

## **Forwarding Comments**

**From the perspective of developing different grade levels of O&M providers from “low to high expertise,” we offer the following:**

### **O&M SERVICE PROVIDER:**

#### **GRADE 1: (Basic Treatment Systems (Septic System) Operator)**

- Is by definition, a septic system service provider.
- Has a knowledge of septic system operation and gravity drainfields, inspection, and troubleshooting.
- Has a knowledge of anaerobic treatment in the septic tank and aerobic treatment in the drainfield.
- Has a knowledge of what constitutes a confined space entry situation.

#### **GRADE 2: (Advanced Treatment System Operator)**

Can do everything a Grade 1 Operator can do, plus...

- Has the additional knowledge to be considered an advanced treatment system service provider.
- Has a good working knowledge of all treatment processes in the advanced treatment system and soil treatment area.
- Has a working knowledge of all advanced treatment system components.
- Can inspect and troubleshoot advanced treatment system.
- Has a knowledge of what constitutes a confined space entry situation.

#### **GRADE 3: (Supervisor Level)**

- Has expert level knowledge of septic and advanced treatment system.
- Can act in a supervisory capacity over a field crew.
- Can write and file final reports to owner or government agency.
- Has a good working knowledge of terminology, nomenclature, and regulations governing all aspects of the job.
- Has excellent Public Relations skills.
- Has an absolute knowledge of confined space entry procedures and holds an OSHA certification.

These grade levels are footnoted in red as G1, G2 and G3 in the aspect of Need-to-Know in the following outline.

## O&M Service Provider – Need to Know

### I. Understand and Apply Administrative Requirements of the Aquifer Protection Permitting Program & Local Ordinances

- A. General permit operation and maintenance (R18-9-A313.B) G1, G2, G3
- B. Conventional system operation and maintenance (R18-9-E302.D) G1, G2, G3
- C. Advanced treatment operation and maintenance (R18-9-E303-E323, operation sections) G2, G3
- D. Be able to read and interpret permits G3
- E. Be able to distinguish the operational condition of a system G1, G2, G3
- F. Inspection requirements G1, G2, G3
- G. Recordkeeping requirements G3
- H. Annual reporting requirements to ADEQ or delegated authority G3

### II. General O&M

- A. Terminology G1, G2, G3
  - 1. Inspection
  - 2. Operation
  - 3. Maintenance
  - 4. Monitoring
  - 5. Repair/ Upgrade
  - 6. Service
  - 7. Management
- B. System treatment train
  - 1. Identify components
    - a. Conventional G1, G2, G3
    - b. Advanced treatment G2, G3
  - 2. Reading a permit G3
  - 3. Completing an inspection using approved forms G1, G2, G3
- C. Site assessment (see CIDWT Site Assessment Checklist) G1, G2, G3
  - 1. Surface water management
  - 2. Subsurface water management
  - 3. System encroachment
  - 4. System setbacks
  - 5. Vegetation and soils
  - 6. Groundwater monitoring wells (if applicable)
  - 7. Off-property influences

- 8. Evidence of soil treatment area failure

### III. O&M of Piping

- A. Sewer line from house to treatment system **G1, G2, G3**
- B. Cleanouts **G1, G2, G3**
- C. Treatment system piping
  - 1. Conventional **G1**
  - 2. Advanced treatment **G2, G3**
- D. Treatment system to soil treatment area piping
  - 1. Conventional **G1**
  - 2. Advanced treatment **G2, G3**
- E. Soil treatment area piping
  - 1. Conventional **G1**
  - 2. Advanced treatment **G2, G3**
- F. Air-relief valves **G2, G3**
- G. Cleaning and flushing **G2, G3**

### IV. O&M of Septic and Holding Tanks (see CIDWT Form 5.2 Checklist) **G1, G2, G3**

- A. Tank material and construction method
- B. Tank access
- C. Alarms
- D. Pumping recommended
- E. Baffles
  - 1. Inlet/outlet
  - 2. Chamber separation
- F. Effluent screens
- G. Tank structural integrity/condition
- H. Watertightness
- I. Operational condition

### V. O&M of Pump Tanks **G2, G3**

- A. Type
- B. Conditions at the pump tank (odor)
- C. Tank description
- D. Tank access
- E. Current tank operating conditions (liquid levels)
- F. Pump/Siphon access
- G. Discharge assembly
- H. Electrical (components sealed and watertight)
- I. Tank structural condition
- J. Solids accumulation
- K. Baffles

- L. Screens or filters

## **VI. O&M of Pumps, Floats, and Controls G2, G3**

- A. Controls
  - 1. Type
  - 2. Controls operating properly
  - 3. Watertight
  - 4. Alarm test switch
  - 5. Electrical meter readings
  - 6. Telemetry operational
- B. Pump/Siphon
  - 1. Type
  - 2. Siphon operating properly
  - 3. Pump operating properly
  - 4. Amps/voltage measurement
  - 5. Pump turns On/Off
- C. Water level sensor
  - 1. Type
  - 2. Alarm sensor operating audible and visible alarms
- D. Sensor settings
- E. Pump delivery rate
- F. Dose volume
- G. Verify dose frequency and volumes
- H. Wiring safe
- I. Float placement and tie downs
  - 1. Dose volume
- J. Flow measurement
- K. Timer settings
- L. Safety
  - 1. Confined space
  - 2. Hygiene
  - 3. Hazard awareness and control
  - 4. Wiring diagram

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## **VII. O&M of Distribution Systems (Gravity and Pressure)**

- A. Gravity distribution **G1, G2, G3**
  - 1. Identify type
    - a. Method of dosing to the field
      - (1) Gravity-to-gravity
      - (2) Pump-to-gravity
      - (3) Siphon-to-gravity

- b. Method for distribution in the field
  - (1) Above grade
  - (2) Bed
  - (3) Parallel trench
  - (4) Serial trench
  - (5) Sequential trench
- c. Distribution media
  - (1) Gravel
  - (2) Sand
  - (3) Engineered pad
  - (4) Chambers
  - (5) Alternative media
    - (a) Cinders
    - (b) Styrofoam
    - (c) Polystyrene
    - (d)
- 2. Conditions at the drainfield site
  - a. Evaluating odor
  - b. Indications of leaks around or above system
  - c. Evaluation of vegetation
  - d. Access
    - (1) Is entire system on the property
    - (2) Preventing accessibility for maintenance
- 3. Distribution device
  - a. Type
    - (1) Distribution box
    - (2) Drop box
    - (3) Header
  - b. Accessibility
  - c. Provides equal distribution
  - d. Condition of device
    - (1) Free of solids
    - (2) No root intrusion
- 4. Distribution field
  - a. Soil treatment area information
    - (1) Evidence of ponding
    - (2) Evidence of surfacing
    - (3) Distance effluent has traveled
    - (4) Evidence of roots and other obstructions
    - (5) Evidence of rodent or animal damage
  - b. Assessment of condition
- 5. Inspection ports
  - a. Present
  - b. Intact
- 6. Switching valves

- a. Present
- b. Type
- c. Operating properly
- B. Pressurized systems **G2, G3**
  - 1. Type
    - a. Low-pressure
    - b. Drip
    - c. Mound
    - d. Spray
    - e. Septic Tank Effluent Pump (STEP)
    - f. Grinder pump
  - 2. Conditions at the drainfield
    - a. Evaluating odor
    - b. Indications of leaks around/above system
    - c. Evaluating vegetation
    - d. Preventing accessibility for maintenance
  - 3. Supply line
    - a. Freely draining
    - b. Ponding or saturation present
    - c. Air relief valves operating
  - 4. Switching valves
    - a. Presence
    - b. Type
    - c. Operating properly
  - 5. Other components
    - a. Backflow prevention valve
  - 6. Soil treatment area information
    - a. Distal head
      - (1) Operation pressure
    - b. Presence of ponding
    - c. Surfacing effluent
    - d. Lateral ends
      - (1) Intact
      - (2) Protected
      - (3) Accessible
    - e. Evidence of root intrusion
    - f. Evident of other obstructions
    - g. Access
      - (1) Is entire system on the property?
      - (2) Preventing accessibility for maintenance
  - 7. Orifices
    - a. Position
    - b. Condition
      - (1) Solids present

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## VIII. O&M of Mound Systems **G2, G3**

- A. Identify conditions at the mound
  - 1. Odor
    - a. Presence
    - b. Source of odor
  - 2. Indications of leaks around/above the system
  - 3. Identify vegetation
    - a. Appropriate
    - b. Excessive
    - c. Adequately maintained
  - 4. Access
    - a. Is the entire system on the property
    - b. Accessibility for maintenance
- B. Identify distribution method
  - 1. Gravity
  - 2. Pressure
- C. Gravity distribution
  - 1. Identify if drain-down area present (designed for freeze conditions)
  - 2. Note the condition of drain-down area
- D. Pressure distribution
  - 1. Pressure at pump
    - a. Before cleaning
    - b. After cleaning
  - 2. Distal head
    - a. Before cleaning
    - b. After cleaning
  - 3. Method of cleaning laterals
- E. Additional requirements for mounds
  - 1. Mound surface appears to be settling
  - 2. Animal activity at surface
  - 3. Ponding at toe/sides
  - 4. Seepage at toe/side
  - 5. Look down grade for differences in soil surface
    - a. Soil saturation
    - b. Vegetation differences
  - 6. Appropriate mound surface maintenance performed
- F. Inspection ports
  - 1. Inspection ports present
  - 2. Inspection ports intact
  - 3. Note liquid level in inspection port

## IX. O&M of Engineered Pad Systems **G2, G3**

- A. Identify conditions at the drainfield
  - 1. Odor
    - a. Presence
    - b. Source of odor
  - 2. Indications of leaks around/above the system
  - 3. Identify vegetation
    - a. Appropriate
    - b. Excessive
    - c. Adequately maintained
  - 4. Access
    - a. Is the entire system on the property
    - b. Accessibility for maintenance
- B. Identify distribution method
  - 1. Gravity
  - 2. Pressure
- C. Gravity distribution
  - 1. Identify if drain-down area present (designed for freeze conditions)
  - 2. Note the condition of drain-down area
- D. Pressure distribution
  - 1. Pressure at pump
    - a. Before cleaning
    - b. After cleaning
  - 2. Distal head
    - a. Before cleaning
    - b. After cleaning
  - 3. Method of cleaning laterals
- E. Additional requirements for engineered pads
  - 1. Surface appears to be settling
  - 2. Animal activity at surface
  - 3. Ponding at toe/sides, if present
  - 4. Seepage at toe/sides, if present
  - 5. Look down grade for differences in soil surface
    - a. Soil saturation
    - b. Vegetation differences
  - 6. Appropriate surface maintenance performed
- F. Inspection ports
  - 1. Inspection ports present
  - 2. Inspection ports intact
  - 3. Note liquid level in inspection port

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**X. O&M of Bottomless Sand Filter Systems      G2, G3**

- A. Identify conditions at the mound
  - 1. Odor
    - a. Presence



- b. Source of odor
  - 2. Indications of leaks around/above the system
  - 3. Identify vegetation
    - a. Appropriate
    - b. Excessive
    - c. Adequately maintained
  - 4. Access
    - a. Is the entire system on the property
    - b. Accessibility for maintenance
- B. Identify distribution method
  - 1. Gravity
  - 2. Pressure
- C. Gravity distribution
  - 1. Identify if drain-down area present (designed for freeze conditions)
  - 2. Note the condition of drain-down area
- D. Pressure distribution
  - 1. Pressure at pump
    - a. Before cleaning
    - b. After cleaning
  - 2. Distal head
    - a. Before cleaning
    - b. After cleaning
  - 3. Method of cleaning laterals
- E. Additional requirements for mounds
  - 1. Mound surface appears to be settling
  - 2. Animal activity at surface
  - 3. Ponding at toe/sides
  - 4. Seepage at toe/side
  - 5. Look down grade for differences in soil surface
    - a. Soil saturation
    - b. Vegetation differences
  - 6. Appropriate mound surface maintenance performed
- F. Inspection ports
  - 1. Inspection ports present
  - 2. Inspection ports intact
  - 3. Note liquid level in inspection port

## **XI. O&M of Drip Systems G2, G3**

- A. Drip systems
  - 1. System identification
  - 2. General assessment
  - 3. Filters
  - 4. Distribution
    - a. System pressure
  - 5. Air release valves

6. Switching valves
7. Flow calculation

## **XII. O&M of Combination Soil Treatment Systems G2, G3**

### **~~XIII. O&M of Drip systems\*~~**

**Commented [FKL-(1)]:** Why was this section removed?

1. ~~System identification~~
2. ~~General assessment~~
3. ~~Filters~~
4. ~~Distribution~~
  - a. ~~System pressure~~
5. ~~Air release valves~~
6. ~~Switching valves~~
7. ~~Flow calculation~~
8. ~~Switching valves~~ Open return valve and flush drain field lines back to the dosing tank. Return drain valve to original position.
9. Inspect, clean, or replace strainer screens
10. Inspect air relief valves
11. Calculate flow
- 12.

## **XIV. O&M of Alternative Pre-treatment Systems \* G2, G3**

- A. Aerobic Treatment Unit
  1. System identification
  2. General assessment
  3. Air supply
  4. Mixed liquor
  5. Separation
    - a. Settling
    - b. Growth
  6. Return
  7. Effluent quality
- B. Media Filter
  1. System identification
    - a. Textile
    - b. Peat
    - c. Sand
    - d. Other
  2. General assessment
  3. Distribution
    - a. Single pass
    - b. Recirculating

- c. Ponding
- 4. Media replacement
- 5. Effluent quality

C. Constructed Wetland Systems

- 1. System identification
- 2. General assessment
- 3. Water level
- 4. Vegetation
- 5. Effluent quality

D. Disinfection Systems

- 1. System identification
- 2. General assessment
- 3. Disinfection agent

E. Other alternative pretreatment systems we need to consider?

**XV. Monitoring of Systems G2, G3**

- A. Types of monitoring
- B. Necessary tools
  - 1. Monitoring
  - 2. Shipping
- C. Monitoring location
- D. Sampling and reporting requirements
- E. Sample handling
  - 1. COC
  - 2. Lab needs

**XVI. Reporting G3**

- A. Who gets report
- B. Method
- C. Forms

**XVII. Large System Reporting G3**

- A. Frequency
- B. Who gets report
- C. Additional legal requirements
  - 1. Operator licenses
- D. Method
  - 1. Groundwater monitoring
- E. Forms

**XII. Basic Math Requirements**      **G1, G2, G3**

- A. Add, subtract, multiply and divide
  - 1. Slope
  - 2. Unit conversion
    - a. Metric to ~~English~~-Standard
    - b. ~~English unit conversion~~-Standard to Metric
    - c. Fahrenheit/Centigrade
- B. Average
  - 1. Weighted average
- C. Use powers and percentages
- D. Graphing (pump curves), pressure calculation
- E. Basic algebra/geometry
- F. Calculate volumes and flow rates
- G. Calculate chemical dilution
- H. Calculate detention time
- I. Know the logarithmic nature of pH values.

**XIII. How to Be A Service Provider**

- A. Developing a Service Company      **G3**
  - 1. Tools
  - 2. **Methods**
- B. Developing a Service Contract      **G3**
  - 1. Creating a File
- C. **Mfr. Form or Company Form/Report**
- D. Health & Safety Program & Other OSHA requirements

**Commented [FKL-(2)]:** I believe that we could provide a standard form to help folks create a more unified contract.