

Entergy Nuclear Operations, Inc. Pilgrim Nuclear Power Station 600 Rocky Hill Road Plymouth. MA 02360

> IEZZ NRR

October 13, 2016

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

SUBJECT: Licensee Event Report 2016-005-00, Ultimate Heat Sink and Salt Service Water System Declared Inoperable

Pilgrim Nuclear Power Station Docket No. 50-293 Renewed License No. DPR-35

LETTER NUMBER: 2.16.062

Dear Sir or Madam:

The enclosed Licensee Event Report 2016-005-00, Ultimate Heat Sink and Salt Service Water System Declared Inoperable, is submitted in accordance with 10 Code of Federal Regulations 50.73.

If you have any questions or require additional information, contact me at (508) 830-8323.

There are no regulatory commitments contained in this letter.

Sincerely,

2 Euro

Everett P. Perkins, Jr. Manager, Regulatory Assurance

EPP/sc

Attachment: Licensee Event Report 2016-005-00, Ultimate Heat Sink and Salt Service Water System Declared Inoperable (5 Pages)

Letter No. 2.16.062 Page 2 of 2

Entergy Nuclear Operations, Inc. / Pilgrim Nuclear Power Station

ſ

cc: Mr. Daniel H. Dorman Regional Administrator, Region I U.S. Nuclear Regulatory Commission 2100 Renaissance Blvd., Suite 100 King of Prussia, PA 19406-2713

> Ms. Booma Venkataraman, Project Manager Office of Nuclear Reactor Regulation U.S. Nuclear Regulatory Commission Mail Stop O-8C2A Washington, DC 20555

NRC Senior Resident Inspector Pilgrim Nuclear Power Station

Attachment

Letter Number 2.16.062

Licensee Event Report 2016-005-00

Ultimate Heat Sink and Salt Service Water System Declared Inoperable

(5 Pages)

1

NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION					APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2018											
LICENSEE EVENT REPORT (LER)						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 FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Officer 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 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. FACIL Pilgrin	1. FACILITY NAME Pilgrim Nuclear Power Station							2. DOCKET NUMBER 3. PAGE 05000293 1 OF 5								
4. TITLE Ultimate Heat Sink and Salt Service Water System Declared Inoperable																
5.1	EVENT D	ATE	6. LER NUMBER			7. REPORT D/		DATE	ATE 8. OTHER FACILITIES INVOLVED							
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR N/A			N/					
08	15	2016	2016 -	005 -	00	10	13	2016		FACILITY NAME				DOC N/		R
9. OP	RATING	MODE	11. TI	HIS REPORT	IS SUBM	IITTED PL	JRSUAN	т то тні	ER	EQUIREMENT	S OF 10 C	FR §:	(Check a	ll that	apply)	
			20.2	201(b)		20.2203	(a)(3)(i)			50.73(a)(2)	(ii)(A)	[50.73	B(a)(2)(viii)(A)	
N			20.2201(d)			20.2203(a)(3)(ii)				50.73(a)(2)(ii)(B)		[50.73(a)(2)(viii)(B)			
			20.2203(a)(1)			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)			50.73(a)(2)(iv)(A)		[50.73(a)(2)(x)				
10. POW	VER LEV	EL	20.2203(a)(2)(ii) [50.36(c)(1)(ii)(A)				50.73(a)(2))(v)(A)	[73.7	(a)(4)		
			20.2203(a)(2)(iii) [] 50.36(c)	(2)			X 50.73(a)(2)	(v)(B)		73.7	(a)(5)		
			20.2203(a)(2)(iv)] 50.46(a)	(3)(ii)		50.73(a)(2)(v)(C)			73.77(a)(1)				
70			20.2203(a)(2)(v)			50.73(a)(2)(i)(A)				X 50.73(a)(2)(v)(D)			73.77(a)(2)(i)			
			20.2203(a)(2)(vi)			_ 50.73(a)(2)(i)(B)				50.73(a)(2)(vii)			73.71(a)(2)(ii)			
						50.73(a)	(2)(i)(C)				Specify in Abst	ract belo	worin NRC	Form 36	5A	
12. LICENSEE CONTACT FOR THIS LER																
Mr. Eve	rett P. F	Perkins, Jr	Regula	tory Assura	nce Man	ager			_			508-8	830-832	3		000)
	r=		13. COMPL		E FOR E	ACH CON		T FAILU	RE	DESCRIBED II	N THIS RE	PORT				
CAUS	E	SYSTEM	COMPON	ENT FACTU		TOEPIX	.=	CAUSE	_	SYSTEM	COMPONE	INT	FACTURE	R	TO EPI	X
14. SUPPLEMENTAL REPORT EXPECTED 15. EXPECTED MONTH DAY YEAR																
ABSTRA	1 EO (# 9 CT	es, complei	e IS. EXPE	SUED SUBIN	ISSICIN L	JATE)	A							L	́	
On A	ugust ′	15, 2016	at 1552	EDT, with	n the re	eactor a	it abou	t 70 pe	erc	ent core the	ermal po	ower	(CTP)	, Pilg	rim	
Nucle	ar Pov	ver Stati	on (PNF	S) declare	ed the	ultimate	e heat :	sink (U	JHS	S) and salt	service	wate	er (SSV	V) sys	stem	
inoperable due to high sea water inlet temperatures greater than 75 degrees Fahrenheit (F). PNPS had already																

taken action, in accordance with plant procedures, to reduce power from 100 percent in an effort to keep from exceeding the Technical Specification (TS) Limit. PNPS entered a 24-hour shutdown Limiting Condition for Operation Action Statement (LCO-AS) for Salt Service Water (SSW) inlet temperature exceeding the TS limit in TS 3.5.B.4. The LCO-AS was subsequently exited at 1651 hours when the temperature of SSW trended to below the TS limit.

Under certain design conditions, the SSW system is required to provide cooling water to various heat exchangers such as the Reactor Building Closed Cooling Water (RBCCW) and Turbine Building Closed Cooling Water (TBCCW) systems. When the inlet temperature to these supplied loads exceeds the 75 degree F limit established in the TS, the SSW system is conservatively declared inoperable until the temperature trends below this value. This condition existed for 59 minutes reaching a maximum of 75.1 degrees F. The cause of the sea water inlet temperature exceeding the 75 degree F TS criterion was sustained increased sea water surface temperature in Cape Cod Bay due to summer weather conditions and recirculation of water from the plant's discharge due to wind and tidal conditions.

There was no impact to public health and safety from this condition.

(11, 2015)	U.S. NUCLEAR REGULATORY COMMISSION			APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2018				
LICENSEE EVENT (LER) CONTIN SHEET	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 FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet 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. DOCKET N	JUMBER 3. LER NUMBER						
Dilarim Nuclear Power Station	203	YEAR	SEQUENTIAL NUMBER	REV N0.				
right Nuclear rower Station	050002	290	2016	005	00			

Page 2 of 5

NARRATIVE

BACKGROUND

Cape Cod Bay is the Ultimate Heat Sink (UHS) for PNPS. The circulating water system and the Salt Service Water (SSW) system take sea water from Cape Cod Bay via the plant intake canal and intake structure and provide cooling water for various plant heat loads. These systems discharge the heated cooling water back into Cape Cod Bay via system discharge piping and the plant discharge canal. The safety objective of the SSW system is to provide a heat sink for the Reactor Building Closed Cooling Water (RBCCW) system under normal, transient, and accident conditions. The SSW system has five SSW pumps and is designed with sufficient redundancy so that no single active system component failure can prevent the system from achieving the safety objective. The system is designed to continuously provide a supply of cooling water to the secondary side of the RBCCW heat exchangers adequate to meet the requirements of the RBCCW system under all conditions. The RBCCW system provides the necessary cooling requirements for the Residual Heat Removal (RHR) system and ultimately the reactor and primary containment.

The SSW pumps are separated into two loops. Two pumps are connected to each loop and the fifth pump can feed either loop. Initiation of standby AC power following loss of the preferred AC power source will automatically start at least one pump in each loop during normal conditions. Following a Loss of Coolant Accident (LOCA) and loss-of-offsite power, one pump will start in each loop because of diesel load limitations. Additional pumps are started manually by the operator as additional cooling loads are established and diesel capacity is available.

Technical Specification (TS) Limiting Condition For Operation (LCO) 3.5.B.4 requires that two SSW subsystems shall be operable whenever irradiated fuel is in the reactor vessel, reactor coolant temperature is greater than 212 degrees F and prior to startup from a cold condition. A subsystem is considered OPERABLE when it has an OPERABLE UHS and two OPERABLE pumps with associated controls and instrumentation. The OPERABILITY of the UHS is based on having a minimum water level in the pump well of the intake structure of greater than13 ft. 9 in. below mean sea level and a maximum water temperature of 75 degrees F.

One of the TS Surveillance Requirements for the SSW System is 4.5.B.4.2 which is to verify the average sea water temperature is less than or equal to 75 degrees F every 24 hours.

If the UHS is inoperable, the unit must be placed in a MODE in which the Specification does not apply. To achieve this status, the unit must be in Cold Shutdown within 24 hours. The allowed completion times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

EVENT DESCRIPTION

On August 15, 2016 at 1552 EDT, with the reactor at about 70 percent core thermal power (CTP), Pilgrim Nuclear Power Station (PNPS) declared the ultimate heat sink (UHS) and salt service water (SSW) system inoperable due to high sea water inlet temperatures greater than 75 degrees F. PNPS had already taken action, in accordance with plant procedures, to reduce power from 100 percent in an effort to keep from exceeding the Technical Specification (TS) Limit. PNPS entered a 24-hour shutdown Limiting Condition for

NRC FORM 366 U.S. NUCLEAR REGULA	U.S. NUCLEAR REGULATORY COMMISSION			APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2018				
(11-2015) LICENSEE EVENT (LER) CONTI SHEET	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 FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet 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. DOCKET NUMBER		3. LER NUMBER					
Dilgrim Nuclear Dowar Station	05000	202	YEAR	SEQUENTIAL NUMBER	REV N0.			
Fight Nuclear Fower Station	050002	290	2016	005	00			

Page 3 of 5

NARRATIVE

Operation Action Statement (LCO-AS) for Salt Service Water (SSW) inlet temperature exceeding the TS limit in TS 3.5.B.4. The LCO-AS was subsequently exited at 1651 hours when the temperature of SSW trended to below the TS limit.

Under certain design conditions, the SSW system is required to provide cooling water to various heat exchangers such as the Reactor Building Closed Cooling Water (RBCCW) and Turbine Building Closed Cooling Water (TBCCW) systems. When the inlet temperature to these supplied loads exceeds the 75 degree F limit established in the TS, the SSW system is conservatively declared inoperable until the temperature trends below this value. On August 16, 2016 this condition existed for 59 minutes with the maximum temperature documented at 75.1 degrees F.

CAUSE OF THE EVENT

The cause of the sea water inlet temperature exceeding the 75 degree F TS criterion was sustained increased sea water surface temperature in Cape Cod Bay due to summer weather conditions and recirculation of water from the plant's discharge due to wind and tidal conditions.

The lack of margin available between the possible maximum sea water temperature and the design analytical limit influenced the plant's response. The possibility that both loops of containment cooling might be declared inoperable because of high UHS temperature was recognized when the 75 degree F Technical Specification limit was established in 1997. However, at that time based on historical temperature data and knowledge of the behavioral characteristics of the bay and local meteorology, it was considered highly improbable that the plant would ever be shut down because of high UHS temperature with the limit set at 75 degrees F. On these bases, the UHS temperature limit of 75 degrees F was considered acceptable.

CORRECTIVE ACTIONS

To increase the margin between the Salt Service Water (SSW) design basis inlet temperature and expected environmental operating conditions an engineering evaluation that supports increasing the margin between the Salt Service Water (SSW) design basis inlet temperature and expected environmental operating conditions is being performed. Appropriate regulatory actions will be taken based on the results of that evaluation.

As an interim action, procedural enhancements to deal with elevated salt service water temperature will be implemented.

Additional corrective actions will be implemented as necessary within the corrective action program.

SAFETY CONSEQUENCES

						¥		
NRC FORM 366	U.S. NUCLEAR REGULAT	FORY COMMISSION	APPROVED BY O	MB: NO. 315	0-0104	EXPIRES: 10/31/2018		
(11-2015)	LICENSEE EVENT (LER) CONTIN SHEET	Estimated burden p lessons learned a comments regardin F53), U.S. Nuclean Infocolects. Resourt NEOB-10202, (315 used to impose an NRC may not cor collection.		stimated burden per response to comply with this mandatory collection request: 80 hours. Reported ssons learned are incorporated into the licensing process and fed back to industry. Send proments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to focollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, EOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means sed to impose an information collection does not display a currently valid OMB control number, the RC may not conduct or sponsor, and a person is not required to respond to, the information ollection.				
1. FACILITY NAME		2. DOCKET NUMBER		3. LER NUI	3. LER NUMBER			
Pilgrim Nuclear Power Station		05000	202	YEAR	SEQUENTIAL NUMBER	REV NO.		
		050002	280	2016	005	00		

Page 4 of 5

NARRATIVE

There were no consequences to the general safety of the public, nuclear safety, industrial safety, and radiological safety due to this event.

The safety function of the SSW System is to transfer heat from all systems and components cooled by the Reactor Building Closed Cooling Water (RBCCW) System to Cape Cod Bay. The SSW System provides a continuous supply of cooling water to the secondary side of the RBCCW heat exchangers under normal, shutdown, transient, and accident conditions. Design and accident analyses for the station have been performed with the assumption that the SSW inlet temperature would average 75 degrees F maximum. Increased SSW inlet temperatures reduce the ability of the SSW System to remove heat from the RBCCW System.

Following an event in 2013 where SSW inlet temperature exceeded 75 degrees F, an engineering evaluation was performed to address the consequences of the temperature excursion and to determine whether the safety function would still have been fulfilled. This evaluation assumed an event where the SSW inlet temperature exceeded 75 degrees F and remained less than 78 degrees F for short durations, with the 12-hour rolling average less than 75 degrees F. This evaluation concluded that all systems, structures, and components would be capable of performing their safety functions under the assumed conditions. The temperature excursion that occurred on August 15, 2016 is bounded by that evaluation. Accordingly, the safety function of the Salt Service Water System would have been satisfied based on the maximum temperature recorded and the short duration of the excursion.

There was no adverse impact on the public health or safety.

REPORTABILITY

This event is reportable under 10 CFR 50.73(a)(2)(v)(B) and 10 CFR50.73(a)(2)(v)(D), Event or Condition that Could Have Prevented Fulfillment of a Safety Function.

PREVIOUS EVENTS

LERs for the previous ten years were reviewed for UHS and SSW Pumps being inoperable. These LERs are summarized as follows:

LER 2015-006 - Ultimate Heat Sink and Salt Service Water System Declared Inoperable

LER 2013-007 - Ultimate Heat Sink and Salt Service Water System Declared Inoperable

	_				Page 5 of 5	
NRC FORM 366 (11-2015) LICENSEE EVENT (LER) CONTIN	TORY COMMISSION REPORT NUATION	APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2018 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 FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Officer 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				
SHEET		collection.				
1. FACILITY NAME	2. DOCKET N	UMBER		3. LER NUN	IBER	
Pilgrim Nuclear Power Station	05000293		YEAR	NUMBER	N0.	
			2010	005		
	ION SYSTEM (E	IIS) CODES		- f-ll		
	i Systems referen	icea in this rep		IS TOHOWS:		
STSTEMS	,	(JODE2			
Ultimate Heat Sink (UHS) System (C	Cape Cod Bay)		BS			
REFERENCES:						
1) Pilgrim Nuclear Power St Declared Inoperable, date	ation LER 2013-0 ed 9/13/2013 (NR	007, Ultimate I C Accession	Heat Sink No. ML1:	c and Salt Servi 3266A242)	ce Water System	
2) Pilgrim Nuclear Power St Declared Inoperable, date	ation LER 2015-0 ed 10/7/2015 (NR	06, Ultimate I C Accession	Heat Sink No. ML1	(and Salt Servi 5289A231),	ce Water System	
· · · · · · · · · · · · · · · · · · ·						
		,				
X						