ENCLOSURE 2

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S0123
NRC

October 16, 1987

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

Gentlemen:

Subject: Docket Nos. 50-206, 50-361 and 50-362
San Onofre Nuclear Generating Station
Units 1, 2 and 3

Since the start of the San Onofre project, Southern California Edison Company (SCE) has actively pursued methods to increase plant safety, availability and operability. Consistent with past SCE practice, the purpose of this letter is to inform the NRC of some plant modifications and activities that have been implemented at San Onofre that improve the overall plant performance and enhance regulatory compliance.

SCE formed the Liquid Effluent Activity Reduction (LEAR) task force in January 1986 in an effort to reduce the amount of liquid effluent (in terms of activity released) discharged from all three units. The task force was comprised of representatives from a number of disciplines including operations, maintenance, technical, and chemistry. Examples of improvements include the implementation of site-wide chemical control and training programs, the installation of baffles in radwaste sumps, the addition of polyelectrolytes to improve resin beds, and the use of a strong base/strong acid resin bed. As a result of these efforts, the activity released in 1986 was a factor of thirteen less than that released in 1985 (1.46 curies versus 19.0 curies).

In addition to reducing liquid radioactive effluents, SCE has achieved substantial reductions in the amount of solid radioactive waste produced at San Onofre. The most effective method to reduce solid radwaste is at the source (don't produce the waste in the first place). At San Onofre, heavy use of rewashable items, use of plastic berms to limit the size of contaminated areas, an aggressive area decontamination program to eliminate areas that provide the opportunity to produce radwaste, and restricting the use of wood in contaminated areas (because it is so difficult to decontaminate) have been responsible for reducing solid radwaste by 7500 cubic feet per year. Since 1983, SCE has produced less solid radwaste than the industry average and has surpassed INPO's goal in 1986.

San Onofre Unit 1 recently shut down for 52 days for a mid-cycle outage. This outage was planned in the middle of the cycle to perform major preventative maintenance. During the outage Reactor Coolant Pump motors were overhauled, motor operated valve analysis and test system (MOVATS) testing was completed and over 500 maintenance orders were performed. All refueling interval surveillances were also completed.

Operation of the Unit 1 power operated relief valves (PORV's) was enhanced by the replacement of check valves on the nitrogen supply line to the PORV's. The replaced valves were on the air line which supplies normal air to the PORV's. It was determined that the check valves were leaking such that if backup nitrogen was required for PORV operation, it may be depleted by leaking into the air system. In order to minimize the possibility of this occurring, new soft-seated check valves were installed on the air lines. These soft-seated valves will ensure the availability of backup nitrogen to the PORV's.

Approximately 100 feet of the Unit 1 carbon steel containment spray header was recently replaced with stainless steel. Part of the replaced 100 foot spray header section is filled with spray water during normal plant operation. As a result, the carbon steel was susceptible to corrosion which could degrade system operation. The replacement of the carbon steel with stainless steel is intended to provide assurance of the absence of corrosion products in this line.

During the Unit 1 mid-cycle outage, initial efforts were begun to replace the nuclear instrumentation systems (NIS). The NIS monitors neutron flux for reactor trips and for reactor startup. Equipment that is being replaced includes instrumentation and controls in the control room, cabling and detection instruments. The mid-cycle outage allowed conduit and cabling to be installed.

SCE has continued to seek methods to reduce personnel radiation exposure. To further this effort, temporary instrumentation on the Unit 1 volume control tank (VCT) that was no longer required was removed. This eliminated operation and maintenance activities on this instrumentation thereby reducing personnel exposure, consistent with the ALARA philosophy.

Non-physical improvements have also been implemented at San Onofre Unit 1 through use of reliability and PRA analyses. This work provides ongoing monitoring of plant performance by tracking the operating history of various plant systems using PRA methods to detect trends in safety. The safety injection system, saltwater cooling system and the auxilliary feed water system have already been modeled. Accidents that have been modeled with PRA methodology include loss of coolant accidents (LOCA), loss of main feedwater, and loss of offsite power.

In other efforts at San Onofre Units 2 and 3, SCE, with cooperation from the NRC, was able to replace the spray additive (NaOH) tank used in the containment spray system with trisodium phosphate (TSP) baskets located in the containment emergency sump. (The purpose of either the NaOH or TSP is to control containment sump pH level to increase the iodine removal of the spray and the iodine retention in the sump, respectively). The change is beneficial in that it allows the spray additive tank and associated systems (pumps, lines, sensors, etc.) to be removed from the plant thereby reducing surveillances and required preventive maintenance. Additionally, this change replaces an active system with a passive system, minimizing the risk of system failure.

In other Units 2 and 3 improvements, SCE was able to reduce critical path outage time. Previously, RCS water level was required to remain high during refueling activities to prevent vortexing in the shutdown cooling system (SDCS) suction (This prevented the RCS from being lowered to mid-loop). By reducing the Technical Specification required SDCS flow rate during refueling, the RCS water level can be lowered to mid-loop during refueling (without SDCS vortexing) thereby allowing steam generator nozzle dam removal and reactor coolant pump (RCP) seal placement concurrently. Critical path outage time saved by NRC approval of this change is approximately five days for each refueling outage.

SCE's Nuclear Safety Group has been successful in reducing the Units 2 and 3 core-melt frequency due to a loss of offsite power (LOOP) by 30%. A PRA based study identified a procedure change that would more effectively cope with a station blackout (LOOP with concurrent failure of <u>both</u> emergency diesel generators at one unit). By revising the procedure by which the Units 2 and 3 diesel generators are manually cross-connected, the probability of completing this task prior to core damage has been increased.

SCE has participated in the development of sensitive personnel monitoring equipment identified as "PBM-200 monitors." These monitors utilize sensitive, large area, gas flow proportional counters to examine personnel for contamination. The PBM-200s are extremely sensitive and because of the large detector area, are more effective in detecting high-energy beta particles, such as irradiated fuel particles, than hand frisking methods. Eleven PBM-200s are currently in daily use at the plant in addition to the existing Geiger-Muller hand friskers. One of the eleven PBM-200s has been located <u>outside</u> the protected area so that any concerned site employee can perform a personal radiation survey, even if they do not have protected area access.

During a recent INPO plant and corporate evaluation, several SCE "good practices" (unique and successful solutions to generic industry operating concerns) were identified by INPO. In this evaluation, INPO was pleased by the positive attitude of San Onofre employees, the teamwork that was displayed, the rapid and effective communications, our aggressive pursuit

of excellence, plant appearance, and SCE's use of advanced technology to improve plant performance. INPO also rated San Onofre as "excellent" in 8 of the 10 areas scrutinized during the evaluation.

A major new effort at San Onofre Units 1, 2, and 3 has been the establishment of the Trip Reduction Task Force (TRTF). The task force commenced operation on November 1, 1986. The effort was initiated in response to the fact that unplanned unit trips are a significant contributor to the perceived and real performance of the units. A compilation of plant trip data for the recent past was conducted to identify trip rates for each unit and for the station as a whole. A review of the data indicated that the more recent trip histories were not improving. As a consequence, the objective of the task force was to reduce unit trips in the second half of 1987 to a frequency of less than .25 trips per month. This objective represents a four-fold reduction in the rate of unplanned trips.

The task force is composed of members from all the pertinent departments within SCE. Representative departments from San Onofre include Operations, Maintenance, Station Technical and Operations and Maintenance Support. Additionally, members of the task force also represent Nuclear Engineering, Safety and Licensing. The task force meets weekly at San Onofre to discuss any recent reactor trips, reactor trips at other units, near trips (trips which were prevented) at San Onofre and the status of a detailed list of action items.

An updated status list is published periodically which identifies specific actions being taken, the responsible party and the assigned due date. In addition, a status report is also sent regularly to site management documenting the progress towards achieving the goal, the work completed and other factors which should receive higher visibility with respect to the task force efforts.

On May 20, 1987, San Onofre achieved the statistical objective of one trip during a period including four operating months. Enclosed for comparison purposes is a graph depicting unplanned (automatic) trips per 30 days of operation per unit plotted on a semi-annual basis. The graph identifies a gradual reduction in trips followed by a sharp increase in the second quarter of 1986. The first quarter of 1987 demonstrates the impact of Task Force efforts, the largest contributor of which is the heightened awareness throughout the company of our continued commitment to reducing and minimizing the number of unplanned trips in all three San Onofre units. We believe that the objective of the task force will be accomplished with the completion of the identified action items. Enclosed is a list of some of the established programs and completed action items for your information.

Of the improvements cited above, SCE considers the Trip Reduction Task Force to be the most significant. Thus, I would like to take this opportunity to invite NRC Project Management to San Onofre to review the TRTF program. If you have any questions, please do not hesitate to call.

Very truly yours,

M O M

M. O. Medford
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BRD/CEW:8482F
Enclosures

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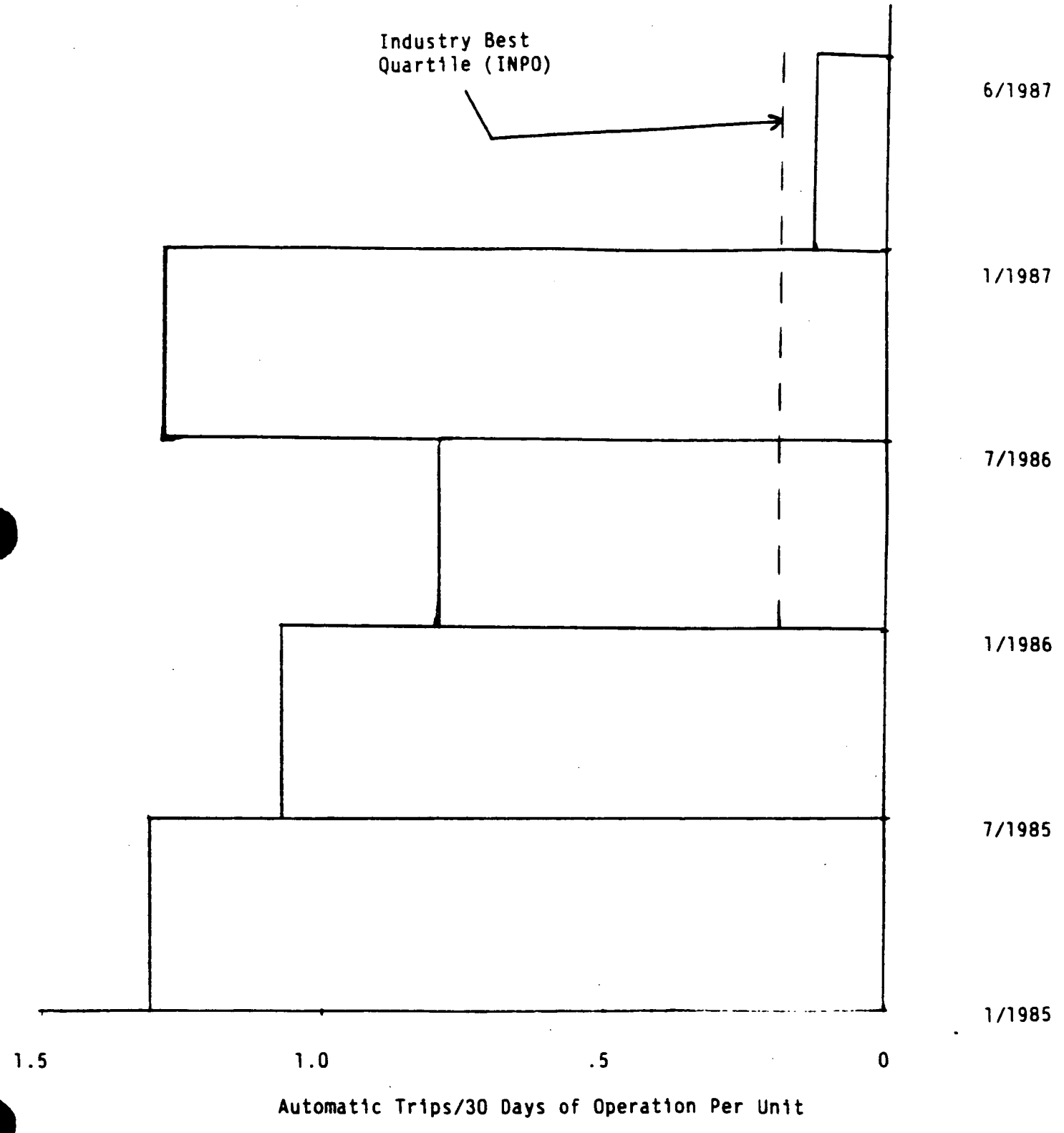
Enclosure

UNPLANNED AUTOMATIC TRIPS DURING OPERATION



Enclosure

TRIP REDUCTION TASK FORCE EFFORTS

Established Programs

All relevant past trips for Units 1, 2 and 3 have been carefully reviewed and the critical components (components which are single failure prone and a failure can result in a trip), have been identified. Based on the information obtained, 31 programs were initiated with initial completion (except for licensing actions) planned by June 30, 1987. Most of these programs are grouped into the following five categories:

1) Detect incipient failures in the critical components before they can cause a trip.

2) Improve preventive maintenance practice on a few critical components such that they are not likely to cause a trip.

3) Improve the design of those critical components which are single failure prone.

4) Reduce the frequency of at-power surveillance activities.

5) Improve personnel awareness of critical components through better labeling, more obvious caution signs, and more detailed caution statements in Maintenance and Operating procedures.

Completed Actions

The following work was completed in January 1987:

1) Required reading for I&C and Test Technicians on wire alteration control (i.e., any electrical wire alteration during maintenance must be returned to its original condition).

2) Cleaning up Unit 3 turbine unitized actuators and establishment of performance monitoring programs for the actuators to detect incipient problems such that the problems can be fixed at power without risking a trip.

3) Signs designed and fabricated that caution the I&C and electrical test technicians of critical equipment.

The following work was completed in February 1987:

1) A single-failure analysis on the Feedwater System has been completed to identify all critical subcomponents whose failure could cause a unit trip. These critical subcomponents will receive more attention so that their good operating condition can be continuously maintained.

2) A list of 17 critical components for Units 2 and 3, whose malfunction could cause a unit trip has been confirmed by Units 2 and 3 Operations. Caution signs are being placed on these critical components and referenced in the associated Maintenance and Operation's procedures.

3) A wide-range water level trend display has been installed on the Unit 3 control room panel to help operators cope with the steam generator "shrink-and-swell" phenomenon during startup.

The following work was completed in March 1987:

1) All critical components in Units 1, 2 and 3 whose malfunction may result in an unplanned unit trip have been labeled with a caution sign.

2) Established a program to add a caution statement to each MO/RMO/CWO related to a critical component.

3) A program has been implemented that requires any anomaly or major maintenance work on a critical component to be reported in the daily STA report.

4) A study on the existing PPS matrix test procedures and PPS design, aimed at minimizing the probability of a spurious trip, has been completed. Selected recommendations from this study are being implemented.

5) Implemented a program at Units 2/3 requiring every MO/CWO/RMO on a critical component to be tailboarded by Operations' Shift Superintendent.

The following work was completed in April 1987:

(1) Developed a list of critical instruments for Units 2 and 3 whose malfunction could trip the turbine (and subsequently the unit). A PM program (once per refueling outage) for periodic channel check and calibration of these instruments has been developed.

(2) Developed a new operation procedure related to properly overboarding the condenser during a saltwater leakage event. All the operators on shift have been trained on this procedure.

(3) Completed a feasibility study to install a redundant water level instrument on the MSR drain tank. Implementation for Unit 2 is expected during the upcoming Unit 2 outage.

(4) Established a program to review new recommendations from vendors on torque requirements for critical vibrating components. Also, an

advanced anti-rotation washer (called lock-disk) has been shop tested for its functionality. Test results show that with this type of washer, it takes twice the original torque to unscrew a bolt as compared to 75% of the original torque for a commonly used washer. It will be used, whenever possible and appropriate, on all the critical, vibrating components.

(5) An advanced thermal image system has been purchased for use in determining the incipient failures in PPS and other critical electronic components.

The following work was completed in May, June and July 1987:

(1) The operation and maintenance procedures related to critical components of Unit 2 and 3 have been enhanced. Appropriate caution statements have been added, and all critical steps in the procedures have been modified to require double verification.

(2) The operator run sheets have been enhanced for the critical components of Units 2 and 3. These run sheets now include items to look for symptoms of incipient failures.

(3) A tracking system has been established for TRTF action items that have resulted from the evaluation of near plant trips by the TRTF task force. This tracking system will ensure that all TRTF action items are completed as scheduled.

(4) All the secondary side critical instruments for all three Units (such as low pressure (LP) turbine exhaust hood temperature measurement) are now included in the preventative maintenance (PM) program. They are scheduled to be calibrated or checked during every refueling outage.

(5) Shift Superintendent accelerated maintenance (SSAM) process has been improved. The SSAM process allows the Shift Superintendent to bypass the normal maintenance order (MO) process and direct the performance of immediate maintenance when needed to prevent an eminent plant trip. The activities performed under the SSAM process on critical components are now required to be tailboarded by Shift Superintendent and pre-planned.

Status Overview

Since initiation of the task force, the list of programmatic action items has grown to 61. Approximately 75 percent of these items have been completed.

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