



South Texas Project Electric Generating Station P.O. Box 289 Wadsworth, Texas 77483

June 5, 2002  
NOC-AE-02001334  
File No.: G25  
STI: 31451791

U. S. Nuclear Regulatory Commission  
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South Texas Project  
Units 1 and 2  
Docket Nos. STN 50-498, STN 50-499  
Technical Specification Bases Changes

Revised South Texas Project Technical Specification Bases pages are attached for your information and for updating of the NRC copy of the Technical Specification's. The attached pages incorporate information regarding the recently approved amendment for 1.4 percent power uprate.

If there are any questions regarding these changes, please contact me at (361) 972-7136.

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Manager, Licensing

mkj

Attachment: Revised Technical Specification Bases Pages B 2-1 and B 3/4 7-1

A-001

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**ATTACHMENT**  
**REVISED BASES PAGES**

## SAFETY LIMITS

### BASES

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#### 2.1.1 REACTOR CORE

The restrictions of this Safety Limit prevent overheating of the fuel and possible cladding perforation which would result in the release of fission products to the reactor coolant. Overheating of the fuel cladding is prevented by restricting fuel operation to within the nucleate boiling regime where the heat transfer coefficient is large and the cladding surface temperature is slightly above the coolant saturation temperature.

Operation above the upper boundary of the nucleate boiling regime could result in excessive cladding temperatures because of the onset of departure from nucleate boiling (DNB) and the resultant sharp reduction in heat transfer coefficient. DNB is not a directly measurable parameter during operation and therefore THERMAL POWER and reactor coolant temperature and pressure have been related to DNB through the WRB-1 correlation and the WRB-2M correlation. The WRB-1 DNB and WRB-2M correlations have been developed to predict the DNB flux and the location of DNB for axially uniform and nonuniform heat flux distributions. The local DNB heat flux ratio (DNBR) is defined as the ratio of the heat flux that would cause DNB at a particular core location to the local heat flux and is indicative of the margin to DNB.

The DNB design basis is as follows: uncertainties in the WRB-1 and WRB-2M correlations, plant operating parameters, nuclear and thermal parameters, fuel fabrication parameters, and computer codes are considered statistically such that there is at least a 95 percent probability with a 95 percent confidence level that DNBR will not occur on the most limiting fuel rod during Condition I and II events. This establishes a design DNBR value which must be met in plant safety analyses using values of input parameters without uncertainties. In addition, margin has been maintained in the design by meeting safety analysis DNBR limits in performing safety analyses.

The reactor core Safety Limits are established to preclude violation of the following fuel design criteria:

- a. There must be at least a 95% probability at a 95% confidence level (the 95/95 DNB criterion) that the hot fuel rod in the core does not experience DNB; and
- b. There must be at least a 95% probability at a 95% confidence level that the hot fuel pellet in the core does not experience centerline fuel melting.

The reactor core Safety Limits are used to define the various Reactor Protection System (RPS) functions such that the above criteria are satisfied during steady state operation, normal operational transients, and anticipated operational occurrences (AOOs). To ensure that the RPS precludes the violation of the above criteria, additional criteria are applied to the Overtemperature and Overpower  $\Delta T$  reactor trip functions. That is, it must be demonstrated that the average enthalpy in the hot leg is less than or equal to the saturation enthalpy and that the core exit quality is within the limits defined by the DNBR correlation. Appropriate functioning of the RPS ensures that, for variations in the Thermal Power, RCS Pressure, RCS average temperature, RCS flow rate, and  $\Delta I$ , the reactor core Safety Limits will be satisfied during steady state operation, normal operational transients, and AOOs.

## 3/4.7 PLANT SYSTEMS

### BASES

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#### 3/4.7.1 TURBINE CYCLE

##### 3/4.7.1.1 SAFETY VALVES

The OPERABILITY of the main steam line Code safety valves ensures that the Secondary System pressure will be limited to within 110% (1413.5 psig) of its design pressure of 1285 psig during the most severe anticipated system operational transient. The maximum relieving capacity is associated with a Turbine trip from 100% RATED THERMAL POWER coincident with an assumed loss of condenser heat sink (i.e., no steam bypass to the condenser).

Five MSSVS, each with an orifice size of 16 in<sup>2</sup>, are located on each main steam header, outside containment, upstream of the main steam isolation valves. The specified valve lift settings and relieving capacities are in accordance with the requirements of Section III of the ASME Boiler and Pressure Code, 1971 Edition. The total relieving capacity for all valves on all of the steam lines is 20.65 x 10<sup>6</sup> lbs/h which is 122% of the total secondary steam flow of 16.94 X 10<sup>6</sup> lbs/h for the Model E steam generators or 120% of the total secondary steam flow of 17.20 X 10<sup>6</sup> lbs/hr for the Model Δ94 steam generators at 100% RATED THERMAL POWER. A minimum of two OPERABLE safety valves per steam generator ensures that sufficient relieving capacity is available for the allowable THERMAL POWER restriction in Table 3.7-1.

STARTUP and/or POWER OPERATION is allowable with safety valves inoperable within the limitations of the ACTION requirements on the basis of the reduction in Secondary Coolant System steam flow and THERMAL POWER required by the reduced Reactor trip settings of the Power Range Neutron Flux channels. The Reactor Trip Setpoint reductions are derived on the following bases:

$$Hi \Phi = \left( \frac{100}{Q} \right) \left( \frac{w_s h_{fg} N}{K} \right)$$

Where:

- Hi  $\Phi$  = Safety analysis power range high neutron flux setpoint, percent
- Q = Nominal NSSS power rating of the plant (including reactor coolant pump heat), MWt
- K = Conversion Factor, 947.82 (BTU/sec)/MWt
- w<sub>s</sub> = Minimum total steam flow rate capability of the operable MSSVs on any one steam generator at the highest MSSV opening pressure, including tolerance and accumulation, as appropriate, in lbm/sec. For example, if the maximum number of inoperable MSSVs on any one steam generator is one, then w<sub>s</sub> should be a summation of the capacity of the operable MSSVs at the highest operable MSSV operating pressure, excluding the highest capacity MSSV. If the maximum number of inoperable MSSVs per steam generator is three, then w<sub>s</sub> should be a summation of the capacity of the operable MSSVs at the highest operable MSSV operating pressure, excluding the three highest capacity MSSVs.
- h<sub>fg</sub> = Heat of vaporization for steam at the highest MSSV operating pressure including allowances for tolerance, drift, and accumulation, as appropriate, Btu/lbm
- N = Number of loops in the plant.

The calculated values are lowered an additional 9% full power to account for instrument and channel uncertainties.