

SNS OPERATIONS PROCEDURES MANUAL



SNS-OPM 2.H-7.6

Spallation Neutron Source Radiation Shielding Configuration Policy

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| <u>HPC No.</u> | <u>Date</u> | <u>Page Nos.</u> | <u>Initials</u> |
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Spallation Neutron Source Radiation Shielding Configuration Policy

The development of suitable radiation shielding configurations for various components of the Spallation Neutron Source will continue throughout the lifetime of the facility. Processes must be in place to determine the proper shielding for normal operations and for conditioning/commissioning. Modifications to shielding are sometimes necessary, as is temporary shielding for special projects. Where shielding is relied on to prevent unacceptable exposures of workers or the public to radiation, the shielding configuration will be planned, approved, and controlled. Shielding configurations are designed with input and guidance from health physicists, neutronics modelers, physicists, and operations personnel. In every case where the shielding configuration is controlled, the modeled loss terms and shielding effectiveness are confirmed and refined based on radiation measurements made during initial testing and periodically after that. Any shielding which would, under normal operating conditions, expose workers to radiation fields greater than 1 rem/h if removed will be locked in place or otherwise secured. Exceptions to this policy can be granted by the SNS Operations Manager on recommendation from the Radiation Safety Committee.

Baseline shielding for normal operation of the SNS facility was determined based on best estimates of beam loss locations and intensities. Detailed modeling codes were used to simulate the radiation produced by the estimated beam loss and the effect of installed structures and shielding on that radiation. Conservative recommendations were used to allow for the uncertainty in this process, and typical shielding was based on models of the areas of greatest loss.

For conditioning and commissioning studies, detailed shielding plans are developed as the work planning evolves. When the design stabilizes, a position paper is generated which includes discussions of the work under consideration, the anticipated radiation source terms, and the appropriate shielding configuration. Active protection systems (e.g., specialized versions of the PPS or interlocked radiation detectors) are incorporated into the shielding plan before its review, approval, and submittal as a controlled document.

A review of shielding is part of every Accelerator or Instrument Readiness Review (ARR or IRR) and readiness assessment. In addition, specific independent modeling reviews have confirmed the accuracy and effectiveness of the calculations performed for this project. These independent review and evaluation activities help assure that the planned shielding will be appropriate to protect workers, visitors, and the public.

Revision History

- Rev. 03 February 16, 2015 – Changed title names on signature page to reflect current organizational structure. Added Revision History Section. Deleted Definitions and Examples section as it is redundant with other procedures.