5 PRACTICAL STEPS FOR A SMOOTH PROJECT HANDOVER TO OPERATIONS

Gillian Woodward (Morrison Low), Dugall Wilson (Stantec)

ABSTRACT

Is achieving a smooth handover between treatment plant project and operations teams possible? Yes, we think so, and in this paper, we identify common pitfalls and share five practical steps from both project delivery and operational perspectives to achieve a smooth project handover.

As an operator have you experienced project teams demanding endless amounts of your time like their project is the only thing on the planet that matters? Does it feel like the project team doesn't realise your day-job is to operate a treatment plant with minimal resources? As a project team have you experienced operations adding more scope to your project like it is Christmas, and you are Santa? Does it feel like operations put up barriers to you delivering a project that is intended to improve things for them? As a programme manager have you experienced projects that struggle to complete and handover to operations, and project teams that come back to you seeking additional funding for what looks like an operations wish list? You are not alone – these are all common experiences!

1. Project scope - If the project scope, including operational requirements, is not clearly defined in the project brief then the project team needs to resolve this. The total project scope needs to be clearly defined, including the operational improvements that are necessary for the project to achieve the outcomes. The project team needs to have a complete awareness of the impacts their project will have on other parts of the treatment system, and this needs to be an active conversation with operations throughout delivery so changes to the project scope can be managed.
2. Operational stakeholders - Operations need to be an active and responsive stakeholder. Not all operational issues will be resolved by the project, only those that are confirmed as within the project scope. This means that operations input to and approval of the project brief is critical, as well as operations input at the project kick-off meeting and other specific points during delivery.
3. Operational resources - The project may need to provide additional operations resource to resolve operational issues that prevent the project achieving the outcomes. The project team may be ready to go, but the operations teams are not on standby to share their practical knowledge – their day job is to operate, maintain, react, and complete mandatory training. They will already be working full days with overtime and are likely being called out after hours.
4. Handover process - The project team remains responsible for new equipment and treatment process provided by the project, until final handover is agreed with operations. Take a moment, pretend you are an operator. How might it feel to stand in the darkness in the howling wind at 2am trying to restore service at this plant? Project teams need to train operators and run any plant upgrades for a performance period, without being dependent on the operating teams.

5. Documentation - Documentation matters, detail matters. The project team needs to provide comprehensive documentation to operations before touching an asset, before commissioning, and before handover.

KEYWORDS

Treatment plant, operations, plant design, project delivery, project handover

1 INTRODUCTION

What is required to achieve a smooth handover between treatment plant project and operations teams. Project handover results in a status for new assets as "accepted into service", which means that the operations team agrees to accept responsibility for operating and maintaining the new asset. The operations team won't accept into service assets that will increase the need for operator intervention, or adversely affect other process streams, or trigger increased maintenance for other existing assets. In the worst case, the upgraded asset is not used by the as designed so the investment is wasted and not realised.

The handover phase of a project is often the poor cousin of project delivery, with project teams investing time in project issues throughout design and construction but not addressing this key project phase until the last minute. This can lead to a protracted and painful handover, as the project team try to convince the operations team that the new asset will improve plant operation and should be accepted into service.

The impacts that arise from a project handover not going as planned include increased financial costs due to schedule delays, additional stress and pressure on the project team and operations staff involved, asset owners holding onto risk longer until new assets are in operation, and damage to delivery reputation

A successful project handover to operations does not require the project team and the operations team to be aligned 100% of the time, nor does it only happen on those rare projects where nothing unexpected happens during delivery. A successful project handover to operations does rely on both teams working together, recognising each other's different drivers and constraints, and actively communicating with each other.

While delivering many projects nationally and globally requiring a commissioning and handover phase, the authors have collected practical tips for improving project delivery in treatment plants. While most of the examples have come from projects at water treatment plants, the lessons are generally applicable to wastewater treatment plants as well, albeit the consequences of issues with project deliver are not the same. The tips and lessons can be applied to any sector and to any project, where an interface from project works on an asset, to the operation and maintenance of the asset exists.

The intent of this paper and presentation is that the audience can obtain:

1. Quick and tangible actions that they can take to resolve a difficult project handover.
2. Awareness of some warning signals indicating issues that might lead to a difficult project handover.

3. Some longer-term methods of fixing this issue.
4. To consider a commitment, wherever you are in your career journey, to adopting a standardised approach, that strives to make project handovers great.

Section 2 of this paper, the "common issues" section, has been written around five key areas where we have observed common issues hindering successful project handover to operations, posed as questions. Section 3, the "planning for handover throughout delivery" section, provides a recommended approach through the project lifecycle aimed at improving the project handover to operations.

2 COMMON ISSUES IN HANDOVER TO OPERATIONS

2.1 WHY DOES MY PROJECT KEEP GROWING, THIS WASN'T THE SCOPE IN THE PROJECT BRIEF?

The project brief should clearly define the project outcomes. The project team should clearly define the project scope, including any operational improvements needed for the project to achieve these outcomes. The project team also needs to address any ambiguity or risk in the project scope - even simple treatment plants can be complex, and to achieve an outcome with one asset or process stream, will often require changes to be made to other assets or process streams, sometimes even outside the treatment plant boundary. The project team needs to have a complete awareness of the impacts their project will have on other parts of the treatment system, and this needs to be an active conversation with operations throughout delivery so changes to the project scope can be managed.

The project team needs to be mindful that the operations teams is not on standby ready to share their practical knowledge. Even if the operations team is engaged and wants to help the project, their priority is to operate, maintain, react, and complete mandatory training so they can deliver safe drinking water to the public, or meet discharge consent conditions, often resulting in after-hours work. The project team may need to provide additional operations resources to get operations team input to the project at the right time or to resolve operational issues that prevent the project achieving the outcomes.

It should be recognised that operators are typically practical-minded people, who are wired to drop everything to fix something going wrong at their treatment plant. This can sometimes lead to operators leaning in and helping, especially when the knowledge of how to operate the plant sits only with them. If operators are completing project related tasks that perhaps should be carried out by the project team, or if the level of effort is significantly more than previously agreed to, or this is having an impact on the operator's day job of running the existing treatment processes, then this needs to be communicated to the project team and resolved by the project team, bringing additional resources to the project if needed.

Case Study One:

This involved a treatment plant that required numerous upgrades over a 3-year period to achieve health and safety standards, but also process deficiencies that were causing operators to respond night and day to critical and noncritical events. In addition, any fault that left the treatment plant offline resulted in the need to attend the site and resume operation within ~6 hours to avoid customers running out of water. Introduction of a new bore to service and a treated water reservoir upgrade project which was located at the

treatment plant site, were two of the key components of the plant upgrade. As well the estimated reservoir turnover time necessitated the introduction of a chlorination top up system. The project was not classified as high risk and proceeded in phases sequentially rather than holistically. As other process issues came to light, these were either absorbed into the project or prioritised by bypassing the standard internal delivery process, which pushed back the original project without proper consideration for the overall risks that the original project was intended to address. The result was during project commissioning and handover the treatment plant processes were adversely impacted.

Due to the existing issues at the site the operators were frequently on hand and the project team became used to depending on them to solve treatment plant issues, inform them of network issues, and to keep the plant running, without providing the operators with additional support. This caused an excessive time burden on the entire operating team, who struggled to have their concerns mitigated.

Classification of treatment plant projects as high risk

Treating water with the application of chemicals is a process, it mimics baking a cake, and repeatability is achieved by using a recipe (operating manual and standard operating procedures). Water as an element has numerous biological, chemical and physical properties which, when applying treatment to change the state of any of these characteristics, must be measured and controlled to achieve the desired level of treatment outcome. Adding chemicals anywhere in the source to tap system should be considered "treatment".

The treatment process is holistic, and we have seen where due to scope constraints that are either budget driven, or not holistically outcome driven, the commissioning result was, in the worst case, a non-functioning treatment plant and/or inability to demonstrate compliance. The authors advice then, as part of the project gateway process, is that all treatment plant projects are initially classified as high risk to begin with and only when certain factors are mitigated can these be downgraded.

The project warning signs that indicate a change in approach is probably needed include:

- Frequent scope changes but particularly scope changes that can be categorized as compliance or standards driven.
- Every interaction the project team has with operations they come away with something that feels like an operational shopping list.
- It is clear that operational staff were not engaged in setting the project scope and outcomes early enough because they are asking questions that don't align with the current project and timeline.

Conclusion: the project team needs to take active steps to own the whole project scope, this is everything needed for the project to achieve the outcomes.

2.2 OUR PROJECT WILL DELIVER AN UPGRADE THAT WILL IMPROVE TREATMENT OPERATIONS, WHY WON'T THE OPERATIONS TEAM ENGAGE WITH US AND HELP US?

The project team needs to be aware that the operations team may have seen a long list of projects delivered poorly or making plant operation harder, in a priority order that makes

no sense, or there may be other workplace dynamics at play that makes them feel like it is not worth engaging with the project team. Words are not enough to change this situation; trust needs to be built. The operations team needs to be aware that the project team has been tasked with delivering this project, they aren't to blame for all the historic issues the operations team has experienced. The operations team also needs to remember that without their input the handover for this project will not succeed, and if they are too busy, or too disengaged from the project the handover will not succeed.

Operations need to be an active stakeholder and an intelligent end user of the project. Not all operational issues at the plant will be resolved by a project, only those that have been clearly identified in the project brief. It may be that the strategy is just to replace like for like for now, rather than upgrade - this is not an operator level decision, but they must have visibility over the decision-making criteria. This means that operations input to and approval of the project brief is critical to capture current on the ground risks to service (that may not have appeared in the information sourced from the asset information system), as well as operations input at the project kick-off meeting and other specific points during delivery.

The operations team also need to consider in advance what approval steps they will need the project to step through to achieve acceptance into service. If that is a well-defined process it needs to be clearly communicated to the project team, if it is not a well-defined process, then the operations team needs to commit to clear expectations for the project team early in project delivery. An acceptance into service process that is constantly evolving and changing is extremely difficult for a project team to adapt to and accommodate within existing deadlines and budgets, so should be avoided by the operations team unless absolutely necessary.

Case Study Two:

This is a reservoir seismic strengthening project that had progressed through design and procurement, but at the point of arranging the reservoir shutdown it was discovered by the project team that the reservoir was not just required for network storage but was also a key treatment asset providing chlorine contact time. The operations team did not automatically approve the reservoir shutdown without a plan from the project team to deal with the loss of contact time as it would have resulted in compromising the existing treatment process. The operations team were under considerable pressure to approve the reservoir shutdown due to the significant impact on the project delivery timeframe and costs, but the operations team prioritised delivery of safe drinking water to customers. The project team felt that the requirements on them had changed part way through delivery, but the project outcomes and scope had not changed, rather that somewhere through the project delivery lifecycle the knowledge of how the reservoir was integrated into the treatment processes, or how the operational constraints had changed due to increased network demand had not been detected, or original project assumptions verified.

The project warning signs that indicate a change in approach is probably needed include:

- There is no detailed evidence of shutdown criteria having being discussed with operations.
- There is no detailed evidence of acceptance to service criteria having being discussed with operations.
- The criteria for acceptance into service keep changing.

- The operations team have a long list of other operational issues that they believe are higher priority to solve than the outcomes this project is targeting.

Conclusion: the operations team needs to be actively involved in the project from briefing stage and engaged with the project team throughout delivery of design and construction for the final handover to succeed.

2.3 THE OPERATIONS TEAM SEEMS REALLY KEEN TO HELP THE PROJECT BUT THEY JUST DON'T HAVE ANY TIME, WHAT CAN I DO?

For some projects the operations team input may not be limited to asset knowledge, project approvals, and acceptance into service, but may include more detailed support to the project, or even undertaking planned operational tasks that are necessary for the project to succeed. If these activities are critical to the project success the project team may need to provide additional resources into the operations team to complete them.

Operations always have very constrained budgets with little or no ability to fund workstreams related to the project or associated compliance issues. It will sometimes feel for the project team that they are being asked to solve a variety of unrelated operational issues and that operations have a long shopping list of issues they want the project team to address – project teams need to be open to the project incorporating anything that is needed for the project to achieve the outcomes. If there is uncertainty about whether something should be part of the project scope or not, then that must be escalated to the project sponsor for resolution.

If the project team does not have visibility that the project has been actively planned into the operations workplan then ask to see the operations resource plan. The project team should schedule regular meetings for the duration of the project. The project team may need to prepare contingency plans for schedule slippage, and plan for how the project will be supported during low resource months or periods when operations are busier than normal.

Case Study Three:

In the lead up to a major treatment plant upgrade it was identified by the operations managers that although the operations team was still not fully resourced and had a backlog of corrective maintenance to complete, the project was deemed critical to advance. A solution had to be found to balance out the consequences of not achieving project delivery with the consequences of not completing the corrective maintenance backlog. This was very challenging decision making. The operations managers started with request to the business to increase operator resources to be able to absorb the project delivery schedules, two years in advance of the project commencing. Due to inability to recruit it was necessary to request to the project team to add another operator from an external resource to support the project.

To ensure that sustainable progress on project tasks were made at the same time as completing business as usual tasks, the project tasks were added to the existing work order management system so that the operations planning team could work with the available operational resources to support the project. This meant that when the operations team attended meetings, they already knew who was covering the response to

alarms and other requests. All requests to the operations team were planned in this manner – HAZOP and SID workshops, site visits, documentation review, training. The intent was that the operations team leaders and managers could make the workplan visible to all stakeholders so that they could see how the finite operational resources had been allocated, providing an opportunity to confirm that organisational priorities were being scheduled in the right order. This resource planning would then form the basis of being able to best manage the treatment plant upgrade portfolio years into the future.

The project warning signs that indicate a change in approach is probably needed include:

- The operations team have a significant backlog of maintenance activities, which could be an indicator that they are resource constrained and have limited time to support the project.
- Activities that need to be undertaken by the operations team or need operations team input, keep getting delayed due to lack of staff availability and ending up on the critical path for delivery.
- Operations staff frequently get interrupted in meetings by phone calls with operational issues or alarms that they need to attend to.
- The project team struggles to arrange meetings with the operations team due to heavy operational workload, or meetings are frequently cancelled at the last minute due to unexpected operational issues.

Conclusion: if there are critical project tasks that need operational input, but the operations team is not resourced enough to carry out those tasks, then the project should provide the resources needed.

2.4 WHY AM I EXPECTED TO RUN THE PLANT ONCE I'VE UPGRADED IT? I'M NOT AN OPERATOR!

The project team needs to put themselves in the operator's shoes – the operator does not want a plant upgrade that works on paper but not in practice, that needs constant tweaking or manual control to achieve the process outcomes, that has alarms constantly going off, or that needs other projects completed before it will work correctly. The plant renewal or upgrade needs to work, and a handover period needs to demonstrate that the project met its outcomes under a variety of real-life situations.

The project team should confirm that commissioning and performance testing have been scoped as independent to operations. The operations team should be involved in signing off these phases of the project as acceptable, but not doing the work unless this has been previously agreed. Commissioning and performance testing can be complex and for some projects the project team may need to bring in additional resources with specialist skills and experience for those activities.

The project team needs to remain responsible for new equipment and treatment processes impacted by the project until final handover is agreed with operations. Project teams need to train operators and run any plant upgrades for a performance period, without being dependent on the operating teams. If the performance testing requirements are not clearly defined, then the project team needs to resolve that with the operations team. The testing

requirements should be appropriately detailed to ensure the upgrades are successful e.g. the dosing system will achieve 100% uptime of dosing system for a period of 90 days.

Case Study Four:

The project commissioning date for a water treatment plant upgrade, that added a specialised treatment process, slid into December because of several project delays. This was foreseeable by October; however, the project team did not adjust and communicate the schedule change needed to stakeholders. Consequently, the stakeholders were expecting that the plant would be commissioned before Christmas, alleviating possible summer water restrictions. Due to operator fatigue resulting from emergency work at other treatment plants, the operations manager formed the opinion that it was not safe for the operations team, or consequently the public, for the team to take responsibility for the operation of the new plant in late December. A request was made that the project team obtain other resource and commit to running the upgraded plant to meet stakeholder and community expectations. Making this request late in the programme resulted in significant stress to all parties and subsequently this request was not agreed to, and the decision was made to begin commissioning when everyone came back from the holiday break. The plant was eventually commissioned by the end of February after a 37-day performance period.

The project warning signs that indicate a change in approach is probably needed include:

- Performance testing needed for the asset to be accepted into service by the operations team has not been defined or planned.
- Significant project milestones are planned close to a key holiday period.

Conclusion: the project team needs to plan from the start of delivery not only to commission the new assets, but also to operate the new assets through a performance or acceptance testing period.

2.5 WHY WON'T THE OPERATIONS TEAM LET ME HAND THIS OVER, IT'S JUST THE DOCUMENTATION LEFT TO DELIVER?

Towards the end of a project when the intense work of the design and construction phases are complete, key team members sometimes move on to other projects and it can be hard to bring a focus to complete what might seem like minor administration activities to close the project out. However, completing asset data and manuals is a key activity that can take significant effort and the asset documentation matters and the detail within those documents matters. If the operational readiness requirements are not clearly defined then the project team needs to resolve that with the operations team, remembering that updating compliance systems are part of operational readiness. The project team needs to have a plan to complete all the documentation so the handover to the operations team can be successful and within the programme.

In your career you may have been expected to pick things up with minimal training and no documentation. It was awkward and inefficient, but you made it work. In a treatment plant environment, the risk from such an approach is not acceptable. Having up to date, complete and accurate documentation is critical for daily operational management and to mitigate the risk of no water or a water quality events 24/7. Remember once a fault has

occurred, the clock to return a plant to service starts ticking, especially when many plants do not have duty/standby asset configurations.

Case Study Five:

A treatment plant experienced a major outage (due to a severe weather event over a weekend) during which electrical, instrumentation and control systems were impacted. To avoid running a township completely out of water, the engineering and treatment teams worked together to determine how to operate the plant without all critical monitoring or failsafe systems running. It was found that the commissioning and final operating documentation for a source water upgrade project completed seven months earlier was not on hand (no commissioning sheets retrievable from documentation system, no operating manuals available at plant) because it had not been supplied by the project team. There was no record of acceptance into service by the operators, yet the assets were being run. Mistakes were made and contingency plans initiated as the teams worked 24/7 through the weekend on a trial-and-error basis. The event was extremely stressful and fatiguing for all involved, resulted in a half an hour non-compliance (the risk for which was managed by increasing the sampling regime) and presented an unacceptably risky practice for treatment plant management. This scenario could have been very different if the upgrade project had been handed over correctly and documents and manuals from that project were readily available for the operations team.

The project warning signs that the project may be going off track and a change in approach is probably needed include:

- Documentation needed for the asset to be accepted into service by the operations team has not been defined.
- The commissioning date is scheduled, but the project team has not yet prepared any of the operational readiness documentation.
- The project team has assigned a someone with minimal experience and with no supervision to pull together the operation manual.

Conclusion: the project team should be clear from the start what documentation will be needed for the handover to operations, and then have a plan for how they will produce those documents in a quality and timely manner.

3 PLANNING FOR HANDOVER THROUGHOUT DELIVERY

In this section we provide advice on the level of engagement between the project team and the operations team that we recommend should be demonstrated throughout the project delivery. Client organisations will all have variations of a standard project delivery process, with lifecycle phases or stages each project must follow, and gateways or milestones which require some approval to pass through (formal or informal). Here we use a simple project lifecycle to illustrate the steps.

The earlier the project is through its delivery lifecycle the greater the opportunity for operations to influence the project, and the greater the opportunity for the project team to engage properly with the operations team. The onus is not on one person or one team to make this work – it takes everyone trying hard for it to be successful.

Both the project team and operations team should consider the stage the project is at and the level of engagement with the operations team that should have been achieved at that point in the project delivery. If the right level of engagement with the operations team has not been achieved then the risk to project handover should be escalated by either team. If it is not clear what level of engagement with the operations team\should have been achieved at that point in the project delivery, you should refer to the client's project delivery framework and any gateway/milestone approval forms or checklists.

Master planning - strategic

Projects at treatment plants are typically initiated to replace aging assets and mitigate risks, be it to treat more water, or to treat the water to a higher quality. The timeline of the risk being realised could be imminent, or it could be many years from now.

The asset data that the asset owner holds and the long-term strategic plans that they develop and keep current are key. The asset owner needs a strategic plan for each treatment plant setting out how it will respond to growth and demand, changing regulatory requirements etc. Information needed to inform the portfolio strategy should largely be accumulated from all the information on the assets (any person who touches the asset needs to record that information in the same system), collected through the Asset Information System. Having meeting or workshops extracting information from subject matter experts is not a sound method for collecting this information, particularly for operations for which most of their work time is spent monitoring the live performance of production assets. At best what meetings and conversations will give you is intelligence around what is already broken (and so you remain reactive in your approach and cannot move to planned).

The correct technique to improve your asset information is to have anyone performing work on the assets collect asset information as:

- part of planned maintenance (defect and condition inspections),
- corrective maintenance (arising from those inspections),
- preventative maintenance (scheduled maintenance),
- reactive maintenance, and
- projects

Make the information simple to collect or ingest, provide prompts for anything that has a target value, or is an assessment (such as a condition score). There is no shortcut for collecting this information, design how to collect asset information and have that information stored in your asset information system before the asset is in the ground. The authors have seen asset information systems used only by the operations teams, leaving all other asset information initiated by other teams sitting outside the database, resulting in lost data, hours of administrative headaches and ultimately impacting the source of truth about the asset, reducing the ability of planners to plan its lifecycle effectively. Invest in your asset management system, invest in the collection of data that helps you understand your assets and ensure that at all levels of your organization that this system becomes one of your business's core systems.

The operations team need to be actively engaged with the masterplan, because, for the multi-year capital delivery plan to be successful, the operations team need:

- A corresponding multi-year workforce resource plan to interface with the projects, and
- A risk mitigation plan that shows the risk the business is carrying (and what the current mitigation is) until outcomes can be achieved by the various projects.

Initiation/Plan Phase - bridge between strategic and tactical

In the initiation phase individual projects will be moved from master planning into delivery. Typically, a brief will be written at this stage to define the project outcomes or success criteria and get buy-in from internal stakeholders. The operations team are a key stakeholder and should have input to the project brief. The brief is a way for the business to ensure operations and other internal teams are aligned and support the project outcomes. In addition, there may be key operational constraints to the project delivery that need to be described, operation team contacts and escalation pathways to be included in the brief, performance testing and handover criteria to be defined. The value of a well written project brief should not be underestimated, in many cases where the operational handover has not gone well, some of the root causes can be traced back to an inadequate project brief. Even projects that need to be delivered though alternative, fast track models should be properly briefed, with operations team input, otherwise those fast-track projects risk the wider business not being fully aligned with the project.

The operations team needs to be aware that their ability to influence a project will be highest early in delivery at the initiation phase when the project is being defined and a brief being prepared that sets out the project outcomes. It can delay a project or cause it to fail if the operations team fails to engage during the initiation phase and subsequently adds scope to the project during design or construction.

Design phase – tactical

Project teams need to be mindful that operations team's input to the project brief may not have been adequate – they should look for clear evidence that the operational team has reviewed (not just a manager) and approved the project brief (manager). Project teams should also be aware that the greatest opportunity to gain alignment with the operations team is early in delivery and the project team should put energy into a kick off meeting including operations as a key stakeholder. While it is unlikely that the kick-off meeting could include any significant planning for the project handover, it should be identified as an area that needs focus from both project and operational teams and progress with handover planning should be tracked throughout delivery. During design the project team needs to add to the level of detail for the commissioning and handover process and work with the operations team to make sure it is clear for all parties. The operations team needs to be clear on what assurance steps and documentation it needs before accepting a new asset into service.

Design may occur in a single stage or over many stages, and although it is not an operational team responsibility to have an intimate understanding of the project delivery lifecycle, the operations team needs to be clear what stages the project will be designed in, what input or approvals will be needed from the operations team and when, and at what steps the project will pass through a governance gateway at which point the project cannot go backwards but only forwards.

The operations team needs to actively engage with the project team during the design phases of delivery and highlight any constraints that may prevent them supporting the project delivery or handover. It is normal that operations teams are resource constrained,

the impact from which needs to be addressed by the project and operations teams collectively, and for larger programmes may require some scheduling of capital projects to align with the operation team's ability to interface with the projects.

It is possible to fast track the delivery of treatment projects but only if the most senior leaders in the client organisation have the political will to support the project throughout its entire delivery lifecycle, and significant funding is available for the project. Often these projects are left with a long handover period when project is no longer deemed a high priority and the focus of the business is shifted elsewhere.

If the business makes a decision to accelerate a treatment project, then it is necessary to consider the overall workload, particularly for the operations team, and either reducing the workload (re-prioritising other projects and slowing some or all down) or providing additional resource. If an operations team is already experiencing multiple projects converging at a pinch point for resources, then the team must find a way to communicate that risk and complete the projects in an order that best reflects to the regulators that you have thought about the order of delivery.

Construction – tactical

Construction within a live treatment plant can be challenging with overlapping responsibilities and the need for constant communications. The operations team need good visibility of construction activities planned each day so there are no surprises with interruptions to the existing treatment processes or controls. The project team needs to constantly reassess if the commissioning, performance testing and handover plan should be updated following changes occurring during construction. The operations team need to make sure any changes to the handover requirements are communicated in advance not saved up for when the project team has completed commissioning and are attempting handover.

Commissioning and Handover – tactical

Once construction is complete the project team undertakes commissioning to prove the new asset operates correctly, and performance testing to demonstrate the new asset operates correctly under a variety of conditions. The project team also provides any necessary training, asset data and documentation. Finally, the operations team must be given an opportunity to run the new asset for a period while project team remains responsible for it should it fail. After all that is completed, the operations team will accept the new asset into service, congratulations, the project is handed over.

Treatment plant projects everywhere experience schedule delays, however, in New Zealand delays that result in the treatment plant project commissioning timelines landing in the months of December, January or February are problematic (all regions throughout the world have a variation of this issue). There are two constraints during this period; one, almost everyone that is not an operator takes holidays and two, pressure on the water supply is more severe due to hot weather. It is at this time, that the assets are needed to perform at their best, to their design limits. Unless adequate resources (including any supplier staff that would be involved in an emergency) are willing to forgo the holiday period to support the project delivery, it is recommended the water supplier adopt a brown out work period zone for project works over this period. This requirement should be reflected on the project delivery schedule from Day 1, or the resources needed to work through the holiday period should be clearly identified and agreed to at least 12 months in advance.

4 CONCLUSIONS

Projects that involve water treatment, whether they are located at treatment plants or in the network, should be treated as high risk by default and appropriate delivery processes adopted.

In this paper we have identified the following five practical steps that teams can take to make a successful handover to operations more likely:

- The project team needs to take active steps to own the whole project scope, everything needed for the project to achieve the outcomes.
- The operations team needs to be actively involved in the project and engaged with the project team throughout delivery of design and construction.
- If there are critical project tasks that need operational input, but the operations team is not resourced enough to carry out those tasks, then the project should provide the resources needed.
- The project team needs to plan from the start of delivery not only to commission the new assets but also to operate the new assets through a performance or acceptance testing period.
- The project team should be clear from the start what documentation will be needed for the handover to operations, and then have a plan for how they will produce those documents on time.

The successful handover of a treatment plant project to operations is achievable, but it relies on both the project and operations teams working together and actively communicating with each other throughout the delivery lifecycle.

5 ACKNOWLEDGMENTS

Gillian Woodward
The treatment plant operators that I have had the privilege of leading in my utility manager roles, especially my direct reports at the supervisory level. The numerous project managers and directors who have been willing to have professional but difficult conversations with me under pressure in order to achieve outcomes safely and who were willing to keep working to influence the creation of processes and systems that improve the likelihood of these conversations being had at the right time in the project life cycle.