# CATEGORY 1

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9606180273 DOC.DATE: 96/06/10 NOTARIZED: NO DOCKET #
FACIL:50-220 Nine Mile Point Nuclear Station, Unit 1, Niagara Powe 05000220
AUTH.NAME AUTHOR AFFILIATION
BALDUZZI,M.A. Niagara Mohawk Power Corp.
RADEMACHER,N.L. Niagara Mohawk Power Corp.
RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 96-003-00:on 960509,power to flow ratio TS violations was discovered due to ineffective change mgt.Generated Deviation Event Rept to evluate event.W/960610 ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 7
TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

NOTES:

| | RECIPIENT ID CODE/NAME | COPIES LTTR | COPIES ENCL | RECIPIENT ID CODE/NAME | COPIES LTTR | COPIES ENCL |
|---|---|---|---|---|---|---|
| | PD1-1 PD | 1 | 1 | HOOD,D | 1 | 1 |
| INTERNAL: | ACRS | 1 | 1 | ~~AEOD/SPD/RAB~~ | 2 | 2 |
| | AEOD/SPD/RRAB | 1 | 1 | FILE CENTER | 1 | 1 |
| | NRR/DE/ECGB | 1 | 1 | NRR/DE/EELB | 1 | 1 |
| | NRR/DE/EMEB | 1 | 1 | NRR/DRCH/HHFB | 1 | 1 |
| | NRR/DRCH/HICB | 1 | 1 | NRR/DRCH/HOLB | 1 | 1 |
| | NRR/DRCH/HQMB | 1 | 1 | NRR/DRPM/PECB | 1 | 1 |
| | NRR/DSSA/SPLB | 1 | 1 | NRR/DSSA/SRXB | 1 | 1 |
| | RES/DSIR/EIB | 1 | 1 | RGN1 FILE 01 | 1 | 1 |
| EXTERNAL: | L ST LOBBY WARD | 1 | 1 | LITCO BRYCE,J H | 2 | 2 |
| | NOAC MURPHY,G.A | 1 | 1 | NOAC POORE,W. | 1 | 1 |
| | NRC PDR | 1 | 1 | NUDOCS FULL TXT | 1 | 1 |

NOTE TO ALL "RIDS" RECIPIENTS:
PLEASE HELP US TO REDUCE WASTE! CONTACT THE DOCUMENT CONTROL DESK, ROOM OWFN 5D-5(EXT. 415-2083) TO ELIMINATE YOUR NAME FROM DISTRIBUTION LISTS FOR DOCUMENTS YOU DON'T NEED!

FULL TEXT CONVERSION REQUIRED
TOTAL NUMBER OF COPIES REQUIRED: LTTR 26 ENCL 26

CATEGORY 1 DOCUMENT

NIAGARA MOHAWK
GENERATION
BUSINESS GROUP

NINE MILE POINT NUCLEAR STATION/LAKE ROAD, P.O. BOX 63, LYCOMING, NEW YORK 13093

June 10, 1996
NMP1L 1079

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

RE: LER 96-03
Docket No. 50-220

Gentlemen:

In accordance with 10CFR50.73 (a)(2)(i)(B), we are submitting LER 96-03, "Power to Flow Technical Specification Violation Due To Ineffective Change Management."

The thirty day period from discovery of this event expired on Saturday, June 8, 1996. However, in accordance with the guidance in NUREG-1022, it is being submitted on the next normal working day as discussed on June 7, 1996, with the Resident Inspector.

Very truly yours,

Norman L. Rademacher
Plant Manager - NMP1

NLR/AFZ/lmc
Enclosure

xc: Mr. Thomas T. Martin, Regional Administrator
Mr. Barry S. Norris, Senior Resident Inspector



170035

IE22

NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92

# LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503

| FACILITY NAME (1) | DOCKET NUMBER (2) | PAGE (3) |
|---|---|---|
| Nine Mile Point Unit 1 | 5000220 | 01 OF 06 |

TITLE (4) Power to Flow Ratio Technical Specification Violation Due To Ineffective Change Management

| 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) |
| 05 | 09 | 96 | 96 | | 03 | | 00 | 06 | 10 | 96 | N/A | 05000 |
| | | | | | | | | | | | N/A | 05000 |

| OPERATING MODE (9) | N | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check one or more of the following)* (11) |
|---|---|---|

| POWER LEVEL (10) | | | | |
|---|---|---|---|---|
| 100 | ☐ 20.402(b) | ☐ 20.405(c) | ☐ 50.73(a)(2)(iv) | ☐ 73.71(b) |
| | ☐ 20.405(a)(1)(i) | ☐ 50.36(c)(1) | ☐ 50.73(a)(2)(v) | ☐ 73.71(c) |
| | ☐ 20.405(a)(1)(ii) | ☐ 50.36(c)(2) | ☐ 50.73(a)(2)(vii) | ☐ OTHER |
| | ☐ 20.405(a)(1)(iii) | ☐ 50.73(a)(2)(i) | ☐ 50.73(a)(2)(viii)(A) | *(Specify in Abstract below and in Text, NRC Form 366A)* |
| | ☐ 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 |
|---|---|
| M. A. Balduzzi, Unit 1 Manager of Operations | 315-349-2196 |

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 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | |

| SUPPLEMENTAL REPORT EXPECTED (14) | | EXPECTED SUBMISSION DATE (15) | MONTH | DAY | YEAR |
|---|---|---|---|---|---|
| ☐ YES *(If yes, complete EXPECTED SUBMISSION DATE)* | ☒ NO | | | | |


ABSTRACT *(Limit to 1400 spaces, i.e., approximately fifteen single space typewritten lines)* (16)

On May 9, 1996, at 700 hours, with the mode switch in "RUN", and the reactor at approximately 100 percent of rated power, plant management at Nine Mile Point Unit 1 (NMP1) determined the unit had previously operated in a condition prohibited by Technical Specifications (TS) during the month of April 1995. Specifically, the Power to Flow Ratio (PFR) had been greater than the Technical Specification Limit of 1.00 (TS 3.1.7) for approximately 3.5 consecutive hours on April 8, 1995 and for approximately 2 consecutive hours on April 9, 1995, due to plant operation with an isolated recirculation loop that caused indicated reactor coolant flow to read higher than actual flow.

The cause of the event has been determined to be ineffective change management in that, during the development of a new recirculation flow calibration methodology, personnel involved in implementing the change did not fully assess the impact of the new calibration method on plant operation with only four of five recirculation loops in service. Consequently, not all operating modes were evaluated and not all procedures were revised to include the new restrictions and requirements needed to operate in a reduced recirculation loop configuration.

The immediate corrective action was to generate a Deviation Event Report (DER) to evaluate the event, and to revise the operating procedure to eliminate the requirement to isolate the reactor recirculation loop flow transmitters when in a reduced recirculation loop configuration. Other corrective actions included evaluation of partial recirculation flow configurations, and additional training of operating and technical personnel.

## I. DESCRIPTION OF EVENT

On May 9, 1996, at 700 hours, with the mode switch in "RUN", and reactor power level at approximately 100 percent of rated, plant management at Nine Mile Point Unit 1 (NMP1) determined the unit had previously operated in a condition prohibited by Technical Specifications (TS) during the month of April 1995. Specifically, the Power to Flow Ratio (PFR) had been greater than the Technical Specification limit of 1.00 (TS 3.1.7) for approximately 3.5 consecutive hours on April 8, 1995 and for approximately 2 consecutive hours on April 9, 1995, due to plant operation with an isolated recirculation loop flow transmitter that caused indicated reactor coolant flow to read higher than actual flow.

Prior to RFO 13, a differential pressure (d/p) of 0 inches Water Column (0" WC) applied to the reactor recirculation flow transmitter resulted in an indicated recirculation loop flow of 0.0 lbm/hr. When a recirculation loop was idle, the associated flow transmitters were, therefore, isolated/equalized, in accordance with procedures, to prevent reverse flow from being added to the recirculation total flow summers and flow converters.

During RFO 13, based on information obtained from the recirculation pump runback transient that occurred on February 1, 1995, the flow instruments were recalibrated with a new methodology, which took into account variables not used in the old calibration method. The new method compensated for a static head, due to venturi orientation, and temperature difference between the process fluid and the reference leg. Therefore, at Normal Operating Pressure and Normal Operating Temperature (NOP/NOT), if a reactor recirculation loop was idled, the static head would result in a correct input of 0 lbm/hr indicated recirculation loop flow. However, if the flow transmitter is isolated/equalized, an uncorrected 0" WC d/p would result in an indicated loop flow of 2E6 lbm/hr to the reactor recirculation total flow summer and flow converter.

At the completion of the RFO 13, the plant was returned to power operation utilizing 4 of 5 recirculation loops. The #14 recirculation loop was idle (discharge valve closed, suction and discharge bypass valves open, pump off), and in accordance with the operating procedures, the associated flow transmitter was isolated/equalized. As a result of the new method used to calibrate the flow transmitters, this configuration resulted in a 2 million pounds mass per hour flow (2E6 lbm/hr) input to the reactor recirculation flow summer from the idle loop flow transmitter. Operating personnel were unaware that this additional flow input signal had caused the indicated reactor recirculation flow to be higher than actual flow.

Unit 1 was started up following RFO13 on April 3, 1995, using 4 recirculation loops. The #14 reactor recirculation loop was idle, and the associated flow transmitter was isolated/equalized, as required by the existing procedure. Operation with an unidentified error of 2E6 lbm/hr indicated loop flow continued undetected for approximately one week, until the System Engineer identified the deviation.

## I. DESCRIPTION OF EVENT (cont'd)

On April 10, 1995, the error was identified, the flow instruments were valved into service to provide correct flow indication, a Deviation Event Report (DER) was generated to document the event, and an investigation was started. Computer logs were reviewed for the week in question. However, after applying a preliminary correction factor to the Power to Flow Ratio, the Limit of less than or equal to 1.00 may have been exceeded for an interval of time on April 8 and 9, 1995.

Although the Average Power Range Monitors (APRMs), which are flow biased, were affected by the error, the instruments were set within the 2 percent tolerance allowed by the Technical Specifications. Additionally, recirculation total flow information was evaluated by the Engineering Branch and the NSSS Vendor (General Electrics Evaluation of Reportability of Core Flow Issues, dated February 15, 1996), and it was determined the error could not have resulted in exceeding the total recirculation flow limit.

On May 7, 1996, a re-evaluation of reportability, based on the vendor supplied detailed analysis, was performed in accordance with the DER action plan. The results of this evaluation indicated that PFR had been exceeded for a period of 3 hours and 29 minutes on April 8, 1995, and a 2 hour period on April 9, 1995.

## II. CAUSE OF EVENT

A root cause evaluation of this event has been conducted in accordance with Nuclear Interfacing Procedure NIP-EC-01, "Deviation Event Report." The cause of the event was determined to be ineffective change management in that personnel that were involved in implementing the new method of recirculation loop flow transmitter calibration did not fully assess the plant impact. Specifically, not all operating modes were considered, and not all applicable procedures were identified for revision in evaluating the change in calibration method. Consequently, not all aspects affected by the change were addressed.

The existing procedure for the Reactor Recirculation System was followed by operating personnel who were unaware that an error would be introduced by the new recirculation flow calibration method. This allowed the plant to be operated utilizing recirculation flow indication that was above the actual flow, and consequently, exceeded the Technical Specification limit for PFR.

### Causes for Delay in Reporting

During the time of the event in 1995, indicated PFR was always in accordance with the Technical Specifications. However, after having determined that higher than expected flow was observed in the idle loop, a correction factor was applied to the previously logged PFRs, which indicated intervals of time where

TEXT *(If more space is required, use additional NRC Form 366A's) (17)*

## II. CAUSE OF EVENT (cont'd)

corrected PFR may have been greater than 1.0. This was not considered reportable under 10CFR50.73 because the correction factor was preliminary, and the results yielded values very close to 1.0.

The results of a detailed analysis were received by Niagara Mohawk in April of 1996. These results validated the correction factors that were applied to the recirculation loop flow transmitters at the time of the event, and clarified the effects on flow indication. This analysis clearly strengthened NMP1's position that no violation of maximum recirculation flow occurred, nor were the APRMs outside of the allowable TS range. However, the information provided verified the PFR correction factor, and confirmed that the PFR limit was exceeded.

## III. ANALYSIS OF EVENT

This event is reportable in accordance with 10CFR50.73(a)(2)(ii)(B), any operation or condition prohibited by the plant's Technical Specifications.

The effect of the higher indicated reactor recirculation flow on the APRM Flow Biased SCRAM setpoint, and the Power to Flow Ratio (PFR) was assessed. The effect on the APRM Flow Biased SCRAM setpoint (TS 2.1.2) was less than the affect of the allowable deviation (2%) that requires adjustment (TS 3.6.2) of the indicated APRM power level. Although the APRM settings for the actual scram and rod block setpoints were less conservative, they remained within the designed acceptable range, and would have functioned as required to provide the appropriate safety function. Furthermore, no credit is taken for the flow-biased functions in the accident analyses described in Section XV, "Safety Analysis," of the NMP1 Updated Final Safety Analysis Report (UFSAR). The only high neutron flux function considered is the High Neutron Flux Scram which uses a setpoint of 120 percent of design reactor power.

Additionally, after review of the available documentation, it was determined that at no time during the event did core flow actually exceed the maximum design. In order for the core flow to exceed the maximum design, operator action coupled with a pump trip would be required. The NSSS vendor was contracted to evaluate this specific issue, and has concurred with Niagara Mohawk that no violation of this limit had occurred.

The PFR limit for NMP1 was established as a locus of reactor power levels, as a function of core flow, from which the occurrence of abnormal operating transients will yield results within defined plant safety limits. Operation below the PFR limit, with all other fuel thermal limits maintained within their respective required ranges, ensures all postulated transients and accident yield acceptable results.

## III. ANALYSIS OF EVENT (cont'd)

A condition of PFR greater than 1.0 is required to be corrected within 15 minutes if found during the normal daily surveillance. A review of the normal surveillance that had been conducted during the time the condition had existed revealed that neither the corrected nor the uncorrected PFRs had been greater than 1.0 during the surveillance. However, the subsequent (1996) review indicated that two periods of approximately 3.5 consecutive hours on April 8, 1995 and 2 consecutive hours on April 9, 1995 existed where the corrected PFR was above the Technical Specification Limit of 1.0, and a maximum peak value of 1.03 was identified.

During the periods that PFR was greater than 1.00, all other fuel thermal limits were less than their respective required TS maximum limit, and the reactor was operated less than 100 percent of rated thermal power. However, NMP1 experienced a trip of the 115 High Pressure Feedwater Heater during this time period, resulting in a minor loss of feedwater heating (approximately 18 degrees F). PFR is sensitive to this type of transient, and if the transient were to occur at 100 percent of rated thermal power, this transient would be required to be analyzed for overall plant affect. Niagara Mohawk performed an analysis of the event that occurred, and found that no fuel limit had been exceeded, and therefore, concluded that cladding and fuel damage did not occur.

The consequence of the event are minimal in that no equipment was affected such that it could not respond to an actual event or transient.

## IV. CORRECTIVE ACTIONS

1. Upon the identification of the isolated and equalized transmitters, the transmitters were restored to service and the operating procedure revised to eliminate the requirement to isolate reactor recirculation loop flow transmitters for an idle/isolated recirculation loop; the assessment of plant operations during the event commenced; and a DER was generated that required an investigation into the cause of the event.

2. System and Design Engineering evaluated the effects of various recirculation loop configurations to identify the effects on the recirculation flow indication.

3. Backflow through isolated and idle reactor recirculation loops were evaluated to determine the impact on the licensing basis for the APRM flow biased SCRAM setpoints. Additionally, flow correction factors were identified for various modes of recirculation loop operation.

## IV. CORRECTIVE ACTIONS (cont'd)

4. Operations and System Engineering personnel will reevaluate appropriate Operating Procedures to ensure all potential impacts of the revised calibration process have been adequately addressed. Completion Date: August 31, 1996.

5. Additional information and instruction related to partial loop operation will be included in the operator training program. Completion Date: October 30, 1996.

6. A review of this event, causes, and corrective actions will be included in the continuing training programs for both technical staff personnel and operators. The review will highlight the significance of considering all plant operating modes when evaluating plant and/or procedure changes. Completion Date: December 31, 1996.

7. A lessons learned will be issued on the use of project management principles to improve the interaction of department team members. The lessons learned will be reviewed with appropriate supervision by August 30, 1996.

## V. ADDITIONAL INFORMATION

A. Failed components: None.

B. Previous similar events: None.

C. Identification of components referred to in this LER:

| COMPONENT | IEEE 803 FUNCTION | IEEE 805 SYSTEM ID |
|---|---|---|
| Recirculation Flow Transmitter | FIT | AD |