TECHNICAL SPECIFICATION CHANGE REQUEST NO. 70

Replace pages 2-2, 2-3, 2-7, B2-2, B2-4, B2-5, B2-6, B2-8 and 3/4 3-2 with the attached revised pages 2-2, 2-3, 2-7, B2-2, B2-4, B2-5, B2-6, B2-8 and 3/4 3-2.

PROPOSED CHANGES

This proposal revises the RPS setpoints, safety limits, and operating limits, allowing operation of Crystal River 3 at 2544 MW thermal.

REASON FOR PROPOSED CHANGE

During Babcock & Wilcox' review(s) of BAW-10003 (environmental qualification of B&W supplied equipment) in response to IE Bulletin 79-01B, it was determined the RPS instrument string errors exceeded those originally assumed in the various safety analyses. Our letter of 4/9/81 (P. Y. Baynard to J. F. Stolz) described our program to resolve the issue. These changes are the end result of those efforts.

SAFETY ANALYSIS

These changes were provided to FPC in the form of Revision 2 to BAW-1607 (Cycle III Reload). The incorporation of these changes into the various analyses allows operation of Crystal River 3 for Cycle III with the recent revisions to RPS error assumptions and at a power level of 2544 MW thermal. Operation to-date at 2452 MW has provided adequate margin to account for the RPS errors, thus safety limits have not nor will they be exceeded should the power level upgrade be achieved in Cycle III. Therefore, neither operation to-date nor future operation at 2544 MW with the revised RPS limits constitutes an unreviewed safety question.

1.0 DEFINITIONS

DEFINED TERMS

1.1 The DEFINED TERMS of this section appear in capitalized type and are applicable throughout these Technical Specifications.

THERMAL POWER

1.2 THERMAL POWER shall be the total reactor core heat transfer rate to the reactor coolant.

RATED THERMAL POWER

1.3 RATED THERMAL POWER shall be a total reactor core heat transfer rate to the reactor coolant of 2544 MWt.

OPERATIONAL MODE

1.4 An OPERATIONAL MODE shall correspond to any one inclusive combination of core reactivity condition, power level and average reactor coolant temperature specified in Table 1.1.

ACTION

1.5 ACTION shall be those additional requirements specified as corollary statements to each principle specification and shall be part of the specifications.

OPERABLE - OPERABILITY

1.6 A system, subsystem, train, component or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified function(s) Implicit in this definition shall be the assumption that all necessary attendant instrumentation, controls, normal and emergency electrical power sources, cooling or seal water, lubrication or other auxiliary equipment, that are required for the system, subsystem, train, component or device to perform its function(s), are also capable of performing their related support function(s).

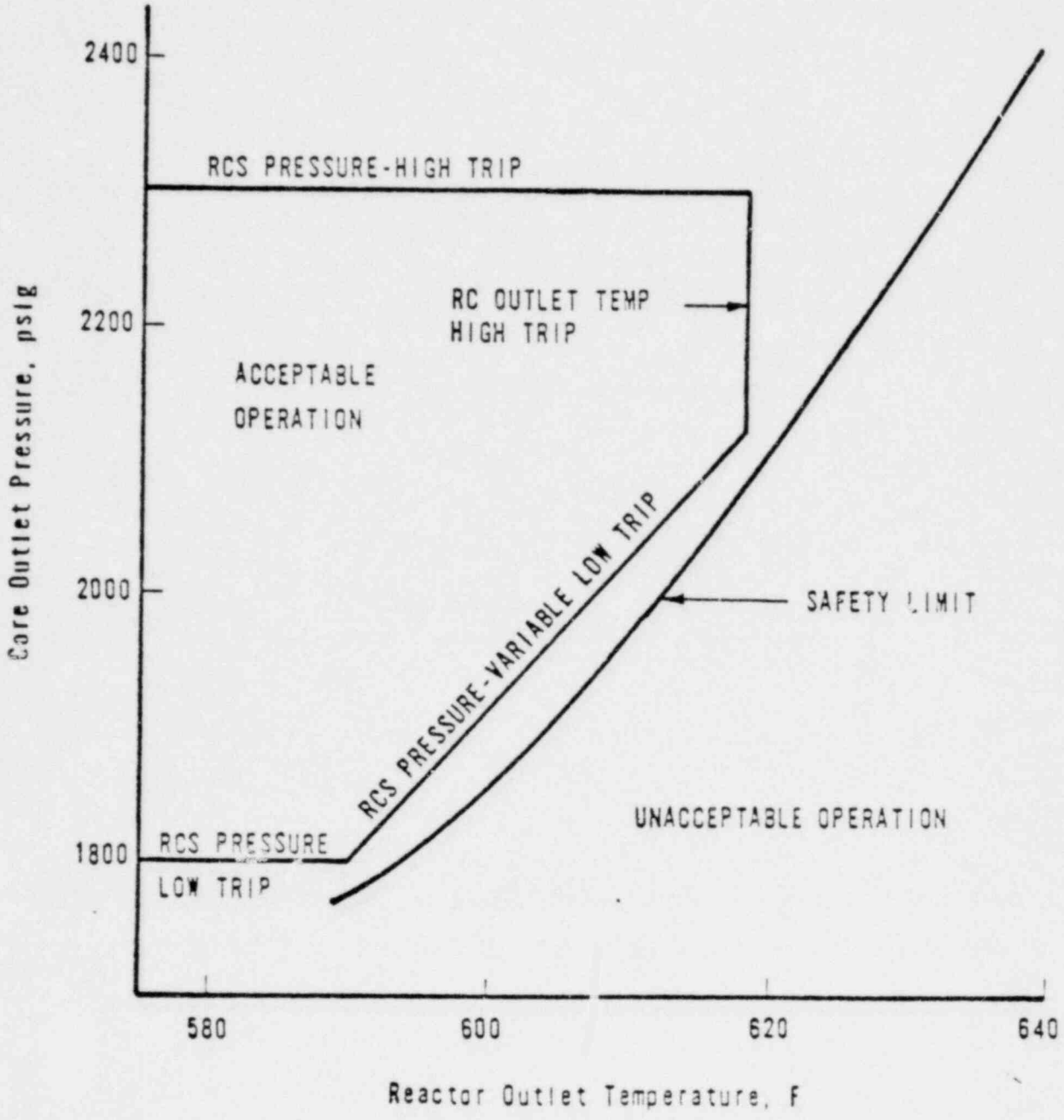

FIGURE 2.1-1

REACTOR CORE SAFETY LIMIT

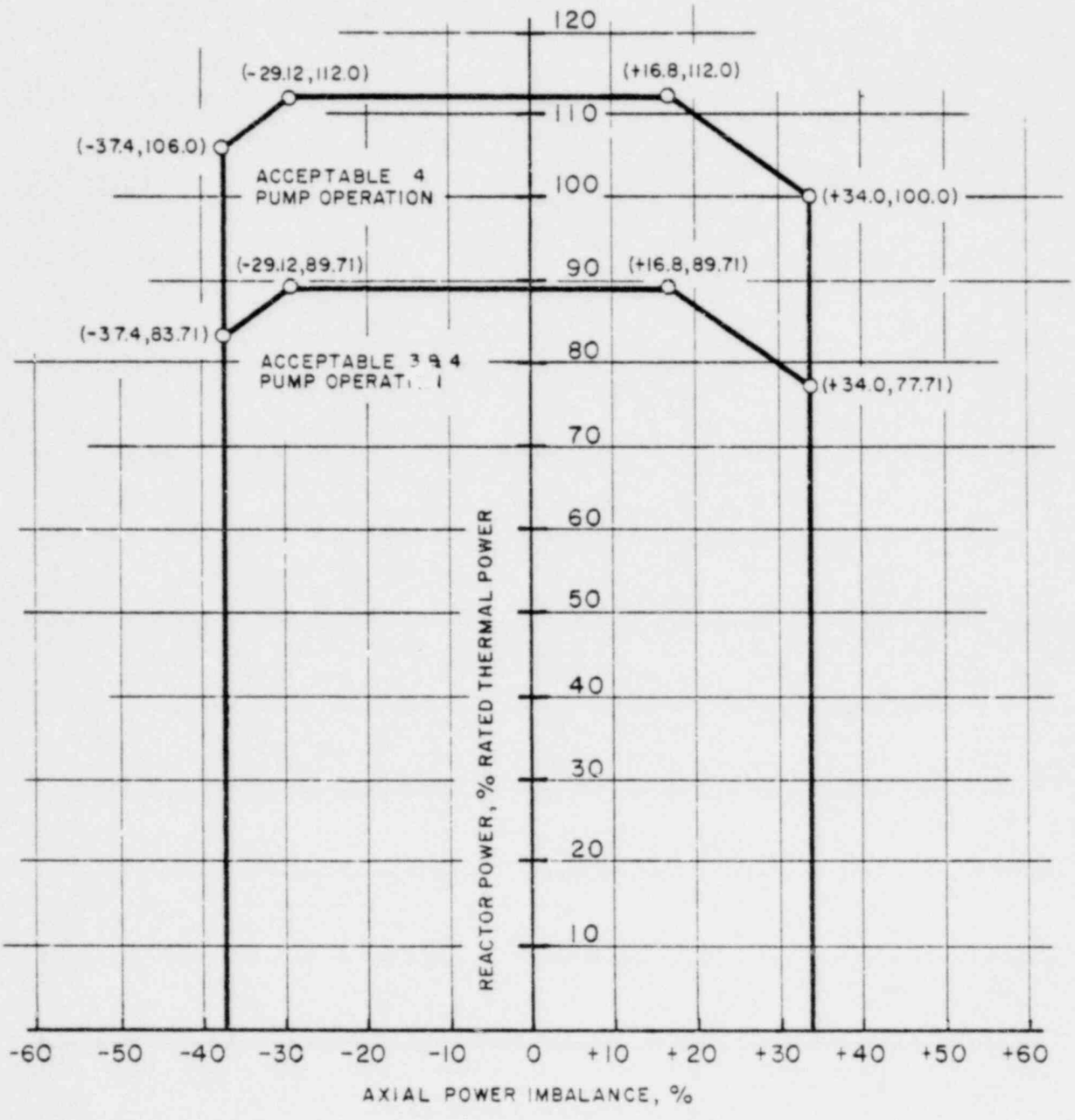

FIGURE 2.1-2

REACTOR CORE SAFETY LIMIT

TABLE 2.2-1

REACTOR PROTECTION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES
1. Manual Reactor Trip	Not Applicable	Not Applicable
2. Nuclear Overpower	$\leq$ 104.88% of RATED THERMAL POWER with four pumps operating	$\leq$ 104.88% of RATED THERMAL POWER with four pumps operating
	$\leq$ 79.92% of RATED THERMAL POWER with three pumps operating	$\leq$ 79.92% 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	$\geq$ 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	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 < 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.

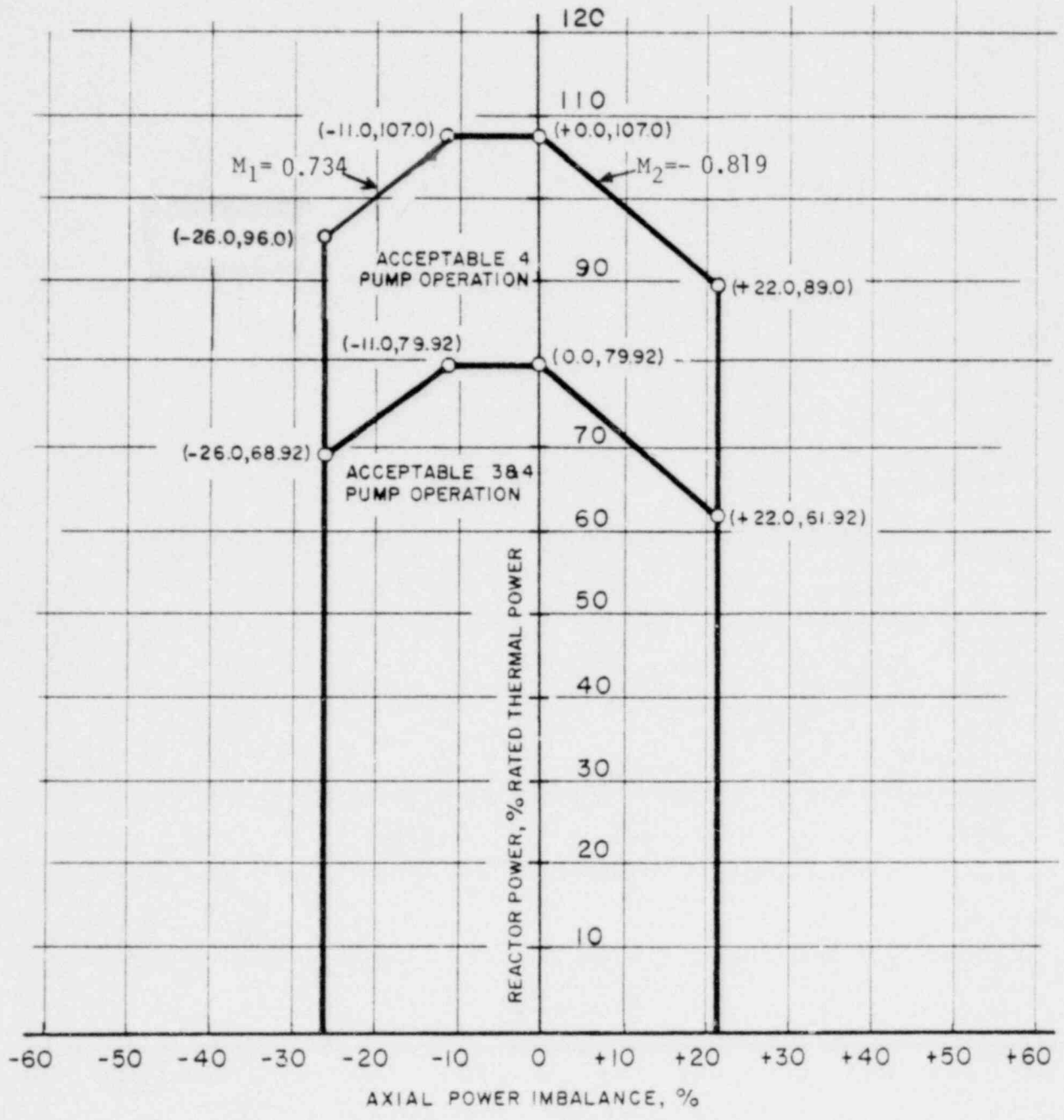

FIGURE 2.2-1

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

For each curve of BASES Figure 2.1, a pressure-temperature point above and to the left of the curve would result in a DNBR greater than 1.30 or a local quality at the point of minimum DNBR less than 22% for that particular reactor coolant pump situation. The 1.30 DNBR curve for three pump operation is more restrictive than any other reactor coolant pump situation because any pressure/temperature point above and to the left of the three pump curve will be above and to the left of the other curves.

2.1.3 REACTOR COOLANT SYSTEM PRESSURE

The restriction of this Safety Limit protects the integrity of the Reactor Coolant System from overpressurization and thereby prevents the release of radionuclides contained in the reactor coolant from reaching the containment atmosphere.

The reactor pressure vessel and pressurizer are designed to Section III of the ASME Boiler and Pressure Vessel Code which permits a maximum transient pressure of 110%, 2750 psig, of design pressure. The Reactor Coolant System piping, valves and fittings, are designed to USAS B 31.7, February, 1968 Draft Edition, which permits a maximum transient pressure of 110%, 2750 psig, of component design pressure. The Safety Limit of 2750 psig is therefore consistent with the design criteria and associated code requirements.

The entire Reactor Coolant System is hydrotested at 3125 psig, 125% of design pressure, to demonstrate integrity prior to initial operation.

2.2 LIMITING SAFETY SYSTEM SETTINGS

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 104.88% of rated power. Due to calibration and instrument errors, the maximum actual power at which a trip would be actuated could be 112%, which was used in the safety analysis.

RCS Outlet Temperature - High

The RCS Outlet Temperature High trip ≤ 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 ≥ 107% and reactor flow rate is 100%, or flow rate is ≤ 93.45% and power level is 100%.

2. Trip would occur when three reactor coolant pumps are operating if power is ≥ 79.92% and reactor flow rate is 74.7%, or flow rate is ≤ 70.09% and power is 75%.

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

The AXIAL POWER IMBALANCE boundaries are established in order to prevent reactor thermal limits from being exceeded. These thermal limits are either power peaking kw/ft limits or DNBR limits. The AXIAL POWER IMBALANCE reduces the power level trip produced by the flux-to-flow ratio such that the boundaries of Figure 2.2-1 are produced. The flux-to-flow ratio reduces the power level trip and associated reactor power-reactor power-imbalance boundaries by 1.07% for a 1% flow reduction.

RCS Pressure - Low, High, and Variable Low

The High and Low trips are provided to limit the pressure range in which reactor operation is permitted.

During a slow reactivity insertion startup accident from low power or a slow reactivity insertion from high power, the RCS Pressure-High setpoint is reached before the Nuclear Overpower Trip Setpoint. The trip setpoint for RCS Pressure-High, 2300 psig, has been established to maintain the system pressure below the safety limit, 2750 psig, for any design transient. The RCS Pressure-High trip is backed up by the pressurizer code safety valves for RCS over pressure protection and is, therefore, set lower than the set pressure for these valves, 2500 psig. The RCS Pressure-High trip also backs up the Nuclear Overpower trip.

The RCS Pressure-Low, 1800 psig, and RCS Pressure-Variable Low, (11.59 T_{out} °F - 5037.8) psig, Trip Setpoints have been established to maintain the DNB ratio greater than or equal to 1.30 for those design accidents that result in a pressure reduction. It also prevents reactor operation at pressures below the valid range of DNB correlation limits, protecting against DNB.

Due to the calibration and instrumentation errors, the safety analysis used a RCS Pressure-Variable Low Trip Setpoint of (11.59 T_{out} °F - 5037.8) psig.

Reactor Containment Vessel Pressur - High

The Reactor Containment Vessel Pressure-High Trip Setpoint $\leq$4 psig, provides positive assurance that a reactor trip will occur in the unlikely event of a steam line failure in the containment vessel or a loss-of-coolant accident, even in the absence of a RCS Pressure-Low trip.

Reactor Coolant Pump Power Monitors

In conjunction with the power/imbalance/flow trips, the Reactor Coolant Pump Power Monitors trip prevents the minimum core DWBR from decreasing below 1.30 by tripping the reactor due to more than one reactor coolant pump/not operating.

A reactor coolant pump is considered to be not operating when the power required by the pump motor is > 120% or is < 70% of the nominal operating power. The nominal operating power decreases from when a pump is first started during heatup and is pumping dense fluid typically (7500KW) to when a pump is operating at full reactor power and is pumping less dense fluid typically (5500 KW). In order to avoid spurious trips during normal operation, the 120% trip setpoint (900 KW) is based on the nominal operating power for a pump during heatup and the 70% trip setpoint (3900 KW) is based on the nominal operating power for a pump operating at full reactor power.

THIS FIGURE IS DELETED
FOR THE REMAINDER OF
CYCLE 3

FIGURE 3.2-2