1.0 Policy

Shutdown/Specific Condition Coordination procedures are vital for coordinated, efficient interactions between the construction team and the San Francisco Public Utilities Commission (SFPUC) Operations group. For this reason, SFPUC Infrastructure CM Organization project construction shutdown /specific condition events shall be coordinated with the designated operations representative (OR). Planned project shutdown /specific condition events must be scheduled, approved, and implemented in an orderly, safe fashion with minimal impact on Operations (including Maintenance activities) and other project shutdown /specific condition event. A flow chart showing the Master System Shutdown Scheduling (MSSS) process is shown in Attachment 019-6.

This shutdown /specific condition coordination procedure applies to all personnel working on the SFPUC Infrastructure CM Organization projects to the extent that their work is affected by this SFPUC Infrastructure CM Procedure and does not conflict with specific SFPUC policies or the Contract under which the work is executed.

2.0 Description

This procedure defines the tasks, sequence and responsibilities for execution of systems shutdown/special condition events during the construction phase of the SFPUC Infrastructure CM Organization projects. This procedure also describes how issues identified during the process will be managed and resolved. It will be necessary to adapt this procedure to the actual scope and content of each project. The facility testing and start-up process detailed description is provided in CM...
3.0 Definitions

3.1 Specific Condition/Shutdown

“Specific Condition” is any condition requested by the Contractor that is necessary to conduct Contractor’s Work. A “shutdown” is one specific type of specific condition. A shutdown is the 1) closing/opening of valves/gates and/or de-pressuring and draining of pipelines or system components and/or 2) de-energizing or isolating system components including electrical systems. Shutdowns/Specific conditions are typically executed in order to allow for inspections, tie-ins or replacement/upgrade of system components. Shutdowns/Specific conditions may affect a portion of a transmission system, collection system, a facility component, a facility, a control system, or an entire system.

3.2 System Outage Request (SOR) for Water Enterprise Projects

System Outage Request (SOR) shown in Attachment 019-1a is a request made by the Contractor after award of the contract, through the RE, to a SFPUC Water Enterprise Operating Division to shutdown a portion of a system in order to perform work.

3.2.1 An SOR is needed for full or partial shutdowns and hot taps. One (1) SOR is required for each facility shutdown. Once the SOR is approved, it will be re-forecast in the Master System Shutdown Schedule for the facility or Enterprise.

3.3 Specific Condition Request (SCR) for Wastewater Enterprise Projects

Specific Condition Request (SCR) shown in Attachment 019-1b is a request made by the Contractor after award of the contract, through the RE, to a SFPUC Wastewater Enterprise Operating Division to provide specific conditions affecting all or a portion of a system integral to Enterprise operations in order to perform work.

3.3.1 An SCR is needed for full or partial impacts and hot taps. One (1) SCR is required for each facility impact. Once the SCR is approved it will be re-forecast in the Master System Specific Condition Schedule for the facility or Enterprise.

3.4 Operational Change Request (OCR)

An Operational Change Request (OCR) is a SFPUC-generated request to take a system, or portion of a system out of service. The OCR includes the Contractor’s SOR submittal and other operational details concerning maintenance of service and equipment during the shutdown. The OCR is prepared by the project Operations Representative and is approved by the
3.4.1 The OCR requires a Work-Around Plan as for certain critical shutdowns. Please note that the three (3) SFPUC operating divisions have different versions of the OCR. These OCR versions are:

- Water Supply & Treatment Division, Attachment 019-2.
- City Distribution Division, Attachment 019-4.

3.5 **SFPUC Infrastructure CM Master System Shutdown/Specific Condition Schedule and SFPUC Infrastructure CM System Shutdown/Specific Condition Matrix**

SFPUC Infrastructure CM Shutdowns/Specific Conditions are scheduled in an iterative fashion using two documents, the SFPUC Infrastructure CM Master System Shutdown/Specific Conditions Schedule and the SFPUC Infrastructure CM System Shutdown/Specific Condition Matrix.

3.5.1 The Master System Shutdowns/Specific Condition Schedule (bar chart) shows all Shutdowns/Specific Conditions required for implementation of the SFPUC Infrastructure CM Organization Projects. This is the official SFPUC Infrastructure CM Specific Condition schedule. Two variations of this schedule are produced monthly, one variation is sorted by time and the second variation is sorted by geographical area.

3.5.2 The Master System Shutdowns/Specific Conditions Schedule facilitates an overview of system impacts during Shutdowns/Specific Conditions. The Master System Shutdowns/Specific Conditions Schedule, an extract of the official SFPUC Infrastructure CM schedule provided by the project teams, is electronically maintained and updated for the Shutdowns/Specific Conditions Coordinator (SDC) by SFPUC Project Controls and Scheduling Bureau (PCSB).

3.5.3 The Master System Shutdowns/Specific Conditions Matrix (chronological table), based on input from SFPUC Infrastructure CM Operational Representatives and CM teams, shows Shutdowns/Specific Conditions and hot taps, operational shutdowns, and some operational activities which potentially could impact shutdowns. The Master System Shutdowns/Specific Conditions Matrix is a detailed document maintained by the SDC.
3.6 **Construction Kick-off Meeting**

Construction Kick-off Meeting led by the RE is a coordination meeting held with City and Contractor staff shortly after issuance of Notice-to-Proceed (NTP). CM team members Shutdown/Specific Condition responsibilities, equipment purchasing lead times, and schedule related matters are reviewed at this meeting.

3.7 **Pre-shutdown/Specific Condition Event Meeting**

Pre-shutdown/Specific Condition Event Meeting led by the RE with participation by the Project Shutdowns/Specific Conditions Delivery Team is a coordination meeting held approximately thirty (30), fourteen (14) and seven (7) calendar days prior to a routine Shutdown/Specific Condition event to confirm the status of Contractor and City activities that will occur before, during and after the Shutdowns/Specific Conditions. Meetings to coordinate very complex, critical, and/or high-risk specific conditions events shall occur earlier and more frequently, as the Operations Division deems appropriate.

3.8 **The Shutdown Delivery Team (SDT)**

The Shutdown Delivery Team includes the RE or Senior PM, Construction Manager, Operations Division (OEM) Representative(s), Senior Engineer, EMB Systems Engineering Representative(s), Health and Safety Representative, Water Quality Division Representative, Communications Representatives, and the Shutdown/Special Condition Coordinator (SDC).

3.9 **Lockout /Tagout (LOTO)**

3.9.1 Lockout/Tagout (LOTO) is a safety procedure necessary to isolate a pipeline/tank or system component from the potential release of hazardous energy while employees perform work. A work-specific LOTO plan must accompany each OCR. If no LOTO is required, state “none”.

3.9.2 Hazardous energy may include electrical, mechanical, hydraulic, pneumatic, chemical, and other sources. Refer to SFPUC LOTO program (Attachment 019-7).

3.9.3 An isolated pipeline or tank may involve confined space entry. Guidelines addressing confined space entry, minimizing potential engulfment, and the necessary plan for managing incidental water are given in Attachment 019-9.

3.10 **Hydraulic Analysis**

A system shutdown hydraulic analysis is a study of how the water pressure, or hydraulic grade line (HGL), within a water transmission and delivery system is affected by a facility shutdown, and is used to analyze potential
consequences to meeting system delivery goals, refer to Section 5.1 for details.

3.11 **SOR/SCR Start Date**
The date that Operations starts to modify or remove a SFPUC facility from service to perform SOR/SCR-related work. Subsequently, Operations performs joint lockout/tagout, dewater, de-energizes, and/or prepares a facility to allow the Contractor to commence work via the RE. The SOR/SCR Start Date reflects the start of activities necessary to provide the respective Shutdown/Specific Condition.

3.12 **SOR/SCR End Date**
The date that Operations finishes restoring a SFPUC facility to normal operation and/or service. Beforehand, Operations is notified that the facility/Shutdown/Specific Condition are no longer needed by the Contractor via the RE, ends joint lockout/tagout, refills, disinfects, re-energizes, and/or prepares a facility for service. The SOR/SCR End Date reflects the completion of activities necessary to provide the respective Shutdown/Specific Condition and return of the facility/system to a normal operating state.

3.13 **Acronyms**

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<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>CM</td>
<td>Construction Management</td>
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<td>CMB</td>
<td>Construction Management Bureau</td>
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<td>CM team</td>
<td>Construction Management team</td>
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<td>EMB</td>
<td>Engineering Management Bureau</td>
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<td>HGL</td>
<td>Hydraulic Grade Line</td>
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<td>LOTO</td>
<td>Lockout/Tagout</td>
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<td>NTP</td>
<td>Notice-to-Proceed</td>
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<td>OCR</td>
<td>Operational Change Request</td>
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<td>OEM</td>
<td>Operations Division Representative(s)</td>
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<td>OR</td>
<td>Owner's Responsibility</td>
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<td>PCSB</td>
<td>Project Controls and Scheduling Bureau</td>
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<td>Resident Engineer</td>
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<td>RWQCB</td>
<td>Regional Water Quality Control Board</td>
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<td>SCR</td>
<td>Specific Condition Request</td>
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<td>SDC</td>
<td>Shutdown Coordinator</td>
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4.0 **Responsibilities**

4.1 **Resident Engineer (RE)**

The RE, with the assistance of the Shutdown/Specific Condition Coordinator (SDC), Senior PM, Construction Manager, and OR shall:

4.1.1 Serve as the lead person to coordinate the Shutdown/Specific Condition with the assistance of the OR and is a member of the SDT.

4.1.2 Coordinate with the Contractor to develop and implement project-specific system shutdown/Specific Condition plans during construction and notifies the SDC of changes to the shutdown schedule, duration, or scope.

4.1.3 Ensure Contractor shutdown/Specific Condition responsibilities are reviewed at the Construction Kick-off meeting and are reflected in the Contractor’s baseline schedule.

4.1.4 Ensure Contractor prepares details of contractor staff, schedule, equipment and materials to be employed during Shutdown/Specific Condition.

4.1.5 Assist the Senior PM in updating the Work-Around Plan, for certain critical Shutdown/Specific Condition, started by the CM team with assistance of the Shutdown/Specific Condition Delivery Team.

4.1.6 Notify Water/Wastewater Enterprise Operations, Shutdown/Specific Condition Coordinator and project Communications Representatives of updates to the Master

4.1.7 System Shutdown/Specific Condition Schedules from the Pre- Shutdown/Specific Condition Event Meetings with the Contractor.
4.1.8 Periodically check on the status of Contractor’s acquisition of long-lead purchase items necessary for Shutdown /Specific Condition.

4.1.9 Monitor Contractor’s work.

4.1.10 Certify that the Contractor’s Shutdown/Specific Condition-related testing has been performed as per Section 5.9.

4.1.11 Review, sign and forward to the OR the Contractor’s SOR/SCR.

4.1.12 Notify SDT of start and completion of the Contractor’s portion of the Shutdown/Specific Condition work as per Section 5.10.

Further details regarding RE responsibilities are given in the procedure described in Section 5.0.

4.2 Owner’s Representative (OR)

4.2.1 The SFPUC OR reviews and signs the SOR/SCR.

4.2.2 The SFPUC OR communicates with the Operations Division Manager regarding an Operational Change Request (OCR), coordinates with SFPUC Water Quality Division (WQD), Systems Engineering Group of Engineering Management Bureau (EMB), and Operations Division Maintenance personnel to ensure support before, during and after the Shutdown/Specific Condition; grants access to affected area to RE and accepts area on behalf of Water Enterprise/Wastewater Enterprise after completion of the SOR/SCR work.

4.2.3 The OR prepares the detailed Operational Change Request (OCR). This OCR must be approved not less than twenty one (21) calendar days prior to the shutdown. Duration may be adjusted per the request of the OR.

- The OR coordinates the facility joint LOTO to be performed prior to granting access to the section or component to the RE. Every Shutdown/Specific Condition Event involving LOTO must have a written LOTO plan which identifies all energy sources and corresponding LOTO control points and methods. SFPUC Health and Safety can waive the LOTO requirement in certain cases where LOTO does not apply. Waiver of LOTO requirement shall be in writing. Water Enterprise/Wastewater Enterprise Operations designates facility lead Operations personnel to coordinate the facility LOTO tasks including the written LOTO
plan. One of the check-off items in the OCR is completion of the LOTO plan.

A LOTO plan is an attachment to the OCR and is fundamentally important to the safety of all City, CM Consultant, and Contractor personnel during a Shutdown /Specific Condition Events. The OR coordinates the LOTO with the Contractor and project CM team and the SFPUC Infrastructure CM Team Senior Safety Managers. Managers of a Shutdown/Specific Condition Event must not be started without an approved OCR and LOTO plan. Prior to commencement of Shutdown/Specific Condition work, the CM team, the Contractor and the OR should walk through the LOTO plan to assure that it is in place.

4.2.4 Every pipeline shutdown where there is incidental water passing the valve, needs a written plan (incidental water management plan) for how the water will be controlled to prevent possible engulfment situations from developing. If SFPUC is responsible for the water and/or primarily SFPUC Infrastructure CM team members will enter the pipe, the OR prepares the plan. Also, each plan needs to address how water will be removed (e.g., sandbag berm and pumps, gravity feed from blow-off, etc.) and how water levels will be monitored such that levels cannot rise to a level that a failure could result in an inundation threat to downstream workers. If the Contractor is responsible for the water and only the Contractor’s employees are the primary people entering the pipe, the Contractor prepares the written plan.

All written plans for controlling incidental water must have a documented review by appropriate Operations personnel coordinated by the OR.

4.3 **Operations Division Manager or Process Chief**

4.3.1 The Operations Division Manager or Process Chief approves the completed OCR; provides personnel, equipment, materials and chemicals for City’s portion of the work for the Shutdown/Specific Condition Event; and notifies wholesale customer of shutdowns or affected parties accordingly.

4.3.2 If applicable, the Operations Division Manager or Process Chief ensures that the San Francisco Regional Water Quality Control Board (RWQCB) and affected environmental agencies are notified.

4.3.3 The Operations Division Manager or Process Chief ensures that the system components are dewatered and isolated or de-energized.
4.3.4 The Operations Division Manager or Process Chief ensures that the safety protocols are followed when granting access to RE. The OCR must not be approved by the Operations Division Manager without the attached LOTO plan unless LOTO is inapplicable.

4.3.5 The Operation Division Manager or Process Chief ensures that the section or component can be returned to service; that filling, sanitary work practices, disinfection, discharge dechloramination, and discharge pH adjustments are performed; and that the section or component is returned to service. Note that discharges to a combined sewer do not require dechloramination or pH adjustment.

4.3.6 Approves the Contractor’s work plan by signing the SOR/SCR AND attaching the SOR/SCR to the signed OCR.

4.4 Shutdown Coordinator (SDC)

The SFPUC Infrastructure CM Shutdown/Specific Condition Coordinator (SDC) reports directly to the CMB Manager. The SDC’s tasks, duties and activities are:

4.4.1 Organizes and facilitates monthly Shutdown/Specific Condition Event Coordination meetings and other necessary Shutdown/Specific Condition shutdown meetings;

4.4.2 Maintains the SFPUC Infrastructure CM Master System Shutdown/Specific Condition Matrix;

4.4.3 Checks the Master System Shutdown/Specific Condition Schedule dates for consistency with the Shutdown/Specific Condition Matrix;

4.4.4 Tracks all Shutdown/Specific Condition -related activities;

4.4.5 Reviews and takes action for compliance issues as required by the Risk Mitigation Plan for any deviation;

4.4.6 Coordinates and updates requirements for Shutdown/Specific Condition and the Shutdown/Specific Condition Business Plan;

4.4.7 Facilitates evaluation of changes to scope or schedule of Shutdown/Specific Condition;

4.4.8 Reviews the Shutdown/Specific Condition portions of the construction contract;

4.4.9 Reviews the contractor submitted SOR/SCRs for consistency and completeness and signs the SOR/SCR;

4.4.10 Stops a SFPUC Infrastructure CM Shutdown/Specific Condition lacking the necessary SOR/SCRs, OCRs, or LOTO plans;
4.4.11 Assists the RE in the planning and execution of Shutdown /Specific Condition including the preliminary review of the draft Work-Around Plan for certain critical work;

4.4.12 Maintains a tracking tool to track formal letters and meetings with wholesale customers and affected parties.

4.4.13 Reviews and develops contract specifications related to system Shutdown/Specific Condition;

4.4.14 Prepares the Shutdown/Specific Condition Summary Report (Attachment 019-5) which are incorporated in the Lessons Learned Report (refer to CM Procedure No.020, Project History/Lessons Learned) and the Project Closeout Report PM Procedure 3.14; and,

4.4.15 Prepares the semi-annual BAWSCA shutdown report (see section 6.2).

4.5 **Senior Project Manager (Senior PM)**

4.5.1 The Senior PM ensures protocol reviews and approvals of all elements for Shutdown/Specific Condition planning.

4.5.2 The Senior PM reviews and coordinates all changes to established schedules for SFPUC Infrastructure CM project. The Senior PM will review these potential schedule changes with the Shutdown/Specific Condition Coordinator and the CM team members.

4.5.3 The Senior PM is responsible and leads the preparation and updates for the SFPUC Infrastructure CM project Work–Around Plan for certain critical Shutdown/Specific Condition.

4.6 **Construction Manager**

4.6.1 Oversees the RE activities related to Shutdown/Specific Condition Event.

4.6.2 Reviews and signs the SOR/SCR.

4.7 **Contractor**

4.7.1 The Contractor is responsible for setting the Shutdown/Specific Condition Event dates in the Baseline Schedule within typically 2 weeks of the start of construction.

4.7.2 The Contractor is responsible for preparing a detailed Contractor Shutdown/Specific Condition Event work plan, contingency plan, and sanitary work practices plan as part of the SOR/SCR as described in Technical Specification, Section 01 69 50, SHUTDOWNS and SITE ACCESS of the project specifications.
4.7.3 The Contractor submits draft System Outage Request/Specific Condition Request (SOR/SCR) not less than sixty (60) calendar-days prior to the Shutdown/Specific Condition Event. The SOR/SCR work duration is from the SOR/SCR Start Date to the SOR/SCR End Date. The Contractor’s work duration is a subset of the Shutdown/Specific Condition Event duration and is from the date access to the facility/system is granted to the Contractor until the date the Contractor has completed work and notifies the RE that the facility/system is ready for SFPUC to resume normal operations. The Shutdown/Specific Condition Event schedule in the SOR/SCR work plan must clearly show the SOR/SCR Start Date, the SCR End Date, and the Contractor’s Shutdown/Specific Condition Event work tasks. In addition, the SOR/SCR must identify all parties anticipated to be affected by the Shutdown/Specific Condition Event.

4.7.4 The Contractor notifies RE, if a need to reschedule develops; and then coordinates delivery of materials and equipment prior to the Shutdown/Specific Condition Event.

4.7.5 The Contractor, if responsible for handling incidental water, develops the plan for handling the water passing the valve and how the water will be controlled to prevent possible worker engulfment situations from developing. Also, each plan needs to address how water levels will be monitored such that levels cannot rise to a level that a failure could result in an inundation threat to downstream workers. All written plans for controlling incidental water must have a documented review by appropriate Contractor safety personnel and then must be submitted to the SFPUC.

4.7.6 The Contractor is solely and totally responsible for construction safety before, during, and after the Shutdown/Specific Condition Event.

4.7.7 The Contractor executes Contractor’s work to be performed during the Shutdown/Specific Condition Event once Operations grants access to the facility/system via the RE.

4.7.8 The Contractor notifies the RE and OR that the affected facility sections are ready to be returned to normal operation Senior OR.

4.7.9 The construction contract provides guidance to the Contractor on available Shutdown/Specific Condition Event windows and system constraints affecting planned Shutdown/Specific Condition Events.

- The Contractor must propose dates for planned project
- Shutdown/Specific Condition Events within the Shutdown/Specific Condition Events windows prescribed in the
contract, if any. In some instances, Contractor-proposed Shutdown /Specific Condition Events for a particular time period may be denied based on conflicts with Shutdown/Specific Condition Events for other SFPUC Infrastructure CM construction contracts, conflicts with operational needs, or other factors beyond the control of the Contractor. In rare instances, once a Shutdown/Specific Condition Event is underway the Contractor may be asked to terminate the Shutdown/Specific Condition Event and ready the system component for return to service.

5.0 Implementation

The overall procedure for system Shutdown/Specific Condition Events is defined by the following activities:

5.1 Review Contractor Shutdown/Specific Condition Event Responsibilities at the Construction Kick-off Meeting

5.1.1 The RE reviews Contractor Shutdown/Specific Condition Event responsibilities at the Construction Kick-off Meeting. This includes a reminder of the importance of adhering to the Shutdown/Specific Condition Event dates on the approved SOR/SCR and an outline of everything expected in the SOR/SCR package. Also, this includes a reminder of the importance of LOTO and a summary of the joint LOTO responsibilities.

5.1.2 The Shutdown/Specific Condition Delivery Team reviews the Contractor’s Shutdown/Specific Condition Event responsibilities at the Construction Kick-off Meeting, refer to Section 3.6.1.

5.1.3 The RE advises the Contractor of the criticality of taking possession of equipment, especially the long-lead purchase items, in a timely manner so as to meet the Shutdown/Specific Condition Event dates.

5.1.4 The RE shall notify Water Enterprise/Wastewater Enterprise Operations,Shutdown/Specific Condition Coordinator and project Communications Representatives of any updates to the Master System Shutdown/Specific Condition Schedules, refer to Section 6.3.1.

5.1.5 If the RE, OR and Shutdown/Specific Condition Coordinator agree that interim smaller scale Shutdown/Specific Condition only involves a portion of a facility or just electrical controls, then the standard level of approvals, review, notification, lessons learned, etc. should be scaled back proportionately. LOTO plans cannot be scaled back unless they are inapplicable.
5.2 **Notify Affected Communities About Construction**

5.2.1 The RE provides confirmation and any new information necessary for municipality courtesy notifications and “courtesy review” to the SFPUC Infrastructure CM Communications representative related to Contractor submittals for staging areas, lay down areas, parking, traffic control, on-site chemical storage, and other appropriate matters. The basic agreements with the affected communities should already be in place.

5.2.2 For most projects, there should already be a memorandum of understanding or a memorialized agreement concerning the upcoming construction activities.

5.3 **Preparing Detailed Shutdown / Specific Condition Plan and System Outage Request (SOR)/Specific Condition Request (SCR)**

The Contractor submits a detailed draft SOR/SCR, refer to Attachment 019-1 to the RE who reviews it. The RE forwards the draft SOR/SCR to the OR and SDC. The SDC will post the draft SOR/SCR on the SDT Shutdown/Specific Condition Event common drive. The RE provides courtesy copies of the draft SOR/SCR to the Regional Construction Manager and to the Senior Environmental Monitor. The OR provides the draft SOR/SCR to the Water Enterprise/Wastewater Enterprise Operations Manager to be included as an attachment to the OCR. One SOR/SCR is required for each Shutdown/Specific Condition Event. The SOR/SCR schedule is shown in Attachment 019-8.

5.4 **Preparing and Monitoring Detailed Operational Change Request**

5.4.1 The Operations Representative, with assistance from the SFPUC Lead Operations Person for a particular facility, prepares a detailed OCR, refer to Attachments 019-2, 3, or 4, in coordination with the Water Quality Division. This detailed OCR must be reviewed and approved by the Operations Division Manager no less than twenty-one (21) calendar days prior to the shutdown. The Shutdown/Specific Condition Event is not approved until the Division Manager signs the OCR which contains the LOTO plan and SOR/SCR as attachments. Also, the Work-Around Plan, for certain critical Shutdowns/Specific Condition Events, must be attached to the OCR.

5.4.2 The RE and SDC shall monitor and assist to ensure timely completion (21 calendar days prior to Shutdown/Specific Condition Event) and approval of the OCR.
5.5 **Monitoring Contractor’s Progress Against Shutdown/Specific Condition Event Dates**

5.5.1 The RE will monitor Contractor’s progress against the approved Shutdown/Specific Condition Event schedule and notify the OR and the SDC if there is a risk that the Shutdown/Specific Condition Event dates will not be met. A variance may impact other projects and planned Shutdown/Specific Condition Events.

5.5.2 Shutdown/Specific Condition Events are not independent activities, but they are tied to operational changes, other shutdowns, and seasonal constraints. Therefore, it is essential that it be known well ahead of time if the Contractor will not be able to achieve/complete the Shutdown/Specific Condition Specific Condition work at or within the planned time.

5.6 **Conducting Pre-Shutdown/Specific Condition Event Meeting**

Thirty (30) calendar days prior to the Shutdown/Specific Condition Event or as the RE deems appropriate, the RE will conduct a pre-Shutdown/Specific Condition Event meeting with the Contractor, SDC, and OR to confirm the status of all Contractor and SFPUC Infrastructure CM activities that will occur before, during and after the Shutdown/Specific Condition Event.

By weekly meeting will be required for all shutdown/specific condition events.

5.7 **Coordinating Operations Dewatering and Lockout/Tagout**

5.7.1 Water Enterprise/Wastewater Enterprise Operations has responsibility to isolate, dewater and/or de-energize, and execute LOTO prior to providing access to the RE. SFPUC Operations Divisions in some cases have tailored the SFPUC LOTO program to fit their needs and have their own LOTO guidelines incorporating all the elements of Attachment 9.

5.7.1.1 SFPUC CM team members must always put their own locks and tags on the lockout points when the CM team members are working in the area where they are exposed to the hazardous energy (i.e., the same LOTO points as the Contractor and Operations). This Policy would also apply if a SFPUC EMB senior engineer or other City employees enters the work area refer to Attachment 019-7.

5.7.2 The RE with OR support will confirm technical and safety suitability before allowing the Contractor access to the work area and informing the Contractor to commence work.

5.7.3 The RE confirms Contractor readiness for the Shutdown/Specific
Condition Event and safety before giving access to the Contractor.

5.7.4 The RE notifies the SFPUC Infrastructure CM Supervisory Control and Data Acquisition (SCADA) representative that the facility is being taken out of service. SCADA will maintain control of the facility/system as needed.

5.8 Monitoring Contractor’s Work and Progress

5.8.1 RE, with assistance from Inspectors, shall monitor the progress of Contractor’s work and perform Quality Assurance. RE shall notify the OR and the SDC if Contractor’s progress jeopardizes the scheduled completion.

5.8.2 The RE oversees Contractor’s Shutdown/Specific Condition related work and responds to quality, safety, leakage, schedule, or sanitary work practices issues.

5.9 Conducting Testing and Accepting the Work

The RE, with assistance from Inspectors, shall certify the Contractor’s testing including welding, pressure/leak tests, other Contract required tests, Contractor’s portion of sanitary work practices/disinfection work, and Contractor’s portion of the drainage/discharge work; and when completed, accept the work, refer to CM Procedure No. 018, System Testing and Start-Up for details.

5.10 Notifying Operations of Completion of Contractor’s Shutdown/Specific Condition Event Work

The RE, upon completion and acceptance of Contractor’s work, will notify the OR, facility SCADA representative, and the SDC of completion of the Contractor’s Shutdown/Specific Condition Event work and confirm that the system is ready to be refilled, disinfected (if necessary) and/or re-energized. The RE coordinates with the Contractor and the SFPUC Lead Operations Person from the facility to remove the Contractor’s and CM team’s locks and tags associated with LOTO.

5.10.1 Additional coordination details are provided in CM Procedure No. 018, System Testing and Start-Up.

5.11 Change Management During Construction

5.11.1 Changes to scope and schedule may occur after award of the construction contract. It is necessary that the RE closely monitor the Contractor’s progress towards Shutdown/Specific Condition Event dates and report any variances to the SDC and the OR as soon as they are recognized. Likewise, it is important that the SDC and the
OR closely monitor Operations Division progress on the Operations portion of the work.

5.11.2 Should a change become necessary, the RE, the SDC and the OR will meet to determine the potential impact of the change, refer to CM Procedure No. 011, Construction Change Management. If this group and the Shutdown/Specific Condition Delivery Team agree that a change is necessary/possible, the SDC shall ensure that PCSB, WQD, and affected parties are formally notified.

5.12 Preparing Shutdown/Specific Condition Event Summary Report

5.12.1 The RE will provide project records, digital images, and a briefing to the SDC.

5.12.2 The SDC with the assistance of the RE is responsible for preparing the Shutdown/Specific Condition Event Summary Report (Attachment 019-5), including Lessons Learned (CM Procedure No. 020, Project History /Lessons Learned and PM Procedure No. 3.14) for application to subsequent Shutdown /Specific Condition Events. The Shutdown/Specific Condition Event Summary Reports are not required for SFPUC Infrastructure CM hot taps and are optional for standalone shutdowns.

5.13 Preparing Work-Around Plan

5.13.1 The purpose of this section is to provide guidance to CM teams on developing a Work-Around Plan as a contingency in case a system Shutdown/Specific Condition Event(s) needs to be rescheduled. The Work-Around Plans are inapplicable to hot taps which are technically not shutdowns. The CM team prepares the draft Work-Around Plan prior to SOR/SCR under the direction of the RE.

- The Senior PM is the lead for preparing a Work-Around Plan for construction contracts which have already started and the Work-Around Plan that was never written.
- The Senior PM is the lead for preparing the Work-Around Plan update with participation and support from the Shutdown/Specific Condition Delivery Team including the RE.

5.13.2 The Work-Around Plan is linked to the designation of critical and standalone Shutdown/Specific Condition Events as defined below:

Critical Shutdown/Specific Condition Event - a Shutdown/Specific Condition Event that has a schedule-dependent relationship to another Shutdown/Specific Condition Event (may affect, or be affected by, other
Shutdown/Specific Condition Events if delayed); or is limited to certain pre-determined times of the year within which it can occur; or has limitations on when it can occur due to system operations, maintenance requirements, or other Non-SFPUC Infrastructure CM System Shutdown /Specific Condition Events.

**Stand Alone Shutdown/Specific Condition Event** - any Shutdown/Specific Condition Event which does not have limitations on when it can occur due to system operations, maintenance requirements, or other non-SFPUC Infrastructure CM system Shutdown/Specific Condition Events.

The critical and standalone Shutdown/Specific Condition Events are designated in the SFPUC Infrastructure CM Shutdown /Specific Condition Matrix and in the SFPUC Infrastructure CM Master System Shutdown/Specific Condition Schedule. Most of the Shutdown/Specific Condition Events listed in the System Shutdown/Specific Condition Matrix are critical Shutdown/Specific Condition Events. Work-Around Plans are inapplicable to SFPUC Infrastructure CM standalone Shutdown/Specific Condition Events.

5.13.3 The Work-Around Plan is linked to options for the Contractor to deal with Shutdown/Specific Condition Event delays.

- The Contract Technical Specification, Section 01 69 50, SHUTDOWNS and SITE ACCESS covers the Contractor requirements for scheduling Shutdown/Specific Condition Events including incentives (early completion or incentive bonuses) or deterrents (liquidated damages) for timely completion of the contract work associated with a particular Shutdown/Specific Condition Event, as appropriate.

- The specifications include provisions for potential Shutdown/Specific Condition Event delay contingencies such as contractor construction activity re-sequencing, contractor demobilization/remobilization, or other appropriate delay mitigation measures.

5.13.4 For each Shutdown/Specific Condition Event the SFPUC Infrastructure CM Shutdown/Specific Condition Delivery Team confirms or needs to identify the following basic Work-Around Plan information:

a. Shutdown/Specific Condition Event Number and Name

b. Date form was initiated
c. CM team member preparing Work-Around Plan information
d. Shutdown/Specific Condition description
e. Project name and number
f. Shutdown/Specific Condition Event window duration
g. Seasonal constraints and changes
h. System/other constraints
i. Related Shutdown/Specific Condition Events (list as many as needed)
   o Shutdown/Specific Condition Event Name and Number
   o Date form was initiated
   o CM team member who prepared Work-Around
   o Plan information:
      o Shutdown/Specific Condition description
      o Project name and number
      o Shutdown/Specific Condition Event window duration
      o Seasonal constraints
      o System/other constraints
      o Related Shutdown/Specific Condition Events (list as many as needed).

5.13.5 A Work-Around Plan update is needed if a particular Specific Condition Event needs to be rescheduled due to new circumstances. Under the direction of the Senior PM, the project teams need to outline the Work-Around options and actions required for both the primary Shutdown/Specific Condition Event and the related Shutdown/Specific Condition Event. This effort must be coordinated with the Shutdown/Specific Condition Coordinator, and the Shutdown/Specific Condition Delivery Team.

5.13.6 The ORs will play a key role in developing work-around options in conjunction with the Shutdown/Specific Condition Delivery Team which meets at least monthly to review the Shutdown /Specific Condition Event schedules. The Work-Around Plan must be an attachment to the OCR (sample OCR Attachments 022 -2, 3, or 4).
5.13.7 There are several factors to consider in developing a Work-Around Plan. Below are some of the possible considerations in developing the Work-Around Plans.
   a. Analyze Shutdown/Specific Condition period/duration for feasibility.
   b. Check on operational staffing resources.
   c. Analyze potential “what if” scenarios.
   d. Meet operational targets (demands [average, diurnal, and maximum day], replenishment, system pressures/grade lines, shutdown durations, reservoir water storage levels, water quality, etc.).
   e. Analyze risk involved with simultaneous Shutdown/Specific Condition and sequencing of Shutdown/Specific Condition.
   f. Review status of associated /waste water system facilities.
   g. Review water/wastewater system facilities under construction.
   h. Review back-up facilities.
   i. Determine alternate sources.
   j. Determine effects of conservation or alternate sources for contingency planning.
   k. Examine Shutdown/Specific Condition specific considerations.
   l. Perform hydraulic analyses.
   m. Consider hydrology and reservoir levels.
   n. Review wholesale customer and affected parties impacts. Review Contractor’s contingency plan for termination of Shutdown/Specific Condition.
   o. Examine impact on most critical Shutdown/Specific Condition Events.

The schedule for the Work-Around Plan is shown in Attachment 019-8.
6.0 Other Procedural Requirements

The following activities are not specific to the subject CM procedure but are necessary to complete the Shutdown/Specific Condition Event process:

6.1 Hydraulic Analyses

A hydraulic analysis is prepared in advance of most approved shutdowns in order to evaluate the impact of the shutdown in conjunction with other scheduled shutdowns on short-term delivery capacity and ability to meet long-term hydrologic goals. This analysis is prepared by the SFPUC EMB Systems Engineering Group in coordination with the Operations Division. The analysis may need to be revised for any changes in the shutdown schedule.

6.1.2 If a change to the original shutdown schedule is proposed through a SOR/SCR, then the OR, in preparing the OCR, must consult with the Operations Division Manager and EMB Systems Engineering Group to determine whether an update to the hydraulic analysis is warranted for the proposed change. This update to the analysis may be required as part of the OCR, or may be waived by the Operations Division Manager.

6.1.3 In preparing an OCR, the OR and Operations Division Manager may request that the analysis be updated by EMB System Engineering Group to evaluate the effects of schedule changes. A satisfactory hydraulic analysis may either be a requirement of the OCR, or may be waived by the Operations Division Manager.

6.2 Semi-Annual Master System Shutdown/Specific Condition Schedule Update

Semi-Annual Master System Shutdown/Specific Condition Schedule updates is prepared by Senior PM. The SDC reviews the Semi-Annual Master System Shutdown/Specific Condition Schedule update and prepares a summary report for signature by the CMB Manager.

6.3 Customer and Affected Parties Notification

Water/Wastewater Enterprise Operations will formally and individually notify customers and affected parties of Shutdown/Specific Condition Events 12-18 months in advance and then 4-6 weeks prior to the actual system shutdown. It is necessary that the RE notify the SDC and the OR if there is a change to the Shutdown/Specific Condition Event (scope or schedule).

6.4 Hot Work

Some SFPUC Infrastructure CM construction activities do not fall into the Shutdown/Specific Condition category; but, are quasi- Shutdown/Specific
Condition or hot work. These activities also need to be tracked along with the Shutdown/Specific Condition Events in order to keep Operations personnel aware of construction work activity at their facilities, including the number of people and amount of equipment at their existing facility. The Operations Group/Supervision at the facility is to be updated on a frequent basis on the status of the hot work and Contractor’s activity so that a clear understanding of potential hazards/risks to Operations and to construction can be identified and communicated swiftly and correctly amongst the parties involved in the hot work.

The work included is a part of a contract with the SFPUC and therefore Operations needs to know who, how many, and where Contractor’s personnel will be on any given day and those areas/systems the contractor will be working with or working on.

The information required will be included in the Access Request Form (Attachment 019-10); add pages with additional information for clarity as necessary. This form precedes the Contractor’s hot work activity.

Operations personnel are to be updated frequently (daily if necessary) on the status of the hot work and to additionally advise CMB Manager and Contractor of relevant changes to operations which affect construction work.

7.0 References

7.1 Technical Specifications
Technical Specifications Division 01: General Requirements 01 69 50: SHUTDOWNS and SITE ACCESS.

7.2 SFPUC Infrastructure CM Procedures
No. 011 Construction Change Management
No. 018 System Testing and Start-Up
No. 020 Project History/Lessons Learned

7.3 References and SFPUC Infrastructure CM Procedures
California Code of Regulations, Title 8 (CCR), Sections 3314 and 2320.4-2320.6.
SFPUC Infrastructure Risk Mitigation Action Plan, prepared by SFPUC
PM Procedure No. 3.14, Project Closeout Report
8.0 **Attachments**

019 – 1A Shutdown/Specific Condition Request (SOR/SCR) Form (Contractor)

019 - 1B Shutdown/Specific Condition Request (SOR/SCR) Form (Contractor)

019 – 2 Water Supply & Treatment Division (WS&TD) Operational Change Request (OCR) Form

019 – 3 Hetch Hetchy Water and Power (HHWP) Operational Change Request (OCR) Form/Shutdown Approval Procedure

019 – 4 City Distribution Division (CDD) Operational Change Request (OCR) Form (Out of Service/Return to Service Record)

019 – 5 Shutdown/Specific Condition Event Summary Report Format

019 – 6 Monthly Revision of Master System Shutdown/Specific Condition Schedule (Flowchart) Flowchart

019 – 7 SFPUC Lockout/Tagout Program

019 – 8 Typical Shutdown/Specific Condition Events Schedule

019 – 9 Guidance on Procedures for Confined Space Entry Work in Water System Pipelines

019 – 10 Access Request Form

019 – 11 Wastewater Enterprise Lockout/Tagout Procedure/Plan

019 – 12 Wastewater Enterprise Lockout/Tagout Plan

019 - 13 Revision Control Log
SYSTEM OUTAGE REQUEST (SOR) FORM

This form is to be prepared by the Contractor to request an outage of any portion of the SFPUC water treatment and ancillary systems and/or transmission and delivery systems to allow the Contractor to perform contracted work requiring a system Outage.

The Contractor proposing an Outage Event must prepare a “Proposed System Outage Work Plan”. This plan is to be filled in as completely as possible and submitted to the City Representative, RE. The RE will forward the SOR to the concerned Operations Division for review and approval.

Significant scope changes or changes in the overall schedule will require an amended work plan and supplementary review and approval.

CONTRACTOR’S NAME AND CONTACT INFORMATION:
(Provide multiple contacts including emergency contact numbers):

CONTRACTOR’S WORK PLAN (Attach Work Plan meeting the requirements of Specification 01 69 50):

CONTRACTOR’S REPRESENTATIVE ________________________________

Date _________________________

FACILITY/FACILITIES AND DATES TO BE SHUTDOWN:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
SYSTEM OUTAGE REQUEST (SOR) FORM

CONCUR:

PROJECT CONSTRUCTION MANAGER: ____________________________

REGIONAL CONSTRUCTION MANAGER: ____________________________

PROJECT OPERATIONS REPRESENTATIVE: _________________________

WSIP SHUTDOWN COORDINATOR: _______________________________

THIS CONTRACTOR-INITIATED SYSTEM OUTAGE REQUEST IS NOT CONSIDERED APPROVED UNTIL IT HAS BEEN SIGNED BY THE OPERATIONS MANAGER AND A COPY IS DELIVERED TO THE CONTRACTOR BY THE CITY REPRESENTATIVE.

THIS OUTAGE REQUEST IS NORMALLY ACCOMPANIED BY AN SFPUC INTERNALLY GENERATED FORM REFERRED TO AS AN OPERATIONAL CHANGE REQUEST PREPARED BY THE CONCERNED SFPUC OPERATING DIVISION.

APPROVAL OF CONTRACTOR’S SHUTDOWN EVENT WORK PLAN:

OPERATIONS MANAGER: ________________________________

DATE: ____________________________
This form is to be prepared by the Contractor to request a special condition of any portion of the SFPUC wastewater treatment and ancillary systems and/or collection and transmission and delivery systems to allow the Contractor to perform contracted work requiring a system Specific Condition Event.

The Contractor proposing a Specific Condition Event must prepare a “Proposed System Specific Condition Work Plan”. This plan is to be filled in as completely as possible and submitted to the City Representative, RE. The RE will forward the SCR to the concerned Operations Division for review and approval.

Significant scope changes or changes in the overall schedule will require an amended work plan and supplementary review and approval.

**CONTRACTOR’S NAME AND CONTACT INFORMATION:**
(Provide multiple contacts including emergency contact numbers):

**SPECIFIC CONDITION EVENT NAME:**

**FACILITY/FACILITIES AND DATES TO BE AFFECTED:**

**CONTRACTOR’S WORK PLAN** (Attach Work Plan meeting the requirements of Specification 01 69 50):

**CONTRACTOR’S REPRESENTATIVE ____________________________________________**

Date ___________________________

**FACILITY/FACILITIES AND DATES TO BE SHUTDOWN:**
SPECIFIC CONDITION REQUEST (SCR) FORM

CONCUR:

PROJECT CONSTRUCTION MANAGER: ________________________

REGIONAL CONSTRUCTION MANAGER: ________________________

PROJECT OPERATIONS REPRESENTATIVE: ________________________

WSIP SHUTDOWN COORDINATOR: ____________________________

THIS CONTRACTOR-INITIATED SPECIFIC CONDITION REQUEST IS NOT CONSIDERED APPROVED UNTIL IT HAS BEEN SIGNED BY THE OPERATIONS MANAGER AND A COPY IS DELIVERED TO THE CONTRACTOR BY THE CITY REPRESENTATIVE.

THIS SPECIFIC CONDITION REQUEST IS NORMALLY ACCOMPANIED BY AN SFPUC INTERNALLY GENERATED FORM REFERRED TO AS AN OPERATIONAL CHANGE REQUEST PREPARED BY THE CONCERNED SFPUC OPERATING DIVISION.

APPROVAL OF CONTRACTOR’S SPECIFIC CONDITION EVENT WORK PLAN:

OPERATIONS MANAGER: _______________________________________

DATE: __________________________
### INSTRUCTIONS FOR COMPLETING THIS FORM

This form is to be used for any project within the Regional Water System that requires a full shutdown, hot tap, or any other work that would directly impact normal system operations. This form, including all supplemental information, indicated in under "Planning Checklist," shall be completed by the shutdown coordinator.

Once the indicated information is collected and attached, this form shall be routed to the section heads of each section for review and approval as indicated herein. If additional information and/or details become available after initial approval, this form shall be amended to include that additional information and re-routed for supplemental review and approval. Any changes to scope and/or schedule shall require supplemental review and approval.

### SHUTDOWN COORDINATOR INFORMATION

<table>
<thead>
<tr>
<th>Date of Initial Request:</th>
<th>Shutdown Number:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Name of Shutdown Coordinator:</td>
<td>Contact Number:</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### PLANNING CHECKLIST

(Shutdown coordinator shall check the appropriate box, and attach additional sheets as necessary)

<table>
<thead>
<tr>
<th>Included</th>
<th>Item Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Shutdown Outage Request (SOR): If the work performed is in support of a contractor's outage request, include a copy of the approved SOR and all SOR supporting documents including details on the contractor's confined space work and the contractor's Incidental Water Management Plan, if applicable.</td>
</tr>
<tr>
<td></td>
<td>OCR Work Plan: Attach a copy of the completed work plan template that describes the work required for the initial shutdown, work performed by WSTD crews during the shutdown, and the work required for return to service. This attachment is required for all shutdowns.</td>
</tr>
<tr>
<td></td>
<td>Hydraulic Impacts and Limitations: Attach a summary list of impacts of the shutdown to the Regional Water System. Include a copy of the hydraulic analysis. Shutdowns that remove supply sources or restrict transmission system capacity may require consultation with the System Operations Manager.</td>
</tr>
<tr>
<td></td>
<td>RWQCB Notice of Temporary Discharge: Attach notification to the RWQCB that details the locations of each discharge point, the approximate flow rates and overall volume of each discharge, and the Best Management Practices utilized to minimize erosion.</td>
</tr>
<tr>
<td></td>
<td>Environmental Review Summary: Attach a list all environmental issues that require review and/or mitigation. Include all additional required regulatory agency notifications and copies of applicable permits and/or environmental documents. Consult the Natural Resources Division for guidance.</td>
</tr>
<tr>
<td></td>
<td>Disinfection Plan: Prepare and attach a plan developed by the WQD to disinfect any potable facilities that are depressurized to support the work. Include estimates of time required for disinfection as well as quantity and type of chemicals used for disinfection.</td>
</tr>
<tr>
<td></td>
<td>Incidental Water Management Plan (IWMP): If the work performed involves pipe entry by WSTD staff behind a single isolation butterfly valve, an IWMP shall be prepared.</td>
</tr>
<tr>
<td></td>
<td>Lock-Out/Tag-Out (LOTO) Plan: Include one LOTO plan for all equipment to be locked out by WSTD, including those locked out by either O&amp;M and SYSOPS personnel.</td>
</tr>
</tbody>
</table>
### REQUIRED NOTIFICATIONS

(Shutdown coordinator shall complete and make the requisite notifications as necessary)

<table>
<thead>
<tr>
<th>Notice</th>
<th>Sent</th>
<th>Not Applicable</th>
<th>Agency</th>
<th>Date of Notice</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>SFPUC City Distribution Division</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>SFPUC Natural Resources Division</td>
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<td>SFPUC Water Quality Division</td>
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<td>SFPUC Health and Safety Division</td>
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<td></td>
<td>Regional Water Quality Control Board</td>
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<td></td>
<td>California Department of Public Health</td>
<td></td>
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</tbody>
</table>

### REVIEWER APPROVALS

(This form requires a signature from each reviewer listed, even if the work is not applicable to that section)

<table>
<thead>
<tr>
<th>Approved</th>
<th>Not Applicable</th>
<th>Comments Attached</th>
<th>Reviewer</th>
<th>Reviewer Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>WSTD System Operations Manager</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>WSTD Operations and Maintenance Manager</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>WSTD Maintenance Engineering Senior Engineer</td>
<td></td>
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</tr>
</tbody>
</table>

### ADDITIONAL COMMENTS

(Shutdown coordinator to complete as necessary)


### DIVISION MANAGER APPROVAL

(This signature is required for all projects)

Request Approved By: 

Water Supply and Treatment Division Manager 

Date: 

5/17/11
## INSTRUCTIONS FOR COMPLETING THIS FORM

This form is to be used to document the work associated with a system shutdown and must accompany all OCR's submitted for review and approval. All applicable fields shall be completed as indicated. Attach a diagram detailing the shutdown. **This form shall be completed by the shutdown coordinator.**

## KEY CONTACT INFORMATION

<table>
<thead>
<tr>
<th>Date of Initial Request:</th>
<th>Contact Number:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shutdown Coordinator:</td>
<td></td>
</tr>
<tr>
<td>WSTD General Foreman:</td>
<td></td>
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<tr>
<td>WSTD Field Foreman:</td>
<td></td>
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<tr>
<td>WSTD Field Foreman:</td>
<td></td>
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<td>WSTD Field Foreman:</td>
<td></td>
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<tr>
<td>WSTD Field Foreman:</td>
<td></td>
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<tr>
<td>WQD Field Operations Rep:</td>
<td></td>
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<tr>
<td>NRD Field Biologist:</td>
<td></td>
</tr>
</tbody>
</table>

## PROJECT INFORMATION

<table>
<thead>
<tr>
<th>Shutdown Number:</th>
<th>WO Number:</th>
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<tbody>
<tr>
<td>Facility/Asset Impacted:</td>
<td></td>
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</tbody>
</table>

Scope of Work: (include initial shutdown, work by WSTD during shutdown, and return to service):
### PROJECT INFORMATION (continued)

<table>
<thead>
<tr>
<th>Action Taken</th>
<th>Date</th>
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</tbody>
</table>

**Description of Contingency Plan:**

---

### ANTICIPATED OVERTIME

(Shutdown coordinator shall check the appropriate box and attach additional sheets as necessary)

- [ ] Yes
- [ ] No

Will overtime work be required? If so, attach a copy of the approved Planned Overtime Request Form.
### REGIONAL WATER SYSTEM

**RWQCB NOTICE OF TEMPORARY DISCHARGE**  
Water Supply and Treatment Division

---

**INSTRUCTIONS FOR COMPLETING THIS FORM**

This form is to be used to document the treated water discharges associated with the system shutdown described in the OCR. It is required that this notification be made to the Regional Water Quality Control Board (RWQCB) at least 7 calendar days prior to the actual discharge taking place. This form shall be completed by the shutdown coordinator.

---

**KEY CONTACT INFORMATION**

<table>
<thead>
<tr>
<th>Name of Shutdown Coordinator:</th>
<th>Contact Number:</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSTD General Foreman:</td>
<td>Contact Number:</td>
</tr>
<tr>
<td>WSTD On-Site Field Foreman:</td>
<td>Contact Number:</td>
</tr>
<tr>
<td>WSTD On-Site Field Foreman:</td>
<td>Contact Number:</td>
</tr>
</tbody>
</table>

---

**DISCHARGE INFORMATION**

(Shutdown coordinator shall provide the information indicated below for all discharge sites)

- Shutdown Number: 
- WO Number: 
- Pipeline: 
- Dates of Discharge: Start Date to End Date
- Time of Discharge: Start Time to End Time

---

**Discharge Summary Table**

<table>
<thead>
<tr>
<th>Water Type</th>
<th>Raw Ground</th>
<th>Potable</th>
<th>Site Number</th>
<th>Site Name</th>
<th>GPS Coordinates</th>
<th>Anticipated Discharge</th>
<th>Affected Water Body</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>
EROSION CONTROL

(Shutdown coordinator shall provide details on the method(s) used to mitigate erosion, including all BMPs utilized.)

SHUTDOWN COORDINATOR SIGNATURE

Notification Prepared By: ____________________________  Signature of Shutdown Coordinator: ____________________________

Date: ____________________________
### REGIONAL WATER SYSTEM
**INCIDENTAL WATER MANAGEMENT PLAN**

**Water Supply and Treatment Division**

#### INSTRUCTIONS FOR COMPLETING THIS FORM

This form is to be used to document the work associated with a confined space pipe entry behind a single block butterfly valve and must accompany all OCRs submitted for review and approval. All applicable fields shall be completed as indicated. Attach a diagram detailing the shutdown. **This form shall be completed by the shutdown coordinator.**

<table>
<thead>
<tr>
<th>JOB INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shutdown Number:</td>
</tr>
<tr>
<td>Job Work Order Number:</td>
</tr>
<tr>
<td>Shutdown Coordinator:</td>
</tr>
<tr>
<td>WSTD General Foreman:</td>
</tr>
<tr>
<td>WSTD Field Foreman:</td>
</tr>
<tr>
<td>WSTD Field Crew:</td>
</tr>
<tr>
<td>Pipeline to be Isolated:</td>
</tr>
<tr>
<td>Valves Closed to Isolate Pipeline:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PIPE ENTRY DETAILS</th>
</tr>
</thead>
<tbody>
<tr>
<td>City and Cross Street(s):</td>
</tr>
<tr>
<td>GPS Coordinate: N W</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DEWATERING PLAN (describe in detail)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaking Valve(s):</td>
</tr>
<tr>
<td>Estimated Leakage Rate (gpm):</td>
</tr>
</tbody>
</table>

**Description of dewatering method:**
(Describe how leaking water will be removed, e.g. sandbag berms and sumps, gravity feed from a blow-off, etc. Provide specific details regarding the number, sizes, types of pumps, types of berms, type of blow-offs used for gravity discharge, etc. Attach drawing as necessary.)

**Water Level Monitoring Plan:**
(Describe in detail how water levels will be monitored; include high water level that triggers evacuation in the event of catastrophic valve failure or unmanageable leakage rate.)
## DEWATERING PLAN (continued)

**Communications Plan:**
(Describe in detail how communications will occur between staff in and out of the pipe, including how emergency evacuations will be communicated)

---

## ADDITIONAL COMMENTS

(Shut down coordinator to complete as necessary)

---

## SHUTDOWN COORDINATOR SIGNATURE

Prepared By: __________________________  Supervisor of Shutdown Coordinator: __________________________  Date: ________________

---

DRAFT
<table>
<thead>
<tr>
<th>INSTRUCTIONS FOR COMPLETING THIS FORM</th>
</tr>
</thead>
<tbody>
<tr>
<td>This form is to be used to document the lock-out/tag-out protocols associated with a system shutdown and must accompany all OCR’s submitted for review and approval. All applicable fields shall be completed as indicated for both O&amp;M and SYSOPS facilities. This form shall be completed by the both the O&amp;M and SYSOPS Supervisors, as applicable, with review by the Overall LOTO Coordinator.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>KEY CONTACT INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shutdown Coordinator:</td>
</tr>
<tr>
<td>Overall LOTO Coordinator:</td>
</tr>
<tr>
<td>O&amp;M Supervisor for LOTO:</td>
</tr>
<tr>
<td>SYSOPS Supervisor for LOTO:</td>
</tr>
<tr>
<td>Construction Manager for LOTO:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PROJECT INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shutdown Number:</td>
</tr>
<tr>
<td>Facility/Asset Impacted:</td>
</tr>
<tr>
<td>LOTO Dates:</td>
</tr>
<tr>
<td>Start Date</td>
</tr>
<tr>
<td>LOTO Times:</td>
</tr>
<tr>
<td>Start Time</td>
</tr>
</tbody>
</table>

**Scope of Work** (describe the purpose of the LOTO Plan, and the key groups/contractors affiliated with this LOTO Plan):

**Lock Box Plan** (describe how it is to be managed, where it will reside, and who will control it):
### LOTO Protocol and Sign-off

(Operator and/or SYSTOS Supervisor shall complete the table below, and attach additional sheets as necessary)

Attach a system or facility schematic showing all energy sources associated with the shutdown.

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Energy Source Type (hydraulic, electric, pneumatic, etc.)</th>
<th>Equipment, Device or Energy Source Name</th>
<th>Energy Source Isolation Type</th>
<th>Describe the Means of Locking Out Equipment, Device or Energy Source</th>
<th>Date, Time and Initials of Lock-Out</th>
<th>Date, Time and Initials of Lock-Off</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Single Block</td>
<td>Double Block</td>
<td>N/A</td>
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SINGLE-BLOCK ANALYSIS

(Shutdown coordinator shall complete and attach a system or facility schematic showing all valves associated with shutdown)

Provide a list of all single-block valves involved in the shutdown, and indicate the size and type of valve, the installation date for each valve and any known maintenance issues associated with the valve. Reference the same item number indicated in the LOTO Protocol and Sign-Off. Attach additional sheets as necessary.

<table>
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<tr>
<th>Item Number</th>
<th>Valve Name</th>
<th>Valve Size and Type</th>
<th>Installation Date</th>
<th>Indicate Valve Condition and Any Known Maintenance Issues</th>
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**SINGLE-BLOCK ANALYSIS (continued)**
For all **single-block butterfly valves** in the shutdown, provide reason(s) for not providing a double-block isolation (e.g. system configuration limitations, system demand, etc.):

| Provide details on pressure surge mitigation utilized during shutdown. |

**ADDITIONAL COMMENTS**
(Complete as necessary)

**APPROVAL SIGNATURES**
- **Signed:**
  - Signature of O&M Supervisor for LOTO
  - Date:
- **Signed:**
  - Signature of STOPS Supervisor for LOTO
  - Date:
- **Reviewed:**
  - Signature of Overall LOTO Coordinator
  - Date:
- **Approved:**
  - Signature of Facility/Systems Owner Representative
  - Date:
SHUTDOWN APPROVAL PROCEDURE

The purpose of this document is to prescribe the procedure that is to be followed in order to shutdown any portion of the Water and Power transmission and delivery system within the Hetch Hetchy Operation System.

The person/section proposing a shutdown needs to prepare a “Proposed Shutdown Planning Checklist.” (Copy attached) It is to be filled in as completely as possible and circulated to the appropriate reviewers for their comments and concurrence.

After the checklist has been completed, the entire package is to be submitted to the Superintendent of Operations for review and approval. As more information and details become available, they are to be amended to the original checklist. Significant changes and changes in the overall schedule will require supplementary review and approval.

FACILITY (IES) AND DATE TO BE SHUTDOWN:


PROPOSENT:


APPROVAL:

Superintendent of Operations: 

Date: ____________________

Phone No.: ____________________
## Shutdown Planning Checklist

**Facility (IES) to be Shutdown:**


**PropONENT:**


Phone No.: ________________

**Shutdown Coordinator:**


Phone No.: ________________

**Objective(s) of this Shutdown:**


**Work Order Number:**


**Reviewers:**

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SHUTDOWN PLANNING CHECKLIST

COORDINATION MEETING:
A shutdown coordination meeting(s) shall be held of all interested and affected parties to ensure that proper planning, scheduling and coordination is being achieved. Multiple meetings will be held if necessary – particularly for complex jobs involving key facilities.

KEY CONTACTS:
List the key contact person(s) for the various bureaus, sections and/or divisions.

<table>
<thead>
<tr>
<th>Person</th>
<th>Section, Division, Etc.</th>
<th>Office Phone</th>
<th>Page Number</th>
<th>Cellular Number</th>
<th>Radio #</th>
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IMPACTS AND LIMITATIONS THIS SHUTDOWN WILL HAVE UPON THE SYSTEM:
(Attach separate sheet if necessary)

BASIC PLAN:
- Attach separate sheet(s) outlining in a general chronological order the various activities of work to be performed, when, how and by whom.
- Include contingency plans for maintaining service if certain key components of the system fail during this shutdown.
- Include a work-around plan that includes a plan for a given WSIP shutdown, in case this shutdown needs to be rescheduled. A given shutdown may affect other WSIP critical shutdowns that cannot be rescheduled. Critical shutdowns such as the CRT, CSB Tunnel, and the BDPLs take precedence over other shutdowns. The project teams need to provide options for allowing the Contractor to continue construction activities even though the shutdown window for a given contract has been delayed.
- Include estimates of time and resources it will take to return the shutdowned facility to service if need be in case of an emergency.
- Identify safety and/or environmental issues that require review and/or technical assistance.
- What activities need to be mitigated; what measures (be specific) will be undertaken to mitigate those activities.
- What agencies/groups need to be notified? What permits are required?
- List all equipment, materials, manpower and other resources need to perform the work. Are they available? If not, how will they be obtained? Will overtime be required?
- Identify those unknowns that may adversely affect the performance of the work as planned. List all assumptions that are being made.
- If appropriate, attach drawing(s) and/or map(s) showing the area where the work is to be performed, the work to be performed, configurations of the system and/or anything else that might be pertinent.

ACTIVITY/TASK LIST:
Attach separate sheet(s), being as specific as possible, enumerating each and every activity and task necessary to be performed. If possible, this listing should include the person responsible for supervising the activity, time/dates of when the activity is to be performed, the person(s) responsible for performing the activity and the work order number(s) covering the activity.

SCHEDULE/TIMELINE:
Attach a timeline schedule showing the major phases of work to be performed and the dependency of any one phase of the work upon any other phase(s) of work.
This request form is to be used for system shutdowns, testing, startups, etc. The party requesting an operational change will need to prepare a documentation package. Fill out the attached planning checklist and circulate package to the appropriate reviewers for their comments and approval. Include as much documentation/information as possible in the package.

After the checklist has been completed, the entire package is to be submitted to the Operations Manager for review and approval. As more information and details become available, the documentation packet should be amended. Significant changes to scope and/or schedule will require supplemental review and approval.

FACILITY / FACILITIES:

OBJECTIVE:

PROPOSED DATE

PROONENT

CDD COORDINATOR

APPROVAL

OPERATIONS MANAGER

DIVISION MANAGER

DATE
### REVIEWERS:

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Attachment 019 - 4
Page 3 of 4
City Distribution Division (CDD) Operational Change Request (OCR)
(Out of Service/Return to Service Record) - Form

Planning Checklist:  (Include documentation for the following and mark box as “NA” to those that don’t apply)

Included N/A

☐ ☐ Basic Plan/Schedule: Attach separate sheet(s) outlining in a general chronological order the various activities of work to be performed, when, how, and by whom.

☐ ☐ Impacts and Limitations: List the impacts of the shutdown to the Local Water System.

☐ ☐ Environmental Review: Environmental issues that require review and/or technical assistance. What activities need to be mitigated, what measures will be undertaken to mitigate those activities? What agencies/groups need to be notified? What permits are required, etc.?

☐ ☐ Personnel/Safety: List all equipment, materials, manpower and other resources needed to perform the work. Are they available? If not, how will they be obtained? Will overtime be required? Have safety concerns been identified and addressed? Has SFPUC’s Health & Safety been involved, etc.

☐ ☐ Documentation: If appropriate, attach drawing(s) and/or map(s) showing the area where the work is to be performed, configurations of the system and/or any other pertinent information. Model runs verifying the proposed system configuration should be included where appropriate.

☐ ☐ Contingency Plan: Include plans for maintaining service if certain key components (a pipeline or pump station, etc.) of the system fail during this shutdown. Include estimates of time and resources it will take to return the offline facility to service if need be, in case of an emergency.

☐ ☐ Coordination Meeting: A shutdown coordination meeting(s) shall be held of all interested and affected parties to ensure that proper planning, scheduling and coordination is being achieved. Multiple meetings will be held if necessary – particularly for complex jobs involving key facilities.
### KEY CONTACTS

List the key contact person(s) for the various bureaus, sections, and/or divisions.

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<th>Cell Phone</th>
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<td>Dan McAuliffe</td>
<td>CDD</td>
<td>(415) 550-4801</td>
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<td>(415) 748-0500</td>
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<td>Bill Teahan</td>
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<td>(415) 601-8779</td>
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<td>Don Lampe</td>
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<td>Paul Ito</td>
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<td>(415) 202-3643</td>
<td>(415) 850-4242</td>
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<tr>
<td>Alan R. Wong</td>
<td>WGD</td>
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<tr>
<td>Carolyn Jones</td>
<td>H &amp; S</td>
<td>(415) 695-7320</td>
<td>(415) 201-6093</td>
<td>(415) 819-6157</td>
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<td>Dee Cutino</td>
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### OTHER NOTES

Preparer: ___________________________ Date: ___________________________

Date updated/revised: ___________________________ Date updated/revised: ___________________________

Date updated/revised: ___________________________ Date updated/revised: ___________________________

Date updated/revised: ___________________________ Date updated/revised: ___________________________
SHUTDOWN SUMMARY REPORT

This form is to be prepared by the Shutdown Coordinator to document the results of the shutdown and prepare a Lessons Learned Summary for possible use on future shutdowns. The results are to be shared with concerned CM and Operations Personnel.

| **SHUTDOWN CONTROL NUMBER:** | ________________________________ |
| **PROJECT AND CONTRACT NUMBER:** | ________________________________ |
| **PROJECT CM:** | ____________________________________ |
| **OPERATIONS REPRESENTATIVE:** | ________________________________ |
| **FACILITY SHUTDOWN:** | ____________________________________ |
| **PURPOSE:** | ____________________________________ |
| **SCHEDULED START:** | ____________________________________ |
| **ACTUAL START:** | ____________________________________ |
| **SCHEDULED COMPLETION:** | ____________________________________ |
| **ACTUAL COMPLETION:** | ____________________________________ |
| **SCHEDULED DURATION:** | ____________________________________ |
| **ACTUAL DURATION:** | ____________________________________ |
| **ESTIMATED INTRUSION:** | ____________________________________ |
| **ACTUAL INTRUSION:** | ____________________________________ |
| **TYPE DECHLORINATION:** | ____________________________________ |
| **DISCHARGE PROBLEM:** | ____________________________________ |
| **SIGNIFICANT CHANGES FROM PLAN:** | ____________________________________ |
| **WHAT SHOULD HAVE BEEN DONE DIFFERENTLY?:** | ____________________________________ |
| | ____________________________________ |
| **WHAT WERE THE LESSONS LEARNED?:** | ____________________________________ |
| | ____________________________________ |

Prepared and Submitted by: ____________________________________________
Monthly Revision of Master System Shutdown Schedule

1. Contractor site visits
   - Ensure the schedule of the WASP/Shutdown is coordinated.

2. WASP/Shutdown Schedule
   - Review and update the WASP/Shutdown Schedule.

3. WASP System
   - Update System Data.

4. WASP System
   - Update System Data.

5. WASP System
   - Update System Data.

6. PM/PQC/OLM and WASP/Shutdown
   - Coordination with project manager and WASP/Shutdown.

7. WASP System
   - Update System Data.

8. WASP System
   - Update System Data.

9. WASP System
   - Update System Data.

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    - Update System Data.

Notes:

1. Events or conditions that could potentially impact the schedule of a planned WASP/Shutdown include:
   - Emergency shutdowns
   - Inclement weather
   - Equipment failures
   - Human error
   - Outages
   - Unforeseen circumstances
   - Other

2. All WASP/Shutdown events should be recorded in the WASP/Shutdown Schedule.

3. The WASP/Shutdown Schedule should be reviewed and updated regularly.

4. The WASP/Shutdown Schedule should be updated to reflect any changes.

5. The WASP/Shutdown Schedule should be updated to reflect any changes.

6. The WASP/Shutdown Schedule should be updated to reflect any changes.

7. The WASP/Shutdown Schedule should be updated to reflect any changes.

8. The WASP/Shutdown Schedule should be updated to reflect any changes.

9. The WASP/Shutdown Schedule should be updated to reflect any changes.

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14. The WASP/Shutdown Schedule should be updated to reflect any changes.

15. The WASP/Shutdown Schedule should be updated to reflect any changes.

16. The WASP/Shutdown Schedule should be updated to reflect any changes.

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Acknowledgments:

PCE: Project Control Engineer
PM: Project Manager
OPS: Operations
WE: Water Enterprise

Update: 07/01/2021
San Francisco Public Utilities Commission
Lockout/Tagout Policy

Summary:
The Lockout/Tagout Policy establishes guidelines, practices, and procedures to protect the San Francisco Public Utilities Commission (SFPUC) employees, outside Contractors, Consultants, and all other outside servicing personnel from hazards caused by the unexpected flow of energy (in any form) or the unexpected operation/movement of equipment, machinery, components or materials.

Authority:
California Code of Regulations, Title 8 (CCR 8) including, but not limited to:
General Industry Safety Orders, §3314
Electrical Safety Orders, §2320.4-2320.6

Scope:
This Policy and its procedures apply to SFPUC employees. In addition the procedures apply to outside contractors or servicing personnel working on SFPUC facilities and SFPUC systems.

This Policy applies to energy sources such as, but not limited to: electrical, electromagnetic, kinetic (moving items), mechanical, hydraulic, pneumatic, chemical, radiation, thermal, physical, and potential energy from suspended or elevated parts or material (gravity), or energy stored in springs.

This Policy applies to activities such as, but not limited to: erecting, installing, constructing, repairing, adjusting, inspecting, cleaning, servicing, overhauling, operating or maintaining the equipment, process, components, machinery, or materials.

Revised 5/1/2015
San Francisco Public Utilities Commission

Health and Safety Policy

Title: LOCKOUT/TAGOUT (LOTO) POLICY

SAN FRANCISCO PUBLIC UTILITIES COMMISSION
LOCKOUT/TAGOUT POLICY

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APPENDIX A: Sample Lockout/Tagout Procedure Summary
1. POLICY
It is the policy of the San Francisco Public Utilities Commission that before any employee
performs service or maintenance on machinery or equipment where the unexpected start-up,
energizing, or release of stored energy (including engulfment), could occur and cause injury, then
equipment, component, or machine must be isolated and rendered inoperative; placed in a Zero
Energy State.

2. OBJECTIVE
The objective of the Lockout/Tagout (LOTO) Policy is to establish a control system to prevent the
unexpected operation or movement of equipment, components, machinery, or material or the
unexpected flow of energy in any form in a process or facility in order to:
2.1. Protect personnel from possible injury caused by the inadvertent movement of
equipment/processes encountered during cleaning, servicing, repairing, inspecting, and
adjustment operations.

2.2. Comply with applicable regulatory standards.

2.3. Communicate lockout/tagout procedures to anyone who may be affected by the process

3. SCOPE
3.1. This Policy and its procedures apply to SFPUC employees. In addition the procedures apply
to outside contractors or servicing personnel working on SFPUC facilities and SFPUC
systems.

3.2. This Policy applies to energy sources such as, but not limited to: electrical, electromagnetic,
kinetic, mechanical, hydraulic, pneumatic, chemical, radiation, thermal, physical, and potential
energy from suspended or elevated parts or materials, or energy stored in springs.

3.3. This Policy applies to activities such as, but not limited to: erecting, installing, constructing,
repairing, adjusting, inspecting, cleaning, servicing, overhauling, operating or maintaining
equipment, components, and processes.

3.4. EXCEPTIONS
This Policy does not apply to the following:
3.4.1. Work on cord and plug connected electrical equipment for which exposure to the hazards
of unexpected energization or start-up is controlled by unplugging the equipment and
the plug is under the exclusive control of the employee performing the servicing or
maintenance.
3.4.2. Tapping operations involving pressurized systems provided that the employer
demonstrates that (1) continuity of service is essential; (2) shutdown of the system is
impractical; (3) documented procedures are followed and special equipment is used
which will provide proven effective protection.
4. RESPONSIBILITIES
   4.1. General Manager:
       Overall responsibility for safety throughout the SFPUC rests with the General Manager, who
       establishes the SFPUC's goals and policies. Responsibilities include the following:
       4.1.1. Adopt and enforce the SFPUC's Lockout/Tagout Policy.
       4.1.2. Support budget for lockout/tagout operations, training, and equipment.
       4.1.3. Exercise oversight review on lockout/tagout issues.

   4.2. Assistant General Managers and Division Managers:
       4.2.1. Implement the SFPUC's Lockout/Tagout Policy within their areas of responsibility.
       4.2.2. Ensure that personnel under their jurisdiction can identify lockout/tagout situations.
       4.2.3. Ensure that employees have been trained on lockout/tagout procedures.
       4.2.4. Establish a system that includes documentation for training.
       4.2.5. Budget and provide for operations, training, and equipment necessary to comply with
               this Policy.
       4.2.6. Identify Authorized and Affected Persons.

   4.3. SFPUC Health and Safety Program:
       4.3.1. Ensure policies and procedures satisfy current regulatory requirements.
       4.3.2. Provide technical support for Lockout/Tagout operations and procedures.
       4.3.3. Provide training/retraining for Authorized and Affected Employees.
       4.3.4. Audit Lockout/Tagout policy and operations.

   4.4. Supervisors:
       4.4.1. Identify locations and situations that require lockout/tagout.
       4.4.2. Provide locks and tags and other equipment necessary for safe lockout/tagout.
       4.4.3. Ensure all safety procedures are followed.
       4.4.4. Require proper inspection and maintenance of lockout/tagout equipment.
       4.4.5. Know lockout/tagout hazards, including all forms of available and stored energy.
       4.4.6. Understand types of energy and methods of control.
       4.4.7. Train employees to follow lockout/tagout procedures.
       4.4.8. Follow lockout/tagout procedures and ensure that energy sources are controlled or
               eliminated.
4.5. Employees:
4.5.1. Know and obey lockout/tagout procedures.
4.5.2. Understand types of energy sources and methods of control.
4.5.3. Know lockout/tagout hazards, including all forms of available and stored energy.
4.5.4. Do not perform maintenance unless energy sources have been controlled or eliminated using lockout/tagout procedures.
4.5.5. Use lockout/tagout equipment properly.
4.5.6. Respect the locks and tags of other employees.

5. DEFINITIONS
5.1. Owner/System Operator:
The Owner/System Operator is the person in charge of operation of the equipment, components, machinery (i.e., facility superintendent, stationary engineer, plant operator, head of operations, or designated representative). This person, or their agent, is responsible for taking the equipment in and out of operation. When work is done in non-SFPUC buildings by SFPUC employees, a designated SFPUC employee will act as the owner for the project duration.

5.2. Owner’s Out of Service Lock and Tag:
5.2.1. The Owner’s Lock is used by the "owner" to indicate that the particular equipment, valve, de-energized switch, etc., is out of service and shall not be operated. It is a representation that the equipment is operationally secured in a safe/off condition and is NOT for personal safety.
5.2.2. The Owner’s Lock must include a tag marked "Danger, Do Not Operate/Valve Closed"
or other similar wording.
5.2.3. Owner’s Out of Service Lock and Tag can only be removed by a supervisor or designated employee of the owner that tagged the equipment and only after all other personal danger locks have been removed. These tags must be used with a lockout device whenever possible.

5.3. Employee’s Repair in Progress Lock and Tag:
Marked "Danger, Do Not Operate, Repair in Progress" or other wording as needed. Used by employees in conjunction with the owner’s Out of Service Lock and Tag to signify the presence of someone inside or working on the equipment. The "Repair in Progress" Lock and Tags can only be removed by the employee whose name is on the tag or under certain conditions as noted in Section 7.3.2. When working on equipment within the LOTO controlled area ALL employees are to place their Repair in Progress Locks and Tags on all Energy Isolating Devices or the appropriate Lock Box(es); there are no exceptions.
5.4. Energy isolating device:
   A device that physically prevents the transmission or release of energy, including-but, not
   limited to, the following:
   • A manually operated electrical circuit breaker;
   • A disconnect switch;
   • A manually operated switch by which the conductors of a circuit can be disconnected
     from all ungrounded supply conductors and, in addition, no pole can be operated
     independently;
   • A slide gate;
   • A slip blind;
   • A line valve;
   • A block;
   • A chain and padlock;
   • And/or any similar device used to block or isolate energy.
   The term does not include a push button, selector switch, and other control circuit type
devices.

5.5. Affected Employee:
   An employee whose job requires him/her to operate or use equipment, components,
machinery, or equipment on which servicing or maintenance is being performed under lockout
or tagout, or whose job requires him/her to work in an area in which such servicing or
maintenance is being performed under lockout/tagout.

5.6. Authorized Employee:
   A person who locks out or tags out machines, equipment, or components to perform servicing
or maintenance on that machine or equipment. The Authorized Employee must have sufficient
knowledge to competently determine effective and safe LOTO procedures for the specific
system being locked out. An Affected Employee becomes an Authorized Employee when that
employee’s duties include performing, cleaning, repairing, servicing, setting-up and adjusting
operations covered under this section.

6. GENERAL PROVISIONS

6.1. Compliance:
   All SFPUC personnel shall comply with the provisions of the Lockout/Tagout Policy and
   procedures. Employees not complying with this policy and its accompanying procedures
   shall be subject to appropriate personnel action.

6.2. Division Specific Procedures:
   Each “Operating Division” (WST, CDD, Hetch Hetchy, Wastewater and Power) shall develop
   their own Division-specific LOTO Program and Procedures. Operating Division-specific LOTO
   Program and Procedures are to be completed no later than 180 days after this Policy is
   signed by the General Manager. The Division’s program shall be based on this SFPUC wide
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LOTO Policy and relevant regulations. The Division specific Program and Procedure shall address:
- Division specific definitions
- Division specific "Written LOTO Plans" format.
- Division specific procedures for applying and removing locks and tags
- Division specific Lock Box procedures.
- Any other Division specific LOTO procedures.

6.3. LOTO Plans

A Written LOTO Plan is required for all LOTO work except as specified in paragraph 6.4. The written plan must include:
- A "Job Specific Title" for the plan.
- The date of the plan.
- A description of the purpose for the LOTO and related relevant information.
- The dates, groups, facilities, contractors, and others affected by this LOTO.
- If a lock box(s) will be used include in the plan how it (they) will be managed, where the box(s) will reside, who will control the box(s).
- Describe all Equipment, Energy Source(s), or Device(s) to be locked out.
- The device use or method use to lock out each point.
- Describe each appurtenance, air valve, or device that, if not functioning properly, could result in the unexpected release of water or energy into the work area.
- The sequencing of the shut down and placement of locks when the shutdown requires a specific sequence for safely shutting down the system.
- The name and signature of the preparer.
- The name and signature of the approver of the plan.
- A signature line for outside Contractors or other servicing personnel confirming they have received and reviewed the plan to their satisfaction, and have attended a LOTO walkthrough including the inspection of control devices and placement of locks.

6.4. Exception to Written LOTO Plan Requirement

Written LOTO Plans are not required when all of the following conditions are met:
- The machine, equipment, or component has a single energy source which can be readily identified and isolated;
- The isolation/locking out of that single energy source will completely de-energize and deactivate the machine, equipment, or component;
- A single lockout device will achieve a lock-out condition;
- The lockout device is under the exclusive control of the authorized employee performing the servicing or maintenance;
- The servicing or maintenance does not create hazards for other employees;
- The Division, in utilizing this exception, has had no accidents involving the unexpected activation or re-energizing of the machine, equipment or component during servicing or maintenance during the past 12 months.

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6.5. Locks and Tags

6.5.1. Physical locks and tags shall be the authorized method used for the lockout/tagout of energy sources. LOTO designated locks and tags shall not be used for any purpose other than personnel protection and removal of equipment from service. Lockout/tagout instructions are specified in the facilities’ Lockout/Tagout procedure.

6.5.2. Affected employees will be provided with locks and tags in sufficient numbers to complete their jobs. Employee locks shall be individually keyed. The employee shall be the only person to retain the key to that lock when it is in use. Owner Locks may be keyed alike if in accordance with Division specific procedures.

6.5.3. A multiple lockout device will be utilized as necessary where more than one lock is to be placed on the energy isolating device(s). Each employee exposed to the unexpected release of energy must still have his/her own lock and Repair in Progress Tag on the equipment, device, or lock box.

6.5.4. Individual locks and tags shall be applied and removed by each employee exposed to the unexpected release of energy, except those special situations where specific facility procedures have been developed that provide protection equivalent to individual locks and tags.

6.5.5. As long as any lock and tag is in place, the equipment, component, or machinery shall not be restarted. Locks and tags shall only be removed by the employees that placed them. (Unless certain circumstances exist. See Paragraph 7.3.2.) Under certain conditions, as outlined in paragraph 7.3.2., a supervisor may remove another employee’s lock and/or tag.

6.5.6. Only Authorized Employees may remove tags from the energy isolating device of equipment, and/or operate a locked out/tagged out system or piece of equipment. Unauthorized lock and/or tag removal shall result in appropriate personnel action, up to and including termination.

6.5.7. Upon completion of duties, the Authorized Employee shall remove locks and tags they are responsible for in a timely manner.

6.5.8. Any employee assigned to work on equipment shall, at any time, request his/her supervisor to explain how to make the equipment safer or where to place locks or tags.

6.5.9. Where equipment, components, or machinery is locatable, the use of a lock and tag is required.

6.5.10. Where equipment, components, or machinery is not locatable and cannot be made lockable, tagout application and special energy isolation procedures shall be utilized. Some exposures may require additional protective techniques or mechanical safeguards, as follows:
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<tr>
<th>Exposure</th>
<th>Protection</th>
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<td>Flywheel/Press rams</td>
<td>Blocks, pins, etc.</td>
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<tr>
<td>Chemicals or steam lines etc.</td>
<td>Slip blinds, chained valves, disconnecting/line breaking, etc.</td>
</tr>
<tr>
<td>Mixers, Chemicals, etc.</td>
<td>Fuse, heater removal, drive shaft disconnect, etc.</td>
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<tr>
<td>Hydraulic/Pneumatic Systems.</td>
<td>Automatic bleeding devices, blanking, etc.</td>
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6.5.11. All forms of energy within the system or equipment, component, or machinery being worked on shall be isolated, locked and tagged.

6.5.12. When locks are used in the lockout/tagout application, they shall always be accompanied by appropriate tags.

6.5.13. Energy isolating devices shall be clearly labeled or identified to indicate their function unless located and arranged so the purpose is evident. Such identification is necessary to reduce possible errors in applying the lockout/tagout devices.

6.5.14. The lockout/tagout of electrical energy sources shall occur at the circuit disconnect switch. (Note: In situations where the circuit cannot be positively interrupted, the responsible supervisor shall develop procedures providing equivalent protection. Feasibility of effective circuit isolation shall be mandated in future engineering improvements.)

6.5.15. The use of electrical control circuitry or SCADA to accomplish lockout/tagout is prohibited since it does not offer positive personnel protection. Examples:
   - Electrical shorts. (Water in lines and some types of dust can supply a path to close the control circuit.)
   - Vibration or component failure.
   - Remote or interlocked switches not affected by control circuitry.

6.5.16. Locks shall be purchased specifically for lockout/tagout applications. They shall be of such design and durability that removal by other than normal means would require excessive force or unusual techniques. In addition, they shall possess individual keying capability for employee locks.

6.5.17. Tags shall be constructed and printed so as not to allow exposure to weather conditions or wet and damp locations will not cause the tag to deteriorate or the message on the tag to become illegible. The tag attachment device shall be a non-reusable type, attached by hand, self-locking, and non-releasable with a minimum unlocking strength of no less than 50 pounds (equivalent to a one-piece, all-environmental tolerant nylon cable tie).

6.5.18. All tags are to show the Division, workgroup/section, phone number, first and last name of the "tagger", and the date, time, and reason for tag.

6.6. Lock Box
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6.6.1. When many pieces of equipment at one or more locations must be locked out, a Lock Box(es) may be used to implement the LOTO. When lock boxes are used a written description of the use, control, management, and “ownership” of the lock box(es) shall be included in the written LOTO Plan.

6.6.2. The Lock Box/Lock Box System shall be designed to ensure that any one affected employee, while in the LOTO protected work, can have their lock(s) placed in such a way that they are assured they are fully protected from any unexpected release of energy.

6.6.3. When working on equipment within the LOTO controlled area ALL employees are to place their Repair In Progress Locks and Tags on the appropriate Lock Box(es); there are no exceptions.

7. PROCEDURES

7.1. Application Survey

7.1.1. Each supervisor shall conduct a survey on a job by job basis to determine when and how the equipment, machinery, process can be safely isolated.

7.1.2. The survey should determine if energy isolating devices are available, adequate and practically located for positive protection.

7.1.3. A plan shall be developed to correct the surveyed deficiencies or provide interim alternative protection in order to make the lockout/tagout system effective.

7.2. Sample Procedures for Application of Lockout/Tagout

7.2.1. The equipment owner must notify Affected Employees that a lockout is required and the reason therefore.

7.2.2. The equipment owner removes the equipment from service and ensures that it is safe for necessary repairs by locking out, de-energizing, and disconnecting, blocking, or other means for isolating and releasing energy sources.

7.2.3. The equipment owner signifies this responsibility has been carried out when he/she attaches the isolating device and the signed Out of Service Tag to the de-energized equipment.

7.2.4. The equipment owner must place their Out of Service Tags first and remove them last, after the equipment has been released by the employee, or work group assigned to repair the equipment.

7.2.5. The employee(s) assigned to the repair or servicing of the equipment shall first verify that all forms of energy have been identified, isolated, and locked out by completing one or more of the following:

- Operate the equipment/process controls (push buttons, switches, etc.) to verify that energy isolation has been accomplished. Controls must be deactivated or returned to the off (non-operation) position.
- Check the equipment/process by use of test instruments and/or visual inspection to verify that energy isolation has been accomplished.
- If residual energy is detected, action must be taken to relieve or restrain the energy.
  - Operate the switch, valve, or other energy isolating devices so that the energy
source(s) (electrical, mechanical, hydraulic, etc.) is disconnected or isolated from the
equipment. Stored energy, such as that in capacitors, springs, elevated machine
members, rotating flywheels, hydraulic systems, and air, gas, steam, or water
pressure, etc., must also be dissipated or restrained by methods such as grounding,
repositioning, blocking, bleeding down, etc.
- Then the employee(s) shall place their personal locks and signed and dated tags in
  addition to the equipment owner’s tag and lock, there are no exceptions. The
  employee’s immediate supervisor will be responsible for monitoring compliance of
  the placement of tags.

7.2.6. In the event a job is incomplete by the end of the shift, each affected employee will
remove his/her personal lock and tag leaving the owner’s lock and tag for protection of
the equipment. When the work is resumed, the employee will again hang his/her lock
and tag in addition to the owner’s lock and tag. The owner’s locks and tags will remain
on the energy isolation devices until the job is completed and they are removed by the
owner.

7.2.7. When the repair is complete, the Authorized Employee will notify the equipment owner
to advise them that the repair (or their part of the repair) has been completed. The
equipment is now released back to the owner.

7.2.8. The equipment owner removes the Out of Service tag once he/she has verified that the
equipment is safe to return to service.

7.3. Lock and Tag Removal

7.3.1. Each affected employee must remove his/her own personal lock and tag when their
work is completed, but in no case later than the end of their work shift.

7.3.2. A supervisor may remove an affected employee’s tag and cut off a personal lockout
device if necessary only if he/she has made absolutely certain that the employee is not
in the workplace. Prior to pulling the lock and tag, the supervisor MUST do the following:
- Check to see if the employee has left the premises;
- Call the employee’s residence/cellular phone to see if he/she has arrived at home;
- Ensure that the equipment owner is notified of the status of the equipment (e.g.
  repair in progress, or repair completed) before removing the employee’s tag and lock;
- Inspect the equipment and surrounding area to make certain that no one will be in
danger if the equipment is allowed to be operated; and
- After confirming all the above items in this subsection are accomplished the
  supervisor may delegate the actual tag and lock removal to a designated employee.
- Ensure that employee knows that his/her lock and tag was removed before he/she
  resumes work at the facility.

7.3.3. The equipment owner shall be notified when the work is complete and overall
lockout/tagout has been cleared.

7.3.4. Before equipment/process energization a visual inspection of the work area shall be
made to ensure that all personnel are in the clear and that all non-essential items have
been removed and components are operationally intact.
8. SPECIAL APPLICATIONS

8.1. Lockout/Tagout Interruption (Energized Testing/Troubleshooting)

In situations where the energy isolating device(s) is locked/tagged and there is a need for testing or positioning of the equipment/process, the following sequence shall apply:

1. Equipment owner shall be notified and he/she will approve and monitor testing;
2. Clear equipment/process of tools and materials;
3. Clear affected personnel;
4. Remove the energy isolating device(s) of locks/tags according to established procedures;
5. Proceed with test;
6. De-energize and re-lock/tag energy isolating device(s) to continue the work;
7. Operate controls, etc. to verify energy isolation;

8.2. Special Cases

In special cases involving low voltage lighting or circuitry (6-12 volts), small piping (instrument, air or water), the supervisor will use his/her judgment to determine whether tagging and locking is necessary, and obtain upper management's approval in writing. This decision would be based on the types and amounts of stored energy in the particular system and its ability to cause injury.

8.3. Use of Butterfly Valves for Isolation of Permit Required Confined Spaces

8.3.1. The use of a single butterfly valve (BV) to isolate a permit-required confined space from a water engulfment hazard, such as in a water transmission pipeline entry, is permitted provided all of the following requirements are met:
- The specific BV valve is evaluated by a qualified person(s) with sufficient knowledge of the valve capabilities and system operation parameters to render a competent professional assessment on whether the valve could catastrophically fail during the specific project in question.
- A written Lockout/Tagout Plan is developed and implemented per the Lockout/Tagout Policy.
- A written Incidental Water Management Plan is also developed and implemented for control of any nuisance water passing the BV, and to prevent a secondary engulfment hazard. This plan must address who is responsible for incidental water control, the method for control and removal, the details for the water diversion devices and equipment, details on how the incidental water will be discharged, the procedure for regular monitoring of water levels, and the procedure for notifying downstream personnel of emergency situations.
- All other safety measures as required by the SFPUC Confined Space Entry Policy are met.

8.3.2. Isolation by a single BV is not permitted in the following confined space entry situations:
- When there is insufficient operational and/or engineering data available to render a competent professional assessment on the safety of the BV.
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Title:
LOCKOUT/TAGOUT (LOTO) POLICY

- For the isolation of wastewater or in wastewater systems.
- For the isolation of chemical or steam lines or hazardous atmospheres.
- For smaller BV’s that is frequently operated for process control or on branch pipelines, or other significant safety concerns.

8.3.3. When use of a single BV is not permitted for isolation, an alternate protective measure is required, such as double block and bleed, blind flange, or physically disconnecting the pipe.

8.4. Pipeline Isolation, Dewatering, Air Valve Release Verification

8.4.1. Upon successful isolation of a pipeline, the stored energy or water must be released prior to entry. To accomplish this task the pipeline must be dewatered. A person knowledgeable of the system must determine which appurtenances could, if not properly functioning properly, result in the unexpected release of water into a work zone. These appurtenances must be listed individually on the written LOTO Plan and each must be confirmed to have operated properly to ensure they have released any stored water.

8.4.2. The shutdown supervisor must prepare a dewatering plan. The plan should include:
- Confined space entry locations and the limits of the entry/inspection area.
- Locations of blow off valves (BO) and dewatering locations.
- Estimated discharge volume at each discharge location.
- Recorded discharge volume at each discharge location.
- The sequence in which automatic vacuum valves (AVV) and air relief valves (ARV) are to open to atmosphere.
- Field crew confirmation that each AVV and ARV operated correctly during depressurization and is open to atmosphere.

8.4.3. Each entry location must be confirmed dewatered and hazard free prior to entry.

9. CONTRACTOR AND OUTSIDE SERVICING PERSONNEL

9.1. The equipment owner will ensure that contractor and/or outside servicing personnel are notified of SFPUC lockout/tagout requirements before work begins. Contractors and/or outside servicing personnel must follow the SFPUC Division specific LOTO procedures unless the contractor and/or servicing personnel have total control of the hazardous energy source.

9.2. Contractors, Consultants, and all other outside servicing personnel affected by or before assuming LOTO responsibilities, will provide an authorized person to attend the LOTO walk through with the Owner. They will be a signatory to the LOTO Plan document confirming their attendance during walk through including inspection of control devices and placement of locks as directed by SFPUC Operations personnel.

9.3. The Contractor or Outside Servicing personnel must receive a copy of the Written LOTO Plan and have it immediately available as needed.
### San Francisco Public Utilities Commission

**Health and Safety Policy**

**Title:**

LOCKOUT/TAGOUT (LOTO) POLICY

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10. **HIGH VOLTAGE WORK**


10.1 Special written procedures (i.e. Codes of Safe Practice) shall be developed to describe the lockout/tagout measures necessary when employees are required to work on high voltage circuits or equipment (greater or equal to 600 volts).

10.2 During application of lockout/tagout-on High Voltage electrical equipment, a Qualified Electrical Worker shall use appropriate test equipment (meter) to test the circuit elements and electrical parts, to verify the equipment is de-energized. The test shall detect any residual electrical voltage or back feed. The test equipment shall be checked for proper operation before and immediately after the test.

10.3 Protective equipment used during this application shall be:

   10.3.1 Maintained in safe, reliable condition;
   10.3.2 Periodically inspected and tested.

10.4 If energy isolating devices are installed in a central location under the exclusive control of a system operator, all the following requirements apply:

   10.4.1. The employer shall use a procedure that affords employees a level of protection equivalent to that by the implementation of personal lockout or tagout devices.
   10.4.2. The system operator shall place and remove lockout and tagout devices in place of the Authorized Employee.
   10.4.3. Provisions shall be made to identify the authorized Employee who is responsible for the lockout or tagout devices, and to ensure that an authorized Employee requesting removal or transfer of a lockout or tagout device is the one responsible for the lockout/tagout devices.

---

11. **EXCEPTIONS TO PROCEDURE**

11.1 In special instances where the Lockout/Tagout procedure cannot be practically applied, a “special lockout/tagout procedure” shall be developed that provides an equivalent level of protection. Those procedures shall be in writing and must have prior approval of the equipment owner, and the SFPUC Health and Safety Program.

11.2 Copies of these procedures will be issued as follows:

   - Copies to all affected employees concerned with this special procedure.
   - A copy incorporated into the job specific Code of Safe Practices
   - Copies to the SFPUC Health and Safety Program.
   - Install a sign to indicate a special lockout/tagout procedure that is required on the equipment or process.

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12. **TRAINING**

12.1 Initial Training

The SFPUC shall provide training to ensure that the purpose and function of the energy control program are understood by employees and owners and that the knowledge and skills...
San Francisco Public Utilities Commission

Health and Safety Policy

**LOCKOUT/TAGOUT (LOTO) POLICY**

required for the safe application, usage, and removal of the energy controls are acquired by employees. The training shall include the following:

12.1.1. Authorized Employees shall receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control.

12.1.2. Affected Employees shall be instructed in the purpose and use of the energy control procedure and the recognition of hazards.

12.1.3. All other employees, whose work operations are or may be in an area where lockout/tagout procedures may be utilized, shall be instructed about the procedure.

12.2. Tagout Training

Employees shall also be trained in the following limitations and characteristics of tags:

- Tags are essentially warning devices affixed to energy isolating devices, and do not provide the physical restraint on those devices that is provided by a lock.
- When a tag is attached to an energy isolating means, it is not to be removed without authorization of the person responsible for it, and it is never to be bypassed, ignored, or otherwise defeated.
- Tags must be legible and understandable.
- Tags and their means of attachment must be made of materials which will withstand the environmental conditions encountered in the workplace.
- Tags may evoke a false sense of security.
- Tags must be securely attached to lockout devices.
- Tagout device attachment shall be non-reusable.

12.3. Employee Retraining

12.3.1. Each Division will establish a policy regarding the frequency of refresher training. Minimally:

12.3.2. Refresher training shall be provided for employees whenever there is a change in their job assignments, whether it is the machinery, equipment or processes that present a new hazard, or when there is a change in the energy control procedures.

12.3.3. Additional training shall also be conducted whenever a periodic inspection indicates it is needed.
12.4. Documentation
   The Learning Management System (LMS) will be utilized to document training required under
   this policy.

13. ANNUAL REVIEW
   The SFPUC will conduct an annual audit review of this policy to ensure that the procedures
   and requirements are being followed, and to identify and correct any problem areas. The
   annual audit review will be documented.
APPENDIX A

SAMPLE LOCKOUT/TAGOUT PROCEDURE SUMMARY
APPENDIX A

SAMPLE LOCKOUT/TAGOUT PROCEDURE SUMMARY

1. IDENTIFY service or maintenance that requires lockout/tagout

2. NOTIFY equipment owner of job

3. OWNER
   a. Determines how to isolate equipment; prepares a written LOTO Plan, and develops special procedures if needed.
   b. Isolates equipment (locks/blocks, etc.) and documents action(s) on written LOTO Plan.
   c. Tests equipment to verify energy isolation (and release) has been accomplished.
   d. Attaches Owner’s Out of Service lock(s) and tag(s).
   e. Notifies Authorized Employee (service or maintenance employee who will work on equipment).

4. AUTHORIZED EMPLOYEE:
   a. Reviews the written LOTO Plan and verifies if the equipment has been properly isolated.
   b. Tests equipment to verify energy isolation has been accomplished.
   c. Adds Employee’s Repair in Progress lock(s) and tag(s). (When many employees are involved, one Lock and Repair in Progress Tag are hung on the equipment and a key is placed in a lock box. Subsequent employee locks and Repair in Progress Tags are hung on the lock box).
   d. Performs service or maintenance work.
   e. Removes his/her lock and tag at the end of the job (if finished in one day) or at the end of the shift each day (if the job is not complete). (The owner’s tag remains on the equipment until the job is finished.)
   f. Notifies Owner when job is complete.

5. OWNER:
   a. Verifies equipment is safe to return to service.
   b. Removes Owner’s tag(s) and lock(s), returns equipment to service, and documents actions on the Written LOTO Plan.
Attachment 019 - 8
Typical Shutdown/Specific Condition Events Schedule

CM Procedure 022 Section
Activities

4.1 CONSTRUCTION SCHEDULE
(includes shutdown schedule)

SHUTDOWN DURATION

4.7.3 Contractor Submits SCR
Minimum 30-Days

5.8 Contractor Pre-shutdown Meeting
Minimum 30-Days

5.4.1 OCR Prepares OCR and LOTO
Minimum 21-Days

5.13 Project Team Creates Workaround Plan

5.13.7 Shutdown Delivery Team and Project Team Update Workaround Plan
Minimum 21-Days

4.3.1 Division OPS Manager Approves OCR and LOTO Plan

*NOTE: All durations are calendar days

LOT0 - Lockout/Tagout
NTP - Notice to Proceed
OCR - Operational Change Request
SOR - System Outage Request

Revised: 1/7/11

SFPUC Infrastructure CM Procedure No. 019, Rev. 0, Page 66 of 79
Attachment 019 - 9
Page 1 of 6
Guidance on Procedures for Confined Space Entry Work in Water System Pipelines

Inter-Office Memo
SFPUC Health and Safety Program

To: WST, HHWP, CDD, PMB, CM1, EMB, AECOM
FROM: Carolyn Jones
Health and Safety Program Manager
SUBJECT: Guidance on Procedures for Confined Space Entry Work in Water System Pipelines
DATE: 3/14/2011

Introduction: The purpose of this letter is to address various questions on confined space entry processes and procedures that have arisen following the receipt of a December 23, 2010 letter from Cal/OSHA, Water System Improvement Project HDP 3- East Bay (see attached). The official memo to that project is Bay Division Pipeline Reliability Upgrade Project - Bay Division Pipeline No. 3 (CUW 368-02) and there are two construction contracts, one in the East Bay and one on the Peninsula. The letter was in response to the East Bay contractor's concerns about permit required confined space (PRCS) entry requirements for pipeline isolation procedures and it summarized the related meeting between Cal/OSHA and SFPUC representatives on November 4, 2010. The letter also identified several areas of Cal/OSHA concern, including engulfment in the event of a major earthquake, and secondary engulfment hazards from incidental water passing the valve.

Several SFPUC managers and staff have asked for clarification about PRCS procedures for other projects, both WSP (continuing) projects and SFPUC Operations projects and inspections. This information below addresses those questions and it summarizes the procedural changes that have been developed from several meetings and discussions with H&S, WST, HHWP, PMB, CM1, and AECOM/WSIP Safety staff. Aspects of this procedure may also be applicable to PRCS for WWE facilities.

Areas of Concern:
1. What are the pipeline entry hazards that Cal/OSHA is concerned about?
   All water system pipeline entries have two water engulfment hazards – the primary hazard from an inability of the valve(s), specifically, HVC, to provide complete and continuous isolation (with no failure potential) from system water, and the secondary hazard from failure to control incidental water passing the valve(s).

2. Do the findings of the Cal/OSHA letter on the single BV isolation apply to other shutdowns?
   The Cal/OSHA letter specifically states that their letter applies only to that one shutdown and that other shutdowns must be individually evaluated for engulfment hazards.
3. What safety-related procedures are required to isolate a section of transmission pipeline from the primary engulfment hazard, to allow personnel to enter the pipe?

a. The work must follow the requirements of Title 8, California Code of Regulations (CCR) Sections 5156 – 5158, Confined Spaces, and Sections General Industry Safety Orders 3314 and Electrical Safety Orders 2110.4-5 for control of hazardous energy.

b. All PRCS entries require initial evaluation to identify the potential hazards; of which only primary and secondary engulfment is addressed in this letter (other hazards such as hazardous atmosphere must also be evaluated). Appropriate controls must be identified and implemented to control those hazards. The evaluation process must be done by a qualified person(s), meaning that the evaluator has sufficient knowledge of the job-specific valve(s) design and condition to determine the likelihood (if any) for valve failure. There is no requirement for the evaluation to be done by a professional engineer or a safety professional; rather, it is the responsibility of the owner (i.e., the respective SFPUC Division or Program level management) to identify the appropriate qualified persons.

The evaluation process should incorporate available information such as, engineering design data and drawings, valve model, manufacturer’s data, valve history information, valve age and condition, valve type (e.g., butterfly or gate), operational data, site data, and/or any other information necessary to render a competent professional assessment on whether the valves in question can catastrophically fail (e.g., could they open or break unexpectedly, leading to flooding and engulfment while workers are inside the pipeline). The evaluation process must also include valves associated with pipe cross-ties, branch lines, service connections, and any chemical injection points, if their failure could cause engulfment of a work area.

Since there are many varieties of IVs, the failure analysis during the special HDEF 5 shutdowns, approved by CalOSHA, may or may not be applicable to other IVs for other shutdowns. For valves for which there is no operational or engineering data available to make this assessment, additional protective measures, such as not limited to double block and bleed, are required for isolation.

c. Because PRCS isolation is achieved through both equipment (controls) and process/operations control (LOTO), the evaluation process must also include review of the job-specific LOTO and criteria. LOTO Plan is now required for all pipeline shutdowns as part of WNIP Contracting Agreement Procedure 022, System Shutdowns. LOTO is not required on tap.

The LOTO Plan must be prepared by knowledgeable, qualified persons. It must be submitted as part of the Operational Control Request (OCR) document, and responsibility for reviewing and approving the OCR includes identification and coordination of the LOTO Plan. LOTO Plan review criteria include identification control of source of energy, identification of each corresponding control point (valve, switch, etc.) and control of LOTO for each control point, sequence for implementation, and responsible section to perform LOTO. The LOTO Plan must also include any information necessary for coordination of LOTO actions, including a locked-out, with between the equipment.
Guidance on Procedures for Confined Space Entry Work in Water System Pipelines

4. When is “double block and bleed” required for pipeline isolation?

Cal/OSHA initially stated to one of the Bay Division Pipeline contractors that a single BV could not be used for providing water system isolation for PRCS entry work in the pipeline, and that “double block and bleed” was always required. The SFPUC met with Cal/OSHA over several months to discuss their regulatory requirement, and we presented operational information on the water system, technical information on potential for valve failure on the BV in question, our procedures for LOTO, the limited amount of time that personnel would be in the pipe, and our history of safe work in the pipelines. Based on this information, Cal/OSHA agreed that risk of engulfment from water in this particular section of pipeline could be adequately controlled by use of this single BV.

It is important to recognize that while the determination for this specific situation recognized that the BV provided adequate protection, each future pipeline shutdown must be evaluated on its merits. Cal/OSHA recited its initial position that a single BV would not be sufficient for isolation. The evaluation process as discussed with Cal/OSHA above is necessary to determine the acceptability of future isolation procedures. There are circumstances where a single BV is not appropriate for isolation, and double block and bleed or a blind flange is required (such as for chemical lines, steam lines, smaller lines that are frequently operated for process control or on branch pipelines, or other significant safety concerns). Note that inflatable blinders or other temporary barriers cannot substitute for required double blocks and bleed or blind flanges.

5. What safety-related procedures are required to prevent water from the secondary incidental water engulfment hazard?

a. In response to an incidental water concern raised by Cal/OSHA on the RDPL-2 project, the following requirements have been identified by H&H, WNSP, and SFPUC Operations staff. Each pipeline entry shall have a written plan to be developed for incidental water management in any situation where workers are endangered by the build-up and sudden release of water. Operations staff will be responsible for incidental water management.
Guidance on Procedures for Confined Space Entry Work in Water System Pipelines

the incidental water management plan will be developed by the SFPUC and submitted as part of the DOC. When the project specifications identify the contractor as responsible for incidental water management, the contractor will develop the plan and submit it as part of the System Change Request (SCR) for review by CSU staff and the Operations Representative.

b. The incidental water management plan must address contractor and SFPUC roles and responsibilities as appropriate, the method for water control, the procedure for regular monitoring of water levels, and the procedure for notifying downstream personnel in a timely manner of any emergency situations. This plan must include de-watering and discharge away from the worksite.

6. Does Cal/OSHA have to review and/or approve the isolation procedures, LOTO Plans, or incidental water management plan each time?

There is no requirement by Cal/OSHA for review and/or approval on a shutdown-specific basis. The Cal/OSHA letter specifically states: "In analyzing future projects to determine whether or not the work will trigger permit required confined space requirements, you [the SFPUC] must include engulffment by water as one of the factors in your determination." However, sufficient project documentation should be kept to address any future questions on how our review and evaluation were done.

7. What are the requirements for work inside or adjacent to tunnels?

Tunnel construction activities (construction, alteration, cleaning, and/or renovating) must comply with the Cal/OSHA Tunnel Safety Orders. Validation or maintaining activities (routine activities in a completed tunnel that do not alter the structure of the tunnel) must comply with the Cal/OSHA Confined Space regulations. Although the employe can choose to follow the Tunnel Safety Orders. In any way, the isolation requirements for work inside tunnels are consistent with the requirements of procedures above addressing potential engulfment hazards.

Additionally, when work is done inside pipelines connected to tunnels, remember that the Tunnel Safety Orders must be followed, unless the pipeline is physically isolated from any tunnel gas hazards. Physical isolation means a pressure block, mechanical block, or disconnected section of pipe. A single closed valve will not be sufficient isolation unless there was water behind the valve. This Tunnel Safety Order applies only to pipeline work adjacent to tunnels irrespective of the tunnel classification.
December 23, 2010

David Brigger, Division Manager
Water Supply and Treatment
San Francisco Public Utilities Division
P. O. Box 730
Millbrae, CA 94030

RE: Water System Improvement Project SBDEP-3 East Bay

Dear Mr. Brigger:

This is to summarize the points discussed at the November 4, 2010 meeting in Division headquarters, regarding the designation of a pre-designated confined space for work underway on the SBDEP-3 project in the East Bay. As part of that work, contractor’s employees are removing pipeline sections in several locations on a 66-inch diameter water pipeline, and must enter the pipeline for the final welding of sections. While arrangements have been made to extract welding gason and fumes and provide fresh air, concerns have been raised about the hazard of engulfment by water. Permanent butterfly valves on the pipelines upstream from the work will be closed off during this work, but no other confinement or other forms of breathing or blocking the pipeline will be installed to completely isolate the work areas from water during the project.

At the meeting, Division staff made clear that when there is a reasonable hazard of engulfment, repair work of this kind on water pipelines triggers all the requirements of a permit-required confined space, including Section 1910.157 of the General Industry Safety Orders. However, your staff explained in some detail why this would not be a hazard in this project:

1. The water in the pipeline is not under pressure, other than the pressure of gravity, and that pressure was less than 1/2 the design strength of the butterfly valves. A butterfly valve has a large closing surface, which pivots on its stem. The valve opens and closes when the stem is rotated one-quarter turn. The sides of the disc that is pointed upstream has a larger surface area than the side facing downstream. Thus, in the event of a failure, this difference in surface area forces the valve shut, rather than opening. In the event of any failure, water pressure would force the valve shut, rather than force it open.

2. Even in the event of an earthquake, engulfment would occur downstream of the valves. Each valve body is one large cast iron object. The valve stem is a solid metal cylinder, and embedded inches into the valve body on top and bottom. In the event of a major earthquake, the pipeline around the valve would fall before the valve did. Water flows on the upstream side of the valve would escape downstream, but would not suddenly burst through the valve.

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3. While the valve is expected to leak, this is not the same as an engulfment hazard, and is generally controlled through conventional dewatering methods such as wells and pumps. In the event that the amount of water leaking from the valve cannot be adequately controlled, the working area on the landside of the pipe can easily be evacuated through manholes in the immediate area of the work.

Based on this information, Division staff agreed that the work in pipeline sections below these particular valves, on Water System Improvement Project HWP-LP, did not have to be treated as permit-required confined spaces because of the risk of engulfment by water. The Division’s agreement about this particular set of circumstances does not apply beyond this particular project. In analyzing future projects to determine whether or not the work will trigger permit-requirement, Division staff will consider the potential for the engulfment by water as one of the factors in your determination. If you need assistance in advance of these projects, you may always contact the Cal/OSHA Consultation Service or our staff.

Thank you for your interest in worker safety.

Sincerely,

[Signature]

Joel Parks, Acting Principal Safety Engineer,
DGSS Research & Standards Safety Unit

cc: Len Webb, Chief, Division of Occupational Safety and Health
Vicky Hsu, Program Manager, Cal/OSHA Consultation Service
## Wastewater Enterprise
### Lockout Tagout
#### Procedure/Plan

**Date**

<table>
<thead>
<tr>
<th>Job Title/Purpose:</th>
<th>Job Date/Duration</th>
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<table>
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<th>Operations Contact:</th>
<th>LOTO Tag #:</th>
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<tr>
<th>Owner: Operations [ ] Maintenance [ ]</th>
<th>Overall LOTO Coordinator:</th>
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Describe the groups, facilities, contractors and others affected by this LOTO:

Is there a lock box? Yes [ ] No [ ]

If Yes, describe the lock box plan i.e. Where the box(s) will reside, who will control the boxes, how it will be managed?

---

**Page 1 of 2**

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<table>
<thead>
<tr>
<th>LOTO Steps</th>
<th>Name of preparer &amp; Name of Approver</th>
<th>Name of group responsible to perform the LOTO</th>
<th>Name, Date, Time Locks Applied</th>
<th>Name, Date, Time Locks Removed</th>
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Reviewed and Approved by: ___________________________ Date: _______________
Contractor: ___________________________ Date: _______________
WASTEWATER ENTERPRISE
LOCKOUT/TAGOUT Plan

Inspect and Repair
SEP 011
#1 Main Lift Pump
Equipment Number: SEO191-1

<table>
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<th>Overall LOTO Coordinator: Jim Manage It</th>
<th>Job Date/Duration: 8/20/14 – 8/24/2014</th>
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<tr>
<td>Operations Contact: Jerry Doe</td>
<td>LOTO Tag Number: 2132</td>
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Describe purpose, groups, facilities, contractors and others affected by this LOTO:
- The purpose of this LOTO is to Inspect and repair as needed.
- WWE crews to perform operational LOTO (See steps below) WWE personal LOTO as needed
- TP Plumbing Contractors on site to perform Repair work TP Plumbing employees to

Is there a lock box? Yes ☐ No ☐
If Yes, describe the lock box plan i.e. Where the box(s) will reside, who will control the boxes, how it will be managed?

Lock Box to be on site at the Lift Pump. LOTO coordinator in charge of Lock Box – the coordinator to have their own lock on it with a white process tag on it.

<table>
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<th>LOTO Steps</th>
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<th>Name of group responsible to perform the LOTO</th>
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<th>Name, Date, Time Locks Removed</th>
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<td>Electric Shop</td>
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<tr>
<td>1</td>
<td>MCC 011 – A1-LP1 position go to EO11G -1 to Close or Open position. Switch to Off and remove control box.</td>
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<td>VFD</td>
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| Suction/Discharge Isolation Valve knife gate  
  - Step 1 - Open supply valve to directional control valve manifold.  
  - Step 2 – Close #1 suction knife gate using correct directional control valve.  
  - Step 3 - Close #1 discharge knife gate using correct directional control valve.  
  - Step 4 - Close hydraulic cylinder supply valves on top of directional control valve manifold. **Apply Locks and Tags**  
  - Step 5 - Once LOTOed, attempt to open gate using correct directional control valve to ensure correct and safe LOTO – Testing out the LOTO.  
  - Step 6 - Reclose supply valve to directional control valve manifold. | Nathan Ciappara | Hydraulic Shop | | |
| Seal Water Solenoid Valve  
  - Close main inlet shutoff valve for seal water solenoid and install appropriate lockout device.  
  - Open drain valve to remove residual pressure and return to close position. | Andy Clark | Operations | | |
| Flushing Water Valve  
  - Close main inlet shutoff valve for flushing water valve and install appropriate lockout device.  
  - Open bypass valve to remove residual pressure and return valve to close position. | Andy Clark | Operations | | |

Date: ____________________________

WWE LOTO Coordinator – Print, Sign, and Date

Date: ____________________________

Contractor - -- Print, Sign, and Date
Step 1: Open supply valve to directional control valve manifold.

Step 2: Close #1 suction knife gate using correct directional control valve.

Step 3: Close #1 discharge knife gate using correct directional control valve.

Step 4: Close hydraulic cylinder supply valves on top of directional control valve manifold. Apply Locks and Tags.

Step 5: Once LOTOed, attempt to open gate using correct directional control valve to ensure correct and safe LOTO – Testing out the LOTO.

Reclose supply valve to directional control valve manifold.
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<th>Revision Date</th>
<th>What changed?</th>
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