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October 12, 1985
ST-HL-AE-1419
File No.: G9.17

Mr. George W. Knighton, Chief
Licensing Branch No. 3
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, DC 20555

South Texas Project
Units 1 and 2
Docket Nos. STN 50-498, STN 50-499
Responses to DSER/FSAR Chapters 4 and 12

Dear Mr. Knighton:

The attachments enclosed provide STP's response to Draft Safety Evaluation Report (DSER) or Final Safety Analysis Report (FSAR) items.

The item numbers listed below correspond to those assigned on STP's internal list of items for completion which includes open and confirmatory DSER items, STP FSAR open items and open NRC questions. This list was given to your Mr. N. Prasad Kadambi on October 8, 1985 by our Mr. M. E. Powell.

The attachments include mark-ups of FSAR pages which will be incorporated in a future FSAR amendment unless otherwise noted below.

The items which are attached to this letter are:

Attachment	Item No.*	Subject
1	D 4.4-3	Loose Parts Monitoring System Compliance with R.G. 1.133, Rev. 1.
	D 12.3-4	Compliance with NUREG 0737 Item II.F.1.3 - Containment Radiation Monitors

* Legend
D - DSER Open Item C - DSER Confirmatory Item
F - FSAR Open Item Q - FSAR Question Response Item

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If you should have any questions concerning this matter, please contact Mr. Powell at (713) 993-1328.

Very truly yours,

M. R. Wisenburg
Manager, Nuclear Licensing

SMH/bl

Attachments: See above

L1/DSER/ab

cc:

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Revised 9/25/85

4.4.6.2 Overtemperature and Overpower ΔT Instrumentation. The overtemperature ΔT trip protects the core against low DNBR. The overpower ΔT trip protects against excessive power (fuel rod rating protection).

As discussed in Section 7.2.1.1.2, factors included in establishing the overtemperature ΔT and overpower ΔT trip setpoints includes the reactor coolant temperature in each loop and the axial distribution of core power through the use of the two section excore neutron detectors.

4.4.6.3 Instrumentation to Limit Maximum Power Output. The output of the three ranges (source, intermediate, and power) of detectors, with the electonics of the nuclear instruments, are used to limit the maximum power output of the reactor within their respective ranges.

There are six radial locations containing a total of eight neutron flux detectors installed around the reactor in the primary shield, two proportional counters for the source range installed on opposite "flat" portions of the core containing the primary startup sources at an elevation approximately one quarter of the core height. Two compensated ionization chambers for the intermediate range, located in the same instrument wells and detector assemblies as the source range detectors, are positioned at an elevation corresponding to one half of the core height; four dual section uncompensated ionization chamber assemblies for the power range installed vertically at the four corners of the core and located equidistant from the reactor vessel at all points and, to minimize neutron flux pattern distortions, within one foot of the reactor vessel. Each power range detector provides two signals corresponding to the neutron flux in the upper and in the lower sections of a core quadrant. The three ranges of detectors are used as inputs to monitor neutron flux from a completely shutdown condition to 120 percent of full power with the capability of recording overpower excursions up to 200 percent of full power.

The output of the power range channels is used for:

1. The rod speed control function
2. To alert the operator to an excessive power inbalance between the quadrants
3. Protect the core against rod ejection accidents
4. Protect the core against adverse power distributions resulting from dropped rods.

Details of the neutron detectors and nuclear instrumentation design and the control and trip logic are given in Chapter 7. The limits on neutron flux operation and trip setpoints are given in ~~Section 16.2.3.~~ the Technical Specifications.

4.4.6.4 Loose Parts Monitoring System. The Loose Parts Monitoring System (LPMS) consists of permanently installed sensors and electronic equipment that continuously monitor selected locations on the reactor vessel and steam generators for excessive motion of core internals and noise resulting from loose parts in the reactor coolant system. The system is designed to meet the guidance of Regulatory Guide 1.133, as noted in Section 3.12. 36 2 Q211.1 36

Closure of DSER item 4.4-3

Sensors are located at each of the following locations: 36 Q492 .02N

a. Lower Pressure Vessel (In-Core Instrumentation guide tubes)

b. Upper Pressure Vessel (Head Service Flange) 36 Q492 .02N

c. Steam Generators (Manway Studs near bottom of SG)

The above are locations where any loose part released within the primary loop will migrate and impact. Signal cables are run separately between the sensors and a plant normally accessible during full power operation. The accelerometers have been selected for the function of loose parts monitoring. All sensors and preamplifiers are designed to function in their normal service environment. High temperature sensors are provided for the upper pressure vessel and the steam generators. The system is capable of detecting a metallic part with an impact force ≥ 0.5 ft-lb striking the inside of the reactor coolant pressure boundary within 3 ft of a sensor. 36 Q492 .02N 2 Q221 .1 36 Q492 .02N

Four core internals monitoring channels are provided for the monitoring of fuel pin and core barrel motion. The channels use existing signals from the ex-core ion chambers through a buffer. The signals can be recorded and analyzed with the system spectrum analyzer. 36 Q492 .02N

The electronics panels are located in the control room. The panels include an indicator assembly, channel selector switch, tape recorder with automatic tape-turn-on, speaker for direct channel listening capabilities, a locator, a locator printer, a dB meter, alarm lights, and power and test lamps. 36 Q492 .02N 20

Hybrid techniques are used for signal processing and indication. A spectrum analyzer shared with the Vibration Monitoring System also provides a capability for on-line signature analysis. The accelerometer sensors are equipped with piezoelectric crystals that are used for both vibration and acoustic monitoring, with special-purpose preamplifiers for wide-band operation. A digital signal which activates an annunciator alarm and initiates recording of appropriate channels is generated when the vibration or loose parts signal level exceeds a preset alarm level for a specified period of time. The core internals channels operate in the same manner as the loose parts channels, with the addition of special electronic filtering to discriminate against noise. 36 Q492 .02N 36 Q492 .02N

The system ~~shall, as a minimum, be~~ is designed and installed to survive an Operating Basis Earthquake (OBE) with either the audio or the visual alarm ~~capacity~~ capability intact. 36 Q492 .02N

Noise and vibration frequencies and amplitudes are dependent upon specific installations, therefore appropriate baseline data is taken during startup to allow determination of the appropriate alarm setting for each channel.

Location of sensors, limiting conditions of operation, and surveillance requirements ~~will be~~ are addressed in the Technical Specifications. 36 Q492 .02N

ATTACHMENT 1
ST-HL-AE-1419
PAGE 3 OF 6

II.F.1 (Continued)

STP Response

Implementation of the NUREG-0737, ITEM II.F.1, instrumentation was integrated with the activities of NUREG-0737, Supplement 1, specifically the Control Room Design Review and the implementation of Regulatory Guide (RG) 1.97 as described in Sections S.5 and S.6 of this appendix respectively. A human factors analysis was performed during the Control Room Design Review.

Appendix 7B, Table 7B.~~10-1~~ 1-1 identifies the variables which satisfy the II.F.1 requirements. Instrumentation adequacy and qualifications are addressed in the analysis presented in Appendix 7B. Table 7.5-1 provides further information as to instrument ranges, qualifications, and display methodology.

Instrumentation calibration requirements ~~will be~~ are identified in the Technical Specifications. A calibration program will be in place as identified in Section 13.5.

Instrumentation provided by STP to respond to each attachment of NUREG-0737, Item II.F.1 is further discussed below.

(1) Noble Gas Monitor 40

The STP design includes two wide range noble gas monitors, one for the unit vent and one for the condenser vacuum pumps which detect and measure concentrations of noble gas fission products in plant gaseous effluents during and following an accident. Three detectors with overlapping ranges provide a monitoring range from normal to 10^5 $\mu Ci/cc$ for each monitor.

An adjacent-to-line monitor is provided for each main steamline to monitor the concentration in steam that is released to the environment via the steam generator (SG) safety valves or the SG power-operated relief valves (PORVs).

The range of each monitor is identified in Table 7.5-1. The monitors are powered from either Class 1E emergency standby power or other reliable power sources.

The instrumentation is a part of the Radiation Monitoring System (RMS) as described in Section 11.5 ~~(later)~~.

Procedures for use of the instrumentation in determining release rates will be provided as described in Section 13.5.

(2) Iodine/Particulate Sampling

Iodine and particulate isokinetic sampling capability, with onsite analysis, of the plant gaseous effluents is continuously provided, both during and following an accident.

The sampling station for the unit vent is located on the 60' elevation of the Mechanical auxiliary building. The sampling station for the condenser vacuum pumps is located in the turbine building. The stations are accessible post-accident.

II.F.1 (Continued)

The plant effluent sampling system and analysis capability are further discussed in Section 11.5 ~~(later)~~. 40

(3) Containment High Range Radiation Monitor

Redundant Class 1E, monitors are provided in the Containment Building, approximately 180° apart ~~on the operating deck (elevation 68')~~. Insert A The range of the monitors is 1R/hr to 10^8 R/hr gamma. 44

(4) Containment Pressure

Redundant Class 1E containment pressure and extended range containment pressure monitoring channels provide continuous monitoring and recording of containment pressure. 40 These monitors cover a range of -5 to 180 psig; accuracy of these monitors is approximately ±3 percent. 49

(5) Containment Water Level

The STP design includes redundant, Class 1E, wide range level monitors. These monitors are located on the containment floor at elevation -11'3" as shown in Figure 7A.II.F.1-1. The wide range monitoring channels provide indication ranging from the containment floor to an elevation corresponding to a water volume of 609,000 gallons. In addition, Class 1E narrow range monitors are provided in the normal and secondary sumps. The narrow range monitoring channels provide indication from the bottom to the top of the normal and secondary sumps. 40

These level monitors detect the presence of water at discrete predetermined levels. The accuracy of detection at each point is approximately ±1/4 inch.

The wide range monitors position the detection points more closely at the bottom than at the top. In addition, the detection points of the three monitors are chosen to provide overlap. Above the floor at El. -11'3", for the first foot, detection points are one inch apart (i.e., four points per monitor, 3 inches apart). For the next two feet, detection points are three inches apart. For the next 3 1/2 feet, detection points are six inches apart. 49

The narrow range monitors provided in the normal sump (bottom at El. -17'3") and the secondary sump (bottom at El. -12'3") use a detection point spacing of six inches. The normal sump monitor provides level detection between El. -17'0" and -11'6"; the secondary sump monitor provides level detection at El. -11'9" and -11'3".

These monitoring channels provide continuous monitoring and recording of the containment water level for use in diagnosis of a Loss-of-Coolant Accident.

INSERT A (DSER item 12.3-4)

(see Figure 12.3.1-6). The monitors are positioned to be accessible for calibration and repair and so that they will be exposed to a representative volume of the Containment atmosphere.

(6) Containment Hydrogen

The STP design includes redundant, Class 1E, hydrogen concentration monitoring
from 0 to 10 percent. The hydrogen monitoring system is capable of func- 40
tioning under containment pressure conditions from -2 to 60 psig. Continuous
indication and recording can be initiated by the operator within 30 minutes of
the initiation of safety injection. The Hydrogen Monitorng System is des-
cribed further in Section 7.6.5. The system is used as an indication to the
operator of the need for manual actuation of the hydrogen recombiners. The
approximate accuracy of the hydrogen monitoring system is ±5 percent. 49