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November 7, 1991

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

Subject: Catawba Nuclear Station
Docket No. 50-413
LER 413/91-24

Gentlemen:

Attached is Licensee Event Report 413/91-24, concerning TECHNICAL SPECIFICATION 3.0.3 ENTRY AS A RESULT OF BOTH TRAINS OF CONTROL ROOM AREA VENTILATION BEING INOPERABLE DUE TO EQUIPMENT FAILURE.

This event was considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

W. R. McCollum
Station Manager

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IE27

NRC FORM 366 (6-89) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104
EXPIRES 4/30/92

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Catawba Nuclear Station, Unit 1	0 5 0 0 0 4 1 1 3	1 OF 1 1

TITLE (4): Technical Specification 3.0.3 Entry As A Result Of Both Trains Of Control Room Area Ventilation Being Inoperable Due To Equipment Failure

EVENT DATE (5)			LER NUMBER (6)					REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR		SEQUENTIAL NUMBER		REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
											CNS, Unit 2	0 5 0 0 0 4 1 1 4
1 0	0 9	9 1	9 1	—	0 2 4	—	0 0	1 1	0 7	9 1		0 5 0 0 0

OPERATING MODE (9)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
1	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10): 1 0 0	20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
	20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
	20.405(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
	20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
	20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
C. L. Hartzell, Compliance Manager	8 0 3 8 3 1 - 3 6 6 5

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	

SUPPLEMENTAL REPORT EXPECTED (14)

	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO			

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On October 9, 1991, at approximately 0912 hours, with Units 1 and 2 in Mode 1, Power Operation, at 100% power, Technical Specification (T/S) 3.0.3 was entered due to both trains of the Control Room Area Ventilation (VC) and Chilled Water (YC) Systems being declared inoperable. Train 'A' was declared inoperable after its chiller tripped due to spurious actuation of the low refrigerant temperature cutout switch. An investigation revealed that the root cause for the Train 'A' YC Chiller trips was due to corroded switch contacts. The Train 'B' YC Chiller inoperability was due to the chiller failing to start. A chiller motor overload occurred as a result of a problem with the guide vane actuator. YC Train 'A' was declared operable and returned to service after replacing the low refrigerant temperature cutout switch. Train 'B' YC Chiller was evaluated and declared operable after corrective action was performed on the guide vane actuator. T/S 3.0.3 was exited at 1515 hours. This incident is attributed to equipment failures. Subsequent corrective actions restored both chillers to operable status. Planned corrective actions include replacing the guide vane actuator on 'B' Chiller. Additional corrective actions may be implemented upon completion of an investigation of both incidents.

BACKGROUND

The Control Room Area Ventilation [EIIS:UC] (VC) System operates in conjunction with the Control Room (C/R) Area Chilled Water [EIIS:UE] (YC) System to maintain conditions in the C/R Area that are suitable for personnel and equipment, as well as provide pressurization to prevent any in-leakage from surrounding areas: C/R Area, Cable [EIIS:CON] Room, Battery [EIIS:BTRY] Rooms, Switchgear Rooms, Motor [EIIS:MO] Control Center (MCC) Rooms, and the Electrical Penetration [EIIS:PEN] Rooms at elevation 594+0.

The VC/YC System is shared between both Units and consists of two 100% redundant trains of equipment. Each is capable of being powered by Unit 1 or 2 Essential Auxiliary Power, but under normal conditions both trains are aligned to Unit 1. Two Diesel Generators [EIIS:GEN] (D/Gs) are provided per Unit to energize the Essential Auxiliary Power buses during emergency conditions. The VC/YC System operates prior to, during, and after a Loss of Coolant Accident (LOCA) and Blackout (B/O). Following a LOCA or B/O, the train that was in service will continue to run or be sequenced on, and the opposite train's C/R Area Pressurizing Filter Train Fan (CRA-PFTF) and C/R Air Handling Unit (CR-AHU) will be sequenced on. This VC/YC System operates exactly the same during normal, B/O, and LOCA conditions with the exception that chilled water makeup is isolated on a Safety Injection Signal (Ss).

The YC portion of the VC/YC System supplies chilled water to all of the air handling units [EIIS:BLO] serving the C/R, C/R area, and Switchgear Rooms. It consists of two 100% capacity chillers, two 100% capacity chilled water pumps, and a three-way hydromotor/actuator [EIIS:XCV] type control valve at each air handling unit. Train separation provides that one chiller and associated pump be Train 'A' and serve the Train 'A' air handling units and the other be Train 'B' and serve the Train 'B' air handling units.

The chiller guide vane actuator manipulates the guide vanes, which control the flow of freon to the chiller compressor. The actuator is located in a NEMA 4 rated enclosure, which is both dustproof and waterproof.

The YC chiller flow rate and temperature of the chilled water leaving the evaporator of the chiller is maintained constantly. The temperature of the water leaving the evaporator is maintained by a thermostat with a sensing bulb located in the water line leaving the chiller. The low refrigerant temperature trip is provided to protect the chiller evaporator tubes from damage (rupture) due to freezing in the event of a chiller malfunction. The low refrigerant temperature cutout switch is located in a NEMA 4 rated enclosure. Condenser water for the chiller is provided by the Nuclear Service Water [EIIS:BI] (RN) System. The condenser water flow rate is controlled by a head pressure controller [EIIS:XC] set to maintain the chiller head pressure within acceptable limits for proper machine operation.

Trouble annunciators [EIIS:ANN] for each chiller are located on the Heating Ventilation Air Conditioning (HVAC) Main Control Board (MCB) and will actuate when a trouble condition is sensed by the chiller Scanmaster. The Operator Aid Computer (OAC) points for each chiller provide an indication [EIIS:XI] for Operations (OPS) personnel that more monitoring of the local refrigerant temperature indication is necessary. An operator is to dispatch the proper personnel to investigate and rectify the problem to insure proper and continuous safe operation of the chillers. In addition, safety indication lights are located on each chiller's control panel. These safety indication lights are provided to aid personnel in determining problems.

IP/0/A/3190/01A, Calibration Procedure for Train 'A' Control Room Area Chilled Water Safety-Related YC System, is an Instrument and Electrical (IAE) procedure which provides guidance for calibration of Train 'A' safety-related instruments. Enclosure 11.1.20 is used to perform the calibration of instrument number 0YCTS9208A, Low Refrigerant Temperature Cutout Switch [EIIS:XIS].

IP/0/A/3190/01B, Calibration Procedure for Train 'B' Control Room Area Chilled Water Safety-Related YC System, is an IAE procedure which provides guidance for calibration of Train 'B' safety-related instruments. Enclosure 11.1.20 is used to perform the calibration of instrument number 0YCTS9208B, Low Refrigerant Temperature Cutout Switch.

MP/0/A/7450/03, Refrigerant Charge for YC Chillers, is a MNT procedure that provides the method to charge the YC chillers with freon.

IP/0/A/3890/01, Controlling Procedure for Troubleshooting and Corrective Maintenance, is an IAE procedure used in the investigation, repair and inspection of inoperable or damaged equipment.

PT/0/A/4971/02R, Routine Test Procedure: Brown-Boveri Type GR-5 Ground Shield Relay [EIIS:RLY], is a Power Delivery Department (PDD) procedure used in the investigation, repair, and inspection of inoperable or damaged relays.

Technical Specification (T/S) 3.7.6 specifies that two independent trains of VC/YC shall be operable during all operational modes. If one train becomes inoperable while either Unit is in Mode 4, Hot Shutdown, or above, the inoperable train must be restored to operability within seven days, or the operating Units must be shutdown. If both Units are below Mode 4, and one train is inoperable, the train must be restored to operability within seven days, or the operable train must be operated in the FILTER mode. If both trains are inoperable, or with the operable train not capable of being powered by an operable emergency power source, all core alterations and positive reactivity changes must be suspended on both Units. The requirement for an operable emergency power source is only specifically stated in T/S 3.7.6 for

Units operating below Mode 4. However T/S 3.8.1 (A.C. Sources) assures that an operable emergency power supply is available for the VC/YC System for Units operating above Mode 4.

T/S 3.0.3 is required to be entered when the Unit is operating in a condition prohibited by T/Ss. This condition exists when a Limiting Condition for Operation is not met as provided in the associated Action Requirements. It requires that within one hour action shall be initiated to place the Unit in a Mode in which the specification does not apply by placing it, as applicable, in:

a) At least Hot Standby in the next 6 hours,
b) At least Hot Shutdown within the following 6 hours, and
c) At least Cold Shutdown within the subsequent 24 hours.

EVENT DESCRIPTION

On both October 4, 1991 and October 5, 1991, with Units 1 and 2 in Mode 1, at 100% power, 'A' YC Chiller tripped on a "low refrigerant temperature" indication. The chiller unit was checked for freon leaks that were thought to be found in the vicinity of the power terminals. The low refrigerant temperature trip condition is an indication that could result from low freon charge. The chiller unit was declared inoperable on October 5, 1991. Train 'B' YC Chiller was operable at this time and was in service. The Shift Manager requested Planning to set up the Maintenance (MNT) HVAC crew to work on the chiller Monday, October 7, 1991. PDD personnel were also scheduled to untape the motor leads to allow for further leak checking using work request (W/R) 493810PS-1.

On October 7, 1991, MNT personnel began investigating the freon leak problem on 'A' YC Chiller. By 1600 hours, MNT personnel had determined that the problem was not with the power terminal block but might be with the low refrigerant temperature cutout switch. Supplemental W/R 493810PS-2 was written for IAE to calibrate the temperature cutout switch.

At 1710 hours, IAE personnel using W/R 493810PS reported finding no problems with the temperature cutout switch on 'A' YC Chiller (0YCTS9208A) and requested MNT personnel to have Operations (OPS) lift the tags. The chiller was then restarted for troubleshooting. At 1815 hours, 'A' YC Chiller was started and troubleshooting began by the HVAC crew. On October 8, 1991, at 0510 hours, it was reported that the Maintenance Engineering Services (MES) personnel also had begun their evaluation concerning the problems associated with the 'A' YC Chiller.

At 1655 hours, OPS swapped to Train 'B' VC/YC, while MNT and IAE personnel began checking out the control circuitry on 'A' YC Chiller. By 1840 hours, IAE reached the point during their troubleshooting that they needed to have

the chiller running to continue. Since Bahnson and MNT personnel also wanted to be present when the chiller was running, it was decided to wait until the day shift before swapping to Train 'A' VC/YC.

On October 9, 1991, at 0840 hours, OPS swapped from Train 'B' VC/YC to Train 'A' for MNT and IAE personnel to continue troubleshooting. After approximately 10 minutes of running, 'A' YC Chiller tripped on "low refrigerant temperature". This occurred several times within the next few minutes. The IAE technician was able to verify that the low refrigerant temperature cutout switch sensor contacts opened and closed when a constant normal refrigerant temperature condition existed. This indicated that the low refrigerant temperature cutout switch was bad. Subsequent investigation by IAE later revealed that moisture had penetrated the microswitch housing which had caused corrosion of the contacts. Due to chiller vibrations, the corroded contacts had lost connection and caused the chiller to trip.

At 0912 hours, after the last trip of Train 'A' YC Chiller, OPS attempted to swap back to Train 'B' VC/YC. The 'B' YC Chiller failed to start due to a "Motor Overload" condition. With both trains now inoperable, T/S 3.0.3 was entered at this time. Upon OPS investigation of breaker [EIIS:BRK] 1ETB-17 ('B' YC Chiller supply breaker), it was found that a overcurrent relay had actuated and "locked-out" the breaker. W/R 564550PS was issued for PDD personnel to investigate and repair 1ETB17 as necessary due to the overcurrent actuation. OPS proceeded to restart Train 'A' VC/YC until the problem with Train 'B' VC/YC could be evaluated. At 0940 hours, the Shift Manager updated the Duty Station Manager of the situation with the YC chillers.

At 0950 hours, 'A' YC Chiller was started with the low refrigerant temperature" switch temporarily jumpered by IAE during troubleshooting using W/R 493810PS-2. Both MNT and IAE had suspected that this switch may be the reason for previous trips due to the lack of other abnormal operating parameters or characteristics. IAE continued their search for a replacement switch.

At 1030 hours, PDD reported that breaker 1ETB-17 and the associated protective relays were checked. There were no problems discovered with the breaker. The 50G target and lockout relay were both reset. OPS then successfully closed the breaker. PDD recommended that OPS restart 'B' YC Chiller with MNT present at the chiller. Upon restarting the chiller, MNT technicians noticed that chiller guide vanes did not open properly and that the guide vane linkage was slipping on the actuator shaft. W/R 564560PS was written to investigate and repair the 'B' YC Chiller tripping due to "Motor Overload". Upon subsequent investigation, it was found that the guide vane linkage had slipped and was mispositioned causing an increased load on the motor at startup. The 50G relay is considered to be an instantaneous ground relay with a sensor that looks for an unbalance in phase current. Since the relay minimum operating current (pick-up setting) is adjusted to 5 amps, a small amount of imbalance

could actuate the relay. The guide vane linkage was found to be slipping due to loose set screws on the actuator shaft at the motor crank arm. The set screws had worn loose, consequently allowing the motor to operate as though the vane guides were closed, when in actuality, they were partially open. The motor normally starts with the guide vanes closed for minimum freon flow at startup.

At 1045 hours, IAE had determined that there were no replacement safety related temperature switches onsite to be used on 'A' YC Chiller. However, it was found that McGuire Nuclear Station (MNS) had three switches available. IAE requested that a switch be transferred from MNS. After additional discussions between IAE and MNT personnel, the decision was made to remove temperature cutout switch (0YCTS9208B) from 'B' YC Chiller and install it in the 'A' YC Chiller. W/R 564570PS was initiated for IAE to transfer the switch. IAE estimated that removal and installation of the switch could be completed within an hour.

At 1130 hours, after discussions between Design Engineering and Performance (PRF), it was determined that, with the appropriate compensatory actions, the 'B' YC chiller would remain operable without a functional temperature switch. The PRF Engineer was pursuing the necessary paperwork (10CFR50.59 Evaluation) to declare the chiller operable in addition to a Temporary Station Modification (TSM) to allow the jumper on 'B' YC Chiller to remain in place until a replacement was found. MES issued an operability statement for the 'B' YC Chiller control vane actuator linkage situation following guide vane actuator adjustments and set screw repairs on the actuator stem. Based on this information, OPS determined that a Unit 1 and 2 shutdown was not necessary. No load reduction was commenced under T/S 3.0.3 due to the assurance of the cause of Train 'A' VC/YC trip and relatively short repair time. This was due to the evaluation from Design and operability statements from MES and PRF.

At 1145 hours, IAE had completed the low refrigerant temperature cutout switch installation on 'A' YC Chiller and only calibrations remained. IAE found damaged contacts on the temperature cutout switch removed from 'A' YC Chiller, along with enclosure moisture intrusion. At 1225 hours, it was determined that the installed temperature cutout switch would require a setpoint adjustment. At 1325 hours, IAE had completed the temperature cutout switch calibrations. OPS successfully restarted 'A' YC Chiller. All conditions appeared to be satisfactory.

At 1400 hours, the Technical Specification Operability Notification Sheet (TSON) was approved concerning 'B' YC Chiller which stated that the guide vane actuator shaft had been worn over time to a point where the set screws were no longer tight and the linkage was slipping. W/R 564560PS was used to re-tighten the set screws. The actuator was stroke tested to ensure a proper

linkage connection, and the chiller was determined to be functional. The actuator would be replaced under the same W/R upon arrival of a new actuator.

At 1515 hours, Units 1 and 2 exited from T/S 3.0.3. Train 'A' VC/YC was operable and Train 'B' YC Chiller would remain inoperable (but functional) until the replacement temperature cutout switch arrived from MNS. Problem Investigation Process (PIP)/PIR 0-C91-0379 was written to document this event.

At 1730 hours, it was decided that the night shift IAE crew would replace the temperature switch on 'B' YC Chiller using W/R 564580PS. Also, if 'B' Chiller was needed to start to support the 'A' Nuclear Service Water System (RN) flow balance, IAE could install the temperature cutout switch with the chiller in service. Once the temperature cutout switch was replaced and functionals completed, the chiller would then be declared operable. To reduce the system unavailability, some VC/YC preventive maintenance (PM) work scheduled for October 10, 1991 was rescheduled to be done on October 24, 1991 during 'A' RN train inoperability.

At 2145 hours, IAE discovered that the part from MNS was the temperature sensing bulb only and was not what they needed. By 2230 hours, IAE determined that the part needed was the switch that the temperature probe actuates.

On October 10, 1991, at 0100 hours, a search for the needed low refrigerant temperature cutout switch turned up nothing within the Duke system. IAE decided to try to rebuild the old temperature cutout switch removed from 'A' YC Chiller. By 0300 hours, IAE had the switch repaired and calibrated. OPS decided to have IAE install the switch before swapping to Train 'B' VC/YC for the flow balance.

At 0345 hours, IAE encountered problems while installing the temperature cutout switch, and OPS decided to run the 'B' YC Chiller unit with the jumper installed. The field wire's lugs did not match the screws on the temperature cutout switch. At 0350 hours, MNT personnel were called in to support the start of 'B' YC Chiller. IAE continued to work on the rebuilt temperature cutout switch problems but also resumed the search for a new temperature cutout switch.

At 0510 hours, OPS swapped to Train 'B' VC/YC. This was the last requirement prior to starting the RN flow balance. Once the flow balance was completed, OPS would swap back to Train 'A' VC so IAE could finish the temperature cutout switch repair on 'B' YC Chiller.

During the day shift on October 10, 1991, a new low refrigerant temperature cutout switch was found. At 2100 hours, IAE completed the installation and calibration of the new temperature cutout switch with the chiller unit

running, and the functional test was in progress. Since PRF determined no retest was required at this time, W/R 564580PS was cleared from the Technical Specification Action Item Log (TSAIL).

On October 10, 1991, at 2300 hours, Train 'B' VC/YC was declared operable.

CONCLUSION

This incident, entry into T/S 3.0.3 due to both trains of the VC/YC System being inoperable, is attributed to Equipment Failure and can be divided into two similar causes. The first cause was the inoperability of the Train 'A' VC/YC System due to its associated chiller tripping because of a failed low refrigerant temperature cutout switch. IAE removed the temperature switch and found corroded contacts in the switch. A subsequent investigation into the cause for the chiller trip revealed that the microswitch housing had experienced moisture intrusion, which resulted in corrosion of the contacts. During the chiller's normal operation, vibrations had caused the contacts to completely separate and consequently caused the chiller to trip. The source of the water intrusion into the waterproof box is being evaluated. MNT suspects that the moisture could have been a condensation buildup because the housing is located on the bottom of the chiller, or it could have been due to cold air hitting the box. There was no apparent sign of water intrusion at 'B' YC Chiller. MES will perform an investigation to determine why there was a water intrusion problem on 'A' YC Chiller but not on 'B' YC Chiller.

The second cause of this incident was the inoperability of the Train 'B' VC/YC System. Upon investigating the 'B' YC Chiller "rotor overload", it was discovered that the actuator guide vane linkage was slipping, due to the actuator shaft having been worn over time to a point where the set screws were no longer tight. This allowed the guide vanes to be open, which would cause a maximum amperage condition during startup. Normal starting conditions require the guide vanes to be in the closed position. The replacement actuator, would not fit inside the NEMA 4 rated enclosure. MES personnel and Design Engineering are evaluating the situation. In the meantime, the set screws at the crank arm were replaced and retightened. The old actuator was then stroked to ensure a proper linkage connection and to allow its use until the new actuator can be installed. A TSON was issued to indicate the chiller was operable. As a corrective maintenance action, work on a chiller guide vane in the future will require using new procedure MP/0/A/7450/43, Control Room Chiller Guide Vane Assembly/Disassembly and Corrective Maintenance, which was developed while this work was being performed and is not yet approved. During the PDD investigation of breaker 1ETB-17, no problems or damage were observed. The 50G lockout relay was then reset.

MNT personnel specified that a special adhesive, known as "Loctite", is applied when set screws are tightened to prevent the screws from backing-out (loosening) and do not believe extra inspections are necessary to ensure that

The screws remain tight during operation. MES personnel are presently evaluating alternate means of securing the crank arm to the actuator shaft, in lieu of using set screws, including the "drill and pin" and "keyway" methods. The currently used method involves dimpling the shaft and using set screws to secure the shaft in its desired location. MES will evaluate the feasibility of yearly preventive maintenance to check the position of set screws on key plant components, such as the YC chillers.

After the low refrigerant temperature switch was found to be the problem with 'A' YC Chiller and no replacement switch readily available, the decision was made to transfer the temperature switch from 'B' YC Chiller to 'A' YC Chiller. This task required a temporary jumper across terminals in the breaker panel. An Operability Evaluation (10CFR50.59) was performed by PRF to allow 'B' YC Chiller to operate without its low refrigerant temperature cutout switch. The installation of the jumper allowed a bypass of the automatic trip of the chiller, which would normally trip if the temperature drops to 33 degrees F. Due to the setup of the OAC points, and the fact that the 'B' YC Chiller is not known to have a low refrigerant charge problem, among other considerations, the chiller was allowed to operate as long as periodic monitoring was increased, and with the stipulation that the chiller would be tripped immediately if the temperature dropped to 33 degrees F.

A review of the Operating Experience Program (OEP) database for the previous 24 months prior to this incident revealed four Licensee Event Reports (LERs) which involved an entry into T/S 3.0.3 due to both trains of the VC/YC System being declared inoperable. All four of the LERs (413/89-023, 413/90-028, 413/90-030, and 413/91-005) involved equipment failures. LER 413/91-005 involved a similar incident in which both train chillers had problems with the low refrigerant temperature cutout switch setpoints. Entry into T/S 3.0.3 due to two inoperable trains of the VC/YC System is a recurring problem.

CORRECTIVE ACTION

SUBSEQUENT

1) On October 7, 1991, MNT/HVAC personnel used W/R 493810PS to investigate possible freon leaks on 'A' YC Chiller, and determined the problem may be with the low refrigerant temperature cutout switch.

2) On October 9, 1991, IAE personnel checked out the control circuitry on 'A' YC Chiller and found a problem with the temperature switch sensor contacts due to corrosion from water intrusion.

3) MNT personnel investigated the "motor overload" problem on 'B' YC Chiller using W/R 564560PS and discovered that the chiller guide vane linkage was slipping due to loose set screws on the actuator shaft. The set screws were re-tightened by MNT, and MES personnel provided an operability statement for the chiller.

4) W/R 564570PS was initiated allowing IAE to transfer the low refrigerant temperature cutout switch from 'B' YC Chiller and install it on 'A' YC Chiller. IAE installed a temporary jumper on 'B' YC Chiller, and PRF personnel provided an operability statement and initiated a TSM for 'B' YC Chiller to allow the jumper to remain in place, so the unit could be declared "functional".

5) IAE personnel recalibrated the new temperature cutout switch on 'A' YC Chiller, and OPS successfully restarted the chiller unit.

6) W/R 564580PS was initiated for IAE to remove the temporary jumper on 'B' YC Chiller and install a new temperature cutout switch. IAE completed the installation and calibration of the switch on October 10, 1991, at 2100 hours.

PLANNED

1) W/R 564560PS will be used by MNT personnel to replace the guide vane actuator on 'B' YC Chiller after Design Engineering's evaluation on the NEMA 4 enclosure is complete.

2) Procedure MP/0/A/7450/43, Control Room Chiller Guide Vane Assembly/Disassembly and Corrective Maintenance, will be completed for guidance during work on guide vane actuators in the future.

3) An alternate method to secure the guide vane actuator set screws will be evaluated, along with the need to perform future set screw surveillances, and implemented accordingly.

4) An investigation is planned to determine the cause of the water intrusion into the NEMA 4 rated enclosure at the low refrigerant temperature cutout switch on 'A' YC Chiller.

SAFETY ANALYSIS

The design requirements of the VC Systems are to supply filtered air at a controlled temperature and humidity to the Control Room and to pressurize the C/R to prevent in-leakage of unfiltered air. The VC System helps ensure that doses to C/R personnel are As Low As Reasonably Achievable (ALARA) and in the event of a design basis accident, the VC System acts to limit C/R operator

dose to less than the General Design Criterion 19 limits, (i.e., less than 5 Rem whole body or its equivalent). Since whole body doses are primarily due to exposure to noble gases which the filters do not remove, the VC System is not required to ensure acceptable whole body doses.

The VC System reduces thyroid and skin doses by pressurizing the C/R with filtered air to minimize unfiltered in-leakage from surrounding areas.

The principle contaminant contained in air leaking into the C/R is assumed to be radioactive Iodine which is very conservatively modeled in dose calculations. Very low amounts of Iodine would be expected to reach the area around the C/R since this requires passage through either Auxiliary [EIIS:VF] (VA) or Turbine Building [EIIS:VK] (VO) Ventilation Systems or passageways first.

No credit is taken for the VA filtration, with regard to the C/R dose calculation, in mitigating the Emergency Core Cooling System (ECCS) leakage source. However, this system is automatically switched to the filtered exhaust mode of operation on an accident or Blackout signal, or if radiation is detected by the exhaust monitor [EIIS:MON]. The VA System has four 50 percent capacity trains for Units 1 and 2 which respond to an accident on either unit, thus providing essentially redundant protection. Operation of the VA System in the filtered exhaust mode by either train of the system would serve to reduce the calculated dose to C/R personnel.

In the event the C/R atmosphere became unbreathable, self contained breathing apparatus (SCBAs) provided in the C/R area could be employed. Radiation monitors in the C/R would alert C/R personnel of high radiation levels.

During this incident, both trains of the VC/YC System were declared inoperable due to chiller trips; thus the system was not capable of maintaining the temperature in the C/R or C/R area. Control Room Operators (CROs) continuously monitored the C/R and C/R area temperatures to ensure they did not exceed any limits as specified in T/S 3/4.7.6. There were no events during the time frame for which pressurization would have been required in order to maintain habitability of the C/R.

The health and safety of the public were not affected by this incident.