

Sanitary Survey Requirements for the Groundwater Rule

A Review of Federal and State Regulations Affecting Public Health

The Sanitary Survey

A Sanitary Survey is an on-site review of the water source, facilities, equipment, operation, and maintenance of a public water system to evaluate the adequacy of such source, facilities, equipment, operation, and maintenance for producing and distributing safe drinking water.

DEP Sanitary Survey Objectives

- Conducting sanitary surveys on a routine basis is an important element in preventing contamination of drinking water supplies.
- Sanitary Surveys help water systems protect public health.
- Sanitary surveys are an opportunity to work and communicate with water systems in a preventative mode.
- Under 40 CFR 142.10(b)(2), DEP is required to have “a systematic program for conducting sanitary surveys of public water systems in the State, with priority given to sanitary surveys of public water systems not in compliance with State primary drinking water regulations.”

The Eight Requirements of the Sanitary Survey per GWR

1. Source water
2. Treatment
3. Distribution system
4. Finished water storage
5. Pumps, pump facilities, and controls
6. Monitoring, reporting, and data verification
7. System management and operation
8. Operator compliance with State requirements

DEP Published SS Requirements

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION OFFICIAL SANITARY SURVEY FORMS 401-00000-1 (11/2016)				
SANITARY SURVEY FORMS				
SURVEY FORMS	Adobe Acrobat	Standard Word Version	Automated Word Version	Other Versions?
Small System Sanitary Survey	PDF	Word	Word - Macros	Expendable, 1 Word, Yes/No
Large Groundwater / Surface Water	PDF	Word	*	*
New DCM Transfer Systems	PDF	*	Word - Macros	*
SUPPORTING ADDENDUMS				
Munitions Table Addendum	PDF	Word	*	*
Rule Addendum	PDF	Word	*	*
Treatment Addendum	PDF	Word	*	*
Landfill Source Page	PDF	Word	*	*
RETIRED FORMS				
Survey Report for Community Systems	PDF	*	*	*
Page 3a for Storage & Pump Facilities	PDF	*	*	*
Page 3b for Treatment Details	PDF	*	*	*

1. Source Water EPA Priority Criteria that Affects Public Health

- Source Water Quality
- Source Water Quantity
- Location of Source Facilities
- Capacity of Source Facilities
- Condition of Source Facilities
- Transmission of Source Water

DEP Source Water Deficiency Index

- Wellhead Protection Plan
- Hydraulics and Hydrogeology of source
- Condition of Facilities, rusting, leaks and operating valves
- Transmission of Source

Source Water Evaluation

Significant Deficiencies: well near source of fecal contamination, well in flood zone or well improperly constructed

- Review of Source Water Quality
- Review of Wellhead Protection
- Review of Well Construction
- Review Potential Source of Contaminants
- Review Setback Distances
- Review Source Quantity and Capacity
- Review Well Location
- Site Security and Housekeeping

1.) Review Source Water Quality

- SWAPP Assessment, i.e. susceptibility to hydrogeological and hydrological sources and contaminant source characteristics
- Significant fluctuations in water quality
- Significant fluctuation in water quantity
- Contaminant source water management, i.e. protection from local water quality problems
- Well and intake integrity, i.e. compliance with DEP regulations, well log and well construction,

2.) Review Wellhead Protection

- Obtain Community Involvement
- Collect existing data, i.e. geology, hydrology, locations of underground storage tanks, septic tanks,
- Collect additional data and conduct surveys of the well head area
- Determine what land uses present a threat to groundwater quality
- Analyze the data and hydrogeology
- Test for contaminants
- Set well head protection zones from certain activities
- Obtain public support and implement new well head protection regulations

3.) Review of Well Construction

- Well Pad and Casing 18" above well slab and 12" above 100 yr. floodplain
- Is well cased for full length
- Is casing grouted and sealed
- Is there a screened well casing vent
- Are well head covers and seals intact
- What is the general condition of equipment on-site
- Is sampling tap smooth and pointed downward

4.) Review of Potential Sources of Contamination

Preventing Contamination at the Well Head

#	Observation	Likely Pathway
1	Septic tanks, broken storm or san. pipes, ponds	Through Surface Strata
2	Drainage up-hill	Surface water runoff
3	Well subject to flooding	Surface water transport of contaminants
4	Casing termination	Must be 1' and above 100 yr flood plane; 18" above slab

Preventing Contamination at the Well Head (continued)

#	Observation	Likely Pathway
5	Area around well is wet	Corroded Casing Pipe
6	Possible Abandoned wells in area	Surface water intrusion from contaminated source
7	Sanitary condition unacceptable	Contaminated water intrusion
8	Cracking in Well Slab	Contaminated water intrusion

Preventing Contamination at the Well Head (continued)

#	Observation	Likely Pathway
9	Evidence of Algae or Mold on Slab	Birds and insects attracted by moist conditions
10	Poor Drainage	Surface water intrusion from contaminated source
11	Seal water Draining into well head	Contaminated water entering borehole
12	Well Seal damaged	Contaminated water intrusion

Preventing Contamination at the Well Head (continued)

#	Observation	Likely Pathway
13	Fittings pointing upward	Contaminated Water intrusion into casing
14	Well vent not properly installed	Contaminated Water intrusion into casing
15	Check Valve absent or not working	Contaminated water back-flowing into casing
16	Cavitation or water hammer	Ck. Valve damage & water back-flowing into casing

Preventing Contamination at the Well Head (continued)

#	Observation	Likely Pathway
21	Intermittent Well Operation	Contaminated occurring from long-term biological activity
22	Wet or extreme weather events	Contamination from run-off or from higher pumping levels.

5.) Review of Well Setback Distances

Installation	Setback Requirement
Reclaimed Water	500'
Reclaimed Transmission	100'
On-site Sewage Disposal Systems	200' (> 2000 gpd) 100' (< 2000 gpd)
Sanitary Hazards	100'
Public Access or Res. Irrigation	75'
Unlined Dairy Storage Lagoon	300'
Dairy Waste Land Application	200'

6.) Review Source Quality/Quantity

- Well Capacity and Pumping Records
- Well Drawdowns and reduction in capacity due to droughts
- Effects of wet conditions and/or flooding
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6.) Review Well Location

- Geologic Characteristics
- Slope of Ground Surface
- Nature of Soil and Homogeneousess
- Slope of Water Table (field determined)
- Size of Drainage Area
- Nature and Distance to Pollution Sources
- Methods in-place to Protect Well

8.) Review Site Security and Housekeeping

- Fenced with locking gate
- No storage of materials inside fence
- Water drained away from well
- No vermin or birds
- Wellhead area free of debris
- Is the well protected from vandalism and accidents

2. Treatment

EPA Priority Criteria that Affects Public Health

- Capacity of Treatment Facilities
- Chemicals and Chemical Feed Systems
- Sedimentation/Clarification
- Filtration
- Disinfection
- Waste Streams
- In-Plant CCC Program
- Treatment Plant Schematic and Layout

Treatment Evaluation

Significant Deficiencies: improper application of treatment chemicals, lack or redundant mechanical components, cross connections, and inadequate monitoring

- Review Design Criteria and Plant Schematic
- Review Plant operation and maintenance records and compliance history
- Review past sanitary survey inspections
- Review overall design, operation, maintenance and management of the treatment facility

DEP Treatment Deficiency Index

- Treatment Facilities
 - Treatment Capacity
 - Auxiliary Capacity
 - Condition of Facilities, rusting, leaks and operating valves
 - Transmission of Source
- Treatment Process
 - Chlorine Test Kit
 - Sampling Taps
 - Spare Parts and Standby Equipment
- Hypochlorite Solution
 - Solution Tanks
 - Storage
 - Security

1.) Review of Design Criteria

- Is the capacity of the major treatment processes sufficient to provide demands?
- Is the plant schematic representative of conditions?
- Are there unusual piping arrangements?
- Disinfection is the major source of problems:
 - Is disinfectant properly stored and dosed to the system?
 - Is there a redundant chemical metering pump?
 - Is the point of dosing of disinfectant unusually subject to short-circuiting?
 - Is disinfectant residual being properly dosed and measured at appropriate points?
- Are their recycled waste streams with unusual characteristics, i.e. pH, turbidity flow rates?

2.) Review O&M Records and Equipment Histories

- Disinfection
 - Are dosing lines replaced, injection points being and metering pump being maintained?
 - Is disinfection doses adjusted for changes in chemical or water quality conditions
- Other Facilities
 - Is there a history of maintenance problems with other critical facilities?
 - Are parts on hand for critical repairs?

3.) Review of Past Sanitary Surveys

- Is there a history of treatment component problems?
- Are there deficiencies that were not corrected or adequately corrected?
- Are there violations of State Drinking Water Rules or Ten State Standards?

4.) Review Design, O&M and Management of the Facility

- Is the design adequate for the level of treatment being provided?
- Is there evidence of proper maintenance at the facility?
- Are facilities clean of algae and mold and free of animals, vermin and insects

3. Distribution System Evaluation EPA Priority Criteria that Affects Public Health

- Distribution Field Sampling and Measurement
- Disinfection of Repaired Water Lines
- Disinfection of New Water Lines
- Cross Connection Control Program
- Elimination of Water Loss
- Distribution System Records

Distribution System Evaluation

Significant Deficiencies: Low or negative pressure that could result in contamination, lack of system flushing and unprotected cross connections

- Review WD System Schematics
- Review maintenance of pipes and appurtenances and adherence to construction standards
- Review operating records, maintenance records and operating procedures including
- CCC Program
- Review WD water quality data

1.) Review WD System Schematics

- Are WD Maps available and do they show major line and valve locations, pipe materials, fire hydrants, dead-end lines and pressure zones?
- Are storage facilities, booster stations and pumps shown?
- How often are maps updated?

2.) Review maintenance of pipelines and appurtenances

- Is there a Maintenance Records System in place
- Does it include documentation of repairs, leak detection?
- Are there SOPs in place for repairs of water main breaks?
- Are there adequate repair materials on-hand?
- Are there published construction standards for the system and are they adhered to?
- Are DEP Flushing Requirements adhered to?

Florida Health Dept. Requirements for Water Main Repairs

1	Fecal Contamination (localized/system wide)	Boil Water Notice
2	Zero or Neg. Pressure (system wide)	Boil Water Notice
3	Drop Below 20 psi (system wide)	Boil Water w/ aggravating factors
4	Backflow Type Condition (localized/system wide)	Boil Water if Imminent Threat

Boil Water Conditions: Notify DOH, DEP and Public

Preventing Contamination Problems in a Water Distribution System

1. Ensuring that water is turned over in the water distribution system's pipelines to ensure proper disinfection residual
2. Ensuring that Sediment in dead-end lines is removed
3. Ensuring that water detention times in storage tanks is not too long and causing loss of chlorine residual or producing DBPs.

All of these tasks are accomplished by Flushing

Florida DEP Flushing Requirements

Flushing Program	Suggested Actions/DEP Rule	Benefits to Treatment System
Written Flushing Procedures	Submit a Written Water Main Flushing Program. DEP Rule 62-555.350	Sampling is during normal operating conditions, and is not valid if you ONLY flush the day you are collecting samples
Treatment Components in Contact With Water	Clean & remove biogrowths, calcium or iron / manganese deposits, & sludge. DEP Rule 62-555.350(2)	Improves water quality, reduces chlorine demand & regrowth in the water system.
Reservoirs and Storage Tanks	Clean & remove biogrowths, Ca or Fe / Mn deposits, & sludge from storage tanks. DEP Rule 62-555.350(2) FAC	Improves water quality, reduces chlorine demand & biological regrowth in the water system.
Water Distribution Mains	Begin systematic flushing of water system from treatment plant to system extremities.	Improves water quality, reduces chlorine demand & biological regrowth in the water system.
Dead-End Water Mains	Flushing (every other day) or Automatic Flushing. DEP Rule 62-555.350(2)	Improves water quality, & reduces biological regrowth.

3.) Review Operating Records

- Are customer complaints and investigative reports documented and are complaints linked to distribution problems?
- Are there low pressure complaints and does the system obtain pressures at high and low pressure points?
- Are there patterns of low chlorine residuals
- Are there large fluctuations in chlorine residuals ranges?
- Are there patterns of corrosion, tuberculation or biogrowth problems?

4.) DEP Cross Connection Control Program Requirements

- Appropriate BFP at Service Connections for Level of Hazard
- Policy Re: materials and installation Standards at Connections
- Policy for Testing and Maintenance of Devices
- Policy Regarding Enforcement

4. Finished Water Storage System Evaluation

EPA Priority Criteria that Affects Public Health

- Capacity of Storage Tanks
- Design of Storage Tanks
- Cleaning and Maintenance of Storage Tanks
- Site Security

Finished Water Storage Evaluation

Significant Deficiencies: inadequate internal cleaning, maintenance, improper screening of overflow pipes, drains and vents, failure to make necessary repairs to structure.

- Review Finished Water Storage Components
- Review Storage Operational Records
- Review Integrity of Storage Structure(s)
- Review potential sanitary risks
- Ensure that maintenance checks have been made

DEP Water Storage Deficiency Index

- Types of Storage including improper use of Hydropneumatic Tank for Fire Storage
- Location and Inadequate Capacity of Storage
- Improper Design of Vents and Overflow
- Corrosion resulting from paint deterioration
- Cleaning, Inspection and Maintenance
- Site Security

1.) Review Finished Water Storage Components

- Roof Sloped to prevent standing water
- No leaks in roof
- Lockable access hatch with raised curbs
- Vent on roof facing downward with screen
- Water measurement device
- Overflow at ground with flapper
- Piping that ensures circulation of water
- Drain to remove accumulated sediment
- Access ladder
- Inlet/outlet isolation valves
- Control and monitoring water level system
- Low and high water alarms

Hydropneumatic Tank Components

- Tank is located above ground
- Tank meets ASME standards with nameplate attached
- Access port for periodic inspection
- Pressure relief device with pressure gauge
- Control system for proper air/water ratio
- Site glass to determine water level
- Slow closing valves and time delay pump to prevent water hammer

2.) Review Finished Storage Operational Records

- Ensure periodic flushing of tank
- Perform periodic sanitary checks
- Ensure that tank is protected from corrosion
- Performance of storage tank Cl residual monitoring
- Ensure adequate storage disinfection provided
- Ensure that water is circulating and turnover is adequate
- Ensure that operating personnel are trained

3.) Integrity of Water Storage Structure

- Check for Intrusion of Water
- Ensure that overflow structures are working, secure and properly drained
- Inspect Structures for Stability, Blockages and Surface and Internal Corrosion.

4.) Check for Possible Sanitary Hazards

- Ensure that tank drain is plugged with at outlet end
- Ensure that vents are screened and that birds are not entering tank
- Ensure that areas around access are secure from water intrusion
- Ensure that hatches are secure and locked

5.) Finished Storage Maintenance Checks

- Does the tank appear structurally sound?
- Is inspection and cleaning performed at minimum every 5 years
- Is inspection performed by qualified PE?
- Is the paint coating inside and outside in good condition?
- Is the tank properly disinfected after maintenance is performed?

6.) Storage Tank Security

- Is tank properly fenced and gated with lock?
- Is there evidence of intrusion under fence?
- Does the system make periodic security checks?

5. Pumps, Facilities and Controls Evaluation

EPA Priority Criteria that Affects Public Health

- Capacity of Pumps
- Condition of Pumps
- Pump Location
- Pump Security

Pumps, Facilities and Controls Evaluation

Significant Deficiencies: inadequate pump capacity, inadequate maintenance, and inadequate or inoperable control system.

- Ensure proper application of pumps and that they are in working order
- Ensure that pumps are in reliable condition from maintenance records and/or pump
- Ensure that monitoring and controls are properly functioning

1.) Ensure proper application of pumps and that they are in working order

- What is average and peak system demand and are the well pumps and high service pump capacities able to meet the anticipated demand conditions per state requirements?
- Is information recorded for manufacturer, model, and serial number of pumps?
- Are all pumps operational?
- Is there excessive noise or vibration?
- Is there a preventative maintenance program in place?

2.) Pump Location

- Is location subject to flooding and have precautions been taken for protection?
- Is the pump location subject to electrical outages and have generators been supplied for emergency operation?

3.) Pump Security

- Are pumps fenced with locked gate or protected inside a secured structure?
- Are structure provided with vandalism alarms?
- Are areas protected with security lighting?

DEP Rules for Pump Controls

- FAC 62-555.330 references the *Recommended Standards for Water Works*. Pump controls must be installed to maintain proper water levels within storage facilities and provide distribution system pressure.
- Pumps should be controlled from tank levels with the signal transmitted by telemetering equipment.

6. Monitoring, Reporting and Data Verification

EPA Priority Criteria that Affects Public Health

- Failure to adhere to Non-regulatory Monitoring Plans
- Failure to adhere to Regulatory Monitoring Plans

DEP Monitoring, Reporting and Data Verification Deficiency Index

- Failure to perform Bacteriological sampling in accordance with Sampling Plans
- Failure to perform DBP sampling in accordance with Sampling Plan
- Failure to perform Pb and Cu sampling
- Failure to provide disinfection Residual Sampling

Monitoring, Reporting and Data Verification Evaluation

Significant Deficiencies: not adhering to site sampling and monitoring plans, not meeting reporting requirements, improper record keeping.

- Compliance with Monitoring Plans
- Improper Sampling Techniques
- Reliability and Accuracy of Data Collected

1.) Compliance with the Routine Sampling Plan

- The location and type of water sources, treatment facilities, storage tanks, pressure stations, and service connections
- The location of dead-end pipes, loops, and other areas of the piping system configurations.
- Cross connection hazards and shared connections.
- Areas of low water pressure and slow water movement.
- Varying population densities.

2.) Compliance with Stage 2 - Initial Distribution System Evaluation (IDSE)

- A Distribution System Evaluation to Find Actual Hot Spots for TTHMs & HAA5s
- Exemptions Apply to Systems with no documented DBP Problems
- Others must Conduct One Year of Monitoring in a Standard Monitoring Plan
- Deadlines by Compliance are based on Population Size except for Consecutive Systems who's schedules are the same as the "wholesaler" system

3.) Compliance with Routine Sampling according to TCR

- Collection of proper number of samples
- Number of TC+ hits and locations
- Techniques, equipment and reagents used
- Proper documenting and reporting
- Use of a Certified Laboratory

7. Water System Management and Operation EPA Priority Criteria that Affects Public Health

- Water System Management
- Water System Staffing
- Water System Funding

Water System Management and Operation

Significant Deficiencies: failure to meet water quality demands, no emergency response plans, inadequate follow up to deficiencies

- Does System have adequate funding to meet water system requirements?
- Is the number of personnel adequate to handle the system needs?
- Is there an O&M Manual that provides written SOPs and equipment maintenance requirement available?
- Is there a EMP for the facility?

1.) Financial Planning and Adequate Funding

- Budgets
 - Operating Budget
 - Personal Services Budget
 - Capital Improvement Plan
- Rate Planning based on the Cost of Providing Services (Cost of Service Study)
- Borrowing Plans such as Bonds and Short Term Securities

Providing Adequate Support Revenue (AWWA M1)

- Step 1: Determine the full cost of doing business by calculating your costs.
- Step 2: Determine your current revenues.
- Step 3: Consider your reserve requirements to ensure you have enough funds to cover your asset rehabilitation and repair costs as well as unexpected costs during the next 5 years.
- Step 4: Calculate how much money you need to collect from customer charges to cover your costs and fully fund your reserve account.
- Step 5: Evaluate appropriate rate structures and distribute the variable costs component to the various customer classes in accordance with their requirements for service.
- Step 6: Implement the rates.
- Step 7: Review and adjust your rates so they recover from each class of customer, within practical limits, the cost to serve them

2.) Staffing Plan for a Water Utility

- Determine the Effective Number of Staff to Fill Available Positions (Personal Services Budget)
- Recruit and Hire Qualified Personnel
- Select, Retain and Train Employees
- Provide Opportunities for Advancement
- Evaluate Employee Performance and Discipline and Discharge when necessary

3.) Requirements of an O&M Manual

- General description of all components
- Water quality performance goals for the WTP
- Design criteria for all WTP components
- Detailed description of operation of each component
- Procedures for monitoring and adjusting plant performance
- Detailed description of the maintenance of each component
- Lab equipment, testing procedures and calibration methods
- Safety program for spills and emergencies including written procedures
- Communication procedures for problems
- Records management

4.) Components of an EMP

- Include written descriptions of all WTP and WDS all hazards and appropriate procedures for response
- Are developed collaboratively with management, staff and community
- Are based upon sound data and information about the potential emergencies
- Are practiced on a regular basis by affected employees
- Are continually reviewed and updated by assigned individual as a living documents
- Include a command structure and responsibilities
- Are tailored to conditions of individual PWS

Possible PWS Hazards to be Included in EMP

- *Natural* –hurricanes, fires, tornados, floods
- *Technological* –Power outages, loss of controls, computer failure or intrusion
- *Infrastructure* –buildings and structures, utilities
- *Man-made* –Hazardous materials release, terrorism
- *Biological* –Pandemic, bacterial or chemical contamination, water main break, food
- *Physical well-being*–injuries, toxic and combustible gasses
- *Terrorist & Disgruntled Employee, Vandalism* – Operating responses to possible water quality disruptions

8. Operator Compliance with State Requirements

EPA Priority Criteria that Affects Public Health

- Competency of Operators
- Proper Training and Concurrency with Current Rules

Water System Operator Evaluation

Significant Deficiencies: not employing proper certified operator, operator not properly trained to operate specific WTP

- Does PWS employ operator with appropriate certification?
- Are all other system personnel properly certified?
- Do the operators now how to operate and maintain the various WTP and WD components?
- Is training encouraged and/or provided?

Water Treatment Plant Category Designations for WTPs

Category	Description
I	Chemical Preparation
II	Demineralization
III	Filtration w/ Primary Treatment or Ion Exchange
IV	Primary Treatment, Aeration and Stabilization
V	Disinfection Only

DEP WTP Licensed Operator Requirements

Water Treatment Process	Class A	Class B	Class C	Class D
Category I: Chemical preparation with filtration including lime softening, coagulation, direct filtration.	5.0 MGD and above	1.0 MGD up to 5.0 MGD	up to 1.0 MGD	None at this level
Category II: Demineralization including reverse osmosis desalination, electrodialysis, and ultra filtration.	0.5 MGD and above	1.0 MGD up to 8.5 MGD	up to 1.0 MGD	None at this level
Category III: Filtration (other than category II) including primary treatment or ion exchange.	8.5 MGD and above	2.0 MGD up to 8.5 MGD	up to 2.0 MGD	None at this level
Category IV: Primary Treatment (includes aeration, stabilization, and disinfection).	None at this level	10 MGD and above	0.1 MGD up to 10 MGD	Up to 0.1 MGD
Category V: Disinfection only	None at this level	None at this level	25 MGD and above	Up to 25 MGD

DEP WTP Staffing Requirements

Category	I	II	III	IV	V
Ea. Day and Weekend			below 0.25	0.1 to 1.0	.25 to 3
1 hr. ea. Day and weekend		below 0.1 MGD	0.25 to 0.5 MGD	1.0 to 3.0 MGD	3.0 to 5.0
2 hr. ea. Day and weekend	Less than 0.1 MGD				
3 hr. ea. Day and weekend	0.1 to 0.3 MGD	0.1 to 0.5 MGD	0.5 to 1 MGD	3.0 to 5.0 MGD	
6 hr. ea. Day and weekend	0.3 to 1.0 MGD	0.5 to 1.0 MGD	1.0 hr to 2.0 MGD	5.0 to 10 MGD	5.0 & Above

DEP Requirements for Water Distribution License

Level 1 (highest level)	10,400 hours of actual experience
Level 2	6,240 hours of actual experience
Level 3	2,080 hours of actual experience