O&M COVID-19 Response Guide //

Strategies to Maintain Essential Operations

Smart Utility

Operations and Maintenance

Due to the COVID-19 pandemic and its resulting challenges, water utilities are asking:

What additional health and safety considerations are needed?*

How do I maintain operations with fewer staff due to illness or quarantine?

Can I use technology to accommodate a reduced and more remote operations workforce?

Brown and Caldwell's (BC) digital technology and operations and maintenance (O&M) specialists developed this guide to provide strategies to maintain essential operations under these unprecedented times. Quick tips to address these critical challenges are highlighted below, with a more detailed list of suggestions provided on the following pages.

Quick tips to addressing immediate O&M challenges:

1 — Operate while maintaining social distancing to protect employees
Add policies and automated reminders for regular safety check-ins for isolated operations personnel. Leverage video conferencing technologies (FaceTime, Microsoft Teams, Vuforia Chalk) to instruct less-experienced personnel.

2 — Use situational awareness to support decision making
Leverage remote sensors or network-connected cameras (e.g., Ring cameras) on routine monitoring areas to maintain awareness but limit physical interaction time.

3 — Revise operating procedures to maintain operations
Contact suppliers to temporarily adjust delivery schedules so that on-hand storage capacity is increased.

4 — Enhance service and supply chain communications to support operations and digital infrastructure
Provide all personnel access to a contact list mapping each critical process area and control technology platform to the associated lead staff for those systems. List backup leads as well.

5 — Take advantage of foundational technology to mitigate system failures
Have PLC, HMI, and network device configurations backups readily available for external support personnel if needed.

Pandemic Response Planning Resources and References

Brown and Caldwell is here to serve our community.

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Go to brownandcaldwell.com/covid-19 for additional resources on current knowledge about this emerging viral pathogen from third-party sources.

**This document is written with the understanding that water utilities are implementing their own modified work protocols in accordance with local, state, and federal - including Center for Disease Control and Prevention (CDC) - guidance on social distancing and quarantines. That guidance and related protocols may result in staff working in greater isolation and/or remote working environments, among other changes.*

1 — Operate while maintaining social distancing to protect employees*

Do we have the systems and procedures in place to maintain essential operations with staff practicing social distancing and/or quarantines?

Meets Needs?	Question	Potential Risk to Mitigate	Mitigation Example
☐	**Have we recently tested and validated each user account associated with remote access?**	Many systems have not been recently accessed or tested. They may not be readily available for use.	Before it becomes a necessity, test multiple concurrent remote access connections and redundant communications with critical technology to identify any potential weakness. If remote access has never been implemented but is available, consider doing so now.
☐	**How do we effectively monitor onsite personnel while maintaining social distancing?**	The constraints of limited personnel and social distancing criteria present new challenges for monitoring personnel health.	Add policies and automated reminders for regular safety check-ins for isolated operations personnel. Leverage video conferencing technologies (FaceTime, Microsoft Teams, Vuforia Chalk) to instruct less-experienced personnel.
☐	**Do we have the technology to support social distancing for operations crews?**	Often IT and SCADA systems are accessed from primary locations, such as an operations center. If we are to segment staff and provide shift isolation, we may not have enough access licenses, terminals, or equipment.	Add remote access infrastructure and licenses for SCADA, including redundant internet communications. If implementation is impractical, consider procedural modifications to separate staff within the facility.
☐	**Do essential personnel have dedicated, individual communication devices and remote access to their work environment?**	Many systems share access computers or a single on-call phone that is passed between operators. This can limit the ability to provide continuous communication and information access.	Identify temporary methods to establish remote access devices to SCADA and automated alarm notification software. If impractical, consider dedicating one operator to monitor entire SCADA and dispatch other personnel to address alarms and monitor equipment as needed.

**Social distancing and other recommendations from the CDC are updated frequently. Water utilities are advised to ensure that they are aware of the latest requirements and guidance from local, state, and/or federal authorities.*

2 — Use situational awareness to support decision making

How are we maintaining awareness of the pandemic and its impact on our O&M staff so we can be proactive in our decisions and prioritize actions?

Meets Needs?	Question	Potential Risk to Mitigate	Mitigation Example
☐	**Do we have enough personnel to focus on critical planning or response needs to manage daily monitoring requirements?**	With the potential for a reduced personnel count, daily monitoring requirements may be hindered. Limit the amount of time key personnel spend on daily rounds to free them to focus on critical needs..	Leverage remote sensors or network-connected cameras on routine monitoring areas to maintain awareness but limit physical interaction time. If remote sensors are not currently installed, consider procuring Internet of Things (IoT) cameras and sensors that can be applied quickly and cost effectively without increasing cyber-security risks.
☐	**Are we continuing to follow our physical and cyber security policies and procedures?**	It is expected that there will be increased physical and cybersecurity threats and targeted social engineering attempts during the pandemic.	If existing cyber security protocols are in place, hold a high-level review of the currently in-place policies and procedures and verify roles and responsibilities. If no cyber security protocol is in place, consider implementation commensurate with exposure.
☐	**Have we recently reviewed ongoing construction projects to evaluate impacts to our processes (primary or redundant capacity/functionality)?**	Construction often requires modifications or shutdowns of critical process equipment or redundancy sections that may be required or may require manual operations to maintain.	Establish procedures with contractors to pause construction and restore automated operations if significant reduction to O&M occurs.
☐	**Are we continuously monitoring and tracking the availability of our personnel?**	The lack of a method to track staff availability and "fit for duty" status makes it difficult to assess workforce availability.	Create a personnel availability tracking approach that is shared with all personnel needing to access it on or off site.
☐	**Have we recently reviewed critical equipment maintenance and repair schedules?**	Equipment may have to sustain through extended operational periods with minimum maintenance, increasing risk of failure.	If available, grant remote access of the Computerized Maintenance Management System (CMMS) to off-site users to allow remote management of maintenance activities. If unavailable, create a critical maintenance tracking sheet that is shared with all personnel needing to access it on or off site.

3 — Revise operating procedures to maintain operations

With a different mix of personnel, situations, and operating state, are the procedures we employ to manage critical operations in place?

Meets Needs?	Question	Potential Risk to Mitigate	Mitigation Example
☐	**Have we reviewed our current process for ordering chemicals and supplies that rely on "just in time" delivery or have minimal storage capacity?**	Many processes and operations rely on chemicals and supplies that are delivered just before they are needed. The supply chain providing these may become limited or compromised.	Contact suppliers to temporarily adjust delivery schedules so that on-hand storage capacity is increased. Consider totes or trailers on site to store additional chemicals. Consider alternative chemicals for short-term use.
☐	**Do we have a current, documented set of passwords and backup files for our control and IT systems (passwords, network addresses/ names) in place?**	With the primary source of support potentially unavailable, supplementary supporters may not be able to gain access to critical systems.	Establish secure method for holding necessary passwords to critical applications like SCADA, firewalls, and other software and hardware systems to ensure continuity of support.
☐	**Have we recently tested and trained our primary and supplemental personnel on our emergency and redundancy scenarios for each of the major technology platforms?**	Many technology systems operate on the primary platform for most of their operational life. If the redundancy or emergency operating mode has not been tested or personnel trained on its use, systems may not work properly when needed.	Complete desktop exercise to test backup systems and operator ability to use them. Provide staff with written instructions on back-up system operations.
☐	**Do we have a documented operating procedure for all critical functions?**	There may be different or auxiliary personnel required to provide functions that are outside their primary competency areas. They may need ready and effective access guidance documentation.	Establish operating procedures necessary for critical systems that can be supported by outside help and verify that documentation for the procedures is readily accessible when necessary.
☐	**Do we have a secondary point of contact for each critical function or support system?**	Many systems, during normal operation, may only have one primary personnel or contact who has intimate knowledge of that system. If that contact is unavailable, there will likely be significant limitations in operating or supporting that system.	Establish at least two back-up personnel for each critical process and define operating procedures for addressing situations that have the potential to occur.
☐	**Have we recently tested our monitored safety systems that do not already have a monthly testing requirement?**	Safety systems like fire monitoring, gas monitoring, and life safety are critical to maintaining process and life safety. If operating on a reduced staff loading, our ability to identify and respond to incidents may be reduced.	Test the alarms of eye wash stations or other systems with the assumption that on-site staff is critically low or no other personnel are on site. Verify that safety systems notify appropriate on- and off-site responders/personnel.

4 — Enhance service and supply chain communications to support operations and digital infrastructure

Is there a potential for the primary support methods to be unavailable, and what are our plans for secondary or supplementary support?

Meets Needs?	Question	Potential Risk to Mitigate	Mitigation Example
☐	**Have we verified that our primary technology support methods and partners have risk evaluation and mitigation methods in place?**	There may be an instance where a primary technology provider's support path is unable to provide support.	Discuss priorities and known risks with all the primary technology support partners and evaluate the current standing of their risk-mitigation methods. Consider alternative support providers as the situation dictates.
☐	**Do we have a method in place for inexperienced O&M personnel to connect to remote experienced personnel?**	There may be different or auxiliary personnel required to provide functions that are outside their primary competency areas. They may need access to knowledge and guidance from others who are unable to be on site.	Set up a buddy system to support on-site personnel with experienced O&M staff. Consider having the ability to use FaceTime or some other form of technology to support this process while keeping social distancing practices in mind.
☐	**Do we have a method for remote technology partners (e.g., consultants, integrators, vendors) to provide remote troubleshooting support of each system?**	Technology platforms may require support or troubleshooting from supplemental partners; without access, they may not be able to effectively help.	Document procedure for new users to login to the system, and add appropriate domain groups to monitor and maintain access control.
☐	**Have we contacted each primary support partner and established a protocol for support and communication?**	Response times may increase without established points of contact for outside partner functions.	Set up a primary and secondary point of contact with each support partner to assist with troubleshooting or developing alternatives for things such as chemicals or process issues
☐	**Do we have a current contact list of each of the primary support partners and is this information readily available to all personnel?**	Often communications contacts are not globally shared or accessible. Updating and consolidating these communications contacts can decrease response time.	Develop a contact list mapping each technology platform to the assigned primary and secondary contact(s) and share with all personnel needing to access it on or off site.

5 — Take advantage of foundational technology to mitigate system failures

Is the critical technology that provides the foundation for critical and essential operations available and stable?

Meets Needs?	Question	Potential Risk to Mitigate	Mitigation Example
☐	**Do we have an ability to activate backup communication methods between technology systems if needed?**	Many systems rely on a variety of communication methods, such as radio, cellular, and hardwired communications, to sustain automatic operations and provide monitoring.	The ability to repair communication systems during the pandemic may be limited. Consider procuring and activating cellular communication modems and firewalls as a backup.
☐	**Have we recently tested hardwired backup and manual operation systems for primary control loops?**	Many systems have hardwired backup or manual operation systems in place if the automatic control system is not in operation. Use of these systems may be required if the primary system is not in operation or to direct and inform auxiliary personnel to operate the process.	Test each primary and secondary equipment process using provided manual control interfaces on control panels; verify hardwired interlocks function correctly. Instruct staff who may have rarely used manual controls on the controls' functions.
☐	**Have we taken backup copies of each of the runtime platforms in the past week and have a method for implementing them?**	Should a system fail, the ability to respond and bring the system back up to its normal state may be critically impacted.	Locate backups to PLC, HMI, and network device configurations with methods for personnel to provide to external support personnel.
☐	**Do we have adequate spare parts for all primary technology systems?**	The ability to obtain a ready supply of spare parts for critical technology systems may become more difficult.	Catalog spare parts on hand for each primary technology system and consider placing orders for additional spare parts now.

Pandemic Response Planning Resources

BC O&M and digital technology staff have found the following resources, among others, to be helpful to utilities planning their response to the COVID-19 Pandemic:

1. **NACWA - Covid-19 Utility Response Guide**
   https://www.nacwa.org/advocacy-analysis/campaigns/coronavirus-covid-19-utility-response
2. **WaterWorld – Coronavirus and Water**
   https://www.waterworld.com/drinking-water/article/14170109/coronavirus-and-water
3. **Article: WaterNews – Water Utilities' Biggest Coronavirus Concern Is Staffing**
   https://www.circleofblue.org/2020/world/water-utilities-biggest-coronavirus-concern-is-staffing/
4. **OSHA – Solid Waste and Wastewater Management Workers**
   https://www.osha.gov/SLTC/covid-19
5. **AWWA - COVID-19 Resource Page**
   https://www.awwa.org/Resources-Tools/Resource-Topics/Coronavirus#10681531-resources
6. **WEF Current Priority: Coronavirus**
   https://www.wef.org/news-hub/current-priorities/coronavirus/
7. **Guidance for Reducing Health Risks to Workers Handling Human Waste or Sewage**
   https://www.cdc.gov/healthywater/global/sanitation/workers_handlingwaste.html
8. **The U.S. Department of Homeland Security's (DHS) 2006 Pandemic Influenza Preparedness, Response, and Recovery Guide for Critical Infrastructure and Key Resources** has additional advice and guidance.
   https://www.dhs.gov/sites/default/files/publications/cikrpandemicinfluenzaguide.pdf

Through these challenging times, we will continue to serve our communities and prioritize health and safety first.