

STANDARD PROCEDURE INSTRUCTION

Title		SPI
Emergency Response for Nuclear Gauges		34-35
Department	Supersedes SPI Dated	Effective Date
Safety, Health and Environment	April 15, 2009	September 21, 2010

Emergency Response for Nuclear Gauges

CONTEXT

Numerous locations across the Manitoba Operations utilize nuclear gauges within their processes. These nuclear gauges are well suited to the harsh applications in which they are applied. Although the gauges are well designed to allow normal operation of the radioactive source without harm to personnel in the area, exposure to ionizing radiation must be considered when working around a nuclear device.

PURPOSE

To provide direction for emergency situations involving nuclear gauges.

PERSONNEL

Canadian Nuclear Safety Commission (CNSC)

Canadian regulatory authority for nuclear material. They must be advised immediately of any incident involving a nuclear gauge.

Radiation Safety Officer (RSO) or Designate

The Radiation Safety Officer role will be held by the Instrumentation Engineering Supervisor as approved by the CNSC and is the onsite person responsible for the fixed gauge radioisotope license and regulated activities.

Authorized Employee:

Person that has completed the course titled "Radiation Safety Training for Nuclear Gauges" within the past two years and is permitted to work on or handle nuclear gauges as documented by the RSO.

Environment and Health

E&H manages the dosimetry program. Handles new dosimeter requests and maintain records.

EQUIPMENT

Personal Protective Equipment (safety glasses, work gloves, mask, etc.)

Personal Dosimeter

Radiation Survey Meter

LIMITS

- Annual whole body ionizing radiation dose of 1 mSv (100 mrem).
- Radiation field is maximum 0.05 mSv/hr or 50 microSv/hr (5 mrem/hr) at 30 cm from the source head with the shutter closed

CRITICAL TELEPHONE NUMBERS

- CNSC 24-hour duty officer: 613-995-0479
- Department of Environment: 204-944-4888 (24 HR. WPG.)
- Norman Barton – Noremtech Inc: 613-299-6986
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PROCEDURE

Changes to this procedure require the involvement of the Radiation Safety Officer, the Canadian Nuclear Safety Commission and the Manager of Engineering.

EMERGENCY PROCEDURES INVOLVING FIXED NUCLEAR GAUGES

The following responses refer to actions to be taken in the affected area in the event of a radiation emergency involving fixed nuclear gauges or damage to a fixed nuclear gauge is suspected.

In the event that a source is lost or stolen, the RSO is to be notified immediately. The RSO is to notify the CNSC immediately.

This procedure must be used in conjunction with SPI #34-36 Guidelines for Handling of Nuclear Gauges. The use of a Nuclear Fixed Gauge Work Permit is not required for emergencies.

RSO and Alternates

- The Radiation Safety Officer and alternates will be required to complete the course titled “Radiation Safety Officer Training – Sealed Source Users” provided by Stuart Hunt and Associates Ltd prior to accepting the role.
 - Record of this training must be entered into VIP.
 - The Radiation Safety Officer and alternates will also be required to complete the course titled “Radiation Safety Training for Nuclear Gauges” every second year.
- The Radiation Safety Officer role will be held by the Instrumentation Engineering Supervisor as approved by the CNSC.

Emergency Response

- Cease work immediately.
- If the emergency is a fire, the senior area process person will deal with the fire first, emergency responders will try to keep a minimum of 5 metres (15 feet) away from the Nuclear device if possible
- Keep people at least 5 metres (15 feet) away from the nuclear gauge by roping off a perimeter with appropriate signage and by posting a person to prevent access to the area for the duration of the emergency.
- The 5 metre (15 feet) perimeter is to be maintained at all times for all unauthorized people.
- Contact the Substation Operator (phone 2395), providing details of the emergency including the source location and the nature of the emergency. This phone is manned 24/7.
- The Substation Operator is to contact the following:
 - a. Radiation Safety Officer or designate, who is to come to site
 - b. Authorized Employee from the provided list, who is to come to site
 - c. Manager or their designate of the affected plant for information only
 - d. Environment and Health person on call for information only
- Radiation Safety Officer to immediately report accident to CNSC 24 hour Duty Officer telephone:613-995-0479.
- With CNSC approval and under the guidance of the RSO, the Authorized Employee is to:
 - a. Use the appropriate PPE including a dosimeter.
 - b. Measure the radiation in the affected area using a calibrated survey meter. Approach gauge from non-shutter side if possible. Survey meters are located in the Smelter, Mill and Utilities buildings on the plant site.
 - c. A dose rate higher than 0.05 mSv/hr or 50 microSv/hr (5 mrem/hr) at a distance of 0.3 meters (1 foot) anywhere around the source holder with the shutter closed indicates that there is damage to the shielding. If higher readings are found, it is likely that the lead shielding within the head has been compromised and the source will have to be shielded with lead plates held in position by metal banding or duct tape.
 - d. Attempt to put the shutter mechanism in the closed position and secure with a lock. If it is impossible to close the shutter, its function should be replaced with external shielding such as lead plates held in position by metal banding or duct tape.

- e. Wrap the gauge in plastic and ensure it is completely sealed to avoid the spread of contamination should the integrity of the source holder be compromised.
- f. Remove the gauge from service and relocate to the nuclear storage room located above the Refinery Instrumentation Shop in the Central Shops Building.
- g. A leak test must be performed by an approved consultant to verify the integrity of the source. If the source is found to be leaking, contact the CNSC for additional instructions. Disposal will be required.
- h. If required, and in consultation with the Radiation Safety Officer, contact the manufacturer for information or assistance.
- At all times during an emergency response, it is imperative that the RSO remain in contact with the plant Manager and the Environmental person on call.
- In the case of a suspected over exposure the following steps will be taken:
 - a. Immediately remove the person from the vicinity of any nuclear device.
 - b. The RSO will immediately notify the person and CNSC of the suspected dose.
 - c. The person will be given a work restriction to eliminate further exposure to nuclear devices for as long as is deemed necessary by the RSO under the guidance of CNSC.
 - d. Medical attention will be provided as determined by the affected person and the RSO.
- In the case of a suspected contamination the following steps will be taken:
 - a. Person will immediately move to the nearest emergency shower taking care to minimize the spread of contamination.
 - b. Person will carefully remove all clothing (if assistance is required disposable gloves must be worn) working from head to toe.
 - c. Place all clothing in an air tight bag.
 - d. Label air tight bag with employees name and number as well as the date, time and location of collection.
 - e. Authorized employee will conduct whole body radiation survey and note areas of high contamination.
 - f. Person will wash from head to toe in safety shower with a mild soap and a gauze sponge or cloth. Shower water will be warm (not hot). Sponge should be used only once and disposed of in the air tight bag with the employees clothing.
 - g. Authorized employee will repeat whole body survey once and person will repeat wash procedure once for a total of two times.
 - h. Once external decontamination is complete if internal contamination is suspected the person will be sent to hospital emergency for further treatment.
 - i. Place air tight bag in radiation storage room located above central shops.
 - j. Contaminated clothing will be disposed of by a qualified consultant as per RSO.
 - k. A qualified consultant will be brought in for area decontamination.
 - l. Any contaminated areas will be roped off to a 5 meter perimeter until decontamination is complete.
 - m. The person's path to the emergency shower will be tested for contamination and roped off as necessary.
- Incidents will be investigated as per SPI 34-29 and SPI 34-31.
- Once investigation is complete and not more than twenty one days after the incident the RSO will submit a written report to the CNSC which will include the following:
 - a. Radiation dose received by personnel.
 - b. Radioisotope and amount of radioactivity involved.
 - c. Levels of radioactive contamination encountered.
 - d. Results of decontamination procedures.
 - e. Final contamination survey results.
 - f. Fate of the affected device.
 - g. Cause of the incident and outline or steps taken to prevent a reoccurrence.

Approved By Lovro Paulic	Title Vice President, Manitoba Operations
Date	