

TENNESSEE OPERATOR NEED-TO-KNOW

Need-to-Know can be simply defined as that knowledge that an operator or those desiring to be operators must possess to be prepared for the duties and challenges he will face as an operator. This Need-to-Know document was developed to provide those individuals with a listing of subject matter and understanding areas for each operator classification of water treatment, distribution systems, wastewater treatment and collection systems available in Tennessee. A person having a mastery of the eleven understanding areas in each subject matter area should possess the knowledge and be qualified to operate the plant or system in the particular field of study or endeavor.

The following are eleven UNDERSTANDING AREAS and a brief description. Each understanding areas should be applied to each SUBJECT AREA (on the following pages) and if applicable, the person, should strive to develop his knowledge and skills in the areas needed.

Understanding areas

- PROCESS** Addresses the biological, chemical and mechanical actions, which may be occurring in any of the subject areas. It certainly includes all the many biological and chemical actions but it may also include how a piece of machinery or equipment works.
- OPERATION** Addresses activities in which an operator has the ability to exercise judgment and take action to affect the processes. Included within this definition is plant design and plant construction.
- MAINTENANCE** Includes both routine and emergency maintenance. Included within this definition is troubleshooting and other problem identification activities.
- GENERAL** Includes any basic knowledge questions which address the subject in a broad nature. (e.g. What is the purpose of pretreatment?)
- PROCEDURE** Is primarily designed for lab questions but can be used whenever an industry-recognized procedure for accomplishing a task is identified. (e.g. testing reduced pressure backflow preventers)
- DATA INTERPRETATION** Is used for questions where data is received, analyzed and acted upon
- PUBLIC HEALTH** Includes any questions relating to the subject's impact on public health. (e.g. Which of the following diseases is transmitted by inadequately treated water?). It includes laws, rules and regulations, quality control and compliance.
- MATH** Includes any applicable math activity associated with the subject area. It includes basic operations, square/cubes, fractions/percents, graphs, tables, formulas, conversion, etc.
- SCIENCE** Includes any basic science, biology, chemistry and microbiology concept or principle which relates to the subject.
- SAFETY** Includes any recommended or required safety practices as well a the "common sense" practices (e.g. What does the beeping sound on the tow motor mean?). It includes identification and description of categories, procedures and violations.
- RULES** Includes any applicable state or federal rule or reporting which addresses the subject.

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Distribution I

Distribution II

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

The following list of categories suggests topics of information that are important to know in order to be a successful and proficient Grade 2 Distribution Systems Operator. The list may not be all-inclusive, and knowledge of additional topics may be of benefit.

Category of Information: Processes

Conveyance

- Piping
- Valves
- Hydrants
 - Parts
 - Flushing
- Service Connections

Pressure Control

- Booster Pumps
- Regulators & Gauges

Storage

- Ground Tanks
- Elevated Tanks
- Standpipes
- Hydropneumatic Pressure Tanks

Metering

- Displacement
- Velocity
- Differential Pressure

Leak Detection and Repair

- Sonic Devices
- Pressure Devices
- Volume
- Visual

Disinfection

- Tanks
- Lines

Cross Connections

- Air Gap
- Reduced Pressure Principle Assembly
- Double Check Valve Assembly
- Vacuum Breakers
- Backflow
- Backpressure
- Backsiphonage
- Cross Connection

Category of Information: Support Systems

Motors

- Single-Phase
- Three-Phase
- Variable Speed

Drives

- Coupled
- Direct

Pumps

- Centrifugal
- Positive Displacement (Piston Plunger; Diaphragm)
- Turbine
- Metering

Generators

- AC

Pipes

- Ductile Iron
- PVC
- Asbestos Cement

Joints

- Flanged
- Compression/Dresser
- Gas
- Threaded

Valves

- Ball
- Check
- Globe
- Gate
- Pressure Control
- Vacuum Relief
- Butterfly
- Air Release
- Foot (on pump at intake)
- Altitude

Fittings

- Coupling
- Union
- Plug/Caps
- Corporation
- Curb Stop

Category of Information: Support Systems (continued)

Measuring and Control

- Signal Generators
 - Magnetic Flowmeter
 - Venturi
 - Propeller Meter
 - Ultrasonic
 - Pitot tube
- Signal Transmitters
 - Electric
 - Pneumatic
 - Mechanical
 - Telemetry
- Signal Receivers
 - Counters
 - Indicators
 - Totalizers
 - Recorder
- Meters
 - Electrical – Amp
 - Electrical – Watt
 - Electrical - Multi – VOM
 - Electrical - Multi – MA
- Alarms
- Controls
 - Pneumatic
 - Float
 - Hydraulic
 - Electrical
 - Telemetry
 - Timers

Cathodic Protection Devices

- Anode Rod/Bags
- Cathode Rod/Bags
- Rectifiers
- Galvanic Corrosion
- Dissimilar Metals

Chemical Feeders

- Booster Chlorinator
- Hypochlorinators
- Gas

Rolling Stock

- Service Vehicles
- Trucks
- Lawn Mowers
- Loaders
- Portable Pumps
- Generators

Safety

- Personal Protection Gear
- Traffic Control (Warning Devices; Barricades)
- Hazard Detection
- First Aid/Hygiene
- Confined Space

Security

- Attack
 - Prevention
 - Detection
 - Recovery

Category of Information: Lab Tests

Lab Tests

- Disinfectant residual
- Disinfectant demand
- Total Coliform
- Orthophosphate
- pH
- Temperature
- Sample Collection
- THM
- HAA5
- Lead and Copper

Category of Information: General Information

Units of Expression

- Definition
- Conversion

Electrical Concepts (Basic)

Hydraulic Concepts (Basic)

Sources and Characteristics

- Quality/quantity

Maps/Plans

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

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- Displacement
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