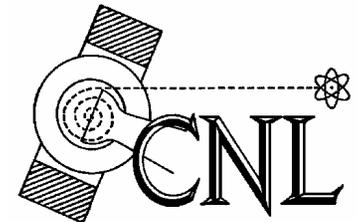


IMPROVE

Particle Monitoring Network: Status Report to IMPROVE Steering Committee

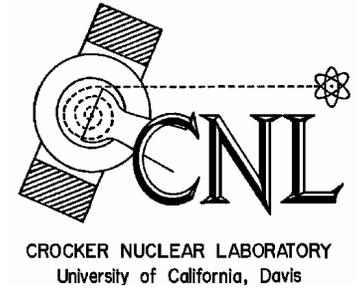
Chuck McDade & Lowell Ashbaugh
Crocker Nuclear Laboratory
University of California, Davis
Acadia National Park, July 2005



CROCKER NUCLEAR LABORATORY
University of California, Davis



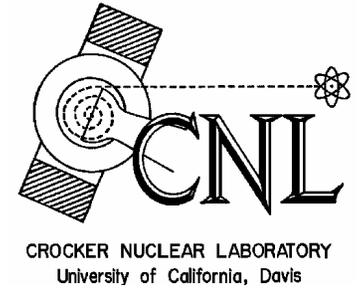
2004 Sample Recovery (A Channel, PM_{2.5} Teflon)



- 95% Q1
- 95% Q2
- 96% Q3
- 96% Q4
- 96% Annual A Channel (2003 was 95%)



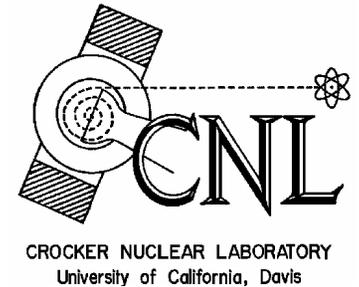
2004 Sample Recovery (All channels, ABCD)



- 93% Q1
- 94% Q2
- 94% Q3
- 95% Q4
- 94% Annual ABCD (2003 was 93%)



Reasons for Sample Losses

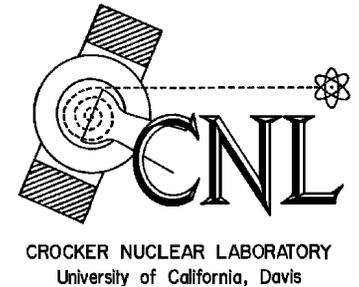


Of the 6% of lost samples (ABCD):

- 25% Equipment problems
- 27% Operator no-show
- 18% Incorrect filter cassette installation
- 23% Power outages
- 6% Torn or damaged filter
- 1% Clogged filter



Regional Haze Rule Requirements



A “complete” site has, for ABCD:

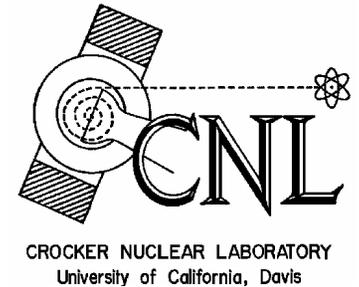
- >75% annual recovery
- >50% recovery in each quarter
- <11 consecutive missed samples

5 sites failed in 2004 (8 in 2003)

- Four failed due to consecutive missed samples
- INGA failed year (73%) due to multiple POs
- Only 1 site (INGA) repeated from 2003



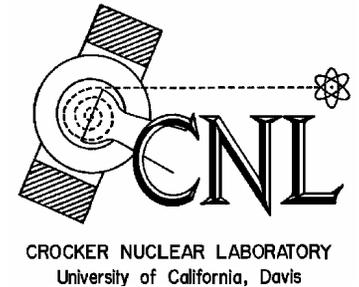
Sites Failing Regional Haze Rule Requirements



- Breton, LA (IMPROVE)
 - Sampler destroyed and power lost due to hurricane
- North Cascades, WA (IMPROVE)
 - Access road blocked by landslide
- Indian Gardens, AZ (Protocol)
 - Ongoing power problems due to location
 - NPS replaced circuit breaker in March 2005



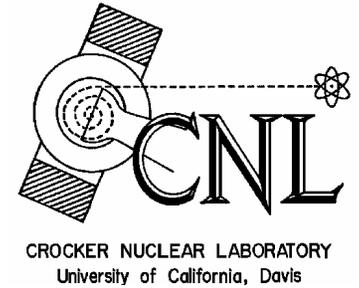
Sites Failing Regional Haze Rule Requirements



- Bliss, CA (IMPROVE)
 - Faulty pump & controller (consecutive problems)
 - Complicated by poor site access during winter
- Addison Pinnacle, NY (Protocol)
 - D Module pump failure
 - First instance of new replacement bearing with viscous grease
 - New bearings discontinued thereafter



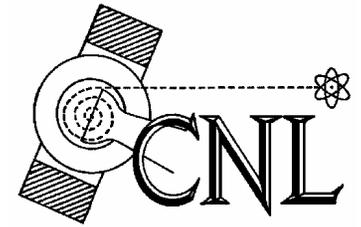
Sites That May Fail Regional Haze Rule Requirements



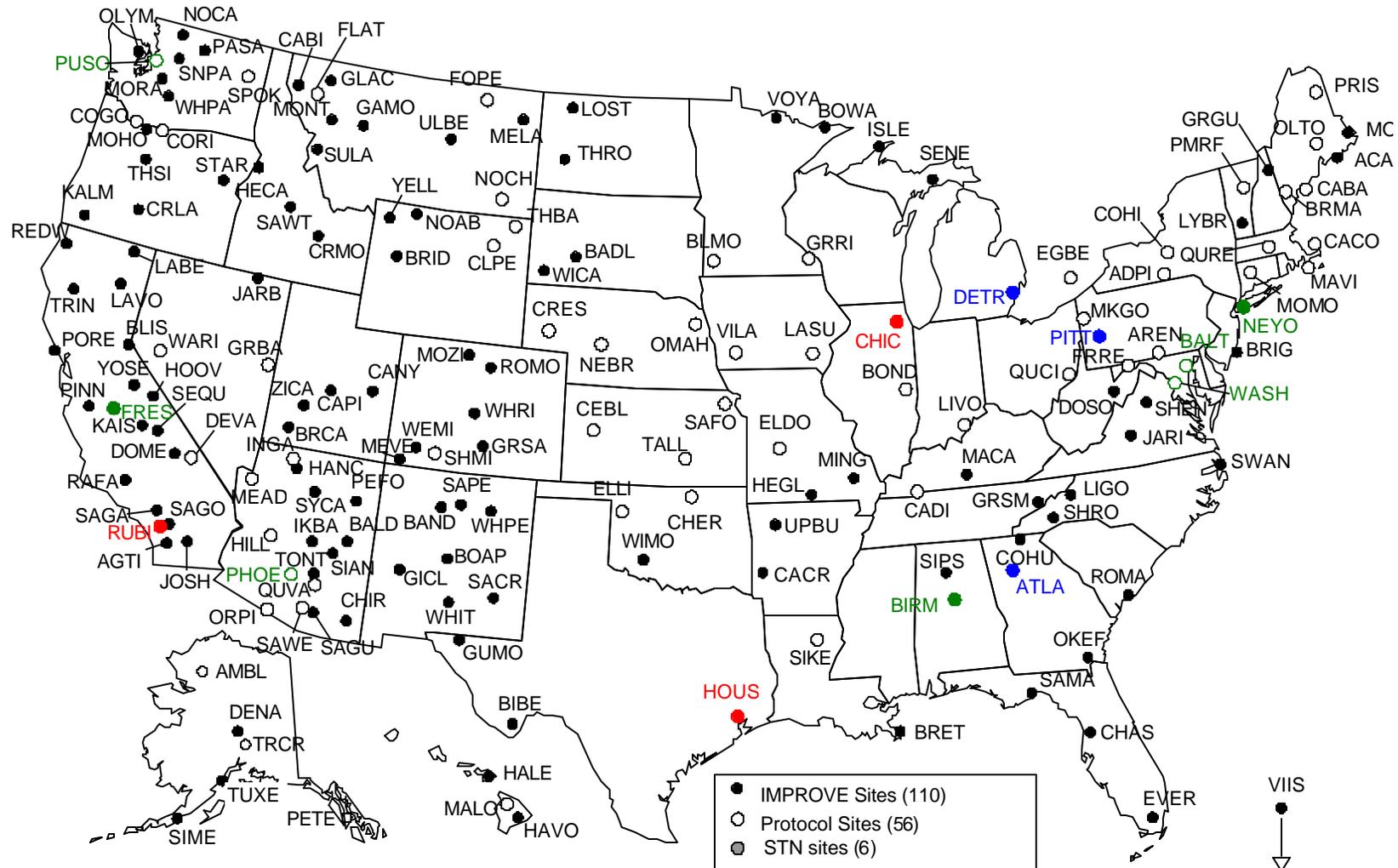
- Clogged inlets; to be resolved following data analysis
 - Chassahowitzka, FL (IMPROVE)
 - Mingo, MO (IMPROVE)
 - Swanquarter, NC (IMPROVE)



IMPROVE Network Urban Sites

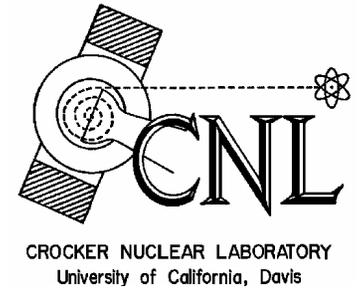


CROCKER NUCLEAR LABORATORY
University of California, Davis





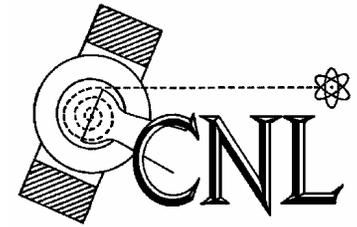
Site Relocation



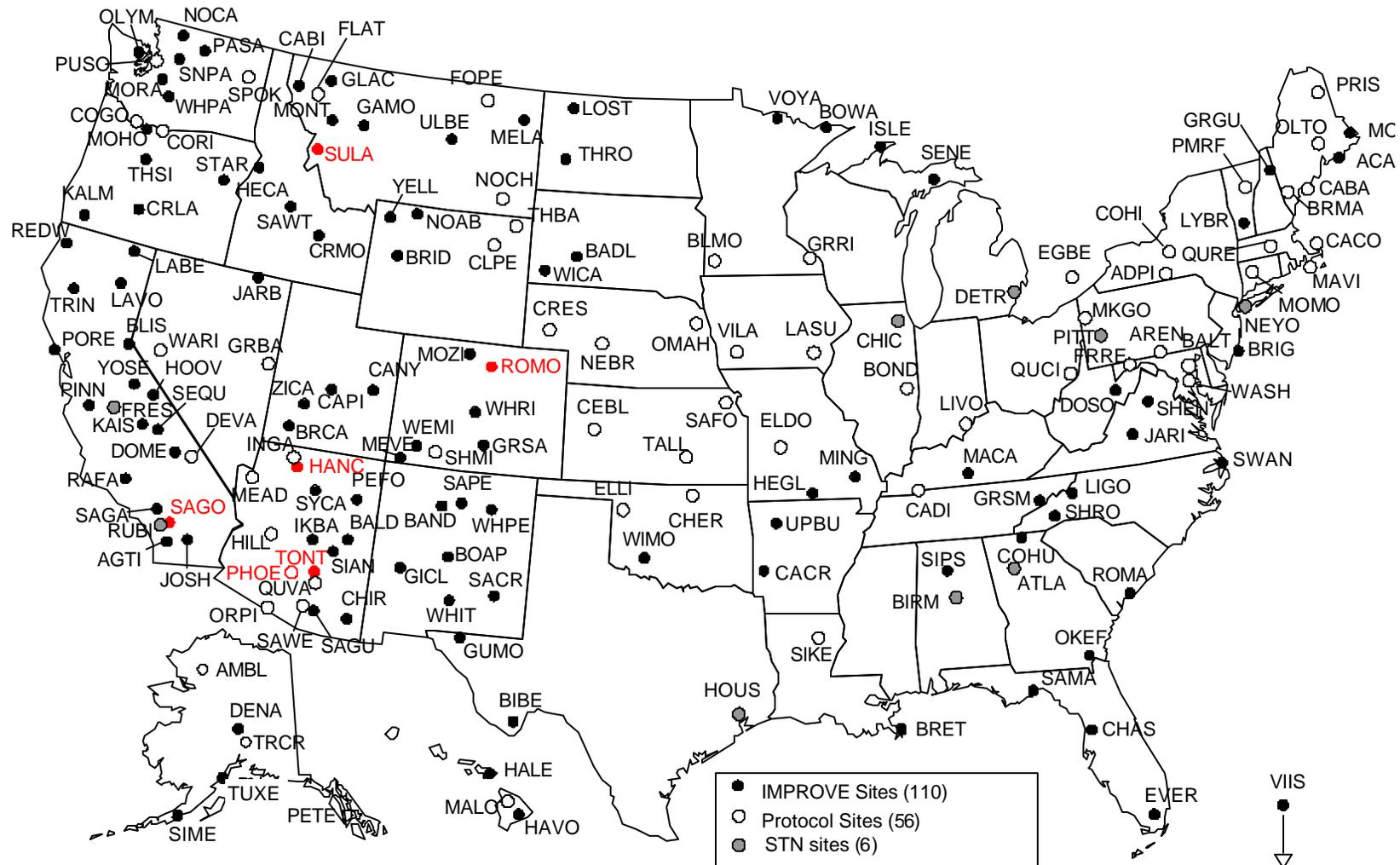
- Lake Sugema, IA, November 2004
- Site lease issue, moved approx. 1 mile



IMPROVE Network 2005 Carbon-14 Hivol Sites

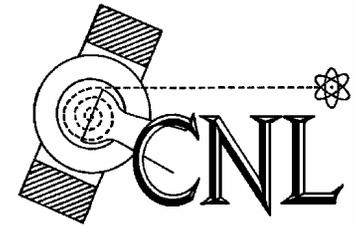


CROCKER NUCLEAR LABORATORY
University of California, Davis

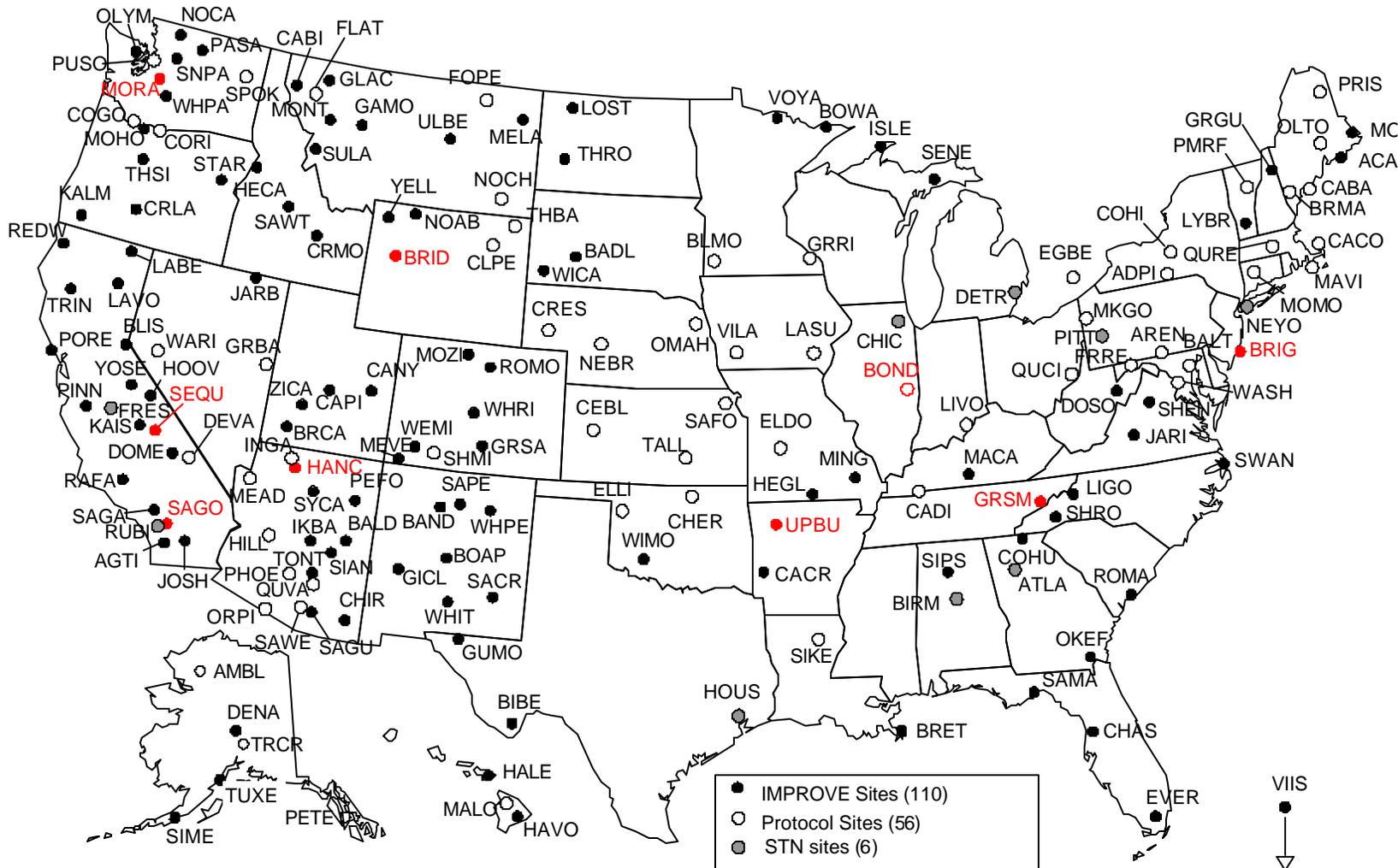




IMPROVE Network PM-10 Speciation Sites

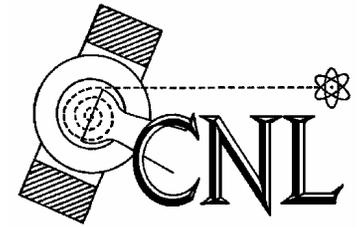


CROCKER NUCLEAR LABORATORY
University of California, Davis





San Geronio PM-10 Speciation Site

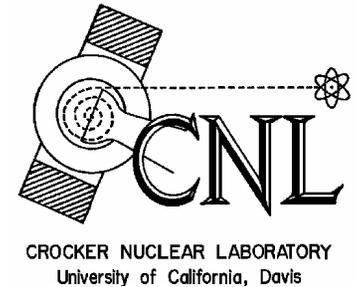


CROCKER NUCLEAR LABORATORY
University of California, Davis





New relational database at UC Davis

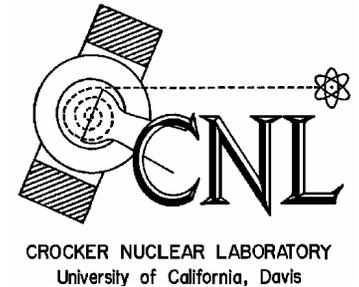


- Some Advantages

- Tracking and documentation of all changes to the data and software
- Standard approach, transferable to others
- Secure files, protected from unauthorized users
- Compatibility with CIRA
- Standardization of comments (e.g., pull-down menus)
- Readily accessible sorting and relational analysis
- Ready access to multi-year or other combinations of data



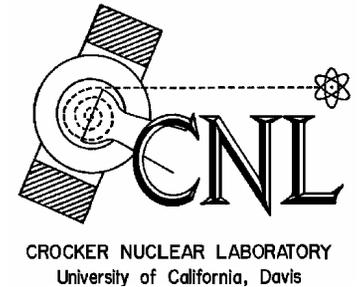
Data status and schedule



- Expected delivery schedule
 - Data completed through August 2004
 - C04 (Sept., Oct., Nov. 2004) data by August 10
 - Laser absorption will be delayed due to laser failure
 - December 2004 data by August 31
 - Laser absorption will be delayed due to laser failure



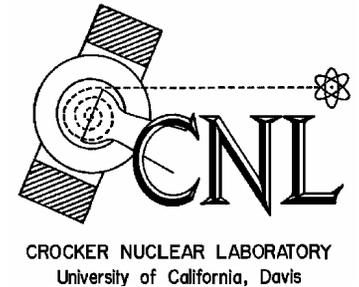
Data Resubmittal, 2000-2004



- Long-term items to be resubmitted
 - New flow validation flags
 - Recalculate flows based on standard temperature
- Specific items to be resubmitted (examples)
 - Samples reanalyzed to verify unusual concentrations
 - Swapped filters identified after submittal
 - Flow calibrations to be backdated if necessary



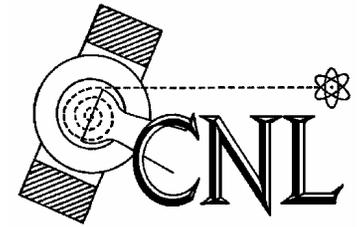
Flow calculation based on standard temperature



- The problem
 - SOP calls for flows referenced to STP (293°K)
 - Actual calculation was referenced to temperature at annual calibration (ranged from 264 to 315°K) until 1/1/04
 - Cold calibration gives high flow (SQRT of °K ratio)
- Ramifications
 - Affects flows through December 2003
 - Single bias for entire year between calibrations
 - Flow bias up to about 5%, but usually <2%



Flow bias due to calibration temperature



CROCKER NUCLEAR LABORATORY
University of California, Davis

Probability plot of day-weighted bias in flow measurement
from using calibration temperature in flow calculation

