



January 28, 2000  
RC-00-0026

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

Gentlemen:

Subject: VIRGIL C. SUMMER NUCLEAR STATION  
DOCKET NO. 50-395  
OPERATING LICENSE NO. NPF-12  
LICENSEE EVENT REPORT (LER 1999-002-01)  
REVISED SUBMITTAL

Reference: Gary J. Taylor (SCE&G) to NRC letter of April 12, 1999

Attached is Licensee Event Report No. 1999-002-01, for the Virgil C. Summer Nuclear Station (VCSNS). This report describes a potential condition for exceeding the VCSNS design basis during surveillance testing utilizing certain emergency core cooling system valves. This revision identifies the plant programs documenting review and evaluation of the event and addresses probabilistic consequences. This issue is being reported per 10CFR50.73(a)(2)(ii).

Should you have any questions, please call Mr. Jim Turkett at (803) 345-4047.

Very truly yours,

  
Gary J. Taylor

JT/GJT

Attachment(s)

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- File (818.07)
- DMS (RC-00-0026)

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**LICENSEE EVENT REPORT (LER)**

<b>FACILITY NAME (1)</b> Virgil C. Summer Nuclear Station	<b>DOCKET NUMBER (2)</b> 05000395	<b>PAGE (3)</b> 1 of 4
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**TITLE (4)**  
Valve Surveillance Test Causes System to be Potentially Outside Design Basis – REVISED

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
03	16	1999	1999	002	01	01	31	2000		05000
									FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
	20.2201(b)	20.2203(a)(2)(v)	50.73(a)(2)(i)	50.73(a)(2)(viii)
POWER LEVEL (10)	20.2203(a)(1)	20.2203(a)(3)(i)	X 50.73(a)(2)(ii)	50.73(a)(2)(x)
	20.2203(a)(2)(i)	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)**

<b>NAME</b> A. R. Rice Manager, Nuclear Licensing & Operating Experience	<b>TELEPHONE NUMBER (Include Area Code)</b>  (803) 345-4232
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**COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)**

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

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)**

Prior to performing a stroke test on ECCS hot leg injection valve XVG08889-SI, Operations personnel questioned whether VCSNS would be within the design basis if the test were performed in Modes 1 through 4. Condition Evaluation Report CER-99-186 was initiated on March 8, 1999, to identify this situation.

The normal ECCS flow path during the injection phase is through both Residual Heat Removal (RHR) pumps, the RHR heat exchangers, through a cross connected discharge header and into the three cold leg safety injection (SI) connections to the reactor coolant (RC) loops. The system also has a cross-connected discharge path, with isolation valves, which allows full flow pump testing by recirculating the flow to the Refueling Water Storage Tank or to two hot leg injection lines.

In conjunction with the CER, Engineering Information Request EIR-80016 was initiated on March 10, 1999, to evaluate the test configuration against plant design basis. An unanalyzed condition has been determined to exist whenever either the hot leg injection recirculation valve (XVG-8881) or the hot leg injection valve (XVG-8889) are opened for ASME code testing while the plant is in Modes 1 through 4. The testing configurations include closing associated cross-connect valves resulting in partial header isolation. If a LOCA were to occur with either XVG08889-SI or XVG08881-SI open, there is a potential that the required design flows might not be delivered to the three cold leg injection lines.

The plant estimates that the test conditions account for 8.7 hours of operation per year. The Probabilistic Safety Assessment group performed a sensitivity run which determined that the plant could exist in the test configuration for 50 hours per year before the CDF increased above 1.00E-06.

No operability concerns currently exist as testing of the hot leg injection valve (XVG-8889) and full flow recirculation pump testing using XVG-8881 will be deferred to cold shutdown, as allowed by the ASME code. Procedure revisions to implement these changes were completed by April 2, 1999.

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

**PLANT IDENTIFICATION**

Westinghouse - Pressurized Water Reactor

**EQUIPMENT IDENTIFICATION**

Safety Injection System - Hot Leg Injection Recirculation Isolation Valve	XVG08881-SI
Hot Leg Injection Header Isolation Valve	XVG08889-SI
Low Head Injection Header Cross-Connect Valves	XVG08887A(B)-SI
Cold Leg Injection Header Isolation Valves	XVG08888A(B)-SI
SI Header Cross-Connect Valves	XVG08972A(B)-SI

EIIS Code - BQ

**IDENTIFICATION OF EVENT**

Unanalyzed Condition Potentially Outside Design Basis. During review of surveillance test procedures to identify test component/system configurations that might impact system design basis or accident analyses, V. C. Summer Nuclear Station (VCSNS) Operations personnel questioned the existing test configuration for performing stroke testing on emergency core cooling system (ECCS) valve XVG08889-SI and throttling XVG08881-SI for residual heat removal (RHR) pump testing in Modes 1 through 4. Subsequent engineering review determined that the testing configuration for ASME Code testing of either the hot leg injection valve (XVG08889) or the RHR pump with flow through the hot leg injection recirculation valve (XVG08881) while the plant is in Modes 1 through 4 could place the system outside the facility design basis. If a LOCA were to occur with either of these valves open, there is a potential that the required design flows might not be delivered to the three cold leg injection lines.

**EVENT DATE**

March 16, 1999. This is the date that it was determined this configuration was not analyzed and potentially outside the design basis and could have an adverse effect on the system during a LOCA.

**REPORT DATE**

April 12, 1999

**CONDITIONS PRIOR TO EVENT**

Mode 1 - Power Operations (100%)

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**DESCRIPTION OF EVENT**

On March 08, 1999, Virgil C. Summer (VCSNS) Operations personnel were reviewing the current ECCS valve surveillance test procedure which requires a quarterly timed stroke for XVG08889-SI in both the open and the closed direction. Operations personnel determined that placing power on this valve and stroking it open is contrary to surveillance requirement 4.5.2 of specification 3.5.2. of the VCSNS Technical Specifications (TS). This discrepancy was discovered during an effort initiated to review VCSNS surveillance procedures to identify all TS action statement(s) applicable to the testing process in order to assure literal compliance. Operations identified this situation as potentially affecting the design basis for the RHR/SI system and suspended any performance of this surveillance procedure until the existing test configuration was evaluated by VCSNS engineering.

The normal flow path for safety injection (SI) during the injection phase is through both residual heat removal (RHR) pumps, the RHR heat exchangers, a cross-connected discharge header and into the three cold leg SI connections to the reactor coolant (RC) loops. The SI system also has an additional cross-connected discharge path, with isolation valves, which provides post-LOCA flow to two hot leg injection lines or allows full flow pump testing by recirculating flow from the pumps to the Refueling Water Storage Tank (RWST). The Hot Leg Injection and pump test isolation valves are normally closed and are identified in TS 4.5.2 as closed in Modes 1 through 4. Testing of these valves during Modes 1 through 4 conflicts with this specification.

Condition Evaluation Report CER-99-0186 was initiated to document actions associated with this condition. Engineering Information Request EIR-80016 was initiated for evaluation of test configuration versus design basis considerations.

**CAUSE OF EVENT**

The apparent cause of this situation is a failure to consider the design requirements and limitations of system analyses when the IST program surveillances and system operating procedures were developed. These valves should not have had their position changed in Modes 1 through 4 without prior analysis.

XVG08889-SI was included in the original IST program following several meetings between the NRC, their reviewers (EG&G, Idaho), and SCE&G. The actual commitment in a March 1982 letter from the NRC to SCE&G was to include the valve and submit a relief request to justify exercising during cold shutdown. SCE&G entered the valve into the program but it appears did not pursue the necessary frequency and mode extension. A review of the implementing surveillance test procedure (STP) history indicates that this valve has always been subjected to quarterly testing.

XVG08881-SI is utilized to throttle RHR flow recirculated from the pumps to the RWST. Originally, the RHR pump testing was performed on minimum flow recirculation without the manipulation of XVG08881-SI. In 1992, through adoption of various positions of Generic Letter 89-04, this pump test was modified for testing at full flow capacity using XVG08881-SI. This alignment is also featured in the RHR system operating procedure (SOP) and has been utilized at times in Mode 3

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**ANALYSIS OF EVENT**

VCSNS Engineering personnel have determined that stroking XVG08889-SI, during Modes 1 through 4, would potentially be outside the design basis for the system. This configuration would include isolating either XVG08887A or B. This action affects both trains of RHR. Should a LOCA occur during this configuration, the system may not provide the minimum ECCS flow rates analyzed for cold leg injection and could result in excessive pump runout if only one RHR pump started. This flow configuration for testing in Modes 1 through 4 was not analyzed for its affect on accident mitigation.

Engineering has also determined that, for Modes 1 through 4, full flow testing (STP) or operation (SOP) of the RHR pumps to the RWST through XVG08881-SI is potentially outside the design basis since flow would be diverted from the RCS cold legs to the RWST during an accident and also create a potential excessive pump flow alignment. This configuration includes isolating either XVG08887A or B and XVG08888A or B.

Closing XVG08972A or B in mode 3 or higher to perform check valve leak testing also reduces the system flow capability and is potentially outside the system design basis.

The plant Probabilistic Safety Assessment (PSA) group performed a sensitivity run to determine how long the test conditions could exist before the CDF increased 1.00E-06 above the normal at power CDF. This time was determined to be about 50 hours per year. VCSNS estimated that the test conditions existed for only 8.7 hours.

These system configurations have occurred for very short durations at the specified periodic test intervals, SCE&G has experienced no adverse consequences during the performance of the described surveillances.

**INTERIM CORRECTIVE ACTIONS**

Interim action by SCE&G was to suspend surveillances associated with these valves until an engineering evaluation was performed. This review was completed on March 16, 1999, determining that the potential to exceed design basis was created by the existing surveillance configurations.

**ADDITIONAL CORRECTIVE ACTIONS**

Operations and Engineering reviews were performed and identified no additional valves subject to the event noted.

IST program documents were revised to establish cold shutdown test frequencies for XVG08887A(B)-SI, XVG08888A(B)-SI and XVG08889-SI, as allowed by ASME Code, Om-10. These documents include direction for the positioning of manual valves XVG08881-SI and XVG08972A(B)-SI. These program changes were completed by April 2, 1999.

IST program documents were revised for performing the ASME Code, OM-6 testing of RHR pumps quarterly utilizing minimum flow recirculation. These actions were completed by April 2, 1999.

Operations revised the system operating procedure and associated mode transition surveillance procedures to assure that the system design basis is not compromised during these evolutions prior to May 15, 1999.

**PRIOR OCCURRENCES**

None