ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9005300009 DOC.DATE: 90/05/24 NOTARIZED: NO DOCKET #
FACIL:50-269 Oconee Nuclear Station, Unit 1, Duke Power Co. 05000269
AUTH.NAME AUTHOR AFFILIATION
LOWERY,H.R. Duke Power Co.
BARRON,H.B. Duke Power Co.
RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 90-006-00:on 900426,mgt deficiency/inadequate review of Tech Spec change led to Unit 1 unanticipated RPS trip.
W/9 ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 9
TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

NOTES:

	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
	PD2-3 LA	1	1	PD2-3 PD	1	1
	WIENS,L	1	1			
INTERNAL:	ACNW	2	2	ACRS	2	2
	AEOD/DOA	1	1	AEOD/DSP/TPAB	1	1
	AEOD/ROAB/DSP	2	2	DEDRO	1	1
	NRR/DET/ECMB 9H	1	1	NRR/DET/EMEB9H3	1	1
	NRR/DLPQ/LHFB11	1	1	NRR/DLPQ/LPEB10	1	1
	NRR/DOEA/OEAB11	1	1	NRR/DREP/PRPB11	2	2
	NRR/DST/SELB 8D	1	1	NRR/DST/SICB 7E	1	1
	NRR/DST/SPLB8D1	1	1	NRR/DST/SRXB 8E	1	1
	REG FILE 02	1	1	RES/DSIR/EIB	1	1
	RGN2 FILE 01	1	1			
EXTERNAL:	EG&G STUART,V.A	4	4	L ST LOBBY WARD	1	1
	LPDR	1	1	NRC PDR	1	1
	NSIC MAYS,G	1	1	NSIC MURPHY,G.A	1	1
	NUDOCS FULL TXT	1	1			

R I D S / A D D S

R I D S / A D D S

A10-4

NOTE TO ALL "RIDS" RECIPIENTS:

PLEASE HELP US TO REDUCE WASTE! CONTACT THE DOCUMENT CONTROL DESK, ROOM P1-37 (EXT. 20079) TO ELIMINATE YOUR NAME FROM DISTRIBUTION LISTS FOR DOCUMENTS YOU DON'T NEED!

FULL TEXT CONVERSION REQUIRED
TOTAL NUMBER OF COPIES REQUIRED: LTTR 36 ENCL 36

Duke Power Company
Oconee Nuclear Station
P.O. Box 1439
Seneca, S.C. 29679

(803) 882-5363

DUKE POWER

May 24, 1990

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

Subject: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287
LER 269/90-06

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a)(1) and (d), attached is Licensee Event Report (LER) 269/90-06 concerning management deficiency/inadequate review of Technical Specification change led to Unit 1 unanticipated Reactor Protection System trip.

This report is being submitted in accordance with 10 CFR 50.73 (a)(2)(iv). This event is considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

H. B. Barron
Station Manager

RSM/ftr

Attachment

xc: Mr. S. B. Ebneter
Regional Administrator, Region II
U.S. Nuclear Regulatory Commission
101 Marietta St., NW, Suite 2900
Atlanta, Georgia 30323

Mr. L. A. Weins
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Mr. P. H. Skinner
NRC Resident Inspector
Oconee Nuclear Station

American Nuclear Insurers
c/o Dottie Sherman, ANI Library
The Exchange, Suite 245
270 Farmington Avenue
Farmington, CT 06032

INPO Records Center
Suite 1500
1100 Circle 75 Parkway
Atlanta, Georgia 30339

M&M Nuclear Consultants
1221 Avenue of the Americas
New York, NY 10020

IE22
1/1

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 WTH 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)
Oconee Nuclear Station, Unit 1	0 5 0 0 0 2 6 9	1 OF 0 8

TITLE (4) Management Deficiency/Inadequate Review of Technical Specification Change Led to Unit 1 Unanticipated Reactor Protection System Trip

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)
0 4	2 6	9 0	9 0	0 0 6	0 0	0 5	2 4	9 0		0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	- 0 -	20.402(b)	20.405(c)	X 50.73(a)(2)(iv)	73.71(b)
		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)	X OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	50.72(b)(2)(ii)
		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
Henry R. Lowery, Chairman Oconee Safety Review Group	AREA CODE 8 0 3 — 8 8 5 - 3 0 3 4

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

CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	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)

ABSTRACT

On April 26, 1990, Unit 1 was subcritical and preparing for a refueling outage with all control rods in except group 1 was 50% withdrawn. At 1932 hours, when a second Reactor Coolant Pump (RCP) was secured an unanticipated Reactor Protective System (RPS) trip occurred. This was the first shutdown following implementation of a Technical Specification (TS) revision which requires a reactor trip if only two RCPs are running with a reactor power level above 0.0% Full Power. Deficient communications and incorrect assumptions between the responsible groups allowed key technical aspects that affect plant operation to go through the review process undetected. The root cause of this event was Management Deficiency, Inadequate Review of revised TS. Corrective action will propose a change to the TS to move the RPS setpoint.

BACKGROUND

All three Oconee units are Babcock and Wilcox Nuclear Steam Supply Systems [EIIS:AB], with two steam generators loops [EIIS:HX] and four reactor coolant pumps (RCP) [EIIS:P], two per reactor coolant system (RCS) loop. Prior to the last Technical Specification (TS) 2.3 change two pump operation was permissible if each reactor coolant system loop had one operating pump and power was equal to or less than 55% Full Power (FP). The Nuclear Engineering Section of Duke Power Design Engineering Department performed appropriate calculations as part of each core reload design to verify that no safety limits would be violated by operation in this mode. The latest revision to TS 2.3 changed the requirements for two pump operation to be permissible if FP was equal to or less than 0.0% and each RCS loop had only one pump operating.

The Reactor Protective System (RPS) [EIIS:JC] is a safety related system which trips the reactor when necessary due to specified operating conditions. In order to prevent spurious trips due to single failure of system inputs, the RPS uses two out of four logic. Therefore, there are four redundant channels for each RPS parameter. The trips associated with two pump operation are produced by the pump power monitor circuits.

The RPS trip signal (RCP/Flux) for two pump operation at 0.0% FP is the net result of two voltage inputs to a bistable. One input is from the pump power monitor logic (setpoint) and the other input is from the Nuclear Instrumentation (NI) System (process variable) [EIIS:IQ]. If the difference between the two input parameters is a voltage of sufficient magnitude the bistable will generate a trip of the control rod drive breaker which will drop the control rods into the core. TS 2.3 required a change to the setpoint for the pump power monitor channel logic from 55% to 0.0% FP. This new setpoint value of 0.0% FP equates to a voltage of 0.000 volts DC from the pump power monitor to the RPS RCP/Flux trip bistable when only two pumps are running. The calibration of the setpoint for pump power monitor logic allows for a tolerance of plus or minus 30 millivolts. The NI's provide indication of neutron flux from .1 counts per second in the source range to 125% power in the power range. The power range NI's are calibrated during power operation at steady state conditions. When power operation conditions vary, the NI's are recalibrated to the new steady state condition, because as the steady state condition changes the NI's indication become less accurate.

EVENT DESCRIPTION

In preparation of the Oconee Unit 3 Cycle 12 Reload Report, the Nuclear Engineering Section (NES) of Design Engineering suggested a cost savings idea to delete the portion of the fuel cycle analysis related to power operation with two Reactor Coolant Pumps [EIIS:P] (one in each loop) in service. While evaluating the feasibility of such a Technical Specification (TS) change, NES personnel telephoned Instrument and Electrical (I&E) Support Specialist "A" (Specialist "A"). Specialist "A" is the system expert for the RPS system. He stated that the physical implementation would require changing the voltage values for the setpoint of each pump power monitor channel (4 channels) of the Reactor Protective System (RPS) [EIIS:JC] from 55% to 0.0% Full Power (FP). Moving of the setpoint from 55% to 0.0% FP was considered to be more conservative and the 0.0% FP value was already in use as a limit for two pump operation (in the same loop). Also the same setpoint is used at another Babcock and Wilcox plant. The proposed TS then received an in-house review by other personnel and management of the NES section. The NES review was focused on how the TS change would affect the Reactor Core [EIIS:AC] design.

On August 2, 1989, NES submitted a draft TS revision to Nuclear Production Regulatory Compliance. Included in the draft was wording which would prohibit two pump operation above 0.0% FP and make that limitation effective on all three units, even though the current Unit 1 and 2 core designs had been analyzed for two pump operation. This was done in order to keep the affected TS identical on all three units.

The draft was then sent to the station's Compliance Section for distribution to the affected station implementing groups for comments. The Compliance Section also reviewed the proposed TS for format, wording and to a small degree technical content.

The Operations group received the TS draft and held a joint meeting of Operations Superintendent, Unit Managers and other Operations personnel. The TS Bases were reviewed, a discussion on which procedures affected by the TS change were discussed and how the moving of the setpoint from 55% FP to 0.0% FP would affect the operation of the units. A question arose as to whether they could have an RPS trip during a unit shutdown. Unit 1 Operations Manager was assigned to ask I&E the question. During shutdown conditions when the power indication is in the source range and the unit is subcritical Operations considers the power level to be equal to or less than 0.0% FP. During startup conditions the unit is judged to be at power when 2% indicated power is reached.

On August 30, 1989, station management approved the proposed TS. The proposed TS was sent to the NRC on September 25, 1989.

I&E Support Section (who had to change the pump power monitor setpoint) was omitted and did not review the proposed TS change prior to submittal to the NRC. This led to a failure to implement the TS change on Units 1 and 2 in a timely manner. This event is described in LER 269/90-01.

On December 4, 1989, Performance Engineer "A" (Engineer "A") realized that the I&E section had been omitted from the review process and provided information to Specialist "A" to make revisions to I&E procedures.

Specialist "A" identified the affected Unit 3 I&E procedures which consisted of four procedures one procedure for each of the four RPS pump power monitor channels. These changes were reviewed by I&E Engineer "B" (Engineer "B"). During this review process the I&E focus was how the TS change affected the operation of the RPS equipment. The setpoint change was considered to be a straight forward change; the existing pump power monitor setpoint of 55% with a voltage value of 4.320 VDC would be moved to a setpoint of 0.0% with a voltage value of 0.000 VDC. I&E was not knowledgeable about two pump operation and relied on Operations to determine how the TS change would affect plant operations.

On December 15, 1989, the NRC approved the TS revision. The associated amendments to the Oconee licenses were made effective on the date of issuance, which was December 15, 1989.

Specialist "A", Unit 1 Operations Engineer and the Unit 1 Operations Manager discussed the TS changes to the RPS setpoint and how it affected two pump operation. Specialist "A" understood they were questioning the RPS equipment tolerances and stated that if 2 pumps were running and if the indicated power level was above 0.0% FP the unit would trip. Both Operations personnel stated they understood from the discussion that there would not be any problem with two pump operation with the setpoint at 0.0% FP. However, this was a brief conversation which occurred after implementation of the change on Unit 3 and during review of unrelated I&E procedure changes.

On December 29, 1989, Specialist "A" made procedure changes to the Units 1 and 2 I&E RPS procedures. Engineer "B" performed a Qualified Reviewer's review of the procedure changes and marked the cross disciplinary review not applicable. This was done because Operations were aware of the RPS setpoint changes. Therefore, Engineer "B" considered it not necessary for them to review the Unit's 1 and 2 procedure changes.

The required setpoint changes were implemented on both Units 1 and 2, on January 4, 1990.

On April 26, 1990 at approximately 0800 hours, Unit 1 began power reduction in preparation for End Of Core 12 refueling outage. At 1830

hours, the reactor was subcritical, pressure at 2100 psig and a temperature of 540 degrees F. By operating procedure the control rods were fully inserted except that group 1 was set at the 50% withdrawn position for reactivity control. The process of cooling down the Reactor Coolant System (RCS) began at 1910 hours. At 1928 hours the 1A2 reactor coolant pump (RCP) was stopped. The source range NI indication was about 130 counts per second. At 1932 hours, the second RCP (1B1) was stopped per the operations shutdown procedure. Immediately the RPS channels A, C, and D initiated a trip signal on RCP/Flux to the control rod drive (CRD) breakers. The safety actuation, Group 1 Control Rods dropped into the reactor core from the 50% withdrawn position. The RPS channels A, C, and D would not reset even though the Reactor was subcritical and indicated FP was considered to be less than 0%.

Operations called the I&E Technicians to check the RPS (RCP/Flux) setpoints and determine why the RPS channels A, C, and D would not reset. The I&E Technicians determined that the voltage signal from the NI's was greater than the pump power monitor setpoint, this had initiated the RPS trip and was preventing the channels from resetting. The values of the voltage signals were very small but the two input signals had a potential difference large enough for the bistables to initiate a trip signal to the group 1 control rod drive breakers. The I&E Technicians verified that the RPS channels were within their calibrated tolerances. An I&E technician called Specialist "A" at home for some advice as to how to get the RPS to reset. Specialist "A" advised that they go to three pump operation.

In order to continue cooldown, Operations made a procedure change to the Operations Shutdown Procedure to operate 3 RCPs until the RCP/Flux trip could be bypassed (1700 psig) and then go to two pump (one pump per RCS loop) operation. At 2345 hours, the 1A2 RCP was started. At 2346 hours, the RPS channels A, C, and D were reset, then the Group 1 control rod drive trip was reset and the withdrawal of the Group 1 Control Rods from the core was started. At 2353 hours, the Group 1 control rods were withdrawn to the 50% position per the shutdown procedure. At 2355 hours, the RCS cooldown was resumed.

The plants response to the dropped rods was within allowed limits and there was no transient caused by this event. There were no radiation exposures, injuries, or releases of radioactive materials associated with this incident. There were no equipment failures, and, therefore, no NPRDS reportability.

CONCLUSIONS

The root cause of this event is Management Deficiency, Inadequate Review of revised TS change. During the review process of the revised TS change; incorrect assumptions, deficient communications, and the implementing

group being omitted from the review process led to technical aspects of the TS being over looked.

During the review of the proposal to change Oconee's TS, the Nuclear Engineering Section (NES) considered moving the RPS pump power monitor setpoint from 55% to 0.0% FP for two pump operation. If this setpoint could be changed it would allow the NES to delete the two pump analysis done during each core reload design and this would be a cost saving. With the RPS pump power monitor setpoint at 0.0% FP (0.0 VDC) combined with the input from the power range NIs the TS proposal set up a situation where an unanticipated trip was possible.

The TS Review process was to allow all affected groups to have the opportunity to review the proposal and catch any deficiency. A combination of the implementing group being left out of the review process, 0.0% FP being an estimated value and not an exact value, Operations personnel understood that when they were within the source range, 0.0% FP had been reached and the missed communications between I&E and Operations, led to the problem going through and not being identified.

The brief conversation between Specialist "A" and the Operation Personnel did not identify the problem because the understanding that I&E had of 0.0% FP did not correspond with the understanding that Operations had. I&E's understanding of 0.0% FP was the difference between the voltages from the power range NI's and the voltage output of the pump power monitor. Operations understanding was when indicated power was in the source range and the unit was subcritical the power level was equal to or less than 0.0%. What was not communicated during the conversation was the fact that the power range NI's always indicate some power even if it is very small. It was not known to both parties that this voltage could be enough to initiate a trip signal.

The RPS circuitry is calibrated such that anytime less than 3 RCP's are operating and FP is greater than 0.0%, a trip signal will be generated. The pump/power monitor logic interprets two pump operation as a voltage signal that is the equivalent of 0.0 volts.

The NES proposal combined the voltage outputs of the RPS pump/power monitor and the NI's to equal 0.0 volts DC. This voltage value was to equal an indicated power of 0.0% (FP). The SE felt that it was possible that even with an adequate review period the situation that caused the trip may not have been identified. I&E will conduct testing of the RPS RCP/Flux inputs to the bistable during startup or shutdown conditions to determine the best setpoint value. A TS change will be submitted after the tests.

During the station review phase, SD 4.5.2 leaves identification and notification of affected groups or sections to the assigned Compliance person, in this case SS "A". The directive gives no guidance as to which sections of TS affect which groups or sections; gives no guidance to consider implementing groups in addition to operating groups; nor does it provide for any independent or supervisory review of the list of identified groups. This deficiency was identified in LER 269/90-01 and corrective measures are in the process of being implemented.

The review process is dependent on each individual section to review the proposed TS as to how it affects their areas of responsibility of operation and to provide comments back to the station Compliance Section. During the station review there is not an opportunity for all affected groups to meet together and discuss the proposed TS to ensure that there is adequate understanding of the effects of implementing the proposal.

While investigating this event it was discovered that a potential problem may exist with the setpoints for two pump operation in the same loop and single pump operations. Planned corrective actions will evaluate the adequacy of the setpoints.

It was observed that this RPS setpoint was not included in the Setpoint Document Program and, therefore, the change did not go through the specific reviews required by that program. It is possible that the review required by the Setpoint Document Program would have identified the probability for this trip.

There were no radiation exposures, injuries, or releases of radioactive materials associated with this incident. There were no equipment failures, and therefore, no NPRDS reportability.

This incident is considered non-recurring. Proper implementation of the proposed administrative changes should substantially reduce the probability of a similar event occurring in the future.

CORRECTIVE ACTIONS

Immediate

* Operations changed the shutdown procedure to require three pump operation until the RCP/Flux trip could be bypassed.

Subsequent

* Operations withdrew Group 1 control rods to 50% and Unit 1 then continued cool down.

Planned

1. Instrumentation and Electrical (I&E) Maintenance Section will conduct a test to determine a more appropriate setpoint for RPS RCP/Flux trip.

2. Station Compliance Section will propose a Technical Specifications change for two pump operation depending on the outcome of the I&E test.

3. I&E Maintenance Engineering Support Section to determine if the RPS setpoints for two pump operation (in the same loop) and one pump operation need to include a tolerance.

4. Station Compliance Section will begin implementing joint station review meetings for reviewing proposed TS when they affect multiple groups.

5. I&E Maintenance Engineering Support Section will evaluate the reasons for excluding the RPS RCP/Flux setpoints from the Setpoint Document Program. These setpoints will either be added to the program or the justification for exclusion and management's concurrence will be documented.

SAFETY ANALYSIS

Unit 1 was subcritical and in the process of cooling down for a refueling outage. The reactor tripped, dropping the group 1 rods from a 50% withdrawn position. Following the reactor trip, the unit was safely maintained at hot shutdown. No significant abnormalities in plant parameters were observed following the trip. There were no actuation of Engineered Safeguards systems. The pressurizer relief valves did not open. There was no abnormal Reactor Coolant System leakage identified due to this trip. The Operations personnel safely controlled the plant at hot shutdown without any degraded plant performance or safety concerns being generated. The health and safety of the public were not affected as a result of this event.