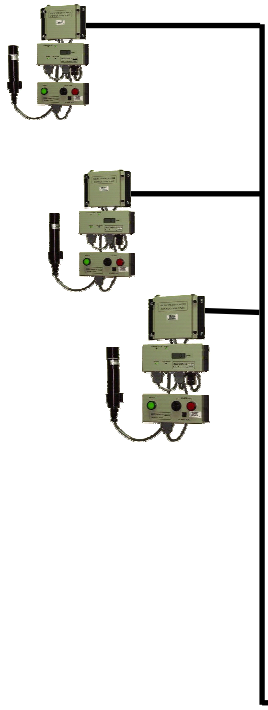
MediSmarts Area and Stack Monitoring System

A Comprehensive Radiation Monitoring System for Cyclotron facilities

- The most respected and used radiation monitoring system available today
- Exceeds all regulatory requirements for recording and reporting of radiation safety data
- Recognized by all leading cyclotron manufacturers
- Over 170 referenced users worldwide
- Superior Support and Service Teams
- Flexible System configurations to meet your facility's exact requirements
- Factory calibration of all detectors

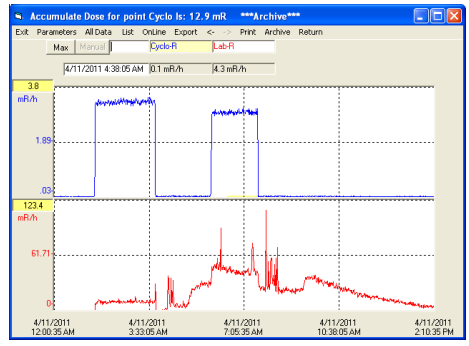


Stack monitoring

- On-line Total Released Activity + Concentration
- Two dry contacts for actuating air duct vents & dampers
- Real Time, continuous background subtraction

Area Monitoring

- Dose + Dose Rate
- One week of activity per graph



Production Monitoring

- Online Q.A. provides guidelines for repeating or improving production

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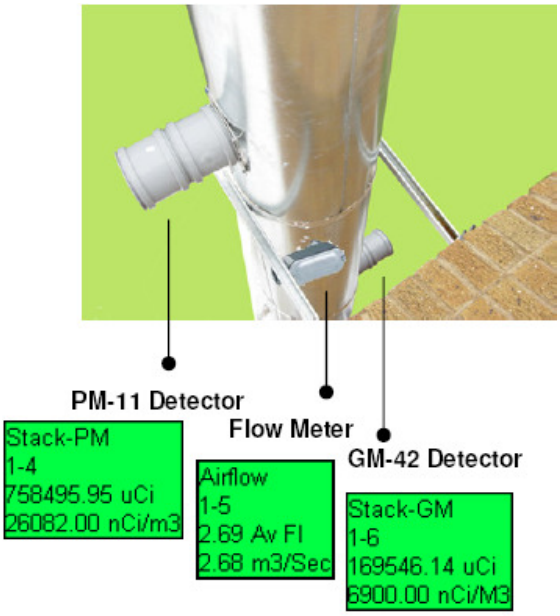
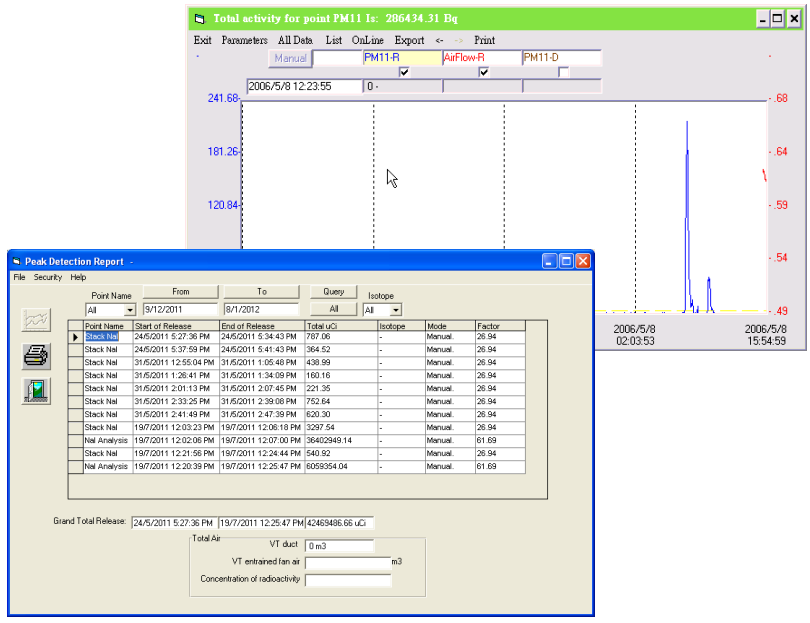
MediSmarts Stack Monitoring Module

MediSmarts provides the complete and automated solution to meet the regulatory requirements for stack emission reporting for any site that is producing radioactive isotopes and tracers.
MediSmarts provides the required regulatory reporting of all radioactive releases according to isotope concentrations and total activity released.
The MediSmarts System was developed specifically for cyclotron facilities and is based on our extensive knowledge and experience of the operational and regulatory requirements for the busy research and production laboratory





System Highlights

- Quantitative activity release measurement
- Complies with environmental regulation
- Helps in the production process
- Local Alarm & Output relays
- Software calibration routine for converting the detector reading
- Automatic Activity release report
- Integrated on-line Air flow data for activity release report
- Measuring wide range of concentration levels from 0.05uCi/m^3 to 150mCi/m^3
- Automatic calculation of the total activity for selected time interval.
- Event messages/Alarms for: fail-safe, Lost contact, detector fail, overflow
- Automatic Archiving of data
- Historical Reports and Activity Logs

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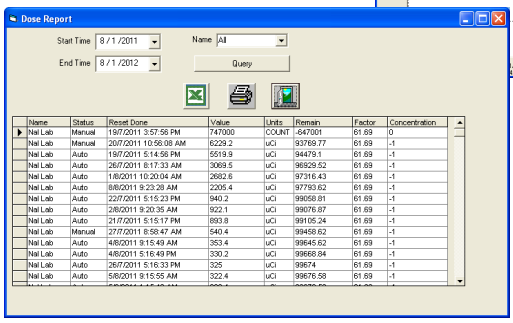
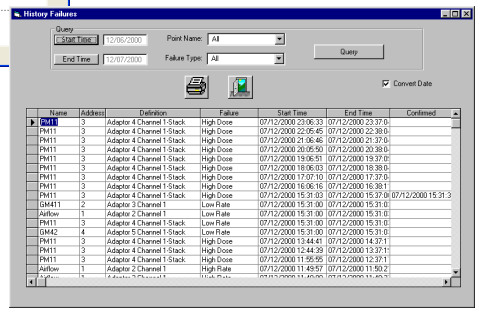
MediSmarts Area monitoring module

Our Area Radiation Monitoring is based on field proven, highly reliable radiation detectors, Electronics Data Processing Units and Unique Computer Software. The system provides real time on line radiation levels. The data is used for both radiation safety and improving the site operation performance.
Area Monitoring is recommended at the following locations:

- **Hot Laboratory**
- **Radiochemistry**
- **Cyclotron Vault**
- **QC/QA Department**
- **Radiopharmacy**
- **Shipping**

Online trend Graphs & Reports





The Monitoring Channel:

- Intelligent DPU controller, coupled to a sensitive detector
- Large, easy to read, digital LCD
- Automatic identification of the detector with quick connect makes swapping easy
- Four indication LED's for Input supply voltage, Threshold & detector malfunction alarm and communication indication
- Reads radiation, provides alarming and activating solenoids independently of Computer

Customer Base

- Installed in over 170 sites Internationally
- Offered by leading cyclotron manufacturers (GE, IBA and Siemens)

MediSmarts System Main Features

User Interface & Display:

- User Defined layout for display
- Multiple layouts
- Real Time data display
- Color coded alarm display
- Flexible graph display of real time data
- Audio and Visual Alarming
- Hardware and software upgradeable
- Expandable (# of detector channels)
- User level login security
- Additional Network Workstations

Reporting

- Regulatory Reports
- Health Physics Reports
- Flexible Report formatting
- Report Export capability
- Stack Emission Report
- Area Dose Report
- Alarm Report
- Event Log
- Failure Log
- Channel Configuration Report

MediSmarts Software

- On line graphs for trend analysis
- Five alarm threshold levels
- User friendly
- Easy to operate
- Software automatic recovery after shutdown
- Export data files in Microsoft excel format.

Recommended system for Radiation safety in cyclotron site consists of:

Stack Monitoring

PM11 - NaI(Tl) Scintillator detector
GM42 - wide range detector
Flow Rate Meter (option)

Area Monitoring

Hotlab, Radiochemistry lab, QC lab, Shipping...
Gm-42 wide range detector
Cyclotron Vault + Hot Cells
GM-41 High range detector
Neutron Detector

Control Station

Computer
Network version available
MediSmarts Real Time Data Display
Including Reporting Software
Gm-42 wide range detector

MediSmarts Monitoring Channel Selection Chart

MediSmarts is a modular system designed to provide maximum capabilities for radiation detection at minimal costs. Our system is capable of reading radiation and contamination from a number of well known detectors as well as any sensor which provides a 4-20 mA output. Each detector is automatically detected by the system and its specific, built-in calibration factor makes it very easy to switch and swap detectors.

The integrated Area Monitoring Channel Measuring Range: 0.1µSv/h – 10 mSv/h (0.01mR/h – 1R/h)

The Integrated Area monitoring channel with built-in alarm is used to monitor and record radiation levels in clean areas of cyclotron sites and nuclear medical departments

The GM-41 Area Monitoring Channel Measuring Range: 1µSv/h – 1 Sv/h(0.1mR/h – 100 R/h)

Used in the Cyclotron vault and in the Hot Cells. Can be set to report activity and is useful to measure the activity before the material is moved out of the Hot cell into the Dose Calibrator

The GM-42 Area Monitoring Channel Measuring Range: 0.1µSv/h – 10 mSv/h (0.01mR/h – 1R/h)

Used in the Radiochemistry Lab, Control Room, Q.A. Dept, Radiopharmacy and other rooms to measure general radiation (dose and dose rate)

The PM-11 Stack Monitoring Channel Measuring Range: 0 –50,000 CPS

High Sensitivity detector used in the Exhaust Stack to measure radioisotope releases, down to the 10^{-7}µCi/cc regulatory requirements. Combined with online readings from the flow meter, provides full reporting on released concentration and amounts

The GM-42 Stack Monitoring Channel

Used in the Exhaust Stack to measure radioisotope releases, over a wide range including large releases. Used as a complement with the PM-11 to provide a true, full range detector system. The higher measuring range of the GM-42 provide accurate measure, beyond the range of the PM-11 in case of saturation during radioisotope releases

The Flow meter Monitoring Channel

Used to measure the online flow rate in the exhaust stack to enable the conversion of measured radiation of radioisotope releases into concentration

The Ludlum Neutron Detector Monitoring channel

Used in sites that are required to measure neutron flux during the cyclotron run. Can be fixed on the wall, as part of the monitoring channel or together with RAM DA 2000 used as a portable instrument for surveying purposes

The Berthold Neutron Detector Monitoring channel

A more sensitive Neutron detector for sites that are required to measure neutron flux during cyclotron run. Can be fixed as a monitoring channel or together with RAM DA 2000 used as a portable survey instrument.

The Temperature Monitoring Channel

Placed in the cyclotron vault and used to monitor the room temperature and used to monitor the climatic conditions of each cyclotron run

The Humidity Monitoring Channel

Placed in the cyclotron vault and used to monitor the humidity of the room and used to monitor the climatic conditions of each cyclotron run

The Wind Velocity and Direction Monitoring Channel

Placed near the Exhaust Stack. Used to show wind velocity and direction for more comprehensive and accurate reporting

MediSmarts Detectors Specification

Type	GM-41 Detector	GM-42 Detector
Geiger Type	ZP1313	ZP1201
Measuring Range	1 uSv/h – 1Sv/h 0.1mR/h - 100R/h	0.1uSv/h – 10mSv/h 0.01mR/h -1R/h
Sensitivity	1.7 cps/mR/h	17 cps/mR/h
Accuracy	± 10% reading within the measuring range	
Energy Range	50 keV - 1.3 MeV	
Energy Dependence	± 15%	± 20%
Angular Dependence	Less than ± 20% for ±45° of preferred direction	
Temperature Range	Operation: -10°C to +50°C Storage: -20°C to +60°C	
Humidity Range	40% to 95% RH (non condensing)	
Dimensions:		
Length	170 mm (6.7″)	197 mm (7.75″)
Diameter	38 mm (1.5″)	38 mm (1.5″)
Weight	200 gr (0.44 lb)	250 gr (0.55 lb)
Casing	Aluminum, splash proof	
Hook-up cable length	up to 100 m	

PM-11 Detector

Radiation detection Gamma above 50 keV

Scintillator Crystal: NaI (Tl)
Dimensions: 2″ dia. x 2″ thickness
Window: 1 mm (0.04″) aluminum

Count rate range 0 to 50,000 cps

Surface Sensitivity

Radionuclide	Sensitivity cpm/Bq/cm^2	Minimum detectable level* Bq/cm^2
F-18	350	10
I -125	25	150
I -131	320	12
Tc-99m	315	12

* Minimum detectable level calculations are based on background reading of 3600 cpm. The confidence level is 99%.

Output signals TTL pulses (5V, 5ms)
Detector status logic:
identification, malfunction, radiation overflow

Temperature range Operation: -10°C to + 50°C (15°F to 122°F)
Storage: -20°C to + 60°C (-5°F to 140°F)

Humidity range 40% to 95% RH (non condensing)

Casing Aluminum, splash proof

Dimensions 34 cm long x 7 cm diameter (13.4″ long x 2.75″ diameter)

Weight 1.75 kg (3.9 lb)

Option Factory calibrated single channel analyzer (SCA) within the energy range

ROTEM INDUSTRIES reserves the right to change specifications without advance notice

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