

# WOLF CREEK

NUCLEAR OPERATING CORPORATION

Otto L. Maynard  
Vice President Plant Operations

February 28, 1996

WO 96-0029

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
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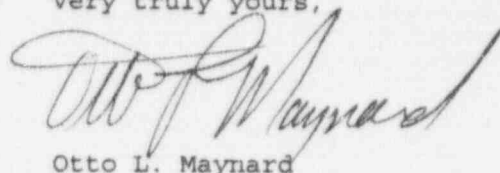
Subject: Docket No. 50-482: Licensee Event Report 96-001-00

Gentlemen:

The attached Licensee Event Report is being submitted pursuant to 10 CFR 50.73 (a) (2) (iv) concerning an Engineered Safety Features actuation and 10 CFR 50.73 (a) (2) (i) (B) for a violation of Technical Specifications. Both incidents are part of the same event and are therefore being documented in one report.

If you should have any questions regarding this submittal, please contact me at (316) 364-8831 extension 4450, or William M. Lindsay at extension 8760.

Very truly yours,



Otto L. Maynard

OLM/jad

Attachment

cc: L. J. Callan (NRC), w/a  
W. D. Johnson (NRC), w/a  
J. F. Ringwald (NRC), w/a  
J. C. Stone (NRC), w/a

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## LICENSEE EVENT REPORT (LER)

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

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), 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.

FACILITY NAME (1)

WOLF CREEK GENERATING STATION

DOCKET NUMBER (2)

05000482

PAGE (3)

1 OF 12

TITLE (4)

Loss of Circulating Water Due to Icing on Traveling Screens Causes Reactor Trip

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
01	30	96	96	001	00	02	28	96	FACILITY NAME	DOCKET NUMBER
OPERATING			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more) (11)							
1			20.402(b)		20.405(c)		x		50.73(a)(2)(iv)	73.71(b)
POWER			20.405(a)(1)(i)		50.36(c)(1)				50.73(a)(2)(v)	73.71(c)
98.3%			20.405(a)(1)(ii)		50.36(c)(2)				50.73(a)(2)(vii)	OTHER
			20.405(a)(1)(iii)		x 50.73(a)(2)(i)				50.73(a)(2)(viii)(A)	
			20.405(a)(1)(iv)		50.73(a)(2)(ii)				50.73(a)(2)(viii)(B)	
			20.405(a)(1)(v)		50.73(a)(2)(iii)				50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME

William M. Lindsay  
Manager Performance Assessment

TELEPHONE NUMBER (Include Area Code)

316-364-8831

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS
C	KE	SCRN	N/A	N/A					
D	BA	P	I-RAND	YES					

SUPPLEMENTAL REPORT EXPECTED (14)

EXPECTED

MONTH

DAY

YEAR

YES

(If yes, completed EXPECTED SUBMISSION DATE)

X

NO

## ABSTRACT:

On January 30, 1996, at 0337 CST, operators in the Wolf Creek Generating Station (WCGS) Control Room manually tripped the reactor due to ice build-up on the Circulating Water (CW) system traveling screens. At the time of the reactor trip, all engineered safety features and the reactor protection system performed as expected except five control rods did not indicate full insertion into the reactor core. The Essential Service Water System (ESWS) train A was declared inoperable at 0747 CST, causing the A Motor Driven Auxiliary Feedwater Pump (MDAFWP) to be declared inoperable. The Turbine Driven Auxiliary Feedwater Pump (TDAFWP) auto-started as a result of the reactor trip, but was declared inoperable due to a packing leak at 0514 CST. With the TDAFWP and the A MDAFWP inoperable, Technical Specification 3.7.1.2.b requires the plant be in Hot Standby (MODE 3) in 6 hours and be in Hot Shutdown (MODE 4) within the following 6 hours. This requirement to be in MODE 4 was not met. The events surrounding the inoperability of ESWS Train A are detailed in LER 96-002-00.

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

**PLANT CONDITIONS AT THE TIME OF EVENT**

MODE: 1  
Power level: 98.3%  
RCS Temperature: 584.6° Fahrenheit (F)  
RCS Pressure: 2235 psig  
Wind Speed: 10-25 mph  
Lake Level: 1086.4  
Circulating Water Condenser Inlet Temperature: 32.4°F  
Outside Air Temperature: 7°F  
Dew Point: 1°F  
Wind Chill: -12°F to -33°F

The A and C Circulating Water (CW) pumps [KE-P] were running and the B CW pump was tagged out for preventive maintenance. The A and C Service Water (SW) pumps [KG-P] were supplying service water. The standby SW pump B was tagged out for maintenance. The standby low flow SW pump was available. The Circulating Water Screenhouse (CWSH) traveling screens [KE-SCN] were in manual operation on slow speed in accordance with procedure STN GP-001, "Plant Winterization."

**BASIS FOR REPORTABILITY**

On January 30, 1996, at 0337 CST, Wolf Creek Generating Station Control Room operators manually tripped the reactor [RCT] which resulted in actuation of the reactor protection system [JD] and multiple engineered safety features [JE]. The decision to trip the reactor was based on icing conditions on the traveling screens preventing flow to the circulating water pumps and inhibiting the supply of CW water to the condenser [KE-COND]. The Reactor Protection System and Engineered Safety Features actuations are reportable pursuant to 10 CFR 50.73 (a)(2)(iv).

The Turbine Driven Auxiliary Feedwater Pump (TDAFWP) [BA-P] auto-started as a result of the trip, but was declared inoperable at 0514 CST, due to a packing leak. The A Motor Driven Auxiliary Feedwater Pump (MDAFWP) [BA-P] was declared inoperable at 0747 CST, due to the A Essential Service Water System (ESWS) [BI] train being out of service. Operators entered Technical Specification 3.7.1.2, Action Statement "b", which requires the plant be in Hot Shutdown (MODE 4) within six hours (i.e., 1347 CST) of being in Hot Standby (MODE 3) when two of the three auxiliary feedwater pumps are inoperable. At approximately 1000 CST, the Manager Operations was informed that the six hour Limiting Condition for Operation (LCO) might be exceeded. The Vice President of Operations and NRC Resident Inspector were notified shortly thereafter.

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The operators were cautioned by the Manager Operations to reach Mode 4 safely and in a timely manner, and not rush to try and meet the LCO time requirement. The plant entered MODE 4 at 1531 CST. This is reportable as a Technical Specification violation, pursuant to 10 CFR 50.73 (a)(2)(i)(B). Refer to Root Cause for Missed Technical Specification Action Statement on page 10 for more information.

The icing conditions which affected the CW System also affected the ESWS and will be detailed in Licensee Event Report 96-002-00.

#### Background Information on the Circulating Water (CW) System

The CWSH has three suction bays which are physically separated by concrete walls. There are four 12" pipe sleeves which penetrate the walls that divide the A and B suction bays and the B and C suction bays. The level fluctuations in one bay are noticed to some degree in the others. (Refer to Figure One on Page 13)

Bar grate type trash racks [KE-RCK] are installed at the front of each suction bay. A solid apron plate is welded to the bar grates and extends from the top of the trash racks down to the 1075'-6" water level. The traveling screens are located 11'-2" from the trash racks.

A 42" CWSH keepwarm line routes some of the CW discharged from the plant to a header installed at the bottom of the CW bays, just in front of the trash racks. The warming line header in front of the trash racks has two discharge nozzles per traveling screen (12 total) for even distribution of flow. Per design criteria, the warming line is to maintain water temperature at a minimum of 34°F in the bays with lake temperature at 32°F. The warming line isolation valve, 1CW002, is to be either full open during winter or full closed during summer operation. The apron plate on the trash racks and the keep warm line are design features which are to prevent frazil ice formation on the trash racks and ice intrusion into the traveling screens.

The accumulation of frazil ice starts when the water becomes supercooled or drops below its freezing temperature. The water will supercool first at the surface, and when turbulence is present, will mix through the entire intake depth. Small crystals of ice - frazil ice - will be carried along with the supercooled water. Because the crystals are supercooled, and rapidly grow in size, they stick to any object they come into contact with, including trash racks (as long as these objects are at a temperature below freezing).



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The traveling screens consist of basket assemblies installed onto a carrier chain. When the traveling screens on the upstream side emerge from the water, they are backwashed by spray as they travel through the fiberglass enclosure on the operating deck. The traveling screens are located outside the enclosed portion of the CWSH. Spray wash water is supplied by SW at about 80 psi. The traveling screen drive motors are interlocked, so they will not energize unless a pressure switch is actuated just downstream of a pneumatically operated spray wash control valve. Each traveling screen backwash header is supplied by its own spray wash control valve.

The traveling screen wash system can operate in an automatic or manual mode. In the automatic mode, the traveling screen wash system is started by either a timer or on high differential bay level. Differential level for each bay is continuously plotted on chart recorders on the local traveling screen wash control panel.

The following are the differential level settings for the control system:

- 4" differential level: traveling screen slow speed wash cycle auto starts and a SLOW SCREEN WASH alarm annunciates locally and in the control room (CWSH SCREEN TROUBLE annunciator) indicating the traveling screens are operating in slow speed.
- 6" differential level: traveling screen fast speed wash cycle auto starts and a FAST SCREEN WASH alarm annunciates in the control room (CWSH SCREEN TROUBLE annunciator) and locally, indicating the traveling screens are operating in fast speed.
- 10" differential level: TRAVELING SCREEN BLOCKED and CWSH SCREEN TROUBLE alarms annunciate in the Control Room and locally.
- 60" differential level: TRAVELING SCREEN DP VERY HI alarm annunciates locally. TRAVELING SCREEN EMERGENCY and CWSH SCREEN TROUBLE alarms annunciate in the control room, CW pumps should be immediately de-energized at this point.
- 1075' elevation: BAY LEVEL LOW alarm annunciates locally. CWSH BAY 1(2)(3) EMERG annunciates in the Control Room.

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**DESCRIPTION OF EVENT**

On January 30, 1996, at 0149 CST, the WCGS Control Room received CWSH SCREEN TROUBLE and TRAVELING SCREEN BLOCKED alarms. The Site Watch was dispatched to investigate. The alarms indicated increased differential pressure across the traveling screens (lake level vs. bay level). At 0158 CST, the Control Room received a bay 1 screen emergency alarm. The Site Watch reported the traveling screens to bays 1 and 3 were frozen and not rotating. The Site Watch also reported that bay 1 and bay 3 levels were approximately 8 feet lower than the normal water mark which could be seen on the wall of the bay. The Control Room then received an "ELECTRIC FIRE PUMP 1FP01PA RUN" annunciator, indicating an auto-start of the electric fire pump [KF-P] due to low SW pressure. The B ESWS pump was started with the intent to separate the ESWS from the SW system. The Control Room noticed that the turbine lube oil temperature was 120°F and increasing as well as other components' temperatures that are cooled by service water. The Turbine Building Watch was dispatched to locally control affected temperatures.

After discussions with Electrical Maintenance, the B CW pump clearance order was removed, and the B CW pump and the low flow service water pump were started (The B CW pump had been tagged out of service for preventative maintenance). The A SW pump and the A CW pump were secured to help reduce the differential pressure across the CW traveling screen. Bay 1 level was nine feet low and decreasing. Prior to starting the B CW pump, the traveling screens were placed in manual fast speed to attempt to prevent them from freezing. Shortly after the swap from the A to B CW pumps, the Site Watch reported bay 2 traveling screens were frozen, and the bay 1 and bay 2 levels were decreasing.

At 0211 CST, the A ESWS pump was started intending to separate ESWS and SW System, such that SW System was supplying only the Turbine Building loads. At 0252 CST, Control Room operators noticed that condenser vacuum was decreasing and started all three condenser vacuum pumps. At 0256 CST, Control Room operators began inserting control rods. At 0300 the Site Watch was directed to throttle the B and C CW pump discharge valves to establish a discharge pressure of 27 psig to stop the bay levels from further decreasing. Control Room operators started reducing turbine load, as required by the Alarm Response Procedure for CW Bay Emergency. The Control Room received reports that the CW bay levels were stable at approximately 6 - 8 feet below normal and vacuum was recovering as the turbine load was reduced.

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At 0324 CST, the SS discussed plant status with the Control Room staff and the decision was made to trip the plant if CW bay levels decreased any further or any other plant problems arose. At 0337 CST, the Control Room received word from the Site Watch that the CW bay levels were down to 12-13 feet below normal and that the low flow SW pump was vibrating. Control Room operators manually tripped the reactor, secured CW pumps, broke condenser vacuum, fast-closed the MSIVs [SB-ISV] and controlled the reactor coolant system [AB] temperature with the steam generator atmospheric relief valves [SB-RV].

**Events occurring after the Reactor Trip**

After the trip, all engineered safety features systems and reactor protection systems functioned as expected with the exception of control rods H-2, F-6, K-10, K-6 and H-8, which failed to fully insert into the reactor core (Refer to Additional Information section on page 12 for more information).

At 0503 CST, while stabilizing the plant in MODE 3, the Control Room was notified that the TDAFWP was spraying water. At 0505 CST, the Turbine Building Watch reported to the Control Room that the TDAFWP shaft gland packing was leaking and notified Maintenance. At 0514 CST, the TDAFWP inboard seal packing was determined to have failed and the pump was declared inoperable. Steam generator water levels were being maintained by the two MDAFWPs. The packing was replaced and the TDAFWP was declared functional at 1411 CST, on January 30, 1996. The required surveillances for operability will be completed during start-up from Refuel VIII.

At 0747 CST, the Control Room entered the following Technical Specifications: 3.7.4 for an inoperable ESWS A train; 3.8.1.1 for an inoperable diesel generator due to the unavailability of the ESWS A train; and, 3.7.1.2 action statement "b" for two inoperable auxiliary feedwater pumps. The TDAFWP and the A Motor Driven Auxiliary Feedwater Pump (MDAFWP) were out of service. Technical Specification 3.7.1.2 Action Statement "b" was entered at 0747 CST, and requires that with two auxiliary feedwater pumps inoperable, the plant be in at least Hot Standby within the next 6 hours and in Hot Shutdown within the following 6 hours. The plant should have reached Hot Shutdown by 1347 CST, but did not make the MODE change until 1531. Refer to Root Cause for Missed Technical Specification Action Statement on page 10 for more information.

Also, at 0747 CST, the Control Room received a report that ice was developing in the A bay of ESWS. The A ESWS pump was secured due to low discharge pressure and high differential pressure across the strainer [BI-STR]. An administrative decision was made to declare a Notification of Unusual Event (NUE) and heighten plant staff awareness of the icing

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conditions in the ESWS bays. Further details on the NUE and the ESWS events that followed the reactor trip can be found in LER 96-002-00.

On January 30, 1996, at approximately 0530 CST, with all CW traveling screens and CW pumps secured, an inspection of the traveling screens was performed. As Maintenance personnel rotated the traveling screens to inspect for damage, a thick layer of ice was noticed packed on the traveling screens as they emerged from the water. The ice formed on the traveling screens in very thin scale-like pieces oriented mainly in a vertical direction and perpendicular to the traveling screen. The ice was densely packed onto the traveling screen.

During this inspection of the CWSH, the C SW pump and the electric motor driven fire protection pump were running. Levels had stabilized as soon as the CW pumps were secured. The SW and fire protection pumps running did not cause bay levels to drop.

Shear pins on the gear reducer drive chain sprocket for all six traveling screens failed during the event. Traveling screens A, C, and D incurred relatively minor damage. Some baskets were replaced on these traveling screens and they were returned to service by February 2, 1996. The B traveling screen frame was bent near the joint between the head section and the upper intermediate frame. The E and F traveling screens incurred substantial damage and could not be immediately repaired.

Diver inspections performed on February 1, 1996, in the outer bay between the traveling screens and trash racks indicated that the traveling screens were free of ice. The inspection for icing was performed just prior to commencing the air sparge. The air bubbler, (introducing air into the water) was implemented in accordance with Temporary Modification 96-009-ZC to prevent further ice build-up on the traveling screens.

**ROOT CAUSE**

**Circulating Water System**

The root cause of the event was that the design of the Circulating Water Intake Structure and associated traveling screens did not account for the harsh environmental conditions imposed on them during the events of January 30, 1996. A potential contributing factor to the event was the spraying of near freezing water onto the screens exposed to atmospheric conditions. This spray water caused an initial ice build-up on the screens, which grew when exposed to the water from the lake.



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**Detailed Evaluation**

**Warming line Flow**

The CWSH is provided with a 42" warming line supplied from the CW Discharge Header and routed to the area just in front of the structure's trash racks. During normal operation, the line delivers approximately 34,000 gpm of water heated 30°F above lake temperature, during 3 Circulating Water Pump operation, and approximately 30,000 gpm of water heated to 40°F above lake temperature, for two pump operation. The head pressure which drives the warming line flow is a factor of CW Discharge Weir water level. This level varies by less than 3' between 2 pump and 3 pump operation. Thus, the change in warming line flow between 2 and 3 pumps is relatively minor. Since throttling of the CW pump discharge valves to prevent pump runout does not reduce the weir level by any significant amount, this practice actually helps increase the heat input to the bay by increasing the condenser outlet temperature even more. Heat balance calculations show that there is sufficient warming line heat input to prevent frazil ice during either mode of Circulating Water Pump operation with the plant on-line. These calculations were verified by measuring the warming line flow rate during two pump operation using an ultrasonic flow meter. The lack of any substantial build-up of ice on the trash racks also indicates that the warming line's design is adequate.

**Traveling Screen Operation**

The CW traveling screens are a series of stainless steel wire mesh basket assemblies with 3/8" openings. The screens are chain driven by a two speed motor (1800/450 RPM). In the slow speed operation (whether manual or automatic), 1 complete basket cycle takes 36 minutes. In fast speed operation (whether manual or automatic) 1 complete cycle takes 9 minutes.

While in manual slow speed operation, as procedurally required, the screens are exposed to the atmospheric conditions for approximately 7 minutes during the 36 minute cycle. While exposed to the atmosphere, the screens are backwashed by sprays supplied by SW at approximately 80 psi. This spray, when exposed to the atmospheric conditions present on January 30, 1996, caused an initial ice build-up on the steel mesh. As the traveling screens continued through their cycle, they were exposed to the water coming into the CW Bay. This incoming water was believed to be warmed sufficiently to prevent ice buildup on the trash racks in front of the screens, yet near enough to freezing that the initial ice build-up caused a rapid growth of ice to block the screens completely.

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**CORRECTIVE ACTIONS**

**Circulating Water Screenhouse**

**Corrective Actions Completed:**

Procedures SYS SW-121, "Circ Water Screen Wash System," and STN GP-001, "Plant Winterization," were revised on February 6, 1996, to delete the requirement to operate traveling screens continuously in the slow manual mode during cold weather or unusual icing conditions. These revisions allow the screens to be operated in an automatic mode in which the screens remain stationary without sprays until the system is started either by timer or on high differential level. The automatic mode will cycle the screens through two-thirds of one complete cycle before stopping, providing there is no high differential level still present across the screens. The screens will be automatically started again by either the timer or a high differential level. This mode of operation is recommended by Engineering when icing conditions are present. The winterization procedure previously had the screens started in slow, as a conservative action, during cold weather in anticipation of surface icing or of moss or other aquatic vegetation floating into the screens.

**Long Term Corrective Actions**

The traveling screens will be enclosed in a heated environment. This modification will be completed by October 1, 1996.

**Root Cause**

**Missed Technical Specification Action Statement**

Technical Specification 3.7.1.2, Action Statement "b", requires that, with two auxiliary feedwater pumps inoperable, the plant be in at least Hot Standby (MODE 3) within the next 6 hours and in Hot Shutdown (MODE 4) within the following 6 hours. This Technical Specification is applicable in MODES 1, 2, and 3.

The TDAFWP was declared inoperable at 0514 CST, on January 30, 1996, due to a packing leak, and the A MDAFWP was declared inoperable at 0747 CST, that same day, based on the A ESWS train being out of service.

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The root cause for late entry into MODE 4 was the amount of time it took to complete procedure, GEN 00-005, "Plant Ops from 20% Min Load to Hot Standby," Attachment "A" before a cooldown of the plant could begin. Many of the steps contained in Attachment "A" could have been delayed or GEN 00-006, "Hot Standby to Cold Shutdown," could have been performed concurrently with GEN 00-005 in order to begin the cooldown in a more timely manner.

**Contributing Factors:**

There are various reasons which contributed to the late entry into MODE 4:

1. This is the first time WCGS has had to perform a rapid cooldown to Mode 4. While the simulator training the operators received helped prepare them for this evolution, certain unanticipated conditions existed (e.g., loss of circulating water, one train of ESW, loss of the TDAFWP) and slowed the process.
2. The procedure did not provide guidance on which steps are required to be performed and which steps can be delayed for the purpose of a rapid cooldown.
3. Adherence to procedures is management's expectation and focused the Operator on ensuring every step of the procedure was completed.

**CORRECTIVE ACTIONS**

**Technical Specification Action Statement Not Met**

Guidance on which steps are mandatory and which actions may be delayed in an accelerated shutdown condition will be provided in appropriate operating procedures. This corrective action will be completed by the end of Refuel VIII.

Simulator training will be conducted to provide the operating crews with the opportunity to operate under conditions which require a forced cooldown in 6 hours. This training will be completed by the end of the third training cycle following Refuel VIII.

**SAFETY SIGNIFICANCE**

The CW and SW systems are not safety-related systems. They provide a source of heat rejection for plant auxiliary systems which require cooling during normal plant operation and normal plant shutdown. The systems also supply cooling water to the safety-related ESWs during normal operation.

**LICENSEE EVENT REPORT (LER)**  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), 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.

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

During this event, the A ESWS train experienced icing conditions on its trash racks, which caused it to be declared inoperable. More detail on the ESWS event can be found in LER 96-002-00.

Previous similar occurrences

Licensee Event Report 85-069-00 details an event involving high differential pressure across the traveling screens. Strong south winds blew dead pondweed growth into the traveling screens. The traveling screen wash control system malfunctioned and the traveling screens failed to backwash. Some of the traveling screens collapsed and a controlled shutdown was commenced. There have been no previous events due to icing conditions.

Additional Information

After the trip, all systems functioned as expected with the exception of control rods in core locations H-2, F-6, K-10, K-6 and H-8, which failed to fully insert immediately into the core. A review of the computer data captured from the Digital Rod Position Indicator (DRPI) system indicates that the first position at which the control rods stopped was H-2 at 30 steps, F-6 at 18 steps, K-10 at 12 steps, K-6 at 18 steps and H-8 at 18 steps.

The fuel assemblies under the subject control rods were all from Region 8 of the core, and were initially inserted into the reactor for Cycle 6. These fuel assemblies are of the Westinghouse V5H fuel design. These fuel assemblies were examined for fuel rod defects by ultrasonic testing at the end of Cycle 6 and 7. No defects were identified. Four of the control rods absorber material were made of Silver/Indium/Cadmium and one was made of Hafnium (location H-2). The hafnium control rod that did not fully insert is scheduled for discharge during Refueling Outage VIII.

The control rods reached the bottom of their travel after a short period of time, with the last rod indicating fully inserted approximately one hour and 20 minutes after the trip. Rod drop testing was performed on February 2-3, 1996. Preliminary results from these tests indicate that only control rods in high burnup regions of the core are experiencing insertion problems. The data from these tests is being analyzed as part of WCNOC's continuing investigation efforts. Further testing is scheduled to occur after all fuel assemblies are offloaded from the core.



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**FIGURE 1**

**Circulating Water System Diagram**

