

NRC ISG

- Loss of automatic control functions; proper segmentation or distribution of control functions to control processors and input/output units can prevent large-scale loss of automatic control capability – however, if more advanced control functions or integrated control capabilities are provided involving interconnection or interaction among control functions, greater vulnerability to such failures may be introduced

Industry Comments

1. Most of this bullet pertains to segmentation of control functions. Segmentation is important to ensure control equipment failures do not result in unanalyzed plant transients that are not bounded by the safety analysis. While this is an important consideration, it is well beyond the scope of Minimum [HSI] Inventory. The control function segmentation issue is currently addressed in SRP Section 7.7-III.1 Bullet 4 and TWG #4 HICR- Communications Issues ISG Rev E Section 3.1-5. Bullet 7.
2. Since loss of automatic control functions can lead to AOOs, it is important for operators to be aware that automatic control functions have been lost. This concern is covered by Purpose of Minimum Inventory Bullet 2, which requires fixed position HSI to “help ensure operator awareness of threats to critical safety functions”. This bullet is intended to cover threats to critical safety functions during normal operation that could lead to plant trips; it is not limited to the traditional concept of critical safety functions which is associated only with post accident conditions. [It is noted that to distinguish these related critical function concepts, for System 80+ critical safety functions for normal operation were referred to as critical power production functions.]
3. If the safety analysis credits manual operator action for an AOO that results from a control system failure, the HSI needed to mitigate that AOO is covered by Minimum Inventory Bullet 1, which requires safety related HSI.
4. Regardless of what operator actions may be credited in the safety analysis, it is still desirable to give the operator the opportunity to take manual control and thereby avoid a reactor trip. This capability is built into the normally used non-safety HSI system. Additional Minimum Inventory requirements for supplemental HSI that is safety related (Bullet 1), fixed position (Bullet 2), independent (Bullet 3) or diverse (Bullet 4) is not warranted.
5. The applicant’s Concept of Operations is based on failures that adversely affect the normally used non-safety HSIs. If a failure is identified that concurrently affects the normally used non-safety HSIs (ie. no ability for manual control) and the automatic control functions, it is expected that a very conservative Concept of Operations would be selected. This would require immediate Trip or immediate Safe Shutdown.