



APPLICATION NOTE

NEW USEPA RULES FOR DRINKING WATER - A COMPLIANCE STRATEGY

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THE RULE

The USEPA has recently issued new rules for drinking water in order to combat the potential harmful effects of disinfection products used.

The Disinfection/Disinfectants Byproducts Rule (D/DBPR) applies to communities of 10,000 or more people that use surface water or ground water that can be influenced by surface water and have trihalomethanes or haloacetic acid content.

COMPLIANCE DEADLINES

| | |
|--------------------------|--------------|
| Large systems | July 1, 2002 |
| Small systems | July 1, 2004 |
| All Ground water systems | July 1, 2004 |

COMPLIANCE METHOD

The D/DBPR requires that total organic carbon (TOC) analysis of the drinking water be taken of the source water and the distributed water after flocculation/softening. The TOC removal requirements are based both on the TOC concentration and the alkalinity of the raw water and adjusted for alkalinity because the optimum pH for TOC removal is often below 6.0. Thus, high alkalinity requires extensive amount of coagulant and/or pH adjustment to drive the pH to an optimum range.

Current DBPR percent TOC removal requirements are as follows:

| TOC | TOC Removal | | |
|----------------|----------------------------|---------------------------------|--------------------------|
| | 0- < 60 mg/L Alkalinity | > 60 - < 120 mg/L Alkalinity | > 120 mg/L Alkalinity |
| 2.0 - 4.0 mg/L | 35% | 25% | 15% |
| 4.0 - 8.0 mg/L | 45% | 35% | 25% |
| > 8.0 mg/L | 50% | 40% | 30% |

SUVA (SPECIFIC ULTRAVIOLET ABSORBANCE)

SUVA uses UV absorbance of organics at the 254 nm line spectrum and a dissolved organic carbon (DOC) analysis whereby the UVA (measured in m^{-1}) is divided by the DOC concentration (measured as mg/L).

SUVA is primarily used for those waters with a natural organic matter (NOM) fraction which is difficult to remove through enhanced coagulation or enhanced softening. These species are generally aromatic. Thus, SUVA provides a quantitative measure of aromatic content per unit concentration of organic carbon. By using SUVA, plant management can control costs of chemicals, since that measurement is an indication of coagulation/flocculation DOC removal capability.

SUVA was included as an alternate criterion for compliance if the raw (source) water has a SUVA of ≤ 2.0 L/mg-m (enhanced coagulation has no or little benefit) or if the treated (distributed) water has a SUVA of ≤ 2.0 L/mg-m, with no oxidants present.

TURBIDITY

New turbidity requirements (USEPA, 19986) are as follows:

| <u>TYPE</u> | <u>COMPLIANCE LEVEL</u> | <u>MEASUREMENT FREQUENCY</u> |
|---|--|--|
| Conventional/Direct Filtration | ≤ 0.3 NTU (95% of measurements) | every 4 hrs. |
| | and < 1.0 NTU at all times | every 4 hrs. |
| Slow Sand/Diatomaceous Earth Filtration | ≤ 1.0 NTU (95% of measurements) | every 4 hrs. |
| | and < 5.0 NTU at all times | every 4 hrs. |
| Individual Filters | < 1.0 NTU | continuous |
| | < 0.5 NTU (at the end of 1 st 4 hrs operations) | two consecutive measurements 15 min. apart |

PRACTICAL APPROACHES TO COMPLIANCE MONITORING

The most effective approach to monitor and control drinking water for D/DBPR compliance depends on the size of the system. Large systems benefit from total automation, while smaller systems can more effectively utilize manual or semi-automatic techniques.

Figure 1 is a manual/semi-automatic TOC benchtop analyzer for performing D/DBPR compliance testing. When configured with the optional UVA 254 module, the analyzer is also capable of SUVA compliance testing.

Figure 2 is a fully automatic TOC with dual stream monitoring capability for on-line source and distributed water monitoring. When configured with the optional alkalinity module, the system automatically provides validated compliance data. A manual alkalinity measurement needs to be entered if the alkalinity module is not used.

Figure 3 is the SUVA module option, which allows the operator a choice of either TOC analysis or SUVA analysis, or both determinations.

Figure 4 is the Star Turbidity Probe. It is either a stand-alone (loop powered) utility or integrated into the analyzer. Both USEPA & Standard Methods configuration are available.

Figure 5 is the alkalinity module.

Figure 6 shows the analyzer networked to the facility DCS.

The appended paper from the City of Houston, Texas is representative of large system requirements and experience for D/DBPR compliance monitoring.

Star provides both Windows based automated online D/DBPR systems and semiautomatic analyzers for compliance testing as well as total integrated packages for water and wastewater analysis.



Figure 1



Figure 2



Figure 3



Figure 4



Figure 5

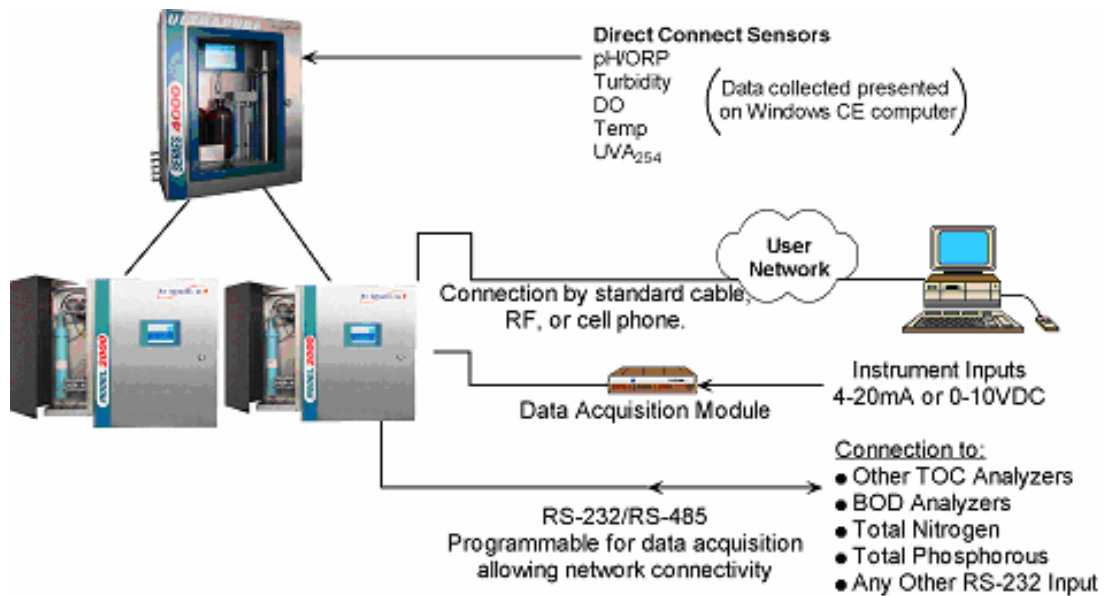


Figure 6

REFERENCES

1. Microbial Disinfection Byproduct Rules, EPA 815 - R -99 - 015, August 1999.
2. DOC and UV Management Practices with Implications for SUVA Determination, AWWA Journal, December 2002.