UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

May 26, 2000

Harold B. Ray, Executive Vice President
Southern California Edison Co.
San Onofre Nuclear Generating Station
P.O. Box 128
San Clemente, California 92674-0128

SUBJECT: NRC'S SAN ONOFRE SAFETY SYSTEM DESIGN AND PERFORMANCE CAPABILITY INSPECTION REPORT NO. 50-361/00-03; 50-362/00-03

Dear Mr. Ray:

This refers to the inspection conducted on April 3 to 21, 2000, at the San Onofre Nuclear Generating Station, Units 2 and 3, facilities. The enclosed report presents the results of this inspection. The results of the onsite inspection were discussed on April 21, 2000, with Mr. D. Nunn and other members of your staff. A supplementary telephonic exit meeting was conducted on May 19, 2000, to inform your staff of the results of the in-office review of an inspection issue identified by the licensee following the team's departure from the site.

This inspection was an examination of engineering activities conducted under the Unit 2 and 3 licenses by your onsite engineering organization. We concluded that your engineering program was satisfactorily maintaining the operability of the safety-related heating, ventilating, and air conditioning systems and the required support systems, for the auxiliary building, safety equipment building, and the common control room.

Based on the results of this inspection, the NRC has determined that two Severity Level IV violations of NRC requirements occurred. The violations are being treated as Non-Cited Violations, consistent with Section VI.A of the Enforcement Policy. The Non-Cited Violations are described in the subject inspection report. If you contest the violation or severity level of the Non-Cited Violation, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001, with copies to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011, the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the San Onofre Nuclear Generating Station, Units 2 and 3 facilities.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and enclosure will be placed in the NRC Public Document Room (PDR).

Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,

/***RA***/

Dr. Dale A. Powers, Acting Chief
Engineering and Maintenance Branch
Division of Reactor Safety

Docket Nos.: 50-361; 50-362
License Nos.: NPF-10; NPF-15

Enclosure:
NRC Inspection Report No.
50-361/00-03; 50-362/00-03

cc w/enclosure:
Chairman, Board of Supervisors
County of San Diego
1600 Pacific Highway, Room 335
San Diego, California 92101

Alan R. Watts, Esq.
Woodruff, Spradlin & Smart
701 S. Parker St. Suite 7000
Orange, California 92868-4720

Sherwin Harris, Resource Project Manager
Public Utilities Department
City of Riverside
3900 Main Street
Riverside, California 92522

R. W. Krieger, Vice President
Southern California Edison Company
San Onofre Nuclear Generating Station
P.O. Box 128
San Clemente, California 92674-0128

David Spath, Chief
Division of Drinking Water and
Environmental Management
P.O. Box 942732
Sacramento, California 94234-7320

Michael R. Olson
Sr. Energy Administrator
San Diego Gas & Electric Company
P.O. Box 1831
San Diego, California 92112-4150

Ed Bailey, Radiation Program Director
Radiologic Health Branch
State Department of Health Services
P.O. Box 942732 (MS 178)
Sacramento, California 94327-7320

Steve Hsu
Radiologic Health Branch
State Department of Health Services
P.O. Box 942732
Sacramento, California 94327-7320

Mayor
City of San Clemente
100 Avenida Presidio
San Clemente, California 92672

Truman Burns/Robert Kinosian
California Public Utilities Commission
505 Van Ness, Rm. 4102
San Francisco, California 94102

Robert A. Laurie, Commissioner
California Energy Commission
1516 Ninth Street (MS 31)
Sacramento, California 95814

Douglas K. Porter
Southern California Edison Company
2244 Walnut Grove Avenue
Rosemead, California 91770

Dwight E. Nunn, Vice President
Southern California Edison Company
San Onofre Nuclear Generating Station
P.O. Box 128
San Clemente, California 92674-0128

bcc to DCD (IE01)

distribution from ADAMS by RIV:
Regional Administrator **(EWM)**
DRP Director **(KEB)**
DRS Director **(ATH)**
Senior Resident Inspector **(JAS7)**
Branch Chief, DRP/E **(LJS)**
Senior Project Engineer, DRP/E **(GAP)**
Branch Chief, DRP/TSS **(LAY)**
RITS Coordinator **(NBH)**
D. Lange **(DJL)**
NRR Event Tracking System **(IPAS)**
SONGS Site Secretary **(SFN1)**

DOCUMENT NAME: R:_SO23\SO003rp-jew.wpd
To receive copy of document, indicate in box: "C" = Copy without enclosures **"E"** = Copy with enclosures **"N"** = No copy

RIV:SRI:EMB	RI:EMB	RI:EMB	RI:EMB	SRI:EMB	RI:PBD
JEWhittemore/lmb	RWDeese	PAGoldberg	WMMcNeill	CJPaulk	DECorporandy
05/12/00 /***RA***/	05/17/00 /***RA***/	05/15/00 /***RA***/	05/15/00 /***RA***/	05/15/00 /***RA***/	05/16/00 /***RA***/
ABC:EMB	C:PBC	ABC:EMB			
DAPowers	CSMarschall	DAPowers			
05/19/00 /***RA***/	05/18/00 /***RA***/	05/26/00 /***RA***/			

OFFICIAL RECORD COPY

ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket Nos.:	50-361; 50-362
License Nos.:	NPF-10; NPF-15
Report No.:	50-361/00-03; 50-362/00-03
Licensee:	Southern California Edison Co.
Facility:	San Onofre Nuclear Generating Station, Units 2 and 3
Location:	5000 S. Pacific Coast Hwy. San Clemente, California
Dates:	April 3 to 21, 2000
Team Leader:	J. E. Whittemore, Senior Reactor Inspector Engineering and Maintenance Branch
Inspectors:	D. E. Corporandy, Resident Inspector Projects Branch D
	P. A. Goldberg, Reactor Inspector Engineering and Maintenance Branch
	W. M. McNeill, Reactor Inspector Engineering and Maintenance Branch
	C. J. Paulk, Senior Reactor Inspector Engineering and Maintenance Branch
Accompanying Personnel:	R. W. Deese, Reactor Inspector Engineering and Maintenance Branch
	D. Prevatte, Contractor Beckman & Associates, Inc.
Approved By:	Dr. Dale A. Powers, Acting Chief Engineering and Maintenance Branch Division of Reactor Safety

ATTACHMENTS:

1. Supplemental Information
2. NRC's Revised Reactor Oversight Process

SUMMARY OF FINDINGS

San Onofre Nuclear Generating Station, Units 2 and 3
NRC Inspection Report Nos. 50-361/00-03; 50-362/00-03

This report covers a 2-week onsite inspection by a team of six Region IV inspectors and one contractor during the first week, and four Region IV inspectors and a contractor during the second week. The report includes the results of a safety system design and performance capability team inspection of the auxiliary building heating, ventilating, and cooling system and related support systems in Units 2 and 3. The significance of issues is indicated by their color (green, white, yellow, red) and was determined by the Significance Determination Process in Inspection Manual Chapter 0609.

Cornerstone: Mitigating Systems

- GREEN. The licensee failed to account for additional axial loading induced on the inlet nozzles of the component cooling water pumps through bellows-type expansion joints when a modification introduced a credible single failure with the potential to increase maximum system pressure. The initial stress analysis assumed a 50 psig suction pressure, but the single failure was calculated to result in pressure up to 72 psig. This was considered to be potentially significant, because component cooling water removes heat from essential components required for normal and emergency shutdown of the plant. The licensee calculated the additional stress to verify the safety function performance of the pumps under the new conditions. The analytical result confirmed that the issue was of very low risk significance because there was no actual loss of safety function (Section 1R21.1.b).

- GREEN. The team found that the room coolers for the emergency core cooling pump rooms were undersized. The room coolers were undersized because the licensee had not taken into account the heat loads from the noninsulated piping located within the rooms when the room coolers were designed. The licensee's staff used conservative assumptions to determine the worst case conditions that would exist in the rooms during the design basis accident and recovery. The equipment and commodity items, such as cables, terminal blocks, and electrical tape, in the rooms were verified as capable of performing under the predicted conditions. This was identified as a Non-Cited Violation (50-361;362/0003-01) of Criterion III of Appendix B to 10 CFR Part 50 consistent with Section VI.A of the NRC Enforcement Policy, and was placed in the licensee’s corrective action system as Action Request 000401086, dated April 19, 2000 (Section 1R21.4.b).

- GREEN. A modification performed to measure air flow in the control room ventilation system introduced a single failure scenario of the recirculation system, which would have resulted in the air to the control room bypassing the high efficiency particulate air filter and the gaseous absorption train. This failure scenario had the potential to result in the control room operators receiving whole-body radiation exposure beyond regulatory limits during design basis accidents. The failure to change procedures affected by a design change to the air flow detection in both trains of the control room ventilation recirculating system, introduced a credible single failure. The current method of detecting and measuring control room ventilation flow would not result in a supply fan shutdown when a loss of the train recirculating fan occurred due to loss of power, if the train supply and recirculating fans were powered from different units. As a result, the design basis for the control room environment would not have been met, and there could have been a potential whole-body radiation exposure to the control room operators, beyond regulatory limits. Procedures, policies, and practices in effect during the inspection, did not preclude operation in the configuration that could result in the scenario of concern, or warn the operators that the condition could occur. The team assessed the condition and determined it to be of low risk significance because there were no system operability concerns. The team identified this issue as a Non-Cited Violation (50-361;362/0003-02) of Criterion III of Appendix B to 10 CFR Part 50, consistent with Section VI.A of the NRC Enforcement Policy. The condition resulting in the violation was entered into the licensee's corrective action system as Action Request 000400949, dated April 17, 2000 (Section 1R21.5.b).

REPORT DETAILS

Summary of Plant Status

During both weeks of onsite inspection, San Onofre Nuclear Generating Station Units 2 and 3 were operating at or near full power.

1 REACTOR SAFETY
Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

Introduction

The inspection of safety system design and performance capability was performed at the San Onofre Nuclear Generating Station (SONGS), Units 2 and 3, to verify that the initial design and subsequent modifications have preserved the design basis of the selected system and related support systems. Additionally, the inspection effort served to monitor the capability of the selected system to perform the design basis functions. This inspectable area verifies aspects of the initiating events, mitigating systems, and barrier cornerstone.

The probability risk analysis model for the SONGS units is based on the capability of the as-built safety systems to perform their intended safety functions successfully. The area and scope of the inspection were predetermined by reviewing the licensee's probabilistic risk analysis model to identify dominant systems, structures, and components, ranked by importance, and their potential contribution to dominant accident sequences and/or initiators. The inspection team reviewed in detail the auxiliary building heating, ventilation, and cooling (HVAC) system. This system in each unit served not only the auxiliary building, but the safety equipment building and the common control room. The primary review prompted a parallel review of HVAC support systems, such as, electrical power, normal chilled water, and emergency chilled water systems.

The objective of this inspection was to assess the adequacy of calculations, analyses, other engineering documents, and engineering and operating practices that were used to support the performance of the auxiliary building HVAC and any necessary support systems (e.g., electrical power and instrument air) during normal, abnormal, and accident conditions. The inspection was performed by a team of inspectors that consisted of a team leader, Region IV inspectors, and a contractor. Acceptance criteria utilized by the NRC inspection team included the SONGS technical specifications, applicable sections of the Updated Final Safety Analysis Report (UFSAR), applicable industry codes, and industry initiatives implemented by the licensee's programs.

1R21 Safety System Design and Performance Capability

.1 System Requirements

a. Inspection Scope

The team reviewed the following attributes for the auxiliary building HVAC system: the auxiliary HVAC and the chilled water systems process mediums (water, air, electrical signal, or the atmosphere being processed), energy sources (electrical and air), control systems, and equipment protection. The team also reviewed the operator actions for the auxiliary building normal and emergency HVAC systems. This review consisted of system walkdowns; review of normal operating, annunciator response, and emergency operating procedures; and review of the UFSAR, the technical specifications, and plant drawings. The purpose of this review was to verify that the normal and emergency auxiliary building HVAC system needs were met.

b. Issues and Findings

During the auxiliary building HVAC system walkdown, the team observed an unrestrained 20-inch nominal diameter bellows-type expansion joint on the suction piping to one of the component cooling water pumps. For each unit, there was a component cooling water pump for each of two trains, plus a swing pump. All six component cooling water pumps had the same piping configuration with an identically configured expansion joint adjacent to the suction nozzle. The team inquired if the unbalanced pressure forces from each of the expansion joints might exceed the pump vendor allowable loads, especially along the axis of the suction nozzles.

The licensee’s staff reviewed component cooling water pump nozzle loads that would result from the maximum pump suction pressure and discovered a discrepancy. Prior to initial plant startup, a decision was made to maintain a nitrogen blanket on the component cooling water expansion tanks. The licensee postulated that a failure of the nitrogen system’s regulator could result in a maximum component cooling water pump suction pressure of 72 psig. The additional system pressure acting on the bellows segments would exert additional load along the piping axis, which would be transmitted to the pump nozzles. However, the licensee’s calculation of record for the system had been based on a maximum operating pressure of 50 psig. During the walkdown, suction pressure was observed to be approximately 50 psig on the pumps.

Recognizing that the component cooling water system was in an unanalyzed condition, the licensee’s staff recalculated the loads based on a 72 psig maximum suction pressure. The revised loads exceeded that which was established by the pump vendor. Using the vendor calculations, the licensee's staff was able to demonstrate to the team’s satisfaction that the revised loads would not overstress the component cooling water suction nozzle, nor overload any of the pump components.

The team determined that this deficiency was of low risk significance because the issue did not affect the operability of the component cooling water system. Therefore, the team determined that this deficiency was a GREEN issue.

.2 System Condition and Capability

a. Inspection Scope

The team reviewed periodic testing procedures (listed in the attachment) and results for the control room emergency air cleanup system to verify that the design requirements were demonstrated by the performance of the tests. The team also verified the environmental qualification of a sample of system components for operation under design environmental conditions and assumed operating parameters, e.g., voltage, speed, and power.

The team also reviewed system operation for the auxiliary building normal and emergency HVAC systems. This review consisted of system walkdowns; review of normal operating, annunciator response, and emergency operating procedures; and review of the UFSAR, the technical specifications, and plant drawings. The team also observed a scheduled fire damper inspection of the normal auxiliary building HVAC system in order to assess the significance and corrective action for reported deterioration of ventilation duct liner insulation.

b. Issues and Findings

There were no findings identified and documented during this inspection.

.3 Identification and Resolution of Problems

a. Inspection Scope

The team reviewed a sample of auxiliary building HVAC and chilled water system problems identified by the licensee’s corrective action program to evaluate the effectiveness of corrective actions related to design issues. The team also reviewed Procedures SO123-XV-50, "Corrective Action Process," Revision 3, and SO123-XX-1 1SS2, "Action Request/Maintenance Order Initiation and Processing," Revision 12. The specific action requests that were sampled and reviewed by the team are listed in the attachment to this report. Inspection Procedure 71152, "Identification and Resolution of Problems," was used as guidance to perform this part of the inspection.

b. Issues and Findings

There were no findings identified and documented during this inspection.

.4 System Walkdowns

a. Inspection Scope

The team performed walkdowns of the auxiliary building normal and emergency HVAC systems, the safety equipment building normal emergency HVAC systems, the control room emergency HVAC system, and the emergency chilled water system, which supplied chilled water to the emergency systems under emergency conditions. The walkdowns focused on the installation and configuration of piping, components, and instruments; the placement of protective barriers and systems; the susceptibility to flooding, fire, or other environmental concerns; the physical separation; the provisions for seismic concerns; accessibility for operator action; and the conformance of the currently installed configuration of the systems with the design and licensing bases.

b. Issues and Findings

During a walkdown of the safety equipment building emergency HVAC system, the team discovered a condition in Rooms 002 and 005, in Units 2 and 3, that was outside the design basis. These rooms contained Trains A and B, respectively, of the emergency core cooling system (ECCS) pumps and other equipment. This included high pressure safety injection (HPSI), low pressure safety injection (LPSI), and containment spray pumps, along with the associated piping, valves, and instrumentation. The team observed that most of the HPSI, LPSI, and containment spray piping, valves, pumps, and equipment in these rooms was not thermally insulated. Only the small portions of the systems that were readily accessible from the walkways were insulated, apparently for personnel protection purposes.

The noninsulated piping was contrary to the assumptions used in the design basis calculations to determine the heat loads in these rooms (M-75-060, "Safety Equipment Building Heat Load - Normal," Revision 0, and M-75-050, "Safety Equipment Building Heat Load - Emergency," Revision 0) that the majority of this piping and equipment was insulated. The additional heat loads from these uninsulated components had been used in turn as the design bases for sizing the rooms emergency coolers, as described in Calculation M-75-051, "Safety Equipment Building HVAC Equipment Sizing - Emergency," Revision 1, for Room Cooler E416 in Room 002 and Room Cooler E417 in Room 005. The team also observed that in Calculation M-75-050, the formula used to determine the heat rejected from the pump motors was incorrect because of inappropriate treatment of motor efficiency losses, which rendered the calculated heat loads approximately 10 percent less than the correct values. However, this difference was a relatively minor contributor to the overall room heat loads, since the motors were cooled primarily by component cooling water.

The design basis temperature of these rooms was 104°F. Since, in the design basis calculations, the insulated pipe contribution to the total room heat load had been 53 percent for Room 002 and 62 percent for Room 005, with this equipment noninsulated, the team expected substantially higher room temperatures. As a result, the safety equipment building emergency HVAC system was in an unanalyzed condition that exceeded its design basis, and the potential existed that the room design temperatures could be exceeded under emergency conditions. This in turn had the potential to cause the emergency chilled water system heat load to exceed its design basis. Thus, the operability of these two systems, plus the ECCS equipment located in the affected rooms, was called into question.

In response to this team observation, the licensee's engineering staff generated Action Request 000401086 on April 19, 2000, and began work to address operability questions.

Two basic event scenarios that would challenge this equipment operability were evaluated. The first was a loss-of-coolant accident and other accidents, which could generate piping temperatures up to 220°F in the HPSI and containment spray systems. The second was any non loss-of-coolant accident event that would require a safe shutdown without the normal HVAC, such as a loss-of-offsite power. Such events could generate temperatures up to 394°F in the LPSI piping. The second scenario's combination of higher temperature and larger diameter (volume) LPSI piping that could be affected, made it the limiting case for room heat loads.

The licensee's staff then performed calculations of the room cooler performances using the newly calculated heat loads. These calculations, performed with many simplifying conservatisms in order to obtain an expedient operability determination, showed that the room temperatures would not exceed 200°F. If more refined calculations were performed removing these conservatisms, the room temperatures would be expected to be well below this value. It should also be noted that the original calculated total room heat loads contained margins of 63 percent in Room 002 and 48 percent in Room 005.

The conservatism of these analyses was supported by actual operating experience performing plant shutdowns at worst case decay heat conditions. Such conditions would closely duplicate the room heat loads for the limiting design case event. Actual room temperatures under these conditions, though not formally measured, were observed by operators to not be excessive for personnel habitation, indicating that they were well below the 200°F analyzed value.

The licensee's engineers also evaluated the increased load that would be applied to the emergency chilled water system chillers and, in turn, to the component cooling water system as a result of the higher room heat loads. The additional heat load on both systems was found to be within their original design bases. Therefore, neither was rendered inoperable by this finding.

Since the original design temperature of the rooms was 104°F, the licensee's staff performed a review of the environmental qualification of the safety-related equipment in the rooms. This equipment included motors, instrumentation, limit switches, valve motor operators, level control switches, and commodity equipment, such as cables, terminal blocks, and tape. Most items were found to have been qualified for the environment inside the reactor containment, which was much more severe than the worse conditions projected for these rooms. This included the mechanical aspects of this equipment, such as lubricants, degraded motor torque at higher temperatures, etc. The equipment that was not qualified for the containment environment was found to be capable of operating at temperatures up to 212°F for 6 hours and 170°F for 15 days, which would envelope the calculated room conditions. The basis for this determination was a search of the equipment material qualification list and verification of equipment qualification. Therefore, all of the equipment in the rooms was determined to be operable.

Although none of the systems associated with this finding were determined to be inoperable, since for certain design basis events, the room temperatures would have exceeded the 104°F design temperature, this was determined by licensee personnel to be a condition during operation that was outside the design basis. Therefore, on April 20, 2000, the licensee made a 1-hour report to the NRC of this condition in accordance with 10 CFR Part 50.72, "Immediate notification requirements for operating nuclear power reactors."

Criterion III of Appendix B to 10 CFR Part 50, "Design Control," requires, in part, that measures shall be established to assure that applicable regulatory requirements and the design basis for those structures, systems, and components to which this appendix applies are correctly translated into specifications, drawings, procedures, and instructions. In addition, the design control measures shall provide for verifying or checking the adequacy of design, such as, by the performance of design reviews. Safety equipment building Heat Load Calculations M-75-060, "Safety Equipment Building Heat Load - Normal," Revision 0, CCN-2; and M-75-050, "Safety Equipment Building Heat Load - Emergency," Revision 0, CCN-2, determined that the maximum temperature in the HPSI, LPSI, and containment spray rooms was 104°F. This design temperature was based on the assumption in the calculations that most of the HPSI, LPSI, and containment spray piping and equipment was insulated in equipment Rooms 002 and 005. Contrary to this assumption, the HPSI, LPSI and containment spray piping were not insulated and had never been insulated as assumed in the design calculations.

The licensee’s failure to verify the adequacy of the design, in that, without insulation on the HPSI, LPSI, and containment spray piping, under certain design basis events, the temperature of the equipment rooms during a design basis accident would have exceeded the 104°F design basis temperature, was considered to be a violation of Criterion III of Appendix B to 10 CFR Part 50. This violation is associated with a GREEN Significance Determination Process finding. This Severity Level IV violation is being treated as Non-Cited Violation (50-361; 362/0003-01), consistent with Section VI.A of the NRC Enforcement Policy. The condition resulting in the violation is in the licensee’s corrective action system as Action Request 000401086, dated April 19, 2000.

.5 Design Review

a. Inspection Scope

The team reviewed the design to verify that the systems would function as required under accident conditions. These reviews addressed design assumptions, calculations, boundary conditions, and models. The team also performed single failure reviews of individual components to determine the potential effects of such failures on the capability of the systems to perform their safety functions. Instrumentation was reviewed to verify its appropriateness for the applications and its setpoints with regard to the function it was required to perform. Additionally, the team performed informal analyses in several areas to verify that design values were correct and appropriate. Documentation reviewed included drawings, procedures, calculations, action requests, and maintenance orders identified in the attachment, as well as, the facility technical specifications and the UFSAR. All reviews were aimed at determining whether the design bases of the systems were met by the installed and tested configurations.

b. Issues and Findings

A portion of the team's review focused on the control room emergency ventilation and air conditioning system which was a subsystem of the auxiliary building HVAC system. Following the onsite inspection, the licensee identified a situation, in which the control room could have been supplied with up to 2,050 cfm of unfiltered outside air during an accident and radioactive release, and there would have been no alarm of the condition causing the filter bypass.

One of this system's functions was to provide radiation protection for the control room operators during a loss-of-coolant accident in order to maintain their exposure to less than 5 rem whole body or equivalent, as required by Criterion 19 of Appendix A to 10 CFR Part 50, "Control Room." This system was intended to accomplish this function by maintaining +0.125 inches of water pressure in the control room envelope to prevent infiltration and by providing control room atmosphere recirculating through filter trains at a minimum design basis flowrate of 29,934.5 cfm. At this recirculating flowrate and with a 2,050 cfm pressurization flowrate supplied to the entrance of the recirculating filters and, therefore, passing directly through them. Calculations N-4060-007, "Post-LOCA PASS and ESF Leakage Doses to EAB, LPZ, and Control Room," Revision 7, and N-4060-020, "Control Room, EAB, and LPZ Post-LOCA Doses," Revision 4, determined the design basis control room exposure would be 3.4 rem whole body for the duration of the design basis accident. This met the Appendix A Criterion 19 limit of 5.0 rem.

As a part of the review of the system's instrumentation and controls logic, the team reviewed Calculation J-GKA-012, "Low Flow Alarm Setpoint for Control Room Area Emergency A/C," Revision 1. This calculation determined the flowswitch setpoint associated with Flow Elements FE-9754 and FE-9722, which were located at the discharges of control room Emergency Recirculation Fans E418, Train A and E419, Train B, respectively. These flowswitches were intended to actuate on a low flow of 30,440 cfm to provide a control room alarm and to trip the affected filter train in order to assure that the recirculation flowrate would not decrease below the design basis value. This calculation indicated that the method of measuring this flow had been changed by Design Modification DCP 951.5M in 1984. The original pitot tube flow elements measured flow velocity directly (i.e., a lower flow indicated by a lower differential pressure over the entire flow range) had been abandoned in-place. Instead, the flow measurement method was modified to monitor differential pressure across the recirculation fans, which provided an indirect indication (i.e., a lower flow was indicated by increased fan differential pressure, but only for a limited range).

This modification appeared to have presumed that the only cause for decreased flow would be increased system resistance due to filter train loading. However, the team was concerned that flow could decrease for other causes that would not be detected by the new instrument scheme, e.g., loss of flow due to a recirculation fan failure. For such a failure, the low flow switch would not be actuated (since low differential pressure would still be sensed), and the corresponding train pressurization fan (A207 for Train A and A206 for Train B) would continue to operate. In this condition, with the recirculation fan not operating, the path of least resistance for the pressurization flow could be through the recirculation return duct work from the control room, in which case, the recirculation filters would be bypassed. Although the pressurization fans also contained separate filter trains, they did not meet the design basis requirements and, therefore, were not credited in the control room exposure analysis. Therefore, in this hypothetical situation, the control room could have been supplied with up to 2,050 cfm of unfiltered outside air, and there would have been no alarm of the condition causing this bypass.

It should be noted that, in the licensee's design basis calculations, 100 percent of the thyroid and beta-skin doses and 53 percent of the whole body dose were due to accident contamination that penetrated the recirculation filters. Since the recirculating filter cleanup efficiencies were 99 percent for particulate and 95 percent for organic and elemental iodine, bypass flow due to a failure, such as described above, would add substantially to operator exposure.

A second potential effect of this condition identified in Calculation J-GKA-012 would be overpressurization of the recirculation filter unit intake.

Based on this concern, the team began a review of the design to determine if there were any single failure modes (mechanical or electrical) for the recirculation fans that could leave the pressurization fans operating. The team also asked the licensee’s staff to provide a copy of the 10 CFR 50.59 safety evaluation for this modification in order to determine if and how this question had been addressed. As a result, several potential failure modes were explored by the team with the licensee's staff, but no credible failures were identified by or to the team that would not either trip the pressurization fan by the control logic or provide some unmistakable indication of a failure or problem to the operators.

On April 25, 2000, following the April 21, 2000, inspection exit meeting, a licensee management representative telephonically provided the team leader additional information. The licensee’s staff had identified a condition that would result in a credible single failure scenario that the team had been concerned about. A telephone facsimile of Action Request 000400949, originated on April 17, 2000, and last updated on April 21, 2000, was also provided. The action request reported a recirculation fan failure mode that had been identified that had the potential to leave a pressurization fan operating. This condition could exist only if power to a given train were being supplied to the recirculation fan and the pressurization fan from different units, e.g., Unit 2 supplying Train A recirculation fan and Unit 3 supplying Train A pressurization fan. For this lineup, a power supply failure to the recirculation fan would cause it to stop, but would not trip the corresponding pressurization fan or result in a low flow alarm. No plant procedure prevented or cautioned against such lineups or provided any operator response guidance for this event.

According to the licensee’s representative, in response to this discovery, it was verified that neither train was operating in the lineup of concern and, therefore, the system was judged operable, and not in a degraded or nonconforming condition. It was unknown if the vulnerable lineup had ever existed, but a manager stated that the licensee would attempt to determine if it had. The action request indicated, and the management representative confirmed, that the system was tagged to preclude an inadvertent lineup that could result in the recognized failure mode. Additionally, the action request directed revision of the operating procedures to caution the inoperability potential when the fan power supplies in any given train were not aligned to the same unit.

Criterion III of Appendix B to 10 CFR Part 50, "Design Control," states, in part, that measures shall be established to assure that applicable regulatory requirements and the design basis for those structures, systems, and components to which this appendix applies are correctly translated into specifications, drawings, procedures, and instructions. It also required that design changes, including field changes, shall be subject to design control measures commensurate with those applied to the original design. Section 6.4 of UFSAR," Habitability Systems," stated that one of the design bases of the control room emergency ventilation system was, "The radiation exposure of control room personnel, through the duration of any one of the postulated limiting faults discussed in Chapter 15, does not exceed the limits set by 10 CFR 50, Appendix A, General Design Criterion 19." This UFSAR section also identified a design basis that stated, "A single failure of a component of the control room emergency ventilation system, assuming a loss of offsite power, cannot impair the ability of the system to comply with the design bases . . . ." Contrary to the requirements, the design bases, although incorporated in the original system design, were not maintained when Design Modification DCP 951.5M was performed in 1984 to change the recirculation fan low flow trip device. As a result of this change, a mode of failure of the system's recirculation fans was created that would not be detected by these instruments, and could, therefore, leave the corresponding pressurization fan operating. As a result, the control room could have been supplied with unfiltered outside air during a design basis accident.

This could have created a condition beyond the design basis analysis for operator exposure, and would likely have caused such exposure to exceed the regulatory exposure limit of Criterion 19 of Appendix A to 10 CFR Part 50. The team determined that this deficiency was of low risk significance because the issue did not affect the operability of the control room HVAC system and, therefore, was GREEN.

The licensee’s failure to verify the adequacy of operating procedures to assure that a design modification would not impact the design basis due to a single failure induced by a loss-of-offsite power during accident conditions, was considered to be a violation of

Criterion III of Appendix B to 10 CFR Part 50. This Severity Level IV violation is being treated as a Non-Cited Violation (50-361;362/0003-02), consistent with Section VI.A of the NRC Enforcement Policy. The condition resulting in the violation is in the licensee's corrective action system as Action Request 000400949, dated April 17, 2000.

.6 Safety System Testing

a. Inspection Scope

The team reviewed the program and procedures for testing, cleaning, and inspecting safety-related room coolers within the auxiliary building emergency HVAC system. The team reviewed testing, inspection, and cleaning records for Units 2 and 3 safety-related room coolers, which were cooled by the emergency chilled water system. The reviewed records included the original chilled water flow balancing and startup testing results. The review included records for the control room coolers, the control room cabinet coolers, engineered safety features (ESF) switchgear room coolers, charging pump room coolers, and the ECCS room coolers.

b. Issues and Findings

During the inspection, the team had questions related to the adequacy of chilled water flow through room cooler heat exchangers. The licensee could not provide records or documentation that would validate the performance of the safety function for some of the Unit 2 room coolers.

The team reviewed three cycles of inspection and cleaning records for each safety-related room cooler and noted that the inspection and cleaning were performed in accordance with maintenance orders, which required lubricating motor bearings and fan bearings, inspecting V-belts, and cleaning the air side (shell side) of the cooling coils as necessary. The inspection and cleaning of the room coolers was performed every 2 to 6 years. No major discrepancies were found during the review of the inspection and cleaning records. However, the team found that the chilled water side of the room coolers had not been inspected or cleaned.

The team requested heat exchanger capacity testing records for the safety-related room coolers. The licensee's representative stated that the safety-related room coolers were not tested since the emergency chilled water was chemically treated and the water chemistry was tested on a monthly basis. The emergency chilled water system is a closed loop system filled with demineralized water. The chemistry department monitored it monthly for corrosion products, microbiological growth, and to ensure that the corrosion inhibitors were within the allowable limits. According to licensee representatives, this treatment and analysis program was initiated during startup and was continuing. From a review of the chemistry department water trending records, the team found that the emergency chilled water chemistry remained within acceptable limits during recent years. The team accepted that there would be minimum heat exchanger tube fouling because of the licensee's program.

The team reviewed the licensee's, "Emergency HVAC Performance Monitoring Program," dated March 6, 1992. The intent of the monitoring program was to supplement the existing testing and preventive maintenance activities by establishing periodic testing of emergency HVAC components in order to confirm that the critical parameters were maintained within design tolerances. The team reviewed the 1992 flow test results where 22 of the 40 safety-related room coolers were tested. The team found that 16 of the 22 tests yielded chilled water flows that exceeded the licensee's allowable margin (+/- 10 percent) of the design flow to the coolers. The measured flows to the control room coolers were 54 and 81 percent of the design flows. The team noted that measured flows to two of the room coolers for the control room cabinets were at 0 percent and 83 percent of the design flows. After reviewing these test results, which indicated that the flow balance to the safety-related coolers was incorrect, the team questioned the operability of the room coolers whose flows were less than the design value. In addition, the team noted that, in 1992, after numerous failures to accurately measure heat echanger chilled water flow rates, the licensee had not entered the issue into the corrective action program. Licensee personnel stated that the 1992 flow test results were erroneous since the chilled water flow was measured with an ultrasonic flow meter, which exhibited high instrument errors and inaccuracies at low flow velocity conditions. In addition, licensee personnel stated that, to obtain meaningful results, a flow transducer must be at least 10 pipe diameters downstream and 5 pipe diameters upstream of a flow disturbance, such as an elbow, valve, or reducer. Licensee personnel determined that there were no locations where the flow transducer could have been placed, which would have met the acceptance criteria. Licensee personnel, however, stated that the startup tests performed in 1981 and 1982 on the safety-related room coolers was the basis for stating that the safety-related room coolers were operable.

The team reviewed Procedure 2PE-204-02, "Auxiliary Building Emergency Chilled Water System Preoperational Test," Revision 1, which measured the chilled water flow rates for each of the Units 2 and 3 safety-related room coolers by installing an appropriate differential pressure gage across the cooler. The team noted that the actual flow rates met or exceeded the design flow rates in the flow balance tests. The tests were performed in May and June 1981. Licensee personnel stated that the throttle valves for each cooler were secured after the test so that there would be no further adjustments of the flow through the cooler.

The team reviewed Procedure 2PE-511-02, "Control Room Complex Normal and Emergency HVAC Preoperational Test," Revision 0. This procedure was used for both the Units 2 and 3 room coolers for the control room and the cabinet coolers in the control room. This startup procedure tested the coolers by supplying a heat load to the room and measuring the maximum temperature in the room and the differential pressure across the room cooler tubes. The room cooler vendor supplied the licensee with the design flow for each room cooler and the differential pressure across the tubes, which was equivalent to the design flow. The Unit 2 room cooler tests were performed in August 1981. The team did not review any other Unit 2 start-up procedures; however, licensee personnel stated that initially, six of the coolers failed the flow test measured by differential pressure across the tubes. Testing was performed again after resetting the throttle valves for the six room coolers. Flow was measured in gallons per minute instead of differential pressure. At the time of this inspection, the licensee was not able to determine the method of flow measurement used to obtain gallons per minute or if the Unit 2 measured chilled water flows were in fact valid.

The team reviewed Unit 3 startup Procedures 3PE-512-02, "ESF Switchgear Rooms Normal and Emergency HVAC Test," Revision 0, and 3PE-515-01, "Safety Equipment Building Normal and Emergency HVAC," Revision 0. These startup procedures tested the room coolers by supplying a known heat load to the room being tested and by measuring the maximum temperature in the room and the differential pressure across the room cooler tubes. Again, the room cooler vendor supplied the licensee with a design flow for each room cooler and the differential pressure across the tubes, which was equivalent to the design flow. The Unit 3 tests were performed in April 1982. Differential pressure was measured, and all room coolers met or exceeded the design differential pressure supplied by the room cooler vendor.

The team reviewed the licensee’s data for room cooler design cooling capacity and the required cooling capacity and noted that the control room coolers, the control room cabinet coolers, and the ESF room coolers had a small margin between the design and required heat load. The team did not have confidence in the licensee's confirmation of the adequacy of the current performance of the safety-related room coolers since, in some cases, cooling capacity margins were small. Cleaning and inspection had not been performed on the chilled water side of the coolers since startup of the units and startup test results for Unit 2 were questionable due to the flow measurements. Inadequate flow through a safety-related room cooler would not meet the design basis and, therefore, would be a violation of regulatory requirements for design control specified in Criterion III of Appendix B to 10 CFR Part 50. The licensee initiated Action Request 000401144, dated April 20, 2000, to perform flow tests on at least five of the safety-related coolers. The licensee planned to measure differential pressure across the cooling coils for the two control room coolers (ME481, 419), two control room cabinet coolers (ME423, 427), and ESF switchgear room cooler (ME257). NRC review of the licensee’s test results and verification of operability is identified as an unresolved item (50-361;362/0003-03).

4 OTHER ACTIVITIES (OA)

4OA5 Management Meetings

.1 Exit Meeting Summary

The inspectors presented the inspection results to Mr. D. Nunn, Vice President, Engineering and Technical Services, and other members of licensee management at the conclusion of the onsite inspection on April 21, 2000. The licensee's management acknowledged the findings presented.

A supplemental telephonic exit meeting was held on May 19, 2000, during which the team leader characterized the results of the in-office review of an inspection issue identified by the licensee following the team's departure from the site.

The inspectors asked the licensee's management whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT 1

PARTIAL LIST OF PERSONS CONTACTED

Licensee

R. Allen, Supervisor, Reliability Engineering
D. Axline, Licensing Engineer, Nuclear Regulatory Affairs
V. Barone, Supervisor, Nuclear Engineering Design
R. Clark, Manager, Quality Engineering
K. Flynn, Supervisor, Station Technical
T. Hooks, Manager, Nuclear Safety Group
M. Jones, Manager, Operations Support
H. McShane, Supervisor, Nuclear Engineering Design
D. Nunn, Vice President, Engineering and Technical Services
N. Quigley, Manager, Station Technical Services
A. Scherer, Manager, Nuclear Regulatory Affairs
K. Slagle, Manager, Nuclear Oversight
M. Wharton, Manager, Nuclear Engineering Design

NRC

J. Kramer, Resident Inspector
J. Sloan, Senior Resident Inspector

ITEMS OPENED AND CLOSED

Opened

361/0003-03	URI	Verification of chilled water flow through safety-related room coolers in Unit 2 (Section 1R21.6.b)
362/0003-03	URI	Verification of chilled water flow through safety-related room coolers in Unit 3 (Section 1R21.6.b)

Items Opened and Closed During this Inspection

361/0003-01	NCV	Current configuration outside design basis for ECCS room temperature in Unit 2 (Section 1R21.4.b)
362/0003-01	NCV	Current configuration outside design basis for ECCS room temperature in Unit 3 (Section 1R21.4.b)
361/0003-02	NCV	Operating procedures not corrected to address credible single failure and loss of design basis for control room HVAC (Section 1R21.5.b)
362/0003-02	NCV	Operating procedures not corrected to address credible single failure and loss of design basis for control room HVAC (Section 1R21.5.b)

LIST OF ACRONYMS USED

HPSI	High Pressure Safety Injection
HVAC	Heating, Ventilating, and Cooling
LPSI	Low Pressure Safety Injection
SONGS	San Onofre Nuclear Generating Station
UFSAR	Updated Final Safety Analysis Report

LIST OF BASELINE INSPECTIONS PERFORMED

71111-21	Safety System Design and Performance Capability

DOCUMENTS REVIEWED

CORRECTIVE ACTION REQUESTS

961100381	971101186	990300313	000200174
970100912	971201513	990300484	000200566
970101142	971201562	990300515	000201097
970101915	980100896	990400329	000201164
970200118	980101630	990401599	000201797
970200227	980101647	990401642	000300212
970200357	980201470	990500961	000301314
970300245	980201927	990601192	000301315
970300725	980202632	990700319	000301337
970400011	980500410	990700754	000301338
970501977	980500787	990700755	000301339
970502215	980501247	990800914	000301356
970600322	980502277	990900158	000301612
970701286	980701852	990900380	000400949
970800083	980900276	990900677	000400213
970800645	980900943	991000278	000400286
970800931	980901462	991000590	000400300
970900237	980901883	991000591	000400301
970900459	981000001	991000825	000400303
970901025	981000883	991000931	000400329
970901026	981001907	991101109	000400374
970901603	981001913	991101160	000400393
971001689	981200678	991101433	000400938
971100187	990200051	991101544	000401086
971100188	990202150	000200084	000401144
971100587	990202281	000200102	
971100661			

MAINTENANCE ORDERS

11212490000
88091708000
89052246000
89060315000
89121196000
90020348001
90020944000
90100389000
90100515000
91040407000
91040863000
91070185000
91070269000
91070270000
91070678000
91070844000
91070845001
91070857000
91079855000
91080919001
91082269000
91110602000
91111688000
91111894000
91112353000
91112356000
91121773000
92010328000
92040635000
92051401000
92070345000
92082097000
92101389000
92110484000
92120993000
93012215000
93013444000
93020981000
93032513000
93050396000
93072239001
93082128000
93090844000
93090845000
93120438000
94011661000
94020353000
94020511000
94031408000
94031439000
94050509000
94051018000
94052412000
94061876000
94070925000
94071143000
94071146000
94071148000
94071149000
94082230000
94082563000
94090182001
94090813000
94100456000
94100595000
94100744000
94100745000
94110109000
94110446000
94110911000
94120010000
95021364000
95031134000
95070739000
95082067000
95090146000
95101539000
95101541000
95120278000
95120574000
95121187000
96010807000
96011827000
96011905000
96021883001
96030908000
96031192000
96031193000
96031729000
96040037000
96041171001
96041204000
96042239000
96050407000
96051010001
96051016000
96051538000
96051733001
96060253000
96060953000
96061374000
96062074000
96062075000
96070289000
96080546001
96080905000
96080941000
96081722000
96102007000
97040003000
97050961000
97051035000
97061780000
97071469000
97080400000
97080499000
97080906000
97090320000
97090349000
97091216000
97091217000
97100607000
97100772000
97100960000
97110396000
98013397000
98020614000
98060831001
98081210000
99011156000
99030589000
99030609000
99031017000
99031148000
99031530000
99032047001
99050552000
99051953000
99070570000
99070785000
99080012000
99091078000
99100945000
99111504000
99120028000
99120045000
99120464000
99120951000
99121259000
00010466000
00021065000
00021750003

PROCEDURES

NUMBER	DESCRIPTION	REVISION
SO23-XVII-8	Outside Containment Leakage Reduction Program	8
SO123-XV-50	Corrective Action Process	3
SO123-XX-1 1SS2	Action Request/Maintenance Order Initiation and Processing	12
SO123-XXIV-12	Nuclear Engineering Design Procedure	1
SO123-XXIV-12.9	Engineering Design Quality Procedure	4
SO23-1-3	Auxiliary Building Normal Heating, Ventilation, and Air Conditioning (HVAC) Chilled Water System Operation	8
SO23-1-3.1	Emergency Chilled Water System Operation	11
SO23-1-5	Auxiliary Building Normal HVAC System Operation	9
SO23-1-5.1	Auxiliary Building Emergency HVAC Cooling Unit Operation	4
SO23-1-8	Safety Equipment Building HVAC	5
SO23-3-2.22	Engineered Safety Features Actuation System Operation	13
SO23-3-2.27	Control Room Isolation and Emergency Ventilation System	10
SO23-5-1.3	Plant Startup from Cold Shutdown to Hot Standby	21
SO23-5-1.9	System Alignment Requirements for Plant Startup	3
SO23-5-2.28	Plant HVAC 83 Alarm Response Procedure	5
SO23-12-3	Loss of Coolant Accident	16
SO23-12-4	Steam Generator Tube Rupture	16
SO23-12-5	Excess Steam Demand Event	16
SO23-12-8	Station Blackout	15
SO23-15-60.A1	Annunciator Panel 60A, Emergency HVAC Windows 1 - 30	3
SO23-15-60.A2	Annunciator Panel 60B, Emergency HVAC Windows 31 - 60	8
SO23-15-60.B	Annunciator Panel 60B, Control Room HVAC	7
SO23-3-2.22	Engineered Safety Features Actuation System Operation	13

NUMBER	DESCRIPTION	REVISION
SO23-XVII-8	Outside Containment Leakage Reduction Program	8
SO23-I-2.44	CREACUS - Control Room Emergency Air Cleanup System Operation and Operability Test Surveillance	6
2PE-204-02	Auxiliary Building Emergency Chilled Water System Preoperational Test	1
2PE-512-06	Charging Pump and Boric Acid Makeup Pump Room Emergency HVAC Test	0
2PE-511-02	Control Room Complex Normal and Emergency HVAC Preoperational Test	0
3PE-512-02	ESF Switchgear Room Normal and Emergency HVAC Test	0
3PE-515-01	Safety Equipment Building Normal and Emergency HVAC	0
3PE-204-02	Auxiliary Building Emergency Chilled Water System Preoperational Test	0
SO123-I-8.317	HVAC Equipment Routine Maintenance	1
SO23-i-2.44	CREACUS - Control Room Emergency Air Cleanup System Operation And Operability Test Surveillance	6
N/A	Emergency HVAC Performance Monitoring Program	0

CALCULATIONS

NUMBER	DESCRIPTION	DATE
E4C-109	Class 1E 125V DC System Protection Calculation	6/17/95
EC-427	Component Cooling Water Heat Exchanger Performance U2C10 RF0	4/12/99
EC-428	Component Cooling Water Heat Exchanger Performance U3C10RF0	10/12/99
J-GKA-012	Low Flow Alarm Setpoint for Control Room Area Emergency A/C	6/29/98
M0073-041	Auxiliary Building Control Area El. 30' Control Room Complex Heat Load Calc.	1/31/00
M0073-043	Auxiliary Building-Control Area El. 30' Control Room Complex Emergency Equipment Sizing Calculation	6/12/98

NUMBER	DESCRIPTION	DATE
M0073-063	Auxiliary Building Control Area El. 50' ESF Switchgear Room Emergency Equipment Sizing Calc. Spec. SO23-410-6	7/28/99
M0073-083	Plant Emergency Chilled Water System Equipment Sizing Calc. Spec. #SO23-410 6&7	7/28/98
M0073-084	Plant Emergency Chilled Water System - Piping Size Calcs.	3/25/75
M0075-050	Safety Equipment Building Heat Load - Emergency	4/10/95
M0075-051	Safety Equipment Building HVAC Equipment Sizing - Emergency	6/23/94
M0075-060	Safety Equipment Building Heat Load - Normal	4/10/95
N-4060-007	Post-LOCA PASS and EFS Leakages Doses to EAB, LPZ, and Control Room	12/22/97
N-4060-020	Control Room, EAB, and LPZ Post-LOCA Doses	11/15/99
SO23-405-9-53	Seismic - Stress Analysis of ASME Section III, Class 3 Pumps (Vendor Calculation)	4/27/00
SO23-457-A	Extrapolation of Cooling Coil Test Data	1/2/80

DESIGN CHANGES

NUMBER	DESCRIPTION	REVISION
FCN 7336J	Revised Setpoint, Tolerance and Reset for Low CCW Flow to Emergency Chiller E-336 Condenser trip	12/31/97
FCN 7337J	Revised Setpoint, Tolerance and Reset for Low CCW Flow to Emergency Chiller E-337 Condenser trip	9/23/98
FCN 14650E	Provide Alternate Source of 120 VAC Power to HVAC Control Panel L154 in Unit 2	10/22/98

DRAWINGS

NUMBER	DESCRIPTION	REVISION
40173	Operational Schematic Control Room Complex HVAC System No. 1513	3
40173A	P&ID Control Room Complex HVAC System No. 1510	20

NUMBER	DESCRIPTION	REVISION
40173B	P&ID Control Room Complex HVAC System No. 1510	8
40173C	P&ID Control Room Complex HVAC System No. 1510	15
40173D	P&ID Control Room Complex HVAC System No. 1510	11
40174A	P&ID Auxiliary Bldg. HVAC System	16
40175A	P&ID Misc.Ventilating System, Safety Equipment Building, System No. 1507	9
40177C	P&ID Misc. Ventilation System	5
40178B	P&ID Misc. Ventilating System	11
40178BSO3	P&ID Misc. Ventilating System	4
40179A	P&ID Aux. Bldg. Emergency Chilled Water System No. 1513, Loop A	25
40179B	P&ID Aux. Bldg. Emergency Chilled Water System No. 1513, Loop A	9
40179C	P&ID Aux. Bldg. Emergency Chilled Water System No. 1513, Loop A	9
40179D	P&ID Aux. Bldg. Emergency Chilled Water System No. 1513, Loop A	3
40179E	P&ID Aux. Bldg. Emergency Chilled Water System, Chiller E336, System No. 1513, LoopA	13
40180A	P&ID Auxiliary Bldg. Emergency Chilled Water System, Loop B, System No. 1513	24
40180B	P&ID Auxiliary Bldg. Emergency Chilled Water System, Loop B, System No. 1513	6
40180C	P&ID Auxiliary Bldg. Emergency Chilled Water System, Loop B, System No. 1513	9
40180D	P&ID Auxiliary Bldg. Emergency Chilled Water System Water Chiller E335 Loop B, System No. 1513	24
40195E	P&ID Auxiliary Bldg. Normal Chilled Water	9
40083	Control Area Elevation 50′-0" Flow Diagram	4
40085	Auxiliary Building HV & AC-Radwaste Area Air Flow Diagram	14
40086	Safety Equipment Building and Penetration Area HVAC Air Flow Diagram	7

NUMBER	DESCRIPTION	REVISION
40088	Control Area El. 50′-0" HVAC Emerg. And NORM. Systems Air Flow Diagram	3
40095	Auxiliary Building HV & AC-Control Area El. 9′ Air Flow Diagram	7
40097	Auxiliary Building Intake Structure and Misc. Areas Air Flow Diagram	7
40099	Auxiliary Building HV & AC-Radwaste Area Air Flow Diagram	19
40818	Area 2S1 Above 30′-0"	8
41300	Area CA3 Elevation 85′-0" and Above	4
41301	Area CA3 Elevation 85′-0" to 63′-6"	3
41302	Area CA3 Elevation 63′-6" to 50′-0"	5
41303	Area CA3 Elevation 50′-0" to 37′-0"	3
41304	Area CA3 Elevation 37′-0" to 24′-0"	4
41305	Area CA3 Elevation 24′-0" to 9′-0"	8
41310	Area CA4 Elevation 85′-0" and Above	6
41311	Area CA4 Elevation 85′-0" to 63′-6"	7
41312	Area CA4 Elevation 63′-6" to 50′-0"	5
41313	Area CA4 Elevation 50′-0" to 37′-0"	7
41314	Area CA4 Elevation 37′-6" to 24′-0"	6
41315	Area CA4 Elevation 24′-0" to 9′-0"	10
41320	Area CA5 Elevation 85′-0" and Above	6
41348	Area CA8 Elevation 85′-0" to 70′-0"	8
41349	Area CA8 Elevation 70′-0" to 50′-0"	7
41355	Area CA9 Elevation 85′-0" and Above	5
41356	Area CA9 Elevation 85′-0" to 70′-0"	7
41357	Area CA9 Elevation 70′-0" to 50′-0"	10
41364	Area CA10 Elevation 85′-0" to 70′-0"	6
41365	Area CA10 Elevation 70′-0" to 50′-0"	10

NUMBER	DESCRIPTION	REVISION
31290	Elementary Diagram HVAC Plant-Control Room Vent Supply Damper	8
31291	Elementary Diagram HVAC Plant CR Rm. Vent Supply Damper	7
31293	Elementary Diagram HVAC Plant Auxiliary Building Emergency Chilled Water System	5
31328	Elementary Diagram HVAC Plant Control Room Cabinet Normal Cooling	2
31334	Elementary Diagram HVAC Control Rm. Emergency AC Unit E418	26
31335	Elementary Diagram HVAC Plant Auxiliary Building Emergency Chilled Water System	27
31342	Elementary Diagram HVAC Plant Cont Bldg. Chiller Rm. Supply Fan A051	4
31343	Elementary Diagram HVAC Plant - Cont. Bldg. Chiller Rm. Exh. Fan A052	6
31347	Elementary Diagram HVAC Plant Control Bldg. Control Room Normal AC Unit E295	5
31357	Elementary & Control Diagram HVAC Plant - Auxiliary Building Emergency Chiller E335 Train B	27
31358	Elementary & Control Diagram HVAC Plant - Auxiliary Building Emergency Chiller E336 Train A	27
31377	Elementary Diagram HVAC Plant - CR Cabinet Area Emergency Clg. Damper HV9738	6
31387	Elementary Diagram HVAC Plant - CR Cabinet Area Emergency Clg. Damper HV9739	8
31393	Elementary Diagram HVAC Plant Control Room Emer. Vent Supply Fan A207	24
31397	Elementary Diagram HVAC Plant - Cont. Bldg. Chiller Rm. Sply. Fan A053	6
31398	Elementary Diagram HVAC Plant - Cont. Bldg. Chiller Rm. Exh. Fan A056	6
31399	Elementary Diagram HVAC Plant - Cont. Bldg. Emer. Chilled Wtr. Pump P162	21

NUMBER	DESCRIPTION	REVISION
31400	Elementary Diagram ESF Switchgear Room Exhaust Fan A165	7
31402	Elementary Diagram HVAC Plant - Control Bldg. El 30 Emer. Vent Htr. E296	8
31404	Elementary Diagram HVAC Plant - Control Bldg ESF Switchgear Rm. Emer. AC Unit E257	12
31405	Elementary Diagram HVAC Control Rm. Emer. Vent Supply Fan A206	20
31406, Sh.1	Elementary Diagram HVAC Control Room Isolation Dampers	12
31406, Sh. 2	Elementary Diagram HVAC Control Room Isolation Dampers	7
31407, Sh. 1	Elementary Diagram HVAC Control Room Isolation Dampers	11
31407, Sh. 2	Elementary Diagram HVAC Control Room Isolation Dampers	7
31410	Elementary Diagram HVAC Cont. Bldg. Chiller Room Supply Fan A054	4
31411	Elementary Diagram HVAC Cont. Bldg. Chiller Room Supply Fan A055	4
31412	Elementary Diagram HVAC Cont. Bldg. Emergency Chilled Water Pump P160	23
31420	Elementary Diagram Hvac Plant Control Rm. Cabinet Emer AC Unit E424	14
31434	Elementary Diagram HVAC Plant Control Rm. Cabinet Emer AC Unit E423	14
40173C	P&ID Control Room Complex HVAC System No. 1519	15
Loop 2/3FT9722-2	Loop Diagram CR Emer A/C TR. B Supply Flow	1
Loop 2/3FT9742-2	Loop Diagram CR Emer. Vent Supply A206 Flow	4

MISCELLANEOUS DOCUMENTS AND DATA

NUMBER	DESCRIPTION	REVISION
SO23-3-3.20, Attachment 3	Emergency Room Cooler Fan Exercise Runs for 1999	N/A

NUMBER	DESCRIPTION	REVISION
Construction Specification CS-M6	Field Fabrication and Erection of Heating, Ventilating and Air Conditioning Ductwork	N/A
N/A	Combined Generic Equipment Database	N/A
N/A	Emergency HVAC Performance Monitoring Program	1
N/A	Maintenance Rule Database	N/A
N/A	Out of Calibration Database	N/A
SD-SO23-620	System Description, "Miscellaneous Ventilation System"	4
99TA550107N	Carrier Instruction Sheet, "19E Hi-Voltage Terminal Assembly"	A
99TA550107	Carrier Instruction Sheet, "19EB/EF/FA High Voltage Motor Terminal Assembly"	April 6, 1988

ATTACHMENT 2

NRC's REVISED REACTOR OVERSIGHT PROCESS

The federal Nuclear Regulatory Commission (NRC) recently revamped its inspection, assessment, and enforcement programs for commercial nuclear power plants. The new process takes into account improvements in the performance of the nuclear industry over the past 25 years and improved approaches of inspecting and assessing safety performance at NRC licensed plants.

The new process monitors licensee performance in three broad areas (called strategic performance areas): reactor safety (avoiding accidents and reducing the consequences of accidents if they occur), radiation safety (protecting plant employees and the public during routine operations), and safeguards (protecting the plant against sabotage or other security threats). The process focuses on licensee performance within each of seven cornerstones of safety in the three areas:

Reactor Safety

- Initiating Events
- Mitigating Systems
- Barrier Integrity
- Emergency Preparedness

Radiation Safety

- Occupational
- Public

Safeguards

- Physical Protection

To monitor these seven cornerstones of safety, the NRC uses two processes that generate information about the safety significance of plant operations: inspections and performance indicators. Inspection Findings will be evaluated according to their potential significance for safety, using the Significance Determination Process, and assigned colors of GREEN, WHITE, YELLOW or RED. GREEN Findings are indicative of issues that, while they may not be desirable, represent very low safety significance. WHITE Findings indicate issues that are of low to moderate safety significance. YELLOW Findings are issues that are of substantial safety significance. RED Findings represent issues that are of high safety significance with a significant reduction in safety margin.

Performance indicator data will be compared to established criteria for measuring licensee performance in terms of potential safety. Based on prescribed thresholds, the indicators will be classified by color representing varying levels of performance and incremental degradation in safety: GREEN, WHITE, YELLOW, and RED. GREEN indicators represent performance at a level requiring no additional NRC oversight beyond the baseline inspections. WHITE corresponds to performance that may result in increased NRC oversight. YELLOW represents performance that minimally reduces safety margin and requires even more NRC oversight. And RED indicates performance that represents a significant reduction in safety margin but still provides adequate protection to public health and safety.

The assessment process integrates performance indicators and inspection so the agency can reach objective conclusions regarding overall plant performance. The agency will use an Action Matrix to determine in a systematic, predictable manner, which regulatory actions should be taken based on a licensee's performance. The NRC's actions in response to the significance (as represented by the color) of issues will be the same for performance indicators as for inspection findings. As a licensee's safety performance degrades, the NRC will take more and increasingly significant action, which can include shutting down a plant, as described in the Action Matrix.

More information can be found at: http://www.nrc.gov/NRR/OVERSIGHT/index.html.