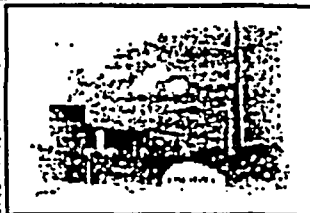
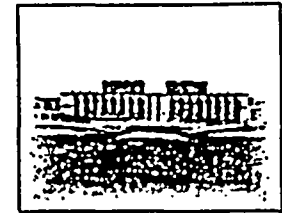


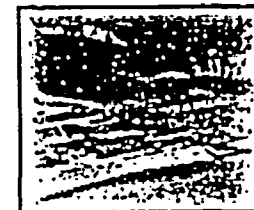
NIMC

Committed to Nuclear Excellence



May 10, 2005

**Kewaunee Nuclear Power Plant
Auxiliary Feedwater Pump Protection
License Amendment Request**



NIMC

Agenda

Introduction/Agenda

Leslie Hartz

Background

Lori Armstrong

AFW System Summary

Jeff Stafford

Post Modification (Design/Analysis)

Brian Koehler

Post Modification (Operations)

Jeff Stafford

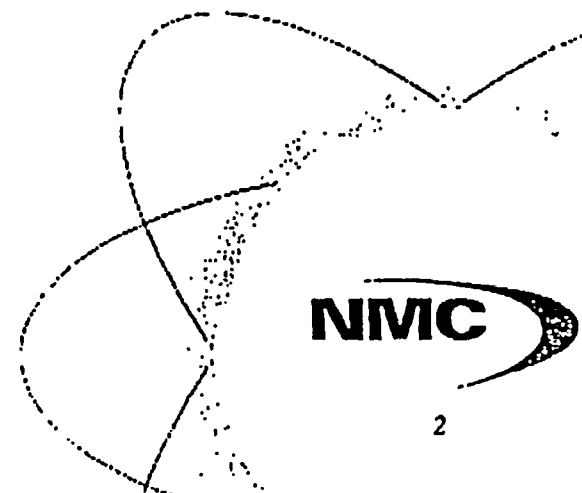
License Amendment Request

Morris Branch

Conclusion

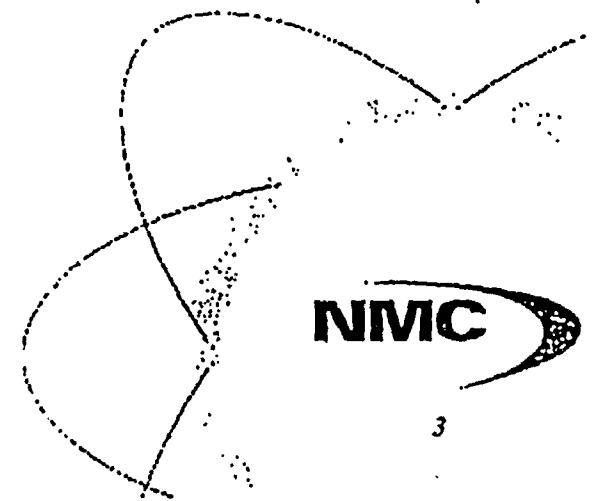
Leslie Hartz

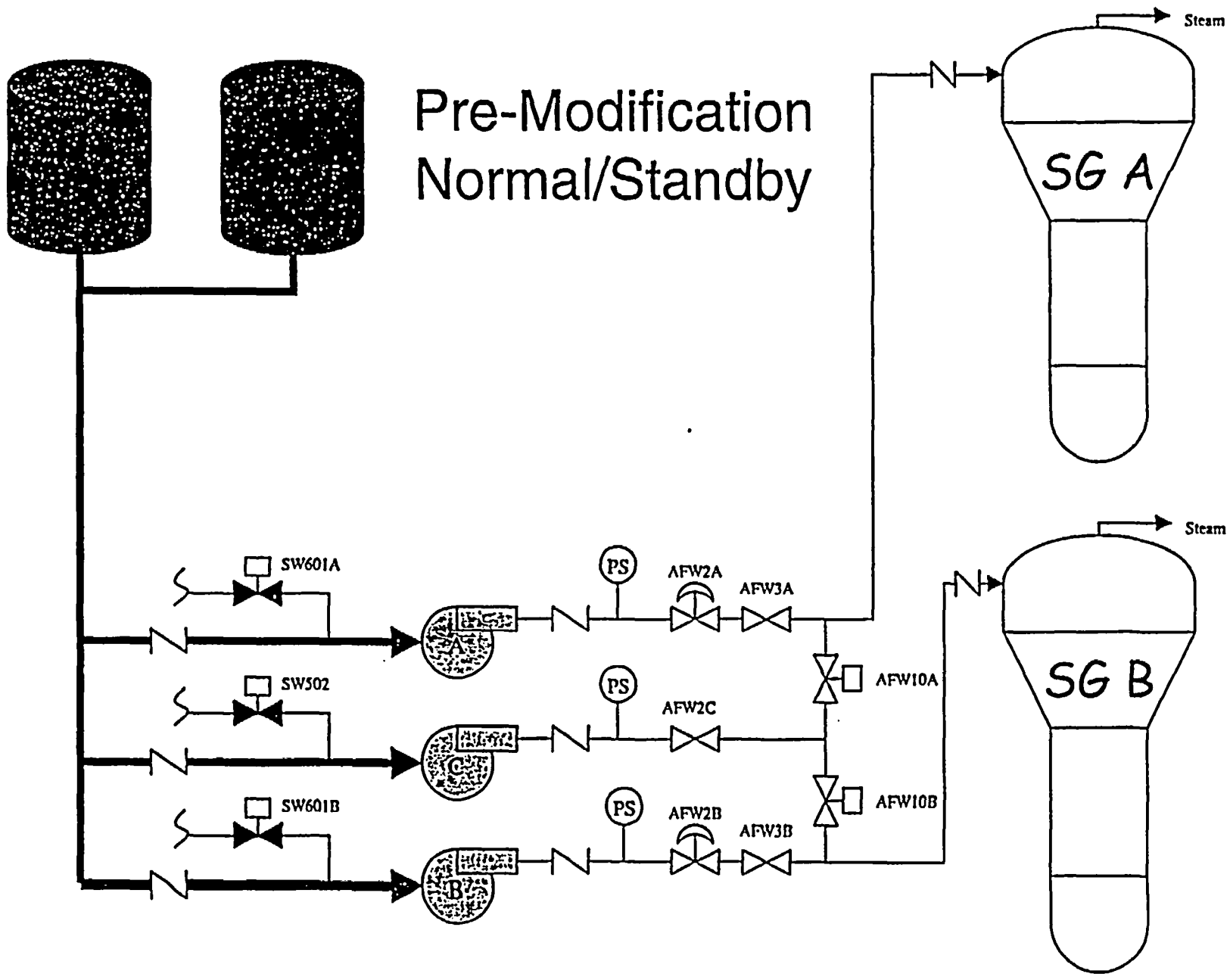
Q&A



Background

- Auxiliary Feedwater (AFW) pump protection for:
 - Loss of normal water supply
 - Loss of Net Positive Suction Head (NPSH) at runout
- License Amendment Request
 - Suction Pressure Trip
 - Discharge Pressure Trip
 - Operator Actions





Pre-Modification
Normal/Standby

SG A

SG B

Steam

Steam

SW601A

SW502

SW601B

PS

AFW2A

AFW3A

AFW10A

PS

AFW2C

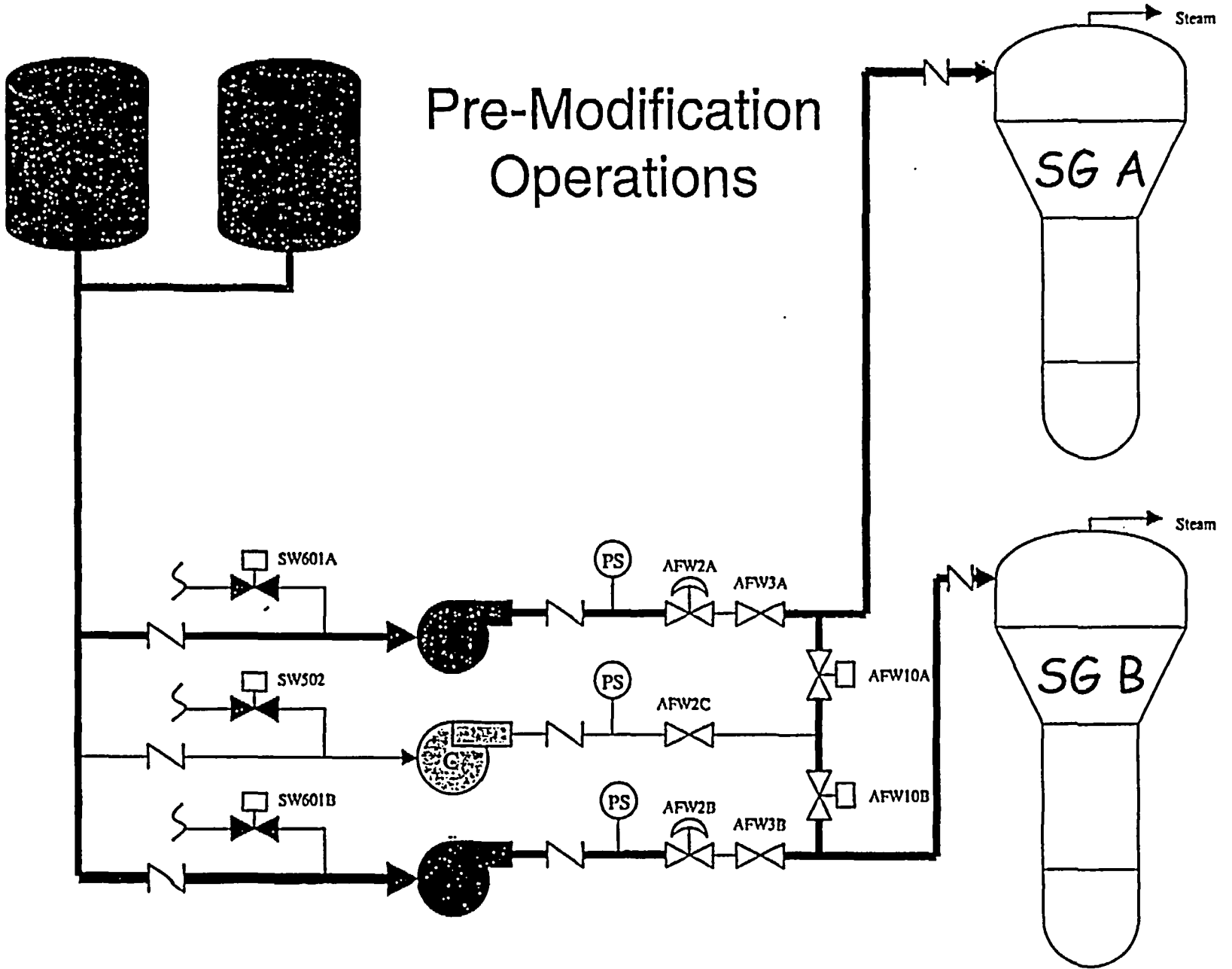
PS

AFW2B

AFW3B

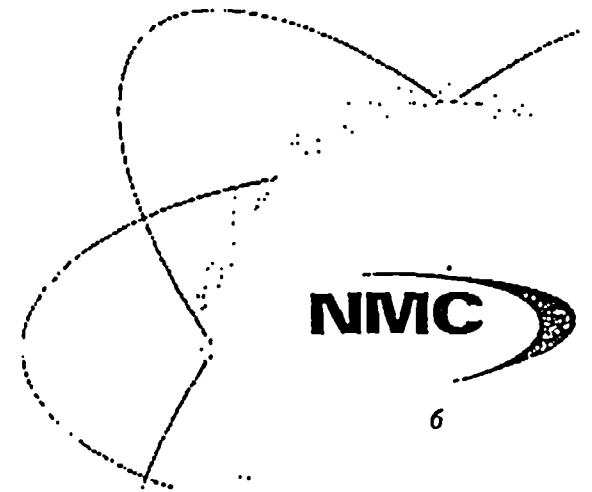
AFW10B

Pre-Modification Operations

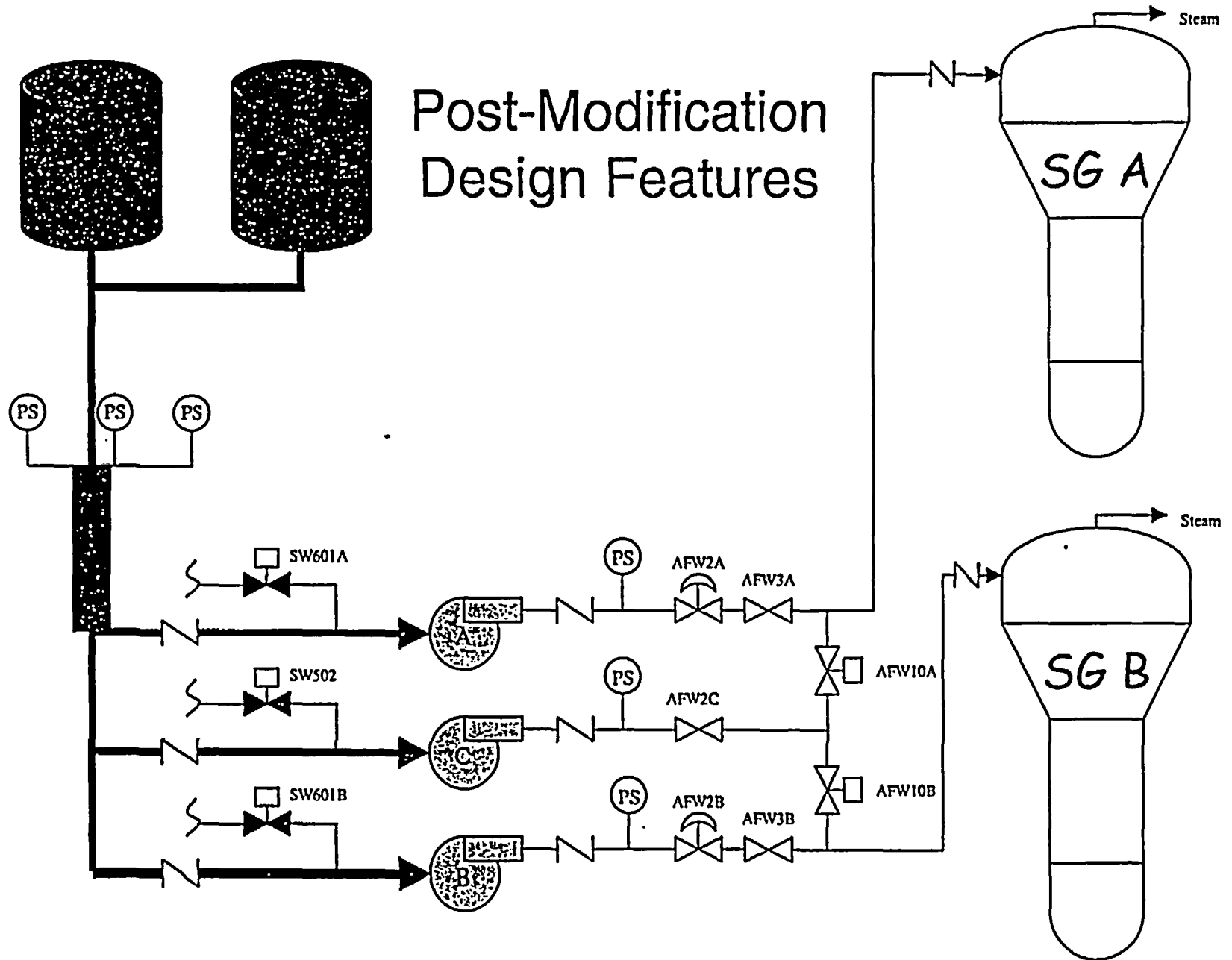


Post Modification - Design Features

- Low Suction Pressure AFW Pump Protection
 - Rerouted & Resized suction piping to provide a Protective Volume
 - Suction Pressure Trip function
- Low Discharge Pressure AFW Pump Trip Setpoint



Post-Modification Design Features



Post Modification - Safety Analysis

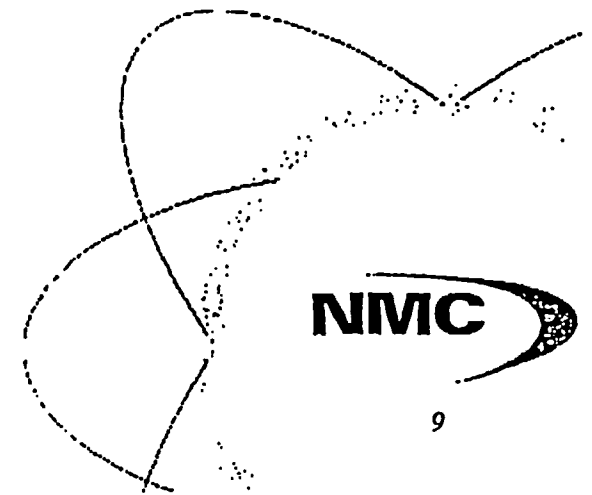
- USAR Accident and Transient Analysis reviewed
- No impact to safety analysis of record
 - Westinghouse review
- Steam generator pressures > 750 psig
 - Except for Main Steam Line Break (MSLB)
 - SGTR event during RCS cooldown (USAR described)



NIMC

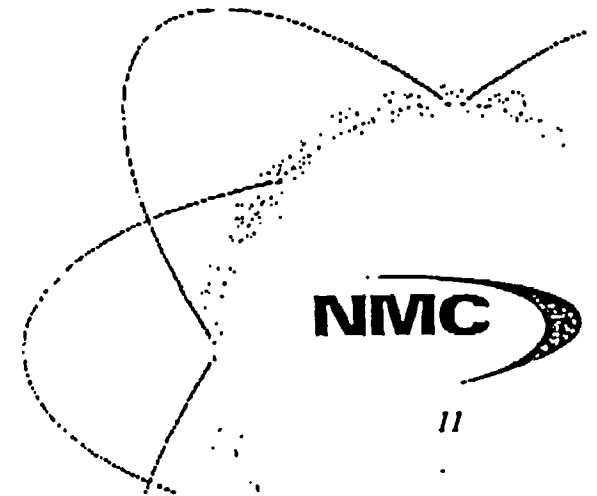
Post Modification – Operations

- Operational Strategy
 - Integrated Plant Emergency Operating Procedures
 - Steam generator tube rupture
 - Main steam line break
 - Event identification (system symptoms)



Post Modification – Operations

- Potential Local Operator Actions
 - Manual valve throttling
 - Diverse access routes
 - Operator time validation



License Amendment Request

- Request for an Expeditious Review
 - Commitment to time validate Operator Actions
- TS Changes
 - TS 3.4.b.1- AFW Pump Suction Pressure Trip Channels added
 - TS 3.4.b.5 – Required actions and completion times for inoperable AFW pump trip channels added



NMTC

License Amendment Request

- Surveillance Changes to TS Table 4.1.1
 - Item 43 - AFW pump discharge pressure trip channels
 - Item 46 - AFW pump low suction pressure trip channels
- TS Bases Changes
 - Revise discharge pressure switches functionality
 - Implement Control Room Operator Actions
 - Implement Local Operator Actions

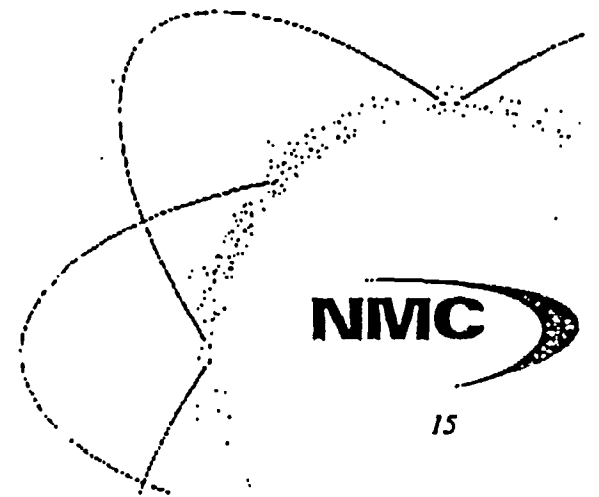
Conclusions

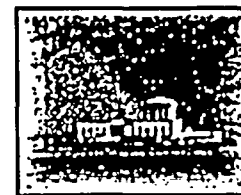
Summary

- Modifications provide pump protection from loss of suction or pump runout.
- Accident analyses timelines are unaffected and current accident analyses are valid.
- Current radiological dose assessment of SGTR is valid
- Local manual operator action may be necessary for post-accident RCS cooldown in some scenarios
- Operator actions will be time validated prior to start-up.
- AFW system will be reviewed for eliminating local operator action



Questions?





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May 10, 2005

**Kewaunee Nuclear Power Plant
NRC Meeting on Internal Flooding**

NMPC

Committed to Nuclear Excellence

Agenda

Purpose

Lori Armstrong

USAR Background

Tom Breene

Internal Flooding Basis

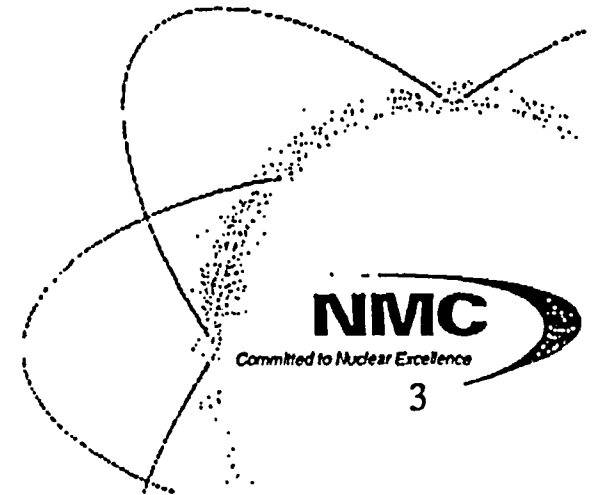
Tom Breene

Closing Comments

Lori Armstrong

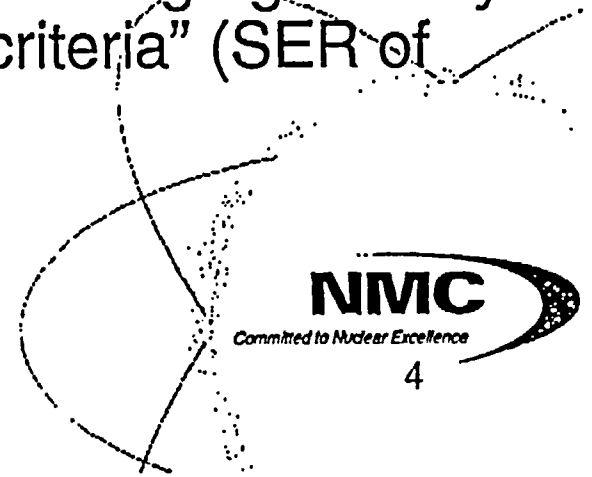
Meeting Purpose

- Communicate Kewaunee design basis for internal flooding.
- Communicate status on resolution of flooding issues.



USAR Background

- KNPP was designed and constructed to comply with the intent of the Atomic Energy Commission (AEC) General Design Criteria (GDC) as proposed on July 10, 1967
- Construction 50% complete when Appendix A GDCs published, February 20, 1971
- AEC did not require KNPP to reanalyze
 - AEC was “satisfied that the plant design generally conforms to the intent of these criteria” (SER of July 24, 1972)



USAR Background

- Appendix B.5 – Protection of Class I Items
- “Class I items are protected against damage from: a) Rupture of a pipe or tank resulting in serious flooding or excessive steam release to the extent that the Class I function is impaired”

The logo for NIMC (Nuclear Incident Management Center) features a stylized, abstract shape resembling a nuclear reactor core or a containment structure, composed of several overlapping curved lines. The text "NIMC" is prominently displayed in a bold, sans-serif font within the upper part of this shape.

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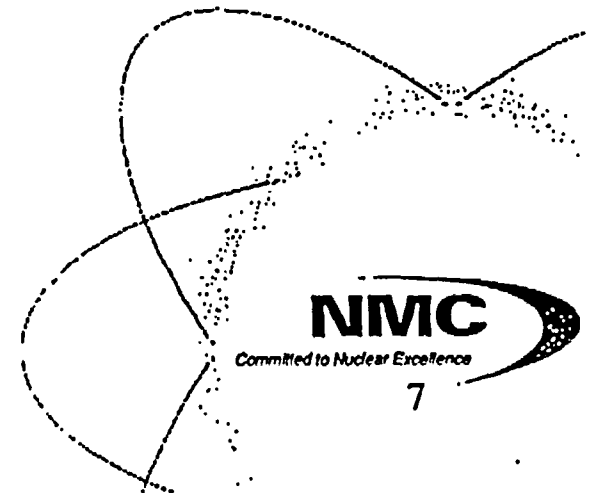
Internal Flooding Basis Overview

1. **Class I SSCs Designed Not to Fail.**
2. **Non-Class I Pipe and Tank Failure:**
 - a) Assume the single most limiting failure in an area
 - b) Single most limiting case determined by maximum level calculated in an area
 - c) Mitigating actions and design features are considered
3. **A Single Active Failure is Applied for Chapter 14 Events and High Energy Line Break (HELB).**
4. **Post-Flood Equipment is Sufficient to Maintain Safe Shutdown Requirements.**

Internal Flooding Basis

1. Class I SSCs Designed Not to Fail.

- Systems, structures, and components designated Class I are so designed that there is no loss of function in the event of a Design Basis Earthquake (DBE) and all environmental factors (Ref.: USAR 1.3.1)
- Non-Class I SSCs may be excluded by evaluation to Class I criteria.



Internal Flooding Basis

2. Non-Class I Pipe and Tank Failure:

a) Assume single most limiting break in an area

- Precedent evaluations of similar vintage plants.
- Assume single, worst case non-Class I piping or tank failure consistent with:
 - ✓ NRC guidance from Multi-plant Generic Issue B-11.
 - ✓ Similar vintage plant TIA 2001-02.
 - ✓ IN 87-49, Deficiencies in outside containment flooding protection.
- Assume only one CW expansion joint failure consistent with:
 - ✓ Similar vintage plant flooding analyses.
 - ✓ NUREG 0800 section 10.4.5 "Circulating Water System"
- Pipe breaks of 1" or less not considered, consistent with BTP ASB 3-1.

NMC

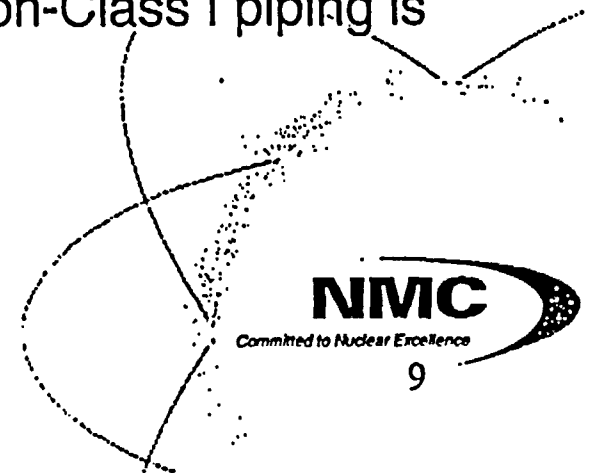
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Internal Flooding Basis

2. Non-Class I Pipe and Tank Failure:

b) Single most limiting case determined by maximum level calculated in an area

- Conservatively evaluated both the maximum flow rate (CW) and maximum volume (FP) cases.
- Flood levels determined based on water sources from either inside or outside a potential flood area.
- Single complete break vs crack of non-Class I piping is evaluated.

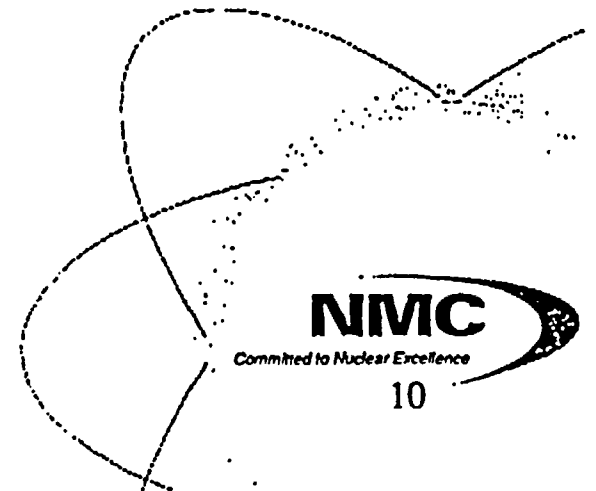


Internal Flooding Basis

2. Non-Class I Pipe and Tank Failure:

c) Mitigating actions and design features are considered, similar to other plants.

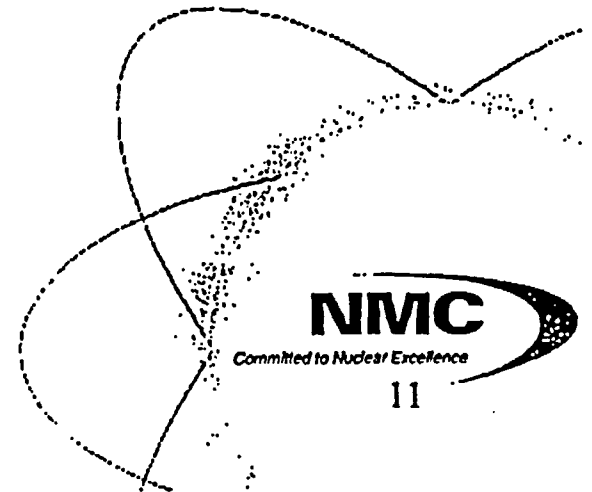
- These Include:
 - ✓ CW pump trip
 - ✓ Barriers
 - ✓ Validated operator actions
 - ✓ Check Valves



Internal Flooding Basis

3. A Single Active Failure is Applied for Chapter 14 Events and HELB.

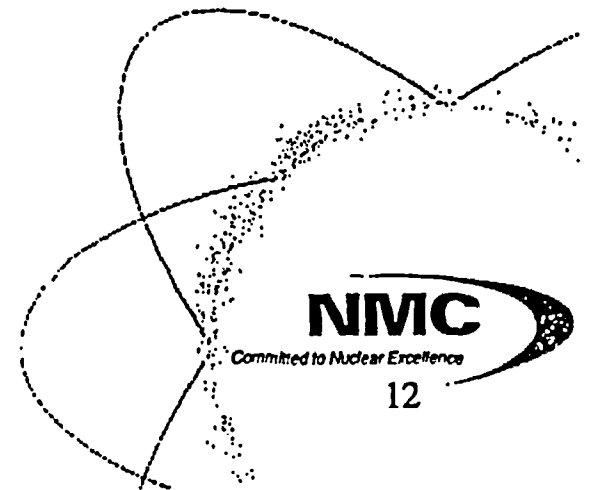
- Available guidance (Multi-plant Generic Issue B-11) does not require consideration of additional single active failure.
- A review of the USAR and the Safety Evaluation Report for Kewaunee indicate that the single active failure criteria is treated separately from criteria related to protection from external events.



Internal Flooding Basis

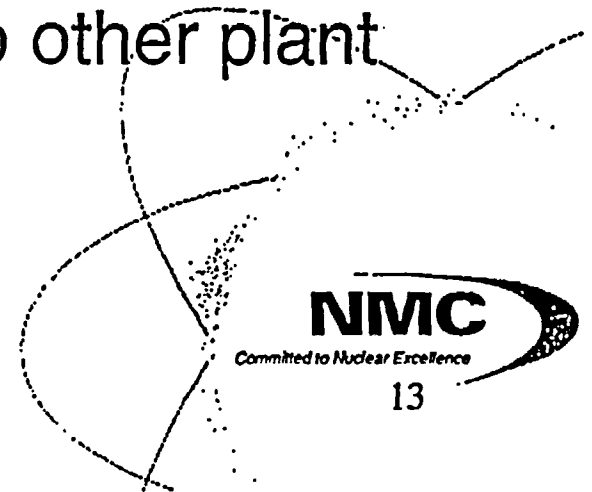
4. Post-Flood Equipment Sufficient to Maintain Safe Shutdown Requirements.

- Safe shutdown requirements based on achieving and maintaining hot shutdown from at-power conditions.
- Loss of offsite power assumed when it increases the consequences of the event. (Ref.: Multi-Plant Generic Issue B-11)



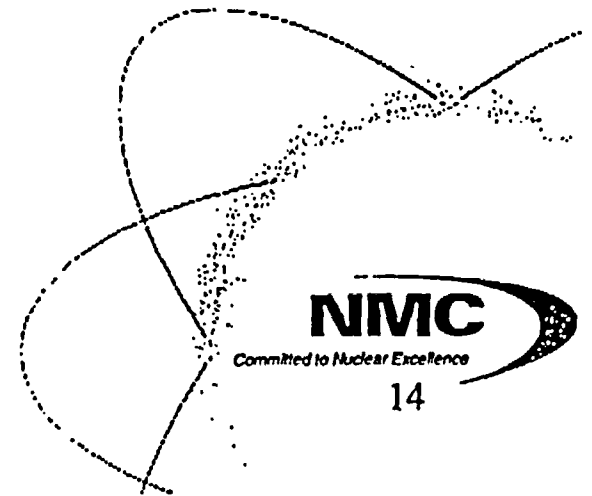
Design Basis Application

- Areas defined based on physical configuration of plant
- Preliminarily, the worst case Turbine Building flood is the Feed Water HELB accompanied by Fire Protection actuation
- The basis is being applied to other plant areas



Internal Flooding Modifications

- Issue
 - Turbine building internal flooding.
- Corrective Actions
 - Modify doors and barriers to be leak tight
 - Add circulating water pump trip
 - Reroute AFW cooling water to the turbine building
 - Add check valves to interconnecting drain lines
- Remaining Actions
 - Complete modification calculations and design
 - Complete installation and testing





Closing Comments

