Water Treatment Plant Tier 2 Notice and After Action Report

Chris Matkins, Water Utilities Manager
Loveland Utilities Commission
July 17, 2013

3/25/13 Alum Dosing Failure

- 10:00 AM – Technical Services Staff began work to improve Alum Dosing control system.
- 1:00 PM – Technical Services Staff isolated a pump for testing after the work and a back pressure valve failed, inadvertently interrupting Alum dosing.
- 1:10 PM – Filter turbidity alarm was triggered and cancelled by junior Plant Operator, incorrectly assuming it was related to ongoing repair work.
- 1:50 PM – Alarm condition recognized by senior Plant Operator as problematic, immediate action taken to restore Alum Dosing.
- CDPHE notified of 70 minute gap in Alum dosing. CDPHE began evaluating response options (including boil order).

Tier 2 Notification and Response

- 4/22/13 – Phone discussions with CDPHE and COL Legal.
- 5/7/13 – Letter sent to printer; CDPHE revised language
- 5/9/13 – Letter resent to printer with State revisions
- 5/20/13 – Press Release
- 5/20/13 – Letter sent to customers
- 5/22/13 – Customer phone inquiries began.
- 5/28/13 – Customer phone inquiries subsided.

- Approximately 200 phone calls received; legal and insurance discussions ongoing.
- Customers concerned about health implications; but more concerned about timeline of public notification.

What are the Differences Between These Repairs in:

- Planning
- Upfront communication
- Coordination of resources
- Process monitoring
- Professionals involved
- Cost

Why the Difference?

RISK!

What is Risk?

Risk = Probability x Consequence

Repairing a Brain

Repairing an Arm

Impact of Alum System Failure

Planning & Performing
½ day

Disruption & Reaction
½ day

Notification & Recovery
114+ days
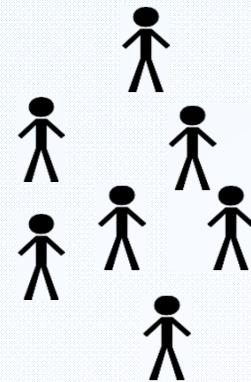
The Alum System has a very high-risk (like brain surgery) and requires a higher standard of treatment.

Risk = Probability x Consequence
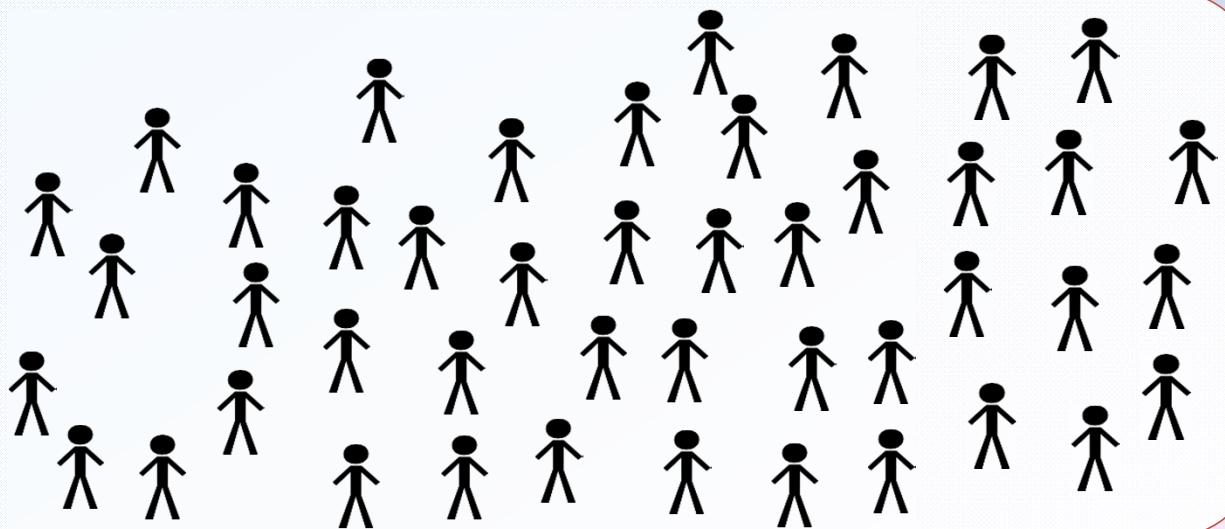
Applying What We've Learned

Lessons Learned: What lessons did we learn from the alum system failure in regards to:

- ❖ People
- ❖ Processes
- ❖ Technology

Other High Risk Systems: What other high-risk systems should be addressed?

- ❖ **What:** Brainstorm which improvements should be made
- ❖ **Who:** Determine who will lead the improvement processes
- ❖ **When:** Determine when these improvements should be made
- ❖ **How:** Plan, budget, and implement the improvements

Improvements in Process

Improvements Currently In-Process for the Alum System	Progress	Estimated Costs	Lead Person on the Improvement	Time Frame (Estimated Start Date/Finish Date)
1 **Adding Remote I/O and PanelView Plus** for Monitoring of Alum pumps at HMI and control of Alum pumps at new Panel View. This gives the ability to Start/Stop from PanelView and generate pump fail alarms.	Panel is built and mounted. Still need to run communication and control wire and add programming to PLC and PanelView	$15,000		
2 **Audible & Visual Alarms:** Add audible and visual alarms to basement (new alum panel) and outside of polymer room and PAC building that are tied to HMI. We also have the option of adding alarms to CCB and Chasteen Tank.	We have the alarm units and Matt is going to finish running conduit from polymer room to the outside of the building and Chad will mount an alarm on the Alum panel.	$800		
3 **Add flow meter** to alum discharge line and monitor flow and generate alarms on low or no flow.	We have just received flow meter and will schedule a shut down to install bypass for meter. Signal will come into new alum panel. Once it is installed we will need to test meter.	$1,000		
4 **Add second SCD alarm** that retriggers if first SCD alarm is still in alarm state.	Completed	In house labor		

New Improvement Ideas

New Improvement Ideas for the Alum System	Progress	Estimated Costs	Lead Person in Charge of the Improvement	Time Frame (Estimated Start Date/Finish Date)
1 **Replace Low Level Alum Tank Switches:** Replace switches with Druck level transmitters to give actual level readings on tank.	Switches currently do not function and need to be replaced. We can install a Druck level transmitters to monitor level. Level transmitters are about $1200.00 each and we would have to run conduit and add I/O.	$10,000		
2 **Add Another SCD Meter:** Install 2 Milton Roy SCD meters one next to each of the existing meters in Floc/Sed 2 and Floc/Sed 3.	This would create redundancy and let operators know if an SCD alarm is an issue with the meter or alum system. Estimated cost $7,000.00 each	$15,000 to $20,000		
3 **Alum Alarm that Must be Acknowledged at Alum Panel:** Write logic so that either the alarm retriggers after a period of time until it is acknowledged at the alum panel or install a separate alarm horn that will not silence until alarm is acknowledged at alum panel. The Operator would then check the level of the tank while acknowledging the alarm at the alum panel.	We can probably do both of these in house.	$400		
4 **Install Clients:** Install clients now instead of waiting until expansion project.	We would have to purchase PC's and licenses for the clients. Cost would depend on number of clients.			
5 **WIFI Campus:** Install WIFI on campus and purchase tablets and software to have a remote client.	Operators could carry tablet with them and have a portable client to monitor the plant or could have a tablet located in each building. Cost would depend on tablets, WIFI routers, and Software.			

New Improvement Ideas

	New Improvement Ideas for the Alum System	Progress	Estimated Costs	Lead Person in Charge of the Improvement	Time Frame (Estimated Start Date/Finish Date)
6	**Flow Meter:** Add a flow meter on the alum feed after back pressure valve (Plant shut down?)		$3,500		
7	**Fiber:** Install a fiber network to the WTP		Already budgeted $150,000		
8	**Standard Operation Procedure Changes:** • Non-critical chemicals should not be changed during single coverage. • Have an additional operator during scheduled maintenance on high risk systems or look at scheduling water quality lab employees more often at the WTP. •Better coordination when working on systems between Tech Services & Operators - Have the sign-in sheet always show who is currently "in-charge" of running the plant (This person could change throughout the day) -Tech Services checks-in with the person in charge and let them know what work you are doing and then check-out with them once the work is completed - For scheduled maintenance items send a calendar invite to WTP to let them know when it will be done and what will be done • Alarms: Whoever acknowledges an alarm needs to take ownership of it. Don't assume someone is just working on the equipment.				
9	**Procedures/CMMS**				
10	**Plant Wide Intercom System**				

Questions?