Southern California Edison Company

P. O. BOX 800

2244 WALNUT GROVE AVENUE

ROSEMEAD, CALIFORNIA 91770

F. R. NANDY
MANAGER OF NUCLEAR LICENSING

TELEPHONE
(818) 302-1896

September 12, 1989

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555

Gentlemen:

Subject: Docket No. 50-206
Acceptance Criteria for Thermal Shield Inspection
San Onofre Nuclear Generating Station
Unit 1

The purpose of this letter is to provide the NRC staff with the proposed acceptance criteria for the mid-cycle inspection of the reactor vessel thermal shield.

During the Cycle X refueling outage, an inspection of the reactor vessel thermal shield revealed degradation of three of the support block fasteners. After it was demonstrated to the NRC that the degradation did not pose a significant danger to the integrity of the thermal shield, the plant was returned to service without repairing the thermal shield support block fasteners. The fasteners are not expected to degrade significantly for the duration of the Cycle X operation. However, a thermal shield monitoring program has been established to ensure that no degradation occurs. This program is covered in detail in the Unit 1 license condition 3.M, "Cycle X Thermal Shield Monitoring Program." To further ensure the integrity of the thermal shield, SCE has committed to an outage by June 30, 1990 to inspect the thermal shield.

By letter dated May 3, 1989, SCE committed to develop and submit the acceptance criteria for the mid-cycle inspection of the thermal shield to the NRC staff. The enclosure provides the proposed acceptance criteria for the inspection.

A001
1/1

If you have any question or desire further information, please contact me.

Very truly yours,

Enclosure:

cc: J. B. Martin, Regional Administrator, NRC Region V
C. Caldwell, NRC Senior Resident Inspector, San Onofre Units 1, 2 and 3

Enclosure

THERMAL SHIELD MID-CYCLE INSPECTION PLAN AND ACCEPTANCE CRITERIA

During the Unit 1 Cycle X refueling outage an inspection of the reactor vessel internals including the thermal shield supports was performed. Three of the fifty four thermal shield lower support block fasteners were found to be degraded. The proposed plan for performing the mid-cycle inspection of the reactor vessel thermal shield and the acceptance criteria for the inspection are given below:

Inspection Plan Details

Once the upper internals have been moved to their storage stand and approximately 7 fuel assemblies transferred to the spent fuel handling building, the inspection can commence.

Inspection between the thermal shield and reactor vessel will be performed with the core barrel in the vessel. A camera will be lowered through the four 3" diameter core barrel flange lifting holes (Figure 1). Inspection of the outside of the core barrel and the thermal shield is performed as follows:

1. Inspect the transition point on the irradiation specimen holders C, H, G, B, and F (see Figure 2). At the transition point we are looking for differential wear at the interface area. This would be an indicator of differential movement.

2. Inspect 4 of the 6 lower support blocks, inspecting the front side of the support block looking for any broken lock bars, tack welds or missing fasteners. A profile inspection will be performed looking for any protruding fasteners. Two of the support blocks (0 and 180 degrees) are not accessible from the front without removing the core barrel. At the 240 degrees support block the lock bar tack welds on the top bolts are broken. This was noted during the January, 1989 inspection.

3. Inspect the remaining intact 124 degree flexure. Of the six flexures this was the only intact flexure noted during the January, 1989 inspection.

4. Inspect the core barrel radial keys, key ways and welds, and look for upset metal and indications in the welds.

Inspection inside the core barrel will be performed with approximately seven fuel assemblies removed. This provides access through the lower core plate for the inspection camera to access the back side of the support blocks. This inspection will be performed as follows:

1. Inspect the back side of the 6 flexures looking for missing bolts.

2. Inspect the back side of the 6 thermal shield support blocks for broken bolts that are walking inboard. During the January, 1989 inspection the center bolts at the 0 and 240 degree blocks were identified as being broken. The top right side bolt on the 240 degree block was inboard 3/4" to 1".

3. Inspect the bottom of the reactor for loose parts/bolts.

Acceptance criteria for inspection

The analysis performed by Westinghouse dated February 1989 concluded that the worst expected current condition of the lower supports is that the 0, 240 and 300 degree blocks are degraded. The analysis also indicates that in this condition, with the one flexure intact, the top bolts at the 60, 120 and 180 degrees blocks are not expected to accumulate any significant amount of additional fatigue usage for the duration of the Cycle X operation. This analysis was submitted to the NRC as attachment 2 to enclosure 1 of the letter dated February, 17, 1989. This analysis is referred to hereinafter as the bounding analysis and provides the basis for the acceptance criteria given below.

a) If signs of differential movement are observed while inspecting the transition point on the irradiation specimen holders, the bounding analysis will be reevaluated. Additional analysis may be required to justify continued operation.

b) If the inspection of the thermal shield support blocks reveals degradation of fasteners in any block other than the 0, 240, or 300 degrees blocks, repair of the thermal shield will be performed.

c) If degradation is observed in the fasteners on the 0, 240, or 300 degrees blocks in addition to those identified during the Cycle X inspection, the bounding analysis will be reevaluated.

d) If the 124 degrees flexure is found to have failed, repair of the thermal shield will be performed.

e) If the inspection of the core barrel radial keys, key ways, and welds reveals abnormal wear or upset metal condition, the bounding analysis will be reevaluated and new analysis may be required to justify continued operation.

f) If the inspection of the back side of the 6 flexures reveals missing bolts, the safety impact of the loose parts will be evaluated.

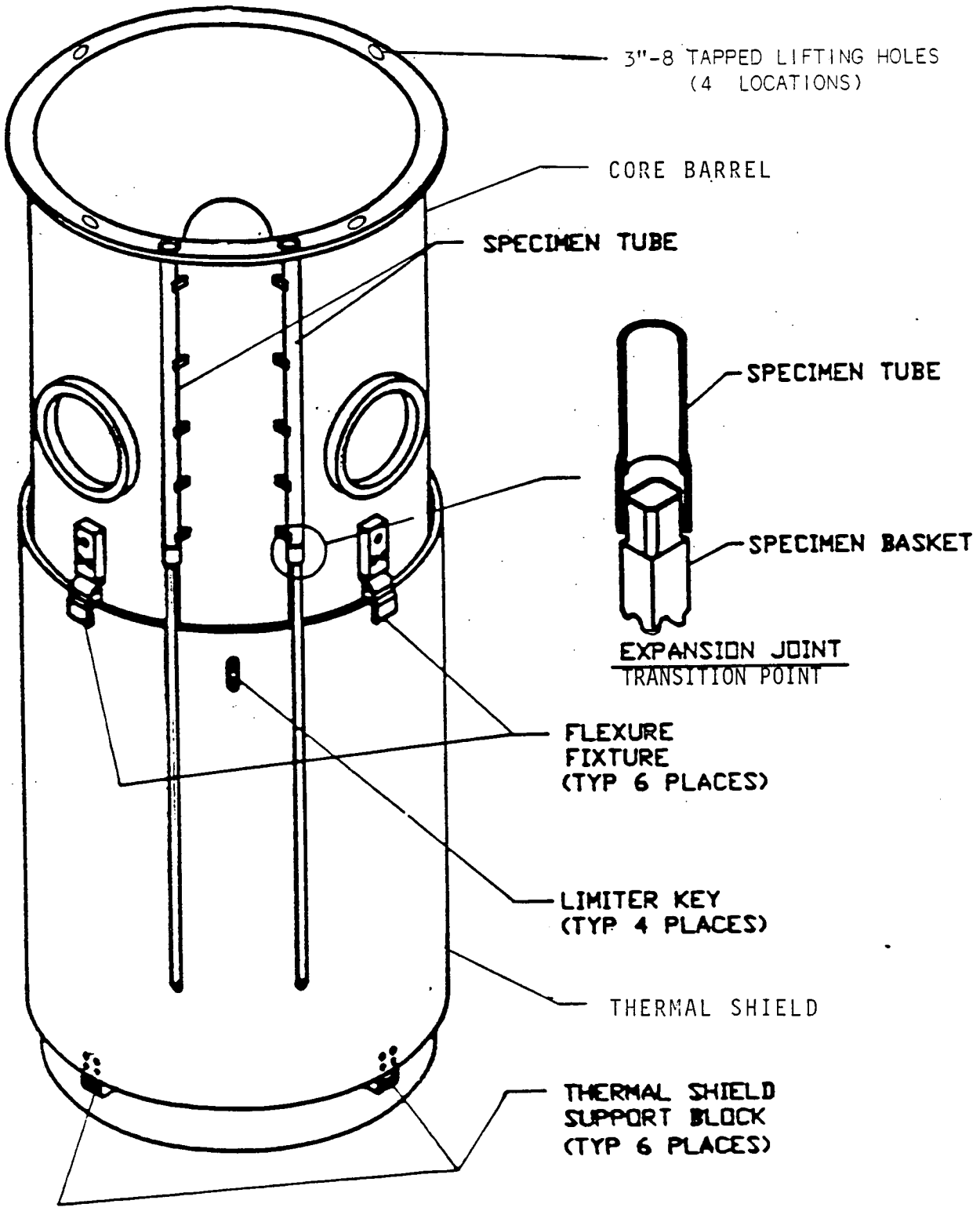
g) If the inspection of the bottom of the reactor vessel reveals loose parts/bolts, the source of the loose parts and their impact on the safe operation of the plant will be evaluated.

Enclosure

If the inspection reveals any appreciable degradation beyond what was discovered during the Cycle X outage, SCE will perform an evaluation and submit the results to the NRC for approval.

The procedures, techniques, and equipment to be used in the mid-cycle inspection of the thermal shield will be similar to those used during the Cycle X outage. These procedures, equipment, and techniques will be used to inspect the same locations as were inspected in the Cycle X outage performed during January, 1989.

FIGURE 1


3"-8 TAPPED LIFTING HOLES
(4 LOCATIONS)
CORE BARREL
SPECIMEN TUBE
SPECIMEN TUBE
SPECIMEN BASKET
EXPANSION JOINT
TRANSITION POINT
FLEXURE
FIXTURE
(TYP 6 PLACES)
LIMITER KEY
(TYP 4 PLACES)
THERMAL SHIELD
THERMAL SHIELD
SUPPORT BLOCK
(TYP 6 PLACES)

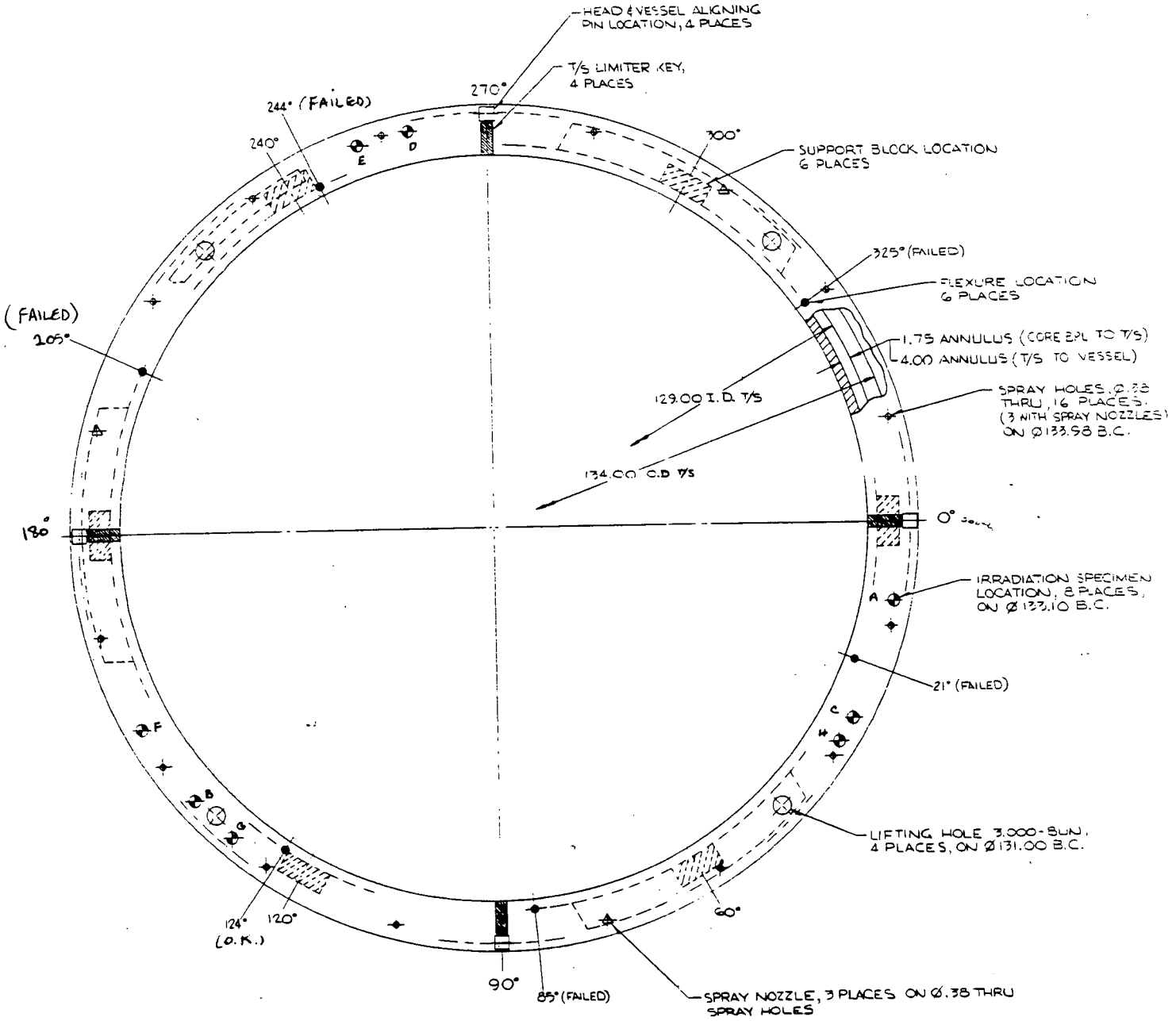


Figure 2 Core Barrel/Thermal Shield Top View