

18.6 Systems Integration

18.6.1 Safety-Related Systems

The operator interfaces with the safety-related systems through (1) dedicated hardware switches for system initiation and logic reset, (2) hardware switches for system mode changes, (3) safety-related VDUs for individual safety equipment control, status display and monitoring, (4) non-safety-related VDUs for additional safety system monitoring, and (5) the large fixed-position display for plant overview information. Instrumentation and control aspects of the microprocessor-based safety systems and logic control (SSLC) are described in Appendix 7A.

Divisional separation for control, alarm and display equipment is maintained. The SSLC processors provide alarm signals to their respective safety-related alarm processors and provide display information to the divisionally dedicated VDUs. The SSLC microprocessors communicate with their respective divisional VDU controllers through the Essential Communication Function. The divisional VDUs have on-screen control capability.

SSLC also provides the plant safety-related systems status information (including alarms) to the plant non-safety-related communication network. Divisional isolation devices are provided between the safety-related systems and non-safety-related communication networks so that failures in the non-safety-related equipment will have no impact on the ability of the safety-related systems to perform their design functions. The non-safety-related communication network is part of the Non-Essential Communication Function described in Subsection 7.7.1.9.

Selected operator control functions are performed through dedicated hardware control switches which are Class 1E qualified and divisionally separated on the main control console. These hardware switches, and safety-related fixed-position displays, communicate with the SSLC safety-related systems logic units through hardwire signal transmission lines.

The divisionally dedicated VDUs are classified as safety-related equipment. These VDUs provide control and display capabilities for individual safety-related systems if control of a system component is required. Normally, such control actions are performed for equipment surveillance purposes only, as the normal method of system control is through the mode-oriented master sequence switches.

18.6.2 Non-Safety-Related Systems

For non-safety-related systems, operation control is accomplished using master sequence switches, on-screen control via the non-safety VDUs. The hardware switches for non-safety-related equipment on the main control console communicate with the non-safety-related systems logic units through hardwire transmission lines.

The non-safety-related systems communicate with other equipment in the operator interface through the Non-Essential Communication Function. The non-safety-related portion of the large display panel fixed-position displays is driven by a controller separate from the plant

computer functions. Alarm processing microprocessor units separate from the plant computer functions perform alarm filtering and suppression and also drive dedicated alarm tiles on the large display panel. The alarms for entry conditions into the symptomatic emergency operating procedures are provided by the alarm processing units, both safety and non-safety-related. Equipment level alarm information is presented by the plant computer functions on the main control console VDUs.