



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

December 2, 1993

Docket Nos. 50-237, 50-249,  
and 50-254, 50-265

LICENSEE: Commonwealth Edison Company

FACILITIES: Dresden, Units 2 and 3  
Quad Cities, Units 1 and 2

SUBJECT: SUMMARY OF MEETING ON RESOLUTION OF ISSUES RELATED TO REACTOR  
VESSEL WATER LEVEL INSTRUMENTATION

On November 16, 1993, a meeting was held between the NRC and Commonwealth Edison Company (CECo) to discuss the details of an unreviewed safety question (USQ) dealing with modifications at Dresden, Units 2 and 3, and Quad Cities, Units 1 and 2, to eliminate possible errors in Reactor Vessel Water Level Indication in accordance with NRC Bulletin 93-03, "Resolution of Issues Related to Reactor Vessel Water Level Instrumentation in BWRs." Enclosure 1 is a list of attendees.

The modification involves connecting the Control Rod Drive (CRD) drive water header into the existing reference legs. This connection provides deaerated water to the reference leg to prevent the accumulation of dissolved gas. This modification is the typical industry standard backfill modification used to comply with Bulletin 93-03.

CECo presented the scenario of root valve closure and the resulting plant perturbations with and without operator actions to the NRC staff. Enclosure 2 is a copy of the slides used by CECo in their presentation. There was a frank exchange of technical information between CECo and the NRC. CECo indicated that the modification was safe because the probability of the root valve closure was very small based on the following:

1. valves located six feet off floor
2. not located in close proximity to other valves
3. administrative controls
  - lock valves
  - proceduralized out-of-service for the root valves
  - training
  - fences and cages around the valves

The NRC staff told CECo that resolution of the USQ for Dresden and Quad Cities would be forthcoming in a short period of time; however, the NRC indicated

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that until final resolution of the USQ had been completed, the systems were not to be made operable.

**Original Signed By:**

John F. Stang, Project Manager  
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Office of Nuclear Reactor Regulation

Enclosures:  
As stated

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DATE	11/30/93	12/10/93	12/12/93	12/11/93	1/93	1/93
COPY	YES/NO	YES/NO	YES/NO	YES/NO	YES/NO	YES/NO

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LIST OF ATTENDEES FOR  
NOVEMBER 16, 1993, MEETING WITH CECO

<u>NAME</u>	<u>AFFILIATION</u>
Andy Kugler	NRR/PDIII-3
Barry Elliot	NRC/EMCB
Bob Rybank	CECo
Kevin Ramsden	CECo
John Rommel	Bechtel
Brain Viehl	CECo
Robert Moravec	CECo
Ronald Skuglund	CECo
Dennis Farrar	CECo
Anthony T. Gody, Jr.	NRC/PDIII-2
Chandu Patel	NRC/PDIII-2
John Zwolinski	NRC/ADR3
John Stang	NRC/PDIII-2
George Dick	NRC/PDIII-2
Angelo Marinos	NRC/DRCH/HICB
Amy Cabbage	NRC/DSSA/SRXB
Warren Lyon	NRC/DSSA/SRXB
Anthony Fuhs	CECo
Erryl Mendenhall	CECo
Britton Grim	GE Nuclear Energy
Cliff Douth	NRC/HICB
M. D. Lynch	NRR/PDIII-2
Jim Pulsipher	NRC/NRR/Containment Systems
Marsha Gamberoni	NRC/NRR/PDIII-1
Beth A. Wetzel	NRC/NRR/PDIII-1
Jim Raleigh	Southern Technical Services
Pete Piet	CECo

# **COMMONWEALTH EDISON**

**Dresden Station Units 2 & 3  
Quad Cities Station Units 1 & 2**

**Resolution of Concerns  
Related to Instrumentation  
Modifications for IEB 93-03**

**November 16, 1993**

# OUTLINE OF PRESENTATION

- Objective of Meeting                      Bob Moravec
- Design Efforts                              Ron Skoglund
- Chronology                                 Brian Viehl
- Safety Evaluation                         Tony Fuhs
- Summary                                     Bob Moravec

# OBJECTIVE OF MEETING

- Provide sufficient information to the NRC so that necessary License Amendments can be issued for the Reactor Vessel Level Backfill Modification in accordance with the following schedule:

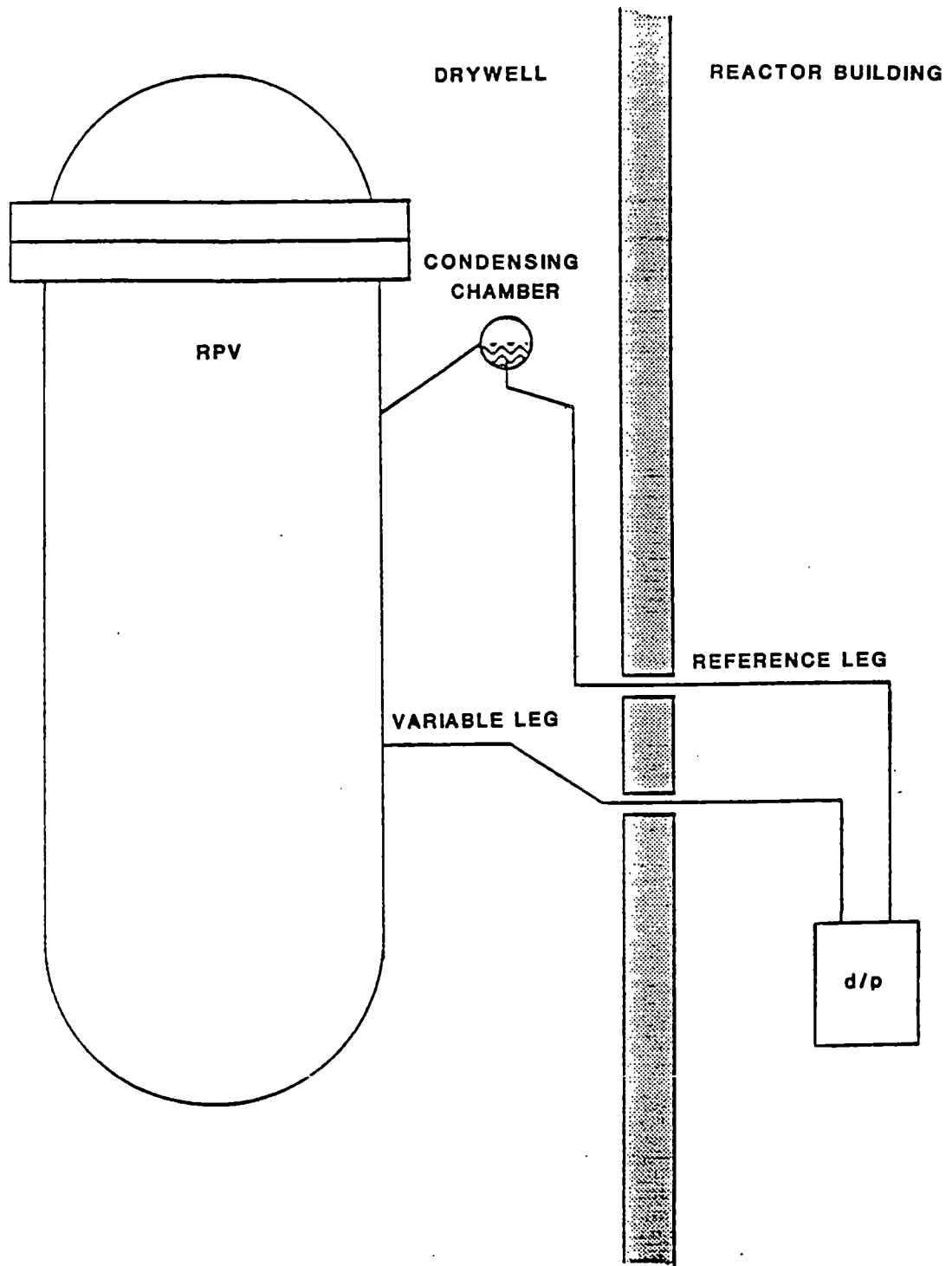
Quad Cities Unit 1:      November 22, 1993

Dresden Unit 2:         December 1, 1993

# DESIGN

- RVLIS SYSTEM OVERVIEW
  - TYPES OF INSTRUMENTS
    - LEVEL
    - PRESSURE
- DRESDEN/QUAD CITIES - BWR 3
  - A TOTAL OF FOUR REFERENCE LEGS ARE BEING MODIFIED PER UNIT
    - 2 TRIP
    - 2 INDICATION/FW LEVEL CONTROL



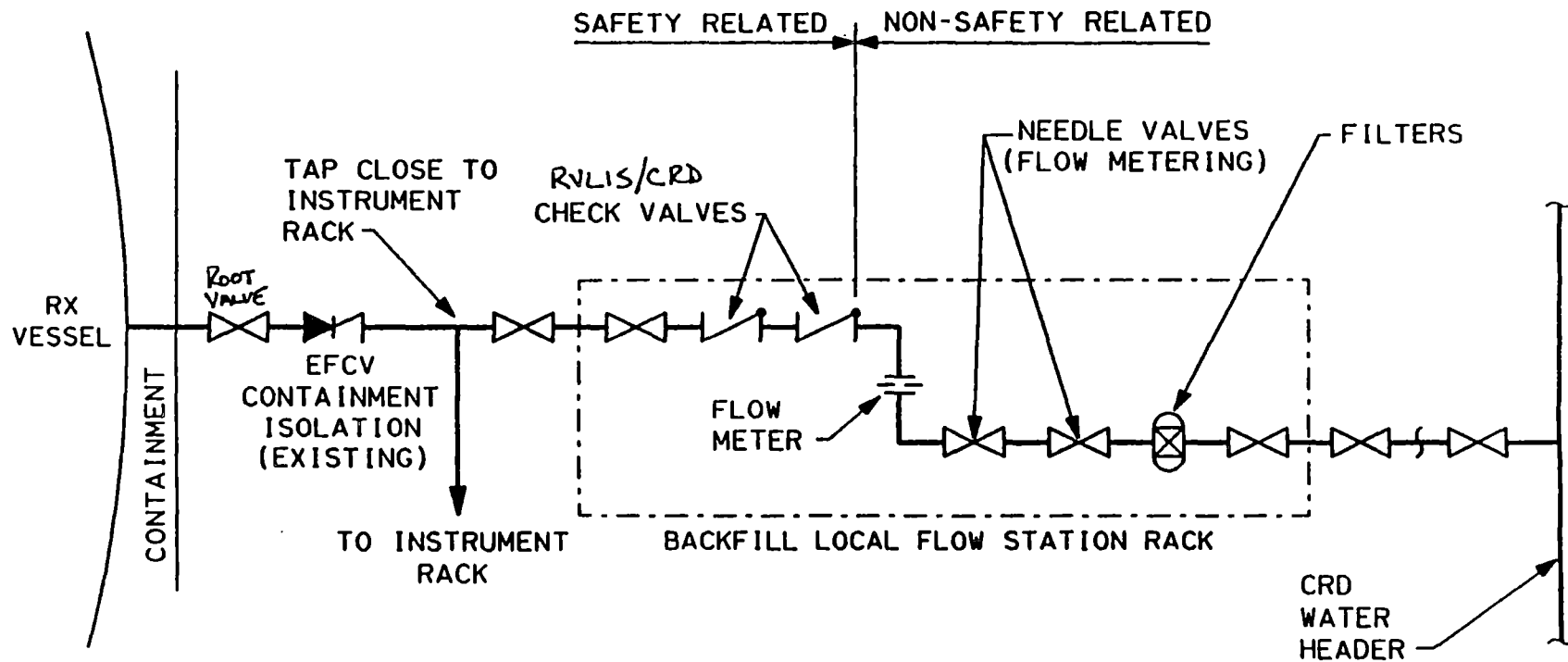


**RPV Water Level Instrumentation**

# DESIGN

- Mod Required to implement solution to bulletin
- Backfill reference legs with CRD water
- RVLIS Backfill System Overview
  - CRD System Drive Water Header
  - Filter
  - Metering Valves
  - Flow Indication
  - Check Valves
  - Reference Leg

# BACKFILL MODIFICATION (INDUSTRY STANDARD)



SIMPLIFIED FOR REFERENCE ONLY

# DESIGN

- Low flow rate
- Evaluated RPV nozzle stresses
- Evaluated thermal piping stresses
- Flow effects on instruments
- Stringent leakage requirements on check valves
- Injection point maximizes amount of degassified water in reference leg
- Administrative controls on valves

# CHRONOLOGY

- Bulletin 93-03 - May, 1993
  - Three CECo Plants formed Design Team
  - Design begins June, 1993
  - Administrative Controls put into place
  - CECo's Lead Plant, LaSalle, performs backfill testing
- Bulletin Response - July, 1993

# CHRONOLOGY

- Root Valve Closure
  - Industry Issue - August, 1993
  - BWR-4 identifies Root Valve Closure/CRD Overpressurization Issue

# CHRONOLOGY

- Commonwealth Edison Evaluates Issue, each plant reviews
  - Operations
  - Maintenance
  - Engineering
- Three sites discuss issue on September 10, 1993
  - Design Review and Preliminary Safety Evaluation indicated a sound design approach with safety evaluation issues based on probability
  - Conclusion reached by CECo is that each design approach is safe

# CHRONOLOGY

## WHY D/Q DESIGN IS APPROPRIATE

- Probability is low
- Transient is not severe
- Inherent design advantages



# CHRONOLOGY

Transient is not severe

- Plant response is clear & safe
- 5 SRVs opening ~ 30% of Feedwater flow
- Scram signal is concurrent w/root valve closure
- Good RPV level & pressure in control room
- Transient similar to other known scenarios
- Control Room Operator intervention possible by design

# CHRONOLOGY

## Inherent Design Advantages

- No containment isolation issue
- Maximizes length of backfilled reference leg
- Industry tested configuration

For Dresden & Quad Cities this design approach is appropriate

# CHRONOLOGY

- Dresden/Quad Cities submit License Amendment - 10/8/93
- Revised 10/29/93

# CHRONOLOGY

- Current Commitment Schedule

Quad 1 - November, 93 Maintenance Outage

Quad 2 - December, 93 Maintenance Outage

Dresden 2 - 1st Cold Shutdown After  
December 1, 1993

Dresden 3 - Refuel Outage March, 1994

# SAFETY EVALUATION

- First 50.59 Issue - Increased Probability of Previously Analyzed Accident
  - Root Valve Closure could cause inadvertent opening of relief valves
  - Scenario [without operator action]
    - Root valve close/instruments pressurized to 1300 psi
    - Reactor scrams
    - Relief valves open
    - MSIV's close
    - High pressure ECCS and Feedwater pumps restore inventory
    - Low pressure ECCS start
    - Reactor stabilizes above 50 psig

# SAFETY EVALUATION

- Scenario [with operator action]
  - Root valve close/instruments pressurized to 1300 psi
  - Reactor scrams
  - Relief valves open
  - MSIV's close
  - HPCI starts & injects
  - Level controlled with Feedwater
  - HPCI secured
  - Relief valves closed
  - Pressure & level manually controlled

# SAFETY EVALUATION

- Commonwealth Edison has concluded that this event is within design limits
- Plant response bounded by intermediate size linebreak
  - Steam leak, stops when vessel is depressurized
  - Steam is directed to Torus rather than Drywell
  - ECCS initiation and scram occur at beginning of scenario
  - Bounded by Mark I Containment Analysis

# SAFETY EVALUATION

- Probability Increase not significant
  - Review by Commonwealth Edison PRA Group  
Quantified the Probability
- Administrative Controls
  - Locked Valves
  - Proceduralized OOS
  - Labeling/Sign
  - Training
  - Fences/Cage



# BASIS FOR PROBABILITY

- Located six feet off floor
- Not located in close proximity to other valves
- Located outside the containment penetration
- Proper valve tags
  
- Locked open
- Sign indicating significance
- Physical barriers

# SAFETY EVALUATION

- Second 50.59 Issue - Reference Leg Integrity
  - Column height is a critical parameter for Inst Function
  - System interconnection introduces potential new leakage path
  - Condensing Pot Water Inventory is small
- SOLUTION
  - Ensure check valve leak tightness
  - Stringent acceptance criteria for CRD check valve leakage
  - Test frequency to ensure performance

# SUMMARY

- Dresden/Quad Cities Backfill Design resolves IEB 93-03 concerns
- Safety Evaluation Issues
  - Acceptable due to the low probability of inadvertent root valve closure and the transient is not severe
  - Check valves are appropriate to maintain reference leg integrity
- Need NRC Approval via License Amendment

that until final resolution of the USQ had been completed, the systems were not to be made operable.

**Original Signed By:**

John F. Stang, Project Manager  
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