

Standard Operating Guideline – Lift Station Inspection

Standard Operating Guideline (SOG)

Title: **LIFT STATION INSPECTION**

District Name: _____

Date Prepared: _____ Date Revised: _____

OBJECTIVE:

Lift stations are used to lift or raise wastewater from a lower elevation to a higher elevation. The term “lift station” usually refers to a wastewater facility with a relatively short discharge line to a down stream gravity sewer. A “pump station” commonly is a similar type of facility that is discharging into a force main. The purpose of this document is to provide adequate equipment and process control information, necessary to ensure the station operates as designed, routine inspections and preventative maintenance are performed to prevent costly repair bills, eliminate spills, and avoid property losses. The following are suggestions that may insure fewer breakdowns and problems:

RATIONALE / PURPOSE:

- Lift stations should be inspected at least a weekly. (Based on system design and capacity, more frequent inspections may be required).
- Records of these inspections must be maintained through the use of written notes, logs, notebooks, and /or computer format.
- These are to be referenced by management, operations, and maintenance crews, to ensure established procedures are being followed to ensure the maximum lifespan of all facilities and equipment.
- Documentation may also be required by outside regulatory agencies and insurance companies in the event of a spill, equipment failure, or property loss.

METHODS / PROCEDURES:

1. Wet wells should be pumped out and cleaned at least twice a year, or more often if necessary, to prevent solids and grease build-up. Build-up of solids can create odors and damage to the pump.
2. Inspection of pumps (submersible and dry) should be performed quarterly. Inspection of the impeller should be performed quarterly or when motor hours are not within 10 percent of each other. The inspections would assure that the impeller is free of debris.

Standard Operating Guideline – Lift Station Inspection

3. Inspection of the check valves should be performed at least twice a year, to insure proper working order and to prevent backflow from the force main to the wet well.
4. Cleaning and inspections of floats should be performed four times a year to assure proper performance. The buildup of grease prevents floats from working properly.
5. Inspection of the light and alarm systems should be performed weekly. An alarm system in working order can alert you to problems immediately.
6. Installation of an hour meter on each motor will give one an accurate record of how often each motor is cycling; and hence, the amount of water being pumped through the system. It is recommended to alternate lead pumps at least weekly. A logbook of motor hours, dates and maintenance performed should be kept.
7. Installation of a flow meter on each pump will give one an accurate record of how much flow is being processed through the system. A logbook of flow records, dates and maintenance performed should be kept.
8. Amp and vibration readings should be taken at least once a month on each motor in the on-site lift station. If the readings do not meet the manufacturer's specifications, it is an indication that debris is lodged in the propeller within the motor, or that water has entered the motor housing or the wiring.
9. An annual inspection of all electrical motor control equipment should be performed to find poor connections and worn parts. This inspection should include infrared testing and panel maintenance.
10. During routine inspections, the emergency back up generator needs to be visually checked for fuel level, battery, and general condition. At least quarterly, the generator is to be operated, under load, to ensure proper operation and per operating permit requirements. This test is to be conducted by tripping power to the station and observing a successful transfer to generator power for at least 15 minutes.
11. All Lift pump stations are to be monitored 24 hours a day by Member Agency using a remote notification system, such as modem dialer, telemetry or SCADA system. These systems must be able to provide 24 hour notification to system operators, and remote monitoring and control of pumps, water level, alarms and power status. This system must be accessible to all assigned employees during non-duty hours.

The following information should be included within the lift station inspection information collected:

- Date;
- Time;
- Initials of person performing inspection;
- Meter readings for each pump;

Standard Operating Guideline – Lift Station Inspection

- Flow reading for each pump;
- General appearance (note if there is grease buildup or if wet well baskets need to be cleaned);
- Any maintenance done to the lift station;
- Date of pump and equipment calibrations;
- Pump ratings in gallons per minute; and
- Power usage (if available).

SAFETY CONSIDERATIONS:

Safety is directly related to your level of professionalism which in turn is directly related to knowledge and ultimately certification. It is imperative that employees conduct all day-to-day activities safely through a combination of awareness and professionalism.

Multiple hazards exist in the performance of the employee's routine daily tasks and work assignments. The following are some of the more common hazards to be aware of:

- Slips
- Falling Objects
- Infections and Infectious Diseases
- Lacerations and Contusions
- Falls
- Explosions
- Confined Space Entry Procedures and Permit Requirements
- Poisonous or Toxic Gases
- Strains or Ruptures
- Traffic Mishaps
- Bites (insects, bugs, rodents, snakes)
- Excavations and Trench Shoring
- Drowning
- Fire
- Electrical Shock and Arc Flash
- Noise

Employees are required to follow the Member Agency's Safety Practices and Procedures. These Administrative Procedures establish guidelines in compliance with the Illness Injury Prevention Program (IIPP) mandates of the Federal Code of Regulations, the State of California Occupational Safety and Health Administration (CalOSHA), and the Member Agency's Board of Directors.

COST BENEFIT:

Senior Management support is critical to the success of any preventive maintenance and inspection program. Critical to any Agency is being able to identify and control activities within both the Operation and the Maintenance areas.

The elimination of sewage spills, improved sewer maintenance, inspection of facilities and equipment and implementing long-term Capital Improvement programs to renew aging infrastructure can reduce the possibility of fines and citations from other State and local

Standard Operating Guideline – Lift Station Inspection

agencies. These costs usually come directly from the Agency’s general operating budget and are not covered by insurance.

Preventive maintenance (PM) is a time based strategy conducted at a set interval or predetermined time when a piece of equipment is routinely inspected and/or taken off line for schedule service or repairs. The result of moving from “Run to Failure” or reactive maintenance to planned PM and scheduled repairs is significant to the maintenance repair budget. Emergency repairs typically take labor, time and equipment. Overtime costs are often involved.

Routine inspections, scheduled maintenance and accurate recordkeeping can help reduce costs and increase equipment reliability and lifespan. Table 1 below shows the four different maintenance approaches used in the water / wastewater industry.

Reactive Maintenance	Fix it when it breaks	High repair budget
Preventive Maintenance	Scheduled Maintenance	Planned Component Replacement
Predictive Maintenance	Condition Based Monitoring	Maintenance based on condition of equipment
Proactive Maintenance	Source failure detection	Monitor and correct failure and root causes

Table 1. Maintenance Categories

INSPECTION FORMS / CHECKLISTS / DOCUMENTATION:

It is understood that each Agency has different types of facilities and equipment. Each comes with their own set of operating procedures, inspection guidelines and specific needs. The following is an outline of the minimum inspections that should to be preformed and documented by a Member Agency. Samples of policies, forms and checklists used by other JPIA Agencies are attached for review.

Sample Lift Station Inspection Schedule

Daily / Weekly

1. Visually inspect the station for vandalism.
2. Clean up any trash or debris material.
3. Record pump hours for each pump.
4. Run each pump by hand / manual control and watch level control go up and down to ensure pumps are operating properly.
5. Wash down wet well.
6. Place pump controls back in auto position prior to leaving station.
7. Visually inspect emergency generator for fuel and ability to operate properly.
8. Test all panel lights and change as needed to ensure proper operation.
9. Lock up station, including exterior power panels if required, prior to leaving.
10. Complete all required paper work.

Standard Operating Guideline – Lift Station Inspection

Monthly

1. Open up wet well and visually inspect the pumping of each pump.
2. Completely pump down the wet well to its lowest point and make a visual inspection.
3. Hose the wet well down during the pump down process.

4. Inspect wet well for excessive grease build up on surface, clean when needed.
5. Check wet well floats for rag build up, clean as needed.
6. Pumps and piping are checked visually for defects.
7. Power back up generator needs to be checked, and started (fuel level, battery and general condition).
8. Turn in operations log sheets at end of the month.

Quarterly

1. Clean grit and grease from the wet well using a vac-con truck.
2. Generator is to be operated, under load, for 15 minutes. This test is to be conducted by tripping power to the station and observing a successful transfer to generator power. Emergency generators are to be operated per manufacturer's requirements and in compliance with any City, County, or State agency operating permit.

Other Duties

1. Assist maintenance staff as needed for repair work requirements.
2. Respond to all lift station alarms.
3. Maintain all required lift station field logs.
4. Report all problems with the lift station to the operations supervisor.
5. Record all problems or observations at the lift station in the lift station journal.

Standard Operating Guideline – Lift Station Inspection

Sample Lift Station Inspection Log

Pump Rating (gpm):

Date of most recent pump calibration:

Date	Time	Meter Reading 1	Meter Reading 2	General Appearance	Initials

Operator Notes:

Standard Operating Guideline – Lift Station Inspection

Sample Documents:

Sample Lift Station Inspection Log

Lift Station, Daily/Weekly Maintenance Checklist

JPIA Confined Space Entry Permit

South Coast Water District Lift Station, Daily/Weekly Maintenance Procedures

South Coast Water District Lift Station, Monthly Maintenance Procedures

South Coast Water District Lift Station, Quarterly Maintenance Procedures

South Coast Water District Lift Station, Semi-Annual Maintenance Procedures

South Coast Water District Lift Station, Annual Maintenance Procedures

Western MWD-Site Specific-Lift Station SOPS

Wastewater Operations and Spill Control Self-Audit Checklist