Omaha Public Power District
1623 Harney Omaha, Nebraska 68102-2247
402/536-4000

July 5, 1988
LIC-88-537

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station P1-137
Washington, DC 20555

References:
1. Docket No. 50-285
2. Letter from the NRC (L. J. Callan) to OPPD (R. L. Andrews) dated June 1, 1988
3. Enforcement Conference - June 8, 1988

Gentlemen:

SUBJECT: Inspection Report 88-15 - June 8, 1988 Enforcement Conference

On June 8, 1988, OPPD met with members of the NRC to discuss the details of an NRC inspection as documented in report 50-285/88-15. In Attachment 1 are copies of the overheads used during the June 8, 1988 presentations. In Attachment 2 are responses to questions that were raised during the conference.

OPPD appreciates the time given to discuss our position and actions relative to Inspection 88-15 and believes this meeting was very beneficial in communicating this information. If you have any additional comments or questions concerning this matter, please do not hesitate to contact us.

Sincerely,

K. J. Morris
Division Manager
Nuclear Operations

KJM/me

cc: LeBoeuf, Lamb, Leiby & MacRae
1333 New Hampshire Ave., N.W.
Washington, DC 20036

R. D. Martin, NRC Regional Administrator
P. D. Milano, NRC Project Manager
P. H. Harrell, NRC Senior Resident Inspector

IE01
1/1

ATTACHMENT 1

SLIDES FROM JUNE 8, 1988

ENFORCEMENT CONFERENCE

NRC MEETING
June 8, 1988
Inspection Report 88-15

I. OPENING REMARKS/INTRODUCTION (5 minutes) — K. J. Morris

II. OVERVIEW OF MEETING (5 minutes) — J. J. Fisicaro

III. POTENTIAL VIOLATION - FAILURE TO INSTALL A COMPONENT THAT COMPLIES WITH ESTABLISHED DESIGN CRITERIA (285/8815-06) (25 Minutes) — S. K. Gambhir
- Background, (System Configuration, Design Basis and Statement of Problem)
- Statement of Problem
- Corrective Actions Taken/Results Achieved
- Future Planned Actions

REVIEW OF ACCUMULATOR TESTING

- Status of Inspection Report Items 1-10

IV. POTENTIAL VIOLATION - CONTAINMENT INTEGRITY (285/8815-14) (25 Minutes) — T. L. Patterson
- Statement of Problem
- Corrective Action Taken/Results Achieved
- Future Corrective Action Planned
- Calculation of Radiation Levels (285/8815-13)

V. MANAGEMENT INVESTIGATIVE SAFETY TEAM (10 minutes) — J. K. Gasper

VI. SAFETY SIGNIFICANCE (25 minutes) — T. L. Patterson
- Safety Analysis for Operability (SAO)
  - SAO for Instrument Air System
  - LOCA concurrent with CCW Line Rupture in containment (285/8815-07)
  - Hot-leg injection (285/8815-11)
  - A/HCV-742 (285/8815-15)

VII. INSTRUMENT AIR STATUS (15 minutes) — R. L. Jaworski
- Update on Issue

VIII. CLOSING COMMENTS (5 minutes) — K. J. Morris

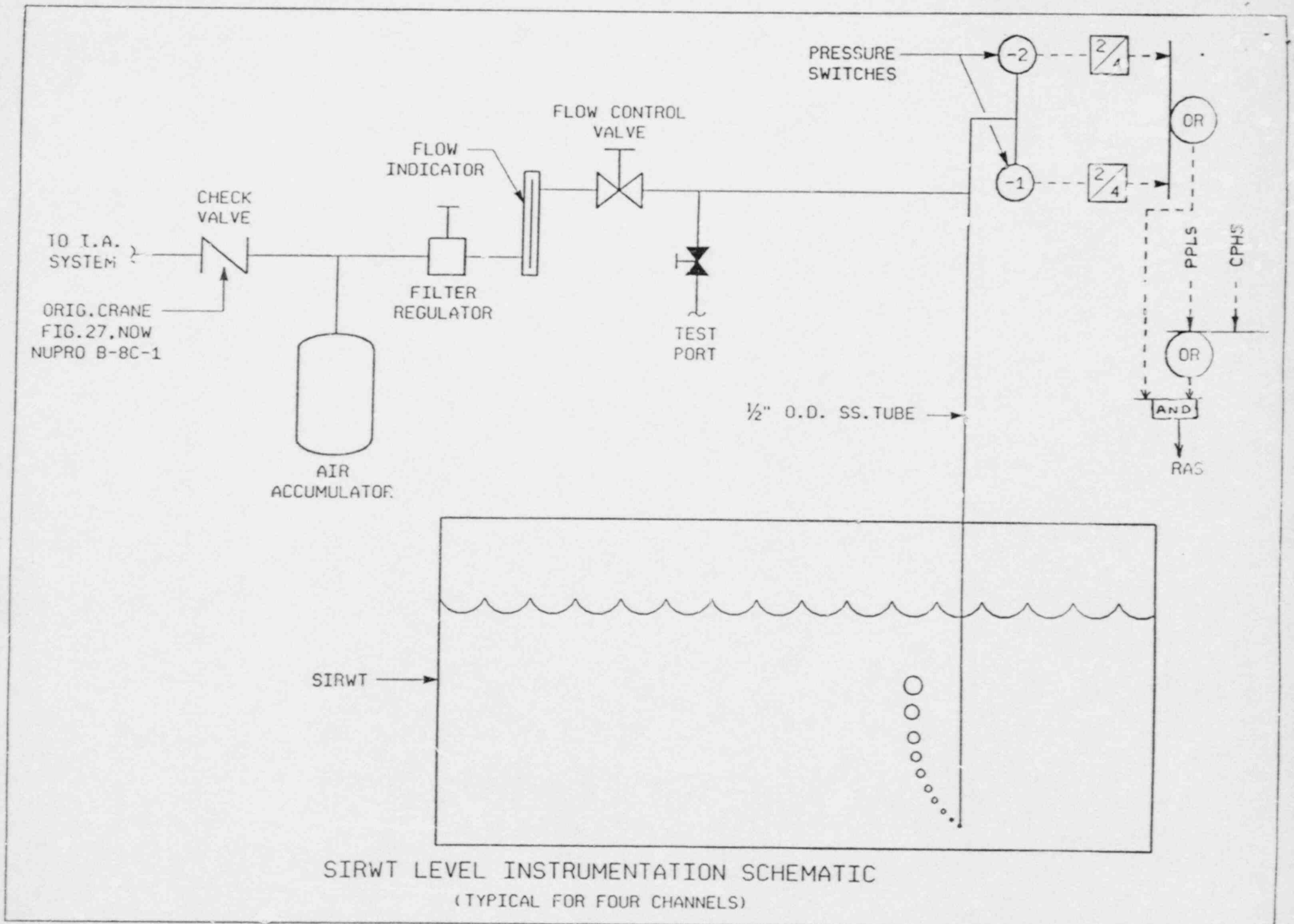
SIRWT LEVEL INDICATION

BUBBLER CHECK VALVE ISSUE

BACKGROUND:

- PROBLEM REPORTED TO NRC (LER DATED 5/16/88)

- DESIGN BASIS
  - USAR DESIGN BASIS
  - REVISED DESIGN BASIS
  - SYSTEM CONFIGURATION



SIRWT LEVEL INSTRUMENTATION SCHEMATIC

(TYPICAL FOR FOUR CHANNELS)

CORRECTIVE ACTIONS TAKEN AND RESULTS ACHIEVED

- REPLACEMENT OF CRANE FIG #27 CHECK VALVES WITH NEW LEAK TIGHT (NUPRO B-8C-1) CHECK VALVES.

- NEW VALVES INCLUDED IN THE ISI PROGRAM

- INSTALLATION IS PROPOSED TO BE FURTHER MODIFIED TO FACILITATE FUNCTIONAL TESTING (MR-FC-88-39)

- REVIEW OF OTHER ACCUMULATOR INSTALLATIONS

  (14 SIMILAR INSTALLATIONS IDENTIFIED - SEE TABLE - A)

TABLE A

FUNCTION OF QQE & NON-QQE VALVES WITH ACCUMULATORS

WITH NON LEAK TIGHT CHECK VALVES

VALVE	VALVE FUNCTION	FUNCTION OF ACCUMULATOR	CORRECTIVE ACTION
LCV-383 1&2	SIRWI HDR ISOL	SAFETY RELATED	TEMPORARY MODIFICATION HAS BEEN COMPLETED. THE VALVES ARE CONSIDERED OPERATIONAL.
HCV-2850	RWP ISO VLVS	SEE OSAR 87-10, P. 15 and 16 ONLY REQUIRED IF RW LINE BREAKS - OUTSIDE F.C. DESIGN BASIS HAND WHEELS ARE PROVIDED AND THE VALVES ARE ACCESSIBLE FOR MANUAL OPERATION.	ALTERNATIVE MEANS ARE AVAILABLE TO PERFORM DESIGN BASIS FUNCTIONS. A MODIFICATION HAS BEEN SCHEDULED.
HCV-2851	"		
HCV-2852	"		
HCV-2874A	RW HDR ISO VLVS		
HCV-2875A	"		
HCV-2876A	"		
HCV-2874B	"		
HCV-2875B	"		
HCV-2876B	"		
MS-291	AIR OPERATED MSS VALVES	SEE OSAR 87-10, P. 5 - ACCUM. IS NOT REQUIRED FOR PERFORMING ANY DESIGN BASIS SAFETY FUNCTION.	
MS-292	"		
HCV-484	CCW EXIT VLV SDH/X	SEE OSAR 87-10, P. 11 - ARE ACCESSIBLE FOR MANUAL OPERATION	
HCV-485	"		

CONCLUSIONS

- THIS PROBLEM WAS CAUSED APPARENTLY BECAUSE OF MIS-APPLICATION OF CHECK VALVES BY THE ORIGINAL A/E.
- THE PROBLEM WAS NOT DISCOVERED EARLIER BECAUSE OF NO FUNCTIONAL TESTING.
- ONCE THE PROBLEM WAS IDENTIFIED, OPPD TOOK PROMPT CORRECTIVE ACTIONS.
- THIS WAS PROMPTLY REPORTED TO THE NRC.
- OTHER SIMILAR INSTALLATIONS WERE REVIEWED TO PRECLUDE POSSIBILITY OF SIMILAR PROBLEMS ELSEWHERE.
- THIS RE-EMPHASIZES THE NEED FOR COMPLETION OF DESIGN BASIS RECONSTITUTION PROJECT INCLUDING PHYSICAL VERIFICATION AS OUTLINED IN THE PROGRAM PLAN PREVIOUSLY SUBMITTED TO THE NRC.

PARTIAL SUMMARY OF OPEN/UNRESOLVED ITEMS

FROM INSPECTION REPORT #88-15

SUMMARY

OPEN ITEM 285/8815-01: SUBMIT SCHEDULE FOR FINAL TESTING OF AIR ACCUMULATORS.

OPEN ITEM 285/8815-02: SUBMIT NEW REVISION OF IST PROGRAM TO INCLUDE ACCUMULATOR CHECK VALVES IDENTIFIED IN OSAR 87-10.

OPEN ITEM 285/8815-03: THIS ITEM DEALS WITH THE SEISMIC QUALIFICATION ISSUE RELATING TO ACCUMULATOR/TUBING AND CONTROL VALVES.

OPEN ITEM 285/8515-04: SIRWT LEVEL CONTROLLERS ISSUE FORMAL CALCULATION TO VERIFY ACCUMULATORS ARE SIZED CORRECTLY.

SUMMARY

OPEN ITEM 285/8515-05: COMPLETE 12 HOUR FUNCTIONAL TESTING OF ACCUMULATORS ASSOCIATED WITH BUBBLERS FOR SIRWT LEVEL INDICATION.

OPEN ITEM 285/8815-06: USE OF NON LEAK TIGHT CHECK VALVE - POTENTIAL VIOLATION FAILURE TO MEET PLANT DESIGN CRITERIA - SIRWT LEVEL CONTROLLERS.

OPEN ITEM 285/8815-07: HCV-438 B&D - EVALUATE AND DETERMINE IF OPPD MUST PERFORM AN ANALYSIS ASSUMING LOCA CONCURRENT WITH CCW LINE RUPTURE IN CONTAINMENT.

SUMMARY

OPEN ITEM 285/8815-08: HCV-238 & 239 - SINCE ACCUMULATOR CHECK VALVES ARE INSIDE BIO-SHIELD, IT IS NOT APPARENT HOW OPPD INTENDS TO TEST THE CHECK VALVES QUARTERLY.

OPEN ITEM 285/8815-09: HCV-238 & 239 - PREPARE SEISMIC CALCULATIONS.

OPEN ITEM 285/8815-10: HCV-240 - PREPARE SEISMIC CALCULATIONS.

OPEN ITEM 285/8815-06: LCV-383-1 & 2 - ONLY ONE ACCUMULATOR IS PROVIDED FOR TWO VALVES. THIS DOES NOT MEET SINGLE FAILURE CRITERIA.

OUTLINE OF CONTAINMENT INTEGRITY EVENT PRESENTATION

- STATEMENT OF PROBLEM
- SUMMARY OF TECHNICAL/LICENSING COMMITMENTS NOT MET
- STATEMENT OF OPERABILITY
- SAFETY IMPLICATIONS
- RESULTS OF HUMAN PERFORMANCE EVALUATION SYSTEM REVIEW
- CORRECTIVE ACTIONS
- CONCLUSIONS

SEQUENCE OF EVENTS

3/27/87 - PERFORMED ST-CONT-3 TEST 1

3/28/87 - PERFORMED ST-CONT-3 TEST 2

5/4/87 - NOZZLE DAMS REMOVED, PARTS STORED IN RM 59

5/27/87 - PERFORMED PENETRATION VERIFICATION USING M.O. # 872525

~6/15/87 - NOZZLE DAMS REMOVED FROM RM 59

4/18/88 - DISCOVERED MISSING CAP PC-743 (~1515)

4/19/88 - I&C FOREMAN CONFIRMS CTMT LEAKAGE (~0815)

4/19/88 - CAP REPLACED AND LEAK CHECKED (~0945)

4/19/88 - MAINTENANCE SUPERVISOR CONVENES PRC (~1030)

4/19/88 - PRC DECLARES EVENT REPORTABLE, ASSIGNS FOLLOWUP ACTIONS TO INVESTIGATE OTHER POTENTIAL PROBLEMS

4/20/88 - COMPLETE WALKDOWN OF ALL NON-WETTED PENETRATIONS

4/28/88 - MIST ACTIVATED

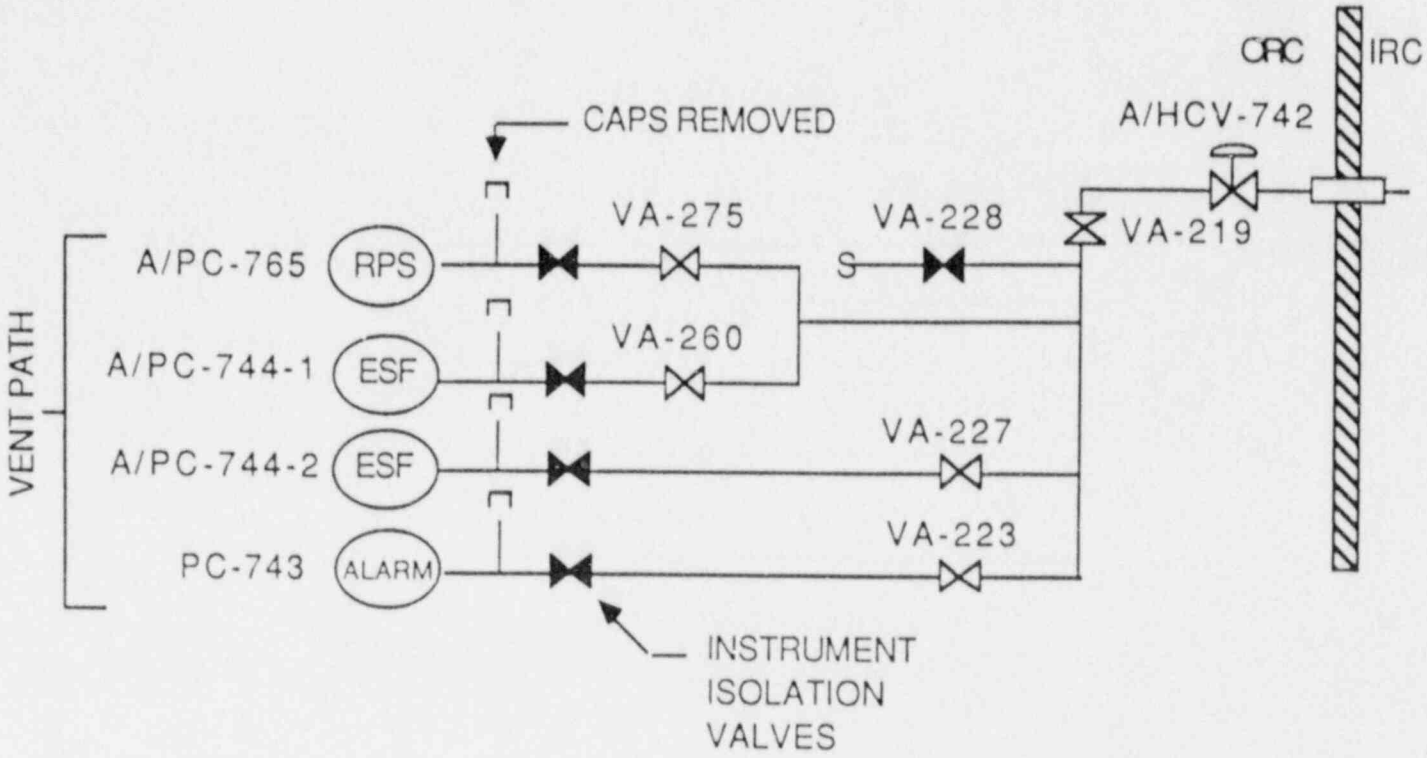
4/29/88 - SP-CONT-3 ISSUED

5/2/88 - SP-CONT-3 COMPLETED

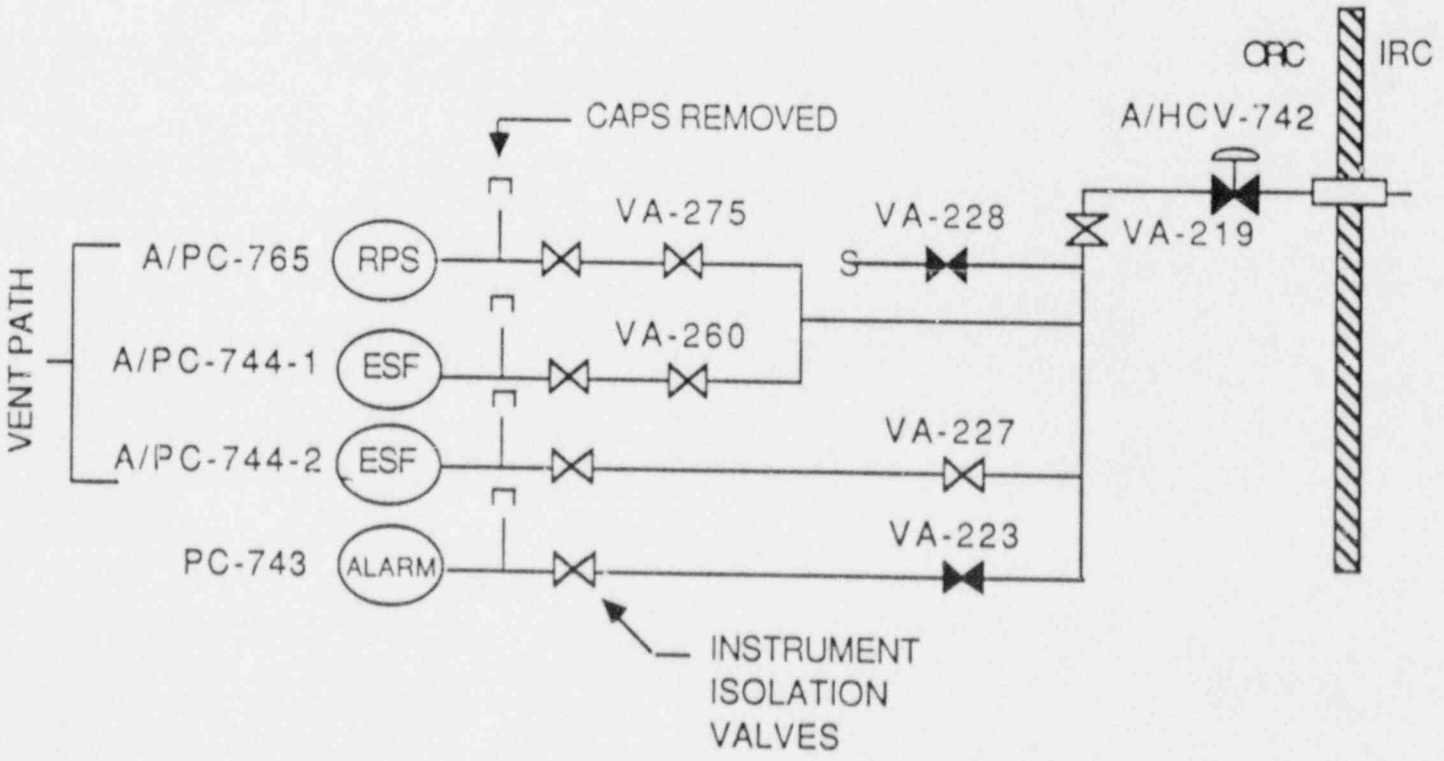
5/12/88 - MIST REPORT ISSUED

5/26/88 - DRAFT HPES REPORT ISSUED

5/27/88 - CONSEQUENCES ANALYSIS COMPLETED BY CE



TEST 1
FIGURE 1



TEST 2
FIGURE 2

TECHNICAL/LICENSE ISSUES POTENTIALLY VIOLATED

- ST-CONT-3 IS PERFORMED TO SATISFY TECHNICAL SPECIFICATION 3.5, PARAGRAPH (4), "CONTAINMENT ISOLATION VALVES LEAK RATE TESTS (TYPE C TESTS)".

- TECH SPEC 2.6, PARAGRAPH (1)a. STATES "CONTAINMENT INTEGRITY SHALL NOT BE VIOLATED UNLESS THE REACTOR IS IN THE COLD SHUTDOWN CONDITION".

- TECH SPEC 2.8, PARAGRAPH (1) REQUIRES "ALL AUTOMATIC ISOLATION VALVES SHALL BE OPERABLE OR AT LEAST ONE VALVE IN EACH LINE SHALL BE CLOSED" DURING ANY REFUELING OPERATIONS.

- TECHNICAL SPECIFICATION 2.15, TABLES 2-2 AND 2-3, IDENTIFIES THE NUMBER OF MINIMUM OPERABLE CHANNELS FOR THE CONTAINMENT HIGH PRESSURE (CPHS) AS 2.

- GDC-19 AND SRP 6.4 CRITERIA ESTABLISHES 5 REM WBE AND 30 REM THYROID/BETA SKIN DOSE LIMITS FOR CONTROL ROOM.

CONCLUSION

THE FORT CALHOUN STATION WAS IN VIOLATION OF SPECIFICATIONS 2.6, 2.8 AND 2.15.

SAFETY ANALYSIS FOR M-38 PENETRATION OPENING

- PERFORMED A CONSERVATIVE CONSEQUENCES ANALYSIS TO DEFINE EXPECTED IMPACT ON SAFETY AS A RESULT OF ADDED LEAKAGE FROM CONTAINMENT.

- PERFORMED INDEPENDENTLY VERIFIED CALCULATION OF EXPECTED LEAKAGE FROM THE OPEN CAP.

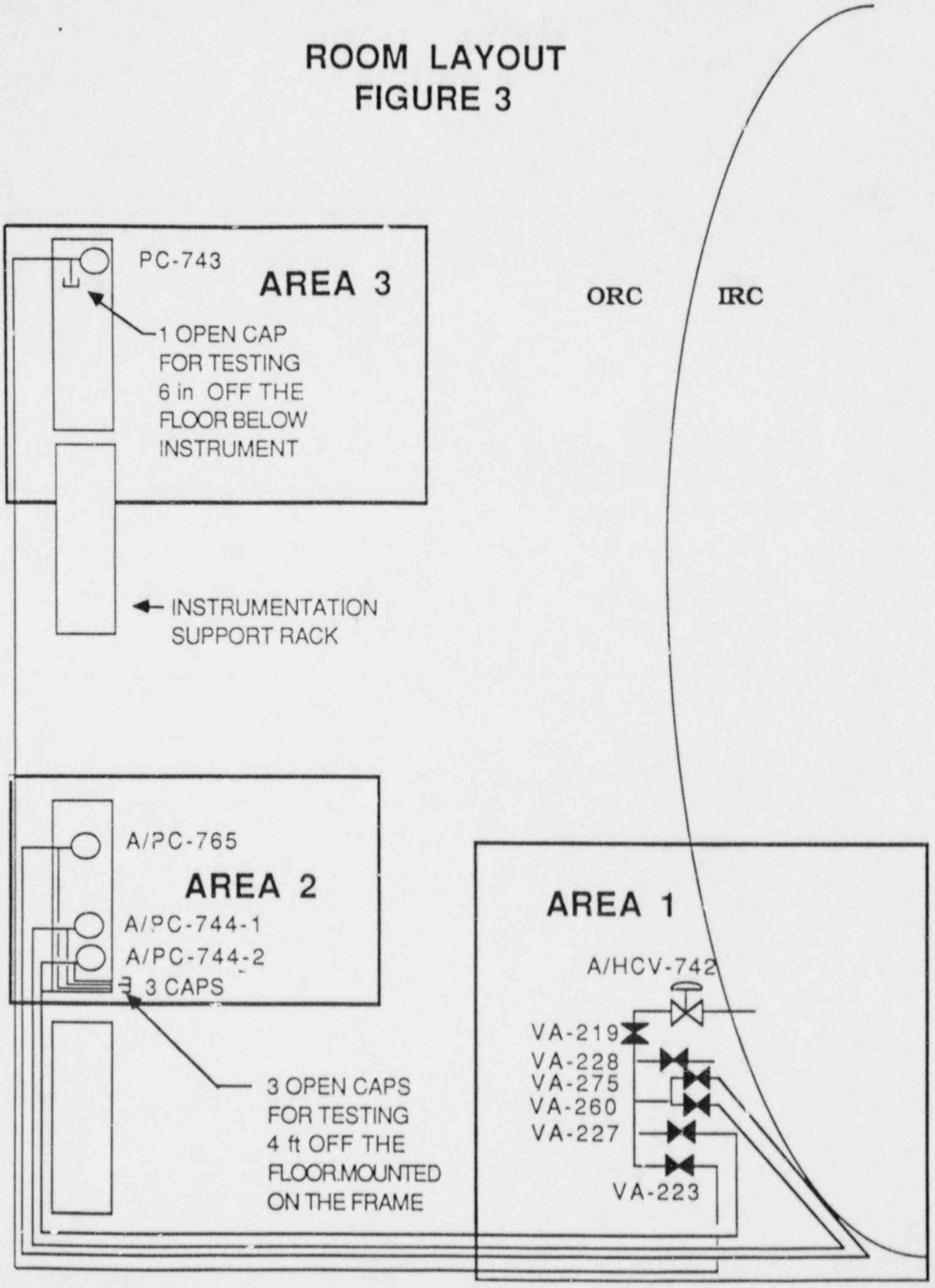
- LEAKAGE WAS DETERMINED USING THE CONTAINMENT PRESSURE PROFILE USED FOR EEQ.

- LEAKAGE FROM M-38 WAS ADDED TO ALLOWED TECHNICAL SPECIFICATION LEAKAGE FROM ALL OTHER SOURCES TO DETERMINE TOTAL EXPECTED LEAKAGE FOR DESIGN BASIS LOCA.

- USING THE CALCULATED TOTAL LEAKAGE, RADIOLOGICAL CONSEQUENCES WERE DETERMINED USING DESIGN BASIS SOURCE TERMS CONSISTENT WITH REG GUIDE 1.4 CRITERIA.

- TOTAL DOSES USING THE ABOVE ASSUMPTIONS INDICATE THAT THE 0-2 HOUR VALUE IS 6.4 REM WHOLE BODY AND 258.6 REM THYROID AT THE SITE BOUNDARY. THESE VALUES ARE WITHIN THE 10 CFR 100 LIMITS OF 25 REM AND 300 REM, RESPECTIVELY.

ROOM LAYOUT
FIGURE 3



HPES FINDINGS

(1) EVALUATED THREE SEPARATE INAPPROPRIATE ACTIONS: TWO PAST EVENTS/ONE RECENT

(2) PRIMARY CAUSAL FACTOR FOR TWO ACTIONS WAS INADEQUATE WRITTEN INSTRUCTIONS. PRIMARY CAUSAL FACTOR FOR THIRD CONCERN WAS COMMUNICATIONS DEFICIENCY

(3) SECONDARY CAUSAL FACTORS INCLUDED (TWO CONCERNS):

- INADEQUATE PRE-JOB BRIEFING
- UNFAMILIARITY/LACK OF TRAINING ON SPECIFIC EVOLUTIONS IN PROGRESS
- INADEQUATE TRAINING ON WORK PRACTICES (SELF-CHECKING PROCESS)
- ENVIRONMENTAL CONDITIONS (SLOPPY WORK AREA, WINTER STORM, AND STORAGE OF MATERIALS IN AREA)
- INADEQUATE TRAINING ON SYSTEMS/SAFETY FUNCTIONS

CORRECTIVE ACTIONS ALREADY IN PROGRESS AT TIME OF INCIDENT

- ST-CONT-3 WAS UNDERGOING MAJOR UPGRADE TO ENSURE ALL CAPS/ COMPONENTS PROPERLY ADDRESSED

- INITIATED PROCEDURES UPGRADE PROGRAM FOR ALL OPERATING MANUAL PROCEDURES

- ADDED REQUIREMENT FOR PRE-JOB BRIEFING FOR ALL SURVEILLANCE TESTS THAT ARE PERFORMED ON AN INFREQUENT BASIS

- HELD SERIES OF MEETINGS WITH PLANT PERSONNEL TO STRESS IMPORTANCE OF VERBATIM COMPLIANCE AND ATTENTION TO DETAIL

- IMPLEMENTED ACCREDITED PERFORMANCE-BASED TRAINING FOR CRAFTSMEN AND OTHER TECHNICAL STAFF MEMBERS

- RESTRUCTURED MAINTENANCE DEPARTMENT TO ADD FIELD SUPERVISORS AND PLANNERS FOR EACH CRAFT

- INSTITUTED PRE-REVIEW REQUIREMENT ON INFREQUENT CALIBRATION PROCEDURES

- DEVELOPING STRUCTURED TRAINING FOR PRC MEMBERS

ADDITIONAL MEASURES PLANNED
AS A RESULT OF CONTAINMENT INTEGRITY

- A FORMAL GUIDANCE DOCUMENT FOR PERFORMING PRE-JOB BRIEFS IS TO BE DEVELOPED. THE NEED TO BROADEN REQUIREMENTS FOR PRE-JOB BRIEFINGS BEYOND CURRENT REQUIREMENTS WILL BE EVALUATED

- WILL REVIEW THE PROCESS FOR CERTIFYING THE QUALIFICATION OF PERSONNEL PERFORMING SAFETY-SIGNIFICANT MAINTENANCE

- A FORMAL PROCEDURE FOR PRE-STARTUP VERIFICATION OF ALL CONTAINMENT PENETRATIONS WILL BE DEVELOPED

- EEAR ISSUED TO INSTALL CAGE IN ROOM 59 TO SEPARATE OUTAGE STAGING AREA FROM SAFETY-RELATED COMPONENTS

- IMPROVED PROCESS FOR POST SURVEILLANCE TEST REVIEW TO ENSURE FIRST LINE SUPERVISOR REVIEW AND VERIFICATION OCCURS WITHIN 24 HOURS OF COMPLETION

- FORMAL TRAINING FOR IMPROVED SAFETY AWARENESS WILL BE DEVELOPED FOR ALL FIRST LINE SUPERVISORS

SAFETY ANALYSES FOR OPERATION
AS APPLIED AT THE FORT CALHOUN STATION

A SAFETY ANALYSIS FOR OPERATION IS REQUIRED

- WHEN AN EXISTING EVENT OR CONDITION HAS BEEN IDENTIFIED THAT HAS PLACED THE PLANT OUTSIDE ITS DESIGN BASIS,

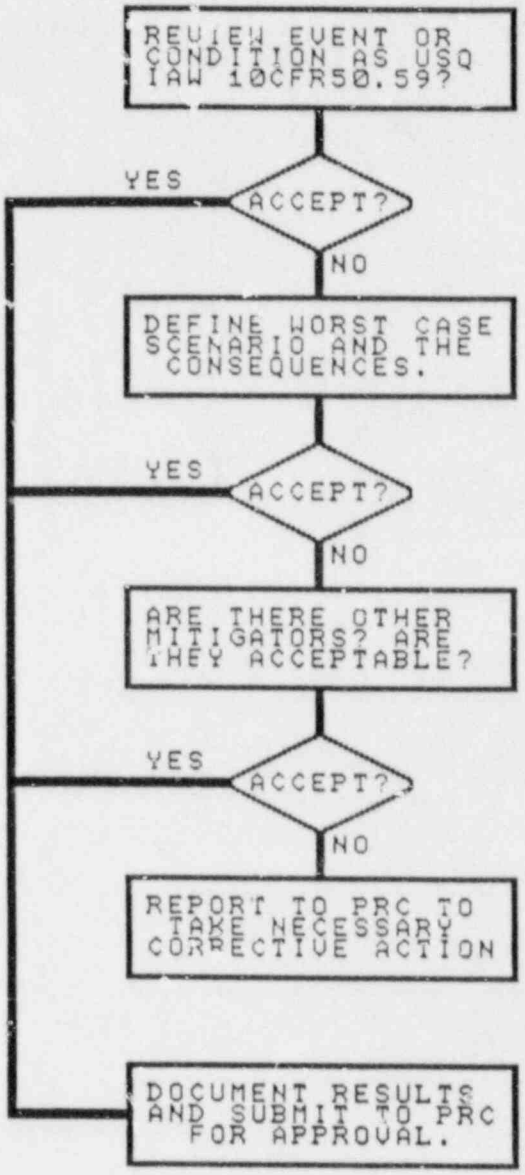
- THE EVENT OR CONDITION CANNOT BE IMMEDIATELY CORRECTED, AND

- THE EVENT MUST BE REPORTED PURSUANT TO THE REQUIREMENTS OF THE CODE OF FEDERAL REGULATIONS, CHAPTER 10, PARTS 50.72 OR 50.73.

BASIS

THE SAFETY ANALYSIS FOR OPERATION IS REQUIRED BY 10 CFR 50.73(B), CONTENTS. SPECIFICALLY, PARAGRAPH (3) REQUIRES "AN ASSESSMENT OF THE SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT. THIS ASSESSMENT MUST INCLUDE THE AVAILABILITY OF OTHER SYSTEMS OR COMPONENTS THAT COULD HAVE PERFORMED THE SAME FUNCTION AS THE COMPONENTS AND SYSTEMS THAT FAILED DURING THE EVENT."

SAO PROCESS FLOW CHART



DETAILS ON THE ACCUMULATOR SAO

- SAO WAS FIRST INITIATED IN APRIL 1987. CONSERVATIVE IN NATURE IN THAT AT THAT TIME, NO SPECIFIC DEFICIENCIES OTHER THAN HCV-385/386 HAD BEEN IDENTIFIED.

- SAO ASSUMED THAT ALL SAFETY RELATED ACCUMULATORS AND THEIR ASSOCIATED CHECK VALVES FAILED. USING THIS ASSUMPTION, OTHER PLANT FEATURES WERE IDENTIFIED TO ASSESS SAFETY SIGNIFICANCE.

- APRIL 6, 1988 THE OSAR FOR ACCUMULATORS WAS COMPLETED. BASED ON THE FINDINGS FROM THIS EVALUATION A ONE HOUR REPORT WAS MADE TO THE NRC ON LCV-383-1/2, HCV-238,239 AND 240, AND HCV-438B/D.

- MID-APRIL 1988, DECISION WAS MADE TO COMPLETE TESTING OF THE ACCUMULATOR FOR THE CCW VALVES TO CONTAINMENT COOLERS AND TO TEST THE SIRWT BUBBLER CHECK VALVES.

- TESTING IS STILL REQUIRED FOR HCV-385/386, SIRWT BUBBLERS, AND HCV-2987. MODIFICATIONS OR OTHER CORRECTIVE MEASURES ARE NEEDED FOR REPORTED DEFICIENCIES.

- FOR HCV 438B/D AND HCV-400 SERIES, EITHER MODIFICATION REQUIRED OR DESIGN BASIS MUST BE REVISED AND SUPPORTED. APPEARS THAT MR IS MOST LIKELY FIX FOR 438 B/D.

- HCV-304, 305, 306 AND 307 NEED A CONFIRMING EVALUATION TO VERIFY THE ADEQUACY OF HOT LEG INJECTION FLOW WITH VALVES IN CURRENT CONFIGURATION.

EVALUATION OF LCV-383-1/2 SINGLE FAILURE QUALIFICATION

- THE FORT CALHOUN STATION UPDATED SAFETY ANALYSIS REPORT (USAR) SECTION 6.2.5, DESIGN EVALUATION, STATES IN PARAGRAPH h, "THE SAFETY INJECTION SYSTEM HAS BEEN DESIGNED TO MEET THE SINGLE FAILURE CRITERION."

- THE USAR, APPENDIX G, CRITERION 21, SINGLE FAILURE DEFINITION, STATES "THE DESIGN OF THE FORT CALHOUN STATION IS BASED ON THE CONCEPT THAT NO SINGLE FAILURE OF ACTIVE COMPONENTS WILL INHIBIT NECESSARY SAFETY ACTION WHEN REQUIRED."

- THE CODE OF FEDERAL REGULATIONS, CHAPTER 10, PART 50, APPENDIX A, CRITERION 21, PROTECTION SYSTEM RELIABILITY AND TESTABILITY, REQUIRES THAT "REDUNDANCY AND INDEPENDENCE DESIGNED INTO THE PROTECTION SYSTEM SHALL BE SUFFICIENT TO ENSURE THAT (1) NO SINGLE FAILURE RESULTS IN THE LOSS OF PROTECTION FUNCTION".

- LCV-383-1 AND LCV-383-2 ARE NORMALLY OPEN, FAIL OPEN AIR OPERATED VALVES THAT MUST BE OPEN TO PROVIDE A BORATED WATER SOURCE FOR THE SAFETY INJECTION AND CONTAINMENT SPRAY PUMPS EARLY IN A DESIGN BASIS LOCA. ONCE LEVEL IN THE SAFETY INJECTION REFUELING WATER TANK (SIRWT) REACHES 16" LEVEL, THE VALVES RECEIVE A RECIRCULATION ACTUATION SYSTEM (RAS) SIGNAL TO CLOSE. THE VALVES ARE CLOSED TO PREVENT BACKFLOW OF ACTIVATED COOLANT FROM THE CONTAINMENT FLOOR FROM ENTERING THE SIRWT.

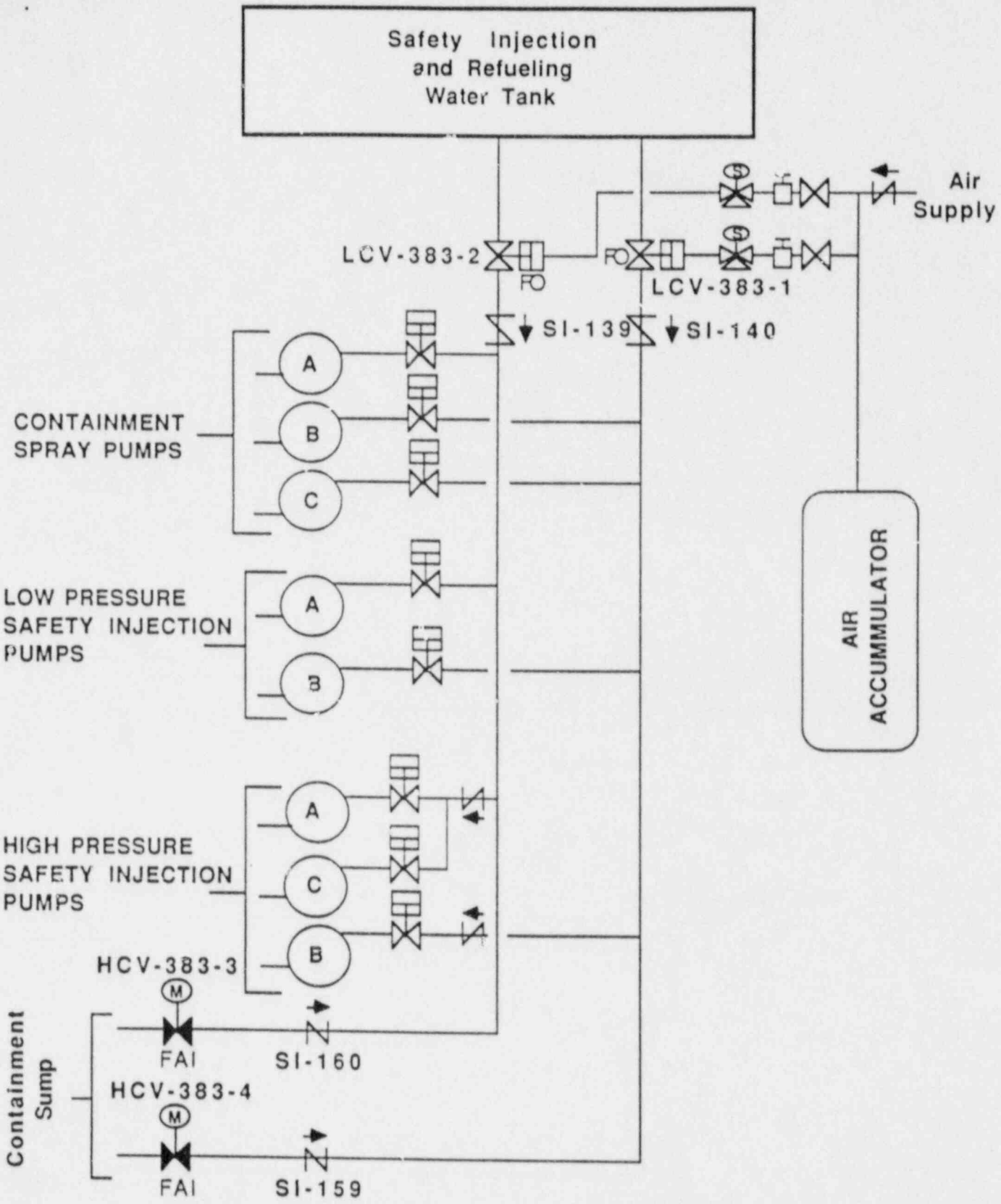
- LCV-383-1 AND LCV-383-2 RELY ON ONE AIR ACCUMULATOR TO CLOSE WITH LOSS OF INSTRUMENT AIR TO PERFORM THE RAS FUNCTION. THE TWO VALVES HAVE THEIR INDEPENDENT SOLENOID VALVES DOWNSTREAM OF THE ACCUMULATOR AND ITS ASSOCIATED CHECK VALVE. THERE IS NO SINGLE FAILURE OF THE ACCUMULATOR OR CHECK VALVE, ACTIVE OR PASSIVE, THAT WOULD PREVENT THE VALVES FROM GOING TO THEIR FAILED POSITION. PASSIVE FAILURE OF THE ACCUMULATOR AND ASSOCIATED TUBING OR AN ACTIVE FAILURE OF THE CHECK VALVE COULD PREVENT BOTH VALVES FROM BEING CLOSED.

- AN ADDITIONAL SINGLE FAILURE OF ONE OF THE CHECK VALVES, SI-140 OR SI-139, WOULD HAVE TO OCCUR BEFORE THE SAFETY FUNCTION (I.E., PREVENTING BACKFLOW) IS INHIBITED.

- LCV-383-1 AND LCV-383-2 ARE IN PARALLEL. THIS DESIGN ARRANGEMENT ENSURES THAT WITH ANY SINGLE FAILURE, AT LEAST ONE PATH OF FLOW FROM THE SIRWT TO THE SI/CS PUMPS WOULD BE AVAILABLE. ALSO, SINCE THE VALVES ARE IN PARALLEL, ONE VALVE FAILING TO CLOSE OR BOTH VALVES FAILING TO CLOSE ON RAS, WOULD HAVE THE SAME EFFECT ON THEIR ABILITY TO PERFORM THEIR SECONDARY SAFETY FUNCTION, THUS, CHECK VALVES SI-139 AND SI-140 ARE REQUIRED TO MEET SINGLE FAILURE CRITERIA FOR PREVENTING BACKFLOW.

CONCLUSION

THE FACT THAT LCV-383-1 AND LCV-383-2 SHARE AN ACCUMULATOR DOES NOT CONSTITUTE A VIOLATION OF FORT CALHOUN STATION'S OR CURRENT NRC SINGLE FAILURE CRITERIA.



Suction Side of Safety Injection System

MANAGEMENT INVESTIGATIVE SAFETY TEAM
(MIST)

* PURPOSE
  - Collect and preserve event information
  - Establish event documentation files
  - Analyze event significance
  - Identify root cause(s)
  - Recommend and review corrective action

* PERMANENT MEMBERSHIP
  - J. K. Gasper (Designated Team Leader)
  - R. L. Jaworski
  - S. K. Gambhir

* METHODOLOGY
  - Identify additional team members
  - Review available documents and data
  - Interview personnel involved
  - Document reviews and interviews

* ACTIVATED
  - April 28, 1988 by R. L. Andrews

* SCOPE
  - SIRWT Bubbler Check Valve Failures
  - Missing Cap On Containment Pressure Sensing Line

* REPORT TO DIVISION MANAGER, MANAGER - FORT CALHOUN, AND SARC MEMBERS REQUESTED BY MAY 12, 1988

* REPORTS ISSUED MAY 12, 1988

SIRWT BUBBLER CHECK VALVE FAILURE

* ADDITIONAL MEMBERS
  - ° R. C. Kellogg
  - ° W. O. Weber

* COLLECT AND PRESERVE INFORMATION
  - ° "As found" condition of check valves destroyed after testing due to way M.O. was written

* EVENT DOCUMENTATION INCLUDED WITH REPORT

* EVENT SIGNIFICANCE
  - During a LOCA with loss of offsite power, instrument air would be lost and failure of the check valves could cause the bubblers to fail causing an inadvertent RAS. This "false" RAS could cause SI pumps failure and consequential core damage.

* ROOT CAUSES
  - Inadequate scope of ST and IST programs
    - ° Inadequate CQE list
    - ° No systematic assessment to assure completeness
  - Misapplication of Crane, Model No. 27, horizontal lift check valve

* CORRECTIVE ACTION RECOMMENDATIONS
  - Limit "testing" procedures to testing and document as found condition
  - Replace similar Crane check valves in other air accumulator applications.
  - Perform fault tree analysis on Safety Injection (SI) System to determine adequacy of CQE list, and ST and IST programs for the SI System. Expand to other systems if discrepancies identified.
  - Place air accumulator check valves in IST program

MISSING CAP ON CONTAINMENT PRESSURE SAFETY LINE

* ADDITIONAL MEMBERS
  - M. W. Butt (HPES Coordinator)
  - J. D. Kecy

* INFORMATION AND DOCUMENTATION INCLUDED IN REPORT

* EVENT SIGNIFICANCE
  - Loss of containment integrity
  - Greater than Tech Spec leak rate
  - Post accident doses less than 10 CFR 100 limits*
  - Control Room habitability limits probably exceeded*

    *Design Basis calculations using R.G. 1.4 assumptions

* ROOT CAUSE(S)
  - Inadequate procedure and work package (primary)
  - Lack of system familiarity (secondary)

* IMMEDIATE CORRECTIVE ACTION
  - April 29, 1988 letter
  - Develop and execute a procedure to accomplish a complete and documented dual verification of all non-wetted penetration "line ups".
  - Completed May 2, 1988

* MAJOR CORRECTIVE ACTION RECOMMENDATIONS (Includes HPES Evaluatior Recommendations)
  - Development and implement procedure(s) to double verify all penetration "line ups"
  - Ensure STs and CPs return instruments to proper configuration
  - Evaluate acceptability of crimped and soldered line seals

- Evaluate method to reduce human error potential of these and similar penetrations
- Qualify method of installing Swagelock caps to serve as 60 psi boundary
- Eliminate test tee caps as single boundary by installing an isolation valve as a second isolation boundary
- Training on safety significance of events and decisions
- Clearly define person serving as Acting Manager - Fort Calhoun Station
- Separate temporary equipment from permanent equipment in Room 59 (HPES)
- Training on planning and organizing maintenance (HPES)
- Centralize scheduling and implement ILS

MIST STATUS

* ADDENDUM TO BE ISSUED THIS WEEK IN RESPONSE TO QUESTIONS

* LETTER REQUESTING COMMENTS AND QUESTIONS BY JULY 1, 1988 TO BE SENT TO ALL RECIPIENTS THIS WEEK

* ASSIGNMENT OF RECOMMENDATIONS TO BE MADE AND TRACKED

* REPORT TO BE PROVIDED TO NEXT SARC MEETING ON JULY 13, 1988

SLIDE 1

INSTRUMENT AIR SYSTEM

STATUS REPORT

I. ITEMS COMPLETE SLIDE 2

A. INSTRUMENT AIR SYSTEM SPECIFIC

1. Operational

a. Assignment of System Engineer

2. Procedural

a. Procedure Change to MP-FP-7 to Ensure Check Valve Operability
b. Review of IAS Operating Procedures
c. Upgrade Incident Reporting Process
d. Development of Operating Instructions for High Dew Points
e. Instrument Air System Line-up/Tag Out

3. Maintenance

a. Preventive Maintenance Program Upgrade
b. Air Dryer Desiccant Replacement
c. Revise Air Dryer Preventive Maintenance Schedule

4. Surveillance

a. Preventive Maintenance/Surveillance Testing of Air Operated Dampers
b. Particulate Monitoring Program
c. Dew Point Sampling Program

5. Evaluations

a. System Functional Inspection
b. Evaluation of Interface Valves and Bubblers
c. Consideration of Check Valve Failures in the Safety Analysis for Operability

6. Engineering

a. Common Mode Failure Consideration

B. MANAGERIAL IMPROVEMENTS

1. Evaluations

a. SARC Evaluation of the Water Intrusion Event
b. Event Investigative Team

2. Reporting

a. Emergency Plan Implementing Procedure (EPIP) Upgrade
b. Safety Analysis for Operability (SAO)

3. Personnel

a. Employee/Management Conferences

4. Procedures

a. Policy Statement Concerning Equipment Operation by Non-Operators

II. ITEMS IN PROGRESS

SLIDE 3

A. INSTRUMENT AIR SYSTEM SPECIFIC

1. Operational

a. Additional Walkdowns of Instrument Air System

2. Procedures

a. Abnormal Operating Procedure (AOP-17) Upgrade in Accordance with Writers Guide

3. Maintenance

a. Clean/Flush the Instrument Air System
b. Valve Teardown Program

4. Surveillance

a. Testing of CQE Non-ISI Valves
b. Monthly Valve Cycling for Inservice Test Program
c. Cycling of Inservice Inspection (ISI) Valves
d. Inservice Inspection Program

5. Engineering

a. Diesel Generator Air Damper Replacement
b. Assessment of Instrument Air System Design to Current Industry Standards
c. System Functional Inspection - Follow-up
d. Development of Instrument Air System Design Basis Documentation
e. Identification and Installation of Air Filter Additions for Valve Operators and Air Dryer
f. Removal of Plant Air System and Fire Protection System Crosstie

B. MANAGERIAL IMPROVEMENTS

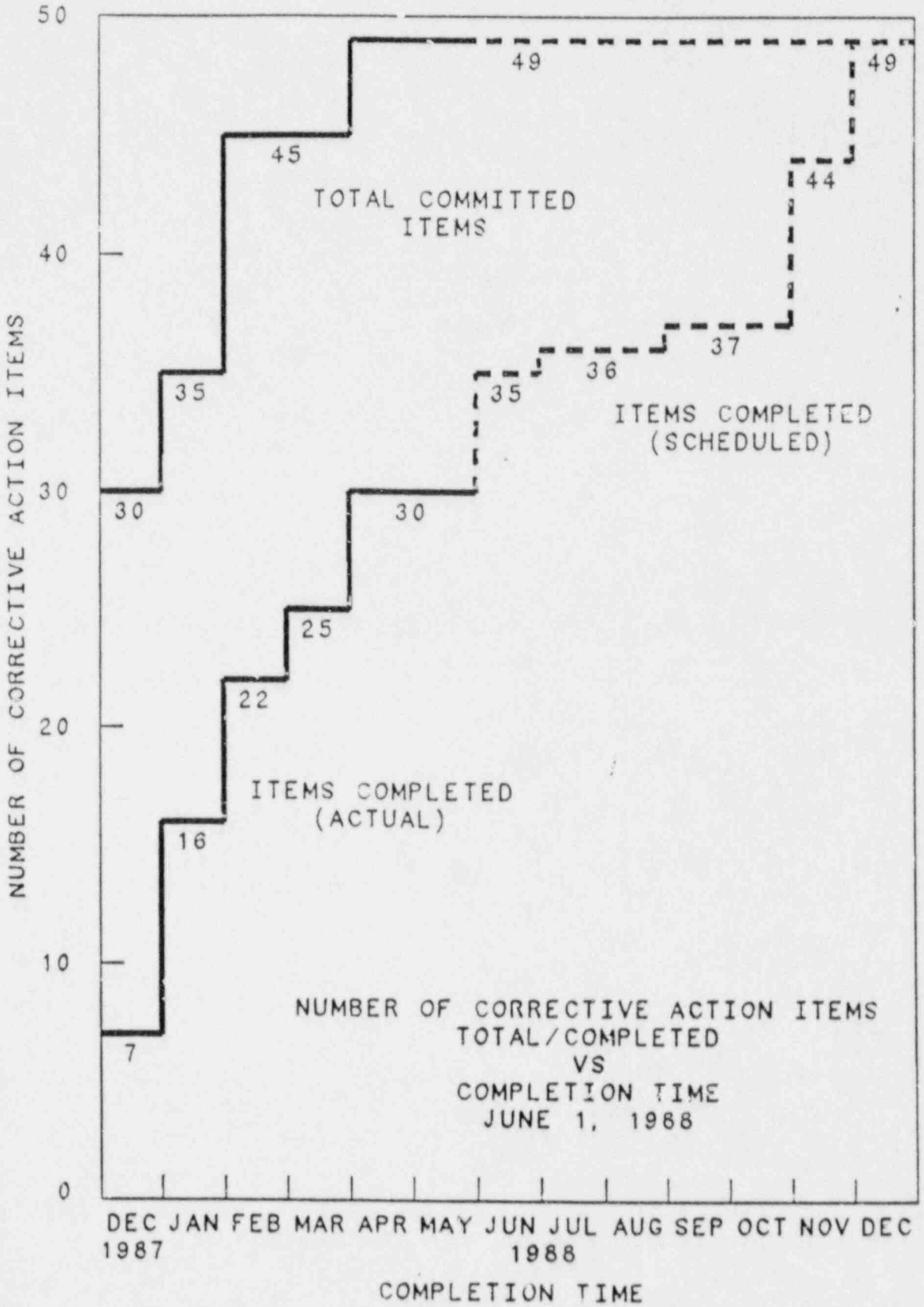
1. Evaluations

a. Nuclear Operations Plan Development and Appraisal
b. Instrument Air Steering Committee

2. Training

a. General Employee Training (GET) Upgrade for Safety Awareness
b. Additional Field Observation Training
c. Upgrade of Lesson Plans
d. Pre-Job Briefings for Surveillance Tests

INSTRUMENT AIR SYSTEM CORRECTIVE ACTION ITEMS



REVIEW OF INSTRUMENT AIR PROJECT ACTIVITIES

RELATED TO SIRWT BUBBLER CHECK VALVE AND CONTAINMENT INTEGRITY EVENTS

CONCLUSIONS OF REVIEW:

1. The two events were not the result of ineffective or incomplete Instrument Air actions

2. Remaining actions improve reliability and operability of the Instrument Air System

3. Completed Instrument Air System action have improved OPPD responsiveness to events

4. Questions arise on broad issues relating the two recent events to the instrument air event:

   a. Is the scope of the Surveillance Test Program and CQE list properly defined? [Open - Action in Progress]

   b. Are personnel who are performing Surveillance Tests properly trained and briefed? [Closed - Action Initiated and Complete]

ATTACHMENT 2

This attachment provides detailed information regarding several questions raised during the enforcement conference.

1. During the discussion, the topic of a Component Cooling Water line rupture inside containment concurrent with a Loss of Coolant Accident was raised. The question raised was: If such an event were to occur, would the amount of componert cooling water dumped in containment be sufficient to dilute critical?

   As discussed at the June 8, 1988 conference, this would require two concurrent accidents, which is outside the bounds of what is considered in an accident analysis. This event was discussed in general terms. As noted at the conference, sufficient time would exist for operator action to address the problem before any criticality would occur. It was also noted that the operator would detect a rise in containment level with the Recirculation Actuation Signal activated. Boric acid injection could still be accomplished via the charging pumps. A formal calculation to document that a return to critical would not occur is currently underway. This calculation will be completed by July 31, 1988.

2. As a result of the enforcement conference, the question was raised as to how Fort Calhoun Station met General Design Criterion 19 during the time the cap was off.

   OPPD held follow-up conversations with the Senior Resident Inspector on June 10 related to the topic of doses in the Control Room Post-LOCA with the instrument cap missing. These conversations were held to ensure there was an understanding of where Fort Calhoun Station stood relative to General Design Criterion 19 during the time that the cap on the 3/8" containment penetration line was not installed. The purpose of our discussion relative to the General Design Criteria was to assess the "safety significance" of the condition if a design basis accident would have occurred during this time frame. As noted, there was never an intent to provide results by calculation which demonstrated that we could license the facility in the as-found condition. However, to assess the plant's interim position from a licensing perspective, the General Design Criteria provide a basis from which to perform that assessment. Subsequently, to clarify the results of comparing the radiological consequences between postulated and realistic conditions, OPPD met with the Senior Resident Inspector to discuss the conservatisms in the analysis which was presented.

The following information was discussed with the Senior Resident Inspector. The NRC-required conservatisms in the analysis are compared to OPPD's best estimate of a "real life" situation.

   a. The source term used in the analysis was developed based upon the assumptions presented in Revision 2 of Regulatory Guide 1.4, dated June 1974, which has been recognized as unrealistically conservative in the years since the Three Mile Island Unit 2 accident in March 1979. In reality, the source term research conducted since the TMI 2 accident has shown that much smaller fractions of the core fission product inventory are actually available for release to the environment (Reference NUREG-0956, dated July 1986). In addition, OPPD has

estimated a maximum source term of 5% core inventory Xenon isotopes, 15% core inventory Krypton isotopes, and 1.25% core inventory Iodine isotopes would be available for release to the environment. This is based upon cladding failure only, with no fuel melting, pursuant to Fort Calhoun Station USAR Section 14.15. Resultant doses from a more realistic source term would be less by a factor of 10 for whole body and more for thyroid dose.

b. No mixing was assumed in the auxiliary building atmosphere, whereas mixing would take place. In addition, operator action mandated by Fort Calhoun Station Abnormal Operating Procedures (AOP-9) would isolate the auxiliary building ventilation system and trap released fission products inside the building.

c. A direct release to the environment from the point of containment closest to the control room ventilation intake was assumed, whereas the actual release would be to the auxiliary building which would be isolated as noted in b. above.

d. Atmospheric mixing due to only the building wake (turbulence) was allowed, whereas additional mixing would occur due to the ventilation exhaust stack height of 51 ft. above the control room ventilation intake. Approximately 84% of any environmental release would be from the ventilation exhaust stack.

e. A 1 meter per second wind speed was utilized to calculate the dispersion factor, X/Q, whereas annual average wind speeds at the Fort Calhoun Station are on the order of 1.8 to 3.6 meters per second. Higher wind speeds result in better dispersion of released gases. Resultant dose reductions would be on the order of 44%-72% due to better dispersion of gases after release from the auxiliary building.

f. Stay time of operators in the control room for the design basis calculation were assumed as follows: 100% for 0-24 hours, 60% for 1-4 days, and 40% for 4-30 days, whereas actual stay times would be a maximum of 33% over the 30 day period if an operator worked every day for 30 days.

g. 10 CFR 20 allows up to 3 Rem/quarter, 12 Rem/year, if not greater than the PAD, whereas OPPD administratively limits worker doses to 4.5 rem per year. In addition, OPPD's Radiological Emergency Response Plan places a Health Physics technician in the control room to monitor dose rates in the event of an accident which would ensure the OPPD administrative limit is not exceeded.

h. Fission product leakage from containment was assumed constant at 0.05% of the containment free volume (1985 ILRT results) for the period 0-24 hours and 0.025% for the remaining 29 days in addition to the conservatively calculated pressure driven release through the uncapped instrument line. The pressure driven release through the uncapped line was based upon the containment pressure transient developed in 1984 for EEQ. In reality, actual release volumes would be less due to a lower, shorter duration pressure transient inside containment

with containment pressure suppression systems operating as designed (i.e., two spray headers and four air coolers operating within 20-30 seconds.)

Based on this discussion, a better understanding of how Fort Calhoun assessed the implications of the event was reached.

3. The use and application of the Safety Assessment for Operability document was discussed. OPPD will arrange a meeting with Region IV to explain the process and provide the NRC with OPPD's perspective on when and how we determine inoperability. We will contact you to arrange for this meeting.

4. OPPD is evaluating whether the SIRWT Bubbler functional testing can be performed before the 1988 refueling outage. If operationally feasible, the testing of the valves will be performed prior to the outage. The bubblers are considered operable based upon the testing performed on the check valves in May and verification that the accumulators are adequately sized.

5. A review to determine locations of check valves installed in applications similar to that of the SIRWT bubbler check valves was performed. Thirteen (13) such valves were identified, and are installed in non-safety-related applications. As noted at the conference, these valves will be replaced. The schedule for replacement will be determined by July 31, 1988.

6. LCV-383-1 and LCV-383-2 were included in the original ISI program. This testing did not include the instrument air accumulators and associated check valves. Testing of LCV-383-1 and LCV-383-2 IA check valves is included in the proposed revisions to the ISI program. This testing and other updates to the ISI program, including changes to address other concerns from Inspection Report 50-285/88-15 will be submitted prior to the end of July 1988.