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

July 22, 1991

Docket No. 50-220

LICENSEE: Niagara Mohawk Power Corporation

FACILITY: Nine Mile Point Nuclear Station Unit No. 1

SUBJECT: MEETING SUMMARY REGARDING THE JULY 15, 1991, MEETING TO DISCUSS LICENSEE'S MAY 14, 1991, SUBMITTAL REGARDING TORUS WALL THINNING 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 NMPC's May 14, 1991, submittal regarding torus wall thinning at Nine Mile Point 1. The licensee had requested this meeting to brief the staff on the May 14, 1991, submittal and to respond to questions from the staff regarding the submittal. Enclosure 1 is a list of the meeting attendees. Enclosure 2 is a list of questions from the staff. The handout material used by the licensee during the meeting is attached as Enclosure 3.

During the meeting, the licensee noted it had made a presentation to the NRC staff on March 4, 1981, during which the licensee had discussed potential load reductions in the torus wall materials due to conservatisms in the hydrodynamic loads. The staff requested a copy of the March 4, 1981, presentation; the licensee agreed to provide one. The licensee also discussed the questions previously supplied (Enclosure 2) by the staff. The licensee agreed to supplement its May 14, 1991, submittal by providing written responses to these questions.

Sincerely,

Donald S. Brinkman

Donald S. Brinkman, Senior Project Manager
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:
1. List of Attendees
2. Staff Questions
3. Licensee Handout Material

cc: See next page

Memo 4

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ENCLOSURE 1

ATTENDANCE LIST

July 15, 1991 Meeting to Discuss Licensee's May 14, 1991 Submittal Regarding Torus Wall Thinning at NMP-1

Name	Position	Organization
Donald S. Brinkman	Senior Project Manager	NRC/PDI-1
J. Kudrick	Section Chief	SPLB
Stephen Koscielny	Chemical Engineer	NRR/EMCB
Robert A. Capra	Director, PDI-1	NRR/PDI-1
Philip B. George	Supervisor, Civic/Structural	NMPC
Larry M. McNeer	Senior Nuclear Engineer	NMPC
Alan J. Bilanin	Senior Associate	Continuum Dyn/NMPC
Richard H. Berks	Principal Engineer	Teledyne Engineering Services/NMPC
Tony D'Angelo	Engineer	NRC/SPLB
Chen D. Tan	Civil Engineer	NRC/ESGB
R. L. Rothman	Section Chief	NRC/ESGB
Herb Kaplan	Reg. I Reactor Engineer	NRC/REG I
Kurt Samuelson	Project Engineer	NMPC

ENCLOSURE 2

NMP1 TORUS QUESTIONS FOR JULY 15, 1991 NRC MEETING

1. Tabulate the stresses resulting from each of the loads in the load combination which gives the controlling membrane stress for loads which consist of more than one component such as the seismic load which consists of two horizontal and one vertical components. Indicate the stresses due to these components and the manner in which these stresses are considered in the load combination. Indicate how the stresses from different dynamic loads are combined. The stresses for each of the loads in the same load combination from the original analysis are to be provided in the table for ease of comparison.

2. In the summary of controlling shell stresses on page 13, stresses for membrane and bending are listed. Indicate if the stresses for bending are from the bending of the torus as a beam or from the bending of the torus shell. If it is the bending of the torus as a beam, the stresses for bending should be considered as primary membrane stresses.

3. Are there any Appendix J implications associated with new analysis?

4. The letters dated 5/14/91, 4/23/91 do not describe the cause of the wall thinning. Is there another submittal? If not please provide a presentation on:

    1. The cause of the corrosion?
    2. The mechanism of the corrosion?
    3. Plans to mitigate the corrosion?

5. The 4/23/91 letter provides Torus Wall Thickness Measurement data. However, no Min Wall is identified in the data table? Also average thickness measurements fluctuate because instruments are sensitive to the amount of pressure placed on the metal? Please explain.

6. The location of the wall thickness measuring and the significance of where the data was taken needs to be defined from the 4/23/91 letter.

7. The presentation of 4/24/91 by NMP in the "Status of Corrosion" by L. McNeer reports trending of corrosion indicators - consistent results obtained from 1979 ? Please explain this point. Corrosion Rate - How does the UT data/C.R. compare with C.R. for the same material in same environment done in lab conditions?

8. Review of the conclusions in the 4/24/91 presentation indicates that NMP will not use a method to control the corrosion but will use a strengthening technique to allow continued operation.

July 15, 1991
Overview of NMPC
April 24, 1991 Presentation
And
May 14, 1991 Submittal

- Generic Mark I Program And NMP1 Modifications
- Torus Wall Thickness Program & Corrosion Monitoring
- Torus CO Load Reduction
- Submittal Overview
- NMPC Proposal

TORUS SHELL ANALYSIS
MARK I PROGRAM EVENT COMBINATIONS

- 27 Mark I Event Combinations Reduced to 4 bounding Event Combinations
- Bounding Event Combinations

Number	Title
14	Chug, O.B.E., S.B.A., S.R.V. (C.O.)
18	Pool Swell, O.B.E., D.B.A.
20	C.O., O.B.E., D.B.A. (Chug)
25	Pool Swell, S.S.E., D.B.A., S.R.V.

CO	=	Condensation Oscillation Loads
Chug	=	Chugging Loads
SBA	=	Small Break Accident (Smaller Diameter Pipe Break)
DBA	=	Design Basis Accident
SRV	=	Safety Relief Valve Actuation
OBE	=	Operating Basis Earthquake
SSE	=	Safe Shutdown Earthquake

SUMMARY

MARK I MODIFICATIONS @ NINE MILE POINT UNIT 1

Y - Quenchers

Vent Head Deflectors

Downcomer Tie Straps

Saddles

Catwalk Removal

Relief Valve Vacuum Breakers

Torus Attached Piping

Resupport Of Relief Valve Discharge Lines

TORUS WALL THICKNESS PROGRAM

I. HISTORY/BACKGROUND

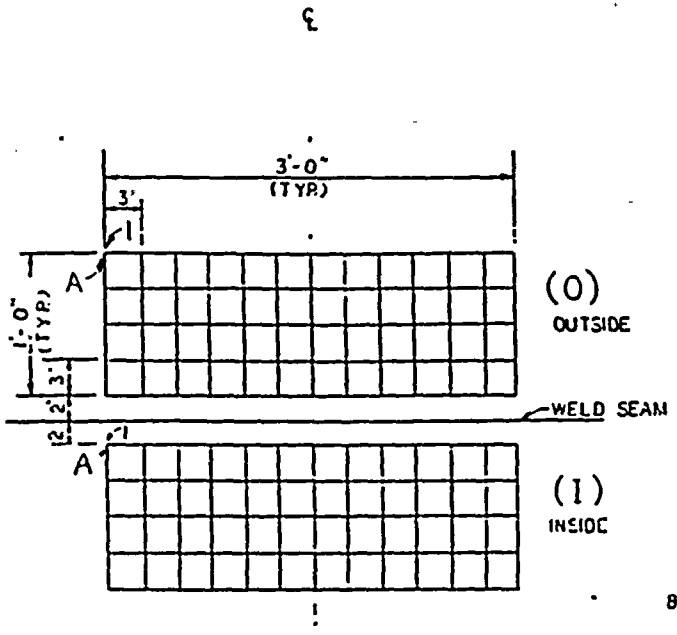
- C.B.I. (1/16" Corrosion)
- Torus: ISI 1975-1988
  6x6 12x12
- Mark I Program 1975-1984
- T.E.S. ---- Report 9/87 - 1/88
  Established Minimum Wall Thickness Requirements
- Further Evaluations - Weld Repair, Proposal For Long Term Fix 2/5/88
- 1988 ISI/NRC Readings (UT) - April 1988

BACKGROUND
(CONT'D)

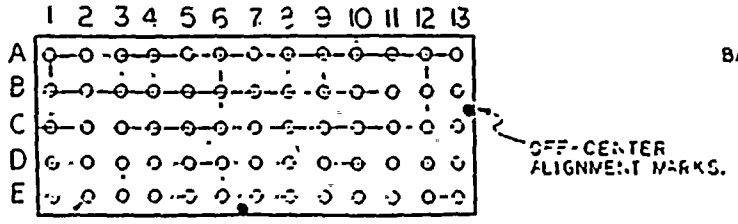
RAP ISSUE: 1988 - 1989

- NMPC Internal Review Of Torus Inspection Program
  - Established One-Time Sample Of All Bottom Mid Bay Areas - Aug 1989
  - Corrosion Rate Re-evaluated On Plate By-Plate Basis
  - Established Thinnest One-Time Sample Areas To Revisit Each 6 Mo.

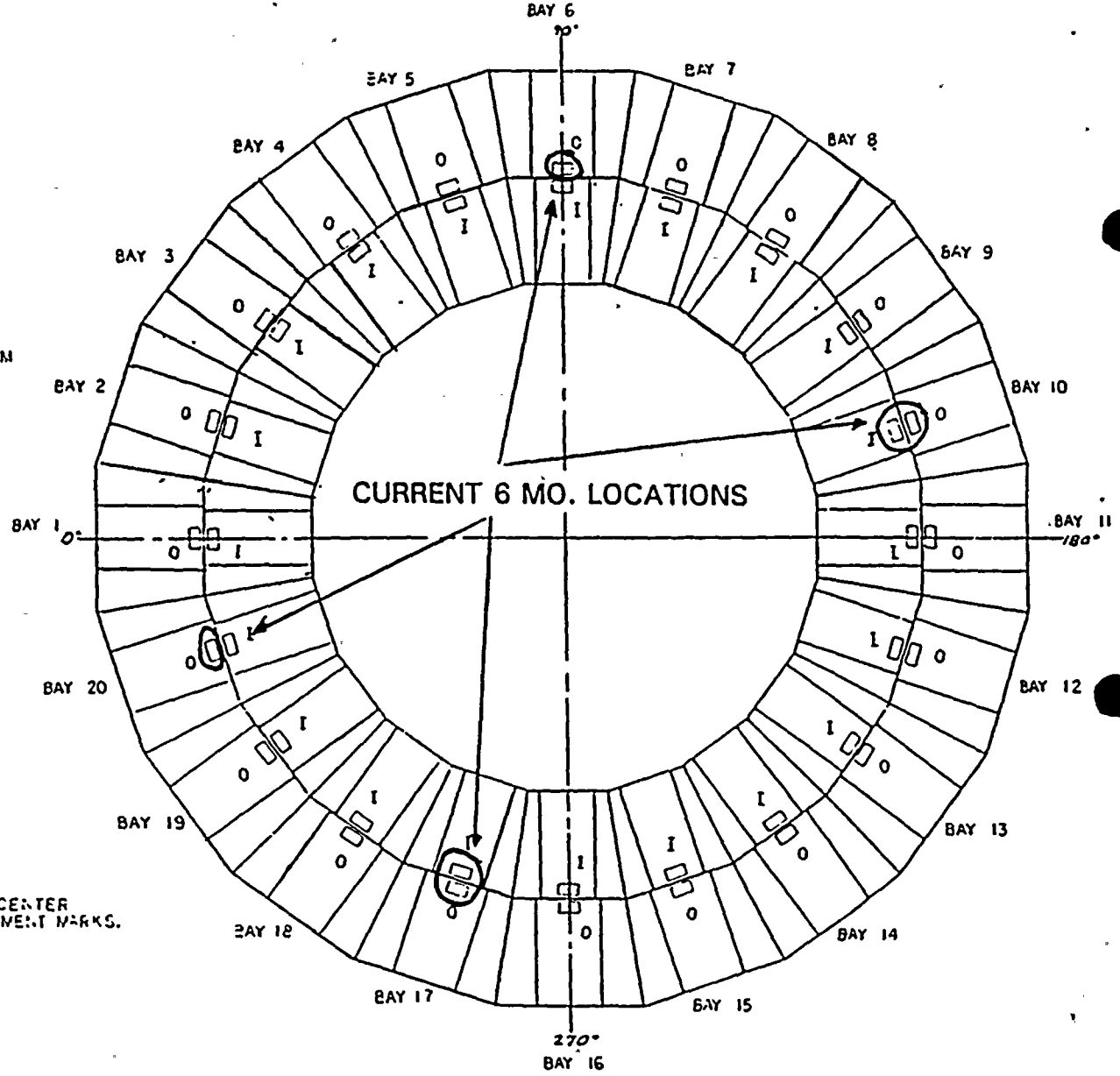
UT MEASUREMENT LOCATIONS



DETAIL
(TYPICAL OF BAYS 1 THRU 20)
SCALE : $\frac{3}{32}$" = 1'-0"



TEMPLATE



PLAN OF BOTTOM PLATES FOR SUPPRESSION CHAMBER

- HIGH CONFIDENCE IN PREDICTED CORROSION RATE

- Avg. Corrosion Rate Based On UT Measurements On Plates Identifiable To Orig. Mil. Certs
- Includes 22 Yrs. Of Corrosion From Initial Torus Fill
- Correlates To Predicted Rate From 1979 Sludge Samples
- Predicted Rate Is Avg. Rate (0.8 Mils/Yr.) + Std. Deviation (0.2 Mils/Yr.)

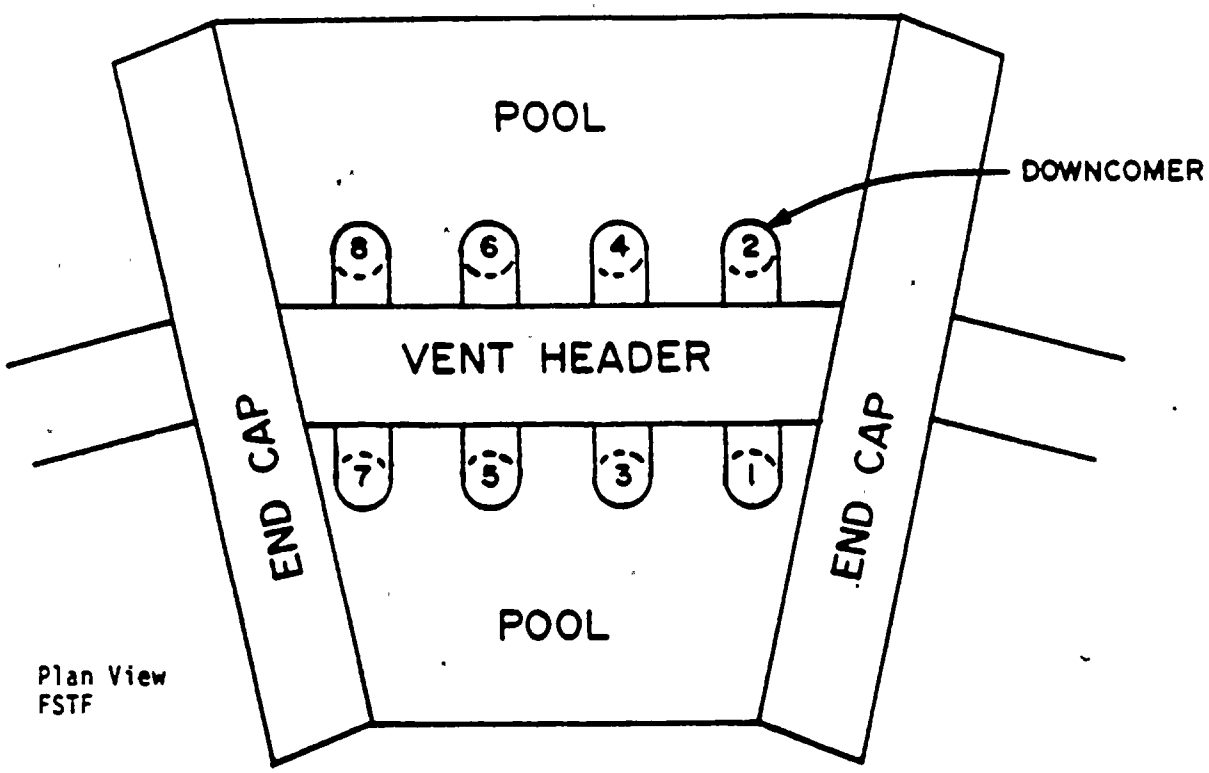
DECISION NOT TO USE COATING

- Based On Following:
  - Effectiveness of Coatings In Industry (I.E., Useful Life, Problems)
  - ALARA Impact
  - Maintenance (Inspection, Repairs)
  - Outage Impact (140 Days Critical Path)
  - Cost 8-10M + Outage Critical Impact (20M)
- K-T Analysis Considered Above and Evaluated As Less Desirable Than Stiffening Rings

TORUS CO LOAD REDUCTION OBJECTIVE

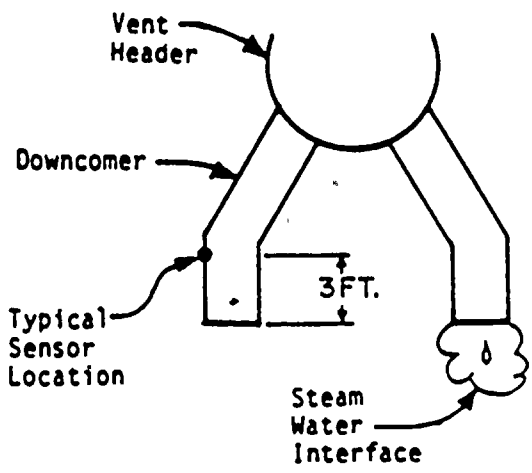
- To Re-Examine The Mark I Torus Shell Condensation Oscillation Hydrodynamic Load By Using A Multi-Bay Hydrodynamic Model That Takes Into Account
  - Uncorrelated Steam Condensation
  - Nine Mile Point Unit 1 Downcomer Configuration
- To Show How This Provides For
  - A More Realistic Torus Shell Load
  - An Increase In Corrosion Allowance
  - Postponement Of Modifications

TORUS CO LOAD REDUCTION
FULL SCALE TEST FACILITY (FSTF)



Plan View
FSTF

VENT	TRANSDUCER
1	P5123
2	P5243
3	P5323
4	P5443
5	P5523
6	P5643
7	P5723
8	P5843



Downcomer exit pressure transducers in FSTF.

TORUS CO LOAD REDUCTION

NMP1 TORUS PLAN VIEW

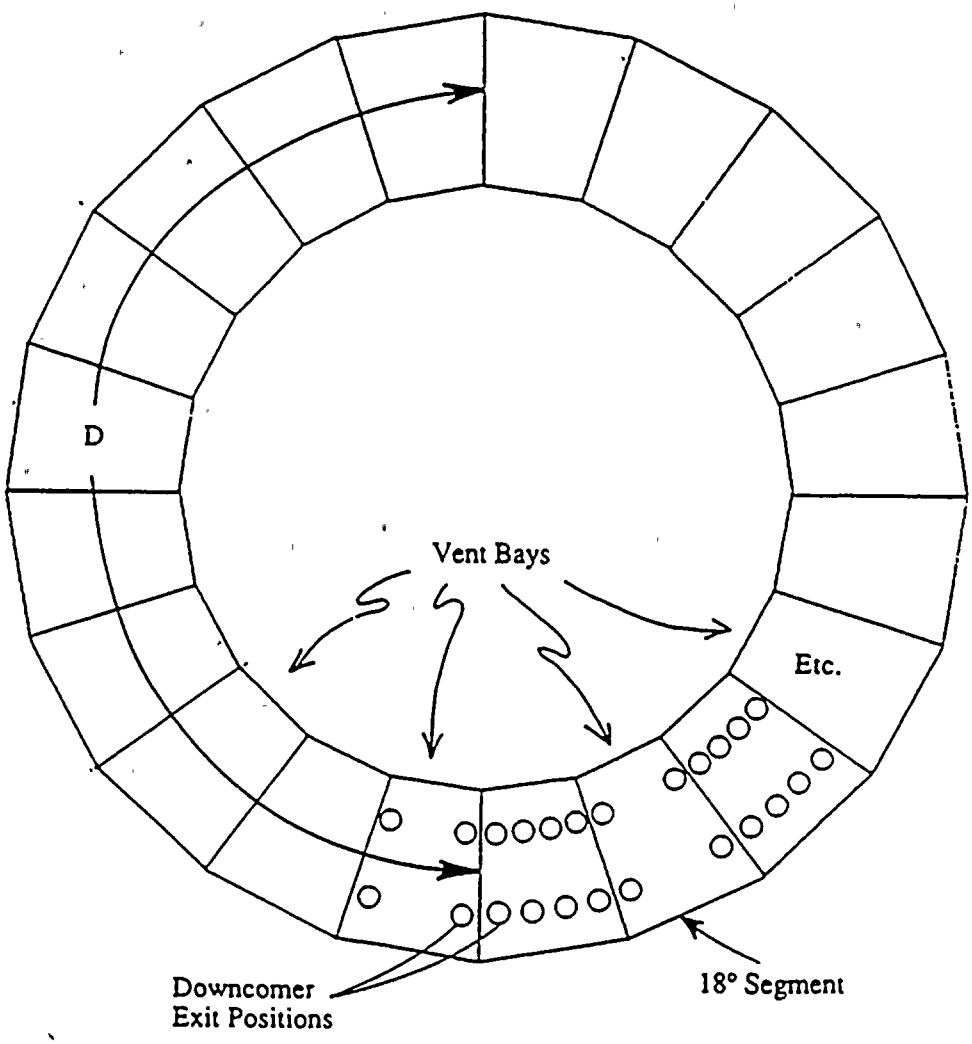


Figure 3. Plan view of Nine Mile Point suppression pool showing 8-4-8-4 downcomer/bay geometry. (Not to Scale)

TORUS CO LOAD REDUCTION

- Conservatisms In Torus Shell
  - Mill Certifications
  - Acoustic Speed
  - Damping
- Conservatisms In Corrosion Program
  - Extensive Data Collection
  - Long Term Monitoring And Trending Program Established
  - Average Corrosion Rate .83 Mil/Yr
  - Conservative Prediction Of Corrosion Rate 1.26 Mil/Yr
  - Estimated Stress In Most Limiting Plate - 9/94

    16381 PSI - Based On .83 Mil/Yr
    16528 PSI - Based On 1.26 Mil/Yr

TORUS CO LOAD REDUCTION

CORROSION ALLOWANCE

CONDITION	CORROSION ALLOWANCE, IN.	APPROXIMATE YEAR AVERAGE CORROSION ALLOWANCE WILL BE CONSUMED*
ORIGINAL ANALYSIS	.0132	1994
REDUCED C.O. 8 D.C. BAY	.0292	$\frac{.0292 - .0132}{.00126} + 1994 = 2007$
REDUCED C.O. 4 D.C. BAY	.0569	$\frac{.0569 - .0132}{.00126} + 1994 = 2029$

***AT A CORROSION RATE OF .00126" PER YEAR**

MAY 14, 1991
SUBMITTAL OVERVIEW

- Mark I Program Summary & NMP1 Plant Specific Actions
- Torus Coating, Study Programs
- Torus Leakage/Surveillance Programs
- Latest Torus UT Measurements
- Structural Detail Drawings

NMPC PROPOSAL

- NRC Review Completed By 12/91 And Agrees With Analysis
  - NMPC Defer Structural Modification
- NRC Review Not Completed By 12/91 But Feel Analysis has Merit
  - NMPC Defer Initiation Of Modification Until 1994
  - NMPC Modify One Bay With Least Margin
  - NMPC Modify Only 8 Downcomer Bays
- NRC Disagrees With Analysis
  - Begin Full Torus Modification In 1992 And Complete in 1994

CONTROLLING SHELL STRESSES - NINE MILE POINT U1

Event Combination 20, Element No. 19, Membrane Stress

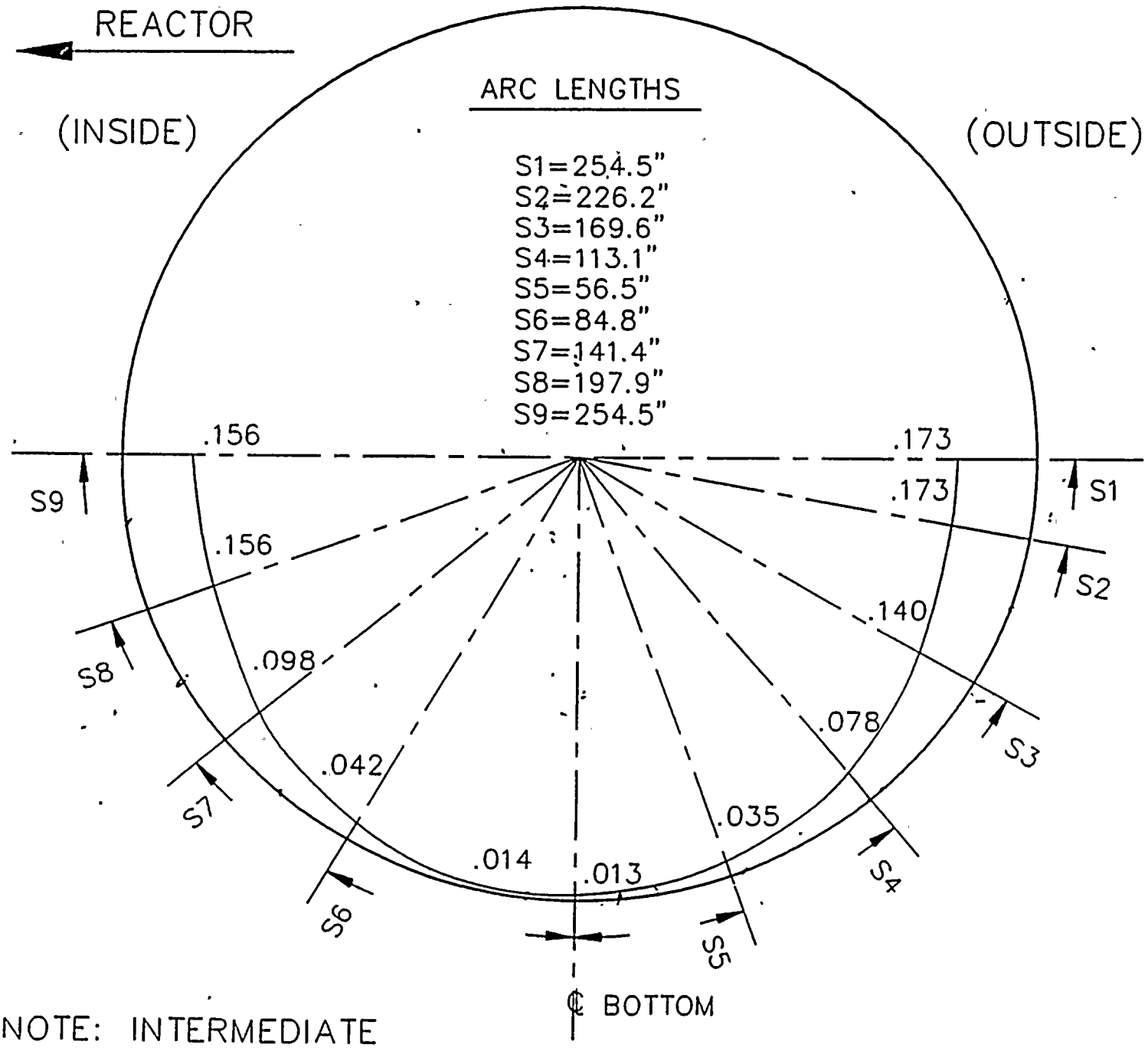
Load	Shell Stresses, lbs./in.^{2} Original Analysis	Reduced CO 8D.C. Bay	Reduced CO. 4D.C. Bay
Deadweight	1756	1756	1756
OBE Seismic	205	205	205
Internal Pres (DBA)	9219	9219	9219
Cond. Oscillation	4970	4342	3349
	16,150	15,522	14,529
	(16,025)	(15,452)	(14,460)

Seismic Acceleration Values (G's)

	OBE	SSE
Vertical	.05	.08
Horizontal	.06	.11

Note: The Stresses In Parentheses Are From The Report (TR-7353-1) And Are The Principal Stresses Calculated After All The Component Stresses From The 4 Load Cases Are Summed. These Are Lower Than The Totals Obtained By Adding The Principal Stresses From Each Load Case.

PERMISSIBLE CORRODED THICKNESS FOR THE TORUS CROSS-SECTION AT MID-BAY (FREE SHELL REGION) NINE MILE POINT UNIT 1 NUCLEAR STATION



NOTE: INTERMEDIATE VALUES MAY BE SCALED

FIGURE 8

July 22, 1991

Docket No. 50-220

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FACILITY: Nine Mile Point Nuclear Station Unit No. 1

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Sincerely,

ORIGINAL SIGNED BY:

NRC FILE CENTER COPY

Donald S. Brinkman, Senior Project Manager
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Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:
1. List of Attendees
2. Staff Questions
3. Licensee Handout Material

cc: See next page

Distribution:

Docket File	RACapra
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SVarga	NRC Participants
JCalvo	ACRS (10)
PDI-1 Reading	CCowgill, RI
CVogan	KBrockman, MS-17G21

OFC	:PDI-1:LA	:PDI-1:PM	:PDI-1:D	:	:
NAME	:CVogan	:DBrinkman:lm	:RACapra	:	:
DATE	:7/22/91	:7/22/91	:7/22/91	:	:

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