AUG - 6 1993

Docket Nos. 50-250, 50-251, 50-335, 50-389
License Nos. DPR-31, DPR-41, DPR-67, NPF-16

Florida Power and Light Company
ATTN: Mr. J. H. Goldberg
President - Nuclear Division
P. O. Box 14000
Juno Beach, FL 33408-0420

Gentlemen:

SUBJECT: MEETING TO DISCUSS ENGINEERING INITIATIVES AT FLORIDA POWER AND LIGHT

This letter refers to the meeting conducted at your request at the NRC Region II offices in Atlanta on July 16, 1993. The purpose of the meeting was to allow Florida Power and Light (FPL) to make a presentation on engineering initiatives at FPL.

It is our opinion that this meeting was beneficial and provided a better understanding of the issues and status of current programs.

In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 1, Title 10, Code of Federal Regulations, a copy of this letter and its enclosures will be placed in the NRC Public Document Room.

Should you have any questions concerning this letter, please let us know.

Sincerely,

Ellis W. Merschoff, Director
Division of Reactor Projects

Enclosures:
1. List of Attendees
2. Presentation Summary

cc w/encls:
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Site Vice President
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IE01

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T. V. Abatiello
Site Quality Manager
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E. J. Weinkam
Licensing Manager
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Nuclear Licensing
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Department of Health and
Rehabilitative Services
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cc w/encls cont'd: (See page 3)

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Department of Legal Affairs
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bcc w/encls:
K. Landis, RII
J. Norris, NRR
L. Raghavan, NRR
St. Lucie Resident Inspector
Turkey Point Resident Inspector
Document Control Room

RII:DRP	RII:DRP	RII:DRP		
RSchin	KLandis	MSinkule		
8/4/93	8/4 /93	8/4 /93		

ENCLOSURE 1

LIST OF ATTENDEES

NRC

L. A. Reyes, Deputy Regional Administrator, Region II (RII)
J. R. Johnson, Deputy Director, Division of Reactor Projects (DRP), RII
J. P. Jaudon, Deputy Director, Division of Reactor Safety (DRS), RII
N. N. Berkow, Director, Project Directorate II-2, DRP-I/II, Office of Nuclear Reactor Regulation (NRR)
M. V. Sinkule, Chief, Reactor Projects Branch II, DRP, RII
C. A. Julian, Chief, Engineering Branch, DRS, RII
K. D. Landis, Chief, Reactor Projects Section 2B, DRP, RII
R. P. Schin, Project Engineer, DRP, RII
G. A. Hallstrom, Reactor Inspector, Materials and Processes Section, DRS, RII

FPL

J. H. Goldberg, President, Nuclear Division
W. H. Bohlke, Vice President, Nuclear Engineering and Licensing
J. B. Hosmer, Director, Nuclear Engineering
G. J. Boissy, Plant General Manager, St. Lucie
J. Scarola, Site Engineering Manager, St. Lucie
D. H. West, Technical Manager, St. Lucie
L. A. Rogers, Supervisor, Instrumentation and Control Maintenance, St. Lucie
D. M. Wolf, Supervisor, Site Engineering, St. Lucie
J. J. Hutchinson, Manager, Equipment Support and Inspections

ENCLOSURE 2

NRC/FPL
SEMIANNUAL COMMUNICATION MEETING
NRC REGION II OFFICE, ATLANTA

JULY 16, 10:00 A.M. - 12 NOON

A/404

PURPOSE

Discuss Engineering And Technical Support To Both Plants With Focus On:

1) St. Lucie Challenges

2) Process Improvements

INTRODUCTIONS

J. Goldberg	President, Nuclear Division
W.H. Bohlke	Vice President, Nuclear Engineering And Licensing
G.J. Boissy	Plant General Manager, PSL
J.B. Hosmer	Director, Nuclear Engineering
D.H. West	Manager, PSL Technical Support
L.A. Rogers	Supervisor, PSL I&C Maintenance
J. Scarola	Project Manager, PSL Engineering
D.M. Wolf	Supervisor, PSL Site Engineering
J.J. Hutchinson	Manager, Equipment Support & Inspections

NRC/FPL SEMIANNUAL COMMUNICATION MEETING
NRC REGION II OFFICE, ATLANTA

JULY 16, 1993 10:00 A.M. - 12 NOON

MEETING AGENDA

● INTRODUCTION/PURPOSE	W. BOHLKE	5 MIN
PSL CHALLENGES		
● ST. LUCIE RCP SHAFT ROOT CAUSE EVALUATION	D. WEST	15 MIN
● ST. LUCIE PRESSURIZER INCONEL 600 NOZZLE	J. SCAROLA	10 MIN
● UNLATCHED CEA	J. HUTCHINSON	10 MIN
● DROPPED CEA	L. ROGERS	10 MIN
● ST. LUCIE CODE SAFETIES	D. WOLF	10 MIN
● ST. LUCIE LESSONS LEARNED	G. BOISSY	10 MIN
PROCESS IMPROVEMENTS		
● ENGINEERING PROCESS IMPROVEMENTS TO SUPPORT OPERATIONS & MAINTENANCE	J. HOSMER	5 MIN
● OPEN DISCUSSION		25 MIN

WHB/A377-3

ENGINEERING JOURNEY

- Successfully Transitioned To A\E Independence
- Conduct Quarterly Self Assessments
- Transition Continues As Engineering Focuses On Involvement With Operations And Maintenance
  - People Philosophy
    - More People On Site
  - Product Philosophy
    - Products More Focused On Operations And Maintenance
- Avoid Repeating Mistakes (Internal/Industry)
  - Problem Reports
  - Tech Alerts

ST. LUCIE REACTOR COOLANT PUMP
I. BACKGROUND

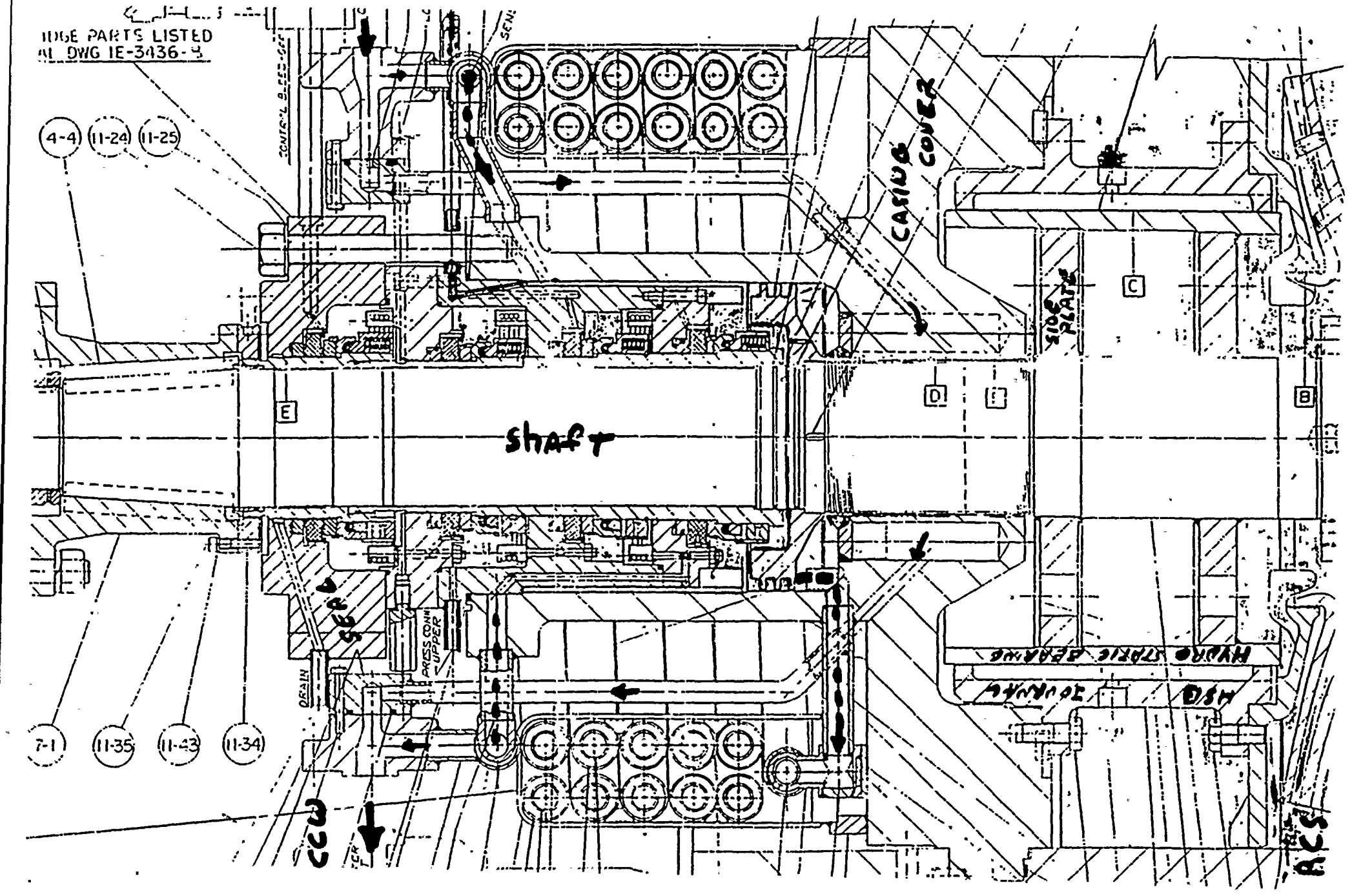
VENDOR: BRYON JACKSON

HEAD/FLOW: 245 FT/81,250 GPM

SEAL:
- 4 Stages Including Vapor Seal
- 1-1.5 GPM Controlled Bleed Off
- Seal Injection Capability Installed As Modification
- Seal Injection Used For Fill And Vent, Heat-Up And Cooldown
- Design Pressure 2485 psig
- Design Temperature 250° F

SHAFT:
- 304 Stainless Steel
- Stainless Steel Pump Hydrostatic Bearing

COOLING:
- CCW Cools Motor And Seal


IDGE PARTS LISTED
AL DWG IE-3436-3
4-4
11-24
11-25
CASING COVER
SIDE PLATE
C
D
E
B
shaft
DRAIN
PRESS CONN UPPER
7-1
11-35
11-43
11-34
CCW

II. PROBLEM

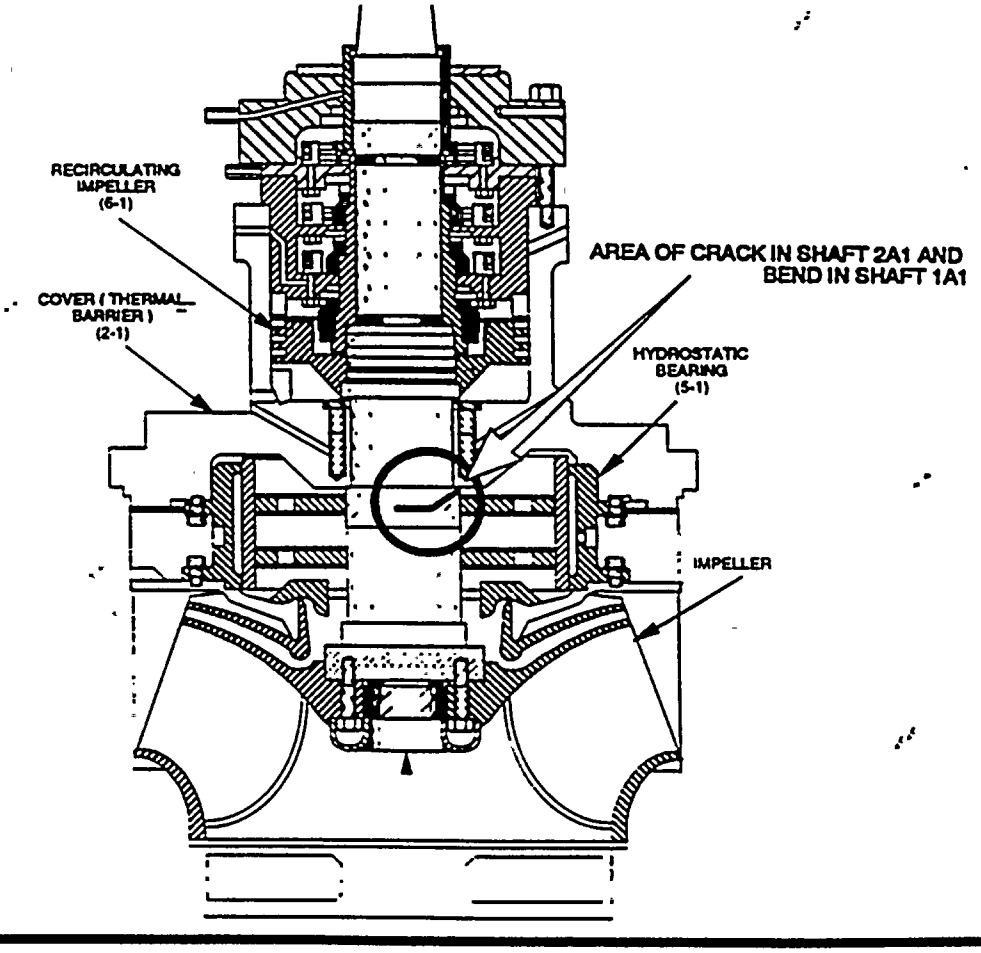
- **PSL NO. 1**

  6/30/90 Pump 1A1 Experienced High Seal Leakoff Flow Requiring Plant Shutdown - Resultant Inspection Revealed Bent Shaft

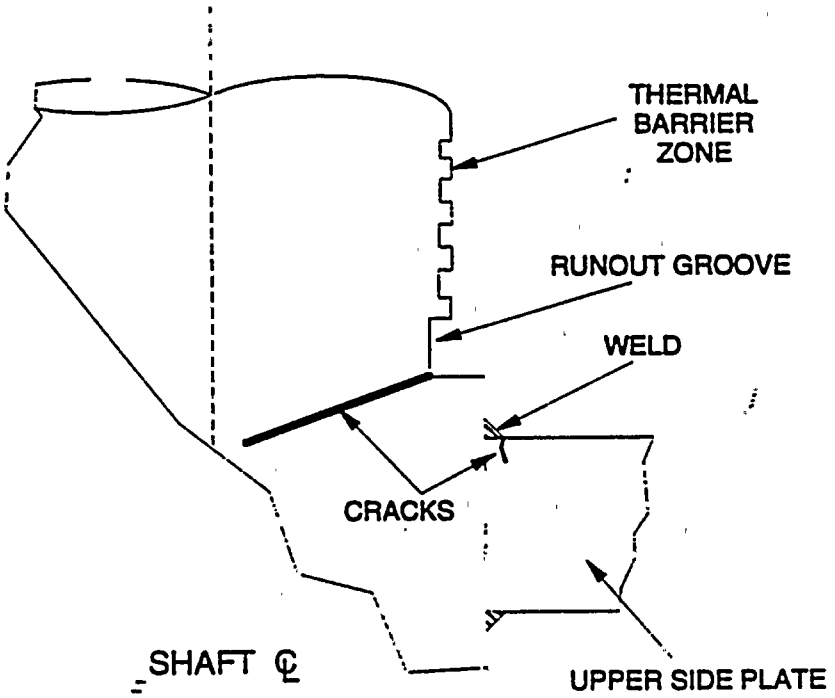
- **PSL NO. 2**

  1/13/93 Pump 2A1 Experienced High Vibration Requiring Plant Shutdown - Resultant Inspection Revealed A Cracked Shaft

- **For Both Events The Unit Was Safely Shutdown Based On Existing Indications**



2A1 CRACK LOCATIONS:



III. ANALYSIS

- Formed Plant/Engineering Team
- Byron Jackson/Combustion Engineering Participation
- Performed Dimensional & NDE of 2A1 Shaft
- Review Operating/Maintenance/Modification History
- 2A1 & 1A1 RCP's Idle for H/U & C/D
- Reviewed 1A1 (Unit No. 1) Analysis
  - Confirmed Thermal Transient Can Bend A Shaft
- Industry Survey
  - Use of Seal Injection
  - Other RCP Shaft Failures
- Preliminary Root Cause Is Thermal Stress From Seal Injection
- Analysis Continuing

SHORT TERM
IV. CORRECTIVE ACTIONS

Plant and Engineering Team Assigned To Address Short Term Actions

- **Installed New Rotating Assembly**
  - Improved Alignment Procedures
- **Engineering/Operations/Maintenance Evaluation Of Operating w/o Seal Injection**
- **Changed Procedures On Both Units To Eliminate Use Of Seal Injection, Except During Fill And Vent Operations And Emergency Procedures**
- **Moved Vibration Monitoring Instrumentation From Lower Motor To Pump Coupling**
- **Prepared Startup Procedure For Monitoring & Data Collection**

V. LONG TERM CORRECTIVE ACTIONS

A. Long Term Root Cause Team Formed

- St. Lucie Plant Staff Mechanical Maintenance
- St. Lucie Plant Reliability Maintenance
- St. Lucie Plant Technical Staff
- Nuclear Engineering Pump Specialists
- Nuclear Engineering Supervisor Component Specialists
- Nuclear Engineering Thermal/Hydraulic Analysis Specialist
- Nuclear Engineering Systems & Operations Specialist
- Nuclear Engineering Design
- Nuclear Engineering Metallurgist
- Pump Vendor (Byron Jackson)

V. LONG TERM CORRECTIVE ACTIONS

(Continued)

B. Long Term Root Cause Team Overall Action Plan

- Using Event Tree/FMEA Methodology To Identify Potential Causes
  - Perform Pump Shaft Metallurgical Analysis
  - Perform Stress Analysis - Pump Rotor
  - Operating & Maintenance Procedures Review
  - Analyze Manufacturing And Pre-Service Test Data
  - Evaluate RCP Modification Packages
  - Evaluate RCP Vibration Data (Prior To & Following Failure)
  - Provide Additional Monitoring Instrumentation To RCPs
  - Draw Conclusion Re Root Cause
  - Recommend Further Corrective Actions And Issue Report

V. LONG TERM CORRECTIVE ACTIONS

(Continued)

C. Action Plan Status

- Manufacturing & Pre-Service Data Analysis Completed
  - Concluded That Initially Defective Assembly Is Not A Probable Root Cause
- Thermal Stress Analysis
  - Preliminary Conclusion That Seal Injection Thermal Stresses Can Propagate Small Surface/Subsurface Flaws (<.O10 In)
  - Crack Initiation & Propagation Investigation Is Continuing
  - Definition Of Mechanical Loads That Could Cause Crack Propagation Is Continuing
    - RCP Runout
    - RCP Shaft Misalignment
    - S/U Torque Against Reverse Flow
- Disassembly Of Pump Rotating Assembly For Dimensional & Metallurgical Analysis Has Begun

VI. SUMMARY

- Replaced Damaged RCP Rotating Assembly
- Changed Procedures To Eliminate Use Of Seal Injection (Suspected Root Cause)
- Relocated Vibration Monitoring Probes To Pump Side Of Coupling
- Proceeding With Further Analysis To Confirm Root Cause And Final Corrective Actions
- Expect Final Recommendations By 12/93

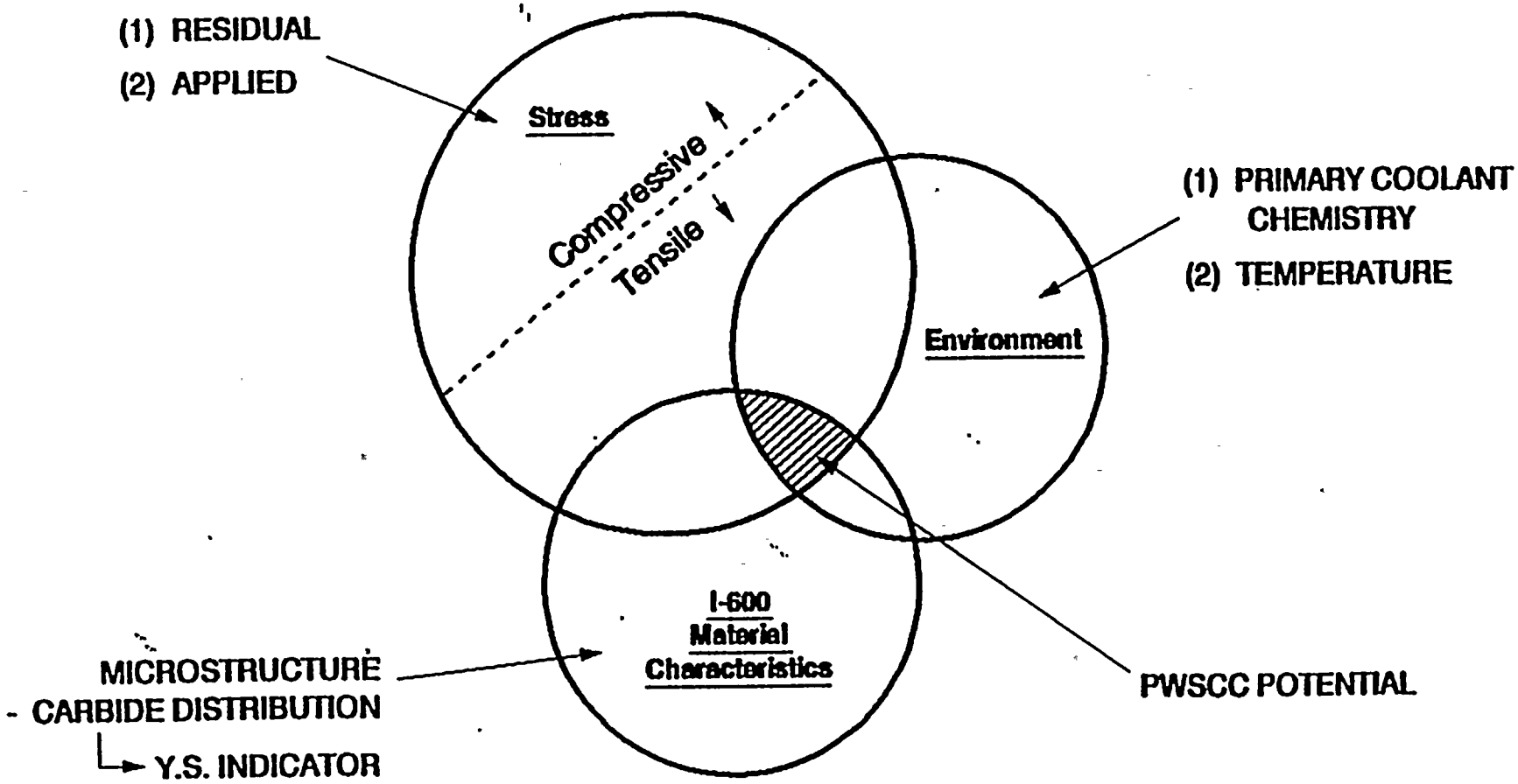
PRESSURIZER INSTRUMENT NOZZLE CRACKING

March 3, 1993, Visually Identified Four Steam Space Nozzles With Leakage On Unit 2 In Mode 5

- **Background:**
  - SONGS 3 Instrument Nozzle Leaks '86
  - Pressurizer Steam Space Nozzles Replaced '87
  - Hot Leg & Pressurizer Liquid Space Replaced '89
- **Analysis:**
  - No Significant Safety Hazard
  - Susceptible Material Inconel Alloy 600
  - High Temperature Environment
  - Heat Number
- **Root Cause:**
  - Primary Water Stress Corrosion Cracking
- **Immediate Corrective Action:**
  - Steam Space Nozzles Replaced With Alloy 690
  - Inspected Liquid Space Nozzles Of Same Heat
- **Long Term Corrective Actions:**
  - Inspect During Refueling Inconel 600 Nozzles
  - Replace Pressurizer Liquid Space Nozzles In '96
  - Continue To Monitor Industry Data

Figure 1

I-600 SUSCEPTIBILITY TO PWSCC FUNCTION OF STRESS, ENVIRONMENT AND MICROSTRUCTURE



I600DIAG
RSB:jlw
9/28/90

PRESSURIZER INSTRUMENT NOZZLE REPAIR

- Examination Phase:
  - NSSS To Perform The Work
  - Independent Oversight (FPL & Vendor)
  - PT Examination
  - Destructive Examination
- Surface Preparation:
  - Removal Of Cracks
  - Clad Build-Up
- Nozzle Replacement:
  - Nozzles Machined
  - Nozzles Welded In Place
- Errors Made:
  - ASME Code Compliance
    - Size Of Weld Rods
    - Thermocouple Placement
  - Work Control
- Lessons Learned:
  - Improve Technical Oversight On Special Process Jobs
- Safety Significance:
  - Qualified Weld

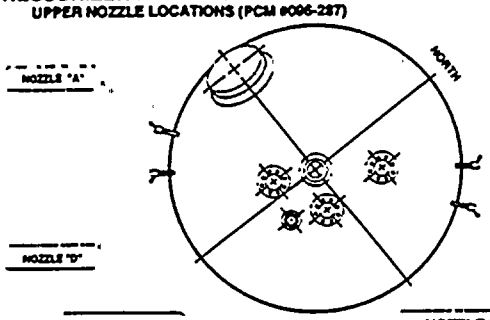
ST. LUCIE UNIT 2

PRESSURIZER UPPER & LOWER INSTRUMENT NOZZLE ANALYSIS

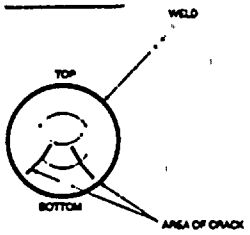
FPL

PRESSURIZER NOZZLE EXAM FINDINGS

UPPER NOZZLE LOCATIONS (PCM #096-287)

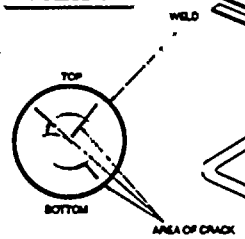


NOZZLE "A"



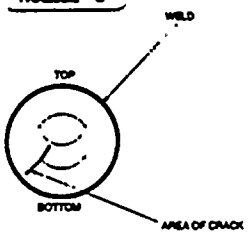
(FRONT VIEW FROM INSIDE PRESSURIZER)

NOZZLE "B"



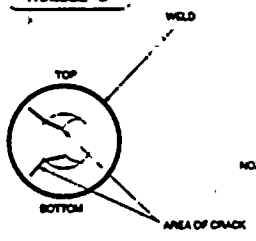
(FRONT VIEW FROM INSIDE PRESSURIZER)

NOZZLE "C"



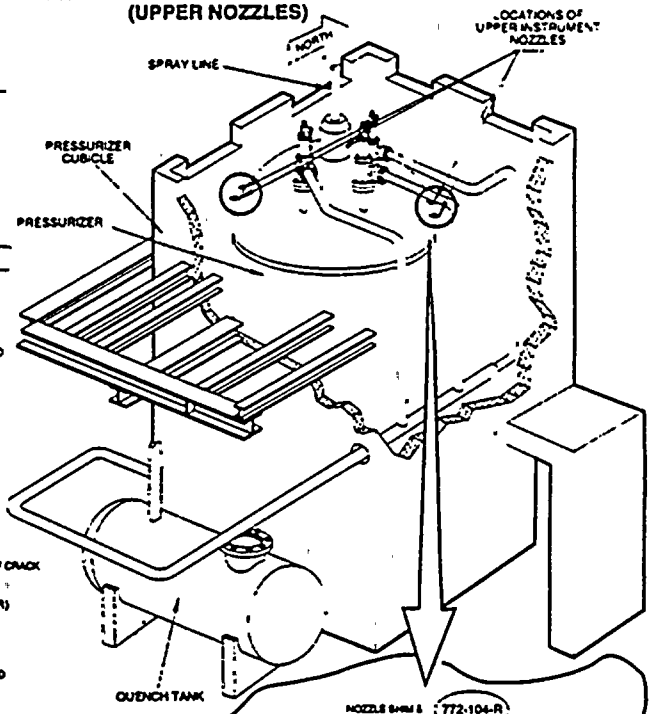
(FRONT VIEW FROM INSIDE PRESSURIZER)

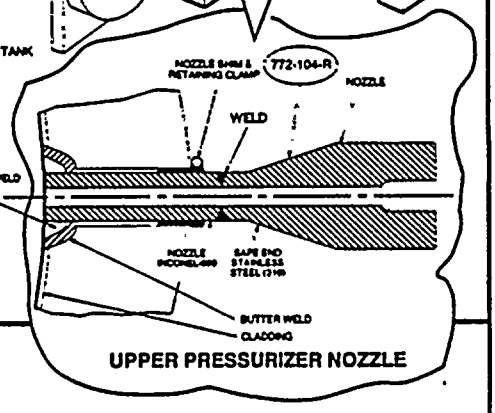
NOZZLE "D"



(FRONT VIEW FROM INSIDE PRESSURIZER)

PRESSURIZER NOZZLE LOCATIONS (UPPER NOZZLES)

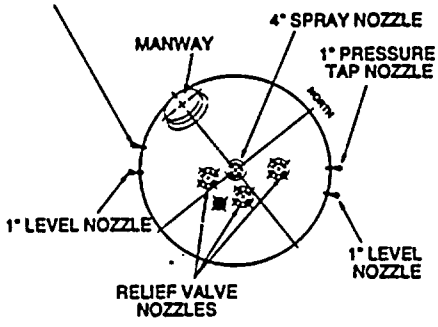




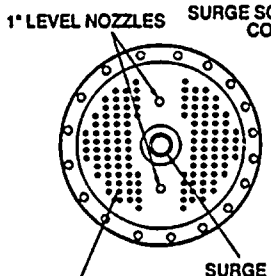
UPPER PRESSURIZER NOZZLE

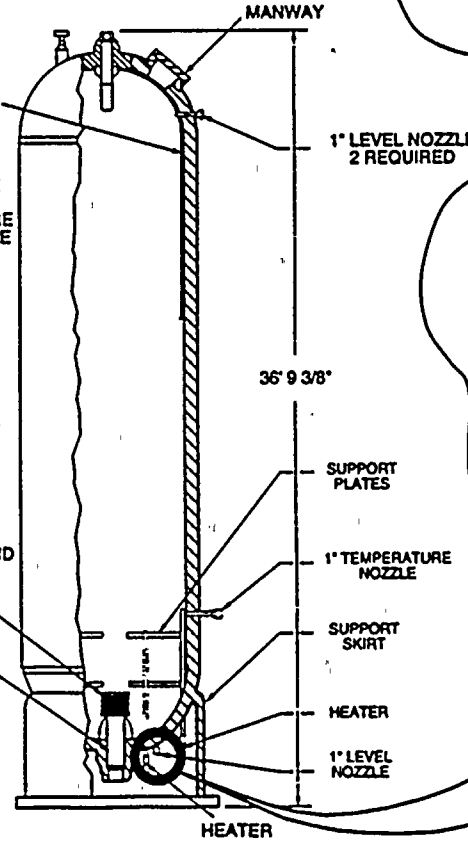
PRESSURIZER LOWER NOZZLE LOCATIONS

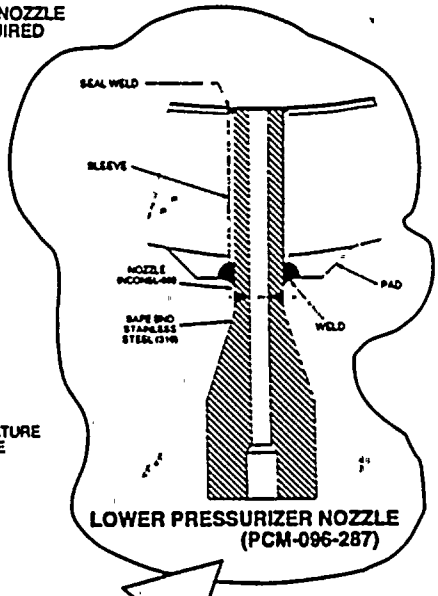
TOP VIEW



BOTTOM VIEW







LOWER PRESSURIZER NOZZLE (PCM-096-287)

ST LUCIE UNIT 1
ALLOY 600 RCS PENETRATION SUMMARY (3-93)

PENETRATION TYPE (HEAT #)	STATUS	PREDICTED LIFE	REPLACEMENT RECOMMENDATION	INSPECTION RECOMMENDATIONS
I. PZR NOZZLES				
7-STEAM & WATER SPACE (NX8297 *)	NOT LEAKING	NO PREDICTION (NOTE 1)	MONITOR	< 1100 DAY
II. PZR HTR SLEEVES				
5-SLEEVES (C2202/NX8878)*	NOT LEAKING	BEYOND PREDICTION	MONITOR	< 1100 DAYS
6-SLEEVES (C2831-1/NX8878)	NOT LEAKING	MODERATE SUSCEPTIBILITY	MONITOR	< 1100 DAYS
109-SLEEVES (NX5038)	NOT LEAKING	HIGH SUSCEPTIBILITY	MONITOR	< 1100 DAYS
III. RCS NOZZLES				
2-RV O RING LEAK MONITOR TUBES (NX5358/NX5282)	NO KNOWN LEAKS	NA	NONE NON PRESSURE APPLICATION	NA
30-HOT & COLD LEG RTD's (NX9752/NX0003)	NOT LEAKING	> 40 YRS (NO FAILURES)	MONITOR	NORMAL B.A. WALKDOWN

* Indicates heats with industry failure history.

NOTE: 1) Based on one failure point, but many more survival points exist with more hours of operation at pressurizer temperature.

ALLOY.600

ST LUCIE UNIT 2
ALLOY 600 RCS PENETRATION SUMMARY (3-93)

PENETRATION TYPE (HEAT #)	STATUS	PREDICTED LIFE	REPLACEMENT RECOMMENDATION	INSPECTION RECOMMENDATIONS
I. PZR NOZZLES				
4-STEAM SPACE (41501 *)	CRACKED (3-93)	NA	ALLOY 690 (1993)	< 1100 DAYS
1-WATER SPACE (41501 *)	NOT LEAKING	28,000 HRS REMAINING FROM 3-93	ALLOY 690 @ EOC 8 (1995)	< 1100 DAYS
2-WATER SPACE (NX7630/7387-2)*	NOT LEAKING	BEYOND PREDICTION (NOTE 1)	ALLOY 690 @ EOC 8 (1995)	< 1100 DAYS
II. PZR HTR SLEEVES				
30-SLEEVES (VARIOUS HEATS)	NOT LEAKING	LOW SUSCEPTIBILITY	MONITOR	< 1100 DAYS
III. RCS NOZZLES				
2-RV O RING LEAK MONITOR TUBES (54318 *)	NO KNOWN LEAKS	NA	NONE NON PRESSURE APPLICATION	NA
5-HOT LEG RTD's (41501 *)	NOT LEAKING	97,000 HRS REMAINING FROM 3-93	MONITOR/REPLACE	NORMAL B.A. WALKDOWN
9-HOT LEG RTD's (NX7630 *)	NOT LEAKING	> 40 YRS	NONE	NORMAL B.A. WALKDOWN
4-HOT LEG RTD's (NX3918V)	NOT LEAKING	> 40 YRS (NO FAILURES)	NONE	NORMAL B.A. WALKDOWN
1-HOT LEG RTD (7760-6)	NOT LEAKING	> 40 YRS (NO FAILURES)	NONE	NORMAL B.A. WALKDOWN
12-COLD LEG RTD's (VARIOUS HEATS)	NOT LEAKING	> 40 YRS	NONE	NORMAL B.A. WALKDOWN

* Indicates heats with industry failure history.

NOTE: 1) Based on 1992 failure data at other CE designed plants.

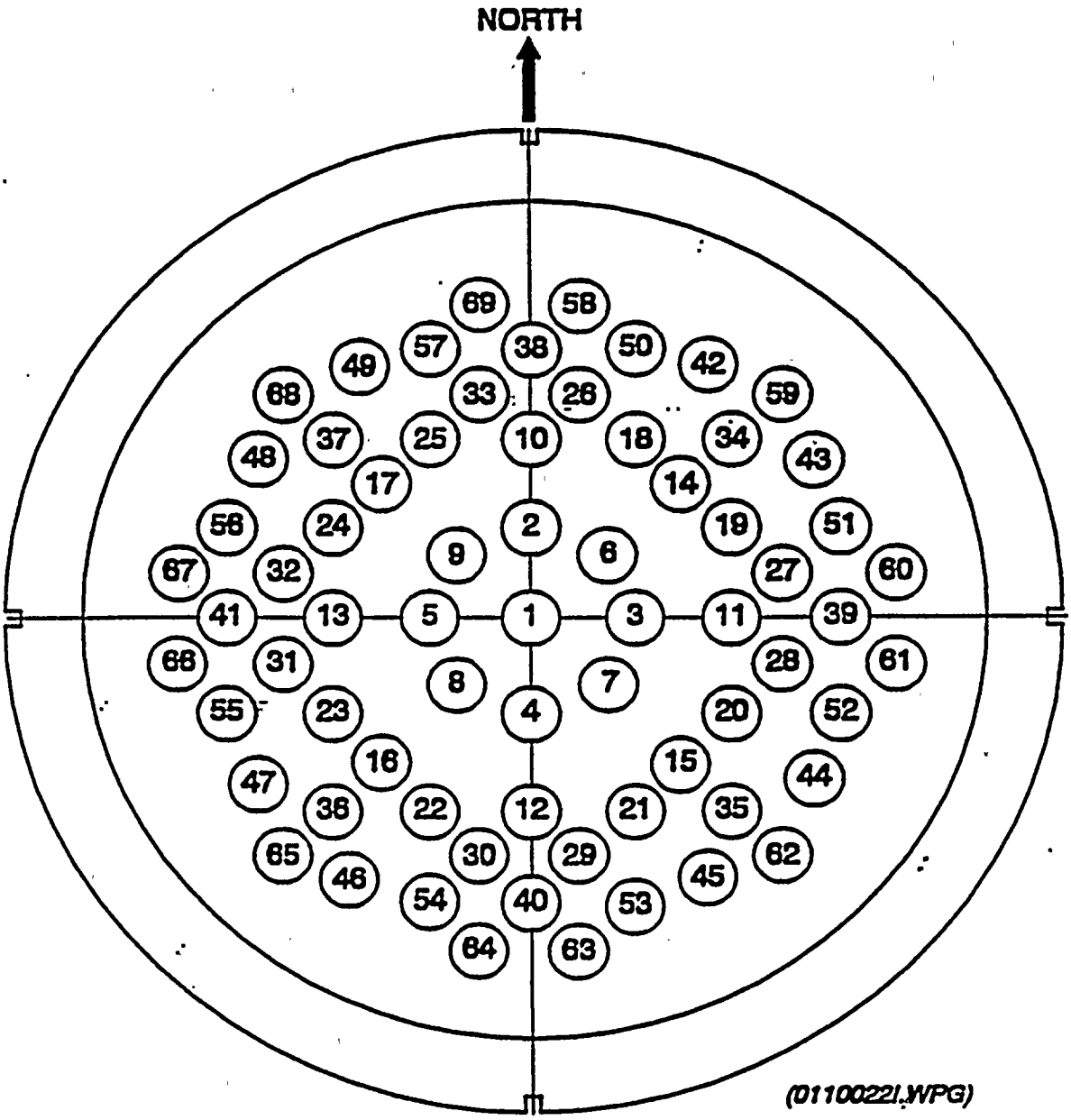
ALLOY 600

ST. LUCIE UNIT #1
UNLATCHED CONTROL ELEMENT ASSEMBLY

Background:

- May 29th, 1993 Low Power Physics Testing Indicated Anomaly With Rod Worth Associated With Dual CEDM #7
- Additional Low Power Physics Tested Indicated That Only One Of The Two CEAs Was Coupled
- Decision Was Made To Shutdown And Dissassemble The Reactor To Pursue Root Cause
- Cross Functional Team Consisting Of Tech Staff/Operations/ Maintenance/Fuels/ And Engineering Formed To Determine Root Cause

ST. LUCIE UNIT 1
OPERATING PROCEDURE NO. 1-0110022, REVISION 12
COUPLING AND UNCOUPLING OF CEA EXTENSION SHAFTS



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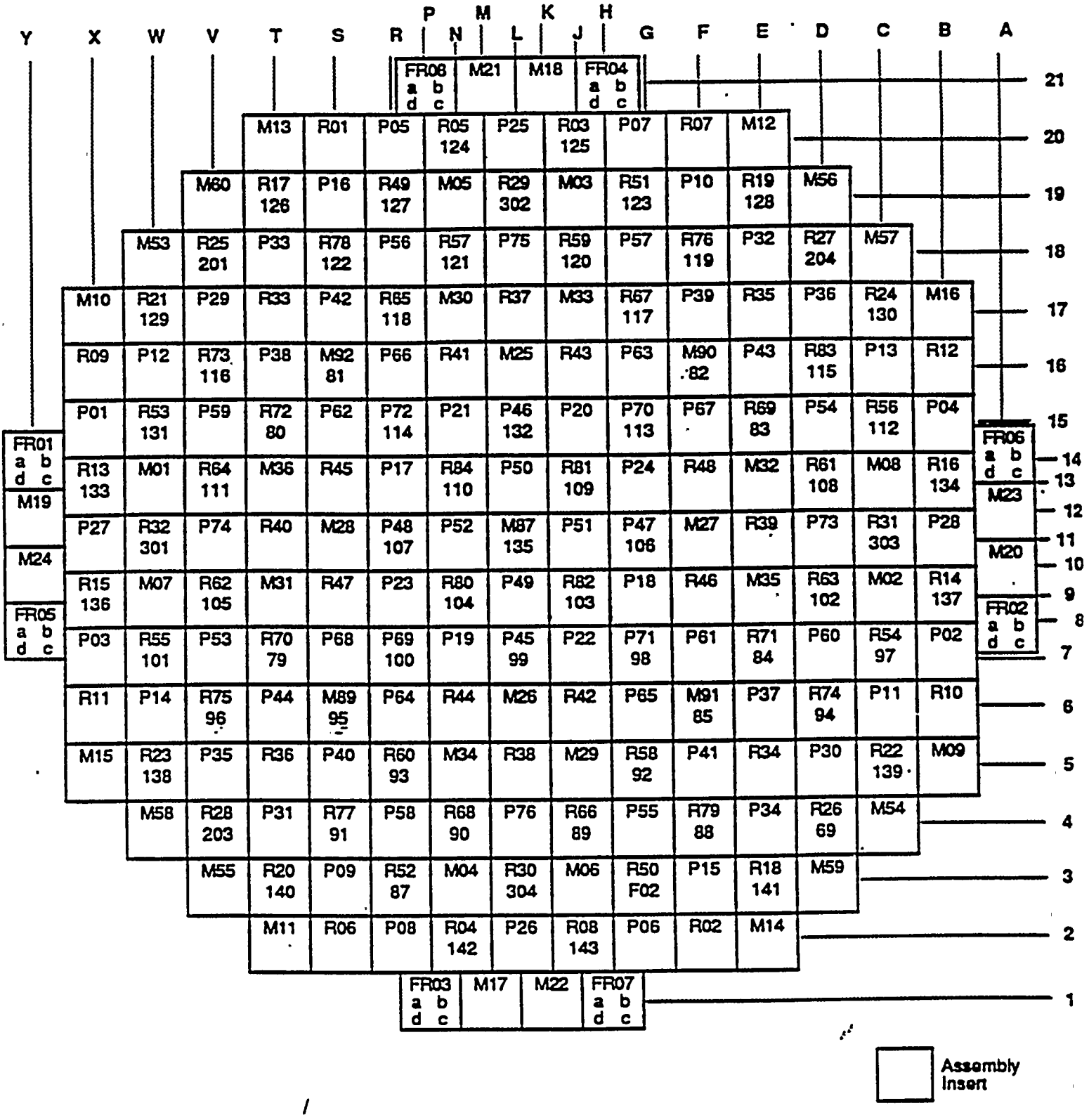
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M60 R17 126 P16 R49 127 M05 R29 302 M03 R51 123 P10 R19 128 M56
19
M53 R25 201 P33 R78 122 P56 R57 121 P75 R59 120 P57 R76 119 P32 R27 204 M57
18
M10 R21 129 P29 R33 P42 R65 118 M30 R37 M33 R67 117 P39 R35 P36 R24 130 M16
17
R09 P12 R73 116 P38 M92 81 P66 R41 M25 R43 P63 M90 82 P43 R83 115 P13 R12
16
P01 R53 131 P59 R72 80 P62 P72 114 P21 P46 132 P20 P70 113 P67 R69 83 P54 R56 112 P04
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R13 133 M01 R64 111 M36 R45 P17 R84 110 P50 R81 109 P24 R48 M32 R61 108 M08 R16 134
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FR02 a b d c
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7
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M15 R23 138 P35 R36 P40 R60 93 M34 R38 M29 R58 92 P41 R34 P30 R22 139 M09
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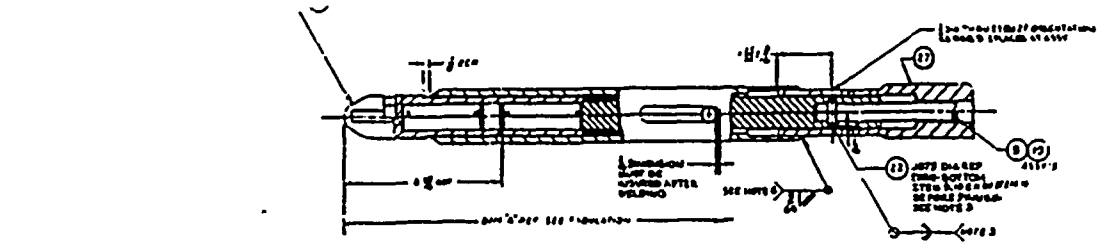
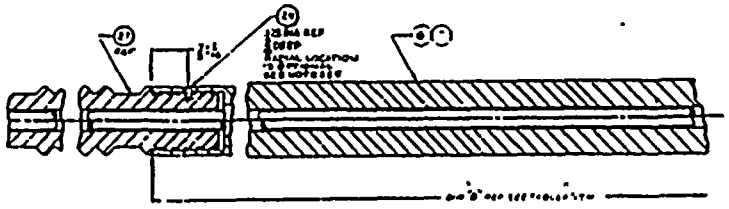
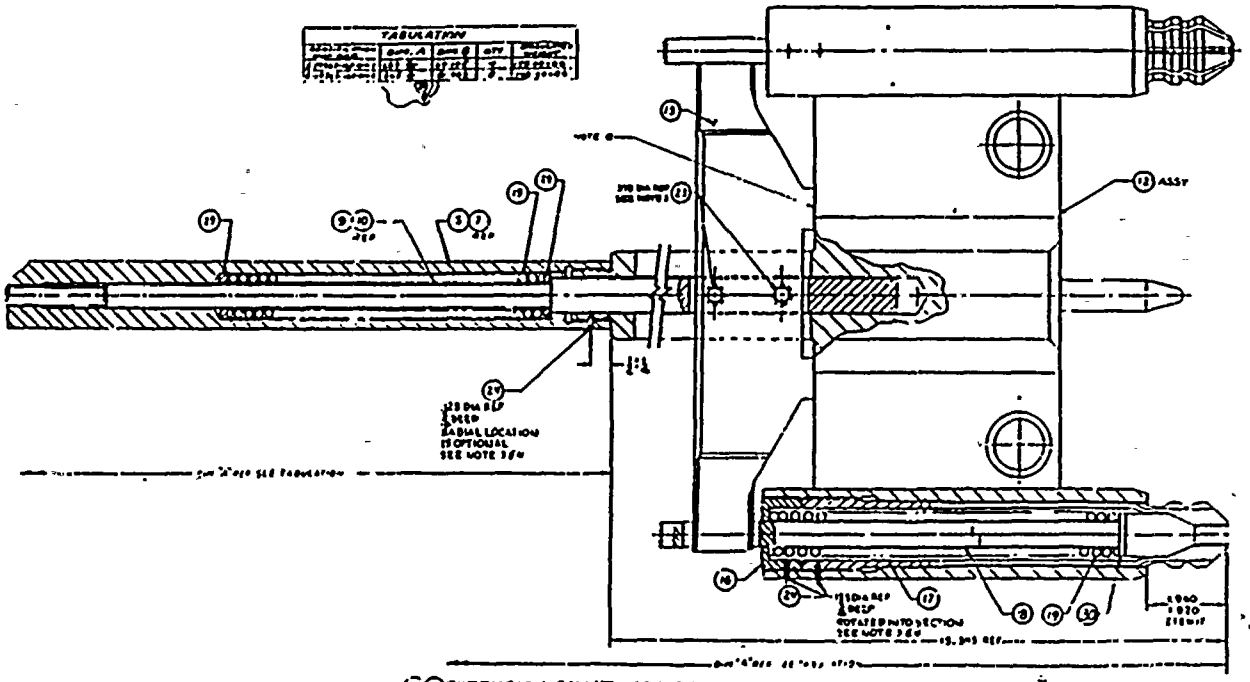
1
Assembly Insert

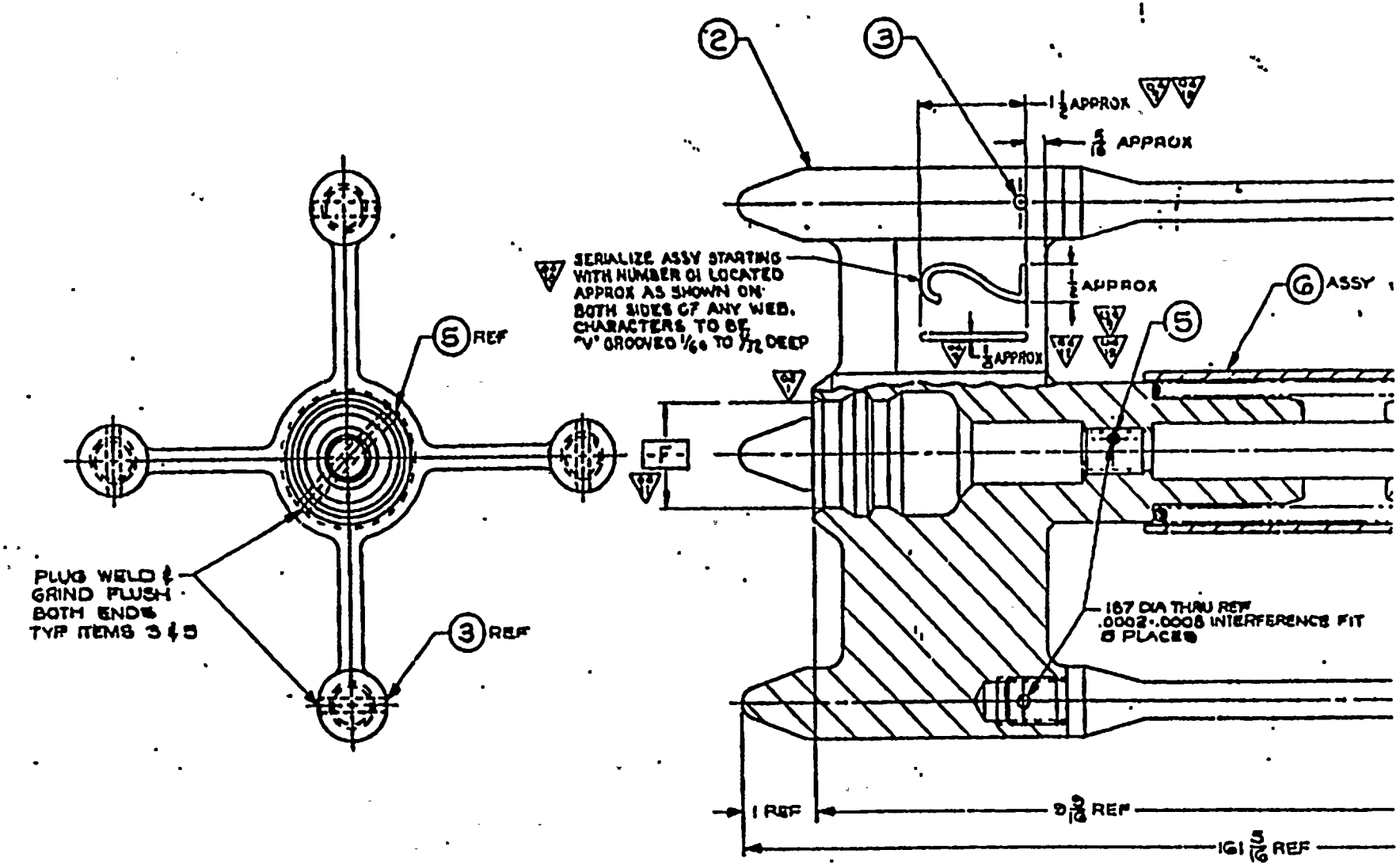






CERTIFIED FOR CONSTRUCTION

EXTENSION SHAFT ASSY-DUAL CEA



1 CONTROL ELEMENT ASSY

SCALE: FULL SIZE

ST. LUCIE UNIT #1
UNLATCHED CONTROL ELEMENT ASSEMBLY

Short Term Actions

1. Core Physics Predictions Analyized To Verify Initial Conclusions

2. All CEA Drive Shafts Reweighed & Pin Postion Verified

3. CEDM Coupling & Uncoupling Procedure # 1-0110022 Rev 12 Reviewed For Potential Root Cause

4. Performed Engineering Study By Use Of Fault Tree To Examine Potential Root Causes

5. Performed Visual/Dimensional Inspections To Verify As-Found Condition

ST. LUCIE UNIT #1
UNLATCHED CONTROL ELEMENT ASSEMBLY

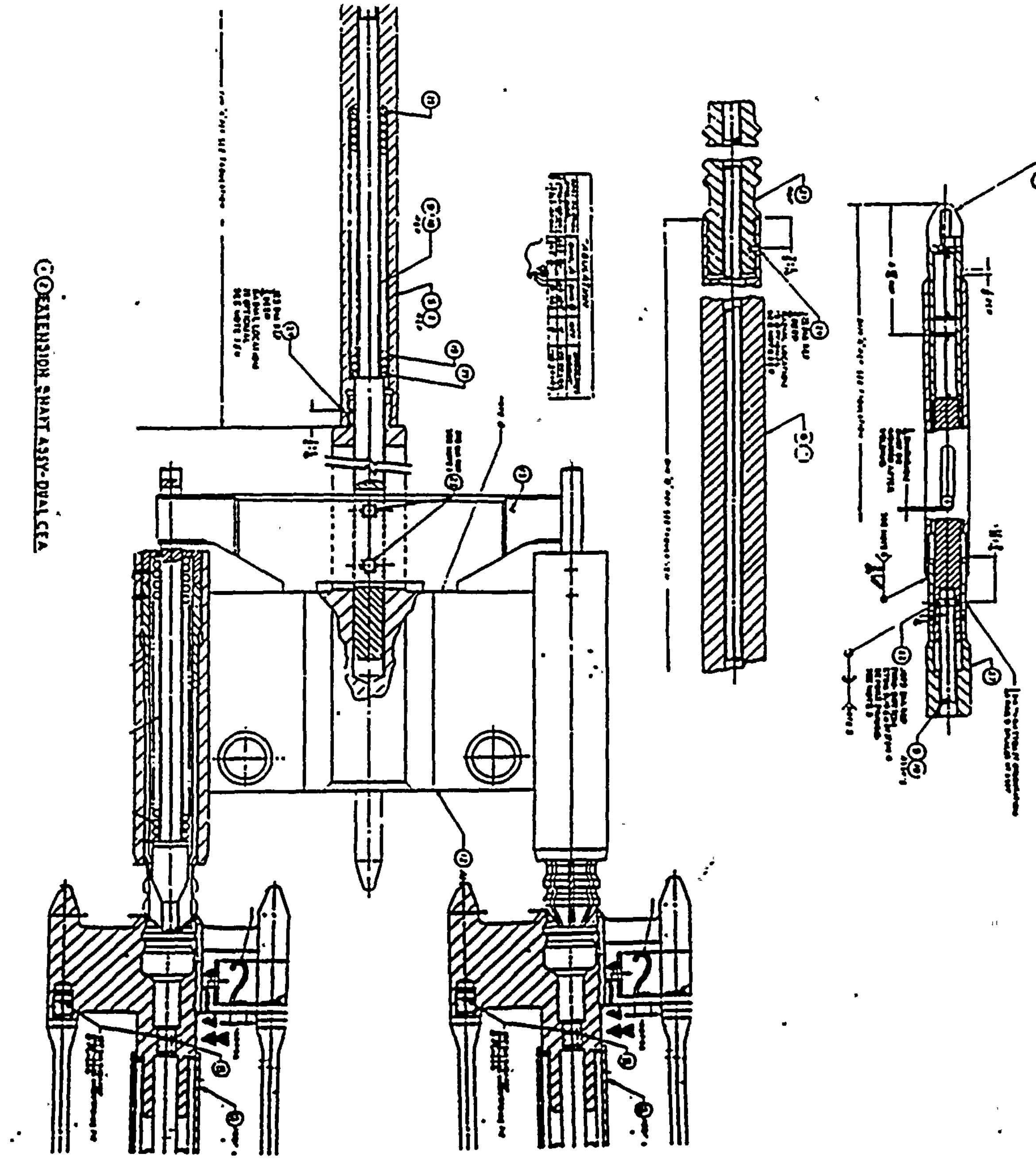
Root Cause Physical Inspection Results:

1. Inboard CEA #103 Found Unlatched From Dual Extension Shaft #7

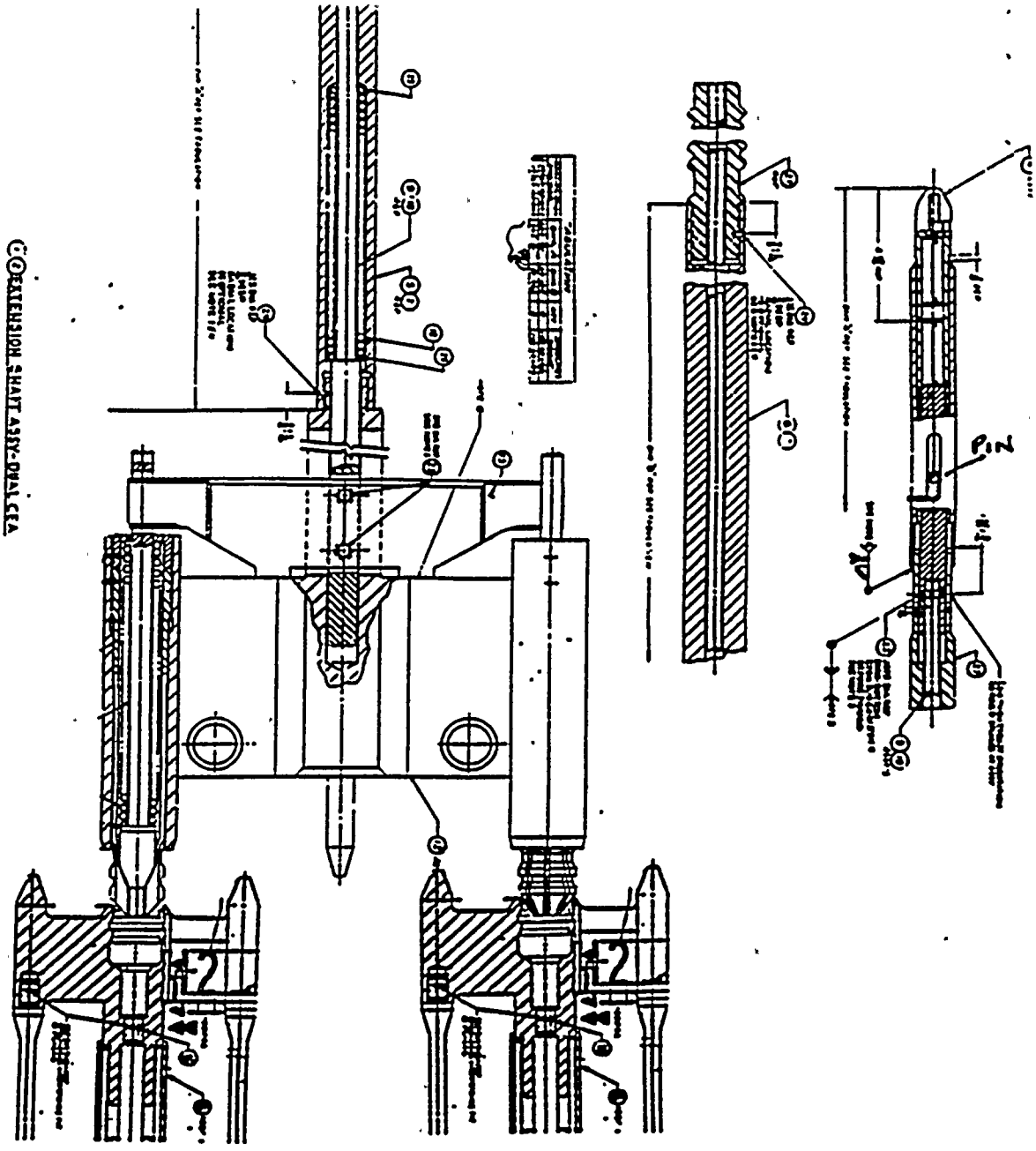
2. Dual CEDM Shaft #7 Removed From Upper Guide Structure. Functionally, Dimensionally And Visually Checked - No Anomalies Noted

3. Inspection Of CEA Hubs #103 & #98 Showed No Damage

4. Inspection Of Dual Shroud And Associated Area Above Fuel Found No Anomalies



INITIAL CONDITION



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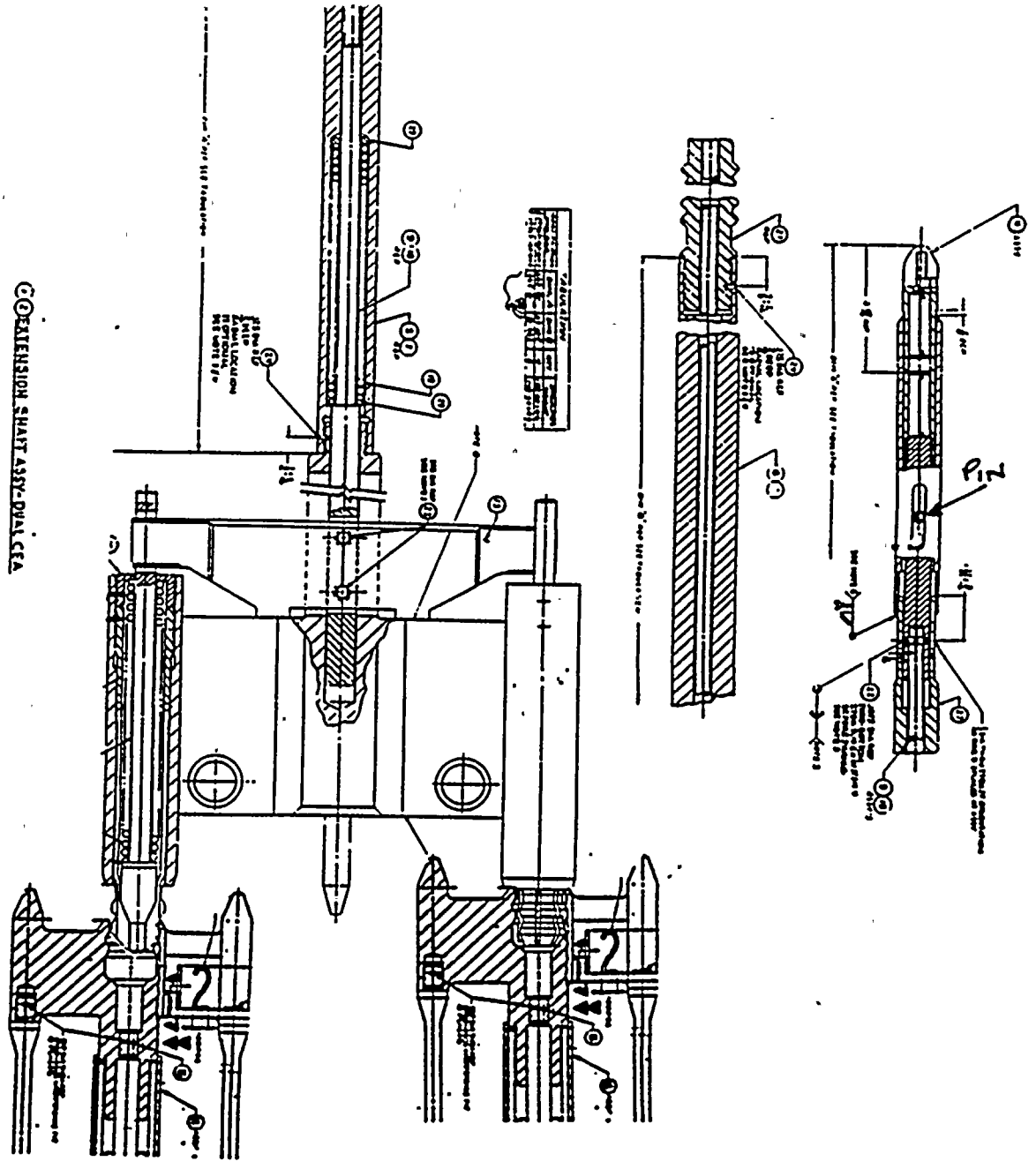
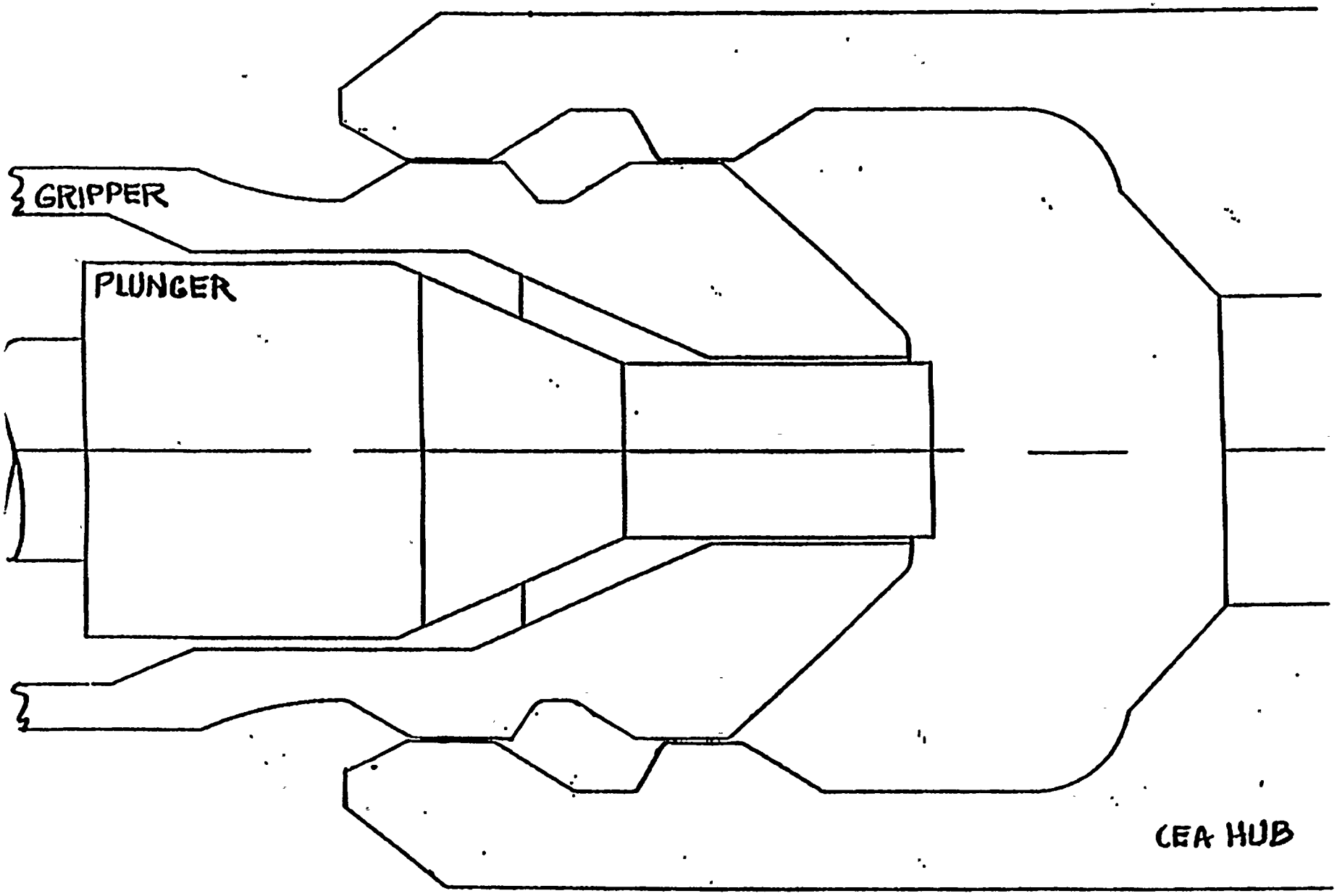
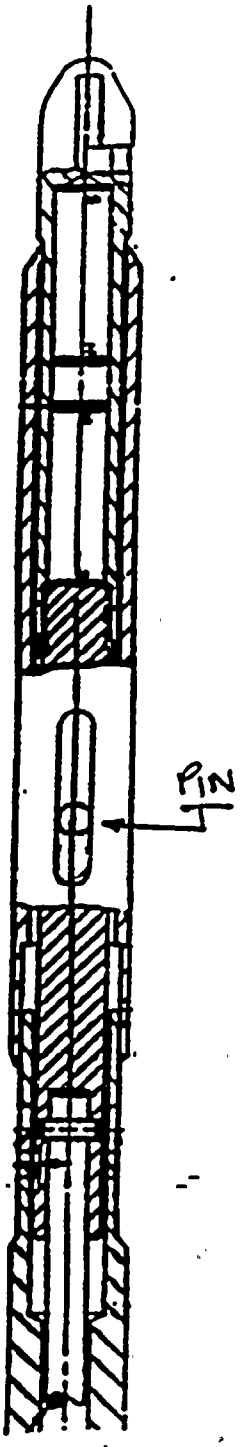


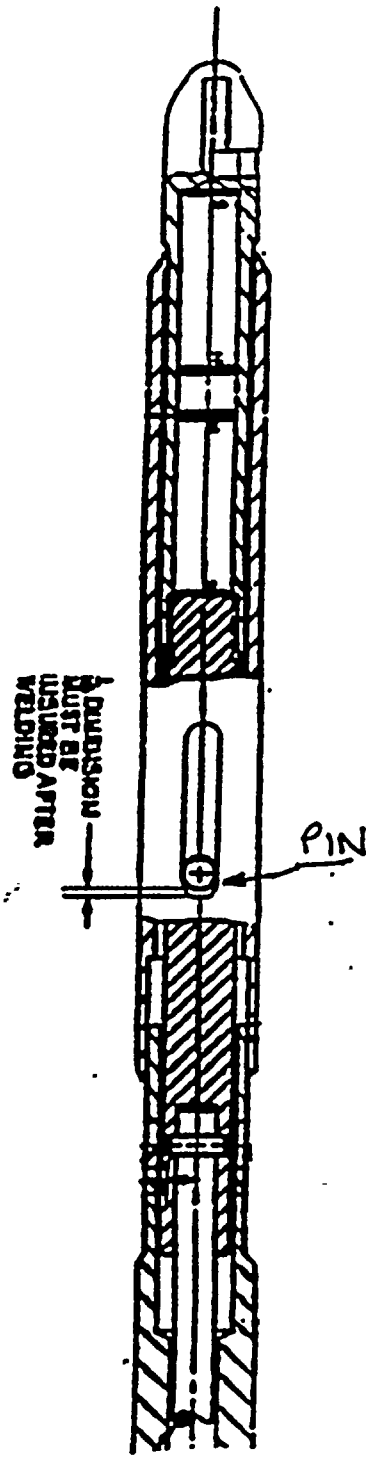
PROBABLE ROOT CAUSE



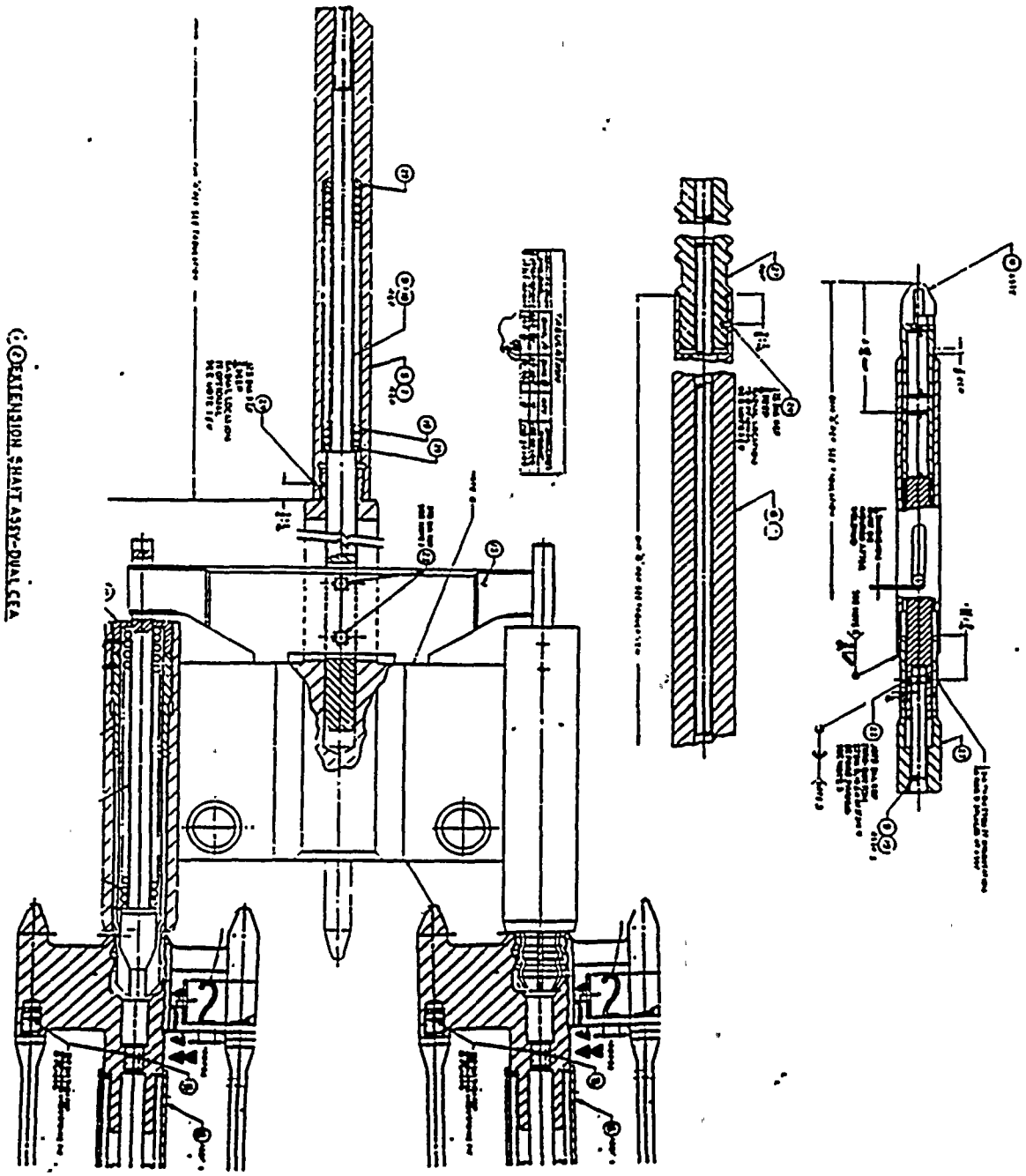
PROBABLE ROOT CAUSE



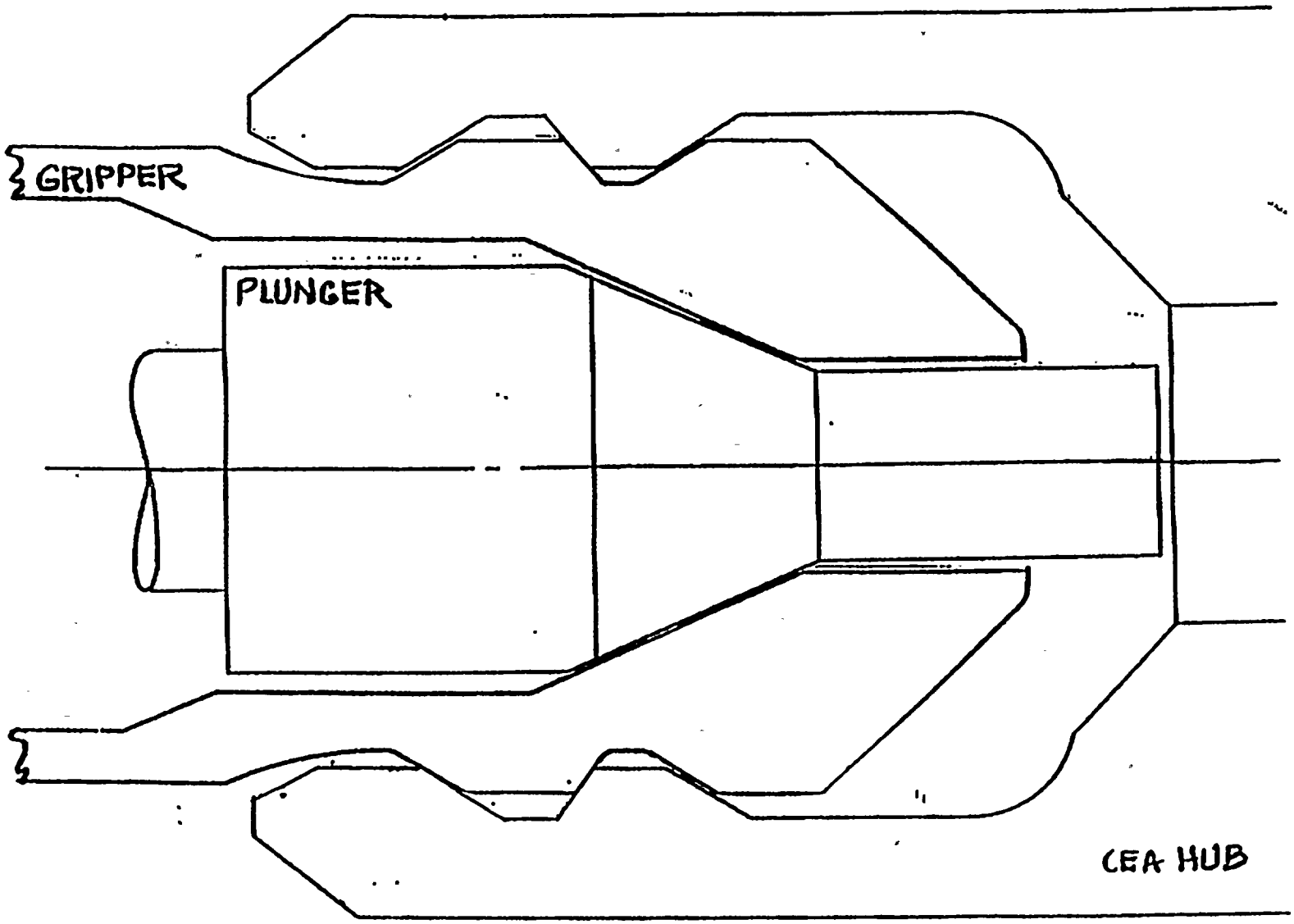
INCORRECT PIN POSITION



CORRECT PIN POSITION



Coupled Configuration



CORRECTLY COUPLED CEA

ST. LUCIE UNIT #1
UNLATCHED CONTROL ELEMENT ASSEMBLY

Long Term Actions

1. Enhance Coupling/Uncoupling Procedure By:
   (a) Add Requirements To Measure Coupled Extension Shaft Height
   (b) Include Step To Verify Adequate Slack Exists In Coupling Tool Suspension System

2. Human Factor Improvements To Improve Indicator Pin Verification
   (a) Supply Additional Lighting To Assist Position Indicator Pin Verification
   (b) Independant Verification Of Position Indicator Pin Location

3. Improve Training Of Personnel On The Implementation Of The Coupling And Verification Procedure

ST. LUCIE UNIT 2
DROPPED CEA EVENT

BACKGROUND

- May 21, 1993
- Reactor At 72% Power - Steady State; Water Box Cleaning In Progress
- Seven CEAs Dropped Fully Into Core
- Reactor Manually Tripped
- Fuel Group Analysis Concluded:
  - DNBR & PLHR Limits Not Exceeded
  - SAFDLs Not Violated
  - Event Bounded By Design Basis Analysis

ST. LUCIE UNIT 2
DROPPED CEA EVENT

ANALYSIS

- Root Cause Team Formed
  - Tech Staff Engineers
  - I&C Engineers
  - Site Design Engineers
  - ABB-CE Design Engineers
  - Containment Penetration Vendor Design Engineers
- Numerous Inspections & Tests Performed
  - CEDMCS System Component/Functional Test
  - Meggered & Tested All CEDM Penetrations For Grounds
  - Time Domain Reflectometer (TDR)
  - Local Leak Rate Testing (LLRT)
  - Visual Inspection Of Penetration With Vendor
- Root Cause For Event
  - Grounds In Containment Electrical Penetration

ST. LUCIE UNIT 2
DROPPED CEA EVENT

IMMEDIATE CORRECTIVE ACTIONS

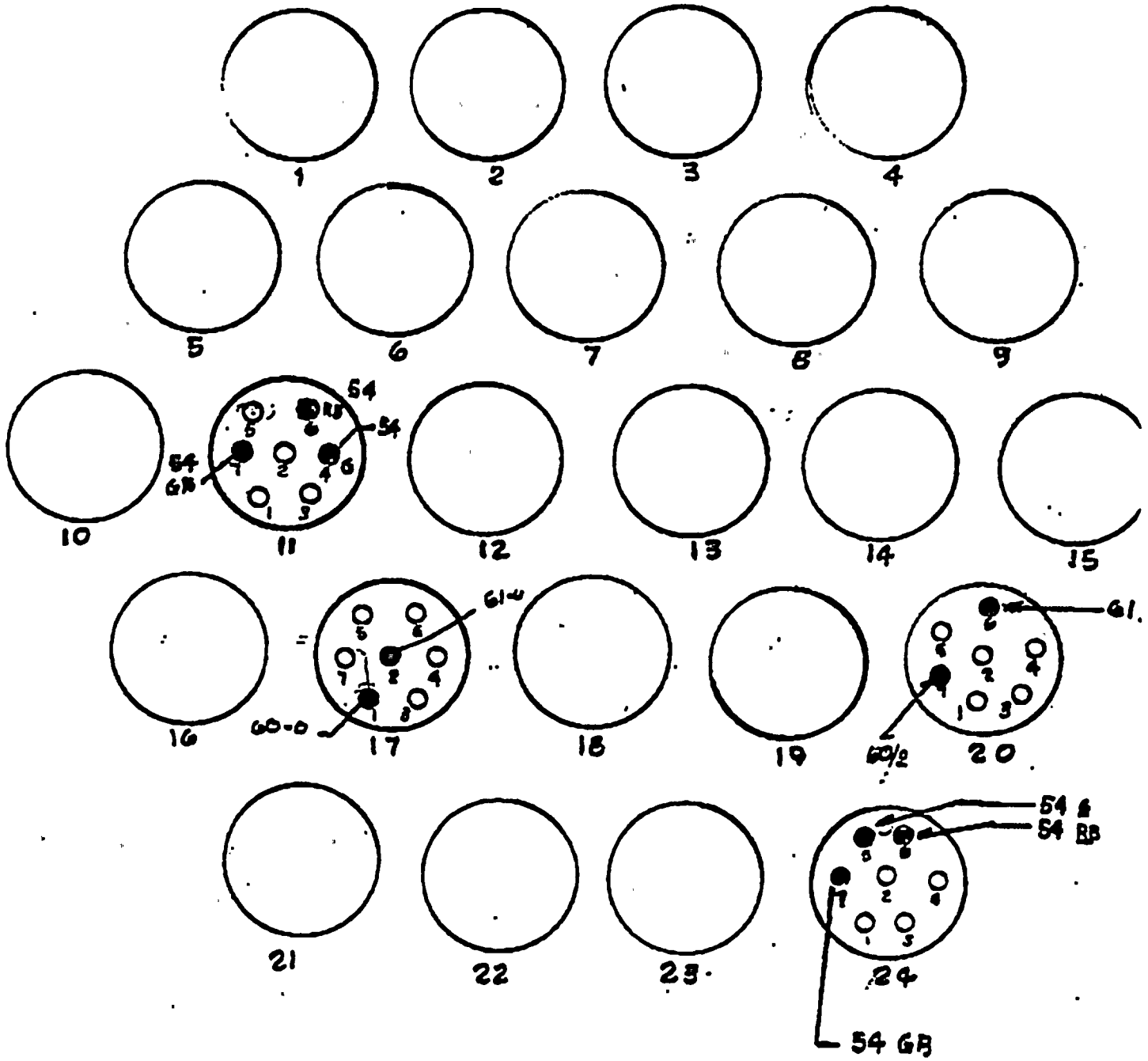
- Meggered All CEDMs From CEDMCS To Identify Grounds
- Re-Routed Grounded Connections To Tested Spare Penetration Conductors
- Monitored Output Of MGs Via Power Line Monitor

LONG TERM CORRECTIVE ACTIONS

- Perform Inspection Of Defective Penetration To Identify Failure Mechanism
- Addition Of Ground Detection System To CEDMCS Bus

PENET. D-1

(NB)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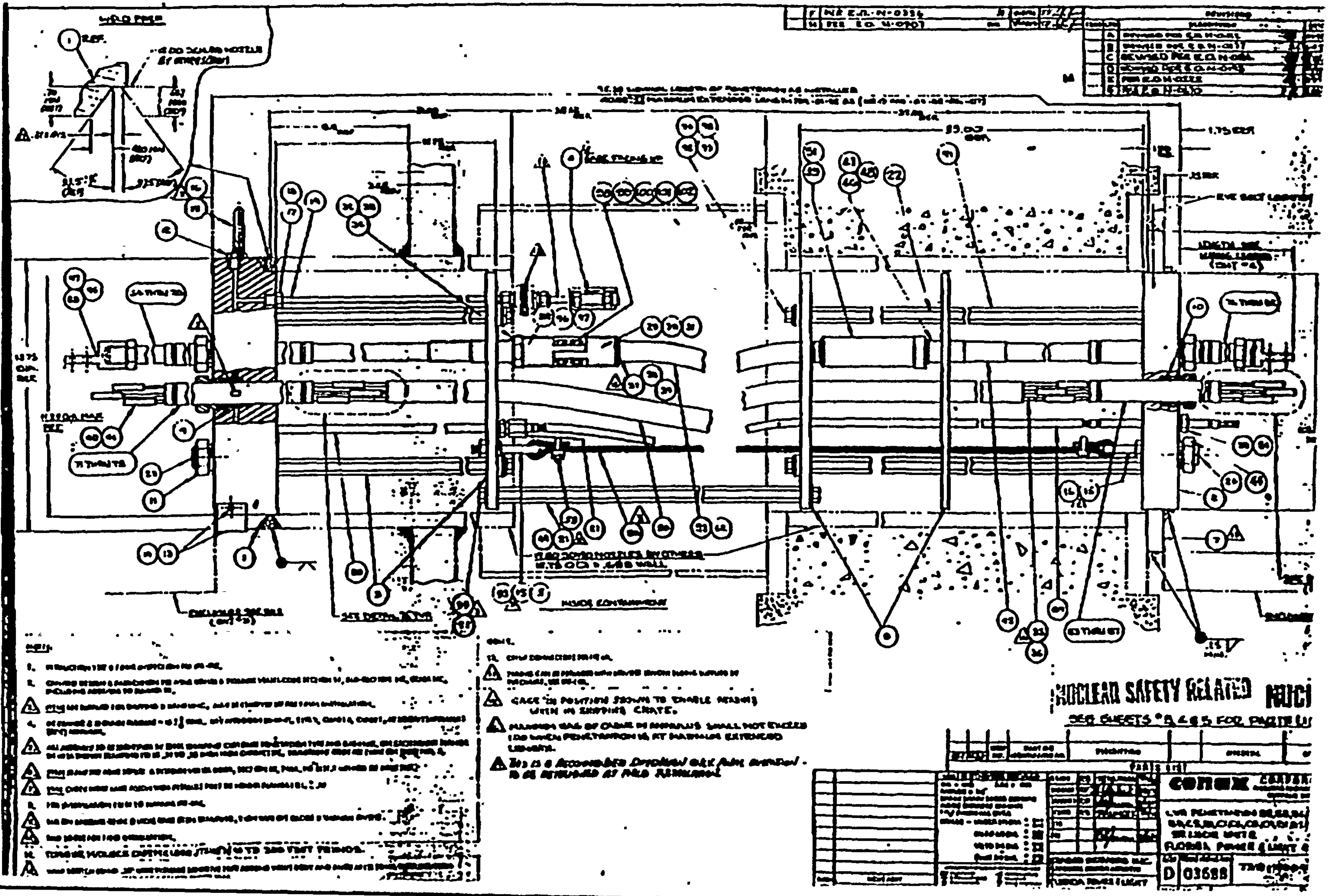

INSIDE CONTAINMENT
CAGE IN POSITION SHOWN TO ENABLE HANDLING WHEN IN SHIPPING CRATE.
NUCLEAR SAFETY RELATED
SEE SHEETS 2, 4 & 5 FOR PARTS LI
CONAX
FLORIDA POWER & LIGHT
D 03688

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
St. Lucie Unit 2	0 5 0 0 0 3 8 9	9 3	- 0 0 7	- 0 0	0 5 OF 0 5

TEXT *(If more space is required, use additional NRC Form 366A's)* (17)

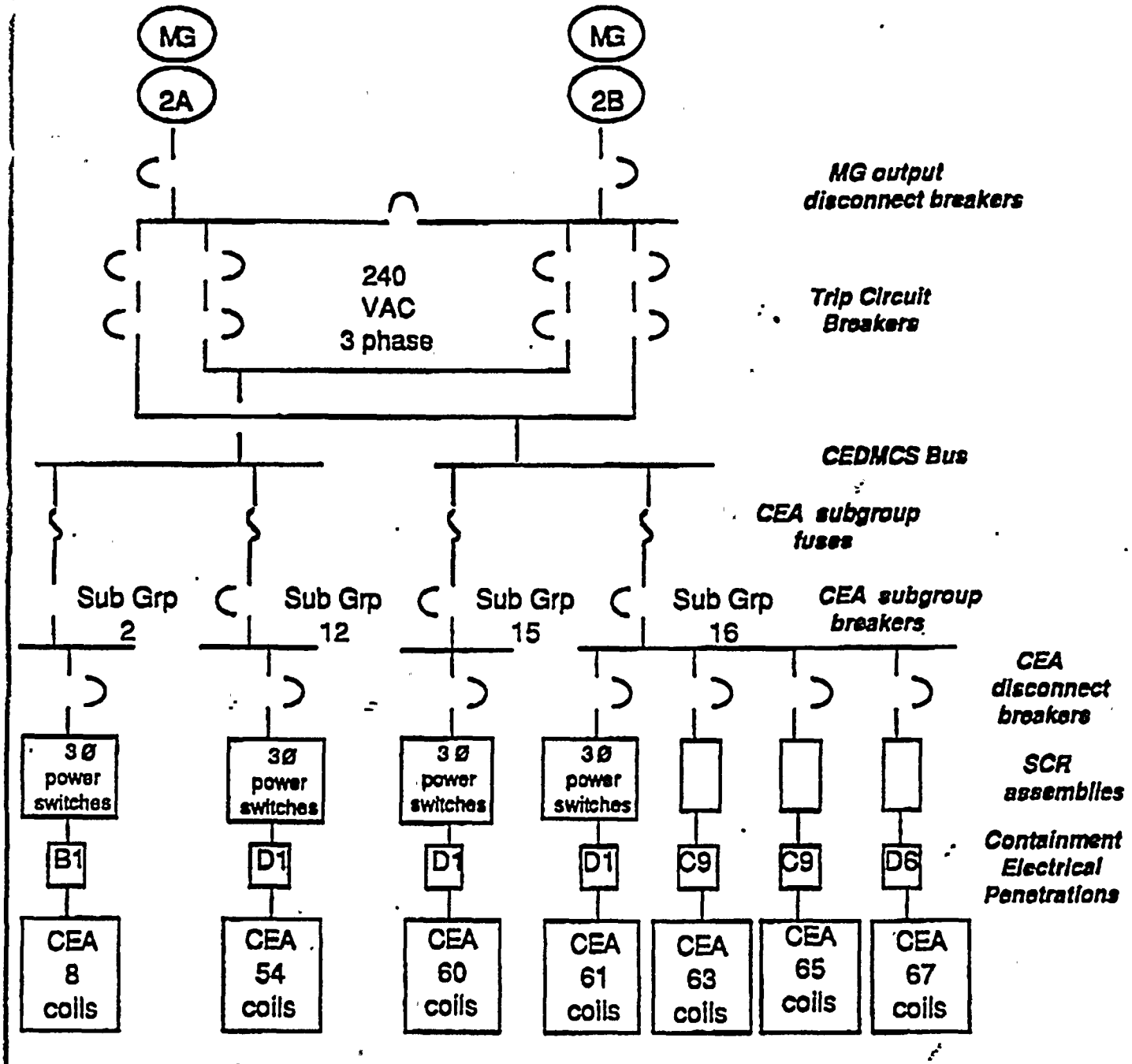


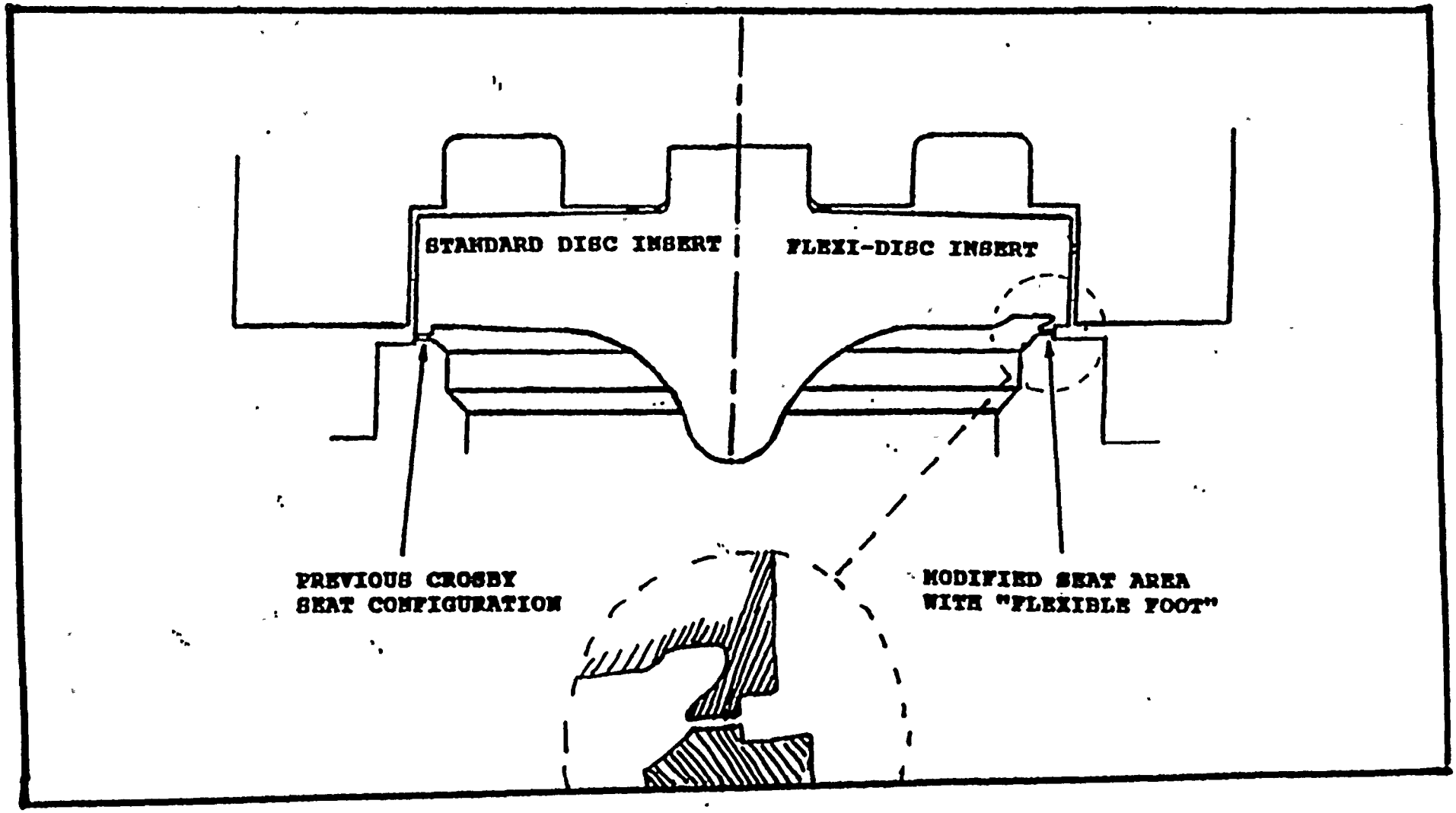
FIGURE ONE - CEA POWER DISTRIBUTION

ST. LUCIE PLANT
PRESSURIZER CODE SAFETY VALVE LEAKAGE

PRIOR TO 1992

- Use Of Crosby Valve Company (OEM) For Overhaul Of Valves To Assure Consistency And Expert Workmanship
- Revised Valve Testing Methodology To Test At NOP/NOT Conditions (At Wylie Test Labs) And Strengthen Acceptance Criteria For Leakage
- Evaluated Nozzle Loads With Respect To Vendor Recommended Values
- Converted To Flexi-Disc Design

FLEXI-DISC CONVERSION



ST. LUCIE PLANT
PRESSURIZER CODE SAFETY VALVE LEAKAGE

1992 LEAKAGE EVENTS

Unit 1

- Gradual Increase In Leakage To Quench Tank
- Operational Difficulties In Maintaining Quench Tank Level & Temperature
- Shutdown On Sept. 14th To Replace Valve V1202
- Instrumented Nozzles To Determine Loading

Unit 2

- Gradual Increase In Leakage To Quench Tank
- Operational Difficulties In Maintaining Quench Tank Level & Temperature
- Shutdown On Nov 24, 1992 & Replaced Valves V1201 & V1202
- Optimized SRV Tailpipe Spring Can Support

NON-LEAKING PLANTS WITH CROSBY SAFETY VALVES

PLANTS\INFO	SEAT LEAKAGE	VALVE/SIZE LOOP SEAL NSS	VALVE TRIM	MAX NOZZLE LOADS (% OF CROSBY ALLOWABLES)	SEAT LK TEST PRES. (% OF LIFT)	SRV AMBIENT CONDITIONS (°F)	COMMENTS
PLANT #1 (Two Units)	NO	3-CROSBY 6M6 DRAINED WESTINGHOUSE	FLEXI-DISC 2 Performed testing of Flexi-Disc 2 with Crosby at Wyle	<50%	95% ON STM	120	1. REDUCED NOZ. LOADS (major effort) 2. ADDED FLEXI-DISC 2 3. REDUCED AMBIENT TEMP.- ADDED HVAC DUCT 4. IMPROVED MAINT. & TESTING - 95% LK TEST ON STM - ZERO LK, - OPTICAL FLATS AT 1 LIGHT BAR - TEST AT WYLE, CROSBY REP. SOMETIMES
PLANT #2	NO	CROSBY $3k_26$ NONE WESTINGHOUSE 400 MWE	FLEXI-DISC 2 INSTALLED 1990	<100%	93% ON STM	140	1. REDUCED NOZ. LOADS (removed rigid support, added snubbers) 2. ADDED FLEXI-DISC 2 3. AMBIENT TEMP REDUCTION - NONE 4. INCREASED TESTING REQM'TS: - 93% LK TEST ON STM - ZERO LK. - OPTICAL FLATS (optional) - TEST AT WEST. WITH CROSBY REP.
PLANT #3 (Two Units)	NO	3-CROSBY 6M6 1-DRAINED 2-HOT WESTINGHOUSE	FLEXI-DISC 2	<50% ADDED FLEX JOINT	93% ON STM		1. DRAINED LOOP SEALS, AND LEAKAGE STARTED. ADDED FLEXIBLE JOINT 2. CHANGED TO FLEXI-DISC 2 3. TESTING AND MAINT: - 93% LK TEST ON STM - OPTICAL FLATS - CHANGED TO WEST. (PRICE & SERV)
PLANT #4 (Two Units)	NO	3 CROSBY 6M6 DRAINED WESTINGHOUSE	FLEXI-DISC 2	<50%	??	145-155	1. SRV SEAT LEAKAGE HAS NOT BEEN A PROBLEM 2. MAINTENANCE AND TESTING: - 93% LK TEST ON STEAM - TEST AT WYLE, WITH CROSBY REP.
PLANT #5	MINIMAL OR NONE	2-CROSBY $4M_16$ NONE B&W RUPTURE DISK	FLEXI-DISC 1 INSTALLED 1982	0% TEE WITH RUPTURE DISC	93% ON STM	120-140	1. PIPE MODS - REMOVED TAILPIPING, 1978 REMOVED LOOP SEALS AND INSTALLED TEES WITH RUPTURE DISC 2. ADDED FLEXI-DISC 1 3. AMBIENT TEMP REDUCTION - NONE 4. INCREASED TESTING REQM'TS: - 93% LK TEST ON STM - ZERO LK. - OPTICAL FLATS (optional) - TEST AT WYLE, USE IN-HOUSE MAINT.
PLANT #6	MINOR, IMPROVED	CROSBY 6M6 DRAINED WESTINGHOUSE	FLEXI-DISC 1	<100%	94% ON STM	100	1. MODIFIED PIPE TO IMPROVE ALIGNMENT 2. SRV'S SIT ON PLATFORM PINNED TO PRESSURIZER 3. AMBIENT TEMP REDUCTION - NONE 4. INCREASED LEAK TEST PRESS TO 94% ON NITROGEN WITH 10 BUB/MIN 5. TESTING LOC. - WYLE LABS WITH REP.

REV. 3/93

ST. LUCIE PLANT
PRESSURIZER CODE SAFETY VALVE LEAKAGE

LONG TERM ACTIONS

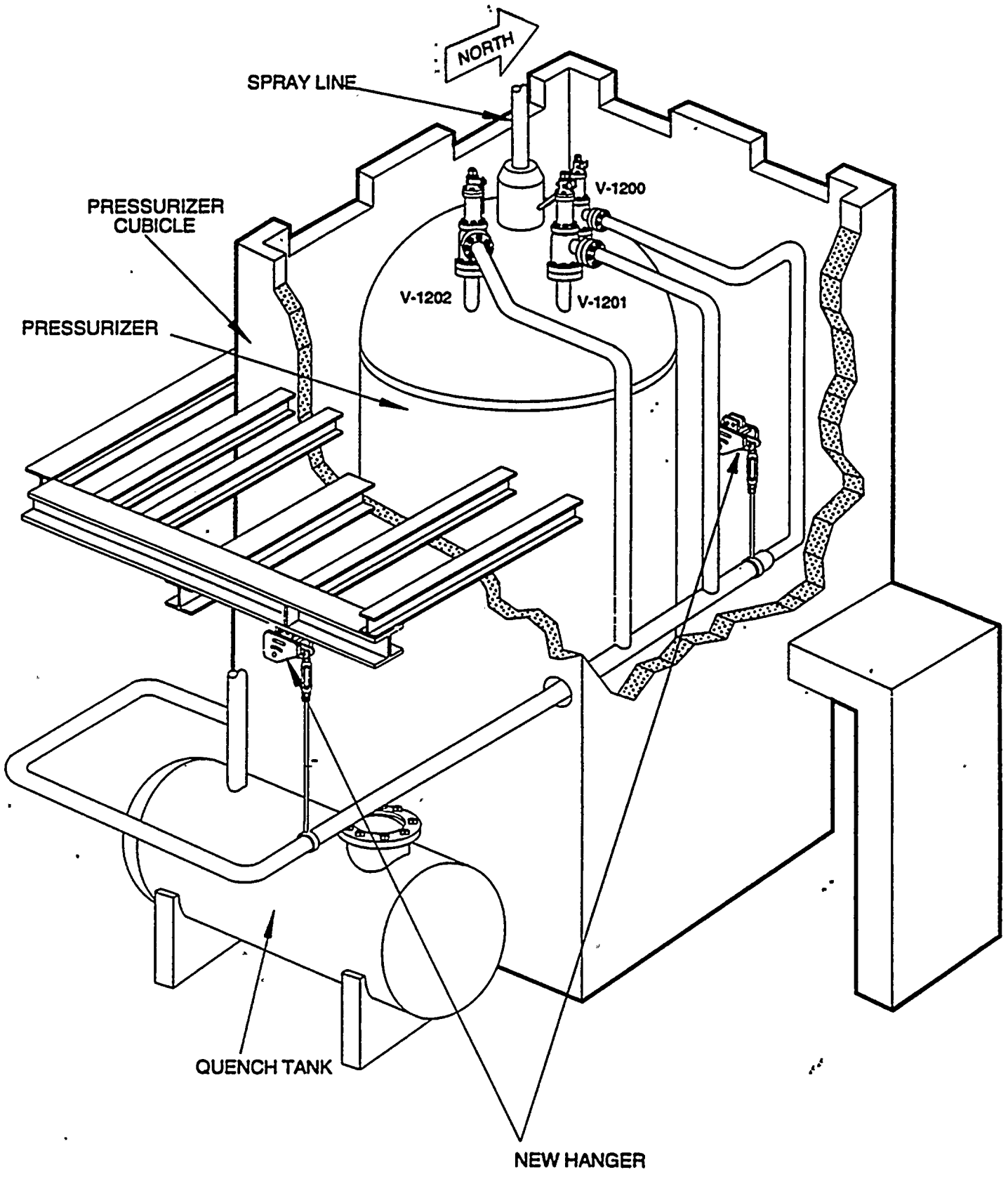
- Maintenance/Engineering/Staff Component Specialist Cross Functional Team Formed To Focus On Resolution

- Industry Analysis
  1. Six Utilities (Crosby Valves) Identified With Successful Results
  2. Identified Common Aspects Associated With Leakage Reduction
     - Consistent Maintenance & Testing Requirements
     - Flexi-Disc Valve Trim
     - Stable Valve Ambient Temperatures
     - Nozzle Loads < Crosby Allowable

FPL

ST. LUCIE UNIT 1

PRESSURIZER SAFETY VALVE PIPE MODIFICATION



ST. LUCIE PLANT
PRESSURIZER CODE SAFETY VALVE LEAKAGE

ACTION PLAN

- More Stringent Leak Test Acceptance Criteria
- Remove Tailpipe Cold Spring And Modify Supports To Reduce Valve Nozzle Loads
  - Unit 1 - 1993 Refueling Outage
  - Unit 2 - 1994 Refueling Outage
- Modify Local Insulation To Reduce Adverse Temperature Effects ("Chimney Effects") On SRVs
  - Unit 1 - 1993 Refueling Outage
  - Unit 2 - 1994 Refueling Outage
- Review Results Of The Above Actions

ST. LUCIE LESSONS LEARNED

- Team Remains Strong
- Plant Performance Remains Strong
- Plant Work Is Proactive & Conservative

ENGINEERING PROCESS & PRODUCT IMPROVEMENT

- 6/92 A/E Independence Complete
- 70 - 80% Engineering Manhours By FPL
- Transitioning To Operations/Maintenance Products & Direct Support
- Meaning
  - People's Attitudes Must Change On Their Accountabilities & Products
  - Management Needs To Change Training Emphasis

ENGINEERING PROCESS & PRODUCT IMPROVEMENT

PEOPLE EMPHASIS

New Accountability	Who Affects	Status	Value
Onsite Outage Package Implementation	Juno PEGs	10-15 People Each Site	- Accountability - Feedback
Supplement Site Engineering & Maintenance During Outages	All Juno Engineering	10-15 People Each Site	- Direct Plant Support - People Development
Onsite Leadership - Problem Solving - Assistant Outage Directors	Juno & Site Engineering	- Unlatched CEA - 4 Outage Directors - ESI Role	- Technical Leadership
Shift Training Emphasis From Design To Plant Operations	Engineering Management	- 4 SRO Complete - 2 to 4 SRO '93 - System Training - New Grad Training	- Plant Knowledge

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ENGINEERING PROCESS & PRODUCT IMPROVEMENT

PRODUCT EMPHASIS

Customer	Product	Status	Value
Maintenance	PSL Custom Vendor Manuals	50 Complete PSL	- Improved Troubleshooting & PMs
	Setpoint Document	Complete 12/93 Both Sites	- Defined Basis - One Document
	Maintenance Specifications	16 Complete Both Sites	- Independent Maintenance Action Within Design Basis
	Engineering Basis For PMs	Start 7/93 Both Sites	- Better PMs
Operations	PTN Split & Enhance P&IDs	PTN Complete	- Legibility - Accuracy
	PTN As Built Drawing Backlog	PTN Complete	- Improved Drawings, Quality
	DBDs	PTN Complete 15/40 PSL	- Problem Solving - Operation Training
	Plant Change/Modification Packages (PCMs)		
	3 New Design Output Products: • IEE • MEP • DCR	Complete	- Improved Responsiveness

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