

# Enhanced Online Water Quality Monitoring for Super Bowl XLVIII

Outcome and Lessons Learned (Not Just Another Giants' Game)

Next Generation Compliance

George Washington University Law School March 26 – 27, 2015

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## Super Bowl Invades NY Area - Feb 2, 2014





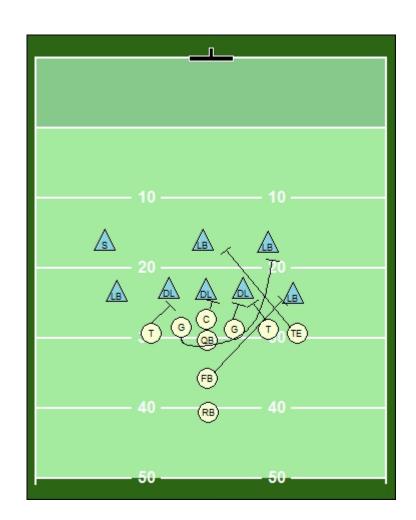
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Broncos:

## Planning for the Big Game



- Assure adequate and uninterrupted water quantity, pressure and quality the week leading up to the game and game day
- Be prepared to quickly isolate and repair main breaks
  - Especially in Jersey City and other towns with Super Bowl events
- Monitor water quality for any potential contamination event
- Be prepared to respond to a contamination incident



## History of Special H<sub>2</sub>O Security



- Done at past Super Bowls Cowboys Stadium, Arlington, TX
- Boston Marathon
- NCIS Los Angeles 4/9/13
- Water Research Foundation
  - \$50,000 research grant



## **United Water Super Bowl Planning Team**



- Transmission & Distribution
- Engineering
- Water quality
- Health & safety
- Communications
- Customer service



## **Planning Agencies Involved**



- NJ State Police
- US Department of Homeland Security
- Bergen County Prosecutor's Office
- NJ Sports & Exposition Authority
- MetLife Stadium
- NJDEP
- NFL
- Hackensack Hospital Med. Center



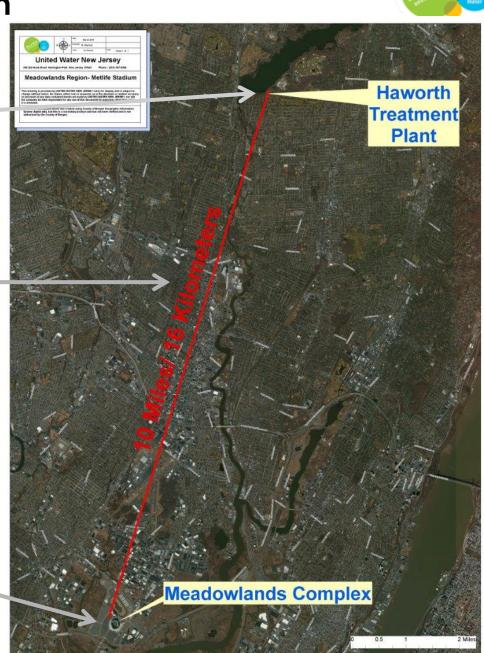
## **UWNJ Distribution System**



Haworth WTP

Transmission Mains

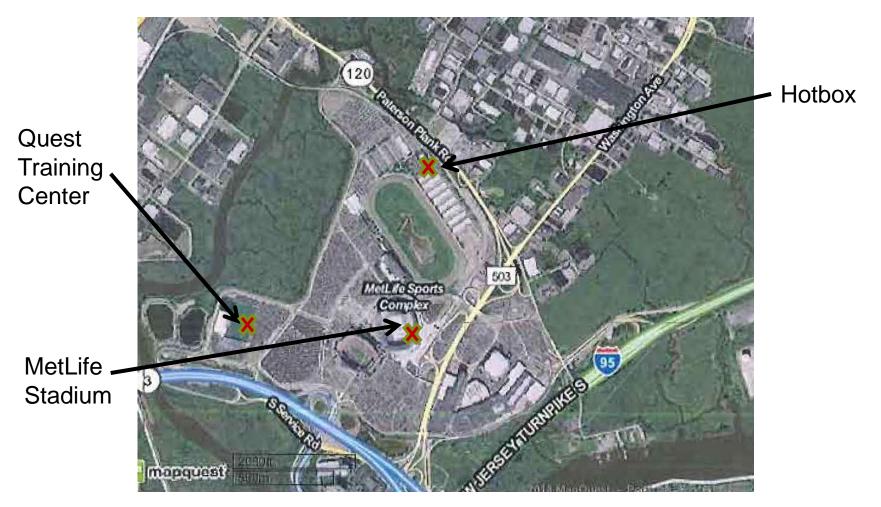
Meadowlands Sports Complex



## **Meadowlands Sports Complex**



### Sampling Locations - \*\*



## **S::CAN Monitoring Device**



0.3M





i::scan manufactured by s::can Measuring Systems LLC, Cambridge, MA

**Parameters Measured:** 

pH
Temperature
Total chlorine residual
Conductivity
Turbidity/Color
/TOC/UV254

**Pressure** 

0.7M

## **Installation of Devices**





### **Event Flowchart**

Online WQ Monitor Event Flowchart **UW New Jersey** Version 1.0, 1/31/14

Analyzer Trends are Outside of **Normal Range** 

Inform SB ICC Outside SB Hours, Contact:

1. K. Cartnick 201-538-0955

2. J. Dyksen 201-245-6915

Response Team reviews the following:

- Is there a power loss at the site, or flow loss to analyzer(s)
- Is there a pressure change, main break, valving change in system
- Any source water quality change or treatment issues at the Haworth WTP
- Is the unusual trending outside of defined limits for the site (i.e. pH, chlorine, turbidity, conductivity, TOC, temperature, pressure, etc.)
- Is the condition continuing for greater than 15 minutes
- Are there any reported concurrent security issues
- Are there reports of illness in the system (customer service, other)
- Are there reports of unusual taste and odor in the water

## What are the consequences of making the "wrong call"?



#### No Further Action Needed if:

- There are no concurrent security issues
- There are no reports of illness, or taste/odor issues from customer service, other
- The alarm condition continues for less than 15 minutes
- WQ event is due to a power loss at the site, or flow loss to the sensor(s)
- WQ event is due to a pressure change, main break, hydrant usage or valving change in system
- WQ event is due to treatment issues or source water quality change at the Haworth WTP
- WQ event is similar to standard background changes experienced at the site (i.e. pressure, turbidity, pH)
- Field kit results indicate that the sensor (s) is faulty and actual results are normal as per the field kit, notify UW Instrumentation on-call personnel to calibrate/repair the sensor, and start field measurements every 15 minutes until sensor is fixed
- Revisit/revise trigger limits as required, if source water conditions have changed

#### Further Action Needed – Proceed to 1. if:

- The alarm continues for more than 15 minutes
- There is no indication of a power loss at the site, or flow loss to the sensor(s) unit
- There is no indication of a pressure change, main break, hydrant usage or valving change in system
- There is no indication of a treatment issue, or source water quality change at the Haworth WTP
- The sensor water quality pattern(s) vary significantly from standard background changes experienced at the site (I.e. pH, chlorine, odor, conductivity, turbidity, etc.) - and more than one parameter changed at the same time outside of normal patterns - and field tests indicate that the sensors are operating properly

#### If the following conditions exist – proceed directly to 2.

- There are concurrent security issues reported
- There are reports of illness and/or taste&odor issues from customer service or other sources
- If an unusual odor is coming from the tap water at the site

**Trigger Response Protocol** 

Stand Down

1. Notify Haworth and SB ICC. Request that State Police Hazmat Team perform field test kits for Cyanide, Arsenic, and Botulinum toxin, and Implement Mobile Lab to perform screening tests. Verify pH and chlorine data with field kits. Assess situation for further actions.

2. Notify Haworth and SB ICC (State Police, and Homeland Security) of a potential water quality contamination event. Notify Corporate ICC of all activity. Assess situation for further actions.

Notify State Police Hazmat Team to collect samples to be subcontracted to Lab for the analysis of unknown contaminants, and perform field analysis for unknown contaminants

**Commence Remaining Components of CMP** 

## Make it Simple for the Quarterback (Monitoring/ Response Procedures)

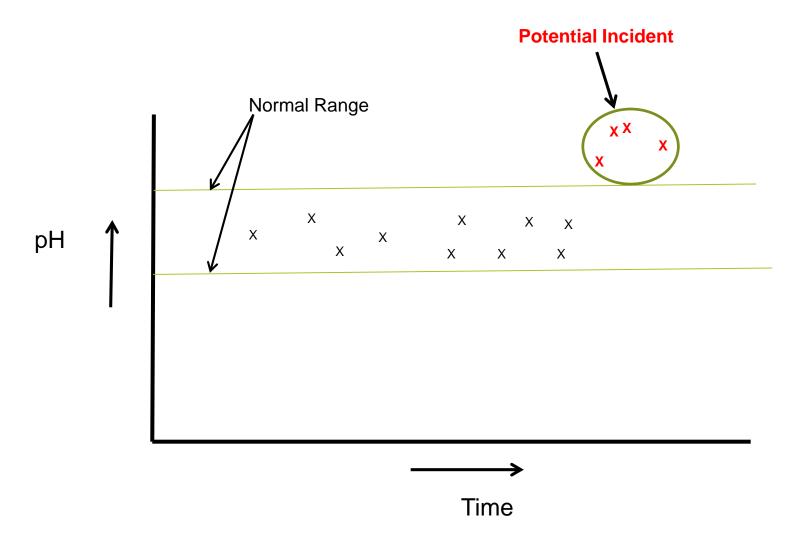


- Track water quality parameters
- If water quality within typical range, all is well
- If major deviation occurs
  - Check water quality at plant for any changes
  - Field check monitoring devices
  - Check system operations for possible main break, fire, change in operations
  - Check with Customer Service about complaints or threats
  - Immediately notify authorities about contamination possibility
  - Analyze water on-site using test kits for selected contaminants like cyanide
  - Notify authorities if on-site test is positive
- Isolate water system and investigate the source
- Initiate decontamination procedures



## **Water Quality Monitoring**

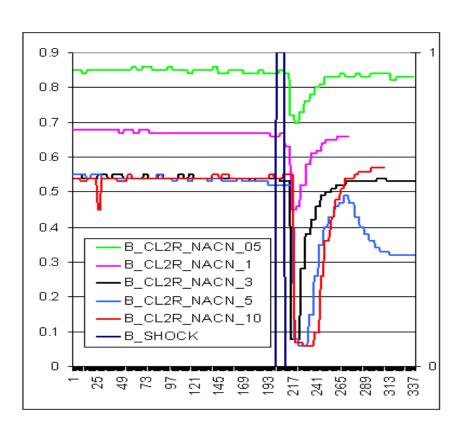


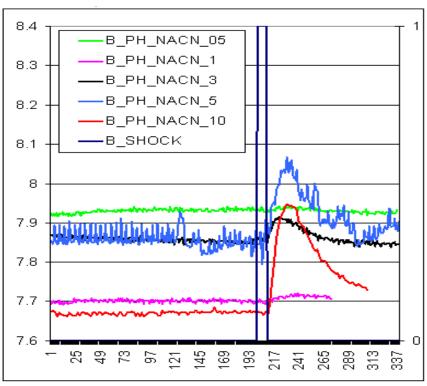




## Chlorine Residual and pH Response to Sodium Cyanide

...really need to understand multi-parameter responses to contaminants





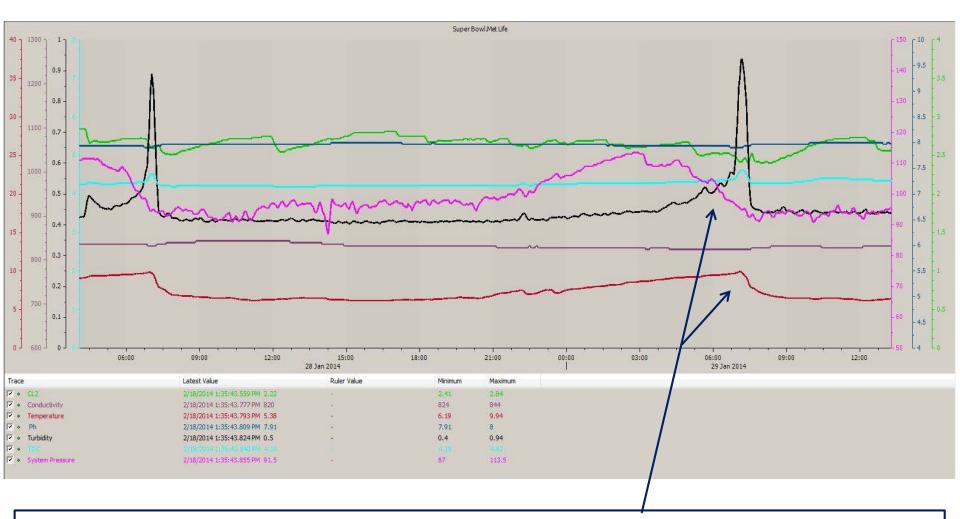
## **Haworth WTP - Stable Water Quality**





## Super Bowl Arena – Met Life Building – 2 Day View





It is important to understand normal, daily excursions due to site operations

## Super Bowl Arena – MetLife Stadium – Game Week





Game Day excursions similar, but slightly different due to more frequent operation of booster pumps at the Stadium to satisfy demand

## Supremental United Water

## Postgame Wrap-up – and Application of Results

- Added security against potential contamination incidents
- Network monitoring in "sensitive" locations (hospitals, schools, etc.)
- Network operations to stabilize/ improve water quality
- Corrosion control optimization. Revised Lead and Copper Rule corrosion control monitoring (real-time pH, conductivity, po4)
- Research need:
   Impact of potential contaminants
   on typical water quality parameters



## Data Integrity – UW Liability



- Monitoring initiative was not publicized should it be?
  - Deterrent
  - Stimulant



- Quality Assurance calibration standards used to verify monitors
  - However, no regulatory requirements and no "Certified" analytical methods
- Data from online sensors is transmitted through "secure" pathway
  - How secure is it?
  - How do we ensure that data is protected?
- What are the consequences of making the "wrong call"?
- When does United Water step out of the way?
  - State Police
  - Homeland Security
  - NJDEP
  - Met Life Stadium personnel
  - What is the liability if we don't monitor the water at all?



### Resources



- Water Contaminant Information Tool (WCIT) EPA
  - o <a href="http://water.epa.gov/scitech/datait/databases/wcit/index.cfm">http://water.epa.gov/scitech/datait/databases/wcit/index.cfm</a>
- Distribution System Water Quality Monitoring: Sensor Technology Evaluation Methodology and Results - EPA 2012
- On-Line Water Quality Monitoring for Drinking Water Contamination -USEPA Cincinnati - 2012
- Data Set: Water Quality Parameter Response Data for 5 Different Finished Drinking Water from 4 Large Municipalities – EPA 2013

## Our Team on Game Day!





## Team effort! – both internal and external "players"

- Engineering, Operations, Communications, Laboratory, Security
- Regulator (NJDEP), State Police, NFL Members



## Thank You!

