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FACIL:50-361 San Onofre Nuclear Station, Unit 2, Southern Californ 05000361
50-362 San Onofre Nuclear Station, Unit 3, Southern Californ 05000362
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SUBJECT: Forwards1 comments re specific impact of proposed Revision 2 to Reg Guide 1.97, "Instrumentation for Light Water Cooled Nuclear Power Plants to Assess Plant & Environs Conditions During & Following an Accident."

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January 21, 1980

Director of Nuclear Reactor Regulation
Attention: Mr. Robert L. Baer, Chief
LWR Branch 2, DPM
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Gentlemen:

Subject: Docket Nos. 50-361 and 50-362
San Onofre Nuclear Generating Station
Units 2 and 3

Reference: (A) S. A. Varga (USNRC) letter to
J. H. Drake (SCE) and B. W. Gilman (SDG&E)
dated 11-23-79, "Proposed Revision 2 to
Regulatory Guide 1.97"

At a meeting in Bethesda on December 13, 1979 (Reference A) the NRC requested comments from each utility present on the plant specific impact of backfitting proposed revision 2 to Regulatory Guide 1.97 (Instrumentation for Light Water Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident) to each near term operating license plant. The comments were requested by January 15, 1980 in order to allow NRC to consider for each plant the existing instrumentation that provides a post accident monitoring capability in light of the recommended list in Table 2 of the Guide.

The plant specific comments on Regulatory Guide 1.97 for San Onofre Nuclear Generating Station, Units 2 and 3 are included in the Enclosure. These comments are not intended to be comprehensive, but to help fulfill the NRC's request to gather sufficient information to allow formulation of a version of Table 2 that would be applicable to near term operating license applicants.

In contributing to the above objective, our response should not be construed as an endorsement of the recommendations of Regulatory Guide 1.97 Revision 2. Edison supports the generic position and comments of the utilities represented at the Reference A meeting; these generic comments will be submitted separately to NRC by February 1, 1980.

B001
SE
1/1

Add: V. Benaroya
S. Hanauer

If you have any questions concerning this subject or require further information, please call me.

Very truly yours,

J. G. Haynes
Chief of Nuclear Engineering

Enclosure

ENCLOSURE

Comments Specific to San Onofre Nuclear Generating Station, Units 2 and 3 Regarding the Impact of Proposed Revision 2 (December 4, 1979) to Regulatory Guide 1.97

In order to provide the NRC with plant specific information regarding the impact of backfitting the requirements of Regulatory Guide 1.97 to San Onofre Units 2 and 3, the following list of instrumentation has been prepared to provide where possible a comparison of instrument channels currently installed on San Onofre Units 2 and 3 with those that would be required in Table 2 of Regulatory Guide 1.97. The objective for such a listing is to help enable NRC to endorse a modified version of Table 2 specifically for those near term operating license applicants addressed in L. Kintner's memorandum to J. Stoltz dated November 19, 1979.

In most cases, upgrading a channel on San Onofre Units 2 and 3 to the "Type" requirements of Table 2 would result in significant hardware impact. The requirement for a two hundred day qualified life exceeds the present qualification on all the San Onofre Units 2 and 3 instrumentation listed; the impact of a significant requalification effort at this time would be severe.

It should be noted that San Onofre Units 2 and 3 have already committed to add to or upgrade existing instruments as a result of our on-going response to the TMI Lessons Learned Short Term Recommendations. These new instrument channels incorporate many of the "Range" and "Type" requirements of Table 2 in Regulatory Guide 1.97.

CORE

Core Exit Thermocouples

Present Range is 0 to 1600°F

1. Not qualified to PAM Environment.
2. Do not meet single failure.
3. No class 1E Power.
4. Displayed by Plant Monitoring System (PMS) only.
5. Temperatures above 1600°F are very inaccurate and not meaningful to operator.
6. Present Range part of TMI Lessons Learned work.

Note: Major system redesign with extensive Bechtel impact to upgrade system to resolve above items.

Control Rod Position

Entire Range of active core length

1. Not qualified to PAM environment.

Neutron Flux

Present range is 10^{-8}% to 200%

1. Note: 10^{-8}% = 10 cps

REACTOR COOLANT SYSTEM

RCS Hot Leg

Present range is 0 to 675°F (T-111, -121)

1. Does not meet single failure.
2. Qualified to SONGS LOCA environment.
3. Range change to 0-700°F planned as part of TMI Lessons Learned work.

RCS Cold Leg

Present range is 465°F to 615°F (T-112, 122)

1. Qualified to SONGS LOCA environment.
2. Range change will require system modification and hardware change (T-112/122 CA). Possibility of using TC of Subcooled Margin Monitor (SMM) system for wider range.

RCS Pressure

Present range is 0-3000 psia

1. Over range at 3125 psia; therefore would require new capsule. This would impact accuracy of Plant Protection System (PPS) inputs.

2. Qualified to SONGS LOCA environment.

Pressurizer Level

Present range is 0-100% (L-110)

1. Taps are close to top and bottom tangents.

Degree of Subcooling

Range is 0-200°F Subcooling

1. Superheat capability would require system redesign hardware and software modifications (major impact to Subcooled Margin Monitor (SMM) design).

2. Part of TMI Lessons Learned work.

Reactor Coolant Loop Flow

Present range is 0-70 psid Steam Generator delta pressure

1. Require new channels to measure natural circulation flow; complete system design, qualification, etc., required.

Safety Valve Position

None

1. Require implementation of a new system.

2. Part of TMI Lessons Learned work.

Radiation Level in Primary Coolant Water

Present range is 10^{-4} - 10^{2}uCi/g

1. Requires implementation of a new system.

CONTAINMENT

Containment Pressure

Present design includes four indicating (four dual indicators with ranges -4 to 20 psig and -4 to 85 psig) channels and one recording channel (-4 to 85 psig). Design also includes two wide range indicating (0 to 180 psig) and one wide range recording (0 to 180 psig) channel. These instruments are consistent with Reg. Guide 1.97.

Containment Atmospheric Temperature

Present design includes two indicating (0 to 400°F) and one recording (0 to 400°F) channels. These instruments are consistent with Reg. Guide 1.97.

Containment Hydrogen Concentration

Present design includes two indicating (0 to 10%) channels. No recording is provided. To be consistent with the requirements of Reg. Guide 1.97, one channel recording hydrogen concentration (0 to 10%) would be required.

Containment Isolation Valve Position

Present design includes open/closed valve status lights in the control room. There is no continuous recording of the valve position.

Containment Sump Water Level

Present design includes two indicating channel (emergency sump level 0 to 8 ft.), one recording channel (sump height 0 to 8 ft.), two indicating channels (containment level to 600,000 gallon level equivalent) and one recording channel (containment level to 600,000 gallon level equivalent). These instruments are consistent with the requirements of Reg. Guide 1.97.

High-Range Containment Area Radiation Monitors

A system consisting of two radiation monitors per containment with individual logic modules, recorders, and remote readouts are being purchased from General Atomics to meet TMI Lessons Learned requirements. This system reads to 1×10^8 rads/hr and is consistent with the requirements of Reg. Guide 1.97.

SECONDARY SYSTEMS

S/G Pressure

Present range is 0-1200 psig

1. Qualified to SONGS LOCA environment.

2. Increasing the range will impact ESF setpoints.

S/G Level

Present range is 0-100% (Narrow Range) (L-1113, 1123)

1. Wide Range S/G level for TMI modification; lower tap off hand-hole covers, near bottom of tube sheet.

Auxiliary Feedwater Flow

Present design includes one indicating channel (0 to 800 gpm) for each steam generator. One of these channels is also recorded (0 to 800 gpm). To be consistent with Reg. Guide 1.97, the following changes are required.

1. One additional flow channel (1E) for each steam generator.

2. One flow recording channel (1E).

Main Feedwater Flow

Present design includes one indicating (0 to 100%) and one recording channel (0 to 8 x 10^6 lbs/hr) per generator. These instruments will not be available on loss of offsite power. To be consistent with Reg. Guide 1.97, battery or diesel backup power is required for these instruments.

Safety/Relief Valve Positions or Main Steam Flow

Present design includes one non-1E recording channel for each steam generator steam flow. These recorders also include an indicating scale. There is no safety/relief valve position indication.

To be consistent with requirements of Reg. Guide 1.97, the following changes are required.

1. Furnish 1E qualified steam flow recorders (1E).

2. Provide indication (1E) in the control room.

3. Provide 1E cables and 1E power.

4. Provide 1E flow transmitters.

Radioactivity in Condenser Air Removal System

The present system has a beta scintillation channel from 10^{-6} to 10^{-1} uCi/cc and a gamma scintillation channel from 10^{-3} to 10^{2} uCi/cc. To provide a system that will read 10^{-7} to 10^{5} uc/cc will require the purchase of noble gas monitors similar to the plant vent stack monitors.

Radioactivity in Effluent from Steam Generator Safety Relief Valves or Atmospheric Dump Valves

San Onofre does not have this capability. Vendors indicate that equipment to monitor noble gases at elevated temperatures is not available. This item is classified as a state-of-the-art problem.

AUXILIARY SYSTEMS

Containment Spray Flow

Present range is 0-100% (F-338, -348)

1. Qualified to SONGS LOCA environment.
2. Indication only.

HPSI Flow

Present range is 0-500 gpm (F-390, -391)

1. Indication only.
2. Qualified to SONGS LOCA environment.

LPSI Flow

None

1. New design, hardware required to add flow instrumentation to LPSI.
2. LPSI temperature is indicated 0-400°F.

Refueling Water Storage Tank (RWST) Level

Present range is 0-100% (L-305)

Condensate Storage Tank Level

Present design includes a 0 to 36 ft. indicating channel in the seismic category I tank, and alarms on low level, high level and temperature. To be consistent with Reg. Guide 1.97, require new 1E level transmitters, panel modifications, 1E cables and 1E power.

Safety Injection Tank Level

Present range is 0-100% (water column - 378 inches)

1. These channels (L-311, 321, 331, 341) are Class I (electrical).
2. Indication is provided in the control room, but not recorded.

Accumulator Isolation Valve Positions

Present design includes open/closed positions of the valve. The switches are consistent with Reg. Guide 1.97.

RHR System Flow

None

1. Requires implementation of a new system.

RHR Heat Exchanger Out Temperature

Present range is 0-400°F (T-351, 352)

1. Indicated and Recorded in Control Room.

Component Cooling Water Temperature

Present design includes a local temperature indicator (50°F to 300°F) in each of the critical component cooling water loops.

To be consistent with the requirements of Reg. Guide 1.97, the following changes per loop are required:

1. Provide a remote indication in the control room.
2. Procure qualified (1E) thermocouples, transmitters and indicators.
3. Modify control room panels.
4. Provide 1E interconnecting cables and 1E power.

Component Cooling Water Flow

Present design includes a flow indicator (0 to 17,000 gpm) in each of the critical and noncritical component cooling water loops.

To be consistent with requirements of Reg. Guide 1.97, the following changes are required.

1. Furnish 1E qualified indicators.
2. Relocate indicators in the qualified (1E) portion of the panel.
3. Provide 1E interconnecting cables and 1E power.
4. Upgrade qualification and location of square root extractors in Specification 200 racks.

Flow in UHS Loop

Present design includes sonic flow meters in each of the four condenser inlet conduits for Unit 2 and common condenser outlet conduits for Unit 3. Digital indication of flow and recording is available in the control room.

To be consistent with requirements of Reg. Guide 1.97, the following changes are required.

1. Furnish 1E qualified equipment which includes sensors, computing devices, display instruments, printer, cabinet, etc.
2. Provide 1E interconnecting cables and 1E power.

Temperature in UHS Loop

Present design includes two temperature monitoring channels (0 to 150°F) in discharge conduit of UHS. Temperature indication and recording is available in the control room.

To be consistent with requirements of Reg. Guide 1.97, the following changes are required.

1. Furnish 1E qualified equipment which includes sensors, display instruments, cabinet, etc.

2. Provide 1E interconnecting cables and 1E power.

Ultimate Heat Sink Level

Present design does not provide any level measuring instruments in UHS. In view of the fact that the ocean is the ultimate heat sink, we question the need of level measurement in the intake structure. The flow and temperature indications should provide necessary information.

Heat Removal by the Containment Fan Coolers

Present design provides status (running/stopped) of emergency cooling unit fan. Fan discharge air temperature is monitored by the plant computer. There is no continuous recording or indication of the fan operation.

To be consistent with Reg. Guide 1.97, the following changes are required.

1. Furnish 1E qualified speed sensors.

2. Furnish 1E qualified recorder and indicators.

3. Furnish 1E temperature recorder and indicators for "Fan Air Discharge Temperature."

4. Modify control room panels.

5. Furnish 1E interconnecting cables and 1E power.

Boric Acid Charging Flow

None

1. Charging discharge flow (F-212) is measured under certain circumstances; however, not recorded or indicated.

2. Requires new instrument channels.

Letdown Flow

None

1. Letdown flow is measured and alarmed (FIA-202 0-150 gpm) but not recorded or indicated.

Sump Level in Spaces of Equipment Required for Safety

Present design includes flood level alarms in the areas where safety equipment is located. The design also includes light modules indicating actuation of a particular level switch. These instruments are consistent with Reg. Guide 1.97.

RADWASTE SYSTEMS

High-Level Radioactive Liquid Tank Level

Present design is consistent with Reg. Guide 1.97.

Radioactive Gas Holdup Tank Pressure

Present design is consistent with Reg. Guide 1.97.

VENTILATION SYSTEMS

Emergency Ventilation Damper Position

Present design includes open/closed status in the control room. These indications are consistent with the requirements of Reg. Guide 1.97.

Temperature of Space in Vicinity of Equipment Required for Safety

Present design includes temperature indicators in the control room for some safety related equipment rooms.

To be consistent with Reg. Guides 1.97, the following changes are required.

1. Furnish 1E qualified temperature sensors in each safety related equipment room.

2. Furnish 1E qualified indicators.

3. Furnish 1E interconnecting cables and 1E power.

POWER SUPPLIES

Status of Class 1E Power Supplies and Systems

Present design includes amp meter, volt meter, frequency meter, watt meter, var meter and watthour meter for each Class 1E ac train. Design also includes amp meter and volt meter for each dc channel. These instruments are consistent with Reg. Guide 1.97.

Status of Non Class 1E Power Supplies and Systems

Present design includes amp meter, volt meter, frequency meter, watt meter, var meter and watthour meter for non Class 1E power supplies.

AIRBORNE RADIOACTIVE MATERIALS RELEASED FROM PLANT

Effluent Radioactivity - Noble Gases

Containment

A noble gas monitoring system consisting of a local skid containing pumps and detectors, a control room logic and readout panel and a recorder is being provided to meet the requirement for TMI Lessons Learned. The system will read from 2.3×10^{-7} to 1×10^{5} uc/cc and is consistent with Reg. Guide 1.97 requirements.

Secondary Containment

San Onofre does not have a secondary containment.

Auxiliary Building

A noble gas monitoring system consisting of a local skid containing pumps and detectors, a control room logic and readout panel and a recorder is being provided to meet the requirement for TMI Lessons Learned. The system will read from 2.3×10^{-7} to 1×10^{5} uCi/cc and is consistent with Reg. Guide 1.97 requirements.

Other Release Points

Ventilation exhaust from the Fuel Handling Buildings, Safety Equipment Building, Penetration Area and laboratories passes through a continuous exhaust plenum and is monitored by the auxiliary building noble gas monitor described above. No additional monitors other than those previously described are required.

Effluent Radioactivity - High Range Radioactivity and Particulates

The present airborne monitors use an offline fixed charcoal cartridge measured by a gamma scintillator single channel analyzer reading from 10^{-9} to 10^{-4} uCi/cc. The high range vent stack noble gas monitors also have fixed charcoal cartridges that can be exposed for known time periods then removed and counted. To provide the 10^{-3} to 10^{2} uCi/cc continuous monitoring capability, a new system must be provided.

POST ACCIDENT SAMPLING CAPABILITY

A system is presently being evaluated and will be installed as part of the TMI Lessons Learned work. This system is expected to provide sampling capability consistent with the intent of Reg. Guide 1.97.

METEOROLOGY

Meteorology information is generally site specific, since ranges utilized as well as accuracy with each range may vary to accommodate the particular geographic location. The present meteorology instrumentation in use at the San Onofre site is consistent with the intent of Reg. Guide 1-97, with the exception that precipitation is not presently monitored.