



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

Docket No. 50-220

June 26, 1991

**LICENSEE:** Niagara Mohawk Power Corporation  
**FACILITY:** Nine Mile Point Nuclear Station Unit No. 1  
**SUBJECT:** MEETING MINUTES REGARDING THE JUNE 13, 1991, MEETING TO DISCUSS APPENDIX J LEAK RATE TESTING METHODS AT NINE MILE POINT 1

A meeting was held in the NRC One White Flint North Office in Rockville, Maryland, with Niagara Mohawk Power Corporation (NMPC) and NRC staff representatives to discuss Appendix J leak rate testing methods at Nine Mile Point 1. The licensee had requested this meeting. Enclosure 1 is a list of the meeting attendees. The handout material used by the licensee during the meeting is attached as Enclosure 2.

During the meeting, the licensee described variations in the procedure it is now using to implement a water seal in the containment spray system versus the procedure reviewed by the NRC staff and evaluated in the NRC staff's safety evaluation dated March 20, 1990. The licensee had implemented the changes in accordance with its 10 CFR 50.59 review process. The NRC staff decided that it will review the licensee's 10 CFR 50.59 evaluation and the revised procedure (Revision 34 to OP-14). The results of the NRC staff's review will be included in a resident inspector inspection report.

The licensee informed the NRC staff that the licensee plans to modify the containment spray system to permit system valves to be Type C tested in accordance with 10 CFR Part 50, Appendix J. However, these modifications will not be implemented before the 1994 refueling outage. The NRC staff recommended that if the licensee elects to again modify the subject procedure, the licensee should reevaluate the radiological consequences of failure of the containment spray system isolation valves.

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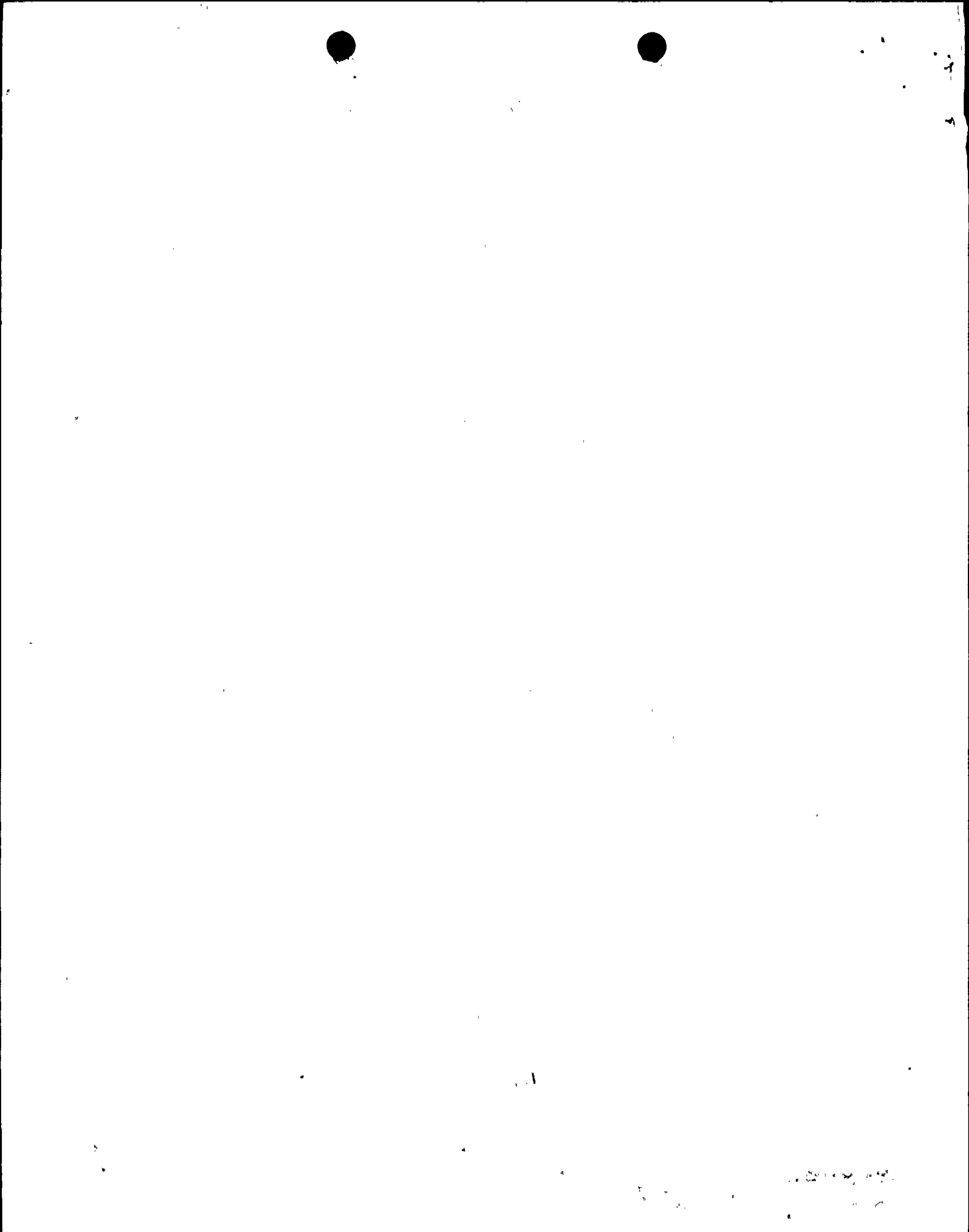
- Enclosures:  
 1. List of Attendees  
 2. Licensee Handout Material

cc w/enclosures:  
 See next page

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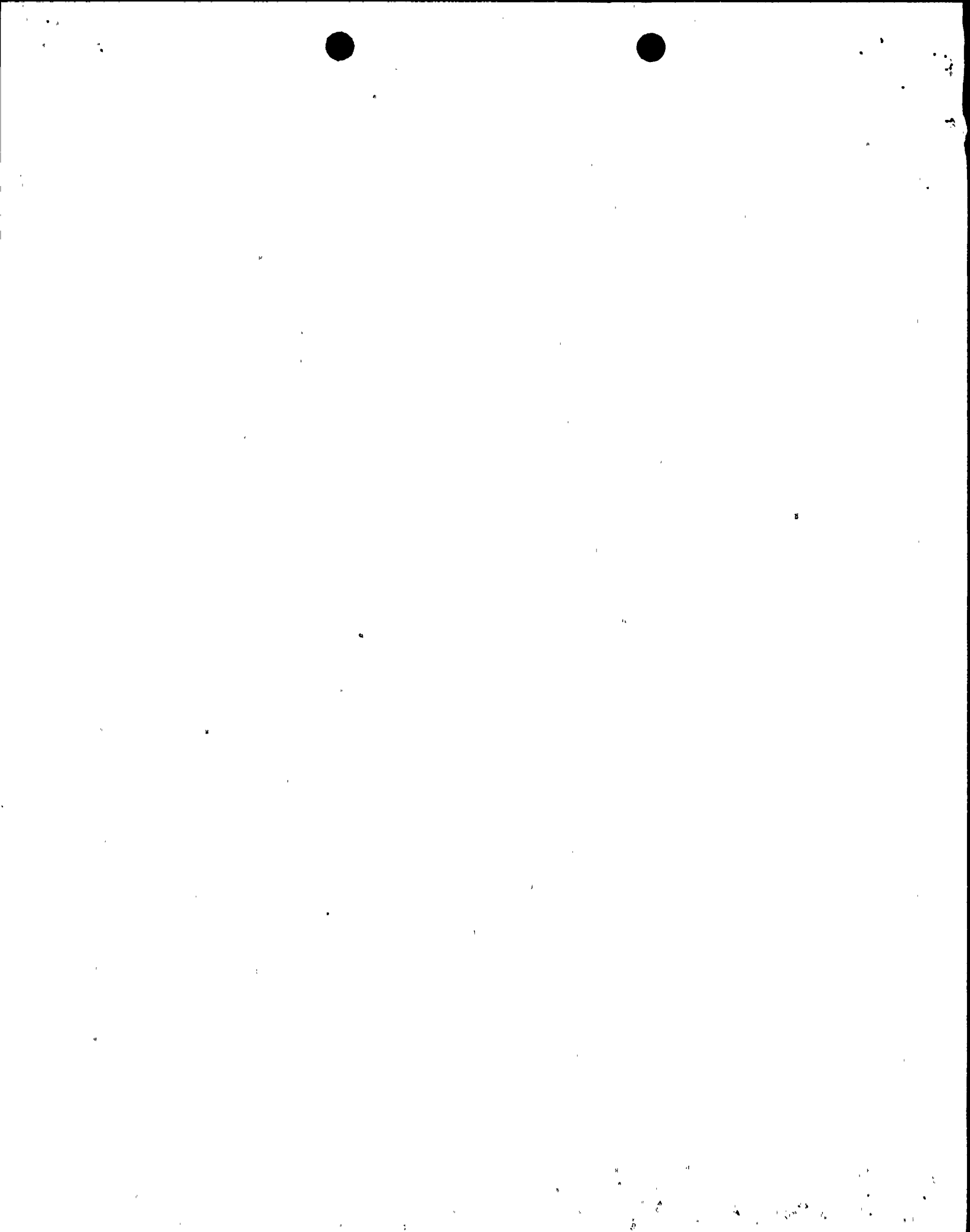
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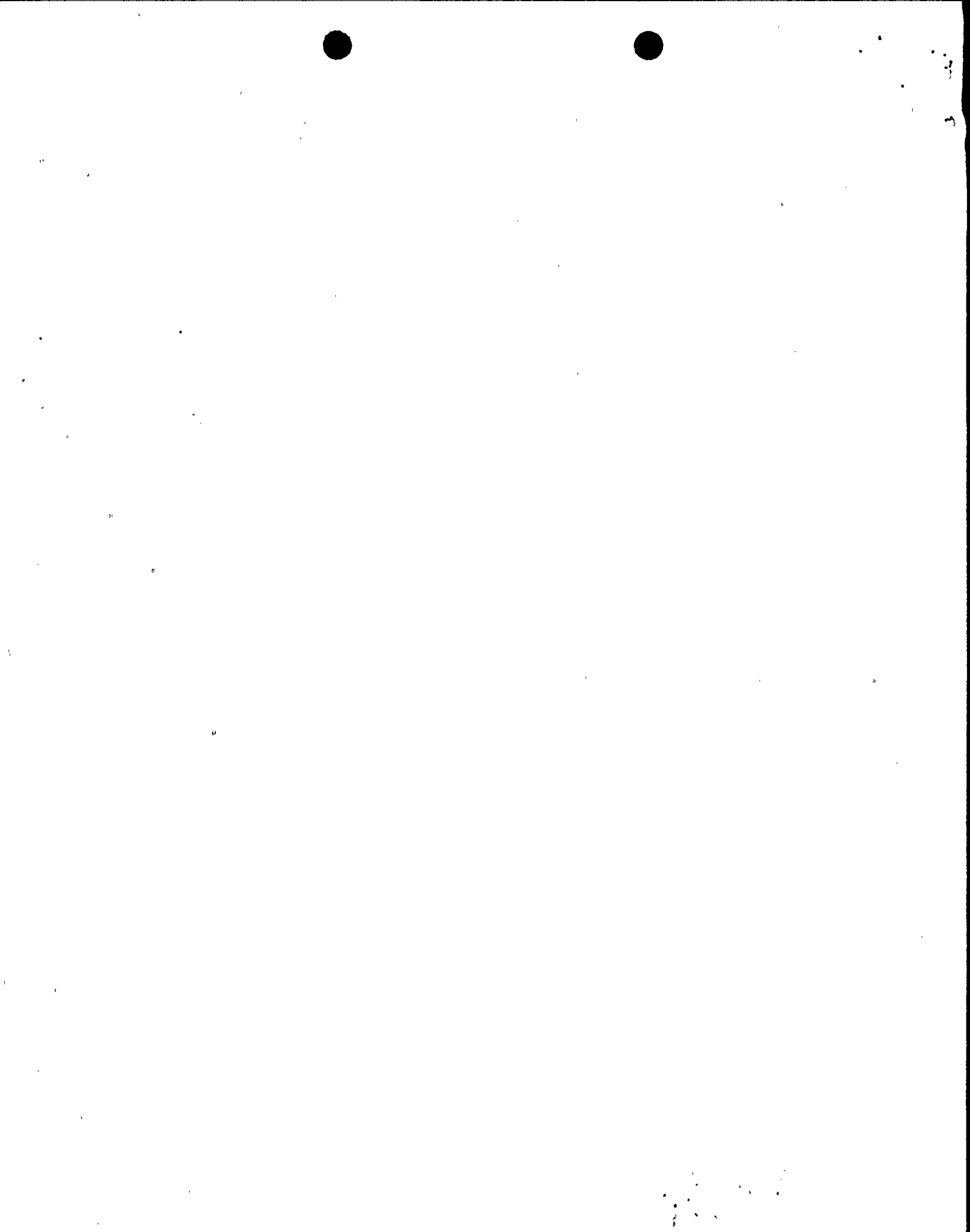
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ATTENDANCE LIST

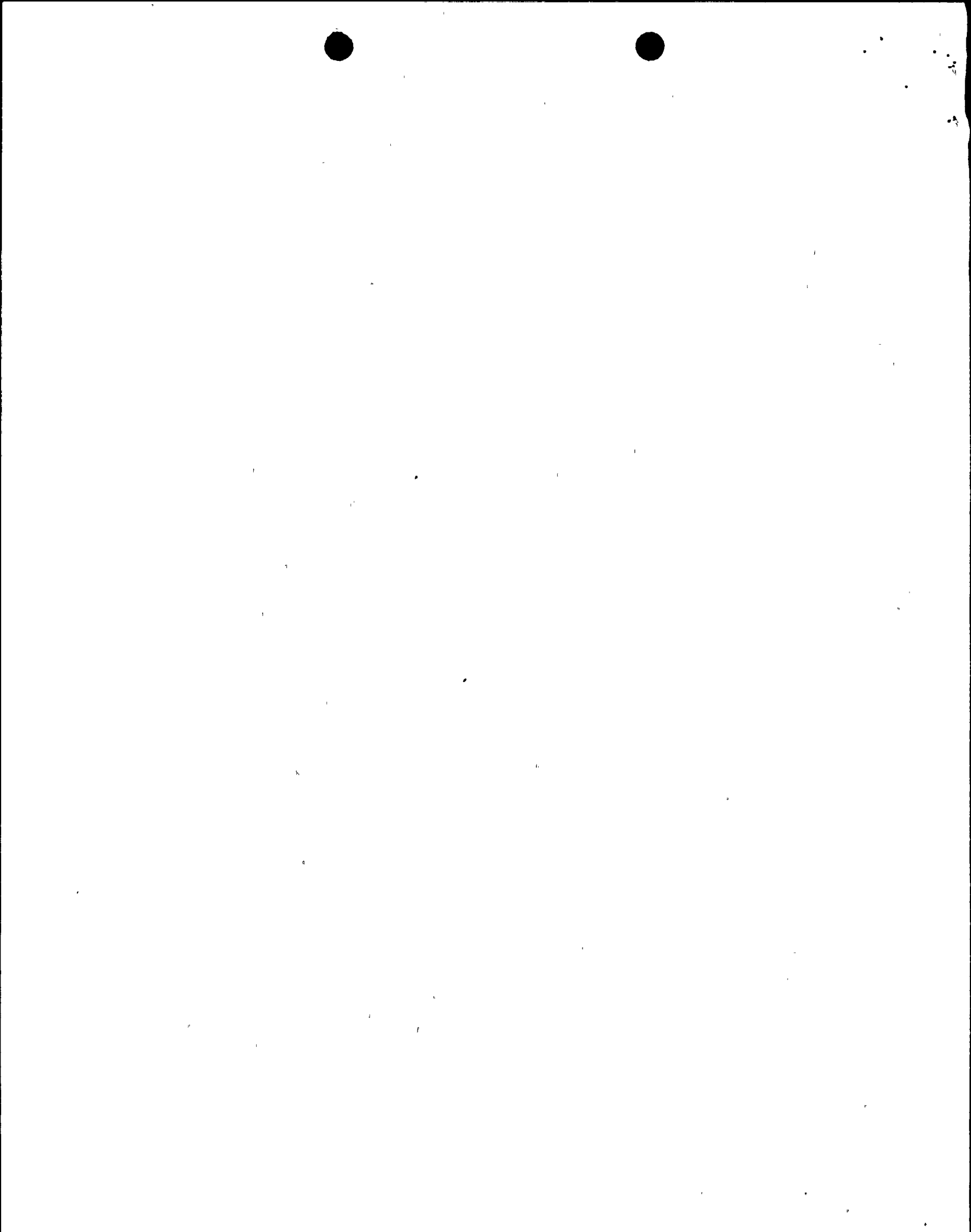
June 13, 1991 Meeting with Niagara Mohawk Power Corporation  
to Discuss Appendix J Leak Rate Testing Methods at  
Nine Mile Point Nuclear Station Unit No. 1

<u>Name</u>	<u>Position</u>	<u>Organization</u>
Donald S. Brinkman	Senior Project Manager	NRC/PDI-1
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Jim Pulsipher	Reactor Eng, Plant Sys, NRR	NRC/SPLB
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Lee Klosowski	Gen. Supv. Design Eng (U1)	NMPC
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Gary Wilson	Managing Attorney	NMPC
Joe Meter	Compliance Eng	PP&L
Mike Crist	Compliance Eng	Bechtel/PP&L
Norman Moreau	Principal Engineer	General Physics
Harrison Lloyd, Jr.	Power Prod. Engr.	Pa. Power & Light Co.
Donald Haverkamp	Section Chief	NRC/Region I (by phone)



**NMPC/NRC MEETING ON  
CONTAINMENT SPRAY SYSTEM  
WATER SEAL**

**JUNE 13, 1991**





# AGENDA

OPENING REMARKS

L. KLOSOWSKI

CONTAINMENT SPRAY  
SYSTEM WATER SEAL  
BACKGROUND

N. SPAGNOLETTI

CONTAINMENT SPRAY  
SYSTEM WATER SEAL  
IMPLEMENTATION

T. LEE

CONCLUSION

L. KLOSOWSKI



# **NMP-1 CONTAINMENT SPRAY SYSTEM WATER SEAL OPERATION**

## **BACKGROUND**

- NMP-1 HAS IMPLEMENTED WATER SEAL TO MEET APP. J. REQUIREMENTS FOR CONTAINMENT SPRAY SYSTEM.
- NRC REVIEWED WATER SEAL OPERATION PRIOR TO IMPLEMENTATION.

## **PURPOSE**

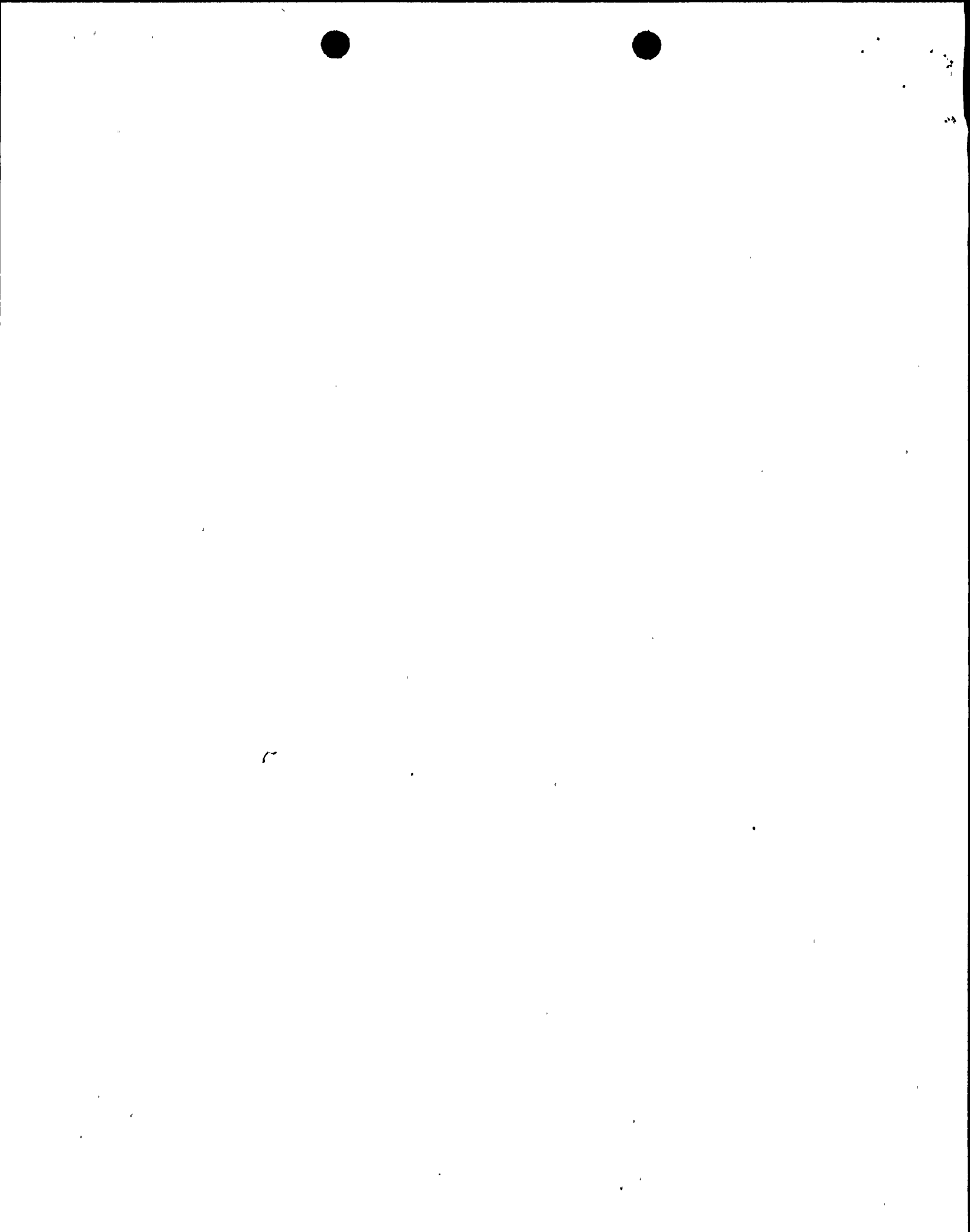
- PROVIDE BRIEF HISTORICAL REVIEW OF BACKGROUND LEADING UP TO WATER SEAL IMPLEMENTATION
- PREVIOUS AND CURRENT SYSTEM CONFIGURATON AND WATER SEAL OPERATION
- NMPC'S LONG TERM PLANS TO ELIMINATE THE NEED FOR WATER SEAL



**MAY 6, 1988**

**NRC SAFETY EVALUATION ON PROPOSED TECHNICAL SPECIFICATIONS:**

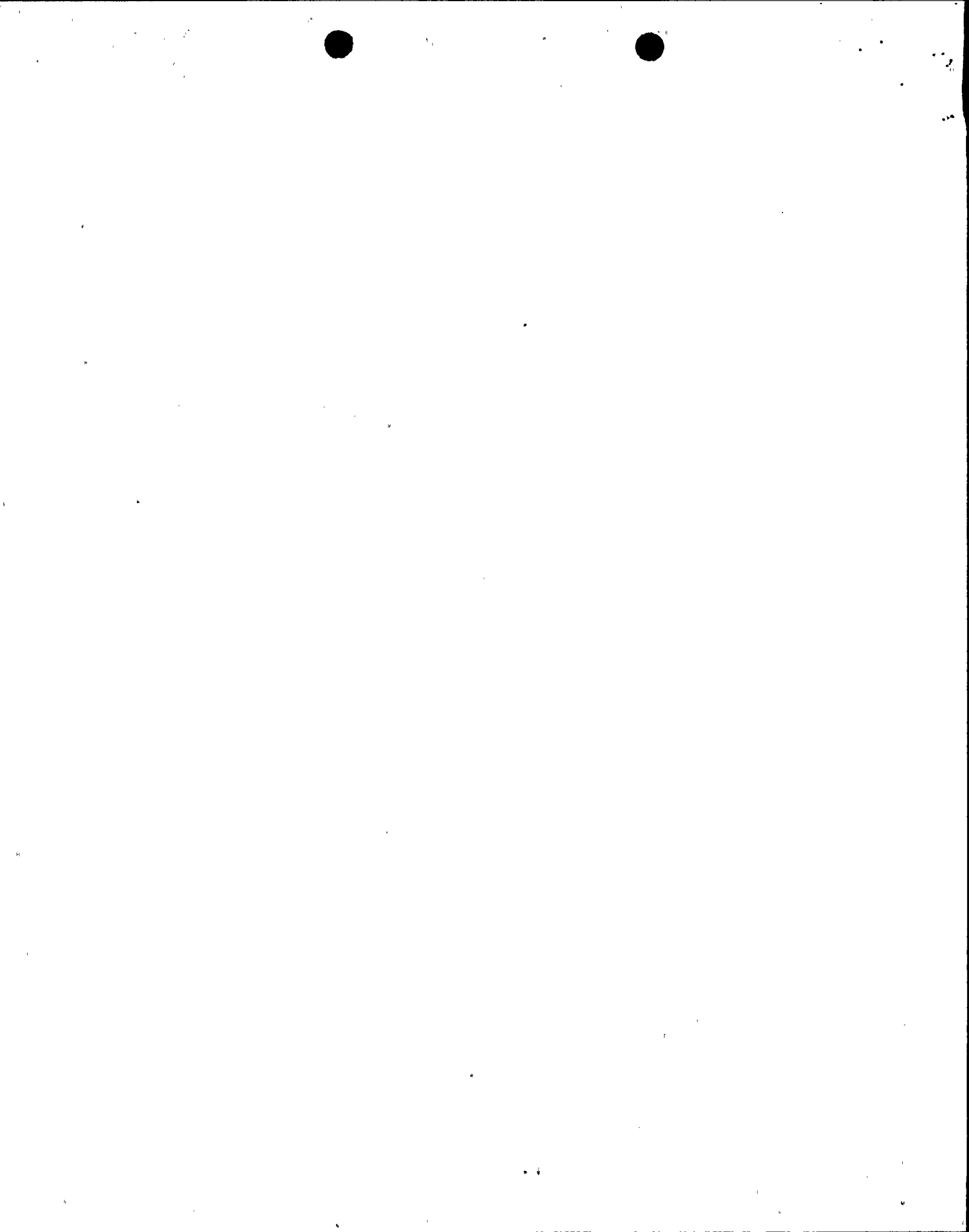
- **DISAGREED THAT THE CONTAINMENT SPRAY SYSTEM WAS DESIGNED AS EXTENSION OF CONTAINMENT BOUNDARY**
- **TECHNICAL SPECIFICATIONS NOT ISSUED BECAUSE OF NEED FOR UPDATE AND REVISION**
- **DISCUSSED USING CONTAINMENT SPRAY INTERTIE VALVES TO MAINTAIN A WATER SEAL ON ALL DISCHARGE ISOLATION VALVES IN LIEU OF REQUIRED TYPE C LEAK TESTING**
- **REQUESTED NMPC TO SUBMIT FOR STAFF REVIEW A PROCEDURE TO MAINTAIN WATER SEAL ON CONTAINMENT ISOLATION VALVES**



**NOVEMBER 30, 1989**

**NIAGARA MOHAWK SUBMITTED COPY OF DRAFT  
OPERATING PROCEDURE N1-OP-14:**

- **PROVIDED WATER SEAL IN THE EVENT OF A DESIGN BASIS LOSS-OF-COOLANT ACCIDENT**
- **PROVIDED WATER SEAL BY UTILIZING THE CONTAINMENT SPRAY SYSTEM INTERTIE**
- **PROVIDED WATER SEAL WITH AT LEAST ONE CONTAINMENT SPRAY PUMP RUNNING**
- **WATER SEAL INOPERABILITY FOR SHORT PERIODS, RESTRICTED BY LIMITING CONDITION FOR OPERATION (LCO)**
- **NMPC PERFORMED SAFETY EVALUATION ON OPERATING PROCEDURE CHANGES**

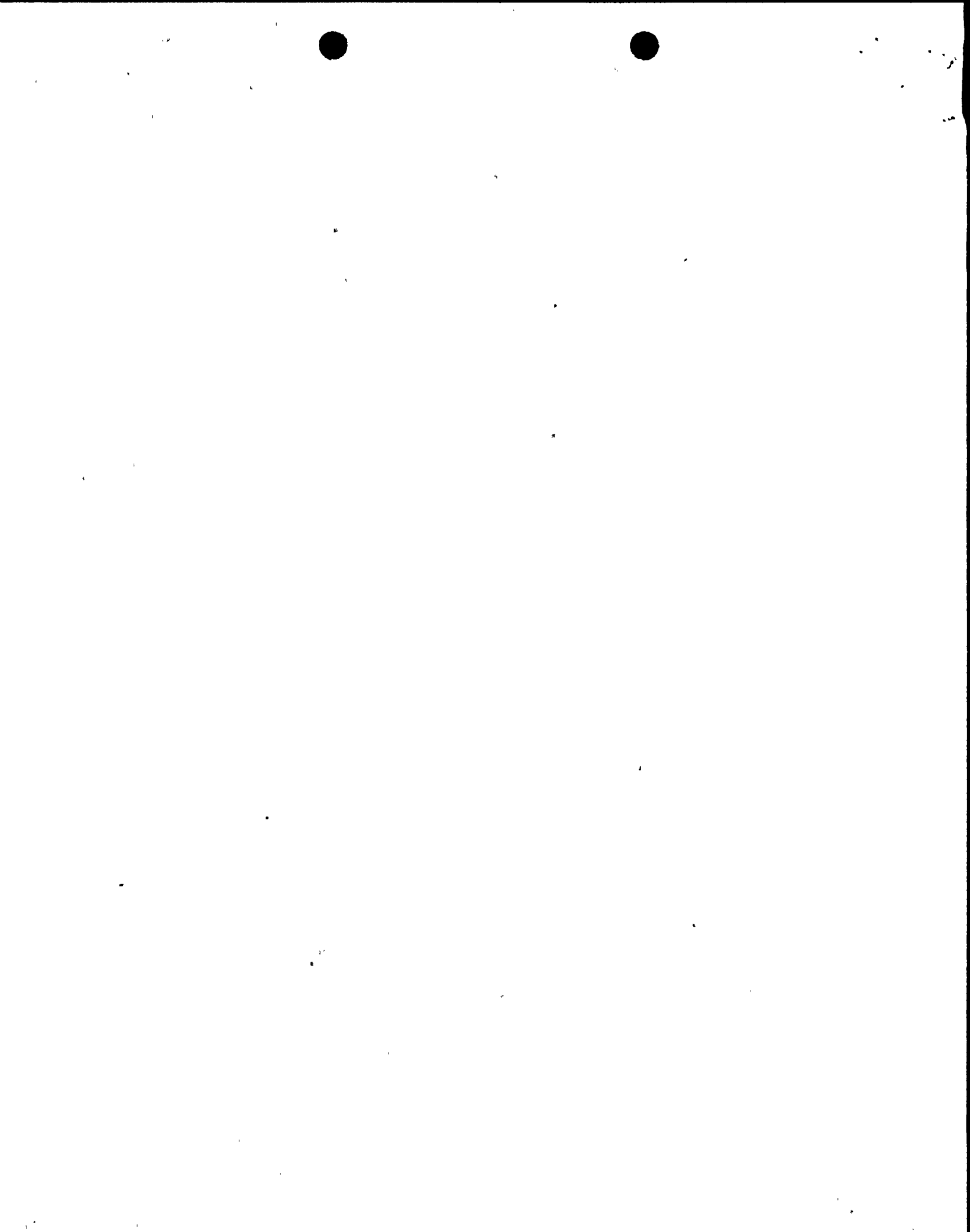




**MARCH 20, 1990**

**NRC ISSUED SAFETY EVALUATION ON DRAFT PROCEDURE FOR ESTABLISHING WATER SEAL:**

- **CONCLUDED THAT THE PROPOSED PROCEDURE (N1-OP-14) FOR ESTABLISHING A WATER SEAL FOR THE CONTAINMENT SPRAY DISCHARGE LINE ISOLATION VALVES WAS ACCEPTABLE**
- **FOUND THAT THE PROPOSED SEALING WILL SATISFY APPENDIX J SECTION III.C.3(b) AND WILL BE CAPABLE OF MAINTAINING WATER SEAL FOR A MINIMUM OF 30 DAYS**
- **CONCLUDED THAT CONDITIONS OF LCO FOR CONTAINMENT SPRAY WATER SEAL WERE ACCEPTABLE**



## **DECEMBER 4, 1990**

**NRC ISSUED INSPECTION REPORT NO. 50-220/90-09:**

- **INSPECTION REPORT IDENTIFIED CHANGES TO NMPC PROCEDURE FOR MAINTAINING WATER SEAL WHICH WERE NOT APPROVED IN NRC MARCH 20, 1990 SAFETY EVALUATION**

## **MARCH 7, 1991**

**NRC ISSUED NOTICE OF VIOLATION CONTAINED IN INSPECTION REPORT NO. 50-220/91-02:**

- **OPERATING PROCEDURE N1-OP-14 CONFLICTED WITH EOP-4 REGARDING CRITERIA FOR TERMINATION OF CONTAINMENT SPRAY**
- **FAILED TO IDENTIFY THAT PORTIONS OF N1-OP-14 COULD NOT BE PERFORMED, IN THAT POST-LOCA RADIATION FIELDS WOULD LIKELY PROHIBIT LOCAL OPERATION OF TWO CONTAINMENT SPRAY SYSTEM'S CROSS-TIE VALVES PER EOP-10**



**APRIL 12, 1991**

**NMPC RESPONSE TO NOTICE OF VIOLATION:**

- **N1-OP-14 REVISED TO REMOVE CONFLICT WITH EOP-4**
- **N1-OP-14 REVISED TO ADDRESS INACCESSIBLE VALVES DUE TO RADIOLOGICAL CONDITIONS**
- **NMPC SAFETY EVALUATION NO: 89-13, "CONTAINMENT SPRAY POST DBA LOCA APPENDIX J WATER SEAL" REVISED TO;**
  - **ADDRESSED METHOD TO BE IMPLEMENTED IN N1-OP-14 WHICH WILL FACILITATE ALTERNATE MODES OF OPERATION IN ACCORDANCE WITH EOPs**
  - **CLARIFIED THE IMPLEMENTATION OF A WATER SEAL WHEN CONTAINMENT SPRAY IS IN THE SPRAY MODE DURING CONTAINMENT DESIGN BASIS LOCA**



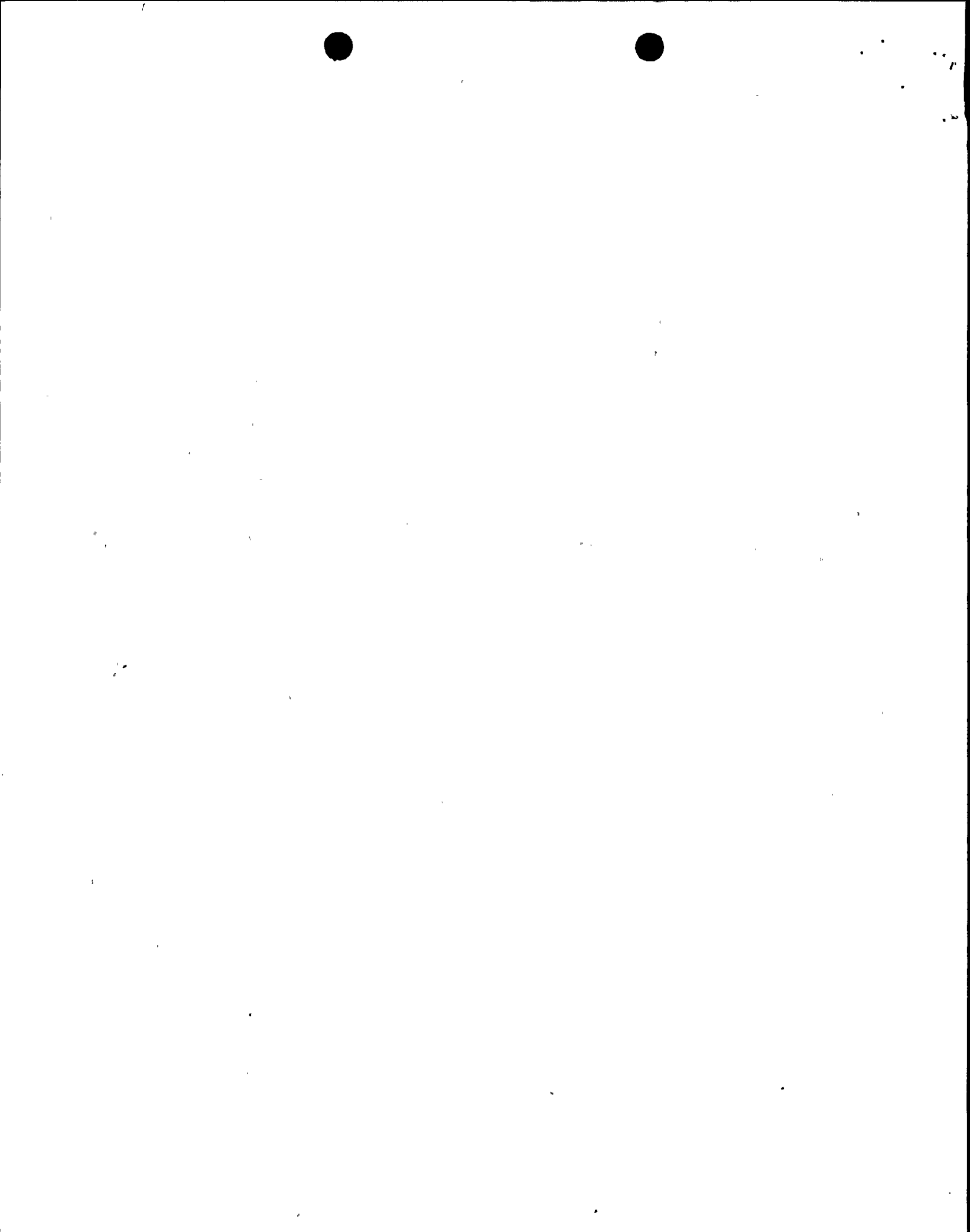
**NINE MILE POINT UNIT 1  
CONTAINMENT SPRAY SYSTEM  
WATER SEAL**





## **TOPICS**

- **BACKGROUND ON THE CONTAINMENT SPRAY SYSTEM**
- **PRESENT CONFIGURATION TO EMPLOY WATER SEAL**
- **POST LOCA WATER SEAL IMPLEMENTATION**
- **BASIS FOR ADOPTION OF CURRENT CONFIGURATION**
- **WHY PRESENT MODE OF OPERATION IS PREFERABLE**



# BACKGROUND ON THE CONTAINMENT SPRAY SYSTEM

ORIGINAL DESIGN BASIS (prior to water seal implementation)

- ENTIRE SYSTEM DESIGNED TO BE EXTENSION OF PRIMARY CONTAINMENT (INCLUDED IN ALL CONTAINMENT LEAKRATE TESTING)

SUBJECT INJECTION VALVES AND CHECK VALVES WERE NOT DESIGNED TO BE ISOLATION VALVES

SYSTEM CONFIGURATION:

- TWO SEPARATE AND INDEPENDENT LOOPS -- PRIMARY AND SECONDARY
- FOUR 100% CAPACITY CONTAINMENT SPRAY PUMPS
  - PUMP FROM THE TORUS TO THE DRYWELL AND WETWELL SPRAY HEADERS
  - TWO REDUNDANT PRIMARY LOOP PUMPS & TWO REDUNDANT SECONDARY LOOP PUMPS
  - EACH LOOP HAS A SEPARATE EMERGENCY DIESEL GENERATOR
- FOUR 100% CAPACITY CONTAINMENT SPRAY RAW WATER PUMPS
  - PUMP WATER FROM THE INTAKE STRUCTURE TO THE CONTAINMENT SPRAY HEAT EXCHANGERS AND TO THE DISCHARGE TUNNEL (ONCE THROUGH COOLING SYSTEM)
  - TWO SEPARATE AND INDEPENDENT PRIMARY LOOP PUMPS AND TWO SEPARATE AND INDEPENDENT SECONDARY LOOP PUMPS
  - EACH LOOP HAS A SEPARATE EMERGENCY DIESEL GENERATOR
- FOUR 100% CAPACITY CONTAINMENT SPRAY HEAT EXCHANGERS
- FOUR NORMALLY CLOSED BYPASS (INTERTIE) VALVES PROVIDED TO SINGLE CONTAINMENT SPRAY PUMP TEST LINE TO THE TORUS SHARED BY ALL FOUR PUMPS



## **PRESENT CONFIGURATION TO EMPLOY WATER SEAL**

### **HOW THE WATER SEAL IS EMPLOYED**

- **VALVES/VALVE LINE UP MODIFIED**
  - **PNEUMATIC OPERATORS REMOVED FROM INTERTIE VALVES 80-45 & 80-40 AND REPLACED WITH MANUAL HANDWHEEL OPERATORS**
  - **VALVES 80-45 & 80-40 MAINTAINED NORMALLY OPEN TO INTERTIE THE PRIMARY AND SECONDARY LOOPS TO ASSURE ENTIRE SYSTEM IS SEALED IN THE EVENT OF A DIESEL GENERATOR FAILURE CONCURRENT WITH A LOSS OF OFF-SITE POWER**
- **THIS CONFIGURATION REQUIRES TWO CONTAINMENT SPRAY PUMPS TO ASSURE ADEQUATE SPRAY DISTRIBUTION AND TO PRESSURIZE BOTH SPRAY LOOP HEADERS TO  $\geq 110\%$  CONTAINMENT PRESSURE**
- **TORUS PROVIDES ADEQUATE WATER INVENTORY FOR  $\geq 30$  DAY AVAILABILITY OF WATER SEAL IN ACCORDANCE WITH APPENDIX J**
- **WATER SEAL IS EMPLOYED WHILE SPRAYING CONTAINMENT IN ACCORDANCE WITH EOPs**



# POST LOCA WATER SEAL IMPLEMENTATION

- IN ACCORDANCE WITH EMERGENCY OPERATING PROCEDURES
  - FOR A DESIGN BASIS LOCA, SPRAYS ARE AUTOMATICALLY INITIATED

CONTAINMENT SPRAYS ARE TERMINATED WHEN CONTAINMENT PRESSURE DROPS TO  $\leq 3.5$  PSIG (APPROXIMATELY 15 MINUTES INTO DBA LOCA)

CONTAINMENT SPRAYS ARE NOT REINITIATED UNLESS CONTAINMENT PRESSURE INCREASES TO THE SPRAY INITIATION LIMIT.
  - FOR OTHER ACCIDENTS, SPRAYS ARE INITIALLY LOCKED OUT BEFORE AUTOMATIC INITIATION. THEY ARE NOT INITIATED UNLESS CONTAINMENT PRESSURE INCREASES TO THE SPRAY INITIATION LIMIT.
  - LONG TERM SUPPRESSION POOL COOLING IS IMPLEMENTED WHEN NOT SPRAYING CONTAINMENT BY OPERATING CONTAINMENT SPRAY IN THE POOL COOLING MODE UTILIZING THE SINGLE TEST LINE TO THE TORUS AND ONE TRAIN OF CONTAINMENT SPRAY (1 CS PUMP AND ITS ASSOCIATED CSRW PUMP AND CS HEAT EXCHANGER)
- DURING LONG TERM SUPPRESSION POOL COOLING THE WATER SEAL IS NOT EMPLOYED.





## **BASIS FOR ADOPTION OF CURRENT CONFIGURATION**

- THE TORUS WATER MAY POTENTIALLY BE HIGHLY CONTAMINATED
  - CHARGING THE CONTAINMENT SPRAY PIPING WITH HIGH PRESSURE CONTAMINATED WATER TO PRECLUDE LEAKAGE OF LOW PRESSURE FISSION GASES IS NOT RECOMMENDED
  - AT LEAST THREE CONTAINMENT SPRAY HEAT EXCHANGERS WILL BE PRESSURIZED WITH CONTAMINATED WATER WITHOUT RAW WATER ON TUBE SIDE. IN THE EVENT OF TUBE LEAK THERE IS A DIRECT PATH TO LAKE.
- OPERATOR POST-LOCA EMERGENCY ACTION WOULD BE MADE MORE COMPLICATED BY ATTEMPTING TO EMPLOY THE ALTERNATE WATER SEAL DUE TO ADDITIONAL REQUIRED VALVE MANIPULATION TO FACILITATE SUPPRESSION POOL COOLING, CONTAINMENT FLOODUP, AND OTHER EOP REQUIRED ACTIONS

IMPLEMENTING THE WATER SEAL FOR THESE MODES OF OPERATION WOULD NOT BE AUTOMATIC AND WOULD REQUIRE OPERATORS TO OPEN TWO ADDITIONAL BYPASS VALVES AND CLOSE ALL SPRAY INJECTION VALVES



## **POSITIVE ATTRIBUTES OF NMP1 ADOPTED WATER SEAL**

- **THE WATER SEAL MEETS THE CRITERIA OF 10 CFR  
PART 50 APPENDIX J**
- **THE WATER SEAL IS EMPLOYED AS CONTAINMENT  
SPRAY IS INITIATED UPON HIGH CONTAINMENT  
PRESSURE**
- **CONTAINMENT SPRAY PIPING HAS BEEN INCLUDED IN  
ALL CONTAINMENT LEAK RATE TESTING**
- **EMERGENCY VENTILATION SYSTEM DESIGNED TO  
PRECLUDE UNFILTERED RELEASE OF FISSION GASES**



## **NEGATIVE ATTRIBUTES OF THE CONTINUOUS WATER SEAL WHICH WAS CONSIDERED**

- **HIGH PRESSURE, HIGHLY CONTAMINATED FLUID CHARGING CONTAINMENT SPRAY PIPING (AND HXs)**
- **COMPLICATES EMERGENCY OPERATING PROCEDURES REQUIRED TO MITIGATE THE CONSEQUENCES OF AN ACCIDENT**
- **INCREASED POTENTIAL FOR INADVERTENT CONTAINMENT SPRAY RESULTING IN POSSIBLE CONTAINMENT DE-INERTING OR EVEN DRYWELL IMPLOSION**
- **THE DRYWELL AND SUPPRESSION POOL CHECK VALVES WOULD NOT BE SEALED**



## **CONCLUSION**

- WATER SEAL OPERATION COMPLIES WITH REQUIREMENTS OF APPENDIX J.
- EOP'S LIMIT THE TIME WATER SEAL WOULD BE IN OPERATION.
- WATER SEAL REQUIRES SIGNIFICANT OPERATIONAL ACTION.
- NMPC PLAN TO PERFORM MODIFICATION TO ELIMINATE NEED FOR WATER SEAL (ALLOW TYPE C TESTING OF VALVES).
  - DEVELOP CONCEPTUAL DESIGN
  - PRIORITIZE IN ACCORDANCE WITH PLANT SAFETY & RELIABILITY
  - BUDGET AND SCHEDULE IN AN APPROPRIATE OUTAGE WINDOW
  - IMPLEMENT





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 FACILITY: Nine Mile Point Nuclear Station Unit No. 1  
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 MILE POINT 1

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 Division of Reactor Projects - I/II  
 Office of Nuclear Reactor Regulation

- Enclosures:  
 1. List of Attendees  
 2. Licensee Handout Material

cc w/enclosures:  
 See next page

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