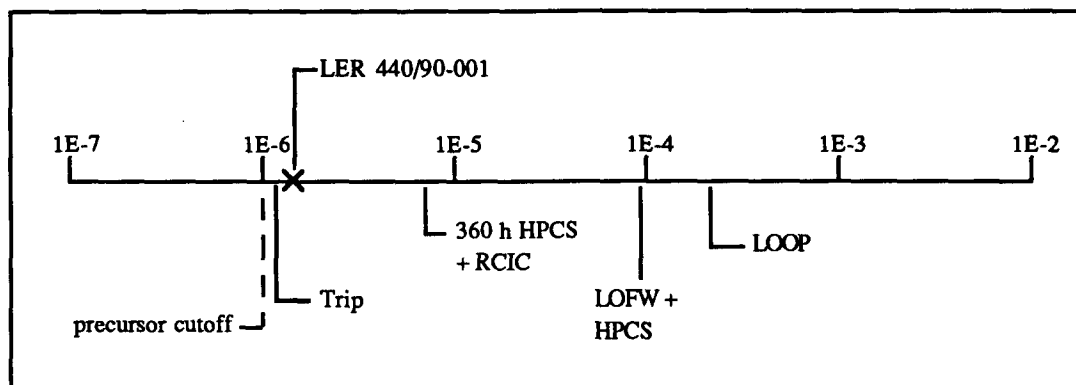


## ACCIDENT SEQUENCE PRECURSOR PROGRAM EVENT ANALYSIS

LER No.: 440/90-001  
 Event Description: RCIC isolation following a reactor scram  
 Date of Event: January 7, 1990  
 Plant: Perry

### Summary

The reactor at Perry scrammed from 100% power, and the reactor core isolation cooling (RCIC) system isolated and tripped off about 37 min after its automatic initiation because of high room differential temperature. The conditional core damage probability estimated for this event is  $1.4 \times 10^{-6}$ . The relative significance of this event compared to other postulated events at Perry is shown below.



### Event Description

Perry was operating at 100% power at 1132 h on January 7, 1990, when an improper bus transfer caused the turbine-driven feedwater pumps to run back to minimum speed. The resulting transient caused a reactor low water level scram followed by the automatic initiation of high-pressure core spray (HPCS) and RCIC. The RCIC initiation caused the main turbine and turbine-driven feedwater pumps to trip. This resulted in the motor-driven feedwater pump starting and supplying water to the vessel. The reactor was stabilized in Mode 3 (hot shutdown), with water level maintained by RCIC and the motor-driven feedwater pump, when RCIC isolated and tripped due to an equipment room high differential temperature.

Subsequent investigations revealed that the cooling water flow to the room cooler and the differential temperature trip setpoint had been set improperly for winter time operations.

This condition had existed since November 1989 when these were last adjusted. As a result, RCIC was considered inoperable from November 1989 until January 16, 1990. Two days later, on January 18 at 1930 h, RCIC was again declared inoperable when it failed its startup test; however, it was not stated when RCIC was returned to service.

### **Additional Event-Related Information**

The RCIC system is a high-pressure injection system designed for makeup of reactor inventory following loss of feedwater (LOFW) events or in cases where the vessel is isolated. RCIC is an independent system, uses a turbine-driven pump, and automatically initiates on reactor low water level. RCIC can deliver 700 gpm of makeup water to the vessel through the vessel head spray connection.

### **ASP Modeling Assumptions and Approach**

This event has been modeled as a reactor scram with RCIC unavailable. The degraded capability of RCIC since November 1989 was addressed in a subsequent calculation in which RCIC was assumed inoperable for 1835 h. Declared HPCS inoperabilities during this time period were not included in the analysis since HPCS appeared capable of performing its safety function if required.

### **Analysis Results**

The conditional probability of severe core damage estimated for this event is  $1.4 \times 10^{-6}$ . The dominant sequence, highlighted in the following event tree, involves failure of long-term core cooling following the trip and loss of the power conversion system. The highest probability sequence, in which RCIC is included, is approximately an order of magnitude lower in probability ( $1.8 \times 10^{-7}$ ) and involves a station blackout with failure of HPCI and RCIC.

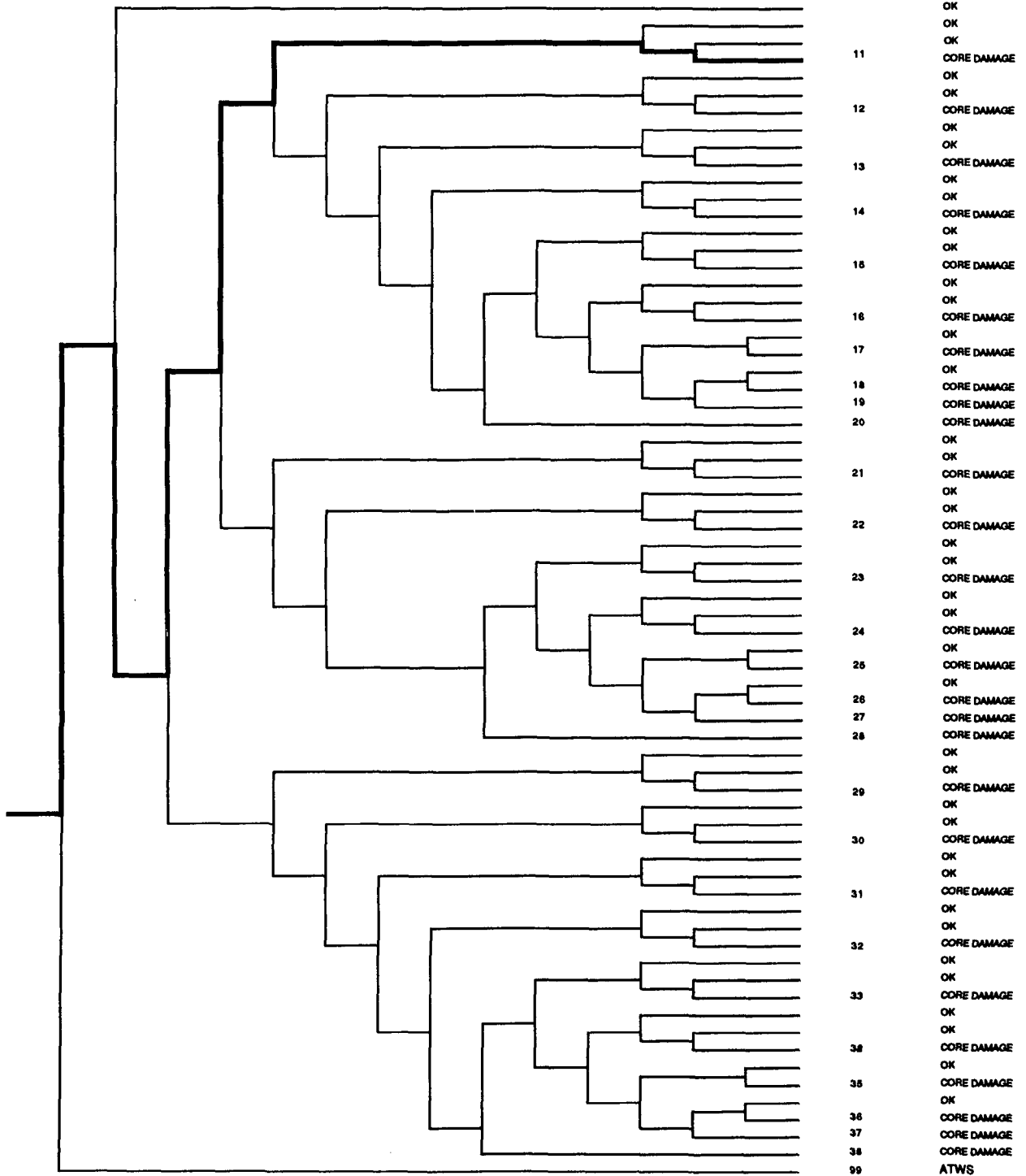
The RCIC isolation and subsequent investigation of why it isolated is described in LER 440/90-002.

# B-360

TRANS- IENT	Rx SHUT DOWN	PCS	SRV CHAL	SRV-C	FW	HPCI OR HPCS	RCIC	CRD	SRVw/ ADS	LPCS	LPCI (RHR)	RHR (SDC MODE)	RHR (SP COOLING MODE)	RHRBW or OTHER
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SEQ  
NO

END  
STATE



Dominant core damage sequence for LER 440/90-001