PhotonTec™
Smart Sensing for Safer and Cleaner Tomorrow

Surface-First™ Non-Contact Monitoring Across Water Infrastructure

Continuous optical sensing at the air–water interface — where hydrocarbons, algal accumulation, and surface-active organics often appear first

+1 (770) 366-4137 info@photontec.net www.photontec.net

What This Overview Covers

This document summarizes the role of surface-first, non-contact optical monitoring across water and wastewater infrastructure.
While most water quality instrumentation operates within the water column, certain contamination and condition indicators develop at the surface before dilution or mixing occurs. Surface-first monitoring provides continuous visibility across source, treatment, membrane, industrial water, and discharge environments.

Where It Applies Across Water Infrastructure

Surface-first monitoring can be deployed at exposed water surfaces across the treatment lifecycle, including:

- Source water and desalination intake zones (shoreline or buoy-mounted)
- Raw water storage reservoirs and open basins
- Pretreatment and membrane feed areas (UF/MF/RO)
- Industrial water systems and process discharge interfaces
- Municipal and industrial wastewater surface zones
- Final effluent channels and reuse outfalls

Surface-Relevant Signals Observed

Surface-first optical sensing monitors surface-expressed contamination and condition indicators, including:

- **Hydrocarbon films and sheens** — free-phase surface expression associated with spills, leaks, or process upsets
- **Algal surface accumulation (HAB-related events)** — early bloom development at intakes, reservoirs, and open basins
- **Optically active dissolved organics (CDOM)** — organic loading trends influencing pretreatment stability and membrane performance

Why Surface Monitoring Matters

Free-phase hydrocarbons, surface-active organics, and algal accumulation are expressed at the air–water interface. Monitoring this surface layer adds complementary sensing alongside submerged instrumentation without inserting probes into the water.

Operational Context

Surface-layer events often precede measurable bulk water changes. Continuous visibility at the surface supports earlier recognition of abnormal conditions, short-duration events, or surface upsets across source, treatment, and discharge assets.

How It Fits Within Existing Monitoring

Surface-first monitoring complements submerged sensors, process instrumentation, and laboratory sampling by providing a continuous surface-layer signal that can integrate into monitoring and control systems. Because sensing occurs above the waterline, it avoids direct contact with the process stream and minimizes fouling-related maintenance burden.