

HYDRO-ELECTRIC POWER PLANTS

1. Monitoring in Collecting Sumps and Turbine Pits

Water may carry oil leaked from turbine bearings and lubricating/cooling systems into deep sumps built under the turbines. In most plants, pumps installed at the bottom of the sump discharge the water directly to the river. For immediate notification, and to prevent oil from being pumped out to the river, sumps/turbine pits should be continuously monitored for oil sheens.

A Leakwise ID-221 Oil Sheen Detector is installed in a perforated 6" stilling well inside the sump. Leakwise detectors use high frequency electromagnetic absorption technology, and can detect the presence of 300 microns (0.3 mm) oil layer and measure its growth up to 25 mm. Leakwise sensors are not sensitive to dirt and oil coating or to changes in water conductivity. The detector has low and high user selectable alarm set points in the range of 0.3–25 mm of oil on water. A low oil alarm can be set off, for example, at 2 mm oil layer; upon this alarm, the operators know that soon they will need to clean or skim the oil from the water surface. A high oil detection alarm can be set off, for example, at 20 mm oil layer; upon this alarm, the operators know that there may be a catastrophic leak into the sump and immediate actions must be taken.

In some hydroelectric power plants, the sump pumps discharge the water into oil/water separators. Water is pumped from the separator into retention tanks and from there back to the river. A Leakwise ID-223 Oil Sheen Detector installed in the retention tank will alarm at the presence of 0.3 mm oil. A Leakwise ID-225 Oil Thickness Monitor, installed in the separator, can measure continuously the thickness of the oil layer in the range of 1-100mm or 1-200mm. The data is displayed via 4–20 mA output signal in the control room. The operators use this data to decide when to skim the oil. The Leakwise ID-225 Sensor can also automatically start and stop a skimming pump according to the oil layer.

2. Monitoring in Transformer Substations

Cooling oil and rainwater are collected from under the power plant's transformers into an underground tank. A Leakwise ID-223 installed in this tank detects leaks of transformer oil, and can be used for preventing discharge of oily water into a river or public drainage system. This can serve as an additional way monitor transformer performance before it fails due to oil leaks.

3. Monitoring Hydraulic Oil of Dam Gates

Dam gates are operated by hydraulic pressure. Strict environmental regulations forbid any discharge of leaking hydraulic oil into the river. A Leakwise ID-223 Oil Sheen Detector can be used in dry or wet sumps built under the hydraulic pumps at the dam gates. The detector monitors the thickness of the accumulated oil layer and controls a skimming pump, or informs the operator when to skim. Usage of these Leakwise Oil Sheen Detectors brings substantial saving in treatment costs.

