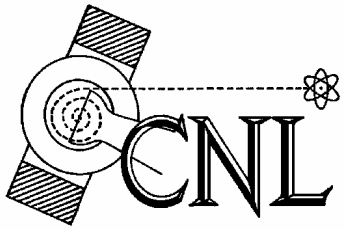
IMPROVE
Particle Monitoring Network: Methods Evaluation

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



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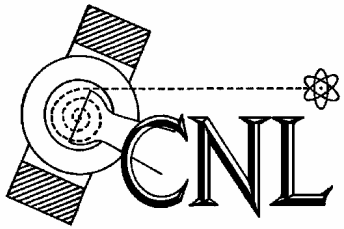

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INLET CLOGGING

Problem

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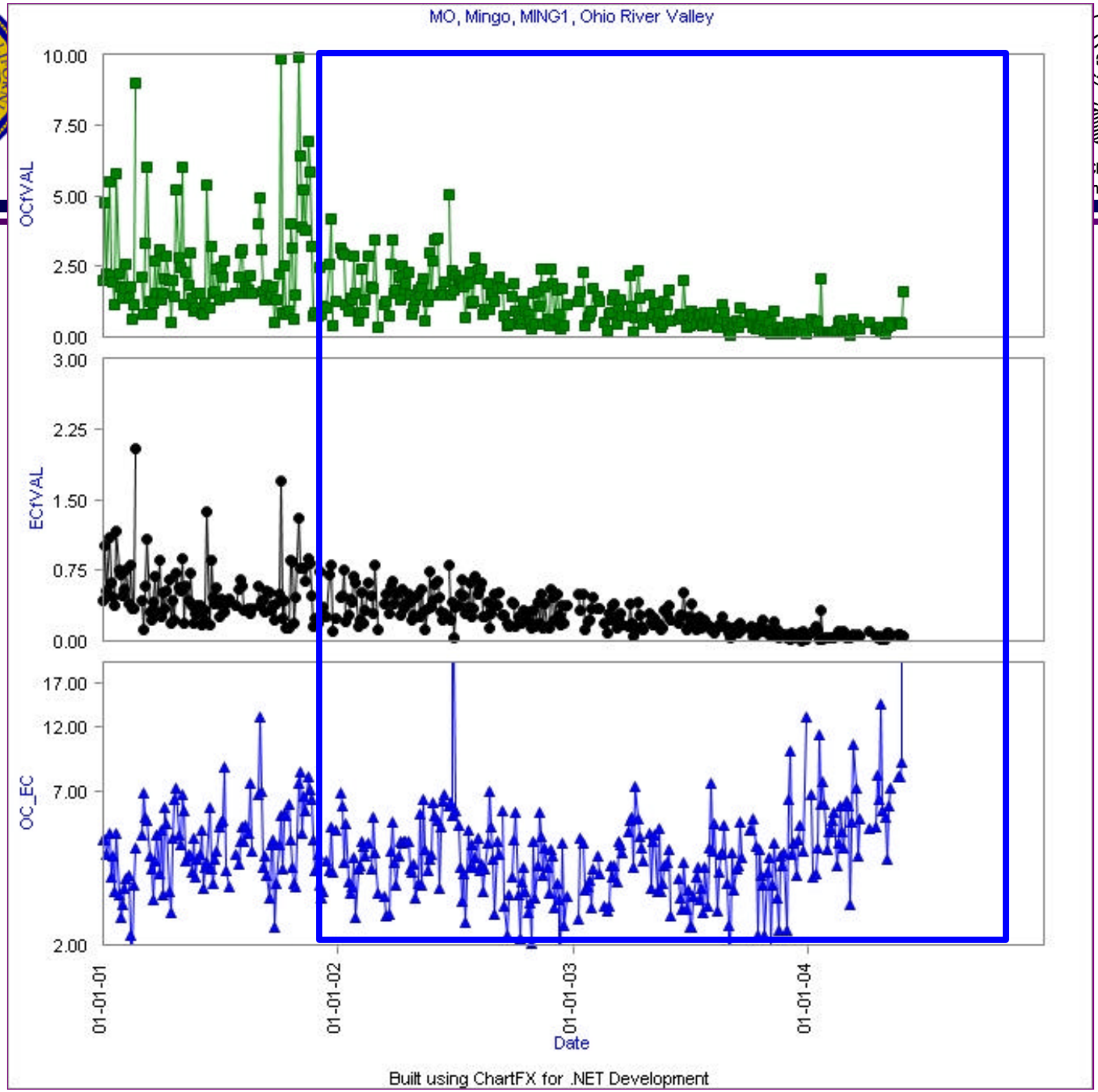
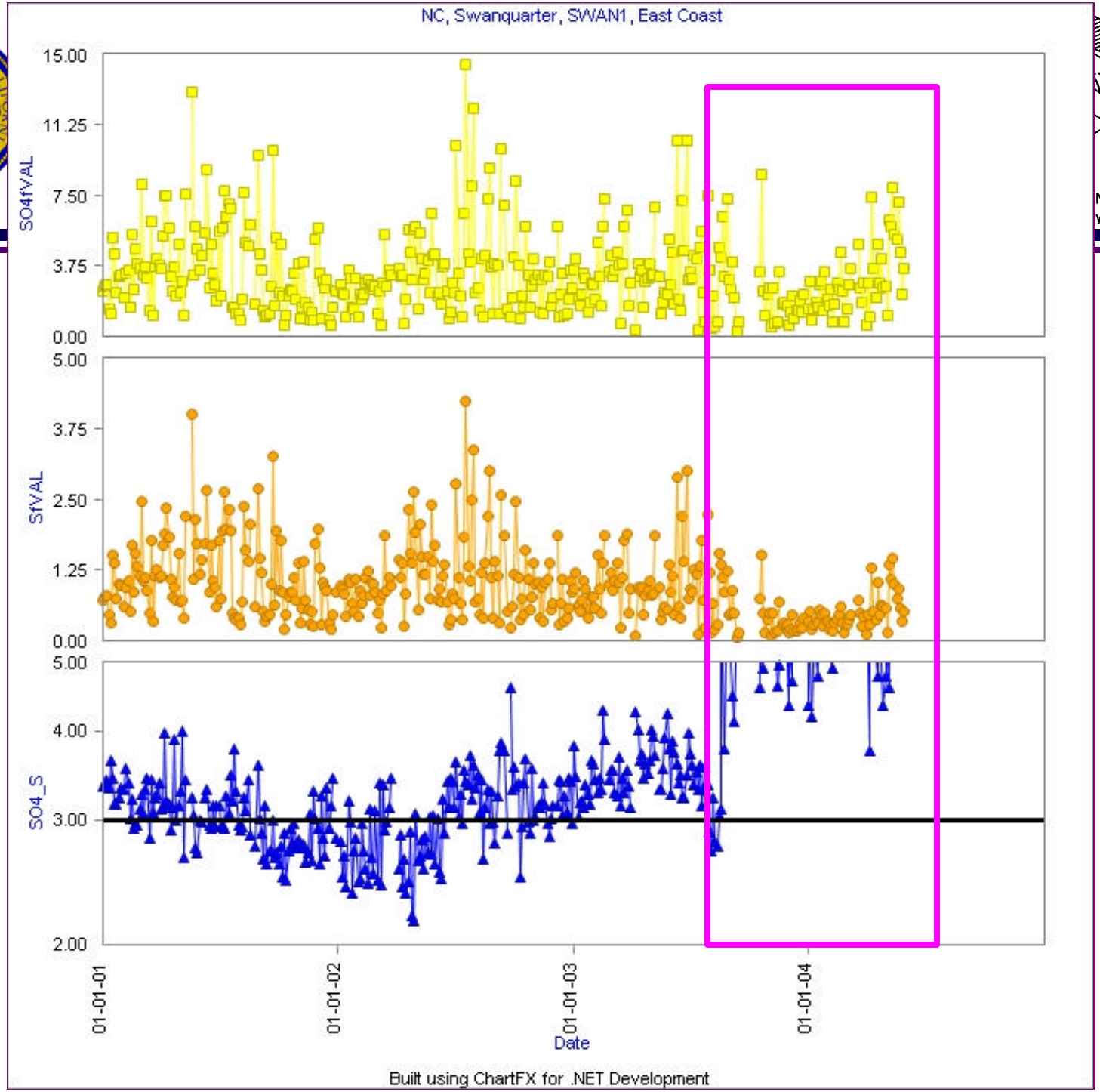
- OC and EC concentrations were slowly declining at Mingo, MO
- Sulfate to Sulfur ratio (modB/modA) jumped very high at Swanquarter, NC
- Flowrates did not change at these sites


MO, Mingo, MING1, Ohio River Valley
OCfVAL
10.00
7.50
5.00
2.50
0.00
ECfVAL
3.00
2.25
1.50
0.75
0.00
OC_EC
17.00
12.00
7.00
2.00
01-01-01
01-01-02
01-01-03
01-01-04
Date
Built using ChartFX for .NET Development


NC, Swanquarter, SWAN1, East Coast
SO4fVAL
15.00
11.25
7.50
3.75
0.00
SfVAL
5.00
3.75
2.50
1.25
0.00
SO4_S
5.00
4.00
3.00
2.00
01-01-01
01-01-02
01-01-03
01-01-04
Date
Built using ChartFX for .NET Development

SWAN A module inlet

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Mass Concentrations

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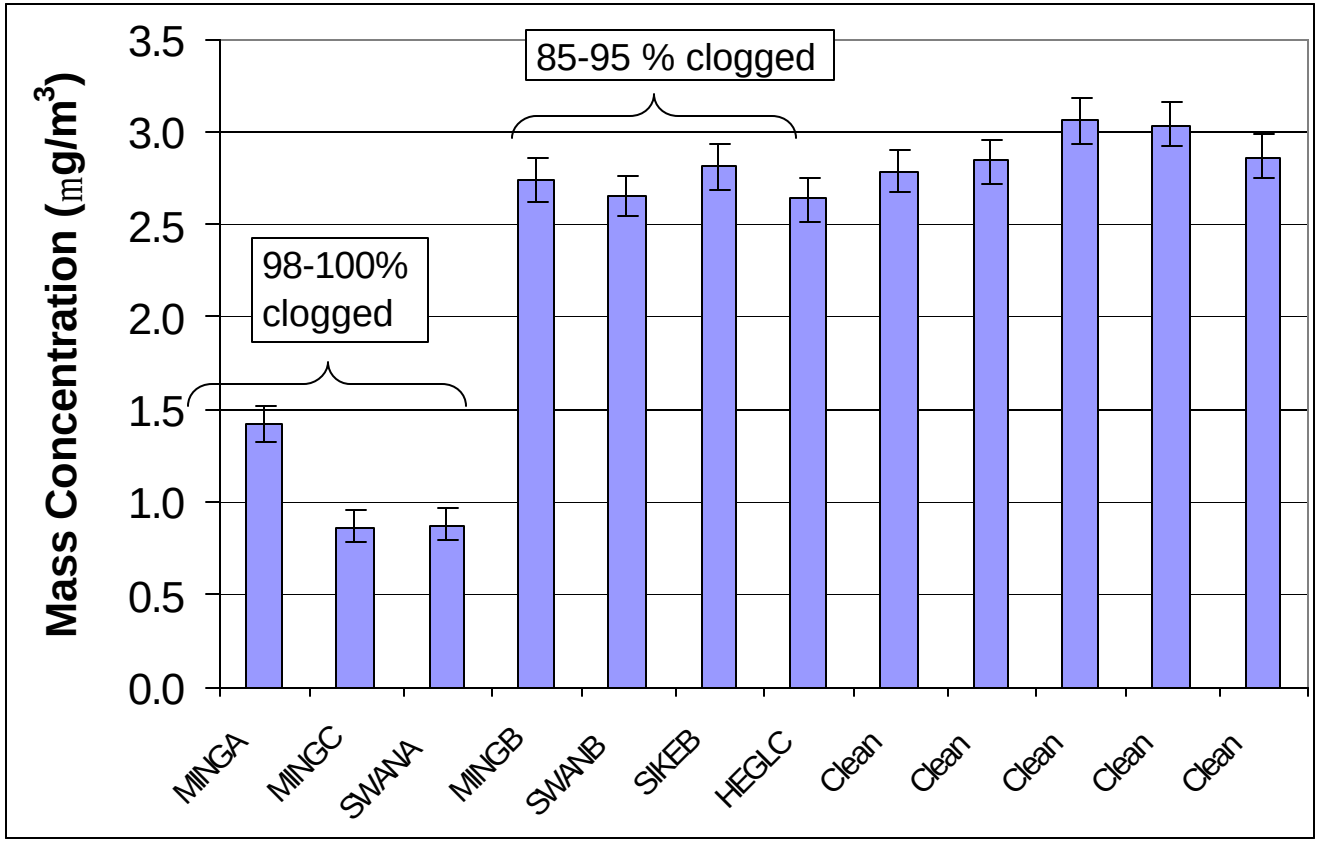

Percent Difference from Average Clean Sample

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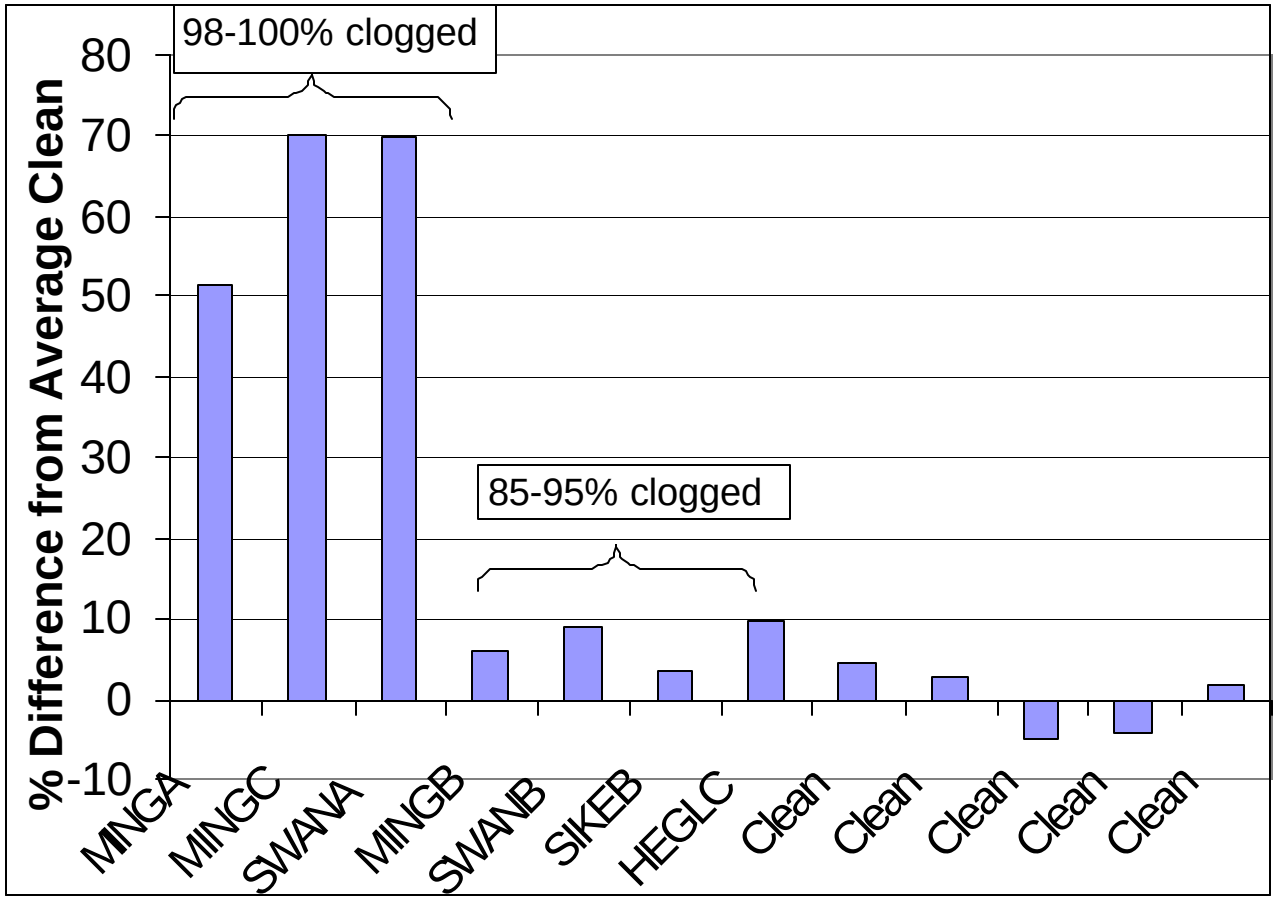

New Inlets

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Outcomes

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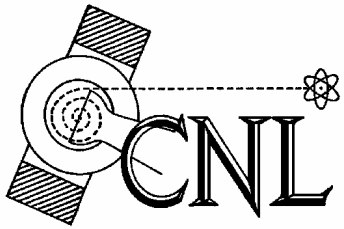
- New inlets provide comparable concentrations
- Flowrates not affected by clogs
  - No data diagnostic available until lab results are returned
  - Currently educating operators to examine inlets and to clean dirty inlets as needed



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CASSETTE REDESIGN

Cassette Types

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A & X Module Flowrates, Mesa Verde

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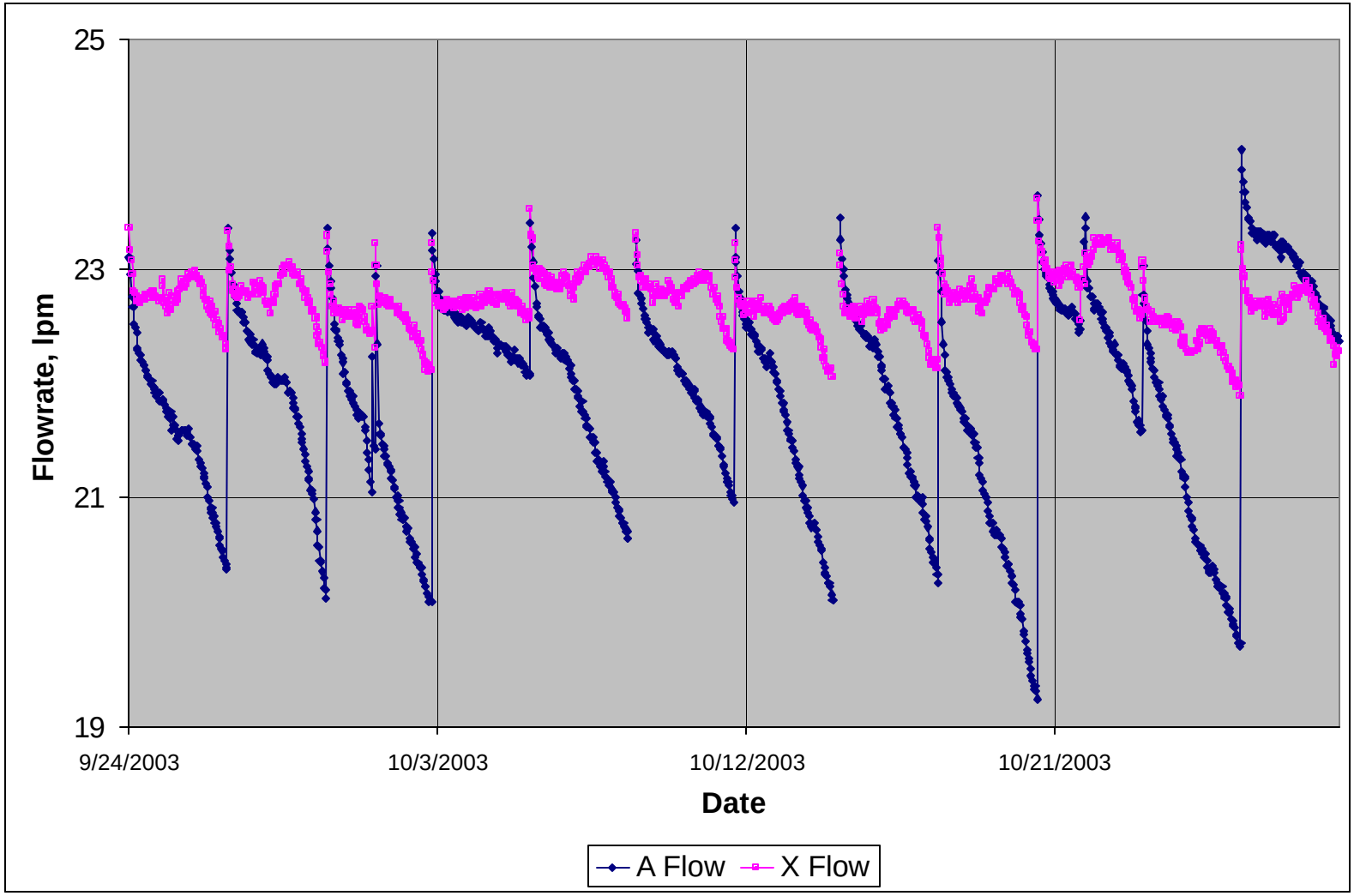

A & X Module Cutpoints, Mesa Verde

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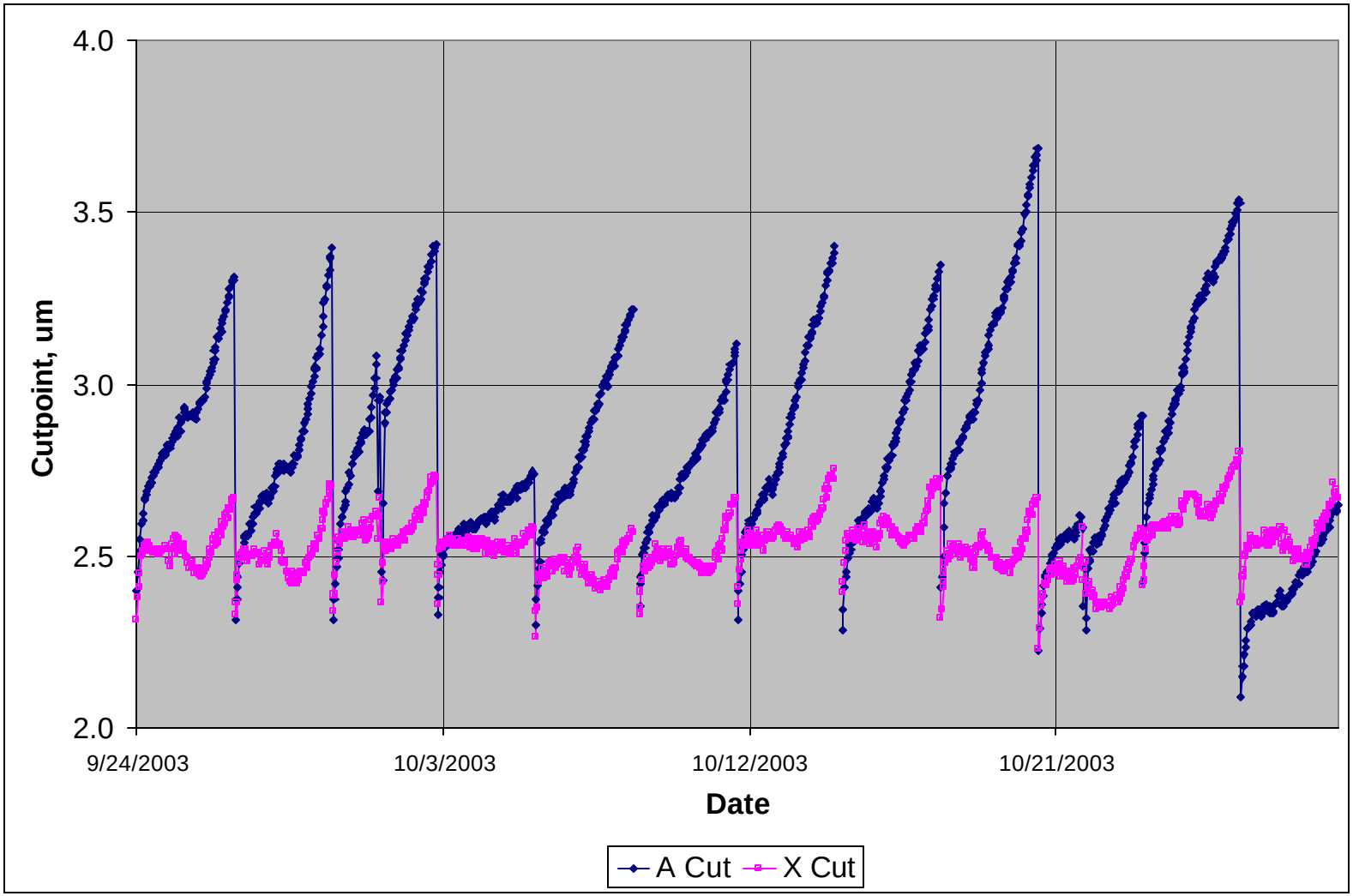

Cassette & Filter Characteristics

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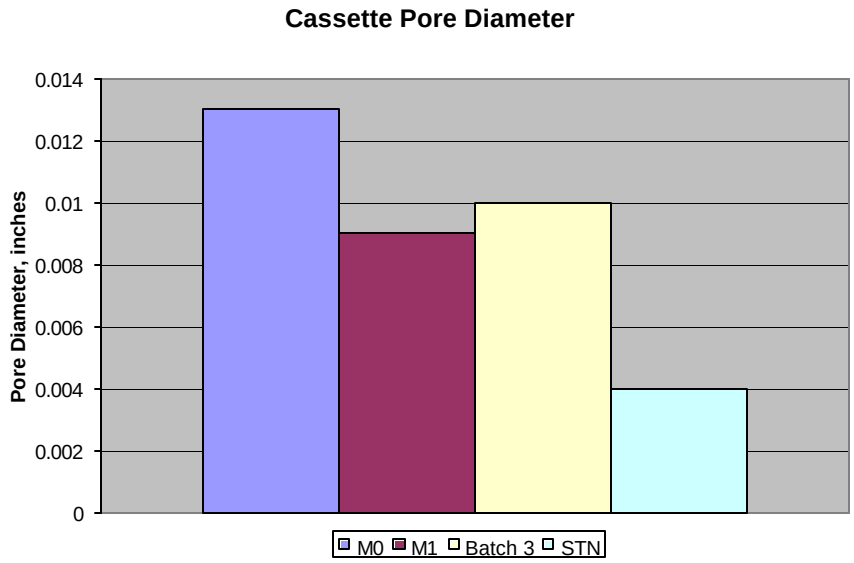

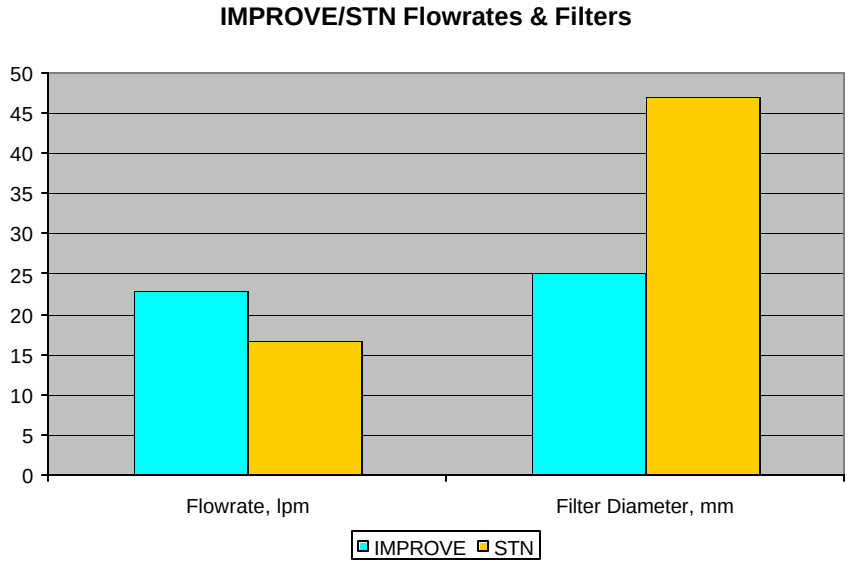

Deposit Area & Effective Pore Area

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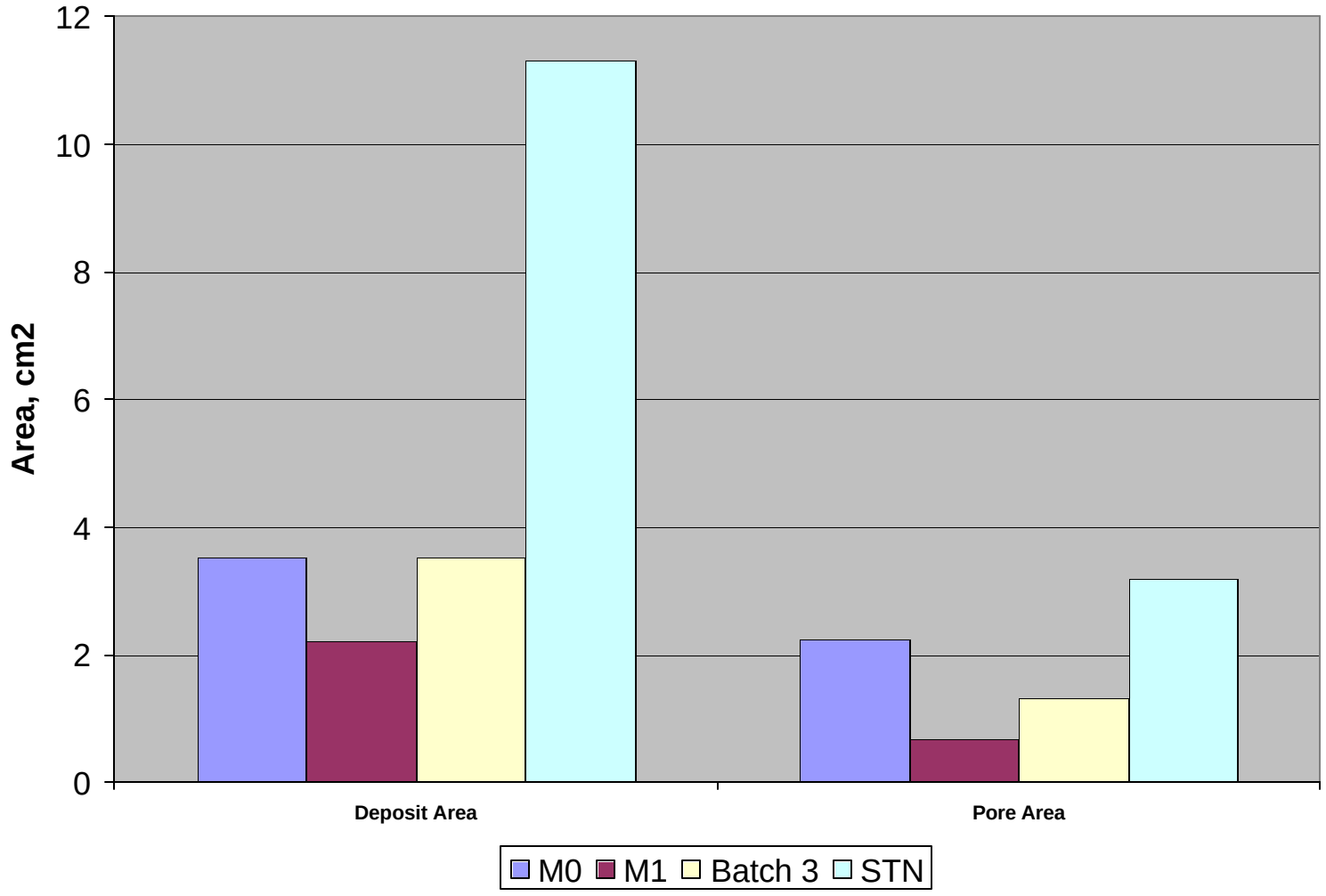

Face Velocities

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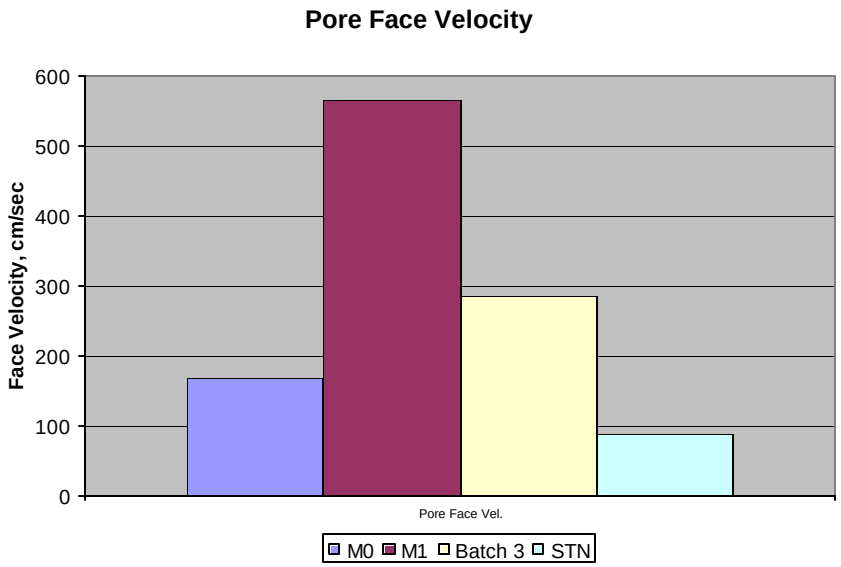

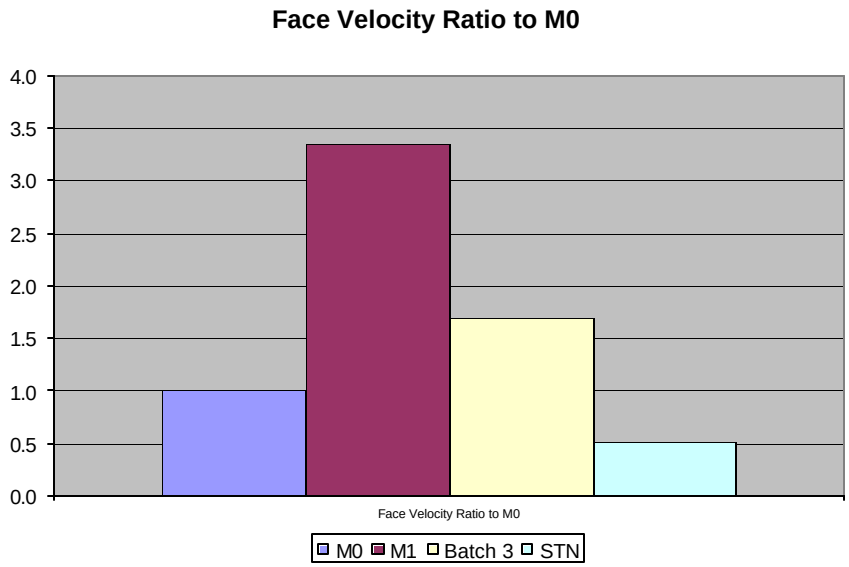

Cassette Tests: Current Work

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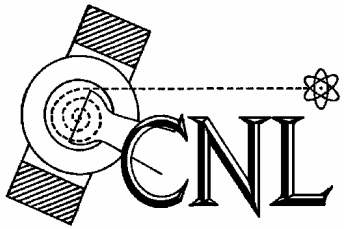
- New cassette design, 0.013”, both ½ hard and ¼ hard
- Testing underway in Davis, fine mass looks good so far, compared to M1 cassettes
- XRF analysis to be performed
- Durability testing of ¼ hard cassettes



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CRITICAL FLOW

Critical Flow

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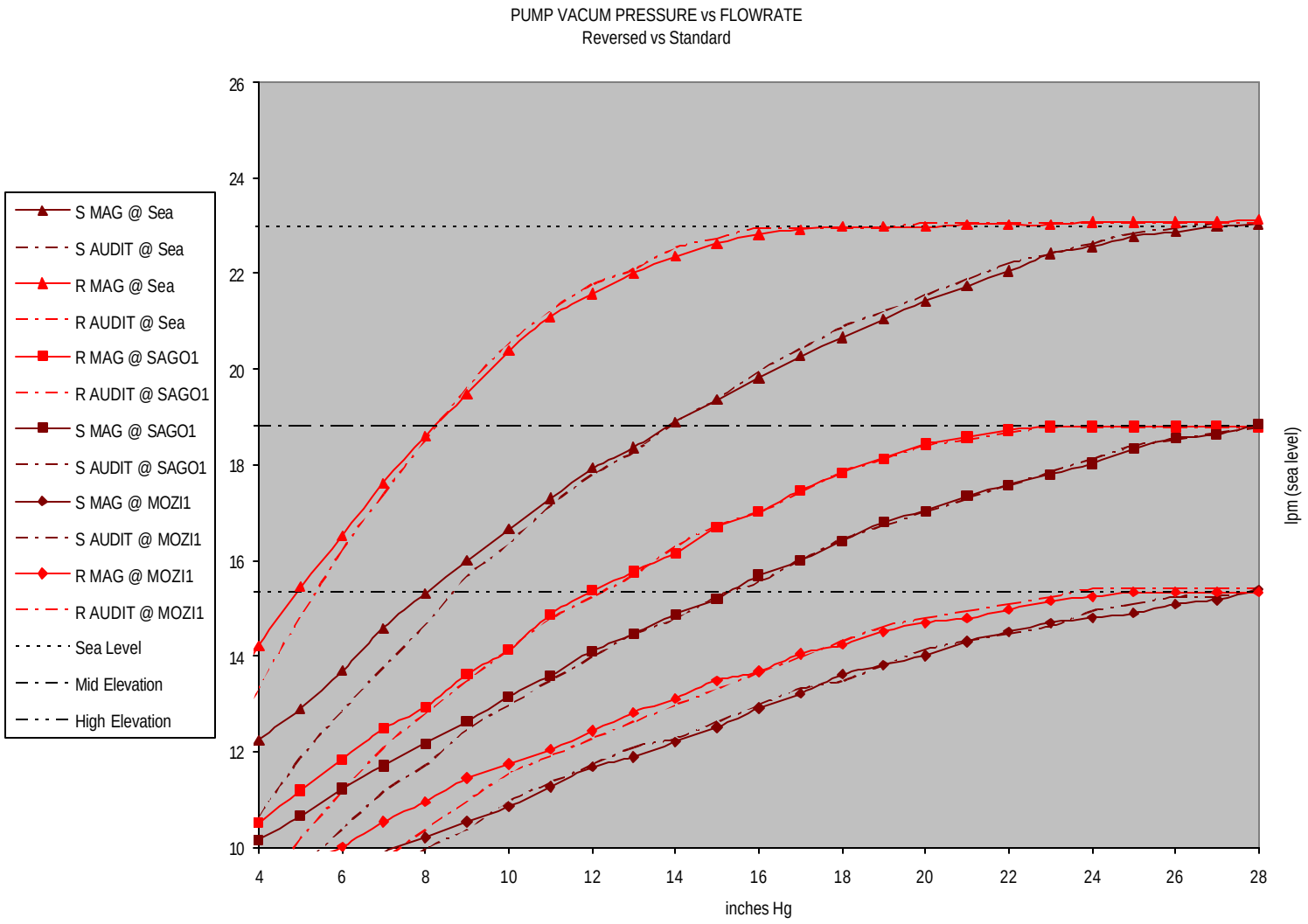

Valve Cutaway

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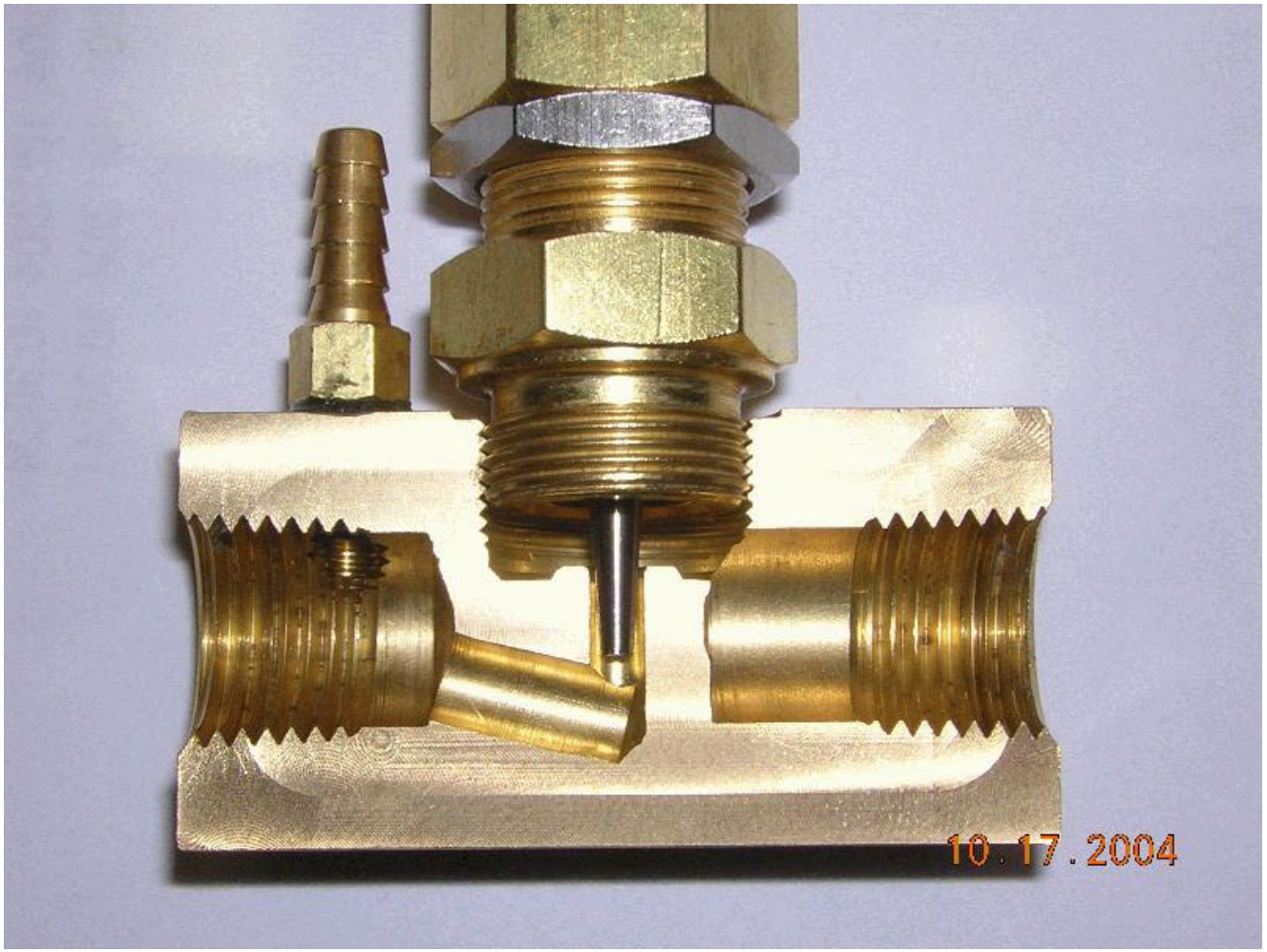

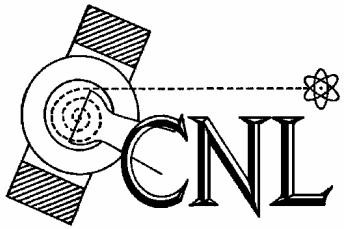

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NEW VACUUM XRF SYSTEM

Vacuum XRF System

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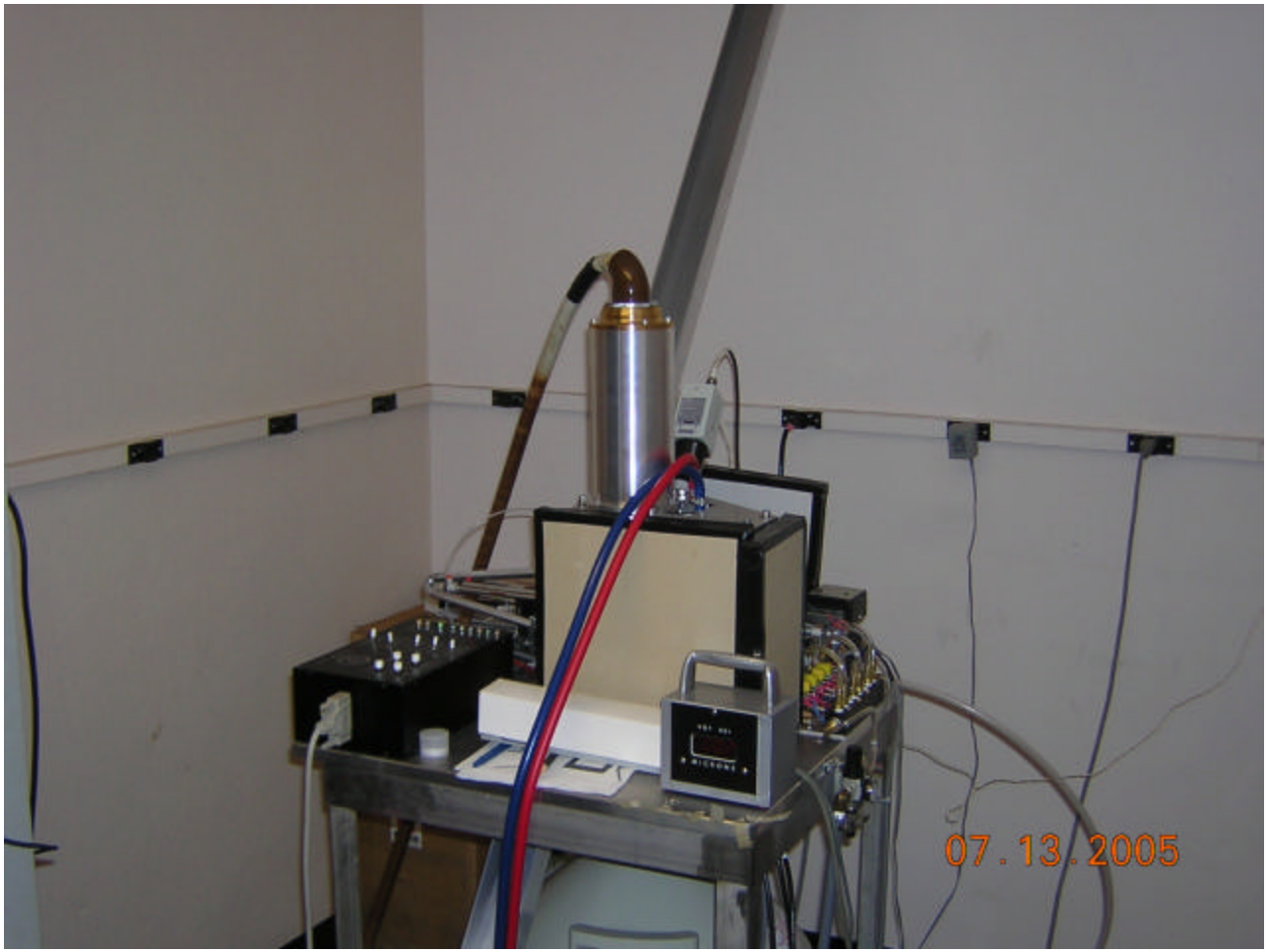

XRF Load-lock Chamber

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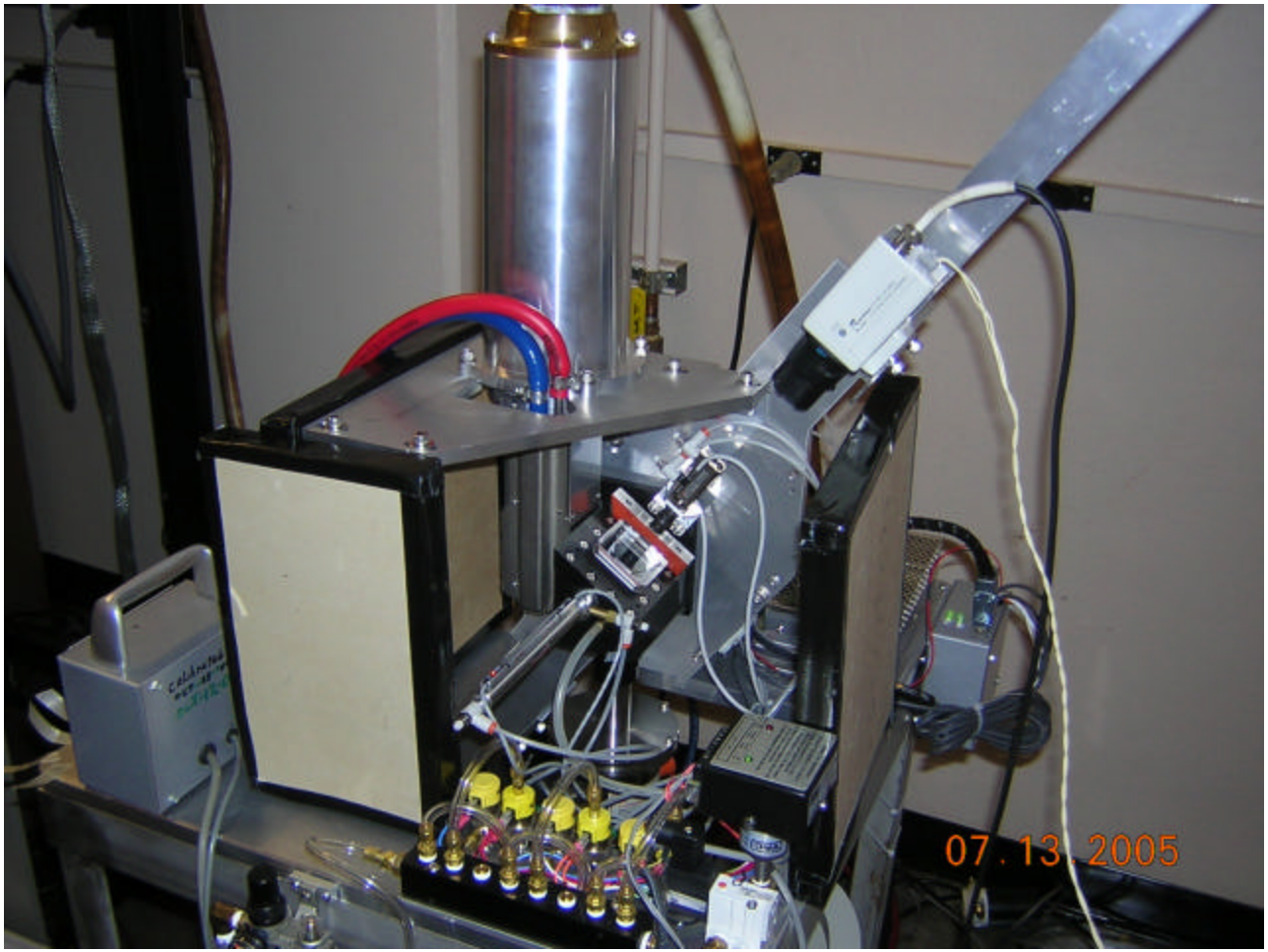

Vacuum XRF Advantages

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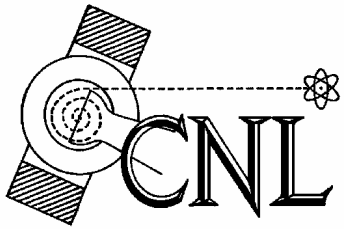
- Minimizes Ar peak interference; better MDLs
- No He leakage through Be window; better detector reliability and longer lifetime
- No need for He supply



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NEW FIELD TEST SHELTER

Davis Rooftop Test Site

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New Field Test Shelter

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