



Commonwealth Edison
Byron Nuclear Station
4450 North German Church Road
Byron, Illinois 61010

February 26, 1993

Ltr: BYRON 93-0095

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

Dear Sir:

The enclosed Licensee Event Report from Byron Generating Station is being transmitted to you in accordance with the requirements of 10CFR50.73(a)(2)(v).

This report is number 93-001; Docket No. 50-454.

Sincerely,


G.K. Schwartz
Station Manager

Byron Nuclear Power Station

GKS/LL/ljf

Enclosure: Licensee Event Report No. 93-001

cc: A. Bert Davis, NRC Region III Administrator
NRC Senior Resident Inspector
INPO Record Center
CECo Distribution List

090097

(0982R/VS/021893/6)
9303100192 930301
PDR ADOCK 05000454
S PDR

Handwritten initials/signature

LER Number
454: 93-001

Title of Event: Low Temperature Overpressure Protection

Occurred: 2-1-93 / 15:30
Date Time

Acceptance by Station Review:

W. Koulm , 2/23/93
OE Date

John Lane , 2/26/93
TSS Date

D. Brumby , 2/19/93
RAS Date

_____, _____
OTHER Date

Approved by: G. K. Schwartz , 3/1/93
Station Manager Date

APPROVED

(Final)

JAN 28 1993

LICENSEE EVENT REPORT (LER)

Form Rev 2.0

Facility Name (1) Byron, Unit 1										Docket Number (2) 0 5 0 0 0 4 5 4				Page (3) 1 of 5				
Title (4) Low Temperature Overpressure Protection																		
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 Names			Docket Number(s)				
0 2	0 1	9 3	9 3	---	0 0 1	---	0 0				Byron Unit 2			0 5 0 0 0 4 5 5				
OPERATING MODE (9)			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)															
POWER LEVEL (10) 0 8 5			20.402(b)				20.405(c)				50.73(a)(2)(iv)				73.71(b)			
			20.405(a)(1)(i)				50.36(c)(1)				<input checked="" type="checkbox"/> 50.73(a)(2)(v)				73.71(c)			
			20.405(a)(1)(ii)				50.36(c)(2)				50.73(a)(2)(vii)				Other (Specify			
			20.405(a)(1)(iii)				50.73(a)(2)(i)				50.73(a)(2)(viii)(A)				in Abstract			
			20.405(a)(1)(iv)				50.73(a)(2)(ii)				50.73(a)(2)(viii)(B)				below and in			
			20.405(a)(1)(v)				50.73(a)(2)(iii)				50.73(a)(2)(x)				Text)			
LICENSEE CONTACT FOR THIS LER (12)																		
Name L. Lahti, Regulatory Assurance										Ext. 2852				TELEPHONE NUMBER				
										AREA CODE		8 1 5 2 3 4 - 5 4 4 1						
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																		
CAUSE	SYSTEM	COMPONENT	MANUFAC- TURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFAC- TURER	REPORTABLE TO NPRDS								
				N														
SUPPLEMENTAL REPORT EXPECTED (14)												Expected Submission Date (15)		Month Day Year				
Yes (If yes, complete EXPECTED SUBMISSION DATE)										<input checked="" type="checkbox"/> NO								
ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)																		

On 12/09/92, Byron Station reviewed Nuclear Network OE 5691 and a related Nuclear Network plant status item through the Operating Experience (OPEX) Program. Station personnel determined that concerns with the Low Temperature Overpressure Protection System (LTOPS) setpoints used in the Technical Specifications and in implementing use of the 10CFR50, Appendix G limits were applicable. The nonconservatism, which occurs when the reactor coolant pumps are running, relates to the pressure difference that may exist between the wide-range pressure transmitters and the pressure corresponding to the reactor vessel location where the heatup and cooldown curves are calculated. Westinghouse did not take this pressure difference into consideration while preparing Byron's curves.

A determination was made that the reactor vessels were operable and that the heatup/cooldown curves may be used with compensatory actions.

The event was caused by a deficiency in Westinghouse's analysis that was used to determine the LTOP setpoints and the licensing bases.

The condition was identified previously by two other stations. CECo has determined that this is a concern at Byron, Braidwood and Zion.

This event is reportable pursuant to 10CFR50.73(a)(2)(v), any event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION												Form Rev 2.0	
FACILITY NAME (1)		DOCKET NUMBER (2)				LER NUMBER (6)				Page (3)			
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Byron, Unit 1		0 5 0 0 0 4 5 4				9 3	-	0 0 1	-	0 0	12 OF 15		
TEXT Energy Industry Identification System (EIIS) codes are identified in the text as [XX]													

A. PLANT CONDITIONS PRIOR TO EVENT:

Event Date/Time 020193 / 1530

Unit 1 MODE 1 - Power Operation Rx Power 85% RCS [AB] Temperature/Pressure Normal Operating

Unit 2 MODE 1 - Power Operation Rx Power 99% RCS [AB] Temperature/Pressure Normal Operating

B. DESCRIPTION OF EVENT:

On 12/09/92, Byron Station reviewed Nuclear Network OE 5691 (dated 11/24/92) and a related Nuclear Network plant status item (dated 12/2/92) through the Operating Experience (OPEX) Program. Station personnel determined that Byron could have a problem similar to that described in OE 5691. The concern involved a potential nonconservatism in determining Low Temperature Overpressure Protection System (LTOPS) setpoints used in the Technical Specifications, and in implementing use of the 10CFR50 Appendix G limits.

The identified nonconservatism, which applies when the reactor coolant pumps are running, relates to the pressure difference that may exist between the wide-range pressure transmitters (PT-403, 405, 406 and 407) and the pressure corresponding to the reactor vessel location where the heatup and cooldown curves are calculated. Westinghouse performed the LTOPS setpoint determination for Byron. Correspondence from Westinghouse indicates the following:

1. Setpoint methodology utilized does not account for this pressure difference.
2. The nonconservatism is generic in nature and could be applicable to all Westinghouse plants for which Westinghouse has performed the LTOPS setpoints analysis/evaluations.
3. The pressure difference is dependent on the number of reactor coolant pumps (RCPs) in operation. A pressure difference between the wide-range pressure transmitters and the core mid-plane elevation of the reactor vessel inner wall of as much as 50 psig may exist for 4 RCPs in operation.

At the time that the potential nonconservatism was identified, neither unit was in a condition that required the LTOP system to be operable. As a short term compensatory action, administrative controls were established to operate at least 50 psig below the heatup/cooldown curves.

Conference calls that included Byron, Braidwood, Zion, and the Nuclear Engineering Department (NED) were held to discuss operability and reportability, and to develop an action plan. It was determined that this problem poses a concern during water solid conditions at temperatures below the LTOP enable temperature, and during operation while using the heatup/cooldown curves in the Technical Specifications. There was also a concern with the operability of the reactor vessel based on past operation. The LTOP/COMS (cold overpressure mitigation system), pressurizer power operated relief valves (PORVs) and reactor vessel were all determined to be operable with compensatory actions required under certain conditions. Furthermore, Westinghouse has indicated that past operation of the reactor vessel with an overshoot of the Appendix G limits of at least 100 psig will have no adverse effects on the integrity of the reactor vessel. These findings are documented in ENC-QE-40.1, "Operability Determination Checklist".

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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				Number		Number		
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TEXT Energy Industry Identification System (EIIS) codes are identified in the text as [XX]

B. DESCRIPTION OF EVENT: (Cont)

On February 1, 1993 at 1455, it was determined that past operation within the Technical Specification heatup/cooldown curves could have exceeded the Appendix G limits due to the nonconservatism. Therefore, this could have prevented the system's fulfillment of the safety function needed to mitigate the consequences of an accident. The condition was determined to be reportable under the provisions of 10CFR50.72(b)(2)(iii)(D). At 1530, CECO notified the NRC resident inspector of the condition. An NRC red phone call followed at 1636.

The following compensatory or mitigating conditions are required to support the operability of Byron Units 1 and 2 to assure the validity of the heatup/cooldown curves for all modes, and to assure that the LTOPS will be operable during water solid conditions in Modes 5 and 6 with RCS temperature below 120°F.

1. Maintain administrative controls to operate 50 psig below heatup/cooldown curves when two, three, or four RCPs are running, and 7 psig below the curves with one pump running.
2. During water solid operation of Unit 1 at RCS temperatures below 120°F, assure actual PORV setpoints are at least 7 psig below the nominal/maximum PORV setpoint value defined in the Technical Specification. No action is required with respect to the PORV setpoints with no RCPs running to assure the Appendix G limits are not exceeded.
3. Maintain administrative controls to operate no more than one RCP during water solid operations at RCS temperatures below 120°F.

C. CAUSE OF EVENT:

The Westinghouse analysis that was used to determine the COMS/LTOP setpoints and the licensing basis did not allow for the differential pressure between the reactor vessel cold legs and the pressure transmitter instrument taps on the RCS hot leg piping.

D. SAFETY ANALYSIS:

Onsite Review 93-009 and NED's ENC-QE-40.1, dated 2/1/93, document the operability of the Technical Specification heatup/cooldown curves and the LTOP/COM system. Past operability of these cases was also considered. Westinghouse stated that an initial review determined that overshoot of the Appendix G limits of up to 100 psig will have no adverse effects on the integrity of the reactor vessel.

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Byron, Unit 1												
		0 5 0 0 0 4 5 4				9 3	-	0 0 1	-	0 0	4 OF 5	

TEXT Energy Industry Identification System (EIIIS) codes are identified in the text as [XX]

D. SAFETY ANALYSIS: (Cont)

In modes 4, 5 and 6 with the reactor vessel head on, the LTOP/COMS system requires the operability of either two Power Operated Relief Valves (PORVs), or two Residual Heat Removal (RHR) suction relief valves, or one PORV and one RHR suction relief valve. This requirement ensures that the Reactor Coolant System (RCS) is protected from pressure transients that could exceed the limits of 10 CFR Part 50 Appendix G, when one or more of the RCS cold legs are less than or equal to 350°F. Transient analysis was performed by Westinghouse and described in the UFSAR 5.2.2.11, to determine the maximum pressure for the postulated worst case mass input and heat input events. These events include: 1) the starting of a centrifugal charging pump and its injection when the plant is solid and 2) the start of an idle Reactor Coolant Pump (RCP) with the secondary water temperature of the steam generator less than or equal to 50 degrees above RCS cold leg temperatures.

Analyses have shown that one PORV is sufficient to prevent exceeding these limits due to anticipated mass and heat input transients. However, protection against overpressurization events are provided through use of two PORVs to mitigate any potential pressurization transients. The protection system is required only during low temperature operation. It is manually armed and automatically actuated.

Also, with RCS temperature below 200°F, i.e. cold shutdown, one RHR loop is required to be in operation and the other RHR loop is required operable. This requirement ensures that at least one RHR suction relief valve is available for overpressure protection of the RCS. The ENC-QE-40.1 does not take credit for the RHR suction relief and is conservative in this respect. Nuclear Engineering Department will follow up with Westinghouse to review whether the safety analysis should address the use of one RHR suction relief and one PORV.

Section 5.2 of the UFSAR states that the Appendix G curves are excessively conservative for their intended purpose of assuring vessel integrity during cold conditions.

E. CORRECTIVE ACTIONS:

Immediate corrective actions taken for Units 1 and 2 include issuing a daily order to administratively limit operation to 50 psig below the heat-up/cooldown curves with two, three or four RCPs running, and 7 psig with one pump running. Procedure revisions are required and are being tracked by NTS # 454-240-93-00900-01.

For Unit 1 only, during water solid operations at RCS temperatures below 120°F, should the operation of one RCP be required, the actual PORV setpoints must be at least 7 psig below the setpoint in Technical Specification 3.4.9.3. This action is tracked by NTS # 454-240-93-00900-02.

For Unit 2 only, during water solid operations at RCS temperatures below 120°F, administrative controls will assure no more than one RCP is running. This action is tracked by NTS # 454-240-93-00900-03.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION													Form Rev 2.0												
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Byron, Unit 1						0	5	0	0	0	4	5	4	9	3	-	0	0	1	-	0	0	5	OF	5
TEXT		Energy Industry Identification System (EIIS) codes are identified in the text as [XX]																							

E. CORRECTIVE ACTIONS: (Cont)

Follow up items include reviewing the Westinghouse potential issue for additional compensatory actions and to determine if or what actions should be taken for long term resolution. (NTS # 454-240-93-00900-04 and 454-240-93-00900-05). UFSAR subsection 5.2.2.11 will be revised to reflect current analysis values (NTS # 454-240-93-00900-06).

RECURRING EVENTS SEARCH AND ANALYSIS:

This issue was first identified at Comanche Peak (OE 5691). South Texas identified the same condition after reviewing Comanche Peak's OE on Nuclear Network. Commonwealth Edison determined that this is a concern at Zion, Byron and Braidwood. The issue is applicable to PWRs for which Westinghouse prepared the COMS/LTOP setpoints.

COMPONENT FAILURE DATA:

This event was not the result of a component failure, nor did any components fail as a result of this event.

EVENT SUMMARY AND CAUSE CODES

LER 454-93-001

DVR Number NA
06- - - - -

<input type="checkbox"/> Lost generation	<input type="checkbox"/> Reactor trip	<input type="checkbox"/> NRC violation, level___
<input type="checkbox"/> Cost > \$25,000	<input type="checkbox"/> ESF actuation	<input type="checkbox"/> GSEP event, class_____
<input type="checkbox"/> Hazard or Spill	<input checked="" type="checkbox"/> NRC reportable	<input type="checkbox"/> Tech Spec LCO
<input type="checkbox"/> Personnel injury	<input checked="" type="checkbox"/> LER	<input type="checkbox"/> Potential or future loss
<input type="checkbox"/> Component type	<input type="checkbox"/> PSE	<input type="checkbox"/> SALP functional area <u>ET</u>
	<input type="checkbox"/> Failure mode	

Department									
X									
X									
X									

Licensed? L or blank		Type		Detail code		Department	
Level							
A							
A							
A							

Type	Detail Code	Department	
B	D 216	INSIC	Deficiency in Whitehouse Analysis for LTOP
B			
B			
B			

Type	Detail code
C	

Type of deficiency	Detail code	Procedure type
D		
D		
D		
D		

Type	Detail code	Department
E		
E		
E		
E		