



INSTRUCTIONS AND GUIDELINES

Radiation Detection

March 2011

**This Instruction & Guideline refers to Practice Statement No:
PS2009/22 – Inspection and Examination of Sea Cargo**

Published date: 14 July 2011
Availability: Internal and External
Subject: Radiation detection
Purpose: Set down procedures to follow should radiation be detected
Owner: National Director Cargo
Category: Operational
Contact: National ISO coordinator, Sea Cargo Improvement

The electronic version published on the intranet is the current Instruction and Guideline.

Summary of main points

- Competencies required by officers operating Radiation Detection Equipment.
- Safety requirements
- Procedures

This I&G applies to staff in:

- Container Examination Facilities in Brisbane, Fremantle, Melbourne and Sydney
- Cargo Examination Facilities in Adelaide, Darwin, Launceston, Newcastle, Townsville

The Quality Management system is applied in Cargo Examination facilities in Launceston, Newcastle, Townsville and Darwin although these sites are not required to certified

Introduction

This Guideline sets down the procedures to be followed when Ionising radiation field above the normal background level is detected in an Examination facility.

Instructions and Guidelines

Competencies

The primary tools for detection of radioactive sources in the CEFs are:

- Thermo Scientific RadEye Personal Radiation Detector (PRD) and
- The SAIC Exploranium GR135Plus Radiation Identifier.

Any officer using either the RadEye PRD or the GR135 must have been assessed and deemed competent in the following units of the X-Ray Education Program:

- Unit 1 - X-Ray Technology;
- Unit 6A – Radiation Detector Operations RadEye PRD; and
- Unit 6B – Radiation Identifier Operations GR135Plus

Safety Requirements

All officers working in the CEF environment should be familiar with the Customs and Border Protection - Occupational Health and Safety Guidelines. Further details can be found on the Customs and Border Protection Intranet site.

- RadEye PRD units have 2 alarms programmed into them, the first threshold is set at 3-5 times the background radiation level and the second threshold is set at 5 Micro Sieverts per Hour (5µSv/h), our ionising radiation safety level.
- The GR135Plus is used to identify the radioactive substances producing the detected radiation and is complementary to the use of personal radiation detection equipment.

Radiation fields with doses of less than 5µSv/hr are within identified safety limits and normal duties can be performed within the radiation field.

Radiation fields with doses of 5 - 20 µSv/hr are above the identified safety limits and competent GR135Plus operators may enter these fields for no more than 15 minutes in any one hour.

Procedures

Contacts for Radiation Detection:

In the event that liaison with external stakeholders is required, consult Attachment A for a list of contact numbers.

Operation of the RadEye PRD and GR135:

The RadEye PRD is a highly portable device designed for use as an initial warning to the presence of ionising radiation fields and possible radioactive isotopes.

The RadEye PRD is best utilised worn during routine cargo examinations. The PRD could be stationed at a single point where the best chance of detection of radiation from radioactive isotopes would be possible (e.g. the door of the opened container being searched, rather than at the CISCOS)

The GR135Plus is a portable device designed to measure and record ionising (gamma) radiation field strengths (dose rates) and radiation spectra to identify the radioactive source isotopes emitting the radiation.

This unit is intended to operate as a separate device to verify and investigate any ionising radiation field greater than 5 µSv/hr detected by the RadEye PRD.

All officers using the RadEye or the GR135 must be accredited in their use. For detailed procedures on the start-up, operation and shutdown of this equipment, please refer to the Detection and Identification Technologies Instructions and Guidelines for both the RadEye PRD and for the GR135 units

Procedures for Radiation Detection

If the RadEye PRD alarm sounds, the following procedures should be followed:

1. Check the RadEye PRD reading and inform the Supervisor that an alarm has sounded.
2. Based on this reading, undertake one of the following actions:
 - Less than 5µSv/hr** – Check the documentation/Manifest for the legitimacy of cargo and proceed as normal. If further examination is warranted, a RadEye PRD should be used to monitor the radiation levels at all times. If at any time the radiation dose reaches 5µSv/hr, advise Intelligence Branch of the incident [and proceed to Step 3].

Between 5 μ Sv/hr and 20 μ Sv/hr - Move all personnel to an exclusion zone of less than 5 μ Sv/hr and advise Intelligence Branch of the incident [and proceed to Step 3].

More than 20 μ Sv/hr - Move all personnel into an exclusion zone of less than 5 μ Sv/hr and advise Intelligence Branch of the incident. Contact ARPANSA for advice on how to proceed [and proceed to Step 3].

3. Deploy the GR135Plus (certified current competent operator only) and confirm the RadEye PRD dose reading.

4. Switch the GR135 to "Identify" mode and obtain a spectrum analysis. If a reading cannot be taken from the initial test point, proceed slowly towards the signal source, ensuring that the dose rate does not exceed 20 μ Sv/hr, until a reading is received.

5. Return to the exclusion zone and record the data from the screen. In consultation with Intelligence Branch, take one of the following actions:

- **Known Radio-isotope** – Check the Manifest for legitimacy of the cargo:
 - if the Manifest is consistent with the reading, [proceed to Step 6].
 - If the Manifest is inconsistent with the reading, contact ARPANSA for advice on how to proceed
- **Unknown Radio-isotope** – Contact ARPANSA for advice on how to proceed.
- **Special Nuclear Material** – Contact ARPANSA for advice on how to proceed.

6. If a decision is made to continue with the inspection, examine the X-ray image for anomalies and determine whether further inspection is warranted. A RadEye PRD should be used to monitor the radiation levels at all times.

Note: If, at any time during this process, Intelligence Branch determines that counter-terrorism indicators are apparent, the CEF Supervisor will be responsible for alerting the AFP.

Related Policies and References

Practice Statements:

- Inspection and Examination of Sea Cargo
- OH&S

Other Instructions & Guidelines

- Instructions and Guidelines relating to CEF Operations
- Radiation Detection Equipment 09/09/2010 (Operation of radiation detection equipment in Customs and Border Protection)

Key Roles and Responsibilities

National ISO Coordinator, Sea Cargo Improvement, Canberra CEF Managers.
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Intranet. National ISO coordinator is responsible for version control.

Consultation

Internal

The following internal stakeholders have been consulted in the development of these Instructions and Guidelines.

- CEF Management and staff
- National OH&S
- ISO Coordinators
- Sea Cargo Improvement
- TEC Branch, DIT Section, X-ray & Radiological program

External

- Not required

Approval

Approved on	12 July 2011	
By	National Director Cargo Raelene Vivian	
Review Period	This guideline is to be formally reviewed on an annual basis at the ISO Coordinators meetings.	

Radiation Detection

Radiation Safety Awareness Officers (RSAO)	(Consult the Contact List for your Region)
ACBPS Radiation Safety Officer (RSO)	Nick RILEY 0400 008 919 or 0421 057 981
ACBPS Radiation Safety Agency	Australian Radiation Services (03) 9877 4898

Emergency Contacts

Emergency Management Australia	(02) 6266 5474
ARPANSA	(02) 9545 8333
AFP	(Consult the Contact List for your Region)

Regional Contacts for the Transport of Radioactive Substances:

New South Wales

NSW Environment Protection Authority (02) 9995 5000

Victoria

Department of Human Services (03) 9637 4167

South Australia

Human Services - Radiation Protection Division (08) 8130 0700

Western Australia

Radiological Council (08) 9346 2260

Northern Territory

Territory Health Services (08) 8999 2983

Queensland

Department of Health (07) 3406 8000

Tasmania

Department of Health and Human Services 1300 135 513

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