

## **Biological/Natural 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 Biological/Natural Systems Operator. The list may not be all inclusive, and knowledge of additional topics may be of benefit to the operator.

### ***Category of Information: Processes***

#### Collection Systems

- Types
- Inflow, Infiltration, Exfiltration
- Sources of wastewater
- Pre-treatment
- Pump stations

#### Flow

- Measurement
- Flow equalization

#### Screening

- Bar screens (hand-cleaned)
- Bar screens (mechanically cleaned)

#### Grinding

- Grinders
- Comminutors

#### Clarification

- Septic tanks

#### Solids handling

- Land application

#### Disinfection/Use of Chlorine

- Chlorination
- Dechlorination
- UV
- Other methods

#### Lagoons

- Aerobic
- Facultative
- Anaerobic
- Aerated
- Discharging
- Total Containment
- Other BNS

#### Effluent Disposal

- Discharge
- Direct Use
- Irrigation
- Underground Disposal
- NPDES Permit

#### Cross- Connection

- Prevention
- Types of devices

### ***Category of Information: Support Systems***

#### Motors

- Single Phase
- Variable Speed

#### Drives

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

#### Pumps

- Air Lift
- Centrifugal
- Positive Displacement
  - Piston Plunger
  - Progressive Cavity
  - Diaphragm
- Metering
- Ejector

#### Blowers and Compressors

- Centrifugal
- Positive Displacement (Rotary)

#### Generators

- AC
- DC

#### Engines

- Gasoline

#### Joints

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

## **Category of Information: Support Systems (continued)**

### Valves

- Ball
- Check
- Globe
- Gate
- Plug
- Petcock
- Pressure Control
- Vacuum Relief
- Mud
- Butterfly
- Multiport
- Telescoping
- Sluice Gate
- Air Release
- Foot

### Fittings

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

### Chemical Feeders

- Solids
- Liquids
- Evaporators
- Gas
- Slurry

### Measuring/ Control

- Signal Generators
  - Parshall Flume
  - Proportional Weir
  - Rectangular Weir
  - Ultrasonic
- Signal Receivers
  - Totalizers
  - Recorders
- Alarms
- Controls
  - Float
  - Hydraulic
  - Electrical
  - Timers

### Rolling Stock

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

### Safety Equipment

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

## **Category of Information: Lab Tests**

### Routine Tests

- B.O.D.
- Ammonia
- Chlorine Residual
- Coliform (Fecal)
- Dissolved oxygen
- E. coli
- pH

- Phosphorus
- Solids
  - Settleable
  - Suspended
  - Total dissolved
  - Total
  - Volatile

### Control Tests:

- Temperature

### Special Tests:

- Biomonitoring

## ***Category of Information: General Information***

### Units expressions

- Define units
- Convert units

### Sources and Characteristics

- Characterize
- Quality/quantity
- Physical/chemical/biological
- Effects
- Grease control

### Hydraulics (Basic)

### Maps/plans - Interpretation and use

### WWT Processes

- Sketch sequence
- Describe processes
- Explain why treated
- Goals of WWT (protect public; protect environment)