

Stephen A. Byrne
Senior Vice President, Nuclear Operations
803.345.4622



December 17, 2003

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

Dear Sir / Madam:

Subject: VIRGIL C. SUMMER NUCLEAR STATION
DOCKET NO. 50-395
OPERATING LICENSE NO. NPF-12
LICENSEE EVENT REPORT (LER 2003-004-00)
REACTOR COOLANT PUMP SEAL INJECTION NOZZLE LEAKAGE

Attached is Licensee Event Report (LER) No. 2003-004-00, for the Virgil C. Summer Nuclear Station (VCSNS). The report describes an event where VCSNS Boric Acid Inspection Program walkdown identified an area of boron in the seal injection nozzle for "C" reactor coolant pump (RCP). Non-destructive examination (NDE) test results concluded that through-wall flaws (cracks) existed in the nozzle weld of the seal injection line to the RCP thermal barrier casing. This LER is being submitted in accordance with 10 CFR 50.73(a)(2)(ii).

Should you have any questions, please call Mr. Ronald B. Clary at (803) 345-4757.

Very truly yours,

Stephen A. Byrne

JT/SAB/dr
Attachment

c: N. O. Lorick
N. S. Carns
T. G. Eppink (w/o attachment)
R. J. White
L. A. Reyes
K. R. Cotton
NRC Resident Inspector
M. N. Browne
Paulette Ledbetter
D. L. Abstance

EPIX Coordinator
K. M. Sutton
INPO Records Center
J&H Marsh & McLennan
NSRC
QC
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File (818.07)
DMS (RC-03-0251)

NRC FORM 366 (7-2001)	U.S. NUCLEAR REGULATORY COMMISSION	APPROVED BY OMB NO. 3150-0104	EXPIRES 7-31-2004
LICENSEE EVENT REPORT (LER) (See reverse for required number of digits/characters for each block)		Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503.	

1. FACILITY NAME Virgil C. Summer Nuclear Station	2. DOCKET NUMBER 05000395	3. PAGE 1 OF 4
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4. TITLE
 Reactor Coolant Pump Seal Injection Nozzle Leakage

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
10	20	2003	2003	004	00	12	17	2003		05000395
									FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE	6	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)								
10. POWER LEVEL	0	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)					
		<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(x)					
		<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 73.71(a)(4)					
		<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(5)					
		<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	OTHER Specify in Abstract below or in NRC Form 366A					
		<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(C)						
		<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(D)						
		<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(vii)						
		<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)						
		<input type="checkbox"/> 20.2203(a)(3)(i)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)						

12. LICENSEE CONTACT FOR THIS LER

NAME R. B. Clary, Mgr., Nuclear Licensing	TELEPHONE NUMBER (Include Area Code) (803) 345-4757
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13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
X	AB	P	S261	Y					

14. SUPPLEMENTAL REPORT EXPECTED				15. EXPECTED SUBMISSION DATE		
<input checked="" type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE).	<input type="checkbox"/> NO	MONTH	DAY	YEAR		
		6	1	2004		

16. ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On October 19, 2003, during performance of surveillance test procedure, STP 250.001B, Boric Acid Inspection Program, boron was observed around the seal injection nozzle and on the thermal barrier casing of reactor coolant pump (RCP) "C". Inspection personnel contacted the Control Room and Outage Management at 1350 hours. Evaluation of the condition was initiated and a dye penetrant examination (PT) was scheduled for the morning of October 20. Evaluation of the PT results at 0700 hours on October 20 determined that the seal injection nozzle to the RCP thermal barrier casing had a surface breaking indication. This along with the visual evidence of Boric Acid residues indicated through-wall leakage at this point.

Notification of this event was reported under Event Notification EN# 40261 at 1321 hours on October 20, 2003 in accordance with 10 CFR 50.72(b)(3)(ii)(A)(2).

The plant was shutdown for refueling, Mode 6. An ultrasonic test (UT) examination was performed and a "boat" sample was removed from the nozzle for metallurgical evaluation of cause and determination of any additional corrective action. The nozzle was replaced and tested satisfactorily. Visual Inspections were performed on RCP "A" and "B" with no through-wall leakage identified.

The event is determined to have no safety significance since the leak rate was small. There was no previous indication of leakage on either the radiation monitors or through leak rate calculation results.

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

PLANT IDENTIFICATION

Westinghouse - Pressurized Water Reactor

EQUIPMENT IDENTIFICATION

Reactor Coolant Pump

IDENTIFICATION OF EVENT

On October 19, 2003, during performance of the Boric Acid Inspection Program team walkdown, boron was observed around the seal injection nozzle and on the thermal barrier casing of reactor coolant pump (RCP) "C". A dye penetrant examination (PT) was performed as part of the evaluation of the event on October 20.

Evaluation of the PT results at 0700 hours on October 20 determined that the seal injection nozzle to the RCP thermal barrier casing had a surface breaking indication. This along with the visual evidence of Boric Acid residues indicated through-wall leakage at this point.

EVENT DATE

10/20/03

REPORT DATE

12/17/03

CONDITIONS PRIOR TO EVENT

Mode 6, 0% Power

DESCRIPTION OF EVENT

On October 19, 2003, during performance of surveillance test procedure, STP 250.001B, Boric Acid Inspection Program, boron was observed around the seal injection nozzle and on the thermal barrier casing of reactor coolant pump (RCP) "C". Inspection personnel contacted the Control Room and Outage Management at 1350 hours. Evaluation of the condition was initiated and a dye penetrant examination (PT) was scheduled for the morning of October 20.

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DESCRIPTION OF EVENT (Cont'd)

Evaluation of the PT results at 0700 hours on October 20 determined that the seal injection nozzle to the RCP thermal barrier casing had a surface breaking indication. This along with the visual evidence of Boric Acid residues indicated through-wall leakage at this point.

Condition Evaluation Report C-03-3634 was generated to address the event to evaluate cause and to develop effective corrective actions. This report was reclassified as a non-conforming condition and transferred to Non-Conformance Notice NCN 03-3436.

CAUSE OF EVENT

A "boat" sample of the flawed weld was removed for metallurgical analysis. Cause of event will be determined based on metallurgical analysis results and provided in a supplemental report to this LER."

ANALYSIS OF EVENT

On October 19, 2003, during performance of surveillance test procedure, STP 250.001B, Boric Acid Inspection Program, boron in the area of the RCP seal injection nozzle was found during an inspection of the RCS for boron leaks. PT test results indicated flaws (cracks) in the thermal barrier casing weld of the seal injection nozzle to 'C' RCP. An ultrasonic test (UT) examination was performed and a "boat" sample was removed from the nozzle for metallurgical evaluation of cause and for determination of any additional corrective action. The UT process implemented was developed by EPRI for VCSNS and is not an ASME Code approved process for the size piping involved.

This is a repetitive failure since there were events in 1987 and 1994 where the plant experienced pressure boundary leakage from the reactor coolant system from this same weld. The nozzle was weld repaired on both occasions.

The 1987 crack cause was believed to originate in a flaw at the root of the weld and propagated outward to the surface of the thermal barrier casing. The 1994 crack cause was believed to be due to the consequence of possible defects in the root pass, which were not removed in the previous weld repair and aggravated over time by intergranular stress corrosion. The 1994 crack was not in the area of the previous weld repair.

To bound the extent of condition, NDE was performed on 'A' and 'B' RCP seal injection nozzle welds. 'A' RCP seal injection nozzle had no indications, but the UT performed on 'B' RCP nozzle had indications of underbead cracks in the thermal barrier base metal.

Additional extent of condition NDEs were performed on the component cooling water connections to the thermal barriers on the RCPs. The results were minor UT indications on the 'B' RCP component cooling outlet and the inlet and outlet for 'C' RCP. These nozzles were cut out and replaced during this outage.

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ANALYSIS OF EVENT (Cont'd)

With the completion of this work in RF-14, all the RCP thermal barrier nozzles (seal injection, CCW inlet and outlet) have been completely replaced with new nozzle assemblies since the initial leak in 1987.

There is no Safety Significance since the leakrate was very small. Prior to the reactor coolant system walkdown, there was no indication of this leak on either the radiation monitors or leakrate calculation results since the previous repair. Previous refueling outage inspections performed since the last repair verified that there was no indication of leakage or presence of boron.

CORRECTIVE ACTIONS

The Station has taken the following corrective actions:

- 'C' RCP Seal Injection Nozzle: A boat sample of the weld was obtained for metallurgical analysis. The entire weld was cut out and another nozzle welded in place.
- The 'C' RCP component cooling water (CCW) inlet and outlet nozzles to thermal barrier welds were also cut out and new nozzles welded in-place.
- 'B' RCP Seal Injection Line: The entire weld was cut out and another nozzle welded in-place.
- The 'B' RCP CCW outlet nozzle to thermal barrier weld was also cut out and a new nozzle welded in-place.
- Vibration readings were obtained during plant start-up on the affected lines to provide input for root cause evaluation.
- A walkdown of the lines was performed to inspect for missing or damaged supports and no problems were noted.
- Additional actions, as needed, will be considered upon review of analysis performed on the "boat" sample.

PRIOR OCCURRENCES

This is a repetitive failure since there were events in 1987 (LER 94-006, January 3, 1995) and 1994 (LER 87-013, June 25, 1987) where the plant experienced pressure boundary leakage from the reactor coolant system from this same weld. Repairs were made to the weld on both occasions.