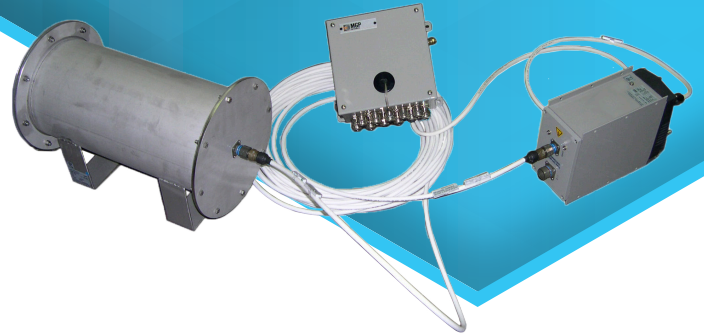**RAMSYS**

SGLM 201K™

Steam Generator Leak Rate Monitor

Monitoring steam generator leak rate in PWR nuclear power plants by measuring ^{16}N activity.

FEATURES

- ^{16}N monitoring when reactor power exceeds 25%
- Gross gamma energy monitoring when reactor power < 25%
- Spectrum stabilization against temperature and aging drifts
- 16 configurable windows over the measurement range
- 1024-channel analysis
- Available with or without display and local signaling
- Seismically qualified
- More than 800 SGLM channels in operation worldwide
- Designed for 1E mild environment conditions

DESCRIPTION

The SGLM 201K forms part of the RAMSYS product line. It has been designed to detect and quantify leaks between the primary and the secondary circuits of a steam generator in a nuclear power plant. It operates on the principle that radioactive nitrogen (^{16}N) produced in the reactor core during operation crosses into the secondary circuit through a steam generator tube crack (or hole). The ^{16}N is carried away by the steam and is detected in the main steam line (MSL) outside containment.

For the SGLM 201K version: the NaI(Tl) detector is wrapped with thick thermal insulation to prevent damage that may be caused by high temperature gradients.

RADIATION MONITORING SYSTEMS DIVISION | STEAM GENERATOR LEAK MONITORS

SGLM 201K | STEAM GENERATOR LEAK RATE MONITOR

PHYSICAL CHARACTERISTICS

- Radiation detected: gamma
- Detector: 3"x2" NaI(Tl) scintillator + PMT (SG/NAI 61)
- Energy range:
  - ^{16}N window: 4.5 MeV to 7 MeV
  - Gamma window: 0.2 MeV to 2.2 MeV
- Measurement range:
  - Leak rate: 0.1 to 5 000 l/h (0.64 to 31 700 GPD)
  - Gamma: 0.5 to 100 000 cps
- Spectrum analysis: 1024 channels

ENVIRONMENTAL CHARACTERISTICS

- Normal temperature: +5°C to +40°C (+41°F to +104°F)
- Temperature limit: -5°C to +55°C (+23°F to +131°F)
- Detector temperature transient (accident condition):
  - 150°C (302°F) - 5 min
  - 100°C (212°F) - 10 min
  - Back to 55°C (131°F) in 1 hour
  - Temperature gradient: 600°C/h (1112°F/h)
- MTBF (LPDU) : > 50 000 hours
- TID: 100 Gy (10^{+4} rad)
- Protection index: IP65 and IK07

MECHANICAL CHARACTERISTICS

- Dimensions:
  - Processing unit: 390 mm x 196 mm x 187 mm (15.3 in x 7.7 in x 7.3 in)
  - Detector: 305 mm x 270 mm x 452 mm (12 in x 10.6 in x 17.8 in)
- Weight:
  - Processing unit: 8 kg (17.6 lb)
  - Detector: 17 kg (37.5 lb)
- Color: gray RAL 7030 (decontaminable paint)

ELECTRICAL CHARACTERISTICS

- Power supply: 230 Vac – 50 Hz or 120 Vac – 60 Hz
- Data link outputs: 1 RS232 (LPDU only) and 2 isolated RS485
- Alarm relays: 3 SPDT relays
- I/O: 2 isolated analog outputs and 1 isolated analog input (0/4-20 mA)

SIGNALING (Applicable to LPDU only)

- Alphanumeric display: measurement, status...
- Sound alarm: buzzer 90 dBA at 1 meter
- Visual alarm: 3 lights (red, yellow, green)

REFERENCE STANDARDS

- Environmental: IEC/IEEE 60780-323
- Seismic: IEEE344 and IEC60980
- EMC: 2014/30/EU and 2014/35/EU, EPRI 102323, RG 1.180, IEC61000-6-2 and IEC61000-6-4

VERSIONS

- 230 Vac or 120 Vac
- Local processing and display unit (LPDU) or local processing unit (LPU)
- With or without RS485 junction box
- Detector cable length: from 20 m (65.6 ft) to 100 m (328 ft)
- Junction box cable length: 2 m (6.56 ft), 5 m (16.4 ft) or 10 m (32.8 ft)

ACCESSORIES

- Calibration tools
- Software: MASS2, RAMVISION, SIMS2...
- Ethernet (LPDU version only)
- USB converters
- Seismic qualified wall mounting bracket for LP(D)U
- Seismic qualified detector support

NOTE

The ^{16}N monitor can measure the ^{16}N count rate in the MSL with a relatively high precision and can convert the count rate into leak rate if the power nuclear level is provided by the manufactor by means of an 0/4-20 mA current loop.

Converting the count rate to volumetric activity requires detailed Monte Carlo analysis. Mirion Technologies can provide such analysis.

Correlating leak rate (in units of l/h or GPD) to ^{16}N activity requires a detailed thermo hydraulic analysis and knowledge pertaining to the leak location.

The steam generator manufacturer typically provides the thermo-hydraulic data required for establishing leak rate correlations.

Mirion Technologies can provide the overall analysis for establishing the leak rate correlations if the thermo-hydraulic data is available.

Featuring:

MGP INSTRUMENTS

MIRION TECHNOLOGIES