THOUGHT PIECE

Running an Advanced Pressure Management Pilot

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THOUGHT PIECE:

RUNNING AN ADVANCED PRESSURE MANAGEMENT PILOT

This thought piece will help in planning and executing on a pilot that really tests and lays the way for advanced pressure management to be rolled out network-wide

It's puzzling to many people who come to the water industry from other sectors that water utilities persist in piloting proven solutions rather than simply procuring them. Let's just set that aside and accept that piloting is still the norm in the industry.

Over many years of being involved with advanced pressure management pilots, we've seen some that have gone well and others that haven't. Not in terms of the performance of our solutions (which is always excellent of course!) but the way that the pilot itself was run. What frequently happens is that there is a significant hiatus following a pilot, and in some cases no progress at all even when the pilot is regarded as a success and those who ran it want to move forward to a network-wide deployment.

We've collected together the learning from our experience in this thought piece. So if you want to ensure that you get the most out of a pilot that you're planning, read on...

There are 5 areas that we've identified. For each of those we're going to offer suggestions of best practices based on what we've observed.

1. Clarity of purpose
2. Stakeholder management
3. Collecting the data
4. Considering everything
5. Picking the right sites

CLARITY OF PURPOSE

It's important to know why you're doing a pilot. We humbly suggest that it shouldn't just be to try out a technology. This turns out to be quite a common mistake. Engineers like to know how something works and whether it works. But if you take that approach then you're unlikely to progress beyond the pilot.

The point of a pilot should be to prove something. And that should be that a certain approach or solution is capable of delivering a return on investment (ROI) for your organisation. In many cases it should demonstrate a better return on investment than i) doing nothing or ii) alternatives.

To do an ROI you will need to define the benefits that you're seeking, that you will obtain, and their relative importance. Here's a list of the benefits of advanced pressure management for you to add and rank:

- Leakage reduction
- Reduction in number of bursts
- Extension in asset life
- Reduced energy costs
- Fewer complaints
- Demand reduction
- Reduced operating costs
- Reduced Health & Safety (H&S) risks/issues
- Drought risk mitigation

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STAKEHOLDER MANAGEMENT

"Stakeholders" is a word that's often tossed into the bin of management speak. But there's method in the management madness. Think of this group as 'interested parties'. Or more importantly as the people who are capable of stopping you doing what you want to do further down the track. If you don't bring them in at the beginning, obtain their input, and keep them appraised as the pilot progresses, then they won't be on your side when you do finally need them or come up against them. Here's a list of interested parties for an advanced pressure management pilot and why they're important:

Senior management	The cost of rolling out advanced pressure management across the whole network is single digit millions in £, $, EURO. That's a relatively small amount in the run of what gets senior management attention but will likely require their authorisation. The payback is both large, wide-ranging and quick, and this is certain to get any senior person's attention and support.
Customer services	One of the benefits of advanced pressure management is a reduction in call/ complaint volumes. And you'll need data (see below) on those.
IT	Many advanced pressure management solutions are provided as a service. This is increasingly understood and accepted by IT departments. However, you don't want them throwing up objections late in the day so it's important to understand their attitudes and policies up front. One of our clients used the pilot stage to give their IT department time to prepare an alternative plan for DIY; the cost, timeframe, and service commitment compared unfavourably.
Finance & procurement	Finance holds the purse strings and procurement will run the process by which you ultimately choose a solution.
HR	Advanced pressure management reduces H&S risks and this usually pleases HR. The impact of advanced pressure management may be to change people's job descriptions or free up some of their time. It may lead you to conclude that organisation structure needs to be changed.
Distribution/ operations	Most pilots are run out of this area. The pilot is most often owned by a leakage team, an optimisation team, or network management. Don't forget your peers.
Control	Advanced pressure management generates data and alarms from battery powered loggers on the network which people often want in SCADA. Advanced pressure management also enables pump station optimisation and those assets are usually owned by Control.
Assets	In some utilities there is a separate assets function that is responsible for the capital investment programme and decisions about which assets are installed on the network.

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COLLECTING THE DATA

Too many pilots try to gather data only at the end of the pilot without having thought through what data is required at the outset. There are four good reasons for getting this right. You will need to:

- Establish a baseline of what was going on before the pilot
- Quantify what changed as a result of the pilot
- Identify whether anything extraneous has affected the pilot results and remove it from/adjust for it in the data
- Develop a business case for wider deployment

To this end, we have set out in the table below how you might go about measuring this, and where the data is likely to come from:

Benefit	How measured	Data sources
Leakage reduction	• Change in nightline before/after • Excluding anomalies	• Flow data from SCADA and/or network monitoring system • Data to identify anomalies which affect • outcome e.g. work order management system data, weather records
Reduction in number of bursts	• Change in number of bursts before/after	• Work order management system data • Utility calculation based on data from work order management system
Extension in asset life	• % increase in asset life	• Reduction in pressure hours from network monitoring system
Reduced energy costs	• Power at site • Total power usage before/after	• Metered energy at controlled/optimised location • Cost of power per Ml from corporate data • Pressure hours from network monitoring system
Fewer complaints	• Number of customer complaints	• CS system pressure related calls • Work order management system data • Average cost to resolve network related call from corporate data
Demand reduction	• Ml reduction in demand	• Average cost per mL from corporate data • Chemicals cost per Ml
Reduced operating costs	• Operating cost reduction	• Work order management system data • Average cost per burst repair from corporate data • Average cost per leak find & fix
Reduced H&S risks/issues	• Reduction in the number of H&S incidents	• HR data

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CONSIDERING EVERYTHING

We've seen a large number of trip hazards that only emerge after the pilot has been run. The difficulty then is that the pilot has already been run – it may be too late! To be honest, we've seen other teams exploit this opportunity to undermine progress from pilot to deployment. You don't want to be caught out in the same way. So, we've listed out the additional areas of functionality that you should consider. In each case, you will need to decide whether these aspects need testing in the pilot or whether there is other evidence that you can rely on which you can simply collect. Evidence might include:

- Assertions in supplier literature
- Certification (e.g. ISO documentation)
- 3rd party validation (penetration tests, logger accuracy testing)
- Client references

If you decide you do need to test any of these, then we have set out in the table below what testing might be conducted. To this end, we have set out in the table below how you might go about measuring this, and where the data is likely to come from:

Functionality	Test
Retrofit	• Identify any issues encountered during pilot • Include in pilot a range of hardware from different manufacturers
Flexibility to apply/ change control philosophy	• Set up pilot to include changes in philosophy and compare data from phases
Whole network	• Gather data on number, size and manufacturers of PRVs, number of pumping stations, number of pumps in each, their size, and presence of VSDs • Ensure that site selection gives representative sample of network
Accuracy/precision	• Commission 3rd party testing of solution • Run parallel test with device of known precision
Smooth transition/calmness	• Review data collected in pilot • Review i2O data on calmness index before/after pilot • Set up specific test for transition and note any customer complaints arising
Continuous operation	• Review data collected in pilot • Set up test to prevent devices from communicating and confirm continuous operation
Failsafe protection	• Review data collected in pilot if failsafe conditions arise during pilot • Set up test to simulate failsafe scenarios
Lowest lifetime cost	• Capture install times
Security	• Identify any security issues encountered during pilot • Commission 3rd party penetration testing

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PICKING THE RIGHT SITES

The first question is how many sites, and the second is which sites.

To be credible, the number of sites should be a sensible % of your total. We'd suggest 4% of the network with a pump station: PRV ratio that reflects what's in your network. That suggests around 18 PRVs and 2 pump stations in a 500 DMA network.

Pressure management has a history of being site specific. Back in the day one had to calculate and model each location and deploy a specific solution with site-specific settings. However, advanced pressure management is a network-wide solution consisting of:

- One interface for visualising data
- One interface for making site-specific settings
- One set of hardware for PRVs, one for pump stations

Engineers seem to like to pilot things in the most difficult/complicated sites. This isn't wise. Applying the 80/20 rule, best practice is to ensure that solutions work in 80% of situations rather than in edge cases. The edge cases can be dealt with subsequently after the benefits are obtained in the 80%

What we have observed as best practice is changes to network design in the 20% of cases to pull as many of them as possible closer to the 80%, ensuring the solution works in an even greater % of the network. This then leaves a very small number of sites that require a bespoke approach

CONCLUSION

So, you're all set. You're ready to write the terms of reference for an advanced pressure management pilot and mobilise. You know what you're testing, who cares, what data you need to collect, everything that you need to consider and the sites you're going to run it on.

Good luck, and don't hesitate to ask us for further assistance.

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