

Collection System Operator Need-to-Know

Collection System

- Types of sewer systems
 - Combined
 - Sanitary
 - Storm
- Components
 - Backflow prevention devices
 - Branch sewers
 - Building sewers (laterals)
 - Catch basins
 - Cleanouts
 - Cross-connections
 - Diversion structures
 - Force mains
 - Gravity sewers
 - Interceptors
 - Inverted siphons
 - Lift stations
 - Main sewers
 - Manholes
 - Measuring and control systems
 - Outfalls
 - Pipes
 - Types
 - Joints
 - Roughness coefficient
 - Pressure sewers
 - Service laterals
 - Trunk sewers
 - Vacuum sewers
 - Valves
- Flow measuring devices
- Flow monitoring and control
- Velocity in sewer
 - Minimum
 - Optimal
- Infiltration
- Inflow
- Exfiltration
- Odor control
- Grease problems
 - Causes of
 - Prevention of
- Septic conditions
 - Causes

Collection System Operator Need-to-Know

- Indicators of
- Problems caused by
- Stoppage removal
- Root removal
- Cleaning the collection system:
 - Bucket machine
 - Rodding machine
 - Sewer jet machine
 - Pig
 - Hydraulic cleaning methods
- Collection system inspection
 - Dye testing
 - Mandrel testing
 - Physical inspection
 - Pressure testing
 - Smoke testing
 - Televising
 - Video inspection
 - Vacuum testing
- Rehabilitation and repair:
 - Manholes
 - Lift station fittings and piping
 - Sewer lines
 - Sewer taps
 - Trenchless technology
 - Pipe bursting
 - Slip lining
 - Cured in place

Equipment Operation, Maintenance, and Troubleshooting

- Atmospheric testing equipment
- Blowers
- Bucket machine
- Cathodic protection devices
- Chemical feeders
- Chlorinators
- Engines
- Excavating equipment
- Flow monitoring equipment
- Generators
- Heavy equipment
- Inspection equipment
- Motors
- Pumps
- Rodding machine

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Collection System Operator Need-to-Know

- Screening equipment
- Sewer jet machine
- Tapping equipment
- Valves
- Evaluate equipment operation
 - Inspect equipment for abnormal conditions
 - Read charts
 - Read meters
 - Read pressure gauges

Pumps and Motors

- Types of pumps
- Pump components
- Proper maintenance of pumps and motors
- Proper start-up procedures
- Factors that influence type of pump to use
- Types and correct locations of pressure gauges
- Maintenance records
- Improper operation
- Cavitation
- Head
 - Dynamic
 - Pressure
 - Static
 - Minor losses
 - Net positive suction head

Lift Station Maintenance

- Electrical
 - Fuses
 - Generators
 - Motors
 - Relays
 - Starters
- Electronic
 - Alarms
 - Controllers
 - Gas detection
 - Level detection system
 - RTU (Remote transmitting unit)
 - SCADA (Supervisory Control and Data Acquisition)
- Mechanical
 - Blowers
 - Compressors
 - Engines

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- Generators
- Piping
- Pressure relief valves
- Pretreatment
- Pumps
- Screens
- Valves
- Wet wells

Chemicals

- Chemical Safety
- Chlorine
- HTH
- pH
- Acids
- Bases/Alkaline chemicals

Management

- Administer programs
 - Fats, oil and grease (FOG)
 - Compliance
 - Emergency preparedness
 - Safety
 - Sewer spill procedures and reporting
- Conduct design reviews
- Develop a budget
- Develop operation and maintenance plan
- Plan and organize work activities
- Record and evaluate data
- Respond to complaints
- Write regulatory authority reports
- Public Relations

Safety

- Characteristics of wastewater
- Personal protective equipment
 - Gloves
 - Glasses
 - Goggles
 - Respirator
- Unsafe atmospheric conditions
- Dangerous gases
 - Hydrogen sulfide

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- Causes
- Characteristics
- Methane
 - Causes
 - Characteristics
- Proper trenching and shoring procedures
- Excavation safety
- Confined space entry (permit-required and non permit-required)
- Manhole safety
- Material Safety Data Sheets
- Location of underground utilities
- Chlorine safety
- Traffic safety
- Electrical safety including overhead power lines
- Lock-out/tag-out
- First aid
- Use of Self Contained Breathing Apparatus (SCBA)
- Fire extinguishers
- Proper storage of chemicals, including lubricants and fuels
- Work zone traffic safety

Mathematics

- Area
- Volume
- Velocity and flow
- Chlorine dosage rates
- Flow conversions
- Gallons to pound conversion
- PSI
- Chemical dosage formula

Definitions

- Aerobic
- Anaerobic
- Coliform bacteria
- Cross-connection
- Domestic wastewater
- Electrical terms
 - Amp
 - Ohm
 - Volt
 - Watt
- Grab sample

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Collection System Operator Need-to-Know

- Indicator organism
- Pathogen
- Sanitary wastewater
- Slope
- Velocity
- Water hammer