PhotonTec™
Smart Sensing for Safer and Cleaner Tomorrow

Non-Contact Monitoring of Water Surface Contamination Across Infrastructure Systems

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

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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 submerged within the water column, certain contamination and condition indicators develop at the water surface before dilution or mixing occurs. Surface-first monitoring provides continuous visibility in source waters, upstream environments, treatment processes, membrane systems, industrial waters, and discharge environments, supporting earlier awareness and response to events.

Where Surface Monitoring Applies in Water Infrastructure

Surface-first monitoring can be deployed at exposed water surfaces throughout 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 basins (UF/MF/RO systems)
- Industrial water systems, stormwater/containment basins, and process discharge points
- Municipal and industrial wastewater basins and clarifiers
- Effluent channels and reuse outfalls

Surface Contaminants Detectable with Non-Contact Monitoring

Surface-first optical sensing monitors contaminants and condition indicators that appear at the water surface, including:

- **Hydrocarbon films and sheens** — free-phase surface expressions associated with spills, leaks, or separation/process upsets
- **Algal surface accumulation (HAB-related events)** — early bloom development at intakes, reservoirs, and open basins
- **Colored dissolved organic matter (CDOM)** — organic matter trends influencing pretreatment stability, membrane performance, and potential DBP precursor formation

Why Monitoring the Water Surface Matters

Free-phase hydrocarbons, surface-active organics, and algal accumulation often first appear at the air–water interface. Monitoring this surface layer provides complementary sensing alongside submerged instrumentation, where present, without inserting probes or requiring personnel entry into the water, while providing earlier visibility of contamination events.

Operational Context

Surface-layer events often precede measurable changes in the water column. Real-time surface visibility supports earlier recognition of abnormal conditions, intermittent and short-duration events, and 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 water surface, it avoids direct contact with the process stream and minimizes fouling-related maintenance.