Mr. Marvin I. Lewis 3133 Fairfield St. Philadelphia, PA 19136

Dear Mr. Lewis:

Your letter of May 23, 1997, to the U.S. Nuclear Regulatory Commission (NRC) has been referred to me for reply. In your letter, you comment on the core shroud cracking problem at Nine Mile Point Nuclear Station, Unit No. 1 (NMP1) based upon the NRC meeting with the public on April 14, 1997, in Fulton, New York, and the NRC Safety Evaluation of May 8, 1997. You state that the results in the Safety Evaluation appear "technically indefensible on its face" and you request that the restart be halted until the NRC completes an adequate evaluation. You base this request upon several specified problems. The staff has addressed your concerns in the enclosure.

NMP1 was restarted on May 13, 1997, following the issuance of the NRC staff's Safety Evaluation dated May 8, 1997, that addressed the root cause of the tierod end damage; other vessel internals susceptible to intergranular stresscorrosion cracking at NMP1 and elsewhere; and, the potential influence of vibrations. The NRC staff has evaluated your concerns and finds no new information that would affect the staff's position. The NRC staff finds no reason to require that the current operation of NMP1 be halted pending further consideration of these matters.

I trust you will find this letter responsive to your concerns. Thank you for sharing them with the NRC.

Sincerely,

ORIGINAL SIGNED BY:

NRC FILE CENTER COPY

Steven A. Varga, Director Division of Reactor Projects - I/II Office of Nuclear Reactor Regulation

DFOI

50 120

Enclosure: Response to Concerns

*See previous concurrence

DOCUMENT NAME: G:\NMP1\970416.GT <u>DISTRIBUTION</u>: See attached list To receive a copy of this document, indicate in the box: "C" = Copy without attachment/enclosure "E" = Copy with attachment/enclosure "N" = No copy

OFFICE	PM: PDI-1 E	LA:PDI-1 ¥	D:PDI-1 ¥	TECH ED*	NRR:DE*	NRR:DSSA*
NAME	DHood/rs1	SLittle	ADromerick(A)	BCalure	B. Sheron	G. Holahan
DATE	06/27 /97	06/2-7 /97	07/ 1 /97	06/27/97	06/27/97	06427497
OFFICE	RGN I \star	DD:NRR	D:DRPE*	OGC *	ADPR:NRR	10:MRB
NAME	LDoerflein telecon	JZwolinski	SVarga		RZimmerman	Scollins
DATE	08 30/97	07/ /97	06/27/97	07/1 /97	07/ 2 /97	07/3 /97

Official Record Copy

...10 07110065 97070 ADOCK 05000220 PDR PDR



UNITED STATES NUCLEAR REGULATORY COMMISSION WASHINGTON, D.C. 20555-0001

July 3, 1997

Mr. Marvin I. Lewis 3133 Fairfield St. Philadelphia, PA 19136

Dear Mr. Lewis:

Your letter of May 23, 1997, to the U.S. Nuclear Regulatory Commission (NRC) has been referred to me for reply. In your letter, you comment on the core shroud cracking problem at Nine Mile Point Nuclear Station, Unit No. 1 (NMP1) based upon the NRC meeting with the public on April 14, 1997, in Fulton, New York, and the NRC Safety Evaluation of May 8, 1997. You state that the results in the Safety Evaluation appear "technically indefensible on its face" and you request that the restart be halted until the NRC completes an adequate evaluation. You base this request upon several specified problems. The staff has addressed your concerns in the enclosure.

NMP1 was restarted on May 13, 1997, following the issuance of the NRC staff's Safety Evaluation dated May 8, 1997, that addressed the root cause of the tierod end damage; other vessel internals susceptible to intergranular stresscorrosion cracking at NMP1 and elsewhere; and, the potential influence of vibrations. The NRC staff has evaluated your concerns and finds no new information that would affect the staff's position. The NRC staff finds no reason to require that the current operation of NMP1 be halted pending further consideration of these matters.

I trust you will find this letter responsive to your concerns. Thank you for sharing them with the NRC.

Sincerely,

ulu ypa

Steven A. Varga, Divector Division of Reactor Projects - I/II Office of Nuclear Reactor Regulation

Enclosure: Response to Concerns

Response to Concerns

1. The conclusion that the reactor may operate safely for 10,600 hours is based on some esoteric reasoning which ignores many contradictory considerations: sensitized grain boundaries, interference with vibrational pickups, origin of tie rod end damage.

Response - Sensitized Grain Boundaries

In your letter you state that stress-corrosion cracking refers to numerous symptoms (including stress, sensitization of grain boundaries with precipitate, and a corroding medium) and that other structures within the reactor vessels of many reactors have been observed over the years to be experiencing intergranular stress-corrosion cracking (IGSCC). You indicate that you believe that the NRC must require that all structures susceptible to IGSCC be evaluated and inspected before restart of NMP1.

Niagara Mohawk Power Corporation (NMPC) follows a program of systematic inspections of reactor pressure vessel internal components established by boiling-water reactor (BWR) utilities when determining the scope of inspections for a given outage. This program, known as the BWR Vessel Internals Project - Vessel Program, includes safety evaluations for vessel internals and assigns inspection priorities on the basis of safety significance and other factors such as material susceptibility to IGSCC. In Enclosure 6 of a letter to NRC dated April 8, 1997, NMPC identified the components inside the reactor vessel that were visually inspected during the 1997 refueling outage. In addition to the inspection of the core shroud and its tie-rod repair assemblies, NMPC inspected core spray piping and spargers, the steam dryer, the moisture separator, the upper core grid, incore dry tubes, a cladding sample, feedwater spargers, the blend radius of feedwater nozzles, and the fuel support castings. The results of the inspection showed no new indications and no growth or change in previously identified indications. The NRC staff believes that the scope of inspection of vessel internal components for the spring 1997 outage was adequate.

Response - Vibration Detection Interference

In your letter you state that vibration is one source of stress for the core shroud and that you are concerned that the change in vibrations as a result of shroud cracks may affect the efficacy of the vibration detection system that senses vibration noise to provide for early detection of cracks as part of the "leakbefore-break" technology. Also it is our understanding that you believe this consideration must be investigated before the NMP1 restart.

There is no requirement to install vibrational pick-up sensors on the NMP1 reactor internals or piping to identify cracking. Vibration monitoring is more typically used for other applications such as loose parts monitoring. Leak-before-break technology is not applicable to piping susceptible to IGSCC because the associated failure mechanism may not provide sufficient leakage prior to catastrophic failure. The integrity of IGSCC-susceptible piping and vessel internals is ensured through periodic inspections.

Response - Origin of Tie Rod End Damage

In your letter you state that the origin of the damage at the end of the tie-rod was an inadequate engineering evaluation by NMPC, that the NRC should review NMPC's engineering evaluation criteria and methods, and that the NRC should address the adequacy of the engineering evaluation before restart.

After observing and evaluating the tie-rod end damage, NMPC concluded, and the NRC staff agrees, that the damage was due to loosening of the tie-rod during plant operation. As described in the NRC staff's safety evaluation dated May 8, 1997, the looseness occurred because the tie-rod toggle bolts moved within the oversized bolt holes in the lower support cone. NMPC's revised installation procedures include measures to prevent tie-rod looseness and to maintain tie-rod vertical forces as intended in the original design. The latch at the lower end of the tie-rod failed because the latch experienced larger-than-anticipated vertical displacements as a result of the looseness in the tie-rod. The displacements subjected the latch to failure by stress-corrosion cracking. Recently completed metallurgical examinations of the failed latch have confirmed NMPC's initial conclusion. The new latch has been redesigned to accommodate larger vertical displacements while maintaining its original function of locking the wedge to the lower spring structure. The calculated stresses in the latch are within the values allowed by the American Society of Mechanical Engineers Boiler and Pressure Vessel Code and the latch has been analyzed as being resistant to stress corrosion for a minimum of 2 years, assuming worst displacements in the latch. The tie-rod lower attachment, where movement of the toggle bolts caused the tie-rod looseness and tie-rod end damage, is the only area of the NMP1 shroud repair design that differs from other General Electric (GE) tie-rod installations. All other aspects of the tie-rod repair design have been evaluated by the NRC staff, both at NMP1 and for other BWR installations. The NRC staff concludes that NMPC and GE have been responsive in resolving the identified tie-rod anomalies. The condition of the tie-rod assemblies will continue to be monitored through future inspections, particularly in the areas where damage occurred. The revised design and installation procedure, along with continued inspections, provides reasonable assurance that the tie-rod assemblies will perform their intended functions.

 The requirement that Niagara Mohawk maintain water chemistry as a condition of operation ignores the evidence that the water chemistry was not previously maintained in strict accordance with good practice. A history of poor performance does not bode well for a future of good performance.

Response

In your letter you state that once sensitization or cracking develops, exposure to a corroding medium is not required to continue the development of more and larger cracks and, therefore, you are concerned that the requirement imposed by the NRC to ensure control of chemistry during current operation may not be of any benefit.

The results of laboratory testing have shown that the maintenance of good water chemistry is effective in mitigating IGSCC. In its letter of April 30, 1997, NMPC committed to continue operating NMP1 in accordance with the Electric Power Research Institute's water chemistry guidelines. In accordance with Action Level 1 of the guidelines, if the conductivity of the reactor coolant exceeds the limit of 0.3 microSiemen/cm, the conductivity must be reduced to that value or lower within 96 hours. NMP1 has been operating at less than 0.3 microSiemen/cm during the last seven cycles and at a much lower conductivity, less than 0.10 microSiemen/cm, during the past three cycles. Thus, the history of chemistry control at NMP1 since the issuance of Generic Letter (GL) 94-03, "Intergranular Stress Corrosion Cracking of Core Shrouds in Boiling Water Reactors" dated July 25, 1994, has shown that the EPRI guidelines for chemistry control have been met.

3. Aside from considerations such as causing strainer blockage during a loss-ofcoolant accident (LOCA), changing heat transfer considerations due to loss of geometry, the cracked core shroud raises many other possible interferences with good practice; specifically, sensitization of other structures susceptible to IGSCC.

Response

The NRC staff is unaware of any credible means by which a cracked or failed core shroud would cause strainer blockage during a LOCA. The core shroud failure mode results in bypass leakage from the core through the shroud by way of potential cracks in the horizontal and vertical welds. Complete 360 degree failure of the horizontal welds results in cylindrical sections of the shroud stacked on top of each other. This mode of failure would not cause blockage to the emergency core cooling system (ECCS) strainers. In addition, to prevent any potential non-design movement of the cylindrical sections, tie-rod assemblies were installed at NMP1 to maintain the structural integrity of the shroud with postulated 360 degree throughwall failure of horizontal welds (H1 through H7). The tie-rod assemblies were designed to limit horizontal movement to less than 0.75 inch and vertical movement to less than 0.5 inch. This assumes that the horizontal welds were cracked completely throughwall. Therefore, the NRC staff does not believe that failure of the core shroud would cause blockage of the ECCS strainers.

Bypass leakage from the core through the core shroud does affect the subcooling of the reactor. Generally, analyses have shown that with all horizontal welds cracked 360 degrees throughwall, core inlet subcooling decreases, having a only a minor effect on the fuel cycle length. The staff notes that if the horizontal welds were cracked, an external load would be required to be applied to the shroud for any type of movement to occur. As previously stated, tie-rod assemblies were installed to maintain the structural integrity of the shroud. The tie-rod assemblies were designed to withstand design-basis earthquake loads occurring in combination with either a main steamline break or a recirculation line break. The staff notes that these design requirements are beyond the design basis for NMP1. The NRC staff has concluded that the core geometry can be maintained even with potential 360 degree throughwall cracks in the shroud H1 through H7 welds. DISTRIBUTION: Docket File (w/original incoming) PUBLIC ED0#970416 L. Callan H. Thompson E. Jordan P. Norry J. Blaha S. Collins/F.Miraglia R. Zimmerman PDI-1 Reading (w/incoming) S. Varga A. Dromerick M. Thadani M. Boyle (e-mail only) OGC OPA **OCA** SECY #CRC-97-0552 NRR Mail Room (EDO#970416 w/incoming) N. Olson C. Norsworthy D. Hood w/incoming S. Little L. Doerflein, RI



ACTION

EDO Principal Correspondence Control

DUE: Mr 17/25/97

EDO CONTROL: G970416 DOC DT: 05/23/97 FINAL REPLY:

Marvin I. Lewis Philadelphia, PA

TO:

FROM:

Chairman Jackson

FOR SIGNATURE OF :

** GRN **

CRC NO: 97-0552

ROUTING:

Callan

Jordan Thompson Norry Blaha Burns

DESC:

OPPOSES THE RESTART OF NINE MILE POINT UNTIL ADEQUATE EVALUATION HAS BEEN COMPLETED

DATE: 06/04/97

ASSIGNED TO:

CONTACT:

 NRR
 Collips
 Martin

 SPECIAL INSTRUCTIONS OR REMARKS:
 Instructions or REMARKS:

 For Appropriate Action.

TAC M98 905

OFFICE OF THE SECRETARY CORRESPONDENCE CONTROL TICKET

· · · · · · ·

PAPER NUMBER:	CRC-97-0552 LOGGING DATE: Jun 2 97				
ACTION OFFICE:	EDO				
AUTHOR: AFFILIATION:	MARVIN LEWIS PENNSYLVANIA				
ADDRESSEE:	CHAIRMAN JACKSON May 24 97 FILE CODE: OPPOSES THE RESTART OF NINE MILE POINT UNTIL ADEQUATE EVALUATION HAS BEEN COMLETED				
LETTER DATE:					
SUBJECT:					
ACTION:	Appropriate				
DISTRIBUTION:	CHAIRMAN	a.			
SFECIAL HANDLING:	NONE				
CONSTITUENT:					
NOTES:	LTR UNDATEDDOC DATE IS ACTUALLY THE POST MARKED DATE				
DATE DUE:					
SIGNATURE: AFFILIATION:	- DATE SIGNED:				