Southern California Edison Company

23 PARKER STREET

IRVINE, CALIFORNIA 92718

December 12, 1991

R. M. ROSENBLUM
MANAGER OF
NUCLEAR REGULATORY AFFAIRS

TELEPHONE
(714) 454-4505

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

Gentlemen:

Subject: **Docket No. 50-206**
Response to NRC Request for Additional Information,
Inadequate Core Cooling Monitoring System
San Onofre Nuclear Generating Station, Unit 1

This letter provides the additional information the NRC requested to support their review of our January 2, 1990 submittal of the proposed design for San Onofre Nuclear Generating Station (SONGS), Unit No. 1 Inadequate Core Cooling Monitoring Systems (ICCMS). The enclosure to the NRC letter dated July 10, 1991 listed seven items that require our response. Since our ICCMS design is still in the preliminary stage, we can only provide preliminary information at this time. Our response to Items 1 thru 5 and Item 7 is enclosed. The response to Item 6 will be provided by March 1, 1992.

Item 6 of the NRC July 10, 1991 letter erroneously referred to a list of Heated Junction Thermocouple (HJTC) failures at SONGS Units 2 and 3 and other facilities as being part of our November 29, 1990 submittal. Following discussions with our NRC Project Manager, the NRC staff subsequently requested that we identify any HJTC failures at SONGS Units 2 and 3 and provide the root cause and corrective actions. We are in the process of gathering HJTC failure data for Units 2 and 3 and identifying the failure mode. Since the personnel performing this task are currently dedicated to support the Unit 2 refueling outage activities, our response cannot be provided until March 1, 1992.

If you have any questions regarding this information, please let me know.

Very truly yours,

R M Rosenblum

Enclosure
cc: J. B. Martin, Regional Administrator, NRC Region V
George Kalman, NRC Senior Project Manager, San Onofre Units 1, 2&3
J. O. Bradfute, NRC Project Manager, San Onofre Unit 1
C. W. Caldwell, NRC Senior Resident Inspector, San Onofre Units 1, 2&3

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RESPONSE TO THE NRC REQUEST FOR ADDITIONAL INFORMATION
SAN ONOFRE NUCLEAR GENERATING STATION, UNIT NO. 1
INADEQUATE CORE COOLING MONITORING SYSTEM

NRC REQUEST 1

What is the distance between the heated junction thermocouples (HJTC) in the level monitoring system probe assembly?

SCE RESPONSE 1

The exact HJTC sensor spacing design has not been finalized. The following is the proposed sensor spacing currently under evaluation:

PROPOSED HJTC SENSOR SPACING

SENSOR #	LOCATION FROM VESSEL FLANGE (in inches)	DISTANCE BETWEEN SENSORS (in inches)	VESSEL REGION MONITORED
#1	+47.75		Vessel Head
#2	0.00	#1&#2: 47.75	Vessel Flange
#3	-12.50	#2&#3: 12.50	Top of the Lower Plenum
#4	-39.00	#3&#4: 26.50	Mid point between #3&#5
#5	-65.50	#4&#5: 26.50	Top of Hot Leg
#6	-82.50	#5&#6: 17.00	Centerline of Hot Leg
#7	-99.50	#6&#7: 17.00	Bottom of Hot Leg
#8	-119.25	#7&#8: 19.75	Top of Upper Core Alignment Plate

NRC REQUEST 2

What is the overall measuring range of the probe?

SCE RESPONSE 2

The overall measuring range of the HJTC probe is 167 inches from reactor vessel head to the top of the upper fuel alignment plate.

NRC REQUEST 3

What is the distance between the top HJTC and the top of the active fuel region?

SCE RESPONSE 3

The distance is approximately 184.5 inches based on the preliminary sensor placement design presented in the response to Request No. 1 above. Sensor #8 will be located at the top of the fuel alignment plate which is 17.5 inches above the active fuel elements.

NRC REQUEST 4

Provide system specifications for the following functions:

a. Measuring sensitivity (indicated level error band).

b. Response time (time delay between actual level increase or decrease and indication).

c. Time delay between system activation (electric power on) and system operation.

d. Power supplies and power requirements for heaters.

SCE RESPONSE 4a

The indication of change from a covered sensor to an uncovered sensor or vice versa will occur within ± 1 inch of the design location (elevation) for that sensor. This inaccuracy is made up of about ± 1/2 inch for dimensional tolerance and ± 1/2 inch due to the finite heater length.

SCE RESPONSE 4b

The response time (time delay between actual level increase or decrease and indication) is 8 to 26 seconds.

SCE RESPONSE 4c

The delay time (the time interval between when the heater power is turned on and the time that HJTC readings reach steady state) is less than 30 seconds. The delay time will not adversely impact the operability of the HJTC because the HJTC heaters will be continuously energized during modes 1, 2, 3 and 4, and part of mode 5 prior to cable structure removal.

SCE RESPONSE 4d

Power to Train A and Train B HJTC heaters will be supplied from Channel R and G 120 VAC safety related UPS respectively. The preliminary heater power required per train is 120 VAC, single phase, 3 amperes nominal, 5 amperes maximum.

NRC REQUEST 5

Provide a copy of the HJTC calibration procedure.

SCE RESPONSE 5

The Unit 1 HJTC calibration procedure has not been developed yet. A procedure for verifying HJTC thermocouple operability will be developed upon completion of Unit 1 ICCMS project. We will be using NUREG 2627, Section IV.C.7. for guidance on HJTC operability verification.

NRC REQUEST 6

Your letter dated November 29, 1990, included a list of HJTC failures at San Onofre Units 2&3 and at other facilities. Please provide the root cause of the failures and the corrective actions.

SCE RESPONSE 6

Our November 29, 1990 submittal did not include a list of HJTC failures. In subsequent discussions, the NRC requested that we identify any failures of the HJTCs at Units 2 and 3 and provide the root cause of failures and corrective actions. It is SCE's intention to provide the NRC with a summary of HJTC failures and the apparent failure mode. Due to the highly radioactive nature of the HJTC probes following reactor operation, detailed root cause analysis of the failure mechanism was not routinely performed. The failed probes that have been replaced also have been cut up and disposed as nonrecoverable waste.

In general, the corrective action has been to replace the failed HJTCs whenever the available number of operable sensors is at or near the minimum number required by the plant Post Accident Monitoring Technical Specification. Replacements can only occur when the plant is in operating mode 6. SCE will provide a list of HJTC failures and the apparent failure mode to the NRC by March 1, 1992.

NRC REQUEST 7

What is the current status and reliability history of the core exit thermocouples?

SCE RESPONSE 7

Thirty-five (35) type K CETs were originally installed in the Unit 1 reactor. Among the 35 CETs, nine (9) have failed since the unit went into commercial operation in 1968. Currently, there are 26 CETs still operational. Among the nine failed CETs, three were damaged during an instrument nozzle brazing repair performed by Westinghouse in 1978. Another CET was cut, capped, and terminated in the reactor head to read the head area temperature. The remaining five CET failures were considered random occurrences. The SONGS-1 RVLIS installation and CET upgrade project is scheduled to be implemented during the Cycle 12 refueling outage. At this time, we will attempt to restore the operability of the defective CETs.