NRC-00-049

Wisconsin Public Service Corporation
(a subsidiary of WPS Resources Corporation)
Kewaunee Nuclear Power Plant
North 490, Highway 42
Kewaunee, WI 54216-9511
920-388-2560

June 19, 2000

10 CFR 50.73

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

Ladies/Gentlemen:

Docket 50-305
Operating License DPR-43
Kewaunee Nuclear Power Plant
Reportable Occurrence 2000-007-00

In accordance with the requirements of 10 CFR 50.73, "Licensee Event Report System," the attached Licensee Event Report (LER) for reportable occurrence 2000-007-00 is being submitted.

Sincerely,

for Mark L. Marchi
Vice President-Nuclear

JJP/jmf

Attach.

cc - INPO Records Center
US NRC Senior Resident Inspector
US NRC, Region III

RGM-001

IE22

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

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

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

Estimated burden per response to comply with this mandatory information collection request: 50 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)
Kewaunee Nuclear Power Plant	05000305	1 OF 6

TITLE (4)

Alternate Service Water Supply Piping Obstructed

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
										05000
05	19	2000	2000	-- 007 --	00	06	19	2000	FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
POWER LEVEL (10)	000	20.2201(b)	20.2203(a)(2)(v)	50.73(a)(2)(i)	50.73(a)(2)(viii)
		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)

NAME	TELEPHONE NUMBER (Include Area Code)
Jim Peterson Group Leader-Engineering Support	(920) 388-8465

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)

During a routine inspection on May 19, 2000 at about 1400, while the plant was in the refueling shutdown mode, contracted divers determined that a 30 inch diameter circulating water recirculation line was obstructed with silt and debris. The line was plugged for most of the 200 foot length up to the valve that isolates the forebay. Approximately 40 feet of pipe downstream of the valve was partially blocked. The line had been designated as an alternate supply to the service water pumps should the main intake system become completely plugged. The safety consequences of this event are minimal because complete failure of the intake system is not credible.

The line was cleaned and returned to service at 1600 on May 31, 2000, before returning the plant to service following the 2000 refueling outage. A design change that will prevent debris from entering the recirculation line has been installed. The procedure that governs underwater inspections will be modified to require periodic inspection of the line.

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
Kewaunee Nuclear Power Plant	05000305	2000	007	00	2 OF 6

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

DESCRIPTION OF EVENT

During a routine inspection on May 19, 2000 at about 1400, while the plant was in the refueling shutdown mode, contracted divers determined that a 30 inch diameter circulating water [KE] recirculation line was obstructed with silt and debris. The line was plugged for most of its 200 foot length up to its isolation valve [ISV]. Approximately 40 feet of pipe downstream of the valve was partially blocked. The line had been designated as an alternate supply to the service water pumps should the main intake system become completely plugged.

During the 2000 refueling outage, a contracted diving service was scheduled to inspect the 30 inch pipe that runs from the circulating water (CW) system discharge structure [NN] to the circulating water Forebay. The inspection was conducted as part of a routine bio-fouling inspection. Kewaunee has always had an underwater inspection program. The program was expanded in 1990 in response to Generic Letter 89-13, however the program has never required inspection of the entire length of the recirculation line.

Upon entering the 200 foot long pipe the divers noted approximately 3 inches of silt on the bottom of the pipe. The layer of silt tapered towards the top of the pipe. At a distance of approximately 35 feet into the pipe, it was nearly completely blocked. Divers began cleaning the pipe on Saturday, May 20, 2000. As the cleaning operation progressed it was found that approximately 165 feet of the 200 foot long pipe was completely blocked and had been incapable of delivering water to the forebay. The pipe was cleaned up to valve CW-500, a manual, locked open valve located where the pipe enters the forebay. Valve CW-500 was removed and reconditioned. The remaining forty foot distribution sparger that extends into the forebay was also cleaned. The forty foot distribution sparger was found only partially blocked. Valve CW-500 was reinstalled and the line was returned to service at approximately 1600 on May 31, 2000.

Debris in the pipe was determined to be mostly silt, gravel, and drift wood. It was not possible to determine exactly how long the pipe had been completely blocked. The extent of the blockage suggests the blockage has existed for several years.

The recirc line was originally designed to admit warmed circulating water discharge to the intake stream in order to help prevent ice formation on the traveling water screens [SCN] during winter operation. In 1972, in response to a question from the Atomic Energy Commission, the line was designated an alternate water supply to the service water pumps [P]. The purpose of providing an alternate water supply was to ensure service water pump suction if the 10 foot diameter circulating water intake conduit became completely obstructed. Blockage of the 30 inch Recirculation line is in conflict with the 1972 commitment and Kewaunee's Updated Safety Analysis Report (USAR) because the line was unable to serve as an alternate service water supply.

CAUSE OF THE EVENT

This event occurred because a periodic inspection of the pipe interior is not performed. The line was not included in the periodic forebay inspection because the USAR assumption requiring its operability was previously unrecognized. As a result, the build up of debris in the piping went undetected.

Debris entered the line from the circulating water discharge. The largest debris consisted of rocks approximately six inches in diameter and pieces of wood up to eight inches in diameter and 5 – 6 feet long. The debris became lodged at various locations in the pipe and allowed silt to gradually build up around it. The silt build up trapped other debris, which in turn promoted further silt build up. It appears this cycle continued until the pipe became almost completely blocked.

An under water inspection of the forebay is performed under procedure PMP 04-01, Circulating Water System Inlet Structure Inspection. Step 4.2.4 of that procedure directs external inspection of the sparger portion of the pipe (approximately 40 feet of slotted pipe that extends into the forebay) downstream of valve CW-500. The forebay inspection has been conducted during refueling outages for many years, however it was only recently recognized that the upstream portion of the pipe could be obstructed without visible indication at the sparger outlet. In January of 2000 Operations Department issued Work Order 00-000350-000, requesting the entire length of the pipe interior be inspected during the 2000 refueling outage. The request was made when the USAR assumption that the line would be available was recognized.

ANALYSIS OF THE EVENT

This event is being reported under 10CFR50.73(a)(2)(ii)(B), "any event or condition that resulted in the condition of the nuclear power plant, including its principal safety barriers, being seriously degraded, or that resulted in the nuclear power plant being: in a condition that was outside the design basis of the plant."

The blocked 30 inch recirculation pipe was originally designed to admit warmed discharge water to the intake stream to help prevent ice formation on the traveling water screens. The piping includes a manually operated 30 inch butterfly valve (CW-500) that could be closed to isolate warm water recirculation during the summer months. Isolating warm water from the intake stream will lower intake water temperature slightly, and improve the heat removal capability of the Service Water (SW) System.

In 1972 Kewaunee committed to installation of a low - low forebay level circulating water pump trip system and to changing valve CW-500 to a locked open valve. The commitment was made in response to questions posed by the Atomic Energy Commission. The specific questions could not be located, however correspondence indicates the actions were taken to address a concern that the three normal circulating water intakes and the two auxiliary service water intakes could simultaneously become blocked. In the event that water would be unable to enter the forebay through the 10 foot diameter circulating water intake pipe, the 30 inch recirculation pipe would supply the service water pumps with enough water to satisfy post-accident demand.

The safety consequences of this event are minimal because complete blockage of the 10 foot diameter intake conduit is not considered credible. The main intake consists of three 22 foot diameter inverted cones that transition to a common 10 foot diameter coated steel intake pipe. The 10 foot diameter pipe includes two 30 inch diameter tees that serve as auxiliary service water intakes if the three main intake cones become blocked. Each of the auxiliary service water intakes provides sufficient capacity to support service water system demand. The auxiliary service water intakes are located 50 feet and 100 feet downstream of the three main intake structures. All five intakes are about 18 feet below lake level at the high water mark. The shallow water renders them inaccessible to typical Great Lakes freighters. A shallow draft flat bottom barge could navigate to the intake structure, but could not block all of them. According to Kewaunee's Updated Safety Analysis Report (USAR) Section 10.2, page 10.2-13, the five

intakes on the 10 foot diameter conduit are arranged such that the largest lake barge could not simultaneously block all five intake ports.

The 10 foot diameter intake conduit is buried in the lake bed. It is covered for its entire length by at least three feet of compacted backfill material. The entire intake system is constructed to class I standards. The intake system is designed to survive a design basis seismic event of 0.12g. The entire Circulating Water System will survive an earthquake that generates 0.41g ground acceleration. Based on the Seismic Hazard Curve for the Kewaunee Nuclear Power Plant Site, the mean probability of exceedance for this magnitude of event is 1.14 E – 5/yr.

Kewaunee has experienced restriction of the intake by frazil and anchor ice formation at least 15 times in the past. None of these events has threatened to completely block the intake. Procedure refinements based on those experiences have proven effective in preserving flow through the main conduit. There is no indication that the ability to maintain required flow to the service water pumps through the 10 foot conduit has ever been challenged.

CORRECTIVE ACTIONS

Completed Corrective Actions

The 30 inch recirculation line was cleared of debris and valve CW-500 was refurbished prior to plant start up.

Design Change, DCR 3168, was installed after determining the nature of the pipe blockage. The design change made two modifications to minimize future pipe blockage. The ¾ inch wide slots in the sparger end of the pipe were enlarged to 1½ inches. The wider slots will allow any larger debris carried to the dead leg portion of the pipe to fall through into the forebay rather than block the sparger ports. Also, a bar grate was added to the inlet of the line to keep larger debris from entering. The grate is expected to be self cleaning, however the design includes a manual rake type cleaner that can be operated from above water. Both of these modifications were made prior to returning the line to service.

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
Kewaunee Nuclear Power Plant	05000305	2000	007	00	6 OF 6

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

Planned Corrective Action

Procedure PMP 04-01 will be revised to specifically require periodic inspection of the interior of the 30 inch recirculation piping. This revision will be completed before the next scheduled refueling outage.

ADDITIONAL INFORMATION

Based on this investigation, it appears the complete failure of the 10 foot diameter intake conduit is outside the design basis of the plant. If it is confirmed that Kewaunee's design meets the specifications of Regulatory Guide 1.27 (Ultimate Heat Sink For Nuclear Power Plants), Kewaunee intends to pursue a change to the portion of the 1972 commitment that requires the 30 inch recirculation line be considered an alternate service water supply.

SIMILAR EVENTS

No evidence of previous similar events was noted.