Commonwealth Edison
1400 Opus Place
Downers Grove, Illinois 60515

May 2, 1994

Mr. William T. Russell, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington D.C. 20555

Attn: Document Control Desk

Subject: Commonwealth Edison Company
10 CFR Part 21 Final Report (File 94-05)
Deficiency of Limit Switch Series EA740-86700 Manufactured by Namco Control

Dear Mr. Russell:

The purpose of this letter is to notify the NRC Staff of concerns by Commonwealth Edison Company (CECo) toward the failures of Limit Switch Series EA740-86700 manufactured by Namco Control Co. The affected Limit Switches are used on Main Steam Isolation Valves (MSIV) to provide the MSIV position indication to Control Room and an automatic trip signal to the Reactor Protection System (RPS).

A root cause investigation concluded that the failure of the switch to return the operating lever immediately to the neutral position was due to one or all of the following:

- excessive amount of grease on the contact block and contact carrier,
- wrong material of the O-ring, and
- a weak torsion spring.

The corrective action is replacement of the series EA740-86700 switches with series EA740-50100 Namco limit switches that have much stronger torsion spring.

Provided as an attachment to this letter is CECo's notification in accordance with the requirements of 10 CFR Part 21.

As stated in the attached report, the defective component was identified only at Commonwealth Edison LaSalle County Station. If there are any questions regarding this notification, please direct them to Luke D. Kim at (708) 663-7457.

Respectfully,

Gary G Benes

For Irene M. Johnson
Licensing Operations Director

Attachment: 10 CFR Part 21 Final Report

cc: J. B. Martin, Regional Administrator - RIII
D. E. Hills, Senior Resident Inspector - LSCS
J. E. Dyer, Director of III-2 Director, NRR
A. T. Gody Jr., LaSalle Project Manager, NRR
Office of Nuclear Facility Safety - IDNS

JE19

Attachment

10 CFR Part 21 Notification
Deficiency of Limit Switch Series EA740-86700
Manufactured by Namco Control Corporation and used at LaSalle County Station.
Part 21 File # 9405

This notification is submitted according to requirements of 10 CFR Part 21, Section 21.1(b).

Identification of Facility and Component

The defective component was identified only at Commonwealth Edison's LaSalle County Station. The effected Limit Switches are used on Main Steam Isolation Valves (MSIV) 2B21-F022A/B/C/D and 2B21-F028A/B/C/D to provide the MSIV position indication to the Control Room and an automatic trip signal to the Reactor Protection System (RPS).

Component Manufacturer

The series EA740-86700 limit switches are manufactured by Namco Controls Corporation.

Nature of Defect

The EA740-86700 is a "maintained contacts, operating lever returned" switch, which means that contacts are maintained in the tripped position, and a torsion spring will return the lever to the initial (neutral) position when released. The switches displayed an apparent inability to fully return the lever to the initial position after being actuated in either direction, i.e., clockwise or counterclockwise. A root cause investigation concluded that the failure of the switch to return the operating lever immediately to the neutral position was due to one or all of the following:

- excessive amount of grease on the contact block and contact carrier,
- wrong material of the O-ring, and
- a weak torsion spring.

Safety Significance

The safety function of the MSIV limit switches is to provide an automatic trip signal to the Reactor Protection System to initiate an automatic scram when closure of the MSIV's is detected during power operation, to protect the reactor when its link to the heat sink (turbine or condenser) is in the process of being removed. The MSIV closure scram anticipates the pressure and flux transients that occur during MSIV closure and by that protects reactor vessel pressure and fuel thermal/hydraulic Safety Limits. RPS logic for full scram actuation requires MSIV

closed indication on 3 of the 4 MSIV's (inboard or outboard). This logic provides redundancy and allows MSIV's to be functionally tested during power operation. The MSIV limit switches also provide Control Room indication of the MSIV position to the operator.

Failure of the MSIV limit switch to reposition during valve closure (limit switches at full closed position) could result in incorrect position indication of the MSIV to either the Control Room position indicating lights or to the process computer. Failure of the MSIV limit switch to reposition during valve opening (limit switch at full open position) could result in failure of the MSIV limit switch to actuate for the RPS scram function for MSIV not fully open or could result in incorrect valve position indication.

Discovery Date

March 1, 1994

Corrective Action

The corrective action is replacement of the series EA740-86700 switches with series EA740-50100 Namco limit switches that have much stronger torsion spring. The Station will replace the MSIV limit switches on Unit 2 in June, 1994 and on Unit 1 at the next refueling outage during the fall of 1995. LaSalle Site Engineering & Construction is responsible for these actions.

Number and Location of All Defective Components

The defective Namco limit switches series EA740-86700 were found on the LaSalle County Station Unit 2 Main Steam Isolation Valves. There are eight MSIVs per Unit (four outboard and four inboard), with four limit switches installed on each MSIV.

The same model of limit switches is installed on Unit 1 MSIV's, but no defective switches were found.

Contacts

Questions pertaining to this notification should be addressed to:

Luke Kim
Regulatory Assurance
Commonwealth Edison Company
1400 Opus Place, Suite 400
Downers Grove, IL 60515
(708) 663-7457

POWER REACTOR

EVENT NUMBER: 27200

FACILITY: LASALLE REGION: 3
UNIT: [ ] [2] [ ] STATE: IL
RX TYPE: [1] GE-5,[2] GE-5

NOTIFICATION DATE: 05/02/94
NOTIFICATION TIME: 08:41 [ET]
EVENT DATE: 05/02/94
EVENT TIME: 00:00[CDT]
LAST UPDATE DATE: 05/02/94

NRC NOTIFIED BY: IRENE M. JOHNSON
HQ OPS OFFICER: CHAUNCEY GOULD

NOTIFICATIONS

EMERGENCY CLASS: NOT APPLICABLE
10 CFR SECTION:
CCCC 21.21 UNSPECIFIED PARAGRAPH

UNIT	SCRAM CODE	RX CRIT	INIT PWR	INIT RX MODE	CURR PWR	CURR RX MODE
2	N	Y	100	POWER OPERATION	100	POWER OPERATION

EVENT TEXT

LICENSEE IS MAKING A PART 21 NOTIFICATION OF DEFECTIVE NAMCO CONTROLS CORPORATION LIMIT SWITCHES SERIES "EA740-86700" INSTALLED ON MAIN STEAM ISOLATION VALVES (MSIV) "2B1-F022A/B/C/D" and "2B21-F028A/B/C/D" TO PROVIDE THE MSIV POSITION INDICATION TO THE CONTROL ROOM AND AN AUTOMATIC TRIP SIGNAL TO THE REACTOR PROTECTION SYSTEM (RPS).

FAILURE OF THE SWITCHES TO RETURN THE OPERATING LEVER IMMEDIATELY TO THE NEUTRAL POSITION WAS DUE TO ONE OR ALL OF THE FOLLOWING:

-EXCESSIVE AMOUNT OF GREASE ON THE CONTACT BLOCK AND CONTACT CARRIER,
-WRONG MATERIAL OF THE O-RING, AND
-A WEAK TORSION SPRING.

CORRECTIVE ACTIONS INCLUDE REPLACEMENT OF UNIT 2 DEFECTIVE LIMIT SWITCHES (TOTAL OF 8) IN JUNE 1994 AND REPLACEMENT OF UNIT 1 (NO DEFECTS FOUND) LIMIT SWITCHES DURING THE FALL OF 1995.

HOONOTE: SEE EVENT #26728 AND #26866 FOR ADDITIONAL INFORMATION.

GENERAL INFORMATION or OTHER

EVENT NUMBER: 26728

LICENSEE:
CITY: MENTOR REGION: 3
COUNTY: STATE: OH
LICENSE#: AGREEMENT: N
DOCKET:

NOTIFICATION DATE: 02/02/94
NOTIFICATION TIME: 12:50 [ET]
EVENT DATE: 02/02/94
EVENT TIME: 00:00[EST]
LAST UPDATE DATE: 02/02/94

NOTIFICATIONS

NRC NOTIFIED BY: SLAYBAUGH
HQ OPS OFFICER: GREG SCARFO

EMERGENCY CLASS: NOT APPLICABLE
10 CFR SECTION:
CDEG 21.21(c)(3)(i) DEFECTS/NONCOMPLIANCE

EVENT TEXT

NAMCO CONTROL OF MENTOR, OHIO, REPORTED FAULTY OPERATING LEVERS ON A LINE OF LIMIT SWITCHES.

NAMCO CONTROL OF MENTOR, OHIO, REPORTED THAT DURING OPERATION OF MSIVs AT LASALLE STATION, NAMCO CONTROLS EA740-86700 LIMIT SWITCH OPERATING LEVERS WOULD NOT RETURN TO THE INITIAL POSITION AFTER ACTUATING THE SWITCHES. AN INVESTIGATION IS IN PROGRESS TO DETERMINE THE ROOT CAUSE.

OTHER NUCLEAR MATERIAL

EVENT NUMBER: 26866

LICENSEE: NAMCO CONTROLS
CITY: MENTOR REGION: 3
COUNTY: STATE: OH
LICENSE#: AGREEMENT: N
DOCKET:

NOTIFICATION DATE: 03/02/94
NOTIFICATION TIME: 14:30 [ET]
EVENT DATE: 03/02/94
EVENT TIME: 00:00[EST]
LAST UPDATE DATE: 03/31/94

NOTIFICATIONS

NRC NOTIFIED BY: HAROLD EVERSON
HQ OPS OFFICER: RUDY KARSCH

EMERGENCY CLASS: NOT APPLICABLE
10 CFR SECTION:
CCCC 21.21 UNSPECIFIED PARAGRAPH

EVENT TEXT

NAMCO CONTROLS; A FOLLOW UP TO A PREVIOUS NOTIFICATION ON 2/2/94 (# 26728).

COMMONWEALTH EDISON REPORTED THAT OPERATING LEVERS ON EA740-86700 LIMIT SWITCHES WOULD NOT ALWAYS RETURN TO THEIR INITIAL POSITION. NAMCO LOCATED IN MENTOR, OHIO HAS BEEN ABLE TO VERIFY THIS CONDITION IN ONLY ONE OF THE RETURNED UNITS. NAMCO HAS DETERMINED THE ROOT CAUSE TO BE A REACTION BETWEEN THE OIL USED TO LUBRICATE THE SHAFT OF THE O-RING. THE O-RING IS USED TO SEAL THE SHAFT CONNECTED TO THE OPERATING LEVER. THIS REACTION RESULTED IN THE ENLARGEMENT OF THE O-RING WHICH PLACED ADDITIONAL FRICTION IN THE AREA OF THE SHAFT AND THE BUSHING THAT THE SHAFT ROTATES IN. NAMCO HAS FURTHER DETERMINED, WITH THE HELP OF TWO TEST LABS, THAT THE O-RING WAS NOT MADE OUT OF THE MATERIAL SPECIFIED BY NAMCO. A SECOND O-RING FROM THIS LOT WAS ALSO TESTED AND FOUND TO BE OF THE CORRECT FAMILY OF MATERIAL.

ADDITIONAL TESTING IS BEING PERFORMED, WITH RESULTS EXPECTED BY MARCH 7, 1994. AT THIS TIME NAMCO HAS NO EVIDENCE OF ANY OTHER OCCURRENCE OF THIS PROBLEM. THE O-RING MANUFACTURER INFORMED NAMCO THAT THE REACTION BETWEEN THE INCORRECT O-RING MATERIAL AND THE OIL ON THE SHAFT WOULD TAKE NO LONGER THAN 21 DAYS. MAMCO BELIEVES THIS IS AN ISOLATED OCCURRENCE.

UPDATE 3/18/94 @ 08:13 FROM SLAYBAUGH TO GOULD VIA FAX THE LICENSEE BELIEVES, BASED ON THEIR REVIEW, THAT THE SITUATION MAY BE AN ISOLATED SITUATION. THIS IS BASED ON THE "O" RING USED ON THE SHAFT BEING MADE FROM THE WRONG MATERIAL. THEY ARE CONTINUING TO INVESTIGATE THIS CONDITION.

* * * UPDATE 3/31/94 @ 09:20 FROM SLAYBAUGH TO SEBROSKY VIA FAX * * *
ALTHOUGH NAMCO BELIEVES THAT THEY HAVE DETERMINED THE ROOT CAUSE OF THE PROBLEM INITIALLY REPORTED TO THEM BY THE CUSTOMER AND THAT THE PROBLEM IS

(Continued on next page)

ISOLATED, NAMCO'S ANALYSIS LEAD TO ANOTHER ISSUE CONCERNING THE ACTUAL O-RING MATERIAL SUPPLIED TO NAMCO BY ONE OF ITS VENDORS.

ALL O-RINGS USED IN NUCLEAR QUALIFIED LIMIT SWITCHES, FOR THE PURPOSE OF THE SHAFT SEAL MENTIONED ABOVE WERE SPECIFIED TO BE MANUFACTURED BY PARKER HANNIFIN CORPORATION. AS PART OF THIS REVIEW, NAMCO ASKED PARKER HANNIFIN TO ANALYZE O-RING MATERIAL FROM FOUR BATCHES OF MATERIAL THAT WERE SUPPLIED TO NAMCO WITH THE REQUIRED CERTIFICATIONS FROM PARKER HANNIFIN AND PURCHASED FROM VARIOUS PARKER HANNIFIN DISTRIBUTORS. PARKER HANNINFIN'S RESULTS WERE INCONCLUSIVE.

NAMCO CONTRACTED TWO INDEPENDENT LABORATORIES TO ANALYZE THE MATERIAL IN QUESTION. THEY CONCLUDED THAT ALL SAMPLES WERE OF ETHYLENE-PROPOYLENE RUBBER AND THAT SIMILAR PERFORMANCE WOULD BE EXPECTED AMONG THE TESTED O-RING SAMPLES.

BASED ON THESE RESULTS, NAMCO HAS RELEASED THE HOLD ON SHIPMENTS.