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IPAN

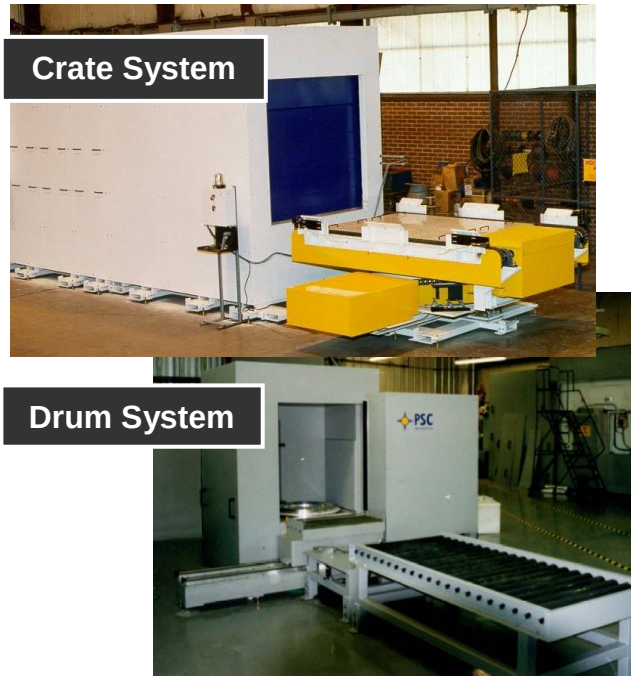
Imaging Passive Active Neutron System

The ***IPAN*** uses a combination of active (differential die-away) and passive (coincidence counting) methods to provide fast, accurate analysis of radioactive waste in drums and large crates.

The system's performance is greatly enhanced by the use of active and passive imaging to determine the spatial location of radioactive constituents.

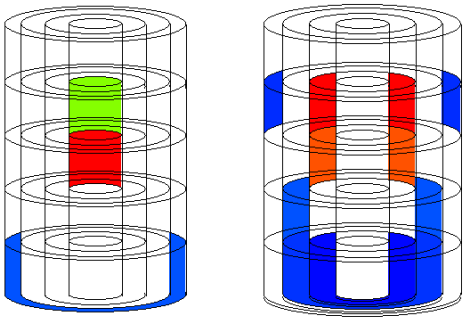
Isotopic data may be input from process knowledge or from an optional High Resolution Gamma Spectroscopy (HRGS) system.

The system can quantify the container's total fissile content, uranium and plutonium content, total alpha activity concentration and other nuclear parameters.



Features

- Pulsed active neutron mode provides very low detection limit
- Passive mode allows assay of high Pu levels without self-shielding bias
- Innovative matrix correction
- High performance electronics
- Measurement control checks and internal data quality verification
- Advanced imaging algorithms provide improved accuracy (shown below):



Imaging screen-shots

Applications

- ☑ Waste management & disposal
- ☑ Decommissioning
- ☑ Criticality safety
- ☑ TRU/LLW segregation
- ☑ Safeguards & accountancy
- ☑ Waste assay for transport and disposal

Benefits

- Rapid and accurate measurements
- Assay of uranium, plutonium & mixed oxide (MOX)
- Suitable for low, medium and high density waste streams including combustibles, metals & sludge
- Applicable for both homogeneous and heterogeneous waste
- Flexibility for different size containers
- Minimal operator training required
- Meets regulatory requirements
- Compliant with nuclear safety regulations
- Wide dynamic range from milligrams to 500 g Pu
- Customizable final report and EXCEL readable data output

Specifications

Measurement Technique:	Active (Differential die-away) Passive (Totals / coincidence / multiplicity counting)
Matrix Correction:	Active Neutron Transmission Index and Epithermal Neutron Index
Chamber Size:	Drum System: Accommodates drums up to 400 liters (100 US Gallons) Crate System: Accommodates crates up to 8 m^3 (2000 US Gallons)
Neutron Detectors:	4 atmospheres ^{3}He detectors in single or double row arrangement
Neutron Generator:	14 MeV Deuterium-Tritium, output of 2E+08 neutrons / sec (50Hz pulse)
Assay Chamber Efficiency:	10.0% (single row) or 16.0% (double row)
Controls:	Start / stop measurement. Door and roller conveyor mechanism control. Optional integration with conveyor systems.
System Control:	Local Industrial Control Panel
Measurement Control Checks:	^{252}Cf and depleted uranium sources are used to verify system is within calibration on a routine basis
Max Package Surface Dose Rate:	200 mrem / hr (2 mSv/hr)
Max Package Weight:	454 kg (1,000 lbs)
Package Rotation:	Internal turntable for drums. External turntable for crates.
Data Inputs:	Pu isotopics from process knowledge or isotopic gamma analysis
Data Outputs:	Printed reports and electronic data files. Optional integration with data management systems.
Additional Options:	Gamma system, Weigh scale, Bar-code reader

Performance

Assay Time:	10 minutes active interrogation + 10 minutes passive counting
Average Throughput:	3 packages / hour
Measurement Uncertainty:	< +/- 30%
Maximum Pu Range:	500 g Pu
Applicable Matrix Types:	Organic & inorganic waste (paper, plastics, metals, filters, sludges etc.)
Lower Limit of Detection:	• Low Density Waste (<75 kg): 5 - 15 mg ^{239}Pu-effective • Medium Density (75 –150 kg): 15 - 50 mg ^{239}Pu-effective • Sludge, Concrete (>150kg): 50 - 150 mg ^{239}Pu-effective • Passive Mode: 20-40 mg ^{240}Pu-effective

Contact

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