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Architecture of the personnel protection systems for Spallation Neutron Source Second Target Station

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Oak Ridge National Laboratory (ORNL) is implementing a major upgrade to the Spallation Neutron Source (SNS) facility, encompassing the addition of the Second Target Station (STS). Preliminary design reviews have been conducted on several STS Personnel Protection Systems (PPS). The reviews focused primarily on the integration with the existing SNS PPS, the new proton transport tunnel, and the target areas. Development of the PPS is ongoing, to ensure a coherent safety system with the mission of protecting users and workers from prompt radiation hazards while providing high beam availability to operations. The STS PPS element in the Integrated Control System (ICS) is a facility-wide system composed of multiple safety subsystems, including the Ring to Second Target (RTST) beam transport tunnel, Target, Bunker and Instruments. Personnel working in all these geographic areas are protected by modular reliable PPS solutions. The safety system enforces access controls, radiation monitoring, beam destination control, and application of critical device inhibit upon detection of abnormal condition. It utilizes well-documented process, Common Industrial Protocol (CIP) safety, pulsed test, and redundancy to achieve the desire Safety Integrity Level (SIL). This paper gives an architectural overview of the STS PPS and a detailed safety plan for the SNS facility, addressing safety solutions and human factors.

Footnotes

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