Subject: The SRF gun Blockhouse Interlocks


The SRF blockhouse was reviewed¹ on March 17, 2009 for full operations. There have been delays in the design of the system due to conflicts in the desired methods to implement the system and document it.

A fair amount of time was spent discussing principles of interlock design and documentation. Several small blockhouses are under construction and these would be good systems to develop new documentation methods and develop designs that address the risk of a facility.

Project management noted that there is concern that the schedule of this particular blockhouse could be impacted if a compromise on the design was not achieved. Other blockhouses could be used to implement new documentation and design practices. All agreed that the design will go forward without delay.

The generic topics discussed were:

1) Often the access controls for small low usage facilities are designed the same as complex high usage facilities. Small systems should have systems commensurate with their risk.
2) Most committee members are not comfortable with the State Tables used for the PLC systems. They also include a lot of information that is not needed for the definition of the functioning of the interlock system. It was noted that the State Tables in their present form are used as an installation and programming aid. They therefore contain lots of information to serve this purpose. However, they are now QA1 documents and any change requires an ECN. As an example, a schematic of the logic was provided for the primary system which requires two AND gates and an OR gate to implement the design. The State Tables on the other hand are 18 pages long.
3) The guidance to implement dissimilar components and systems should be followed more stringently. There are situations where this can be difficult. The principle of dissimilar components and systems is intended to reduce common modes of failure for redundant systems. It should be practiced as much as possible with good judgment.
4) The most likely representation of the logic that committee members are comfortable with is logic schematics. These could be made for each mode of the PLC system if need be.
5) Most of the present PLC designs have both Divisions, A and B, with the same functions even when some functions are not required to be redundant in the interlocks. Examples of items that are not required to be redundant in the interlocks are the warning system, the crash system, the check stations for the sweep, and the locking system. It is suggested that the A division have the extra items and therefore the programming of the systems also become dissimilar.

6) The regulations do not require that an interlock system prevent access if an error is detected. Many people find comfort in preventing access if one of the interlock systems detects an error. This often causes frustration for the users when they become locked out of an area during the summer shutdown, as an example. Locking an area on error detection should only be done when appropriate.

7) The Access Controls group would like to have more specific details from the RSC for the designs. It was noted that if an undefined item comes up they should ask for it to be defined.

**SRF Specific items**

Asher Etkin will work with the access controls group and provide to the committee logic diagrams for the SRF blockhouse interlocks for the committee to approve. The diagrams will be QA1 if approved by the QA Representative. *(Ck-SRF-FY2010-715)*

The State Table which act as an installation and programming tool will be change to a less stringent QA level. *(Ck-SRF-FY2010-716)*

The warning time will be 90 seconds. *(Ck-SRF-FY2010-717)*

The interlock systems will lock the gates if an error in the response of the critical devices is detected. *(Ck-SRF-FY2010-718)*

System A will be independent of system B. *(Ck-SRF-FY2010-719)*

Item that are not required to be redundant will be only in Division A. *(Ck-SRF-FY2010-720)*

The panels above the door will be used every time a Dewar is removed and placed into the blockhouse, about once per week. These panels will have redundant door switches. *(Ck-SRF-FY2010-721)*

The access to the area will use a card reader rather than the previously defined key control. *(Ck-SRF-FY2010-722)*

There will be no station inside the gate since it is not needed for the interlock logic. *(Ck-SRF-FY2010-723)*

It was noted that the area between the blockhouse and the shadow block will have barriers in the final configuration and these areas should not be used for mounting equipment boxes.
References

1) Link to RSC minutes of March 17, 2009.

CC:
Present
RSC
SRF RSC File
RSC Minutes File
D. Passarello