Pump Station Startup Checklist

January 16, 2025

The Pump Station Startup Checklist aims to assist the Contractor in clarifying the Sacramento Area Sewer District's (SacSewer) acceptance requirements for newly constructed and rehabilitated pump stations. The Pump Station Startup Checklist is divided into four phases based on the activities and personnel involved:

- **Phase 1 Pre-demonstration:** Phase 1 ensures the Contractor has correctly installed all equipment and that applicable manufacturers have field-verified their specific devices to meet the required warranty criteria. The Contractor completes the work, the inspector observes (excluding specific Factory Acceptance Test (FAT) items), and the design engineer confirms during this phase.
- **Phase 2 Demonstration:** Phase 2 demonstrates that all installed equipment operates correctly as an integrated system and prepares the pump station for the continuous 10-day test.

  The Contractor and subcontractors are responsible for this phase.

- **Phase 3 Operational Testing and Startup:**
  During this phase, the Contractor will perform the following:
  - Calibrate the captive air bell.
  - Ensure the captive air bell and tubing to the pressure switch are airtight to trigger the alarm.
  - Provide a minimum of 3 inches of potable water above the bottom of the captive air bell to trigger the alarm. Ensure the water level holds for a minimum of 24 hours. Maintain the pressure within the captive air bell and the alarm through the 24-hour test.

  Phase 3 provides a 10-day freshwater test to mimic the pump station's realistic operation. The Contractor will use potable water for the 10-day test unless otherwise approved by SacSewer. See SacSewer Standards and Specifications drawing PS-03 for typical fresh water test configuration. The 10-day test consists of 240 hours of continuous operation of the pump station without system or component failure or interruption. Failures or

interruptions will require the Contractor to rectify the issue and restart the 10-day fresh water test. The 10-day test subjects the communication, plumbing, mechanical, and electrical systems to real operating conditions to ensure the system operates as designed. The Contractor will supply and coordinate specific vendor training during this phase as SacSewer requires.

Successful completion of Phase 3 must occur before the operational responsibility is transferred to SacSewer. The Contractor must schedule an appointment with SacSewer to transfer operation, full access, and acceptance of live flows to the new pump station. Schedule SacSewer transfers and field inspections, as required by the phase, Tuesday through Thursday, with a minimum of 72 hours notice. The Contractor and subcontractors are responsible for this phase.

- **Phase 4 Acceptance:** Phase 4 ensures that the Contractor provides SacSewer with all appropriate signatures, approvals, and documentation.

Notes:

1. Phases 1 and 2 must be completed before starting the 10-day freshwater test, including the review and approval from SacSewer and the Engineer of Record (EOR) of all the required submittals, reports, etc., for each phase as listed.
2. The Contractor will keep a project binder on site containing the original pump station startup checklist, certificates, test results, and other pertinent information. The binder will be accessible to SacSewer personnel at all times.
3. The Contractor, Design Engineer (or field representative), Construction Management and Inspection Division (CMID) inspector and SacSewer representative will initial each item as it is completed. The SacSewer Project Manager will verify that the entire checklist phase is complete and sign at the bottom.
4. SacSewer requires that all phases be fully completed and formally approved before the CMID will issue field acceptance of any pump station.

SACRAMENTO AREA SEWER DISTRICT Page 1	**Pump Station Startup: Phase 1 (Pre-Demonstration) Checklist** (To be completed before starting the 10-day freshwater test)				
		Contractor	Design Engineer	Inspector	SacSewer
Pump Station:_____					
Design Engineer:_____	Inspector:_____				
Proposed Start date: _____	Date Notification Sent to SacSewer: _____				
SacSewer requires a 2-week notification before the 10-day freshwater test.					
Permits	Authority to Construct (Approved Plans and Specs)				
	Permit to Operate				
	Easements submitted to SacSewer				
	Access Permit				
Field Installation/ Testing	All wiring terminated, tagged, and installed				
	Protective devices coordinated per study				
	Permanent utility power installed - Record number of phases and the actual voltage				
	Permanent water service pressure tested and installed				
	All grounding systems installed and tested				
	All conduits tagged and installed				
	All pneumatic lines installed and tested				
	All equipment installed per approved seismic calculations				
	Generator and load bank installed				
	Site lighting installed - Permanent wiring and power with photocell adjusted				
	Switchboard, MCC, ATS, PLC, bubbler installed				
	Building or canopy, including lighting (interior and exterior) installed				
	All installed equipment labeled				
	Cathodic protection installed				
	Factory Acceptance Test (FAT) Ready for SacSewer Witness	**Note that all components must be configured, assembled, and ready for testing before SacSewer will make time available for the witnessed FAT. See below for the required components.**			
	Factory Acceptance Test: Witnessed	Switchboard			
		Automatic or manual transfer switch			
		Motor control center			
		PLC cabinet			
	Factory Acceptance Test: Non-witnessed	Pumps			
		Standby generator and load bank and transfer switch as applicable			
	Onsite pump test by manufacturer				
	Onsite hoist system test by manufacturer as applicable				
	Onsite generator and load bank tested by manufacturer				
	Manufacturer's and NETA quality control on switchboard/MCC				
	Field cable insulation tested				
	Captive air bell leak test				
	Building Systems	HVAC			
		Plumbing			
		Electrical			
		Lighting			
		Storm drain			

SACRAMENTO AREA SEWER DISTRICT Page 2	**Pump Station Startup: Phase 1 (Pre-Demonstration) Checklist** (To be completed before starting the 10-day freshwater test)			Contractor	Design Engineer	Inspector	SacSewer
Pump Station:_____							
Design Engineer:_____		Inspector:_____					
	Description		**Plan Elevation (ft)**	**Actual Elevation (ft)**			
Elevation Verification	Wet Well Floor						
	Inflow Inlet Invert						
	Captive Air Bell						
	Pressure Transducer Bottom						
	Pump Inlet Invert						
	Upstream Shed Low Manhole Rim						
	Wet Well Rim						
Approved Submittals	Manufacturer's statement of installation						
	Preliminary As-builts (reflecting actual field conditions, final record drawings to be submitted at install.)	Loop Drawings					
		Interconnect Drawings					
		Mechanical Site drawing					
		Civil Site Drawing					
		Electrical Site drawing					
	Instrument calibration certifications						
	Protective devices coordination study by a professional electrical engineer						
	Wire pull sheets and conduit schedules						
	Certified cable insulation resistance test results by a NETA testing firm						
	Certified grounding system test results by a NETA testing firm						
	Switchboard and MCC testing results by a NETA testing firm						
	Witnessed factory acceptance test on all control and electrical equipment ** Include FAT, PL						
	Pump factory acceptance test results						
	Generator factory acceptance test results						
	Certified onsite generator test, including noise level at property line: ____dB						
	O&M manuals (include all approved submittals)						
	Test procedures for Phase 2						
	** FAT Punch List items, complete and certified prior to delivery to site						

ATS: Automatic Transfer Switch
dB: Decibel
FAT: Factory acceptance test
HVAC: Heating, Ventilation, and Air Conditioning
MCC: Motor control center
NETA: International Electrical Testing Association
PL: Programming Language
PLC: Programmable logic controller
SacSewer: Sacramento Area Sewer District

SacSewer CSO Project Manager Phase 1 Checklist Approval: _____ _____
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SACRAMENTO AREA SEWER DISTRICT Page 3	**Pump Station Startup: Phase 2 (Demonstration) Checklist** (To be completed before starting the 10-day freshwater test) **All Phase 2 tests require a two-week notice to SacSewer**		Contractor	SacSewer
Pump Station:_____				
Design Engineer:_____		Inspector:_____		
Remote Telemetry Unit	Verify installation and hookup, connectors, and conduits			
	RTU Radio Antenna alignment (Contractor provides bucket truck)			
	Communications programming and testing			
	I/O test modem			
	Captive air bell calibration (attach field calibration record)			
	5-point verification of the pressure transducer (attach field calibration record)			
System Demo	Pumping Systems	Pull pumps and inspect		
		Guide rails		
		Crane as applicable		
		Inspect wet well		
		Clean water recirculated		
	Generator, load bank, and fuel tank, transfer switch, 5 cycles			
	Switchboard/MCC, cabinet lighting, heaters, cooling fans, all functions			
	Instrumentation			
	Crane, as applicable			
	Security system/fire alarm, including cabinets and other as applicable			
	FM tested/approved, wet well to first accessible joint, off-site			
Assets Input	Service Request submitted for pumps, CARV, force main			
	Service Request submitted for station - new asset			
General Walkthrough	CMID Punch list Completed	Inspector's Initials		
Approved Submittals	Test Plans for Phase 3 (simulating operational conditions)			
	Final O&M manuals (3 copies with one copy at the pump station) - provide O&M manual CAD files (MCC and SCADA)			
	Final As-built Drawings			

CAD: Computer-aided design
CARV: Combination air release valve
I/O: Input/Output
MCC: Motor control center
O&M: Operations and Maintenance
SacSewer: Sacramento Area Sewer District
Collection System Operations
SCADA: Supervisory Control & Data Acquisition
RTU: Remote telemetry unit

SacSewer CSO Project Manager Phase 2 Checklist Approval: _____ _____
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SACRAMENTO AREA SEWER DISTRICT Page 4	**Pump Station Startup: Phase 3 (Operational Testing and Startup) Checklist** (To be completed before starting Phase 4) **SacSewer requires a 2-week notification before the 10-day freshwater test.**		Contractor	Inspector	SacSewer
Pump Station:_____ Design Engineer:_____ Inspector:_____					
1. Captive Air Bell Test	Calibrate the captive air bell.				
	Ensure the pressure switch's captive air bell and tubing are airtight to trigger the alarm.				
	To trigger the alarm, provide a minimum of 3 inches of potable water above the bottom of the captive air bell. Ensure the water level holds for a minimum of 24				
2. 10-Day Fresh Water Test	Level change start of test: WW/HL and LL alarms verified, 4 cycles each				
	Pumping Requirements: Pumps larger than 100 hp = min 5 pump runs/hour per pump Pump equal to and smaller than 100 hp = min 6 pump runs/hour per pump Each pump run must last longer than 1 minute See Drawing PS-03 PUMP STATION 10-DAY FRESH WATER TEST of the latest SacSewer's CSO Standards and Specifications				
	Daily checks AM and PM (See Supplemental Example Field Form), Contractor and Inspector recorded				
	Holding tank, all hoses, fittings, valves, etc., secure, no leaks				
	Pull pumps, check oil, impeller, volute, etc. (at start and completion of test)				
	Run pumps on generator power				
	Site specific	Site lighting, SCADA, alarms, etc., active			
		Site security: WW access secured/locked, fencing, gates			
		Cabinet heaters, fans, etc., record outside temperatures			
	SacSewer Phase 3 punch list generated				
	SacSewer Phase 3 punch list completed				
	Start date:_____ Stop date:_____				
3. Contractor Provided Training	Pumping Systems				
	Generator as applicable, load bank & fuel tank, transfer switch, identify phase at generator				
	Switchboard/MCC				
	Instrumentation				
	Crane as applicable				
	Security systems				
	Fire alarm				
	Other systems, as applicable				
4. Pump Station Cleanup	Remove re-circulation system, test plates, etc., after 10-day test				
	Remove all contractor equipment from the site				
	Final pump station cleanup				
	Final punch list generated. Must be completed before Step 4				
Connect to Sewer	Verify downstream systems are operational and connected	Plugs removed (verify), and allow sewage into facility			
		Valves open			
		Forced main operational, tested, signed off			
	Abandon items as applicable. Arrange access via SacSewer representative.				
Make Facility Operational	Replace the Contractor's lock with SacSewer's locks. No Contractor access without SacSewer				
	Change station operational parameters in SCADA to design set points				
	SacSewer M&O ready to accept maintenance and operations of the pump station				
	Notify SacSewer M&O				
	Notify SacSewer USA Group				

HL: High Level LL: Lower Lateral M&O: Maintenance and Operations

SCADA: Supervisory Control & Data Acquisition USA: Underground Service Alert WW: Wet Well

SacSewer CSO Project Manager Phase 3 Checklist Approval: _____ _____

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SACRAMENTO AREA SEWER DISTRICT Page 5	**Pump Station Startup: Phase 4 (Acceptance) Checklist** (To be completed prior to final SacSewer acceptance of facility)			Contractor	Inspector	SacSewer
Pump Station:_____						
Design Engineer:_____			Inspector:_____			
Final Signoff	All completed punch lists recorded					
	Phases 1, 2, and 3 checklists recorded					
	CMID Acceptance Letter	Force main				
		Pump station				
Paperwork	Transfer power bill to the SacSewer					
	Transfer water bill to the SacSewer					
	Grant Deed / Easements recorded					
	Copies of All Applicable Permits to SacSewer	Building Permit				
		Authority to construct				
		Permit to Operate				
		Hazardous Materials Plan				
	Warranty Paperwork Submitted by Contractor					
Final Acceptance	Acceptance letter by SacSewer filed					
	Copy to SacSewer	Accounting				
		Information Management: Final Record Drawings and other documentation				
		M&O				
		Modeling				
		Regulatory Compliance				
		MAXIMO				
		SacSewer USA				

M&O: Maintenance and Operations SacSewer: Sacramento Area Sewer District USA: Underground Service Alert

SacSewer CSO Project Manager Phase 4 Checklist Approval: _____ _____
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