NIAGARA MOHAWK

GENERATION **BUSINESS GROUP** 

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

May 21, 1998 NMP1L 1319

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

RE: Docket No. 50-220 LER 98-06

Gentlemen:

In accordance with 10CFR50.73(a)(2)(i) and 10CFR50.73(a)(2)(ii), we are submitting LER 98-06, "Design Deficiency Associated with Control Room Emergency Ventilation System Radiation Monitors."

Very truly yours,

Abert & Smith

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Robert G. Smith Plant Manager - NMP1

RGS/GJG/kap Enclosure

xc: Mr. H. J. Miller, Regional Administrator Mr. B. S. Norris, Senior Resident Inspector Records Management

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NRC FORM 366 U.S. NUCLEAR REGULATORY COMM LICENSEE EVENT REPORT (LER)				OMMISSION	MMISSION APPROVED OMB NO. 3150-0104 EFPIRES: ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLEC REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-536), U.S. NUCLEAR REGULATO										
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ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single space typewritten lines) (16)

On April 21, 1998, Niagara Mohawk Power Corporation (NMPC) determined that the Nine Mile Point Unit 1 (NMP1) Control Room Emergency Ventilation System (CREVS) Radiation Monitor (RM) setpoint had been incorrect since installation in 1984. Subsequently, on April 28, 1998, NMP1 initiated a plant shut down when it became evident that the setpoint could not be adjusted to assure that the control room remained habitable during all accident conditions. The shutdown was completed on April 29, 1998.

The cause of the incorrect RM setpoint is that engineering personnel in 1984 did not perform an adequate evaluation of the setpoint to address Main Steam Line Break (MSLB) and Loss of Coolant Accident (LOCA) releases.

Corrective actions include modifying the system logic to initiate CREVS directly from MSLB and LOCA signals and reperformance of the habitability analysis. Additionally, the design process has been changed to improve design evaluation and verification.

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

### I. DESCRIPTION OF EVENT

On April 21, 1998, Niagara Mohawk Power Corporation (NMPC) engineers were performing a design review of the Nine Mile Point Unit 1 (NMP1) Control Room Emergency Ventilation System (CREVS) due to recent operations experience information provided by Nine Mile Point Unit 2 (NMP2). On March 28, 1998, following a partial loss of offsite power at NMP2, engineers discovered that the design of the NMP2 ventilation system actuation scheme incorporates a time delay feature that was not previously recognized. To determine whether a similar condition existed at NMP1, the design of the NMP1 control room emergency ventilation system was reviewed. During that review, engineering personnel determined that CREVS Radiation Monitors (RMs) had potentially been set nonconservative and would not actuate the system for a Main Steam Line Break (MSLB). The RMs were set at 300 counts per minute (cpm) and preliminary calculations showed that the combination of background radiation and accident releases would be less than 800 cpm. The Control Room Air Treatment System was consequently declared inoperable and Technical Specification (TS) 3.4.5.e was entered which allowed operation for 7 days to restore operability. When confirmatory calculations were performed, engineering personnel discovered that the radiation monitors could not be set to initiate during a Loss of Coolant Accident (LOCA). Therefore, a plant shutdown was initiated on April 28, 1998 to make necessary modifications. The plant shutdown was completed on April 29, 1998.

NMPC determined that the RM's setpoints had been set inappropriately high since 1984 when the CREVS was modified to initiate automatically. In submittals of January 31, 1984 and March 19, 1984, NMPC indicated that "..., the requirement of General Design Criterion (GDC) 19 that adequate radiation protection be provided to permit access and occupancy of the control room under accident conditions without personnel receiving in excess of 5 Rem whole body or its equivalent to any part of the body for the duration of the accident, has been satisfied." However, contrary to what was assumed in the analysis with the RMs set at 800 cpm, the CREVS would not have initiated automatically, since the radioactivity from a design basis Main Steam Line Break (MSLB) or Loss of Coolant Accident (LOCA), plus background would be below 800 cpm.

The NRC's Safety Evaluation Report, dated May 21, 1984 concerning NUREG-0737, Item III.D.3.4, Control Room Habitability, in response to NMPC submittals, accepted the modification to install redundant radiation monitors to provide the initiation function. The calculation that was performed to determine the appropriate radiation monitor setpoint assumed the MSLB as the bounding accident. This calculation was the basis for assuming that the radiation monitors would provide a signal to automatically isolate the normal intake and initiate the emergency ventilation system when the setpoint of 1000 cpm was exceeded. The RM was set at 800 cpm to account for uncertainty associated with instrumentation drift and calibration.

Calculations completed April 1998 showed that a lower setpoint of  $\leq 210$  cpm would detect and initiate control room emergency ventilation for the spectrum of MSLB conditions which would exceed GDC 19 criteria without filtration. However, calculations showed that the existing radiation monitors could not be set to detect LOCA accidents, therefore, GDC 19 criteria could not be met.

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# II. CAUSE OF EVENT

The cause of the RM inadequate setpoint is that engineering personnel in 1984 did not perform an adequate evaluation of the setpoint to address MSLB and LOCA releases. The setpoint calculation used the MSLB calculated doses as an input, but the methodology was flawed (e.g., the dispersion factors were wrong). In addition, there is no evidence that a setpoint based upon a LOCA was calculated.

Contributing to this event was inadequate design control in the 1983 and 1984 time period. Personnel in the Health Physics group performed the habitability calculations. This group was not part of the design group and had informal controls for their work. Consequently, the calculations and setpoints were not properly evaluated or independently verified, which contributed to incorrect setpoints.

# III. ANALYSIS OF EVENT

This event is reported in accordance with 50.73(a)(2)(ii)(B), "In a condition that was outside the design basis of the plant;" and 10CFR50.73(a)(2)(i)(A), "The completion of any nuclear plant shutdown required by the plant's Technical Specifications."

The purpose of the CREVS is to provide filtered air to the control room, to maintain a positive pressure in the control room relative to the adjacent areas to prevent infiltration and to assure adequate cooling to protect equipment and personnel during a Design Basis Accident. The system can be manually initiated from the control room.

In the event of a LOCA, NMPC would have entered the Emergency Plan which would require staffing of the emergency facilities. As part of that response, Radiation Protection technicians survey the emergency facilities and then survey the areas outside and inside the plant. Those surveys would have included the Control Room. If CREVS were not in operation, surveys would have identified the condition and CREVS would have been manually initiated. These actions would have been taken within hours of the initiation of the event. Since the LOCA doses are over an extended period, the consequences would have been minimal.

It has been determined that if the reactor coolant activity is below 9.5 micro curies per gram, that CREVS initiation is not required to mitigate the radiological consequences of the design basis MSLB event (the most limiting for early doses), or small break LOCAs in secondary containment. The NMP1 operating history is that reactor coolant activity has always been significantly below 9.5 micro curies per gram. Therefore, the results of this event would have been of minimal consequence to operations personnel.

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## IV. CORRECTIVE ACTIONS

- 1. In accordance earlier with TS 3.4.5, NMP1 was shutdown on April 28, 1998.
- 2. The CREVS initiation logic is being modified prior to plant startup from the current outage such that direct hard wired signals of a MSLB or LOCA will initiate the system
- 3. The habitability analyses for NMP1 is being re-performed in support of a TS amendment prior to plant startup from the current outage.
- 4. The CREVS will have a System Design Basis Document developed by October 30, 1998.
- 5. The engineers who performed the 1984 analysis are no longer employed at NMPC. However, the valuable lessons learned from the event will be provided to Engineering personnel during Engineering cycle training by October 15, 1998.
- 6. Additional health physics calculations have been reviewed, and additional discrepancies have been identified. These discrepancies have been dispositioned in accordance with NMPC's Corrective Action Program and no further operability or reportability concerns were identified.
- 7. Since the early 1990s, NMPC has made substantial improvements to our design control process. To ensure that design changes are properly evaluated, the design process requires an independent verification of design criteria and bases including system interaction considerations. NMPC believes that these improvements are effective in preventing events of this nature.
- 8. The Health Physics group is now totally integrated in the design process.

# V. ADDITIONAL INFORMATION

- A. Failed components: none.
- B. Previous similar events:

NMP1 LER 97-07, "Potential Control Room Emergency Ventilation System Operation Outside the Design Basis due to Inadequate Evaluation", describes the use of the Control Room Smoke Purge System on occasions when CREVS was required. Since the Control Room Smoke Purge System does not automatically isolate except upon activation of the carbon dioxide fire suppression system, the CREVS would not have been able to maintain the design requirements for Control Room habitability.

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#### V. ADDITIONAL INFORMATION (Cont'd)

The cause of that event was inadequate evaluation of the interface between the Smoke Purge System and the CREVS. One corrective action in LER 97-07 was to review selected modifications performed in the early 1980's time frame for system interaction deficiencies. Since the modifications selected focused on system interaction, the setpoint aspects of CREVS was not considered.

NMP1 LER 98-02, "Failure of the Control Room Emergency Ventilation to meet the Differential Pressure Requirements," describes the results of a test which demonstrated that the CREVS did not meet the positive differential pressure requirements between the control room and its surroundings. The NMP1 UFSAR states that the CREVS inlet damper is full open, however, the damper had been moved during operations when CREVS was required to be operable for personnel comfort reasons. In addition, total system flow was not monitored. Corrective actions from that LER focused on physical configuration and system operation; there were no corrective actions associated with initiation logic.

#### C. Identification of components referred to in this LER:

COMPONENT	IEEE 803 FUNCTION	IEEE 805 SYSTEM ID
Control Room Emergency Ventilation System	NA	VI