

From: David Drake
To: [commentletters](mailto:commentletters@waterboards.ca.gov)
Subject: Fwd: Comment Letter - Changes to Proposed Regulation Prohibiting Wasteful Water Use Practices
Date: Thursday, February 15, 2018 5:34:58 PM
Attachments: [WDR Submittal 2018 feb 13.pptx](#)
[SWRCB Briefing 170912.pdf](#)



Resent after address correction.

----- Forwarded message -----

From: "David Drake" <ddrake@smartcoversystems.com>

Date: Feb 13, 2018 3:04 PM

Subject: Comment Letter - Changes to Proposed Regulation Prohibiting Wasteful Water Use Practices

To: <commentletters@waterboards.ca.gov>, "gquist@smartcoversystems.com"

<gquist@smartcoversystems.com>, "Fischer, Jim@Waterboards"

<Jim.Fischer@waterboards.ca.gov>, "Vazquez, Gil@Waterboards"

<Gil.vazquez@waterboards.ca.gov>

Cc:

Jeanine Townsend, Clerk to the Board

State Water Resources Control Board

P.O Box 100, Sacramento, CA 95812-2000

Dear Ms. Townsend,

Please find the attached files as our submittal concerning Waste and Unreasonable Use of Water.

Our main focus is on the control of wastewater and prevention of Sanitary Sewer Overflows. Water lost in SSOs

is usually lost to reclamation, reducing the water available for use. Our premise is to apply 21st century

telemetry to provide closed loop control and predictive maintenance of wastewater systems for optimal risk reduction,

cost control, and safety. Please feel free to ask any questions and we would be pleased to provide an

in person presentation as needed. Jim Fischer advised there may be future opportunities to make a similar

submission and we will do so.

We are very supportive of your efforts and hope for effective improvement.

Very best regards,

David Drake and Dr. Greg Quist

--

David Drake
Vice President of Innovation

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Turning Your Data into Decisions

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Wastewater Discharge Regulations Submittal February 14, 2018

Dr. Gregory Quist
CEO and President

David A. Drake
Vice President of Innovation

SmartCover Systems
Escondido, CA



Overview

The next section identifies specific recommendations to reduce Sanitary Sewer Overflows, improve public health and reduce damage to the environment. **Reducing SSOs also retains wastewater that would have been lost for water reclamation. This increases the source water available for reuse.**

The recommendations are followed by supporting details that show California has significantly improved water quality since 2005 by taking general action against SSOs. These new recommendations take more direct action against SSOs and will more quickly reduce the pollution of natural waters. A key to success is applying 21st century remote sensing and new technology to the old challenge of wastewater management. This moves wastewater operations from “open loop” control to “closed loop” management.

Please feel free to contact us with any questions concerning this issue. A copy of a report to the SWQCB from September, 2017 is included.

Dr. Gregory Quist and David Drake
760-291-1980

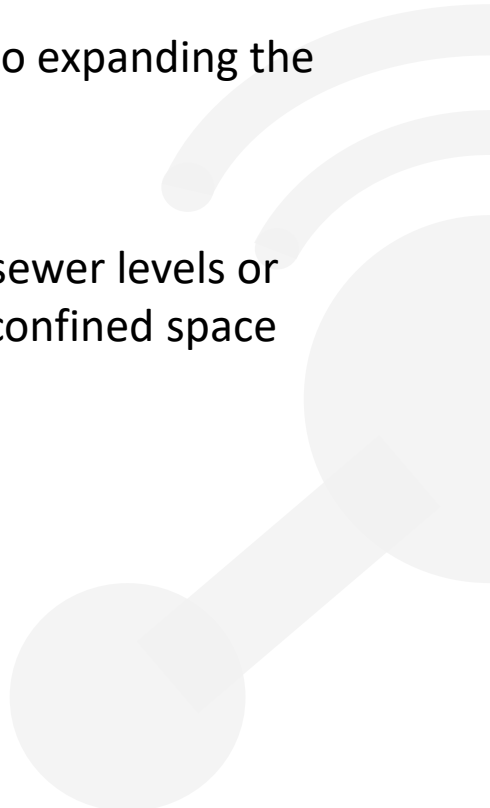
Recommendations

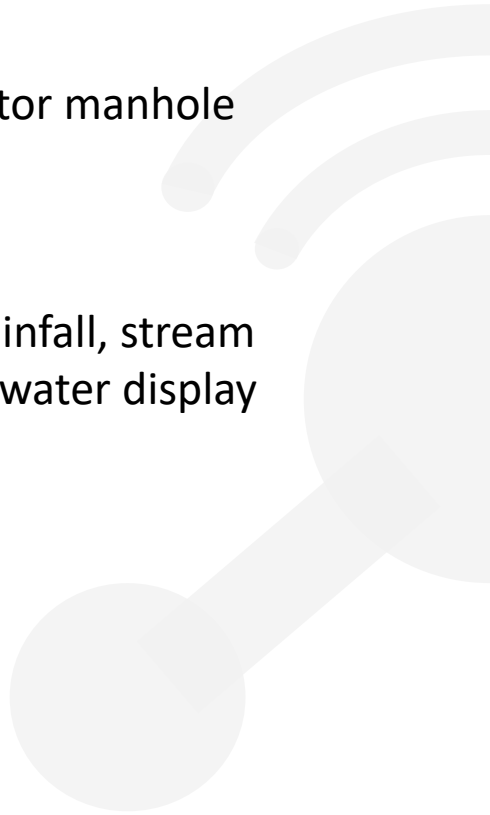
1. Sanitary wastewater agencies should deploy real time monitoring to determine the status of wastewater in pipes, manholes, lift stations and any wastewater conveyance. The real time system shall measure at least the height of the wastewater and optionally, the volume of flow. A real time system is defined as a measurement system with remote sensors that can transmit alarms fast enough that actions can be taken to prevent damage. Many vendors can provide such real time systems.
2. The real time system shall advise cognizant operators of abnormal wastewater height in order for a response to prevent the surcharge of wastewater into the environment.
3. Each wastewater agency will draft and approve a plan for response to abnormal conditions in wastewater.

4. The real time system shall provide two way communications for historic values and alarms to flow to cognizant operators and to allow for operational commands to be sent to remote monitoring units for rapid system adaptation. This shall include wastewater threshold alarm settings.
5. The real time system must allow for continuous level measurements to support condition forecasting.
6. The real time system must record each surcharge event with location, event time, and acknowledgment time.

Recommendations (Cont)

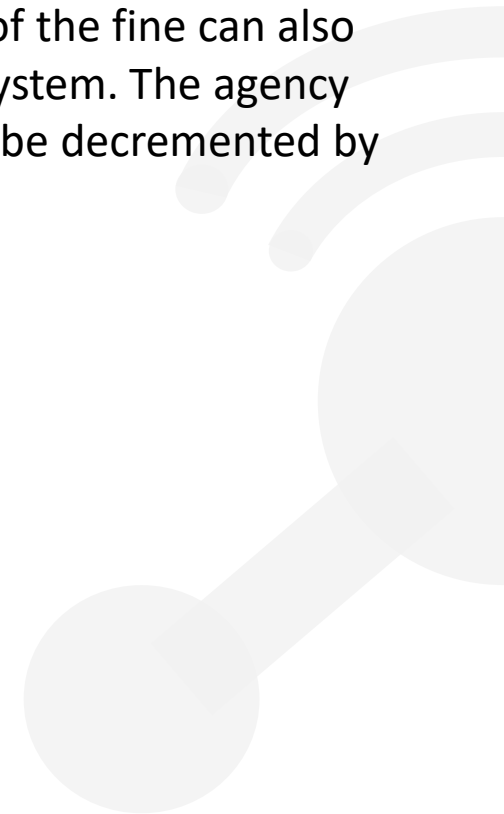
7. Alarms and alerts shall be communicated to cognizant operators by text message, e-mail, or pager, along with a change in status of a web display. Written reports should be accessible for transmission to management for review.
8. The real time system shall provide flexible single channel and multi channel graphics for data display, review and analysis.
9. Real time remote monitors shall be placed at any location that has had a Sanitary Sewer Overflow (SSO) within the last five years.

10. Real time remote monitors shall be placed at any location that represents a serious risk to human health or environmental damage, as determined by the senior manager of the wastewater agency.
 11. In lieu of fines, up to 75% of a potential fine can be applied to expanding the coverage of the real time system to prevent future SSOs.
 12. Installation and maintenance of any sensor used to monitor sewer levels or flows can comply with Cal-OSHA safety standards, including confined space entry.
- 

13. All remote monitoring sites shall be vigorously maintained with a maximum repair time of 5 days.
 14. It is recommended the real time system also be able to monitor manhole security to prevent illegal dumping.
 15. It is recommended the real time system be able to monitor rainfall, stream flow, and tidal information and combine this data with wastewater display for correlation.
- 

Recommendations (Cont)

- 16. In order to encourage the deployment of real-time systems more quickly, and thus to reduce SSOs faster, it is proposed that investments in qualified real-time systems be offset by a credit against fines. The investments accumulate into a “virtual” or “shadow” account. If the agency is fined for an SSO, the shadow credit shall be first applied to the fine. 75% of the remainder of the fine can also be applied to the direct expansion of the qualified real-time system. The agency would pay the remainder in cash. The shadow account would be decremented by the payment.



Awareness Goals

- Supporting the recommendations
- Understand the past
- Make decisions today
- Improve the future

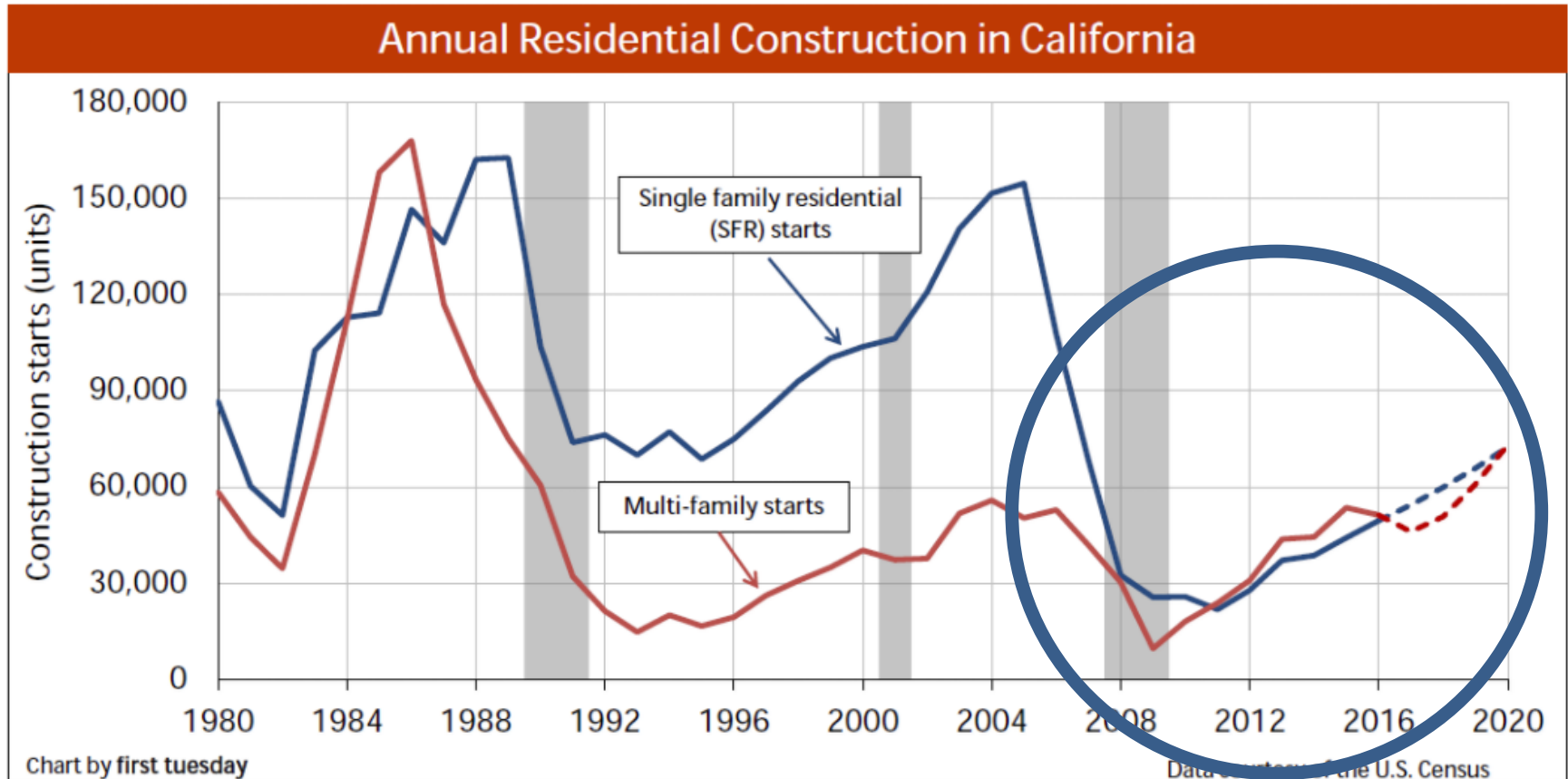


Solutions through Technology

Real-Time Continuous Monitoring Technology

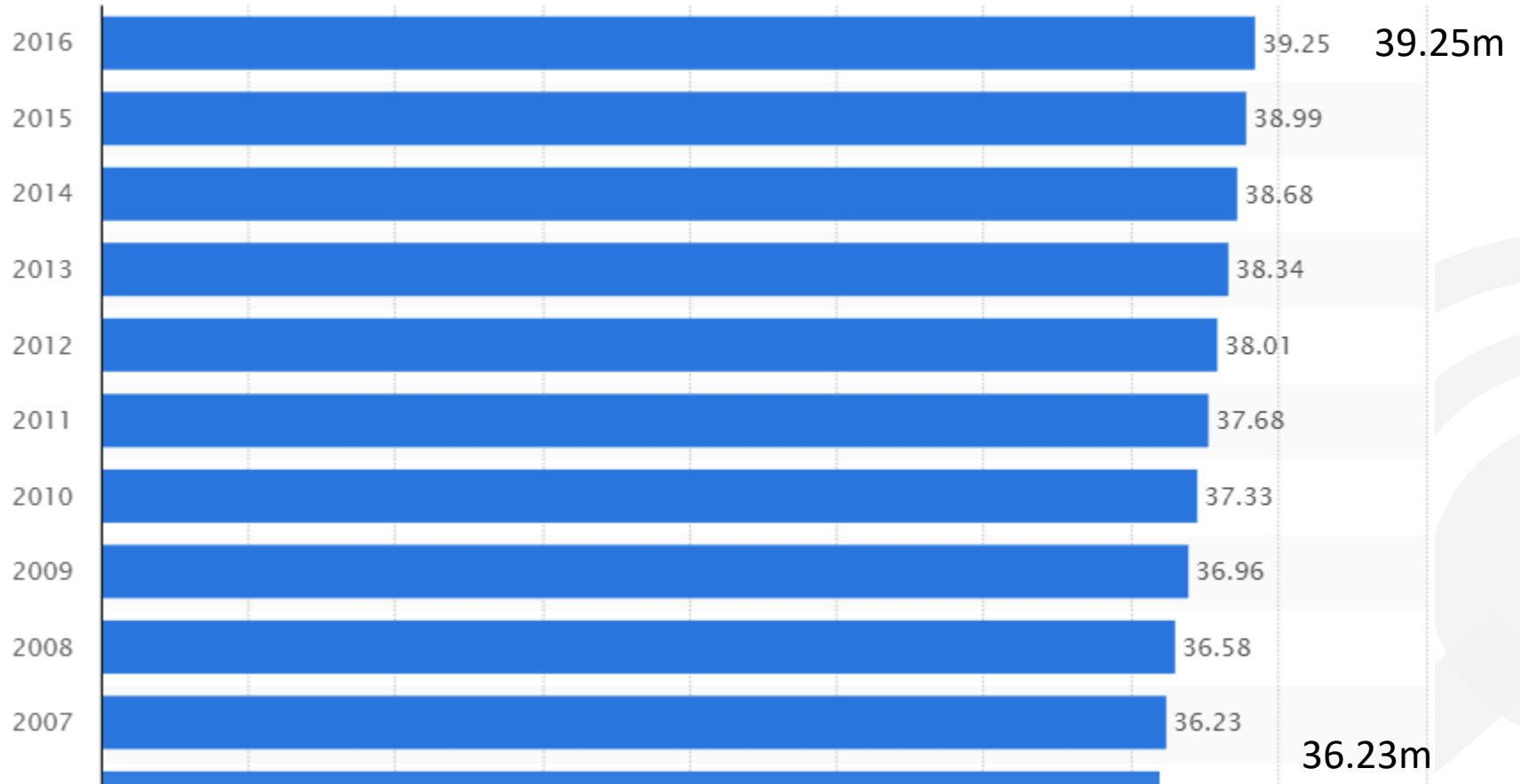
- Is here and it works
 - Allows transformational change, e.g.
 - 99% reduction in spills
 - 94% reduction in cleaning
 - Millions in savings for decaying infrastructure
 - Operational savings
 - Capital savings
 - Lower risk
- = A BETTER ENVIRONMENT**

California Housing Starts



Housing starts are a good proxy for economic growth

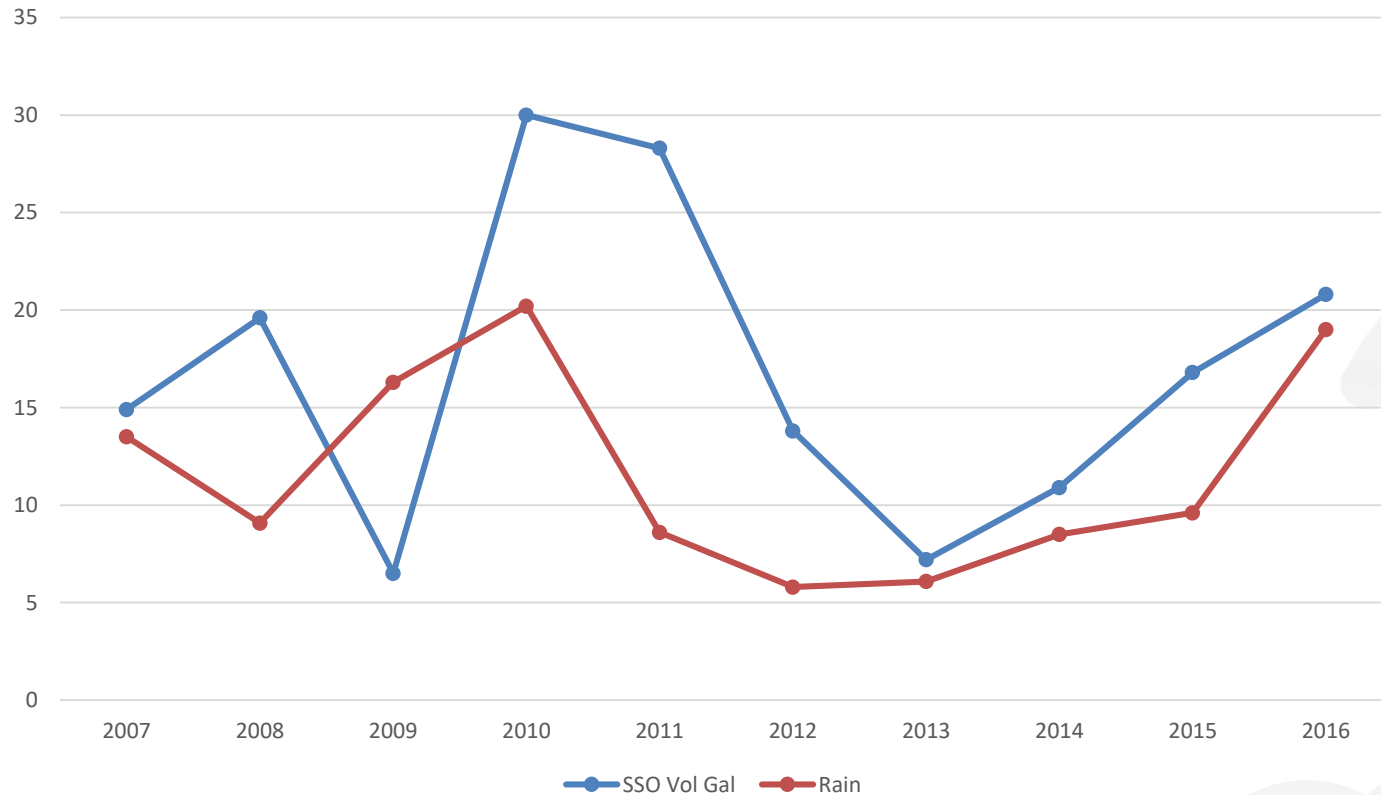
California Population



The population has grown by 3 million people since the first WDR

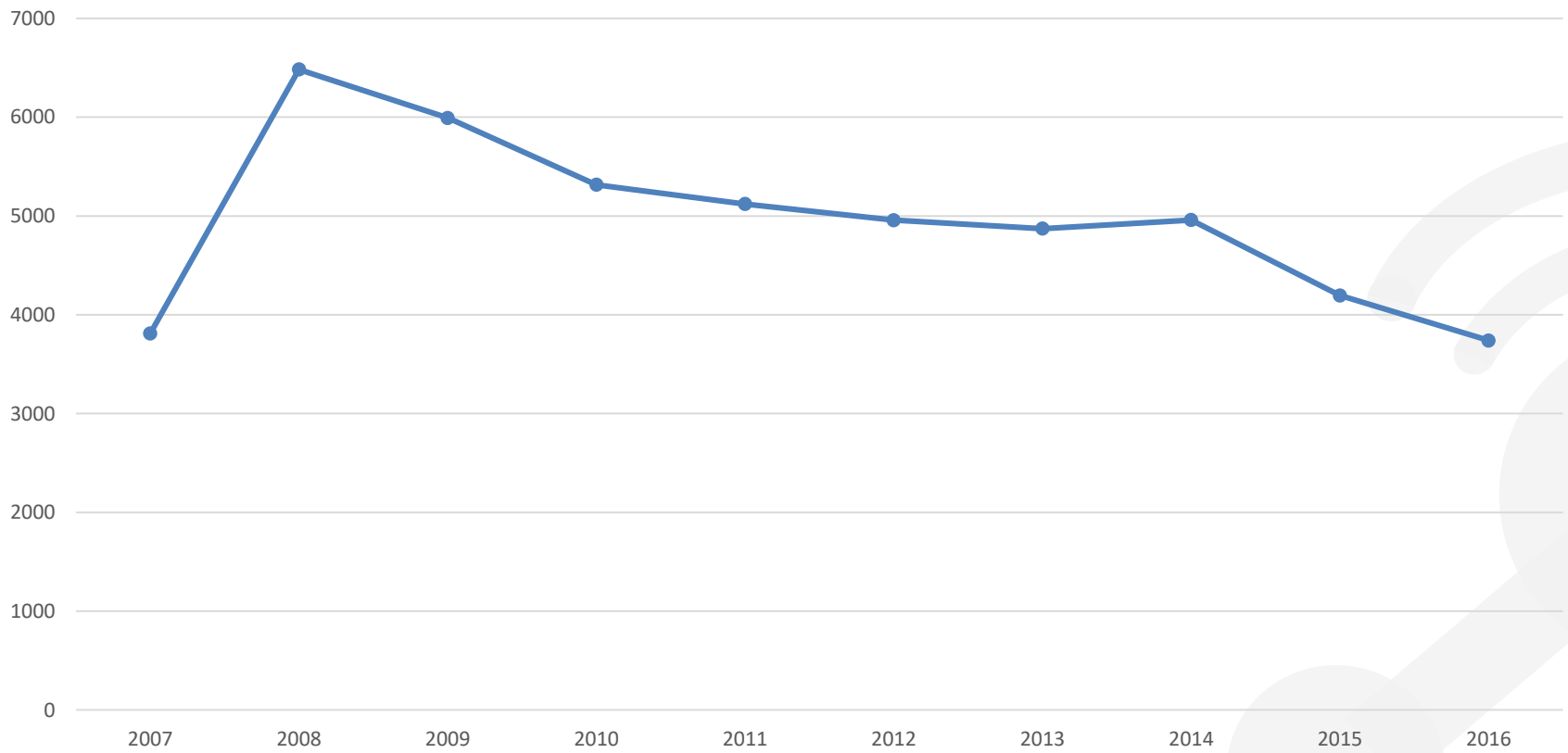
SSOs and Rainfall

Annual California SSO Gallons in Millions vs. Rain in Inches



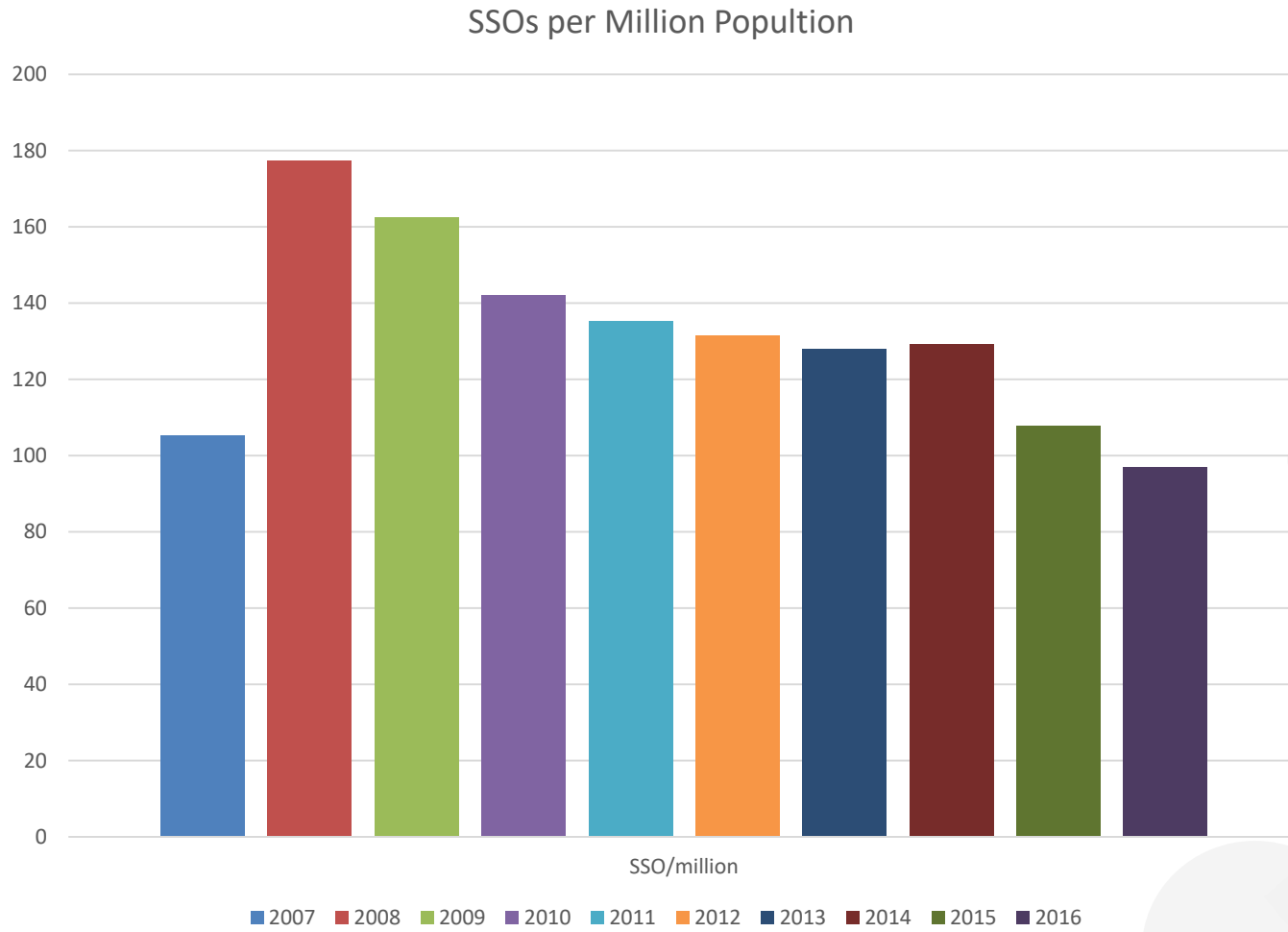
There is correlation between rainfall and SSOs

SSO Count



The SSO count has been falling due to improved operations

SSOs per Million Population



The SSO count has fallen, even with expanding population

Trending of Water Levels

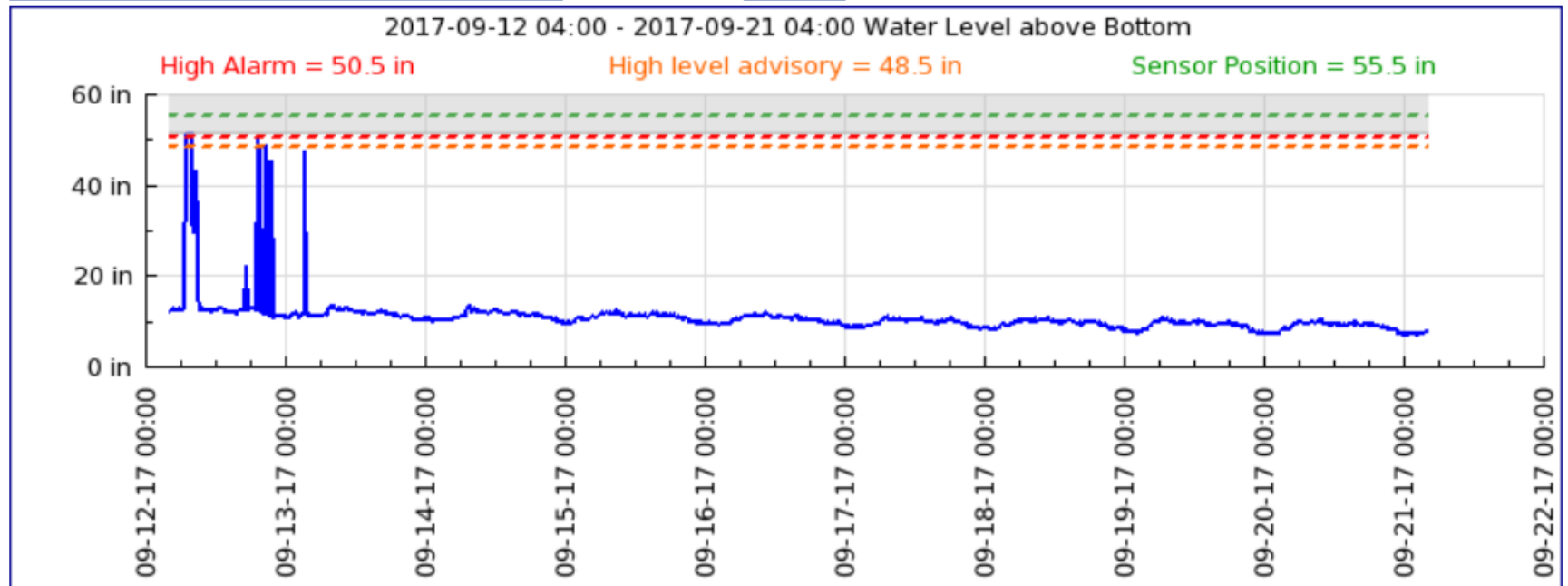
- Detecting rising or falling long term trends
- Identifying installation issues
- Identify poor conditions ahead of alarm events and take action
- Alarms are **not** desired

Falling Trend

The following 5 sites are experiencing a level trend fall:

Lift Station 7 MH 4 Pomelo Ave and Alta Vista - Trends: Fall - Settings

[Top](#)



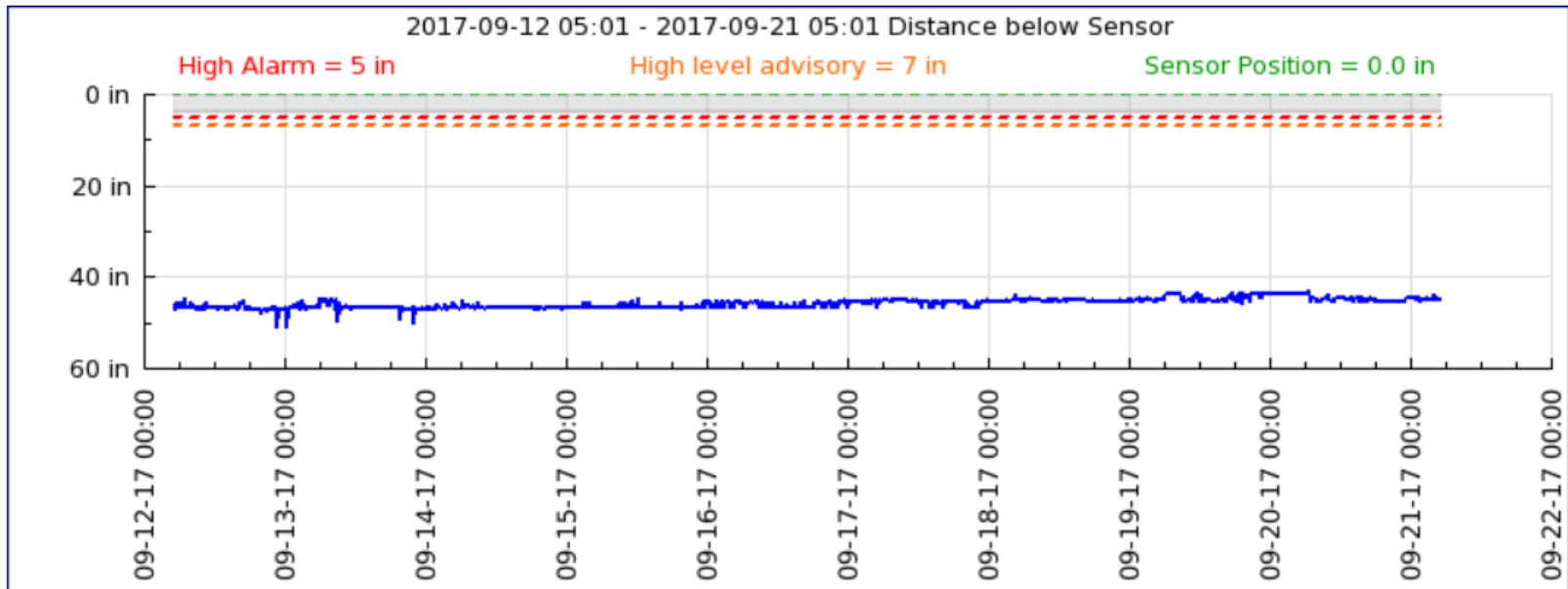
This is an example of an upstream blockage

Rising Trend

The following 1 site is experiencing a level trend rise:

[1099 Rendon Crowley ID 33569](#) - Trends: Rise - [Settings](#)

[Top](#)



A subtle rise cannot be detected by eye, but rather by linear trending

So...

- You look at historic data to **determine risk**
- You observe the effects of independent environmental problems
- You tabulate and **prioritize actions** you should take
- The goal is to **sharpen the Capital Improvement Plan** and control rates
- A qualified real-time system can **guide** the above

Pipe Condition

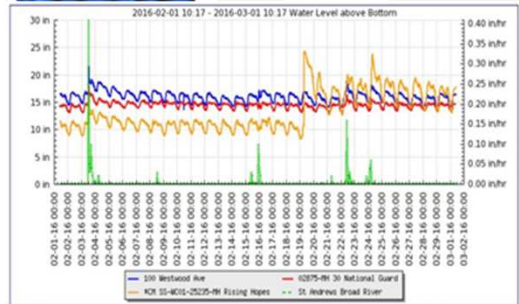
- The oldest pipes aren't always the big problem
- Installation stupidity, years before, is the largest problem
- Preemptive repair is often four times cheaper than response repair
- Roots are insidious, difficult to diagnose

Remember...

- Understand the past
- Make decisions today
- Improve the future
- Support the recommendations

Closing

1. The recommendations at the beginning are supported by the methods and procedures described.
2. Over 10,000 surcharges have been detected and forwarded to wastewater managers all over California and they have subsequently prevented thousands of SSOs.
3. Real time monitoring directly reduces the incidence of SSO events.
4. The fine credit system avoids the claim of an “unfunded mandate”.
5. A detailed technology report that was presented to the SWQRCB is attached for your review.

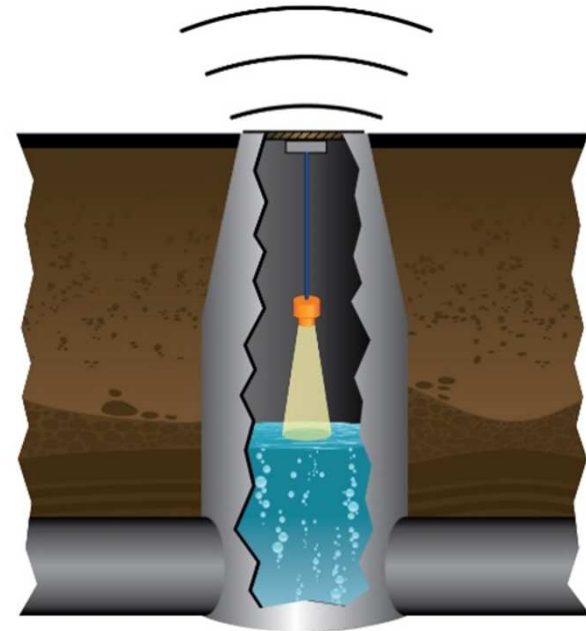
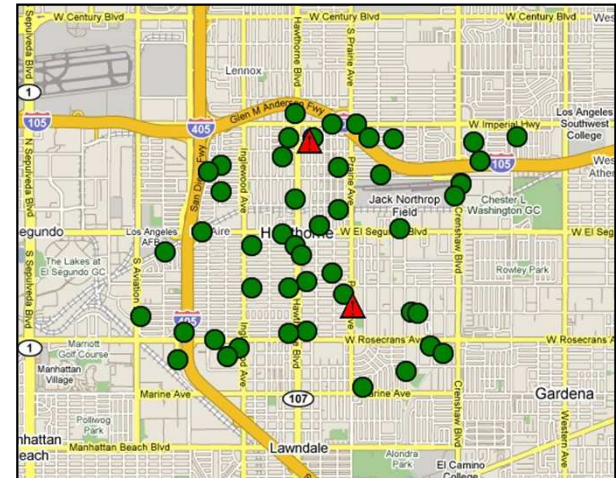


SmartCover Systems

September 12, 2017

About SmartCover Systems

- San Diego technology company
- Serving water industry with smart infrastructure and IoT
- 13th year of operations
- >3,000 installations, > 300 utilities, >160 million operating hours
- 15 patents, US and international
- Solutions for:
 - SSO monitoring and prevention
 - Optimized cleaning: operational savings
 - Real-time CSO monitoring and reporting
 - Stormwater monitoring
 - I&I detection
 - Capital project prioritization



Our Mission

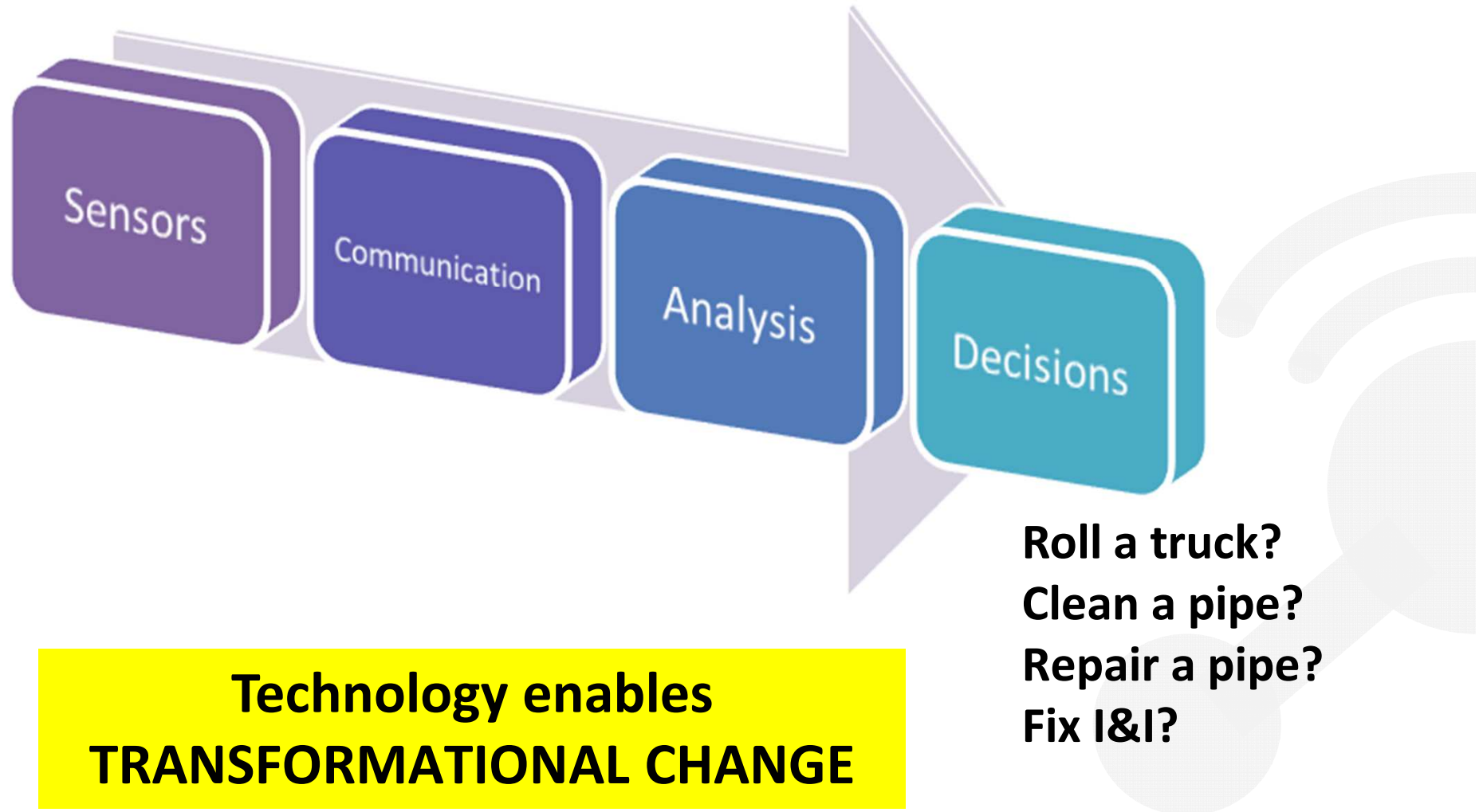
SmartCover Systems provides end-to-end real-time monitoring systems to our customers who benefit:

- *Internally, through lower costs, improved performance and lower risk; and*
- *Externally, by safeguarding our water, public health and the environment.*

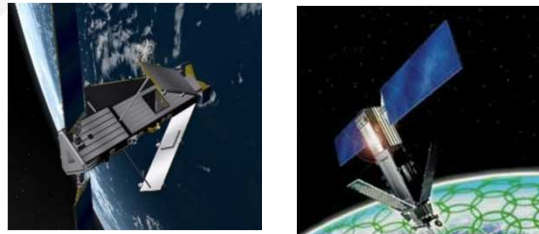


The Internet of Things

SmartCover[®] Integrated Solution Delivery Model

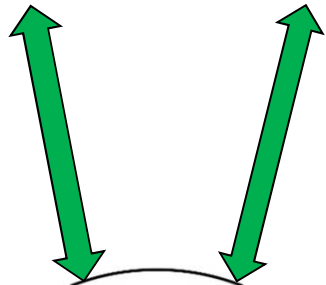


How it Works

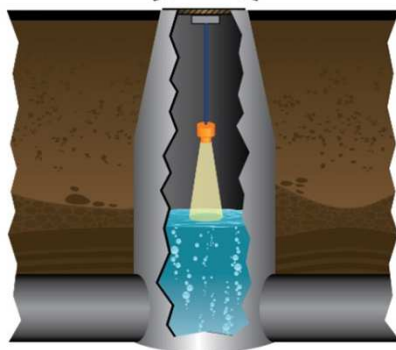
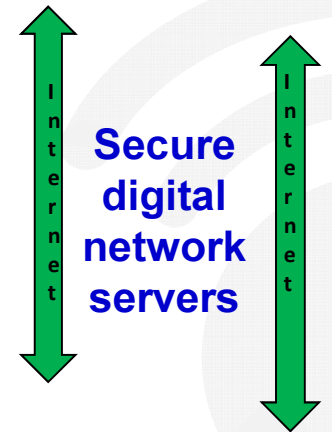


Redundant Iridium Satellite Network

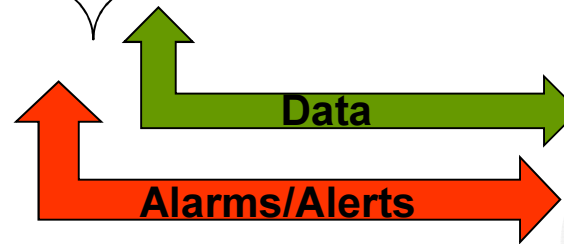
Redundant Ground Stations



Bi-Directional User Interfaces



**SmartCover[®] :
Remote Site
Direct to Satellite
Communication**

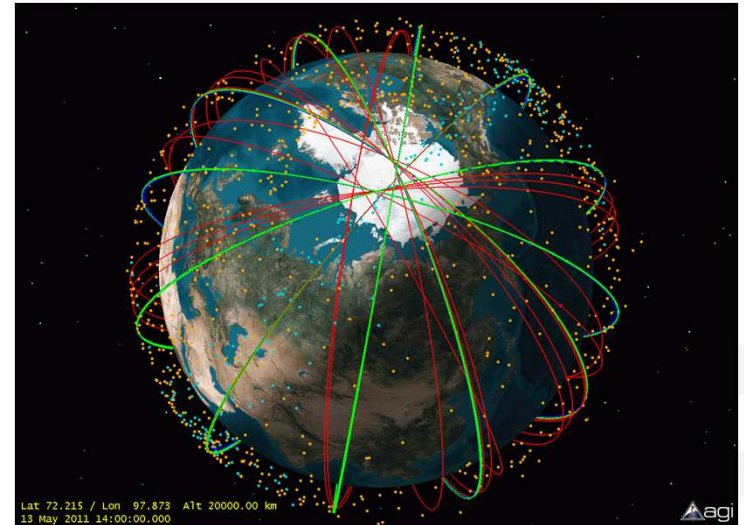


**Secure SCS Servers
(San Diego)**

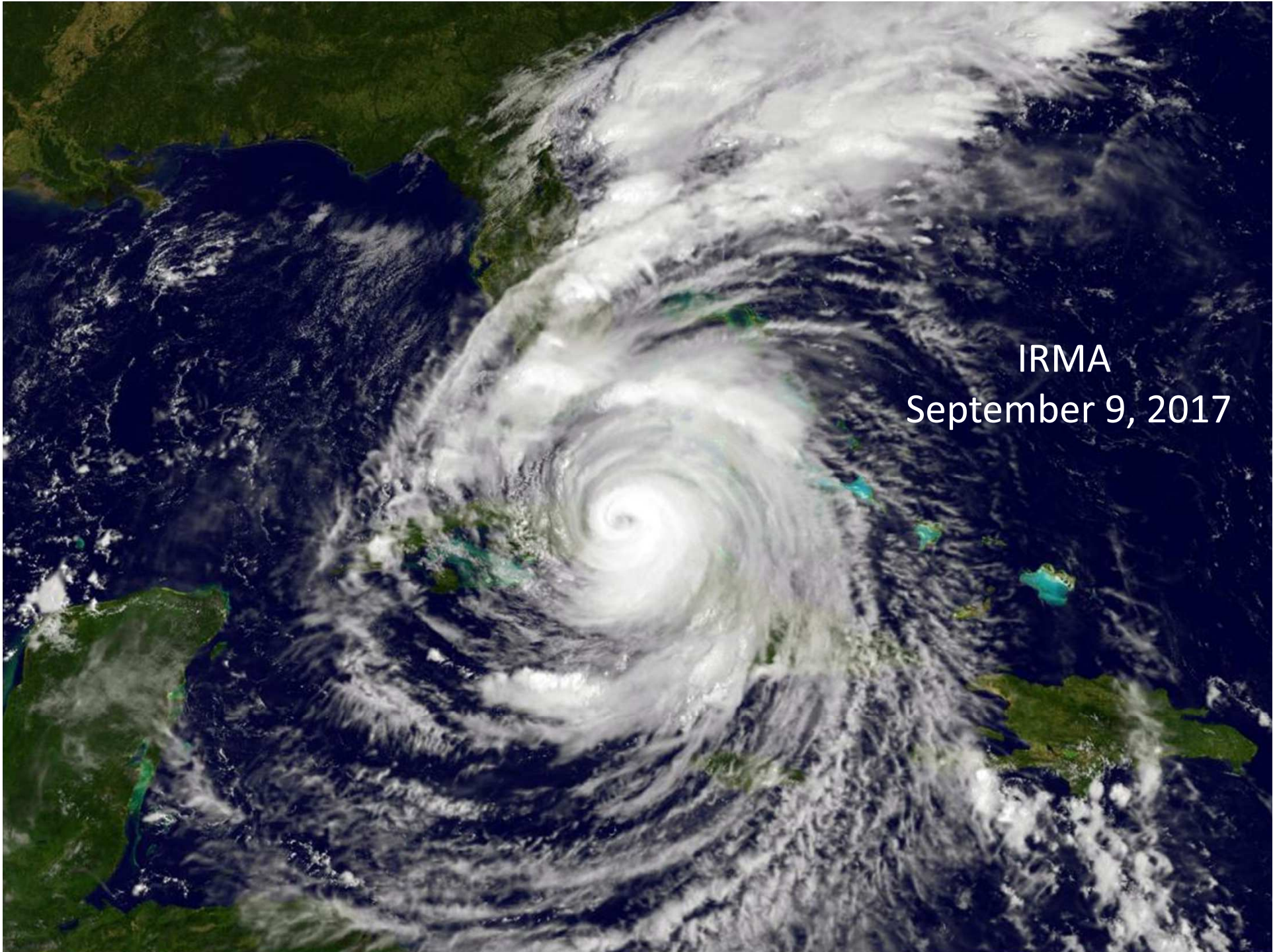
The Iridium System

Iridium Satellite System

- **66 active satellites in Polar, Low Earth Orbit - 485 miles**
- **Global, redundant coverage**
- ***Mission critical reliability***
 - **Used by the DoD for troops**
 - **Needs small % of horizon**
 - **No issue with shadowing i.e., underpasses or trees**
 - **No issue with weather:
100% reliability during Sandy**



Only telemetry system operating reliably during Hurricane Sandy



IRMA
September 9, 2017

Cell-based Wireless



FPL is assembling a restoration force of more than 13,500 including utility partners from 29 states, as far away as Texas and California. - Florida Power and Light Company

HURRICANE

When will power and cellphone services be restored? Patience urged



BY NANCY DAHLBERG AND RENE RODRIGUEZ

ndahlberg@miamiherald.com

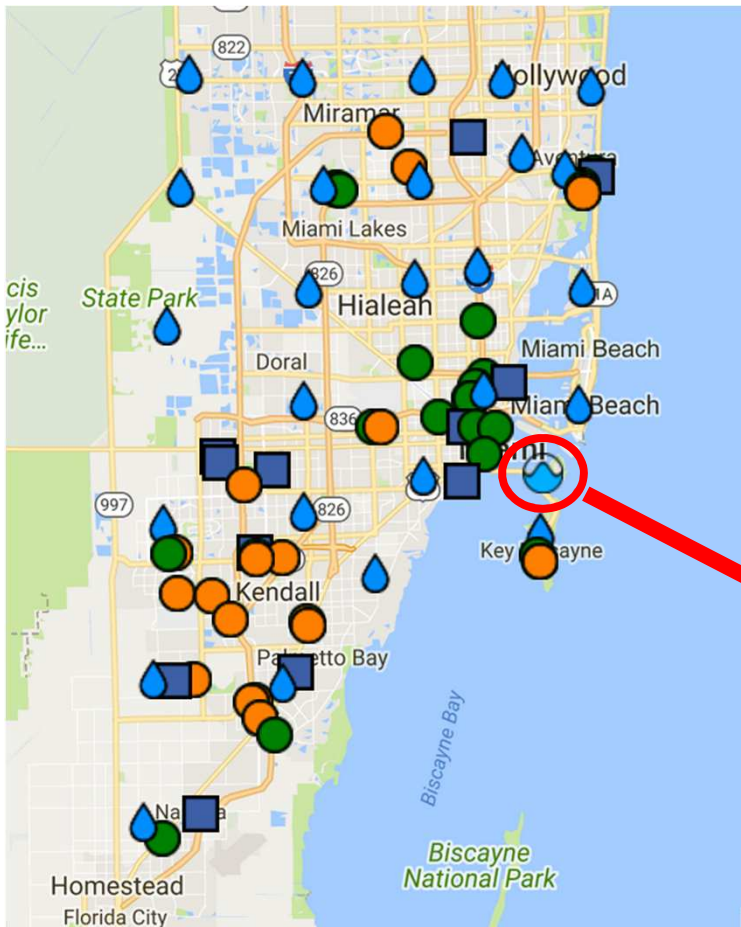


SEPTEMBER 11, 2017 9:16 AM



On the day after Hurricane Irma, the question everyone wants answered is: When will my power and cellphone service be restored?

Satellite-based Wireless

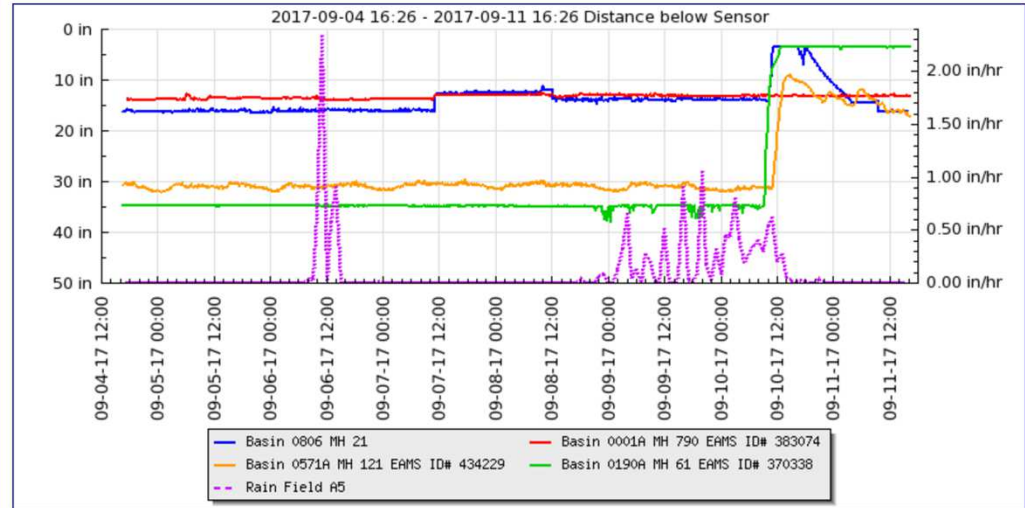


Miami Dade Water and Sewer

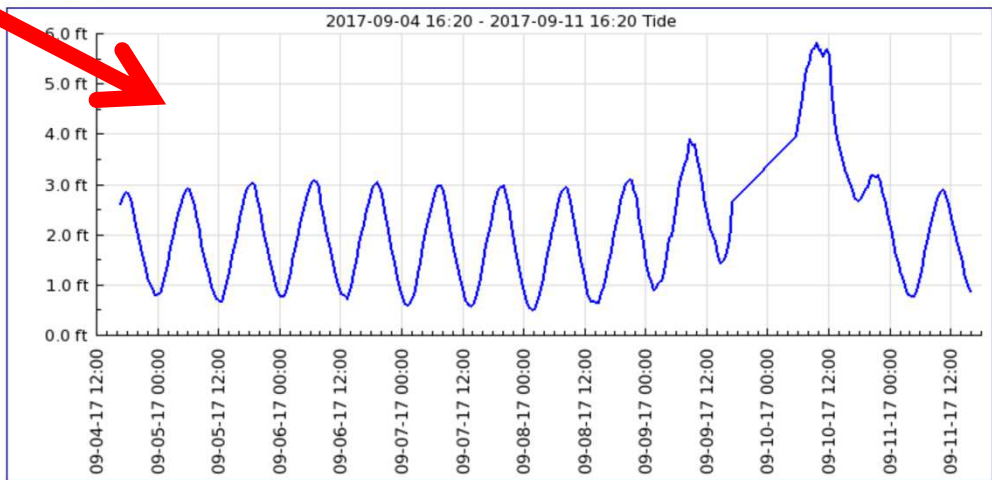
SMARTCOVER[®] SEWER INTELLIGENCE[®]

You are logged in as: gquist :: Super Admin :: Switch Organization :: Logout

Map SmartTrend[™] Alarms and Alerts System Operations Multi Graphs Super Admin Support Contact

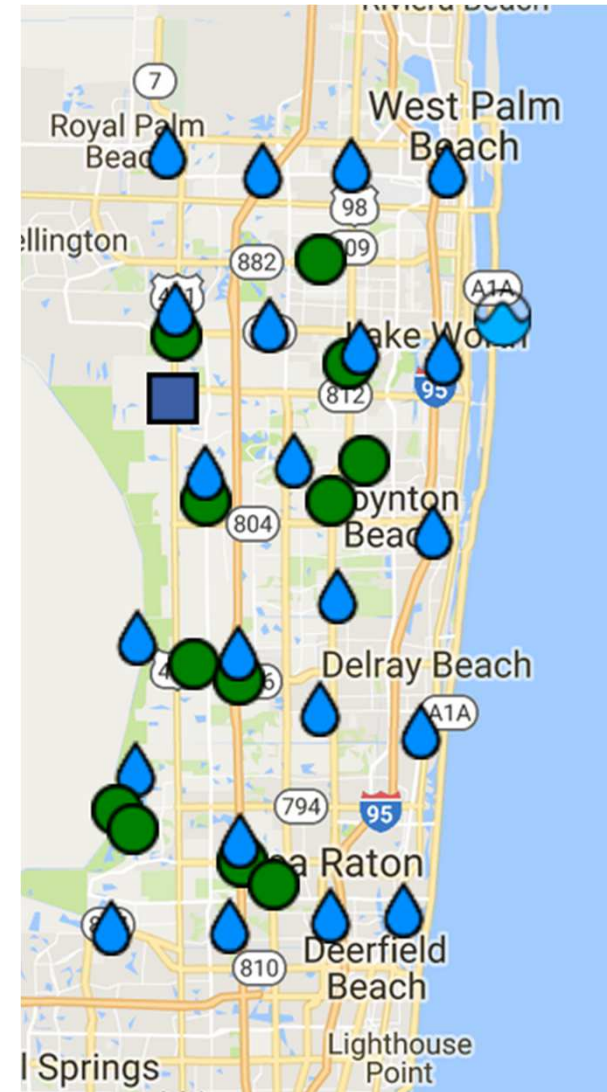


Virginia Key



No interruption in service before, during, after Irma

More Irma Results...



Florida Drainage Canals



Operations during Irma

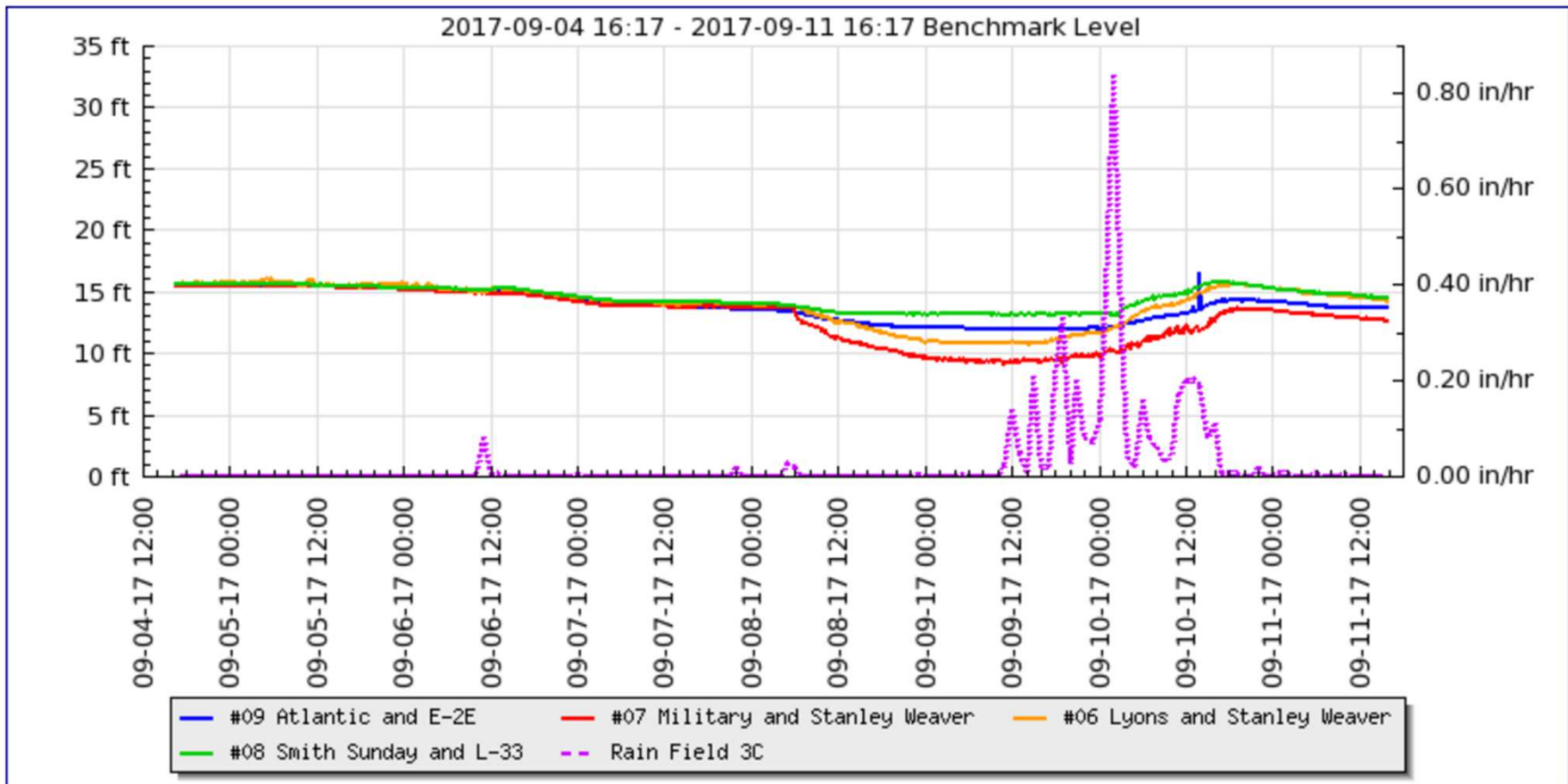


Lake Worth Drainage District

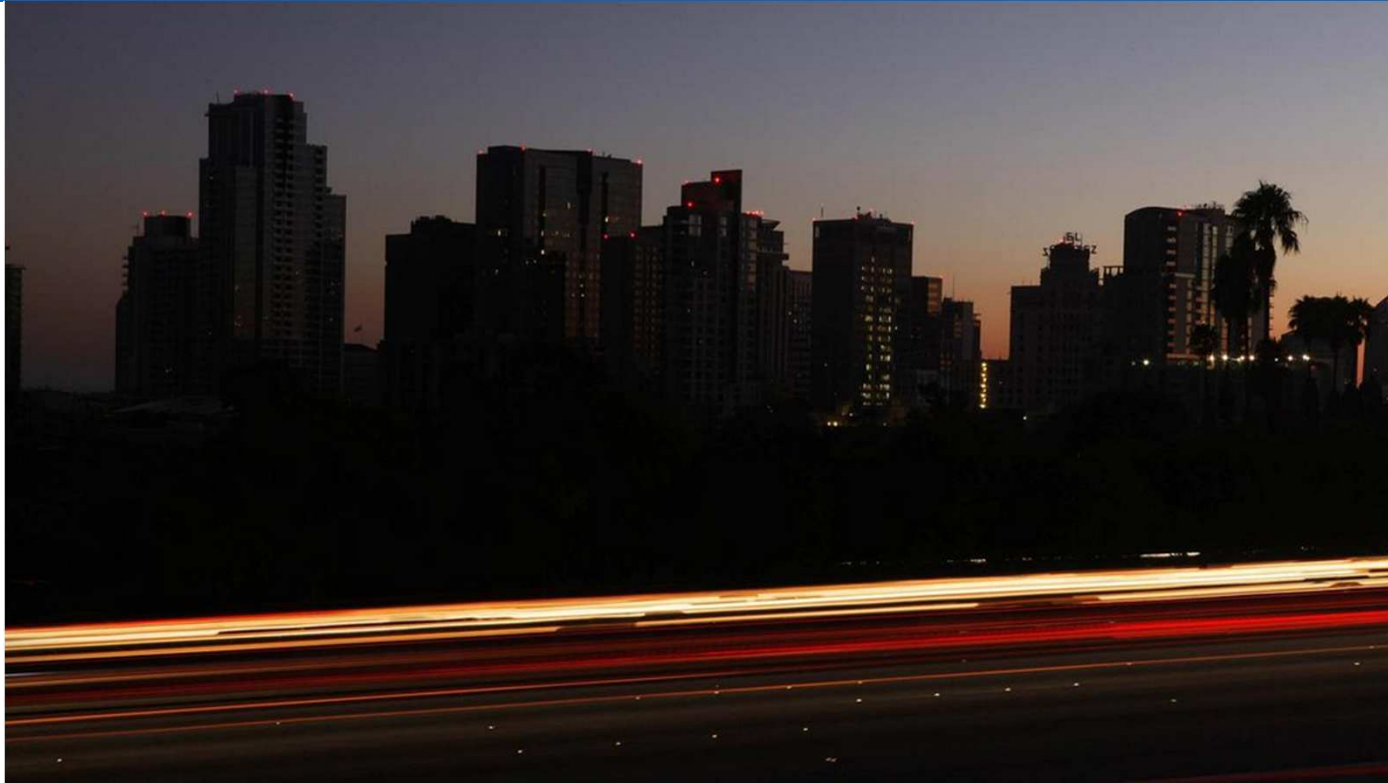
SMARTCOVER® SEWER INTELLIGENCE®

You are logged in as: gquist :: Super Admin :: [Switch Organization](#) :: [Logout](#)

[Map](#) [SmartTrend™](#) [Alarms and Alerts](#) [System Operations](#) [Multi Graphs](#) [Super Admin](#) [Support](#) [Contact](#)



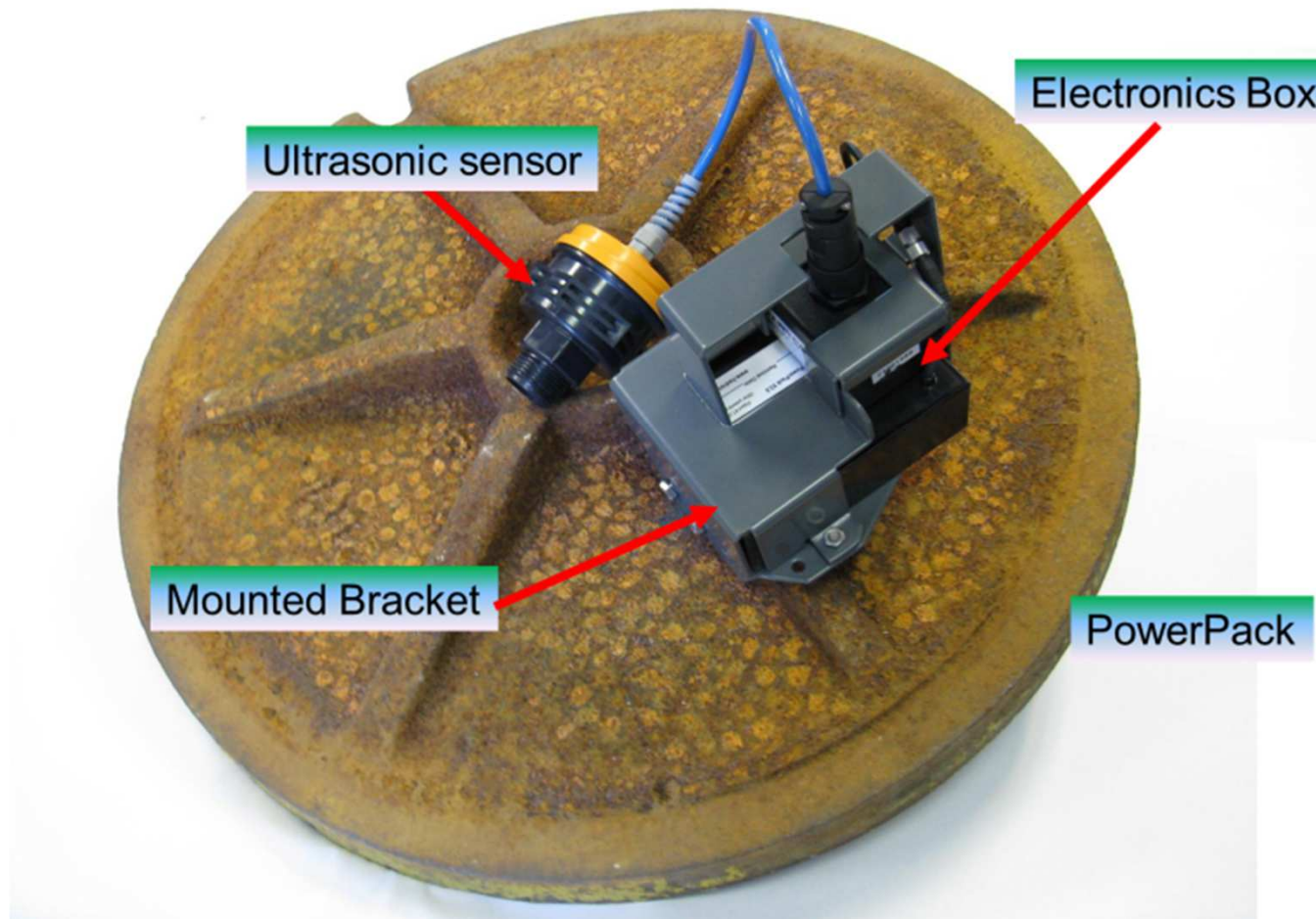
The Great Southwest Blackout



September 2011 Southwest Blackout Event

On May 1, 2012, FERC and NERC issued a joint report on the September 8, 2011 Southwest Blackout Event. On the afternoon of September 8, 2011, an 11-minute system disturbance occurred in the Pacific Southwest, leading to cascading outages and leaving approximately 2.7 million customers without power. The outages affected parts of Arizona, southern California, and Baja California, Mexico. All of the San Diego area lost power, with nearly 1.5 million customers losing power, some for up to 12 hours. The disturbance occurred near rush hour, on a business day, snarling traffic for hours. Schools and businesses closed, some flights and public transportation were disrupted, water and sewage pumping stations lost power, and beaches were closed due to sewage spills. Millions went without air conditioning on a hot day.

Sensor Mounting System



NO Confined Space Entry



CAL
OSHA[®]

Subchapter 7. General Industry Safety Orders
Group 16. Control of Hazardous Substances
Article 108. Confined Spaces

[Return to index](#)

[New query](#)

§5157. Permit-Required Confined Spaces.

*“Entry means the action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as **any part of the entrant's body breaks the plane of an opening into the space.**”*

Does it Really Matter?

2008



2 Dead in Sewer Line Accident at The Orleans

(Feb. 4) -- The sole survivor of a deadly accident at the Orleans hotel remains in critical condition.

The accident happened Friday. An engineer was fixing a sewer pipe when it broke. The water pressure knocked the saw out of his hands. He then fell in after it.

Two co-workers jumped into the eight-foot hole to help but toxic fumes inside knocked all three out. Two of the men died.

Officials have not said if the survivor is the man who fell in or one of the workers who tried to help.

(Feb. 2) -- Trying to save their co-worker, two men risked their own lives and jumped into a sewer hole after him.

An engineer was trying to fix a sewer pipe, but as he finished sawing, a torrent of water swept the tool from his hands and he fell in after it.

2017



A woman comforts a man at the site of Monday's tragedy in Key Largo during which three utility workers died in a wastewater trench. **DAVID GOODHUE** - dgoodhue@keysreporter.com

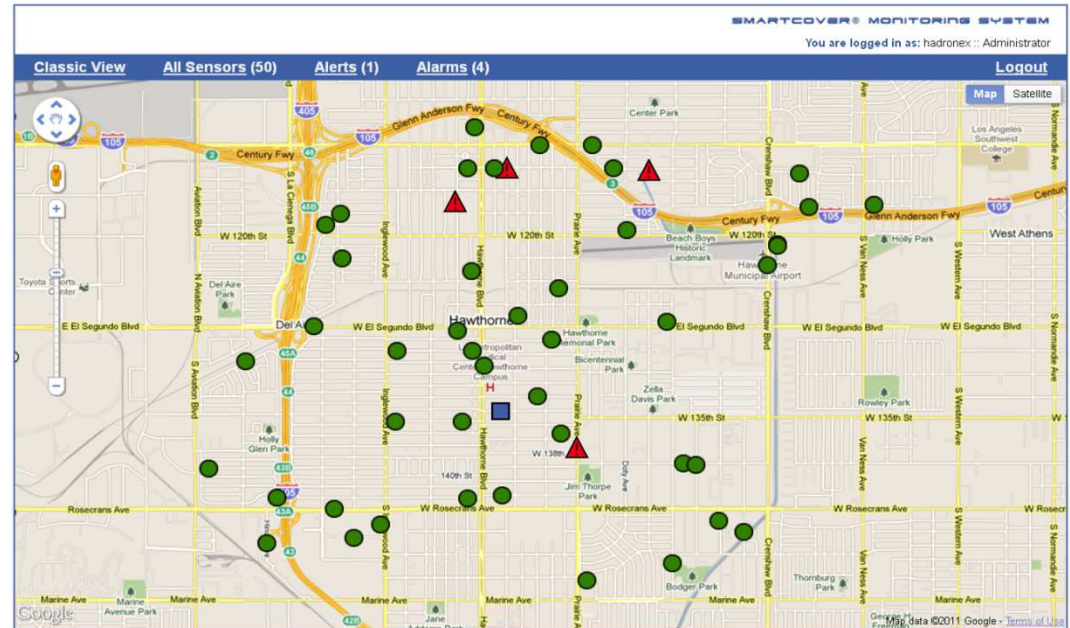
FLORIDA KEYS

Three men descend to their death, overcome by poisonous gas under the ground

Case Study: Hawthorne, CA

Eliminating Spills

- 2 Full-time field staff
 - 90 miles of pipeline
 - 2,000 manholes
 - 0 Lift stations
- ~ \$400K per year in fines
PLUS clean up and litigation



Historical average spills/year - **10**

Since installation of 50 unit monitoring system (11/06):

1 SPILL (at unmonitored location)

99% reduction of overflows

Estimated program savings: > \$2.5MM

Imagine a Future...

“Last Rain Storm Left Some Grit”

“Getting a Few Roots Here”

“All Clear”

“FOG Getting Thick CLEAN ME”

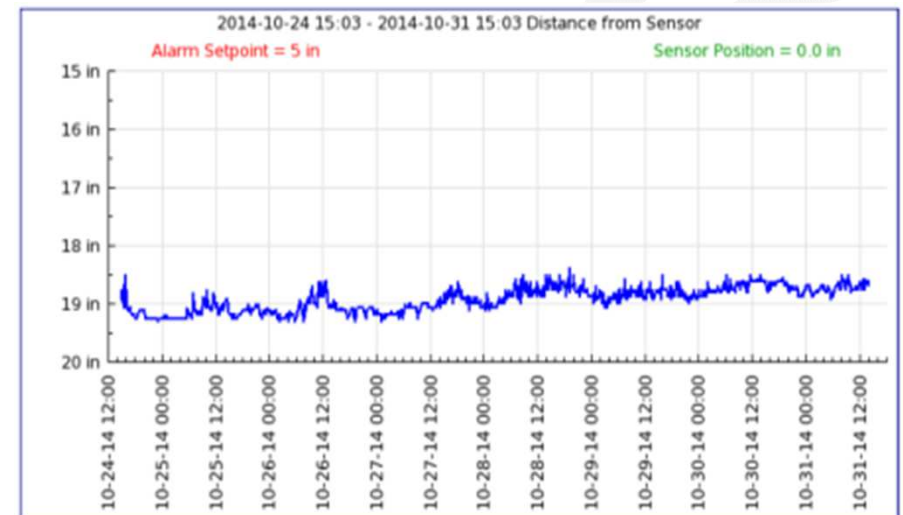
“No Problem”

“I’m Good”



Tipping the Scales

- Most overflows are a result of capacity issues -

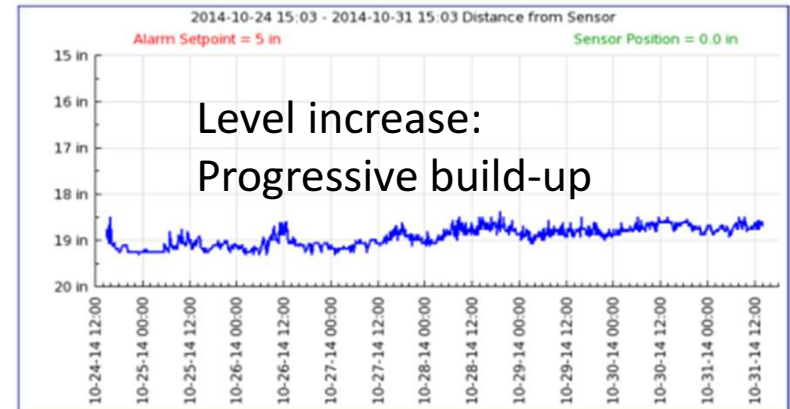


A Few Facts about Blockages

Most blockages are progressive

Causes

- Tree roots
- Fat, Oil and Grease (FOG)
- Sedimentation
- Grit
- Pipe decay



Conventional Solution

Clean, Clean, Clean where...

- Exaggerated action (high frequency cleaning) increases expense



Frequency	30-Day Sites	90-Day Sites	6-Month Sites	Annual
Action	Clean	Clean	Clean	Inspect & clean

Limiting Factors

- Open-loop- no ongoing feedback
- Users are *blind* collection system changes between cleanings

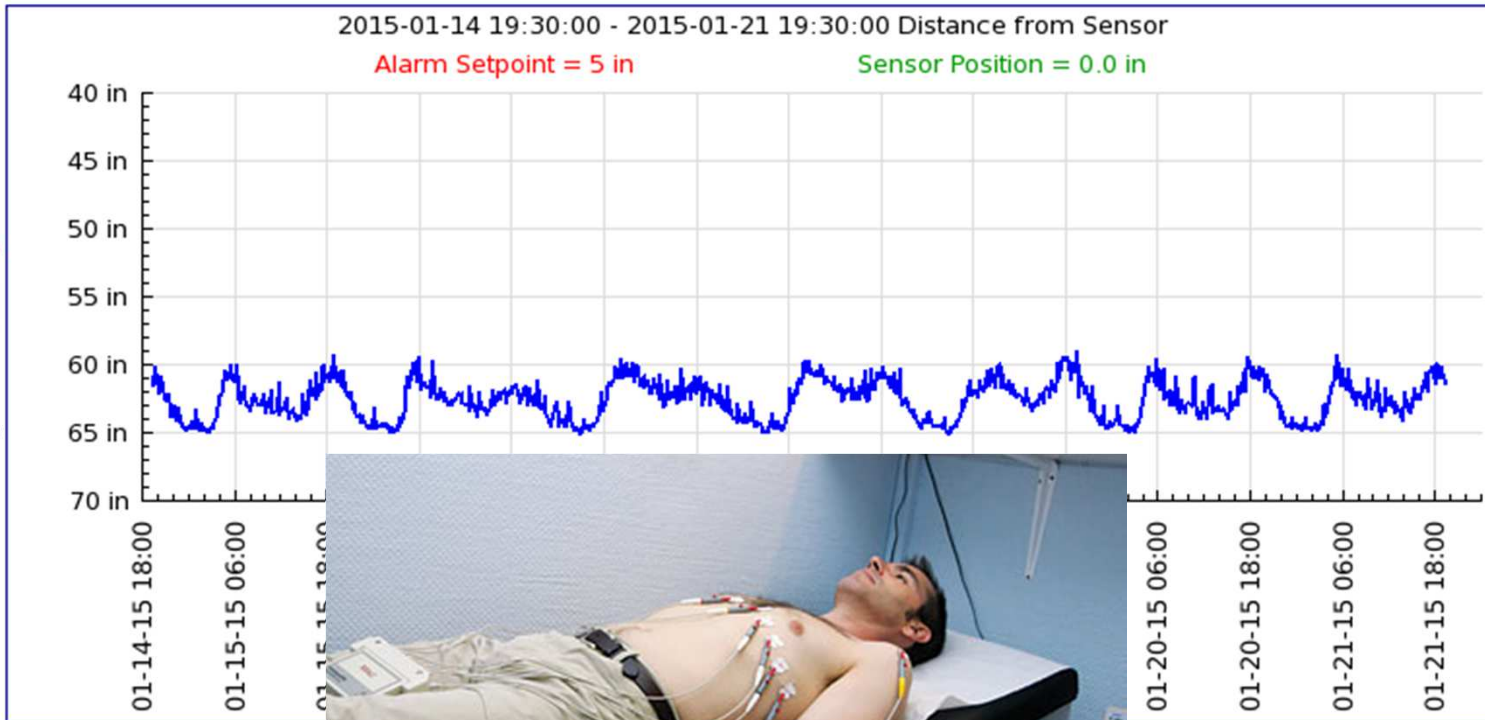
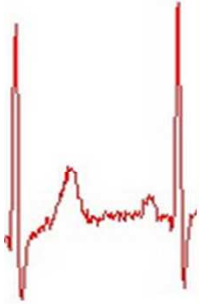


Overflow Impact

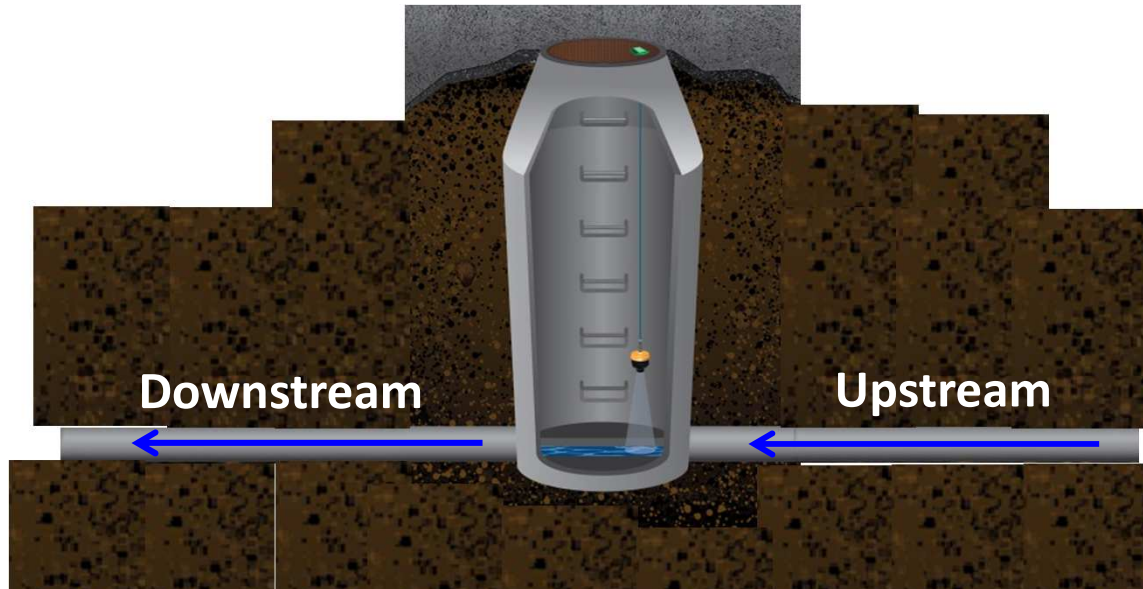
- Human Health
- Environmental Impact
- Bad Press
- Political turmoil
- Unplanned Cost



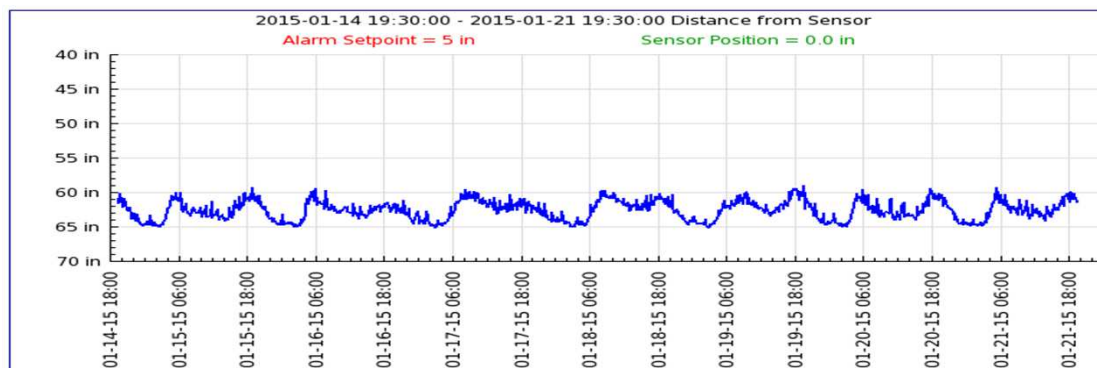
The Language: Sewer EKG



How Do I Hear a Sewer?



Ultrasonic
sensor



Learning to Listen

A Few Observations

- Every collection system is unique
- Every manhole and pipe section is unique
- Dry weather and wet weather are different
- Dry weather patterns are easier than wet weather patterns
- BUT – there are a few basic truths that stand out
- The patterns will talk – but it will take time to interpret the language



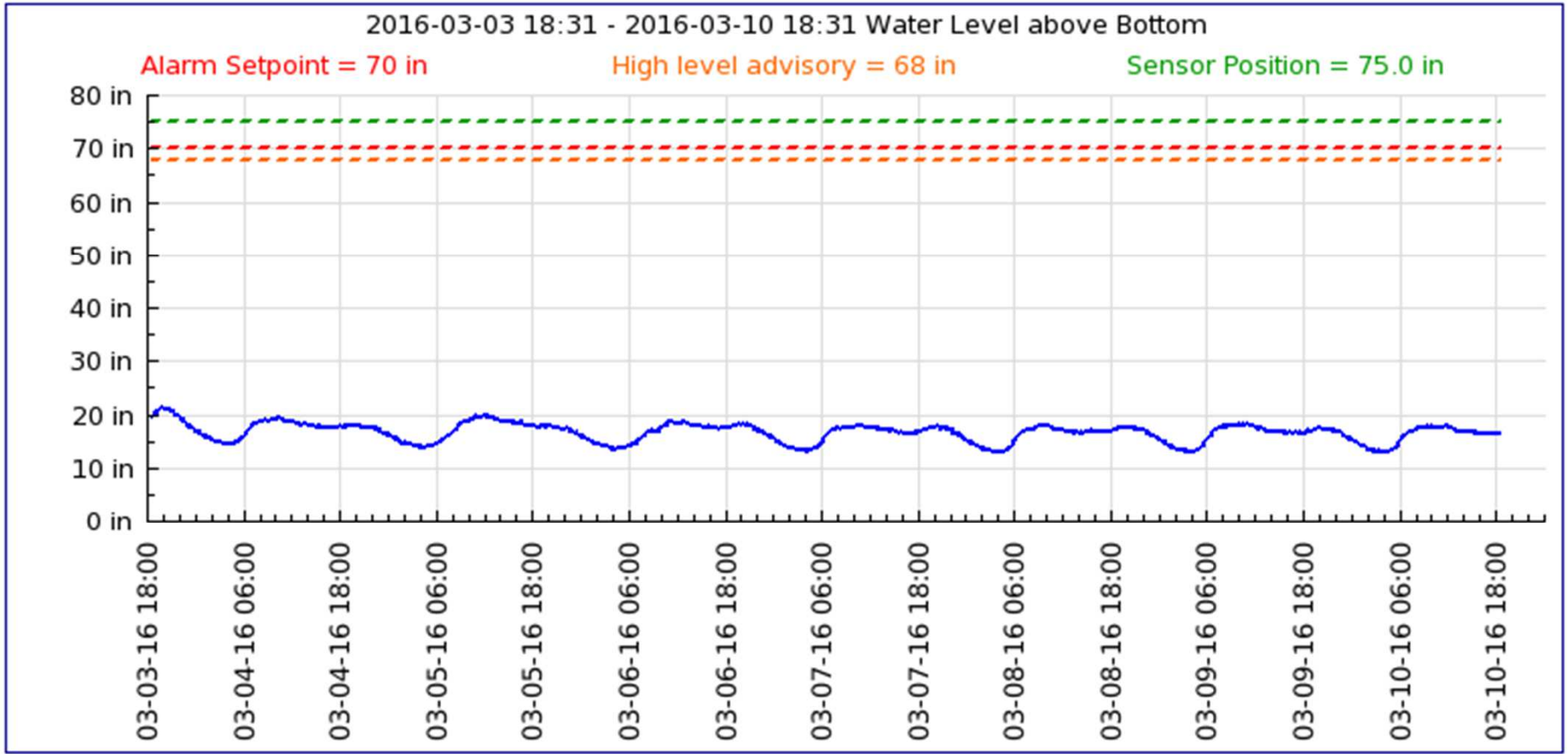
“Everything is Fine”

Characteristics of a NORMAL (Dry Weather) Flow

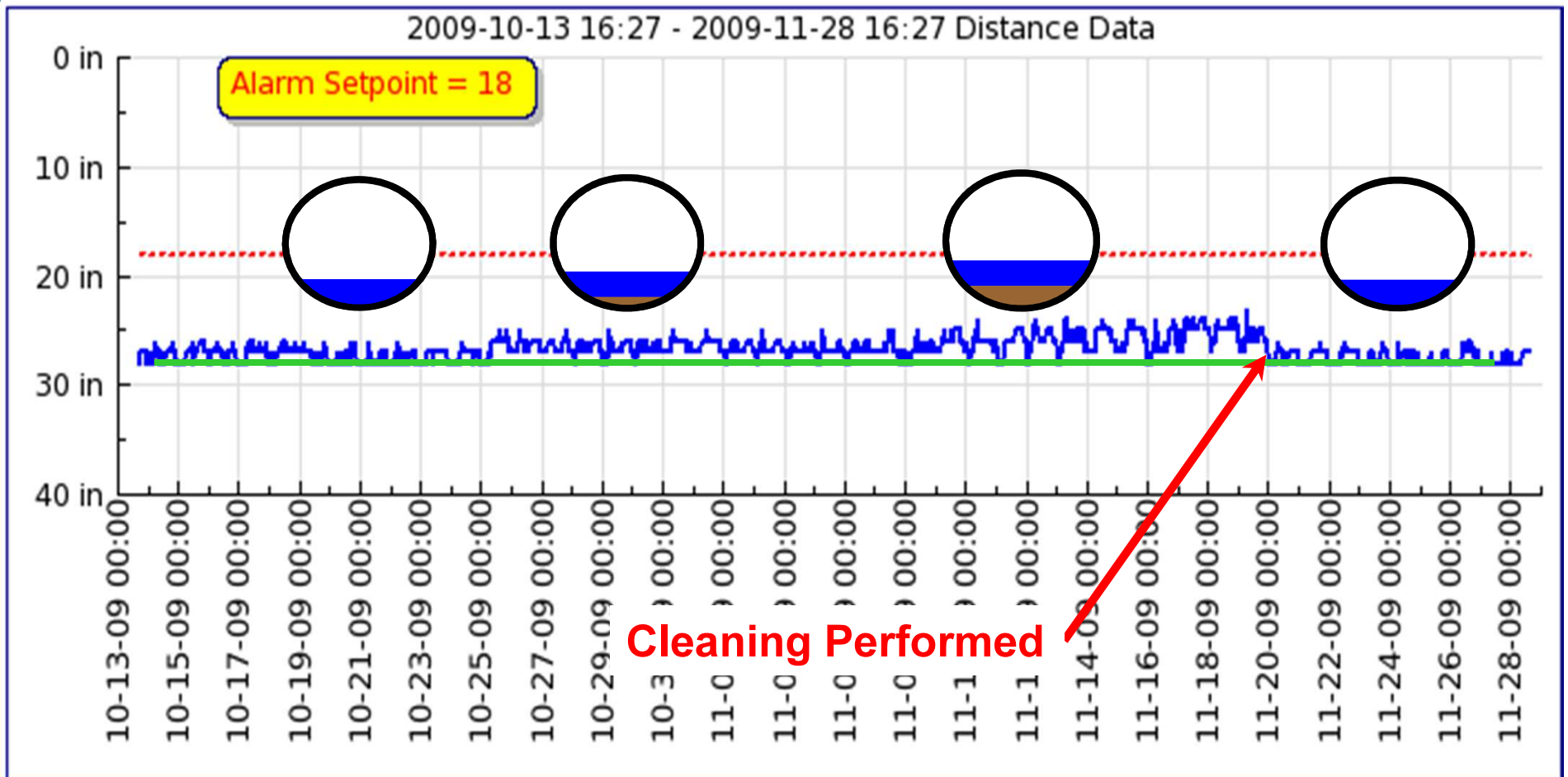
- The “standard pattern” stays the same
 - Diurnal patterns
 - Residential: Double hump (morning/evening)
 - Industrial: it depends
 - Weekly patterns: weekends vs. weekdays
- Minima don't rise: no grit buildup
- Maxima do not have increasing pattern



“I Feel Good”



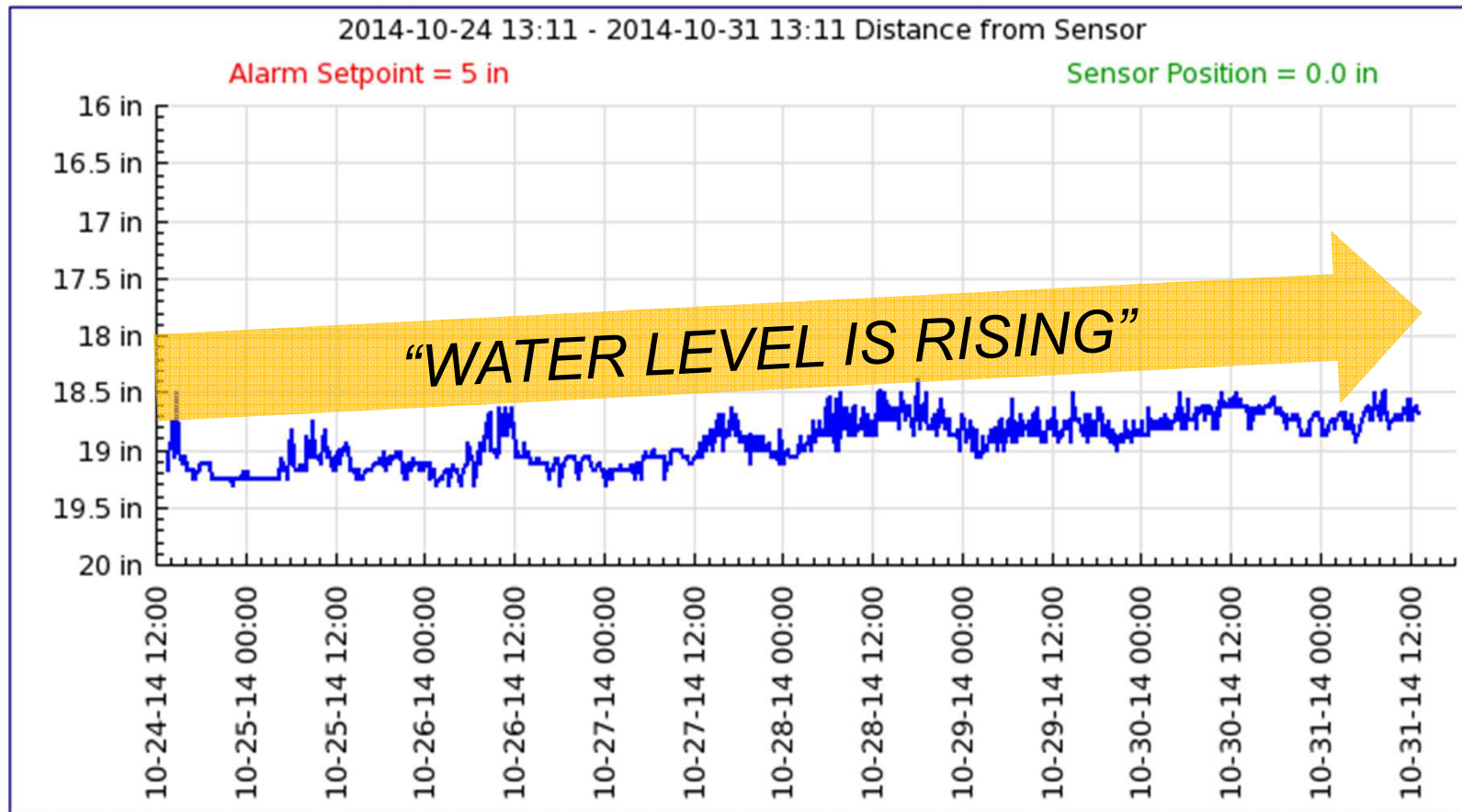
“Got Grit Buildup Here”



Another Grit Example

SmartTrend™: Automated data trend analysis of level change

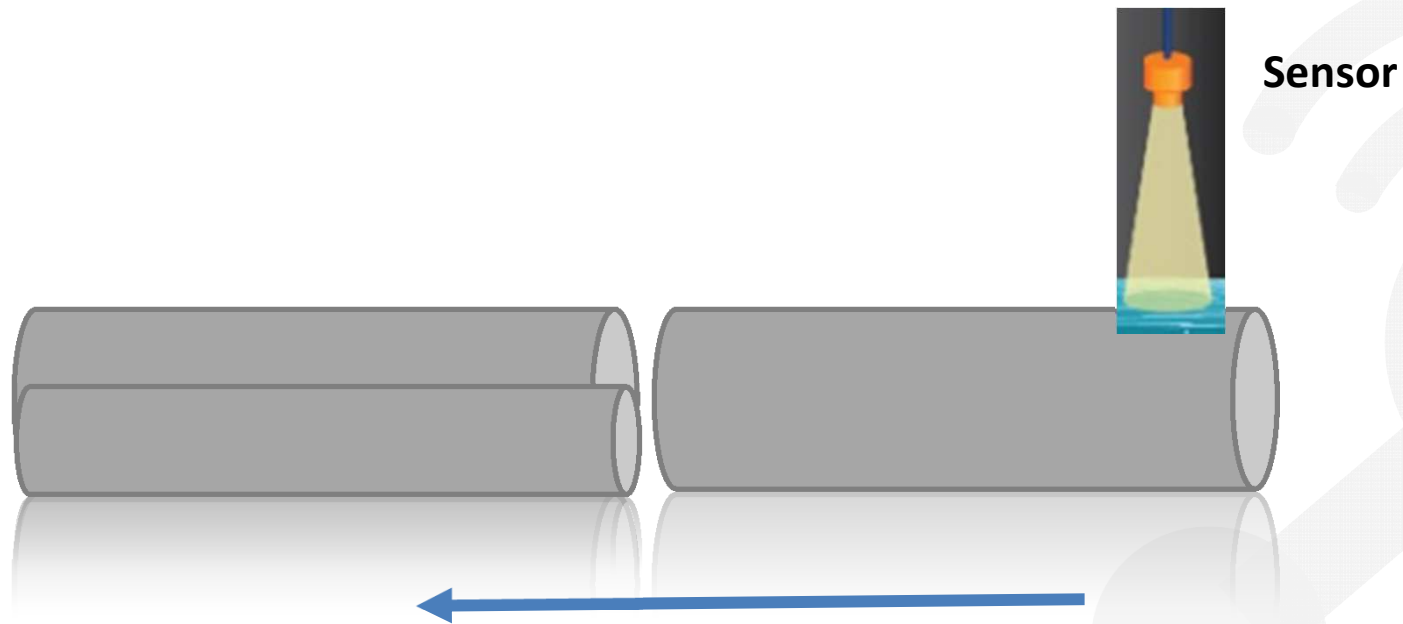
PS 639 MH 11



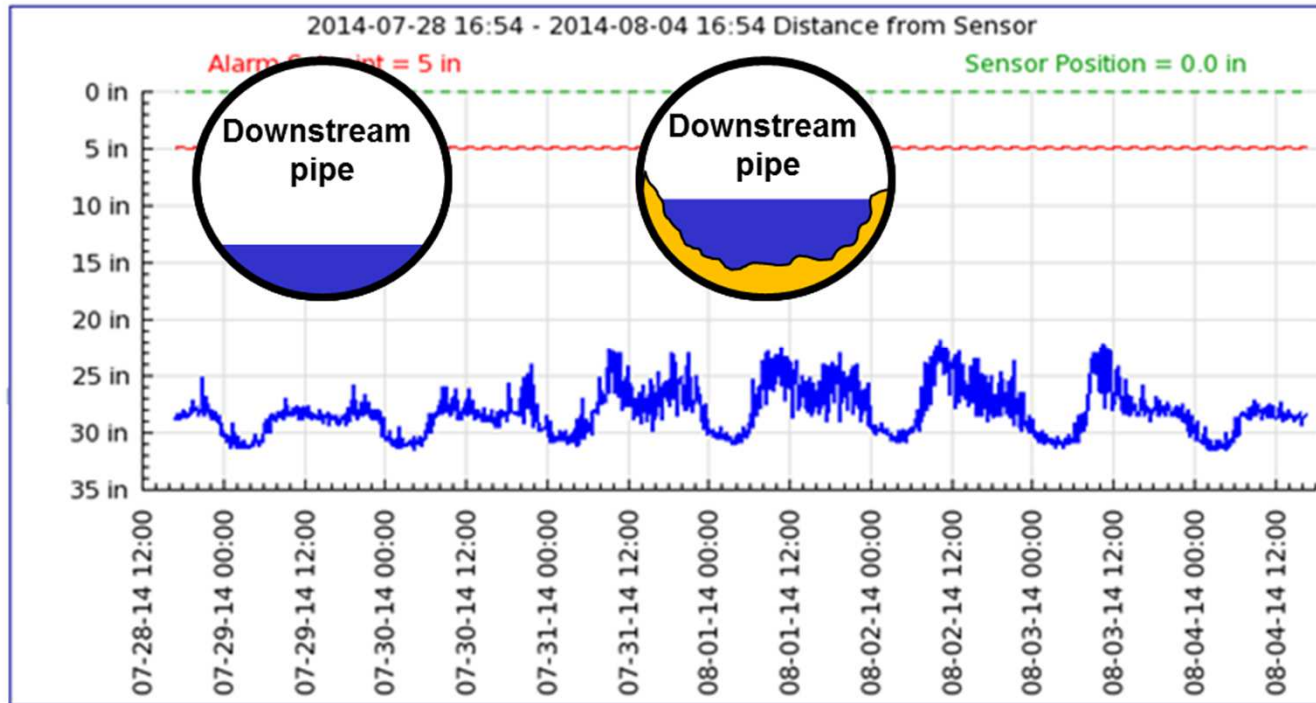
“There’s Buildup Downstream”



“There’s Buildup Downstream”

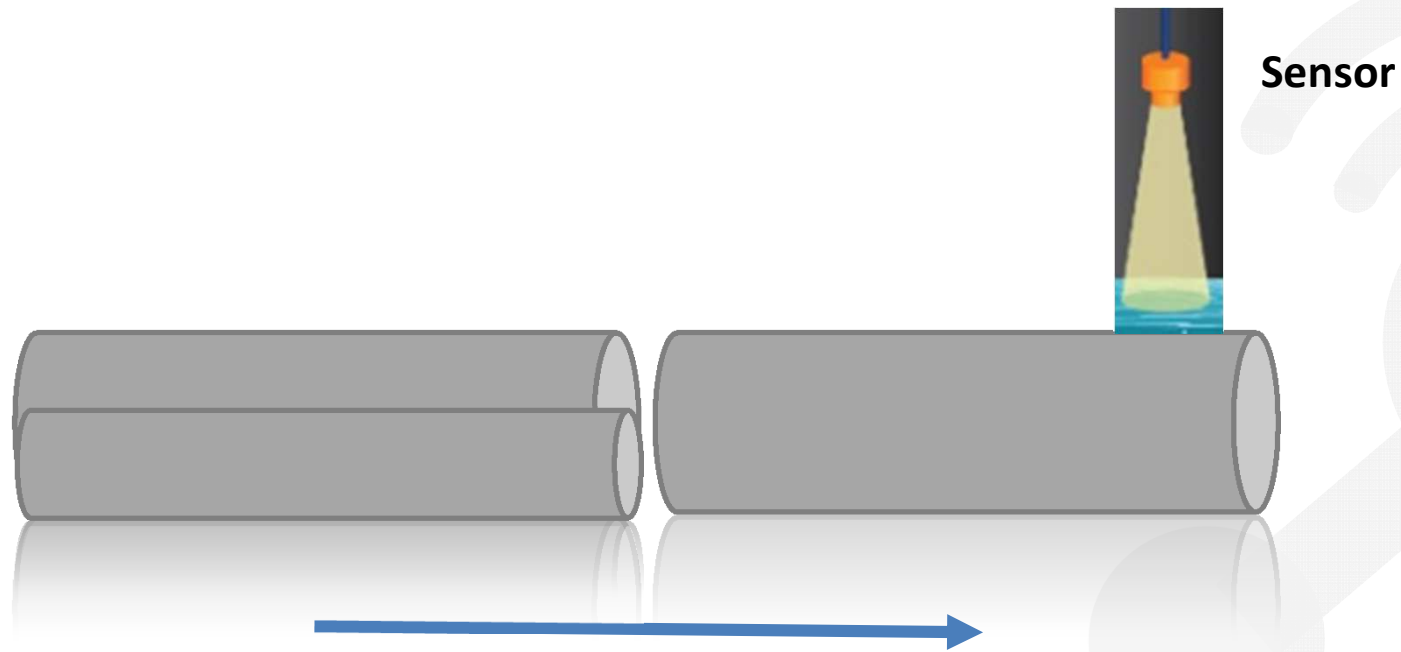


“There’s Buildup Downstream”

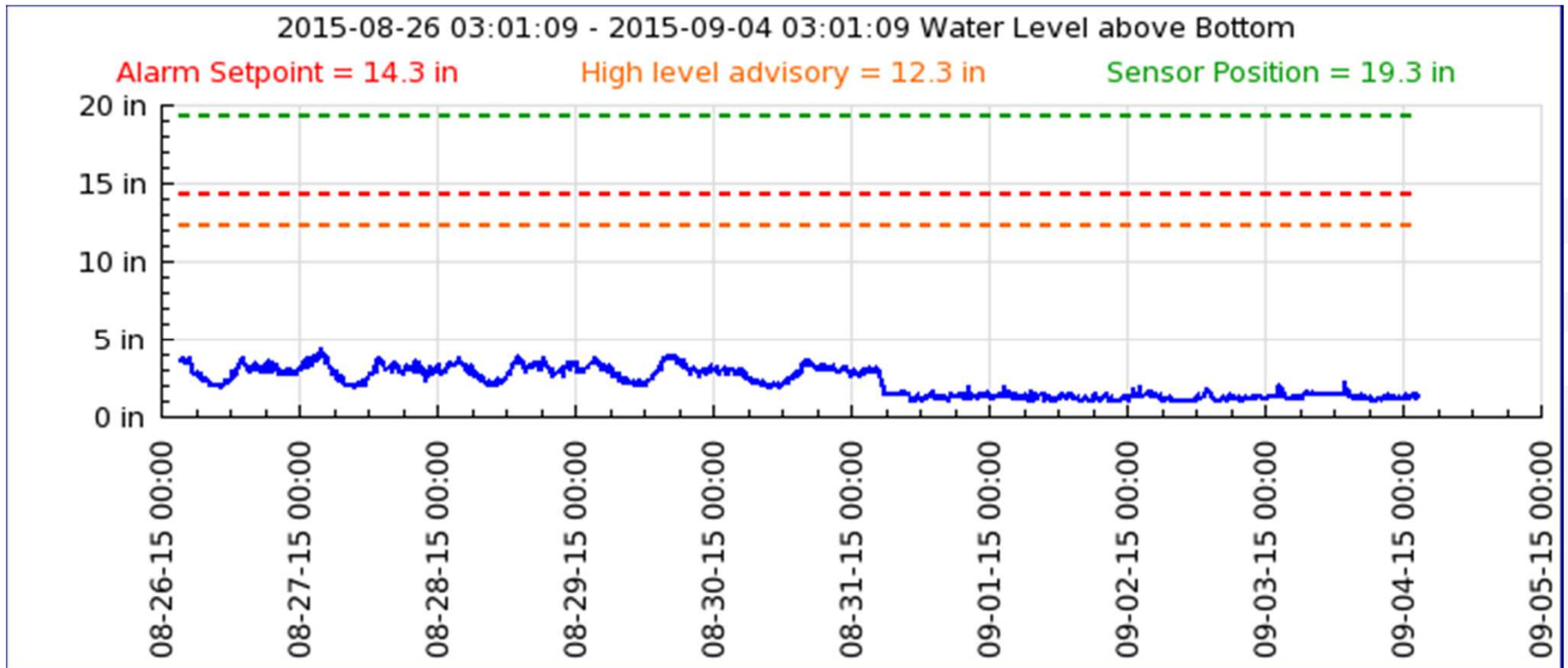


**Physical properties of pipe
produce
distinct level signatures
And they change....**

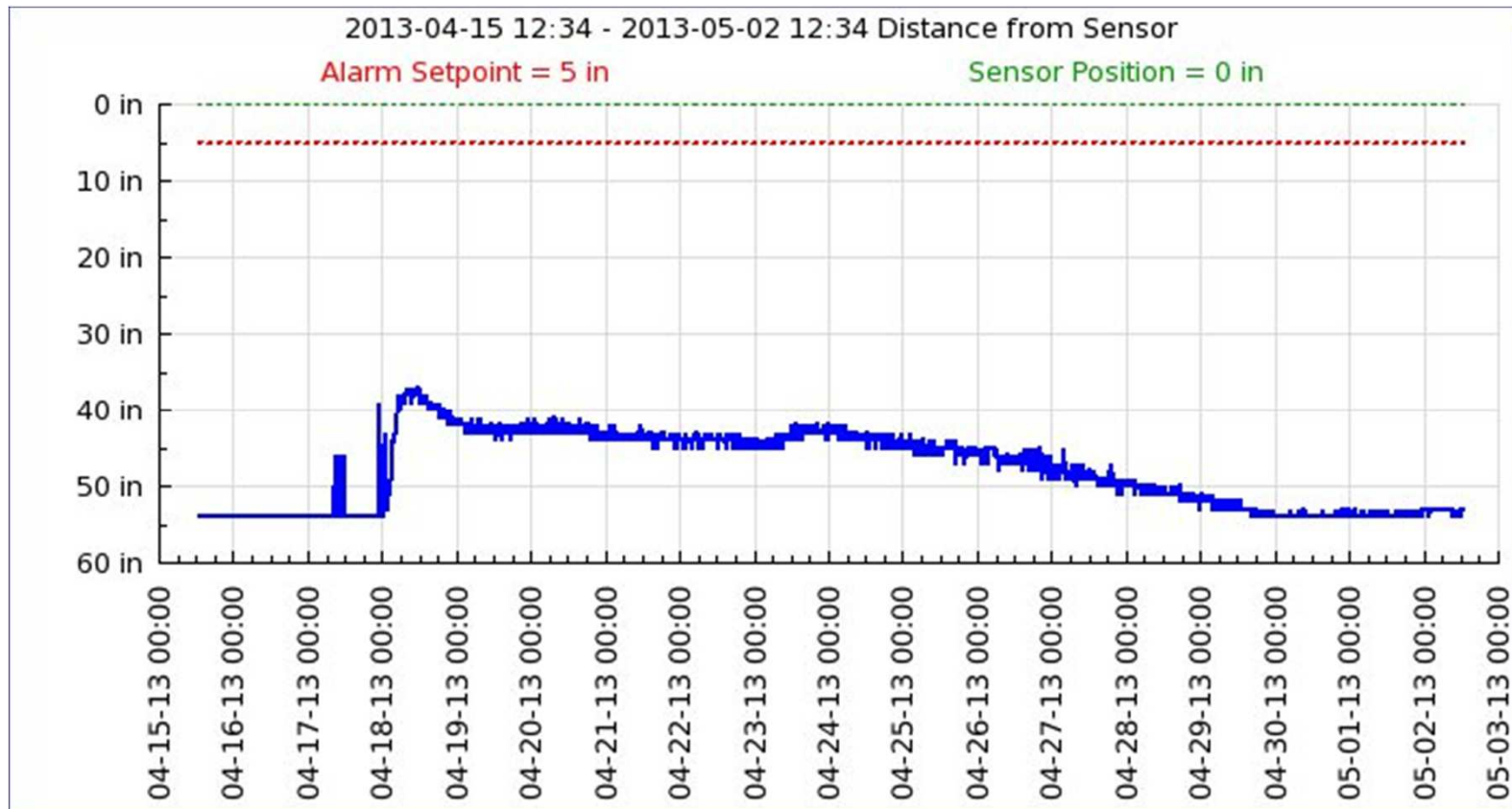
“There’s Something Going On Upstream”



“There’s Something Going On Upstream”



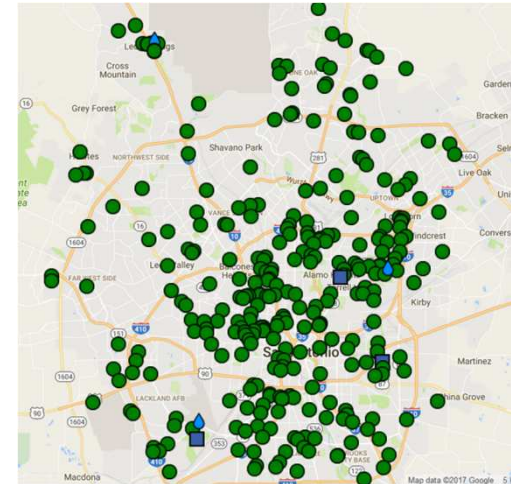
Another Upstream Problem



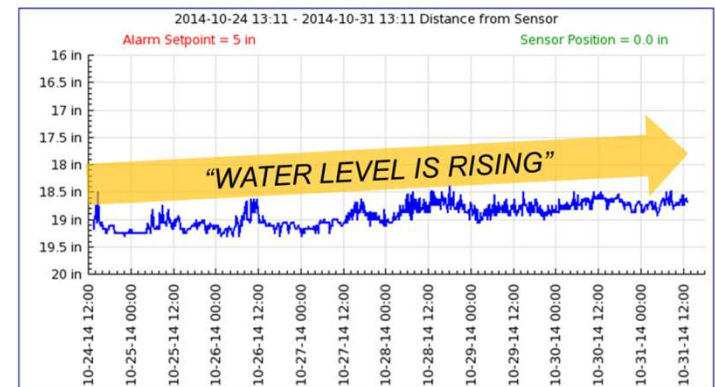
Case Study: SAWS (TX)

Saving Operational Expenses

- **Pilot Question: Can technology reduce cleaning frequency & expense with no increased risk?**
- **SAWS' Pilot Set-up (8/15 through 7/16)**
 - 10 monthly cleaning sites selected
 - Sites cleaned prior to start
 - SmartTrend[™] trend analysis performed daily
 - Cleaning based on level trends only



PS 639 MH 11



94% reduction of cleaning (NO SPILLS)

Estimated program savings: \$3.1MM

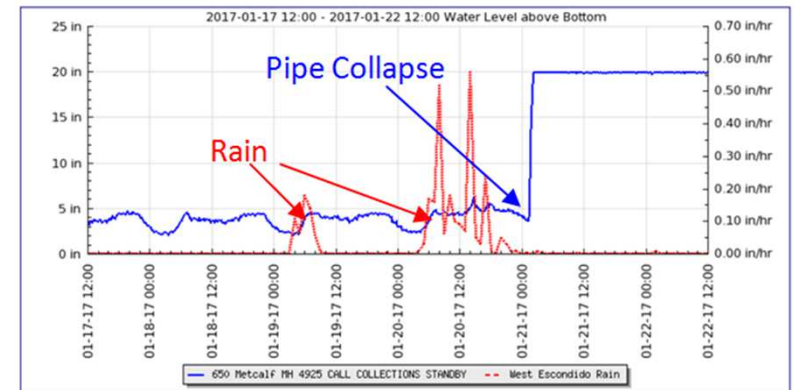
WaterWorld

**EDITORIAL SPOTLIGHT
WEFTEC 2016**

Case Study: Escondido

The Spill that Didn't Happen

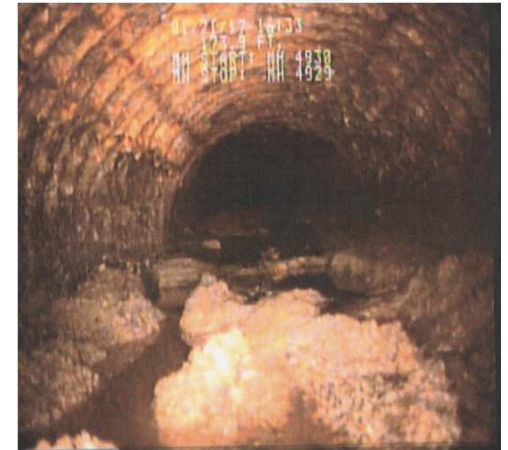
- “Atmospheric river” storm, January 2017
- Inflow from storm prompts large line collapse



- SmartCover[®] positioned 5 MH upstream
- Detected anomalous level & alarmed
- City staff responded
- Performed near-term fix
- Pipe currently being replaced

NO SPILL

Estimated savings: “Millions”



Capital Project Savings

Mt. Crested Butte, Colorado

6,500 year-round residents
10,000 during ski season
1.2 MGD plant
14.2 miles of pipeline
~300 manholes



The Crested Butte News
State imposes fines for 2005 sewer spill
CONSENT ORDER - 2006

Estimate for pipeline replacement: \$10 million

Solution

Install and Operate
Remote Level Monitoring System

COST: < \$100K

Savings/Deferral ~ \$10 million



Colorado State DPH
Approved monitoring system

Results

- Continuous real-time level system accepted by Colorado DPH as **alternative to rehab**
- Consent order lifted
- **Immediate savings of about 100:1**
- Surcharges, but **NO SPILLS** since installation of system
- Rehab can now take place at pace and intensity decided by District - not the State

Lift Station Backup

Independent, Redundant Monitoring “Solution”

- Battery powered- off the grid
- Satellite radio- running while cellular may be overloaded or down



Complements SCADA

- Lift station back-up
 - Power loss from severe storms/lightning strikes
- Pump failure or partial failure

CASE STUDY: Pump Station Backup SUCCESS

SMARTCOVER®

1/22/14

SmartCover® Monitoring at Lift Stations when Everything Else goes Down

"At approximately 2AM on New Year's Day a drunk driver on El Segundo Boulevard collided with not one but two

"Thank you Hadronex for a great product and staff support that came through when needed."

G. Busick, City of El Segundo

New Year's drunk driver knocked down two power poles causing power outage.

Part way through the 18 hour outage the power was temporarily restored and the generators and pump were broken down and put away. On call employees returned home and one hour later we began receiving SmartCover® level alarms once again. Apparently the temporary restoration was short lived as other parts of the electrical distribution system were overloaded and were knocked out as well.

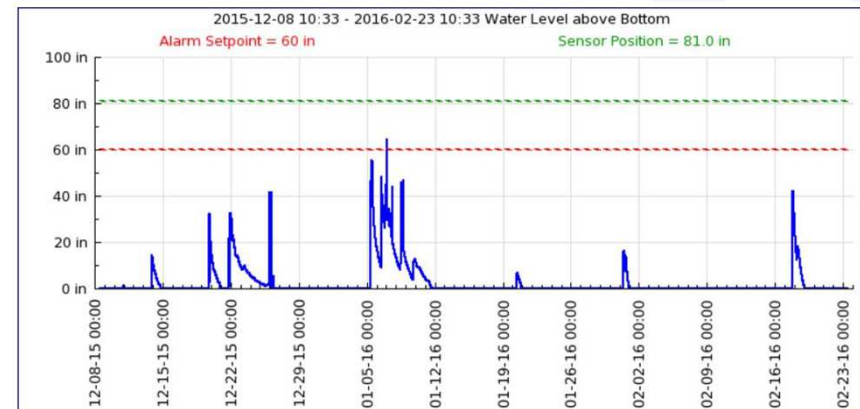


Lift Station #2, El Segundo, CA



We redeployed our emergency generators and three staff

Urban Stormwater




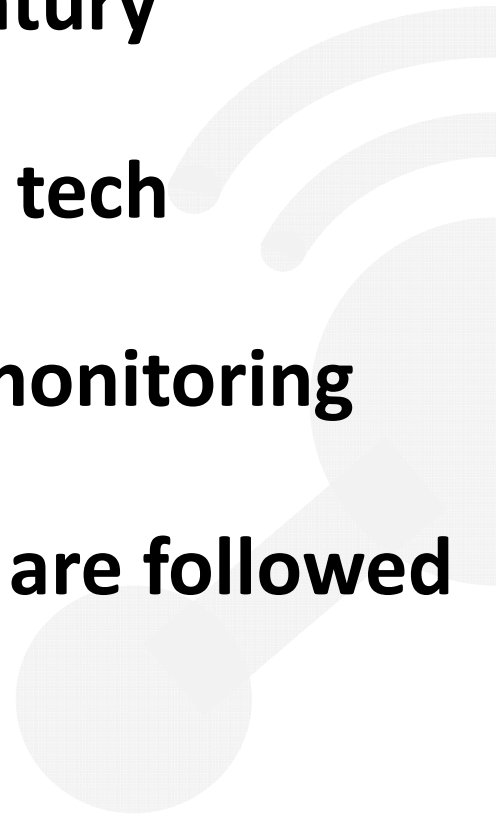
Los Angeles CA storm water monitoring
Data used to verify nets and gates are properly operating

Where do We Go from Here?

Smart real-time monitoring, combined with big data intelligence:

- 1. Works** – more than a decade of proof and case studies
- 2. Lowers spill rates** - *semper vigilans*
- 3. Lowers operational costs** - optimized cleaning
- 4. Lowers operational risks** - labor, fuel, carbon footprint
- 5. Provides solution to infrastructure puzzle**
Real-time condition assessment = right replacement

What Can the SWRCB Do?

- 
- 1. Know this technology is here, available, affordable**
 - 2. Encourage the entry into the 21st century**
 - 3. Best management practices includes tech**
 - 4. SSMP guidance: monitoring means monitoring**
 - 5. Carrot and stick: lower fines if BMPs are followed**
- 

Solutions through Technology



Real-Time Continuous Monitoring Technology

- Is here and it works
- Allows transformational change, e.g.
 - 99% reduction in spills
 - 94% reduction in cleaning
 - Millions in savings for decaying infrastructure
- Operational savings
- Capital savings
- Lower risk

= A BETTER ENVIRONMENT

THANK YOU !