Case Study

HMA INSTRUMENTATION

POWER DISTRIBUTION

Transformer Substations

Utilities have hundreds of transformer substations. In each substation, there are usually several transformers. Each transformer contains a high volume of cooling oil. A catch basin is built under the transformer to contain small leaks, or all the transformer oil in case of a major breakdown. Most substations are unmanned, and continuous remote monitoring of oil leaks is essential for meeting operational, safety and environmental requirements.

1. Transformer Oil Leak Detection

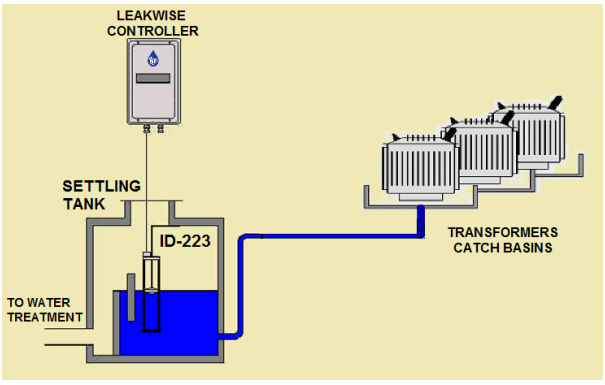
Small oil leaks or spills drain into the catch basin. This oil can be carried away with the rain into the public storm drain system when the catch basin is over-filled with water. To prevent this, water is collected from the catch basin of the transformers into the central sump of the substation. From there it is discharged by gravity, or by a pump into the public storm drain system. A Leakwise ID-223 Oil Sheen Detector is installed in the sump. If there is no sump, it can sometimes be installed directly in the catch basin. When an oil sheen is detected on the water or at the bottom of the sump (if it is dry), an alarm in the remote control-center is set off, and the sump's water pump or discharge valve will be shut off automatically.

2. Reduction of Water Treatment Costs

Following the oil alarm, maintenance personnel will come to remove the oil. Alternatively, they may choose to pump the oily water into an oil retention tank. In this retention tank, a Leakwise ID-225 Oil Thickness Monitor can be installed to monitor the oil layer thickness up to 200 mm. After a short retention time, water can be drained from the bottom of the tank and additional oily water can be added to it until the oil layer is thick enough to be removed (e.g., by a vacuum skimming truck). This process can prevent the removal of a large volume of water by stopping skimming until enough oil has accumulated at the upper layer of the tank.

3. Underground Power Distribution

In large cities, high voltage power cables are run underground. These cables are insulated with large quantities of oil, which is constantly pumped along the cable through underground pumps. Transformers are installed in building cellars and in underground vaults. Access to these cables and supporting equipment is through manholes. The underground cable service manholes can fill up with water and utility maintenance teams must pump the water out into the drainage system. If oil is detected, the water must be removed for treatment. Oil detection can be done either in a fixed installation of Leakwise ID-221 or ID-223 Detectors or by using a transportable ID-223 Oil Sheen Detector, that can be operated by 12/24 VDC from the service trucks.



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