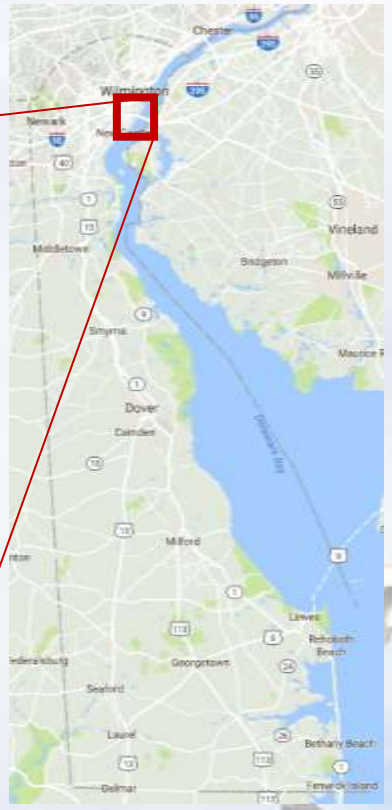
Cooper Environmental Xact 625i Multi-Metal Monitor

Short-term Source Apportionment Study

Presented by:
DNREC Division of Air Quality
11/21/2019

MMP Eden Park Project

Site Selection



Objectives:

Primary Objective: Investigate local ambient air concentrations of certain pollutants to evaluate the local conditions

Secondary Objective: Determine if permanent monitoring sites are representative of local conditions or whether there is need for local further monitoring

Community Concerns

Fugitive Dust

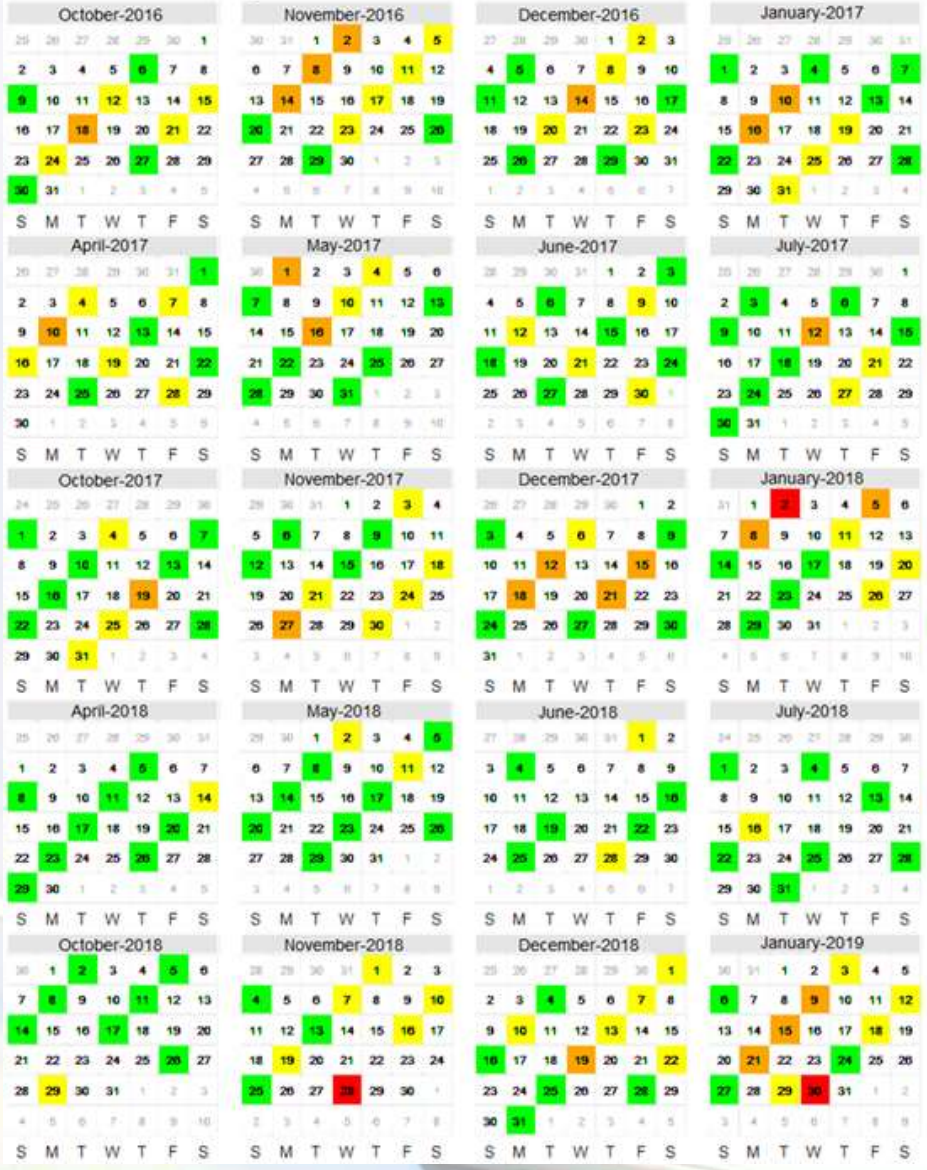
MMP Eden Park Project: MMP Load-out

- Ozone
- SO_2
- NO_x
- Continuous $PM_{2.5 \& 10}$
- Black Carbon
- BTEX AutoGC
- Meteorology

- Manual TSP
  - High-volume
  - Low-volume

MMP Eden Park Project: Dust Data

Eden Park Project: Maximum recorded Total Suspended Particulate (TSP) concentration Calendar



TSP Samples Collected every 3 days

White Background = no sample

Number of Samples = 267

TSP Standards based on 24 hour Sample

- State TSP Primary Standard: ≥ 260 µg/m^3
Days Above Standard = 3

- State TSP Secondary Standard: ≥ 150 µg/m^3
Days Above Standard = 24

- Moderate Range*: ≥ 75 µg/m^3
Days in Moderate Range = 76

- Good Range*: < 75 µg/m^3
Days in Good Range = 164

**Moderate and Good ranges demarked by concentration at ½ the State TSP Secondary Standard*

MMP Eden Park Project: Xact Study

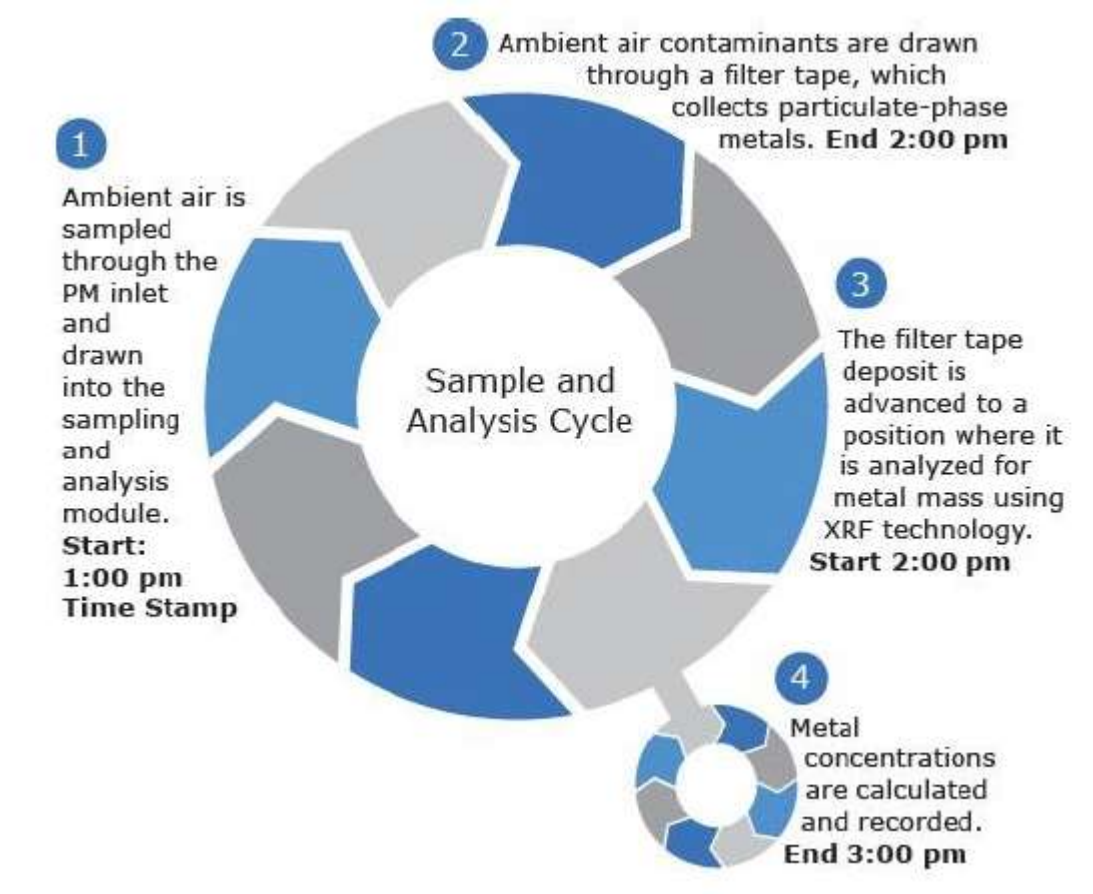
While we were able to address how much dust was in the air the communities voiced concerns about what made up the dust. DAQ partnered with Sonoma Inc. to rent a Cooper Environmental Xact 625i Multi-Metals Monitoring System to answer that question and attempt to determine sources.

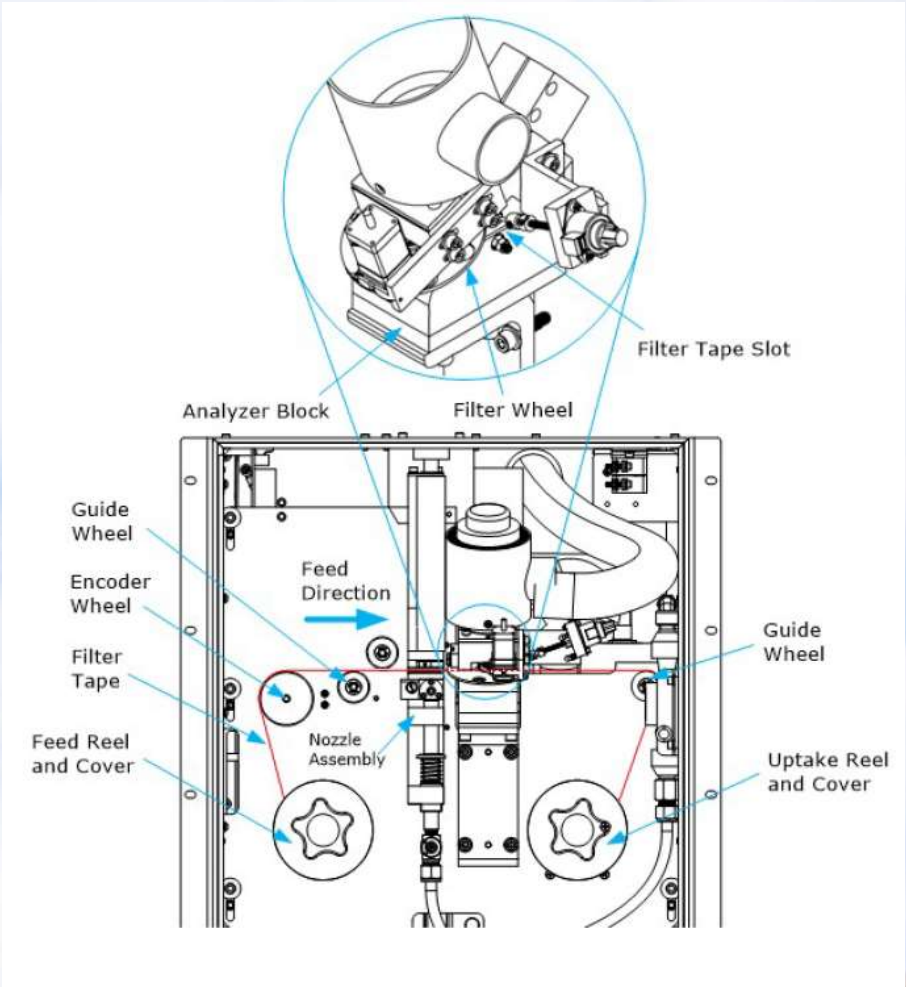
The goals of this short-term project were:

1) Collect data at the Eden Park site using the Xact Monitor for near real-time PM_{10} Metals Analysis, collocated with the MMP's suite of instrumentation.

2) Using wind speed/wind direction and pollutant data to conduct a source apportionment analysis to attempt to identify source categories and direction.

Xact 625i Basic Sampling Principle





Xact Delivery

Xact Study: MMP Modifications

Equipment relocated and rack removed for the Xact

Front Handles not load bearing. Space for compact external pump. Optional space for mouse/keyboard inputs.

Xact Study: MMP Modifications

SHARPs were replaced by a TAPI T640 and the Aethalometer was moved to the front rack.

Xact Study: Installation

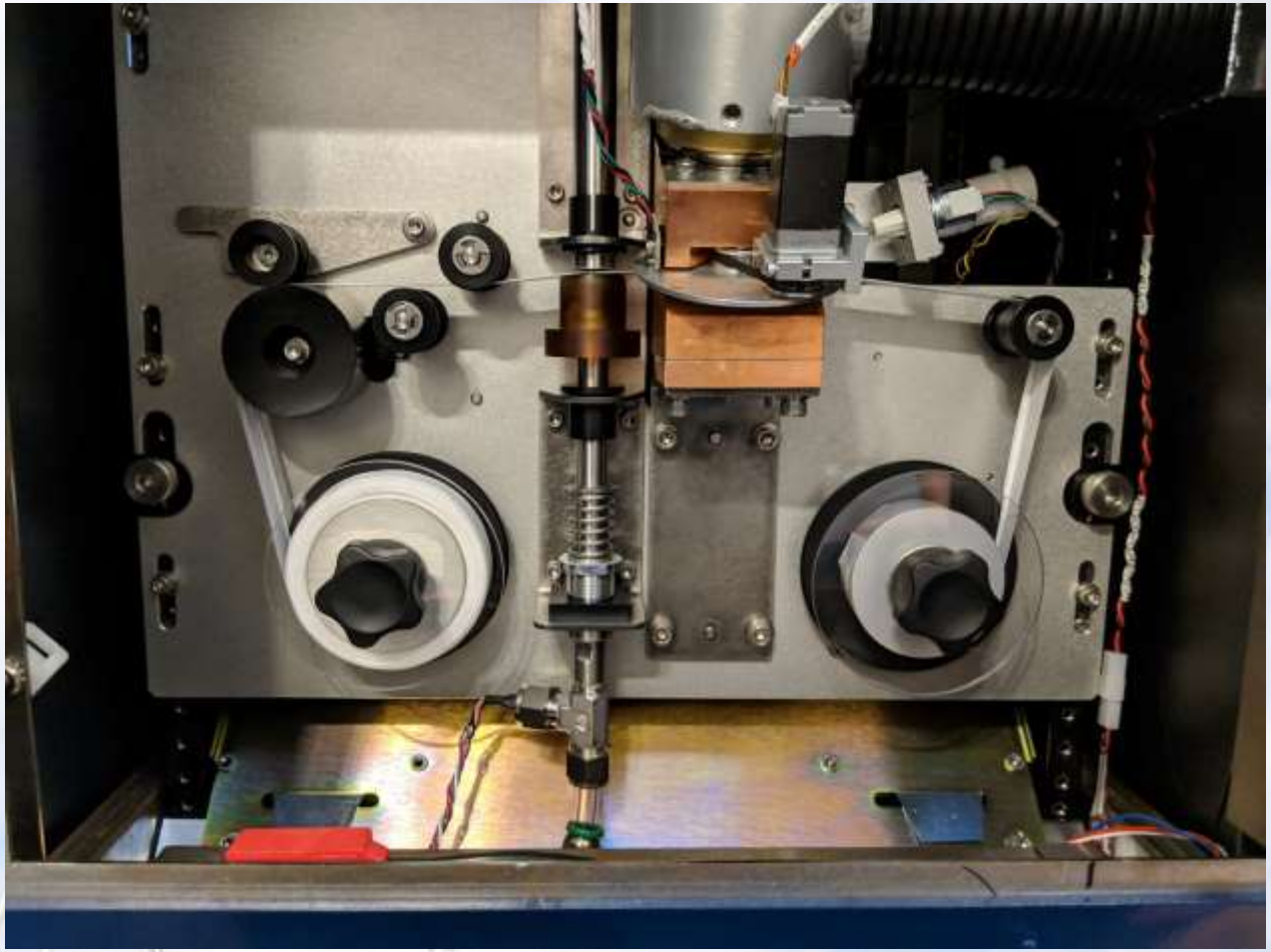
Xact Study: External Installations

PM_{10} inlet installed and Met sensor attached to MMP Met mast.

Partisol configured for PM_{10} filters to be analyzed by Method IO-3.3 for comparison.

Xact Study: Internals

Lead plated doors, shut down X-Ray when opened.

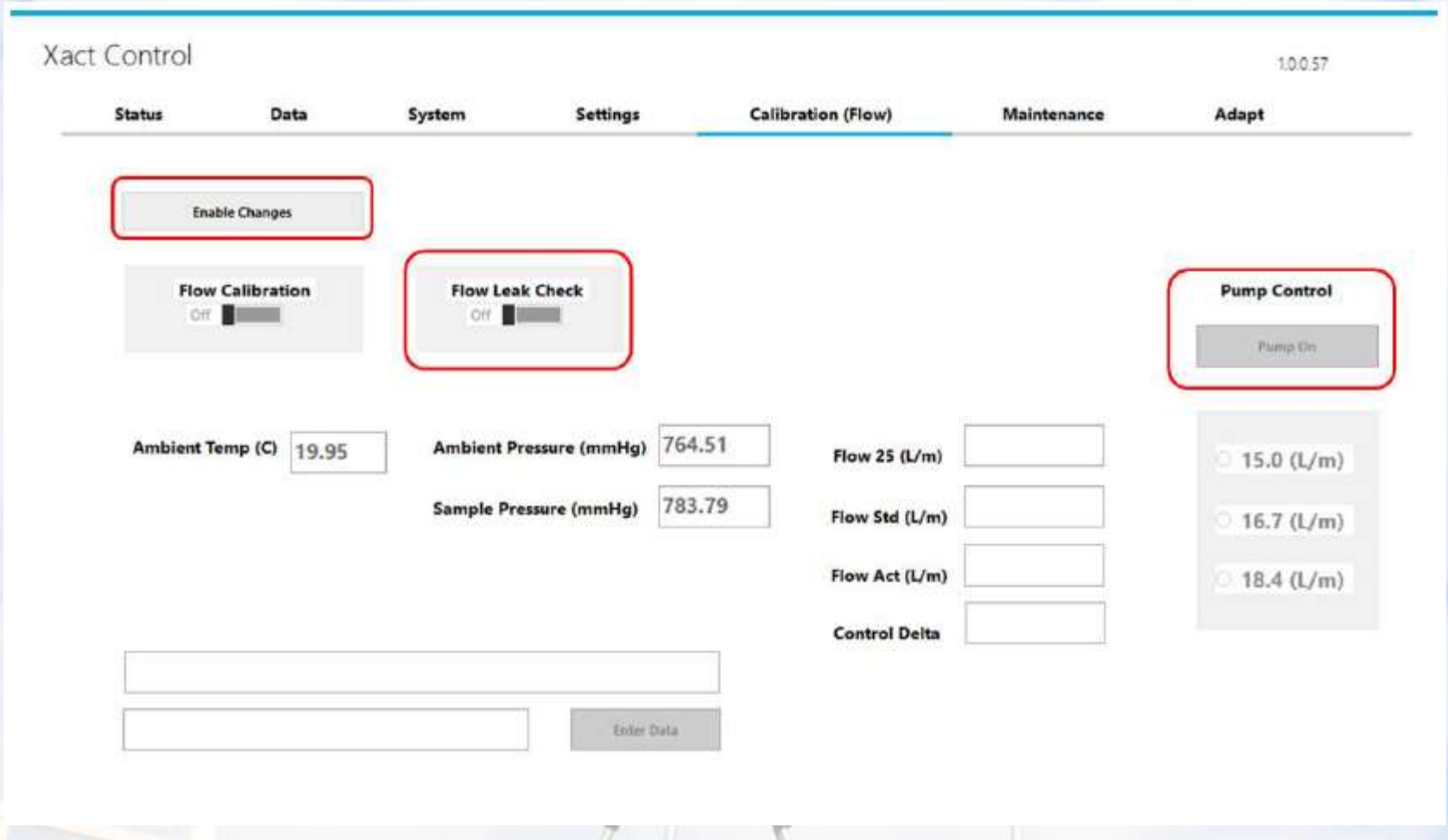


Teflon filter tape threaded through inlet and analysis block. Very fragile, careful to not touch analytical surface.

Xact Study: QC Checks

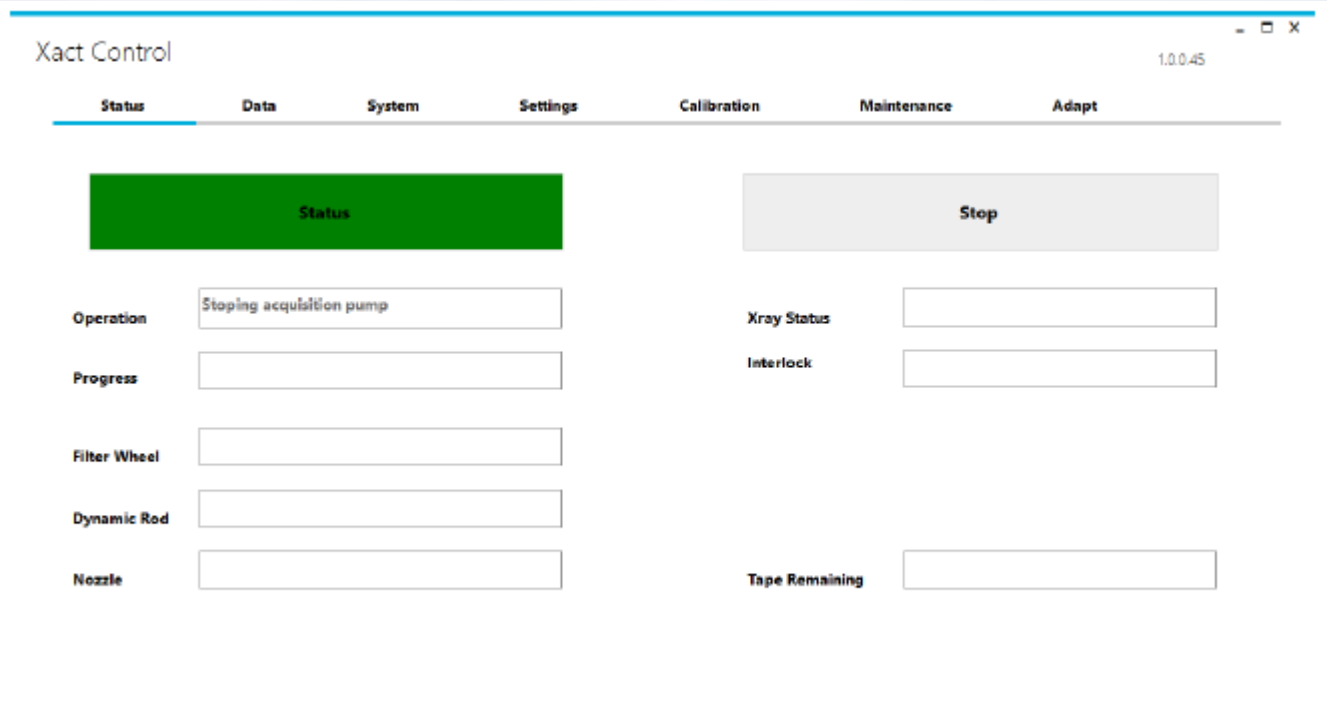
- Leak Check
- Flow Check
- Clean Inlet

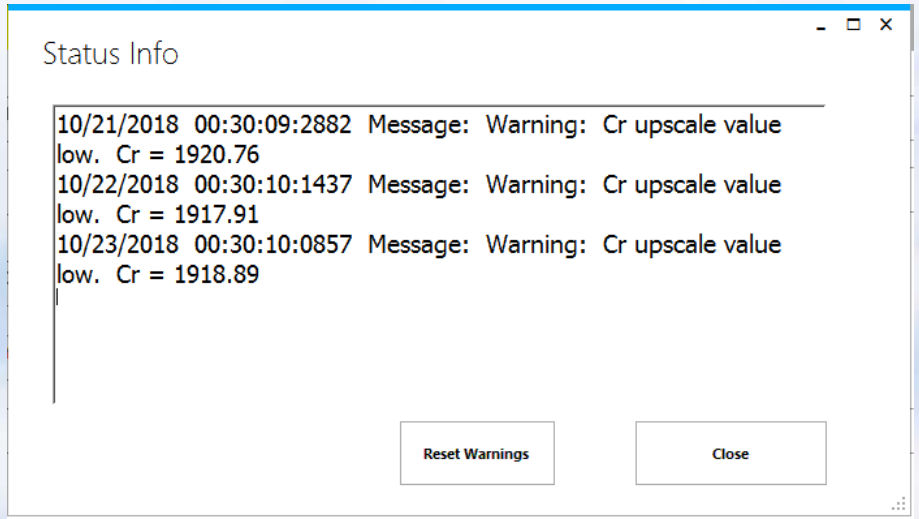
Xact Study: QC Checks



Xact Study: Smooth Operations

If everything is operating normally, status will be green

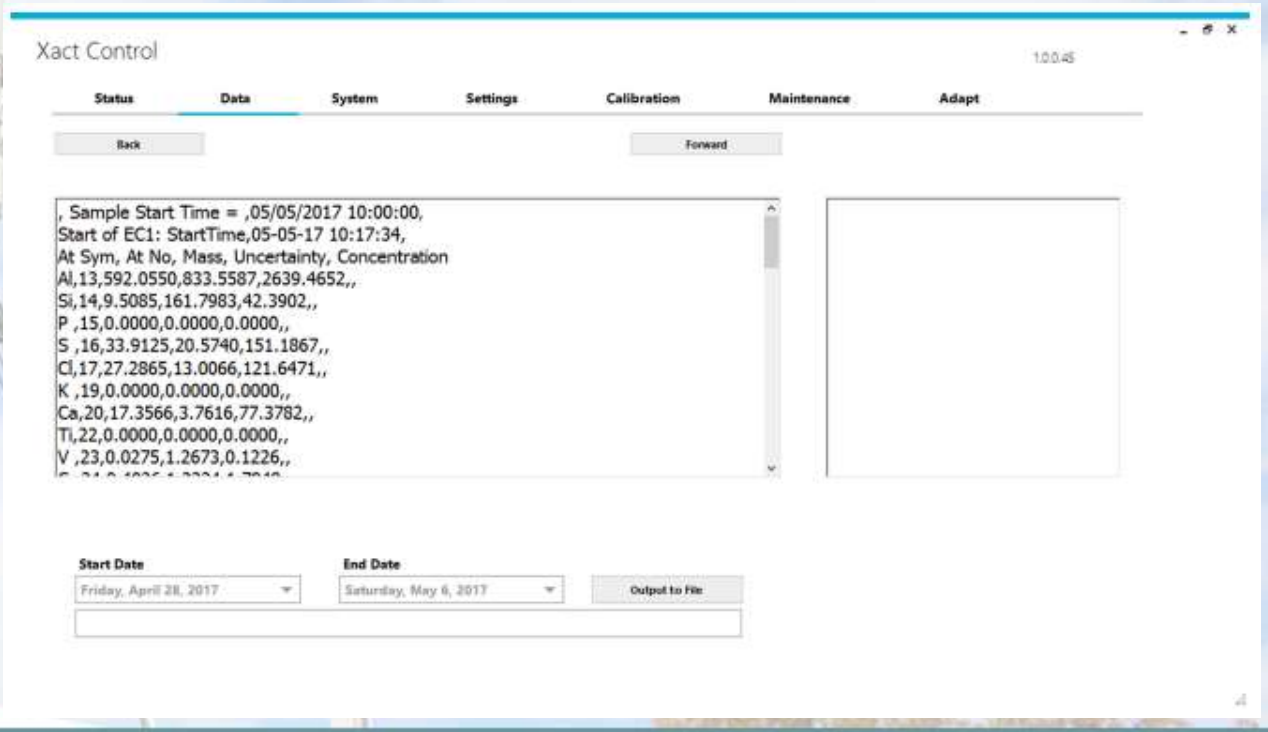




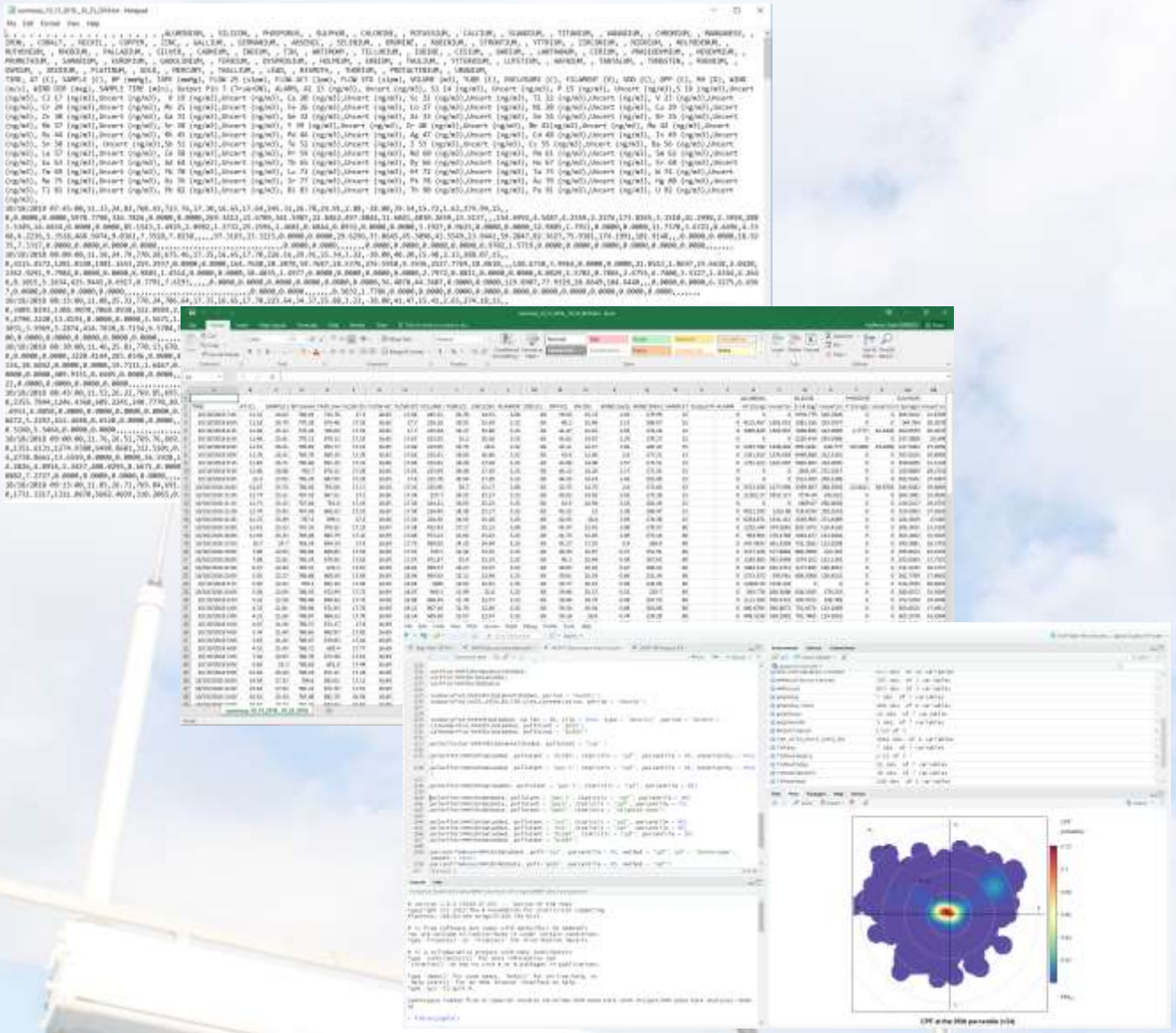
If everything not, status will be yellow or red and tapping on the status bar will show warnings. We had issues with maintaining constant temperature which impacted the nightly calibrations.

Xact Study: Connect to Database?

Attempts to connect to DRDAS were unsuccessful, however downloading data from the monitor was easy with a USB drive the Xact ADEPT interface. Recommend using mouse and keyboard.



Xact Study: Data Analysis



Questions?

Resources

- Cooper Environmental - Xact 625i
  http://cooperenvironmental.com/xact-625/
- Sonoma Technology Inc. - Air Quality
  http://www.sonomatech.com/services/airquality
- California Air Resources Board - SOP for Xact 625i
  https://ww2.arb.ca.gov/resources/documents/standard-operating-procedure-xact625i-xrf-sop-450
- DNREC Division of Air Quality - MMP Website
  https://dnrec.alpha.delaware.gov/air/quality/monitoring/mmp/