

Commonwealth Edison Company
Byron Generating Station
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May 22, 1996

LTR: BYRON 96-151
FILE: 3.03.0800 (1.10.0101)

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)(ii) and 50.73(a)(2)(v).

This report is number 96-005; Docket No. 50-454.

Sincerely,

A handwritten signature in dark ink, appearing to read "K. L. Kofron", is written over the typed name.

K. L. Kofron
Station Manager
Byron Nuclear Power Station

KLK/WD/ja

Enclosure: Licensee Event Report No. 96-005

cc: H. J. Miller, NRC Region III Administrator
NRC Senior Resident Inspector
INPO Record Center
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LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

BYRON NUCLEAR POWER STATION	05000454	YEAR	SEQUENTIAL	REVISION	2 OF 4
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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

A. PLANT CONDITIONS PRIOR TO EVENT:Event Date/Time 04-23-96 / 1645Unit 1 Mode 6 - Refueling Operations Rx Power 0% RCS [AB] Temperature/Pressure RefuelingUnit 2 Mode 1 - Power Operations Rx Power 91% RCS [AB] Temperature/Pressure NOT/NOPB. DESCRIPTION OF EVENT:

On March 18, 1996, Byron Station System Engineering Department (SED) received a Nuclear Network notification that Indian Point 3 had notified the NRC that they had exceeded the bounds of their accident analysis by cross-tying several Safety Injection (SI) Accumulators [BQ] using the water and nitrogen fill headers. Indian Point and Byron Station are Westinghouse PWRs.

On March 28, 1996, Byron Station became aware that Turkey Point made an NRC notification concerning cross-tying of their SI Accumulators which exceeds the bounds of their accident analysis. Turkey Point operating procedures allowed cross-connection of the nitrogen gas space using the nitrogen fill header. Byron Station identified procedures which would allow cross-tying of two accumulators, and fill procedures which could allow opening of multiple fill valves on the common headers. Byron Station did not find any restrictions in the Technical Specifications or the UFSAR or the SI System Description for Byron Station for this plant configuration.

During the week of April 1, 1996, Byron Station continued to investigate the issue and the status of other Stations throughout industry. Byron Station Technical Specifications and Updated Final Safety Analysis Report (UFSAR) define accumulator operability with respect to required levels and pressures, but do not specify how being cross-tied will affect accumulator operability.

On April 17, 1996, based on the review of the recent 10CFR 50.72 notifications by other licensees, and confirmation of Byron's accident analysis, SED personnel identified a concern with the practice of cross-tying SI Accumulators. ComEd Nuclear Fuel Services had performed a review of the accident analysis and determined that cross-tying of the accumulators could reduce the effectiveness of the accumulators during a design basis LOCA.

Plant procedures permit transfer of Nitrogen or water through common fill lines from one accumulator to another and did not limit the number of accumulators that could be tied to the common headers at any one time. There was no documentation readily available to determine historically how many accumulators were tied to the common headers at any one time. At the time of discovery, the plant was in a configuration that did not have any accumulators tied together.

A Problem Identification Form (PIF) was written and an Operability Determination was initiated. In the interim, Byron Operations was notified to not cross-tie accumulators until further notice. Caution Cards were also placed on the control switches for the accumulator fill and vent valves in the Main Control Room.

NRC FORM 366A (4-95)		U.S. NUCLEAR REGULATORY COMMISSION							
LICENSEE EVENT REPORT (LER) TEXT CONTINUATION									
1 BYRON NUCLEAR POWER STATION	05000454	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; text-align: center; font-size: small;">YEAR</td> <td style="width: 33%; text-align: center; font-size: small;">SEQUENTIAL</td> <td style="width: 33%; text-align: center; font-size: small;">REVISION</td> </tr> <tr> <td style="text-align: center;">96 --</td> <td style="text-align: center;">005 --</td> <td style="text-align: center;">00</td> </tr> </table>	YEAR	SEQUENTIAL	REVISION	96 --	005 --	00	3 OF 4
YEAR	SEQUENTIAL	REVISION							
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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

B. DESCRIPTION OF EVENT: (cont.)

On April 23, 1996, Byron Station determined that the plant licensing basis does not consider the effects of having more than two accumulators cross-tied during a Loss of Coolant Accident (LOCA). Byron Station had determined that having two accumulators cross-tied for a period of time less than one hour is no more limiting than having one accumulator inoperable for up to one hour per Technical Specification 3.5.1. However, cross-tying more than two SI Accumulators, or tying two accumulators together for more than one hour places the plant outside of the design basis. The Accident Analysis assumes that the accumulator on the faulted loop would dump to the floor, and the other three accumulators would inject into the three Reactor Coolant System (RCS) loops. In the event that the accumulators were cross-tied, the faulted loop would allow one accumulator to start to dump to the floor immediately. This condition would allow the other accumulators to start to depressurize through the crosstie header to the faulted loop before the reactor vessel pressure would reduce to a point where the accumulators on the intact loops could inject. At 1645 hours on April 23, 1996, it was determined that more than two accumulators may have been cross-tied in the past. Operations personnel made a one-hour notification to the NRC.

Byron Station used the ability to cross-tie accumulators to benefit plant performance. Cross-tying of accumulators allowed operators to make water level adjustments to a low accumulator while reducing the frequency of SI pump starts. This enhanced SI pump reliability by reducing wear and tear on the pump. Water level adjustments to a low accumulator in this manner also eliminated having to isolate, and make inoperable, a train of SI when the RCS is between 1000 and 1700 psig. Another advantage of cross-tying accumulators is it allowed redundant instruments to be aligned to verify indications during trouble shooting of pressure and level instrumentation.

This event is reportable per 10CFR50.73(a)(2)(ii)(B), as a condition that was outside the design basis of the plant and 10CFR50.73(a)(2)(v)(D), an 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.

C. CAUSE OF EVENT:

The root cause of this event was a management deficiency. At the time of the writing of the original procedures and their subsequent revisions, an inadequate review of the licensing basis did not identify the failure scenario involving cross-tying of accumulators. Only recently has the industry become aware of this scenario.

A contributing cause of the event can be traced to the procedures which align the Safety Injection system to manipulate water levels or nitrogen pressures. The procedures allowed an alignment that placed one or more accumulators in communication with a common liquid or nitrogen space header. There were no restrictions on how many accumulators could be cross tied or what modes of operation supported cross-tied alignments. Investigation of procedure history shows that the cross tied alignments are supported back to the original procedure releases.

D. SAFETY ANALYSIS:

ComEd's Nuclear Fuel Services Department (NFS) Department performed an evaluation of the safety significance of past operation with cross-tie of the accumulator's gas and liquid lines. The details of the evaluation is documented in NFS letter NFS:PSA:96-049 dated May 10, 1996.

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D. SAFETY ANALYSIS: (cont)

The major impact of the operation of the accumulators is on the large break LOCA. Based on the review of the pertinent licensing basis analysis and assuming best estimate input, it is likely that the licensing basis limits would not be exceeded in a large break LOCA with two accumulators cross-tied.

For the rare occasion when all four accumulators were cross-tied and in the unlikely event that the LOCA occurred at the same time, the accumulators will still require a finite time period to depressurize. However, accounting for this partial injection and using best estimate assumptions, the peak clad temperature would exceed 2200°F (10CFR50.46 acceptance criteria).

E. CORRECTIVE ACTIONS:

The Operations Department was immediately restricted from performing any actions which would tie two or more accumulators together. This administrative action included tagging the controls for the individual fill and vent valves in the Main Control Room.

Byron Station procedures have been revised to limit filling or draining processes to be performed on one accumulator at a time. Transferring of water from one accumulator to another or equalizing nitrogen pressure between accumulators has been limited to modes when the accumulators are not required to be operable.

Subsequent to the initial procedure error, which occurred many years ago, personnel who perform 50.59 evaluations are required to receive formal training to become qualified. The training includes a two day accident analysis class or equivalent, a one day class on the 50.59 station procedure and federal regulations, and a three week systems course or equivalent. This training should help eliminate this type of an event.

F. RECURRING EVENTS SEARCH AND ANALYSIS:

There were no previous events.

G. COMPONENT FAILURE DATA:

Not Applicable