IMPROVE
Particle Monitoring Network:
Status Report to
IMPROVE Steering Committee
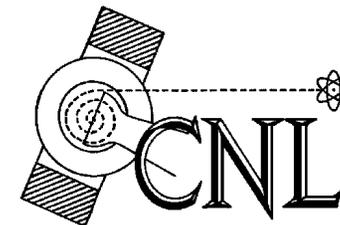
Chuck McDade

Crocker Nuclear Laboratory

University of California, Davis
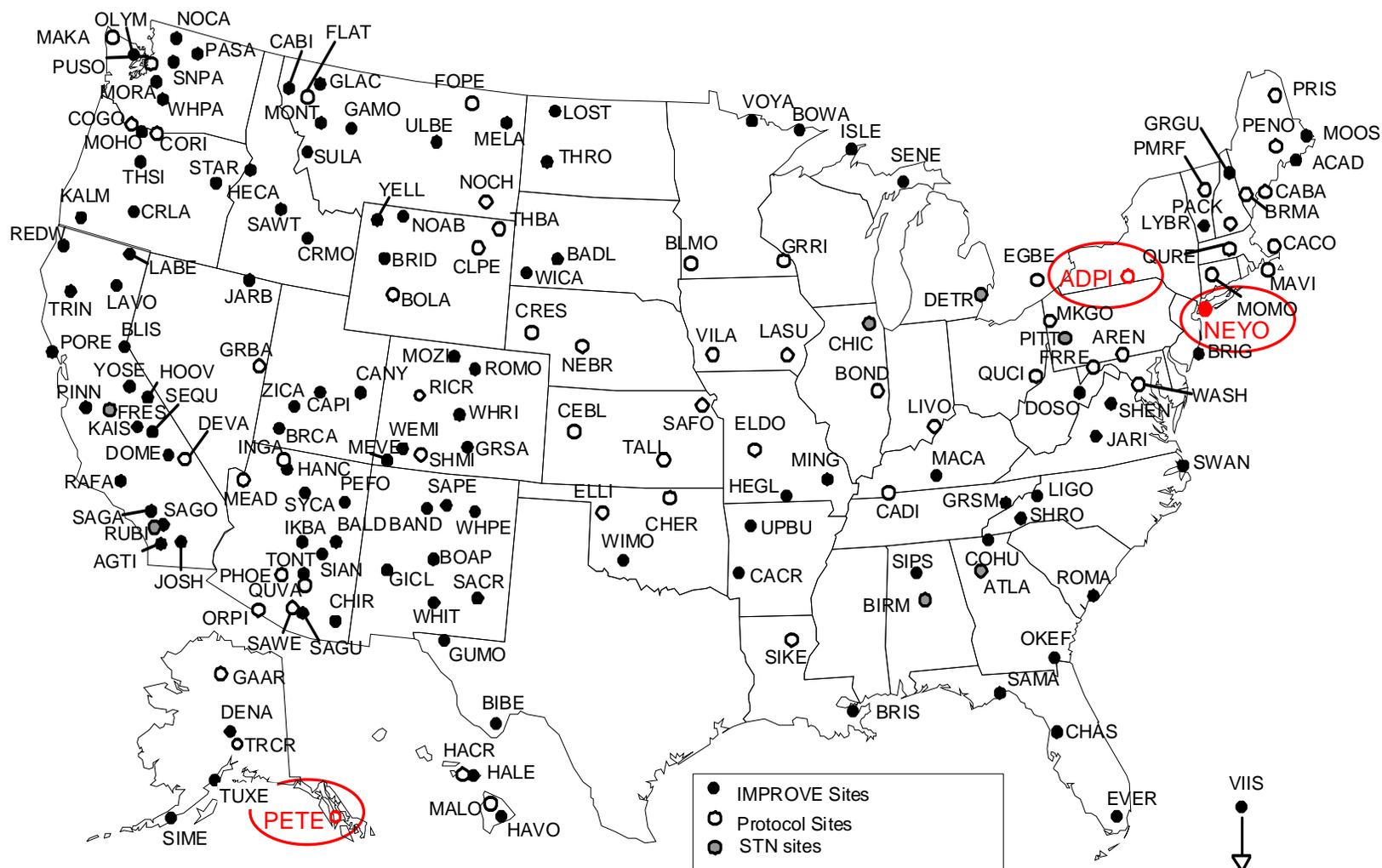
Stevenson, Washington

October 2010

CROCKER NUCLEAR LABORATORY
University of California, Davis

IMPROVE Network
Fall 2010

CROCKER NUCLEAR LABORATORY
University of California, Davis

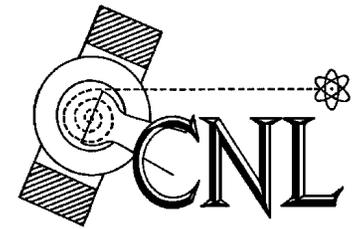# IMPROVE Network Urban Sites, 2010

CROCKER NUCLEAR LABORATORY
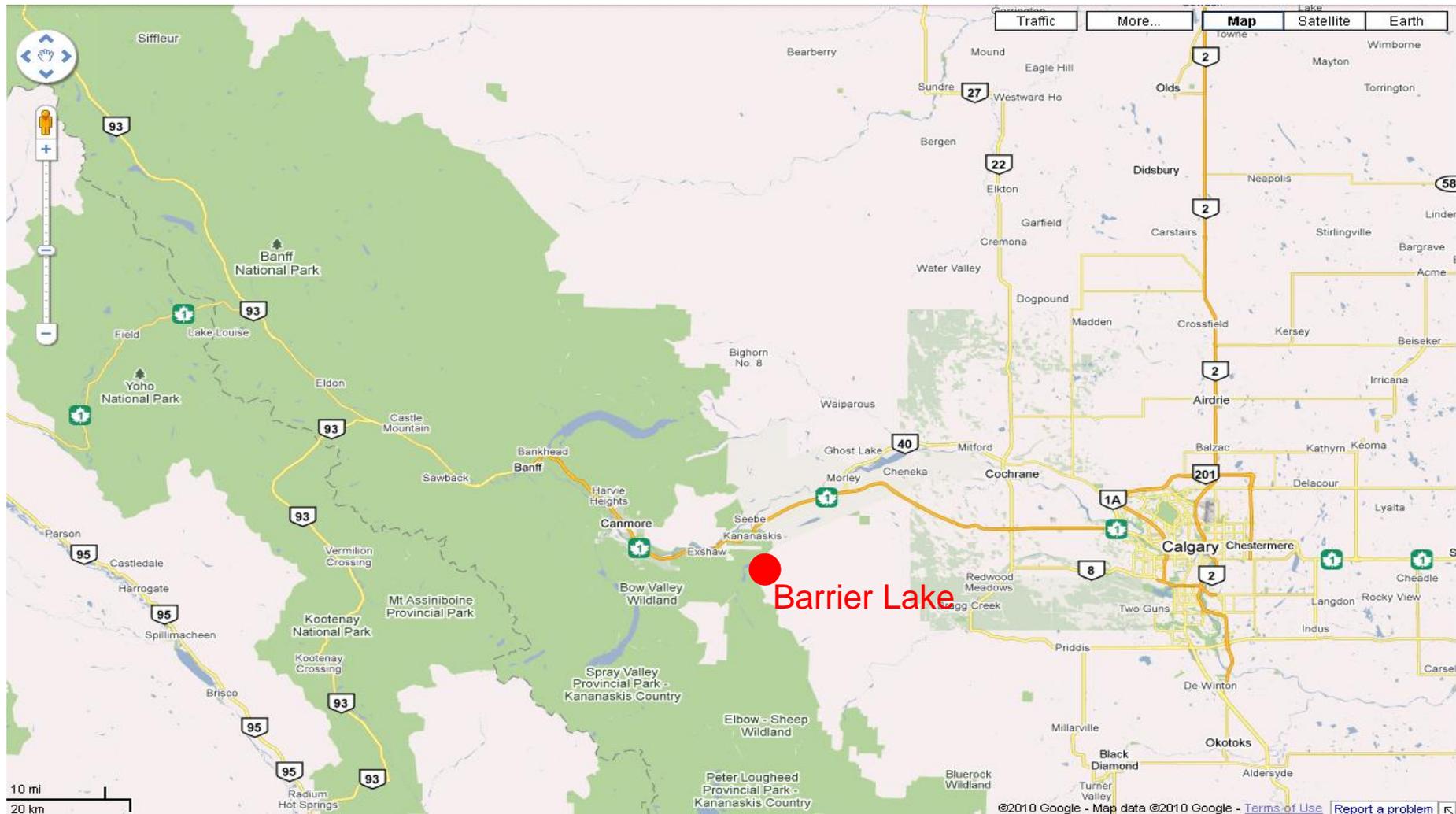University of California, Davis
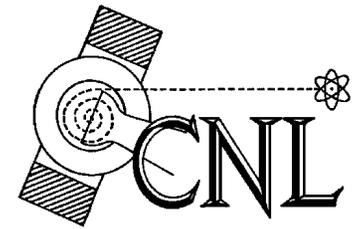
New Site at Barrier Lake Near Banff, Alberta

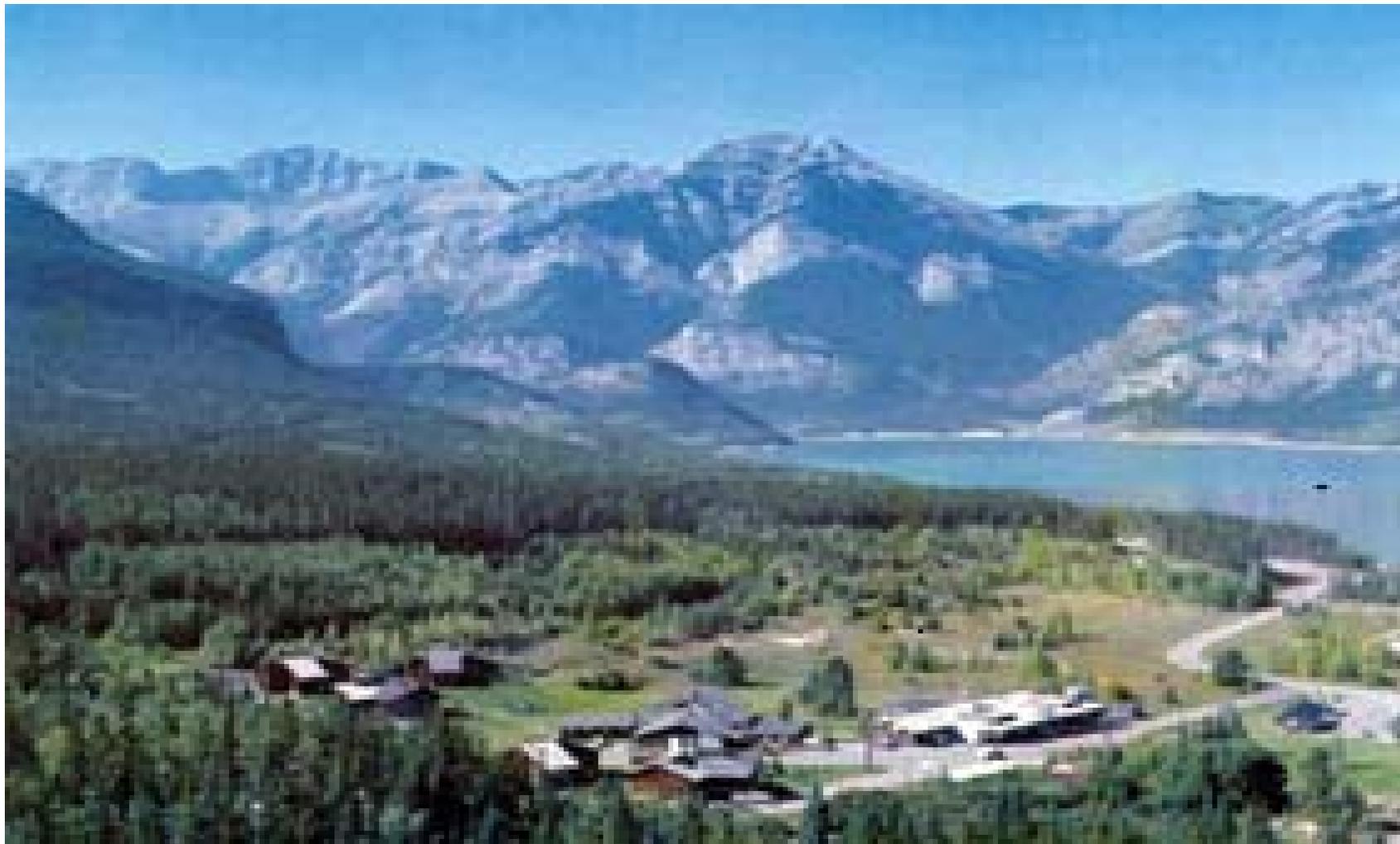CROCKER NUCLEAR LABORATORY
University of California, Davis
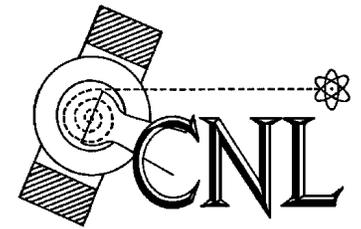
Barrier Lake Station
University of Calgary

Barrier Lake Webcam
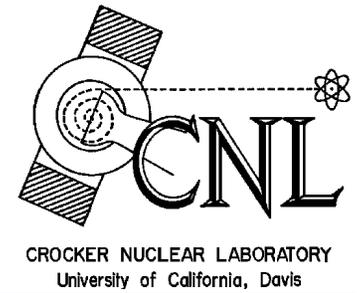# Available Online

Barrier Lake Station Wed Sep 22 2010

Londonderry, NH
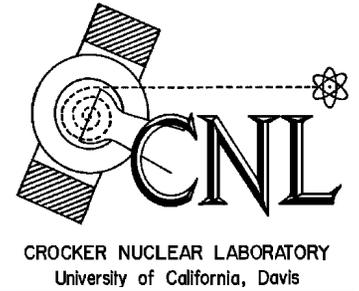
- Southern New Hampshire, near Manchester
- NCore site, collocated with other measurements
- To be operational before January 1, 2011

NETWORK PERFORMANCE:
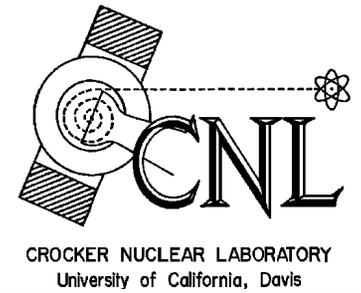# CALENDAR YEAR 2009

2009 Sample Recovery (A Channel, PM$_{2.5}$ Teflon)
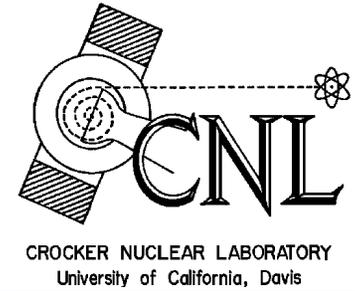
- 94%   Q1
- 94%   Q2
- 94%   Q3
- 94%   Q4
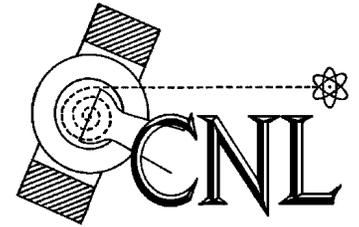- 94%   Annual A Channel

  2008 was 93%

2009 Sample Recovery (All channels, ABCD)

- 90%   Q1
- 91%   Q2
- 90%   Q3
- 92%   Q4
- 91%   Annual ABCD

2008 was 90%

Reasons for Sample Losses

Of the 9% of lost samples (ABCD):

- 40%   Equipment problems
- 21%   Operator no-show
- 20%   Power outages
- 12%   Incorrect filter cassette installation
- 7%   Torn or damaged filter

Regional Haze Rule Requirements
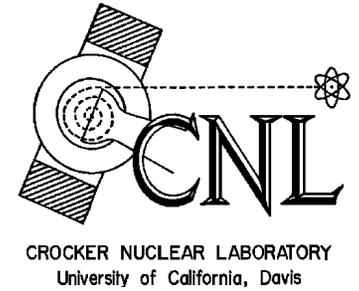
A "complete" site has, for ABCD:

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

11 sites failed in 2009

(5 in '04, 6 in '05, 4 in '06, 7 in '07, 13 in '08)

Sites Failing RHR Requirements: Maintenance Error

- Grand Canyon (Hance), AZ (IMPROVE)
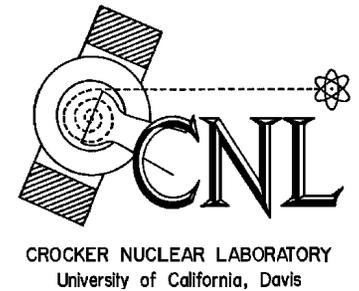- Linville Gorge, NC (IMPROVE)
- Mohawk Mountain, CT (Protocol)
  - Failed annual, quarter, & consecutive criteria
  - PM-10 stack not properly replaced at 2008 maintenance
  - Discovered in data review by MF>MT

- Remedy for maintenance error
  - Checklist before leaving site
  - Electrical tape to secure stack after maintenance
 - Photos of each module

Sites Failing RHR Requirements: Weather
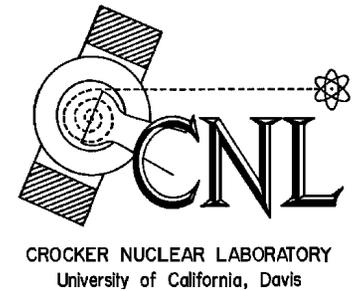
- **Gates of the Arctic, AK (Protocol)**
  - Failed quarter & consecutive criteria
  - Power & equipment failures due to severe winter weather
  - Park electrician repaired breakers
  - Pumps moved inside shelter
  - 2010 Winter was OK

- **North Absaroka, WY (IMPROVE)**
  - Failed consecutive criterion
 - Repeated lightning strikes, including one just after repair trip

Sites Failing RHR Requirements: Power Outages
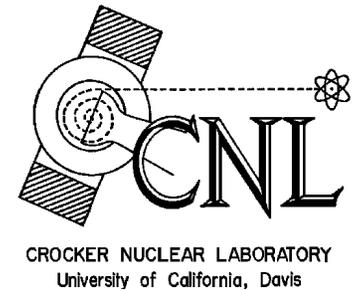
- **Glacier, MT (IMPROVE)**
  - Failed consecutive criterion
  - Faulty electrical wiring. Park electrician repaired it.

- **Indian Gardens, AZ (Protocol)**
  - Failed quarter & consecutive criteria
  - Faulty electrical breaker. Park electrician repaired it.

- **Meadview, AZ (Protocol)**
  - Failed annual, quarter, and consecutive criteria
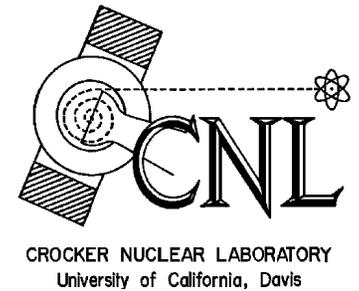 - Power outages in entire area of Meadview

# Sites Failing RHR Requirements: Operator Problems
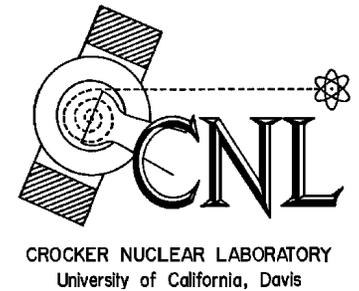
- **Thunder Basin, WY (Protocol)**
  - Failed annual criterion
  - Recurring problems with missed samples and with equipment problems not reported promptly
  - Working with ARS to resolve

Sites Failing RHR Requirements: Repair Error

- ## Hell's Canyon, OR (IMPROVE)
  - Failed annual, quarter, & consecutive criteria
  - Pump replaced but did not solve problems
  - Had to replace pump a second time

- ## Makah, WA (Protocol)
  - Failed consecutive criterion
  - Problem initially misdiagnosed as pump failure
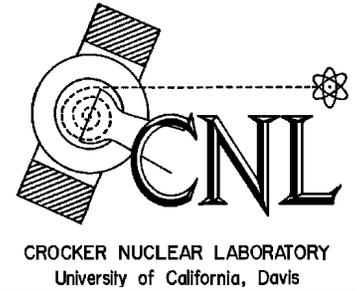 - Actually required controller replacement
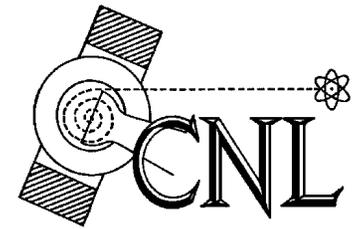
DATA MANAGEMENT AND DELIVERY

Data Delivery

- Data to be submitted soon through December 2009

- This period represents the second 5-year block of RHR data

- IMPROVE data are now delivered to EPA's Air Quality System (AQS) database