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Modernization of PLC-based control systems at SNS

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When the SNS site was built around 20 years ago, the Conventional Facilities (CF) control systems were designed using 2 communication protocols to allow programmable logic controllers (PLCs) to interface with motors, variable frequency drives (VFDs), and distributed inputs and outputs (I/O). The protocol chosen to control motors and VFDs is DeviceNet, a CANbus-based protocol developed by Rockwell Automation. The protocol chosen to communicate with distributed I/O is ControlNet, another protocol developed by Rockwell Automation. Both of these protocols are obsolete and present reliability and maintainability issues, particularly DeviceNet. As the Control Systems Section at SNS is working to modernize control systems throughout the machine, a major goal for PLC-based systems is to remove the obsolete communication protocols in favor of standard, ubiquitous Ethernet. To this end, any new VFDs installed use Ethernet communication. Many VFDs are currently being replaced in the Central Utilities Building (CUB) and the Central Exhaust Facility (CEF) and are being removed from DeviceNet in favor of Ethernet communication. Planning is underway to retrofit Eaton Intelligent Technology motor control centers (MCCs) in the Target Building to remove DeviceNet adaptors and replace them with Ethernet adaptors for each motor starter. The ControlNet network in the CUB has been demolished, with I/O drops integrated into a local Ethernet network, improving sustainability and maintainability.

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