



HIGHLANDVIEW DEPRESSURIZATION EVENT

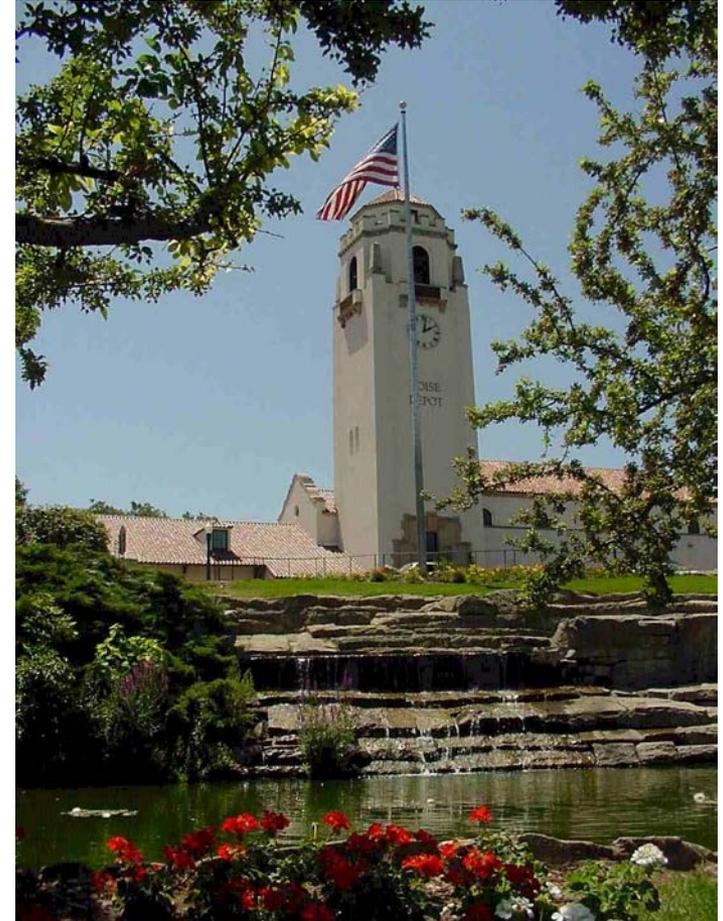
United Water Idaho
May 2014



OUTLINE



- **United Water Idaho (UWID) System Background**
- **Depressurization Event**
- **UWID Response**
- **Regulator's Response - Idaho Department of Environmental Quality (ID DEQ)**
- **Boil Water Advisory vs Order**
- **System Modifications**
- **Lessons Learned**



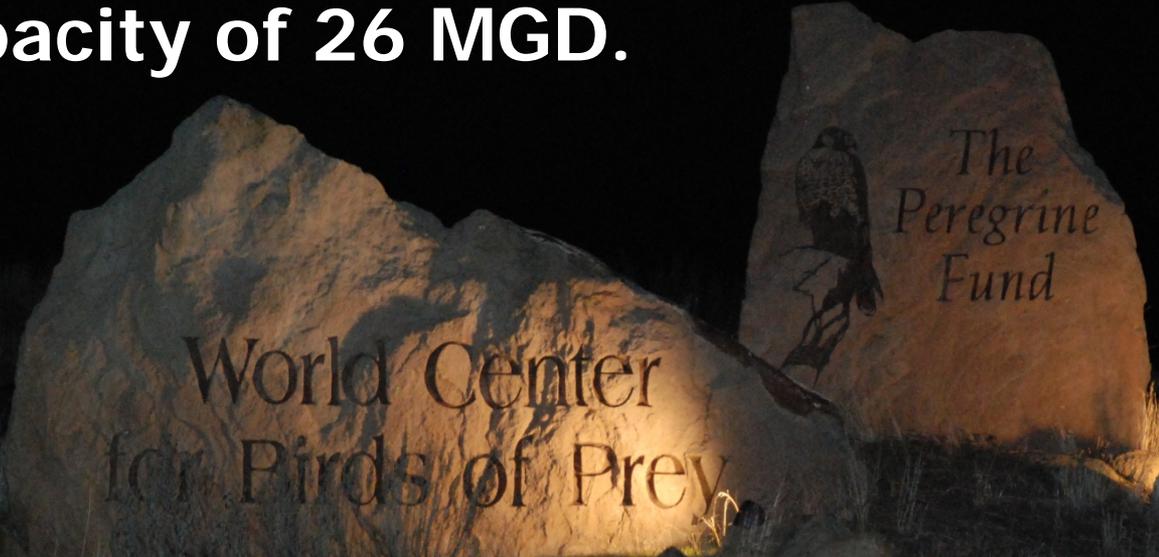
United Water Idaho has over 87,148 service connections and serves a population of 244,000 people in the greater Boise metropolitan area



Boise, Idaho

OUR WATER SYSTEM

- 70% Ground Water & 30% Surface Water
- 2 Surface Water Treatment Plants with a total capacity of 26 MGD.

Two large, light-colored rocks are illuminated from below, casting a warm glow. The rock on the left has the text "World Center for Birds of Prey" engraved on it. The rock on the right has a silhouette of a bird of prey perched on a branch, with the text "The Peregrine Fund" engraved below it.

World Center
for Birds of Prey

The
Peregrine
Fund

- 81 wells that range in depth from 100 to 1,120 feet & an average depth of 550 feet
- System Capacity of 100.5 MGD

UWID SYSTEM

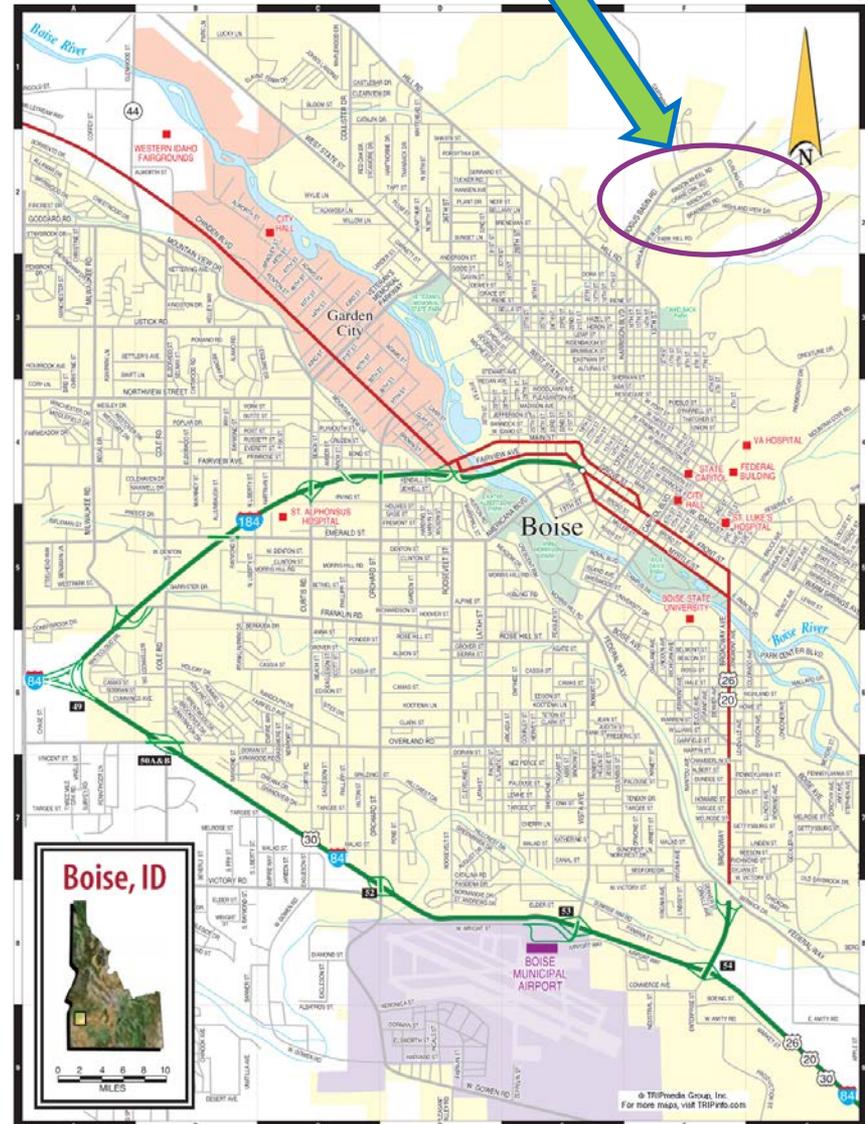


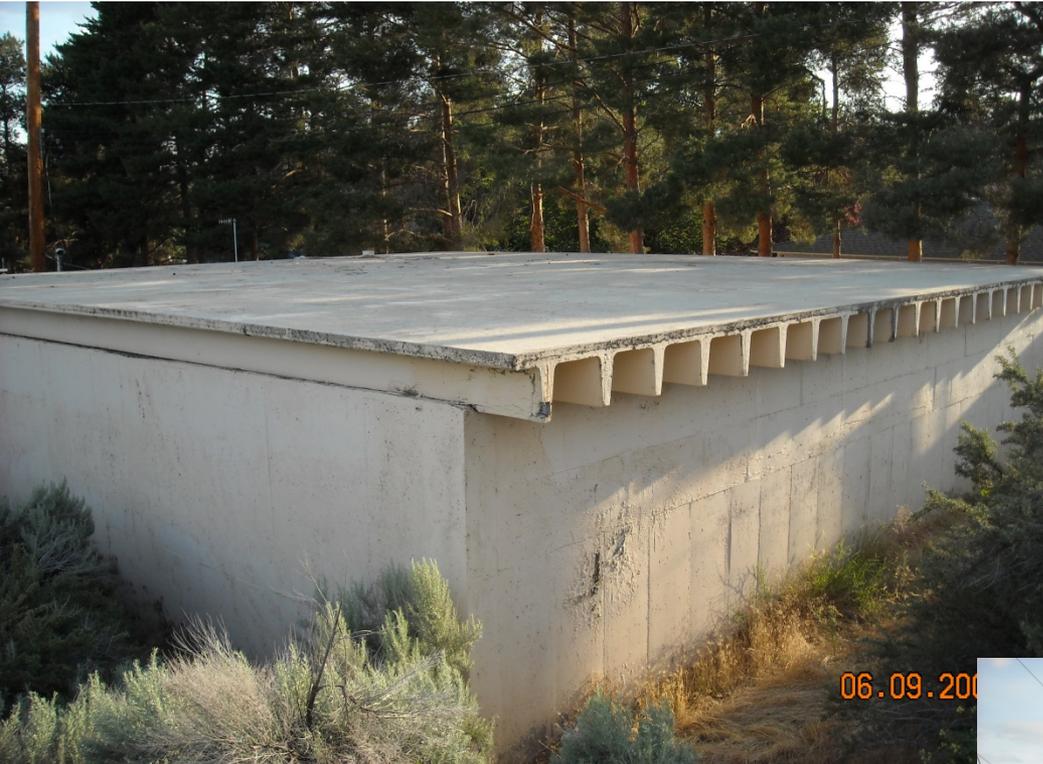
- 11 Service Levels
- 92 Distinct Pressure Zones
- 37 Reservoirs
 - 38.7 MG storage capacity
- 45 Booster Stations
 - equipped with 108 pumps
- Over 1,222 miles of main in distribution system.

DEPRESSURIZATION AREA

- Boise foothills - no sources of supply.
- All water is boosted up to reservoirs & boosted or gravity fed out.
- Event occurred in Highland View PSI Zone which is supplied by 2 reservoirs at the same site that float off each other (Highland View #1 & #2).

Highland View PSI Zone





Highland View Rsvr #2
Steel tank built in 1980
0.3 MG capacity



Highland View Rsvr #1
Concrete tank built in 1962
0.2 MG capacity

HIGHLAND VIEW RESERVOIRS #1 & #2





HIGHLAND VIEW RESERVOIRS & BOOSTER STATION

WHAT HAPPENED - HIGHLAND VIEW DEPRESSURIZATION (MAY 22nd, 2013)

- The automated controls at Highland View Reservoirs failed to recover from an internal disruption.
- Reservoirs drained through the night yet the level trend on our SCADA system only flat-lined.
- No alarms were ever generated by the SCADA system.
- No one working during the night noticed that the tank trends had flat-lined.



DEPRESSURIZATION TIME-LINE

MAY 23rd, 2013

- 5:45 AM, UWID answering service started receiving calls customers in Boise foothills that they had **"no water"** at any taps.
- This was the first indication to us that we had problems.
- We had no PSI monitors or alarms anywhere else in this pressure zone as a secondary alert to a problem.
- By 6:25 AM, one of our operators arrived in Highland View pressure zone where he discovered no water at any hydrants.
- Production staff was immediately contacted to diagnose & correct supply issues.



UWID RESPONSE

MAY 23rd, 2013

- At 6:41 AM, the Hulls Gulch Boosters were manually activated/turned-on (via SCADA) to begin refilling the Highland View reservoirs.
- Crews saw immediate improvement to system pressure and water service was restored to the Highland View pressure zone.
- Crews proceeded to flush air from all low points in the pressure zone and respond to customer calls for service.
- By 8:15 AM, automated controls to the tank had been reset.
- By 10 AM, normal operational levels and pressures had returned.



REGULATORY REQUIREMENTS (5/23/13)

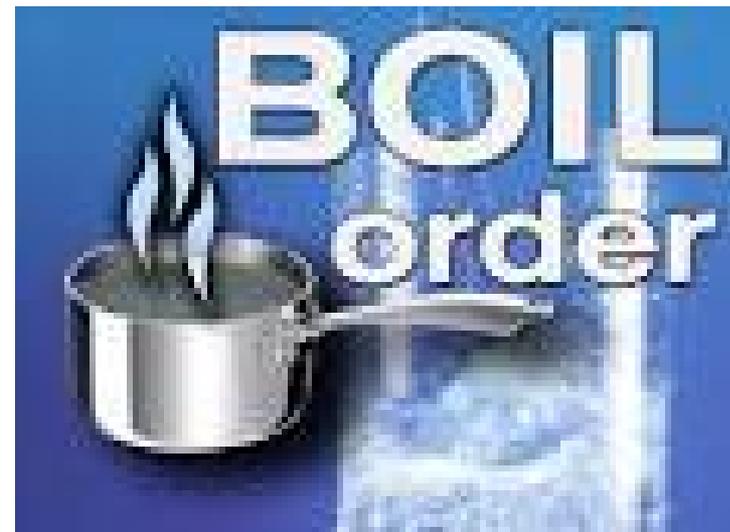


- UWID immediately notified state regulators of what had happened.
- ID DEQ directed UWID to develop coliform sampling plan to cover the entire PSI Zone & distribute a Boil Water Advisory for entire psi zone.
- Approx. 350 customers in zone.
- Coliform sample plan developed to cover entire pressure zone, 11 samples collected.
- Luckily, no alternate irrigation sources in the area.



BOIL ADVISORY VS. BOIL ORDER

- A ***boil advisory*** is a precautionary measure issued by utilities to alert customers when there is a potential for compromised water quality. It is *recommended* that customers boil all water used in the preparation of food and beverage for consumption for 2 minutes.
- A ***boil order*** is a confirmation that contamination is present in the water system. It is *essential* that customers boil all water used in the preparation of food and beverage for consumption for 2 minutes.



BOIL ADVISORY & COLIFORM SAMPLES (5/23/13)



- Coliform samples were collected & turned into the lab.
- 2 notable customers in this pressure zone included an elementary school and country club.
- Success – early personal communication with both entities provided understanding & acceptance.
- By 5 PM, the boil advisory had been hand delivered to all affected customers along with 2 large bottles of drinking water.



WATER ADVISORY ISSUED



IMPORTANT CUSTOMER NOTICE FROM UNITED WATER IDAHO

WATER ADVISORY

What happened?

Overnight automated controls failed to a booster station that refills the Highland View Water Storage Tank. This caused a loss of water pressure in your neighborhood early this morning, May 23, 2013.

Water service was fully restored by 10 am. In consultation with the Idaho Department of Environmental Quality (ID DEQ), we are issuing a precautionary boil water notice for your neighborhood.

What does this mean? What should I do?

United Water Idaho has taken water samples for analysis. We anticipate results from these tests will be returned by Friday afternoon, May 24, 2013.

In the meantime, we are advising customers to use an alternative water source. If it is necessary to use tap water, boil it for at least one minute and let it cool before using it for drinking, cooking, brushing teeth, washing dishes, food preparation and making ice.

Once the water is confirmed to be safe, another notification will be sent out, and you may return to normal water usage.

For more information, please contact United Water Idaho at 362-7304.

This notice is being sent to you by United Water Idaho Inc.

State Water System ID#: 4010016

Date Distributed: May 23, 2013

RESCINDING THE BOIL WATER ADVISORY

MAY 24th, 2013



- All samples were absent for coliform bacteria
- Notified ID DEQ of results.
- Developed public notification to lift the boil water advisory.
- Hand delivered *"Water Advisory Updates"* to all customers lifting the boil water recommendation.



BOIL WATER ADVISORY FINISHED



IMPORTANT CUSTOMER NOTICE FROM UNITED WATER IDAHO

WATER ADVISORY UPDATE

What happened?

United Water Idaho took 11 samples in the Highlands area, between E. Highland View Drive and Bogus Basin Road. The lab's analysis confirmed no bacterial contamination in your drinking water.

What does this mean? What should I do?

The result of the clean water tests means you can now resume using your tap water for all your needs. We appreciate your patience and understanding and apologize for any inconvenience this may have caused your family.

For more information, please contact United Water Idaho at 362-7304.

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ROOT CAUSES & CONTRIBUTING FACTORS



- SCADA RTU brain unit was found in a **“fault state”** which prevented the call for water to refill the reservoirs.
 - The IO was not talking to the PLC.
 - The control unit itself was not defective.
 - No major power disruptions in the area.
-
- Reservoirs were equipped with two stage battery back-up system that may have contributed to the failure (we installed a single stage back-up as a preventive measure).
 - Conclusion - the RTU brain unit failed to recover when the battery backup moved between power stages.

ADDING DISTRIBUTION PSI MONITORS



- Absence of pressure monitors anywhere in zone.
- Thus installed proxy PSI indicators at two nearby sites to provide redundancy within the zone.

UWID ACTION PLAN



ACTION PLAN

No.	Action Plan	Responsible Party	Target Date	Priority 1 - High 2 - Medium 3 - Low	Status 1 - Not Started 2 - In Progress 3 - Complete (include date)
1	Conduct departmental incident debrief and investigation into the incident.	M. Thompson	5/24/2013	1	3
2	Identify redundant locations within the pressure zone for alarm set points.	B. Carr, C. Cegnar	5/28/2013	2	3
3	Reemphasize the use of recent period trending tools at all operational sites (control room, swing-shift plant operations)	B. Carr	5/28/2013	2	3
4	Replaced Highland View two stage power supply with single source unit to prevent change over failure potential.	R. Barrett	5/24/2013	2	3

UWID ACTION PLAN



ACTION PLAN (continued)

No.	Action Plan	Responsible Party	Target Date	Priority 1 - High 2 - Medium 3 - Low	Status 1 - Not Started 2 - In Progress 3 - Complete (include date)
5	Investigate Rate of Change and Trend Variance based alarm strategies for Highland View Pressure Zone (and other similar zones)	R. Barrett	6/28/2013	2	3
6	CAPEX planning for installation of low-float tank shut off control and alarming at next opportunity (Tank Painting or Inspection)	B. Carr	7/1/2013	2	3
7	Coordinate discussion with ID DEQ on strategies for Low Pressure Event Response.	M. Thompson, C. Cegnar	7/1/2013	2	3
8	Identify pressure zones elsewhere in the system that have similar single point of failure conditions on controls and trending.	M. Thompson, R. Barrett	7/30/2013	2	3

UNDERSTANDING REGULATOR'S RESPONSE TO OUR DEPRESSURIZATION EVENT



- This event raised concerns that our regulators had adopted a "new" interpretation of public notification requirements during depressurization events (in conflict with past guidance).
- How would this impact main breaks, main replacements & leak repairs?
- Clarification needed regarding situations that mandate boil water advisories.



MEETING WITH ID DEQ

JULY 24th, 2013



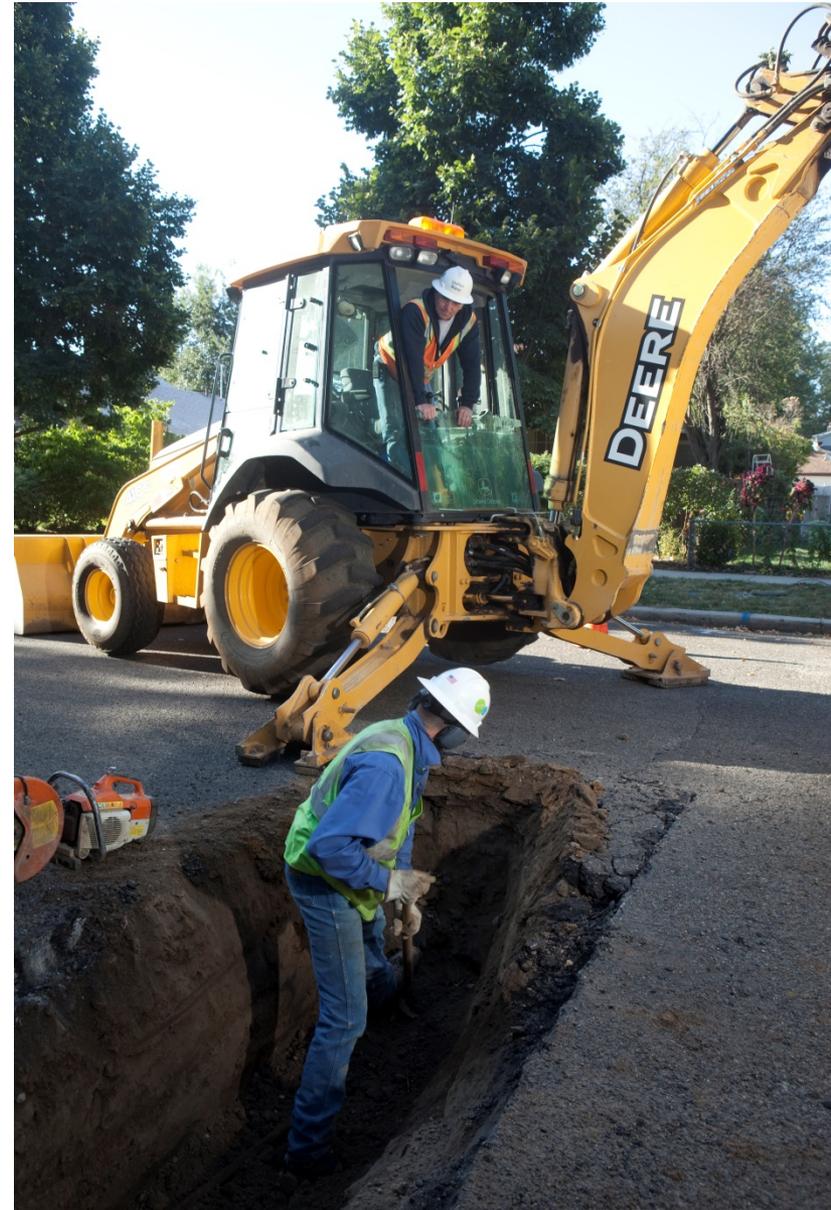
- UWID requested meeting with ID DEQ to discuss Idaho rules and common practice concerning Boil Water Advisories (BWAs) & Public Notification requirements.
- We discussed key differences between routine **controlled events** (main breaks & planned shut-downs where system pressure is nominally maintained) and **unplanned emergencies** (Highland View Depressurization) where full control of system pressure is lost.
- Discussion included WRF paper regarding causes for Boil Water Advisories.



CATEGORIZING BWA TRIGGER POINTS



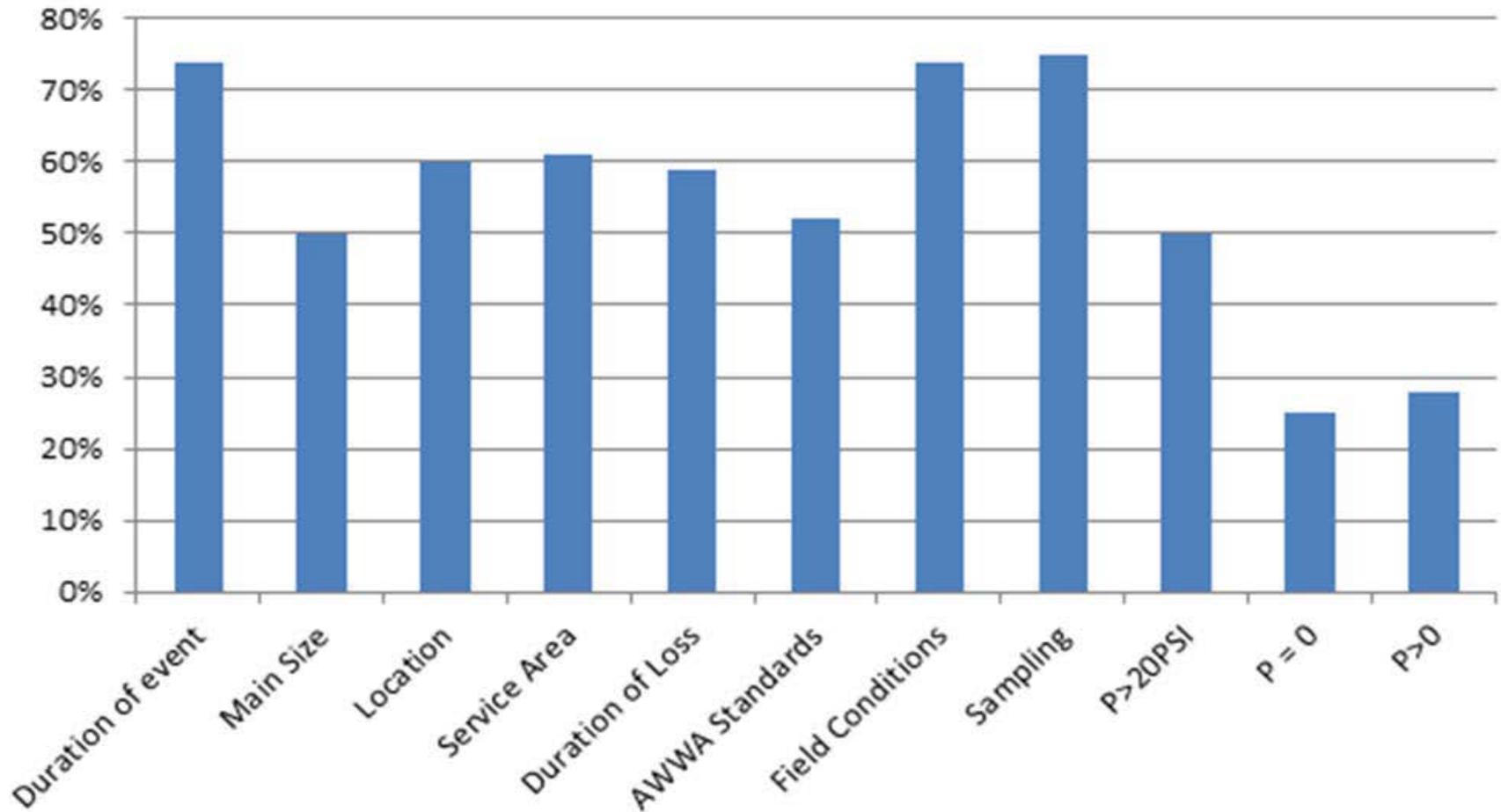
- **WaterRF Project 4307 - “Effective Microbial Control Strategies for Main Breaks and Depressurization”**
(by Gregg Kirmeyer & Mark LeChevallier)
- **WRF paper researched causes that states use for mandating Boil Water Advisories (BWA).**
- **Examined situations used to distinguish what characteristics states consider when requiring a BWA.**



Non-EPA Regulated Boil Water Advisories (BWA)



- Highlighted categories which States use as cause to issue precautionary non-EPA regulated BWAs



MEETING OUTCOME



- Idaho Law (IDAPA 58.01.08.552) specifies public notification is required during **unplanned or emergency situations** (pressure falls below 20 psi)

- Uncontrolled event where pressure falls below 20 psi, water suppliers must notify DEQ & provide public notice to affected customers within 24 hrs.
- Main Breaks & Leak Repair are controlled depressurizations (required to notify effected customers, but no issuance of a boil advisory).

IDAHO ADMINISTRATIVE CODE
Department of Environmental Quality

IDAPA 58.01.08
Idaho Rules for Public Drinking Water Systems

During unplanned or emergency situations, when water pressure within the system is known to have fallen below twenty (20) psi, the water supplier must notify the Department, provide public notice to the affected customers within twenty-four (24) hours, and disinfect the system. When sampling and corrective procedures have been conducted and after determination by the Department that the water is safe, the water supplier may re-notify the affected customers that the water is safe for consumption. The water supplier shall notify the affected customers if the water is not safe for consumption.

(4-4-13)

During planned maintenance or repair situations, when water pressure within the system is expected to fall below twenty (20) psi, the water supplier must provide public notice to the affected customers prior to the planned maintenance or repair activity and shall ensure that the water is safe for consumption. (4-4-13)

BOIL WATER ADVISORY TRIGGER POINTS



- DEQ highlighted the “trigger points” of the Highland View Depressurization Event that ultimately warranted the BWA.

○ ID DEQ TRIGGER POINTS

- Less than twenty psi (<20 psi)
 - Less than zero psi (<0 psi)
 - Total customers affected (>100)
 - Duration of the event (>4 hrs)
-
- Result: We now understand how to interpret and apply public notification requirements better.



LESSONS LEARNED/CONCLUSION

- Budget & purchase of **low-float tank shut off controls & alarming** at next opportunity (Tank Painting or Inspection) at all reservoirs.
- Identified all locations with two stage power supply & **replaced with single source units** to prevent change over failure potential.
- Gained better understanding of **depressurization rules** and how to apply them.
- Realize difference between **Boil Advisories & Boil Orders**.
- Identified & **corrected** other pressure zones that have similar **single point of failure conditions** on controls and installed additional pressure monitors.
- It was worth the extra effort to **personally contact sensitive customers** at beginning of the event (Elementary School and Country Club).
- Perform regular assessments to **identify vulnerabilities** within each pressure zone.



QUESTIONS?

