LICENSEE EVENT REPORT (LER)

Facility Name (1)	Docket Number (2)	Page (3)
QUAD-CITIES, NUCLEAR POWER STATION, UNIT One	0 5 0 0 0 2 5 4	1 of 0 4

Title (4) U-1 RCIC Inoperable Due To Spurious Overspeed Trips

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 5	0 5	8 6	8 6	---	0 ? 3	0 0	0 5	3 0	8 6		0 5 0 0 0
											0 5 0 0 0

OPERATING MODE (9)	4
POWER LEVEL (10)	0 9 6

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)

___ 20.402(b)	___ 20.405(c)	___ 50.73(a)(2)(iv)	___ 73.71(b)
___ 20.405(a)(1)(i)	___ 50.36(c)(1)	X 50.73(a)(2)(v)	___ 73.71(c)
___ 20.405(a)(1)(ii)	___ 50.36(c)(2)	___ 50.73(a)(2)(vii)	___ Other (Specify in Abstract below and in Text)
___ 20.405(a)(1)(iii)	___ 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	TELEPHONE NUMBER
	AREA CODE
Alan J. Blamey, Technical Staff Engineer Ext. 2174	3 0 9 6 5 4 - 2 2 4 1

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	
X	B N	T R B	T 1 4 7	Y							

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 fifteen single-space typewritten lines) (16)

On May 5, 1986 the Unit One Reactor Core Isolation Cooling (RCIC) System turbine tripped numerous times on mechanical overspeed while attempting to manually start the system for an operability test. The RCIC system was declared inoperable and the High Pressure Coolant Injection (HPCI) System tested satisfactorily as per Technical Specification 3.5.E.2./4.5.E.2. Unit One was operating in the RUN mode at 96 percent power when the event occurred. The cause of the overspeed trips was due to the mechanical overspeed trip linkage being out of adjustment. The linkage was adjusted and a portion of the linkage machined, and the system was run satisfactorily and declared operable on May 10. Additional corrective action is being pursued by Action Item Records 4-84-27 and 4-85-16, which address improving the RCIC overspeed trip system. This report is being submitted in accordance with the requirements of 10 CFR 50.73(a)(2)(v), which requires the reporting of any event or condition that alone could have prevented the fullfillment of the safety function of a system needed to remove residual heat.

PLANT AND SYSTEM IDENTIFICATION:

General Electric - Boiling Water Reactor - 2511 MWt rated core thermal power. Energy Industry Identification System (EIIS) codes are identified in the text as [XX].

IDENTIFICATION OF OCCURRENCE:

During the monthly Reactor Core Isolation Cooling (RCIC) system [BN] operability test the RCIC turbine tripped on overspeed numerous times.

Discovery Date: 05/05/86

Report Date: 05/30/86

This report was initiated by Deviation Report D-4-1-86-52

CONDITIONS PRIOR TO OCCURRENCE:

RUN Mode(4) - Rx Power 96% - Unit Load 795 MWe

RUN Mode(4) - In this position the reactor system pressure is at or above 825 psig, and the reactor protection system is energized, with APRM protection and RBM interlocks in service (excluding the 15% high flux scram).

DESCRIPTION OF OCCURRENCE:

On May 5, 1986, at 10:35 hours the Unit One Reactor Core Isolation Cooling System (RCIC) [BN] was declared inoperable. The Unit One operator observed numerious mechanical overspeed trips while attempting to perform the monthly Reactor Core Isolation Cooling System operability test, QOS 1300-2. The turbine was tripping on overspeed immediately after putting steam to the turbine for a manual start. Unit One was operating in the RUN mode at 96 percent of rated core thermal power, in Economic Generation Control (EGC), at the time of the incident.

The High Pressure Coolant Injection System (HPCI) [BJ] was immediately tested and proven operable as per Technical Specification 3.5.E.2/4.5.E.2. Work Request Q49519 was written to investigate and correct this problem. The ENS notification was made at 11:17 hours on May 5, 1986, that the Reactor Core Isolation Cooling System was inoperable. At 23:30 hours on May 5, 1986, the initial investigation was complete. The problem appeared to be in the turbine mechanical overspeed linkage between the centrifugal weight assembly and the trip and throttle valve.

This report is being submitted in accordance with the requirements of 10 CFR 50.73(a)(2)(v), which requires the reporting of any event or condition that alone could have prevented the fullfillment of the safety function of a system needed to remove residual heat.

APPARENT CAUSE OF OCCURRENCE:

This Terry Steam Turbine, type GS, is provided with a mechanical overspeed trip mechanism (drawing B-12555) which consists of a disc (37-B12555) fitted with a lever type emergency weight (21-B12555) and associated parts. This disc is balanced on the turbine shaft after all parts are assembled. The weight is secured to the disc by means of the weight screw (25-B12555) which is also the pivot point of the weight. A needle bearing is fitted to the weight so that it is supported on the weight screw by the bearing to reduce friction when the weight moves. The weight is heavy at the free end and the unbalanced force of the weight is opposed by the emergency weight spring (27-B12555). The compression force on the spring is adjusted by means of the adjusting screw (22-B12555) so that the centrifugal force at the free end of the weight overcomes the opposing forces of the spring when the desired trip speed is attained. The weight then pivots about the adjusting screw and the free end of the weight moves outward and strikes the ball tappet (13-B12555). This blow lifts the tappet breaking the contact between the tappet nut (28-B12555) and head lever (12-B125[illegible] This permits the spring (5-B12555) to actuate the mechanical trip latch [illegible]lose the trip and throttle valve.

Close investigation showed several components in the above mechanical circuit to be out of tolerance. The emergency weight (21-B12555) striking the tappet and ball (13-B12555) would not engage the trip and throttle valve with good repeatability. This mechanical linkage being out of adjustment was the root cause of the incident.

Analysis of Occurrence:

The Reactor Core Isolation Cooling System functions to provide cooling water to the reactor in the event the reactor becomes isolated from the main turbine and when the feedwater system is not available. The Reactor Core Isolation Cooling System pump is a horizontal, five stage, centrifugal double-volute pump driven by a common shaft from the RCIC turbine. The pump provides a flow of 400 gal/min, over a reactor vessel pressure range of 1150 psig to 150 psig.

When the Reactor Core Isolation Cooling System was declared inoperable, the High Pressure Coolant Injection System was proven operable immediately and daily thereafter per Technical Specification 3.5.E.2/4.5.E.2. The High Pressure Coolant Injection System can be used as a redundant system to supply makeup water to the reactor, therefore the safety consequences of this incident is minimal.

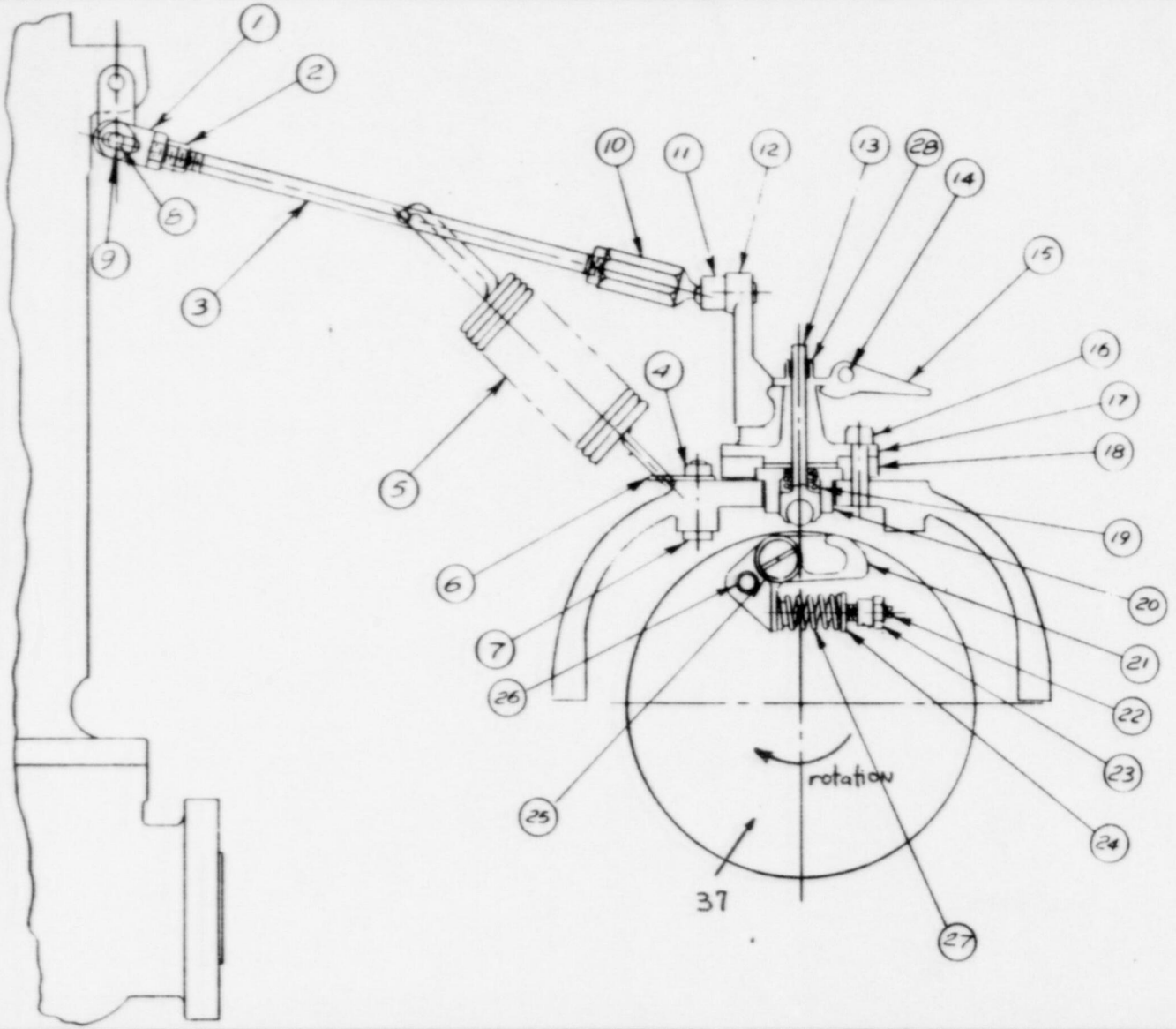
CORRECTIVE ACTIONS:

Several of the mechanical overspeed trip components were adjusted to yield a repeatable trip setting. The emergency weight was adjusted using the Terry Steam Turbine Instruction Manual as a guide by adjusting the emergency weight spring adjusting screw (22-B12555). The emergency head lever was machined to yield a better engagement/disengagement surface for the tappet and ball. The final adjustment was made to the emergency connecting rod spring (5-B12555). The adjustment assured that when the tappet and ball became disengaged there was enough force to disengage the trip and throttle valve thus tripping the turbine. The RCIC system was tested satisfactorily and declared operable at 05:10 hours on May 10, 1986. The system was inoperable from May 5 to May 10.

The above corrective actions were made under the supervision of a Terry Steam Turbine Engineer and are considered to be adequate. However, Quad-Cities is expecting further information on preventative maintenance from Terry Steam Turbine Co. Two Action Item Records (AIR) dealing with overspeed trips on the Reactor Core Isolation Cooling System had also been initiated prior to this event. AIR 4-85-16, removal of the electronic overspeed trip and AIR 4-84-27, to preclude unnecessary mechanical overspeed trips are presently being studied in an effort to increase the reliability of the Reactor Core Isolation Cooling System.

FAILURE DATA:

Overspeed trip of the RCIC system during manual initiation has occurred previously as documented on LER 265/84-010.



No.	NAME OF PARTS
1	ROD END
2	3/8 NUT
3	EMERG. CONN. ROD
4	3/8 NUT
5	SPRING
6	EMERG SPRING HOLDER
7	3/8 HEX HEAD BOLT
8	ROD END PIN
9	ROD END WASHER
10	BALL ROD END
11	BALL SOCKET
12	EMERG HEAD LEVER
13	TAPPET & BALL
14	TRIP LEVER PIN
15	TRIP LEVER
16	5/16 x 1" CAP SCR. SOC. HEAD
17	HEAD BRACKET
18	SPACE COLLAR
19	COMP. SPRING
20	EMERG TAPPET GUIDE
21	EMERG GOV. WEIGHT
22	EMERG. SPRING ADJ STUD
23	JAM NUT
24	EMERG. SPRING SEAT
25	EMERG. GOV. WEIGHT SCREW
26	EMERG GOV. WEIGHT STOP PIN
27	EMERG. WEIGHT SPRING
28	EMERG. TAPPET NUT

DIMENSIONAL TOLERANCES UNLESS OTHERWISE SPECIFIED
TOLERANCE ON FRACTIONS FOR MACHINED SURFACES
0 TO 1/4 ± .000
OVER 1/4 TO 24 ± 1/64
OVER 24 TO 72 ± 1/32
OVER 72 ± 1/16
REAMED HOLE TOLERANCE IS ± .001
INSIDE MACHINED CORNERS TO HAVE A RADIUS OF 3/64 +0 −1/32
OUT OF ROUNDNESS, ECCENTRICITY OR UNINTENTIONAL TAPER TO BE WITHIN THE DIAMETRAL TOLERANCE SPECIFIED.

FILE 22237-22448

TYPE-GS

OVER SPEED TRIP

SCALE NONE DATE 6-1968

THE TERRY STEAM TURBINE CO.
WINDSOR, CONN., U.S.A.

DRAWN A.B
TRACED
CHECKED
APPROVED

B-12555

B-12555

Commonwealth Edison
Quad Cities Nuclear Power Station
22710 206 Avenue North
Cordova, Illinois 61242
Telephone 309/654-2241

NJK-86-69

May 30, 1986

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

Reference: Quad-Cities Nuclear Power Station
Docket Number 50-254, DPR-29, Unit One

Enclosed please find Licensee Event Report (LER) 86-023, Revision 00, for Quad-Cities Nuclear Power Station.

This report is submitted to you in accordance with the requirements of the Code of Federal Regulations, Title 10, Part 50.73(a)(2)(v), which requires the reporting of any event or condition that alone could have prevented the fullfillment of the safety function of systems that are needed to remove residual heat.

Respectfully,

COMMONWEALTH EDISON COMPANY
QUAD-CITIES NUCLEAR POWER STATION

R. L. Bax
Station Manager

RLB/MSK/dak

Enclosure

cc: J. Wojnarowski
A. Madison
INPO Records Center
NRC Region III

IE22
1/1

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