

FEB 7 1991

Docket No. 50-458/91-04
License No. NPF-47
EA 91-008

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

Gentlemen:

SUBJECT: NRC INSPECTION REPORT NO. 50-458/91-04

This refers to the January 8-10, 1991, special inspection of the apparent inoperability of the safety relief valves (SRV) in the automatic depressurization system (ADS) at the Gulf States Utilities' (GSU) River Bend Station (RBS) and to the discussion of that inspection with you and other GSU representatives at an enforcement conference held in the NRC Region IV office in Arlington, Texas, on January 31, 1991.

The enforcement conference was conducted to provide GSU an opportunity to provide additional information with respect to the reported inoperability of the ADS, caused by the normal supply air compressors being out of service, and to assist NRC in making an appropriate enforcement decision. This situation constituted an apparent violation of the RBS Technical Specifications (TS). Specifically, on January 4, 1991, with the RBS in Mode 1, the licensee declared the ADS inoperable because of the indeterminate status of the capability of the ADS/SRVs to meet their design basis functions due to apparent inadequate air pressure in the SRV accumulators. The apparent inoperability existed for approximately 27 hours, which exceeded the TS limit of 12 hours.

Based on further analysis and evaluation provided by GSU at the enforcement conference, it appears that the ADS system was not inoperable as the SRVs could have performed their intended design basis function. This conclusion was based on an analysis completed by GSU, after NRC Inspection Report 50-458/91-04 was issued, that indicated that sufficient air pressure remained in the SRV accumulators even though the normal air supply system was not in service. Therefore, it does not appear that the condition of the ADS was in violation of TS 3.5.1.e.2. For this reason, the NRC has decided that no violation occurred and that no enforcement action will be taken.

The NRC notes that this was a licensee-identified issue and recognizes that it was identified as a result of the tenacity of the operations staff, coupled with the diligent efforts of system and design engineering personnel. The short-term actions taken by the licensee, while the final analysis was being completed, appeared to adequately address the continued operability of the ADS/SRVs.

RIV:DRP/C
RVAzua
2/7/91

C:DRP
PHH
2/7/91

EO
GFSanborn
2/7/91

D:DRP
Socottins
2/7/91

IE45
~~111~~

During the enforcement conference presentation, the licensee committed to make enhancements to improve its overall performance level, as discussed below:

- . Provide training to engineers on the proper usage of the information contained in the Updated Safety Analysis Report (USAR).
- . Operations personnel will review the current TS to identify any other TS that may require clarification.
- . Submit a TS amendment to define the operability requirements for the ADS/SRVs.
- . Install backup air compressors to increase the reliability of the normal air supply system for the ADS/SRVs.
- . Issue instructions to the operations department to specify the operability requirements for the ADS/SRV air system.
- . Revise the USAR, as required, to clarify the information related to the air systems that supply the ADS/SRVs.

The above commitments provided by the licensee will be reviewed by NRC personnel in the future, under the routine inspection program, to verify adequate implementation. The performance of this review will be tracked as an open item (458/9104-01).

Should GSU's understanding of the commitments listed above differ from ours, please contact me immediately.

In accordance with Section 2.790 of the NRC's "Rules of Practice," Par: 2, Title 10, Code of Federal Regulations, a copy of this letter and its enclosure will be placed in the NRC Public Document Room.

Sincerely,
Original Signed By

G.L. Constable

Samuel J. Collins, Director
Division of Reactor Projects

Enclosure:
Meeting Summary

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

Gulf States Utilities

-3-

Winston & Strawn
ATTN: Mark J. Wetterhahn, Esq.
1401 L Street, N.W.
Washington, D.C. 20005-3502

Gulf States Utilities
ATTN: Les England, Director
Nuclear Licensing
P.O. Box 220
St. Francisville, Louisiana 70775

Mr. J. David McNeill, III
William G. Davis, Esq.
Department of Justice
Attorney General's Office
P.O. Box 94095
Baton Rouge, Louisiana 70804-9095

H. Anne Plettinger
3456 Villa Rose Drive
Baton Rouge, Louisiana 70806

President of West Feliciana
Police Jury
P.O. Box 1921
St. Francisville, Louisiana 70775

Cajun Electric Power Coop. Inc.
ATTN: Philip G. Harris
10719 Airline Highway
P.O. Box 15540
Baton Rouge, Louisiana 70895

Department of Environmental Quality
ATTN: Glenn Miller, Administrator
Radiation Protection Division
P.O. Box 14690
Baton Rouge, Louisiana 70898

bcc to DMB (IE14)

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

Resident Inspector
Section Chief (DRP/C)
MIS System
RSTS Operator
RIV File
Senior Resident Inspector, Cooper
G. F. Sanborn, EO

MEETING SUMMARY

Licensee: Gulf States Utilities (GSU)

Facility: River Bend Station (RBS)

License No.: NPF-47

Docket No.: 50-458

Subject: ENFORCEMENT CONFERENCE CONCERNING NRC FINDINGS (INSPECTION
REPORT 50-458/91-04)

On January 31, 1991, representatives of GSU met with Region IV personnel in Arlington, Texas, to discuss the findings contained in NRC Inspection Report 50-458/91-04 that was completed in January 1991. The meeting was held at the request of Region IV. The attendance list and licensee presentation are attached to this summary.

The NRC discussed its concerns regarding the apparent inoperability of the safety relief valves in the automatic depressurization system due to inadequate pressure in the air system accumulators. The specific violation, which was discovered by the licensee, involved an apparent failure to comply with the requirements of Technical Specification (TS) 3.5.1.e.2. This TS requires that, if the ADS is inoperable greater than 12 hours, the plant should be placed in hot shutdown. The ADS was apparently inoperable for approximately 27 hours.

The licensee discussed the sequence of events leading up to and following the discovery of the problem, an analysis of the safety significance of the issue, and the corrective actions taken. Based on the analysis performed by the licensee, it was shown that the ADS was not inoperable because sufficient pressure was available in the SRV accumulators, even though the normal air supply was not available. The licensee discussed the program enhancements that would be implemented to improve their overall performance with respect to interpretation of TS operability requirements.

Attachments:

1. Attendance List
2. Licensee Presentation

ATTENDANCE LIST

Attendance at the GSU/NRC enforcement conference on January 31, 1991, at the NRC Region IV office:

GSU

J. C. Deddens, Senior Vice President
D. E. Jennigan, System Engineering Supervisor
W. H. Odell, Manager, Oversight
E. Zoch, Senior Nuclear Engineer
P. D. Graham, Plant Manager
J. P. Shippert, Assistant Plant Manager; Operations, Radiological Waste,
and Chemistry
L. A. England, Director, Nuclear Licensing

NRC

S. J. Collins, Director, Division of Reactor Projects
J. P. Jaudon, Acting Director, Division of Reactor Safety
T. F. Stetka, Acting Deputy Director, Division of Reactor Safety
P. H. Harrell, Chief, Project Section C
G. F. Sanborn, Enforcement Officer
E. J. Ford, Senior Resident Inspector
D. P. Loveless, Resident Inspector
R. V. Azua, Project Engineer
C. M. Abbate, NRR Project Manager, Project Directorate IV

NRC, Office of Enforcement (Participated by Telephone)

W. Troskoski, Enforcement Specialist

Enforcement Conference
January 31, 1991
Arlington, Texas

Attachment 2

AGENDA

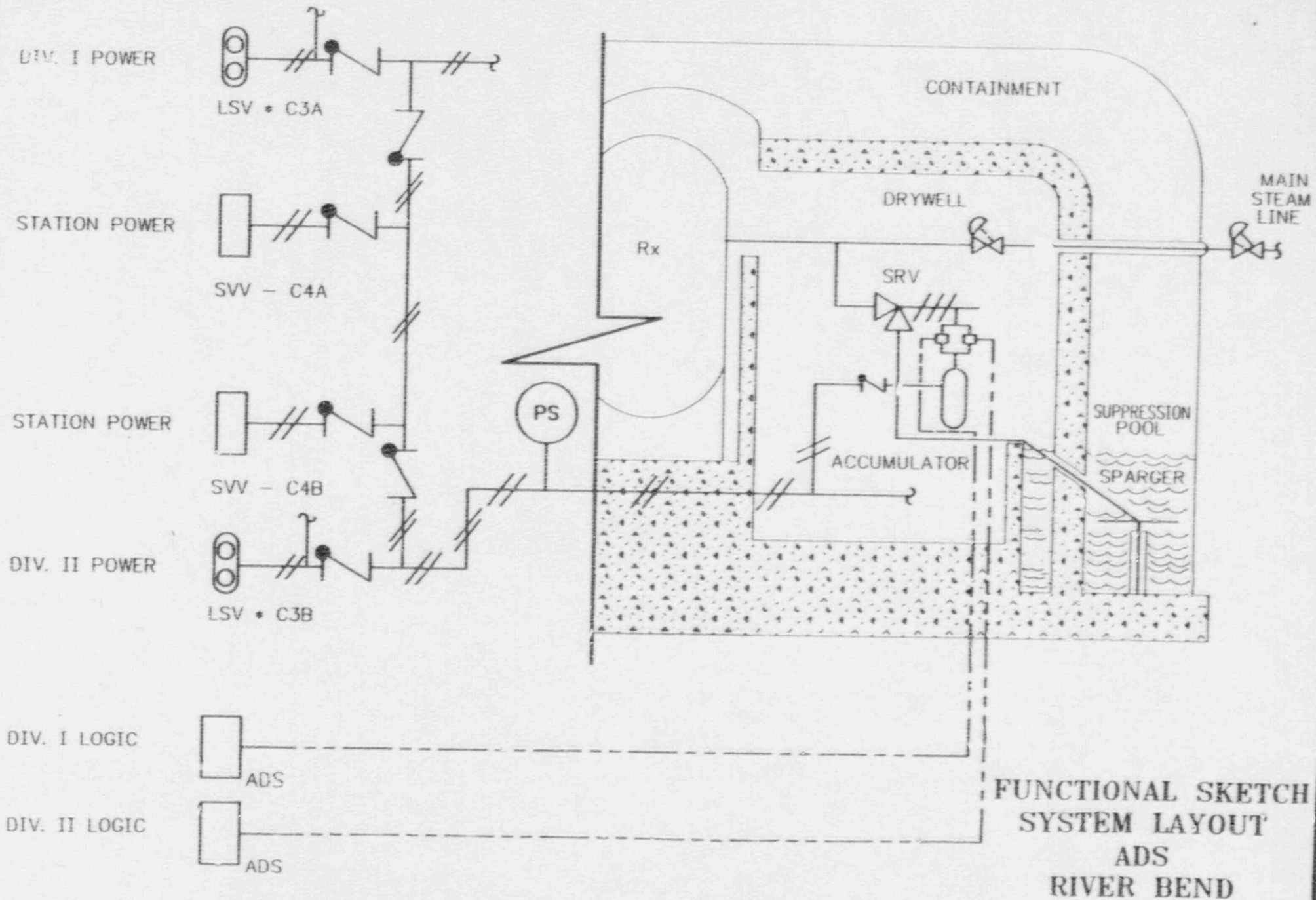
Opening Remarks	NRC
GSU Opening Remarks	J. C. Deddens
Overview of Automatic Depressurization System	J. P. Schippert
- Current System Status	
Events Leading up to and Discussion of 01/04/91 Report	D. E. Jernigan
- Immediate Actions Taken	
Engineering Analysis of Required Pressures and Safety Assessment	E. J. Zoch
Root Causes/Corrective Actions to Prevent Recurrence	D. E. Jernigan
Maintenance History of SVV Air Compressors	D. E. Jernigan
- Problems	
- Actions Taken	
Other Actions	P. D. Graham
GSU Closing Remarks	J. C. Deddens



SYSTEM OVERVIEW
AUTOMATIC DEPRESSURIZATION SYSTEM
RIVER BEND STATION

ADS SYSTEM

- OPENING FUNCTION FOR 7 OF 16 SAFETY RELIEF VALVES, IN ADDITION TO THE SAFETY, RELIEF, AND LOW-LOW SET FUNCTIONS
- ADS REDUCES REACTOR PRESSURE FOLLOWING SMALL BREAKS IN THE EVENT OF HPCS FAILURE
- WHEN VESSEL PRESSURE IS REDUCED TO WITHIN THE CAPACITY OF THE LOW PRESSURE SYSTEMS (LPCS AND LPCI), THEY PROVIDE POST-ACCIDENT INVENTORY MAKEUP



SEQUENCE OF EVENTS

SVV MALFUNCTION

01/03/91/0541	BOTH SVV COMPRESSORS INOP
01/04/91/0912	SVV COMPRESSOR 'B' RETURNED TO SERVICE
01/04/91/1100	CR 91-0004 INITIATED, FOLLOWING ENGINEERING REVIEW OF DESIGN INFORMATION. LSV DETERMINED INADEQUATE FOR ADS OPERABILITY.
01/04/91/1320	NRC NOTIFICATION

SUMMARY

- BOTH SVV COMPRESSORS OUT-OF-SERVICE FOR 27 HOURS 31 MINUTES
- NRC NOTIFICATION MADE WITHIN 2 HOURS 20 MINUTES OF DISCOVERY

History of SVV Operability Question

1984: Review of plant correspondence indicated that during Tech. Spec. development, questions were posed concerning SRV/ADS air pressure requirements and what pressures should be used. The correspondence implied that the requirements were not clear concerning the absolute minimum pressure.

Feb. 1987: A question was posed to the Operations Supervisor by a Shift Supervisor on the requirements for SVV pressure. The question posed referenced a 1984 letter from GE on a 150 psig requirement for SVV air pressure. The answer given by the Operations Supervisor stated that the design basis may require 150 psig but in fact operability was good until 101 psig.

December 25, 1987

On December 25, 1987, an annunciator energized signifying low header pressure to the 'B' ADS/SRV air accumulators.

- o Prompt MkOs were issued by Operations to confirm and correct the condition causing the annunciator on the 'B' header. This action confirmed a varying header pressure between 140 to 150 psig.
- o Tech. Specs. did not give the requirement directly for ADS/SRV air accumulator operability.
- o Field Engineering was contacted to investigate the problem and to state to Operations the required air pressure for ADS/SRV operability.
- o Field Engineering reviewed several sections of the USAR to determine the requirements for ADS/SRV accumulator. Based on this review, a memorandum was issued to Operations stating that air pressure must be maintained above 101 psig.
- o A tracking LCO was issued by Operations identifying the problem. The tracking LCO required the LSV*C3B compressor to remain operable with the low header pressure annunciator energized. The air pressure recommended by Field Engineering for operability was listed on the LCO. Based on this information, the system was determined operable.

EMERGENCY CORE COOLING SYSTEMS

LIMITING CONDITION FOR OPERATION (Continued)

ACTION: (Continued)

- d. For ECCS divisions I and II, provided that ECCS division III is OPERABLE:
 1. With LPCI subsystem "A" and either LPCI subsystem "B" or "C" inoperable, restore at least the inoperable LPCI subsystem "A" or inoperable LPCI subsystem "B" or "C" to OPERABLE status within 72 hours.
 2. With the LPCS system inoperable and either LPCI subsystem "B" or "C" inoperable, restore at least the inoperable LPCS system or inoperable LPCI subsystem "B" or "C" to OPERABLE status within 72 hours.
 3. Otherwise, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours*.
- e. For ECCS divisions I and II, provided that ECCS division III is OPERABLE and divisions I and II are otherwise OPERABLE:
 1. With one of the above required ADS valves inoperable, restore the inoperable ADS valve to OPERABLE status within 14 days or be in at least HOT SHUTDOWN within the next 12 hours and reduce reactor steam dome pressure to ≤ 100 psig within the next 24 hours.
 2. With two or more of the above required ADS valves inoperable, be in at least HOT SHUTDOWN within 12 hours and reduce reactor steam dome pressure to ≤ 100 psig within the next 24 hours.
- f. With an ECCS discharge line "keep filled" pressure alarm instrumentation channel inoperable, perform Surveillance Requirement 4.5.1.a.1 at least once per 24 hours.
- g. In the event an ECCS system is actuated and injects water into the Reactor Coolant System, a Special Report shall be prepared and submitted within 90 days to the Commission, pursuant to Specification 6.9.2, describing the circumstances of the actuation and the total accumulated actuation cycles to date. The current value of the usage factor for each affected safety injection nozzle shall be provided in this Special Report whenever its value exceeds 0.70.

*Whenever two or more RHR subsystems are inoperable, if unable to attain COLD SHUTDOWN as required by this ACTION, maintain reactor coolant temperature as low as practical by use of alternate heat removal methods.

CONTAINMENT SYSTEMS

PENETRATION VALVE LEAKAGE CONTROL SYSTEM

LIMITING CONDITION FOR OPERATION

3.6.1.10 Two independent penetration valve leakage control system (PVLCS) divisions shall be OPERABLE.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, and 3.

ACTION:

With one PVLCS division inoperable, restore the inoperable division to OPERABLE status within 7 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

SURVEILLANCE REQUIREMENTS

4.6.1.10 Each PVLCS division shall be demonstrated OPERABLE:

- a. At least once per 24 hours by verifying division PVLCS accumulator pressure greater than or equal to 101 psig.
- b. During each COLD SHUTDOWN, if not performed within the previous 92 days, by cycling each motor-operated valve through at least one complete cycle of full travel.
- c. At least once per 18* months by performance of a functional test which includes simulated actuation of the system throughout its operating sequence, and verifying that each automatic valve actuates to its correct position and that a sealing pressure greater than or equal to 22 psig is established in each sealing valve.
- d. By verifying the operating instrumentation to be OPERABLE by performance of a:
 1. CHANNEL FUNCTIONAL TEST at least once per 31 days, and
 2. CHANNEL CALIBRATION at least once per 18 months.



*This frequency may be extended to coincide with the refueling outage for the first cycle, scheduled to begin 9-15-87.

RIVER BEND - UNIT 1

3/4 6-16

RECEIVED

SEP 9 1987

Amendment No. 10

SDC

USAR 9.3.6.2.2: PVLCS

<u>COMPONENT</u>	<u>DESCRIPTION</u>
Air Compressor	Delivers 60 SCFM of air at 120 psig operating pressure. It is equipped for water cooling and provides a nuclear safety-related air supply for the PVLCS, the MS-PLCS, and the main steam safety/relief valve system. <u>It is sized to accommodate the above systems.</u>
Air Accumulator	Stores sufficient air at 101 psig minimum to fill the piping and valve body volumes being sealed. Downstream of the accumulators are two branch lines, one to the MS-PLCS and the other to the main steam safety and relief valve system. <u>Each of the systems requires compressed air after an accident.</u>

USAR 9.3.6.2.3: PVLCS

"The twin systems are pressurized within 5 minutes by the air compressors and their associated accumulators. The accumulators are sized so that the initial air requirements for the PVLCS, the MS-PLCS, and main steam safety/relief valve system are met, thereby, allowing the air compressors to be on or off."

USAR 5.2.2.4: Overpressure Protection

"During normal plant operation, SRV and ADS accumulators are supplied with air from the non-nuclear safety (NNS) main steam system air compressors, C4A and C4B, as shown on Fig. 10.3-1b. Those compressors provide 17 SCFM at 175 psig. Post-LOCA requirements are supplied from the penetration valve leakage control system (PVLCS)..."

INTER-OFFICE MEMORANDUM

(This form for handwritten memos only)

DATE 12/25/87

LOCATION	TO	SUBJECT
	J. Boyle / G.H. Supervisors	ADS/SRV operability
LOCATION	FROM	
	G.A. Bysfield / K.W. Siev	

After review of USAR Section 5.2.2, Depressurization; 9.3.6, PVLCS; and 6.3, ADS/ECCS field engineering has determined that the ADS/SRV'S are operational as long as the header and accumulator pressures are maintained above 120 psig. This is based upon USAR section 9.3.6 which describes PVLCS as the safety-related supply for this system. The PVLCS compressors are designed for an output of 120 psig. A pressure of 121 psig is sufficient for operability of ADS/SRV as this is the minimum design pressure of the PVLCS accumulators. For conservatism field engineering has

REPLY TO MS
12-25-87

SIGNED N/A

determined 120 psig to be the minimum operable pressure

12-28-87

Further investigation has led field engineering to determine that the ADS/SRV'S are operational with a PVLCS accumulator pressure of 121 psig or greater, 46-110.

G.W.S.
G.A. Bysfield 12-28-87

TE 12 25 87

SIGNED *G.A. Bysfield*

July 17, 1990

Material problems developed with the SVV-C4A and C4E compressors that threatened ADS/SRV header pressure. Question was again asked System Engineering by Operations what the requirements were for ADS air accumulator pressure as this was not addressed in Technical Specifications. System Engineering commenced an indepth study of this issue to understand the requirements. The existing guidance from the 1987 Field Engineering memo was still in place for guidance to Operations, however, it was felt by Plant Staff that a more thorough understanding of this issue should be pursued. In the meantime, the material issue with the SVV-C4A,B compressors were resolved. System Engineering performed the following during this research period which encompassed the remaining months of 1990:

- o Searched USAR for information on the requirements for SRVs/ADS.
- o Reviewed design specification for SRVs.
- o Reviewed design calculations.
- o Reviewed vendor manuals/instructions.
- o Consulted with GE, S&W, and the vendor to understand the design aspects of the system.
- o Reviewed previous plant correspondence on this issue.

January 3,4, 1991

For a 28 hour period on January 3rd and 4th, 1991, both SVV compressors were inoperative causing the "low header pressure to ADS/SRV" annunciator to energize. The System Engineering review was finalized and compared with Design Engineering's independent review on January 4, 1991. On this date System Engineering in concert with Design Engineering and Licensing had reasons to assume that having operated with SRV/ADS header pressure below 150 psig was outside the original design basis for the ADS valves.

On January 4, 1991, the following corrective actions were initiated based on this review:

- o A condition report was generated identifying the issue.
- o The NRC was notified of the condition and the apparent deviation from Technical Specifications. This was reported under the provisions of 10CFR50.72(b)(ii)(B).
- o The senior NRC resident was notified.
- o Temporary Change Notices (TCNs) to Operations System Operating Procedures (SOPs) and Alarm Response Procedures (ARPs) were completed.
- o A Prompt Modification Request was initiated to provide a back-up source of air in the advent the SVV-C4A,B compressors again failed.
- o Design Engineering initiated a review and evaluation of the design bases calculations for the SRV/ADS accumulators to determine the safety significance of this issue. This review and evaluation completed after January 4th revealed that the ADS/SRV relief valves would have in fact performed their safety function.

ENGINEERING EVALUATION OF
ADS AIR SUPPLY REQUIREMENTS

I. PURPOSE

- * Determine if ADS function remained operable
 - during failure of both SVV air compressors on 1/3-4/91
 - during degraded system conditions on 12/25/87 to 2/5/88

ENGINEERING EVALUATION OF
ADS AIR SUPPLY REQUIREMENTS

II. EVALUATIONS PERFORMED

In order to determine if ADS FUNCTION remained operable during these events, calculations were performed to determine the minimum ADS accumulator pressure required to satisfy:

- * Accident Design Basis Requirements
(2 actuations with drywell pressure at 17.5 psig)

- * TMI Action Plan Requirements (Item II.K.3.28)
(4-5 actuations at normal drywell pressure)

- * Accident Analysis Assumptions
(2 actuations with drywell pressure at 8.2 psig)

Calculations were also performed to determine:

- * ADS accumulator pressure after 28 hours without makeup

ENGINEERING EVALUATION OF
ADS AIR SUPPLY REQUIREMENTS

III. EVALUATION METHOD, DATA, AND ASSUMPTIONS

Method

- * Ideal gas law equations
- * Consistent with GE methodology

Data

- * Drywell design pressure = 25 psid
- * Peak drywell pressure for small steam line break = 22.9 psia (8.2 psig)
- * Pressure required to open SRV = 88 psid
- * Maximum leak rate measured during RF3 for ADS accumulators = 0.9 scfh (0.025 psig/minute)
- * Accumulators are isolated from SVV air supply header by check valves

Assumptions

- * Accumulator pressure after 2 actuations must be greater than or equal to the minimum pressure required to open SRV's under drywell design and accident pressure conditions
- * Accumulators charged to 175 psig prior to SVV air compressor failure
- * No makeup air supplied to the accumulators
- * Accumulator leakage rate over time is a function of accumulator pressure
- * Actuator leakage during SRV actuation is negligible (Note: all SRV's are fully tested after refurbishment and all 16 SRV's are replaced at each refueling)

ENGINEERING EVALUATION OF
ADS AIR SUPPLY REQUIREMENTS

IV. ANALYSIS RESULTS

- * Calculated ADS accumulator pressure
available, 1/3-4/91 event at 28 hours.....= 136 psig

- * TMI Action Plan Requirements.....= 130.4 psig
(4 ADS SRV actuations at normal
drywell pressure, without makeup)

- * Accident Design Basis Requirements.....= 126.3 psig
(2 ADS SRV actuations with drywell
pressure at 17.5 psig, without makeup)

- * Calculated Peak Drywell Accident Pressure..= 115.4 psig
(2 ADS SRV actuations with drywell
pressure at 8.2 psig, without makeup)

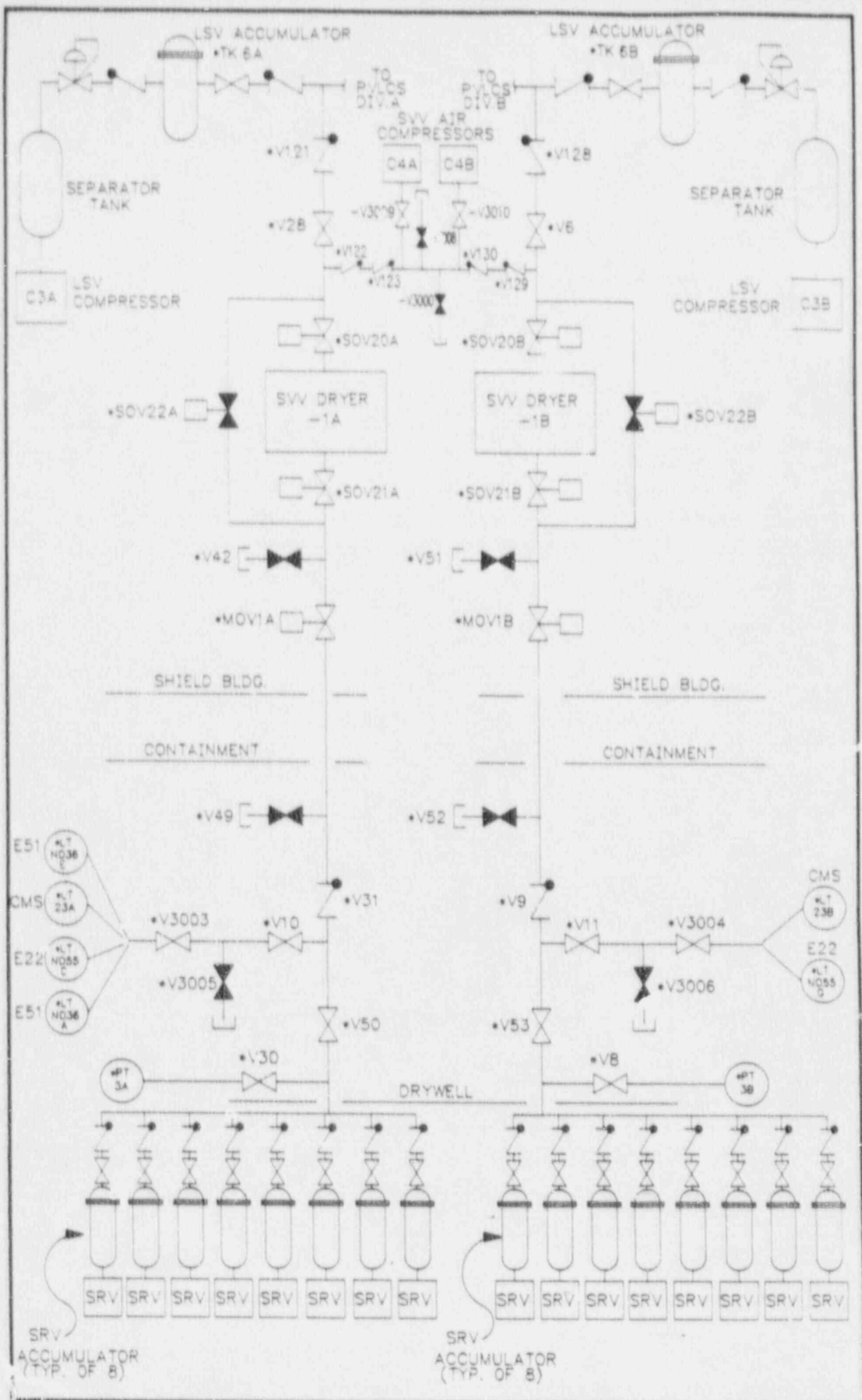
ENGINEERING EVALUATION OF
ADS AIR SUPPLY REQUIREMENTS

V. CONCLUSIONS

- * ADS function remained operable during failure of both SVV air compressors on 1/3-4/91.
 - Minimum accumulator pressure available...= 136 psig
 - Minimum accumulator pressure required...= 130.4 psig

- * ADS function remained operable during degraded system conditions for the period 12/25/87-2/5/88.
 1. Both SVV compressors were fully operational during the entire event.
 2. Both safety-related LSV compressors were fully operational during the entire event.
 3. SVV Div. A header pressure was maintained above 153.5 psig alarm setpoint and Div. B header pressure was measured at 140 psig.
 4. The degraded pressure condition in Div. B header is attributed to sticking compressor discharge check valves.

- * In summary, ADS SRV accumulators remained pressurized above minimum required pressure to satisfy its safety function and the Automatic Depressurization System remained operable for both of these events. Therefore, there would have been no impact upon the safe operation of the plant or upon the health and safety of the public during any accident requiring the use of ADS.



ROOT CAUSE

- o Incorrect interpretation of operability requirements by the station's engineering staff.
- o Ambiguous USAR language for air pressure requirements in the ADS/SRV accumulators.
- o Lack of clear T/S requirements for air pressure in the ADS/SRV accumulators.

CORRECTIVE ACTIONS

- o Training for engineers on information provided by the USAR and when that information can be used to base engineering decisions.
- o LCN to clarify USAR statements for air pressure to ADS/SRVs.
- o - Tech. Spec. interpretation being issued for air pressure requirements to ADS/SRVs.
- o - Tech. Spec. change to be initiated to clarify the requirements for ADS/SRV air accumulators.

Preventative Maintenance Program for Compressors

- Quarterly PMs:
- (1) Change crankcase oil.
 - (2) Change belts condition, tension.
 - (3) Inspect cooling fans.
 - (4) Inspect all screws/nuts/fasteners for tightness.
 - (5) Inspect, change air inlet filter.
 - (6) Replace oil coalescing filter element.

Installed instrumentation checked at least every 5 years.

Preventative Maintenance Program for Dryers

Semi-annually (six months):

- o inspect/change prefilter/afterfilter.
- o inspect/change purge filter.
- o inspect/change desiccant.

MAINTENANCE ON 1SVV-C4A & B
JANUARY 1987 - JANUARY 1991

DATES PM's PERFORMED
ON 1SVV-C4A

01/02/87
03/12/87
07/02/87
09/08/87
12/09/87
03/11/88
06/06/88
09/12/88
12/12/88
02/11/89
05/09/89
08/24/89
11/04/89
01/30/90
04/29/90
08/06/90
12/16/90

DATES PM's PERFORMED
ON 1SVV-C4B

03/11/87
07/02/87
09/24/87
12/08/87
03/08/88
06/06/88
09/11/88
12/12/88
02/13/89
05/12/89
08/22/89
09/09/89
11/03/89
01/30/90
05/02/90
08/05/90
11/10/90

PM's CONSIST OF THE FOLLOWING: (SUMMARIZED)

- 1) CHANGE CRANKCASE OIL
- 2) CHECK BELTS CONDITION, TENSION
- 3) INSPECT COOLING FANS
- 4) INSPECT ALL SCREWS, NUTS, FASTENERS FOR TIGHTNESS
- 5) INSPECT, CHANGE AIR INLET FILTER
- 6) REPLACE SIL COALESCING FILTER ELEMENT

THE UNIT OUT, OPERATIONAL CHECK, SUGGESTED TOOLS.

* PM's PERFORMED ON 13 WEEK INTERVAL.

Historical Problems with SVV-C4A

1986

86118 1F50 Lube oil switch causes nuisance trip.

1987

870205 R104019 Compressor short cycles due to PS36A and
 R102950 leaking check valve V121.

1988

None.

1989

None.

1990

900716 R143852 Compressor cycling excessively.

Historical Problems with SVV-C4B

1986

861021 R040573 Lube oil switch causes nuisance trip.

1987

871102 R111664 Compressor breaker trips.
870513 R105088 Valve leaks cause excessive cycling to C4B.
870616 R105785 Loose belts on C4B.
870221 R055535 Compressor tripped on high temp; air leak at skid.
 R102890

1988

880624 R111362 Discharge valve leaks air.
880614 R115612 Compressor does not shut down; Trips.
880911 R116235 Compressor does not operate.
880310 R111300 Compressor short cycling.

1989

890819 R120861 Breaker to compressor trips.
891122 R056438 P528B on skid doesn't work.

1990

900716 R143841 Compressor will not start.
900821 R148203 Compressor cycles excessively due to dirty filters.

Low Header Pressure Problem History

1986

861013 R61936 Low Header (B) Annunciator in.
(Pressure cycled from 140-175 psig thru 861018.)

861116 R101750 Low Header (B) Annunciator in.
(Pressure again cycling from 140-175. Fixed under
MR 86-1053.)

1987

871225 R53162 Low Header (B) Annunciator in.
(Pressure cycled from 140-150 psig thru 880205.)

1988

None.

1989

None.

1990

None.

1991

910103 Low Header (A,B) Annunciator in due to both
compressors inop for 28 hours.

Moisture Intrusion into the SVV System

- o May 18, 1990, a large volume of water and foreign matter was discovered in safety related transmitter E22*LTN055G, suppression pool water level. This was the attributed cause for this instruments failure to operate.
- o July 14, 1990, approximately four (4) gallons of water and foreign matter was collected from safety related transmitter CMS*LT23B, suppression pool water level. This instruments failure was also attributed to this cause.
- o During this units third refueling outage (10-10-90), two SRV accumulators supplied by the 'B' SVV header were noted to have approximately four (4) ounces of water in them when they were depressurized for maintenance.

Problem attributed to a poor history of operation of the SVV dryers. There were frequent occurrences of clogged and water saturated dryers noted during preventative and corrective maintenance.

Dryer Maintenance History

1985

DRY 1A: 851004 R005058 Air leaking at switching valve.

1986

DRY 1B: 861119 R101704 Desiccant is wet.
RY 1B: 861112 R100552 No power to dryer.

1987

DRY 1A: 870313 R104397 Low dryer purge flow.
DRY 1A: 870720 R105743 Desiccant exhausted.
DRY 1A: 871104 R111016 Air leak at pre-filter.
DRY 1B: 870904 R114425 Desiccant is wet.

1988

DRY 1A: 880330 R115039 No purge flow, heaters failed.
DRY 1B: 880108 R119360 High D/P across dryer; alarm.

1989

DRY 1A: 890405 R133167 Purge solenoid stuck.
DRY 1A/1B: 890312 R134079 Shuttle valve leaks air.
DRY 1B: 890606 R134273 Dryer has high D/P.
DRY 1B: 890613 R134450 Prefilter leaks air.

1990

DRY 1B: 900429 R131944 High D/P alarm on dryer.
DRY 1B: 900702 R141754 Desiccant dew point indicator is pink.
DRY 1B: 900821 R148203 Filters clogged.
DRY 1B: 900314 R135661 Desiccant is spent. Heater broke.
DRY 1B: 900416 R136021 Cannot obtain purge.
DRY 1A: 901125 R147811 Prefilter drain plugged.
DRY 1A: 900702 R141755 Dew point indicator is pink.
DRY 1A: 900501 R157063 Pre and After Filter blowing air.

Analysis of Maintenance Program

- o Preventative Maintenance Program is being implemented.
 - Quarterly PMs for compressors.
 - Semi-annual PMs for dryers.
- o The SVV-C4B compressor has shown a higher corrective work order history than the C4A compressor corresponding to its higher usage and cycling.
- o The SVV-DRY 1A/1B has shown an increase in corrective work orders during the past two years. In addition, recent experience has questioned their effectiveness to remove moisture from the system.

ACTIONS TO IMPROVE PERFORMANCE

- INCREASED SYSTEM ENGINEERING ATTENTION HAS BEEN OCCURRING ON THIS SYSTEM FOR THE LAST SEVERAL MONTHS TO IMPROVE THE SYSTEM'S PERFORMANCE.
- VENDORS HAVE BEEN BROUGHT ON SITE TO RECOMMEND MEANS FOR SYSTEM IMPROVEMENTS.
- PREVENTATIVE MAINTENANCE FREQUENCY FOR THE DRYERS HAS BEEN INCREASED.
- A MODIFICATION HAS BEEN INITIATED TO UPGRADE THE SYSTEM. IMPROVEMENTS INCLUDE:
 - COMPRESSORS WITH AVAILABLE REPLACEMENT PARTS
 - RECEIVER TANK TO MINIMIZE COMPRESSOR CYCLING
 - NEW DRYER SKID
 - IN-LINE DEW POINT INSTRUMENTATION
- WANT CAPABILITY TO EASILY CHANGE OUT COMPRESSOR SKID.
- SVV HAS BEEN ADDED TO IMPORTANT TO RELIABILITY PROGRAM.

SUMMARY

Immediate Corrective Actions (1-4-91)

- . CR initiated to document results of operability review
- . Issued instructions to Operations regarding ADS air pressure operability requirements
- . Initiated PMR to provide backup air compressor to SVV-C4

Long Term Corrective Actions

- . Installed two backup air compressors
- . Training for engineers on use of USAR
- . Licensing change notice will clarify USAR
- . TSI on ADS requirements issued
- . Clearer T/S requirements will be proposed for inclusion
- . MR-91-0001 initiated to upgrade compressors, receivers, dryers and instrumentation
- . T/S review by Operations to identify any other specifications needing improved guidance
- . Added SVV to the Important to Reliability Program
- . Increase management awareness of SVV as one of the non-safety related systems with a potential impact to plant safety and reliability