RADIATION DISCRIMINATION

Ronan Measurements Division supplies the process control industry with leading-edge Radiometric Measurement Systems that provide non-contact measurement solutions for the harshest environments.

RONAN'S RADIATION DISCRIMINATOR SYSTEM

Application

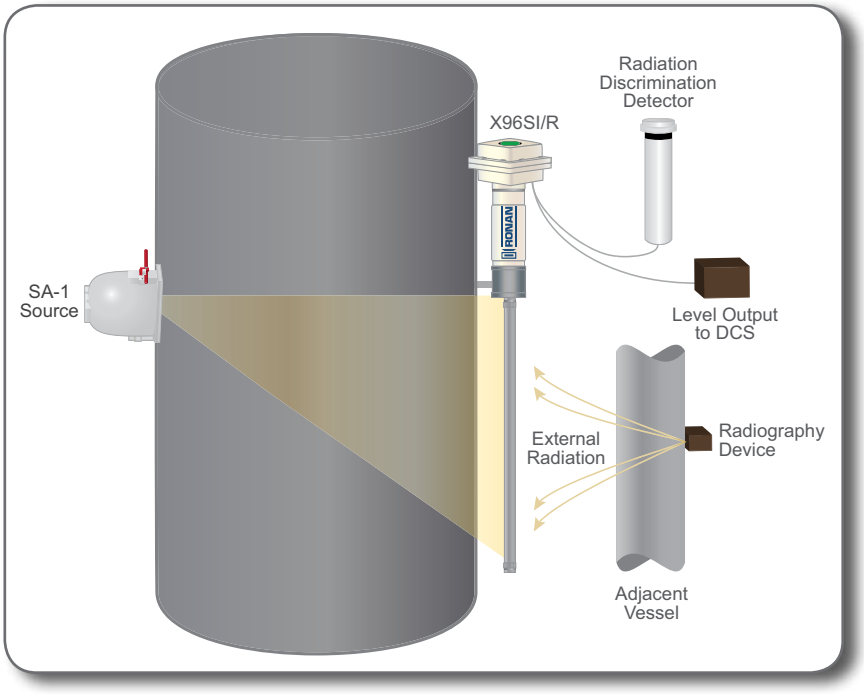
At facilities where other sources of radiation exist, such as X-Ray machines, background radiation can affect readings from a Radiometric Measurement system.

Problem

When the source of radiation is located some distance away from the Radiometric Measurement system, low levels of radiated energy will be present. The Radiometric Measurement system processor may not be able to discriminate between external radiation and measurement radiation from the gauge source, giving a false indication of a change in the process.

Solution

The most accurate method to discriminate external radiation is to add a separate detector located outside of the beam of the measurement source. This Radiation Discriminator configuration permits normal level output operation during temporary periods of large, external radiation fields. The Radiation Discriminator function detects up to three separate conditions: Radiation Discriminator detector saturation, a low sigma external field, and a high sigma external field. Radiation fields above the maximum for the Radiation Discriminator detector will cause the detector to go into saturation and drop its output to zero. When first triggered, the function temporarily freezes the level output, and the current elevated level and Radiation Discriminator detector outputs are averaged for a period of four times the current time constant. The average values are used to calculate the effects of the high field on each detector. The change in level detector output is calculated and stored as an offset value. The change in Radiation Discriminator detector output is calculated and stored to be used in the ratio algorithm. The ratio will determine the adjustment to the level detector's output if the Radiation Discriminator detector's output should change. If the external field changes and the actual level remains constant, the ratio will adjust the change in level detector output to remain constant. If the level actually changes in the tank, causing a change in level detector output but no change to the Radiation Discriminator detector's output, then the level output will change as the ratio remains the same. When the Radiation Discriminator detector's output drops below the low sigma threshold, the alarm condition ceases, and offset is set to zero. This produces a level output based soley on the level detector's output, as normal.



Summary

Ronan's Radiation Discrimination system ensure accuracy in measurement readings when background radiation is present.

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RADIATION DISCRIMINATOR SYSTEM

SA-1 General Purpose Source Holder

The SA-1 is a rugged, general purpose source holder suitable for a wide range of applications requiring an externally mounted source. The SA-1 provides shielding which meets all international standards for radiation limits, and accomodates source activity up to 5 Curies (185 GBq) CS-137 or 18 mCi (0.67 GBq) Co-60.

Features:

- Available in Ductile Iron cast with epoxy paint as standard; also available in stain less steel and PVC-coated ductile iron as options for harsh environments
- Lead-free option Available
- Fireproof design available
- Manual Rotary Shutter availble as standard; Shutter Position Indicator Contact Output, Air or Electric available as options
- Actuated Shutter with Position Indicator Contact Output

Scintillation Detector

A separate scintillation detector is used as the Radiation Discriminator detector in this application. Ronan pioneered the use of solid crystal scintillation detectors more than 20 years ago, and now has an installed base in the thousands across a wide variety of applications worldwide. Ronan employs two types of solid crystals, Scintillating Plastic Crystals for standard applications and Sodium Iodide scintillating crystals. Scintillation Detectors provide efficient detection, enabling the use of lower-level sources.

X96SI/R Radiometric Transmitter with FlexDetector™

The X96SI/R is compatible with all Ronan scintillation detectors. The new integrally-mounted, explosion-proof transmitter includes a patented optical coupling that allows the transmitter and detector electronics assembly to be easily mounted to any detector configuration. The transmitter can also be remotely mounted in the field or control room. Fully Ethernet capable, configurations, software updates, and data logging can be completed easily through the user's PC using a standard web browser. The system is backward-compatible to enable you to easily upgrade existing systems to newer transmitter technology. Built-in intelligence provides a range of features including:

- Automatically compensates for vapor density changes, foam, gasses, process build-up
- Automatic source decay compensation
- Auto calibration
- Radiation discrimination
- State of the art dynamic tracking of process fluctuations
- Data logging and event recording
- Adjustable time constant
- Empty vessel alarm

The patented FlexDetector utilizes a non-hazardous, non-flammable scintillating fill-fluid, which is doubly encapsulated and protected by an outer sheath of armored conduit. This newest flexible design offers unique advantages in reliability and sensitivity while the lightweight construction eliminates the need to employ cranes and rigging for installation. This design is ideal for horizontal or spherical vessels, or parts of the vessels where space is limited.

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