Entergy

Entergy Operations, Inc.
17265 River Road
Killona, LA 70066
Tel 504 739 6242

Early C. Ewing III
Director, Nuclear Safety Assurance
Waterford 3

W3F1-99-0163
A4.05
PR

October 27, 1999

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

Subject: Waterford 3 SES
Docket No. 50-382
License No. NPF-38
Reporting of Licensee Event Report

Gentlemen:

Attached is Licensee Event Report (LER) 99-015-00 for Waterford Steam Electric Station Unit 3. This report provides details of failure to comply with Technical Specification requirements during plant startup.

This condition is being reported pursuant to 10CFR50.73(a)(2)(i)(B) as an operation or condition prohibited by the plant's Technical Specifications.

All of the commitments contained in this submittal are identified in Attachment 2, the Commitment Identification Voluntary Enhancement Form.

Very truly yours,

Everett P. Perkins Jr. (EC for Ewing)

E.C. Ewing
Director,
Nuclear Safety Assurance

ECE/GCS/rtk
Attachment

cc: E.W. Merschoff (NRC Region IV), C.P. Patel (NRC-NRR),
A.L. Garibaldi, P. Lewis - INPO Records Center,
J. Smith, N.S. Reynolds, NRC Resident Inspectors Office,
Louisiana DEQ/Surveillance Division

IE22

NRC FORM 366 (6-1998) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001

Estimated burden per response to comply with this mandatory information collection request: 50.0 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Waterford Steam Electric Station, Unit 3	05000-382	1 of 11

TITLE (4)
TS Non-Compliance While Raising RCS Pressure Due To Inadequate Shift Communication

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 NAME	DOCKET NUMBER
									N/A	N/A
09	27	99	99	015	00	10	27	99	FACILITY NAME: N/A	DOCKET NUMBER: N/A

OPERATING MODE (9)	4
POWER LEVEL (10)	0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more) (11)

	20.2201(b)		20.2203(a)(2)(v)	x	50.73(a)(2)(i)		50.73(a)(2)(viii)
	20.2203(a)(2)(i)		20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(x)
	20.405(a)(1)(ii)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71
	20.2203(a)(2)(ii)		20.2203(a)(4)		50.73(a)(2)(iv)		OTHER
	20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A
	20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
James Hoffpauir, Operations Manager	(504) 464-3138

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 15 single-spaced typewritten lines) (16)

On September 27,1999 at approximately 1755, the Control Room Operations shift at Waterford 3 was raising Reactor Coolant System (RCS) pressure during a normal plant startup. Upon reaching RCS pressure of approximately 420 pounds per square inch absolute (psia), the shift realized that Containment Spray (CS) Train B was inoperable due to failure to perform the CS system fill and vent. This is a condition prohibited by Technical Specification (TS) 3.0.4 as TS 3.6.2.1 requires two trains of CS to be operable with RCS pressure greater than 400 psia. In addition, it was determined that all four Safety Injection Tanks (SIT) were also inoperable because the shift failed to open the SITs outlet isolation valves. This is also a condition prohibited by TS 3.0.4 as TS 3.5.1 requires that three SITs be operable when RCS pressure is greater than 392 psia. The operation's shift entered TS 3.0.3 and RCS pressure was reduced to below 392 psia within the allowed outage time of TS 3.0.3. An investigation has determined the root cause to be inadequate communication among shift personnel. To address this matter, the shift was temporarily relieved of duty pending debriefing, which occurred the following day. Shift briefing plans have been developed to enhance communication methods.

CS train A was available to perform its safety function. The four closed SITs valves would have opened in response to an automatic or manual SIAS. Accordingly, safe plant shutdown could be achieved and the health and safety of the plant and the general public were not compromised during this condition.

Reportable Occurrence

On September 27,1999, the Waterford 3 Control Room Operations shift was raising Reactor Coolant System [AB] pressure during a normal plant startup. While starting up, the shift failed to perform a fill and vent of Containment Spray [BE] train B. This rendered the CS Train B inoperable and resulted in a violation of Technical Specification (TS) 3.0.4, because TS 6.3.2.1 requires two trains of containment spray be operable for the existing Reactor Coolant System pressure. In addition, the shift discovered the Safety Injection Tanks [BQ-TK] (SITs) were inoperable due to a failure to open the SITs outlet isolation valves. This is also a condition prohibited by TS 3.0.4 as TS 3.5.1 requires that three SITs be operable when RCS pressure is greater than 392 psia. Upon discovery of this condition, the shift entered TS 3.0.3. Accordingly, these events are being reported per 10CFR50.73a(2)(i)(B) as an operation or condition prohibited by the plant's Technical Specifications.

Initial Conditions

Upon discovery on this event, Waterford 3 was in mode 4. There were no systems, structures, or components inoperable, other than described herein, relative to this event.

Event Description

On September 27, 1999, at approximately 0620, the operation's day shift crew arrived and assumed their designated responsibilities. It was their first day back after spending the previous week completing their annual licensed operator requalification training. Waterford 3 was in Mode 5 (Reactor Coolant System temperature less than 200°F) and was making final preparation to enter Mode 4. Turnover from the night shift mainly consisted of the identification of what was still required to be accomplished for the mode change and upcoming milestones that should be accomplished during the next twelve hour period. The main evolution remaining prior to entry into Mode 4 was successful completion of OP-903-024, Reactor Coolant System Water Inventory Balance or "RCS leakrate". After completion of shift turnover, the crew focused on preparation for and performance of OP-903-024 to

obtain a satisfactory Reactor Coolant System leakrate. During leakrate preparation, the crew identified that, per the precautions of OP-903-024, the Reactor Drain Tank (RDT) can not be pumped while an RCS leakrate test is in progress. Earlier in the startup, the System Engineer had requested that Reactor Coolant Pump 2B gasket leakoff be aligned to the RDT until RCS pressure was raised to normal operating pressure. With Reactor Coolant Pump 2B gasket leakoff aligned to the RDT, enough water was flowing into the RDT that the shift had to pump the RDT approximately every 45 minutes. Performance of a RCS leakrate, per OP-903-024, states that data should be collected for a period of 120 minutes with the Charging System unisolated. The shift contacted the System Engineer and discussed isolating RCP 2B gasket leakoff from the RDT during the performance of their leakrate (Operations normal operating procedure has gasket leakoff from 2B RCP to the RDT isolated). At approximately 0912, RCP 2B gasket leakoff was isolated from the RDT and the RCS leakrate commenced. The Primary Nuclear Plant Operator (PNPO) was directed by the Control Room Supervisor (CRS) to maintain RCS pressure and temperature as stable as possible for the duration of this evolution, which was completed at 1117. During this period of approximately two hours, the CRS and the Secondary Nuclear Plant Operator (SNPO), along with an administrative Nuclear Plant Operator (ANPO), were looking ahead in OP-010-003, Plant Startup, to prepare for upcoming evolutions or milestones. This procedure is a general operating procedure, which lists the actions required to start up the plant from a cold shutdown condition. At 1233, Reactor Coolant Pump 2A was started to facilitate heatup of the RCS. The plant entered Mode 4 at 1301.

As the day shift progressed into the afternoon, several issues were being addressed simultaneously by the shift crew.

- The CRS was evaluating the need to fill and vent Low Pressure Safety Injection [BP] (LPSI) Train A. The system had been filled and vented per plant procedures prior to entry into Mode 4 on 9/22/99. Subsequently the plant was returned to Mode 5 for additional valve maintenance. System configuration had not changed since the last fill and vent for Mode 4 entry was performed on 9/22/99 and the CRS, as well as Operations Work Management personnel, wanted to ensure that

the fill and vent performed on 9/23/99 could be credited on 9/27/99.

- Maintenance on Broad Range Gas Monitor B had commenced earlier in the day and was planned to be complete by 1200; however, delays had occurred which had caused the maintenance to continue into the afternoon. The SNPO was supporting this maintenance from a paperwork and control room support function.
- The Shift Superintendent and the System Engineer were discussing the need to realign gasket leakoff for RCP 2B back to the RDT.
- The PNPO was trying to purge the Volume Control Tank with hydrogen to obtain satisfactory hydrogen concentration in the RCS to meet desired chemistry requirements for continued heatup.
- The PNPO was also concerned with RCS pressure with respect to the RCP operating curves as the temperature in the RCS was being raised.
- The STA was involved in a discussion with Chemistry personnel concerning the fact that appropriate chemicals for Emergency Diesel Generator fuel oil were not on site to support the scheduled upcoming EDG run, which was relayed to the Shift Superintendent (SS).
- The ANPO had left the control room surveillance area and was in the Control Room administrative area completing paperwork to support component tagging and equipment maintenance.

Shutdown Cooling Train B was removed from service at 1513, which required realignment of LPSI Train B and CS Train B for Modes 1 through 4. At 1636, the realignment of these systems was completed; however, CS Train B remained inoperable and needed to be filled and vented in accordance with the normal operating procedure. At 1706, low temperature overpressure protection (LTOP) relief valves were removed from service for both trains of Safety Injection when RCS Cold Leg temperature exceeded 272°F. An annunciator alarmed for SI-405B low gas pressure and the crew discussed whether or not the operability of SI-405B was now in question. It was determined that the valve was operable since it was closed. Shortly after satisfactory evaluation of the annunciator for SI-405B, the SS informed the CRS that based on follow-up discussion with the System Engineer, gasket leakoff for RCP 2B needed to be realigned to the RDT prior to the end of the shift. The CRS was in the

process of reviewing OP-010-003 in regards to raising RCS pressure. The CRS then directed the PNPO to commence raising RCS pressure to approximately 1700 psia. When this order to raise pressure was given, the Administrative NPO was not in the Control Room surveillance area, the SS was in his office discussing plant priorities and the STA was performing Condition Report Operability assessments in PCRS. The SS, STA and ANPO did not hear the instruction given by the CRS to the PNPO to commence raising RCS pressure to 1700 psia. After instructing the PNPO to raise RCS pressure, the CRS then organized and coordinated field operators to perform a Containment entry to realign gasket leakoff for RCP 2B to the Reactor Drain Tank. A subsequent review of OP-010-003 by the CRS identified a RCS pressure hold at 500 psia and he amended his order to the PNPO, directing him to raise RCS pressure to approximately 500 psia. At about this time, the Operations Assistant Superintendent, who had recently entered the Control Room to discuss plant priorities with the SS, observed Hot Leg 2 Injection Flow indication spiking to approximately 100 gpm. This flow spiking is one indication that the line upstream of SI-339B (relief valve) could be pressurized and lifting the relief due to leaking Safety Injection valves. The Nuclear Auxiliary Operator (NAO) that was sent into Containment to realign gasket leakoff was contacted and sent over to the relief valve. The NAO stated that there was no leakage from the relief valve. At this point, RCS pressure was reported as being approximately 420 psia.

While awaiting a report back from the NAO in containment, the SS had left his office and approached the control boards at Control Panel 8 to get a closer look at plant indications associated with the Safety Injection System. He then noticed that plant pressure was greater than 400 psia. He knew that he had not declared Containment Spray Train B Operable and questioned the CRS about raising pressure. Subsequent discussion between the SS and CRS confirmed that Containment Spray Train B had not been vented and was not Operable. The SS directed the shift to lower RCS pressure to less than 400 psia (a band of 335 to 365 psia was given by the CRS) since CS Train B was inoperable and was required to be operable with RCS pressure greater than 400 psia. The shift was directed to enter TS 3.6.2.1 due to only one CS Train being Operable. The shift was giving direction to reduce RCS

pressure to less 400 psia because it was apparent that the requirements of TS 3.0.4 were not being met. As the pressure reduction was in progress, the CRS called a shift brief for all Control Room Staff personnel. The purpose of the brief was to ensure that personnel were aware as to why RCS pressure was being lowered, to refocus shift personnel and to ensure that no additional unidentified problems existed. During the briefing it was also recognized that at least three Safety Injection Tanks (SIT's) were required to be operable with RCS pressure greater than 392 psia and none were due to all four outlet isolation valves being closed. The Action Statements of TS 3.5.1 could not be complied with and TS 3.0.3 was entered following the shift briefing. At 1815, RCS pressure was less than 400 psia and Technical Specification 3.6.2.1 was exited. At 1824, RCS pressure was less than 392 psia and TS 3.0.3 was exited. RCS pressure and temperature were stabilized and shift turnover was then conducted.

Causal Factors

Entergy conducted an investigation into these events. The following causal factors were identified:

- Communication was inadequate in that frequent detailed shift briefings were not performed. During the transition from Mode 5 to Mode 4 with the subsequent plant heatup and pressurization, many simultaneous evolutions are in progress that require the Control Room staff to maintain focus on both current and upcoming tasks. On 9/27/99, while transitioning to Mode 4 and pressurizing the RCS, the Control Room Staff failed to maintain overall shift focus on current plant conditions and upcoming conditions by conducting frequent, detailed briefings to ensure that all personnel were aware of changing plant conditions. A briefing with the shift was conducted at the beginning of the day but, as the day continued and control room workload increased, no follow-up briefings with the Control Room Staff were conducted until the shift identified that RCS pressure was greater than 400 psia with Containment Spray Train B inoperable. Once the shift began to lower pressure the Control Room Supervisor conducted a brief with input from all members of the Control Room crew. During this briefing

the crew identified that they had also exceeded 392 psia with all four Safety Injection Tanks isolated.

- Inadequate communication in that a breakdown in verbal communication between the shift occurred. On 9/27/99, as the day progressed and more activities began to occur in the Control Room, crew members began to focus on specific details associated with the individual tasks that they were performing. As their focus narrowed, breakdowns in the communications process occurred. These breakdowns included failure to relay information to other crew members as well as failure to adequately address and question information contained in verbal communications from other crew members. Prior to the order being given to raise RCS pressure, several crew members had the opportunity to communicate to other crew members exactly what was needed to be accomplished prior to raising RCS pressure. However, due to individuals focusing on specific tasks, this communication never occurred.
- Performance Standards were not adequately defined. General Operating Procedures such as OP-010-003, Plant Startup, have sign-off steps (requiring individual initials and date) for plant personnel to use as a placekeeping method to assist in performance of involved processes such as a startup that lasts over several shifts. In addition general operating procedures contain general steps that do not have to be performed in sequential order and having sign-offs as a placekeeping tool aids in ensuring that necessary tasks are performed and appropriate procedures are referenced during plant startups and shutdowns. Placekeeping is a tool that helps the procedure director/performer to remain focused on the overall task instead of getting distracted and missing important procedural steps/tasks. On 9/27/99, Control Room personnel were using OP-010-003 for Plant Startup. Individuals were initialing for steps as they performed them. With each individual initialing for tasks that he performed, the effectiveness of placekeeping in OP-010-003 was greatly reduced. With each individual initialing for his specific tasks, there was no procedure director ensuring that parallel process evolutions were performed prior to performance of the next temperature or pressure increase. On 9/27/99 there was no clear management expectation established

requiring that one crew individual be assigned the position of procedure director and required to initial for all steps in the general operating procedure when crew members complete assigned tasks. In addition, OP-010-003 is written to be a general operating procedure for a plant startup. Procedure steps in OP-010-003 do not have to be followed sequentially; many evolutions can be performed concurrently. Review of the procedure indicates that some steps, specifically step 9.2.9, can lead an individual to believe that it is permissible to start raising pressure to 1700 psia once Mode 4 is entered. However, subsequent steps and procedural cautions contain actions or reminders that relate to pressure dependent conditions. Therefore, the individual's chances of making an error related to raising pressure are increased by this procedural weakness. This contributed to the error that occurred on 9/27/99 while raising Reactor Coolant System pressure.

CORRECTIVE ACTIONS

- Reactor Coolant System Pressure was reduced to less than 392 psia when it was discovered that Reactor Coolant System pressure was greater than 400 psia with Containment Spray Train B inoperable and Safety Injection Tanks isolated.
- The Control Room shift, on duty at the time of these events, was relieved of watchstanding duties until completion of a panel debrief to determine causes of the error and potential shift weaknesses.
- On 9/28/99 a panel debrief was conducted with the shift in accordance with W1.106, Excellence in Human Performance. Upon completion of the debrief, the crew was directed by Operations Management to develop a plan to improve their communications and briefs and present this plan to the Operations Superintendent prior to their next shift.
- On 9/29/99, the Operations Superintendent conducted a Meeting with all Shift Superintendents to review the results of the debrief conducted on 9/28/99 and to ensure that all Operations Shift Superintendents were aware of both the sequence of the events and causes of the error that occurred on 9/27/99.

- Operations Management will clarify Management Expectation requiring that one crew individual be assigned the duty of procedure director and required to initial for all steps in the general operating procedure when crew members complete assigned tasks.
- Operations will review procedure OP-010-003, Plant Startup, and make necessary changes to improve human factoring and reduce potential human error traps.

Safety Significance

A synopsis of the sequence of events as described herein is that Waterford 3 was heating up and pressurizing the Reactor Coolant System (RCS) from a shutdown condition. RCS pressure was raised to approximately 420 psia with all four Safety Injection Tanks isolated and only one train of Containment Spray (CS) operable. Technical Specification 3.6.2.1 requires two trains of CS operable with RCS pressure greater than 400 psia. Technical Specification 3.5.1 requires three Safety Injection Tanks to be operable when RCS pressure is greater than 392 psia.

The Containment Spray (CS) System safety function is to remove containment heat during and following a Loss of Coolant Accident (LOCA) or a Main Steam Line Break (MSLB) inside containment. The Containment Cooling and Spray system heat removal capacity is sufficient to keep containment temperature and pressure below design requirement for any size break up to and including a double-ended break of the largest Reactor Coolant System pipe. The system is also designed to mitigate the consequences of any break up to and including a double-ended break of a main steam line. According to the bases for Tech Spec 3.6.2.1, at low Reactor Coolant System pressure in Mode 4 the Containment Cooling and Spray system is available to provide depressurization and cooling capability. The System design is such that one train of Containment Cooling and Spray is capable of providing 100% of design heat removal.

On 9/27/99, Containment Spray Train A was operable and capable of fulfilling its safety function.

Containment Spray Train B was available for service but not operable. The Containment Spray Actuation Signal (CSAS) system was in service and capable of providing an automatic actuation.

The Safety Injection System (SIS) safety function is to provide inventory and core cooling for accidents which require additional RCS inventory (i.e. Loss of Coolant Accident, Steam Generator Tube Rupture, etc.). The SIS consists of High Pressure Safety Injection (HPSI), Low Pressure Safety Injection (LPSI), and 4 Safety Injection Tanks (SITs). The system is designed to automatically activate in Modes 1, 2, 3, and 4 on a Safety Injection Actuation Signal (SIAS), which is actuated by either Low Pressurizer Pressure or High Containment Pressure. The SIAS can also be performed manually by operator action.

The Safety Injection Tanks did have adequate level and pressure as required by Technical Specification 3.5.1, but their associated isolation valves were closed with their breakers energized. If an accident had occurred, then automatic SIAS would have opened the Safety Injection Tank Outlet Isolation Valves allowing the contents of the Safety Injection Tanks to be dumped into the RCS. Also automatic SIAS would have initiated the High Pressure Safety Injection system and the Low Pressure Safety Injection system.

In addition, SIAS could have been initiated manually by the Operator in the control room. An evaluation of a Mode 4 LOCA has shown that one HPSI pump provides adequate injection to ensure that the core remains cooled if operator action to start the pump is within 10 minutes of event initiation. Per ANSI/ANS-58.8-1984, the 10 minute operator action time is acceptable since all the required actions can be performed from the control room.

Since the Containment heat removal safety function and the SIS safety functions could still have been met with automatic actions, the events that occurred posed no safety significance concern associated

with continued plant operation in Mode 4.

ADDITIONAL INFORMATION

Entergy Industry Identification System (EIIS) codes are identified in the text within brackets [].

COMMITMENT IDENTIFICATION/VOLUNTARY ENHANCEMENT FORM

Attachment 2 to W3F1-99-0163
Subject: Licensee Event Report (LER-99-015-00)
Date: October 27,1999

COMMITMENT(S)	ONE-TIME ACTION*	CONTINUING COMPLIANCE*	SCHEDULED COMPLETION DATE (IF REQUIRED)	ASSOCIATED CR OR ER
♦ Operations Management will clarify Management Expectation requiring that one crew individual be assigned the duty of procedure director and required to initial for all steps in the general operating procedure when crew members complete assigned tasks.	x			99-1022
♦ Operations will review procedure OP-010-003, Plant Startup, and make necessary changes to improve human factoring and reduce potential human error traps	x			99-1022

*Check one only