PhotonTec™

Smart Sensing for Safer and Cleaner Tomorrow

Surface-First™ Water Intelligence Across Water Infrastructure

Earlier operational awareness through continuous monitoring of the often-unmonitored water surface

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What This Overview Covers

This overview summarizes how Surface-First™ Water Intelligence provides earlier operational awareness across water and wastewater infrastructure by continuously monitoring the often-unmonitored water surface. 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 provides continuous visibility in source waters, upstream environments, treatment processes, membrane systems, industrial waters, and discharge environments, supporting earlier operational awareness and better-informed decisions.

Where Surface-First™ Water Intelligence Creates Value

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

What Surface-First™ Detects

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 Surface-First Is Different

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 Benefits

Surface-layer events often precede measurable changes in the water column. Real-time surface visibility supports earlier operational awareness 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™ Water Intelligence 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.