



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATING TO SCRAM DISCHARGE VOLUME

NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT UNIT 1

DOCKET NO. 50-220

1.0 INTRODUCTION

In November 1987, the staff inspected the scram discharge volume (SDV) design for Nine Mile Point, Unit 1 to determine compliance with the June 24, 1983 Order on the SDV system. As a result of the inspection, two areas of deviation from the Order and the Generic Safety Evaluation (GSE) (dated December 1, 1980) for the SDV were identified. These deviations to the GSE had been identified by the licensee in a January 30, 1981 letter, but the licensee failed to obtain prior NRC approval for the deviations as required by the Order.

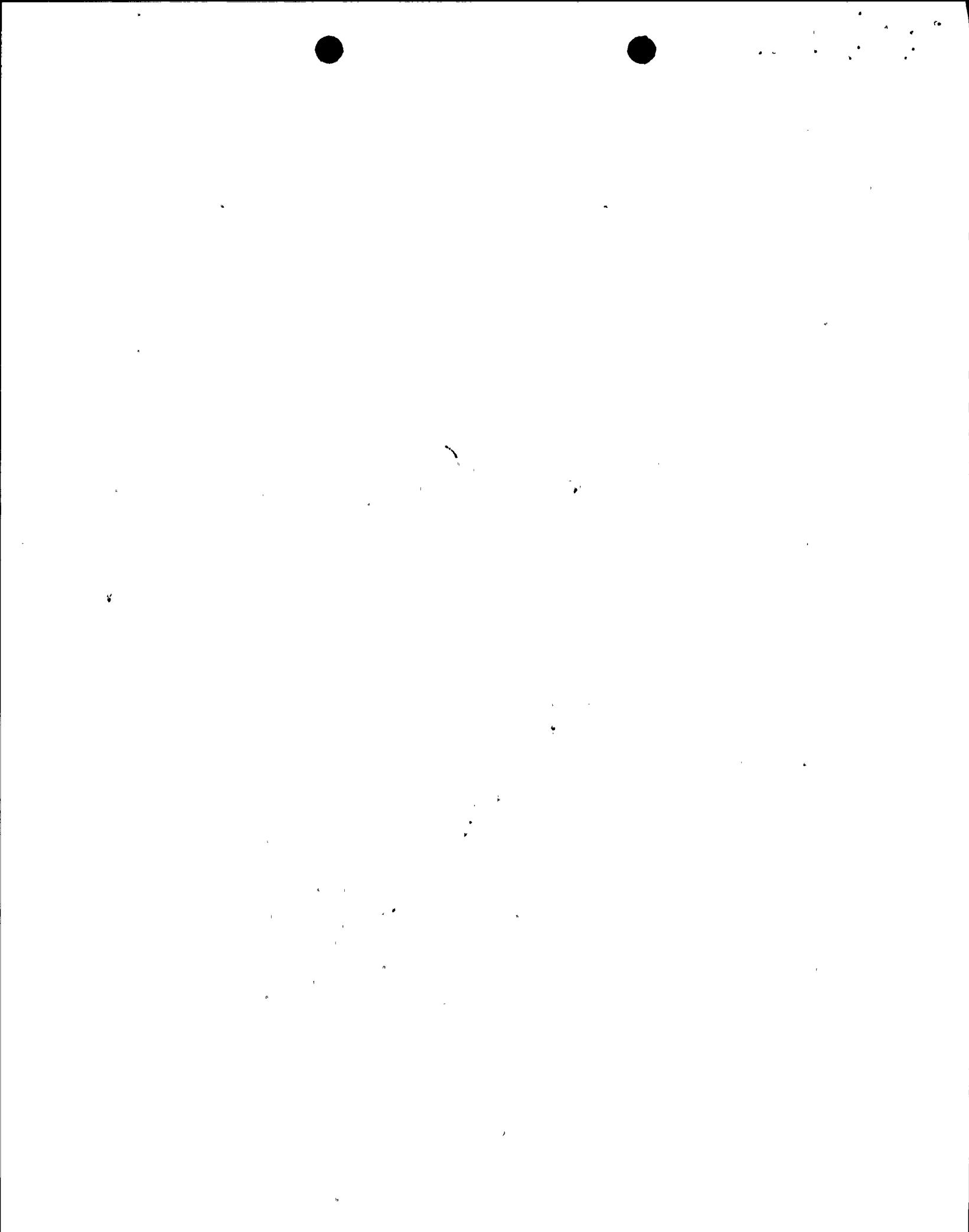
By letter dated January 21, 1988, the licensee requested the staff evaluate the deviations from the GSE. Attachment A of the letter presented justification for the deviations. These are evaluated below.

2.0 EVALUATION

The specific deviations from the June 24, 1983 Order for the Nine Mile Point, Unit 1 SDV concern Design Criterion 3 and Surveillance Criterion 3 of the GSE. During the review, the staff also raised concern with regard to adequate hydraulic coupling. Each item is discussed below.

Design Criterion 3 states "Instrumentation taps shall be provided on the vertical instrument volume and not on the connected piping." This criterion for instrumentation piping was to eliminate the potentially large loading forces on instrument floats during a scram transient.

The Nine Mile Point, Unit 1 SDV includes instrumentation tapped into horizontal runs of piping, and thus the deviation. This configuration has existed for seven years. For justification of this deviation, the licensee stated that with this type of instrument configuration, there has not been any evidence of damage to the instrument floats at this plant during past scrams. In addition, at the volume level at which an automatic scram is required, the SDV contains redundant instruments which do not contain floats.



The staff finds that, based on the operating experience, which reveals no SDV float damage from scrams, and because of the diverse instrumentation, the existing instrument and piping configuration is sufficient to address the staff's concern regarding reliability of the level instrumentation.

Design Criterion 3 states "The operability of the entire system as an integrated whole shall be demonstrated periodically and during each operating cycle by demonstrating scram instrument response and valve function at pressure and temperature at approximately 50% control rod density." The licensee stated that plant procedures require a review of data following scrams. This includes scram discharge vent and drain closure times and the time required to drain the system to a repeatable reference level. The data is compared to historic data to provide assurance that operability of the system as an integrated whole is maintained. In addition, the vent and drain valves are required by technical specification to be stroked quarterly. We find the justification acceptable provided the scrams are initiated from reactor operating pressure and temperature with at least one scram per fuel cycle.

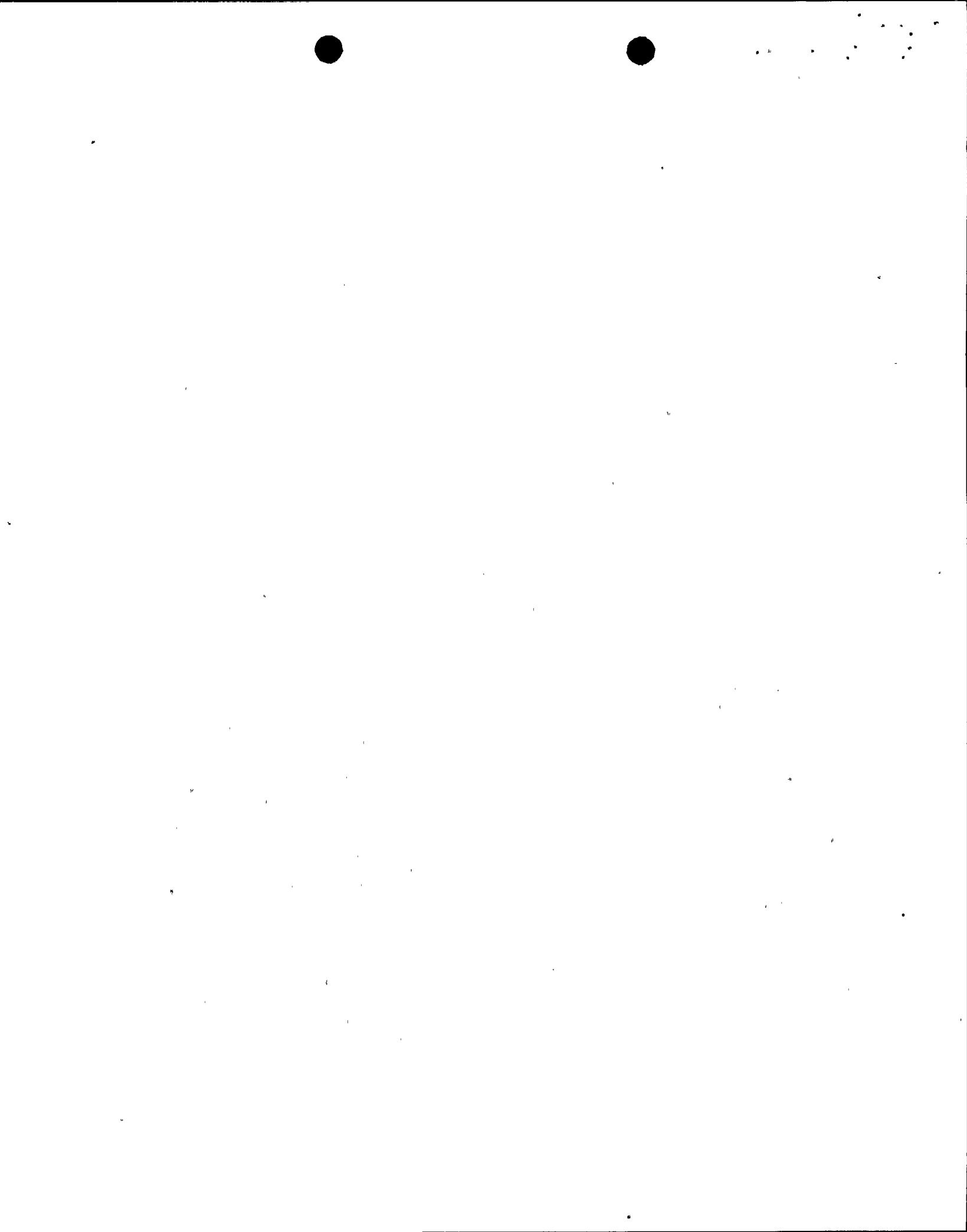
During its review the staff found that the SDV design did not fully resolve the GSE concern relating to adequate hydraulic coupling of the level instrumentation. Specifically, the SDV configuration included several feet of horizontal, 2 inch, carbon steel piping upstream of the level instruments. This design is potentially susceptible to a common mode failure from crud blockage.

On March 1, 1988 the staff met with the licensee to discuss concerns relating to a potential failure of the SDV level instrumentation to detect water levels as a result of poor hydraulic coupling. Video tapes illustrated the results of utilizing a boroscope in the lines of concern. The staff concluded that there was not a significant buildup of crud inside these lines which had been in place for seven years.

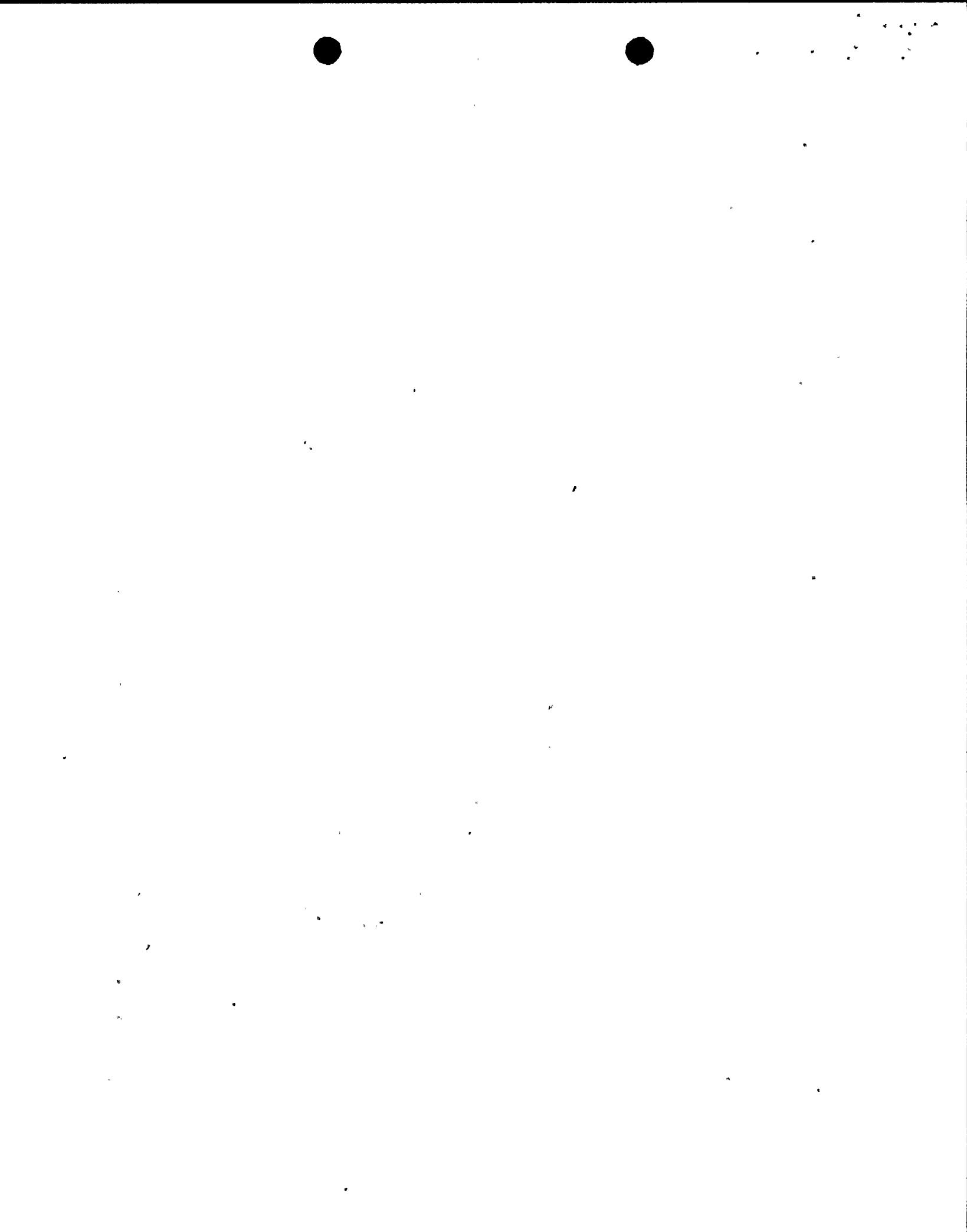
In a letter dated June 3, 1988, the licensee submitted a proposed post-maintenance testing program including filling and draining the SDV system. In a letter dated August 17, 1988, the licensee proposed that the testing program outlined in the June 3, 1988 letter be performed on a periodic basis to address the concerns of crud buildup in the lines and operability testing in the event a scram from reactor temperature and pressure has not occurred during a fuel cycle. The licensee further committed to submit a Technical Specification amendment to include this test requirement by December 31, 1988.

3.0 CONCLUSION

The staff has evaluated the licensee's justifications for exceptions to the Confirmatory Order issued on June 24, 1983 relating to modifications of the SDV. The staff finds the concern relating to the reliability of level indication is adequately addressed by the system design. In addition, the



staff finds that the licensee's program for reviewing the operability of the SDV system as described in its letter of January 21, 1988 and discussed above, provides an acceptable alternative to the 50 percent rod density test discussed in the GSE provided at least once per fuel cycle a scram is initiated from reactor operating temperature and pressure. Furthermore, on the basis of the videotape viewed during the March 1, 1988 meeting and on the basis of the operational experience with this system, for the past seven years, the staff finds that operation with this system for another fuel cycle poses no undue risk to the public with respect to crud buildup and hydraulic coupling in the instrument lines. As discussed above, in a letter dated August 17, 1988 the licensee proposed a periodic test program to address the issues of crud buildup and SDV system operability in the event a scram has not occurred during the previous cycle. The staff will review the program when the Technical Specification amendment is submitted and determine the adequacy of that program to address these concerns for long term operation.



October 12, 1988

Docket No. 50-220

Mr. Charles V. Mangan
Senior Vice President
Niagara Mohawk Power Corporation
301 Plainfield Road
Syracuse, New York 13212

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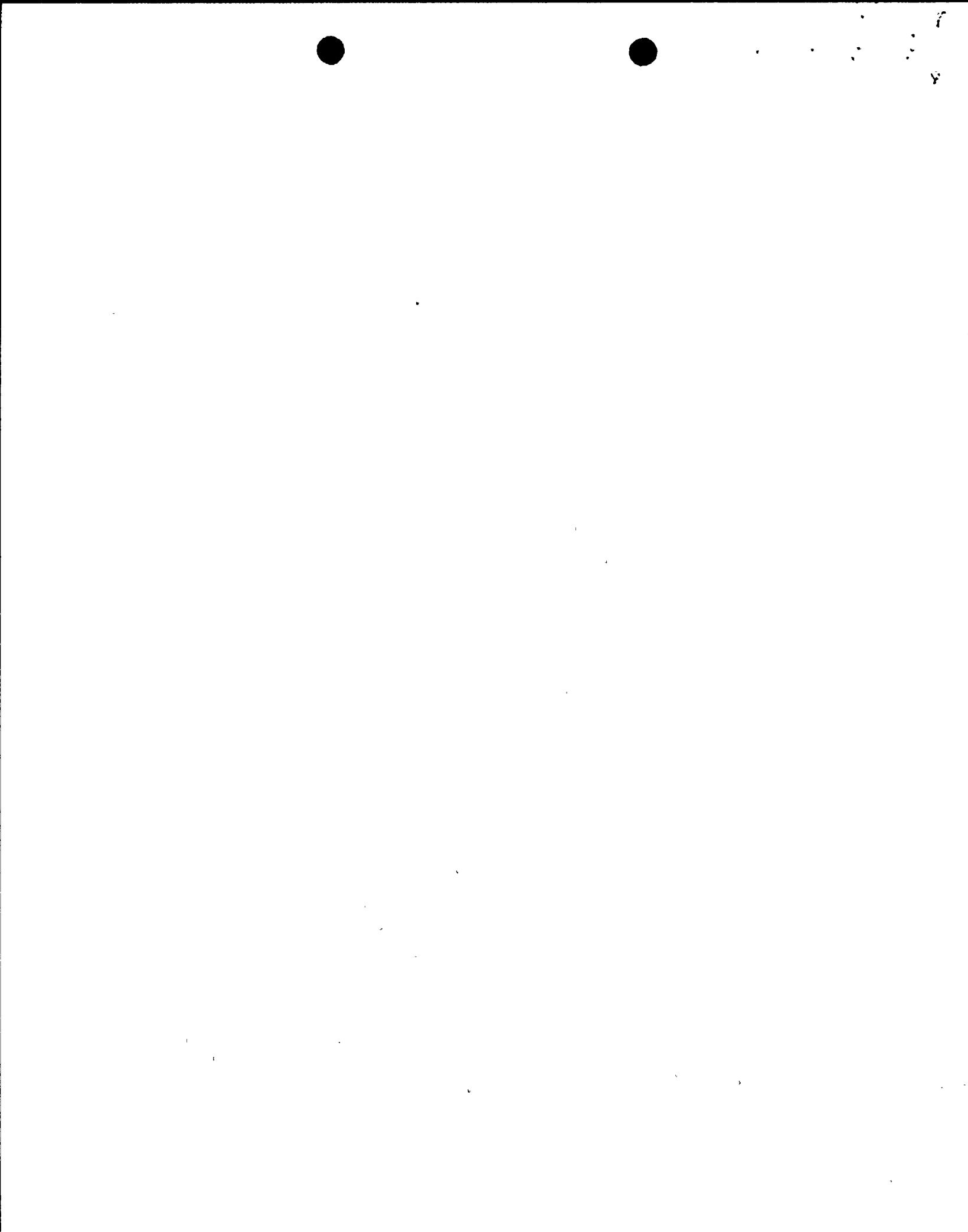
Dear Mr. Mangan:

SUBJECT: SCRAM DISCHARGE VOLUME (SDV) FOR NINE MILE POINT UNIT 1 (TAC 66750)

In a letter dated January 21, 1988, you discussed exceptions taken at Nine Mile Point Unit 1 to the June 24, 1983 Confirmatory Order regarding the SDV. These exceptions included (1) an exception to Design Criterion 3 of the Generic Safety Evaluation (GSE) which states instrument taps shall be provided on the vertical instrument volume and not on the connected piping and (2) an exception to Surveillance Criterion 3 of the GSE concerning a periodic 50 percent control rod density test. A third requested deviation regarding diverse level instrumentation was retracted in your letter of October 9, 1981. In the process of reviewing the design of the instrument taps for the level instrumentation, the staff determined that the SDV design at Nine Mile Point Unit 1 did not fully resolve the GSE's concern regarding adequate hydraulic coupling. Specifically, there was a potential for a common mode failure resulting from corrosion product ("crud") buildup or blockage in the instrument lines.

On March 1, 1988, the NRC staff met with members of your staff to discuss these concerns. During that meeting the NRC staff was shown a video tape of a boroscope inspection of the SDV instrument lines. While this video tape alleviated the staff's immediate concerns relating to the potential crud buildup in the instrument lines, the staff was concerned that the operability of the SDV system be verified after rewelding the piping that was cut to allow the boroscope entrance. In a letter dated June 3, 1988, you submitted a commitment to perform post-maintenance testing before and during startup to confirm the operability of the SDV system.

The staff has reviewed the January 21, 1988 letter concerning the deviations to the SDV Confirmatory Order, as well as your June 3, 1988 commitment to perform post-maintenance testing. The staff has determined that the proposed tests, in conjunction with the boroscope inspection reviewed during the March 1, 1988 meeting and the recording and review of the system response during the scrams which occurred during the last cycle, are sufficient to ensure



operability of the SDV system for one cycle. The details of our review are contained in the enclosed Safety Evaluation.

In a letter dated August 17, 1988, you proposed performing a periodic test consisting of the post-maintenance testing discussed in your June 3, 1988 letter, each refueling outage if a scram has not occurred during the last operating cycle, or if the pressure boundary of the scram discharge instrument volume is opened to perform maintenance, testing, or inspections. Furthermore, your August 17, 1988 letter indicated that a request for a Technical Specifications amendment to include this test requirement would be submitted by December 31, 1988. The staff will review the proposed amendment when it is submitted to determine the ability of the testing to ensure the acceptability of the SDV design for long term operation.

Sincerely,

original signed by

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

Enclosure:
Safety Evaluation

cc: See next page

*SEE PREVIOUS CONCURRENCE

PDI-1:LA
CVogan
9/13/88*

PDI-1:PM
MHaughey:vr
9/13/88*

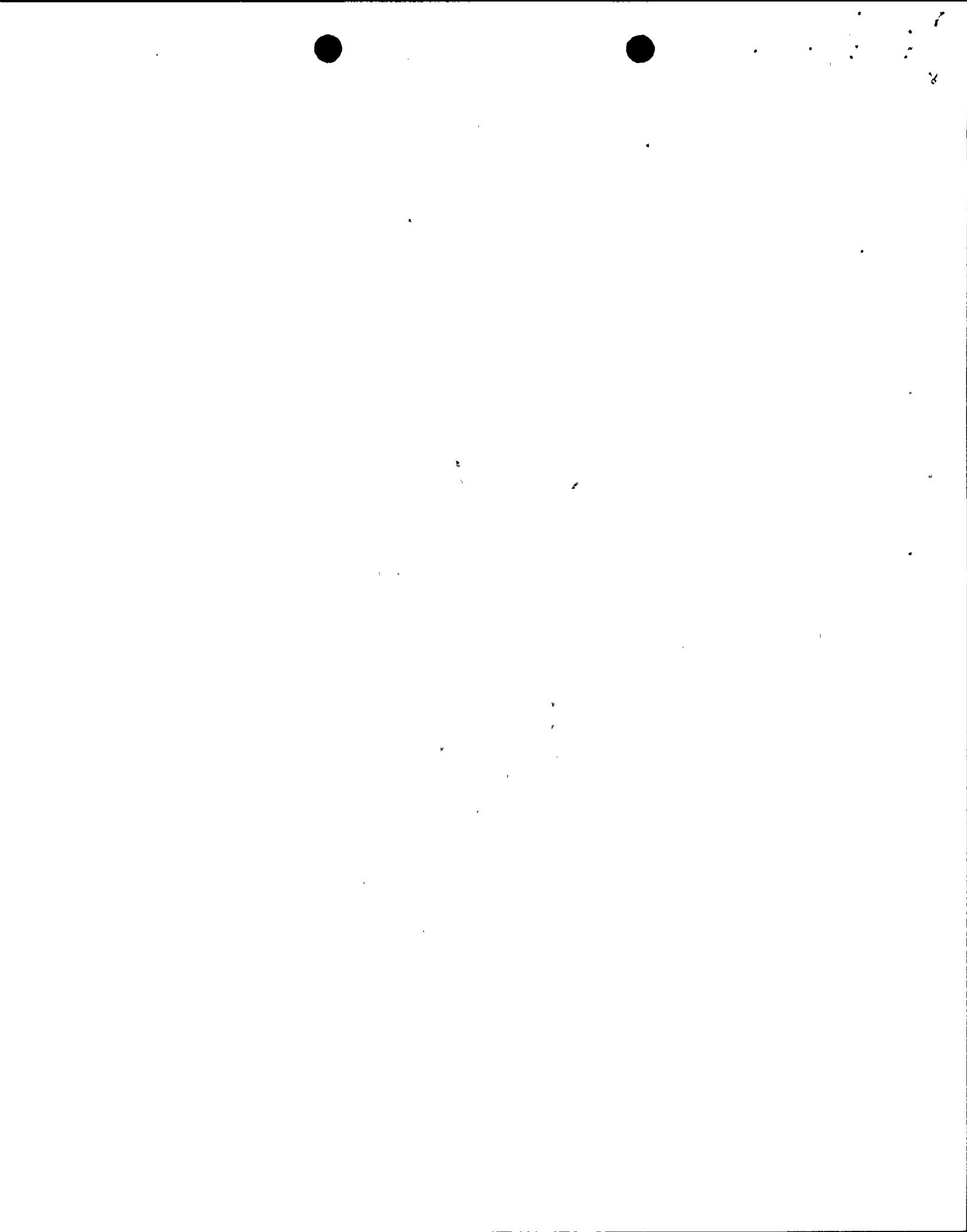
SRXB
MWHodges
9/13/88*

OGC
MYoung
9/19/88*

PDI-1:D
RCapra
10/5/88

PDI-1:AD
BRoger
10/6/88

PDI-1:D
SVarga
10/1/88



Mr. C. V. Mangan
Niagara Mohawk Power Corporation

Nine Mile Point Nuclear Station,
Unit No. 1

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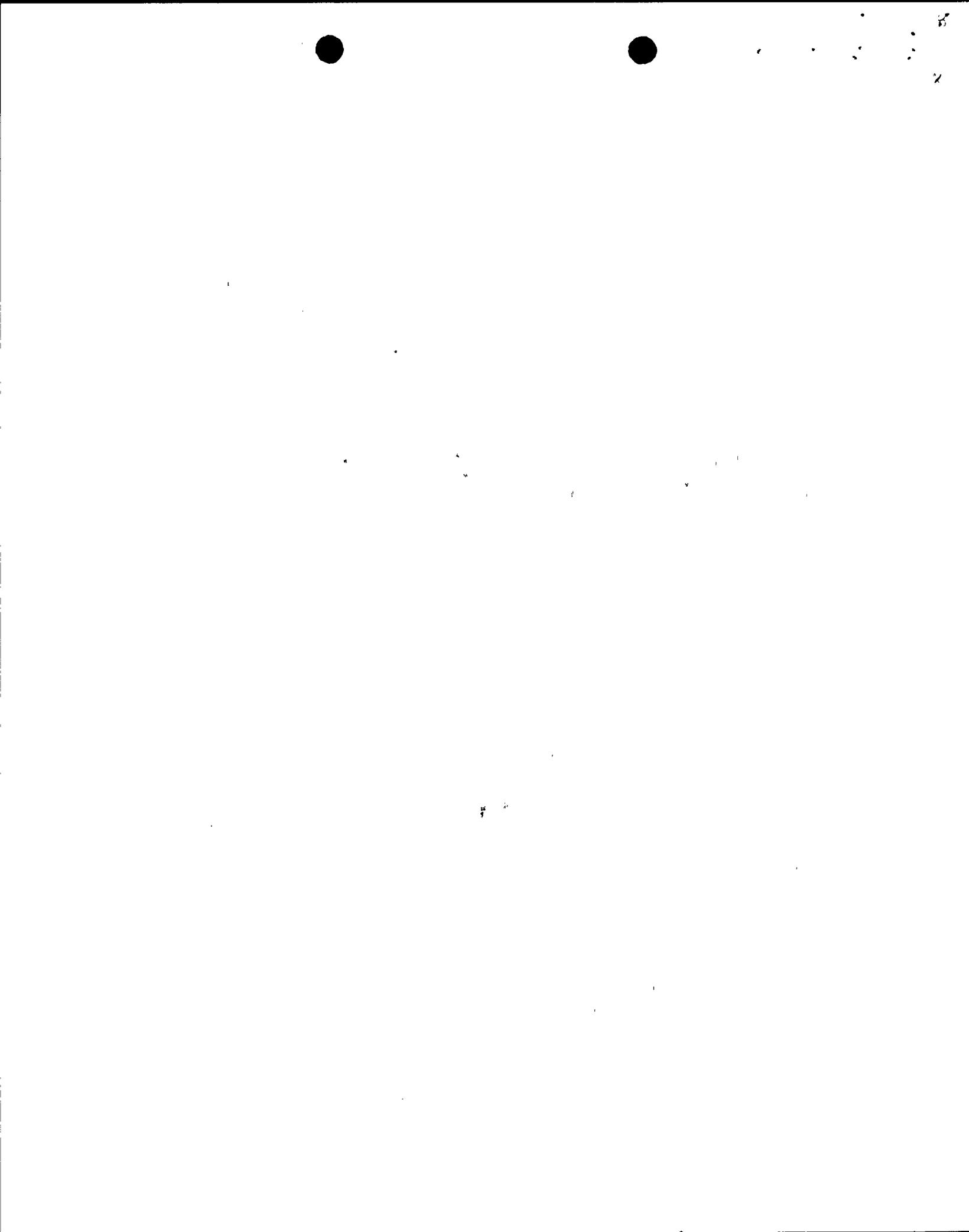
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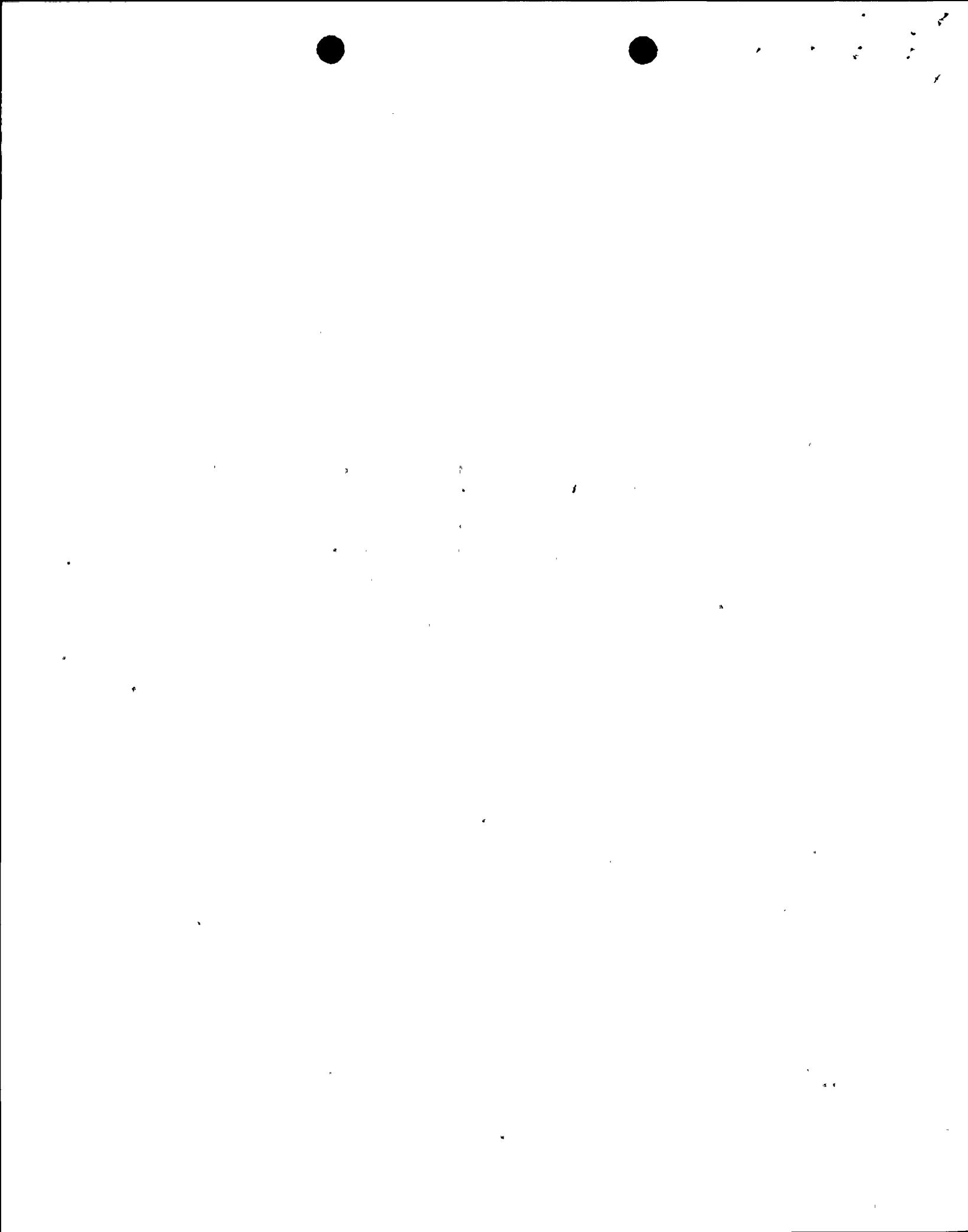
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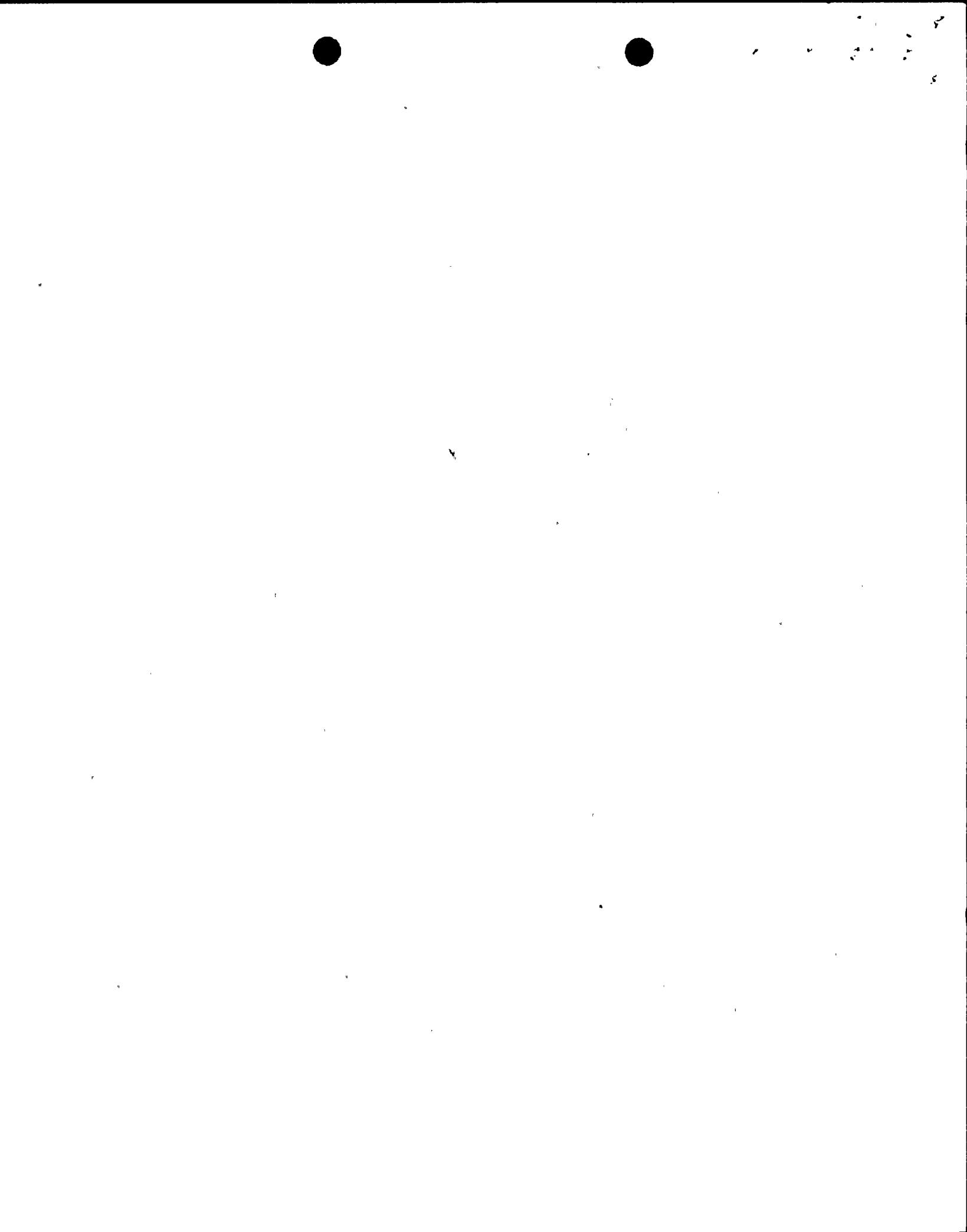
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