

# ***OPERATOR NEED-TO-KNOW***

# **WASTEWATER COLLECTION**

# **CLASS 1**

## **SKILL LEVEL REQUIREMENTS**

- A. Know the sources and characteristics of sewage.
- B. Know the sanitary aspects of sewage such as disease, transmission, and pollutant effects.
- C. Know the types of pumps use in sewage pumping, advantages and disadvantages.
- D. Know the safety aspects of working around sewage, collection systems and treatment plants.
- E. Know the hydraulics of a collection system.
- F. Know the operation and maintenance of different types of pumps, motors and controls of small systems.
- G. Know the hazards of cross connections and be able to identify and correct those common in sewer systems.
- H. Know the different types of lift stations and advantages or disadvantages of each.
- I. Know the features of a maintenance program for a system of this size.
- J. Know simple Math formulas.
- K. Know the various types of materials, joining methods common in systems of this class.
- L. Know the proper safety procedures for underground repair and maintenance.

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# **WASTEWATER COLLECTION**

# **CLASS 2**

## **SKILL LEVEL REQUIREMENTS**

- A. Know all the skills required in the lower class.
- B. Know the advantages and disadvantages of the various types of pumps.
- C. Know how to determine the capacity of a lift station wet well.
- D. Know various methods of testing sewer lines for leaks.
- E. Know the various methods of cleaning sewer lines.
- F. Know how to determine the carrying capacity of lines.
- G. Know the various types of controls for lift stations in this class.
- H. Know how to read blueprints and system maps.
- I. Know the various types of line rehabilitation.
- J. Know how to prepare budgets and other reports for this size system.
- K. Know math skills appropriate for this level.
- L. Know how to read and interpret pump operating curves.

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# **WASTEWATER COLLECTION**

# **CLASS 3**

## **SKILL LEVEL REQUIREMENTS**

- A. Know all the skills required in lower classes.
- B. Know how hydraulics of a collection system, especially size, slope and flow interrelationship.
- C. Know the maintenance and operational features of pumps motors and controls common to this class.
- D. Know how to check lines for proper line and grade.
- E. Know how to determine I & I flows into sewer system.
- F. Know how to calculate pumping rates from fill or draw downs in wet wells.
- G. Know how to set up a safety program for lift station and collection system personnel.
- H. Know how to prepare budgets and other reports for this size system.
- I. Know the features of a maintenance program for this size system.
- J. Know the methods of identifying and controlling odor problems in the system.
- K. Know the proper methods of dealing with public complaints.
- L. Know math skills appropriate for this level.

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**WASTEWATER COLLECTION**  
**CLASS 4**

**SKILL LEVEL REQUIREMENTS**

- A. Know all skills required in lower classes.
- B. Know how to prepare specifications for retrofit, repair or replacement of sewer lines, lift stations.
- C. Know how to set up a preventative maintenance program for this class system.
- D. Know how to determine proper size of lines, pumps and controls for this class system.
- E. Know how to prepare budgets and other reports for this size system.
- F. Know how to interpret the results of I & I testing.
- G. Know how to read and interpret the results of televised lines.
- H. Know math skills appropriate for this level.

# ***OPERATOR NEED-TO-KNOW***

# **WASTEWATER TREATMENT**

# **CLASS 1**

## **SKILL LEVEL REQUIREMENTS**

- A. Know the characteristics of sewage, its source and expected flows.
- B. Know the health and safety aspects of sewage treatment operations including cross connections.
- C. Know the diseases transmitted by sewage.
- D. Know the general effects of discharging insufficiently treated sewage into a stream.
- E. Know the physical features of an oxidation pond and the purpose of each.
- F. Know the basic physical features of different types of treatment facilities and the purpose of each.
- G. Know the basic maintenance procedures necessary for each type of treatment facility.
- H. Know the reasons for treating sewage.
- I. Know the difference between the various types of treatment to include ponds activated sludge and biofiltration.
- J. Know the basic purpose, operation, control and maintenance of different methods of disinfection and the safety aspects of each.
- K. Know the basic math associated with the class of systems.
- L. Know the basic purpose, operation, control and maintenance of digesters.
- M. Know the basic methods of sludge thickening and disposal, drying beds, sludge lagoons and mechanical methods.
- N. Know basic control tests needed in operation of plants, to include pH, DO, MLSS and Chlorine Residual.
- O. Know why records are kept and what reports should be submitted.
- P. Know the basic mechanical and electrical principles as they relate to plants of this type and size.
- Q. Know the various types of pumps and valves used in treatment works and their maintenance procedures.
- R. Know the purpose and types of aeration uses in ponds.
- S. Know the basic purpose, operation, control and maintenance of the various types of aeration equipment.
- T. Know the basic principles of blowers.
- U. Know the basic purpose, operation and maintenance of grit removal equipment, screens and grinding equipment.
- V. Know the source of grit, and its effects on plant operation.
- W. Know basic electrical principals.

# ***OPERATOR NEED-TO-KNOW***

# **WASTEWATER TREATMENT**

# **CLASS 2**

## **SKILL LEVEL REQUIREMENTS**

- A. Know all the skills required in the lower class.
- B. Know the sampling methods required for each type facility, ponds, activated sludge, biofiltration.
- C. Know how to run D.O., pH, and chlorine residual tests.
- D. Know the design criteria for ponds.
- E. Know the meaning of BOD, TSS, MLSS, MPN results, and the general methods used in these test.
- F. Know how to calculate retention times for various type treatment systems.
- G. Know the relationship of flow, chlorine demand, chlorine residual and be able to calculate them.
- H. Know the community relations aspects of the use of sewage treatment.
- I. Know how aeration equipment works, the merits of each type and maintenance features of each type.
- J. Know the basic principles of electricity and its controls as related to facilities in this class.
- K. Know and be able to identify the various types of activated sludge systems.
- L. Know the effluent requirements of NPDES Permit, federal and state.
- M. Know how to calculate the capacity of various size and shape tanks, impoundments, etc.
- N. Know how to maintain electrical control systems associated with facilities in this class.
- O. Know the math skills for this level.
- P. Know and be able to identify the various types of biofiltration systems.

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# **WASTEWATER TREATMENT**

# **CLASS 3**

## **SKILL LEVEL REQUIREMENTS**

- A. Know the requirements for lower classes.
- B. Know the effects of physical, chemical and biological characteristics on treatment.
- C. Know the indicators for normal and abnormal operation of treatment systems.
- D. Know how to recognize and identify potential safety hazards.
- E. Know emergency procedures for chlorine and sulfur dioxide leaks.
- F. Know basic laboratory test procedures for process control.
- G. Know how to read and interpret blue prints and other technical drawings.
- H. Know how to calculate detention time, sludge volume index, sludge age, mean cell retention time and other formulae used at treatment facilities.
- I. Know how to differentiate and perform periodic, preventive and corrective maintenance.
- J. Know how to conduct public relations briefings.
- K. Know proper reporting methods for permit violations.
- L. Know principles of flow equalization.
- M. Know how to deal with news media.
- N. Know methods of dechlorination and calculate costs of each.
- O. Know and understand various methods of sludge dewatering.
- P. Know the principals of operation of the various innovative methods of wastewater treatment.
- Q. Know the principals of advanced or tertiary wastewater treatment.
- R. Know the various methods of electrical controls for treatment plants.
- S. Know the methods of computer control used at plants, SCADA, etc.
- T. Know how to read and interpret pump curves.
- U. Know the math skills for this level.

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**WASTEWATER TREATMENT**  
**CLASS 4**

**SKILL LEVEL REQUIREMENTS**

- A. Know all the requirements for lower classes.
- B. Know the math skills for this level.
- C. Know advanced odor control.
- D. Know advanced activated sludge.
- E. Know advanced solids handling and disposal.
- F. Know advanced solids removal from secondary effluents.
- G. Know advanced phosphorus removal.
- H. Know advanced nitrogen removal.
- I. Know advanced wastewater reclamation.
- J. Know advanced instrumentation.

***WASTEWATER OPERATOR  
NEED-TO-KNOW***

**TREATMENT  
COLLECTION**

Revised 2001

***WATER OPERATOR  
NEED-TO-KNOW***

**DISTRIBUTION  
PRODUCTION  
TREATMENT**

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