WATER EFFICIENCY MEASURES FOR 24 X 7 WATER SUPPLY

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What is inspection and survey:

The drinking water supply system is a complex system on which people rely. Hence regular inspection and survey audit is mandatory. An onsite review of the water source, facilities, equipment, operation, and maintenance of the public water system for the purpose of evaluating the adequacy of such source facilities, equipment, operation and maintenance for producing and distributing safe drinking water can be termed as inspection and survey.

Inspection and surveys help to ensure that the public has safe drinking water. Inspectors point out the shortcomings and discuss how to fix them. Sometimes this means helping the water system itself. However, inspectors must be careful about how much detail they go into about correcting problems because they could be held liable if the information is misunderstood. But system personnel should not be shy about asking for help.

Benefits of surveys:

- reduce the risk of waterborne disease;
- provide an opportunity to enhance the knowledge of system operators and managers;
- identify technical and managerial capacity development needs; and
- document compliance deficiencies.

The outcome is typically divided into eight main sections:

1. Water sources
2. Water treatment process
3. Water supply pumps and pumping facilities

4. Storage facilities
5. Distribution systems
6. Monitoring, reporting, and data verification
7. Water system management and operations
8. Operator compliance with state requirements

Frequency of Inspection & Surveys:

The States must conduct inspection and surveys at the frequency shown below**:**

System Type	Minimum Frequency
Non‐community water systems	Every 3 years
Community Water Systems	Every 1 years
Community water systems with Good performance on prior Inspection & surveys.	Every 3 years.

The Govt. Of India have a more frequent schedule or may already include all groundwater systems and transient non‐community water systems, such as restauranat.






Deficiencies are classified in one of three categories: (1) significant or major, (2) moderate, or (3) minor. Some state primacy agencies may lump all the deficiencies together or have slightly different designations.

Significant or Major Deficiencies

Significant or major deficiencies have immediate potential to affect human health. Some possible examples include:

- maximum contaminant level violations;
- not enough time provided for the appropriate log inactivation of pathogens (not enough chlorine contact time);
- insufficient water for normal demand;
- not enough disinfectant residual to meet the minimum requirement; or
- no licensed operator for the water system.

Moderate Deficiencies

Moderate deficiencies are a concern but do not have an immediate effect on human health.

These could include:

- no formal backflow prevention program for the distribution system;
- sediment accumulation in the storage tanks; or
- inadequate pressure to all customers.

Minor Deficiencies

Minor deficiencies do not pose an immediate risk to human health, but, ii left unaddressed for a long period of time, could eventually get worse and cause adverse health effects. Some examples are:

- storage tanks need to be painted;
- inadequate mapping for valve locations;
- no screens on the overflow; and
- no vents on the storage tanks.

All these deficiencies can be subjective, and some states do not classify deficiencies. All deficiencies need to be addressed, but the most critical ones are those that pose an immediate public health risk.

Preparing for a Inspection and Survey:

Reviewing the previous inspection & survey report will help in preparing for the next inspection. The water system needs to keep the inspection & survey reports on file for at least 10 years and in some states even longer. Review past deficien□cies and be sure they have been properly addressed.

Other steps to prepare for a Inspection include:

1. Having all records ready, such as monthly operational reports, equipment calibration dates, laboratory test results, daily logs, and system drawings (preferably "as□built" drawings);

2. Having operator certification credentials readily available or displayed;

3. Making sure all areas (source water, storage facilities, pump stations, treatment plant) can be accessed for the inspector; have the keys available for quick access; *if* Having records of flushing and valve exercise program;

4. Having records of backflow prevention program;

5. Documenting water production/purchase and water demand/sold to calculate accountability;

6. Removing snow and ice if necessary; a good cleaning never hurts;

7. Having the emergency response plan available; and

8. Providing documentation for water meter replacement program;

Anything that can be done to help streamline the process will make the inspection more efficient.

During the Inspection & Survey:

The inspection & survey itself is not as hard as preparing for the survey. For the chief operator, the survey will be pretty much like any other day at work. The operator's main goal is to provide safe drinking water, and the in□charge engineer should not hinder that process.

Each of the main categories listed above will be examined. Deficiencies will be documented, dis□cussed, and corrective action suggested. Use this time to ask questions. The inspector is there to help as well as regulate.

The inspector will usually start with the source water, unless the system purchases water from another system. When looking at the source water, the quantity, quality, protection of the source water, and pumps, as well as security and access will be reviewed. The inspector might even get detailed enough to look at the size and length of the raw water line.

Next in the inspection is water treatment. If the system purchases finished water (treated water from another system), the report will probably state this and note the amount of water per month over the last year or the last quarter.

Answer – 12 Questions:

1	**Is the water source safe, adequate, and reliable?**
2	Is microbial contamination a current or potential future problem?
3	Are disinfection byproducts likely to be a problem under the Safe Drinking Water Act regulations?
4	Are corrosion byproducts an existing or potential problem?
5	Are natural geologic contaminants an existing or potential problem?
6	Are agricultural chemicals an existing or potential problem?
7	Are industrial/commercial chemical contaminations an existing or potential problem?
8	Is the water system infrastructure, including pumping, storage, and distribution systems, in good condition?
9	Can existing and future operator require□ments be met?
10	Are management systems and controls m adequate to meet existing and future requirements?
11	Has the system completed comprehensive financial plans and is the system capable of meeting all existing and future financial obligations?
12	Do water system customers understand the challenges and costs of providing high□ quality water on demand?

Treatment will be examined from the beginning (pre-chemicals, flash mix) all the way to the end (clear-Well tank). The amount of water treated, chemicals used, and chemical feeder settings will all be checked and verified with operational data. The contact time for the log inactivation of pathogens should also be calculated. Filter backwash rates and turbidity profiles will be looked at to see if the filters are operating according to specifications.
Water supply pumps and pumping facilities will be next, from the finished water pumps to the distribution system booster pumps. The pump size (capacity) and the number, preferably duplex (two) or more for reliability, will be looked at. The booster pump station building will be checked for operating condition, safety, and secu-rity. The pump run times, pressure in, and pres-sure out are also very important as are mainte-nance records that show when pumps and motors were replaced or repaired.

The system's storage facilities follow pumps on the list. Tank interiors will be checked for paint and/or sediment and exteriors for paint, screened vents, screened overflows, and secu-rity issues. The inspector might even want to see when the water system had its own inspection done on the tank.

The distribution system is checked for water line type and size to ensure adequate water availabili-ty and pressure. Pressure reducing stations, air release valves, gate valves, bypass valves, their exercise /flushing program are checked. Past permits might even be used to compare linear feet of line in the ground to what is on record (as-built drawings).

The monitoring, reporting, and data verification component requires monthly, quarterly and/or yearly operational reports, along with a minimum of a year's worth of required bacteriological reports (based on system population), consumer confidence reports, water analysis as per protocol regulated volatile organic compounds, synthetic organic compounds, and inorganic chemicals. The monthly operational reports will include water produced/ purchased, amounts of chemicals used, chlorine residuals turbidity at certain intervals, and filter run-times. Records of instrument or feeder calibration can be checked.

The inspector analyzes work done by water managers, water boards, mayors -and- the respective elected body. The survey report is for management as much as it is for the oper-ators. This section looks at billing cycles, rate structures, and contact numbers and lists all management or board members associated with the water system. Two important items are debt coverage and capital improvement planning. The water system should be able to show that it is running the system like a good business corporate.

The last of the main categories is operator compliance with state requirements. This sec-tion outlines the requirements for the particu-lar classification of your system and may list each of the operators in your system including back-up operator, part-time, or emergency back-up operators and their classification.

Not all inspectors follow this process. Some prefer to move from one area to another based on what they think will be the most efficient use of time.

Inspection & Survey Follow-up Plans:

After the inspection & survey has been completed, the inspector will write a follow-up letter addressed to the water system, usually to the manager or Water Supply in charge engineer. The letter provides a summary of any deficiencies, as well as recommendations for necessary improvements to become compliant or more efficient (or both). After the summary, the report discusses each of the eight main sections (listed above) in detail.

The report will most likely have a date or dates to comply with any faults that need to be addressed. The report could ask for a confirmation letter from the water system incharge acknowledging that the report was received and requesting details about how the water system will address deficiencies. It is important for the water system to show that it is trying to correct the problems in a timely matter.

If it looks like (the water system) might have difficulty meeting the suggested timeframe, contact the state technical group and the inspector to work out a schedule that will enable the water system to stay within compliance. A compliance schedule may be negotiated between the water system and the state technical agency, as long as it does not jeopardize public health. Make sure you have the revised schedule in writing.

Conclusion:

With periodical regular inspection and survey will ensure 24 x 7 water supply satisfactorily and policy revision can also be framed out. The cost benefit analysis shall be arrived on the basis of health parameters.