



# Western Municipal Water District Standard Operating Procedures



## Site Specific Sewage Lift Station

Address

APPROVED:

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Operations Supervisor

\_\_\_\_\_  
Date

\_\_\_\_\_  
Wastewater Operations Manager

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Date

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Annual Reviewer				
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## Sewage Lift Station Purpose

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 and serves the community in safely conveying raw sewage to a wastewater treatment facility.

## Sewage Lift Station Health and Safety

Safety/survival is directly related to your level of professionalism which in turn is directly related to knowledge and ultimately certification. This is supported in a Water Environment Federation (WEF) safety survey report that states:

- 43% of all disabling injuries occurred to employees with 0-5 years of wastewater experience
- 73% of the injured had 0-10 years' of experience
- 71% of all injuries were attributed to uncertified employees

It is imperative that collection system employees conduct all day-to-day activities safety through a combination of awareness and professionalism.

Multiple hazards exist in the performance of the collection system operator'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
- Poisonous or Toxic Gases
- Strains or Ruptures
- Traffic Mishaps
- Bites (insects, bugs, rodents, snakes)

- Excavations and Trench Shoring
- Drowning
- Fire
- Electrical Shock
- Noise

Employees are required to follow the WMWD Administrative Policy SAF-04-A, 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 Organization (CalOSHA), and the District's Board of Directors.

## Driving Directions from Operations Center

## Lift Station General Information

The station contains two submersible 20 hp non-clog pumps that normally operate in automatic control based on the wet well level reading from an ultrasonic level control unit. In addition to the ultrasonic level instrumentation, level floats located inside the wet well serve as backup level monitoring in the event that the ultrasonic level control equipment fails. The ultrasonic level control unit is located in the MCC panel. Each submersible non-clog pump control is also located in the MCC panel of the Spring Canyon lift station control.

## Lift Station Operator Inspections

### **Daily**

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 in hand and watch Miltonic's 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. Test all panel lights and change as needed to ensure proper operation.

8. Lock up station, including exterior power panels if required, prior to leaving.
9. Complete all required paper work.

### **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 vactor truck.
2. Generator is to be operated, under load, for 30 minutes. This test is to be conducted by tripping power to the station and observing a successful transfer to generator power.

### **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.

## **Lift Station Operating Strategy**

When in automatic control at the MCC panel as well as in automatic at the SCADA screen, the pumps will start automatically at a preset wet well level of 4.5' for the lead pump and 8.0' for the lag pump. The lead/lag button can only be selected at the MCC panel. The lead and lag pumps will both stop at 2.15'. These start and stop settings can be changed at the SCADA screen. As a

backup to the ultrasonic level control, floats have been provided that will activate as a backup control system.

- High-High wet well level float is set at 8.0' and overrides ultrasonic level control and starts both pumps. Pumps will remain running until the Low-Low level float is reached.
- High wet well level is set at 8.0' for ultrasonic level alarm only.
- Low wet well level is set at 2.15' for ultrasonic level alarm only.
- Low-Low wet well level float is set at 2.15' and overrides ultrasonic level control and stops both pumps.

The ultrasonic level control will be overridden at a high-high level of 8.0' with both pumps in operation and will not stop until the low-low level of 2.15' has been reached in the wet well. The ultrasonic level control will be re-activated once the wet well rises above the low level of 3.75'.

## Equipment Operating Procedures

### Pump Controls at the MCC Panel

- Hand-off-auto switch, normally in auto.
- Controls pump in automatic operation or turns pump on manually in hand.
- Pump thermal overload red alarm status light.
- Pump seal failure red alarm status light.
- Pump running green status light.
- Pump thermal overload reset button.
- Pump mechanical overload reset button.
- Pump hour meter.



## Pump Controls on MCC panel

### Instrumentation Controls at MCC Panel.

- Wet well level indication in feet.
- Wet well level backup level control in operation red status light indicates wet well controlled by level floats.
- Wet well high level, set at 8.00'.
- Wet well high float level set at 8.00'.
- Wet well low level, set at 2.15'.
- Wet well low level float set at 3.5'.
- Wet well level alarm reset button for both low and high level.



**Milltronics Instrumentation on MCC Panel**



**Alarm Status Lights and reset buttons on MCC Panel**

### **SCADA Screen Controls**

- Power on at MCC green status light.
- HOA green status light.
- Pump ready green status light.
- Soft start ready green status light.
- Pump in lead green status light.
- Pump in lag yellow status light.
- Pump off-hand-auto button. Allows operator the option to start pumps manually from the SCADA screen or allow for automatic operation based on wet well level. Normally in the auto position.
- Pump call light, indicates pump being called into operation.
- Pump output light PLC telling pump to come on based on level.
- Pump stopped status light.
- Pump motor fault overload red alarm light.
- Pump soft start fail red alarm light.
- Pump seal failure red alarm light.
- Wet well level indication in feet.
- Wet well flow indication.

**Green Status Lights** - *Green status lights indicate the following status or problems:*

- PLC status alarm.
- Communication to PLC alarm.
- Station power off (electrical power).
- ATS (automatic transfer switch for emergency generator) emergency indicates loss of power and ATS switch for has engaged to call the emergency generator to start.
- Generator run.
- Generator fault, generator in fault condition and has not started.
- Wet well high level.

## **Generator/Transfer Switch**

**Transfer Switch** The emergency generator transfer switch normally should not require any attention. **It should be noted that when exercising the generator, the generator should be started at the emergency generator rather using the test button located at the transfer switch. The automatic transfer switch should be checked every 3 months with the test button.** Upon the automatic start up of the generator, the transfer switch has been set up to allow for a five minute generator “cool down” period and a five minute power “re-transfer period for a total of 10 minutes of generator operation.

### Transfer Switch Instrumentation

- Test hold button – will start the generator automatically
- Test hold button – will stop the generator automatically after the “cool down and retransfer” 10 minute period.
- Override button – will override re-transfer period.
- Source available LED lights indicate normal situation.
- Source connected LED light when emergency generator is on and load is transferred to generator power.



**Generator transfer switch**

**Emergency Generator Introduction** The emergency generator should be exercised on a monthly basis for 10 minutes or until the generator reaches operating temperature. The generator should be run using the selector switch and turning it to the start/on position. The battery water level should be checked once per month as well as the fuel level. Annual service should be done once per year or every 250 hours of operation. Battery charger normal DC volts should be around 25 volts

### **Instrumentation at Generator Control Panel**

- Run – stop – remote switch/button.
- Run status light.
- Remote start status light.
- Not in auto start status light.
- Low oil pressure warning light.
- High engine temperature warning light.
- Low oil pressure shutdown status light.
- Overspeed shutdown light.
- Fail to start status light.
- Hour meter, engine r.p.m., engine temperature, output voltage, battery status, all located on digital display and could be accessed using the arrow keys.



**Generator Control panel**



**Emergency generator**

## Lift Station System Failure

### Power is available

1. Check the electrical meter and determine if the meter is turning to ensure power is going to the station
2. Check electrical panel to ensure main switch is engaged and system is In auto mode of operation
3. Push in the test lamp to check for power
4. Confirm the pump is operational by the miltronics operation and hearing pumps running.
5. Check the wet well to ensure the level is moving
6. Observe the pump check valve to determine if it is opening normally

### No power is Available

1. Start generator power system if available
2. If no on site power generator is available, determine how long the wet well can hold sewage
3. Notify supervisor of situation
4. Get portable power on site or arrange pumping of wet well to ensure no spill of sewage.

## Spill Overview

All Western employees are responsible for minimizing the affects of any spill. WMWD Sanitary Sewer Overflow Emergency Response Plan is to be followed in the event of any SSO involving any amount of raw sewage. The following steps provide guidance's for either the first responder or the spill response supervisor in the event of a lift station spill. These steps are: Containment, Sampling, Recovery and Cleanup, Spill Site Posting and Notification.

### **Containment**

The following methods can be used to mitigate sewage or chemical spills.

1. Dikes can be constructed of dirt, sand bags or pump hoses. The purpose of using dikes is to prevent the spill from entering either a storm drain or surface waters. The diverted spill can be directed to either a down stream manhole for a sewage spill or to a natural spill containment area such as a low spot in a field, parking lot, or roadway where the spilled material can be collected and later vacuumed up.
2. Blocking off the entrances is a quick and effective method to protect storm drain channels, catch basins or surface waters. Dirt, sandbags or pump hoses can be used to block of these entrances. Refer to Appendix D for examples on using plastic and sand bags to prevent a spill from reaching a catch basin.

### **Control Methods**

These methods utilize Vector Trucks or bypass pumping to divert the flow to a downstream manhole. WMWD has at its disposal two vacuum Vector Trucks and an emergency spill response trailer equipped with one gas driven portable trash pump capable of pumping 600 GPM at 25' of lift. The pump is equipped with 1000' of 4" discharge hose. In addition to this, the MWRf has one portable gas driven 1400 GPM pump with 600' of 6" hose.

### **Recovery and Cleanup**

Once the source of the sewer spill has been stopped, (line unblocked or sewer/chemical line repaired), all efforts must be made to recover as much of the spilled contents as possible. The material can be recovered by using Western's Vector Trucks or spill response pumps. The sewer spill may be returned back to a sewer manhole or discarded at the MWRf.

If the material spilled is a chemical, consult the respective MSDS sheet for the proper recovery and cleanup needed. Diesel fuel spills should be contained and absorbed with commercial absorbent or sand with fuel. The sand and/or

absorbent should then be placed in containers for proper disposal. In the event that the chemical spill is too large for Western employees to handle, the Spill Response Supervisor will consult Westerns' hazardous material vendor, Advanced Environmental Services in Appendix C, for the proper way of dealing with the spill.

The area of the spill will need to be cleaned up as well. For sewer spills, lime or sodium hypochlorite may be used as disinfectants as long as there is minimal chance of contact with people and if the spill has no chance of reaching a storm drain channel or body of water. Lime can be applied with shovels and raked into the soil. Sodium hypochlorite may be applied by using a small hand held sprayer. If chemical disinfection cannot be used, the area may be cleaned up by using water from a near by fire hydrant or Western's water truck. Again, this water must be vacuumed up and returned to either a sewer manhole or the MWRF. Small spills may be cleaned up by using spill absorbent socks or sand. This material must be removed and discarded into the MWRF grit disposal bin.

### **Spill Site Posting**

In the event that the spill will need several days to cleanup, the Spill Response Supervisor or the Operations Superintendent will delineate the area to be posted with barricades and caution tape. The spill area should also be posted to protect public health. This will be under the direction of the Operations Superintendent. It should be noted that all effort must be made to have the area cleaned up before the chance of a rain event.

### **Spill Overview Site Map**