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



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



Project Site – Upstate NY (Syracuse)



• Geotextile tubes – for sediment containment & dewatering



Geotextile Tubes

(photograph from another project)



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 (PM₁₀)
 - Total VOCs
- 13 Fixed Monitoring Stations
 - 8 at SCA (operating since 2010)
 - 5 along Lakeshore
- Centralized Data Collection Station at SCA





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



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



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



Fixed Air Monitoring Stations

11.



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





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



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



Monitor station and control data collection and connections via LoggerNet

<u>File E</u> dit <u>V</u> iew]	<u>T</u> ools <u>H</u> elp									
Image: Display transformed by the set Device Toggle Din/Off Reset Device Stop Collection LogTool Comm Test										
り Network Map		Line State	Avg Err %	Coll State	Last Data Coll	Next Data Coll	Vals Last Coll	Vals to Coll		
N 📼 OL-SI	CA1	on line	0%	normal	7/24/2012 12:49:01	7/24/2012 12:49:15	290	290		
N 📼 OL-Si	CA2	on line	0%	normal	7/24/2012 12:49:01	7/24/2012 12:49:15	290	290		
N 📼 OL-Si	CA3	on line	0%	normal	7/24/2012 12:49:02	7/24/2012 12:49:15	290	290		
N 📼 OL-Si	CA4	on line	0%	normal	7/24/2012 12:49:01	7/24/2012 12:49:15	261	261		
N 📼 OL-Si	CA5	off line	0%	normal	7/24/2012 12:49:03	7/24/2012 12:49:15	261	261		
N 📼 OL-Si	CAG	off line	0%	normal	7/24/2012 12:49:02	7/24/2012 12:49:15	286	286		
N 🗰 OL-S	CA7	off line	0%	normal	7/24/2012 12:49:06	7/24/2012 12:49:15	294	294		
N 📼 OL-Si	CA8	on line	0%	normal	7/24/2012 12:49:02	7/24/2012 12:49:15	290	290		
N 🕨 📼 01-13	S1	on line	0%	normal	7/24/2012 12:49:10	7/24/2012 12:49:15	249	249		
N 🕨 📼 01-13	52	on line	0%	normal	7/24/2012 12:48:51	7/24/2012 12:49:15	0	0		
N 📼 01-19	53	off line	0%	normal	7/24/2012 12:49:01	7/24/2012 12:49:15	249	249		

Station Status Monitor

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

4	RealTime Alarms Histo	ny Weather Cont	roi									Q.
Ê												
		SCA 1	SCA 2	SCA 3	SCA 4	SCA 5	SCA 6	SCA 7	SCA 8	LS 1	LS 2	LS 3
III -	TVOC	0.0 ppm	0.0 ppm	0.0 ppm	0.0 ppm	0.0 ppm	0.3 ppm	0.0 ppm	0.0 ppm	0.0 ppm	0.0 ppm	0.0 ppm
u–												
	PID Error Codes											
	1-min. avg.											
	>0.5ppm	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0
	60-min. avg.											
Ш.,	Control >3ppm Work Perimeter >5ppm	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0
	Dust	8 µg/m^3	13 µg/m^3	2 µa/m^3	12 µg/m^3	5 µg/m^3	11 µg/m^3	10 ug/m^3	12 ug/m^3			
	Dust	- .		g	<u>-</u>	- -9	game .					
	1-min. avg.											
	<-2ug/m^3											
	1-min. avg. Early Warning	9	10	11	11	10	11	10	10			
⊫	>100ug/m^3											
	60-min. avg. Investigate >100 ug/m^3	8	8	9	9	9	11	7	8			
~	Jork Perimeter >150 ug/m^3											
					PID Error Codes		(1)	Communication Failure				
					ADR Nega	ative Drift						
					Early Warr	ning Level	11	Temperatur	e Limit			
					Investiga	te Level	4 6	. entre entre				
					Control	Level	<u></u>	Pattane Valte				
					Work Perin	neter Limit	<u>- +</u>	Ballery Volta	ige Low			

Alarm Displays



Station Status Boxes and Remote Control Buttons

Alarms His	tory Weather Control									
Station Name Last Data Collection										
	Pump_Status	Toggle Status	Test Mode	Toggle Status		Pump_Status	Toggle Status	Test Mode	Toggle Status	
SCA 1 07/24 12:43:48	Running	PressOnceToToggle	No	PressOnceToToggle	Awake	Running	PressOnceToToggle	No	PressOnceToToggle	Awake
SCA 2 07/24 12:43:48	Running	PressOnceToToggle	No	PressOnceToToggle	Awake	Running	PressOnceToToggle	No	PressOnceToToggle	Awake
SCA 3 07/24 12:43:49	Running	PressOnceToToggle	No	PressOnceToToggle	Awake	Running	PressOnceToToggle	No	PressOnceToToggle	Awake
SCA 4 07/24 12:43:48	Running	PressOnceToToggle	No	PressOnceToToggle	Awake	Running	PressOnceToToggle	No	PressOnceToToggle	Awake
SCA 5 07/24 12:43:46	Running	PressOnceToToggle	No	PressOnceToToggle	Awake	Running	PressOnceToToggle	No	PressOnceToToggle	Awake
SCA 6 07/24 12:43:47	Running	PressOnceToToggle	No	PressOnceToToggle	Awake	Running	PressOnceToToggle	No	PressOnceToToggle	Awake
SCA 7 07/24 12:43:48	Running	PressOnceToToggle	No	PressOnceToToggle	Awake	Running	PressOnceToToggle	No	PressOnceToToggle	Awake
SCA 8 07/24 12:43:46	Running	PressOnceToToggle	No	PressOnceToToggle	Awake	Running	PressOnceToToggle	No	PressOnceToToggle	Awake
LS 1 07/24 12:43:42	Running	PressOnceToToggle	No	PressOnceToToggle	Awake					
LS 2 07/24 12:43:45	Running	PressOnceToToggle	No	PressOnceToToggle	Awake					
LS 3 07/24 12:43:49	Running	PressOnceToToggle	No	PressOnceToToggle	Awake					
										Connected: Server
	- и и									

Station Control Panel



Running averages each hour, and 24-hour time-histories



Station History – Data Trends







Weather Station Time-history

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

QUESTIONS?







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