



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

October 13, 2000

Mr. Robert P. Powers, Senior Vice President  
Indiana Michigan Power Company  
Nuclear Generation Group  
500 Circle Drive  
Buchanan, MI 49107

**SUBJECT: DONALD C. COOK - SUMMARY OF SEPTEMBER 27, 2000, PUBLIC MEETING  
REGARDING UPDATE ON CONTAINMENT STRUCTURES**

Dear Mr. Powers:

This letter summarizes the meeting held on September 27, 2000, between members of your staff and the Nuclear Regulatory Commission (NRC) related to containment structures at the Donald C. Cook (D. C. Cook) nuclear plant. The meeting was held at the D. C. Cook Training Center in Stevensville, Michigan. This meeting was open for public observation. Enclosure 1 provides a list of meeting attendees. A copy of the handouts used by your staff is provided in Enclosure 2.

Your staff presented information related to (1) the design and licensing bases for the containment structures, (2) the current configuration of the containment structures including which subcompartment walls were degraded, (3) resolution strategies, and (4) a long-term corrective action plan.

Your staff presented background information regarding the design and licensing basis of the containment structures and identified specific containment structural issues. In particular, your staff discussed the following containment structural issues: (1) questions regarding the adequacy of the Transient Mass Distribution (TMD) analysis, (2) missing or deficient containment structural calculations, and (3) physical deficiencies with the lower containment subcompartment walls.

Your staff presented a summary of resolution strategies. The strategies included four parallel tasks: (1) reconstitution of the containment TMD analysis, (2) performance of bounding evaluations for structures with apparent margin, (3) performance of detailed calculations for limiting structures (steam generator enclosure roof, ice condenser/fan room support slabs, ice condenser/fan room support columns, ice condenser internals, and ice condenser radial beams), and (4) evaluation and repair, if necessary, of subcompartment walls.

Your staff presented the current status of the containment structures on both units, including completed corrective actions. Your staff presented the status of the Unit 2 containment structures at the time of the Unit 2 restart and the anticipated status of the Unit 1 containment structures at restart. Your staff stated that they anticipate two operability determination evaluations will be performed for Unit 1 relating to its containment structures. In addition, your staff presented the differences between containments in Unit 1 and Unit 2. Also, your staff

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discussed the status of the Unit 1 subcompartment walls relating to grout strength, open pockets, cut rebar, rebar location, and rebar cover.

Your staff concluded the presentation by describing the long-term corrective action plan and schedule. Your staff stated that the physical work for Unit 1 containment structures will be completed before the Unit 1 restart, and that the approach to evaluate the operability of Unit 1 containment structures will be similar to the approach used on Unit 2. Your staff stated that the refined analysis for the Unit 1 ice condenser floor slab and columns demonstrate conformance with the design and licensing bases. Your staff anticipates that the remaining refined analyses will have similar results for all containment structures on both units. Lastly, your staff stated that the schedule for the long-term final resolution of containment issues will be submitted in a letter to the NRC by October 16, 2000. The NRC staff reinforced expectations, as stated in Generic Letter 91-18, "Information to Licensees Regarding NRC Inspection Manual Section on Resolution of Degraded and Non-Conforming Condition," that the corrective actions to remedy the deficiencies in the subcompartment walls will be undertaken as soon as practical, commensurate with the safety significance of the deficiency, but no later than the next refueling outage for each unit.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and the enclosures will be available for public inspection at the NRC's Public Document Room, located at One White Flint North, 11555 Rockville Pike (first floor), Rockville, Maryland.

Publicly available records will be accessible electronically from the ADAMS Public Library component on the NRC Web site <http://www.nrc.gov> (the Electronic Reading Room).

If you have any questions regarding this matter, please contact me at 301-415-1345.

Sincerely,

/RA/

John F. Stang, Senior Project Manager, Section 1  
Project Directorate III  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket Nos. 50-315 and 50-316

- Enclosures: 1. Attendees List
- 2. Licensee's Slide Presentation

cc w/encls: See next page

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NAME	JLamb	JStang	THarris	GGrant via telecon	CCraig
DATE	10/12/00	10/12/00	10/13/00	10/12/00	10/12/00

R. Powers

- 2 -

discussed the status of the Unit 1 subcompartment walls relating to grout strength, open pockets, cut rebar, rebar location, and rebar cover.

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John F. Stang, Senior Project Manager, Section 1  
Project Directorate III  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket Nos. 50-315 and 50-316

Enclosures: 1. Attendees List  
2. Licensee's Slide Presentation

cc w/encls: See next page

**Donald C. Cook Nuclear Plant, Units 1 and 2**

**cc:**

**Regional Administrator, Region III  
U.S. Nuclear Regulatory Commission  
801 Warrenville Road  
Lisle, IL 60532-4351**

**Attorney General  
Department of Attorney General  
525 West Ottawa Street  
Lansing, MI 48913**

**Township Supervisor  
Lake Township Hall  
P.O. Box 818  
Bridgman, MI 49106**

**U.S. Nuclear Regulatory Commission  
Resident Inspector's Office  
7700 Red Arrow Highway  
Stevensville, MI 49127**

**David W. Jenkins, Esquire  
Indiana Michigan Power Company  
Nuclear Generation Group  
One Cook Place  
Bridgman, MI 49106**

**Mayor, City of Bridgman  
P.O. Box 366  
Bridgman, MI 49106**

**Special Assistant to the Governor  
Room 1 - State Capitol  
Lansing, MI 48909**

**Drinking Water and Radiological  
Protection Division  
Michigan Department of  
Environmental Quality  
3423 N. Martin Luther King Jr Blvd  
P.O. Box 30630, CPH Mailroom  
Lansing, MI 48909-8130**

**Wayne J. Kropp  
Director, Regulatory Affairs  
Indiana Michigan Power Company  
Nuclear Generation Group  
One Cook Place  
Bridgman, MI 49106**

**David A. Lochbaum  
Union of Concerned Scientists  
1616 P Street NW, Suite 310  
Washington, DC 20036-1495**

**A. Christopher Bakken, Site Vice President  
Indiana Michigan Power Company  
Nuclear Generation Group  
One Cook Place  
Bridgman, MI 49106**

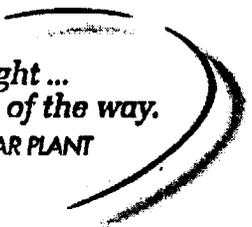
**Michael W. Rencheck  
Vice President, Nuclear Engineering  
Indiana Michigan Power Company  
Nuclear Generation Group  
500 Circle Drive  
Buchanan, MI 49107**

**ATTENDANCE LIST FOR SEPTEMBER 27, 2000 MEETING**

<b><u>NAME</u></b>	<b><u>ORGANIZATION</u></b>
Bill Schalk	AEP
Delfo Bianchini	Sargent & Lundy
John G. Lamb	NRC
M. J. Finissi	AEP
Roger Rickman	AEP
Brian Renwick	Sargent & Lundy
Randy Crane	AEP
John Stang	NRC
Claudia Craig	NRC
Geoff Grant	NRC
Jack Grobe	NRC
Singh Bajwa	NRC
A. Vogel	NRC
B. Bartlett	NRC
Ron Smith	AEP
Brenda Kovarik	AEP
Chris Bakken	AEP
Mike Rencheck	AEP
Scott Greenlee	AEP
Brian McIntyre	AEP
John Rabold	WSBT TV22
Roszell Gadson	WSBT TV22
Matt Galbraith	SB Tribune
B. P. Jain via telecon	NRC

NRC = Nuclear Regulatory Commission  
AEP = American Electric Power  
SB = South Bend

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# American Electric Power

Meeting with

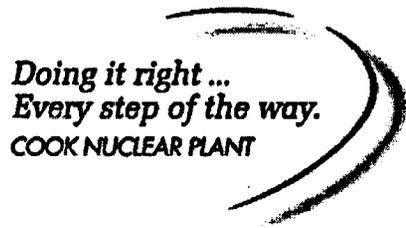
## Nuclear Regulatory Commission

Update on Containment Structures

Restarting D. C. Cook Unit 1  
September 27, 2000



ENCLOSURE 2



# **Agenda for Update on Containment Structures**

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■ **Introduction**

**Mike Rencheck**

■ **Background**

**Scot Greenlee**

**Issue Identification**

**Resolution Strategies**

**Status of Units 2 & 1**

**Long-term Corrective Action**

**Plan / Schedule**

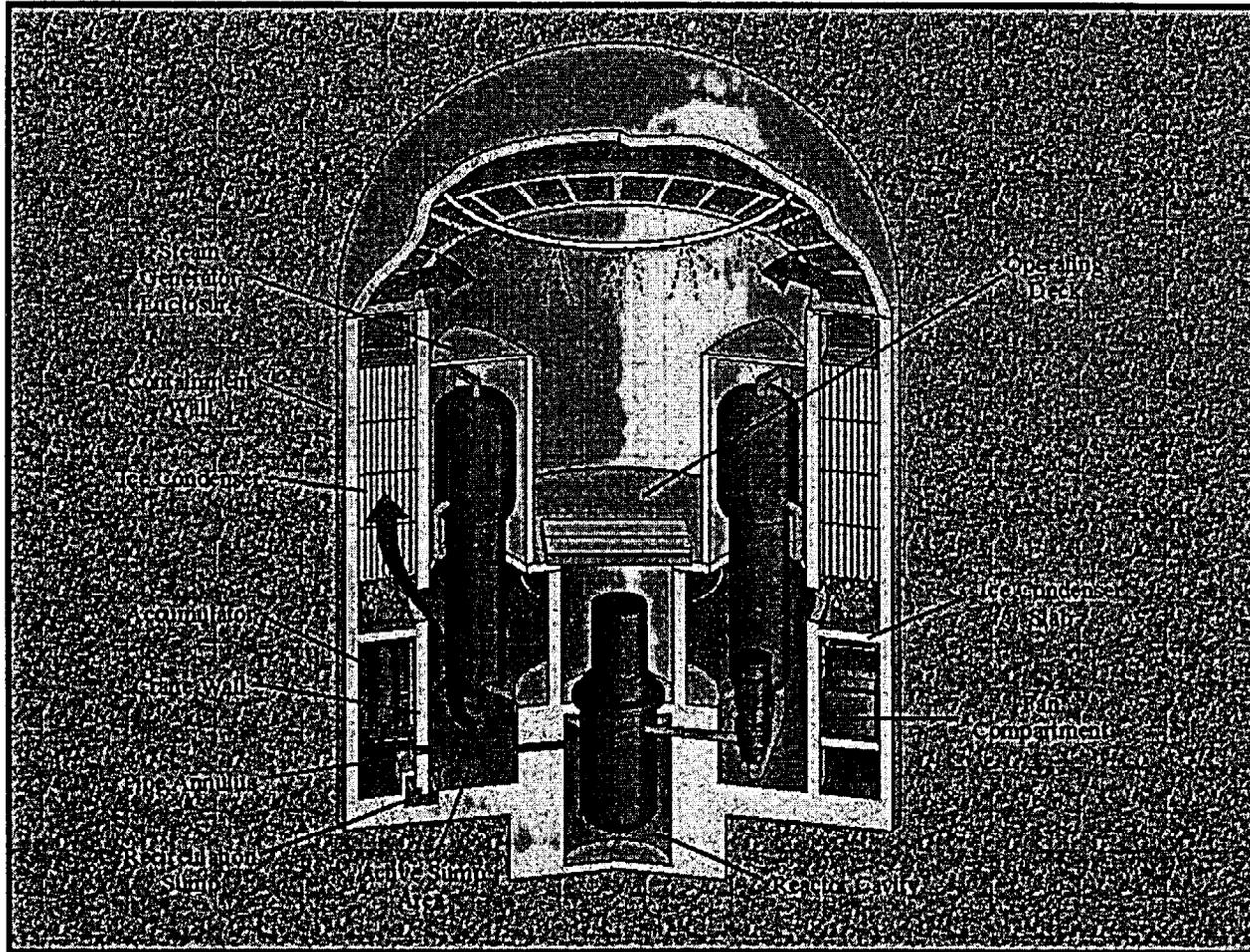
■ **Conclusion**

**Mike Rencheck**

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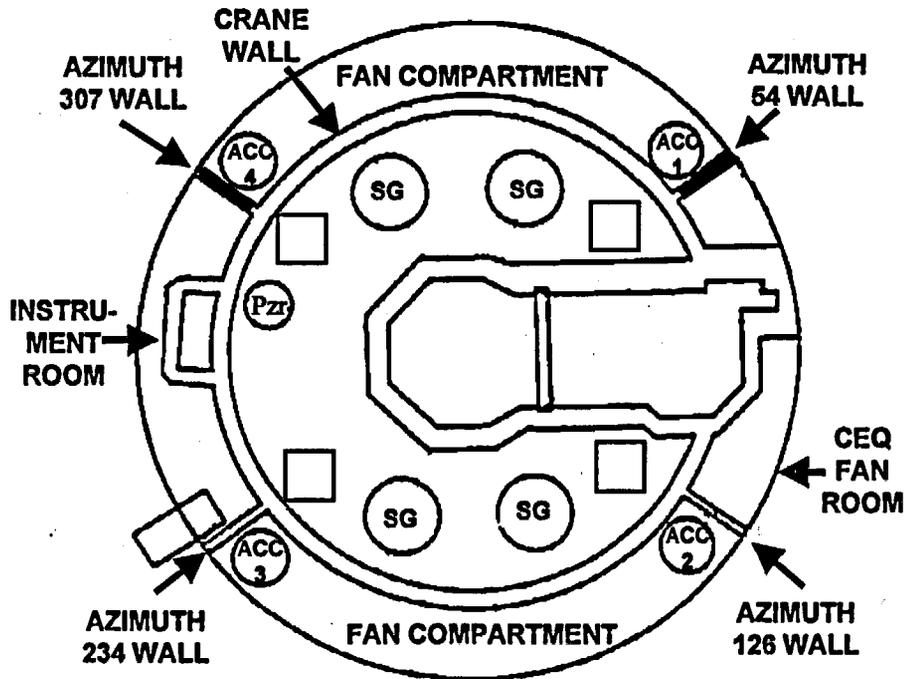
# Background: Diagram of Containment

## ■ Containment

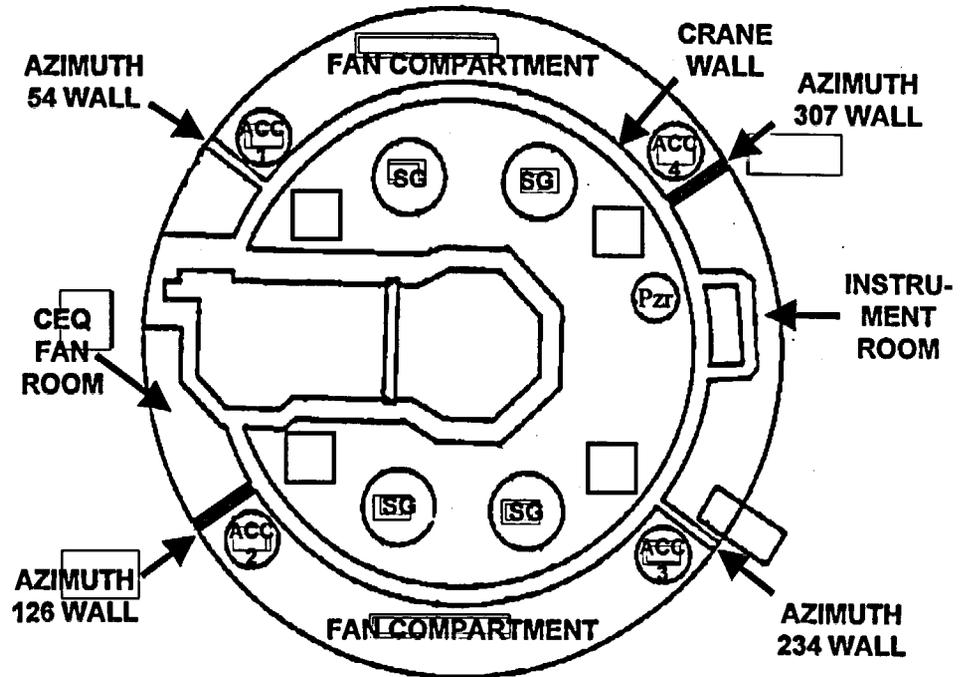


# Background: Diagram of Containment Subcompartment Walls

## Unit 1



## Unit 2



# Identified Containment Structural Issues

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- **Questions Regarding Adequacy of the Transient Mass Distribution (TMD) Analysis**
- **Missing or Deficient Containment Structural Calculations**
- **Physical Deficiencies with the Lower Containment Subcompartment Walls**

# Restart Resolution Strategies

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- **Reconstitute Containment TMD Analysis**
- **Perform Bounding Evaluation for Structures with Apparent Margin**
- **Perform Detailed Calculations for Limiting Structures**
  - **Steam generator enclosure roof**
  - **Ice condenser and fan room support slabs**
  - **Ice condenser / fan room support columns**
  - **Ice condenser internals**
  - **Ice condenser radial beams**

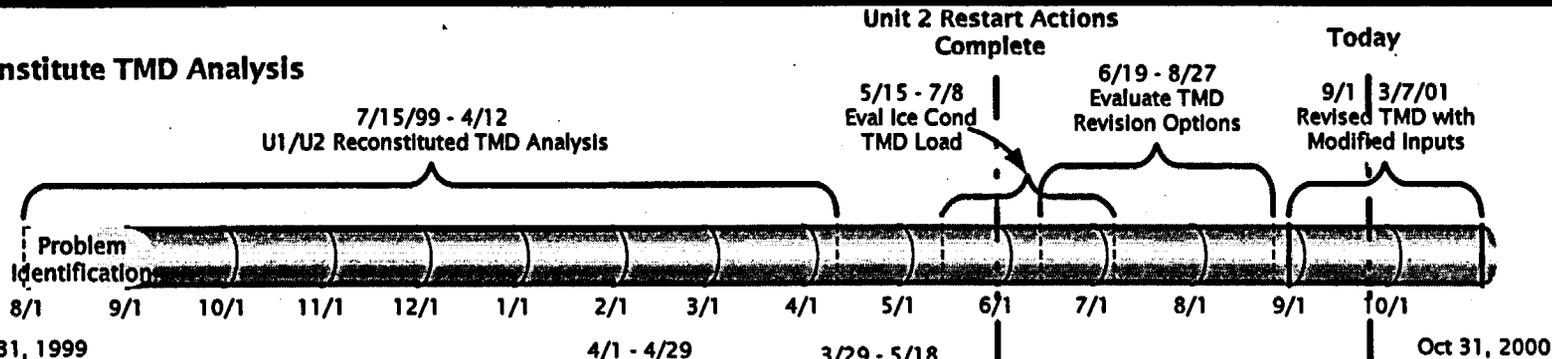
# Restart Resolution Strategies

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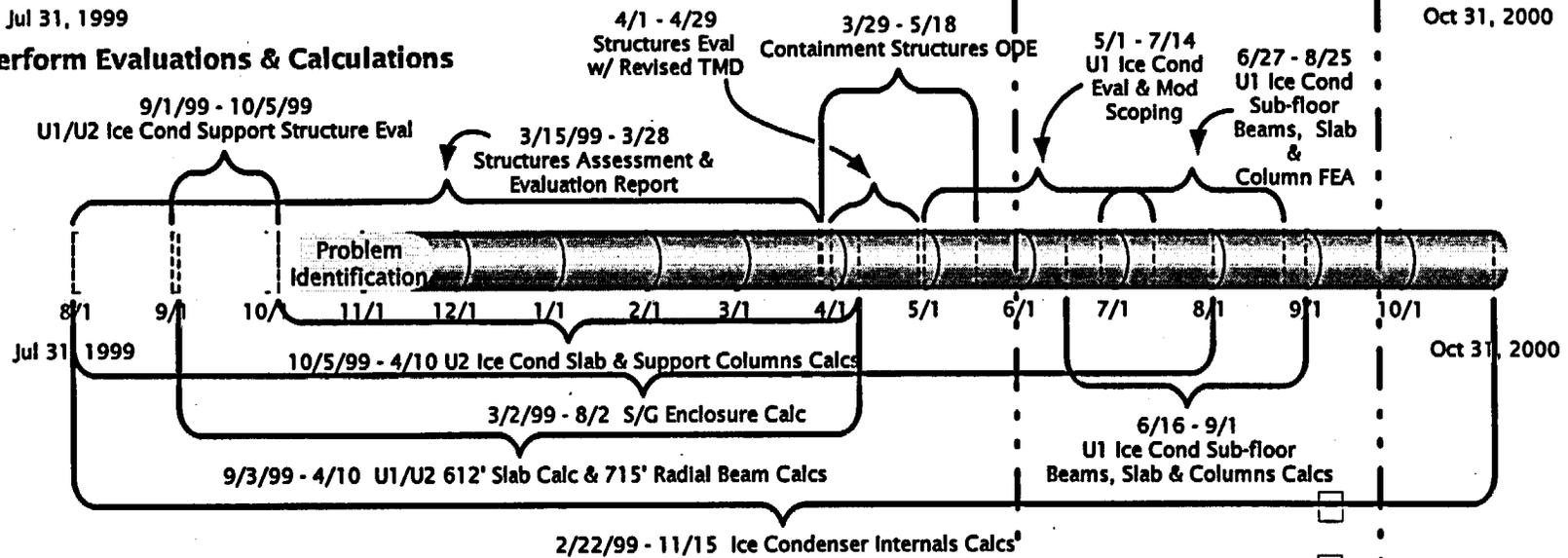
- **Evaluate and Repair Subcompartment Walls**
  - **As-built configuration of penetrations and pockets**
  - **Assess structural grout strength**
  - **Rebar mapping (missing/misplaced rebar/cover)**
  - **Limited excavation**
  - **Grout repairs**
  - **Calculations to document structural capacity**

# Containment Internal Structures Corrective Actions Completed

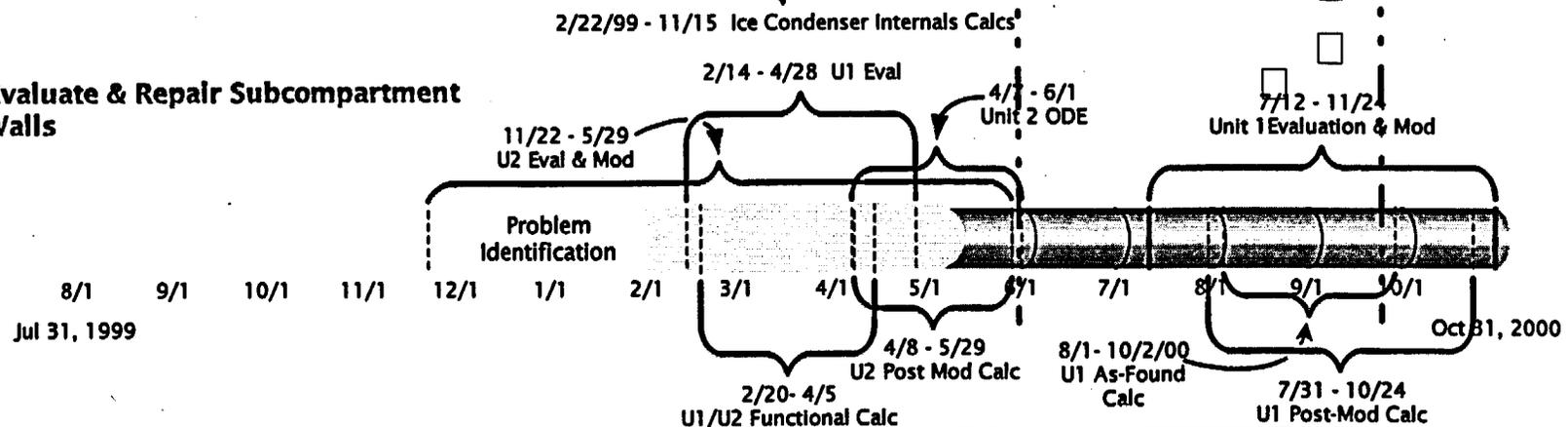
## Reconstitute TMD Analysis

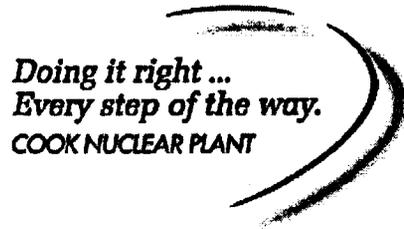


## Perform Evaluations & Calculations



## Evaluate & Repair Subcompartment Walls





# **Unit 2 Status: Containment Structures at Restart**

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- **Operability Determination Evaluation for Missing/ Deficient Calculations and TMD Loading Increase**
  - **Operability based on**
    - » **Revised TMD analysis**
    - » **Bounding evaluation for structures with apparent margin**
    - » **Structure-specific calculations**
  - **Evaluations and most calculations used simplified, conservative modeling**
  - **Structures expected to meet design basis with refined modeling and input assumptions**

# Unit 2 Status: Containment Structures at Restart

- **Operability Determination Evaluation for Subcompartment Walls - June 1, 2000 Public Meeting**
  - **Grout repaired**
  - **Used in-situ parameters (grout strength, concrete strength, rebar location, rebar cover)**
  - **Operability criteria:  $C > 1.0 P1$** 
    - » **C = wall capacity**
    - » **P1 = pressure load due to MSLB**
  - **Minimum margin attained**
    - » **1.21 — simplified methodology**
    - » **1.34 — yield line methodology**

# Unit 1 Status: Containment Structures at Restart

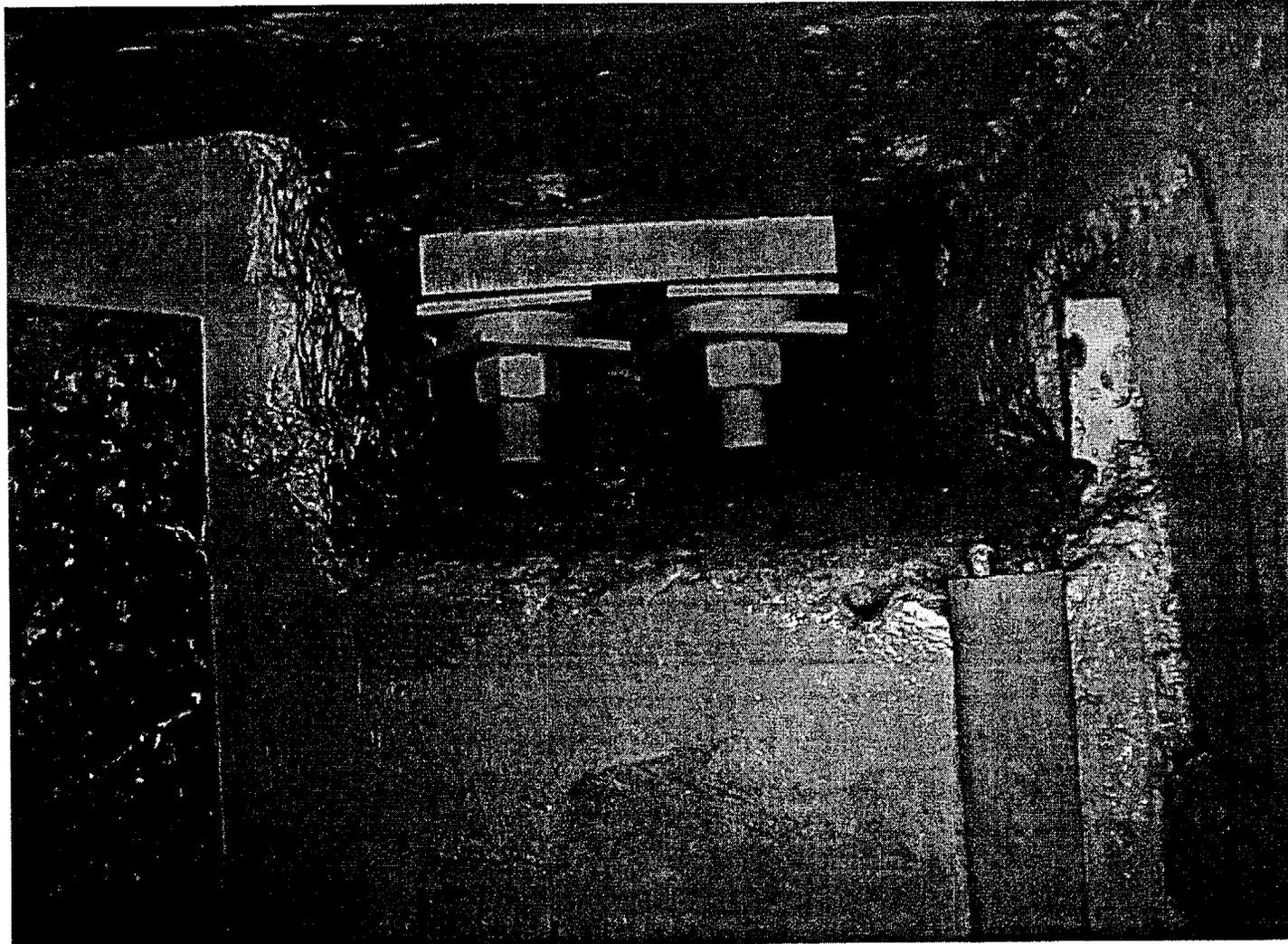
- **Expect Two Operability Determination Evaluations - Similar to Unit 2; to Include Evaluation of:**
  - **Missing / deficient calculations and TMD loading increase**
  - **Subcompartment walls**
- **Differences Between Units 1 & 2**
  - **Ice condenser slab and columns calculation for Unit 1 - Complete**
    - » **Results show loading within design basis**
    - » **3rd party finite element evaluation shows about 30% additional margin available beyond design basis**
  - **Steam generator enclosure calculation - Complete**
    - » **Meets UFSAR Chapter 14 loading requirements**
  - **Ice condenser components calculation - Complete by November 12**
    - » **Results show loading within design basis**
  - **Subcompartment walls: specific physical issues**

# Unit 1 Status: Comparison of As-found Subcompartment Walls

Unit 1	<u>54°</u>	<u>126°</u>	<u>234°</u>	<u>307°</u>
■ Grout Strength				X
■ Open Pockets	X			
■ Cut Rebar	X			
■ Rebar Location	X	X	X	X
■ Rebar Cover	X	X	X	X
 Unit 2	 <u>54°</u>	 <u>126°</u>	 <u>234°</u>	 <u>307°</u>
■ Grout Strength		X		X
■ Open Pockets		X		
■ Cut Rebar		X		
■ Asbestos		X		
■ Rebar Location	X	X	X	X
■ Rebar Cover	X	X	X	X

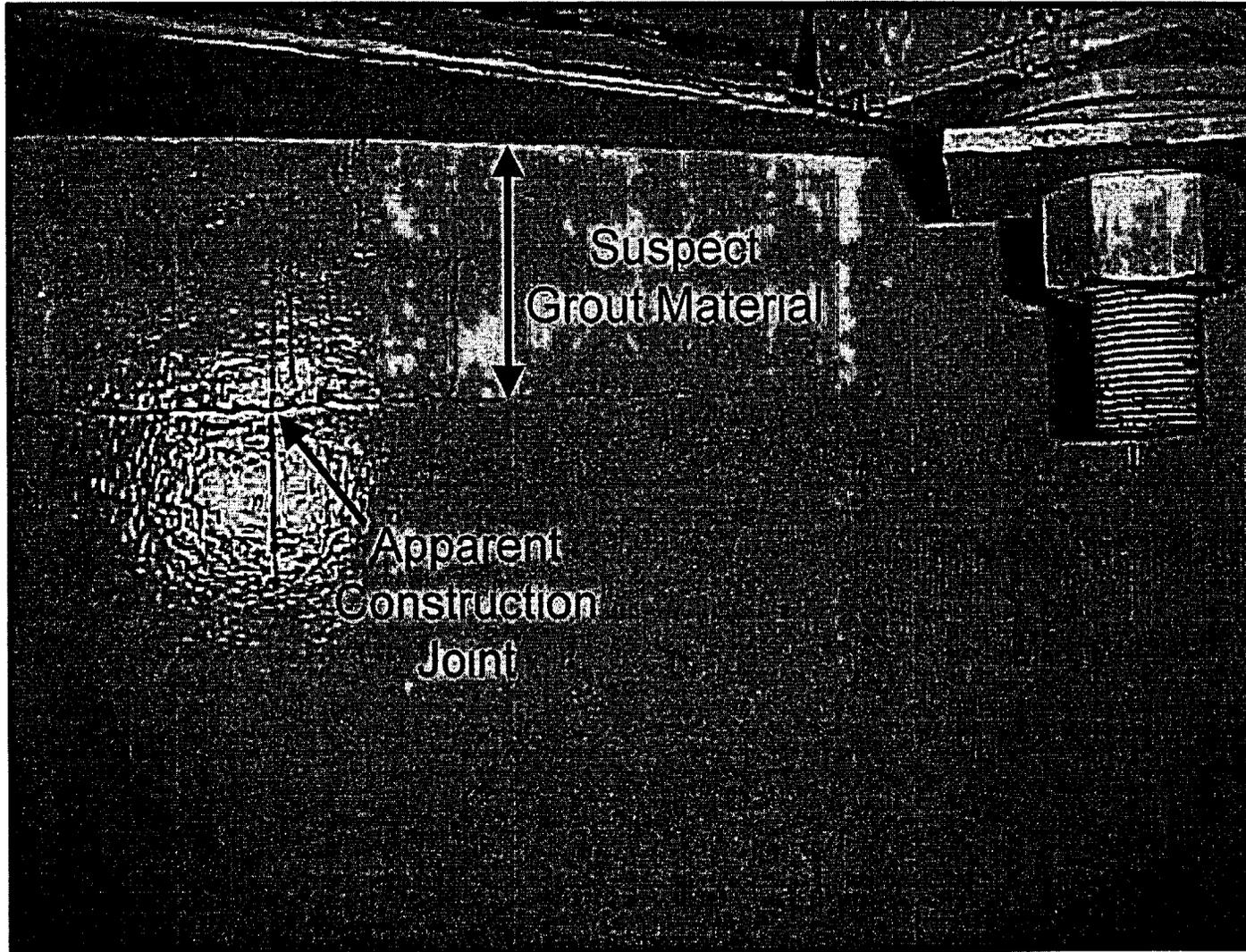
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# Unit 1 Status: Picture of 54° Wall Through-Hole



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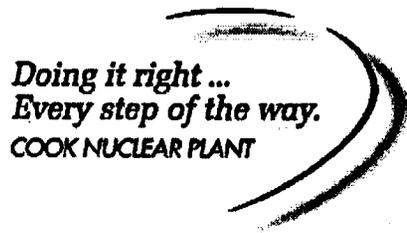
# Unit 1 Status: Picture of Top of 307° Wall



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# Unit 1 Status: Excavation at Top of 307° Wall





# **Unit 1 Status: Subcompartment Walls**

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- **Through-Hole at Top of 54° Wall for Ice Slab Bolting**
  - Bolting required for slab redesign
  - Plate fastened to back of wall to prevent bypass
  - DCP to fill hole with grout prior to restart
  - Condition limited to this wall
  
- **Cut Rebar at Top of 54° Wall**
  - Required for pockets identified on design drawings
  - Not structurally significant

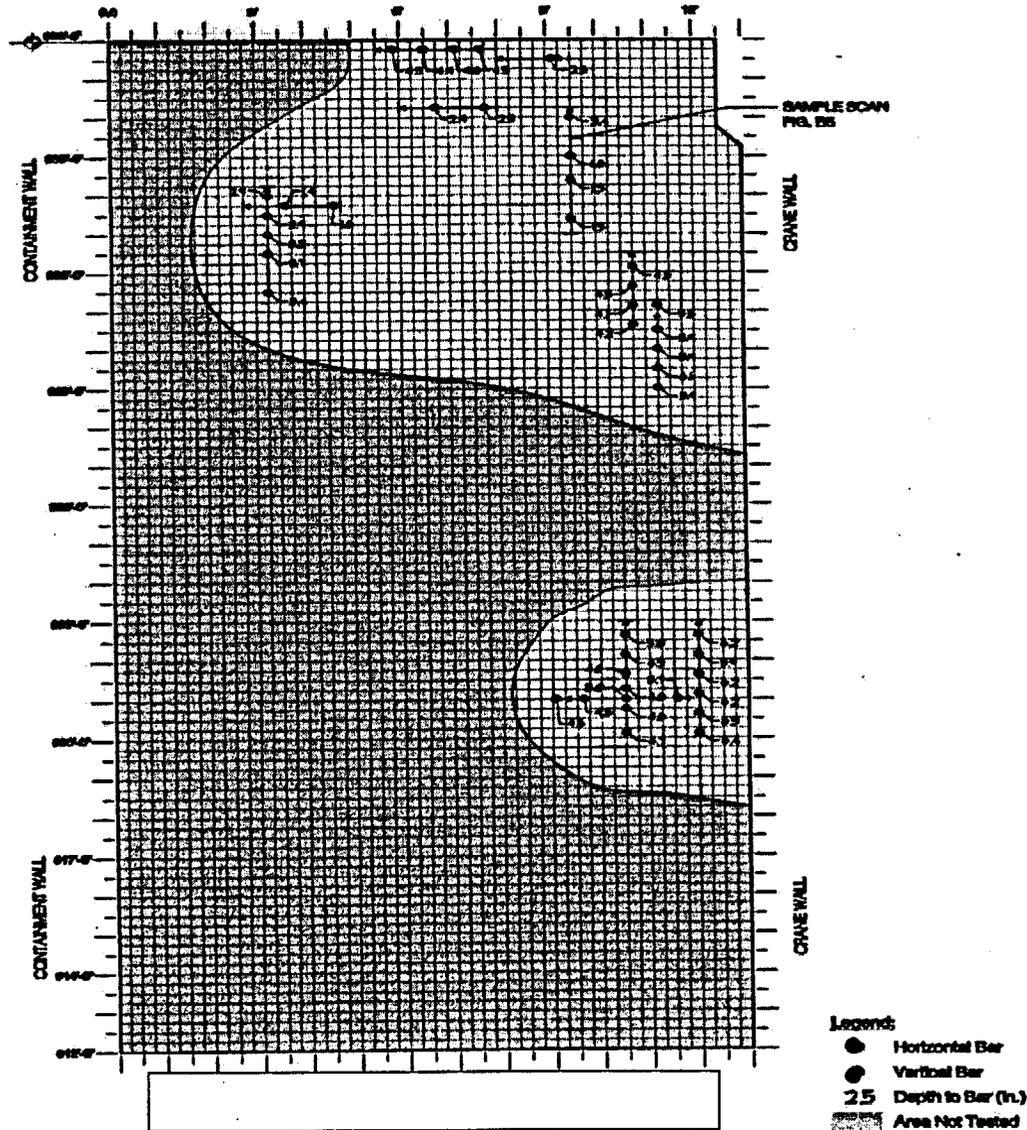
# Unit 1 Status: Subcompartment Walls

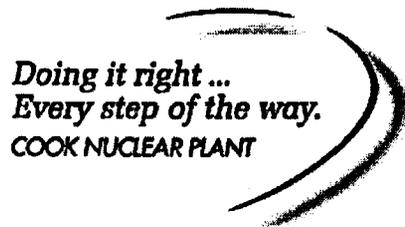
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- **Grout at Top of 307° Wall**
  - **Due to construction sequence**
    - » **Installed after ice condenser slab poured**
  - **Low strength**
  - **Condition limited to this wall**
  
- **Radar Mapping Complete - All Four Walls**
  - **Critical accessible areas**
  - **Both sides of each wall**
  - **Rebar placement and cover issues similar to Unit 2**

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# Wall Radar Mapping Example





# Unit 1 Status: Subcompartment Walls

## ■ Calculations Using Simplified & Yield Line Methods

- Owner’s acceptance in progress
- Margin available ( $C > 1.0$  P1)

<u>Wall</u>	<u>Simplified</u>	<u>Yield Line</u>
54°	1.35	1.48
126°	1.27	1.39
234°	1.40	1.76
307°	1.62*	2.22*

\* Assuming free edge at top

- All four walls operable

## ■ Margin Greater Than Unit 2 for All Four Walls

# **Extent of Condition: Unit 1 Containment Structures**

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## ■ Walkdowns

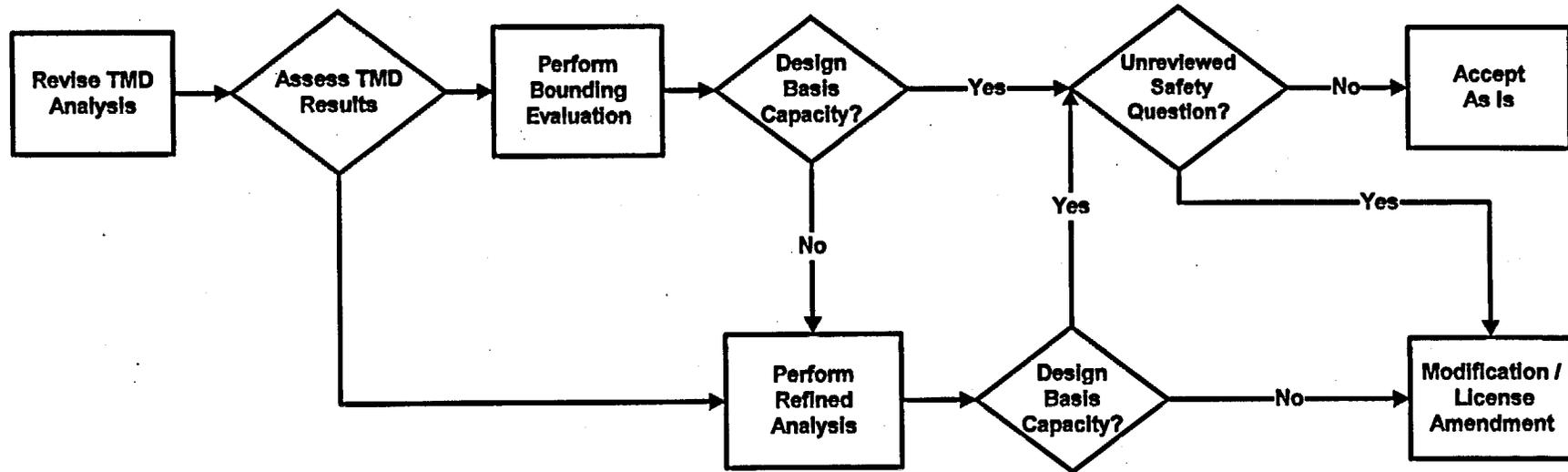
- ESRR walkdowns Complete
- Additional extent of condition reviews for remaining containment structures in progress (Expected by October 11)
- Evaluations and repair, as necessary, before restart

## ■ Review of Construction Records Complete

- No generic issues

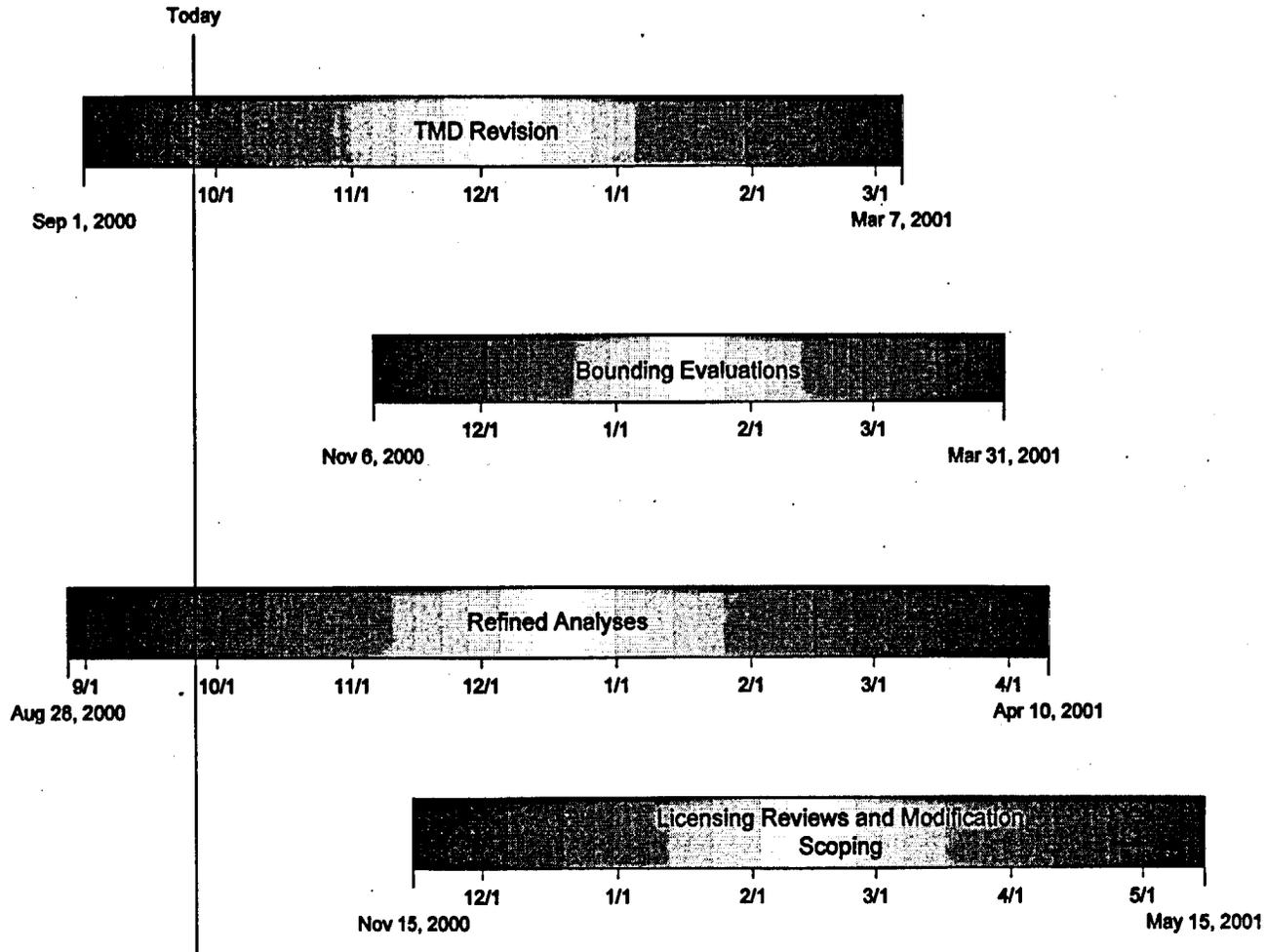
## ■ Rebar Placement and Construction Openings Evaluations Complete

# Long-term Corrective Action Plan



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# Projected Schedule for Major Activities

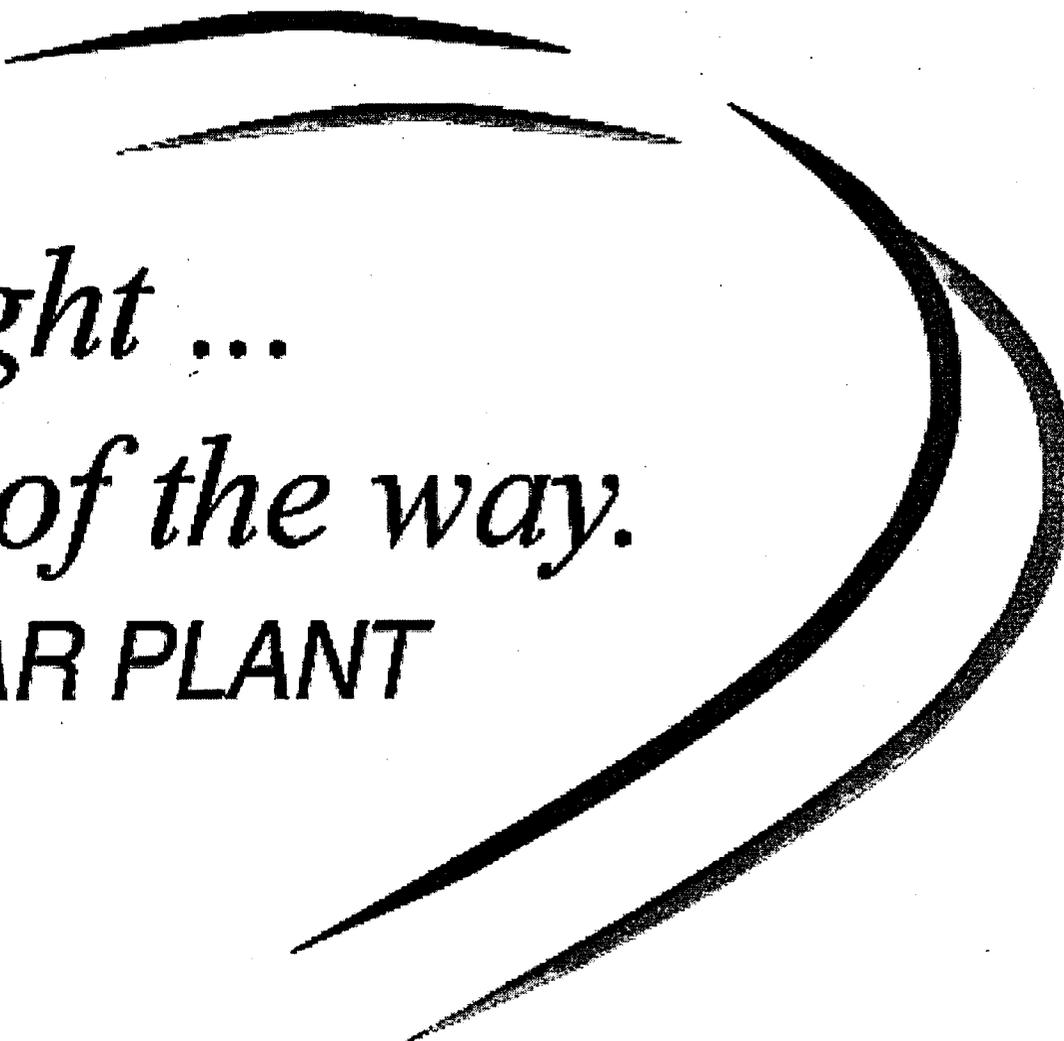


Unit 2 Validation to be performed during next Refueling Outage

# Conclusion

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- **Unit 1 Physical Work Complete Before Restart**
- **Unit 1 Restart Efforts Very Similar to Unit 2**
- **Refined Analyses Demonstrate Conformance with Design Basis**
- **Anticipate Remaining Refined Analyses will have Similar Results**
- **Submittal of Schedule for Resolution of Containment Issues by October 16, 2000**



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