

In Reply Refer To:
Docket: 50-267

MAR 9 1988

Public Service Company of Colorado
ATTN: Robert O. Williams, Jr.
Vice President, Nuclear Operations
2420 W. 26th Avenue, Suite 15c
Denver, Colorado 80211

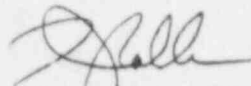
Gentlemen:

This letter documents a meeting held March 3, 1988, in the NRC Region IV office with you and members of your staff. An attendance list for the meeting is enclosed. The meeting addressed:

- ° The interchanged Helium circulator speed cables and other maintenance-related concerns.
- ° The leakage of Helium into the core support floor.
- ° The Helium circulator QA program quality levels.

We found the meeting to be beneficial. Enclosed are the handouts presented.

Sincerely,



L. J. Callan, Director
Division of Reactor Projects

Enclosures:
As stated

cc:
Fort St. Vrain Nuclear Station
Manager, Nuclear Production Division
16805 WCR 19½
Platteville, Colorado 80651

Fort St. Vrain Nuclear Station
P. Tomlinson, Manager, Quality
Assurance Division
(same address)

Colorado Radiation Control Program Director

Colorado Public Utilities Commission

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DISTRIBUTION:

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*Section Chief (DRP/B)

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*K. Heitner, NRR Project Manager

*R. Hall

*DRP

R. D. Martin, RA

*Project Engineer, DRP/B

Lisa Shea, RM/ALF

*RIV File

*DRS

FORT ST. VRAIN

MANAGEMENT MEETING ATTENDEES

NRC

T. F. Westerman	NRC/RIV	Chief, Reactor Projects Section D
J. P. Jaudon	NRC/RIV	Deputy Director, DRS
L. J. Callan	NRC/RIV	Director, DRP
R. F. Farrell	NRC/RIV	Senior Resident Inspector
R. P. Mullikin	NRC/RIV	Project Engineer

PSC

R. O. Williams, Jr.	PSC	VP Nuclear Operations
Don Warembourg	PSC	Manager, Nuclear Engineering
H. L. Brey	PSC	Manager, Nucl. Licensing and Fuel
Ralph Sargent	PSC	Asst. to VP Nuc. Ops.
P. F. Tomlinson	PSC	Manager, QA

FORT ST. VRAIN

NRC - PSC

MANAGEMENT CONFERENCE

ARLINGTON, TEXAS

MARCH 3, 1988

FORT ST. VRAIN

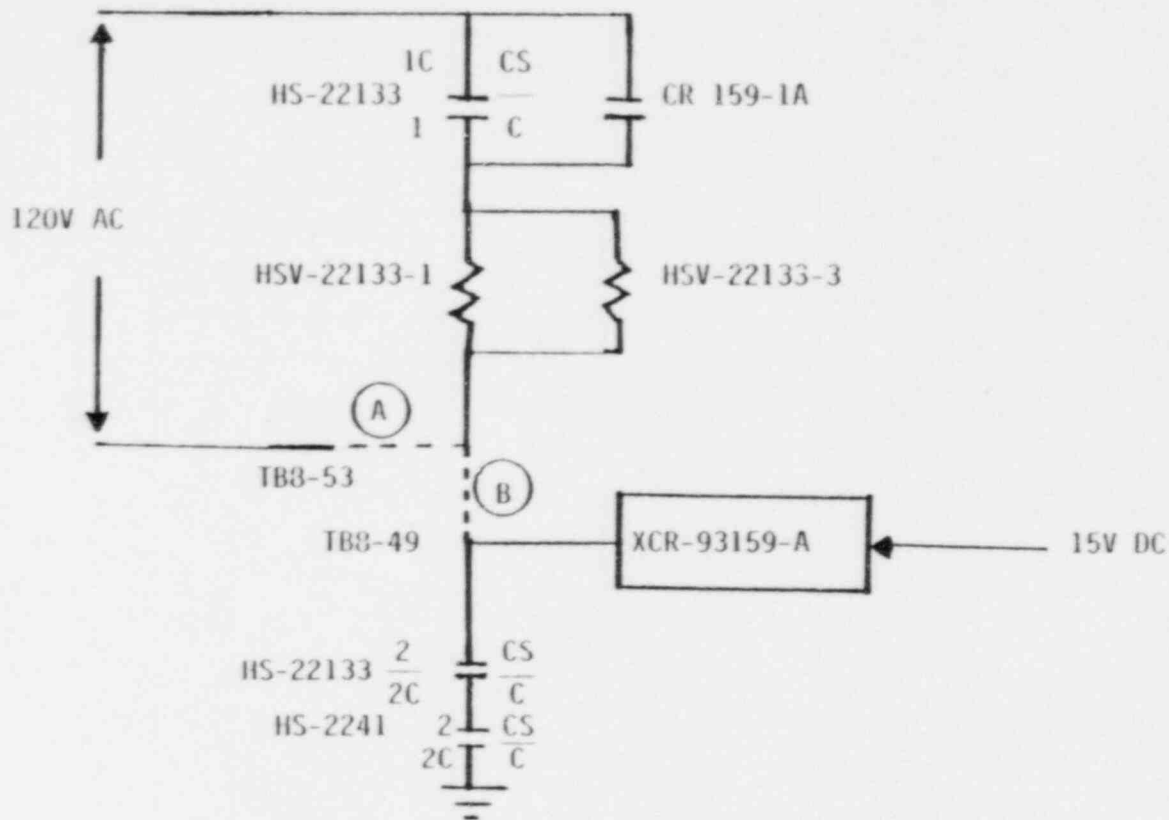
MISLANDED LEADS

EVENTS

- MISLANDED PPS LEAD (LER 87-029)
- TRIP OF RESERVE AUXILIARY TRANSFORMER (LER 87-028)
- EMERGENCY LIGHTING BATTERIES DAMAGE
- HOT REHEAT ROD RUNBACK
- MISLANDED CIRCULATOR SPEED CABLES (LER 88-002)

MISLANDED PPS LEAD

- EVENT DESCRIPTION
 - FIRE RECOVERY ACTIVITY
 - ELECTRICIAN PLACED TERMINATIONS ON POINTS 46, 47, 48, AND 49, VERSUS POINTS 46, 47, 48, AND 53
- CAUSE DESCRIPTION - PERSONNEL ERROR
- ACTIONS TAKEN
 - RELANDED LEAD
 - SITUATION DISCUSSED, PERSONNEL ADMONISHED



- A. Design lead connection.
- B. Miswired lead connection.

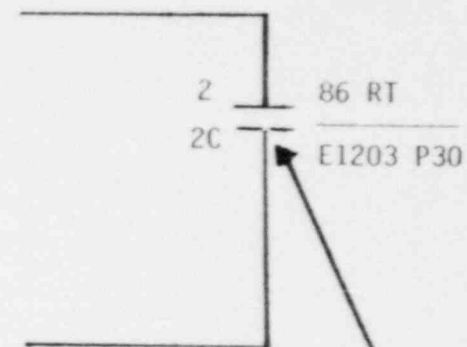
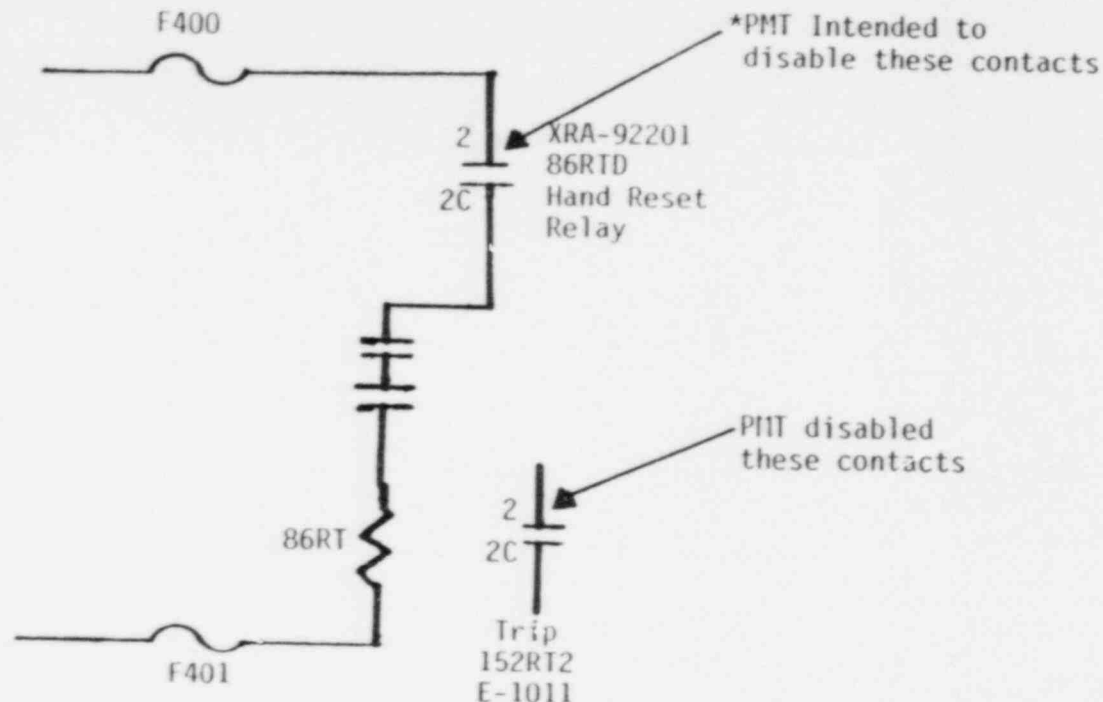
CIRCUITRY SIMPLIFIED FOR CLARITY

On December 1, 1987, following work performed under Change Notice CR-2701, cable 7487 was returned to service. During the reconnection of the cable 7487 leads to IB8 in 1-05, the ground return wire for solenoids HSV-22133-1 and HSV-22133-3 was inadvertently connected to the reset circuit of relay XCR-93159-A at IB8-49 instead of the proper location at IB8-53. Independent verification failed to detect the mispositioned lead.

The application of 120V AC to XCR-93159-A damaged the relay and caused it to chatter when energized from the operation of hand switch HS-2241. This chattering induced noise into the wide range channel neutron flux rate of change circuits and produced the reactor scram actuations. Refer to IER 87-029.

TRIP OF RESERVE AUXILIARY TRANSFORMER

- EVENT DESCRIPTION
 - POST MAINTENANCE TEST ACTIVITY
 - TEST PROCEDURE PREPARED BY BACKUP SYSTEM ENGINEER
 - RAT TRIP FUNCTION TO BE DISABLED FOR PURPOSE OF TEST
 - FIELD WALKDOWN OF PMT RESULTED IN INCORRECT CHANGE TO PROCEDURE
 - FIELD ERROR FAILED TO DEFEAT RAT TRIP DURING TEST
- CAUSE DESCRIPTION
 - PERSONNEL ERROR
 - PROCEDURAL INADEQUACY
- ACTIONS TAKEN
 - PROCEDURE CORRECTED
 - ORIGINAL DESIGN FUNCTION OF EQUIPMENT VERIFIED
 - IN-PLANT OPERATING EVENT REVIEW PERFORMED (OER 87-22)
 - ADMINISTRATIVE PROCEDURE BEING REVISED TO INCORPORATE INDEPENDENT REVIEW FOR PMT DEVELOPMENT



This is a portion of drawing E-1011. It was on this drawing that the 2-2c contacts of 86RT were mistaken for the 2-2c contacts of 86RTD.

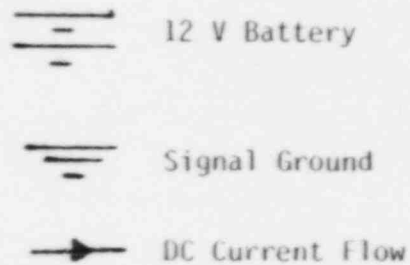
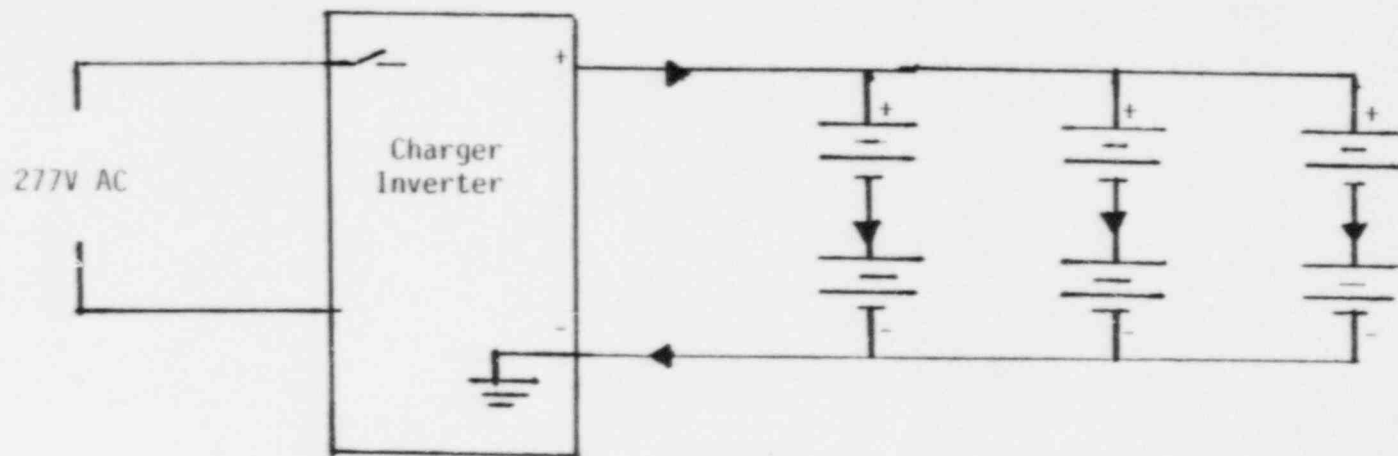
* PMT - Post Maintenance Test

Prior to reactor startup, a Post Maintenance Test was to be performed on firewater deluge control relay CR-4505. This relay initiates numerous actions including local and remote alarms, firewater pump starts, and firewater system valve closures. CR-4505 was disassembled and cleaned following the inadvertent RAT deluge actuation that occurred on October 30, 1987. Following these maintenance activities, Post Maintenance Testing (PMT) was required. The test plan was to actuate the RAT deluge system and CR-4505, via HS-4516 and verify completion of the various automatic actions that are initiated by CR-4505. Actuation of the RAT deluge system automatically opens the RAT feedbreakers; this automatic RAT trip function was to be disabled. To accomplish this, without disabling other functions, one of the leads on the 2-2C contact of XRA-92201 (86RTD) was to be lifted. After a field walkdown it was discovered that due to its physical location, XRA-92201 was relatively inaccessible; to remove its housing cover as to allow the disconnection of the 2-2C contact leads would require a substantial amount of time. Plant electrical drawings were referenced. On E-1011, the 2-2C contacts of 86RT (see Figure 2) were mistaken for the 2-2C contact of 86RTD. This error failed to prevent the automatic opening of the RAT feedbreakers during the test as intended.

CIRCUITRY SIMPLIFIED FOR CLARITY

EMERGENCY LIGHTING BATTERIES DAMAGE

- EVENT DESCRIPTION
 - VENDOR INSTALLATION PRECAUTION NOT INCORPORATED INTO FIELD INSTALLATION INSTRUCTIONS
 - INSTALLATION RESULTED IN DAMAGE TO BATTERIES
 - PROBLEM DISCOVERED DURING PRE-OPERATIONAL TESTING
- CAUSE DESCRIPTION - PROCEDURAL INADEQUACY
- ACTIONS TAKEN
 - NEW BATTERIES OBTAINED AND INSTALLED CORRECTLY (IN PROGRESS)
 - THE DESIGN CHANGE PROCESS IS BEING CHANGED WITH ONE OF THE OBJECTIVES BEING IMPROVING WORK PACKAGES

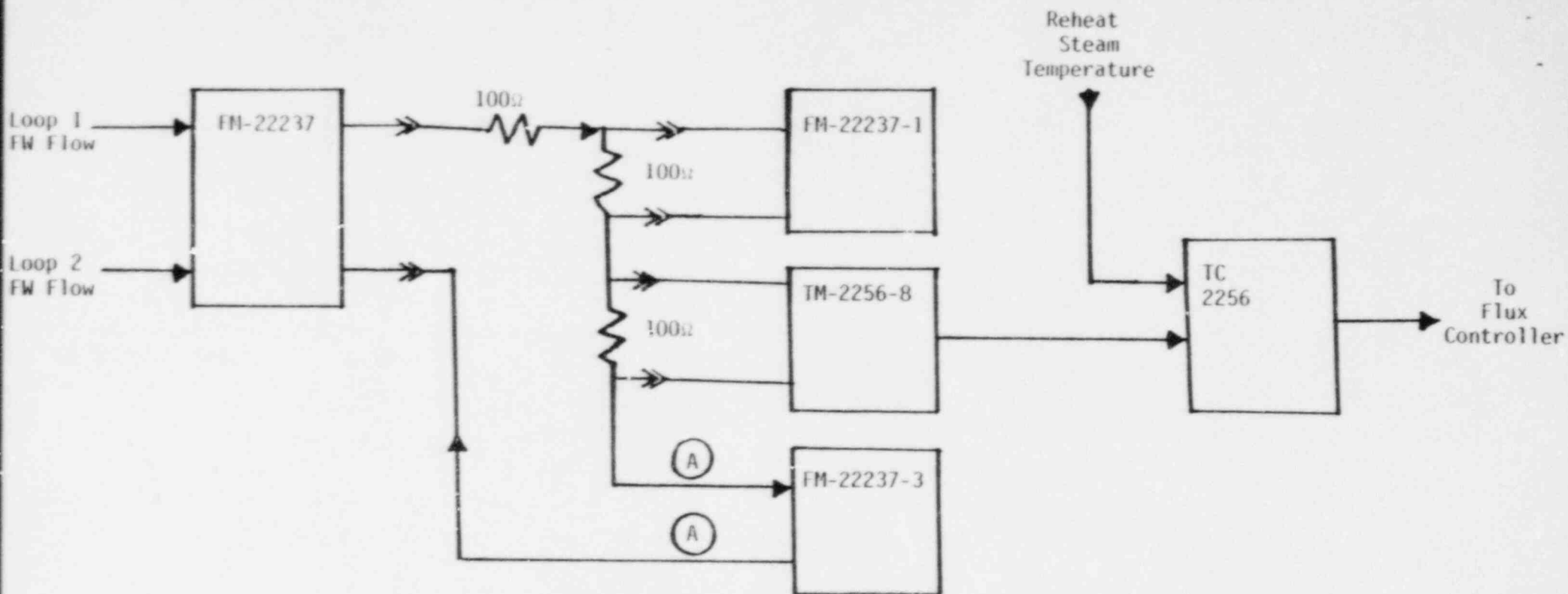


The charger inverter supply was turned off with the batteries connected. This allowed the batteries to completely discharge. When the switch was turned on, high current for charging boiled the electrolyte and ruined the batteries.

CIRCUITRY SIMPLIFIED FOR CLARITY

HOT REHEAT ROD RUNBACK

- EVENT DESCRIPTION
 - TROUBLESHOOTING EFFORT FOR CORRECTIVE MAINTENANCE UNDERWAY
 - SYSTEM WAS RECONFIGURED FOR PRIMARY EFFECTS WITHOUT ADEQUATE CONSIDERATION OF SECONDARY EFFECTS
 - MAINTENANCE ACTIVITY INTRODUCED UNANTICIPATED SECONDARY CIRCUIT RESPONSE
- CAUSE DESCRIPTION
 - PROCEDURAL INADEQUACY
 - ADMINISTRATIVE CONTROLS
- ACTIONS TAKEN
 - OPERATOR RESPONSE MINIMIZED EFFECT OF TRANSIENT
 - SECONDARY CIRCUIT AND OTHER CONTROLS WERE CONFIGURED TO MAINTAIN PARAMETERS
 - CONTROLS RECALIBRATED AS INTENDED



▶ DC Current Flow

➤ Instrument Plug

(A) Leads disconnected by Instrument Tech.

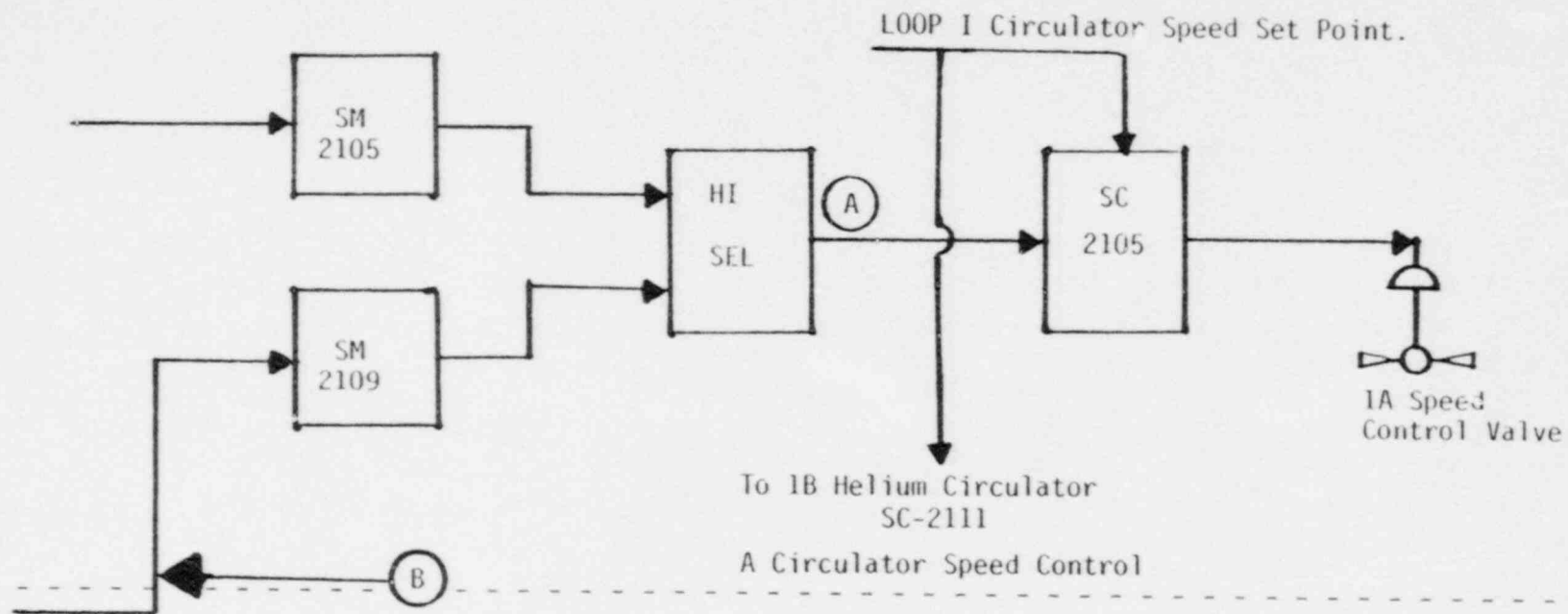
Results: When the leads to FM-22237-3 were disconnected the current (ma) output of FM-22237 went to zero.

The loss of input to TM-2256-8 feeds through to the setpoint of TC-2256 and the flux controller as an error. The magnitude was sufficient to cause a rod runback.

CIRCUITRY SIMPLIFIED FOR CLARITY

MISLANDED CIRCULATOR SPEED CABLES

- EVENT DESCRIPTION
 - PLANT PERFORMANCE TESTING IDENTIFIED POTENTIAL PROBLEM
 - CORRECTIVE MAINTENANCE ACTIVITY UNDERTAKEN
 - INCORRECT CABLE FROM 'B' CIRCULATOR ATTACHED TO 'A' CIRCULATOR CONTROLS
 - PLANT TRANSIENT RESULTED FROM 'A' CIRCULATOR CONTROLS RESPONDING TO 'B' CIRCULATOR PROCESS INPUTS
- CAUSE DESCRIPTION
 - PERSONNEL ERROR
 - PROCEDURAL INADEQUACY
- ACTIONS TAKEN
 - ALL SPEED CABLES COLOR CODED FOR CORRESPONDING CIRCULATORS
 - CABLE NUMBERS AND LOCATIONS VERIFIED TO DESIGN DOCUMENTS, NO OTHER DEFICIENCIES FOUND
 - PLANT PERFORMANCE TEST SURVEILLANCE WAS REVISED TO DOCUMENT CABLE CHANGES AND PROVIDE FOR INDEPENDENT REVIEW OF SURVEILLANCE DRIVEN ACTIVITIES



A. 1A Helium Circulator measured signal.

B. 1B Helium Circulator speed cable improperly connected to 1A Helium Circulator.

RESULT: When B Helium Circulator speed exceeds A Helium Circulator speed and is above the speed set point.

1. 1A Helium Circulator speed controller starts closing the speed valve which decreases 1A Helium Circulator speed. This process repeats until 1A Circulator trips on programmed speed low.

NOTE: CIRCUITRY SIMPLIFIED FOR CLARITY.

MANAGEMENT ASSESSMENT ANALYSIS

COMMON CONDITIONS

- PERSONNEL ERROR
- PROCEDURAL INADEQUACY

VARIABLE CONDITIONS

- PLANT STATUS
- PERSONNEL INVOLVED
- WORK ACTIVITY IN PROGRESS

MAINTENANCE

MODIFICATION

TESTING

PERFORMANCE MONITORING

CONCLUSION

- ROOT CAUSE
 - MIXED SIGNALS TO PERFORMANCE LEVEL PERSONNEL
- CONTRIBUTING FACTORS
 - OPERATIONAL FACTORS
 - QUALIFIED PEOPLE NEW TO FORT ST. VRAIN
 - NEW PROGRAMS/PROCEDURES

ROOT CAUSE - ISSUE SPECIFIC

ACTIONS TAKEN

- ISSUE PRESENTED TO I&C TECHNICIANS AND PLANT ELECTRICIANS
- MANAGEMENT EXPECTATIONS CLARIFIED , "ZERO DEFECTS"
- USER DEVELOPED "LIFTED LEADS" POLICY DRAFTED
- "LIFTED LEADS" POLICY UNDER MANAGEMENT REVIEW
- PMT CONTROLS REVISED TO INCORPORATE INDEPENDENT REVIEW
- PMT PROGRAM UNDER REVIEW

FUTURE ACTIONS

- PRESENT ISSUE AND MANAGEMENT EXPECTATIONS TO REMAINING STAFF
- FORMALIZE AND ISSUE ADMINISTRATIVE PROCEDURES FOR LIFTED LEADS

ROOT CAUSE - ORGANIZATIONAL SOLUTION

- ENHANCE THE COMMUNICATIONS OF MANAGEMENT EXPECTATIONS
- ENCOURAGE AN ATMOSPHERE WHICH PROMOTES CONSISTENCY AND FEEDBACK
- IMPROVE THE MONITORING OF NEW PROGRAMS AND ADJUST AS NECESSARY

PLAN FOR IMPLEMENTATION OF ORGANIZATIONAL SOLUTION

- PROMOTE TOP LEVEL STATEMENT OF WORK:
"THE NUCLEAR OPERATIONS ORGANIZATION SHALL USE ITS BEST JUDGEMENT, SKILL AND CARE IN ALL MATTERS PERTAINING TO ITS PERFORMANCE, AND SHALL USE GOOD BUSINESS PRACTICES IN OPERATING AND MAINTAINING THE FORT ST. VRAIN NUCLEAR FACILITY TO COMBINE EFFICIENCY WITH SAFETY, QUALITY, SECURITY AND PLANT RELIABILITY."
- CLARIFY MANAGEMENT EXPECTATIONS TO ALL NUCLEAR ORGANIZATION PERSONNEL WITH THE FOLLOWING PRIORITY:
 - FIRST - SAFE OPERATION
 - SECOND - QUALITY OF WORK
 - THIRD - FINANCIAL
- CONTINUE ISSUE SPECIFIC PERFORMANCE LEVEL DISCUSSIONS
- IMPROVE UTILIZATION OF FEEDBACK TO IMPLEMENT SPECIFIC SOLUTIONS
- CONTINUE TO FOCUS RESOURCES TO RESOLVE ISSUES

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HELIUM CIRCULATOR
PROCUREMENT ISSUES

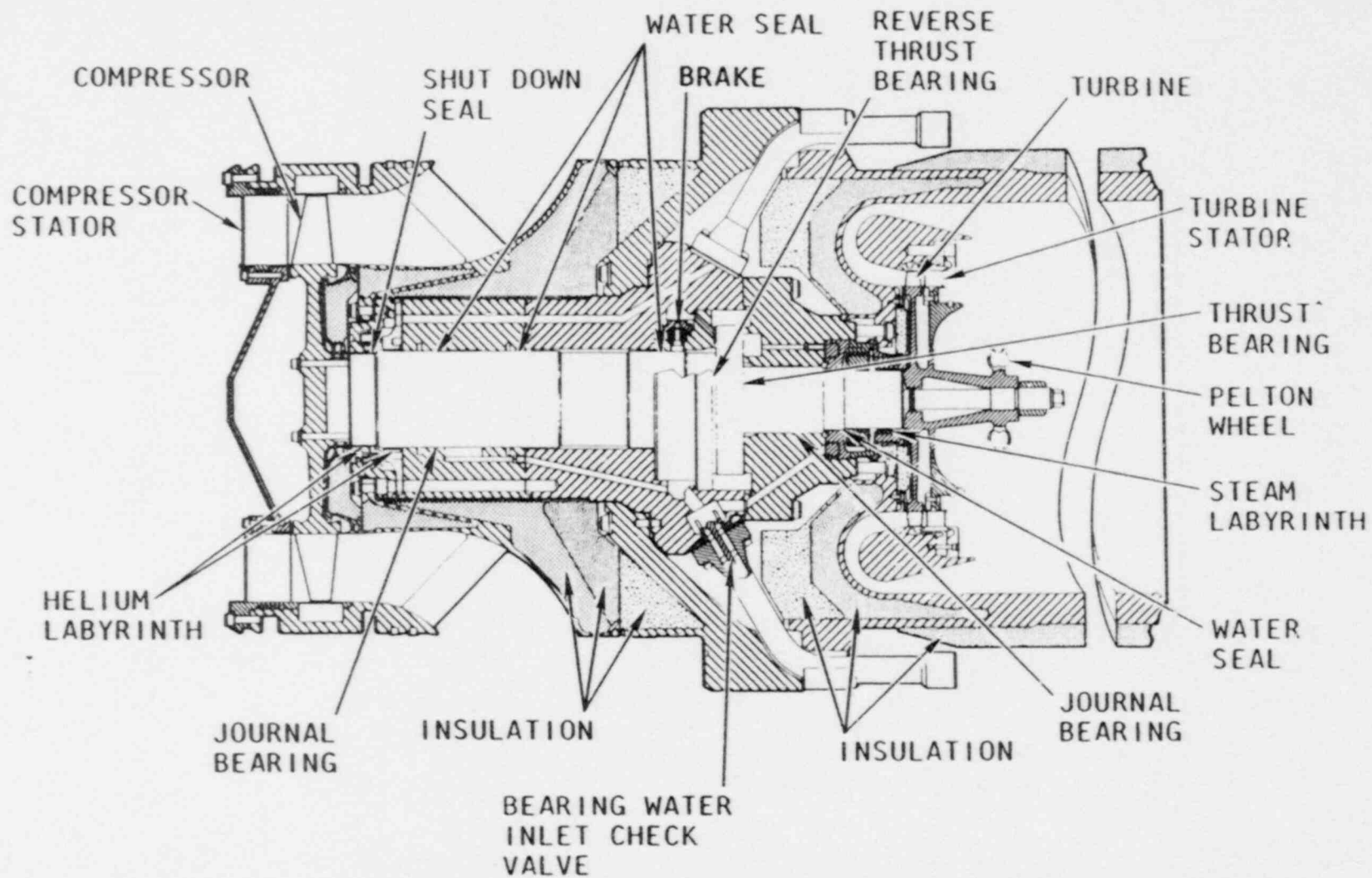


Figure 4.2-1 Helium Circulator Assembly

GA'S GRADED QUALITY ASSURANCE PROGRAM

QAL I SAFETY-RELATED

QAL II NONSAFETY-RELATED

QAL III NONCRITICAL APPLICATIONS

PROBLEM IDENTIFICATION

PSC QA AUDIT OF GA'S PROGRAM CONDUCTED WEEK OF JANUARY 11, 1988

PSC IDENTIFIED THAT A CIRC PELTON WHEEL HAD BEEN PROCURED TO QAL II

PSC'S P.O.'S TYPICALLY REQUIRED GA TO WORK OR SUPPLY PARTS IN ACCORDANCE WITH GA'S QA MANUAL WITH THE INTENT THAT GA APPLY APPROPRIATE QAL LEVEL REQUIREMENTS FOR SAFETY RELATED COMPONENTS (10CFR50 APP B)

ROOT CAUSE

PSC'S PROCUREMENT SYSTEM DID NOT RECOGNIZE GA'S GRADED
PROCUREMENT SYSTEM

GA INAPPROPRIATELY PROCURED THE PELTON WHEEL TO A QAL LEVEL II
REQUIREMENT

IMMEDIATE ACTIONS

PSC NOTIFIED SITE RESIDENT INSPECTOR WHO IN TURN NOTIFIED NRR AND REGION IV

GA NOTIFIED REGION V OF A POSSIBLE DEVIATION

PSC IN TURN NOTIFIED REGION IV AND NRR OF GA'S NOTIFICATION

PSC PART 21 COMMITTEE CONSIDERED SITUATION WITH DETERMINATION IT WAS NOT REPORTABLE UNDER PART 21 AT THIS TIME

ASSESS PLANT OPERABILITY

- REVIEW ACTIVE PROCUREMENT OF PARTS FOR UPCOMING CIRC OUTAGE

REVIEW ACTIVE PROCUREMENT FOR CIRC (C-2101) AND TAIL PIPE REFURBISHMENT

ESTABLISHED INTERIM P.O. REQUIREMENTS FOR PSC/GA PROCUREMENT TO ESSENTIALLY REQUIRE GA PROCUREMENT AT QAL LEVEL 1 FOR SAFETY RELATED APPLICATIONS UNLESS OTHERWISE APPROVED BY PSC

PARTS IN REACTOR

PSC HAS SELECTED 3 MAJOR COMPONENTS FOR SAFETY FUNCTION REVIEW (CIRCULATOR, CONTROL ROD DRIVES, MOISTURE MONITORS)

THE LICENSING BASIS FOR THE COMPONENTS WAS REVIEWED. A LIST OF THE SAFETY FUNCTIONS WAS GENERATED

AN ENGINEERING EVALUATION WAS PERFORMED TO VERIFY OPERABILITY. FINAL DOCUMENTATION OF THIS REVIEW IS IN PROCESS

OPERABILITY REVIEW RESULTS

- ALL SAFETY FUNCTIONS ARE VERIFIED OR THEIR PURCHASE WAS QAL 1
- SAFETY FUNCTION IS DEMONSTRATED VIA NORMAL OPERATION, SURVEILLANCES AND SPECIAL TESTS

COMPLETED
FOLLOW-UP ACTIONS

ON FEBRUARY 10, 1988, A JOINT PSC, GA, NRC REGION IV MEETING WAS HELD IN SAN DIEGO TO DISCUSS ISSUES AND ACTION PLANS

PSC QA COMPLETED A REVIEW OF ALL APPROVED VENDORS TO ENSURE SIMILAR PROBLEMS DO NOT EXIST WITH OTHER VENDORS

EQUIPMENT SAFETY FUNCTION ANALYSES COMPLETED

PSC QA COMPLETED AN AUDIT OF CLOSED GA PO'S TO ASSESS OVERALL PROGRAM COMPLIANCE

COMPLETED QAL LEVEL CLASSIFICATION OF CIRCULATOR PARTS FOR UPCOMING OUTAGE

IDENTIFIED CLOSED GA PURCHASE ORDERS AND CATEGORIZED THESE ORDERS TO IDENTIFY QAL LEVEL ISSUES

ON GOING ACTION

PSC ENGINEERING FINALIZING DOCUMENTATION (ENGINEERING EVALUATIONS)
IN SUPPORT OF PLANT OPERATIONS

PSC/GA COMPLETING REVIEW OF SELECTED MAJOR PROCUREMENT PACKAGES
TO RESOLVE ANY QAL LEVEL ISSUES

CONTROL ROD DRIVE REFURBISHMENT	- 70% COMPLETE
MOISTURE MONITORS	- 80% COMPLETE
CIRCULATOR C-2101	- 40% COMPLETE
CIRCULATOR C-2104	- 10% COMPLETE

PSC ENGINEERING DOCUMENTING FINAL RESOLUTION OF ISSUES IN AN ENGINEERING
EVALUATION OR SERIES OF EVALUATIONS

PSC ENGINEERING/LICENSING TO PROVIDE FINAL RESOLUTION OF ISSUES TO
THE NRC. TARGETED FOR APRIL 1988

FORT ST, VRAIN

CORE SUPPORT

FLOOR ISSUES

FORT SAINT VRAIN STATION

CORE SUPPORT FLOOR

- I PHYSICAL ORIENTATION

- II HISTORICAL REVIEW
 - o COOLING TUBE LEAKS
 - o LINER LEAK

- III EVALUATIONS AND CORRECTIVE ACTION
 - o CSF TUBES, EPOXY
PHYSICAL
ADMIN.

 - o CSF LINER
PHYSICAL
ADMIN.

 - o PASSIVE VENT SYSTEM

 - o OTHER STUDIES

- IV ACTIONS IN PROGRESS
 - o MONITORING/TRENDING

 - o SAFETY RELIEF VALVE MODIFICATIONS

- V SAFETY IMPLICATIONS

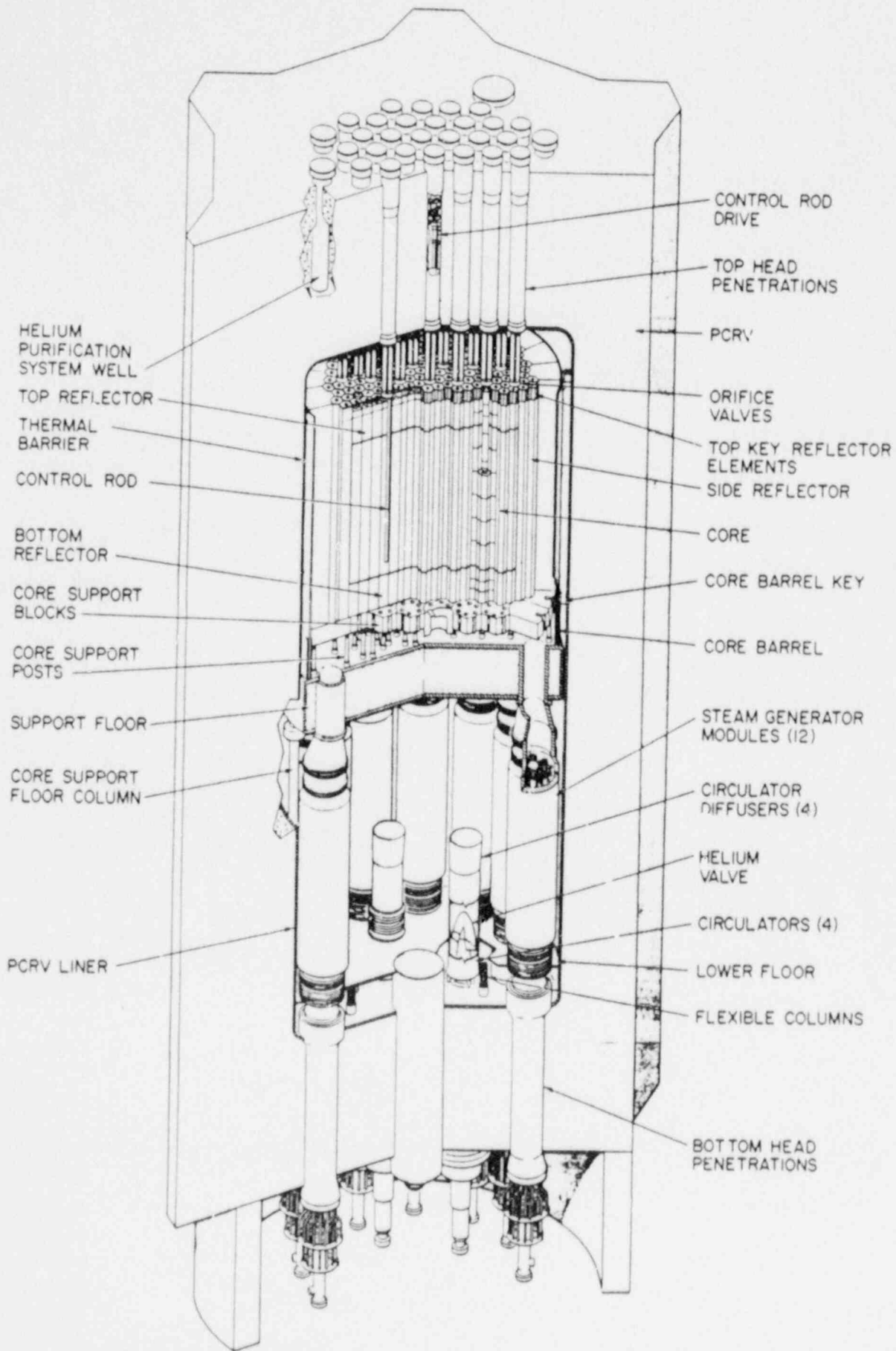
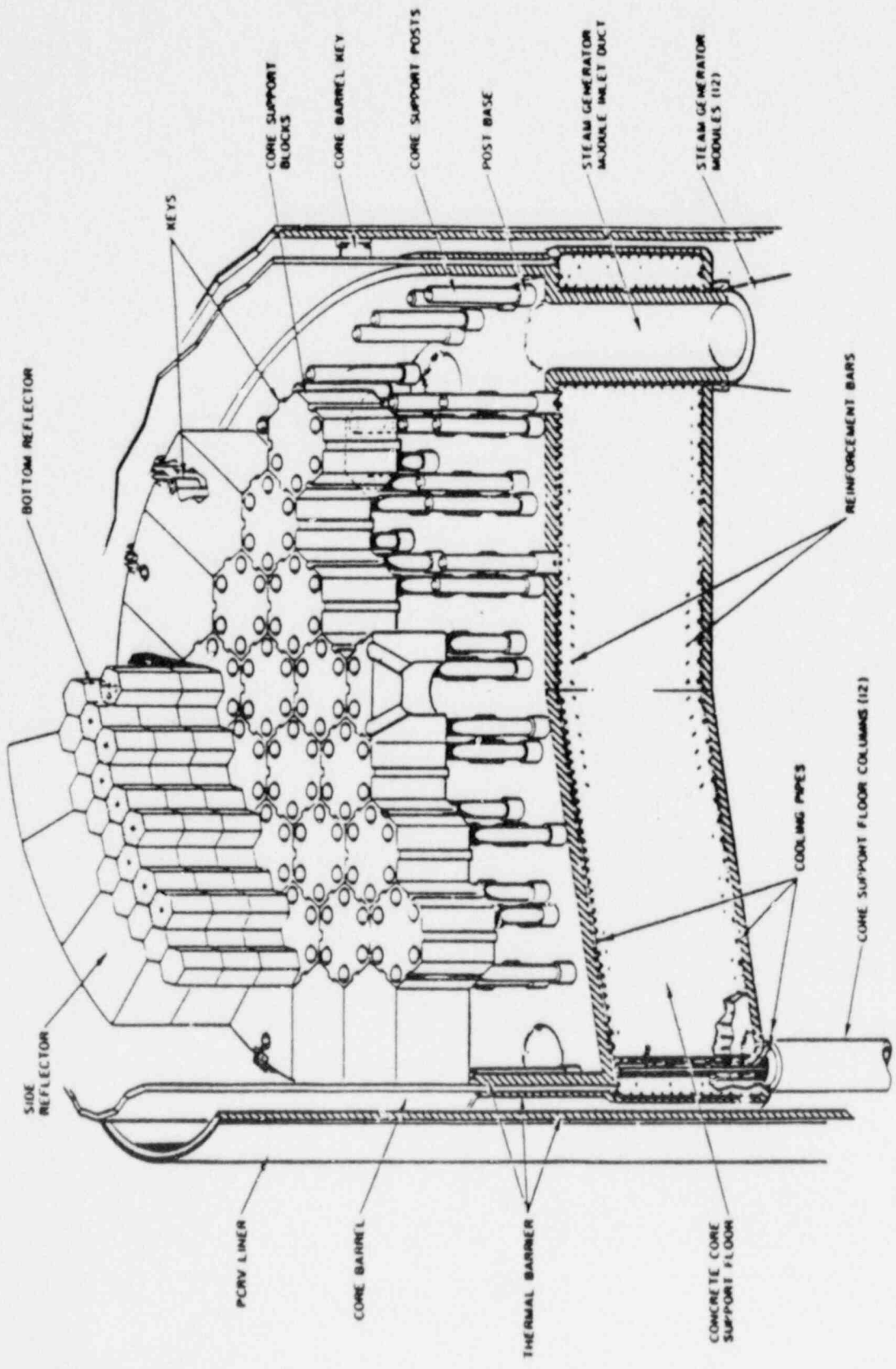


Figure 3-1-1 Reactor Arrangement



Core Support Arrangement

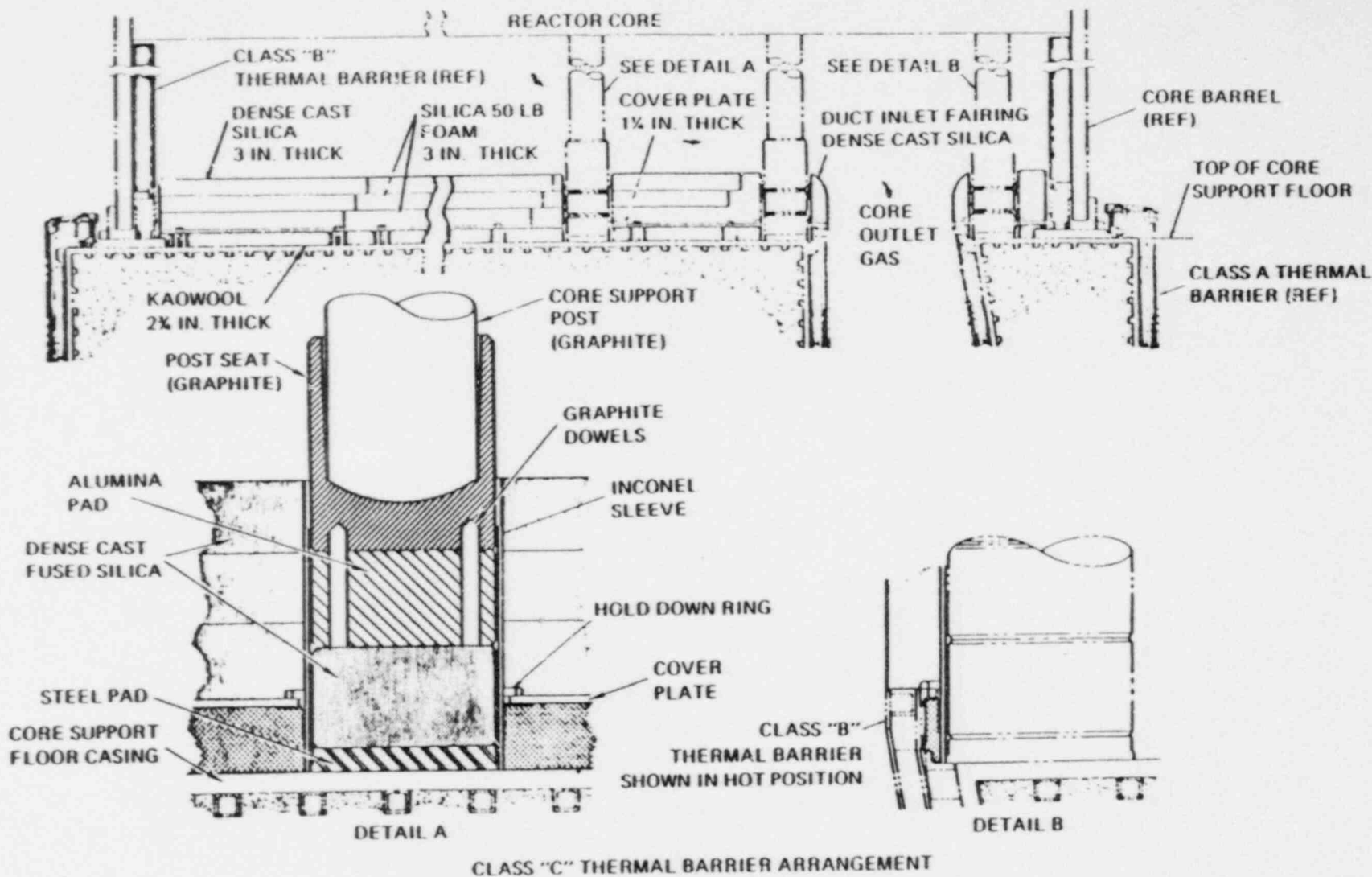


Figure 5.9-4 Class "C" Core Support Floor Upper Surface Thermal Barrier Arrangement

FIGURE 3 MONITORED COOLING TUBE ARRANGEMENT

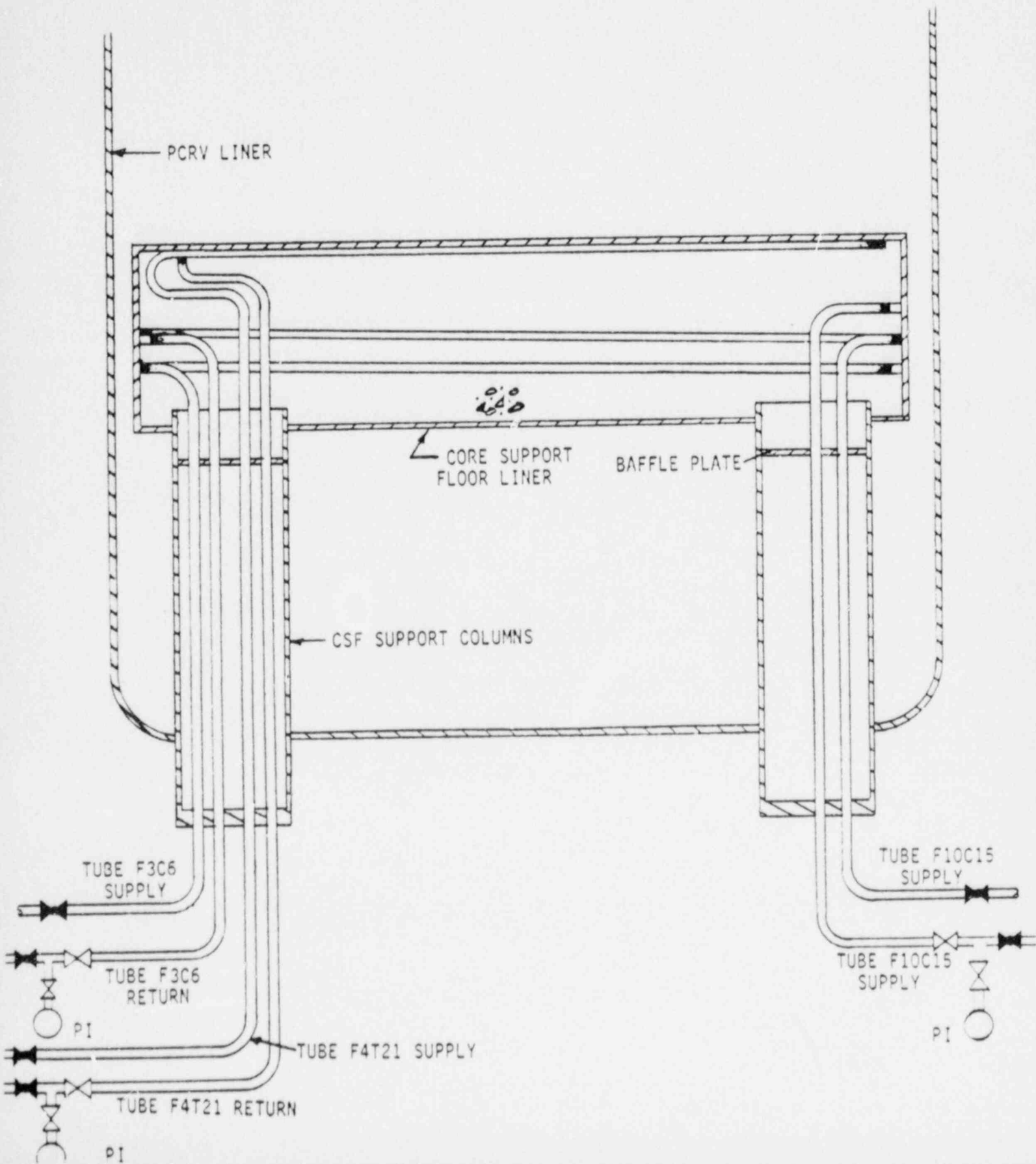


FIGURE 5 SYSTEM 46 COOLING TUBE ARRANGEMENT

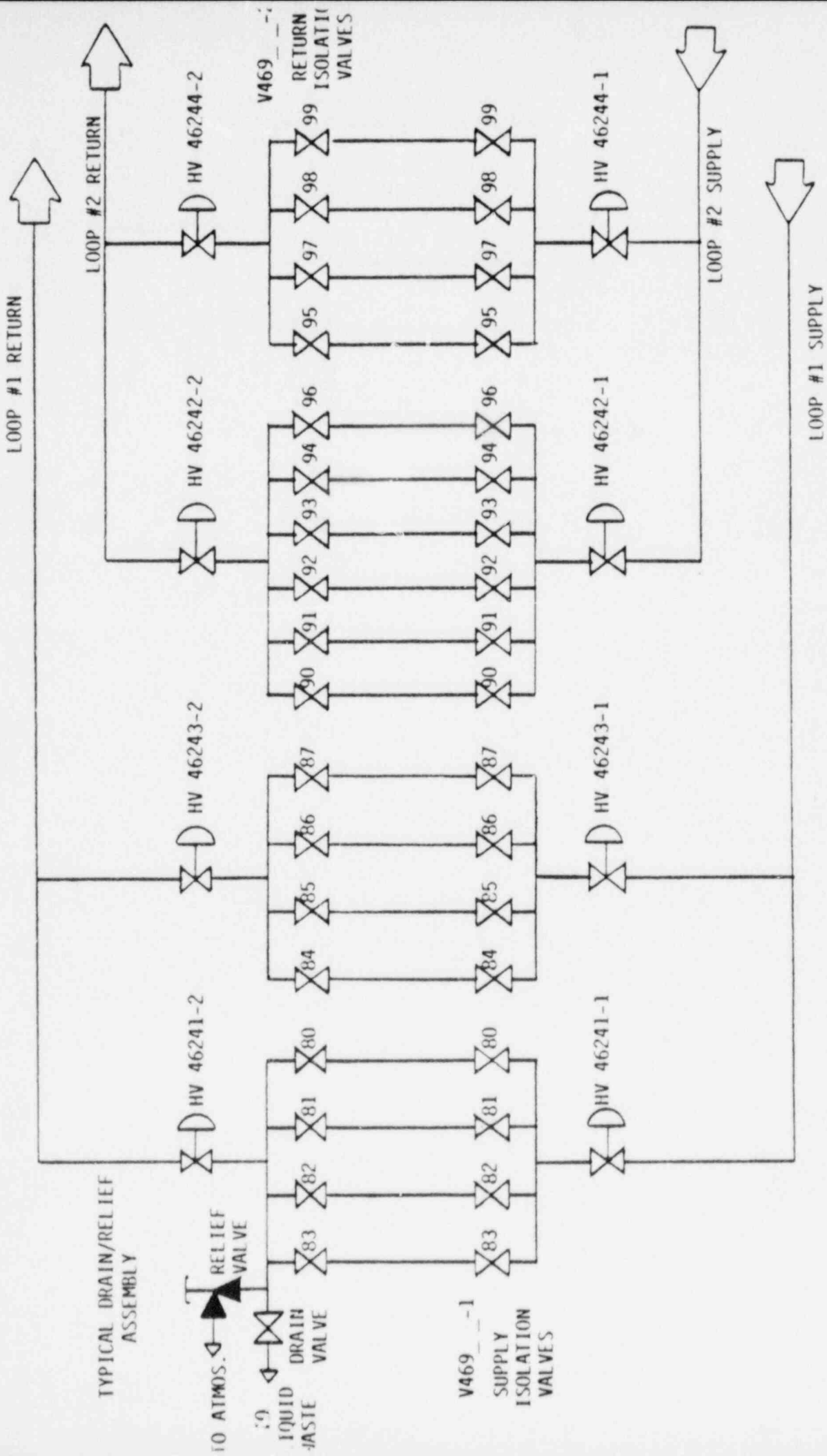


FIGURE 4 CORE SUPPORT FLOOR/COLUMN VENT SYSTEM

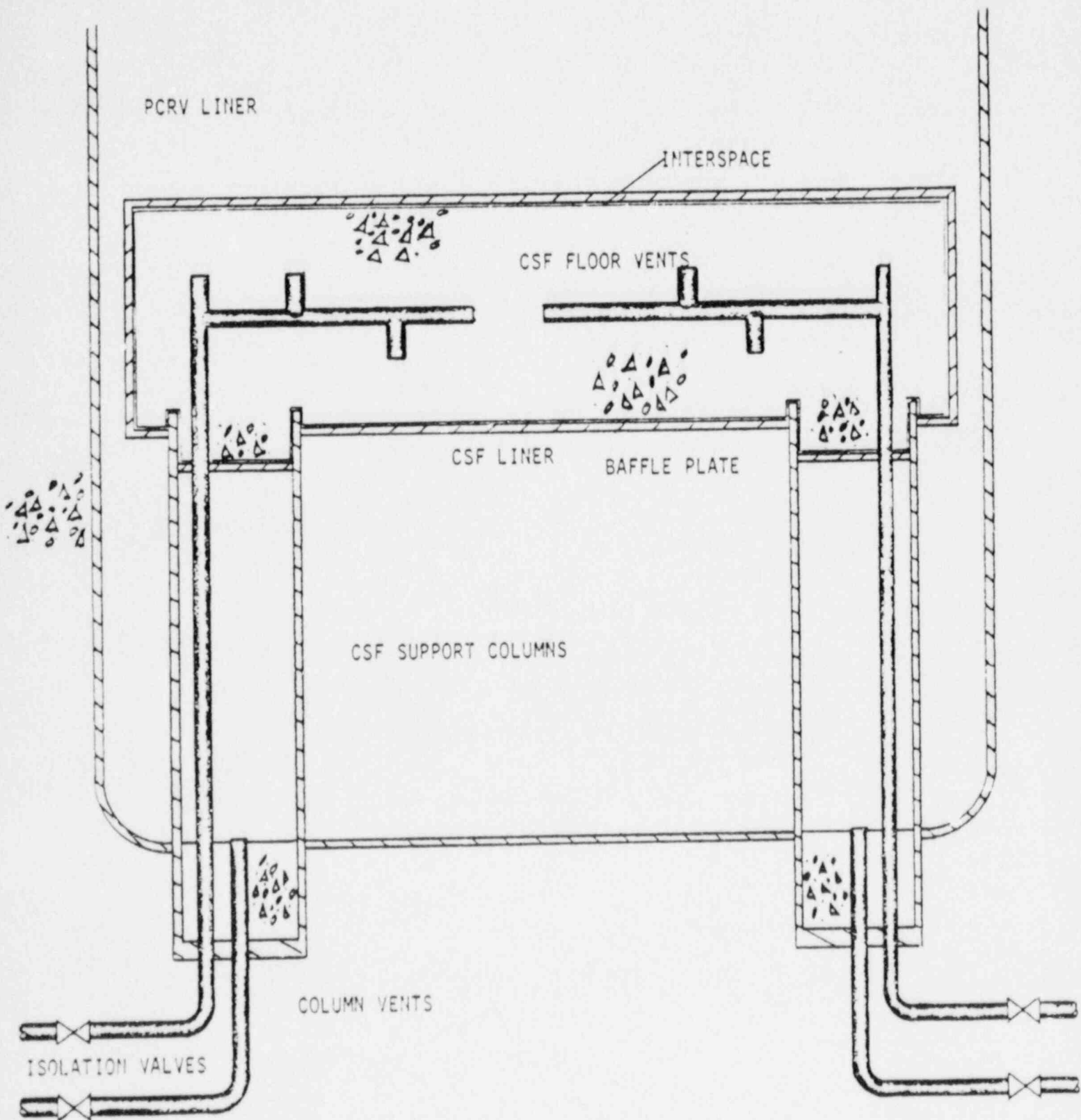
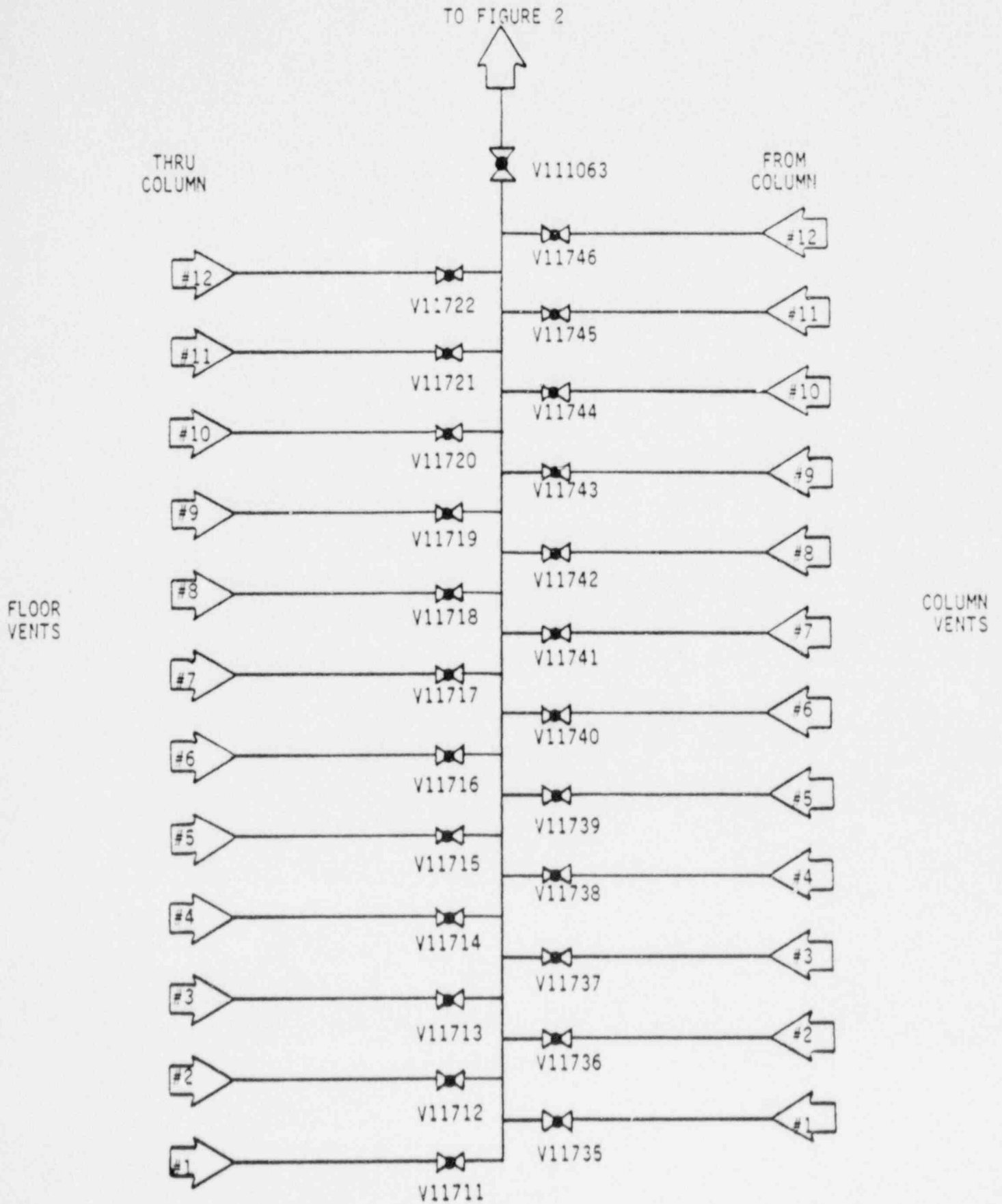
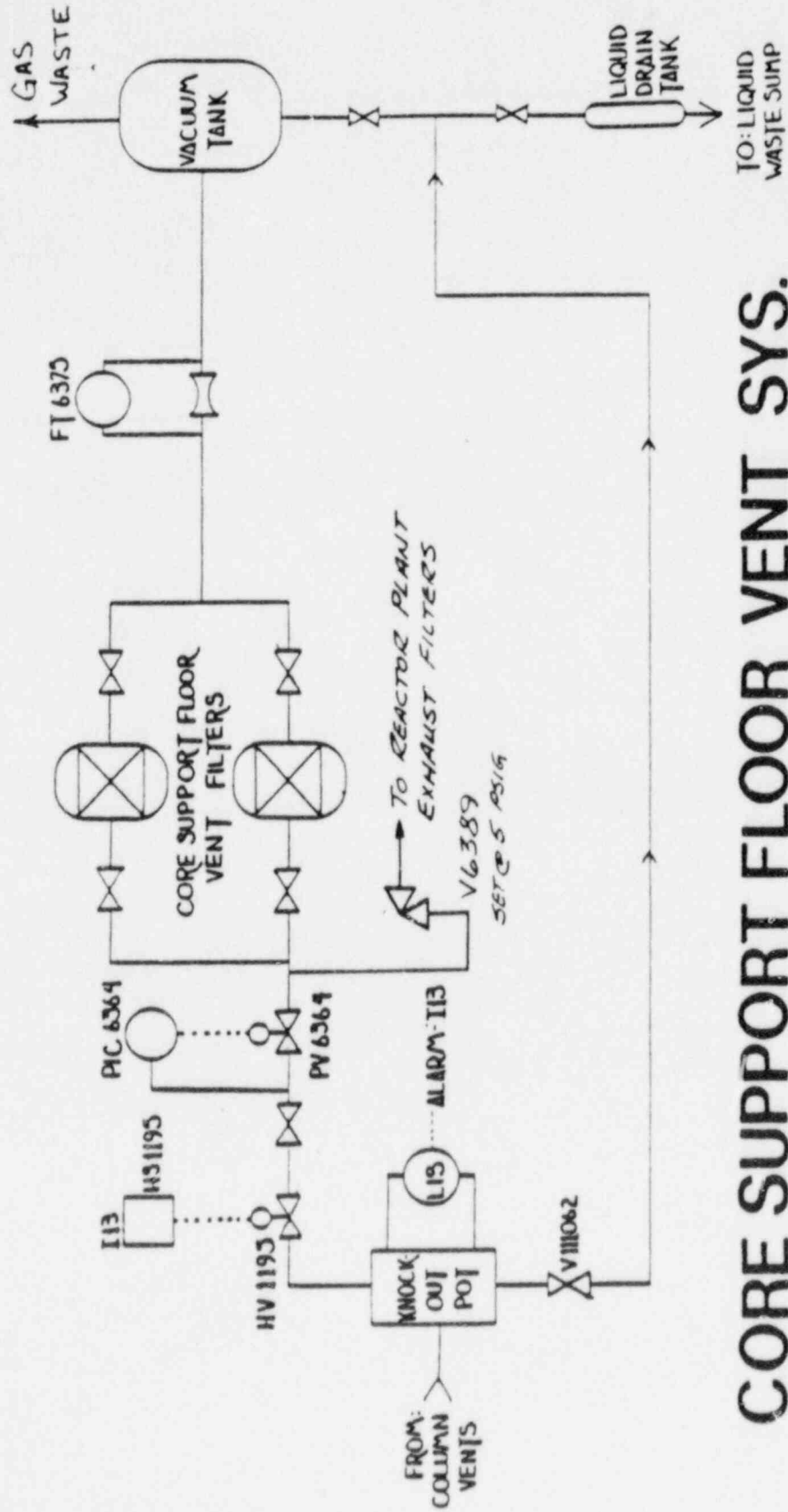


FIGURE 1 CORE SUPPORT FLOOR VENT SYSTEM





CORE SUPPORT FLOOR VENT SYS.

HISTORICAL REVIEW

KEY EVENTS

- o 1971 DURING PLANT CONSTRUCTION THE CSF WAS INADVERTENTLY/OVER PRESSURIZED DURING A VENT SYSTEM PRESSURE TEST

- o FEB 1972 FOUR (4) LEAKING CSF SIDEWALL TUBES IDENTIFIED

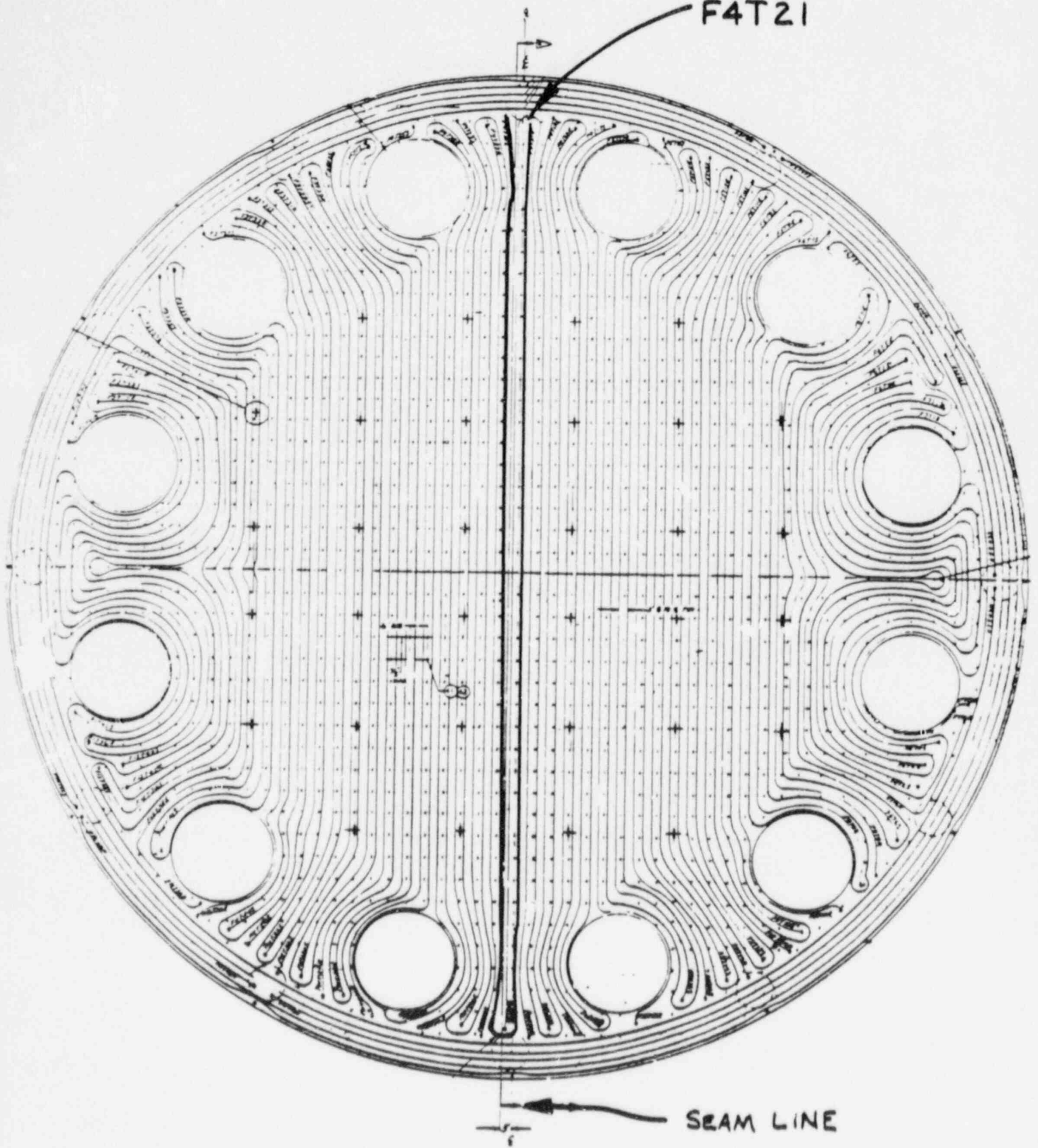
- o INITIAL REPAIR ATTEMPT UTILIZING A BENAQUA, BENTONITE CLAY SLURRY WAS UNSUCCESSFUL. DUE TO APPLICATION PRESSURES COOLING TUBE LEAK RATE INCREASED

- o EPOXY REPAIR SYSTEM WAS DEVELOPED AND IN FEB 1973 THE FOUR (4) CSF SIDEWALL TUBES WERE SUCCESSFULLY REPAIRED

- o ADMINISTRATIVE CONTROLS ESTABLISHED TO ISOLATE CSF SIDEWALL TUBES AT OR BELOW 150 PSIG REACTOR PRESSURE

- o APRIL 1982 ANOTHER LEAKING CSF TUBE IDENTIFIED TOP HEAD TUBE (F4T21)

F4T21



HISTORICAL REVIEW
KEY EVENTS (CONT'D)

- o CSF COOLING TUBE F4T21 WAS REMOVED FROM SERVICE AND CAPPED EXTERNAL TO THE PCRV
- o SEPT, 1982 SIGNIFICANT CSF VENT GAS FLOW NOTED FOLLOWING A REACTOR SCRAM FROM 70% POWER
- o TWO (2) OF THE ORIGINALLY EPOXY REPAIRED CSF SIDEWALL TUBES WERE IDENTIFIED AS LEAKING
- o INSTALLED A LAMINAR FLOW ELEMENT IN THE CSF VENT SYSTEM TO PERMIT FLOW DETERMINATION MONITORING AND TRENDING (DEC 1982)
- o CHARACTERIZED CSF LINER LEAK BASED ON PRIMARY COOLANT CONDITIONS

CSF SEALING

THRESHOLD

— 500 - 550 PSIA

— 600°F - 800°F

REACTOR PRESSURE

PRIMARY COOLANT TEMP

HISTORICAL REVIEW

KEY EVENTS

- o FORMED TWO (2) SPECIAL COMMITTEES TO COORDINATE CSF ACTIVITIES

MANAGEMENT OVERVIEW GROUP

WORKING COMMITTEE

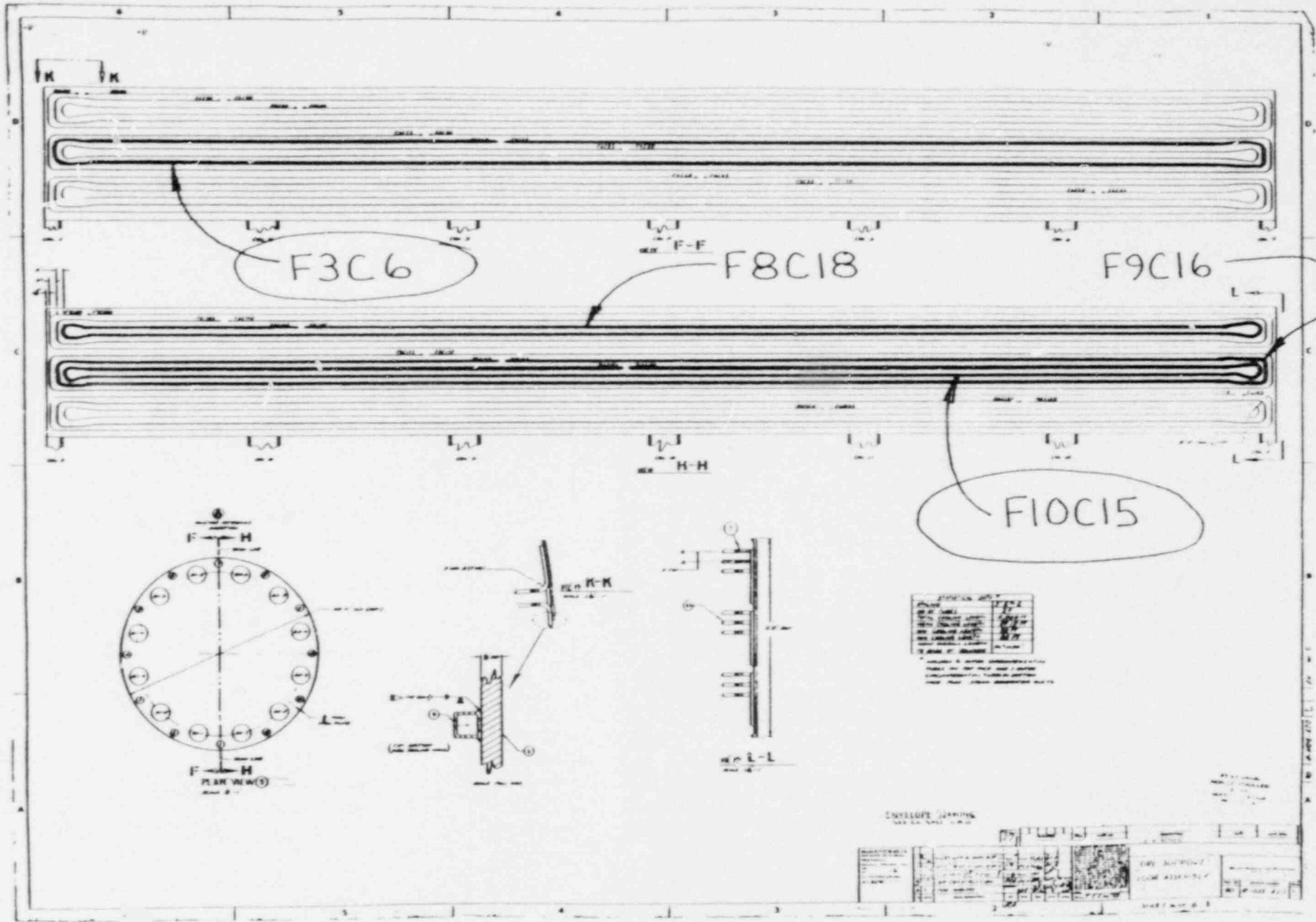
- o FUNCTION
 - CONDUCT STUDIES, EVALUATIONS, ANALYSES TO CHARACTERIZE LINER LEAK, IDENTIFY POSSIBLE FLOW PATHS, LOCATE CSF COOLING TUBE LEAKS, DETERMINE CSF STRUCTURAL INTEGRITY, DEFINE POSSIBLE CORRECTIVE ACTIONS
- o STUDIES AND EVALUATIONS AND PLANT TESTING CONTINUED THROUGHOUT 1983 AND 1984 INVOLVING PSC, PROTO-POWER AND GA TECHNOLOGIES, AS WELL AS SEVERAL HIGH TECH RESEARCH GROUPS

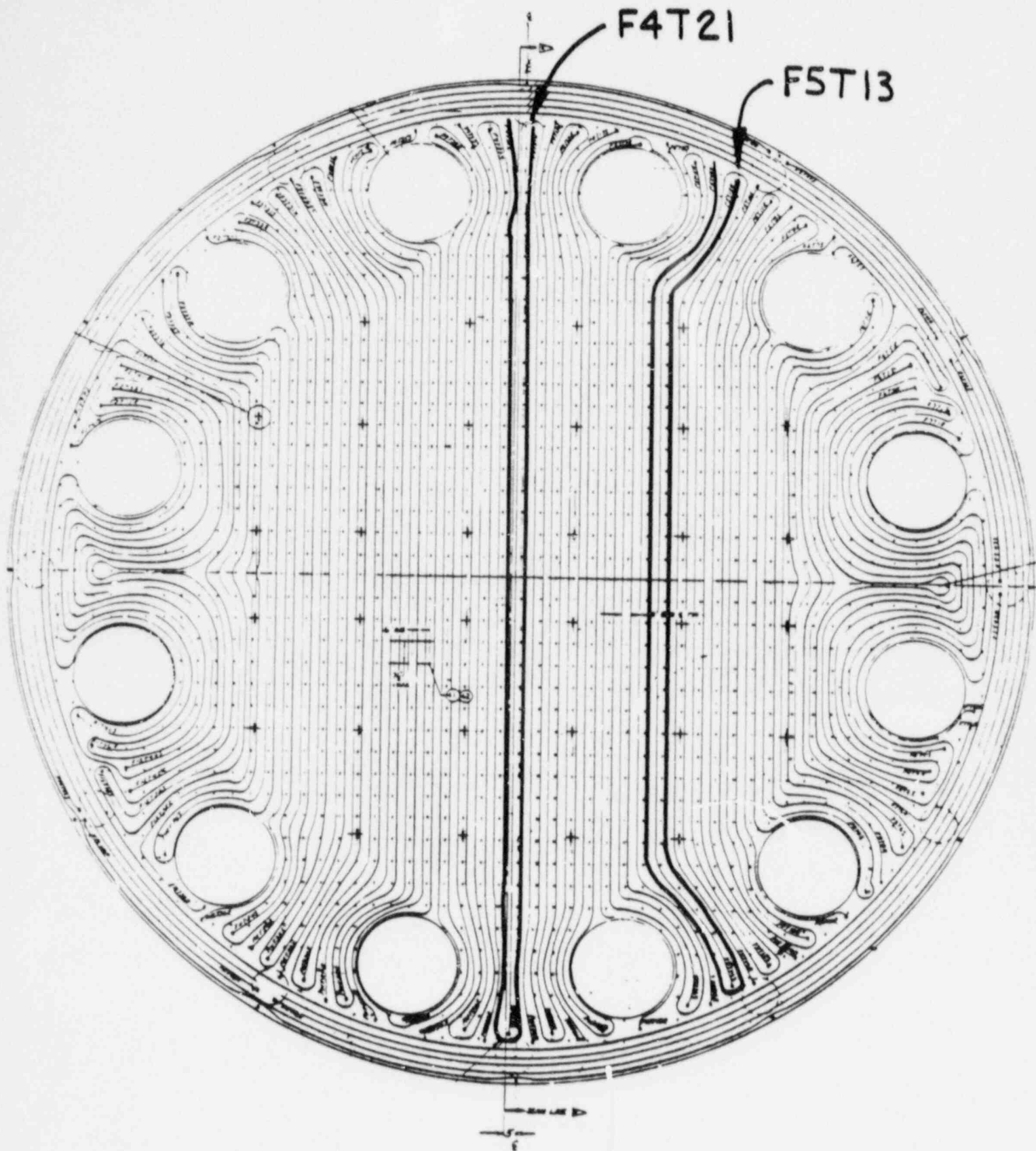
HISTORICAL REVIEW
KEY EVENTS (CONT'D)

- o EARLY 1984 - SUCCESSFULLY REPAIRED THE TWO (2) RECURRING CSF SIDEWALL TUBE LEAKS

- o SPRING 1984 - IDENTIFIED ANOTHER CSF TOP HEAD COOLING TUBE LEAK (F5T13)

- o THIS TUBE WAS VALVED OUT OF SERVICE AND REMAINS OUT OF SERVICE AT THE PRESENT TIME





EVALUATIONS/CORRECTIVE ACTIONS

- o FOUR (4) LEAKING CSF SIDEWALL TUBES REPAIRED WITH EPOXY
- o TWO (2) RECURRING CSF SIDEWALL TUBES REPAIRED WITH EPOXY
- o TWO (2) CSF TOP HEAD TUBES OUT OF SERVICE
- o CONTINUE TO ISOLATE THE FOUR (4) CSF SIDEWALL TUBES AT REACTOR PRESSURE AT OR BELOW 150 PSIG
- o ADMINISTRATIVE/OPERATOR ACTION TO MINIMIZE CSF LINER LEAKAGE WHEN NOT IN OPERATION BY CONTROLLING CSF BACK PRESSURE BETWEEN 60 PSIG AND 95 PSIG
- o COMPLETED A MULTITUDE OF ANALYSES, TESTS AND SAFETY EVALUATIONS INVOLVING FLOW RATES, CSF STRUCTURAL INTEGRITY, CSF LINER COOLING TUBE THERMAL ANALYSES, GAS WASTE ANALYSES, LEAK CHARACTERIZATION, ETC. TO INCLUDE SUPPORTING ANALYSES FOR A PASSIVE VENT SYSTEM

PASSIVE VENT SYSTEM

- o OUT OF THE MANY EVALUATIONS A PASSIVE VENT SYSTEM WAS IDENTIFIED AS A POSSIBLE SOLUTION TO THE CSF LINER LEAK

- o CONSIDERATIONS

LINER LEAK EXCEEDS GAS WASTE CAPACITY

LINER FAILS TO SEAL AT SOME FUTURE TIME

CSF LINER IS ESSENTIALLY INACCESSIBLE

REMOTE REPAIR UNLESS LINER LEAK AND
TUBE LEAK WERE COINCIDENT IS NOT FEASIBLE

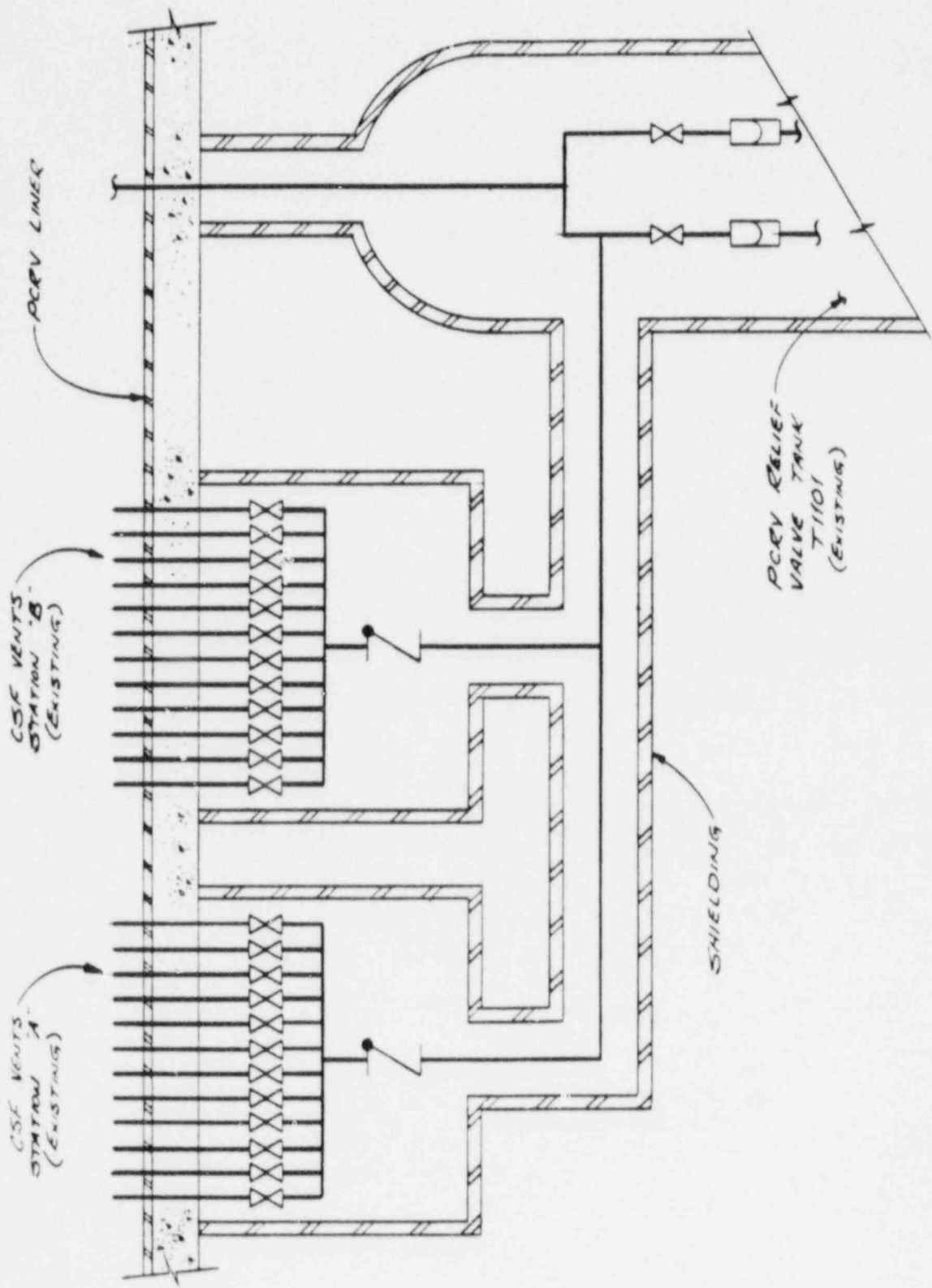
- o PASSIVE VENT SYSTEM IS DESIGNED TO ALLOW OPERATION OF THE REACTOR FLOATING THE CSF INTERNAL PRESSURE WITH REACTOR PRESSURE

- o KEY CONCERNS

PRIMARY SYSTEM DEPRESSURIZATION

REACTOR COOLANT PRESSURE BOUNDARY

COOLING TUBE INTEGRITY



OTHER STUDIES

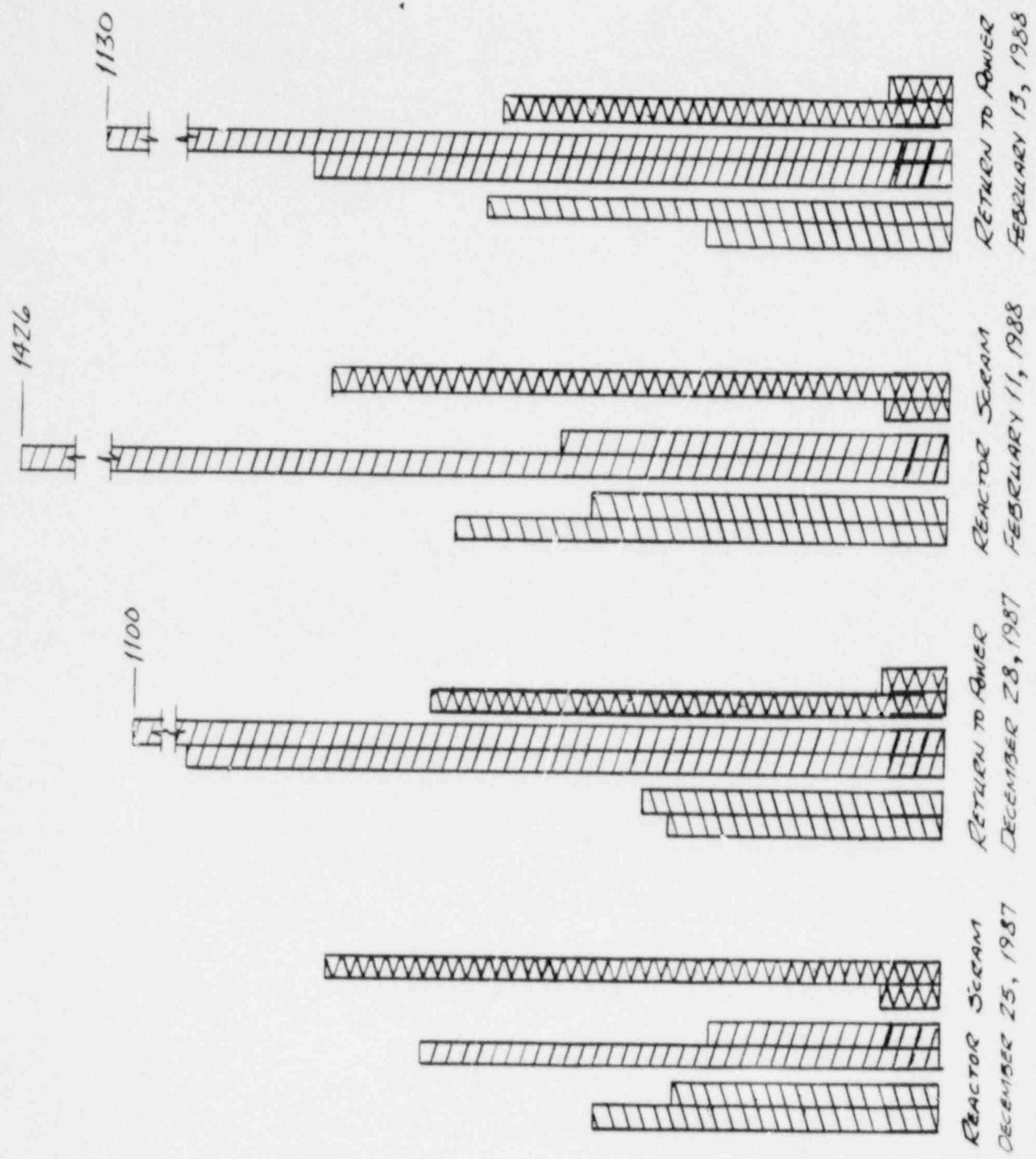
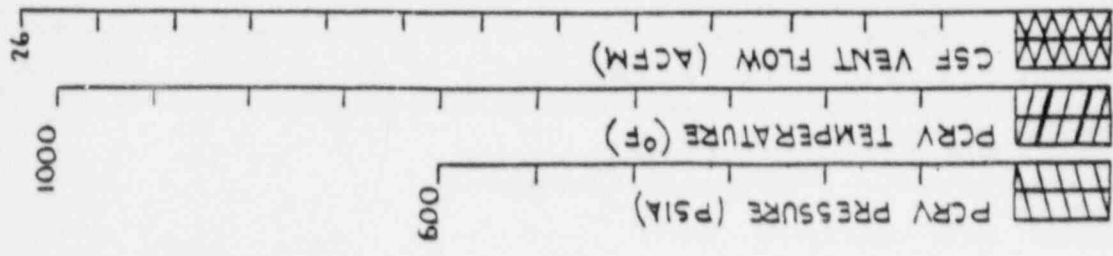
- o COOLING TUBE LEAK LOCATION
- o INVESTIGATION TOOLS
 - EDDY CURRENT
 - TELEVISION
 - MICROPHONES
 - HYDROPHONES
 - SPECTRUM ANALYSES
 - FIBER OPTICS
 - ACOUSTIC MONITORS
- o LIBERTY TECHNOLOGIES MOCK-UP/TESTING PROGRAM
- o REPAIRS
 - TUBE WITHIN A TUBE
 - MEMBRANE INSERTION
 - METAL FORMING
- o ALTERNATE COOLING MEDIUMS IN CSF COOLING SYSTEM
- o THERMAL RESPONSE/EFFECTS OF ISOLATING VARIOUS COMBINATIONS OF CSF TUBES, SUBCOOLING ADJACENT TUBES, UTILIZING HELIUM AS A COOLANT, UTILIZING REDUCED FLOW/PRESSURES

ACTIONS IN PROGRESS

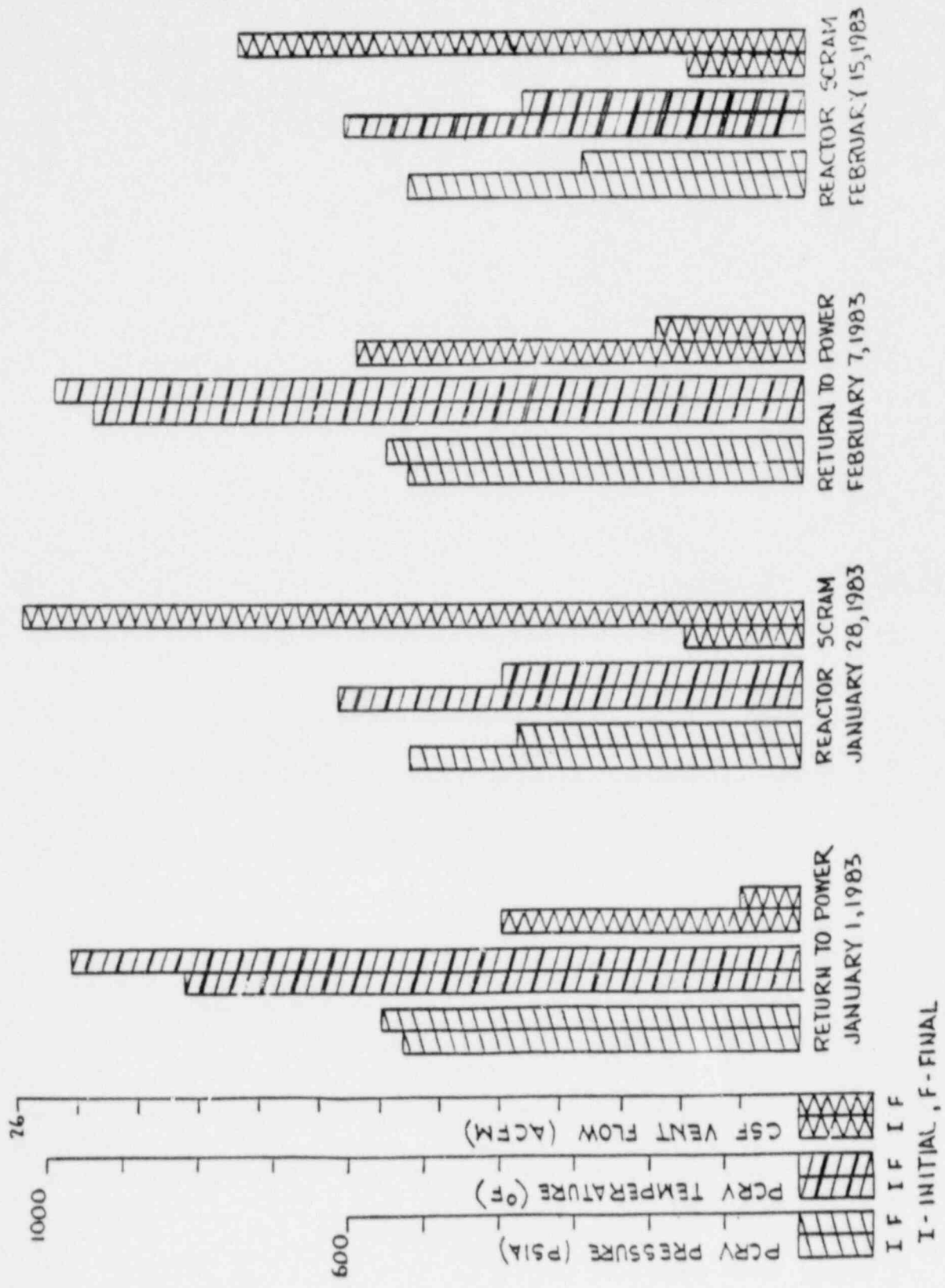
- CONTINUE DEVELOPMENT OF MONITORING/TRENDING PROGRAM

- PASSIVE VENT SYSTEM WORK BEING RE-EVALUATED FOR PHASED IN APPROACHES

- EVALUATING MODIFICATION TO EXISTING GAS WASTE SYSTEM RELIEF VALVE ARRANGEMENT



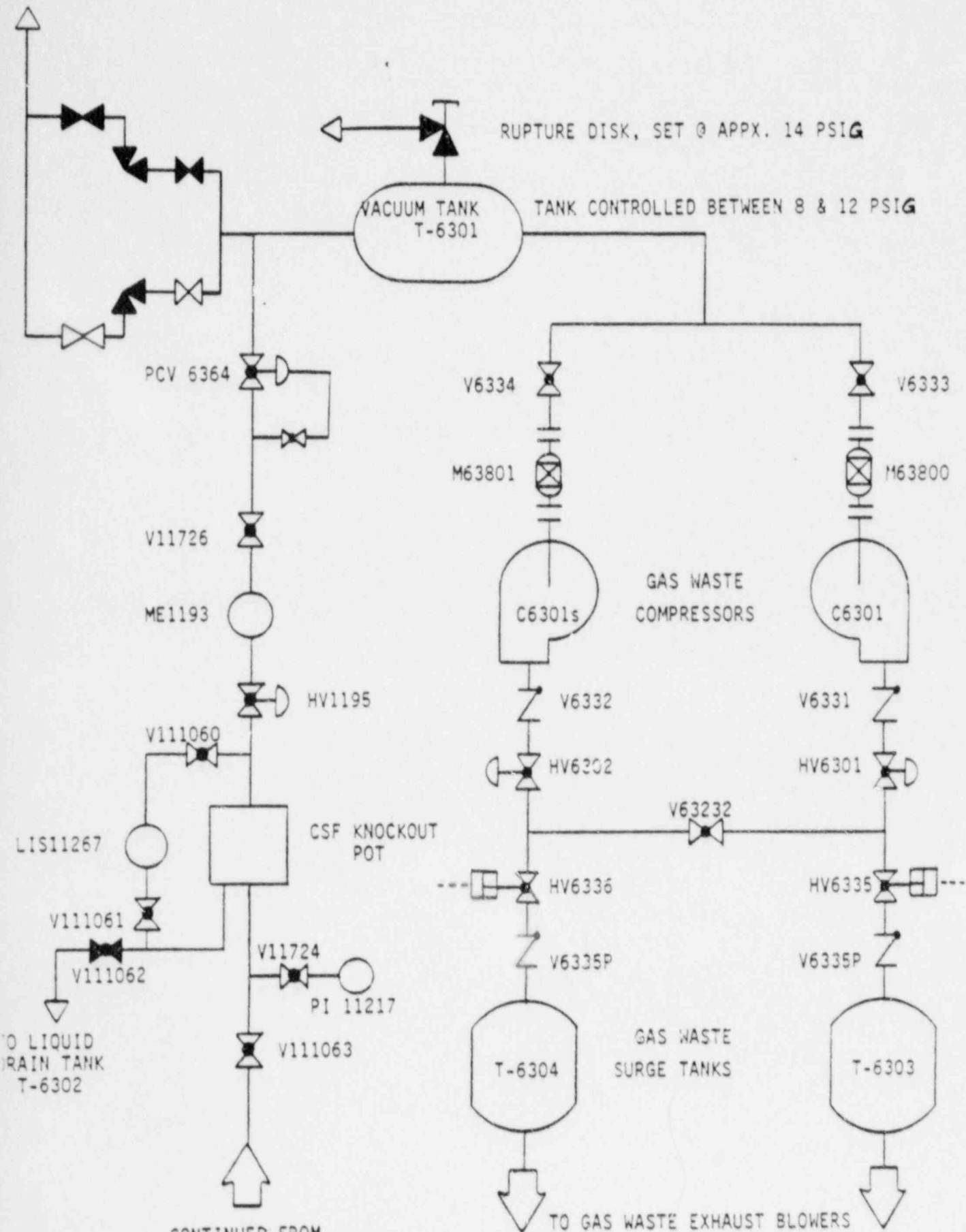
I - INITIAL, F - FINAL



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I - INITIAL, F - FINAL

FIGURE 2 CORE SUPPORT FLOOR VENT & GAS WASTE SYSTEM



CONTINUED FROM
FIGURE 1

**CORE SUPPORT FLOOR LEAK
CASE COMPARISON**

	FSAR CASE	WORST CASE ACTUAL EXPERIENCE	GAS WASTE SYSTEM AT MAXIMUM CAPACITY
Helium Leak Rate	14 lbs/hr	10 lbs/hr	53 lbs/hr
Hold Up Capacity	30 hours	42 hours	7.9 hours
Circulating Primary Coolant Inventory	30,900 curies	515 curies	8163 curies
Curie Content of CSF Leak	60 curies/hr	0.7 curies/hr	60 curies/hr
Duration of Release	Continuous	During Start-up	During Start-up
Percent of 10CFR20 MPC Limit	100%	1.67%	25%
Off-site Dose	Per FSAR Table 11.1-11	1/84 of FSAR Table 11.1-11	Per FSAR Table 11.1-11

ASSUMPTIONS (ALL CASES):

Two 700 cu. ft. gas waste surge tanks, capable of operating at 450 psig. FSAR short term Condition F atmospheric dilution based on elevated release (50m plant vents) with a wind speed of 5 m/sec causing down wash per FSAR Figure 14.12-1. No decay during hold-up.

FORT ST. VRAIN

MANAGEMENT MEETING ATTENDEES

NRC

T. F. Westerman	NRC/RIV	Chief, Reactor Projects Section D
J. P. Jaudon	NRC/RIV	Deputy Director, DRS
L. J. Callan	NRC/RIV	Director, DRP
R. F. Farrell	NRC/RIV	Senior Resident Inspector
R. P. Mullikin	NRC/RIV	Project Engineer

PSC

R. O. Williams, Jr.	PSC	VP Nuclear Operations
Don Warembourg	PSC	Manager, Nuclear Engineering
H. L. Brey	PSC	Manager, Nucl. Licensing and Fuel
Ralph Sargent	PSC	Asst. to VP Nuc. Ops.
P. F. Tomlinson	PSC	Manager, QA