REACTOR PROTECTION AND CONTROL
PROCESS INSTRUMENTATION REPLACEMENT PROJECT AT
DONALD C. COOK NUCLEAR PLANT UNITS 1 AND 2

TECHNICAL SPECIFICATION
COMPLIANCE ASSESSMENT

REPORT NO. 2985-SKF-01, REV 0

Prepared by: _____ Date 12/14/92

Concurred by: _____ Date 12/14/92

Approved by: _____ Date 12/15/92

Subject:

This Report is to summarize the impact of the Cook Nuclear Plant Reactor Protection System Upgrade on the existing Technical Specifications.

References:

Cook Nuclear Plant Technical Specifications (both Unit 1 & 2).

Calculation 12-RPC-01 Loop Uncertainty/Setpoint Calculation For The Reactor Coolant Flow.

Calculation 12-RPC-04 Loop Uncertainty/Setpoint Calculation For Pressurizer Pressure.

Hurst Engineering Report 2985-HEI-01; Response Time Evaluation.

Instrument Society of America (ISA) draft recommended practice ISA-DRP67.04, Part II, Methodologies for the Determination of Setpoints for Nuclear Safety-Related Instrumentation (Draft 10).

Westinghouse Menu Driven Setpoint Calculation Program (WCAP-12741).

Issue:

The Cook Nuclear Plant, Reactor Protection System is being upgraded to Foxboro SPEC 200/SPEC 200 MICRO equipment. Several of the existing Technical Specifications contain definitions, testing, configuration, surveillance, and operability requirements which are potentially effected by the upgrade of this instrumentation. This evaluation was performed to document the impact of the Reactor Protection Upgrade on these Technical Specifications.

Scope:

The Technical Specifications were reviewed in detail to identify all areas of potential impact. The following areas were identified by this review:

1. Channel Functional Test Definition
2. Indicated DNB and TAVG operating parameters
3. Time Response Testing
4. Surveillance Intervals
5. Channel Operability Requirements
6. Permissives and Interlocks
7. Remote Shutdown Instrumentation
8. Appendix R Requirements
9. Post Accident Monitoring
10. Reactor Trip and Engineered Safety Feature Trip Setpoints
11. Reactor Trip and Engineered Safety Feature Allowable Values

This report provides a summary of the impact of the Reactor Protection and

Control System upgrade on each of these Technical Specification topics.

Discussion:

1. Channel Functional Test Definition

Based on information from other Plants performing similar projects, the definitions section of the Technical Specifications was reviewed. In particular the definition of Channel Functional Test was scrutinized. The current definition recognizes analog and bistable channels. Addition of a digital channel functional test definition, as done in some of the similar upgrades, would imply that there is some acceptance of equipment performance based on the input or monitoring of digital signals. This implication would not be correct. Even though the new instrumentation uses card level digital processors for signal processing, all communication between modules is by analog signal. All test points used for evaluating performance are located in the analog portions of the instrument loops. All inputs and outputs used as acceptance criteria for channel calibration, channel check, and channel functional tests are analog. The existing definition for Channel Functional Test, as well as the other definitions, are both appropriate and correct.

2. Indicated DNB and TAVG operating parameters (T.S 3.2.5)

Technical Specification 3.2.5 provides values for Reactor Coolant System Average Temperature, Pressurizer Pressure and Reactor Coolant System Total Flow Rate. The values provided include an instrument error allowance for the indication portion of these instrument loops. Based on review of the Unit 2 Cycle 9 Technical Specification submittal (AEP:NRC:1071E) these allowances are 2.7 degrees for Average Temperature, 63 psi for Pressurizer Pressure, and 3.5% Reactor Coolant Flow. Calculation 12-RPC-01 rev 0 shows the new Reactor Coolant flow indication uncertainty to be 3.1%. Calculation 2-RPC-04 rev 0 shows the Pressurizer Pressure indication uncertainty to be 49 psi. Both of these values are moderately conservative and acceptable. Uncertainties associated with Tavg Indication will be revised as a Unit 2 Cycle 10 specific parameter to reflect current assumptions relative to temperature streaming and calculation methods.

3. Time Response Testing

Time Response Testing is discussed in Report Number 2985-HEI-01. Manufacturers Specifications indicate that the new equipment will meet the current Technical Specification response time requirements. Instrument performance will be verified both during acceptance testing and during post installation tests.

4. Surveillance Intervals

The drift specifications of the new equipment are better than the installed equipment. This improvement may be sufficient to allow extension of some of the Surveillance intervals using the previously approved Westinghouse Owners Group Methodology; however, application for extended surveillance intervals will be deferred until an extensive amount of plant specific data has been collected and analyzed.

5. Channel Operability Requirements
6. Permissives and Interlocks

Design of the new equipment maintains the same functions and logic as the base design. There are no changes in either the number of channels or the channel power supply orientation of the Functional Units listed in the current Technical Specifications. The new equipment does not incorporate any channel bypass features. Existing Technical Specification Tables 3.3-1 and 3.3-3 accurately reflect the configuration of the new equipment. Similarly the various permissives and interlocks noted in the notes throughout Technical Specification Section 3.4.3 are not effected.

7. Remote Shutdown Instrumentation
8. Appendix R Requirements
9. Post Accident Monitoring

Current Technical Specification requirements for Remote Shutdown Instrumentation, Appendix R Remote Shutdown Instrumentation, and Post-Accident Instrumentation were reviewed. The new instrumentation does not add or delete any plant parameters. No indicators are added, deleted, or moved. No Surveillance Interval changes are required. The Reactor Protection and Control System Upgrade will have no impact on compliance with these Technical Specification requirements.

10. Reactor Trip and Engineered Safety Feature Trip Setpoints

All Trip Setpoints noted in tables 2.2-1, Reactor Trip System Instrumentation Trip Setpoints and table 3.3-4, Engineered Safety Feature Actuation System Instrumentation Trip Setpoints were evaluated. Functional Units associated with Neutron Flux were not recalculated because the Nuclear Instrumentation is not effected by this project. The remaining Functional Units for Unit 2 have been recalculated.

Trip setpoint calculations were based both on Instrument Society of America (ISA) draft recommended practice ISA-dRP67.04, Part II, Methodologies for the Determination of Setpoints for Nuclear Safety-Related Instrumentation (Draft 10) and the Westinghouse Menu Driven Setpoint Calculation Program, WCAP-12741 (STEPIT). The ISA methodology was used to provide a completely new set of calculations

based on manufacturers published data, qualification test reports, Plant specific procedures and Plant specific practices. These calculations address the entire instrument loop (process connection through bistable output) and include inaccuracies associated with cable insulation losses. The Westinghouse methodology was used as a direct comparison between the current H-Line equipment and the SPEC 200/SPEC 200 MICRO equipment. The STEPIT databases were first benchmarked against the existing setpoint studies performed by Westinghouse. The rack portions of the databases were then modified to reflect the new equipment. Accuracies used in the STEPIT databases reflect analog signal accuracies, this assured both the applicability and fidelity of the Westinghouse methodology. The new values from both calculations were then compared with the existing values contained in the Technical Specifications. In all cases the calculated Trip Setpoints were conservative to the existing Technical Specification values.

11. Reactor Trip and Engineered Safety Feature Allowable Values

All Allowable Values noted in tables 2.2-1, Reactor Trip System Instrumentation Trip Setpoints and table 3.3-4, Engineered Safety Feature Actuation System Instrumentation Trip Setpoints were evaluated. Functional Units associated with Neutron Flux were not recalculated because the Nuclear Instrumentation System is not effected by this project. Allowable Values associated with the remaining Functional Units using the same methodology described above for Trip Setpoints.

The existing Technical Specification Allowable Values are conservative approximations of current calculated allowances. Of the 16 Allowable values examined , 6 are based on the original license practice of a 1% or 10 psi difference between the trip and allowable values. The remaining values are conservative approximations of the values calculated by STEPIT. The conservatism built into the existing values is sufficient to bound the calculation variance caused by the improved drift characteristics of the SPEC 200/SPEC 200 MICRO equipment.

Conclusion:

The replacement of the existing Foxboro H-line Reactor Protection System Instrumentation with Foxboro SPEC 200/SPEC 200 M ICRO Instrumentation does not generate the need for a Technical Specification Amendment.

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