## TECHNICAL SPECIFICATION CHANGE REQUEST NO. 97

Replace pages 2-5, 2-6, 2-7, B2-4, B2-5, 3/4 3-2 and 3/4 3-3 of Appendix A with the replacement pages provided.

## PROPOSED CHANGE

This change will allow operation of Crystal River Unit 3 during Cycle IV, at power levels up to 2300 MWt without an RPS trip based on Reactor Coolant Pump Power Monitors (RCPPM's). This change requires that the trip setpoints for Nuclear Overpower, based on RCS Flow and Axial Power Imbalance, be reduced to provide DNBR protection previously provided by RCPPM's. The enclosed revision to Figure 2.2-1 reflects these reductions. In addition, the Integrated Control System (ICS) must be limited to 92.41% of Rated Thermal Power and the Nuclear Overpower Trip setpoint will be reduced to 94.8% Rated Thermal Power. The latter two changes will (a) prevent the ICS from driving reactor power beyond transient envelope assumptions, and (b) provide trips, on increasing flux, in time frames consistent with the original Cycle IV analyses for Full Power operation.

## REASON FOR PROPOSED CHANGE

Operation with the RCPPM's has resulted in an unacceptable number of spurious plant trips. The plant has been tripped by distant lightning strikes, output pertubations from distant generating plants, startup of an idle reactor coolant pump, swap-over from unit-startup to unit-auxiliary transformer and other causes. These spurious trips are counter-productive from both safety and economic standpoints.

The RCPPM's were installed as required by the NRC as part of the Crystal River Unit 3 power level upgrade from 2452 to 2544 MWt. Their purpose is to anticipate the loss of Reactor Coolant flow by monitoring the power supply to the Reactor Coolant Pump motors. At higher power levels, the RCPPM's are necessary because they provide a reactor trip in a shorter time frame than other RPS trips; thus providing greater DNBR margin. At a conservative power level of 2300 MWt or less, the RCPPM's are not necessary since the Nuclear Overpower based on Reactor Coolant Flow and Axial Power Imbalance trip is sufficiently fast to protect the DNBR margin.

## SAFETY ANALYSIS

Babcock & Wilcox analyses performed in support of operation at power levels up to 2300 MWt, without RCPPM's, yield a minimum DNBR of 1.35 for the most limiting pump coastdown event (four pump coastdown). Acceptable MDNBR for Cycle IV is 1.35. Therefore, the DNBR criterion is met.

The requirement to limit the ICS to 92.41% Rated Thermal Power is to ensure that initial transient conditions will be within the bounds of the B&W Analyses.

All B&W analyses were performed using assumptions and methodologies consistent with NRC approved reload techniques.

## TABLE 2.2-1

## REACTOR PROTECTION SYSTEM INSTRUMENTATION TRIP SETPOINTS

| | FUNCTION UNIT | TRIP SETPOINT | ALLOWABLE VALUES |
|---|---|---|---|
| 1. | Manual Reactor Trip | Not Applicable | Not Applicable |
| 2. | Nuclear Overpower | $\leq$ 94.8% of RATED THERMAL POWER with four pumps operating | $\leq$ 94.8% of RATED THERMAL POWER with four pumps operating |
| | | $\leq$ 72.08% of RATED THERMAL POWER with three pumps operating | $\leq$ 72.08% of RATED THERMAL POWER with three pumps operating |
| 3. | RCS Outlet Temperature - High | $\leq$ 618°F | $\leq$ 618°F |
| 4. | Nuclear Overpower Based on RCS Flow and AXIAL POWER IMBALANCE (1) | Trip Setpoint not to exceed the limit line of Figure 2.2-1 | Allowable Values not to exceed the limit line of Figure 2.2-1 |
| 5. | RCS Pressure - Low (1) | $\geq$ 1800 psig | $\geq$ 1800 psig |
| 6. | RCS Pressure - High | $\leq$ 2300 psig | $\leq$ 2300 psig |
| 7. | RCS Pressure - Variable Low (1) | $\geq$ (11.59 $T_{out}$ °F - 5037.8) psig | $\geq$ (11.59 $T_{out}$ °F - 5037.8) psig |

TABLE 2.2-1 (Continued)

REACTOR PROTECTION SYSTEM INSTRUMENTATION TRIP SETPOINTS

| | FUNCTION UNIT | TRIP SETPOINT | ALLOWABLE VALUES |
|---|---|---|---|
| 8. | Nuclear Overpower Based on Reactor Coolant Pump Power Monitors (1) (2) | More than one pump not operating | More than one pump not operating |
| 9. | Reactor Containment Vessel Pressure High | $\leq$ 4 psig | $\leq$ 4 psig |

(1) Trip may be manually bypassed when RCS pressure $\leq$ 1720 psig by actuating Shutdown Bypass provided that:

a. The Nuclear Overpower Trip Setpoint is $\leq$ 5% of RATED THERMAL POWER
b. The Shutdown Bypass RCS Pressure - High Trip Setpoint of $\leq$ 1720 psig is imposed, and
c. The Shutdown Bypass is removed when RCS Pressure > 1800 psig.

(2) Trip may be manually bypassed when reactor power is less than or equal to 2300 MWt.

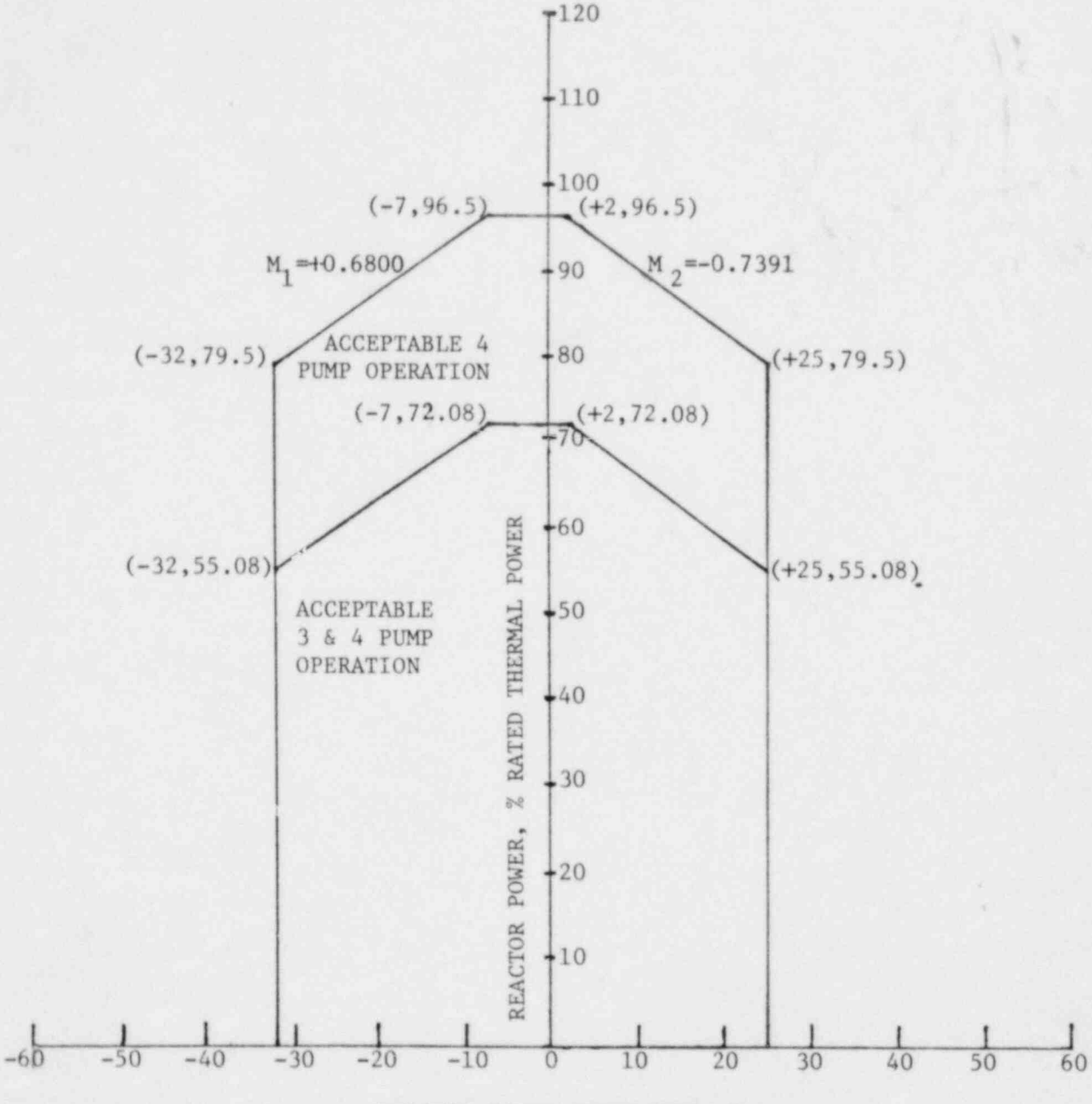


FIGURE 2.2-1

TRIP SETPOINT FOR NUCLEAR OVERPOWER BASED ON
RCS FLOW AND AXIAL POWER IMBALANCE

BASES

## 2.2.1 REACTOR PROTECTION SYSTEM INSTRUMENTATION SETPOINTS

The Reactor Protection System Instrumentation Trip Setpoint specified in Table 2.2-1 are the values at which the Reactor trips are set for each parameter. The Trip Setpoints have been selected to ensure that the reactor core and reactor coolant system are prevented from exceeding their safety limits. Operation with a trip setpoint less conservative than its Trip Setpoint but within its specified Allowable Value is acceptable on the basis that the difference between each Trip Setpoint and the Allowable Value is equal to or less than the drift allowance assumed for each trip in the safety analyses.

The Shutdown Bypass provides for bypassing certain functions of the Reactor Protection System in order to permit control rod drive tests, zero power PHYSICS TESTS and certain startup and shutdown procedures. The purpose of the Shutdown Bypass RCS Pressure-High trip is to prevent normal operation with Shutdown Bypass activated. This high pressure trip setpoint is lower than the normal low pressure trip setpoint so that the reactor must be tripped before the bypass is initiated. The Nuclear Overpower Trip Setpoint of $\leq$ 5.0% prevents any significant reactor power from being produced. Sufficient natural circulation would be available to remove 5.0% of RATED THERMAL POWER if none of the reactor coolant pumps were operating.

### Manual Reactor Trip

The Manual Reactor Trip is a redundant channel to the automatic Reactor Protection System instrumentation channels and provides manual reactor trip capability.

### Nuclear Overpower

A Nuclear Overpower trip at high power level (neutron flux) provides reactor core protection against reactivity excursions which are too rapid to be protected by temperature and pressure protective circuitry.

During normal station operation, reactor trip is initiated when the reactor power level reaches 94.8% of rated power. Due to calibration and instrument errors, the maximum actual power at which a trip would be actuated could be 101.9% which was used in the safety analysis.

## RCS Outlet Temperature - High

The RCS Outlet Temperature High trip $\leq$ 618°F prevents the reactor outlet temperature from exceeding the design limits and acts as a backup trip for all power excursion transients.

## Nuclear Overpower Based on RCS Flow and AXIAL POWER IMBALANCE

The power level trip setpoint produced by the reactor coolant system flow is based on a flux-to-flow ratio which has been established to accommodate flow decreasing transients from high power.

The power level trip setpoint produced by the power-to-flow ratio provides both high power level and low flow protection in the event the reactor power level increases or the reactor coolant flow rate decreases. The power level setpoint produced by the power-to-flow ratio provides overpower DNB protection for all modes of pump operation. For every flow rate there is a maximum permissible power level, and for every power level there is a minimum permissible low flow rate. Typical power level and low flow rate combinations for the pump situations of Table 2.2-1 are as follows:

1. Trip would occur when four reactor coolant pumps are operating if power is $\geq$ 96.5% and reactor flow rate is 100%, or flow rate is $\leq$ 93.69% and power level is 90.41%.

2. Trip would occur when three reactor coolant pumps are operating if power is $\geq$ 72.08% and reactor flow rate is 74.7%, or flow rate is $\leq$ 70.26% and power is 67.81%.

For safety calculations the maximum calibration and instrumentation errors for the power level were used.

## TABLE 3.3-1

## REACTOR PROTECTION SYSTEM INSTRUMENTATION

| | FUNCTIONAL UNIT | TOTAL NO. OF CHANNELS | CHANNELS TO TRIP | MINIMUM CHANNELS OPERABLE | APPLICABLE MODES | ACTION |
|---|---|---|---|---|---|---|
| 1. | Manual Reactor Trip | 1 | 1 | 1 | 1, 2 and * | 8 |
| 2. | Nuclear Overpower | 4 | 2 | 3 | 1, 2 | 2# |
| 3. | RCS Outlet Temperature - High | 4 | 2 | 3 | 1, 2 | 3# |
| 4. | Nuclear Overpower Based on RCS Flow and AXIAL POWER IMBALANCE | 4 | 2(a) | 3 | 1, 2 | 2# |
| 5. | RCS Pressure - Low | 4 | 2(a) | 3 | 1, 2 | 3# |
| 6. | RCS Pressure - High | 4 | 2 | 3 | 1, 2 | 3# |
| 7. | Variable Low RCS Pressure | 4 | 2(a) | 3 | 1, 2 | 3# |
| 8. | Reactor Containment Pressure - High | 4 | 2 | 3 | 1, 2 | 3# |
| 9. | Intermediate Range, Neutron Flux and Rate | 2 | 0 | 2 | 1, 2 and * | 4 |
| 10. | Source Range, Neutron Flux and Rate | | | | | |
| | A. Startup | 2 | 0 | 2 | 2## and * | 5 |
| | B. Shutdown | 2 | 0 | 1 | 3, 4 and 5 | 6 |
| 11. | Control Rod Drive Trip Breakers | 2 per trip system | 1 per trip system | 2 per trip system | 1, 2 and * | 7# |
| 12. | Reactor Trip Module | 2 per trip system | 1 per trip system | 2 per trip system | 1, 2 and * | 7# |
| 13. | Shutdown Bypass RCS Pressure - High | 4 | 2 | 3 | 2**, 3**, 4**, 5** | 6# |
| 14. | Reactor Coolant Pump Power Monitors | 4 | 2(a,b) | 3 | 1***, 2*** | 3# |

## TABLE 3.3-1 (Continued)

## TABLE NOTATION

*With the control rod drive trip breakers in the closed position and the control rod drive system capable of rod withdrawal.

**When Shutdown Bypass is actuated.

***For one time only, the reactor coolant pump power monitor trip function may be manually bypassed in Modes 1 and 2 (at less than 40% Full Power) for the duration of special testing. These tests are to be conducted following startup from the unit outage which began on January 28, 1982.

#The provisions of Specification 3.0.4 are not applicable.

##High voltage to detector may be de-energized above $10^{-10}$ amps on both Intermediate Range channels.

(a) Trip may be manually bypassed when RCS pressure $\leq$ 1720 psig by actuating Shutdown Bypass provided that:

(1) The Nuclear Overpower Trip Setpoint is $\leq$ 5% of RATED THERMAL POWER,

(2) The Shutdown Bypass RCS Pressure - High Trip Setpoint of $\leq$ 1720 psig is imposed, and

(3) The Shutdown Bypass is removed when RCS pressure >1800 psig.

(b) Trip may be manually bypassed when reactor power is less than or equal to 2300 MWt.

## ACTION STATEMENTS

**ACTION 1** - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, restore the inoperable channel to OPERABLE status within 48 hours or be in at least HOT STANDBY within the next 6 hours and/or open the control rod drive trip breakers.

**ACTION 2** - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided all of the following conditions are satisfied:

a. The inoperable channel is placed in the tripped condition within one hour.

b. The Minimum Channels OPERABLE requirement is met; however, one additional channel may be bypassed for up to 2 hours for surveillance testing per Specification 4.3.1.1.