GammaTrend

Real-Time Source-Term Trending

Features

- ✓ Rapidly identifies and quantifies isotopes over time
- ✓ Remotely collect and review gamma-ray spectra and trends
- ✓ Field-deployable high-resolution detectors: compact, lightweight, no cryogenic cooling required
- ✓ Data transmission via Ethernet or radio
- ✓ Expandable to allow simultaneous measurement of multiple components/systems
- ✓ Designed for long-term use with direct power
- ✓ Software provides continuous system health check to allow for timely response to equipment issues
- ✓ Detectors are air/water-tight for easy decontamination
- ✓ Software upgrades included
- ✓ Annual recalibration and software updates included

GammaTrend™ provides a powerful tool for real-time monitoring of the plant's source term during outage and online periods.

- ❑ Isotopic characterization of pipes and valves
- ❑ Isotopic trend analysis
- ❑ Outage monitoring

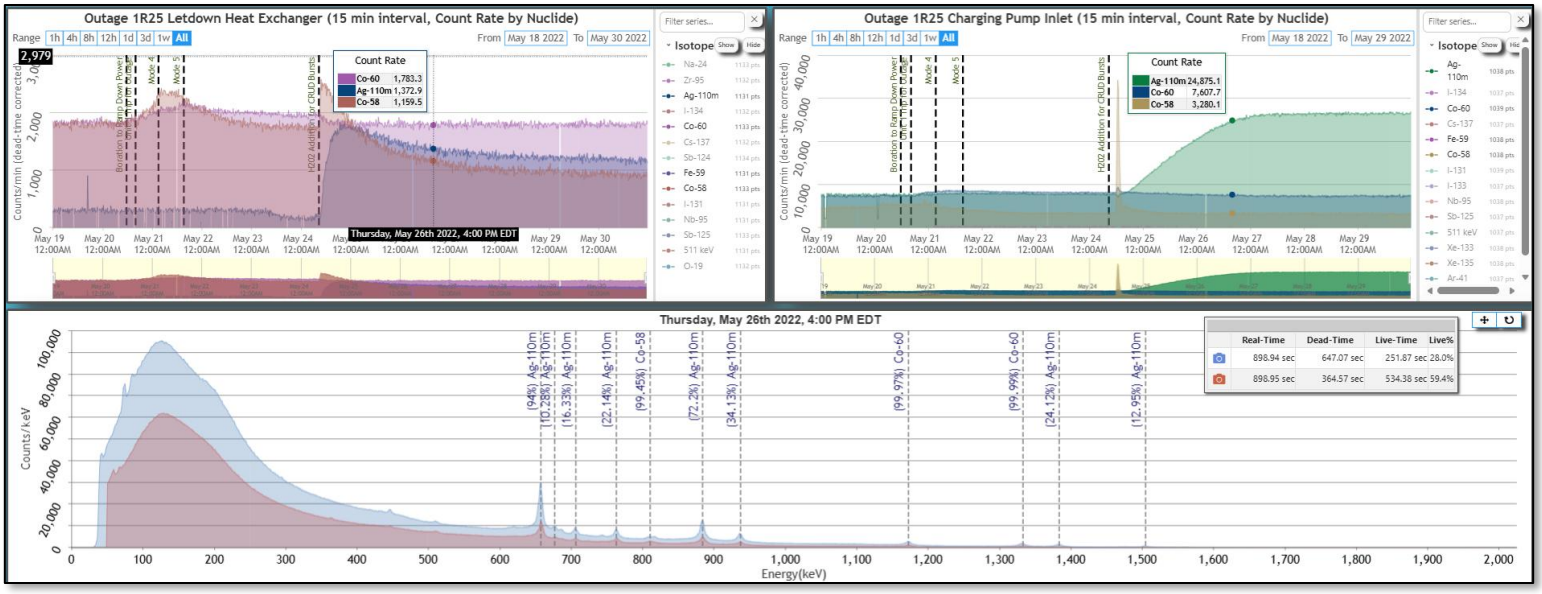


Deploy H3D spectrometers at strategic locations throughout a facility and use GammaTrend software to view real-time energy spectra and activity trends.

Truly know your plant's source term:

- ❑ Monitor minute-by-minute impacts of planned and unplanned changes to reactor coolant, such as chemistry, temperature and pH.
- ❑ Gain critical nuclide- and location-specific results to inform source-term reduction strategies.
- ❑ Validate source-term reduction successes by comparing results over multiple outages and cycles.
- ❑ Enable early detection and trending of unexpected changes in source-term radionuclides, such as ^{110m}Ag impacts at some plants.
- ❑ Monitor trends during online cycles to predict impacts on outage dose.

Integrating the GammaTrend server with facility IT systems allows data to be viewed on any computer connected to the network.



Outage monitoring showing different source-term characteristics along the reactor coolant purification systems.

***Top left**: Isotopic trends along the Letdown Line* ***Top right**: Isotopic trends along the Charging Pump Inlet*

***Bottom**: Overlay showing spectra from both locations at a common time*



System and Process Monitoring:

GammaTrend is compatible with various spectrometer products designed for an array of radiological conditions

GammaTrend Specifications

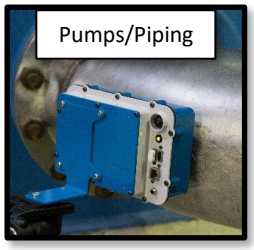
Compatible Detectors:	H3D S Series, P100S detectors, M Series (specialized applications)
Connection Methods:	Ethernet or XBee radio
Compatible Web Browsers:	Mozilla Firefox, Google Chrome, Microsoft Edge
Server Operating System:	Compatible with RHEL 8/9 and Ubuntu 22.04/24.04 LTS
Languages:	English, French, Chinese; others available on request
Software Installation:	Dependent upon server option; some installation support required
Server Options:	H3D-provided software loaded to customer's existing server H3D-provided standalone server connected to network H3D-provided standalone server separate from network
Isotope Library:	Select from 3573 ENDF isotopes & user-defined (with Visualizer)
Live Data Frequency:	One-minute updates; data are easily aggregated into longer durations
Unit System:	SI or US customary
Data Exporting:	PNG/JPEG, CSV
Activity Quantification:	Empirical calibration with known activity/concentration Source discretization calculation using defined geometries/materials
Software updates:	Provided with associated detector warranty

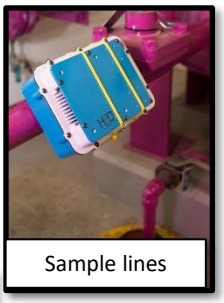
S100 Spectrometer

Powerful trending capabilities for most power-plant applications.

Crystal Volume:	>4.5 cm^3 CZT
Weight:	2.4 kg (5.2 lbs)
Energy Range:	50 keV to 3 MeV
Identification Time:	<50 s for ^{137}Cs producing 30 nSv/hr (3 µrem/hr) <365 s for ^{60}Co producing 50 nSv/hr (5 µrem/hr)
Energy Resolution:	≤1.1% FWHM at 662 keV (coincident interactions combined) ≤0.9% FWHM at 662 keV (coincident interactions separated)
Count Rate Limit:	10 mSv/hr (1 rem/hr) bare ^{137}Cs-equivalent
Communications:	Ethernet RJ45 port; TCP/IP; other RF
Warranty:	2 years (includes annual recalibration and software updates)

View full spec sheet: https://h3dgamma.com/s100.php







P100S Spectrometer

A tungsten-shielded and collimated version of the S100 for use in higher dose rates and complex radiation fields.



Crystal Volume:	>4.5 cm^3 CZT
Weight:	11.3 kg (25 lbs)
Collimator:	2.5 cm (1 in) with removable plug
ID Time:	<1 min for ^{137}Cs at 30 nSv/hr (3 µR/hr)

Count Rate Limits (front, bare ^{137}Cs-equivalent):
10 mSv/hr (1 rem/hr) without plug
200 mSv/hr (20 rem/hr) with plug

View full spec sheet: https://h3dgamma.com/p100.php

S400 Spectrometer

Additional CZT volume provides 4x the efficiency for trending of lower activities/concentrations.



Crystal Volume:	>19 cm^3 CZT
Weight:	2.5 kg (5.4 lbs)
ID Time:	<20 s for ^{137}Cs at 30 nSv/hr (3 µrem/hr) <120 s for ^{60}Co at 50 nSv/hr (5 µrem/hr)

Count Rate Limits:
10 mSv/hr (1 rem/hr) bare ^{137}Cs-equivalent

View full spec sheet: https://h3dgamma.com/s100.php

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