Fermilab	ES&H Section Procedures	
Procedure Number/Name ESH-RPO-SOURCE-06 Sealed Neutron Source Use in Experimental Areas		**Effective Date:** 2/22/2021
Written by: Kathy Graden	**Reviewed and Updated By:** Kathy Graden	**Revision:** 2

Sealed Neutron Source Use in Experimental Areas

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Revision History

Author	Description of Change	Revision Number	Revision Date
K. Graden	Editorial changes	0	2/29/2016
K. Graden	Changes include incorporation of ESH&Q Section procedure template, new numbering system, and editorial changes	1	1/10/2017
K. Graden	Incorporation of procedure into ESH RPO template. Editorial changes	2	2/22/2021

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Procedure

1.0 Purpose

This procedure describes instructions for use of a sealed neutron source in experimental areas at Fermilab.

2.0 Scope

This procedure is limited to neutron source use in experimental areas and does not address use of a neutron source at the Radiation Physics Calibration Facility (RPCF). Use of neutron sources at RPCF is addressed in ESH-RPO-SOURCE-01, Sealed Radioactive Source Control and Accountability Program document.

3.0 Summary

Experimenters need to utilize neutrons from neutron sources at Fermilab to calibrate detection equipment. This procedure describes policies associated with using a neutron source in experimental areas.

4.0 Definitions

N/A

5.0 Responsibilities

5.1 The ES&H Section RPO Department Program Coordinator/Source Physicist is responsible to coordinate the use of a neutron source in experimental areas.

5.2 The ES&H Section Hazard Control Technology Team (HCTT) Source Technician and Source Technician Backup are responsible to deliver and pick up the neutron source each day of use and ensure that the Radiological Work Permit (RWP) is posted and signed by authorized users.

6.0 Health and Safety Warnings

Personnel may encounter radiological hazards such as radiation exposure while fulfilling responsibilities related to use of neutron sources. Personnel must comply with applicable RWP.

7.0 Material, Equipment & Training Needed

7.1 Material & Equipment Required

- Five gallon bucket for transporting neutron source
- Radiological postings
- Dosimetry badge

7.2 Training Required

- Radiological Worker Training (FN000470 and FN000471) or DOE Core Academics for RCTs (FN000277) and RCT Continuing Training and Requalification (FN000300)
- Radioactive Source Training (FN000048)
- Sealed Neutron Source Use for Support of Fermilab Experiments (FN000358)

8.0 Procedural Steps

8.1 Instructions for Use of Neutron Source in Experimental Areas

8.1.1 Requests for use of a neutron source must be made about one week in advance for planning and coordination purposes.

8.1.2 Radiological Worker training (FN000470 and FN000471) and Radioactive Source training (FN000048) are required for use of a neutron source. The Source Physicist is responsible for verifying training for all neutron source users. If training is not current, inform them that they must complete the training before the neutron source may be used.

8.1.3 The only neutron source allowed for use in Fermilab experimental areas is Californium-252, **Source ID 252-7.2-1**. No other neutron sources may be used outside of RPCF or Site 40.

8.1.4 RCTs must sign out 252-7.2-1 on the ES&H Section Radioactive Source Use Log (R.P. Form #8) that is located in RPCF Cave 1, on top of the neutron source storage cave.

8.1.5 No Am-241Be neutron sources may be used in experimental areas. If a request is made for use of an Am-241Be source, the Source Physicist will determine the feasibility of using source ID 241Be-5.2-1 at Site 40 or RPCF.

8.1.6 The Cf-252 neutron source ID 252-7.2-1 may be used only during normal working hours.

8.1.7 Scheduling for use of the neutron source must be coordinated with the HCTT Group Leader.

8.1.8 The Source Physicist notifies the appropriate assigned RSO. Include the assigned RSO on email correspondence regarding the use of a neutron source within their assigned area.

8.1.9 Schedule a time to meet with the experimenter(s) to determine where and how the neutron source will be used. The Source Physicist, Source Technician and/or backup, and the assigned RSO (as deemed necessary) should be included in this meeting.

8.1.10 Determine whether or not the neutron source can be used in a secured location. If the neutron source can be used in a locked room or in a room that can be padlocked, the neutron source can be used without constant supervision by authorized users. If the source cannot be secured in a locked room, authorized users as indicated on the RWP must continuously supervise the use of the neutron source. During lunch and other breaks, authorized users must switch off to provide continuous coverage while the neutron source is in the experimental area.

8.1.11 Inform source users that they must wear a dosimetry badge. Even though the neutron source does not constitute a Radiation Area, dosimetry badges are required due to the uncertainty of neutron exposure.

8.1.12 The Source Physicist generates a job-specific RWP to cover the use of the neutron source.

8.1.13 Send RWP to all personnel involved as well as the assigned RSO.

8.1.14 All authorized users must read and sign the RWP.
8.1.15 RCTs post the RWP where the neutron source will be used.
8.1.16 RCTs ensure that radiological postings are in place.
8.1.17 RCTs retrieve the signed RWP upon completion of work and return it to the Source Physicist.

9.0 Data and Records Management

ESH-RPO-SOURCE-06, Neutron Source Use in Experimental Areas, https://esh-docdb.fnal.gov/cgi-bin/sso/ShowDocument?docid=186

ES&H Section Radioactive Source Use Log (R.P. Form #8) is stored in an Access Log binder in the Source Physicist's office.

10.0 Quality Assurance/Quality Control

This procedure is subject to a review/update frequency requirement of five years and is due 2/2026.

11.0 References

Radiation Physics Form #8, ES&H Section Radioactive Source Use Log, https://esh-docdb.fnal.gov/cgi-bin/sso/ShowDocument?docid=2385

12.0 SOP Signature Sheet

N/A - procedure review and training specified in section 7.2 is tracked in TRAIN.

13.0 Procedure Specific Training Checklist

N/A - procedure review and training specified in section 7.2 is tracked in TRAIN.

14.0 Attachments

N/A