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 MANGAN, C. V.      Niagara Mohawk Power Corp.  
 RECIP. NAME      RECIPIENT AFFILIATION  
 ADENSAM, E. G.      BWR Project Directorate 3

SUBJECT: Forwards request for schedular exemption from further analysis of & possible mod to MSIVs. Final rept scheduled to be submitted on B61010 re resolution of MSIV leakage problem.

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NIAGARA MOHAWK POWER CORPORATION/300 ERIE BOULEVARD WEST, SYRACUSE, N.Y. 13202/TELEPHONE (315) 474-1511

October 2, 1986  
(NMP2L 0894)

Ms. Elinor G. Adensam, Director  
BWR Project Directorate No. 3  
U.S. Nuclear Regulatory Commission  
7920 Norfolk Avenue  
Washington, DC 20555

Dear Ms. Adensam:

Re: Nine Mile Point Unit 2  
Docket No. 50-410

On August 28, 1986, Niagara Mohawk Power Corporation submitted an exemption request to permit fuel loading and performance of those startup tests which can be conducted within the Technical Specifications Operational Conditions 4 and 5 while some recently identified problems with the Main Steam Isolation Valves were resolved.

Subsequent to that submittal, we discovered an additional problem with those valves; namely, that they leaked more than the allowable amount. We believe that we have solved this latest problem, but implementing the solution will require additional time. The final report on the resolution of the Main Steam Isolation Valve leakage problem is scheduled to be submitted by October 10 to the NRC Administrator for Region I in accordance with the requirements of 10CFR50.55(e). This report will include a detailed description of the problem and its cause, an evaluation of its safety impact, the corrective actions being implemented, and the long-term preventive actions and monitoring that will be conducted.

The August 28th submittal has been revised to reflect the impact of the resolution of the leakage problem. The revisions are indicated in the margin in the attached exemption request, which supersedes the August 28, 1986 version. The revisions are minor in terms of what is requested.

Very truly yours,

C. V. Mangan  
Senior Vice President

RAC/pns  
2102G

xc: W. A. Cook, NRC Resident Inspector  
Project File (2)

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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

In the Matter of )  
Niagara Mohawk Power Corporation )  
(Nine Mile Point Unit 2) )

Docket No. 50-410

AFFIDAVIT

C. V. Mangan, being duly sworn, states that he is Senior Vice President of Niagara Mohawk Power Corporation; that he is authorized on the part of said Corporation to sign and file with the Nuclear Regulatory Commission the documents attached hereto; and that all such documents are true and correct to the best of his knowledge, information and belief.

C. V. Mangan

Subscribed and sworn to before me, a Notary Public in and for the State of New York and County of Onondaga, this 2<sup>nd</sup> day of October, 1986.

Christine Austin  
Notary Public in and for  
Onondaga County, New York

My Commission expires:

CHRISTINE AUSTIN  
Notary Public in the State of New York  
Qualified in Onondaga Co. No. 4787687  
My Commission Expires March 30, 1987

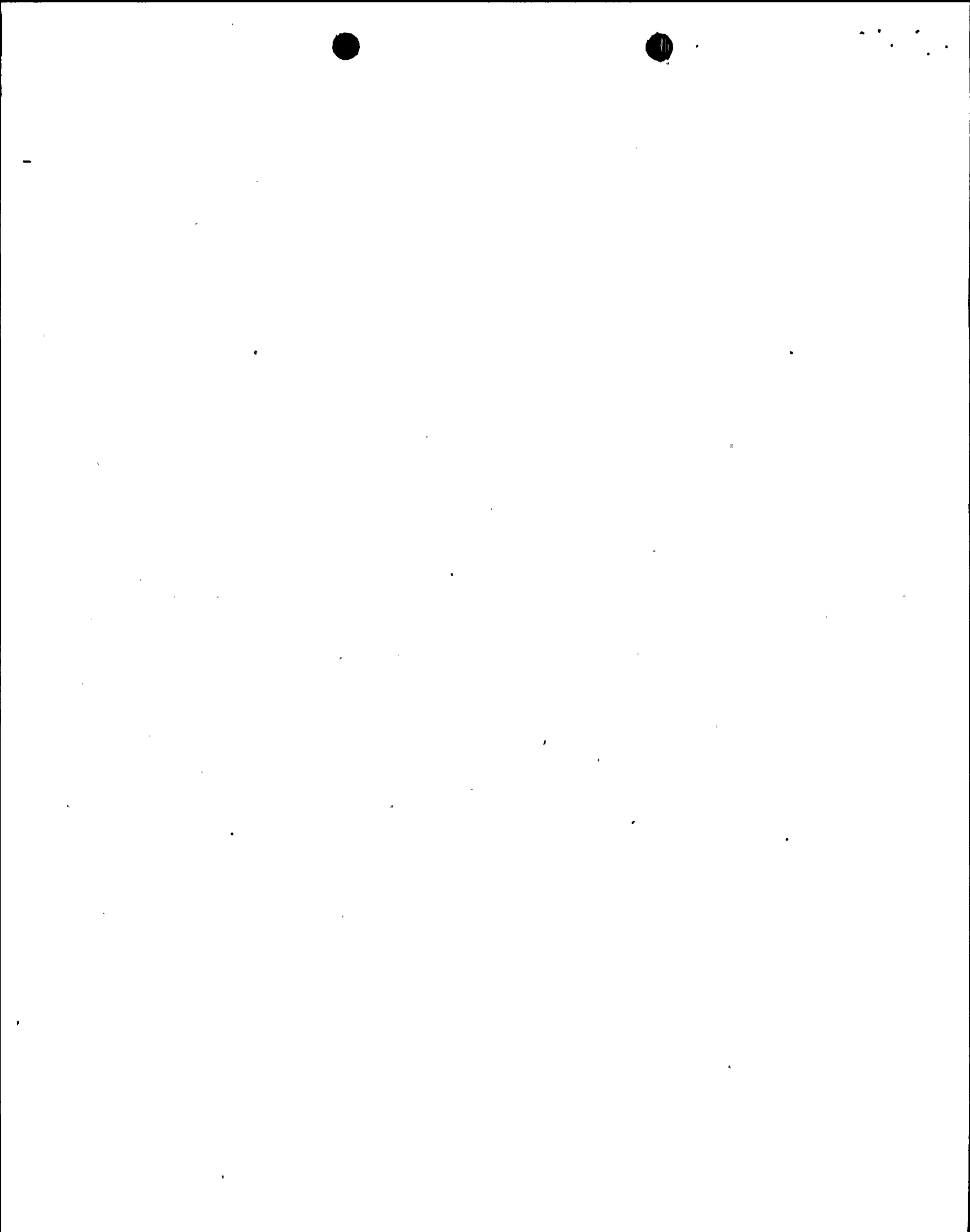
CHRISTINE AUSTIN  
History Public in the State of New York  
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By Commission Expires March 30, 19\_\_

APPLICATION FOR SCHEDULAR EXEMPTION  
RELATED TO FURTHER ANALYSIS OF AND POSSIBLE  
MODIFICATION TO MAIN STEAM ISOLATION VALVES

I. Introduction and Summary

Nine Mile Point Unit 2 ("NMP Unit 2") is a nuclear power plant employing a General Electric Company single cycle, forced circulating boiling water reactor ("BWR") with a plant rated core thermal power level of 3323 MWt corresponding to a net electrical output of 1080 MWe. Niagara Mohawk tendered an application for an operating license for NMP Unit 2 on January 31, 1983. The Final Safety Analysis Report ("FSAR") was docketed on April 12, 1983 subsequent to the completion of the Staff acceptance review.

The main steam isolation valve design and operation are described in Section 5.4.5 of the Final Safety Analysis Report. The Main Steam Isolation Valves are 24-in, reduced port (21 in.) ball-type valves. Two isolation valves are located in each of the four main steam lines; one valve inside containment and one valve just outside containment. They are provided to isolate the main steam lines in the event of a design basis accident in order to limit any radioactive release to the environment, to limit any inventory loss from the reactor vessel, and to terminate the release of mass and energy in the event of a main steam line rupture outside containment.

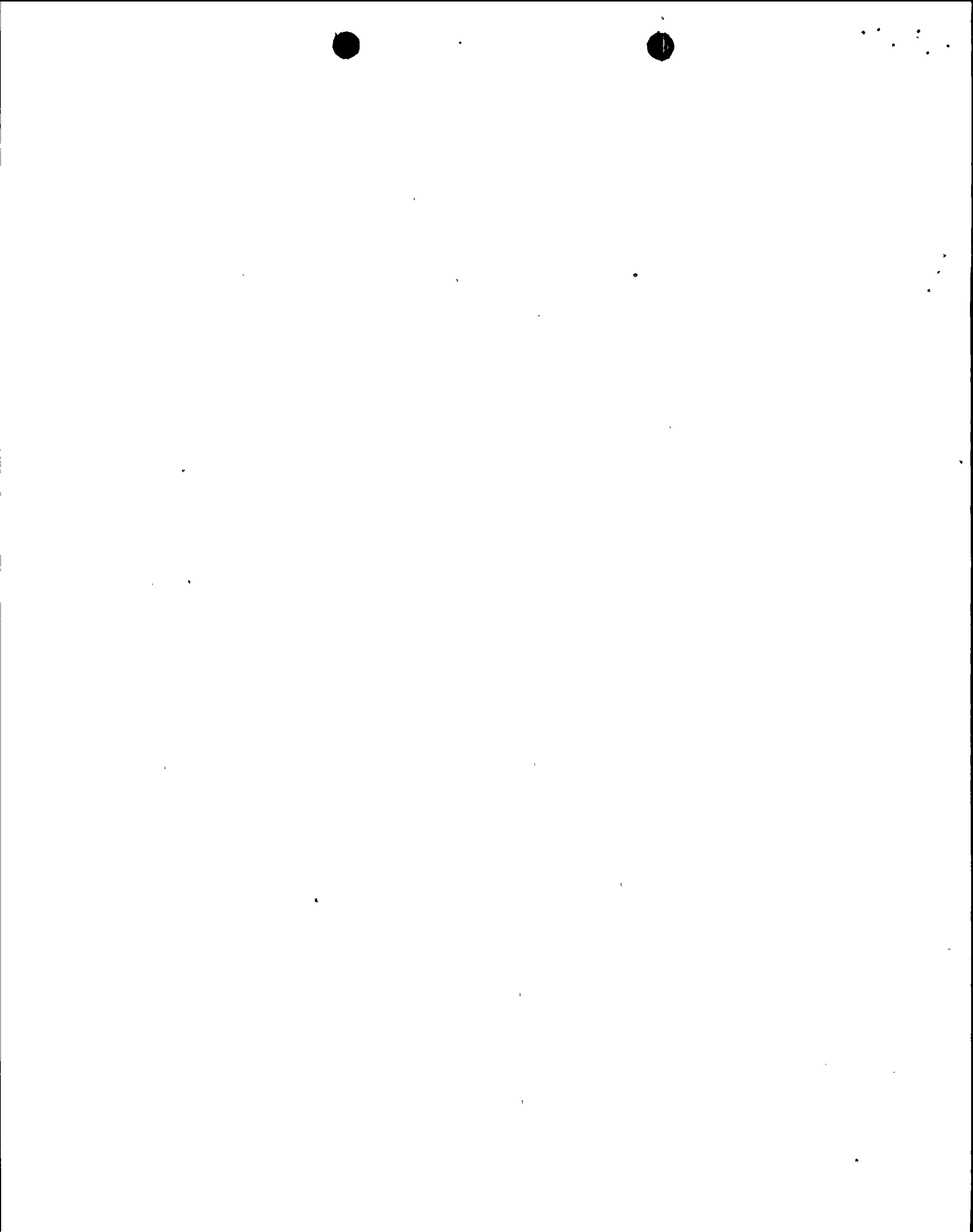




Recent testing of the main steam isolation valves has disclosed three problems:

- 1) The mechanical actuator which closes the valve did not always function properly. Two types of problems were encountered: a) the actuator system operated slowly, so that the valve did not close within the time (5 seconds) called for in the Technical Specifications; Sections 3/4.4.7 and 3.4.6.3; and b) on occasion, the actuator did not operate sufficiently to permit the valve to move from its open position.
- 2) A crack was discovered in a latching roller, a component of the valve actuator. This is similar to a problem that was previously reported to the Nuclear Regulatory Commission under 10CFR50.55(e) (in NMPC letter number 7600, December 9, 1983, C. V. Mangan to R. W. Starostecki).
- 3) A repetition of previously successful Type C leak tests resulted in excessive leakage rates for all of the valves. Leak rates ranged from 16 to greater than 42 standard cubic feet per hour (scfh), compared to the Technical Specification allowable limit (Section 3/4 6-6) of 6.0 scfh.

The above problems may be divided into two categories: one, Items 1) and 2) above, concern the actuation of the valves (i.e., the ability of the valves to assume the closed position when called upon to do so) and; two, Item 3) above, concerns the ability of the valve to perform its isolation function



when in the closed position. The problems are sufficiently independent that the solutions of the two categories can be separately pursued.

In light of the above, the main steam isolation valves are not operable in the context of the Technical Specifications, they will not be initially installed as described in the Final Safety Analysis Report, and the requirements of 10CFR50, Appendix A, General Design Criteria 54 and 55 are not met. However, when closed, the isolation function to assure integrity of the Reactor Coolant Pressure Boundary and Primary Containment will be provided.

Niagara Mohawk therefore requests a schedular exemption pursuant to the Commission's regulations under 10CFR 50.12(a) to the requirements of 10CFR 50 Appendix A, General Design Criterion 54 (in regard to the provision of redundancy, reliability and performance capability of the isolation and containment capability of the main steam piping system penetrating primary reactor containment) and General Design Criterion 55 (in regard to the provision of one automatic isolation valve inside and one automatic isolation valve outside containment) to allow completion of the analysis required to provide resolution of the problems, the procurement of equipment found necessary to resolve the problems, completion of any required modification, and the testing to prove the acceptability of the resolution of the problems.



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The requested exemption is to permit fuel loading and performance of those startup tests which can be conducted within the Technical Specifications Operational Conditions 4 and 5 (See Technical Specifications Table 1.2).

The following discussion sections demonstrate that the grant of an exemption would be in accordance with the requirements of 10CFR50.12(a). In particular, as discussed in detail below, grant of the exemption would not present an undue risk to public health and safety.

There are no Technical Specification requirements regarding the position of the valves, i.e., whether they are open or closed, during operation in Modes 4 and 5. At least one isolation valve in each line will be kept closed and deactivated at all times until the required testing, including that described in our schedular exemption requests concerning the Offgas Systems and the Electrical Hydraulic Control System which were submitted in our letters dated May 7, 1986 and July 13, 1986, respectively, is complete.

The requested exemption also meets the other requirements of the regulations. Special circumstances exist which meet the standard under 10CFR50.12(a)(2). The requested exemption is authorized by applicable law, including the Atomic Energy Act, 42 U.S.C. 2011 et seq., and National Environmental Policy Act, 42 U.S.C. 4321 et seq., and is consistent with the common defense and security.



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II. The Requested Exemption Does Not  
Present An Undue Risk To The  
Public Health And Safety

The requested exemption will permit the loading of fresh fuel into the reactor vessel. Fuel loading takes place with the reactor vessel and the drywell open; there is no containment, so no need for containment isolation. During fuel loading the vessel water level will be above the vessel steam line nozzle, a main steam line plug will be in place in each nozzle, and at least one isolation valve in each main steam line will be closed and deactivated\* in order to maintain Secondary Containment Integrity as required by the Technical Specifications for the fuel loading process. Such operation is permitted by the Technical Specifications.

It is expected that there will be work activities associated with these valves during the period of the exemption. No occupational radiation exposure is expected, however, as the reactor will not achieve criticality. There will be no steam produced, as the temperature in the vessel will not be greater than 200°F.

\*A Standing Order, issued by the Station Superintendent, will require that one valve in each line be closed whenever Secondary Containment Integrity is required by the Technical Specification. To ensure closure, the circuit breaker controlling the hydraulic pump for the closed valve will be opened and marked up (tagged out).



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Operation as described above, presents no undue risk to the health and safety of the public, particularly as there will be virtually no fission product inventory in the fuel at the conclusion of the exemption period.

III. Special Circumstances Exist Which  
Warrant Issuance Of The Requested  
Exemption

Special circumstances exist under the categories contained in 10CFR50.12(a)(2) any of which would warrant issuance of the requested exemption. Undue hardship and costs would otherwise result that are significantly in excess of those incurred by other licensees. Further, the exemption is temporary and Niagara Mohawk has made good faith efforts to comply with licensing requirements. These special circumstances are discussed in accordance with the classification contained in the rule.

A. Undue Hardship

(iii) Compliance would result in undue hardship or other costs that are significantly in excess of those contemplated when the regulation was adopted, or that are significantly in excess of those incurred by others similarly situated . . .

Completion of the additional analyses required to demonstrate operability of the main steam isolation valves as well as any necessary hardware changes and testing, prior to fuel loading of the facility would result in undue hardship and costs. Considering all factors, a delay in operation would



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result in a monthly delay cost of \$60,000,000. The \$60 million/month has two components. Fifteen million dollars is estimated as additional overhead construction costs, that is, the overhead involved in maintaining the construction status at the site. The remaining forty-five million dollars constitutes financing costs. This \$60 million cost does not include the cost of replacement power.

The fuel loading and testing for which the exemption is requested are scheduled to take about 30 days. At the \$2,000,000 per day cost of delayed operation, failure to grant the exemption would add \$60,000,000 to the cost of the plant.

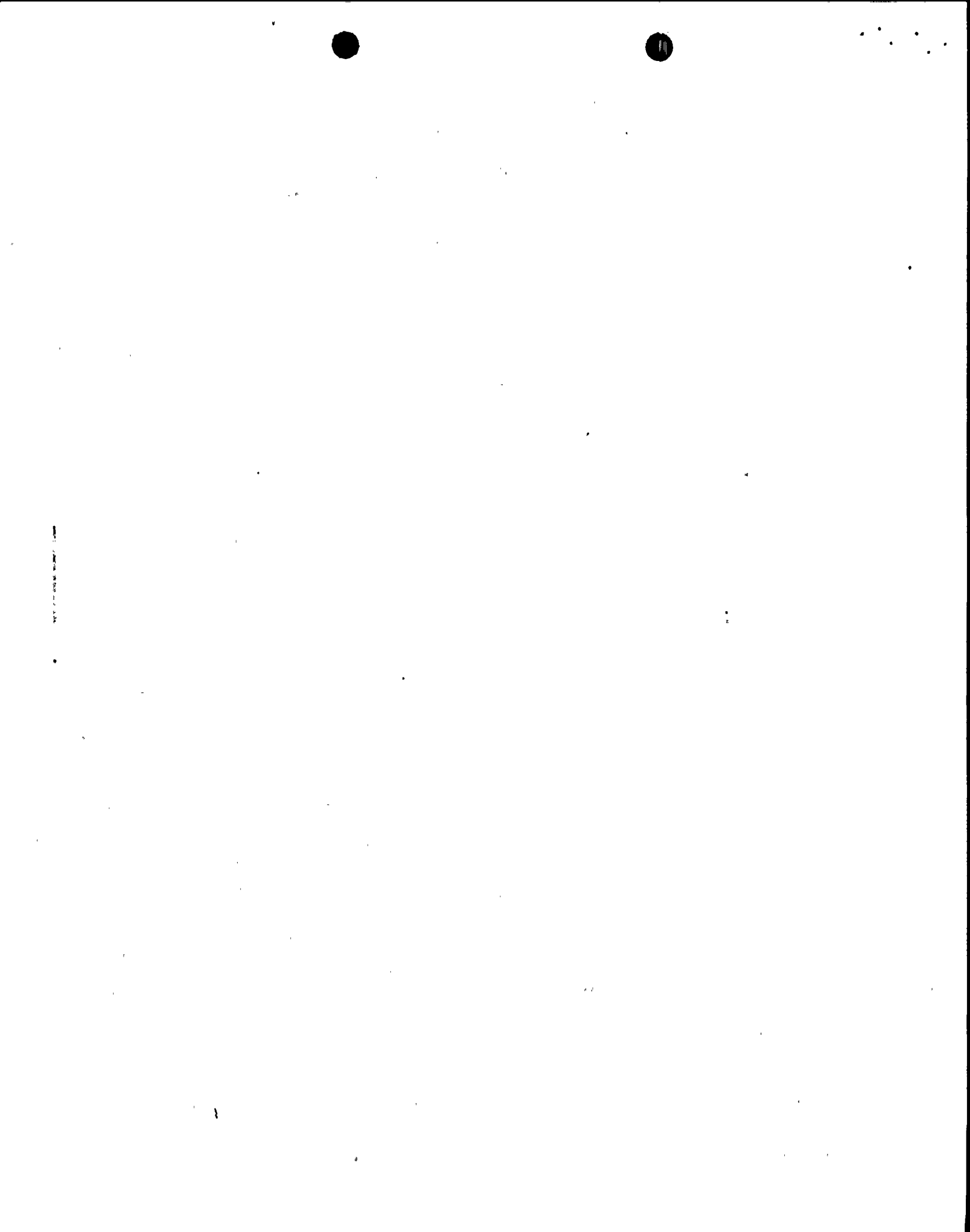
Inasmuch as these problems were identified only shortly before fuel loading for this facility, they result in costs significantly in excess of those incurred by other applicants.

Thus, special circumstances exist which warrant granting of the exemption.

B. Applicant's Good Faith Efforts

(v) The exemption would provide only temporary relief from the applicable regulation and the licensee or applicant has made good faith efforts to comply with the regulation ...

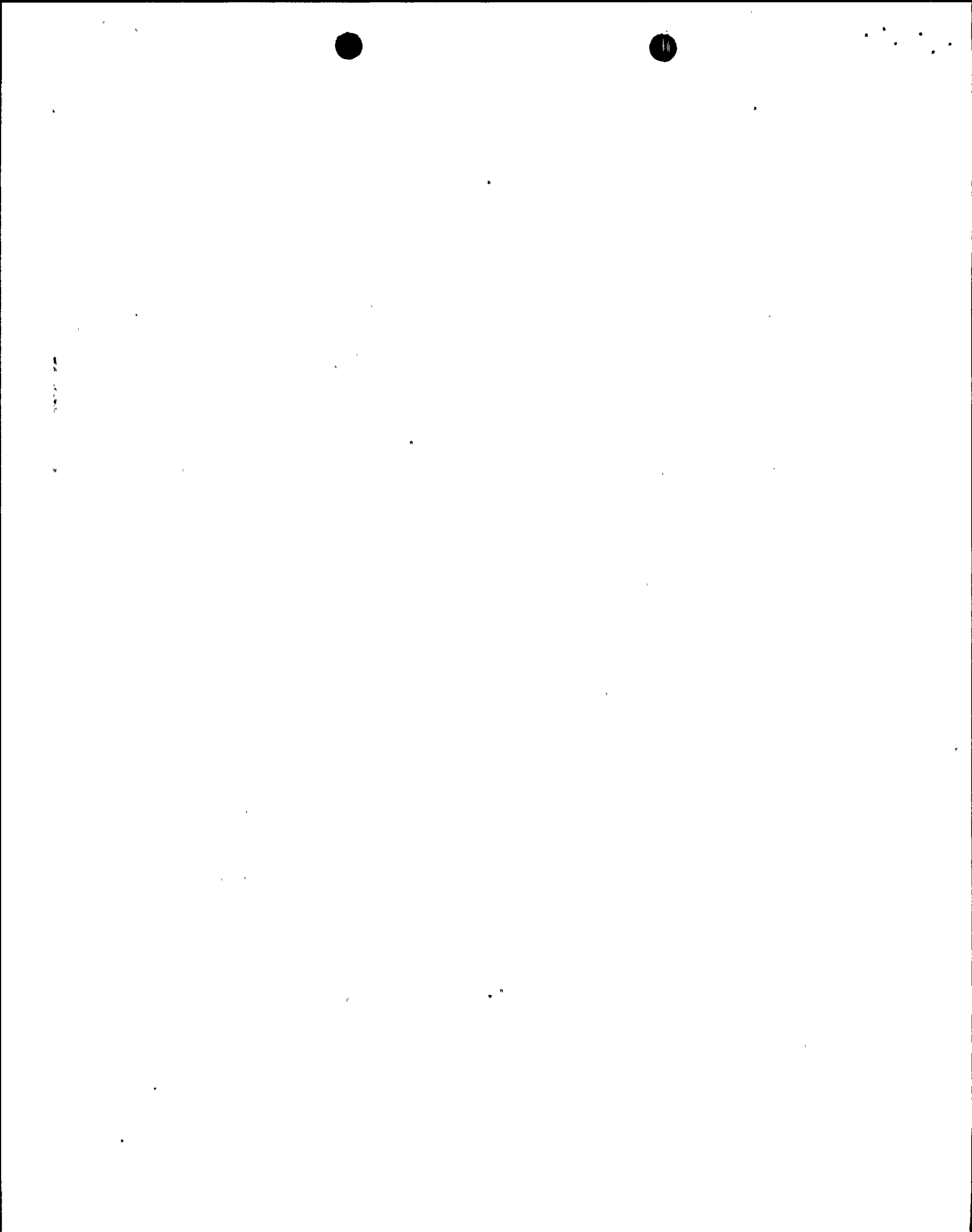
As noted above, the exemption is being requested to provide temporary relief until the completion of the testing described above. As further discussed, Applicant has made good faith efforts to comply with all regulatory requirements as set forth in applicable Staff guidance.



The main steam isolation valves were procured and installed with the intent of fully meeting the requirements of the Final Safety Analysis Report and the Technical Specifications with regard to closing time and leakage. As noted in Section 5.4.5:3 of the Final Safety Analysis Report, the ability of the ball-type valve to close in 3 to 5 seconds was demonstrated by a combination of dynamic tests and analysis. However, recent Site testing experience indicates that the actuator mechanism does not function to consistently close the valve within the required five seconds. Similarly, the valves had previously been tested and met leakage requirements. A number of options are currently being evaluated to assure that the valves close within 5 seconds. The valves are currently being repaired in order to meet leakage requirements.

The causes of the above problems are attributed to the following:

1. Failure to close within the five seconds is due to a time related increase in the force required to trip the latch mechanism. The specific cause of the time dependent phenomenon is being investigated.
2. The current investigation indicates that failure of the roller appears to have initiated from pre-existing defects which were induced during the manufacturing process. Through-thickness cracking occurred only after a load was applied to the roller in such a manner, dependent on roller orientation and pre-existing defect size, that the critical stress intensity at the given defect was exceeded.

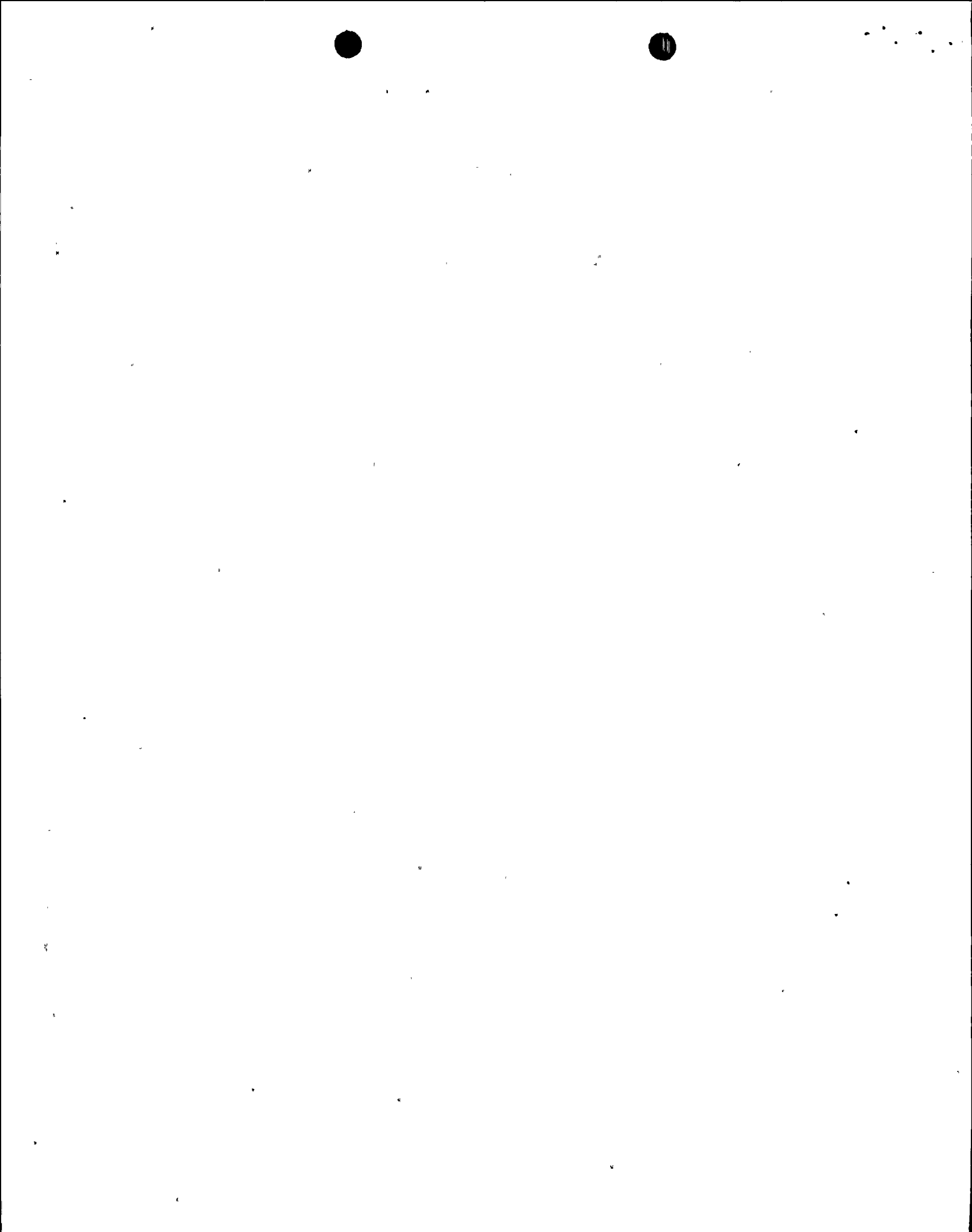


3. The increased leakage is caused by scoring of the valve seat. This scoring is caused by delaminated particles of the tungsten carbide coating. This delamination of the tungsten carbide coating is caused by a high bearing stress which can occur during the opening and closing of the valve.

A modification, which is being pursued to resolve the MSIV closure problem, includes modification of the hydraulic system which is presently used to open the MSIV and allows it to be latched. The hydraulic system will be modified to additionally maintain the MSIV in an open position. By accomplishing this, the present mechanical latching mechanism will not be required.

The hydraulic system solenoid valves will be normally closed and changed to continuously energized. In the event of power failure, the solenoid valve will fail open, thereby causing the MSIVs to close. Additionally, hydraulic failure will cause the spring to close the MSIV thereby maintaining the fail safe feature of the valve.

A sketch is provided, Attachment 1, to depict the modified hydraulic system. It should be noted that the hydraulic actuator mechanism, rather than the mechanical latch, was used during the testing which was performed to characterize and resolve the leakage problem.





The bearing stress on the tungsten carbide coating has been reduced by modifying the system of springs which forces the seat against the ball to form the sealing surface. The revised spring loading reduces the bearing stress between the tungsten carbide coating and the stellite seal ring, while maintaining virtually the same total seating force when the valve is closed.

The balls which had been damaged are being repaired by removing the tungsten carbide coating, and reapplying a new coating of tungsten carbide. Four valves, after the above repairs, will be reinstalled (one in each line) and, subsequently, satisfactorily pass a leak test in order to provide the isolation function. The other four valves (one in each steam line) will be similarly repaired, installed, and tested before or during the period covered by this exemption request. Therefore, the isolation function in any steam line will be provided by either the inboard or outboard valve, after it has been closed and deactivated.

The schedule milestones to accomplish the above includes:

<u>Activity</u>	<u>Target Completion Dates</u>
1. Complete Installation and Testing of four valves	October 22, 1986
2. Completion of Actuator Modification and Testing	November 27, 1986

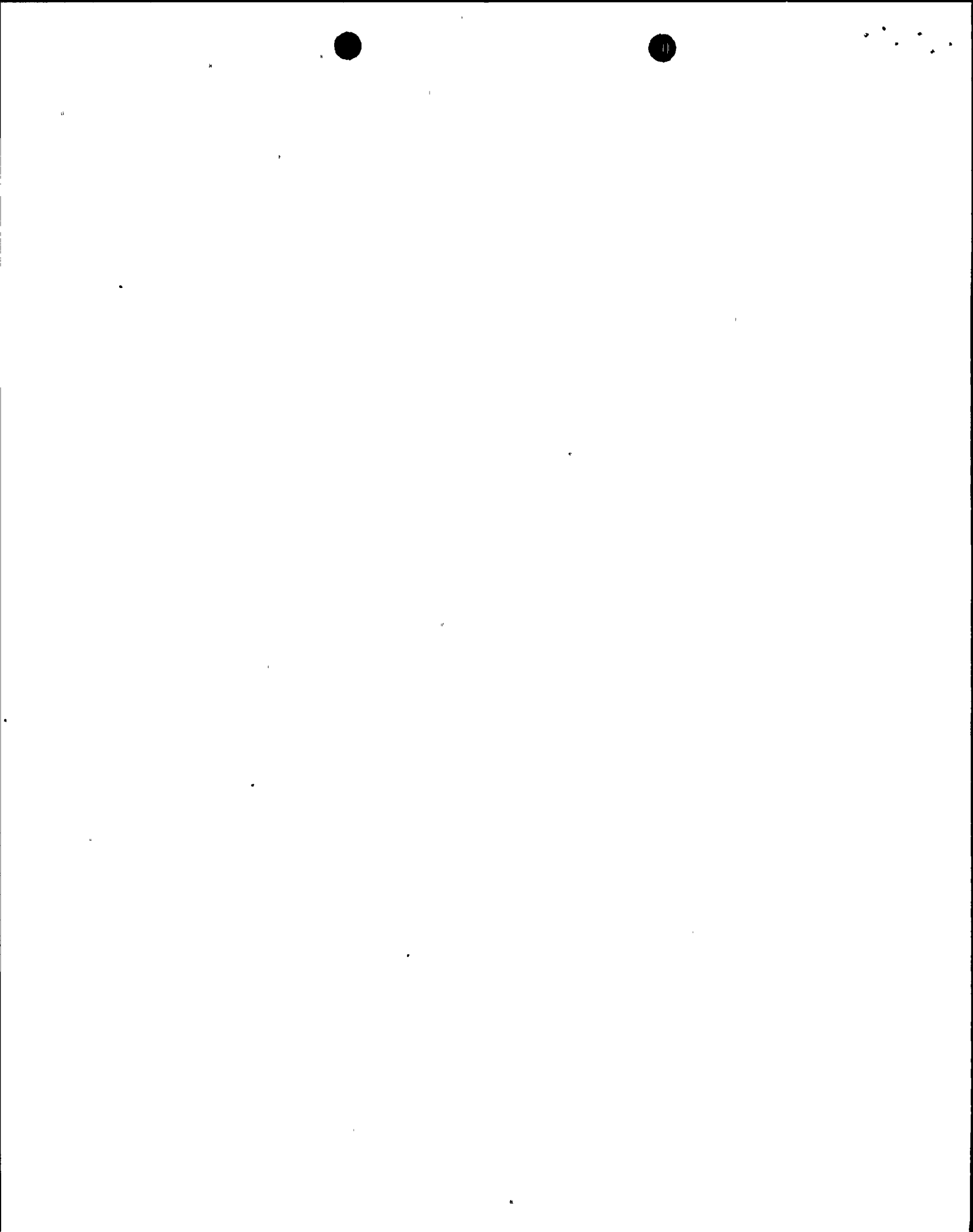
In addition to the above modification effort, NMPC will be continuing its investigation of how best to accomplish some of the operational advantages of the original mechanical latch design features of the MSIV operator.



As demonstrated above, the present design presents no undue risk to the public health and safety during the exemption period in the interim. Thus, under this criterion, good cause has been shown for granting the requested exemption.

IV. The Other Requirements For Issuance  
Of An Exemption Are Met.

The requested exemption is authorized by applicable law, including the Atomic Energy Act and National Environmental Policy Act. With regard to the "common defense and security" standard, the grant of the requested exemption is consistent with the common defense and security of the United States. The Commission's Statements of Consideration in support of the exemption rule note with approval the explanation of this standard as set forth in Long Island Lighting Company (Shoreham Nuclear Power Station, Unit 1), LBP-84-45, 20 NRC 1343, 1400 (1984). Thus, the term "common defense and security" refers principally to the safeguarding of special nuclear material, the absence of foreign control over the applicant, the protection of Restricted Data, and the availability of special nuclear material for defense needs. The granting of the requested exemption will not affect any of these concerns and is, therefore, consistent with the common defense and security.



The proposed exemption has been analyzed and determined not to involve additional construction or operational activities which may significantly affect the environment. It will not result in a significant increase in any adverse environmental impact previously evaluated in the Final Environmental Impact Statement-Operating License Stage, a significant change in effluents or power levels or a matter not previously reviewed by the NRC which may have a significant adverse environmental impact.

#### V. Conclusion

For the foregoing reasons, Niagara Mohawk Power Corporation has demonstrated that it meets the requirements contained in 10CFR50.12(a) for the issuance of an exemption. Therefore, the requested exemption to permit operation of Nine Mile Point Unit 2 during the time that the necessary effort to verify operability of the main steam isolation valves and ensure that they meet their intended function over the design life of the station is being performed, and to allow any changes to the facility required as a result of this effort to be completed prior to proceeding beyond the operational conditions 4 and 5 and granted.



10-10-10

# MSIV CONVERTED HYDRAULIC SYSTEM

**REPLACED ITEMS:**

CYLINDER

**NEW:**

PRESS SWITCHES  
ACCUMULATOR  
JOCKEY PUMP

