Community Air Monitoring

Onondaga Lake Dredging Project

Presenter: Scott Manchester

Onondaga Lake Dredging Project

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Presentation Agenda

- Dredge Project Overview and Air Monitoring Considerations

- Review of Standard Air Monitoring System Options

- Onondaga Lake Air Monitoring System
  - ▸ Continuous real-time monitoring capability
  - ▸ Flexibility and features
  - ▸ Centralized approach

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- Dredging ~2 million cu. yards of sediment over 4 years
- 4-mile pipeline to sediment consolidation area (SCA)

Project Site – Upstate NY (Syracuse)

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- **Geotextile tubes – for sediment containment & dewatering**

Geotextile Tubes
(photograph from another project)

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Community Air Monitoring Program Description

- Sediment Contains Volatile Organic Compounds (VOCs)

- 24/7 Monitoring of Over 8 miles of Site Perimeter

- Includes Continuous Real-time Monitors
  - Dust (PM_{10})
  - Total VOCs

- 13 Fixed Monitoring Stations
  - 8 at SCA (operating since 2010)
  - 5 along Lakeshore

- Centralized Data Collection Station at SCA

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Air Monitoring Site Layout

System Requirements

- Centralized
  - Viewable in real-time
  - Central operator control

- Compliant with new monitors (digital data outputs)

- Customized and Automated Alarms
  - Multiple time-averaged perimeter action levels
 - Notify of station operational status

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Standard Air Monitoring System Options and Limitations

- Local Pager Systems
  - Not centralized
  - Alarms - short range and require analog monitor outputs

- Radio Telemetry Systems (900 MHz)
  - Limited range without repeaters
  - Data transmission interferences

- Internet-based Telemetry System
  - Limited data polling rate
  - Communication affects data capture
  - Limited operator interaction, alarms and data backup

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Onondaga Lake Air Monitoring System

- Fixed Stations: Cellular-based with Digital Data Loggers
  - ▸ Data Logger: Campbell Scientific Inc. – CR800 Series
  - ▸ Total VOCs: Rae Systems – MiniRae 3000
  - ▸ Dust: Thermo-Fisher – ADR 1500
  - ▸ Cell Modem: Raven XT
- Central Station Operations at SCA
  - ▸ Station data collection
  - ▸ On-site weather data collection
  - ▸ Operator alarms and controls

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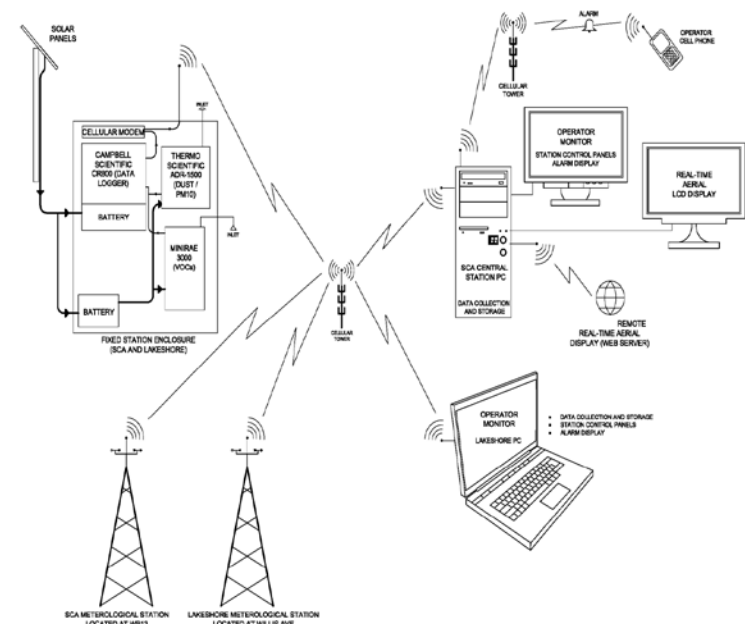
Fixed Air Monitoring Stations

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Cellular-based Digital Data Logger System

- Data Logger
  - Polling rate – every 5 seconds
  - Data averaging – user-defined

- Data Storage
  - Non-volatile – ~1 month
  - Invalid data flags – auto/manual
  - Data capture automatically recorded

- Cell Modem with Internet IP-address

- Solar Powered – 10-day Battery Backup

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Central Data Collection and Operations System

- Central Station at SCA – Desktop PC with cable internet
  - All stations download every 15 sec. (Campbell LoggerNet)
  - Polls
    - real-time (5-sec) data
    - multiple time-averaged data files (1-min, 15-min,1-hr)
- Backup Data PC
  - Portable Notebook with Wi-Fi (at Lakeshore)
  - Same capability and configuration as Central Station PC

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Central Station Operator Displays

- Data Acquisition Software by Campbell Scientific Inc.
  - LoggerNet
    - station data collection
    - status monitoring and direct communication
    - on-site weather station data collection
  - RTMC Pro
    - operator real-time displays
    - alarm notifications
    - integrated on-site weather station display

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Monitor station and control data collection and connections via LoggerNet

Station Status Monitor

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Updates every 15 seconds plus Downwind Station Tracking
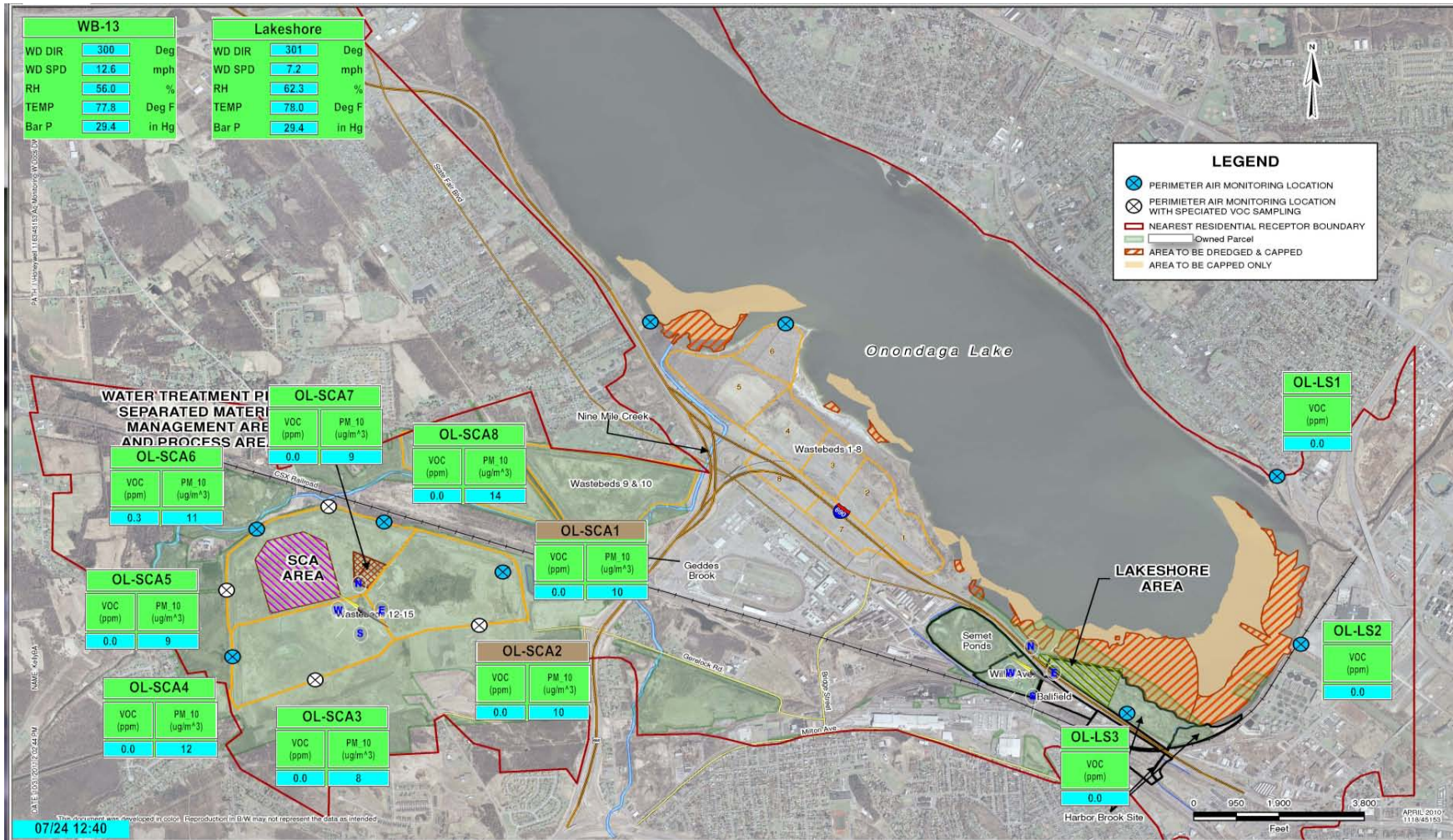
Real-time Data Display

**Perimeter Exceedance Levels, Early Warning and Station Status
Visual, Audible and to Operator Phones**

Alarm Displays

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Station Status Boxes and Remote Control Buttons

Station Control Panel

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Running averages each hour, and 24-hour time-histories
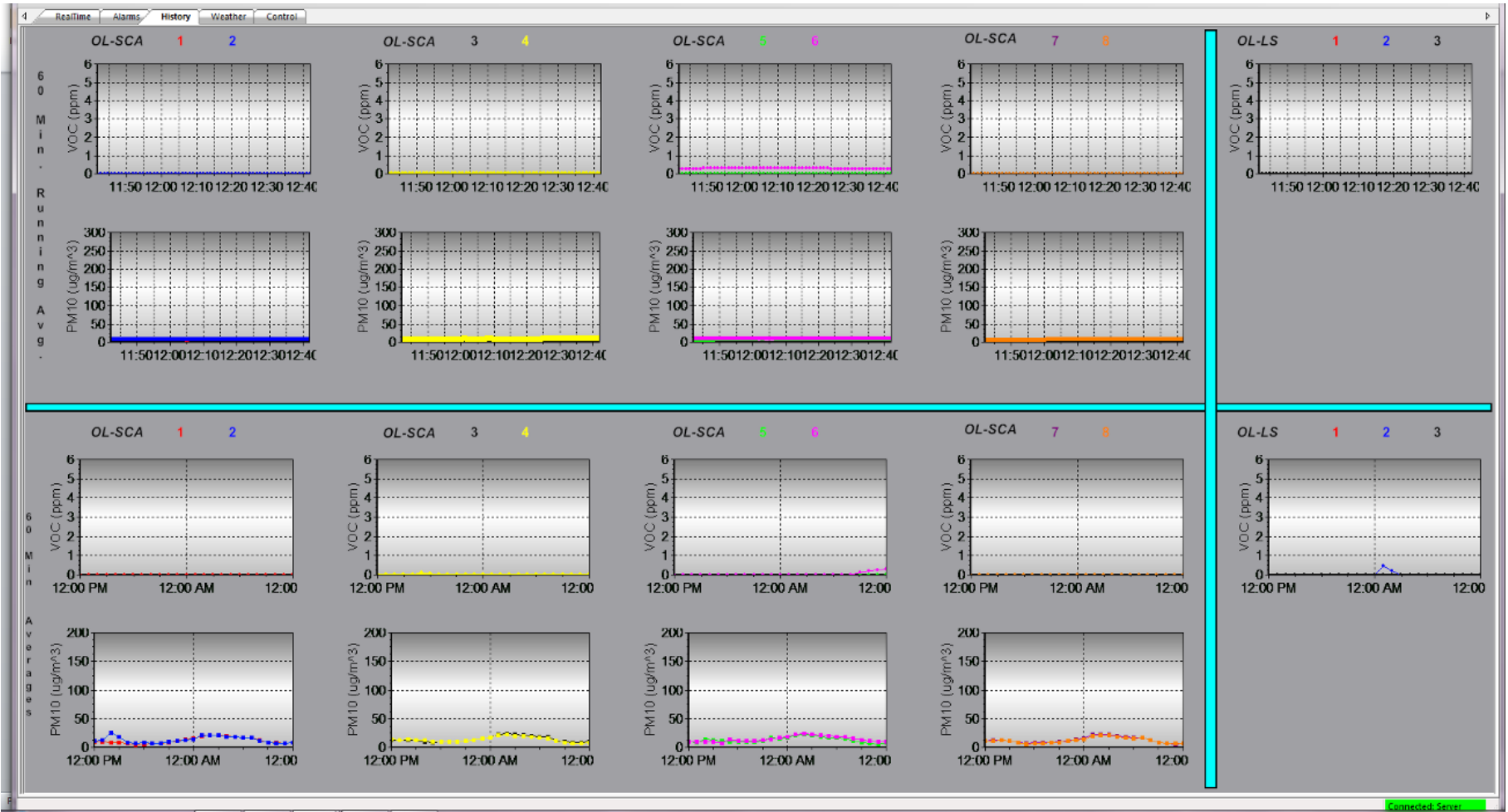
Station History – Data Trends

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Integrated on-site weather data and wind roses
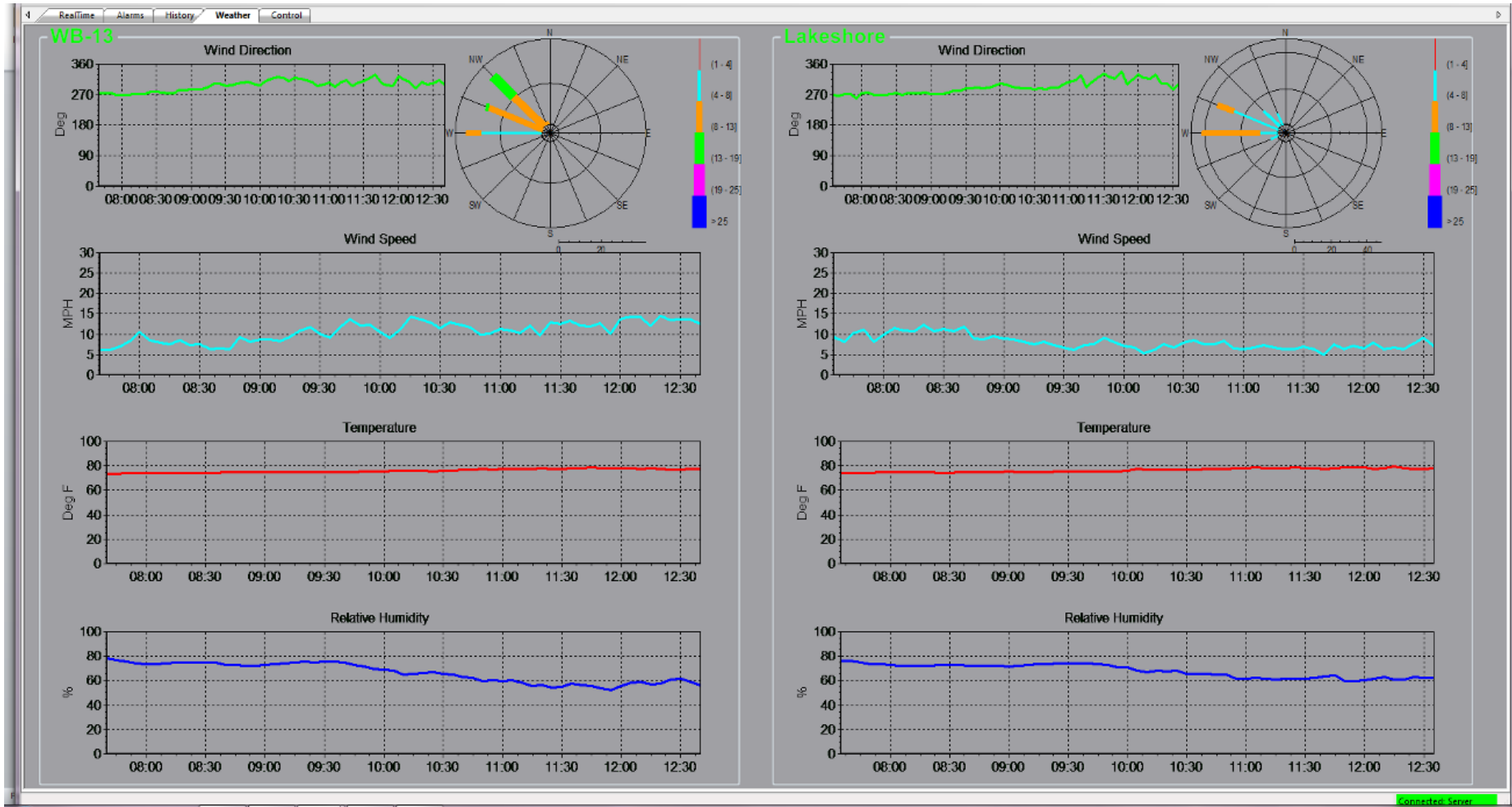
Weather Station Time-history

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Additional System Features

- Real-time Aerials Viewable via Campbell CSI WebServer
  - Flat-screen TV for visitors
  - Via secure internet connection
- Flexible Station Connect Options
  - Wireless via smartphone
  - Direct via PC or keypad
- Alarms Direct from Data Logger
- Multiple Layers of Data Backup – Stations and Main Office
- Easily Expandable
  - Each station - additional monitors or peripherals
  - Central Station - additional stations

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QUESTIONS?

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