

# APPLICATION NEWSLETTER

**PROBLEM:** Hydrogen Leaks in an Alternator

A Power Plant Construction Engineer and the Plant Engineer needed a simple, safe and accurate means of monitoring very small leak rates of Hydrogen in alternators. High power alternators used in power stations produce a good deal of heat and are normally cooled by circulating hydrogen in a closed circuit around them. Hydrogen as a coolant has two advantages over air. First, it is fourteen times less dense, therefore, less power is used to push hydrogen through the system. Second, hydrogen has seven times the heat transferring ability.

Hydrogen passes over the alternator, through heat exchangers and back to the alternator. The heat exchangers have water circulating through them. Because hydrogen is flammable and expensive, leaks into the water must be quickly detected and

eliminated. The water cooling tank has an air blanket over the water. The tank is vented. The pressure, temperature and water level in the tank are closely regulated to prevent air flow through the vent. Hydrogen that leaks into the water circuit, however, will collect in the cooling tank and, as pressure builds, pass through the vent. The flow rate of the gases through the vent will usually be very low and will occur at low pressures.

**SOLUTION:** The solution to this utilities problem was to install a 50MK10 Laminar Flow Element on the vent. If there is any flow out of the vent, the LFE detects it and operators are alerted to a hydrogen leak. A heater is located upstream of the LFE to heat the gas as it leaves the tank. This prevents water vapor from condensing in the LFE by keeping the gas temperature above the dew point.

