Grade 1 Collection Systems Operator
Need-To-Know Criteria (Subject Areas)

The following list of categories suggests topics of information which are important to know in order to be a successful and proficient Grade 1 Collection Systems Operator. The list may not be all inclusive, and knowledge of additional topics may be of benefit to the operator.

Category of Information: Process

Gravity Sewers
- Describe
- Operation/maintenance
- Design/Construction

Pressure Sewers
- Describe
- Operation/maintenance
- Design/Construction

Vacuum Systems
- Describe
- Operation/maintenance
- Design/Construction

Sewer Equipment
- Application
- Maintenance
- Use/Procedure

Aeration
- Purpose
- Describe types

Chemical Additives
- Purpose
- Methods
- Equipment

Chlorination
- Purpose
- Methods
- Equipment

Corrosion Control
- Describe
- Methods

Infiltration/Inflow Devices
- Describe
- Methods of inspection and testing
- Concept of sewer rehabilitation

Lift Stations
- Operation/maintenance
- Design/Construction

Flow/Velocity Measurement
- Describe
- Purpose
- Flow regulators

Manholes
- Describe
- Purpose
- Design/Construction

Cross-Connection
- Definition
- Types of devices

Category of Information: Support Systems/Equipment

Motors
- Single phase
- Poly phase
- Variable speed

Drives
- Coupled
- Direct (Shaft; Gear)
- Speed Reducer (Fixed; Variable)
- Right angle

Blowers and Compressors
- Centrifugal
- Positive displacement (Rotary; Piston)

Generators – AC & DC

Engines – Gasoline, Diesel & Gas

Hydrants (Basic)

Pumps
- Air Lift
- Centrifugal
- Positive displacement
    - Piston plunger
    - Progressive cavity
    - Diaphragm
- Screw
- Turbine
- Metering
- Ejector

Joints
- Flanged
- Compression
- Dresser
- Victualic
- Fused
- Threaded

Category of Information: Support Systems/Equipment (continued)

Valves
- Ball
- Check
- Globe
- Gate
- Plug
- Petcock
- Pressure control
- Vacuum relief
- Mud
- Butterfly
- Multiport
- Telescoping
- Sluice Gate
- Air release
- Foot
- Altitude

Pipes
- Types
- Cleaning/maintenance
- Sewer rehabilitation

Fittings
- Coupling
- Union
- Plug/Caps
- Corporation (Ferrell; Cock)
- Curb Stop
- Special

Odor Control
- Biofilters
- Chemical Additives
- Scrubbers

Rolling Stock
- Service vehicles
- Fork lifts
- Trucks
- Tractors
- Trailers
- Lawn Mowers
- Loaders
- Portable pumps
- Generators

Chemical Feeders
- Solids
- Liquids
- Slurry

Measuring and Control
- Signal generators
  - Kennison nozzle
  - Magnetic flowmeter
  - Parshall flume
  - Proportional weir
  - Rectangular weir
  - Venturi
  - Propeller meter
  - Ultrasonic
  - Pitot tube
- Signal transmitters
  - Electric
  - Pneumatic
  - Hydraulic
  - Mechanical
  - Telemetry
- Signal receivers
  - Counters
  - Indicators
  - Log Scale Indicators
  - Totalizers
  - Recorders
  - Combination recorders
- Meters
  - Hydraulic – Rotameters
  - Electrical – Amp
  - Electrical – Watt
  - Electrical – Watt Hour
  - Electrical – Multi
  - Electrical – Multi – VOM
  - Electrical – Megger
  - Mechanical – RPM
- Alarms
- Controls
  - Pneumatic
  - Float
  - Hydraulic
  - Electrical
  - Telemetry
  - Timers

Transformers
- Step down
- Step up

Safety Equipment
- Personal protection gear
- Traffic control (Warning devices; Barricades)
- Hazard detection
- First Aid/Hygiene

Category of Information: Laboratory

Materials testing
- Concrete
- Piping

Category of Information: General Information/Knowledge

Units of expression
- Define units
- Convert units

Sources and characteristics
- Characterizing sources
- Quality/quantity
- Identify characteristics
- Describe effects

Electrical
- Basic concepts
- Math calculations

Hydraulics
- Basic concepts
- Math calculations

Maps/plans
- Interpretation and use
- Describe types

Grade 2 Collection Systems Operator
Need-To-Know Criteria (Subject Areas)

The following list of categories suggests topics of information which are important to know in order to be a successful and proficient Grade 1 Collection Systems Operator. The list may not be all inclusive, and knowledge of additional topics may be of benefit to the operator.

Category of Information: Process

Gravity Sewers
- Describe
- Operation/maintenance
- Design/Construction

Pressure Sewers
- Describe
- Operation/maintenance
- Design/Construction

Vacuum Systems
- Describe
- Operation/maintenance
- Design/Construction

Sewer Equipment
- Application
- Maintenance
- Use/Procedure

Aeration
- Purpose
- Describe types

Chemical Additives
- Purpose
- Methods
- Equipment

Chlorination
- Purpose
- Methods
- Equipment

Corrosion Control
- Describe
- Methods

Infiltration/Inflow Devices
- Describe
- Methods of inspection and testing
- Concept of sewer rehabilitation

Lift Stations
- Operation/maintenance
- Design/Construction

Flow/Velocity Measurement
- Describe
- Purpose
- Flow regulators

Manholes
- Describe
- Purpose
- Design/Construction

Cross-Connection
- Definition
- Types of devices

Category of Information: Support Systems/Equipment

Motors
- Single phase
- Poly phase
- Variable speed

Drives
- Coupled
- Direct (Shaft; Gear)
- Speed Reducer (Fixed; Variable)
- Right angle

Blowers and Compressors
- Centrifugal
- Positive displacement (Rotary; Piston)

Generators – AC & DC

Engines – Gasoline, Diesel & Gas

Hydrants (Basic)

Pumps
- Air Lift
- Centrifugal
- Positive displacement
    - Piston plunger
    - Progressive cavity
    - Diaphragm
- Screw
- Turbine
- Metering
- Ejector

Joints
- Flanged
- Compression
- Dresser
- Victualic
- Fused
- Threaded

Category of Information: Support Systems/Equipment (continued)

Valves
- Ball
- Check
- Globe
- Gate
- Plug
- Petcock
- Pressure control
- Vacuum relief
- Mud
- Butterfly
- Multiport
- Telescoping
- Sluice Gate
- Air release
- Foot
- Altitude

Pipes
- Types
- Cleaning/maintenance
- Sewer rehabilitation

Fittings
- Coupling
- Union
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- Corporation (Ferrell; Cock)
- Curb Stop
- Special

Odor Control
- Biofilters
- Chemical Additives
- Scrubbers

Rolling Stock
- Service vehicles
- Fork lifts
- Trucks
- Tractors
- Trailers
- Lawn Mowers
- Loaders
- Portable pumps
- Generators

Chemical Feeders
- Solids
- Liquids
- Slurry

Measuring and Control
- Signal generators
  - Kennison nozzle
  - Magnetic flowmeter
  - Parshall flume
  - Proportional weir
  - Rectangular weir
  - Venturi
  - Propeller meter
  - Ultrasonic
  - Pitot tube
- Signal transmitters
  - Electric
  - Pneumatic
  - Hydraulic
  - Mechanical
  - Telemetry
- Signal receivers
  - Counters
  - Indicators
  - Log Scale Indicators
  - Totalizers
  - Recorders
  - Combination recorders
- Meters
  - Hydraulic – Rotameters
  - Electrical – Amp
  - Electrical – Watt
  - Electrical – Watt Hour
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  - Electrical – Megger
  - Mechanical – RPM
- Alarms
- Controls
  - Pneumatic
  - Float
  - Hydraulic
  - Electrical
  - Telemetry
  - Timers

Transformers
- Step down
- Step up

Safety Equipment
- Personal protection gear
- Traffic control (Warning devices; Barricades)
- Hazard detection
- First Aid/Hygiene

Category of Information: Laboratory

Materials testing
- Concrete
- Piping

Category of Information: General Information/Knowledge

Units of expression
- Define units
- Convert units

Sources and characteristics
- Characterizing sources
- Quality/quantity
- Identify characteristics
- Describe effects

Electrical
- Basic concepts
- Math calculations

Hydraulics
- Basic concepts
- Math calculations

Maps/plans
- Interpretation and use
- Describe types