MAR 9 1992

Docket No. 50-458
License No. NPF-47

Gulf States Utilities
ATTN: James C. Deddens
Senior Vice President (RBNG)
P.O. Box 220
St. Francisville, Louisiana 70775

Gentlemen:

This refers to the management meeting conducted at Region IV's request at the River Bend Station on March 4, 1992. This meeting related to activities authorized by NRC License NPF-47 for the River Bend Station and was attended by those on the attached attendance list.

The subjects discussed at the meeting are described in the enclosed Meeting Summary.

It is our opinion that this meeting was beneficial and provided a better understanding of your management controls to address shutdown risk for the refueling outage and provided a good summary of major outage activities. In accordance, with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter will be placed in the NRC's Public Document Room.

Should you have any questions concerning this matter, we will be pleased to discuss them with you.

Sincerely,

A. Bill Beach, Director
Division of Reactor Projects

Enclosure:
Meeting Summary w/attachments

cc w/enclosure:
Gulf States Utilities
ATTN: J. E. Booker, Manager-
Nuclear Industry Relations
P.O. Box 2951
Beaumont, Texas 77704

~~RIV~~/PE:DRP	C:PSO	D:DRS	D:DRP
EECollins;bh	PHHarrell	SJCollins	ABBeach
3/9 /92	3/9 /92	3/9 /92	3/9 /92

IE45

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bcc to DMB (IE45) - DRP

bcc distrib. by RIV:
R. D. Martin
DRP
Lisa Shea, RM/ALF
DRSS-RPEPS
Project Engineer (DRP/C)
Senior Resident Inspector, Fort Calhoun
Resident Inspector
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RIV File
Senior Resident Inspector, Cooper
DRS

MEETING SUMMARY

Licensee: Gulf States Utilities

Facility: River Bend Station

License No.: NPF-47

Docket No.: 50-458

Subject: Meeting to Discuss Shutdown Risk Management During the Refueling Outage and Major Outage Activities

On March 4, 1992, representatives of Gulf States Utilities met with NRC personnel at the River Bend Station to discuss shutdown risk management during the refueling outage and major outage activities. The attendance list and licensee presentation are attached to this summary. The meeting was open to the public.

The licensee presented their outage schedule and the approach used to evaluate how multiple activities could contribute to shutdown risk. Also, the management controls of outage activities were reviewed. In addition, outage work involving the service water system, motor operated valve testing program, source term reduction, and feedwater nozzle repairs was summarized.

Attachments:
1. Attendance List
2. Licensee Presentation (NRC distribution only)

ATTENDANCE LIST

Attendance at the GSU/NRC management meeting on March 4, 1992, at the River Bend Station:

GSU

J. Donnelly, Chief Executive Officer/Chairman of the Board of Directors
P. Graham, Plant Manager, River Bend
K. Suhrke, General Manager Engineering and Administration
J. Booker, Manager, Nuclear Industry Relations
M. Sankovich, Manager, Engineering
T. Crouse, Manager, Administration
J. Pruitt, Manager, Business Systems
W. Odell, Manager, Oversight
E. Cargill, Director, Radiological Programs
L. England, Director, Nuclear Licensing
J. Shippert, Assistant Plant Manager, Operations, Radwaste, Chemistry
P. Freehill, Assistant Plant Manager, Outage Management
J. Leavines, Supervisor, NSAG
C. Dietrich, Supervisor, Nuclear Licensing
J. Burton, Supervisor, PRA
D. Wells, Senior Licensing
T. Brice, Engineer, Service Water Chemical Cleaning
M. Stein, Engineer, Service Water Pipe Replacement
T. Davey, Presenter, Service Water System
R. Buell, Presenter, Motor Operated Valve Testing Program
W. Beck, Presenter, Source Term Reduction
T. Hoffman, Presenter, Nozzle Repairs
G. Mohan, Presenter, Nozzle Repairs
M. Dreher, Administrator, Municipal Affairs

NRC

S. Collins, Director, Division of Reactor Safety (DRS)
B. Boyer, Director, Reactor Projects III, IV, V, Office of Nuclear Reactor Regulation (NRR)
T. Westerman, Chief, Plant Systems Section, DRS
E. Ford, Senior Resident Inspector, River Bend Station (RBS)
D. Loveless, Resident Inspector, RBS
E. Collins, Project Engineer, RBS

NUCLEAR SAFETY ADVISORY COMMITTEE

E. Lambremont, LSU Nuclear Science Center
T. Pigford, University of California - Berkeley
H. Woodson, Dean of Engineering, University of Texas at Austin
J. Smith, Consultant

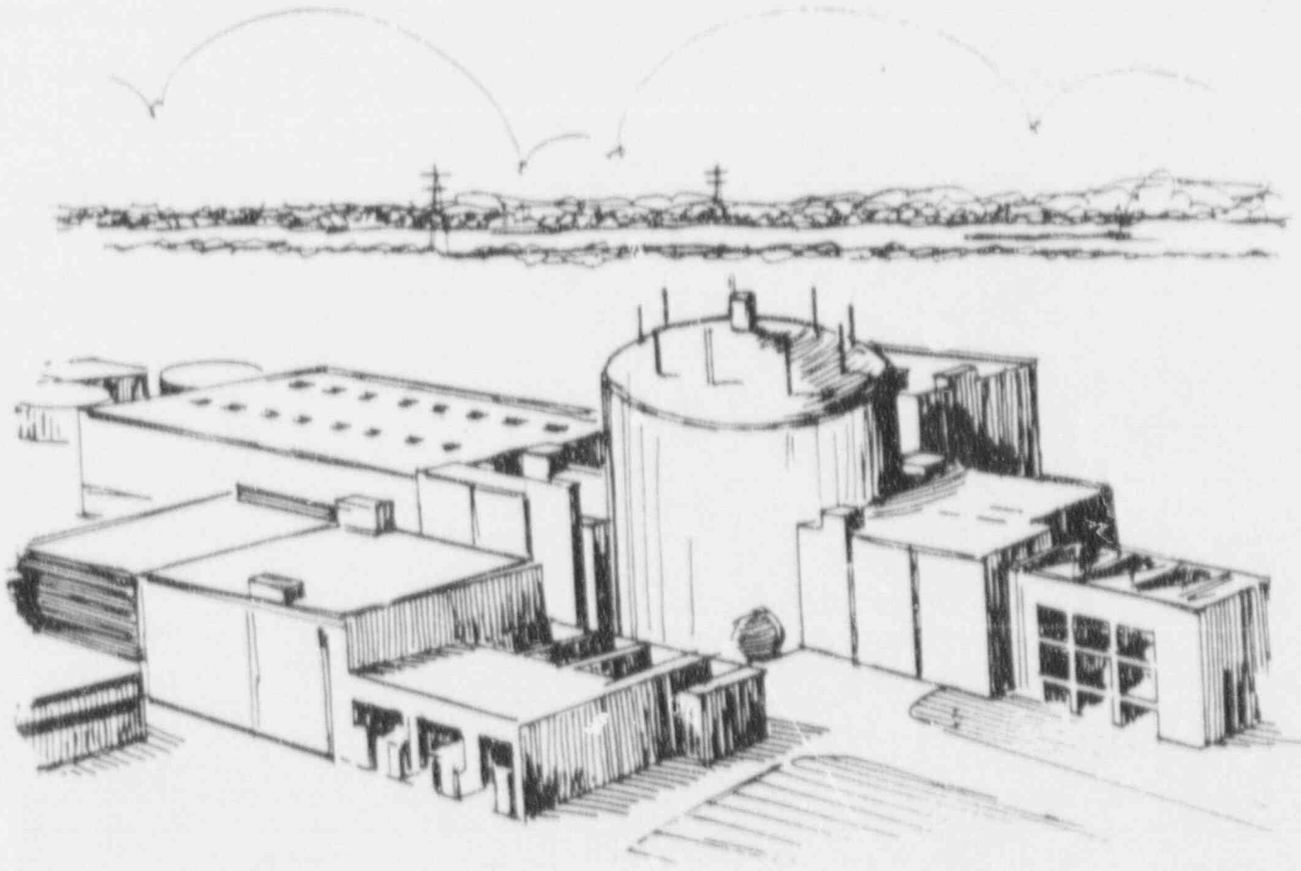
OTHER ATTENDEES

H. Anne Plettinger, Member of the Public
J. Minton, Reporter, The Advocate
P. Shinkle, Reporter, The Advocate
W. Curran, Site Representative, Cajun Electric

Attachment 2

RIVER BEND STATION
4TH REFUELING OUTAGE PLANS

A PRESENTATION TO THE
NUCLEAR REGULATORY COMMISSION
MARCH 4, 1992



GULF STATES UTILITIES COMPANY

FINAL AGENDA
GSU/NRC MEETING: 4TH REFUELING OUTAGE PLANS
MARCH 4, 1992
RIVER BEND STATION

9:30-9:40	OPENING ANNOUNCEMENTS	(10 MIN)	LES ENGLAND
9:40-9:55	OUTAGE CONTROL A. CONTRACTOR WORK CONTROL B. SECURITY C. RADIATION PROTECTION	(15 MIN)	PHIL GRAHAM
9:55-10:15	RF4 SCOPE AND SCHEDULE A. MAJOR EVOLUTIONS B. OTHER WORK	(20 MIN)	PETE FREEHILL
10:15-10:35	OUTAGE RISK ASSESSMENT	(20 MIN)	JOE LEAVINES
10:35-10:55	OUTAGE RISK MANAGEMENT A. GSU INITIATIVES	(20 MIN)	JOE BURTON
10:55-11:15	OPERATIONS OVERVIEW-RF4 A. RISK MANAGEMENT B. CLEARANCES	(20 MIN)	JOE SCHIPPERT
11:15-11:30	ENGINEERING PROJECT CONTROL	(15 MIN)	MEL SANKOVICH
11:30-11:50	BREAK FOR LUNCH	(PROVIDED)	
11:50-1:05	SERVICE WATER PROGRAM		
	A. INTRODUCTION	(10 MIN)	KEN SUHRKE
	B. CHEMICAL CLEANING	(25 MIN)	TAMMY BRICE
	C. PIPE REPAIR/ REPLACEMENT	(15 MIN)	MIKE STEIN
	D. CLOSED LOOP MODIFICATION	(25 MIN)	TOM DAVEY
1:05-1:20	MOTOR OPERATED VALVE TESTING PROGRAM	(15 MIN)	RICH BUELL
1:20-1:40	SOURCE TERM REDUCTION	(20 MIN)	WALLY BECK
1:40-2:10	N4A NOZZLE REPAIRS		
	A. ENGINEERING	(10 MIN)	TOM HOFFMAN
	B. INSTALLATION	(20 MIN)	GARLAND MAHAN
2:10-2:25	OPEN DISCUSSION		ALL
2:25-2:30	CLOSING REMARKS		PHIL GRAHAM NRC

RIVER BEND STATION

REFUELING FOUR

OUTAGE CONTROL

- Contractor Management & Control
- Integrated Organization
- Facilitators
- Training
- Maintenance Management Field Observations
- Using More Long Term Contractors

RISK MANAGEMENT

- Standards and Expections
- Power Supplies and Switchyard Controls
- Decay Heat Removal
- Water Supply
- Containment Control

OUTAGE MANAGEMENT

- 0 APM Shift Outage Managers
- 0 Enhanced Risk Managed L-II Schedule
- 0 Computerized Tag System
- 0 Bar Code Work Package/Tool Tracking
- 0 Drywell Coordinators

MINIMIZE ESF ACTUATIONS

- Revised MR Planning Process
- Goal $\leq$ 20 LER's
- goal $<$ 3 ESF Actuations
- STAR Program

RADIATION PROTECTION

- Hot Machine Shop Decon Personnel
- R.P. Technician Assignment to Planning
- Foreman Assignment to Training
- Computer Generated RWP's
- Noble Gas Release Procedure
- Local Plant Postings
- Surrogate Tour
- Chemical Decon
- Plant Decon
- RWCU Ring Header Replacement
- Camera Equipment
- Alarming Dosimetry

ALARA

< 500 Person Rem

< 200 Contamination

SECURITY CONTROL

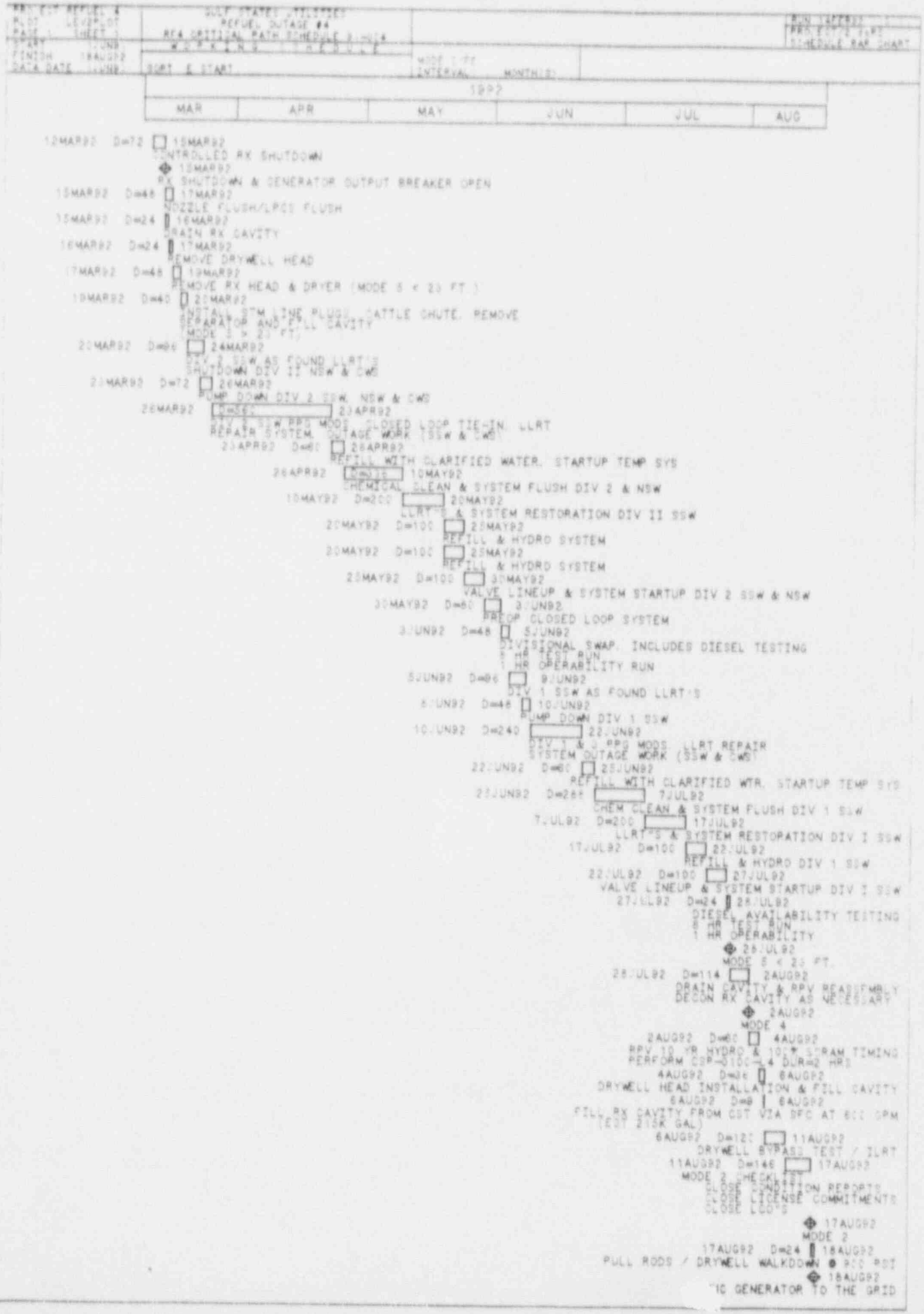
- 0 Revised Visitor Escort Training
- 0 Expanded Protected Area
- 0 Changes to PAP Processing

RIVER BEND STATION
REFUELING FOUR

- Start March 15, 1992
- Duration 156 Days
- End August 18, 1992
- Risk Management
- Scope
- Schedule

SERVICE WATER TASKS

- Pipe & Valve Replacement
- Chemical Cleaning
- Closed Loop System Preop


GULF STATES UTILITIES
REFUEL OUTAGE #4
RCA CRITICAL PATH SCHEDULE 3-JUL-4
SCHEDULE BAR CHART
START & START
1992
MAR
APR
MAY
JUN
JUL
AUG
12MAR92 D=72 15MAR92
CONTROLLED RX SHUTDOWN
15MAR92
RX SHUTDOWN & GENERATOR OUTPUT BREAKER OPEN
15MAR92 D=48 17MAR92
NOZZLE FLUSH/LPCI FLUSH
15MAR92 D=24 16MAR92
DRAIN RX CAVITY
16MAR92 D=24 17MAR92
REMOVE DRYWELL HEAD
17MAR92 D=48 19MAR92
REMOVE RX HEAD & DRYER (MODE 5 < 23 FT.)
19MAR92 D=40 23MAR92
INSTALL STM LINE PLUGS, CATTLE CHUTE, REMOVE
SEPARATOR AND FILL CAVITY
(MODE 5 > 23 FT.)
23MAR92 D=96 26MAR92
DIV 2 SSW AS FOUND LLRT'S
SHUTDOWN DIV II NSW & CWS
23MAR92 D=72 26MAR92
PUMP DOWN DIV 2 SSW, NSW & CWS
26MAR92 D=456 23APR92
DIV 2 SSW PPS MODS, CLOSED LOOP TIE-IN, LLRT
REPAIR SYSTEM OUTAGE WORK (SSW & CWS)
23APR92 D=60 26APR92
REFILL WITH CLARIFIED WATER, STARTUP TEMP SYS
26APR92 D=312 10MAY92
CHEMICAL CLEAN & SYSTEM FLUSH DIV 2 & NSW
10MAY92 D=200 20MAY92
LLRT'S & SYSTEM RESTORATION DIV II SSW
20MAY92 D=100 25MAY92
REFILL & HYDRO SYSTEM
20MAY92 D=100 25MAY92
REFILL & HYDRO SYSTEM
25MAY92 D=100 30MAY92
VALVE LINEUP & SYSTEM STARTUP DIV 2 SSW & NSW
30MAY92 D=60 3JUN92
PREOP CLOSED LOOP SYSTEM
3JUN92 D=48 5JUN92
DIVISIONAL SWAP, INCLUDES DIESEL TESTING
8 HR TEST RUN
1 HR OPERABILITY RUN
5JUN92 D=96 9JUN92
DIV 1 SSW AS FOUND LLRT'S
9JUN92 D=48 10JUN92
PUMP DOWN DIV 1 SSW
10JUN92 D=240 22JUN92
DIV 1 & 3 PPS MODS, LLRT REPAIR
SYSTEM OUTAGE WORK (SSW & CWS)
22JUN92 D=60 25JUN92
REFILL WITH CLARIFIED WTR, STARTUP TEMP SYS
25JUN92 D=288 7JUL92
CHEM CLEAN & SYSTEM FLUSH DIV 1 SSW
7JUL92 D=200 17JUL92
LLRT'S & SYSTEM RESTORATION DIV I SSW
17JUL92 D=100 22JUL92
REFILL & HYDRO DIV 1 SSW
22JUL92 D=100 27JUL92
VALVE LINEUP & SYSTEM STARTUP DIV I SSW
27JUL92 D=24 28JUL92
DIESEL AVAILABILITY TESTING
8 HR TEST RUN
1 HR OPERABILITY
28JUL92
MODE 5 < 23 FT.
28JUL92 D=114 2AUG92
DRAIN CAVITY & RPV REASSEMBLY
DECON RX CAVITY AS NECESSARY
2AUG92
MODE 4
2AUG92 D=60 4AUG92
RPV 10 YR HYDRO & 10CFR STRAM TIMING
PERFORM CSP-0150-4 DUR=2 HRS
4AUG92 D=36 6AUG92
DRYWELL HEAD INSTALLATION & FILL CAVITY
6AUG92 D=8 6AUG92
FILL RX CAVITY FROM CST VIA RFC AT 800 GPM
(TEST 215K GAL)
6AUG92 D=120 11AUG92
DRYWELL BYPASS TEST / ILRT
11AUG92 D=144 17AUG92
MODE 2 CHECKLIST
CLOSE CONDITION REPORTS
CLOSE LICENSE COMMITMENTS
CLOSE LCO'S
17AUG92
MODE 2
17AUG92 D=24 18AUG92
PULL RODS / DRYWELL WALKDOWN @ RFC POT
18AUG92
TIC GENERATOR TO THE GRID

MAJOR TASKS

- Reactor Refueling
- Turbine Generator Low Pressure Inspection
- Source Term Reduction
  - RWCU & Recirc Chemical Cleaning
  - RWCU Ring Header Replacement
- Recirculation Pump & Discharge Valve Inspections
- Suppression Pool Cleanup
- RPV Feedwater Nozzle Safe End Replacement

REPETITIVE TASKS

- Diesel Generator Inspection
- Division I Bus Outages
- Safety Relief Valve Replacement
- CRD Rebuild
- LLRT & ILRT
- MOV Signature Tests
- Surveillance Tests
- Check Valve Operability Tests
- Pipe Erosion Ultra Sonic Tests
- Pipe & Reactor Inservice Inspections

REACTOR SCHEDULE

- 0 Shutdown
- 0 RPV Disassembly
- 0 Mode 5
- 0 Off Load
- 0 Bottom Head Drain Cleaning
  - 0 RCS Pump & Motor PM
  - 0 N4A Safe End Replace
- 0 Reload
- 0 12 Days Float
- 0 RPV, DW BYP & ILRT, Mode 2
  Checklist & Startup

SCHEDULE FEATURES

- Availability v.s. Unavailability Based Schedule
  - Containment
  - Off Site Power
  - Diesel Generator
  - Shutdown Cooling - RPV
  - Decay Heat Removal - Pools
  - ECCS
  - Level Control - RPV
- Fuel Off Load
  - Simplified Cooling Requirements
  - Eliminate RPV Potential to Drain
  - Simplified Reactivity & Core Alteration control

INITIATIVES

- Standards & Expectations
- RF-3 Critique
- Schedule Change Control-MPLD
- Bus Outage Procedures
- NRC Notice 91-22
- Numarc 91-06
- INPO - Draft 'INPO Shutdown Evaluation Guidance'
- Contingency Plans

STANDARDS and EXPECTATIONS

- 0 Off-site & Emergency Power
- 0 Decay Heat Removal & Makeup Capability
- 0 Containment Control
- 0 Fuel Handling
- 0 Operations Schedule Reviews
- 0 Critical Schedule Reviews
- 0 Schedule Change Control
- 0 Periodic Schedule Reviews
- 0 Availability Based Schedule
- 0 Outage Window Timing
- 0 Electrical Work Plan Reviews
- 0 Summary L-II Schedule

OVERVIEW OF ASSESSMENT

- USED INPO AND NUMARC GUIDELINES

- CONDUCTED ASSESSMENT WITH TEAM OF ISEG ENGINEERS

  - ALL SRO LICENSED OR CERTIFIED
  - ALL EXPERIENCED IN RBS PREVIOUS OUTAGES
  - ALL SENIOR LEVEL PERSONNEL

- REVIEWED LEVEL II SCHEDULE VERSUS THE ELEMENTS OF THE GUIDELINES

- PRODUCED SUMMARY SCHEDULE FOR KEY FUNCTIONS AND HIGHER RISK EVOLUTIONS

HIGHER RISK EVOLUTIONS

- WATER MOVEMENT (Upper Pools, RHR, Suppression Pool)
- LOWERED D/G OR ECCS AVAIL.
- FUEL MOVEMENT
- SWITCHYARD WORK
- CONTAINMENT NOT SET
- FREEZE SEALS
- COMBINATIONS OF THE ABOVE

KEY SAFETY FUNCTIONS

- DECAY HEAT REMOVAL (RHR & SFC)
- MAKEUP TO VESSEL AND POOLS (ECCS)
- POWER AVAILABILITY (OFFSITE AND D/G)
- CONTAINMENT (ABILITY TO RESTORE)
- FUEL HANDLING/CRITICALITY

CHANGES AS A RESULT OF REVIEW

- RECOMMENDED DEVELOPMENT OF POLICY STATEMENT REGARDING OUTAGE RISK MANAGEMENT. PLANT MANAGER ISSUED STATEMENT INCORPORATING APPROPRIATE ELEMENTS OF INPO GUIDELINES.

- RECOMMENDED POSITIVE CONTROL OF SWITCHYARD ACTIVITIES. POSITIVE COMMUNICATION AND CONTROL OF T&D ACTIVITIES ESTABLISHED BY OPERATIONS DEPT. SYSTEM WILL MONITOR.

- RECOMMENDED CONTINGENCY PLAN FOR LOSS OF SFC WHEN CORE OFFLOADED. BACKUP D/G & FPW WATER.

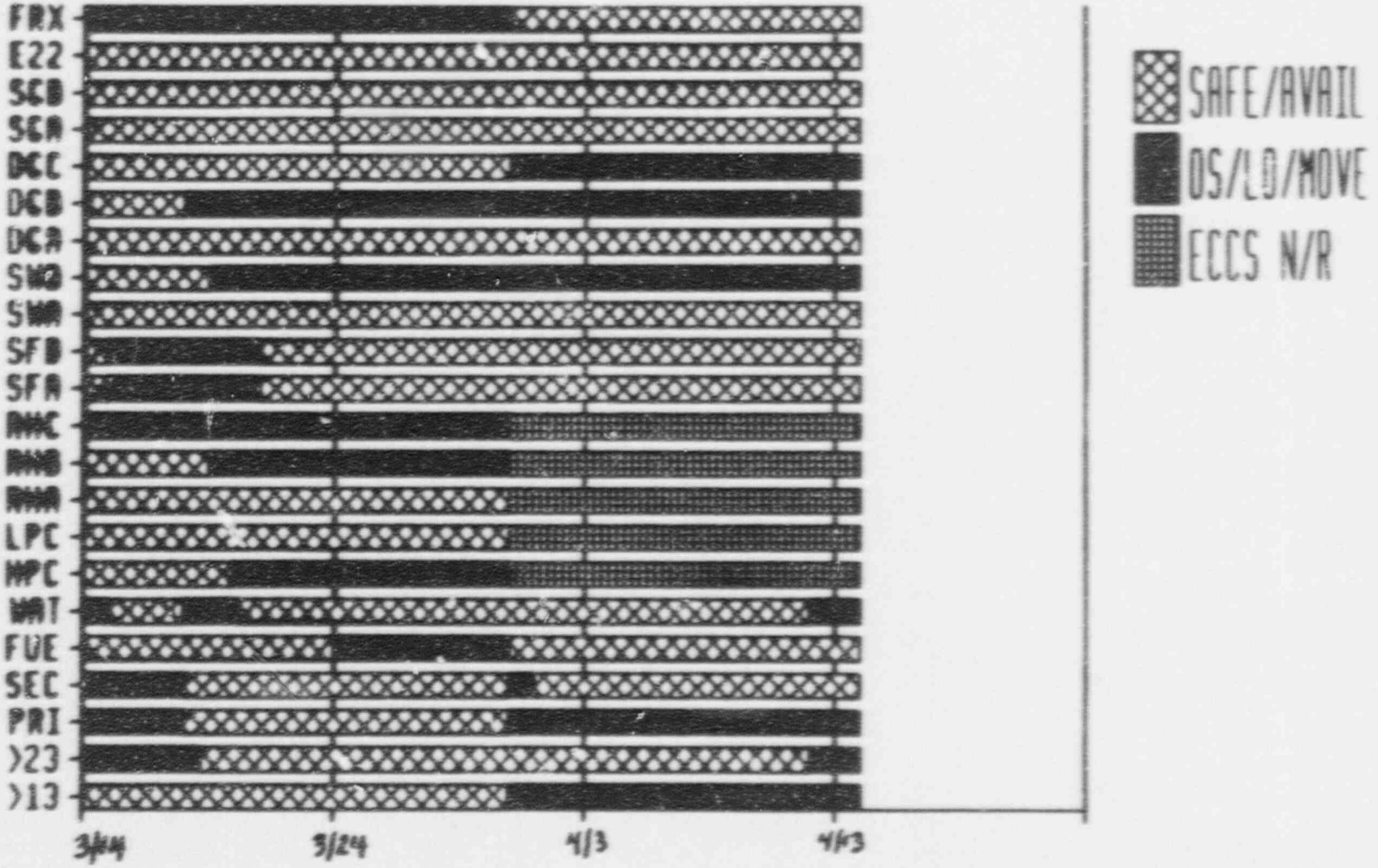
- RECOMMENDED CONTINGENCY PLAN FOR SETTING CONTAINMENT. OPS DEVELOPING PLANS WITH CHECKLISTS ON STATUS OF PENETRATIONS SO THEY CAN BE CLEARED AND CLOSED.

- RECOMMENDED DEVELOPMENT OF LOSS OF DHR CONTINGENCY PLAN. AOP UNDER DEVELOPMENT.

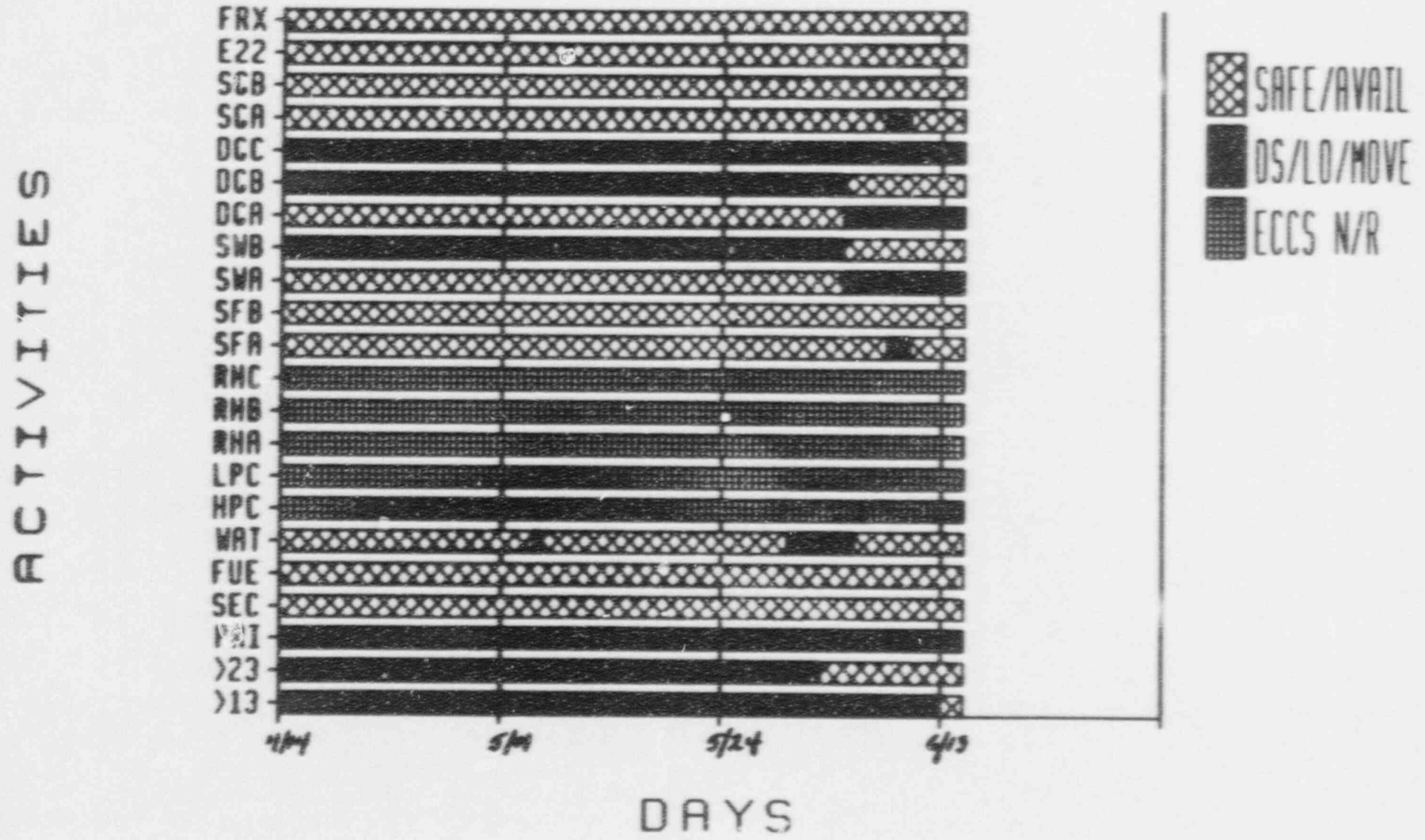
- CONTROL ACCESS TO AND ENHANCE SURVEILLANCE OF D/G WHEN ONLY ONE OPERABLE.

- ORIGINAL LII HAD "B" AND "C" DG OUTAGE WHILE FUEL IS IN VESSEL. "C" DG WAS MOVED TO CORRESPOND TO END OF FUEL MOVEMENT. "B" OPERABILITY EXTENDED MAXIMIZE AVAILABILITY.

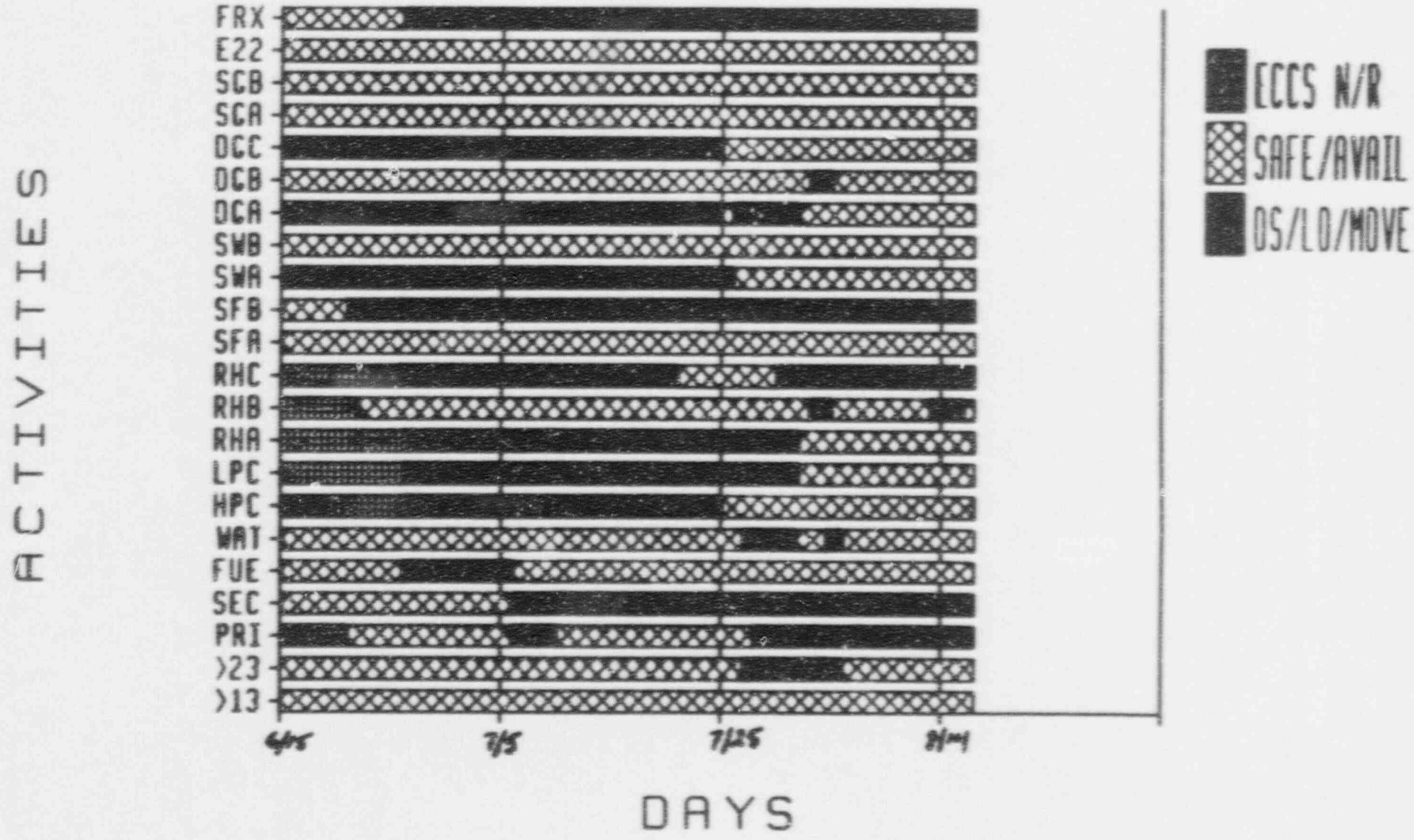
RF4 SUMMARY SCHEDULE
3/15 TO 4/14



RF4 SUMMARY SCHEDULE
4/15 TO 6/15



RF4 SUMMARY SCHEDULE
6/16 TO 8/17



CONTINUING EFFORT - NSAG

- NSAG WILL HAVE ON SHIFT COVERAGE OF THE OUTAGE.

- WILL REVIEW CHANGES TO LEVEL II IN THE SAME WAY WE DID THE ORIGINAL ASSESSMENT.

- WILL INDEPENDENTLY MONITOR STATUS OF KEY SAFETY SYSTEMS.

OUTAGE RISK MANAGEMENT

J. L. Burton
Supervisor of PRA/Radiological Analysis

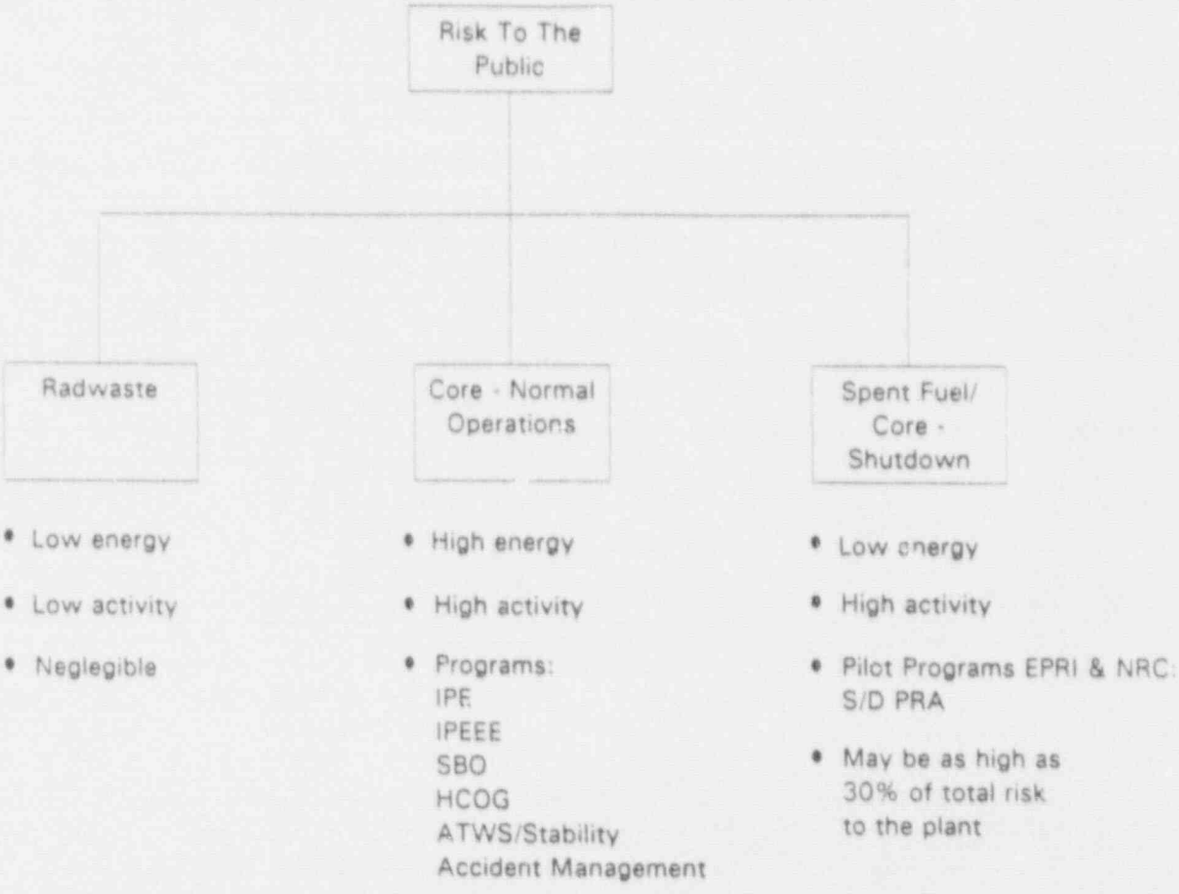
River Bend Station
Gulf States Utilities Company
St. Francisville, La.

Update of RF4 Status
Nuclear Regulatory Commission
March 4, 1992

SUMMARY OF PRESENTATION

- Risk Management Overview
- RF4 Planned Evolutions
- Pre-Outage Planning Evaluations
- RF4 Outage Evaluations
- MPLD Overview
- MPLD and PRA Integration Into Outage

RISK MANAGEMENT



LEVELS OF RISK MANAGEMENT

- Common Sense Approach
  - Lessons - Learned
  - Industry Experience
  - Precursors

- Decision Making Based on Logic Trees
  - Master Plant Logic Diagrams (MPLDs)
  - Dependency Matrices

- Decision Making Based on PRA
  - Quantified Model
  - Change in Core Damage Frequency (CDF) or Release Frequency

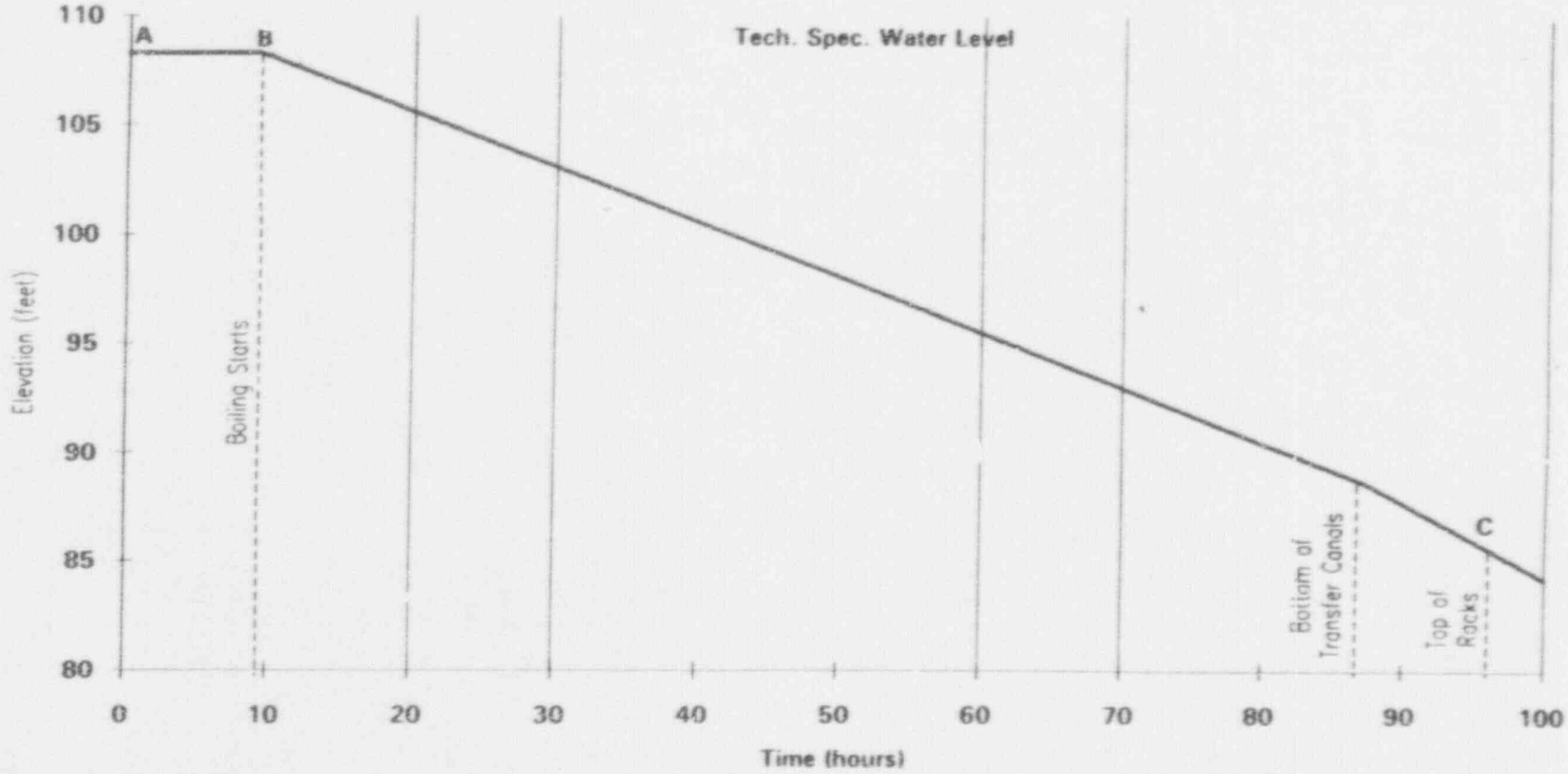
RF4 EVOLUTIONS

- Full Core Off-Load
- One Emergency Diesel Generator Operable
- Service Water Cleaning
- Service Water Piping Replacement
- Normal Service Water Closure
- RPV Nozzle N4A Replacement
- Source Term Reduction
- Routine Outage Testing/Repairs

PRE-OUTAGE PLANNING
PRE-EVALUATION

- Evaluations Performed Prior to Final Outage Approach
- Evaluation of Outage Options for Mode 6
  - * External flooding PRA of G-tunnel
  - * Tornado strike probability
  - * Tornado missile strike probability
  - * Tornado depressurization studies
  - * Seismic probabilities (OBE, SSE, and 0.5g)
  - * Potential for loss of offsite power
- Evaluation of Mode 6
  - * Decay heat load from core offload
  - * Thermal-hydraulic analysis of Spent Fuel Pool
  - * PRA for loss of SFC, pool boiling, and fuel uncovery

Spent Fuel Pool Water Level After Loss of Cooling



A. Probability for loss of spent fuel cooling: 8.48×10^{-3}
B. Probability for fuel pool boiling: 1.12×10^{-3}
C. Probability of fuel uncovering: 1.93×10^{-8}

RF4 OUTAGE EVALUATIONS

- Preferred Transformer Outage PRA
- Developed Mode 5 PRA Models
  (Fuel Bldg HVAC, Spent Fuel Pool Cooling)
- Provide Training To:
  * Outage Management
  * Operations (5-crews in Requal.)
  * NSAG
- Level 1 PRA Models for RHR, Service Water, Electric Power, etc.
- Radiological Analysis for Fuel Building due to Pool Heatup
- Provide Guidance to Operations on Loss of SFC (AOP-0051)
- Application of PRA Models
  * On-going RF4 Support using MPLDs and quantifying risk

Challenge:

To develop a set of technically sound controls and tools which allow effective risk management when important safety systems are unavailable

Objectives:

Develop a shut-down Risk Management Program for the RF4 outage

A Master Plant Logic Diagram (MPLD) was developed for the outage

This diagram identifies the relationships between:

- Critical Functions which must be achieved to protect the core and containment and prevent release

- Primary plant systems (front-line systems) which provide needed success paths for the critical functions

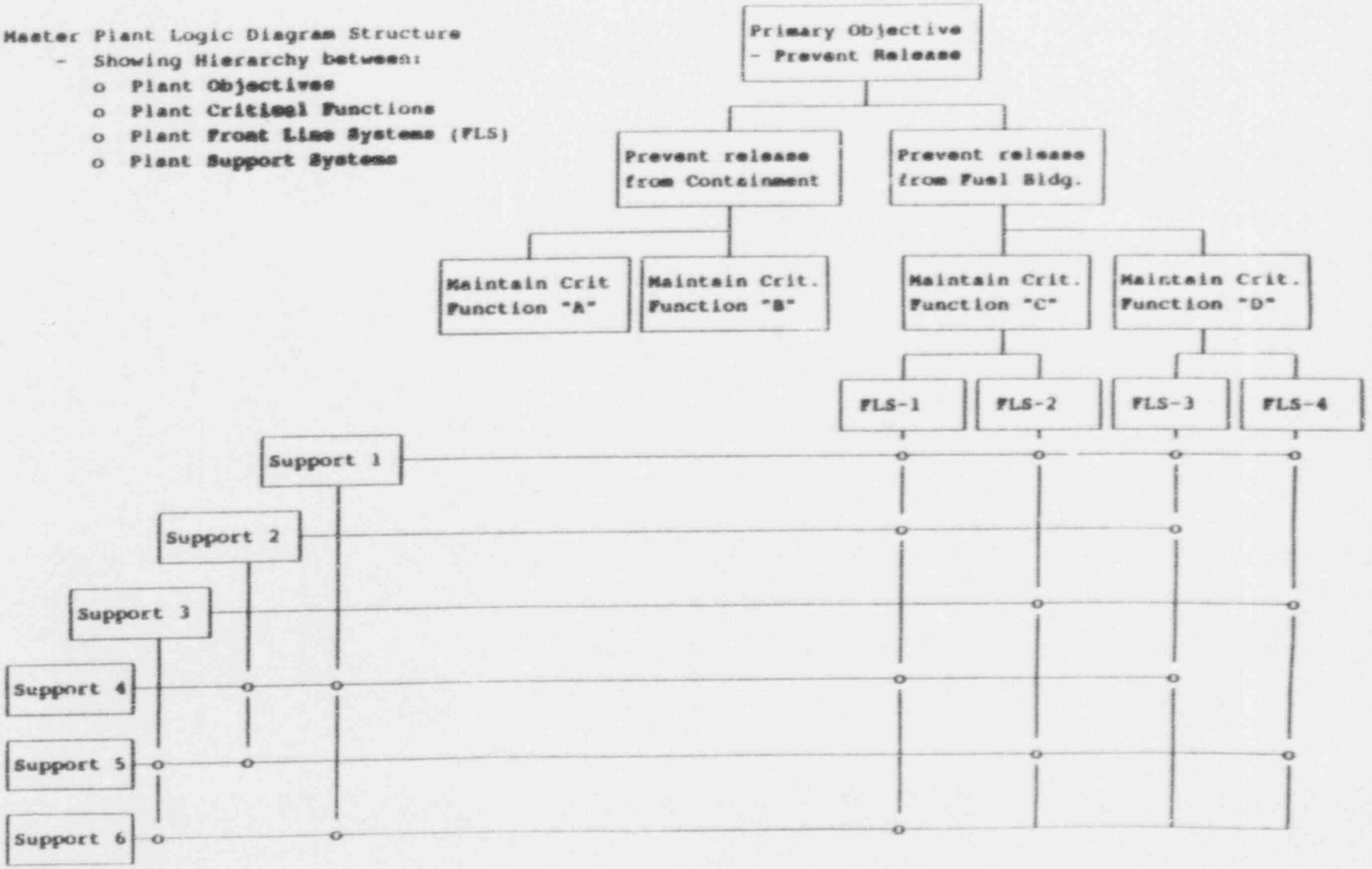
- Support systems which must operate to maintain the capability of the front-line systems:

  - motive power
  - cooling
  - actuation and control
  - lubrication

The inter-system relationships are graphically presented as a hierarchy to allow inference of cause-consequence relationships.

- The general structure of the MPLD is shown in Figure 1

Master Plant Logic Diagram Structure
- Showing Hierarchy between:
  - o Plant Objectives
  - o Plant Critical Functions
  - o Plant Front Line Systems (FLS)
  - o Plant Support Systems



Structure of MPLD - Figure 1

MPLD AND PRA INTEGRATION INTO OUTAGE

- PRA and NSAG Engineers On-Shift in Outage Management Center or Control Room for Support

- MPLD Developed with Comments from Operations, NSAG and Outage Management

- MODE 5 PRA Developed

- Check Level II Outage Schedule Against PRA

CONCLUSIONS

- First Step to Outage Risk Management Using PRA Methods

- MPLDs May Not Be 100% Usable This Outage
  - Test/Evaluate

- Other Plants are Interested in Developing MPLDs

- Outage Team Evaluations Will Minimize Risk in RF4

- Programs Developed Will Reduce Risks for Future Outages

OPERATIONS OVERVIEW - RF-4

J.P. SCHIPPERT

ASSISTANT PLANT MANAGER -
OPERATIONS, RADWASTE AND CHEMISTRY

- Risk Management
  - NUREG 1410
  - Risk Management Concepts Embedded Into Schedule
  - Operations Personnel Familiar With Schedule

- Schedule Execution And Overview
  - Operations Organization
  - NSAG Review
  - MPLD Utilization
  - NUMARC Comparison

- Operations Training
  - Pre-Outage Review
  - Ongoing Outage Training
  - Startup Training

- Risk Minimization
  - Switchyard Control
  - Diesel Generator Rounds
  - Freeze Seal Contingencies
  - Diesel Backup Alternate SFC Cooling
  - Emergency Fire Protection Water Supply To SFC Cooling
  - MR Adverse Impact Reviews
  - Emergency Plan Drill

- Contingencies
  - Inventory Makeup
  - Decay Heat Removal
  - Electrical Power
  - Containment Recovery - Primary/Secondary
  - Reactivity Control

ENGINEERING PROJECT CONTROL

MAJOR ENGINEER PROJECTS FOR RF-4

- Service Water
  - Chemical Cleaning
  - Pipe Replacement
  - Closed System
- N4A Nozzle Safe End Repair
- Source Term Reduction
  - Ring Header Replacement
  - Chemical Decontamination
- MOV Testing

PROJECT CONTROL ITEMS

- Pre-Planning
- Procedural
- Methodology/Technology

EXAMPLES OF PRE-PLANNING

- Core Off-Load
- Series versus Parallel SWS Cleaning
- Clean versus Replacement of SWS Piping

PROCEDURAL

- Project Organization
- Generic Modification Request (MR)
- Status Tracking

Generic MR Process

Design

- Approved for Work
- ① Design requirement document (What-How-Application Boundary)
- Estimated Cost
- ② Level II Schedules
- Design Proceeds

Review

- System Engr - Oper - Maint Checklists
- ③ Post design review and adverse impact statement
- ④ Release to Maintenance & Planning

Installation

- Plan Maintenance Work Orders
- Material Procurement Completed
- ⑤ MR Release for work
- Changes require FCN afterwards

Close Out

- Critique
- ⑥ Transmittal to PPF

Modification Number: MR 55-0561 FCN-3

Description: HVK CHILLERS HAVING GHOST LIGHTS DUE TO SNEAK CIRCUIT. ELIMINATE THEM USING BLOCKING DIODES

NOTE: WORK ON CHILLER A, B, & D HAS BEEN COMPLETED. WORK ON DIV I CHILLER "C" IS SCHEDULED FOR RF-4 WHICH REQUIRES DE ENERGIZATION OF EJS BUS

H. Khan/4553
Design Engineer/ext.

W. McDougald/4568
System Engineer/ext.

308 Jellison/2295
Operations/ext.

Harvey Lacas/3612
Maintenance Planner/ext.

Maintenance Planner/ext.

Maintenance Planner/ext.

Materials/ext.

Trudy
Scheduler/ext.

Activity	Responsibility	ECD	Status
Design Requirements	Design Engineer	12/21/90A	COMPLETED
BOM	Design Engineer	2/09/91A	COMPLETED
Post Design Review Meeting	Design Engineer	N/A	MR RELEASED FOR WORK
Release For Planning	Design Engineer	3/27/91A	COMPLETED
MWO's MWO # R147303, R137364 AND R146652	Electrical Mechanical I&C	6/18/91A	COMPLETED
Stock Mat. Staged	Warehouse	2/19/91A	COMPLETED
Purchased Material (Req.)	Warehouse	3/5/91A	COMPLETED
Purchased Material (P.O.)	Purchasing	3/5/91A	COMPLETED
Purchased Material Staged	Warehouse	5/4/91A	COMPLETED
Material Verification	Design Engineer	5/19/91	COMPLETED
RFW	Design Engineer	3/28/91A	COMPLETED
Installation By MWO	Maintenance	4/18/92	
PCP's	Design Engineer	4/25/92	
Block 35 Block 36 PPF	Design Engineer Design Engineer DCC		

Comments: NOT currently on RF-4 list as of 1-31-92 PRS. Harvey can still be planning contrlt, however do not want to spend resources on unless its approved for RF-4 prs.

APPLIED METHODOLOGY/TECHNOLOGY

- Fuel Shuffling - COSMOS
- Configuration - MPLD
- Welding Overlay Contingency
- Reactor Vessel/Nozzle Mock-Ups

SERVICE WATER PROGRAM

INTRODUCTION

- System Description Video
- System Condition
- Program Objective
- Program Organization

• System Condition

- ✓ Corrosion product buildup - degraded flow
- ✓ MIC - localized pitting
- ✓ Pinhhole leaks - 11
- ✓ System structurally sound
- ✓ Safety performance requirements met

•Program Objective

Restore health of system so that system will last life of Plant with normal maintenance

- ✓ Off-Line chemically clean
- ✓ Selected pipe/valve/component replacement/refurbishment
- ✓ Selected mechanical cleaning
- ✓ Close system
- ✓ Implement aggressive water treatment program to significantly reduce corrosion rates and impact of MIC

• Organization

Service Water Program Project Manager
KESuhrke

Construction Manager DEHoeppner	Closed Cycle Project Engineer RTDavey	Chemical Cleaning Project Engineer TOBrice	Assistant Project Manager JRDunkelberg	Pipe Replacement Project Engineer GOJavaherian	Part Time (as required)
-Construction Assistant SAlsandor	-Lead Mechanical Engineer CEDeWeese	-GHughes	-Scheduler JGottschalck	-Pipe Design Engineer DNaike DReed	-Inspect/Clean/Replace Heat Exchanger JKHam
-Field Supervisor--Closed Cycle SGray	-Fluid System Engineer JACampbell	-GJMermigas	-Cost BLMorgan	-Pipe Support Engineer CFontain	-Clarifier NKariouk
-Field Supervisor--Chemical Cleaning/Pipe Replacement JSalmon	-Lead Civil Engineer TDRouns	-Dowell Schlumberger			-Procurement EPBell
-Planners (Functionally report to Maintenance) EBarrass DCampanile JCowart RHelton ELoveday PSulliven	-Major Equipment Piping Layout CGirgis	-UE&C			-Outage Management/Operations TPLacy
-Field Coordinator/Engineer--Pipe Replacement/Chemical Cleaning BBurgess BLoftin MRutherford RThibaudeau DTumey	-Lead Electrical Engineer TOMoffitt	-WSullivan			-Start-Up & Test--Closed Cycle CAWomack Jr + 8 (FT) Test Personnel
-SWP Field Material Coordinator JClark	-Foundations BLenox	-NShah			

CONTINUED ON NEXT PAGE

•Organization

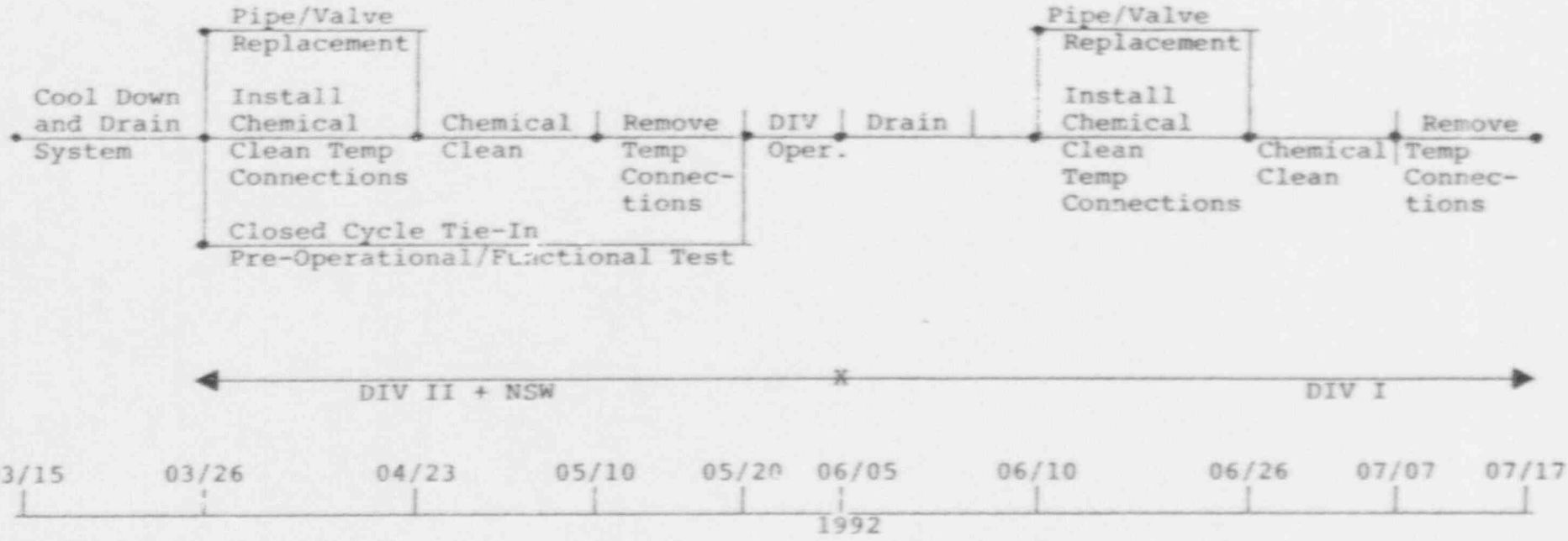
CONTINUED FROM PREVIOUS PAGE

- Service Water Program Project Manager KESuhrke
  - Construction Manager DEHoeppner
    - -514 Craft Personnel
      - Closed Loop 214
      - Chemical Cleaning
      - Pipe Replacement 300
  - Closed Cycle Project Engineer KTDavey
    - -Control & Instrumentation Engineer PCorley
    - -Mechanical/ Civil KRKlamert
    - -Instrumentation PRMatzke
    - -Piping Tie To Building WCLee
    - -CAD Designer JPatin MJPoulard
    - -Electrical CAD Designer JWhite
    - -Programmer DGoing
    - -Power JHashagen
    - -Controls MGrimm
    - -Piping NZink (PT)
    - -Supports RMaxwell
    - -Electrical Materials ECollier
  - Chemical Cleaning Project Engineer TOBrice
    - -PTodd
    - -PWenzel
    - -KDauzat
  - Assistant Project Manager JRDunkelberg
  - Pipe Replacement Project Engineer GOJavaherian
  - Part Time (as required)

•RF-4 Schedule

SERVICE WATER

SUMMARY RF-4 SCHEDULE



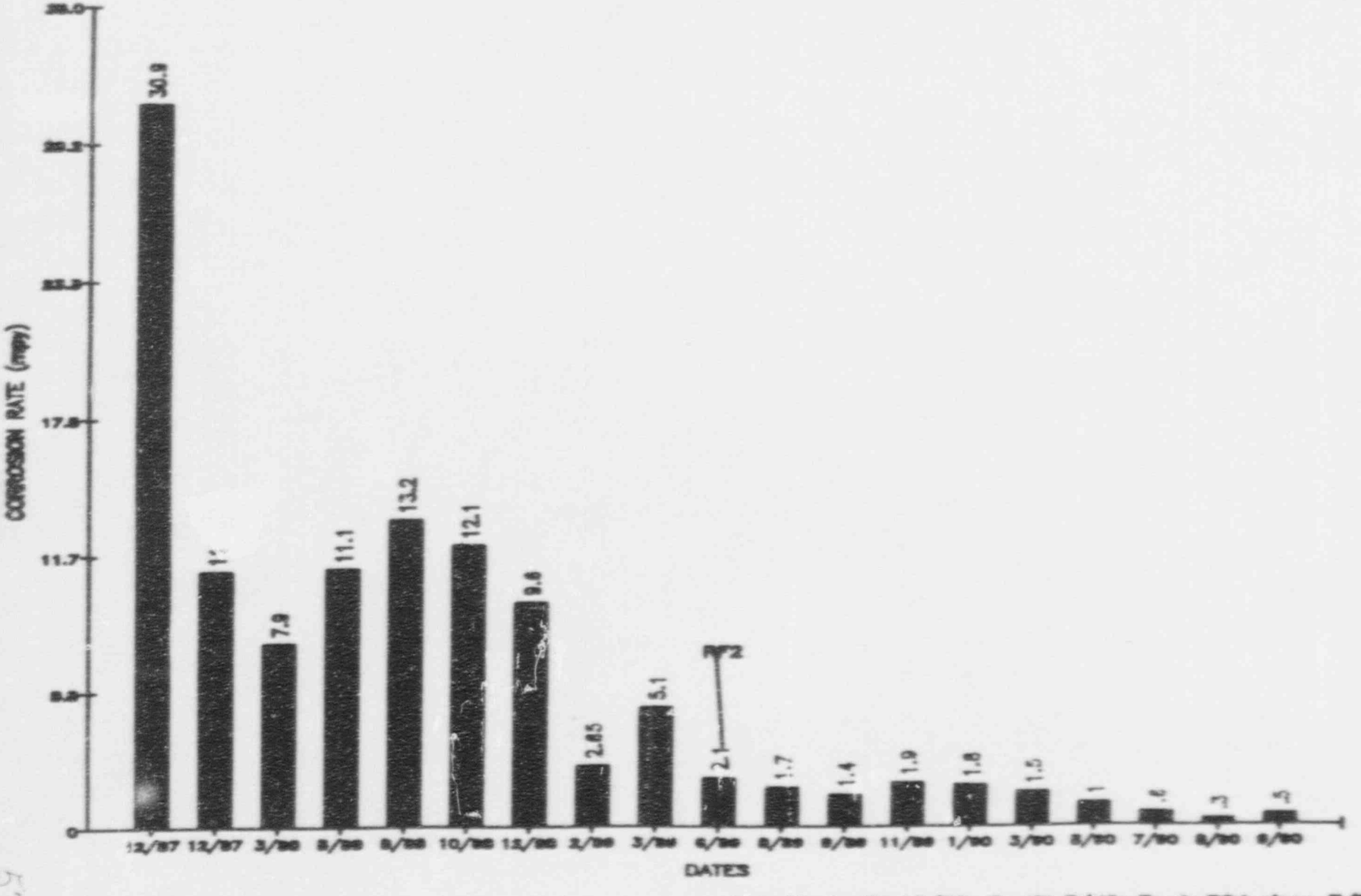
SERVICE WATER PROJECT
CHEMICAL CLEANING

TAMMY O. BRICE
CHEMICAL CLEANING PROJECT ENGINEER

ASSESSMENT OF SYSTEM CONDITION

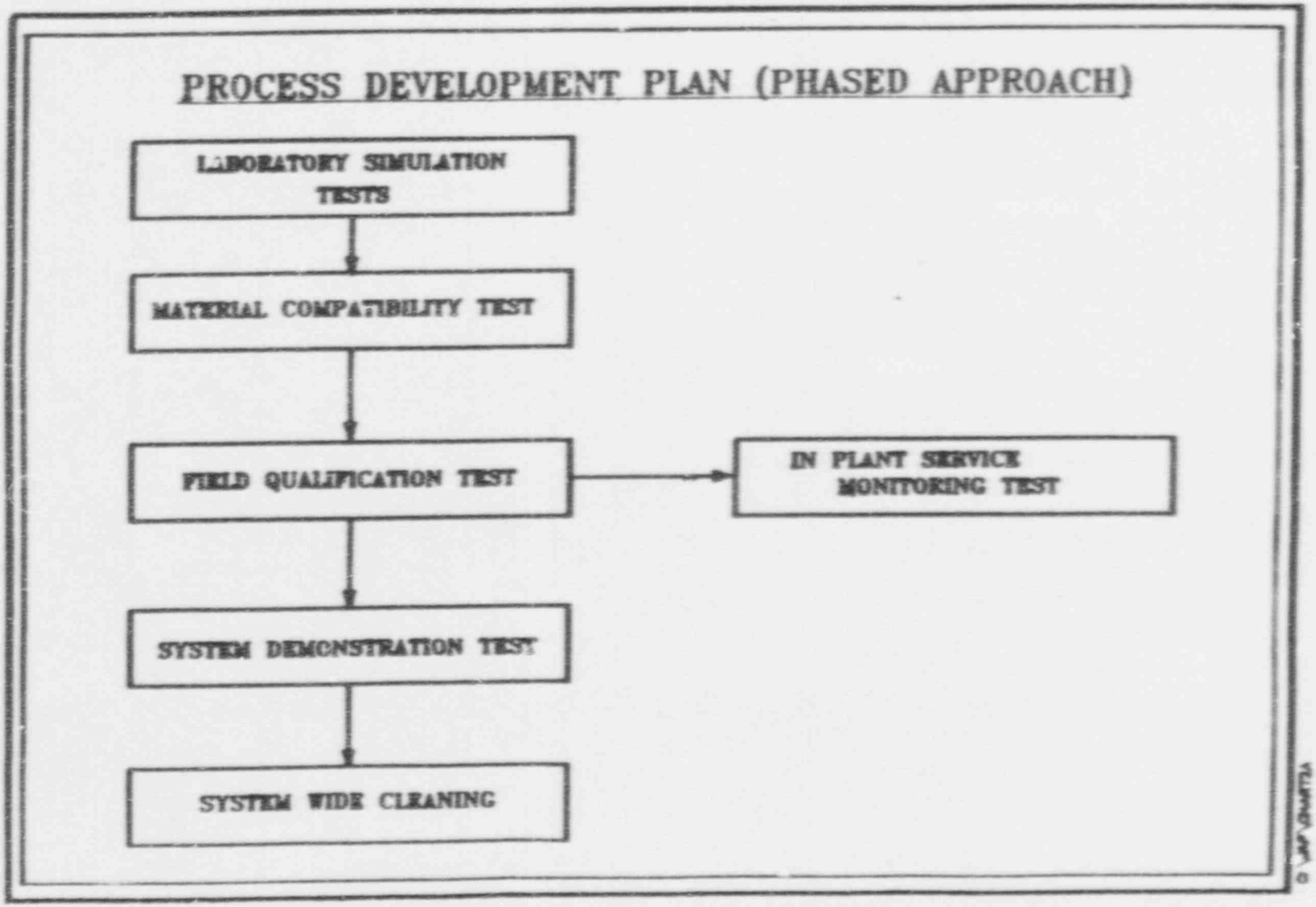
- CORROSION PRODUCT BUILDUP
- MICROBIOLOGICALLY INDUCED CORROSION
- LEAKS - 12
- LOCALIZED PITTING
- DEGRADED FLOW
  - Fouling of valve seats
  - General corrosion product buildup obstructing flow
  - Blocking of heat exchanger tubes
- MUD/SILT ACCUMULATION

GULF STATES UTILITIES - RIVER BEND STATION
STEEL CORROSION RATES
DECEMBER 1987 - SEPTEMBER 1990



Polysilicate till 10/88; Zn till 7/89; Zn & PO4 since 7/89

57


PROCESS DEVELOPMENT PLAN (PHASED APPROACH)
LABORATORY SIMULATION TESTS
MATERIAL COMPATIBILITY TEST
FIELD QUALIFICATION TEST
IN PLANT SERVICE MONITORING TEST
SYSTEM DEMONSTRATION TEST
SYSTEM WIDE CLEANING

Finalized Multi-Stage Chemical Cleaning Process

- Iron Removal Stage
- Alkaline Stage
- Copper Removal Stage
- Passivation Stage

Qualification of the Chemical Cleaning Process

- Quality assurance requirements for chemical cleaning as a "special process" are met
- Material compatibility studies
- A field qualification test
- A high velocity corrosion rate test

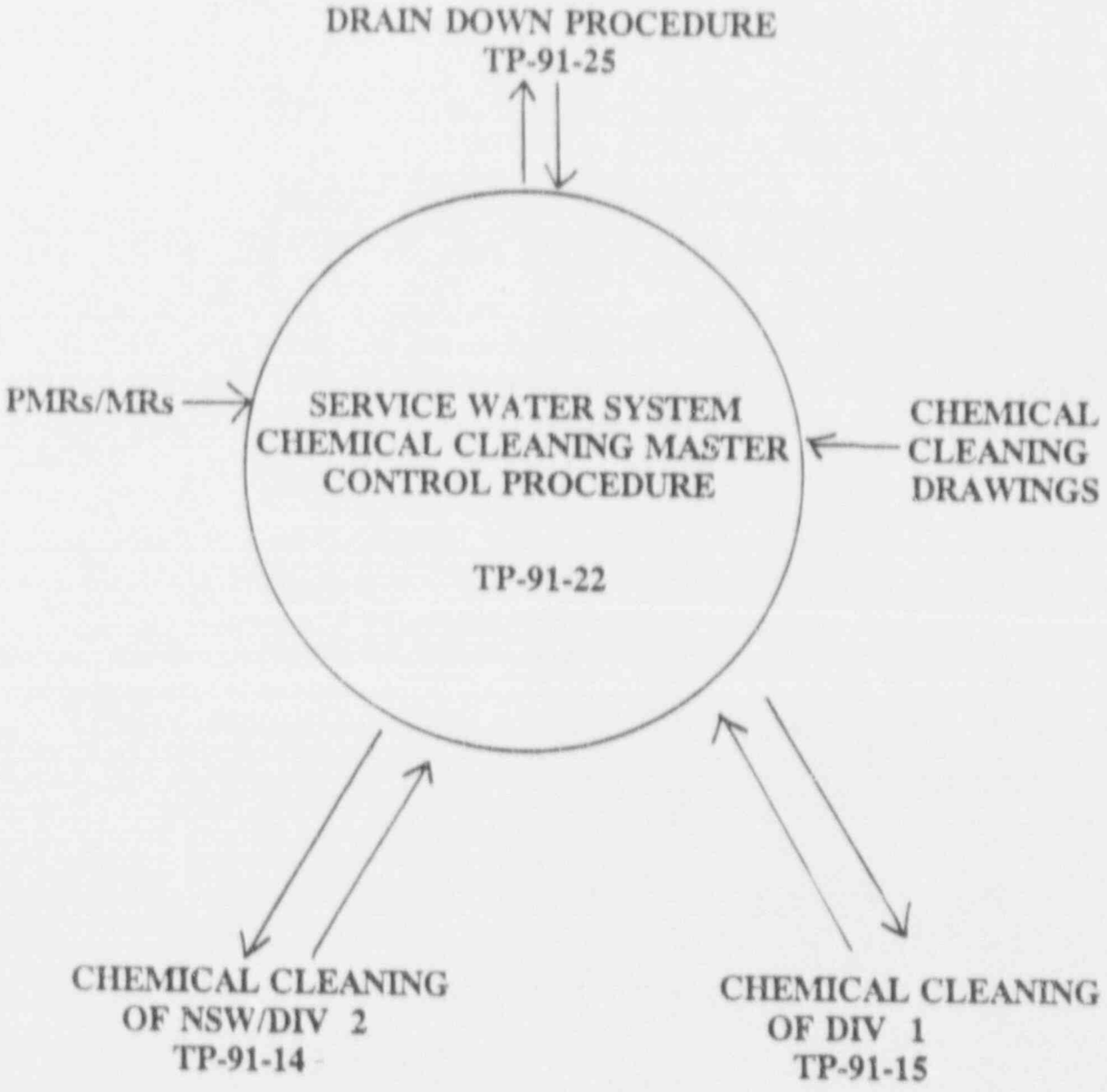
System Demonstration Test

- Experience with a larger scale chemical cleaning job on site
- Provides additional in plant experience with the qualified cleaning process
- The overall logistics will be tested since the transport of chemicals, waste handling and manpower loading will all be exercised
- Provides additional data on the type of waste that should be generated

FULL SYSTEM CHEMICAL CLEANING (RF-4)

- SYSTEM VOLUMES
  (2 CLEANING LOOPS)
  - ▸ NORMAL SERVICE WATER/DIVISION 2:
    ≈ 175,000 GALLONS
  - ▸ DIVISION 1 : 85,000 GALLONS
- ESTIMATED WASTE VOLUME: 2.6 X 10^6 GALLONS
- TEMPORARY DELIVERY SYSTEM
- JUMPERING HEAT EXCHANGERS
- 3 WASTE STORAGE TANKS (1.2 X 10^6 GALLONS EACH)

WORK CONTROL DOCUMENTS



WASTE PROCESSING

- FQT WASTE CHARACTERIZATION
- DEMONSTRATION TEST WASTE CHARACTERIZATION AND ON SITE PROCESSING
- SYSTEM WIDE CHEMICAL CLEANING

CONCLUSIONS

The lab simulation testing, the material compatibility studies, the field qualification test, the high velocity, and the radwaste cleaning are a series of activities which will develop a cleaning process..

To effectively chemically clean the Service Water System with a qualified chemical cleaning process which is compatible with the SWS material.

SERVICE WATER PIPE-REPLACEMENT PROGRAM

GULF STATE UTILITIES COMPANY

BOP Supervisor: Mike Stein

Ext. 4675

Date: 3-4-92

66

TYPICAL FINDINGS FROM INSPECTIONS

A. REDUCTION OF WATER FLOW RATE TO SOME EQUIPMENT. AS A RESULT, CHEMICAL CLEANING CAN NOT BE PERFORMED.

B. DRAIN / VENT / INSTRUMENT VALVES CAN NOT BE OPERATED DUE TO BLOCKAGE OF PIPELINES AND VALVES. AS A RESULT, VALVES REQUIRED FOR FILLING AND VENTING OF CHEMICAL CLEANING AND FOR NORMAL OPERATION MUST BE CHANGED.

C. WELD JOINTS BETWEEN A FEW VALVES AND PIPES HAVE LEAKED DUE TO CORROSION.
THIS REPRESENTS A RISK OF LEAKAGE DURING CHEMICAL CLEANING.

GOALS AND PRINCIPLES FOR PIPE-REPLACEMENT

1. IMPROVE THE SERVICE WATER SYSTEM EQUIPMENT PERFORMANCE TO MEET OR EXCEED SAFETY REQUIREMENTS AND/OR TO ENSURE VITAL EQUIPMENT AND PLANT RELIABILITY.

2. ESTABLISH AND IMPLEMENT A SAMPLE PLAN FOR ULTRASONIC TEST INSPECTIONS OF LARGE BORE ASME PIPING THAT IS MOST SUSCEPTIBLE TO CORROSION.

3. REPLACE / REPAIR PIPELINES TO REDUCE PROBABILITY OF ASME MINIMUM WALL VIOLATIONS, IF INSPECTION-SAMPLE TESTING SO INDICATES.

4. REPLACE / REPAIR VALVES NECESSARY TO SUPPORT PLANT OPERATION AND CHEMICAL CLEANING.

5- ALL PIPE-REPLACEMENT NEED NOT NECESSARILY BE ACCOMPLISHED DURING CYCLE-4 OR RF-4.

6. THE PRIORITY SYSTEM USED IN ESTABLISHING THE PIPE REPLACEMENT SCHEDULE MUST BE BASED ON MEETING SAFETY AND PLANT-RELIABILITY STANDARDS.

7. THE NEW CLOSED-CYCLE SERVICE WATER SYSTEM MUST ADDRESS AND ACCEPT RESIDUAL CORROSION PRODUCTS IN THE 1% OF THE PIPING THAT WILL NOT BE REPLACED OR CLEANED.

PIPE-REPLACEMENT SCOPE

1. REPLACE SMALL-DIAMETER PIPING THAT CAN NOT BE CLEANED DUE TO BLOCKAGE.

2. REPLACE DRAIN / INSTRUMENT / VENT VALVES THAT CAN NOT BE OPERATED DUE TO BLOCKAGE.

3. FINALIZE THE PIPE-REPLACEMENT PROGRAM BY IMPLEMENTING AN ULTRASONIC TEST-SAMPLE INSPECTION PLAN

PIPELINES THAT ARE SCHEDULED TO BE REPLACED

SIZE	LENGTH	ASME	NON-ASME
1/2"	90'	N/A	90'
3/4"	700'	600'	100'
1"	15'	15'	N/A
2"	511'	400'	111'
3"	447'	N/A	447'
4"	170'	40'	130'
TOTAL	1,933'	1,055'	878'

NOTE:

950 FEET OF THE ABOVE 1,933 FEET OF PIPE WERE REPLACED DURING PLANT NORMAL OPERATION AND PAST FORCED OUTAGE.

VALVES THAT ARE SCHEDULED TO BE REFURBISHED / REPLACED WITHIN PIPELINES

230 VALVES

SIZE	ASME	NON-ASME
1/2"	2	N/A
3/4"	98	67
2"	2	2
2.5"	48	21
TOTAL	150	80

NOTE:

120 OF THE ABOVE 230 VALVES WERE REPLACED DURING PLANT NORMAL OPERATION AND PAST FORCED OUTAGE.

DRAIN / VENT / INSTRUMENT VALVES THAT ARE SCHEDULED TO BE REPLACED

182 VALVES

SIZE	ASME	NON-ASME
1/2"	24	6
3/4"	111	41
TOTAL	135	47

NOTE:

73 OF THE ABOVE 182 VALVES WERE REPLACED DURING PLANT NORMAL OPERATION AND PAST FORCED OUTAGE.

ULTRASONIC TEST-SAMPLE INSPECTION PLAN

PURPOSE:

- TO ENSURE THE STRUCTURAL INTEGRITY OF THE PIPELINES.

- TO DETERMINE THE GENERAL CONDITION OF THE PIPELINES. (FOR ASME CODE COMPLIANCE)

- TO DEVELOP A METHOD OF SAMPLE INSPECTION, WHICH WILL PROVIDE VERY HIGH LEVEL OF CONFIDENCE THAT THE S.W. PIPING IS IN ACCEPTABLE CONDITION.

ULTRASONIC TEST-SAMPLE INSPECTION PLAN

INSPECTION PROGRAM
(TP-91-037)

1 - PIPELINES SELECTION:

THOSE SELECTED WERE CONSIDERED TO BE THE MOST SUSCEPTIBLE TO CORROSION.

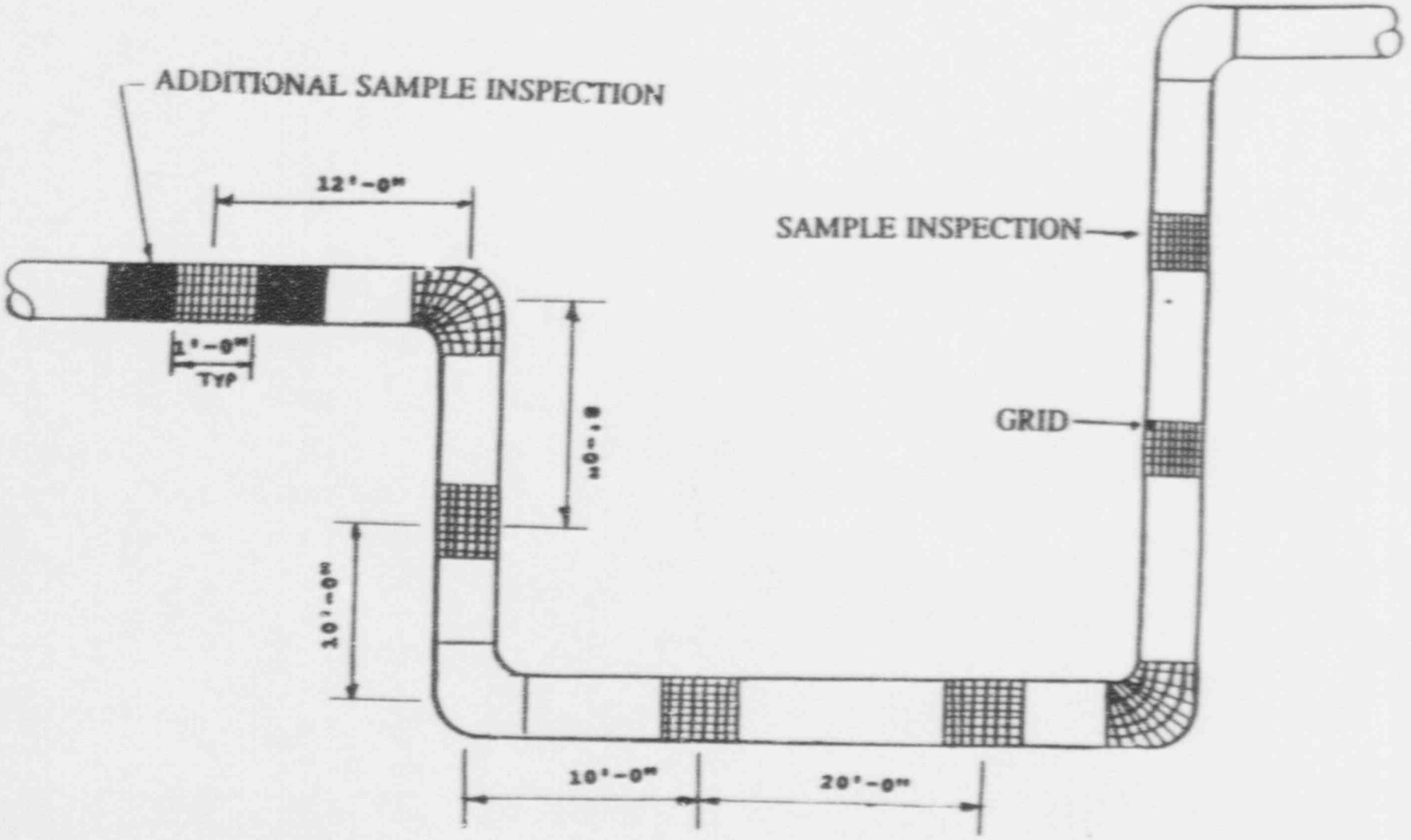
2 - SAMPLE SELECTION:

ONE SAMPLE FOR EVERY 20 FEET MAXIMUM WAS SELECTED.
ONE SAMPLE FOR EVERY OTHER FITTING WAS SELECTED.

3 - ACCEPTANCE CRITERIA:

- PIPE STRUCTURAL INTEGRITY COULD NOT BE VIOLATED. (VERIFIED BY MEANS OF CALCULATION).
- ONE ASME MINIMUM WALL VIOLATION WAS ALLOWED PER SAMPLE WITH LOCAL REPAIR/REPLACEMENT REQUIRED.
- IF REMAINING WALL THICKNESS IS LESS THAN CALCULATED 35 YEARS WALL THICKNESS, THE AFFECTED PIPELINES TO BE MONITORED DURING EACH CYCLE.

EXAMPLE


ADDITIONAL SAMPLE INSPECTION
12'-0"
SAMPLE INSPECTION
GRID
1'-0" TYP
10'-0"
10'-0"
10'-0"
20'-0"

SAMPLE PLAN SUMMARY

SIZE	LENGTH OF ASME PIPE	NUMBER OF SAMPLE	NUMBER OF GRID SQUARE	NUMBER OF GRID SQUARE < SPEC.	NUMBER OF GRID SQUARE < ASME
3"	80'	7	484	5	NONE
6"	25'	5	367	13	NONE
8"	500'	38	3115	195	1
12"	600'	41	3480	80	1
TOTAL	1,205'	91	7446	293	2

ULTRASONIC TEST-SAMPLE INSPECTION RESULTS

1 - THE REMAINING WALL THICKNESSES OF TWO GRID SQUARES WAS LESS THAN THE ASME MINIMUM WALL THICKNESS. REPAIRED COMPLETED.

2 - THE WALL THICKNESSES OF 293 GRID SQUARES HAVE BEEN REDUCED TO BELOW THE SPECIFICATION MINIMUM WALL THICKNESS.

3 - EXCEPT FOR THE TWO GRID SQUARES NOTED ABOVE, REMAINING PIPE WALL THICKNESSES WERE GREATER THAN 35 YEAR CALCULATED WALL THICKNESS.

4 - CALCULATIONS VERIFY THAT THE EXISTING PIPE WALL THICKNESSES ARE SUFFICIENT TO MAINTAIN STRUCTURAL INTEGRITY.

THE CLOSED CYCLE

SERVICE WATER SYSTEM

Tom Davey

Closed Service Water
Project Engineer

SERVICE WATER:
CLOSING THE SYSTEM

OBJECTIVE: Modify the existing service water system to a closed system

TIME FRAME: Closed system to be operational during the fourth refueling outage. Significant because groundbreaking occurred May 22, 1991

ATTRIBUTES:
- -Trouble/accident free
- -Designed in-house
- -Accelerated design & construction time frame


CLOSED CYCLE SERVICE WATER
NORTH PLANT ROAD
CONTROL ROOM
OUTAGE CONTRACTOR PARKING

THE EXISTING SERVICE WATER SYSTEM

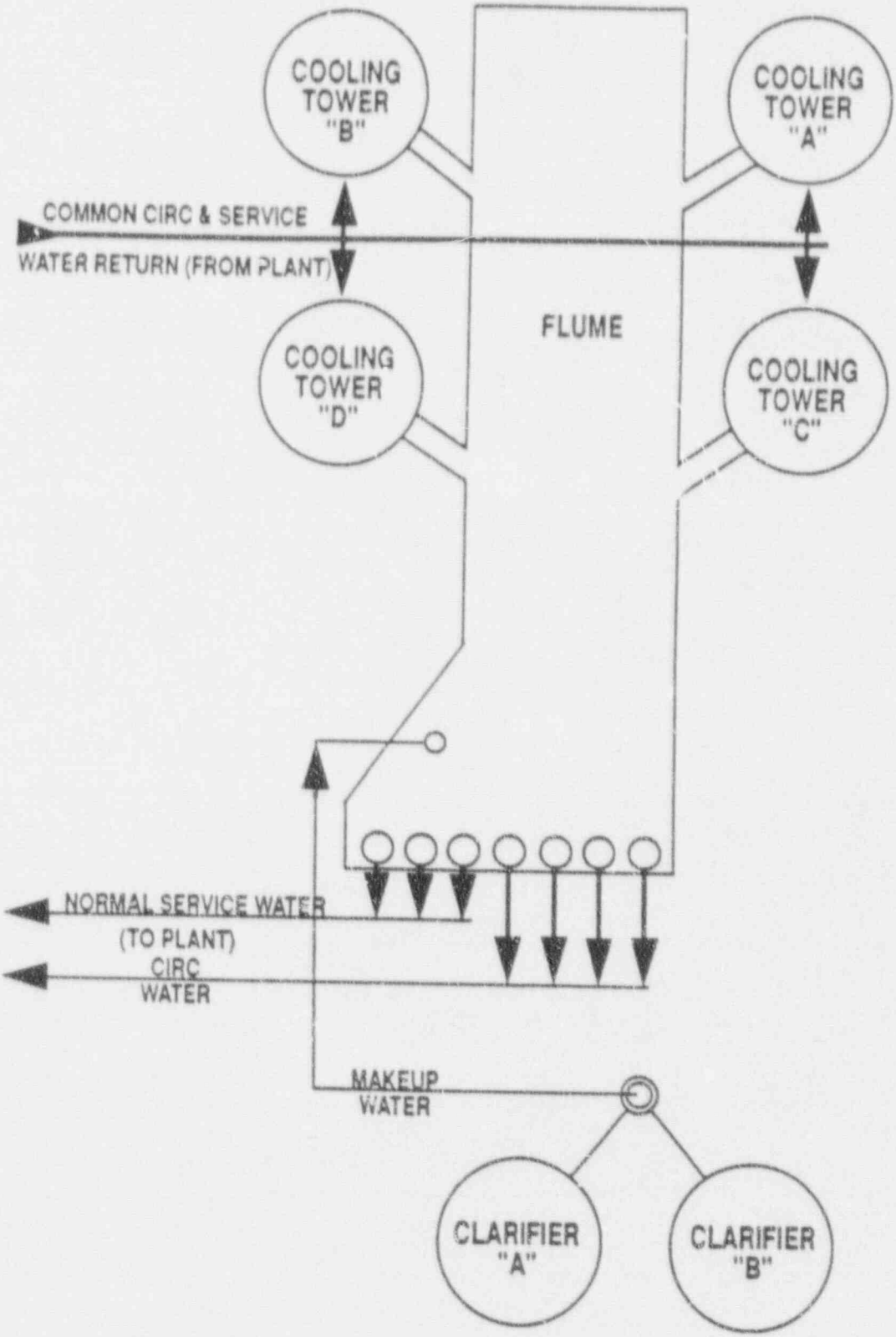
-Service water is common with circulating water using mechanical draft wet cooling towers to lower water temperature

-Water quality is limited because of interaction with atmosphere in the 4 cooling towers and the use of clarified river water for makeup

-Chemical treatment of the common systems is utilized to control corrosion and biological fouling, but is costly because of the high water dilution factor

-Water treatment has to be restricted to avoid exceeding EPA discharge limits during blowdown to the river

EXISTING "OPEN" SERVICE WATER SYSTEM



THE NEW CLOSED SYSTEM

-New design separates entire service water system from circulating water / service water system

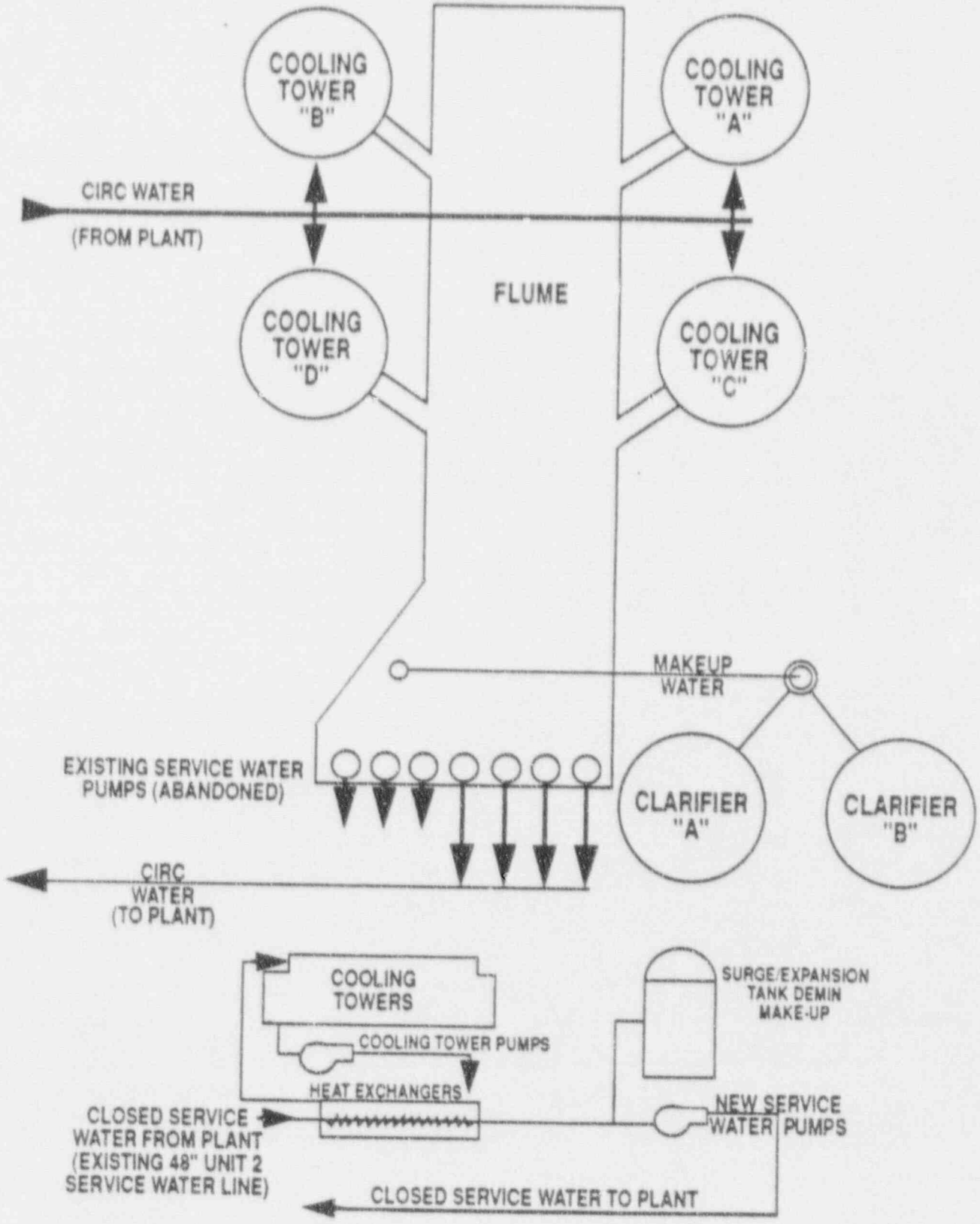
-The new service water system will be cooled using new heat exchangers

-The heat exchangers will be cooled by water recirculating through a new cooling tower

-The design of the new system provides smooth interface to existing systems and precludes changes to safety systems. The new system is non safety related and does not affect the safety aspects of the Standby Cooling Tower system

-The new system allows aggressive water treatment because there is less volume to treat. EPA discharge requirements are easier to meet and since service water is no longer exposed to atmosphere, there are no evaporative losses

NEW CLOSED SERVICE WATER SYSTEM



MAJOR COMPONENTS

-Plate heat exchangers

-Pumps (Cooling tower pumps and in-line service water pumps)

-Cooling tower

-Approximately 4000 feet of 48 inch diameter pipe

-Surge/expansion tank w/ approximately 40,000 gallon capacity

PLATE HEAT EXCHANGERS

-Low cost (compared to other heat exchanger types)

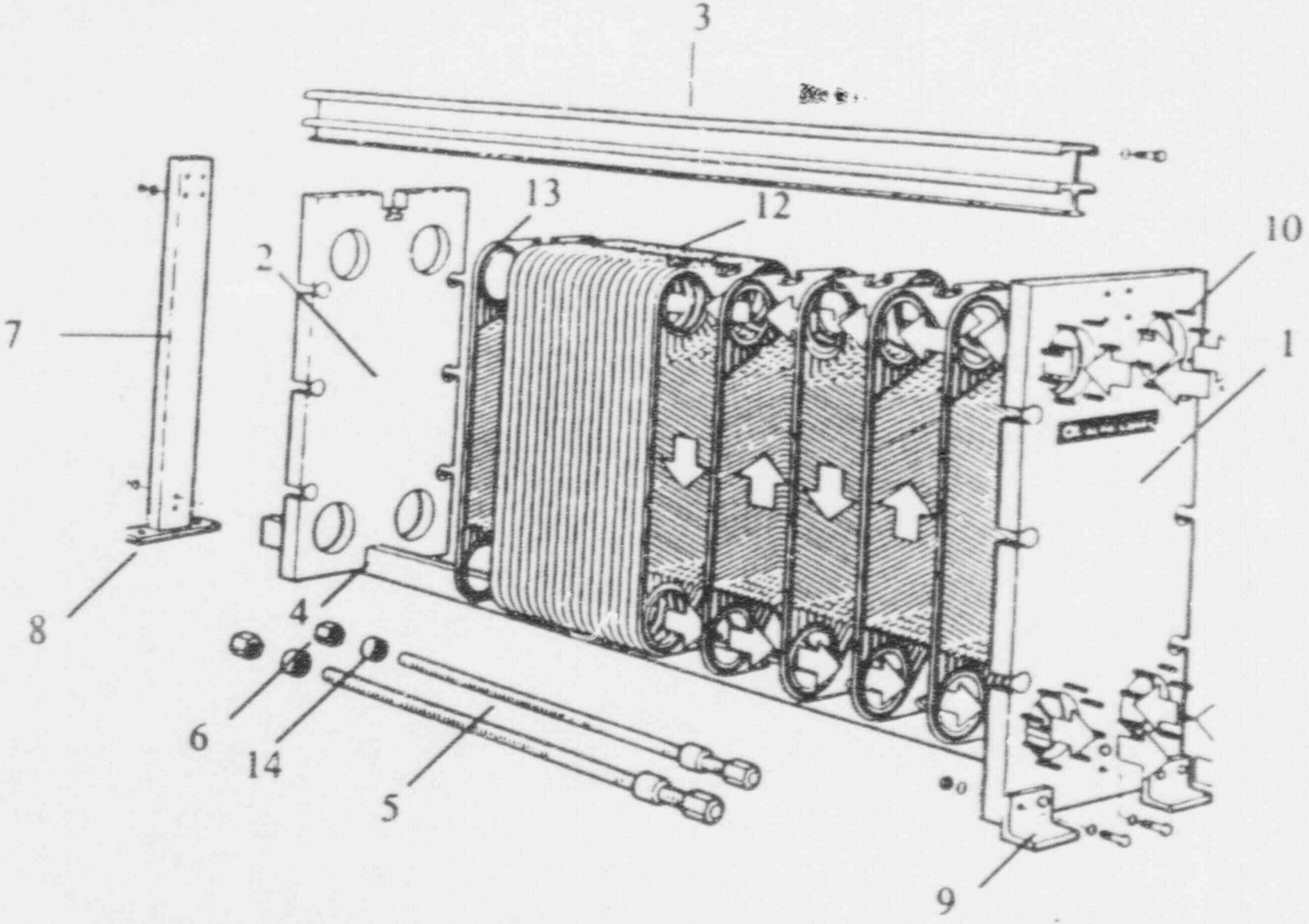
-Less space requirements than shell and tube

-Easily maintained

-Easily expanded - modular design

-Good operating experience in plants using Mississippi river water for cooling

-Eight heat exchangers measuring approximately 4 feet wide by 15 feet long by 10 feet high



#1 - Fixed Cover
#2 - Movable Cover
#3 - Carrying Bar
#4 - Guide Bar
#5 - Tightening Bolt
#6 - Tightening Nut
#7 - Support Column
#8 - Support Foot
#9 - Frame Foot
#10 - Stud Bolt
#11 - Bearing Box
#12 - Plate Pack
#13 - Gasket
#14 - Lock Washer

PUMPS

COOLING TOWER PUMPS

-Three 50% capacity vertical pumps (approximately 31,500 GPM each) at 1000 HP each

-Cooling tower flume (about 300 feet long by 60 feet wide) with pump pit

IN LINE PUMPS

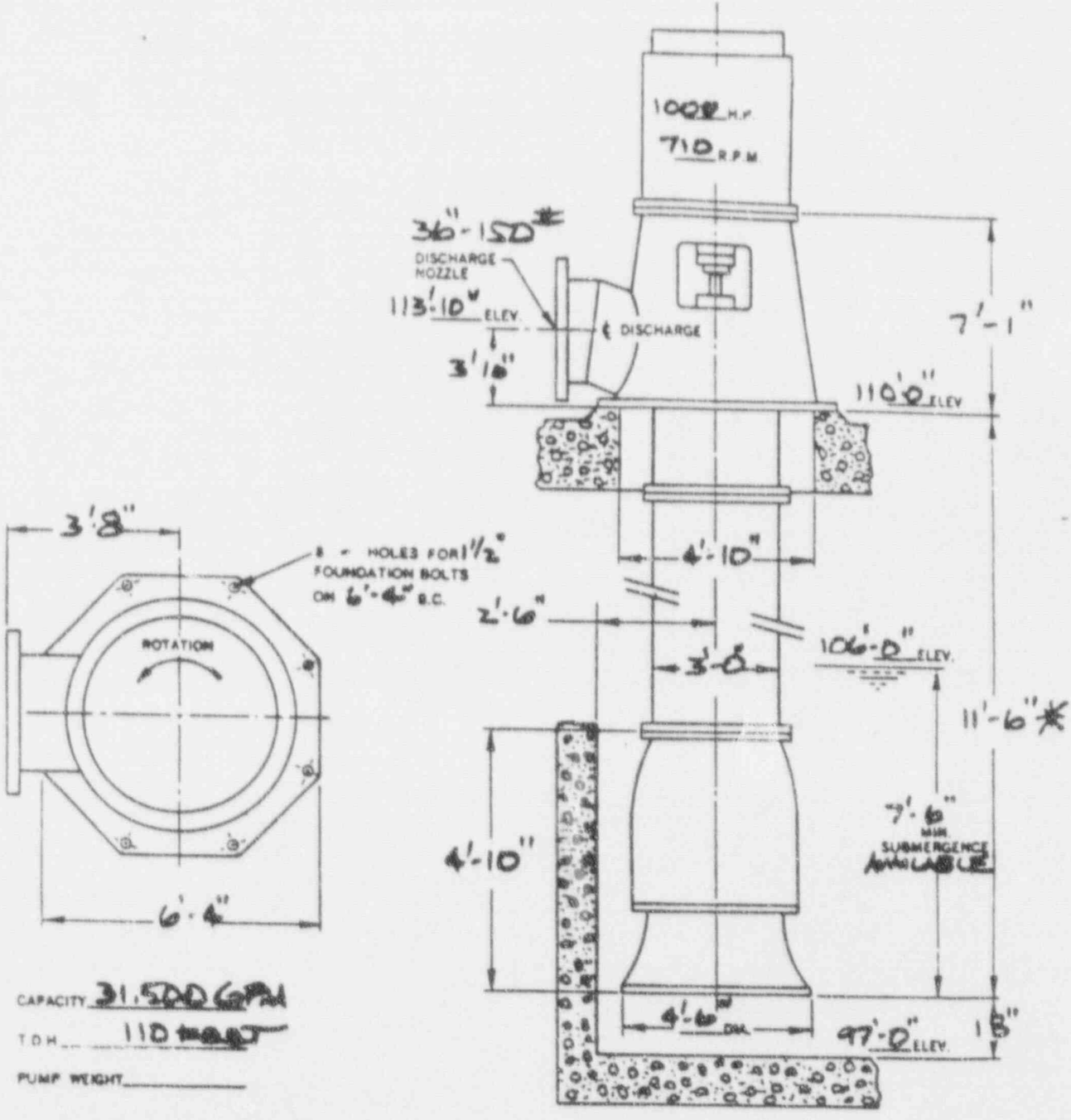
-Three 50% capacity horizontal pumps (approximately 31,500 GPM each)

-Each pump motor combination measures about 20 feet long by 10 feet wide by 10 feet high and is rated at 2000 HP

-Design utilizes expansion tank to control surges

VERTICAL CIRCULATING PUMP

Preliminary Outline Dimensions



CAPACITY 31,500 GPM

T.D.H. 110 FEET

PUMP WEIGHT _____

NOTE: Dimensions are preliminary and are not to be used for construction purposes.

USER: GULF STATES UTILITIES	DRAWN BY: RA	DATE: 5/28/81	PROP. NO.: AN95160
LOCATION: RIVER BEND UNIT 1			
ENGINEER:	BW/IP International, Inc. Byron Jackson Pump Division		DRAWING NO.: SK01
PUMP SIZE AND TYPE: 18 RXL-1 stage VCT			

PART LIST | ORDER NO | REF

UNIT _____ OUR ORDER No _____

JOB GULF STATES UTILITY CUSTOMER ORDER No _____

PUMP 36 - 30 MAA CAPACITY 31,500 GPM AT 190 FT HD

MOTOR _____ MAKE _____ FRAME _____

2000 HP 3 PHASE 60 CYCLE 4160 VOLT 330 RPM

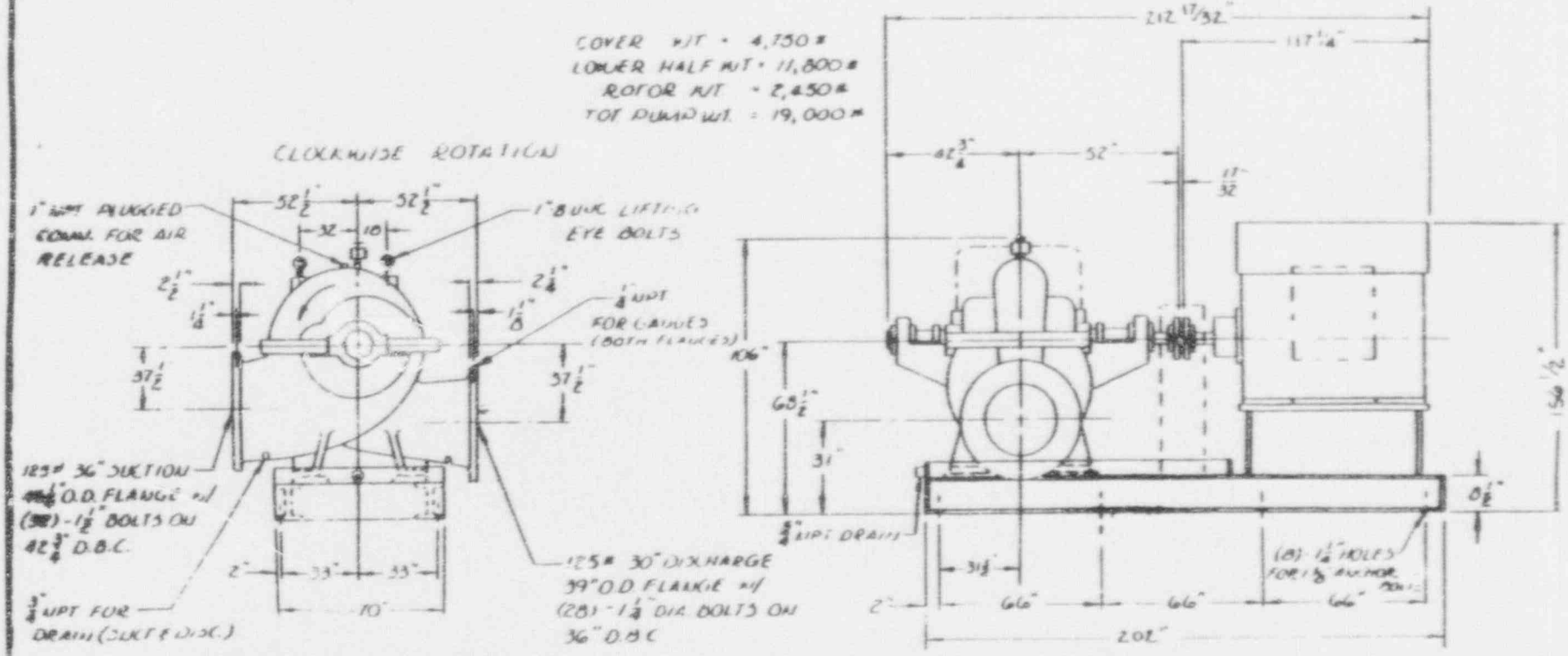
CONTROLLER _____

CERTIFIED BY _____ DATE _____

SCALE	CHKD	PATTERSON PUMP COMPANY	DRWG No
NONE	-H	TOCCOA GA	AB-70904 M
DATE 3-24-83	APPRVD -A-	36 - 30 MAA WITH 2000 HP MOTOR	PATT NO. / PART
DRAWN MONARD	MAT.		

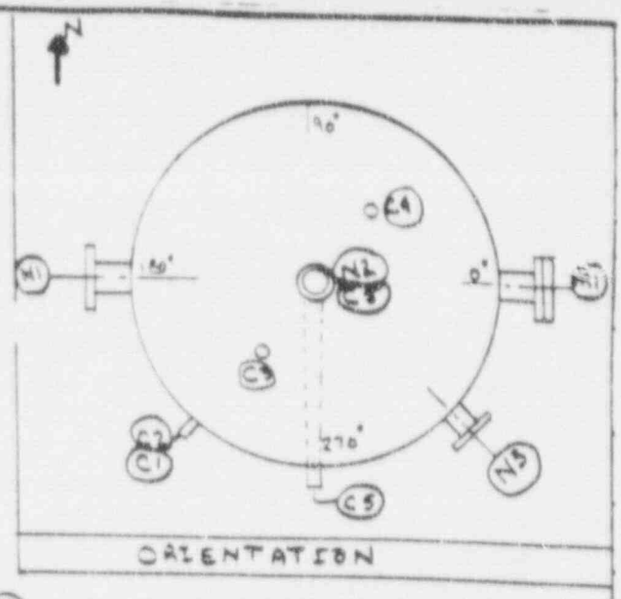
COVER WT = 4,750 #
LOWER HALF WT = 11,800 #
ROTOR WT = 2,450 #
TOT PUMP WT = 19,000 #

CLOCKWISE ROTATION

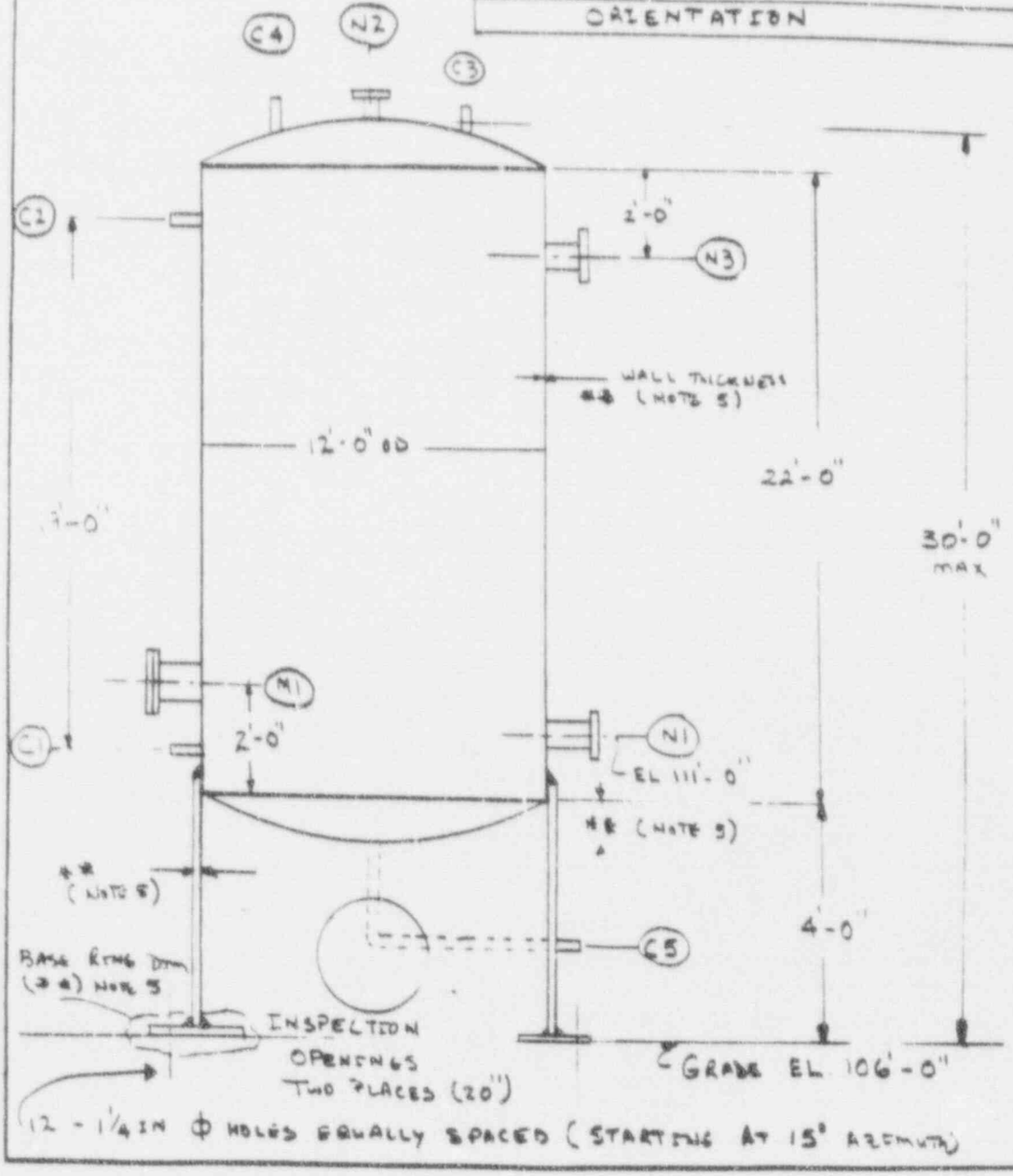


ALL DIMENSIONS ARE APPROXIMATE, HOWEVER NOMINAL CAPACITY AND MAXIMUM HEIGHT SHALL BE MAINTAINED

PROPOSED TANK APPROX CAPACITY: ** 24,000 GALS



ORIENTATION



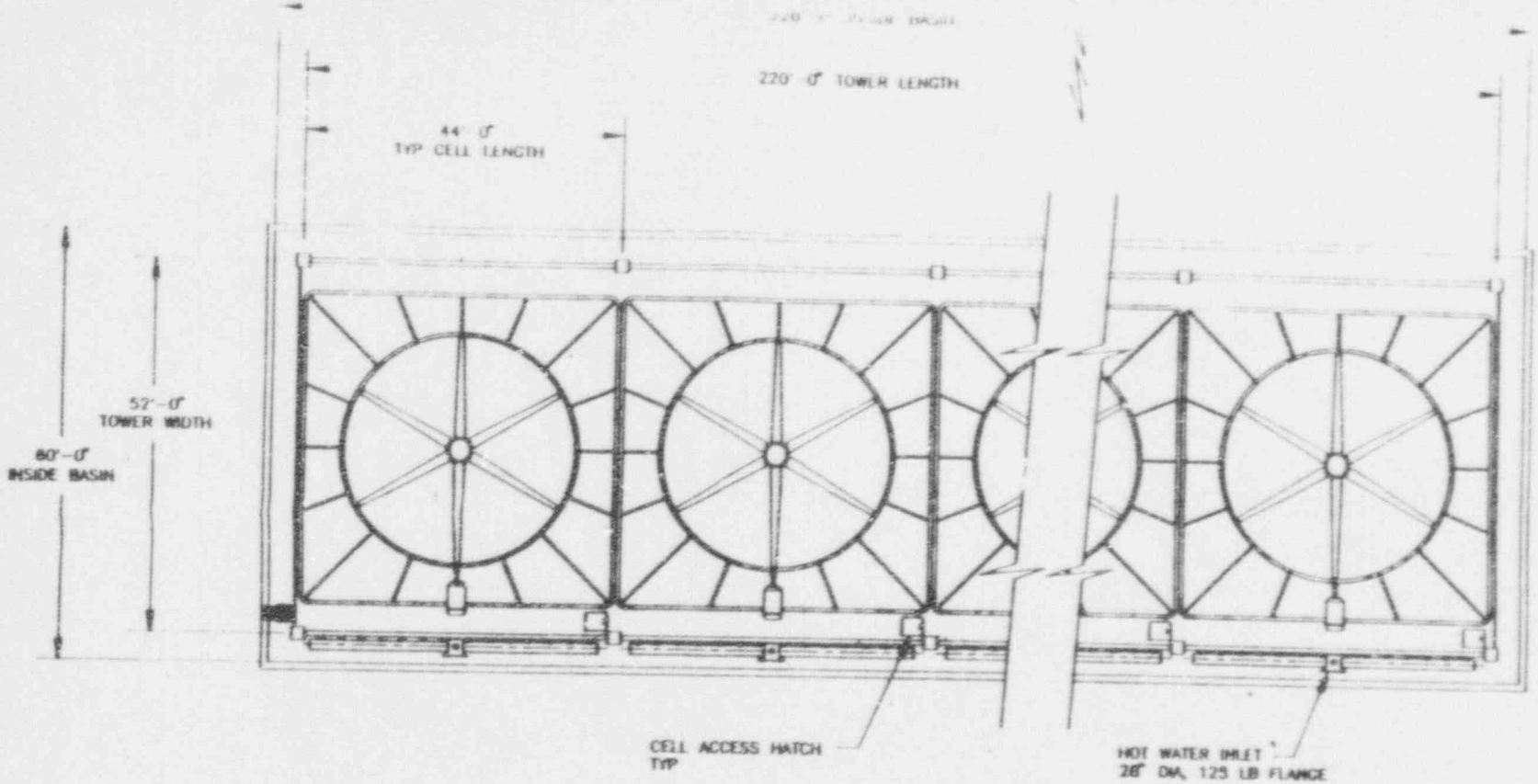
COOLING TOWER

-Multiple cell, mechanical draft type

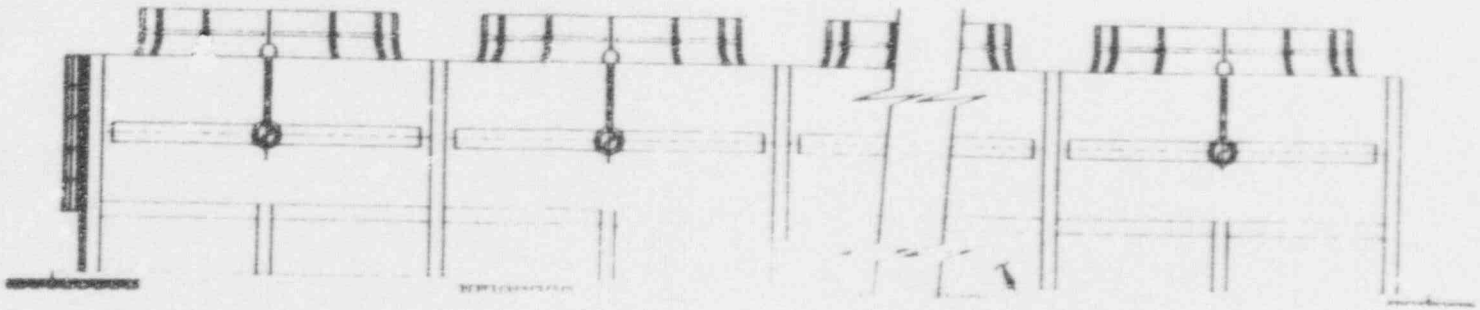
-Five individual concrete cells measuring approximately 50 feet square; the size is based on maximum total heat load

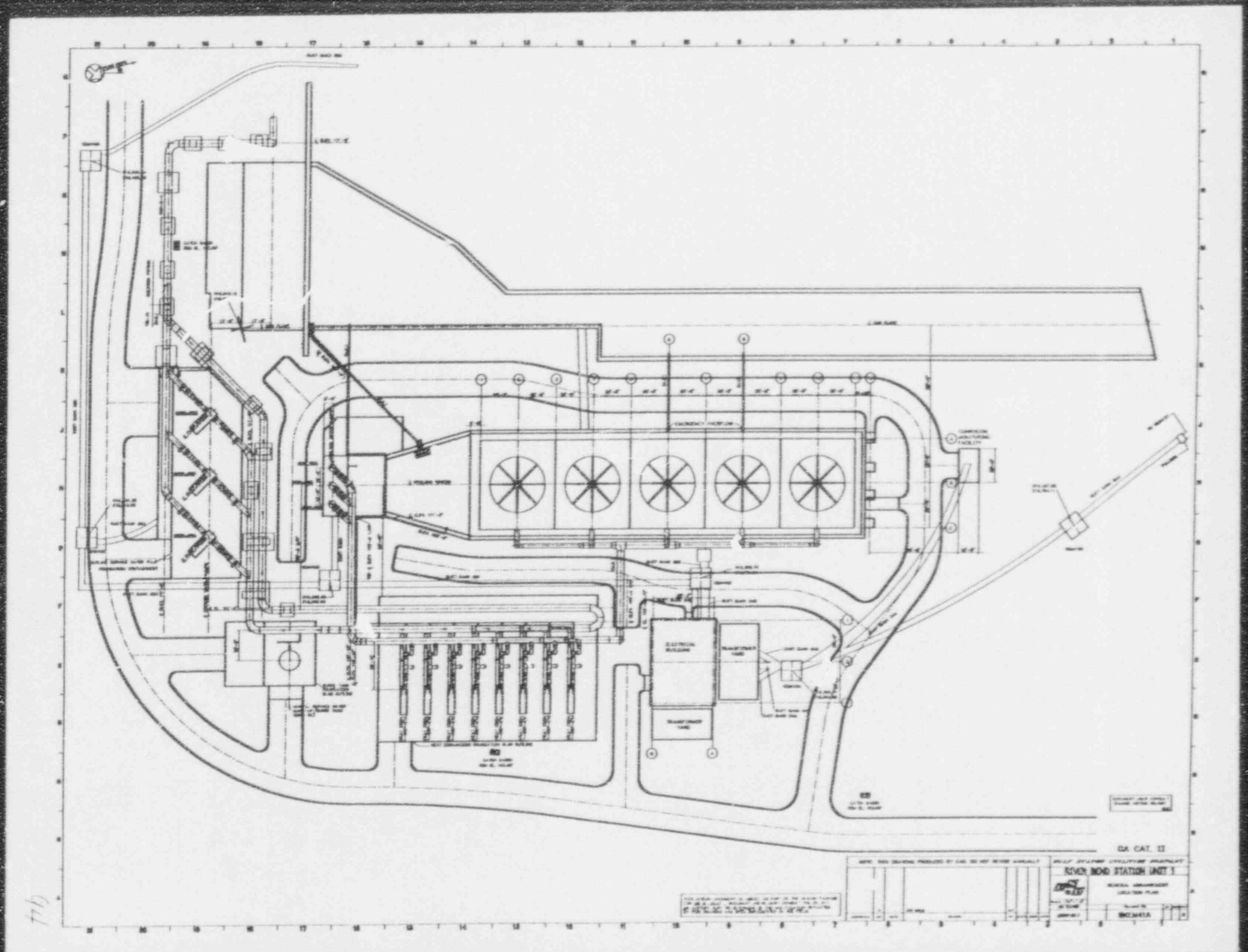
-Each tower to have single fan with two speed motors for efficiency (100 - 200 HP)

-GSU has good operating experience with this type cooling tower


220'-0" TOWER LENGTH
44'-0"
TYP CELL LENGTH
52'-0"
TOWER WIDTH
60'-0"
INSIDE BASIN
CELL ACCESS HATCH
TYP
HOT WATER INLET
28" DIA, 125 LB FLANGE

PLAN VIEW




GA CAT. II
RIVER ROAD STATION UNIT 1

TESTING/TURNOVER STATUS

SYSTEM	DESCRIPTION
SWC-001	13.8KV transformers and 4.16KV switchgear: Protective relaying, Station Service transformers 1STX-XS5A + 5B, Switchgear 6A + 6B
SWC-002	Batteries and Chargers: BUS battery and charger
SWC-003	480V transformers, load centers and motor starters: Protective relays, Switchgear breakers, Transformers, Cooling tower fan motors
SWC-004	480V Motor control center: None
SWC-005	Cooling tower fans: Fans 1A-1E
SWC-006	Cooling tower: Cooling tower valves, Cooling tower cells 1A-1E, Cooling tower flume, Cooling tower makeup water
SWC-007	Heat Exchangers: Strainer MOVs and diverter actuators, SWC heat Exchanger inlet and outlet temp inst,
SWC-008	Cooling tower pumps: Instruments for calibration
SWC-009	Chemical Feed and injection: None
SWC-010	Multiplexer: None
SWP-001	Normal service water: SWP temperature monitoring instruments

GENERIC LETTER 89-10
MOV PROGRAM
RF-4 PREPARATIONS

RIVER BEND STATION - UNIT 1
GULF STATES UTILITIES COMPANY

NRC PRESENTATION
MARCH 4, 1992

BACKGROUND

- PREPARATIONS DURING CYCLE 4
  - DESIGN BASIS REVIEWS
  - PURCHASE VOTES TEST EQUIPMENT
  - PROCEDURE UPGRADE
  - SPARE PARTS
  - TRAINING

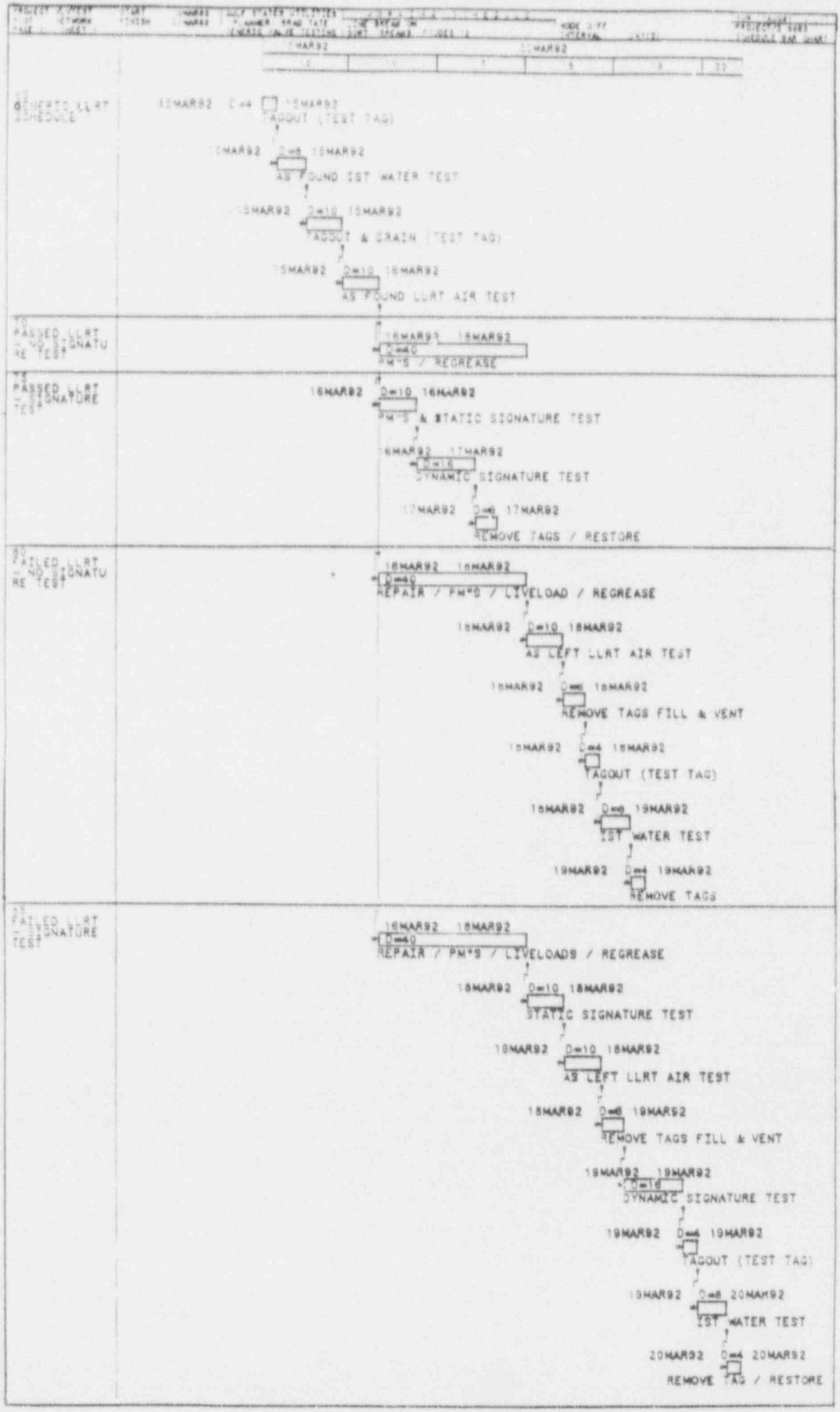
- NRC INSPECTION DECEMBER 9-13, 1991
  - INSPECTORS CONCLUDED THAT GSU'S GL 89-10 PROCRAM REPRESENTATED A GOOD INITIAL EFFORT TO MEET THE INTENT OF THE GENERIC LETTER.
  - GSU HAS ALLOCATED SIGNIFICANT RESOURCES IN BOTH MANPOWER AND EQUIPMENT TO DEVELOP THE PROGRAM
  - SEVERAL WEAKNESSES WERE IDENTIFIED, WHICH WHEN PROPERLY RESOLVED SHOULD ENSURE AN ACCEPTABLE PROGRAM WILL BE IN PLACE
- RESPONSE TO NRC INSPECTION REPORT 91-24
  - DUE MARCH 22, 1992
  - WILL ADDRESS EACH OF THE SEVEN WEAKNESSES
  - REPRESENTS A SIGNIFICANT EFFORT

TOTAL SCOPE

- 260 SAFETY RELATED MOV'S
- 4 OUTAGES (RF-3, 4.5.6)

RF-4 SCOPE

- 115 MOV'S PLANNED FOR STATIC TESTING
- OF THOSE, APPROXIMATELY 60 WILL BE FLOW TESTED AT MAX ACHIEVABLE FLOW/PRESSURE
- APPROXIMATELY 40 MOV'S PLANNED FOR REFURBISHMENT PRIOR TO DIAGNOSTIC TESTING


7MAR92
11MAR92
0
5
8
10
01
ROUTINE LLRT SCHEDULE
15MAR92 D=4 15MAR92
TAGOUT (TEST TAG)
15MAR92 D=4 15MAR92
AS FOUND IST WATER TEST
15MAR92 D=10 15MAR92
TAGOUT & DRAIN (TEST TAG)
15MAR92 D=10 16MAR92
AS FOUND LLRT AIR TEST
02
PASSED LLRT - NO SIGNATURE TEST
16MAR92 16MAR92
D=0
PM'S / REGREASE
03
PASSED LLRT - SIGNATURE TEST
16MAR92 D=10 16MAR92
PM'S & STATIC SIGNATURE TEST
16MAR92 17MAR92
D=16
DYNAMIC SIGNATURE TEST
17MAR92 D=4 17MAR92
REMOVE TAGS / RESTORE
04
FAILED LLRT - NO SIGNATURE TEST
16MAR92 16MAR92
D=0
REPAIR / PM'S / LIVELOAD / REGREASE
16MAR92 D=10 16MAR92
AS LEFT LLRT AIR TEST
16MAR92 D=6 16MAR92
REMOVE TAGS FILL & VENT
16MAR92 D=4 16MAR92
TAGOUT (TEST TAG)
16MAR92 D=6 19MAR92
IST WATER TEST
19MAR92 D=4 19MAR92
REMOVE TAGS
05
FAILED LLRT - SIGNATURE TEST
16MAR92 16MAR92
D=0
REPAIR / PM'S / LIVELOADS / REGREASE
16MAR92 D=10 16MAR92
STATIC SIGNATURE TEST
16MAR92 D=10 16MAR92
AS LEFT LLRT AIR TEST
16MAR92 D=6 19MAR92
REMOVE TAGS FILL & VENT
19MAR92 19MAR92
D=16
DYNAMIC SIGNATURE TEST
19MAR92 D=6 19MAR92
TAGOUT (TEST TAG)
19MAR92 D=8 20MAR92
IST WATER TEST
20MAR92 D=4 20MAR92
REMOVE TAG / RESTORE

MOV TEST SEQUENCE

- TAGOUT (TEST TAG)
- AS-FOUND LLRT WATER TEST
- TAGOUT & DRAIN
- AS-FOUND LLRT AIR TEST
- VALVE REPAIR
- OPERATOR OVERHAUL
- LIVELOAD PACKING
- PREVENTIVE MAINTENANCE
- STATIC SIGNATURE TEST
- AS-LEFT LLRT AIR TEST
- REMOVE TAGS, FILL & VENT
- DYNAMIC SIGNATURE TEST
- TAGOUT (TEST TAG)
- IST WATER TEST
- REMOVE TAG/RESTORE

RF-4 MOV TEST ORGANIZATION

- 3 CREWS, EACH WITH AN EXPERIENCED GSU LEAD IN CHARGE
- DEDICATED STAFF OF TEST ENGINEERS AND TECHNICIANS ASSIGNED TO PPT
- TRAINED IN BOTH ENGINEERING AND MAINTENANCE FUNCTIONS
- BENEFITS
  - QUALITY - PROGRAM EMPHASIS ON QUALIFICATIONS AND TRAINING
  - CONSISTENCY - ONE GROUP RESPONSIBLE FOR GL 89-10 ACTIVITIES
  - EFFICIENCY - WORK PACKAGES DO NOT HAVE TO TRANSFER FROM GROUP TO GROUP
- CLOSE INTERFACE WITH SYSTEM ENGINEERING VALVE COORDINATOR
- DESIGN ENGINEERING SUPPORT
  - CALCULATION PREPARATION AND REVIEW
  - ONSHIFT OUTAGE COVERAGE
  - REVIEW/FEEDBACK/TREND TEST RESULTS

CONCLUSIONS

- GL-89-10 IS A VALID PROGRAM
- GSU HAS A WELL MANAGED & DEDICATED MOV TEAM
- NRC INSPECTION INDICATED GSU'S PROGRAM IS A GOOD INITIAL EFFORT TO MEET THE INTENT OF GL-89-10
- MOV TESTING, INSPECTION AND REFURBISHMENT REQUIRES AN INTEGRATED AND DETAILED APPROACH
- GSU IS DEDICATED TO A GOOD FAITH EFFORT TO TEST 115 VALVES DURING RF-4

RADIATION SOURCE TERM REDUCTION

RIVER BEND STATION

MARCH 1992

1.4

OBJECTIVE

Reduce the Source Term as necessary
to Minimize Man - Rem Expenditures consistent
with River Bend ALARA Goals.

OVERALL GOAL

Reduce RBS Man - Rem Expenditures
to the BWR Industry Goal of 255 Man - Rem
for a 3 Year Average
by 1995.

ACTION REQUIRED

Reduce current Man - Rem Expenditure by 30%.

SOURCE TERM REDUCTION
PROGRAM OVERVIEW

Chemical Decontamination

RWCU Ring Header Replacement

----<>----

Maximize Pre - Startup Condensate Cleaning Duration
with Condenser Vacuum

Soft Shutdown with Maximized RWCU Availability

Temporary Shielding and Component Flushing

----<>----

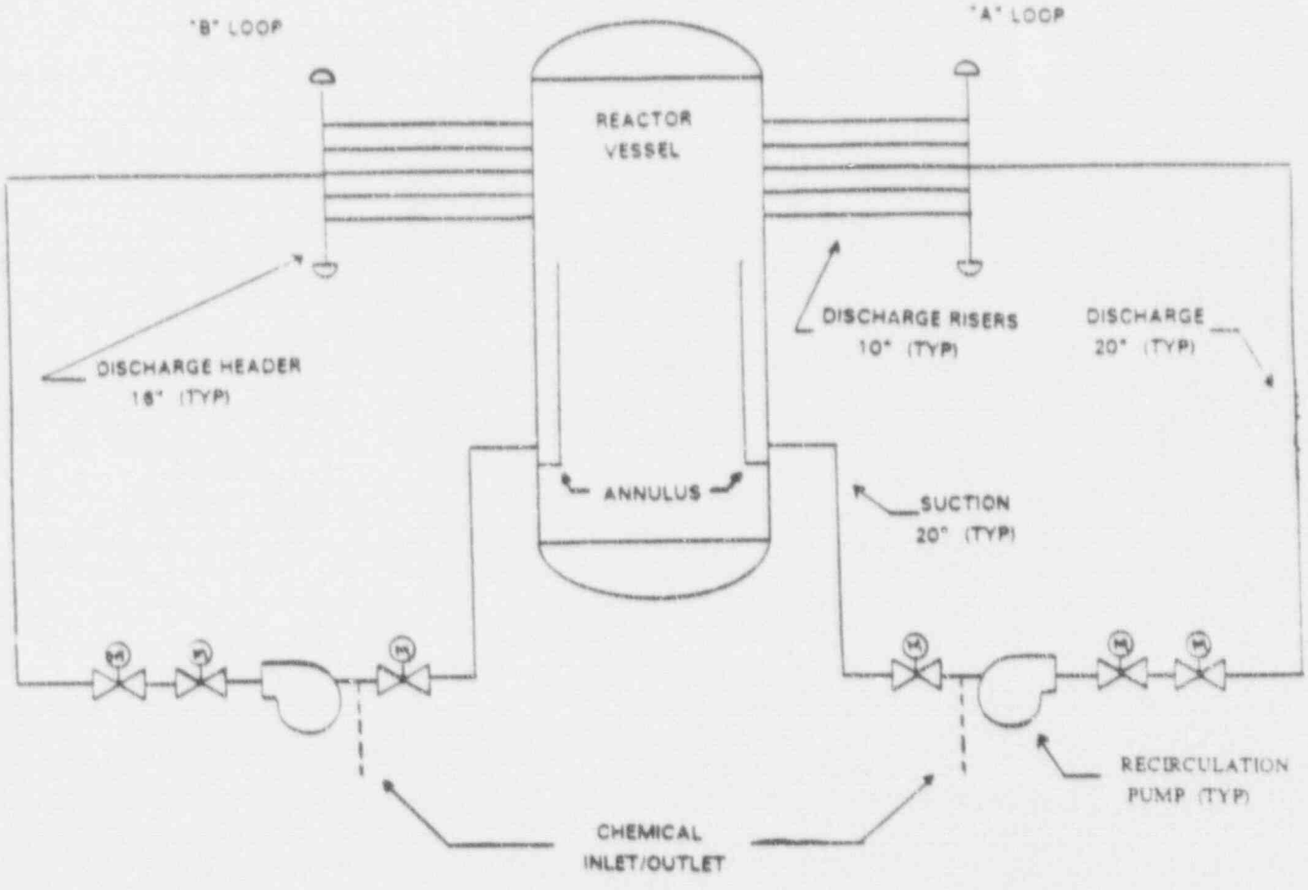
Stellite (Cobalt) Reduction

Low Cobalt Parts Program

Use of NOREM for Valve Repair

Condensate Filter Addition Study

CHEMICAL DECONTAMINATION
REACTOR RECIRCULATION SYSTEM



Low Oxidation - State Metal Ion (LOMI) Process

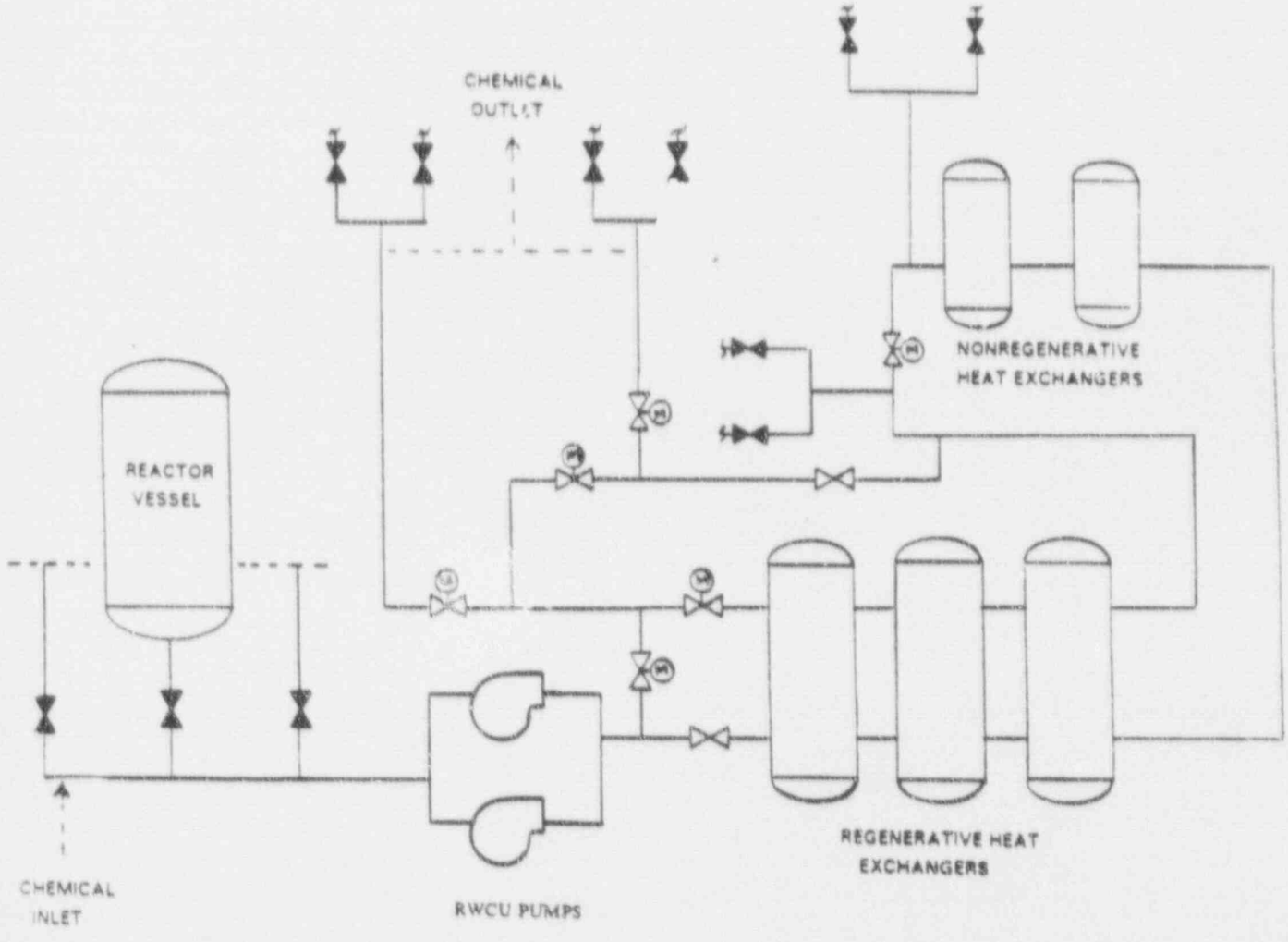
Non - Regenerative (Batch) Type Process

Best for Systems with Small Surface Area to Volume Ratio

Approved for Use in the Reactor Vessel

Decontamination Factor - 10 Target

CHEMICAL DECONTAMINATION
REACTOR WATER CLEANUP SYSTEM



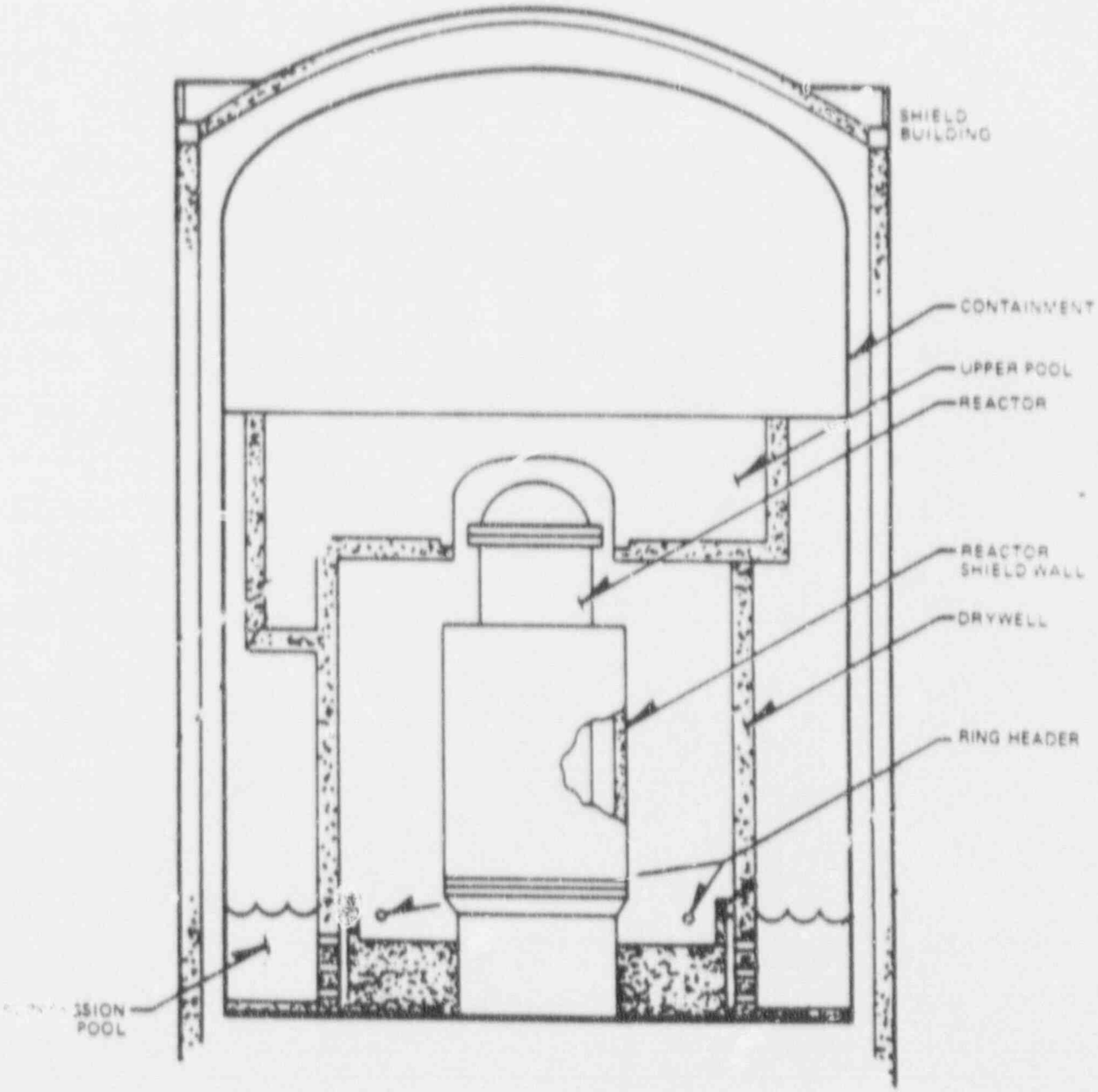
Can - Derem Process

Regenerative (Continuous) Type Process

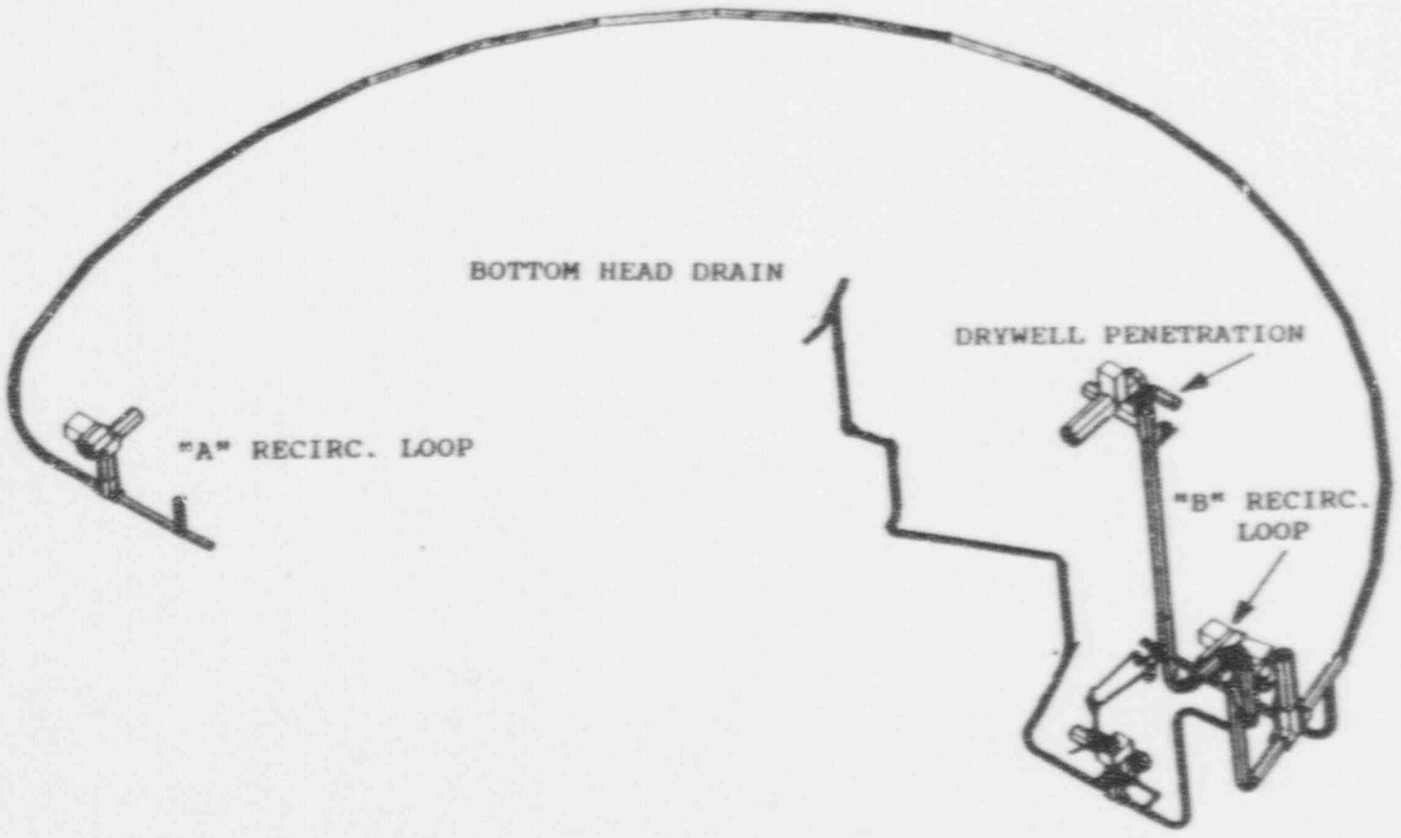
Best for Systems with Large Surface Area to Volume Ratio

Decontamination Factor - 10 Target

RWCU PIPE REPLACEMENT
GENERAL LOCATION



Reactor Building (Mark III Containment and Shield Building)



RBS RWCU RING HEADER

MATERIAL SELECTION AND PROCESSING

Selected 316L Stainless Steel

Corrosion Resistant

Not Susceptible to IGSCC

Corrosion Resistance Enhancements:

Finished Spool Pieces will be ELECTROPOLISHED.

Finished Spool Pieces will be PREOXIDIZED.

IGSCC Resistance Enhancements:

All Piping will be SOLUTION ANNEALED following Fabrication.

Field Welding will be Performed using HEAT - SINK WELDING.

Meets and Exceeds NUREG 0313 Requirements for Category "A" Weld Inspection.

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BENEFITS OF REPLACEMENT

Eliminates Approximately 5 Whip Restraints

Eliminates Approximately 21 Seismic Snubbers

Reduced Maintenance and Inspection Requirements

Reduced Shielding Requirements

Removes "Dead Legs" and "Hot Spots"

Adds Permanant Chemical Decontamination Connections

Cobalt Reduction (No - Cobalt Valves)

Low Recontamination Rate

(Approximately 100 mRem/hr Maximum)

Adds Maximum Support Jacket Insulation

CONCLUSION

Savings of over 650 Man - Rem

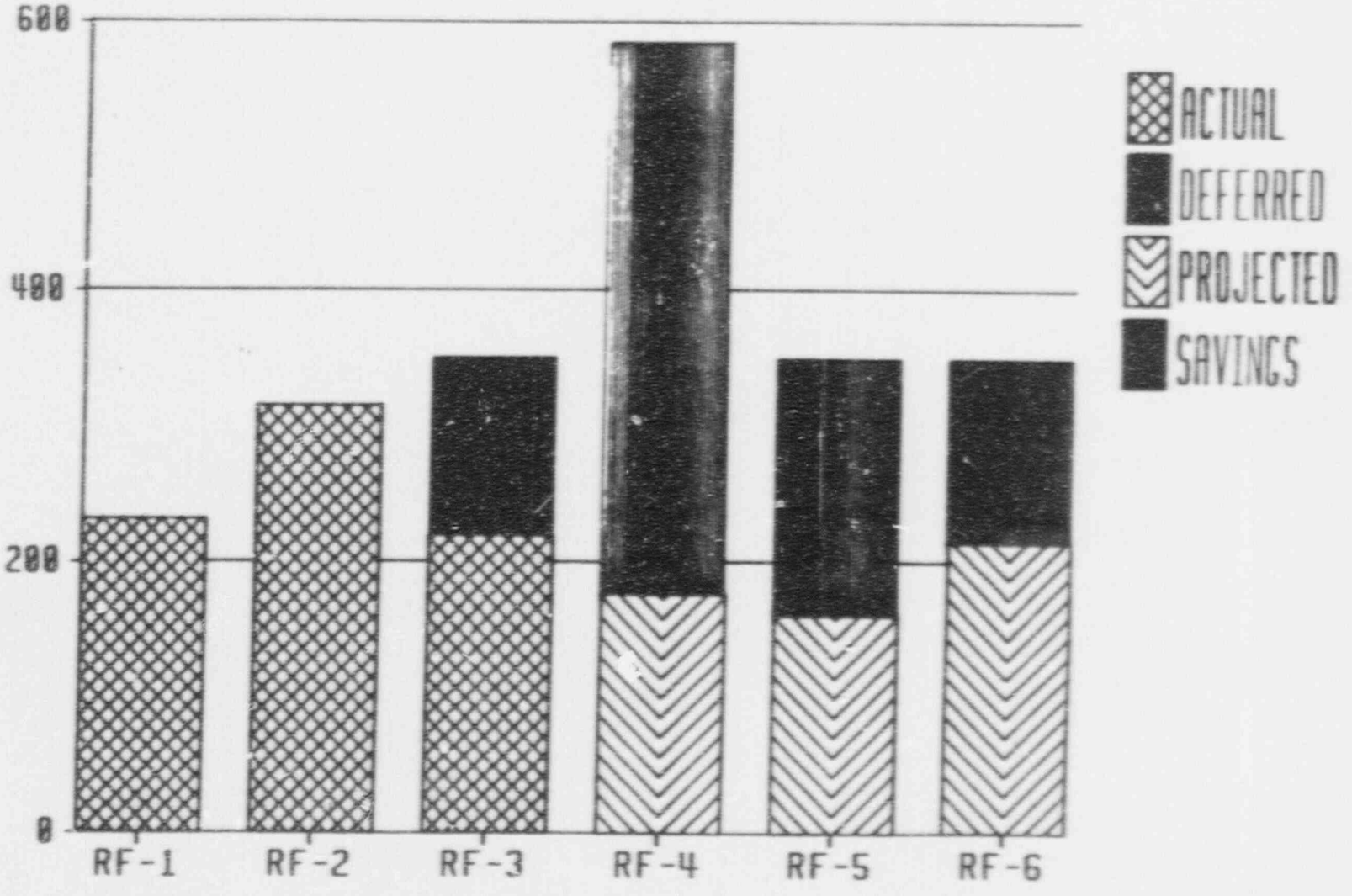
Projected through 1995

Developed Comprehensive Program

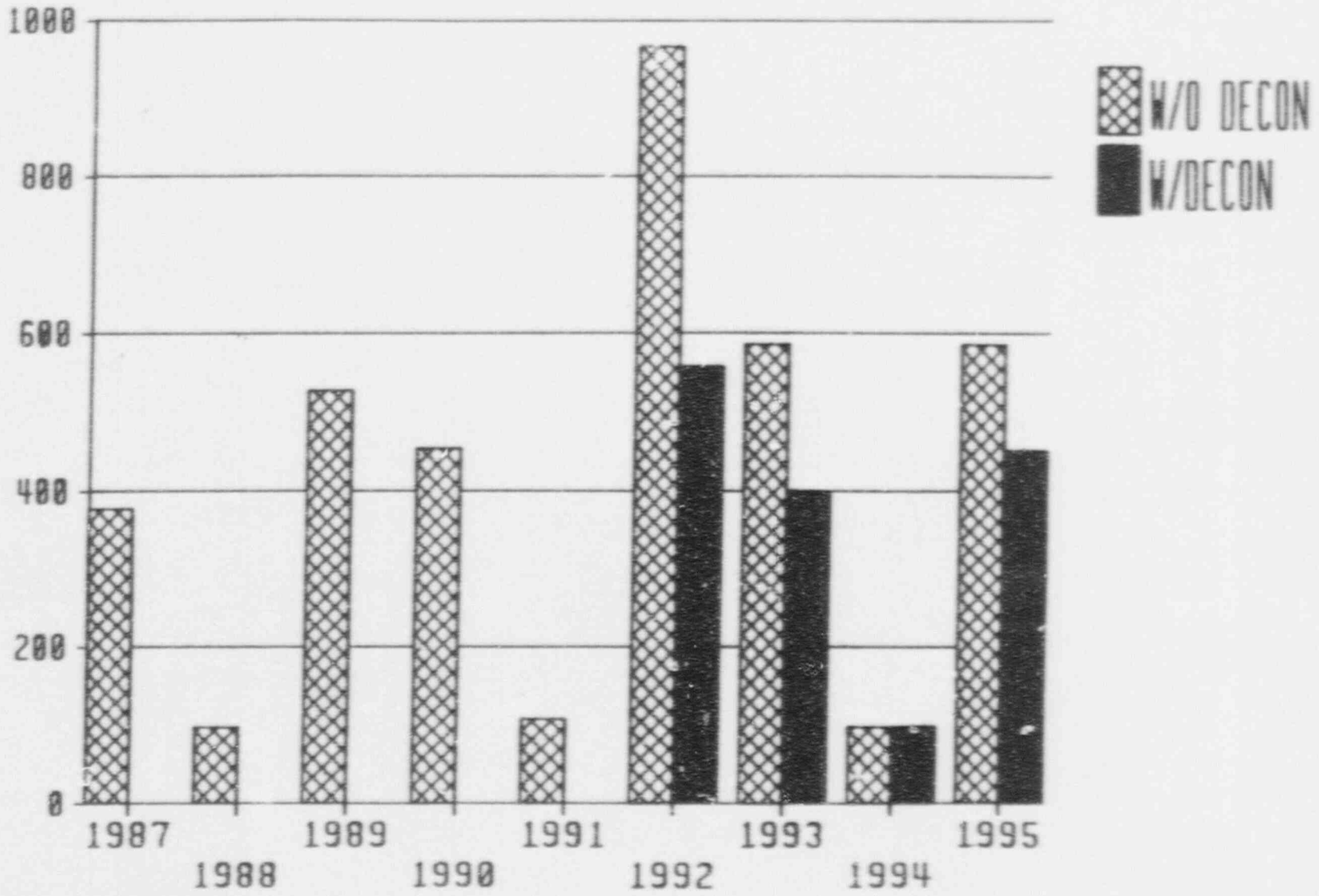
Established Aggressive Goal

Ongoing Team Effort

RBS DRYWELL MAN-REM



RBS MAN-REM EXPENDITURE



FEEDWATER NOZZLE REPAIR

- INTRODUCTION
- EXISTING SAFE END/THERMAL SLEEVE DESIGN CHARACTERISTICS
- INDICATION FOUND IN FEEDWATER NOZZLE N4A SAFE END TO NOZZLE WELD DURING RF-2 IN MARCH 1989
  - INDICATION HAS BEEN MONITORED DURING REFUELING AND MIDCYCLE OUTAGES SINCE DISCOVERY
  - FLAW ANALYSIS WAS PERFORMED FOLLOWING EACH INSPECTION
  - GROWTH RATE HAS BEEN CONSISTENT WITH PREDICTIONS FOR IGSCC FLAW
  - PREDICTIONS SHOW SIGNIFICANT MARGIN WILL EXIST AT RF-4
- SEVERAL REPAIR OPTIONS WERE CONSIDERED
  - EXCAVATE WELD TO REMOVE DEFECT
  - WELD OVERLAY
  - LIKE FOR LIKE REPLACEMENT
  - REPLACE WITH MODIFIED SAFE END AND THERMAL SLEEVE CONFIGURATION
- MODIFIED DESIGN WAS DEVELOPED
  - INSTALLATION TO BE IN ACCORDANCE WITH REPAIR REPLACEMENT PROVISIONS OF ASME SECTION XI
  - NEW DESIGN SPECIFICATION ISSUED BY GSU
  - COMPETITIVE BIDS SOLICITED FROM QUALIFIED DESIGN FIRMS
  - CONTRACT AWARDED TO GE TO PROVIDE DESIGN AND ANALYSIS IN ACCORDANCE WITH DESIGN SPECIFICATION
  - MATERIAL PROCUREMENT HANDLED BY GSU

- MODIFICATION DESIGN DETAILS
  - NEW SAFE END IS A DOUBLE THERMAL SLEEVE "TUNING FORK" CONFIGURATION
    - REQUIRES MINIMAL IN VESSEL WORK
    - ELIMINATES SEAL LEAKAGE
    - PROVIDES ADEQUATE THERMAL PROTECTION FOR THE RPV NOZZLE
    - UTILIZES EXISTING SPARGER
  - DESIGNED IN ACCORDANCE WITH ASME III, 1986
  - MATERIALS SELECTION BASED ON NUREG-0313 REV 2
    - NO IGSCC SUSCEPTABLE MATERIAL
    - ISI FREQUENCY REDUCED
  - POST WELD HEAT TREATMENT
- SUMMARY OF ENGINEERING PRESENTATION
  - SIGNIFICANT PROJECT FOR GSU
  - PERMANENT FIX
  - MEETS ALL DESIGN REQUIREMENTS FOR REACTOR PRESSURE VESSEL
  - REDUCED ISI FREQUENCY RESULTS IN EXPOSURE SAVINGS
- MAINTENANCE PRESENTATION
  (BY GARLAND MAHAN)

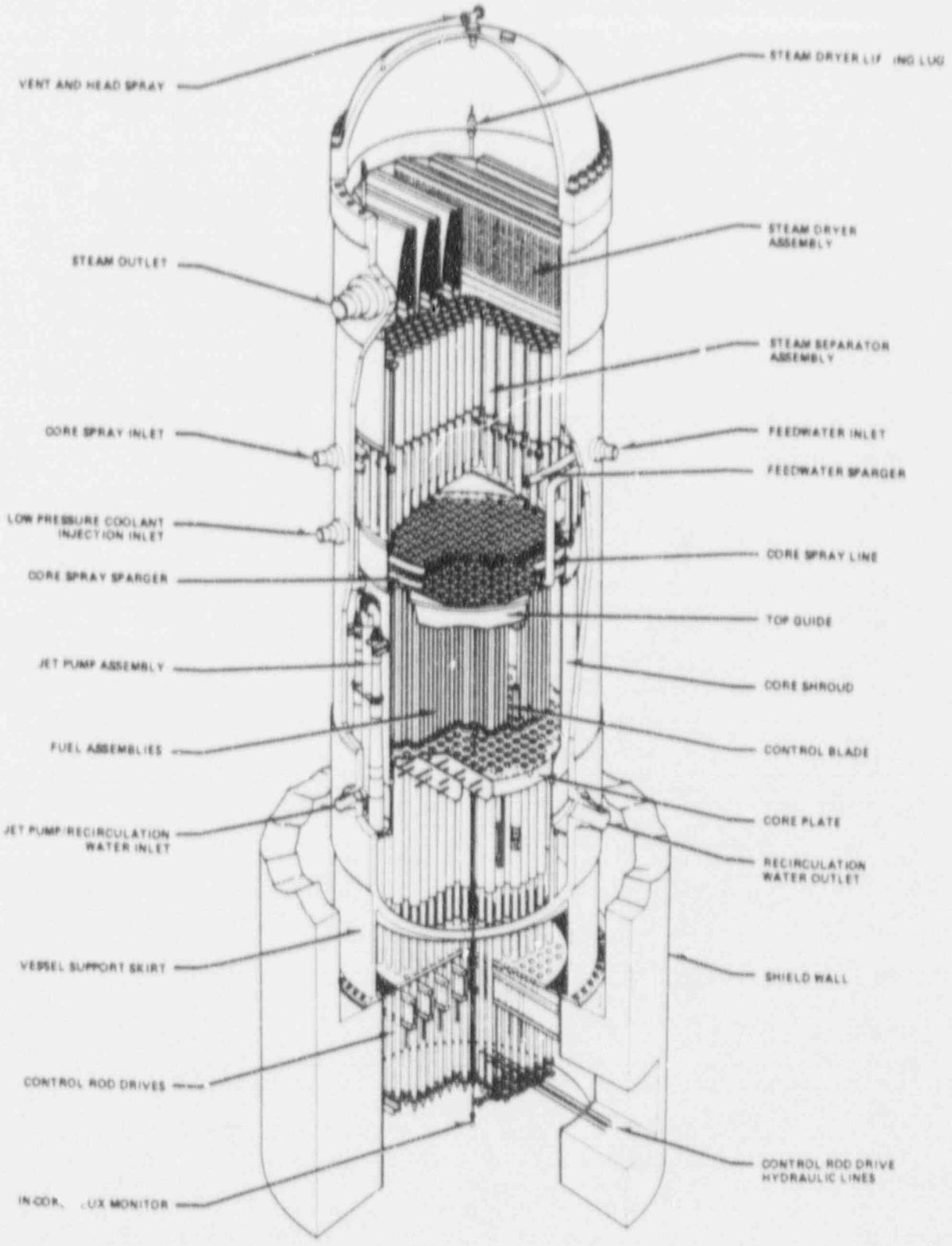
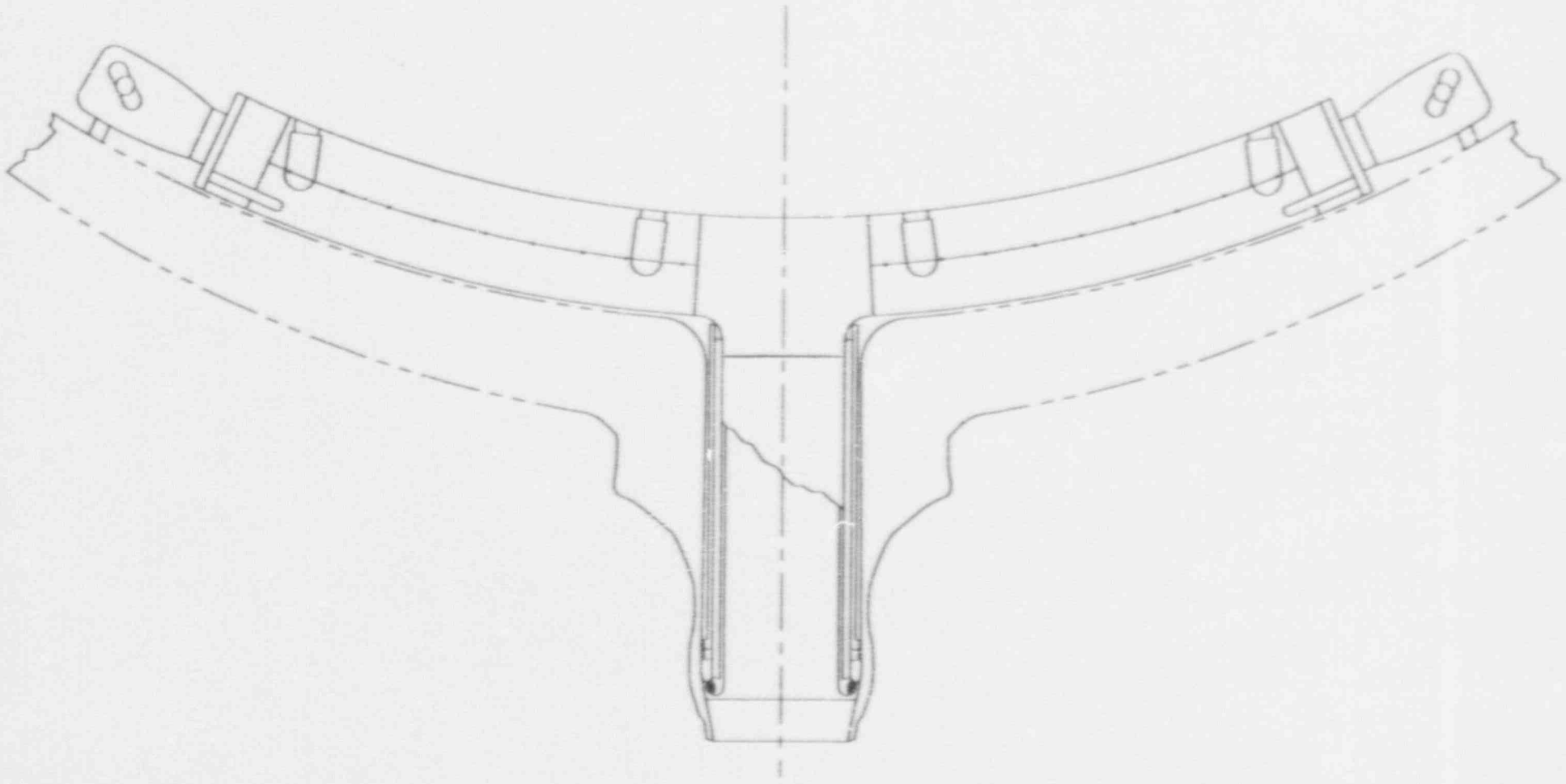
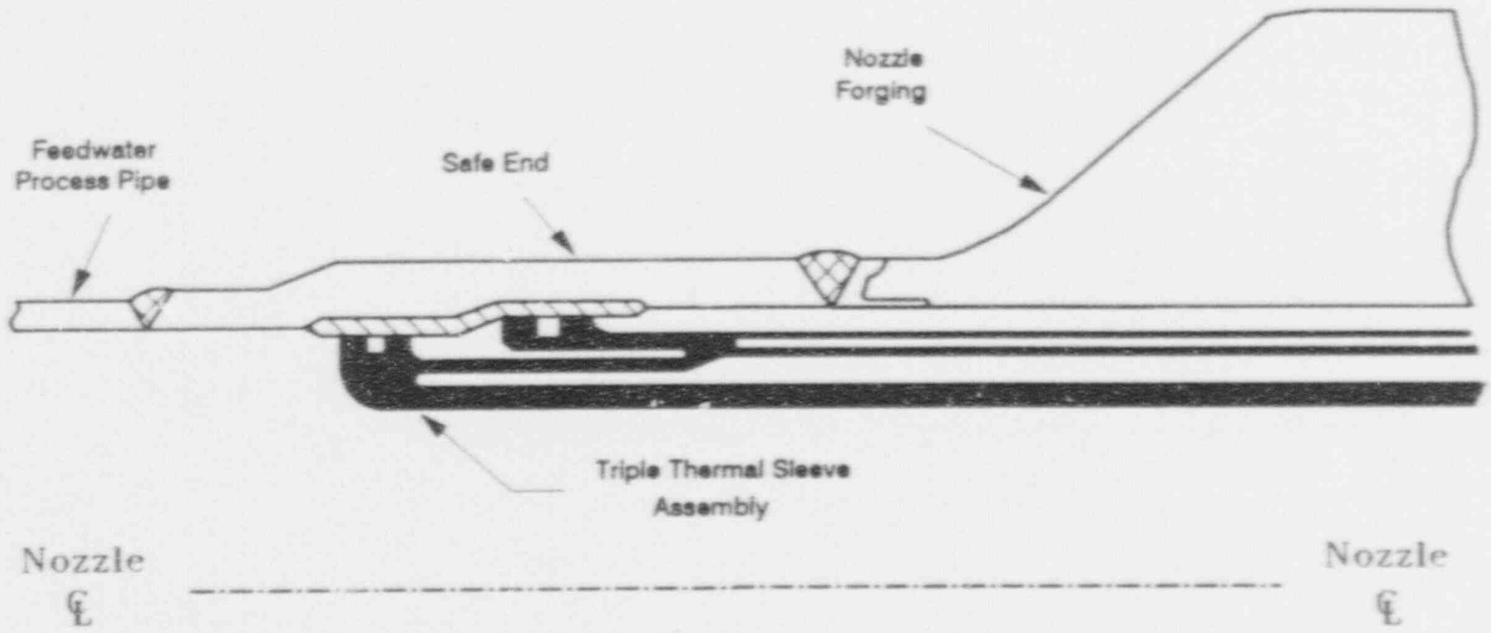


Figure 2-1. Reactor Assembly

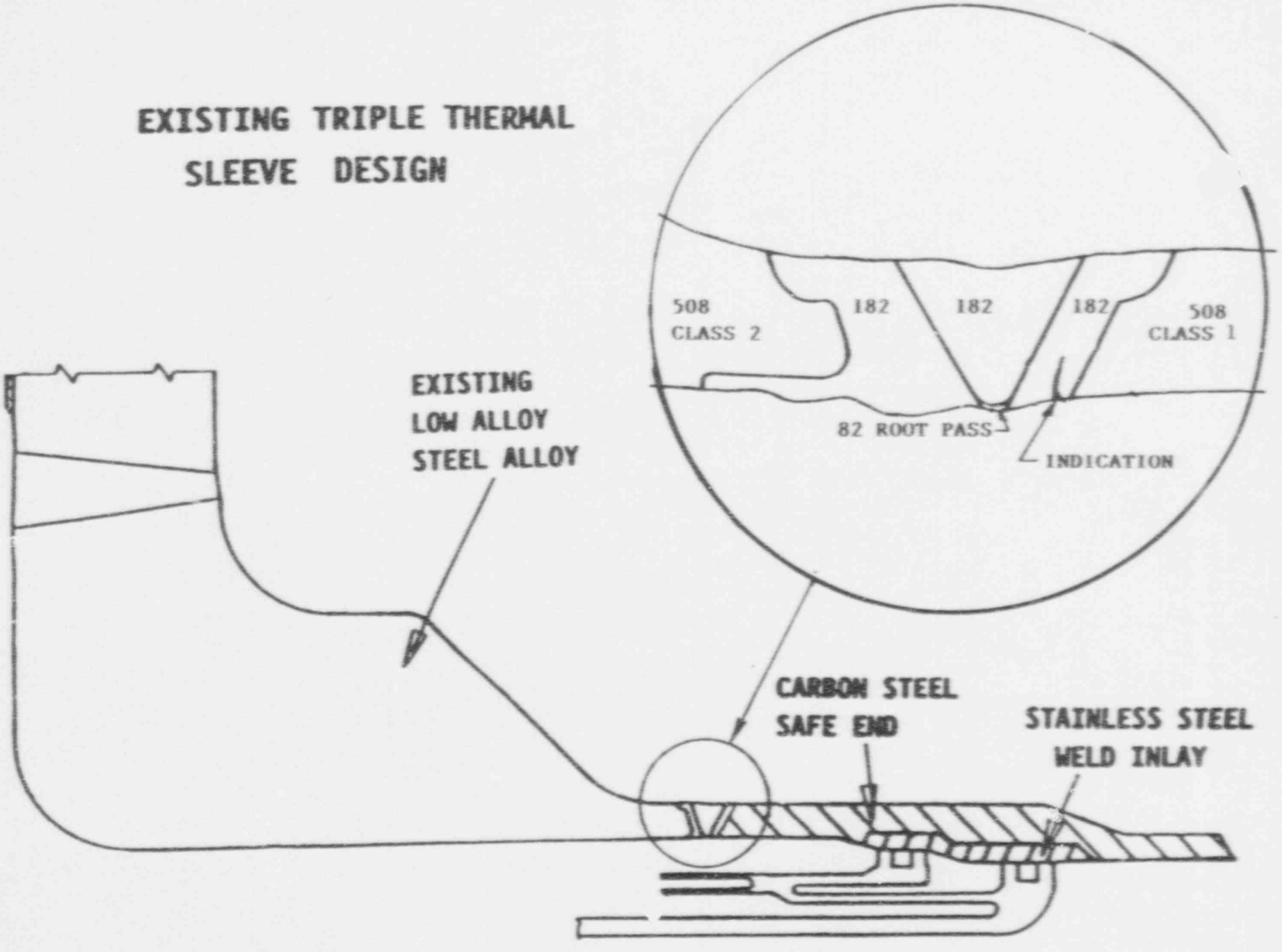


FEEDWATER SPARGER
PLAN VIEW

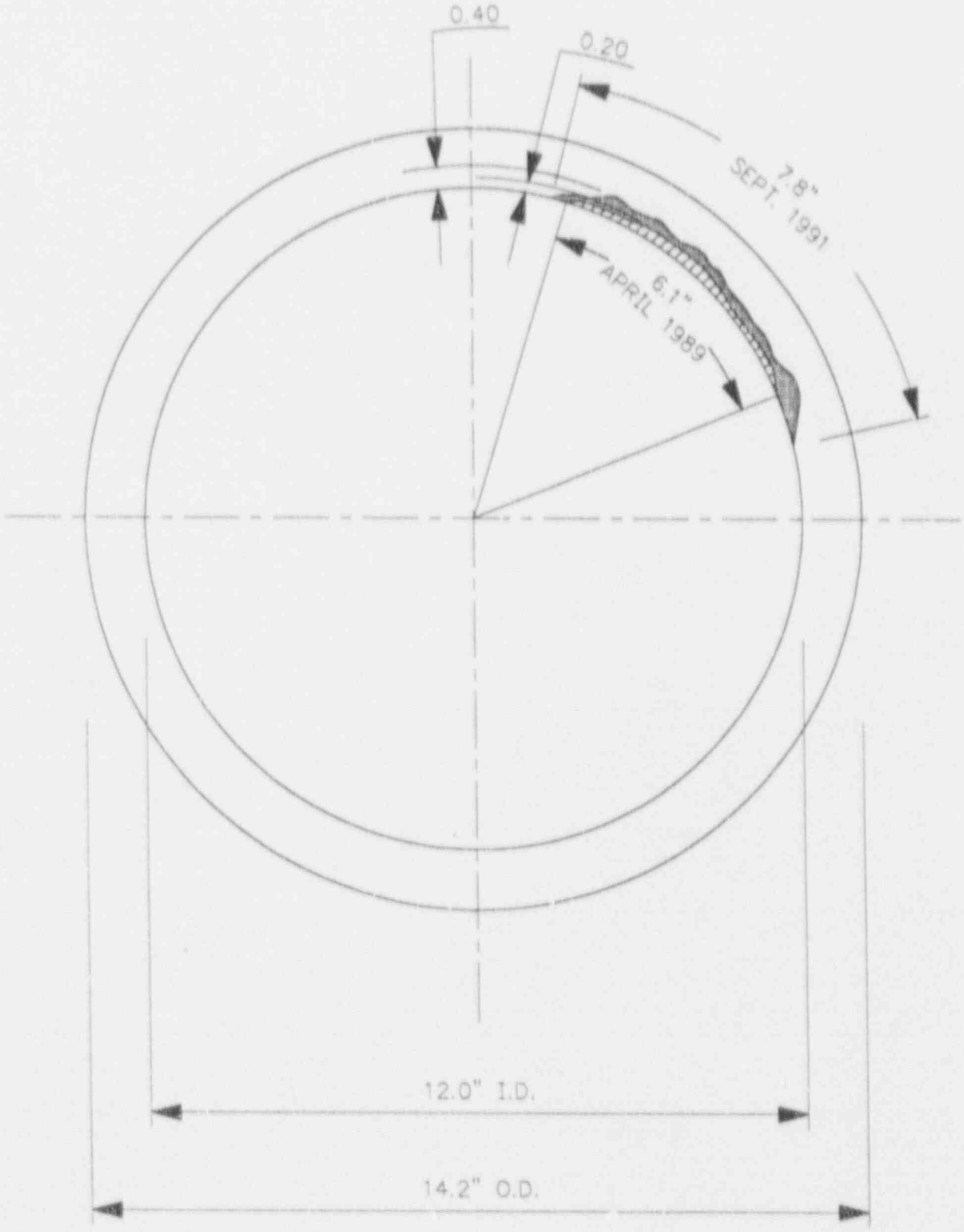


Current Existing Feedwater Safe End Design

EXISTING TRIPLE THERMAL SLEEVE DESIGN



NOZZLE N4A CRACK PROGRESSION



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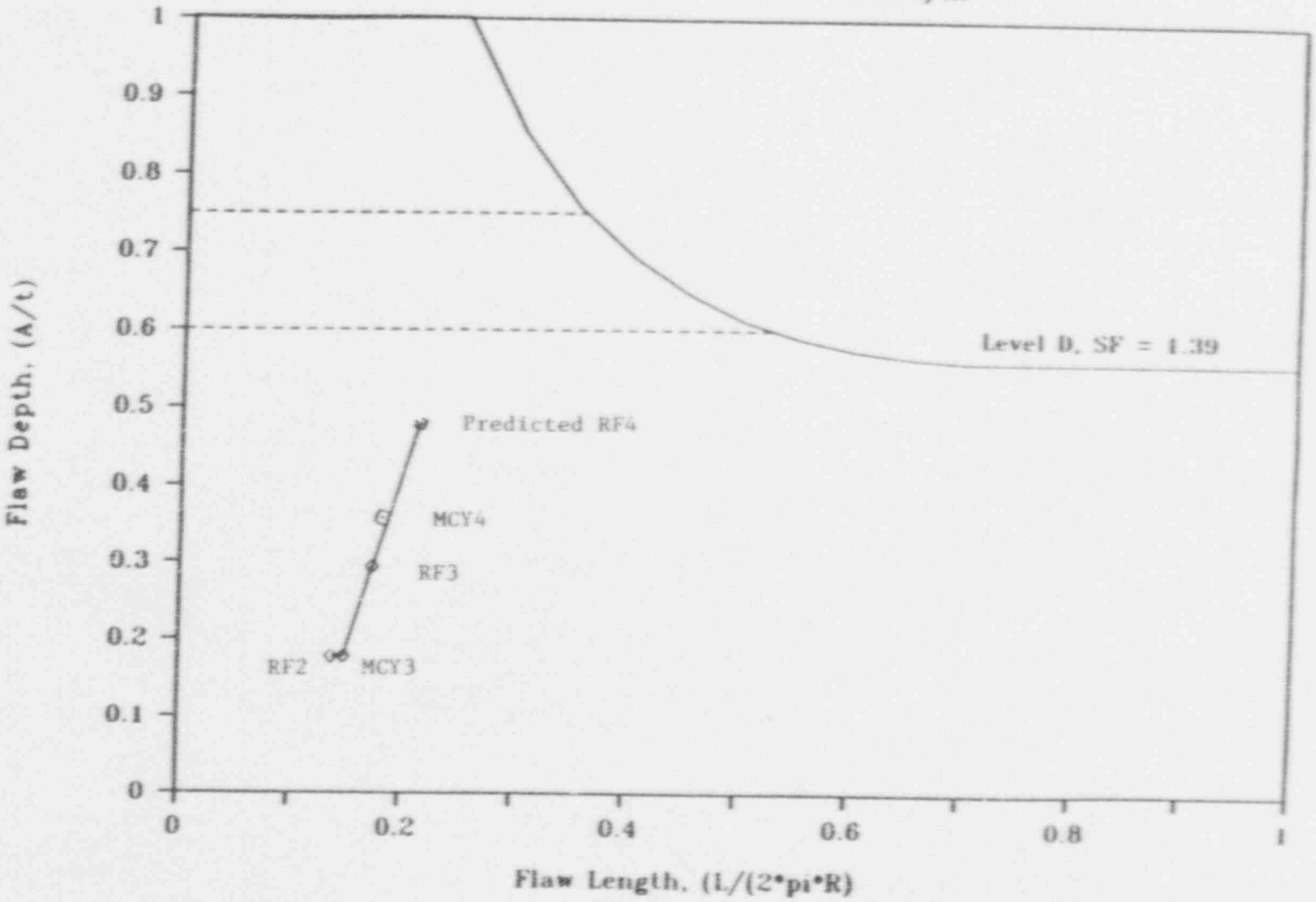
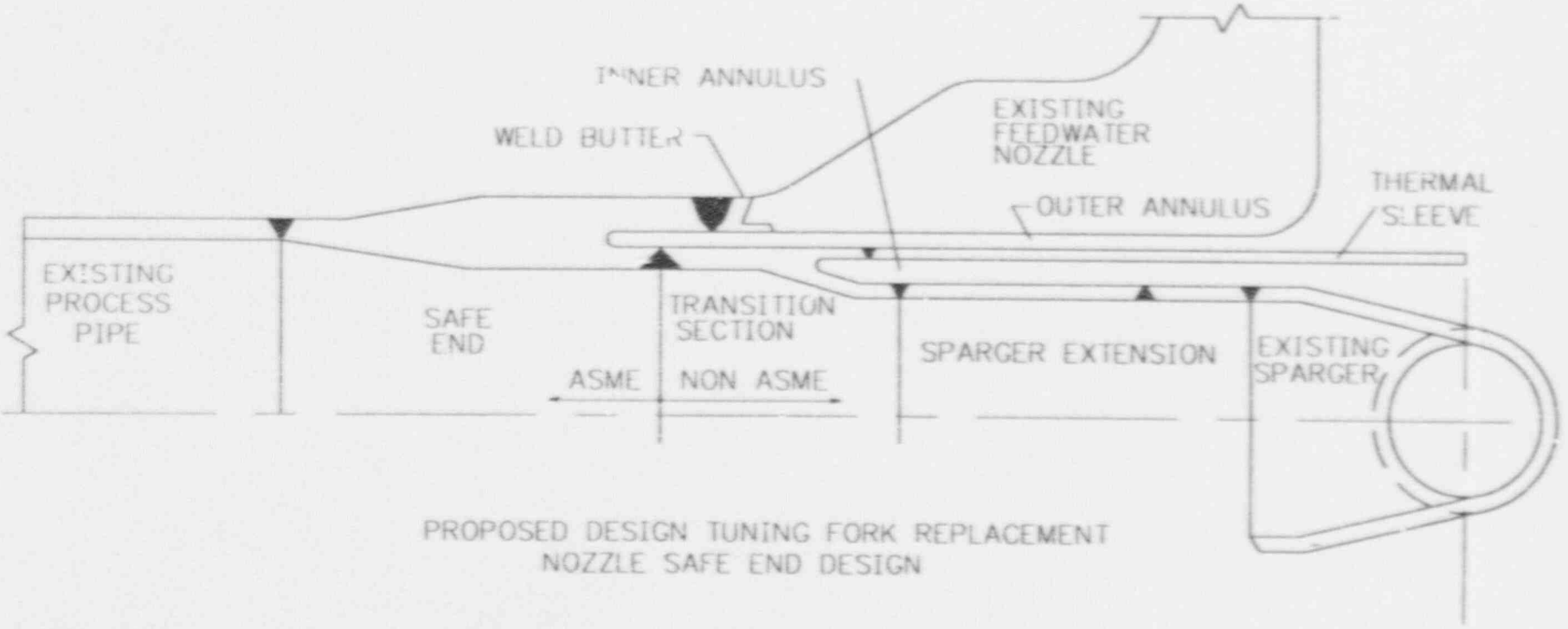
Level D Condition Flaw Assessment Diagram, River Bend - Feedwater Nozzle

Crack Growth Rate of 3.0×10^{-5} inches/hr



Flaw Assessment Diagram for Level D Conditions Based on 3×10^{-5} in/hour Crack Growth Rate



PROPOSED DESIGN TUNING FORK REPLACEMENT
NOZZLE SAFE END DESIGN

MATERIALS
SAFE END SA-508 CLASS 1
TRANSITION SECTION SA-508 CLASS 1
THERMAL SLEEVE SA-106 GR B

N 4 A

NOZZLE

SAFE END

REPLACEMENT

LOCATION

ELEVATION 141' LEVEL

AZIMUTH 45°

TRAINING

INITIAL TRAINING

PROCEDURE REFINEMENT

EQUIPMENT CHECKOUT

ALARA REVIEW

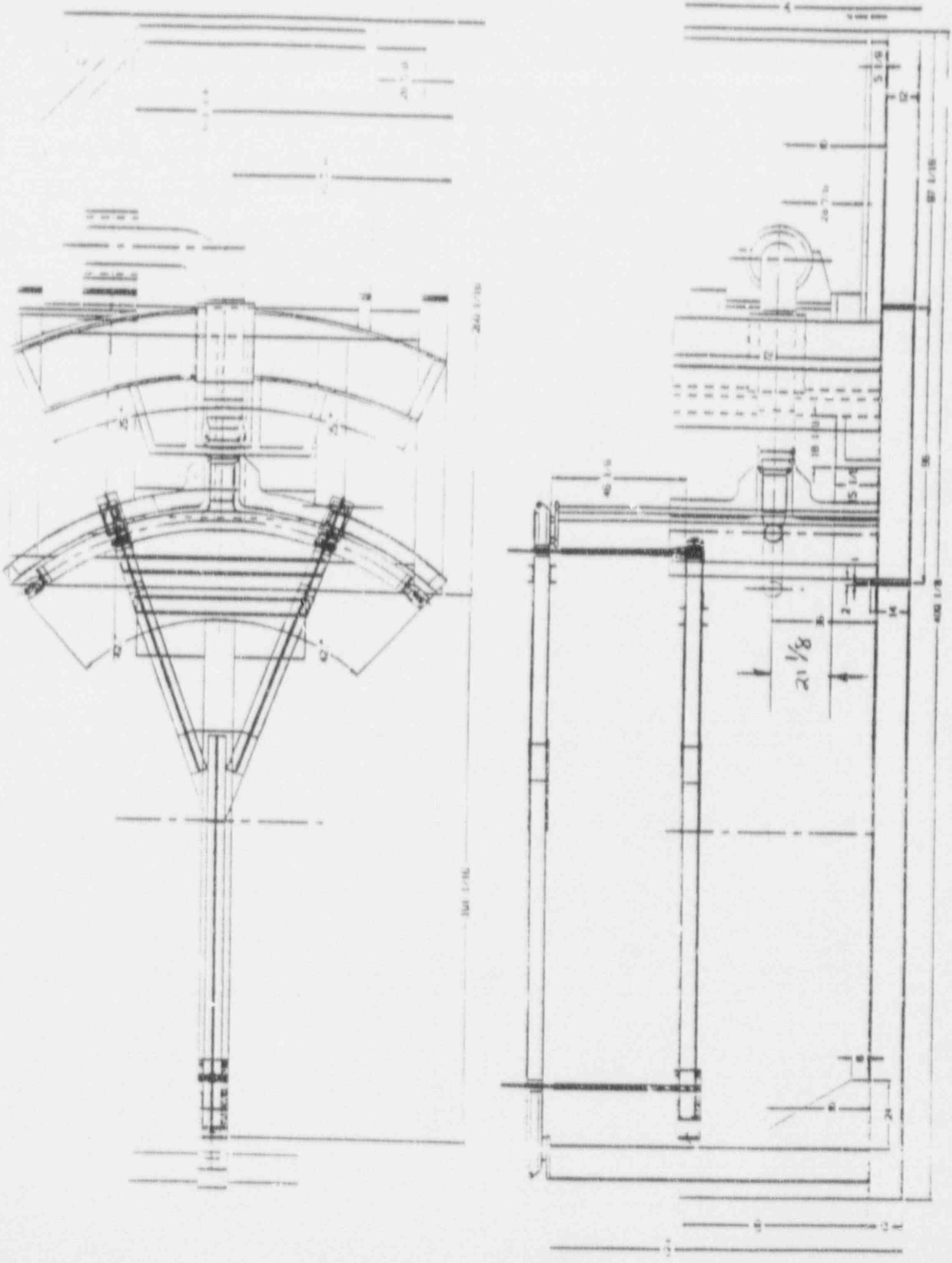
RADIOLOGICAL PROTECTION
FAMILIARIZATION

OQC

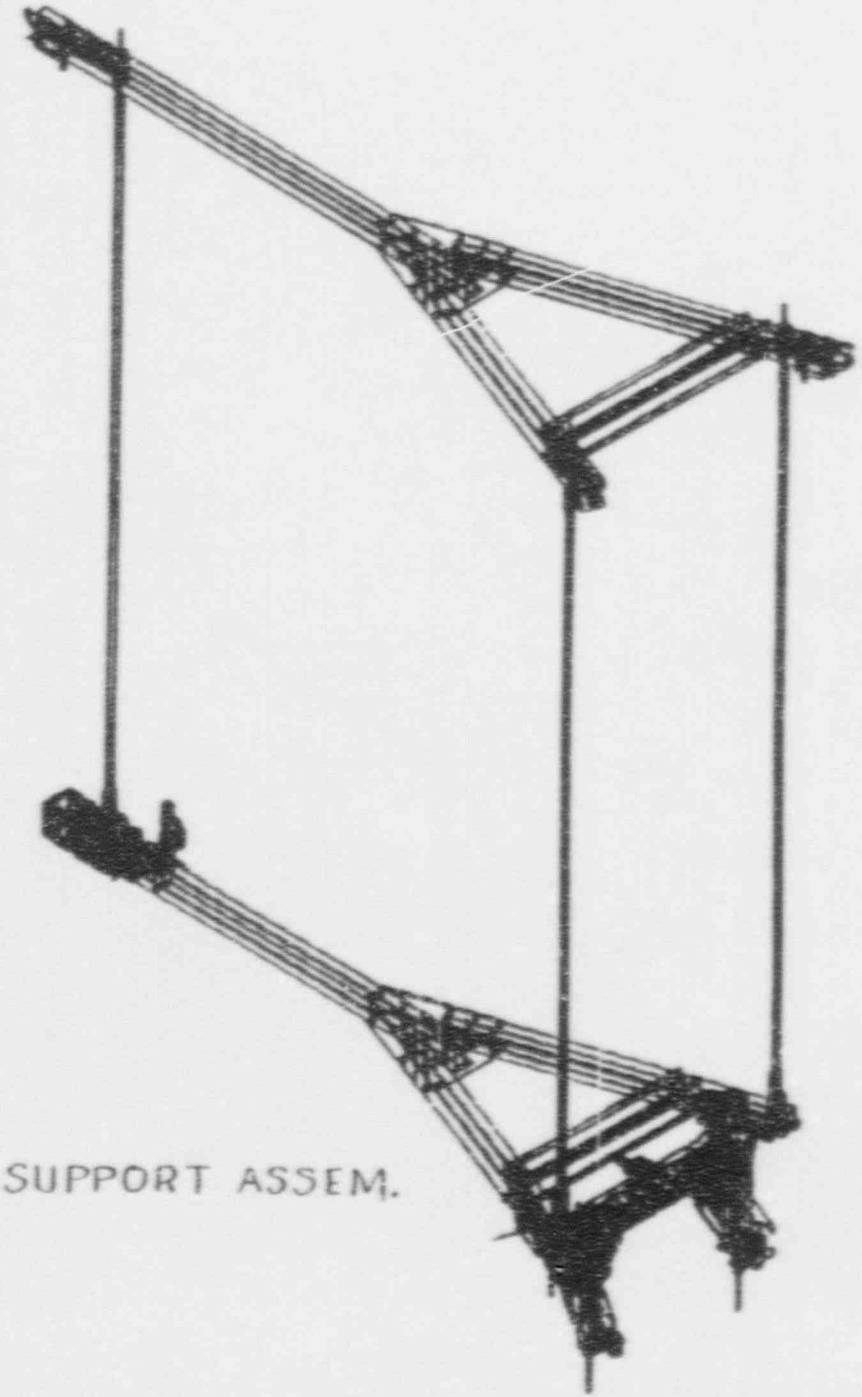
FINAL TRAINING

COMPLETE DRY RUN
SIMULATING ALL DRYWELL CONDITIONS

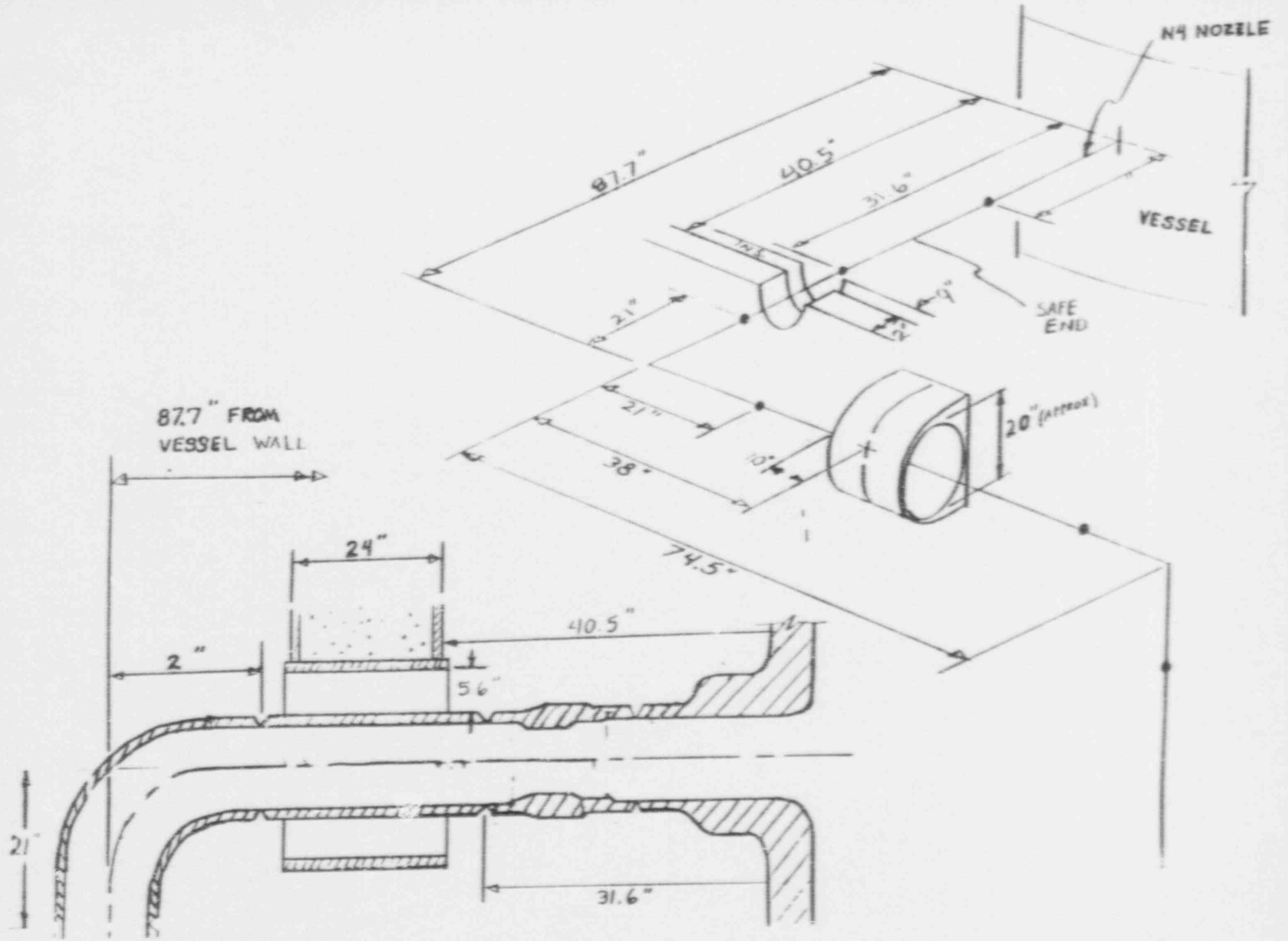
ALL CRAFTS TO BE INVOLVED

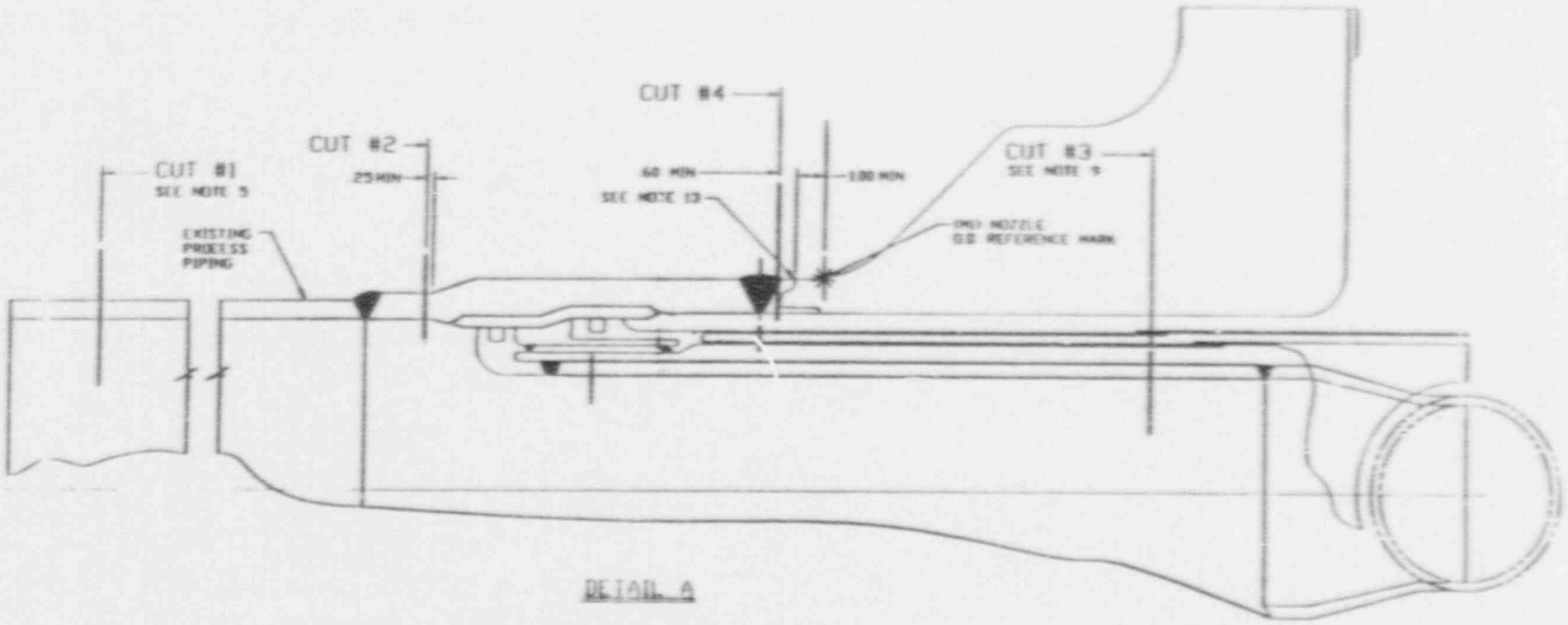

21 1/8

REPLACEMENT



SPARGER SUPPORT ASSEM.

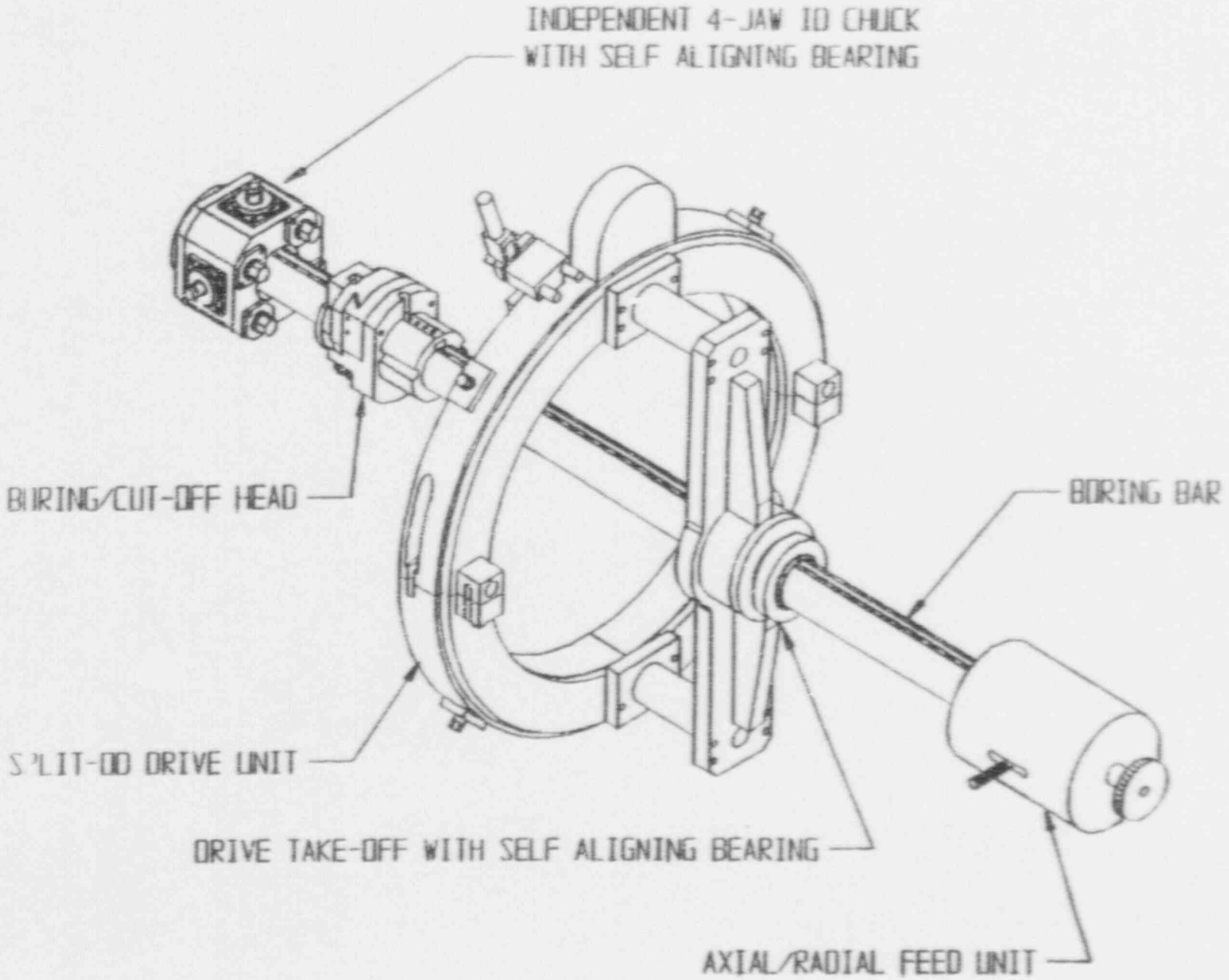

N4 NOZZLE
87.7"
40.5"
31.6"
VESSEL
SAFE END
21"
38"
74.5"
20" (APPROX)
87.7" FROM VESSEL WALL
24"
40.5"
2"
5.6"
21"
31.6"



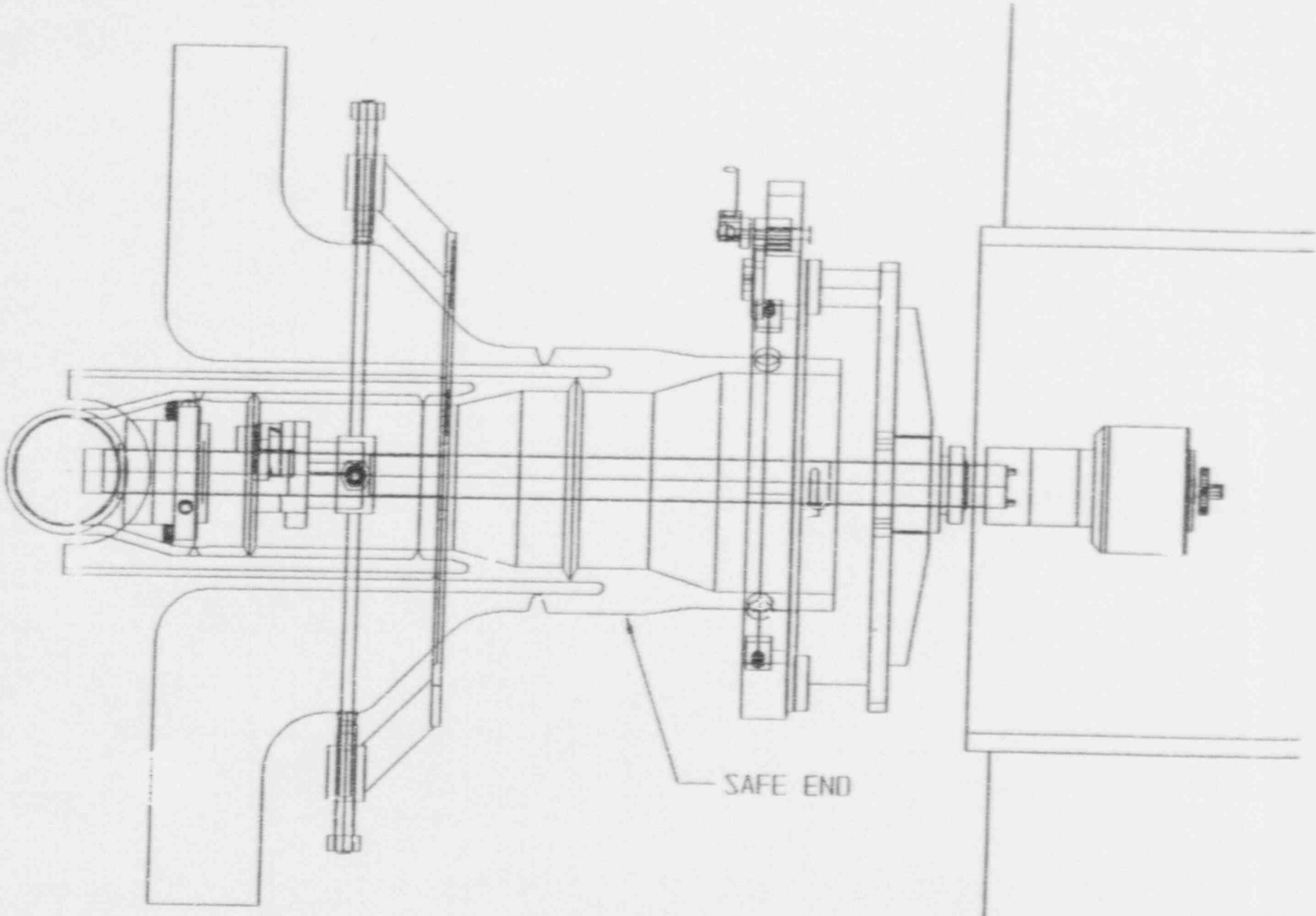
DETAIL A

STEP 1

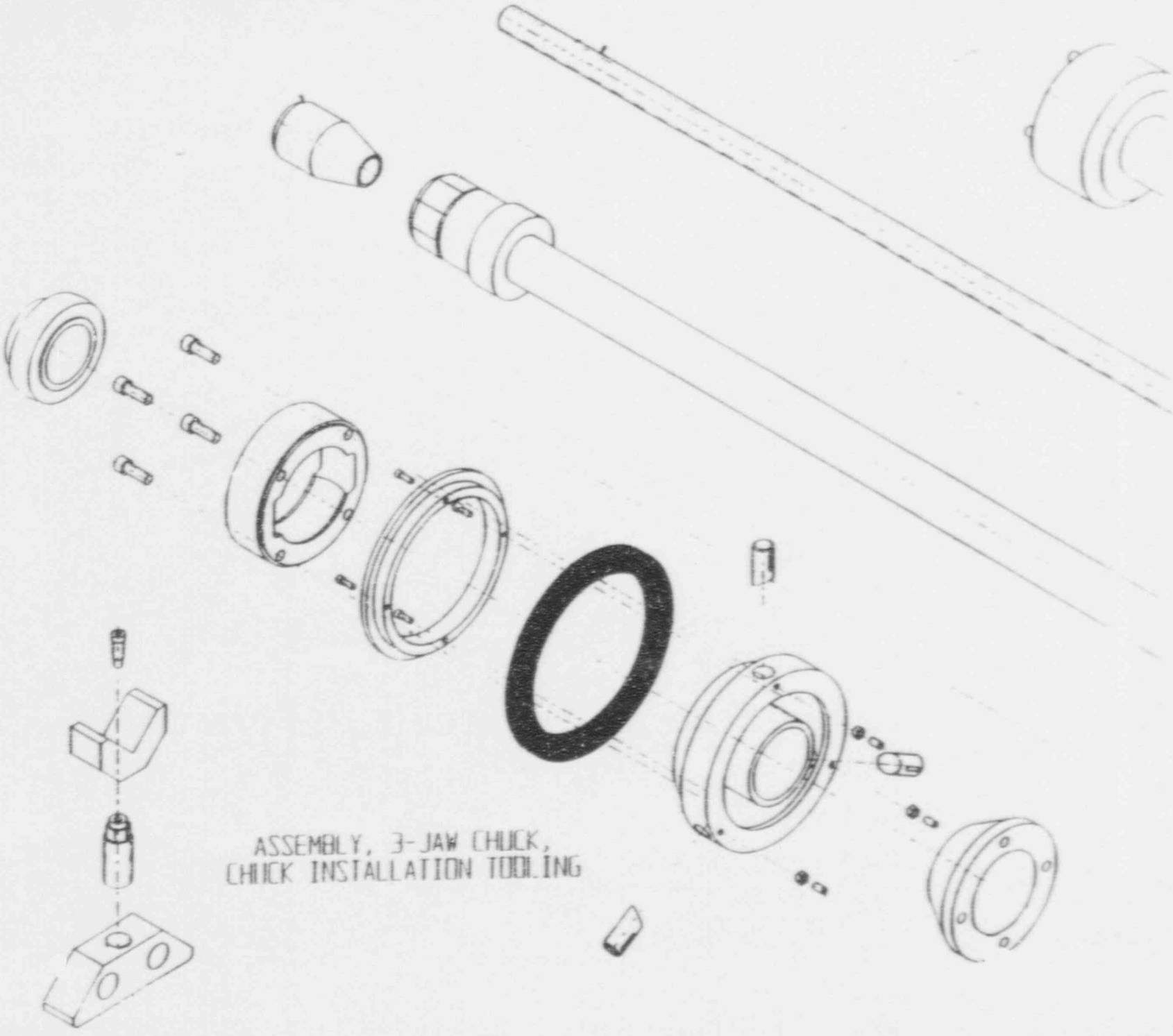
EXISTING SAFE END AND THERMAL SLEEVE


INDEPENDENT 4-JAW ID CHUCK
WITH SELF ALIGNING BEARING
BORING/CUT-OFF HEAD
BORING BAR
SPLIT-OD DRIVE UNIT
DRIVE TAKE-OFF WITH SELF ALIGNING BEARING
AXIAL/RADIAL FEED UNIT

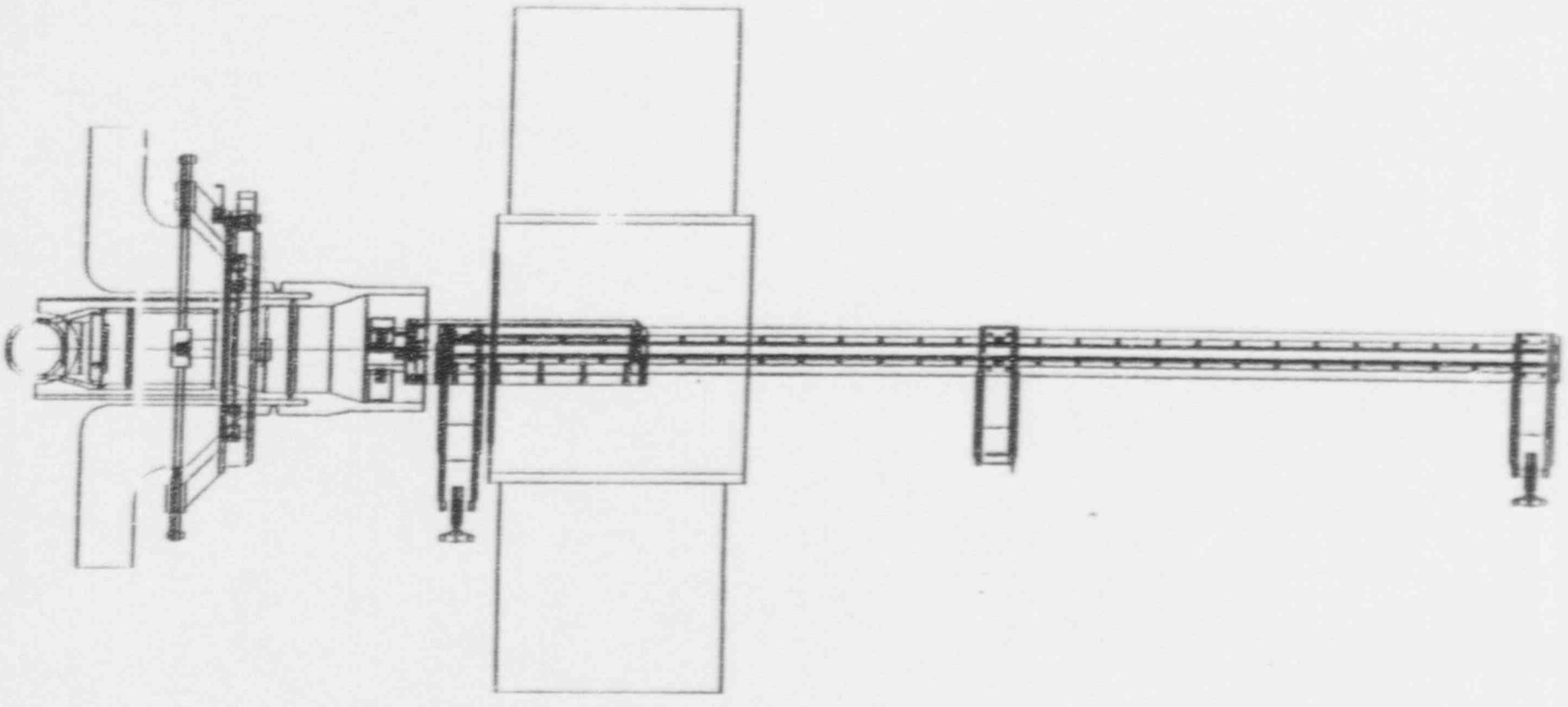
2088
2092



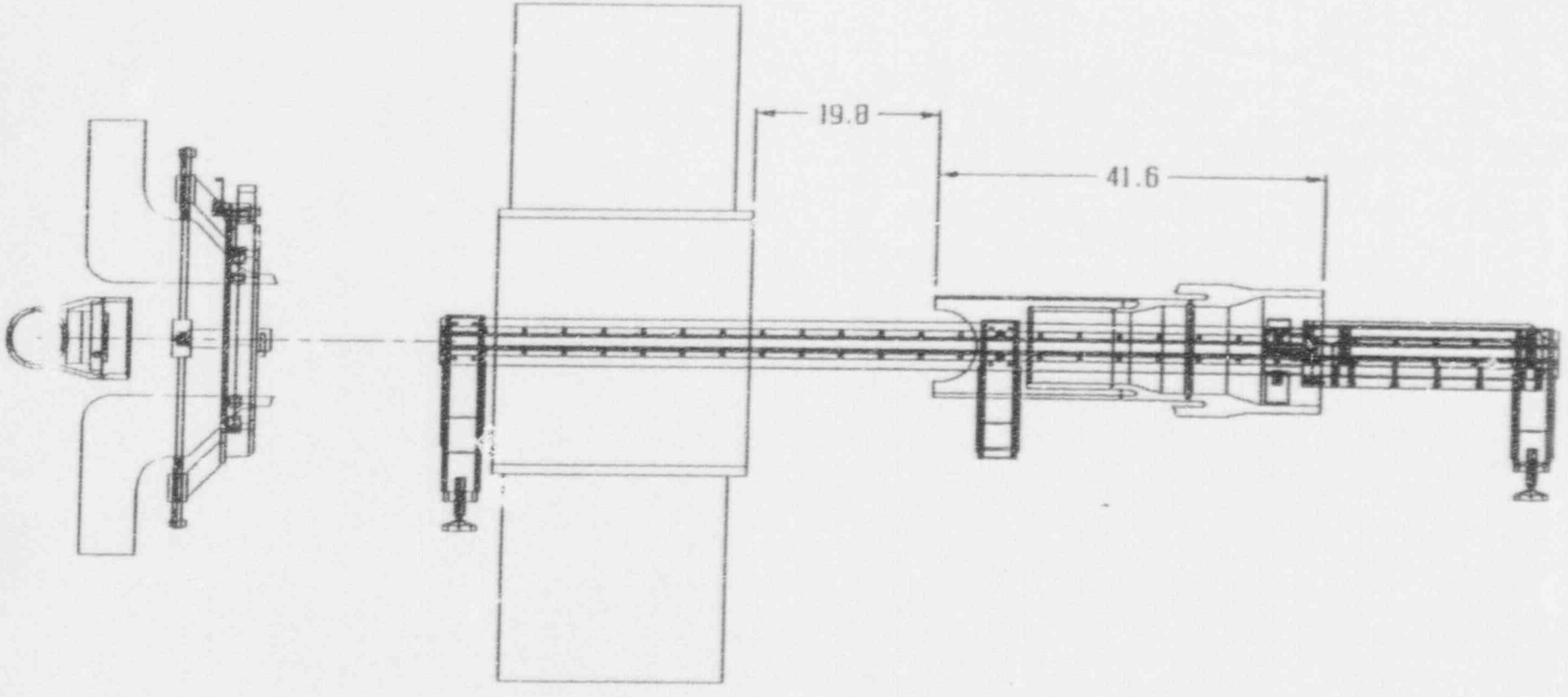
SEVER SPARGER USING ID BORING BAR



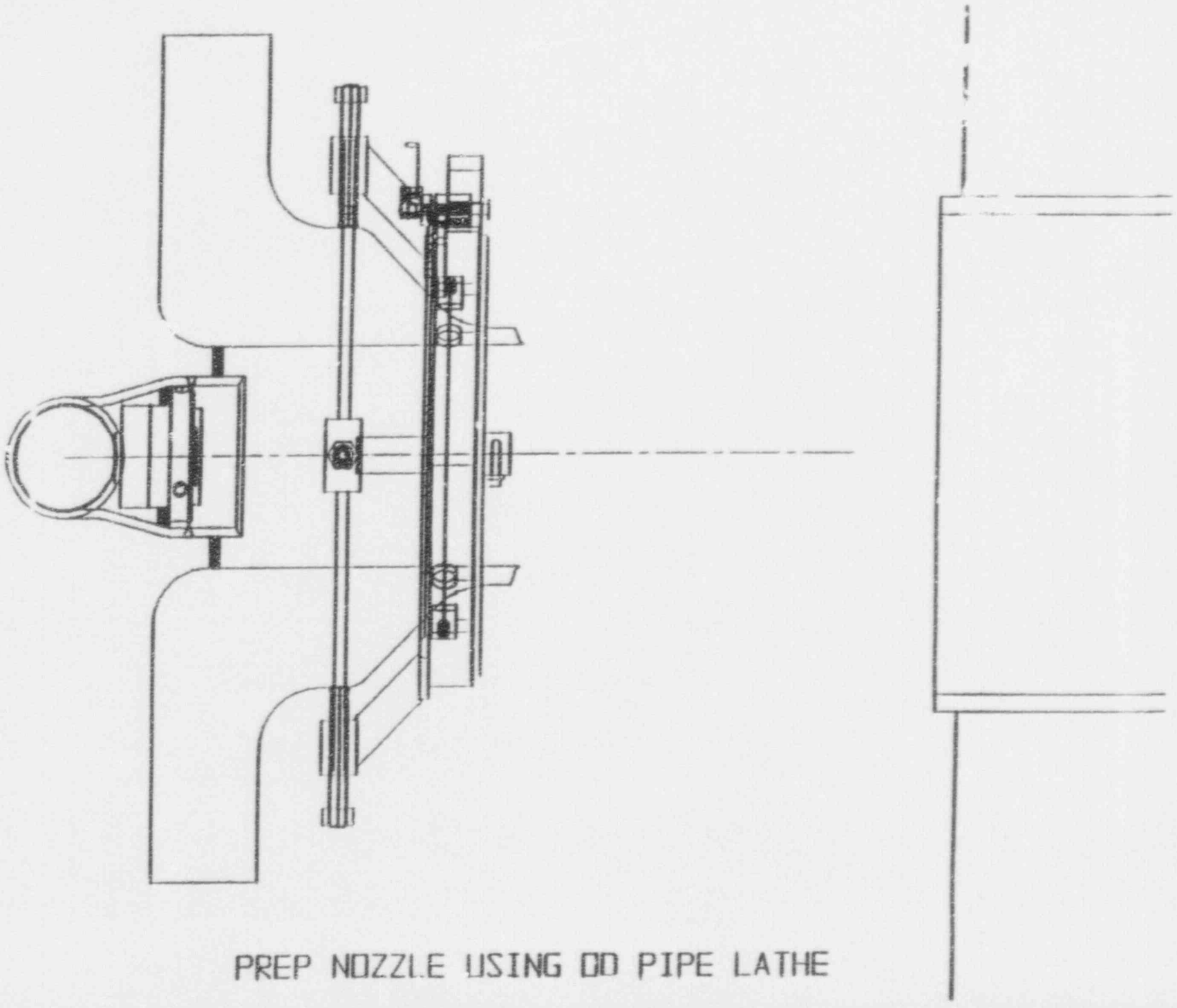
ASSEMBLY, 3-JAW CHUCK,
CHUCK INSTALLATION TOOLING



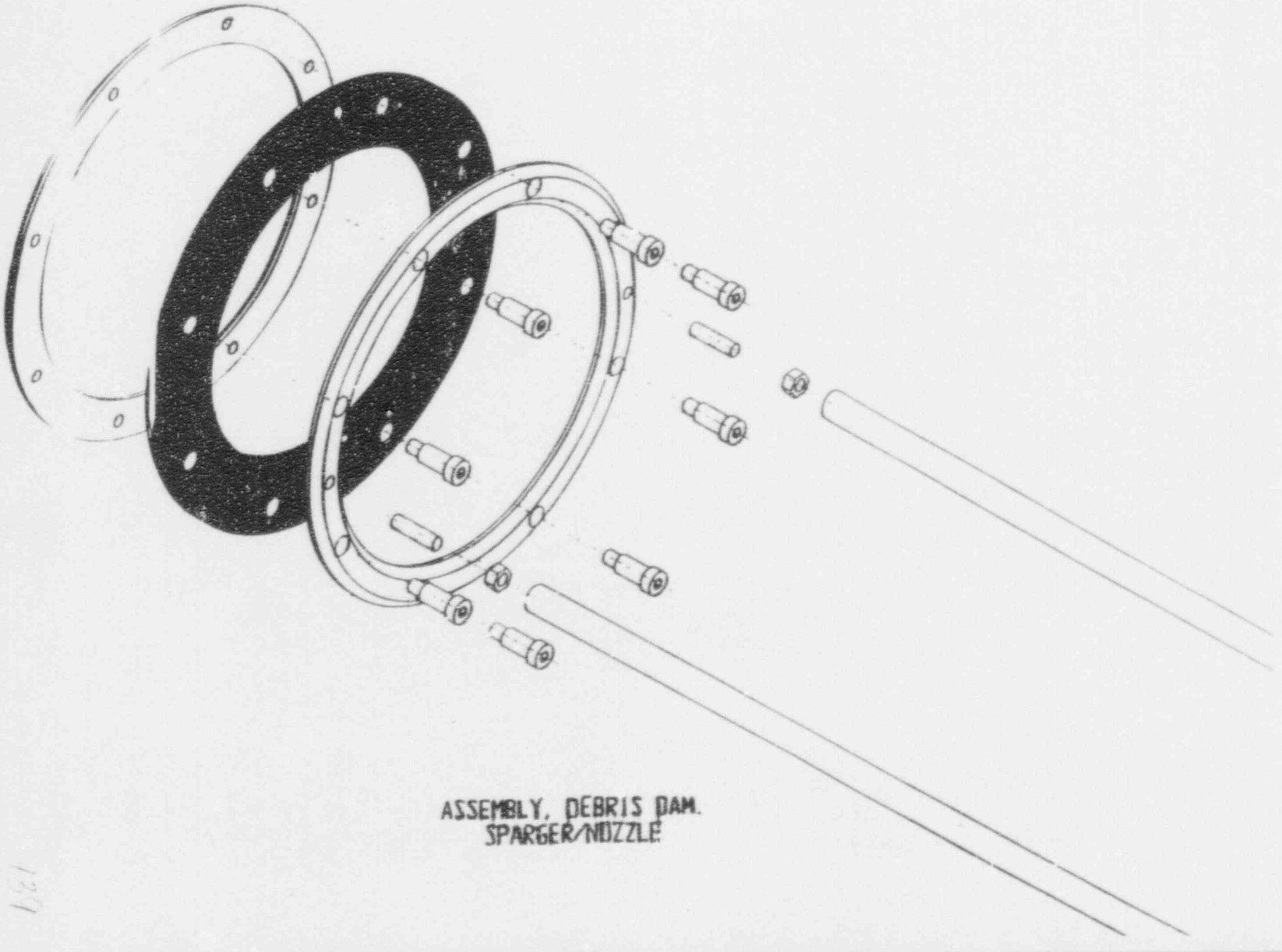
SAFE END INSERTION POSITION



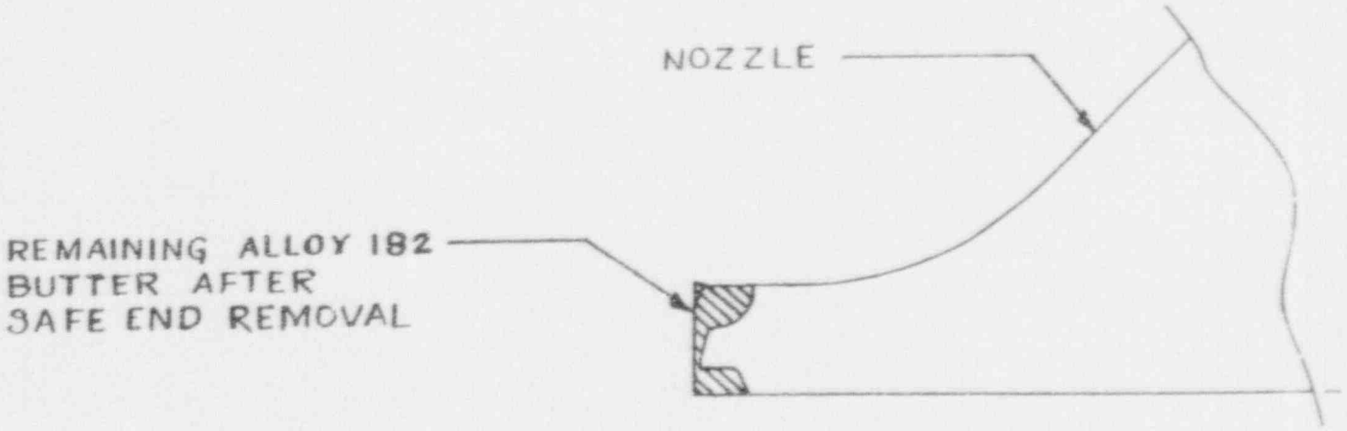
SAFE END RETRACT POSITION



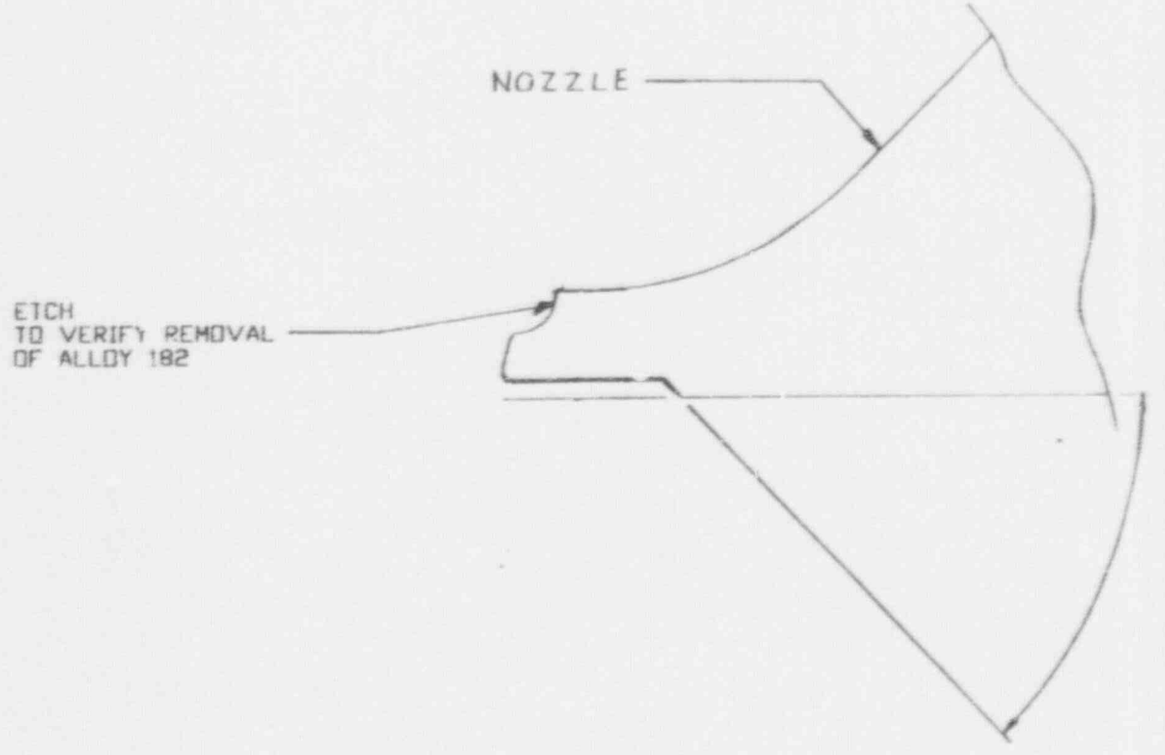
PREP NOZZLE USING OD PIPE LATHE

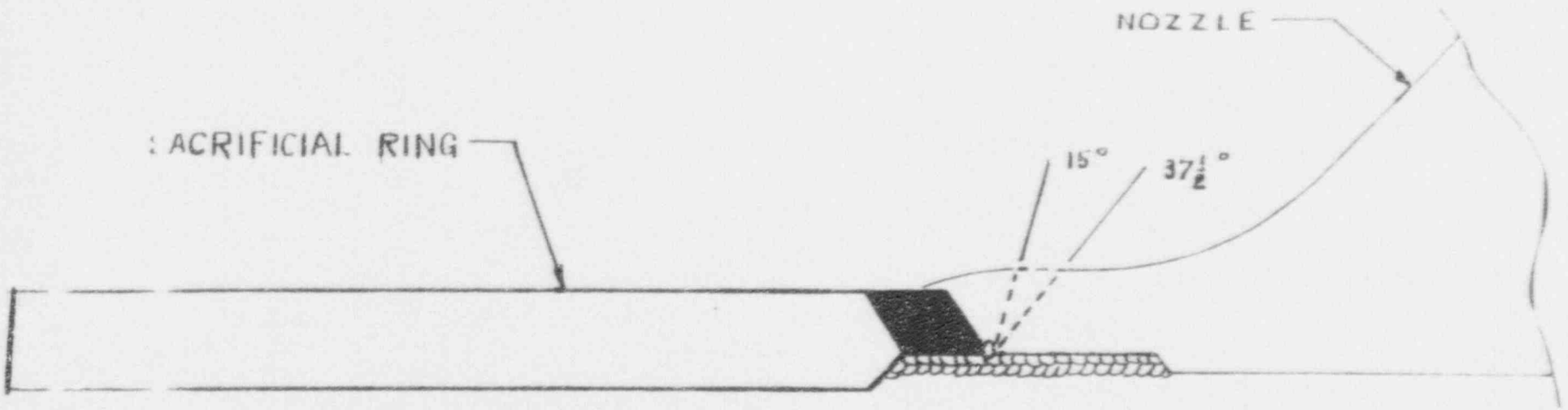


ASSEMBLY, DEBRIS DAM.
SPARGER/NOZZLE



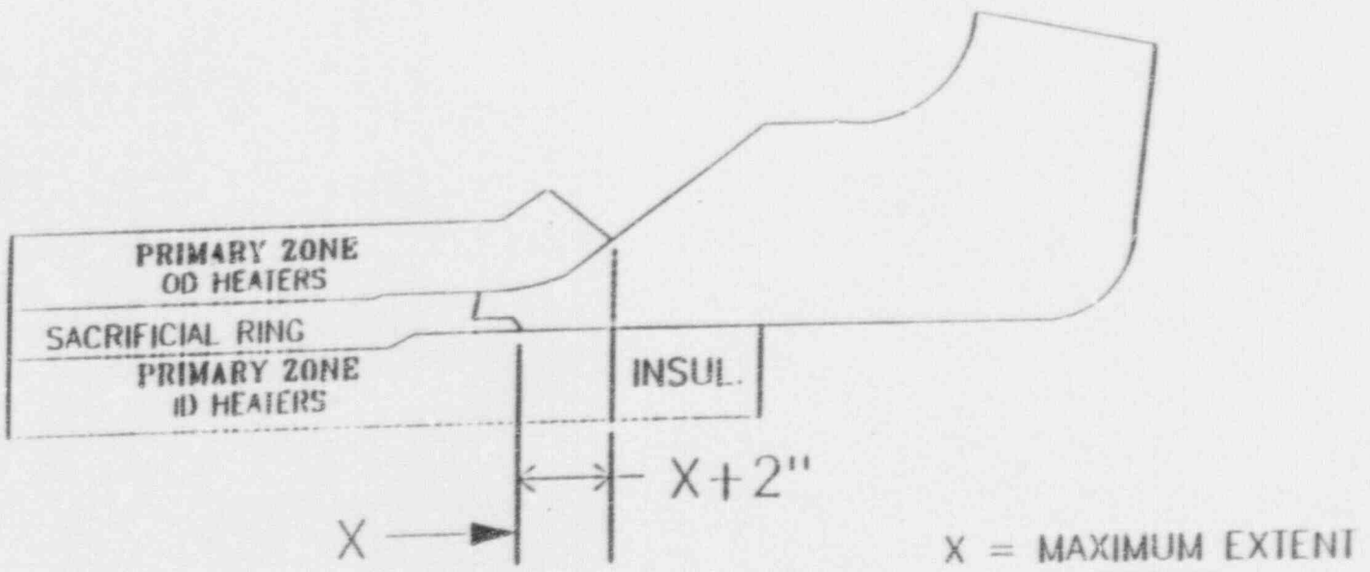
NOZZLE AFTER SAFE END REMOVAL


NOZZLE
ETCH
TO VERIFY REMOVAL
OF ALLOY 182



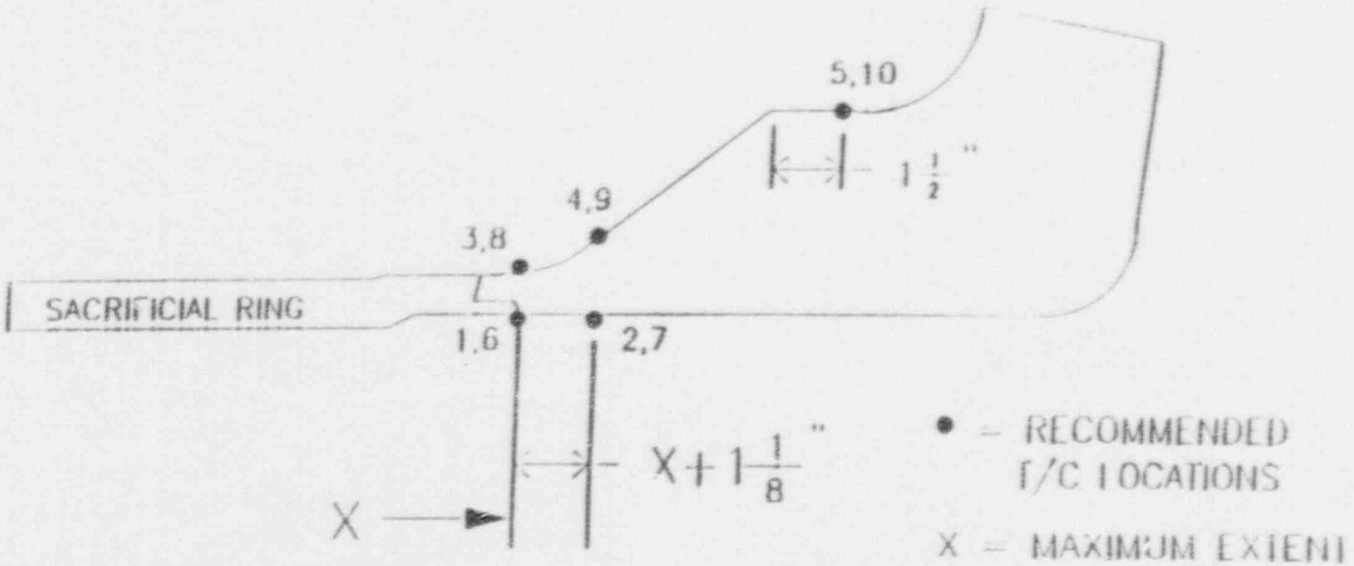
WELD JOINT DETAILS OF SACRIFICIAL RING TO NOZZLE

NOTE: PLACE HEATERS AND INSULATION CIRCUMFERENTIALLY

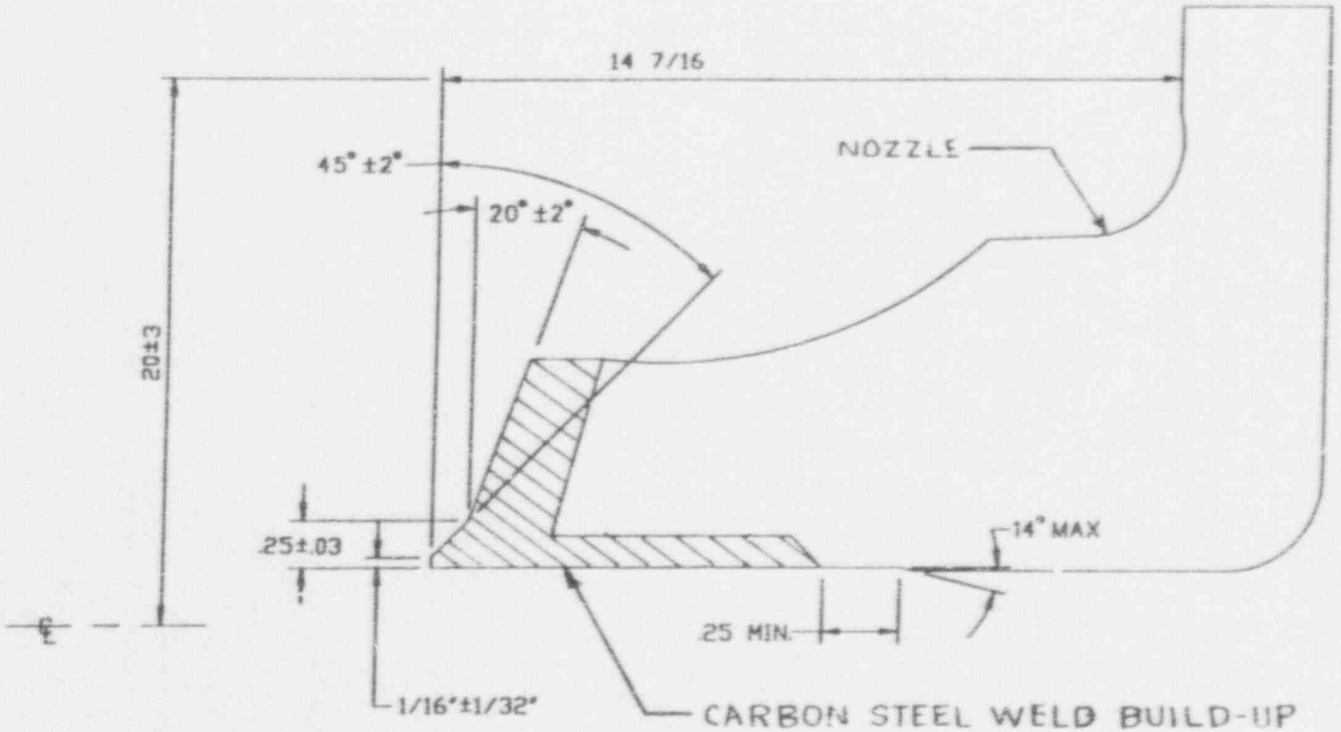


HEATER AND INSULATION LOCATIONS

NOTE: A MINIMUM OF 2 THERMOCOUPLES IS RECOMMENDED FOR EACH LOCATION (ONE AT THE TOP, OTHER AT THE BOTTOM)

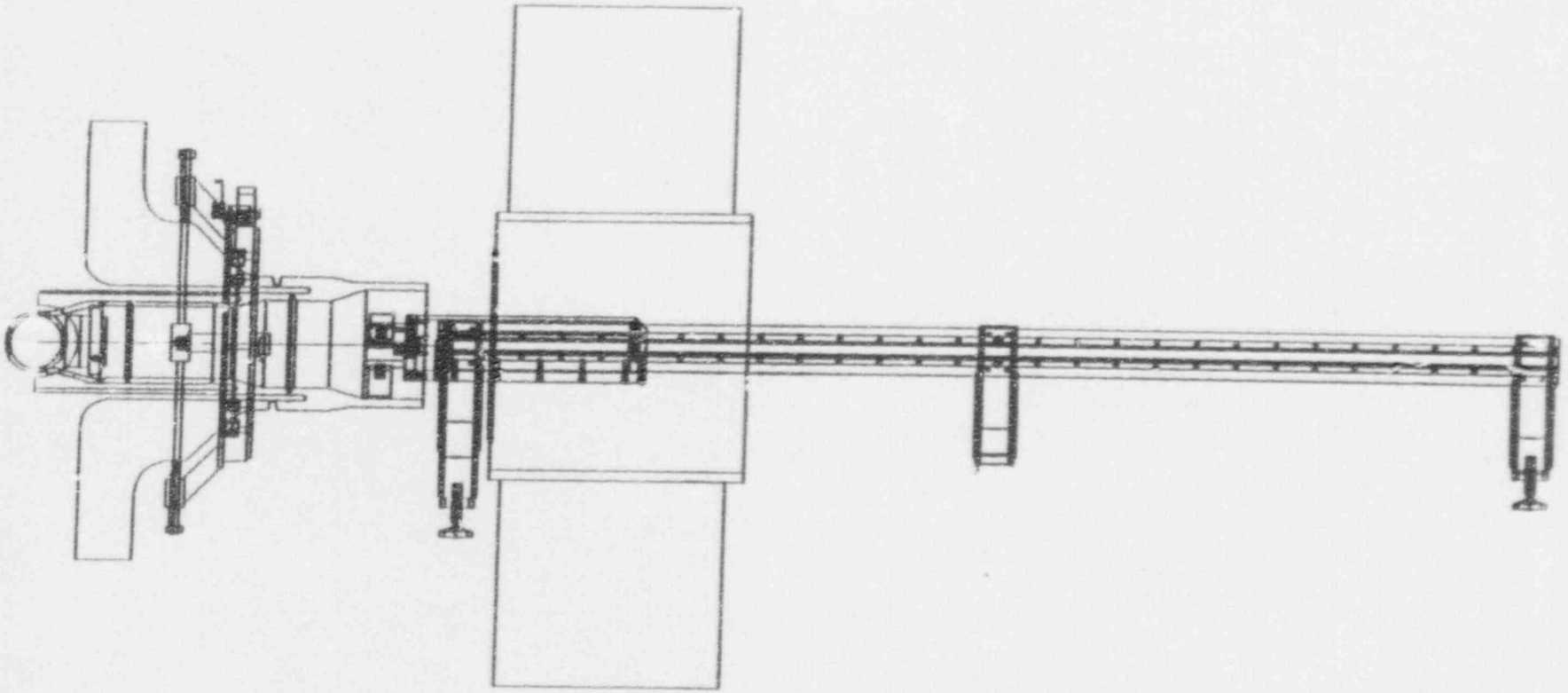


RECOMMENDED THERMOCOUPLE LOCATIONS
THERMOCOUPLE READINGS ARE SHOWN IN TABLE 1

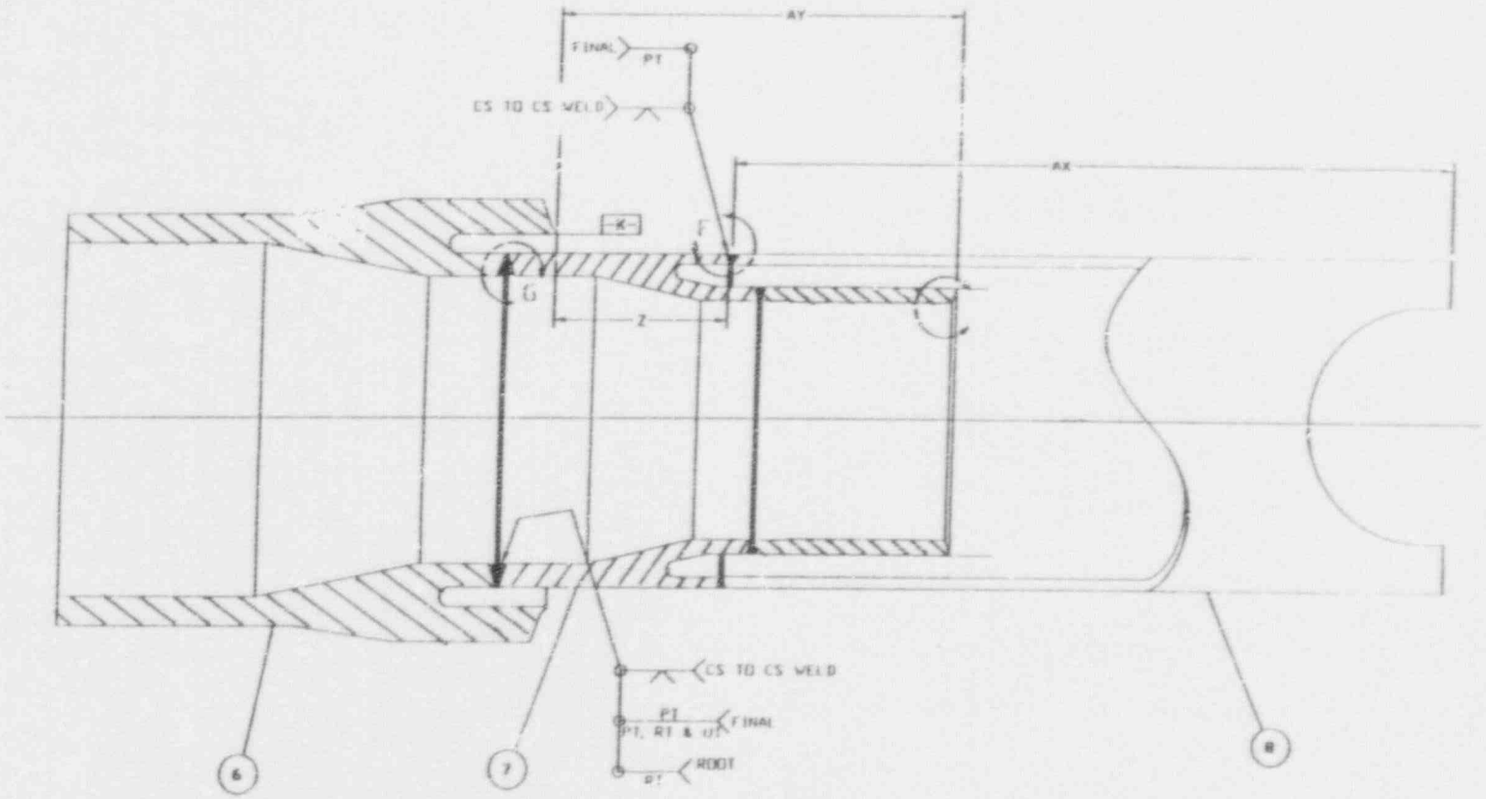


DETAIL D

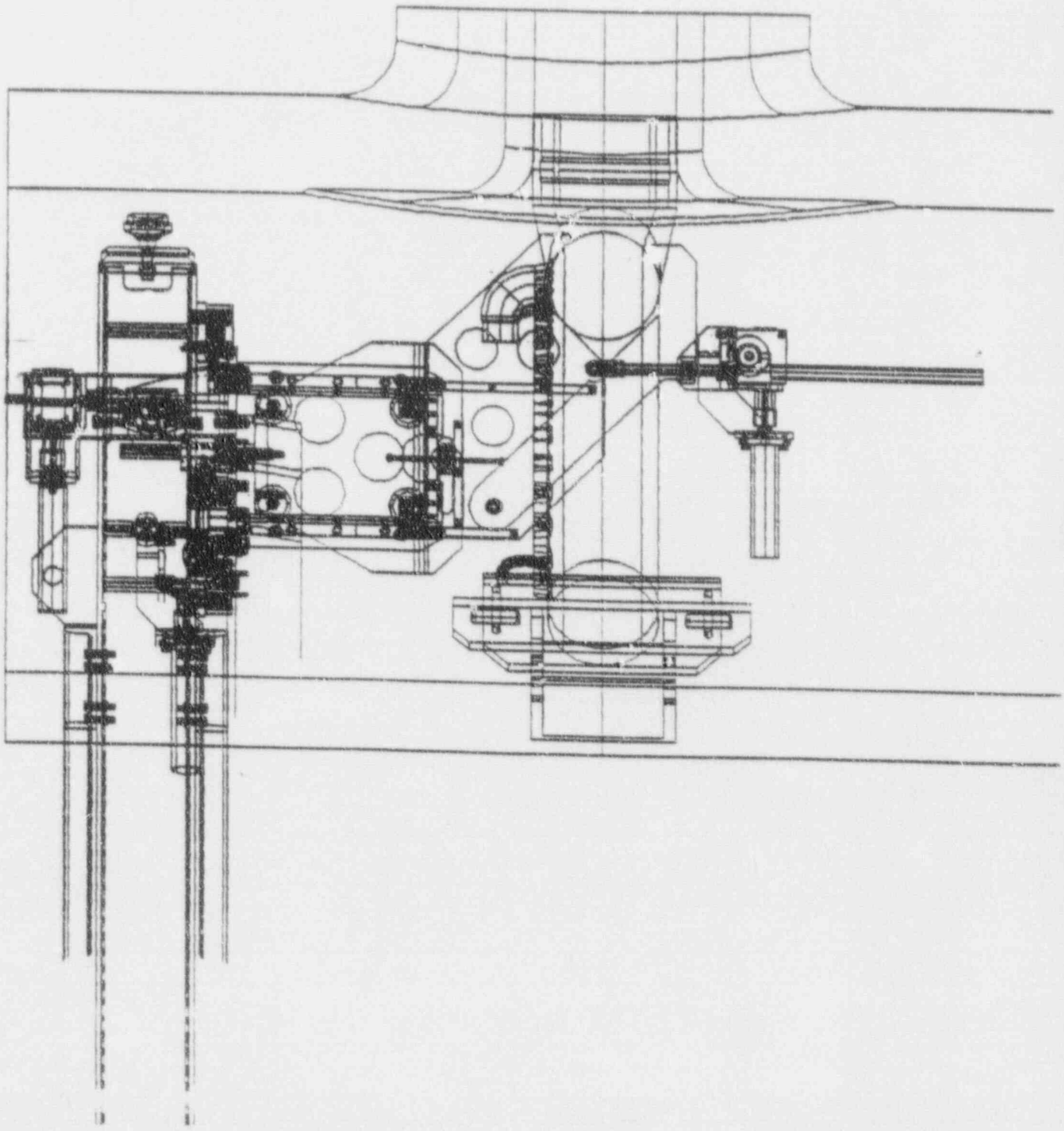
NOZZLE WELD END PREPARATION

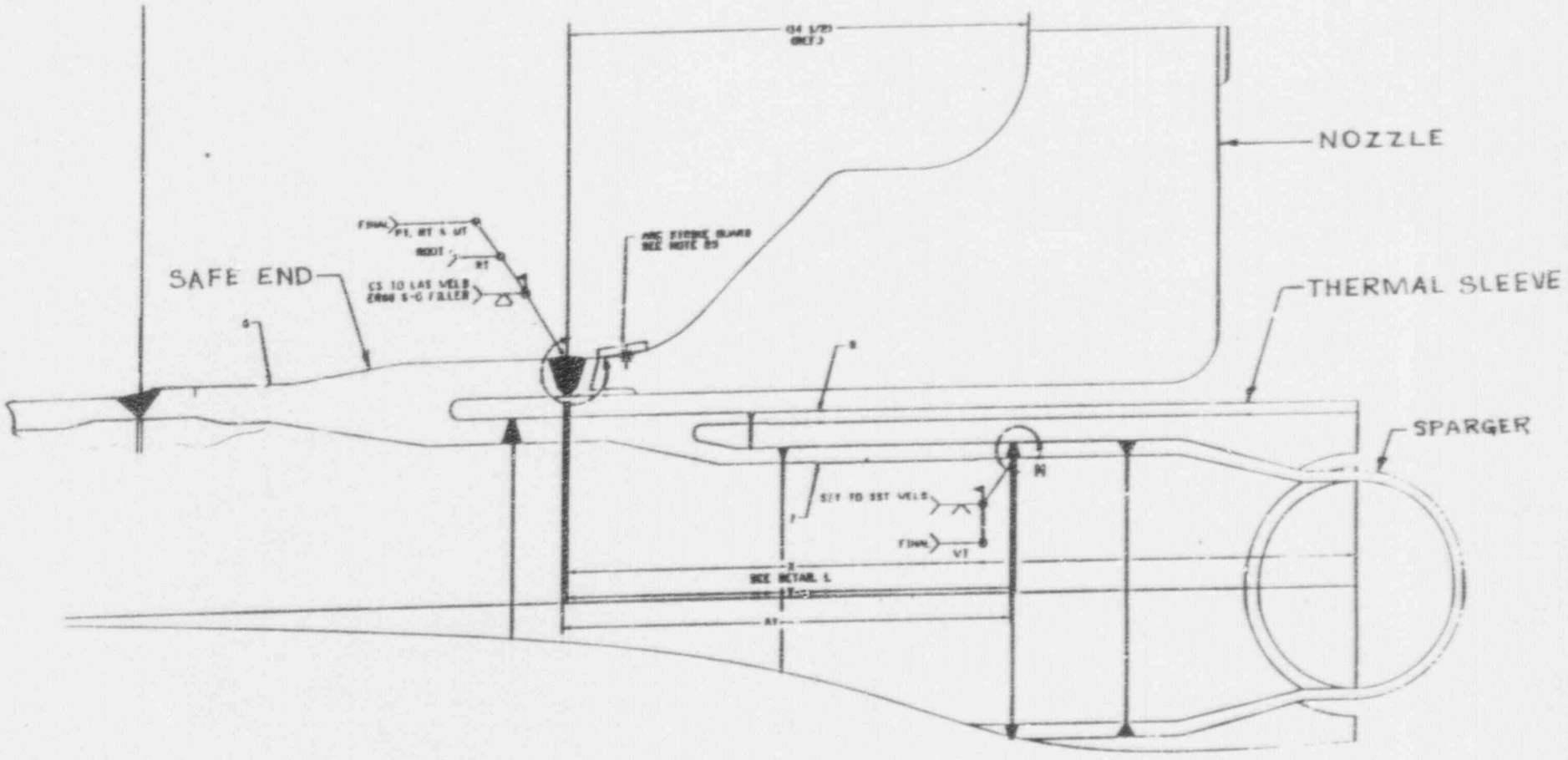


SAFE END INSERTION POSITION

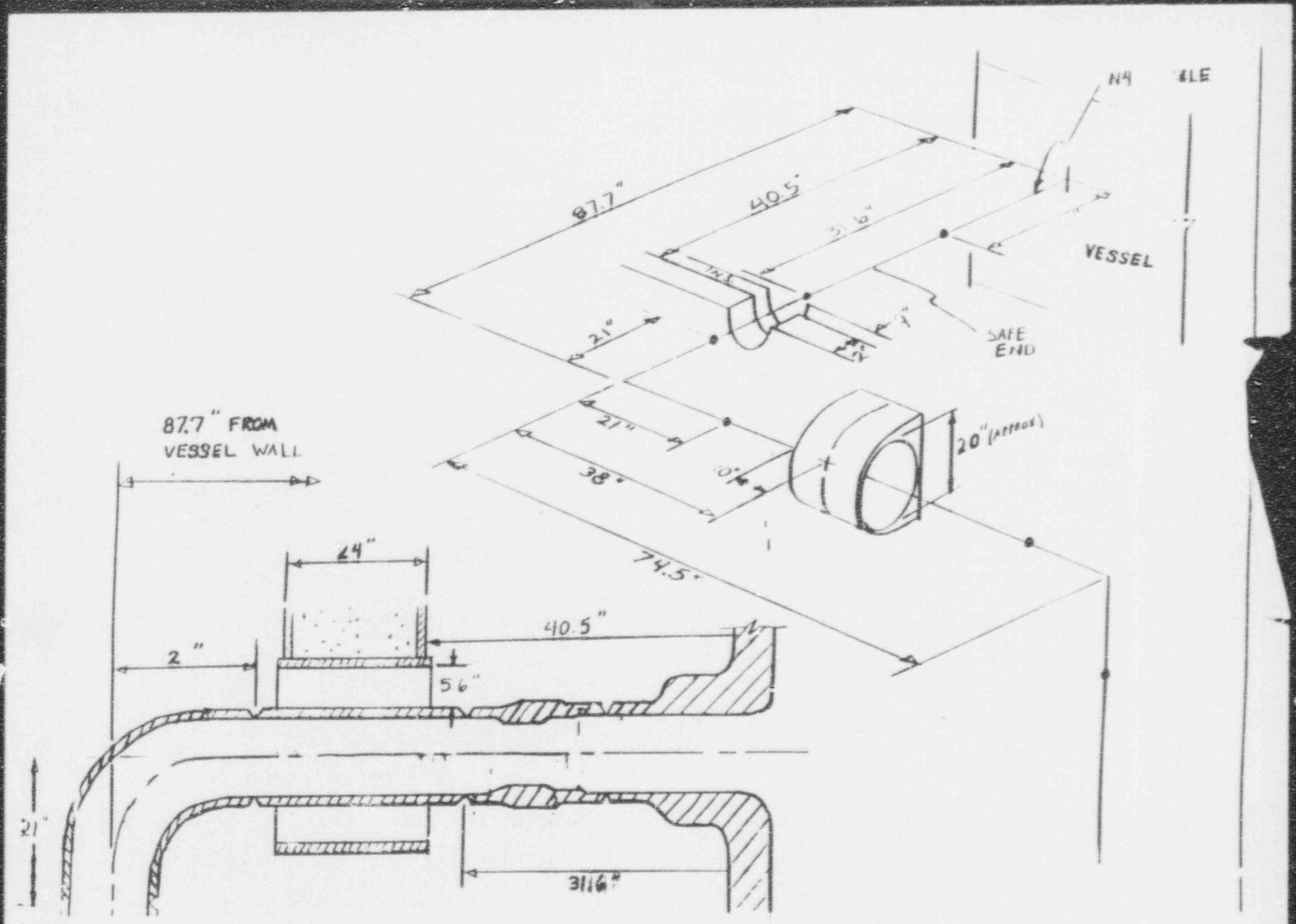


SAFE END ASSEM.





NEW SAFE END CONFIGURATION


N4
87.7"
40.5"
31.6"
VESSEL
SAFE
END
21"
38°
74.5°
20" (APPROX)
87.7" FROM
VESSEL WALL
24"
40.5"
2"
5.6"
21"
3116"

10/15/91

RF-4 GOALS

GOAL	MEASURE OF SUCCESS
MR scope growth via Emergent Work excluding safety items	≤ 10
MR Scope Growth prior to outage	≤ 10
MWO Scope Growth between freeze at 120 days before outage and outage start	≤ 10%
MWO Scope Growth via Emergent Work in RF-4	≤ 50%
MWO Scope Growth of previously known tasks submitted after the 7.5 month preoutage freeze	≤ 5%
Schedule Performance Negativity	≤ 0 DAYS
Lost Time Accidents	0
Service Water System Closed Loop Installation and Chemical Cleaning	100%
Recirc and Cleanup System Chemical Cleaning	100%
Recordable Injuries (OHSA)	≤ 7
Person-Rem Exposure	≤500
Contaminations	≤200
Near Miss and Lost Time Accidents	0
Unplanned ESF Actuations	≤ 3
Budget	≤ +5%

File: RF-4 GOALS