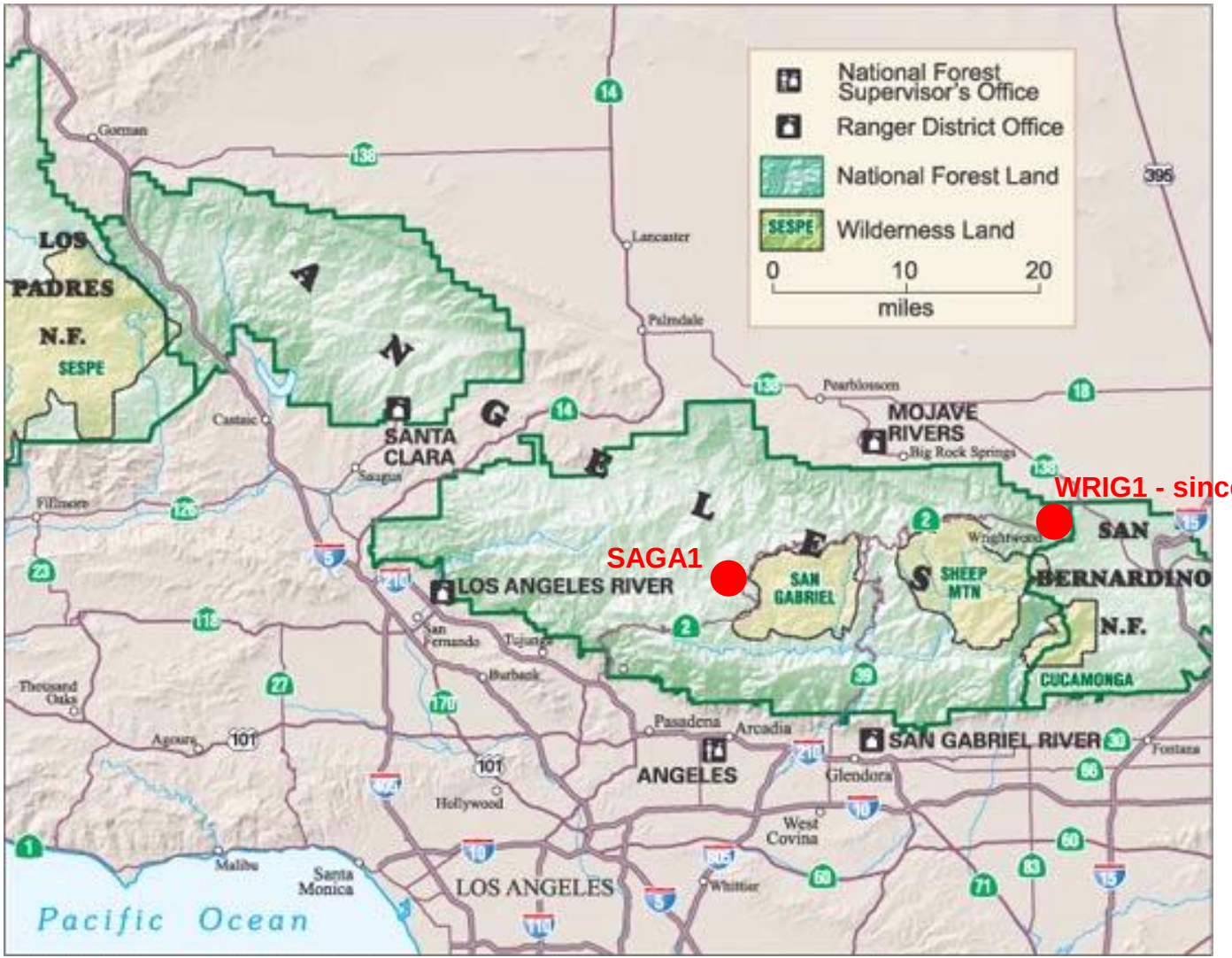

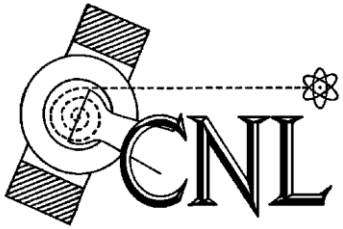

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UC DAVIS RESPONSES TO EPA FIELD AUDITS

Audit Summary for 2011

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- 28 audits conducted in 2011
  - Flowrate measurement differences exceeded 10% limit in two audits.
  - Nominal flow differed by 11% in one audit but flowrate measurement was in perfect agreement.
  - UCD responses on following slides.

Lake Sugema, IA, 10/26/11

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- D Mod flow high by 17% in audit.
- UC Davis mail audit on 11/28/11 confirmed this result (20% difference).
- Difference was due to a damaged valve. D Mod was replaced on 12/13/11.

Ike's Backbone, AZ, 10/26/11

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- B Mod nominal flow high by 11% in audit, although flow calibration showed perfect agreement.
- UC Davis check showed nominal flow within 5%, but B Mod was adjusted and recalibrated for good measure on 11/15/11.
- No repairs necessary.

Ripple Creek, CO, 10/5/11

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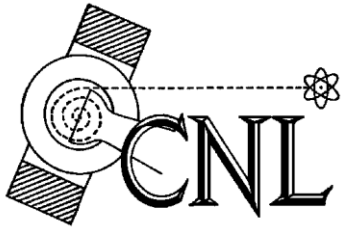
- A Mod flow high by 10% in audit.
- Site was moved to Flat Tops later in October. Final calibration check at RICR1 shutdown showed A Mod flow to agree with prior calibration (July 2011) to within 1%.
- No backdating or remedial action needed.



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UC DAVIS DATA SUBMITTAL

Data Submittal Status

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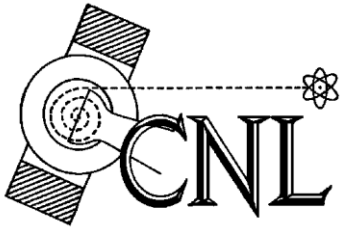
- Data have been submitted through October 2011
- November/December data will be submitted by mid-November
- We are analyzing >1 month of samples in each calendar month, expect to reach minimum lag time sometime in late 2013.



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NETWORK PERFORMANCE: CALENDAR YEAR 2011

2011 Sample Recovery (A Channel, $PM_{2.5}$ Teflon)

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- 93% Q1
- 93% Q2
- 92% Q3
- 94% Q4
- 93% Annual A Channel

  2009 was 94%, 2010 was 95%

2011 Sample Recovery (All channels, ABCD)

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- 90% Q1
- 90% Q2
- 90% Q3
- 93% Q4
- 91% Annual ABCD

  2009 was 91%, 2010 was 93%

Reasons for Sample Losses

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Of the 9% of lost samples (ABCD):

- 29% Equipment problems
- 28% Operator no-show
- 17% Power outages
- 10% Incorrect filter cassette installation
- 16% Torn or damaged filter

Regional Haze Rule Requirements

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A “complete” site has, for ABCD:

- >75% annual recovery
- >50% recovery in each quarter
- <11 consecutive missed samples

7 sites failed in 2011

(4 in ’06, 7 in ’07, 13 in ’08, 11 in ’09, 9 in ‘10)

Sites Failing RHR Requirements: Weather

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- Fort Peck, MT (Protocol)
  - Failed consecutive samples
  - Snowed in, inaccessible
- Thunder Basin, WY (Protocol)
  - Failed first quarter
  - Snowed in, inaccessible
  - Also failed in ‘08 (snow), ‘09 (operator problems), ‘10 (operator & controller problems)
- Gila Cliff Dwellings, NM (IMPROVE)
  - Failed annual criterion
  - 4 separate lightning strikes, also Miller Fire

Sites Failing RHR Requirements: Missed Sample Changes

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- Lostwood, ND (IMPROVE)
  - Failed second quarter
  - Lost primary operator, then new operator missed many samples and installed others incorrectly
- Sierra Ancha, AZ (IMPROVE)
  - Failed annual criterion
  - Fire fighting duties and insufficient backup operators
- Remedy for missed sample changes
  - Discuss problem with operator and/or supervisor. Both of these sites have improved their site visitation in 2012.

Sites Failing RHR Requirements: Equipment Problems

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- Gates of the Mountains, MT (IMPROVE)
  - Failed first quarter and consecutive criteria
  - Controller damaged on first sample of box. 3 weeks of urban-schedule sampling (30 min/hr); operator was unaware
  - Also failed in 2010 due to missed samples and lightning
- Zion Canyon, UT (IMPROVE)
  - Failed fourth quarter and annual criteria
  - Controller & pump problems, compounded by lack of operator communication. Power outages throughout the year.
  - Also failed in 2010 due to late notification of problems.
  - Operator has been instructed to report problems promptly.

Additional 2012 RHR Failures due to PM-10 Module Anodizing Dust

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- Columbia Gorge, WA (Protocol)
- Douglas, AZ (Protocol)
- Meadview, AZ (Protocol)
- North Absaroka, WY (IMPROVE)
- Salt Creek, NM (IMPROVE)
- White Mountain, NM (IMPROVE)

Anodizing dust was observed on some PM-10 filters

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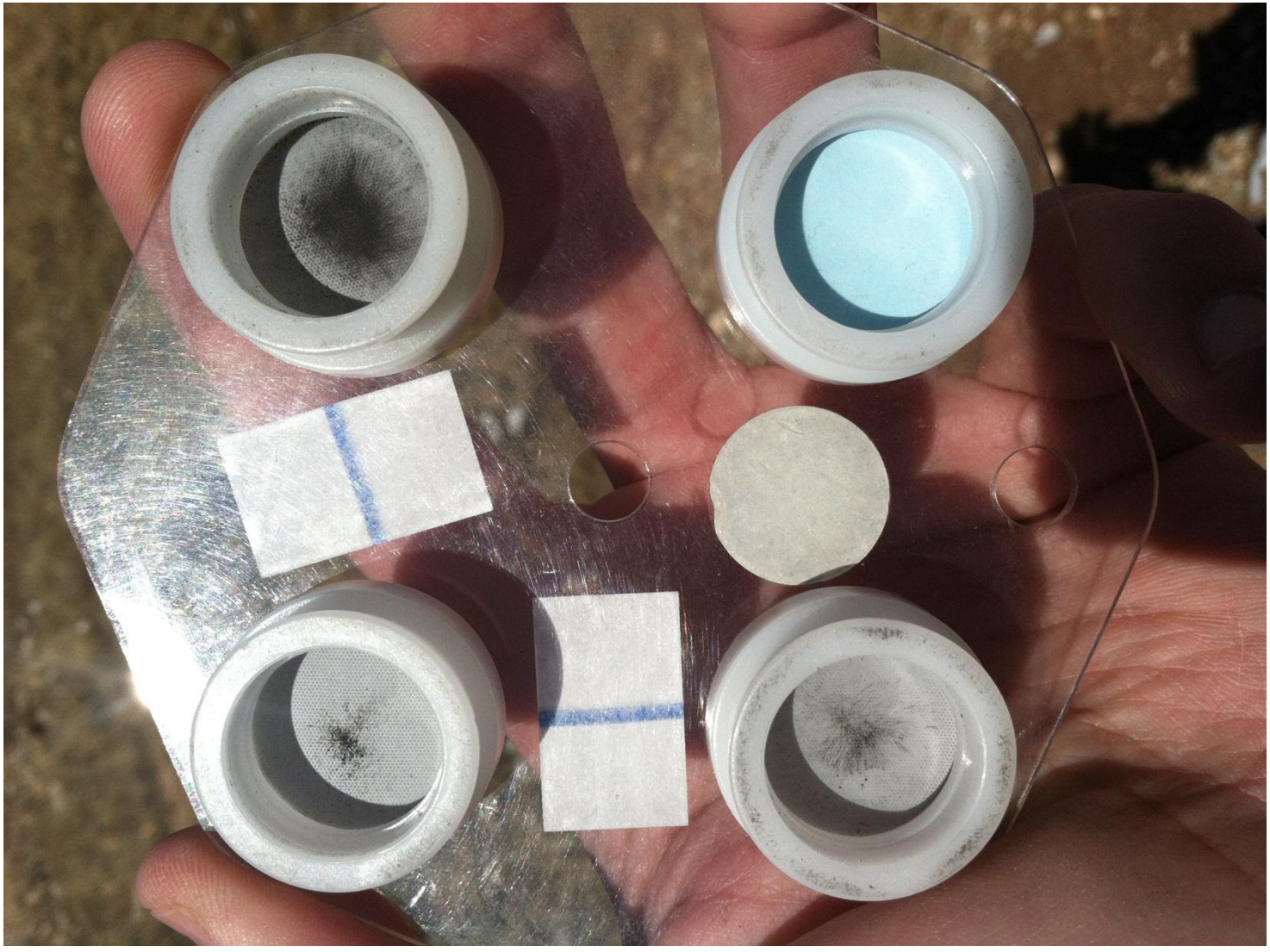

Sites with observed anodizing dust

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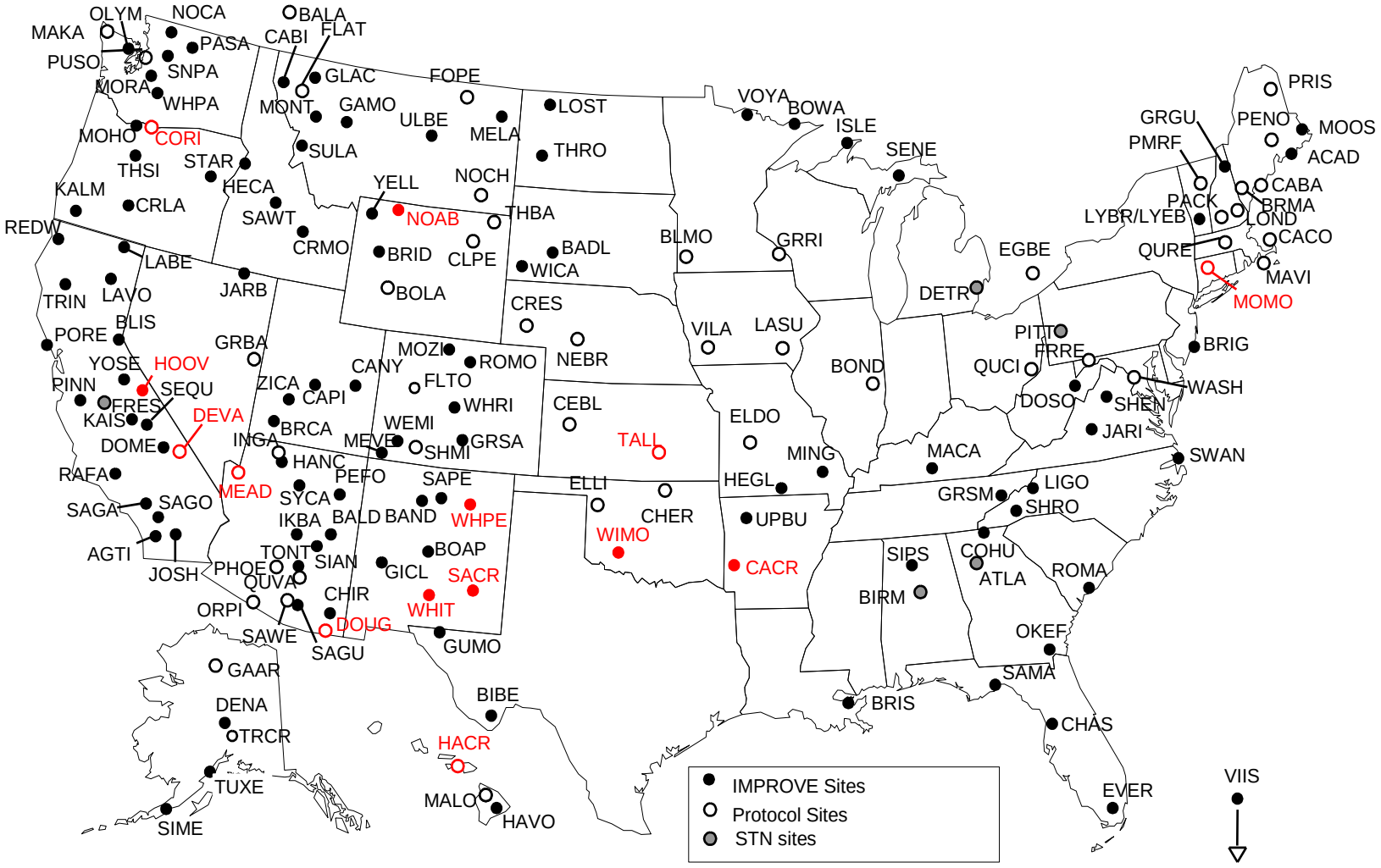

Anodizing Dust

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- Observed at 14 sites
- First noted in April 2012, apparently began in 2011
- Dust is due to abrasion of the PM-10 stack
- Remedy:
  - Install tripods to stabilize stacks and avoid twisting in wind.
  - Add an o-ring to avoid metal-to-metal contact.
  - Label stacks to be installed at proper height, to avoid metal-to-metal contact at base of stack.
  - Inspect every PM-10 sample in 2011 and 2012. Flag or invalidate data from affected samplers.

Tripod stabilizes the stack

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O-ring avoids metal-to metal contact

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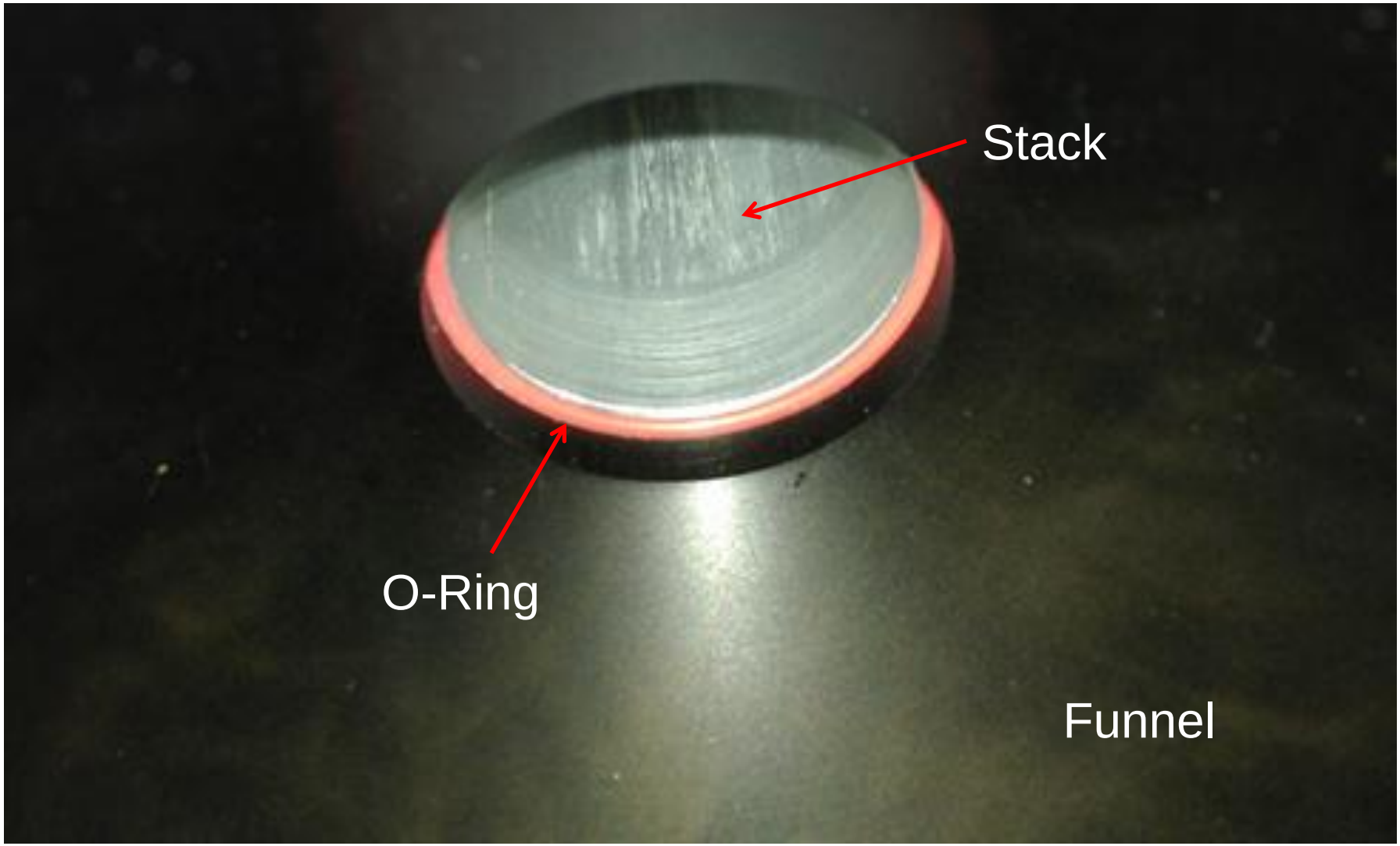

New label indicates proper stack positioning

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