

LaSalle County Station 2601 North 21<sup>st</sup> Road Marseilles, IL 61341 815-415-2000 Telephone www.exeloncorp.com

10 CFR 50.73

RA17-039

April 12, 2017

U.S. Nuclear Regulatory Commission ATTN: Document Control Desk Washington, DC 20555-0001

> LaSalle County Station, Unit 2 Renewed Facility Operating License No. NPF-18 <u>NRC Docket No. 50-374</u>

Subject: Licensee Event Report 2017-003-00, High Pressure Core Spray System Inoperable due to Injection Valve Stem-Disc Separation

In accordance with 10 CFR 50.73(a)(2)(i)(B) and 10 CFR 50.73(a)(2)(v)(D), Exelon Generation Company, LLC (EGC) is submitting Licensee Event Report (LER) Number 2017-003-00 for LaSalle County Station, Unit 2.

There are no regulatory commitments in this letter. Should you have any questions concerning this report, please contact Mr. Guy V. Ford, Jr., Regulatory Assurance Manager, at (815) 415-2800.

Respectfully,

William J. Trafton *l* Site Vice President LaSalle County Station

Enclosure: Licensee Event Report

cc: Regional Administrator – NRC Region III NRC Senior Resident Inspector – LaSalle County Station

NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION								APPROVED BY OMB: NO. 3150-0104 EXPIRES: 03/31/2020										
SUBAR Residence								Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry.										
(See Page 2 for required number of digits/characters for each block)							Send comments regarding burden estimate to the Information Services Branch (T-2 F43), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects. Resource@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. If a means											
(See NUREG-1022, R.3 for instruction and guidance for completing this form http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/)							used to impose 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.											
1. FACILITY NAME								2. DO	2. DOCKET NUMBER 3. PAGE									
LaSa	LaSalle County Station, Unit 2									05000374 1 OF 4								
4. TITLI	4. TITLE																	
High	High Pressure Core Spray System Inoperable due to Injection Valve Stem-Disc Separation																	
5. EVENT DATE 6. LER NUMBER 7. REPORT DA						ATE 8. OTHER FACILITIES INVOLVED												
MONTH	DAY	YEAR	YEAR	SEQUI NUN	ENTIAL IBER	REV NO.	MONTH	DAY	·	YEAR	F	FACILITY NAME DOCKET NUMB			NUMBER			
02	11	2017	2017	- 003	-	00	04	12		2017	N	FACILITY NAME DOCKET NUMBER					NUMBER	
9. OPE	RATING	MODE	11.	THIS RE	PORTIS	SUBN	NITTED P	URSU	AN	т то тн	ER	REQUIREMENT	S OF 10 C	FR§	§: (Check	all that	t ap	ply)
			20.2201(b)				20.2203(a)(3)(i			i)		50.73(a)(2)(ii)(A)			50.73(a)(2)(viii)(A)			
	F		20.2201(d)			20.2203(a)(3)(ii			ii)		50.73(a)(2)(ii)(B)			50.73(a)(2)(viii)(B)				
	Э		20	).2203(a)	20.2203(a)(4)					50.73(a)(2)(iii)			50.73(a)(2)(ix)(A)					
			20.2203(a)(2)(i)			50.36(c)(1)(i)(A			A)		50.73(a)(2)(iv)(A)			50.73(a)(2)(x)				
10. PO	10. POWER LEVEL			20.2203(a)(2)(ii)			50.36(c)(1)(ii)(A			A)	50.73(a)(2)(v)(A)			73.71(a)(4)				
			20.2203(a)(2)(iii)				50.36(c)(2)				50.73(a)(2)(v)(B)			73.71(a)(5)				
			20.2203(a)(2)(iv)				50.46(a)(3)(ii)					50.73(a)(2)(v)(C)			73.77(a)(1)			
000			20.2203(a)(2)(v)				50.73(a)(2)(i)(A			A)	50.73(a)(2)(v)(D)				73.77(a)(2)(i)			
			20.2203(a)(2)(vi)			50.73(a)(2)(i)(B			B)		50.73(a)	(2)(vii)	73.77(a)(2)(ii)					
							50.73(a)(2)(i)(C			C)	) OTHER Specify in Abstract below or in NRC Form 366A					66A		
LICENSEE	CONTACT					12. L	ICENSEE	CON	TAC	T FOR	THIS	S LER	TE	EPHO		(Include	Area	Code)
Joe	Joe Fiesel, Maintenance Director (815) 415-2500																	
		OVETEN	13. COM		MANU	E FOR	REPORTA	BLE	DNE		UR	E DESCRIBED	IN THIS F	REPC	MANU-		REP	ORTABLE
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		DG		V	A39	<u>'</u>	T				_			_	INA			
										SUBMISSION					+	2017		
On February 11, 2017, Unit 2 was in Mode 5 for a planned refueling outage. While attempting to fill and vent the Unit 2 High Pressure Core Spray (HPCS) system, no flow was observed from the drywell vent valves or downstream of the HPCS injection																		
valve. The HPCS system was already inoperable to support a scheduled surveillances performed on February 8, 2017 in which the HPCS injection isolation valve had been cycled three times satisfactorily. Troubleshooting determined the cause of the valve																		
malfunction was due to stem-disc separation. The valve was replaced prior to restart of the unit from the refueling outage. The																		
causal evaluation for the value failure is ongoing, and results of the investigation will be reported in a supplement to this LEH.																		
I his component failure is reportable in accordance with 10 CFR 50.73(a)(2)(V)(D) as an event or condition that could have prevented fulfillment of the safety function of structures or system that are needed to mitigate the consequences of an accident.																		
This condition could have prevented the HPCS system, a single train safety system, from performing its design function if the valve failure occurred during an actual demand. This component failure is also reportable in accordance with 10 CEB 50 73(a)(2)(i)(B)																		
as a condition prohibited by Technical Specifications (TS) 3.5.1 "ECCS – Operating," since the HPCS system may have been																		
inope statu	erable fo s. Ther	e were n	r than th ninimal s	e TS 3.5 afety cc	5.1, Requinsequer	nces a	Action B.	2, Co d with	mpl 1 the	etion Ti e condit	me	of 14 days to since HPCS	restore H was not r	IPCS equi	S system red to be	to ope operat	orab ole	at the
time HPC	time of the failure, and other required emergency safety systems remained operable. There were no actual demands for Unit 2 HPCS, other ECCS systems, or the reactor core isolation cooling (RCIC) system during this period.																	

NRC FORM 366A	U.S. NUC	LEAR REGULAT	ORY COMMISSION	APPROVED BY OMB: NO. 315	0-0104	EXPIRES	S: 03/31/2020				
(04-2017))	ENSEE E CONTII	EVENT REP	ORT (LER) HEET	Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Information Services Branch (T-2 F43), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@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. If a means used to impose an information collection does not display a currently valid OMB control number. the							
(See NUREG-1022, R.3 http://www.nrc.gov/re	for instruction eading-rm/doc-	and guidance for c -collections/nuregs/	ompleting this form staff/sr1022/r3/)	NRC may not conduct or sponsor, an collection.	id a person is	s not required to respond t	o, the information				
1. FACILITY NAME			2. DOC	KET NUMBER	3. LER NUMBER						
LaSalle County Sta	tion, Unit 2		05000374		YEAR		REV NO.				
NADDATIVE					2017	- 003	- 00				
PLANT AND SYSTE		ICATION									
LaSalle County Station Unit 2 is a General Electric Boiling Water Reactor with 3546 Megawatts Thermal Rated Core Power.											
The affected system was the Division 3 High Pressure Core Spray (HPCS) system, one of the stand-by emergency core cooling systems (ECCS) credited for emergency injection into the reactor pressure vessel (RPV). The HPCS system is designed to provide sufficient cooling to the reactor core to prevent excessive fuel cladding temperatures following any break in the nuclear system piping. The affected component was the motor operated HPCS injection isolation valve (2E22-F004). This valve is normally closed and automatically opens following a HPCS injection signal to allow injection to the RPV from the HPCS pump.											
CONDITION PRIOR	TO EVENT										
Unit(s): 2 Reactor Mode(s	): 5	Date: Februar Mode(s) Name	y 11, 2017 e: Refueling	Time: 1200 CST Power Level: 0 percent							
DESCRIPTION		<i>x</i>				3					
During the Unit 2 refueling outage, with the reactor in Mode 5, the Unit 2 HPCS system was declared inoperable on February 8, 2017 to support performance of the HPCS high pressure water leak rate test and stem lubrication and rotation check of the HPCS injection isolation valve 2E22-F004. On February 11, 2017, while attempting to fill and vent the HPCS system, problems arose when finishing the drywell portion of the fill. Full flow water was observed from the high point vents (valves 2E22-F349 / 2E22-F350) with the water leg pump and cycled condensate systems lined up for fill. With the HPCS injection isolation valve 2E22-F004 opened from the main control room, and the HPCS check valve 2E22-F005 pinned open, no air or water was observed through the vents in the drywell. The check valve 2E22-F005 was cycled to verify proper operation, and the HPCS injection isolation valve 2E22-F004 was also cycled to verify the valve was opeh. However, again no air or water was observed from the drywell 'vents. Additional trouble shooting was performed that determined there was no flow downstream with the valve open.											
Prior to this fill and vent sequence, the HPCS system had been taken out of service for leak rate testing and then drained for relief valve work. The leak rate tests (which involved cycling the 2E22-F004 valve open and closed) all passed satisfactory. Upon completion of those tests, the system was drained from the drywell down to the pump suction. System parameters observed during the leak rate tests provided firm evidence that the HPCS injection isolation valve satisfactorily cycled as designed.											
Therefore, it was concluded that the HPCS injection isolation valve 2E22-F004 failure occurred sometime after the successful leak rate tests, and most likely during the fill and vent sequence. The Unit 2 HPCS injection valve had been successfully cycled open and closed during previous surveillances required by Technical Specifications (TS) during the refueling outage.											
CAUSE											
Upon investigation, t stem threads and we issues documenting Darling double disc upper wedge thread operating experience	roubleshoot adge pin wer a Flowserve gate valves. ed connectic e suggests tl	ing determined t re found to be da e 10 CFR Part 2 Topical Report I on failures cause hat vendor quali	the cause of the va amaged, causing s 1 Notification conce BWROG-TP-13-00 ed by the valve ster ty was a causal fac	lve malfunction was due to eparation from the valve d erning the quality of the we 6 documents instances wh ns not being properly torque tor for the component failu	o stem-dis isc. Ther idge pin o iere this t ued into t ire.	sc separation. The e have been indus connections of And ype of valve has s he upper wedge.	valve try hor tem to This				
Valve disassembly a to separate from the dual floating discs w wedge. A hole is dri documented within F	nd inspectio valve disc. ith a two pie lled through 3WROG-TP-	on revealed the v Anchor Darling ce wedging med the stem for the -13-006 that stat	wedge pin to be sho double disc gate va chanism between th wedge pin to hold te the cause of ster	eared, and the valve stem alves are unique in design nem. The valve stem is the the disc retainers in place n disc separation was the	threads of as the di- readed ar . There h stem was	lamaged, causing sc assembly consi nd torqued into the ave been instance	the stem sts of upper s ued into				

the upper wedge. BWROG-TP-13-006 states that there is no non-intrusive test or inspection method to determine if the stems were adequately torqued into the upper wedge prior to pin installation. Flowserve recommends that all critical Anchor Darling double disc gate valves with threaded stem to upper wedge connections and actuators that produce torque be evaluated for

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(04-2017)) LICENSEE EVENT REP CONTINUATION S (See NUREG-1022, R.3 for instruction and guidance for c http://www.nrc.gov/reading-rm/doc-collections/nuregs/	ORT (LER) HEET completing this form /staff/sr1022/r3/)	Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Information Services Branch (T-2 F43), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@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. If a means used to impose 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.								
1. FACILITY NAME	2. DOC	CKET NUMBER	3. LER NUMBER							
LaSalle County Station, Unit 2	05000374		YEAR	SEQUENTIAL NUMBER	REV NO.					
			2017	- 003	- 00					
NARRATIVE										
potential wedge pin failure. At the time of the failure, the station was following vendor and industry guidance for inspection of the valve related to the Flowserve Part 21 Notification.										
The causal evaluation into the valve failure is ongoing. The results will be reported in a supplement to this LER upon completion.										
REPORTABILITY AND SAFETY ANALYSIS										

This component failure is reportable in accordance with 10 CFR 50.73(a)(2)(i)(B) as a condition prohibited by TS due to the failure to complete TS 3.5.1, "ECCS – Operating," Required Action B.2, to restore HPCS system to operable status within the specified Completion Time of 14 days. This component failure is also reportable in accordance with 10 CFR 50.73(a)(2)(v)(D) as an event or condition that could have prevented fulfillment of the safety function of structures or system that are needed to mitigate the consequences of an accident. This condition could have prevented the HPCS system, a single train safety system, from performing its design function.

There were minimal safety consequences associated with the condition since HPCS was not required to be operable at the time of discovery of the condition, and other required emergency safety systems remained operable. The HPCS injection isolation valve 2E22-F004 was cycled open and closed satisfactorily during previous flow surveillances. There were no actual demands for Unit 2 HPCS, other ECCS systems, or the reactor core isolation cooling (RCIC) system during this period.

This condition is under evaluation as a safety system functional failure defined in accordance with NEI 99-02, Regulatory Assessment Performance Indicator Guideline.

## **CORRECTIVE ACTIONS**

Following discovery of the failure, the Unit 2 HPCS injection isolation valve 2E22-F004 was overhauled using a new stém, and the upper wedge threads were repaired. In addition, a stem lube and rotation check was performed satisfactorily. A review of the diagnostic testing results and pin analysis criteria was performed on all the affected valves in this population. The remaining valves in the population were within the latest vendor's recommendation for rotation criteria.

## **PREVIOUS OCCURRENCES**

A review of station Licensee Event Reports for the past three years, related to stem-disc separation issues, identified the following similar instances:

LER 374-2014-001: On August 5, 2014, LaSalle County Station Unit 2 automatically scrammed from 100 percent power on high neutron flux, followed by a Group I containment isolation. Following the Group I isolation, the control room operators noted that the position indication for valve 2B21-F022C, the inboard 2C Main Steam Isolation Valve (MSIV), showed dual indication rather than full closed. Troubleshooting of the 2C MSIV determined that the valve stem disc had separated from the stem, which allowed the main disk to drop into the main steam flow path. The resulting reactor pressure transient added positive reactivity, which caused the high neutron flux scram. Increased steam flow in the other three main steam lines resulted in a nearly simultaneous high main steam line flow Group I containment isolation. The cause of the stem-disc separation on the 2C MSIV was fretting wear attributable to marginal design. The root cause of the event was a legacy decision made in 2008 deferring installation of a manufacturer upgrade that would have prevented the failure. Corrective actions include installing the upgrade on all MSIVs on both units, and reviewing previous deferral decisions made using the same decision-making process.

LER 374-2017-001: On January 23, 2017, operators initiated a manual scram of the LaSalle County Station Unit 2 reactor as a result of observing a generator run-back due to a generator stator winding cooling (GC) system malfunction. Initial troubleshooting identified the most likely cause was plugging in the 'A' GC heat exchanger, based on inspection of the GC system flow-path components. The GC system was realigned to the 'B' heat exchanger until inspections could be performed in the upcoming refueling outage, and the unit was re-started on January 24, 2017. Further inspections of the GC components were performed while the unit was shut down for a planned refueling outage. These inspections determined the cause of the GC system failure was stem-disc separation in the 'A' GC heat exchanger inlet valve. The valve was repaired during the refueling outage. This event is reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A) as an event or condition that resulted in manual or automatic actuation

NRC FORM 366A (04-2017)) U.S. NUCLEAR REGULAT LICENSEE EVENT REP CONTINUATION S (See NUREG-1022, R.3 for instruction and guidance for contractions/pureos)	ORY COMMISSION	APPROVED BY OMB: NO. 3150-0104 EXPIRES: 03/31/2020 Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Information Services Branch (T-2 F43), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@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. If a means used to impose 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.						
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LaSalle County Station, Unit 2	05000374		YEAR 2017	SEQUENTIAL NUMBER	REV NO. - 00			

## NARRATIVE

of the Reactor Protection System (RPS). There were no safety consequences associated with the event since there was no loss of safety function, and the RPS functioned as designed.

LER 374-2017-002: On January 30, 2017, during routine surveillance testing of the LaSalle County Station Unit 2 Division 3 Diesel Generator Cooling Water (DGCW) system, the cooling water strainer backwash valve was unable to open due to stem-disc separation. The valve was replaced, and the HPCS system was returned to operable on February 2, 2017. This condition could have prevented the HPCS system, a single train safety system, from performing its design function. There was minimal safety consequences associated with the event since the other emergency safety systems remained operable, and the Division 3 DGCW system remained functional as it retained the ability to provide the required flow through the system. The apparent cause of the stem-disc separation was erosion due to the carbon-steel valve internals in a raw water system environment.

## **COMPONENT FAILURE DATA**

Manufacturer: Anchor Darling (A391) Device: Gate Valve, 12-inch Component ID: Model C900