

STEAM GENERATOR LEAK DETECTION

RESOLVING AN INDUSTRY CHALLENGE SUCCESSFULLY

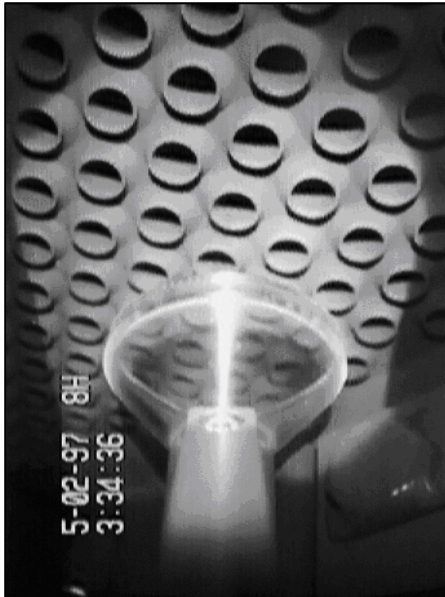


Fig.1 Moisture probe is scanned over boiler tubes at the tubesheet

Effective leak detection

Leaks in steam generator tubes can cause forced shutdowns in nuclear power plants. After shutdown, visual leak detection with fluorescein dye can detect typical leaks, but not problem leaks such as those that close up when the temperature and pressure of the steam generator is reduced. For these, Kinectrics has developed a unique, highly sensitive technique based on a dew point measurement method.

Kinectrics' steam generator leak detection technology utilizes moisture detection from leaking tubes by scanning the tubesheet with a moisture sniffer (Fig. 1) mounted on a robotic arm. This method can scan the tubesheet in 48 hours and localize the leaking tubes. In contrast to helium leak detection, the moisture method works on tubes that leak under the sludge pile or above the rolled joint in the tubesheet.

Proven success

Kinectrics has successfully located tube leaks in steam generators at three North American generating stations.

- One station had a leak that was clearly detected by the elevation of dew point in air flowing through it. (Fig. 2)
- In another station, a SG tube had a "low-level leak" detected. Available evidence indicated that this leak had been the source of elevated secondary tritium concentrations for the previous ten years.
- In a third station, a tube that had been plugged on a previous outage was found to be leaking.

To use moisture detection, the tube bundle is covered with water and pressurized on the secondary side (Fig. 3). Prior to the leak search, the primary side must be effectively dried to enable the effective detection of small leaks.

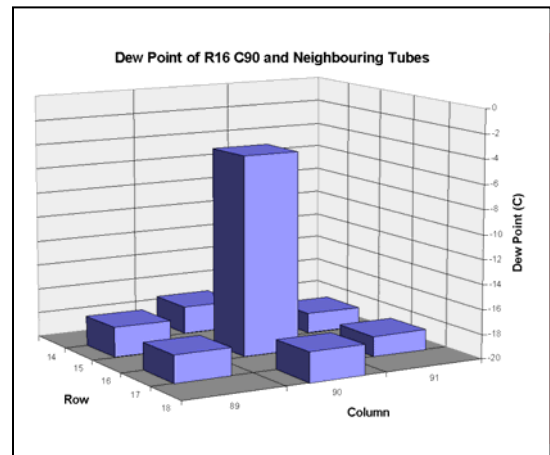


Fig. 2 Detailed view of dew point readings for tube R16/C90 and its six neighbouring tubes.

Quality project management

Responsibilities for the project were shared among Kinectrics, station personnel, the robotic arm service provider and various subcontractors.

- ✓ Kinectrics managed the majority of the project responsibilities, including leak detection equipment and site preparation, set-up of containment, leak detection operations and project documentation.
- ✓ Station personnel prepared the steam generator for testing, and provided support for equipment handling and site installations.
- ✓ The robotic arm service provider supplied an acquisition trailer to enable the SM-23 robotic arm installation and manipulation throughout leak detection operations.

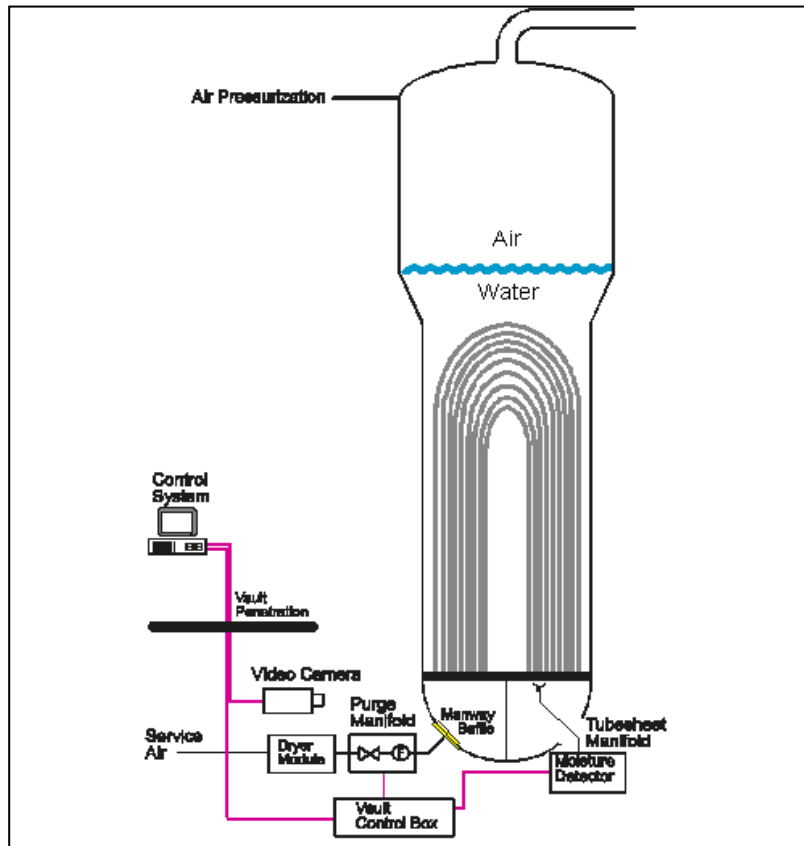


Fig. 3 Leak detection equipment

For more information, contact:

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