

JAN 7 1986

Docket No.: 50-529

8601160422 860107  
PDR ADDCK 05000529  
A PDR

APPLICANT: Arizona Public Service Company

FACILITY: Palo Verde Unit 2

SUBJECT: Summary of Meeting to Discuss Auxiliary Pressurizer Spray System

A meeting was held in Bethesda, Maryland on October 8, 1985 with representatives of the applicant to discuss the auxiliary pressurizer spray system (APSS). The applicant requested the meeting to present the status of its evaluation of the APSS for Palo Verde Unit 2 to correct vulnerabilities with the charging pump portion of the system which were demonstrated during an event on Palo Verde Unit 1 on September 12, 1985. A list of attendees is shown on Enclosure 1 and the viewgraphs presented at the meeting are included as Enclosure 2. The meeting is summarized as follows.

#### Summary

The applicant presented a history relating to the staff's review of the APSS, including the use of the APSS to mitigate the consequences of a postulated steam generator tube rupture (SGTR) accident.

In response to the problems encountered during the September 12, 1985 event, the applicant plans to make the following three modifications to increase the reliability of the APSS:

- (1) Provide a second, and diverse, reference leg to the volume control tank level monitoring instrumentation.
- (2) Ensure a continued power supply to Valves 501 and 536 (which are on the suction lines to the charging pumps).
- (3) Provide for automatic realignment for valves V 501 and V 536.

The applicant also plans on performing a reanalysis of the SGTR accident which does not rely on the APSS.

The applicant stated that the above information would be submitted on the docket shortly. The staff indicated that it would perform its review of the submittal after it is received.

Original signed by:  
E. A. Licitra

E. A. Licitra, Project Manager  
PWR Project Directorate No. 7  
Division of PWR Licensing-B

Enclosures: As stated

cc: See next page

PD7 EAL  
EALicitra/es  
1/3/86

PD7 GWK  
GWKnighton  
1/7/86

[illegible]

|   |   |   |   |
|---|---|---|---|
| 1. The first part of the report is a general statement of the purpose of the study. | 2. The second part of the report is a description of the methods used in the study. | 3. The third part of the report is a description of the results of the study. | 4. The fourth part of the report is a discussion of the results of the study. |
| 5. The fifth part of the report is a conclusion of the study.                       | 6. The sixth part of the report is a list of references.                            | 7. The seventh part of the report is an appendix.                             | 8. The eighth part of the report is a glossary.                               |
| 9. The ninth part of the report is a list of figures.                               | 10. The tenth part of the report is a list of tables.                               | 11. The eleventh part of the report is a list of equations.                   | 12. The twelfth part of the report is a list of symbols.                      |
| 13. The thirteenth part of the report is a list of abbreviations.                   | 14. The fourteenth part of the report is a list of acronyms.                        | 15. The fifteenth part of the report is a list of initialisms.                | 16. The sixteenth part of the report is a list of contractions.               |
| 17. The seventeenth part of the report is a list of synonyms.                       | 18. The eighteenth part of the report is a list of antonyms.                        | 19. The nineteenth part of the report is a list of related terms.             | 20. The twentieth part of the report is a list of cross-references.           |
| 21. The twenty-first part of the report is a list of footnotes.                     | 22. The twenty-second part of the report is a list of endnotes.                     | 23. The twenty-third part of the report is a list of appendices.              | 24. The twenty-fourth part of the report is a list of figures.                |
| 25. The twenty-fifth part of the report is a list of tables.                        | 26. The twenty-sixth part of the report is a list of equations.                     | 27. The twenty-seventh part of the report is a list of symbols.               | 28. The twenty-eighth part of the report is a list of abbreviations.          |
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| 33. The thirty-third part of the report is a list of antonyms.                      | 34. The thirty-fourth part of the report is a list of related terms.                | 35. The thirty-fifth part of the report is a list of cross-references.        | 36. The thirty-sixth part of the report is a list of footnotes.               |
| 37. The thirty-seventh part of the report is a list of endnotes.                    | 38. The thirty-eighth part of the report is a list of appendices.                   | 39. The thirty-ninth part of the report is a list of figures.                 | 40. The fortieth part of the report is a list of tables.                      |
| 41. The forty-first part of the report is a list of equations.                      | 42. The forty-second part of the report is a list of symbols.                       | 43. The forty-third part of the report is a list of abbreviations.            | 44. The forty-fourth part of the report is a list of acronyms.                |
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| 49. The forty-ninth part of the report is a list of related terms.                  | 50. The fiftieth part of the report is a list of cross-references.                  | 51. The fifty-first part of the report is a list of footnotes.                | 52. The fifty-second part of the report is a list of endnotes.                |
| 53. The fifty-third part of the report is a list of appendices.                     | 54. The fifty-fourth part of the report is a list of figures.                       | 55. The fifty-fifth part of the report is a list of tables.                   | 56. The fifty-sixth part of the report is a list of equations.                |
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1. The first part of the document discusses the importance of maintaining accurate records of all transactions, including sales, purchases, and expenses. It emphasizes the need for a systematic approach to record-keeping, such as using a ledger or accounting software, to ensure that all financial data is properly documented and organized.

2. The second part of the document focuses on the importance of regular reconciliation. This involves comparing the company's internal records with external statements, such as bank statements or supplier invoices, to identify any discrepancies or errors. Regular reconciliation helps to ensure the accuracy of the financial records and allows for the timely identification and correction of any mistakes.

3. The third part of the document discusses the importance of maintaining proper documentation for all financial transactions. This includes keeping receipts, invoices, and other supporting documents for each transaction. Proper documentation is essential for verifying the accuracy of the records and for providing evidence in the event of an audit or dispute.

4. The fourth part of the document discusses the importance of maintaining accurate records of all assets and liabilities. This includes tracking the value of the company's assets, such as equipment and inventory, and the value of its liabilities, such as loans and accounts payable. Accurate records of assets and liabilities are essential for determining the company's net worth and for making informed financial decisions.

5. The fifth part of the document discusses the importance of maintaining accurate records of all income and expenses. This includes tracking the company's revenue from sales and other sources, as well as its operating expenses, such as salaries, rent, and utilities. Accurate records of income and expenses are essential for determining the company's profitability and for preparing financial statements.

6. The sixth part of the document discusses the importance of maintaining accurate records of all taxes. This includes tracking the company's tax obligations, such as income tax, sales tax, and property tax, and ensuring that all taxes are properly calculated and paid. Accurate records of taxes are essential for avoiding penalties and for maximizing the company's tax efficiency.

7. The seventh part of the document discusses the importance of maintaining accurate records of all financial statements. This includes preparing and maintaining accurate balance sheets, income statements, and cash flow statements. Accurate financial statements are essential for providing a clear and concise overview of the company's financial performance and for making informed financial decisions.

8. The eighth part of the document discusses the importance of maintaining accurate records of all financial transactions. This includes tracking all transactions, including sales, purchases, and expenses, and ensuring that they are properly recorded and organized. Accurate records of all financial transactions are essential for maintaining the integrity of the financial records and for providing a clear and concise overview of the company's financial performance.

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Figure 1. The effect of the concentration of the *Agrobacterium* suspension on the transformation efficiency of *Agrobacterium* strains. The number of transformed cells was determined by the number of colonies obtained on the selective medium. The results are the mean of three independent experiments. Error bars represent standard deviation.

[illegible]

Figure 1. The effect of the concentration of the *Agrobacterium* suspension on the transformation efficiency of *Agrobacterium* strains.

|   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
|---|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|
| 1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |

Mr. E. E. Van Brunt, Jr.  
Arizona Nuclear Power Project

Palo Verde

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MEETING ATTENDEES

PALO VERDE AUXILIARY SPRAY SYSTEM

October 8, 1985

NRC

Marilyn Ley  
R.W. Houston  
Manny Licitra  
G. W. Knighton  
Cecil Thomas  
Chandu Patel  
L. B. Marsh  
C. Y. Liang  
T. M. Novak  
Stephen Sands  
Dean Houston  
Lee Dewey

APS

Gerald W. Sowers  
Mark Radspinner  
Terry Quan  
Robert M. Butler  
Kristin L. McCandless

CE

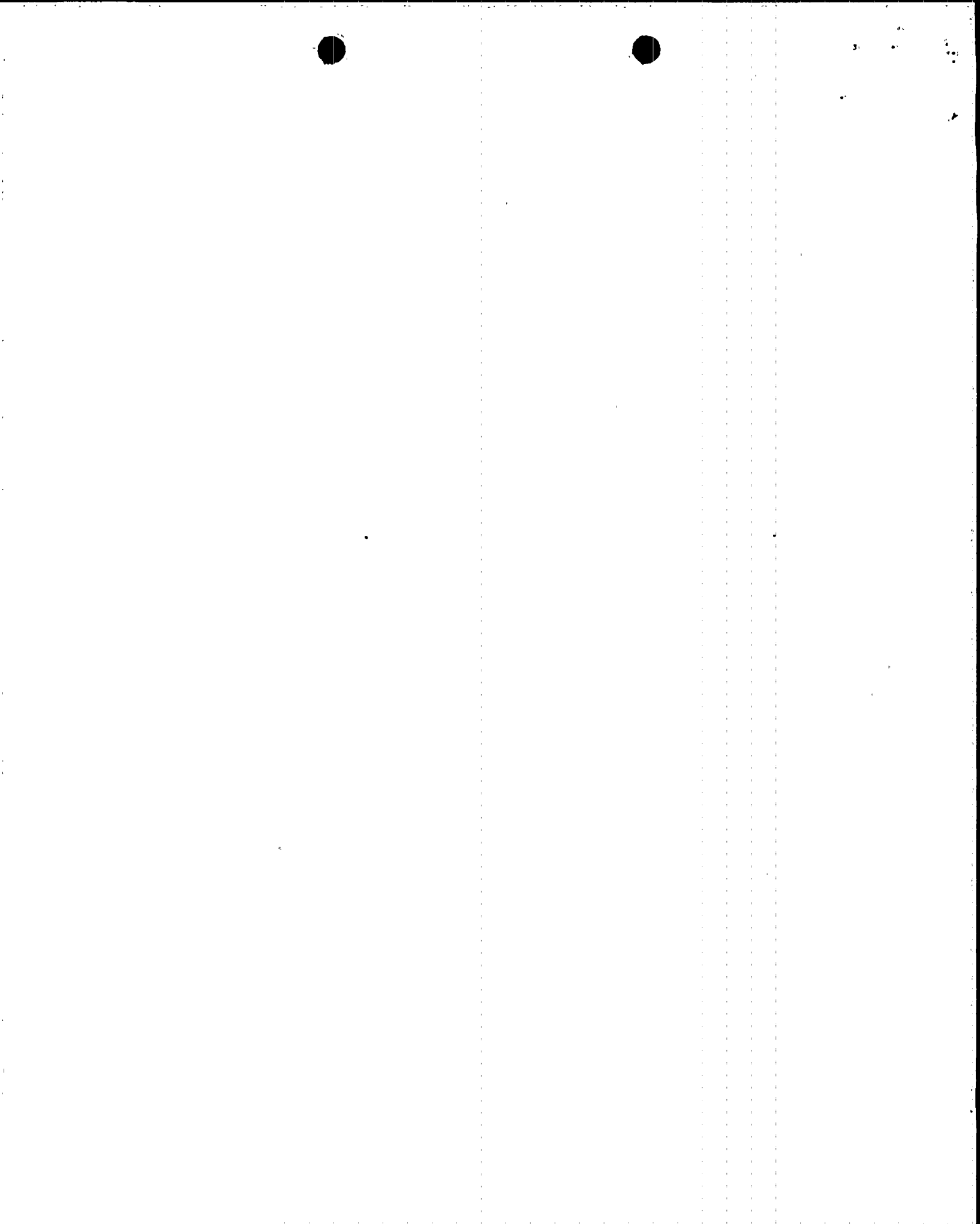
Mike Barnoski  
BK McQuoid  
George Davis  
C. B. Brinkman  
Tim Collier  
Fred Carpentino  
Dave Bajumpaa  
Rick Turk

Bechtel

Steve Shepherd

WPPS

D. W. Coleman



AGENDA

PRESSURIZER AUXILIARY SPRAY  
DESIGN REVIEW

OCTOBER 8, 1985

INTRODUCTION

R.M. BUTLER  
DIRECTOR OF TECHNICAL SERVICES, ANPP

DESIGN HISTORY

G.A. DAVIS  
MANAGER, STANDARD PLANT LICENSING, CE

SGTR USE OF AUX SPRAY

G.W. SOWERS  
SUPERVISOR OF SAFETY ANALYSIS, ANPP

EXISTING DESIGN

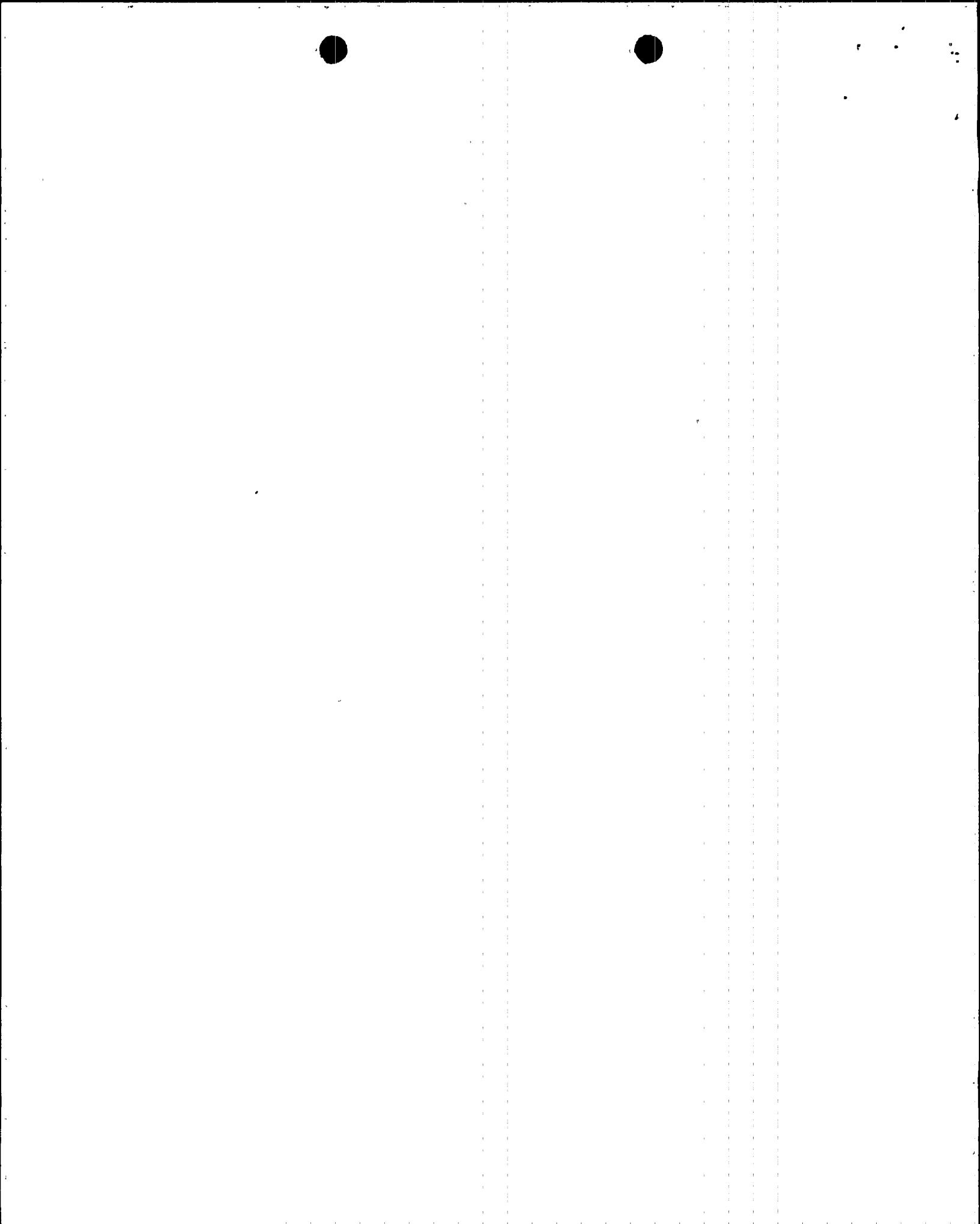
B.K. MCQUOID  
SYSTEM ENGINEER, CE

DESIGN MODIFICATIONS

M.A. RADSPINNER  
MECHANICAL ENGINEER, ANPP

SUMMARY

T.F. QUAN  
LICENSING SUPERVISOR, ANPP



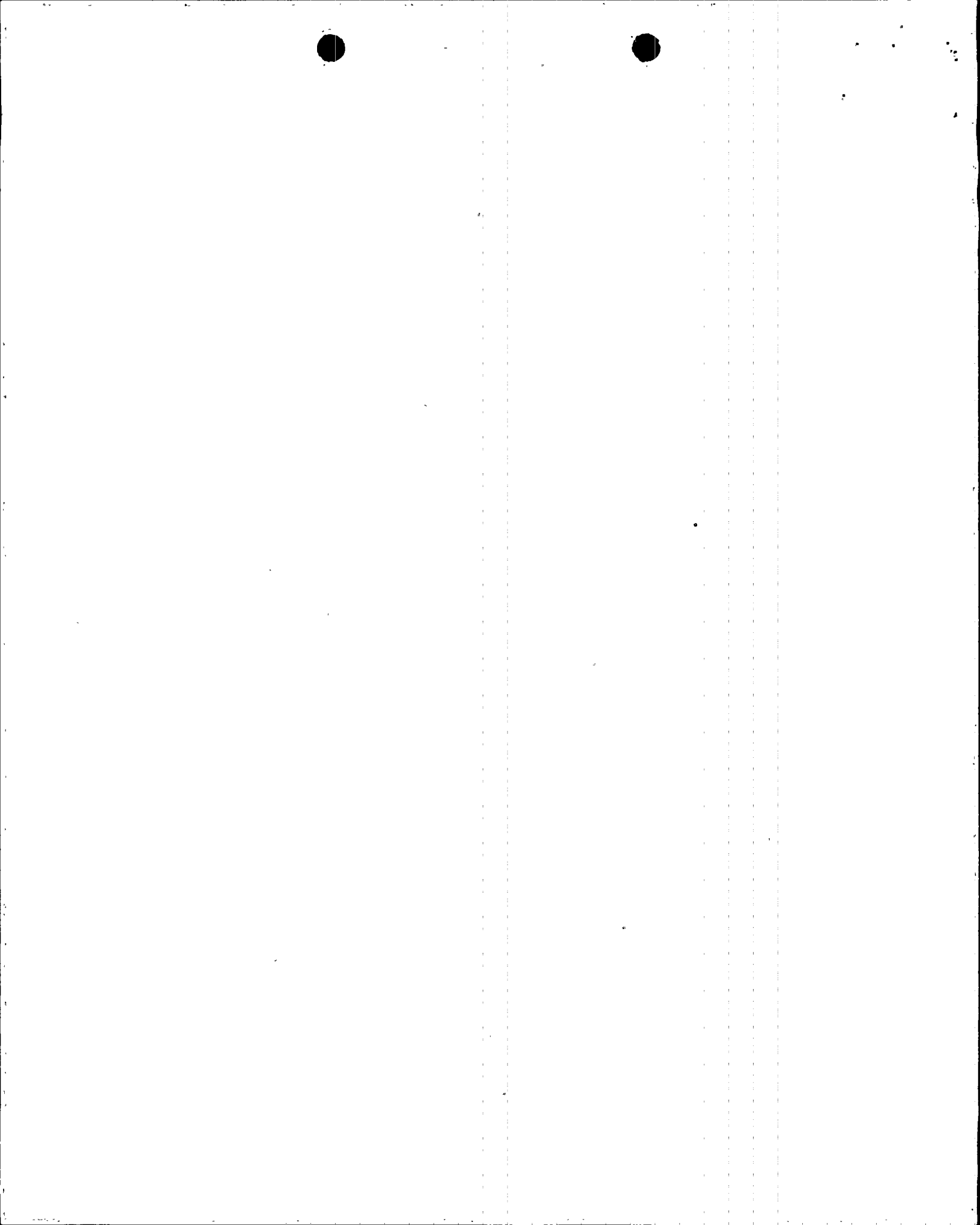


DEFINITION OF SYSTEMS THAT ARE SAFETY RELATED

FROM 10CFR100, APPENDIX A:

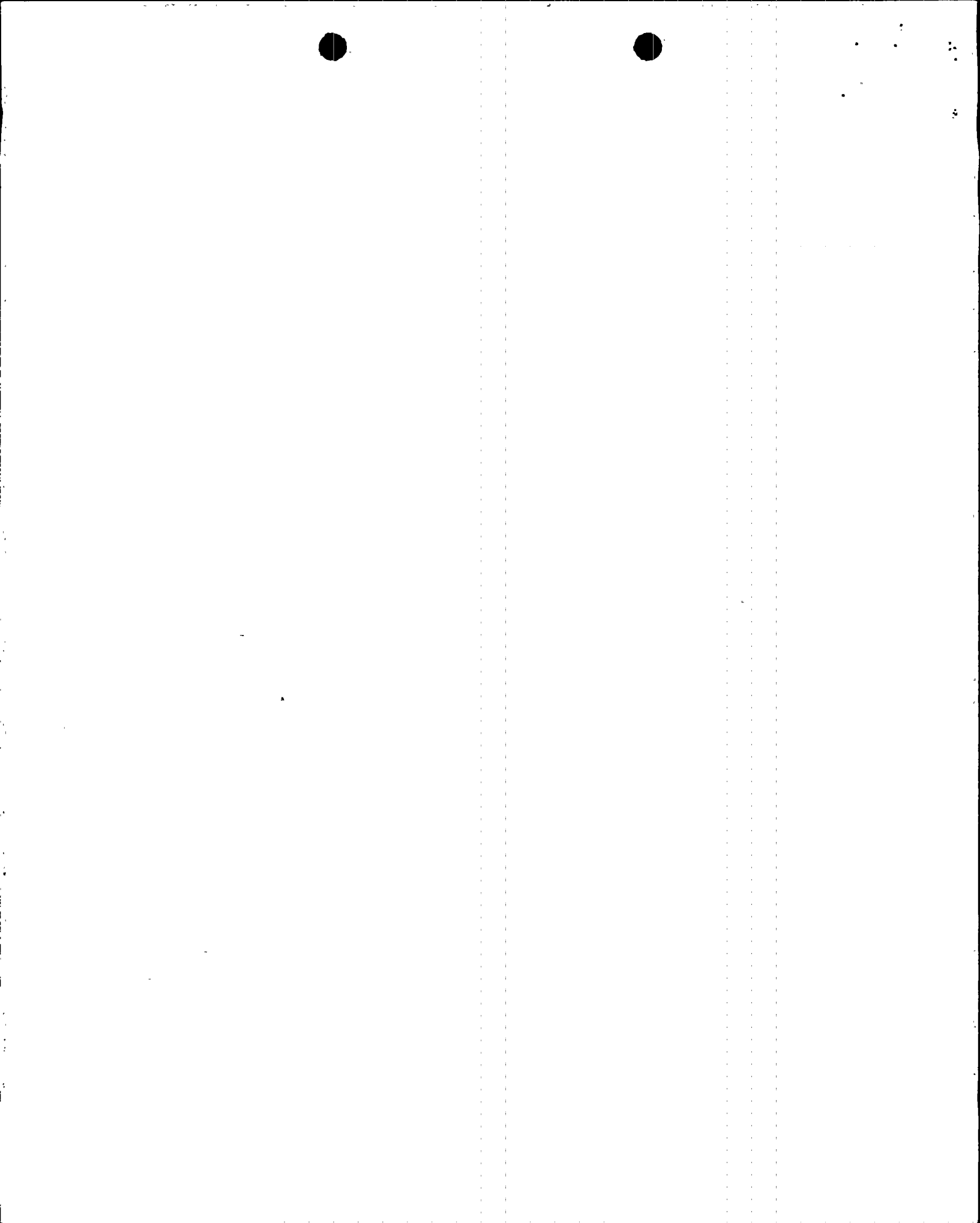
"CERTAIN STRUCTURES, SYSTEMS, AND COMPONENTS ARE DESIGNED TO REMAIN FUNCTIONAL [AFTER A SAFE SHUTDOWN EARTHQUAKE]. THESE STRUCTURES, SYSTEMS, AND COMPONENTS ARE THOSE NECESSARY TO ASSURE:

- (1) THE INTEGRITY OF THE REACTOR COOLANT PRESSURE BOUNDARY,
- (2) THE CAPABILITY TO SHUT DOWN THE REACTOR AND MAINTAIN IT IN A SAFE SHUTDOWN CONDITION, OR
- (3) THE CAPABILITY TO PREVENT OR MITIGATE THE CONSEQUENCES OF ACCIDENTS WHICH COULD RESULT IN POTENTIAL OFFSITE EXPOSURES COMPARABLE TO THE GUIDELINE EXPOSURES OF THIS PART."



## REQUIREMENTS FOR SAFETY RELATED SYSTEMS

- o MINIMUM REQUIREMENTS ARE SPECIFIED IN 10CFR50,  
APPENDIX A - GENERAL DESIGN CRITERIA FOR  
NUCLEAR POWER PLANTS
- o GDC'S RECOGNIZE THAT SPECIFIC REQUIREMENTS  
FOR EACH SYSTEM DEPEND ON FUNCTION PERFORMED
- o ACCEPTABLE METHODS FOR MEETING GDC'S PROVIDED IN:
  - REGULATORY GUIDES
  - STANDARD REVIEW PLANS
  - BRANCH TECHNICAL POSITIONS



### COLD VS. HOT SHUTDOWN

- o PRIOR TO 1978, SAFE SHUTDOWN WAS TAKEN TO MEAN HOT SHUTDOWN
- o IN 1978, NRC ISSUED NEW GUIDANCE ON GDC'S WHICH EFFECTIVELY DEFINED SAFE SHUTDOWN AS COLD SHUTDOWN (BRANCH TECHNICAL POSITION RSB 5-1)
- o RSB 5-1 SPECIFIES THAT:
  - "THE DESIGN SHALL BE SUCH THAT THE REACTOR CAN BE TAKEN FROM NORMAL OPERATING CONDITIONS TO COLD SHUTDOWN USING ONLY SAFETY-GRADE SYSTEMS."
- o RSB 5-1 IDENTIFIES THREE CLASSES OF PLANTS FOR IMPLEMENTATION:
  - CLASS 1, (NEW PLANTS) FULL COMPLIANCE
  - CLASS 2, (PLANTS UNDER CONSTRUCTION) PARTIAL IMPLEMENTATION
  - CLASS 3, (OPERATING PLANTS) BACKFIT
- o CESSAR AND PALO VERDE ARE IN CLASS 2



RECOMMENDED IMPLEMENTATION FOR CLASS 2 PLANTS

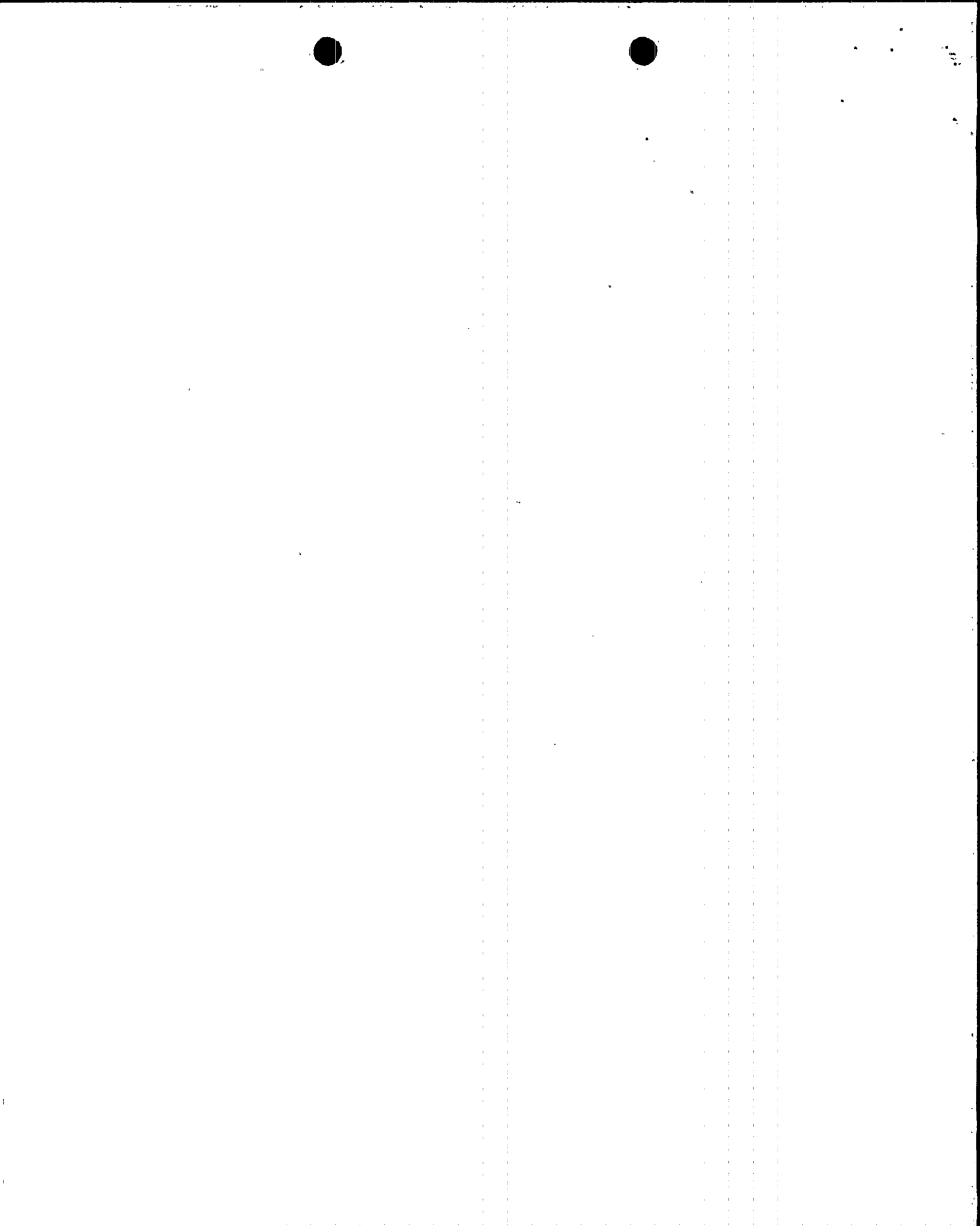
- o CONCERNING AUXILIARY PRESSURIZER SPRAY,  
TABLE 1 OF BTP RSB 5-1 STATES:

POSSIBLE SOLUTION FOR  
FULL COMPLIANCE

PROVIDE UPGRADING AND ADDITIONAL VALVES TO ENSURE OPERATION OF AUXILIARY PRESSURIZER SPRAY USING ONLY SAFETY-GRADE SUB-SYSTEM MEETING SINGLE FAILURE. POSSIBLE ALTERNATIVE MAY INVOLVE USING PRESSURIZER POWER-OPERATED RELIEF VALVES WHICH HAVE BEEN UPGRADED. MEET SSE AND SINGLE FAILURE WITHOUT MANUAL OPERATION INSIDE CONTAINMENT.

RECOMMENDED IMPLEMENTATION FOR  
CLASS 2 PLANTS

COMPLIANCE WILL NOT BE REQUIRED IF A) DEPENDENCE ON MANUAL ACTIONS INSIDE CONTAINMENT AFTER SSE OR SINGLE FAILURE OR B) REMAINING AT HOT STANDBY UNTIL MANUAL ACTIONS OR REPAIRS ARE COMPLETE ARE FOUND TO BE ACCEPTABLE FOR THE INDIVIDUAL PLANT.





### SCOPE OF AUXILIARY PRESSURIZER SPRAY SYSTEM

- o AUXILIARY PRESSURIZER SPRAY SYSTEM BEGINS AT BRANCH FROM CHARGING SYSTEM AND ENDS AT PRESSURIZER SPRAY NOZZLES
- o MECHANICAL COMPONENTS CONSIST OF:
  - PIPING
  - TWO SOLENOID OPERATED VALVES (CH-203 & CH-205)
  - CHECK VALVE
- o SCHEMATIC OF AUXILIARY PRESSURIZER SPRAY SYSTEM AND SOURCES OF BORATED WATER (VIA CHARGING SYSTEM) SHOWN IN:
  - FIGURE 2.1-4 OF CEN-239, AND
  - FIGURES 5 & 6 OF APPENDIX B IN NUREG-1044

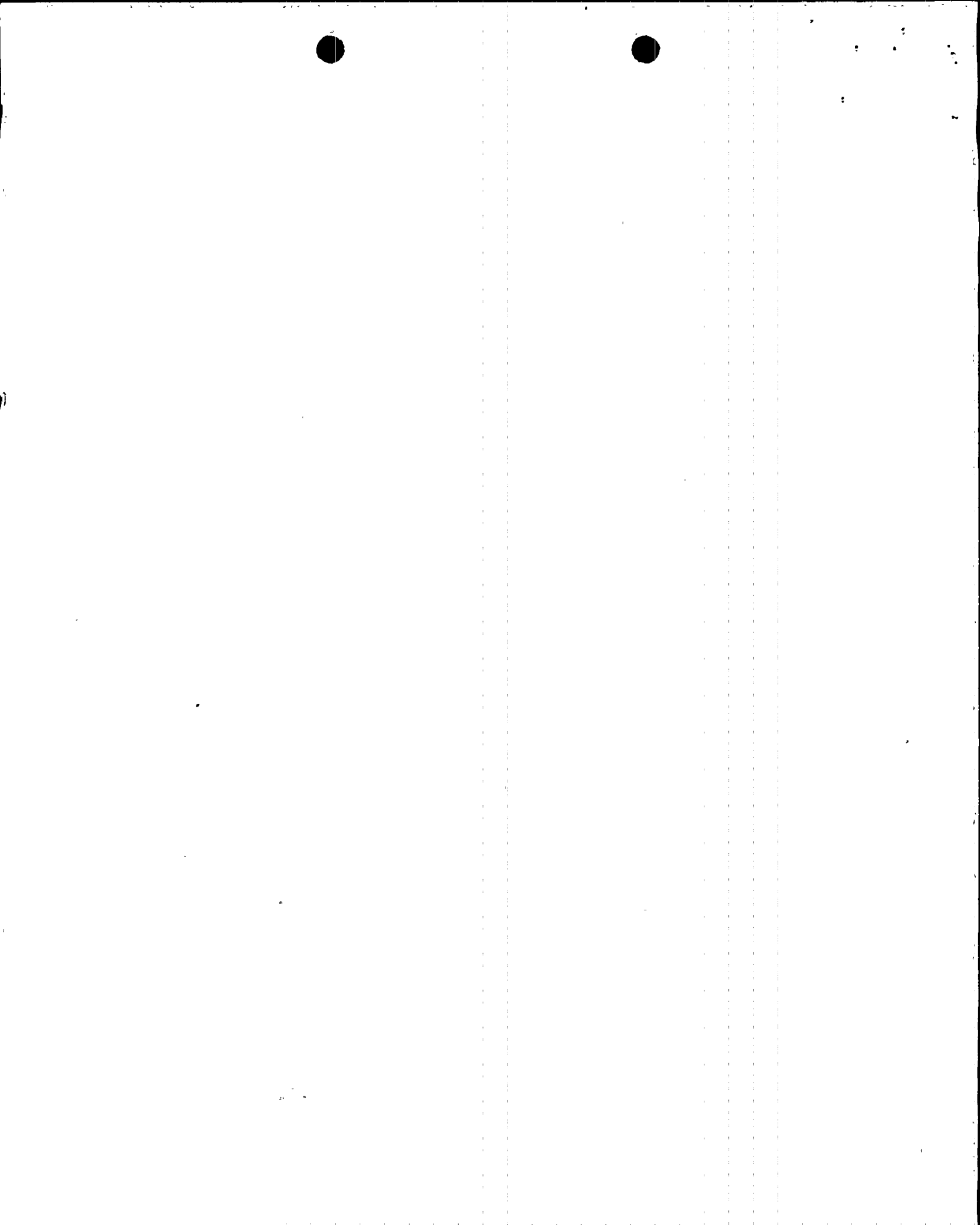
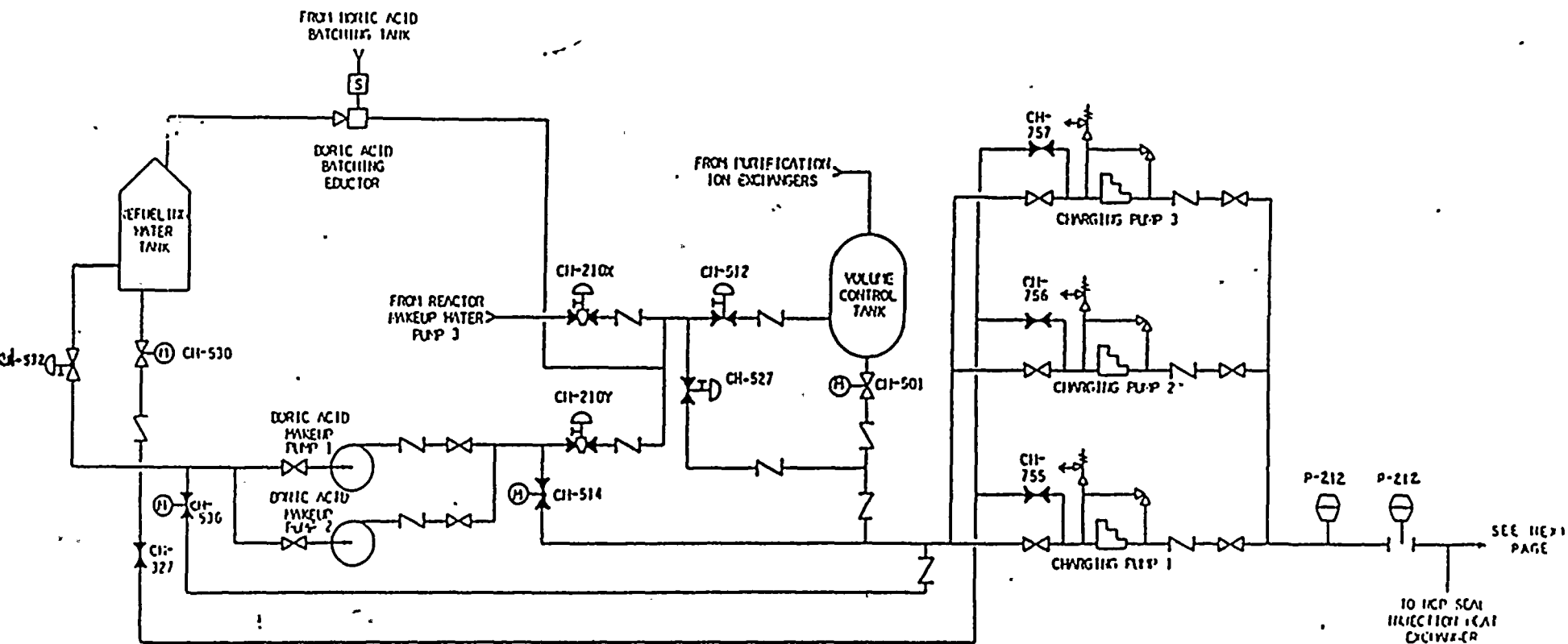


FIGURE 2.1-4

SIMPLIFIED SCHEMATIC OF PALO VERDE CYCS SHOWING AUXILIARY  
 SPRAY PORTION AND SOURCES OF BORATED WATER



SEE NEXT PAGE

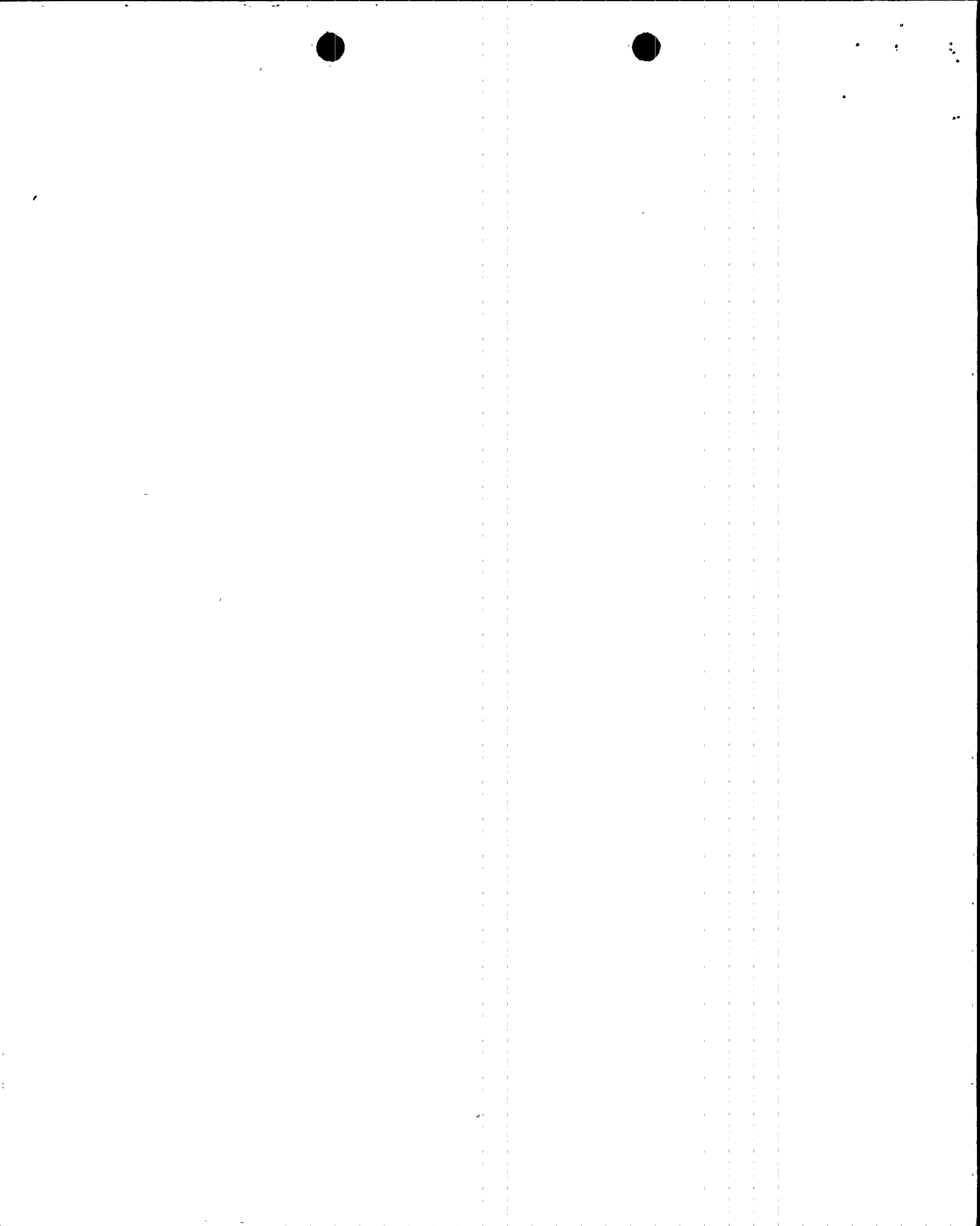
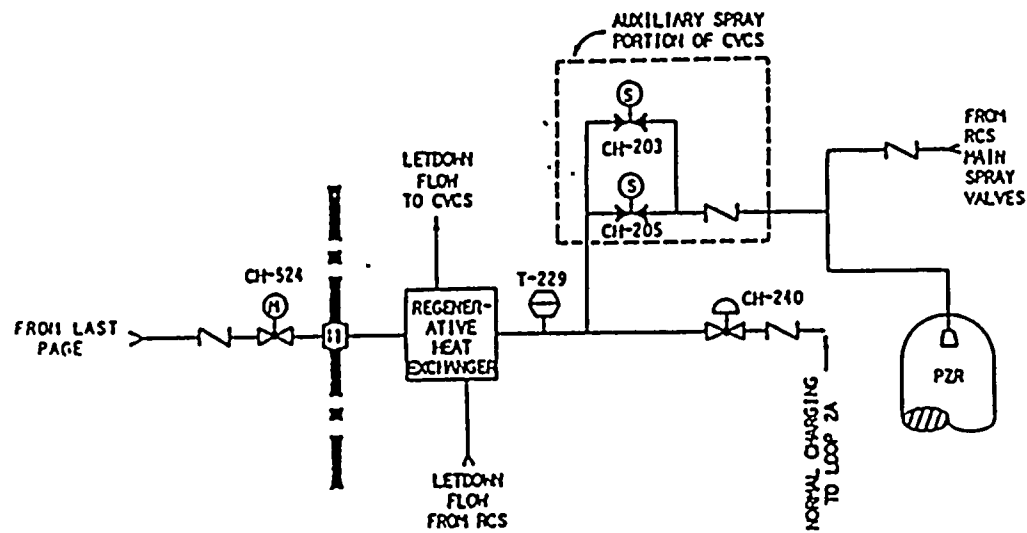
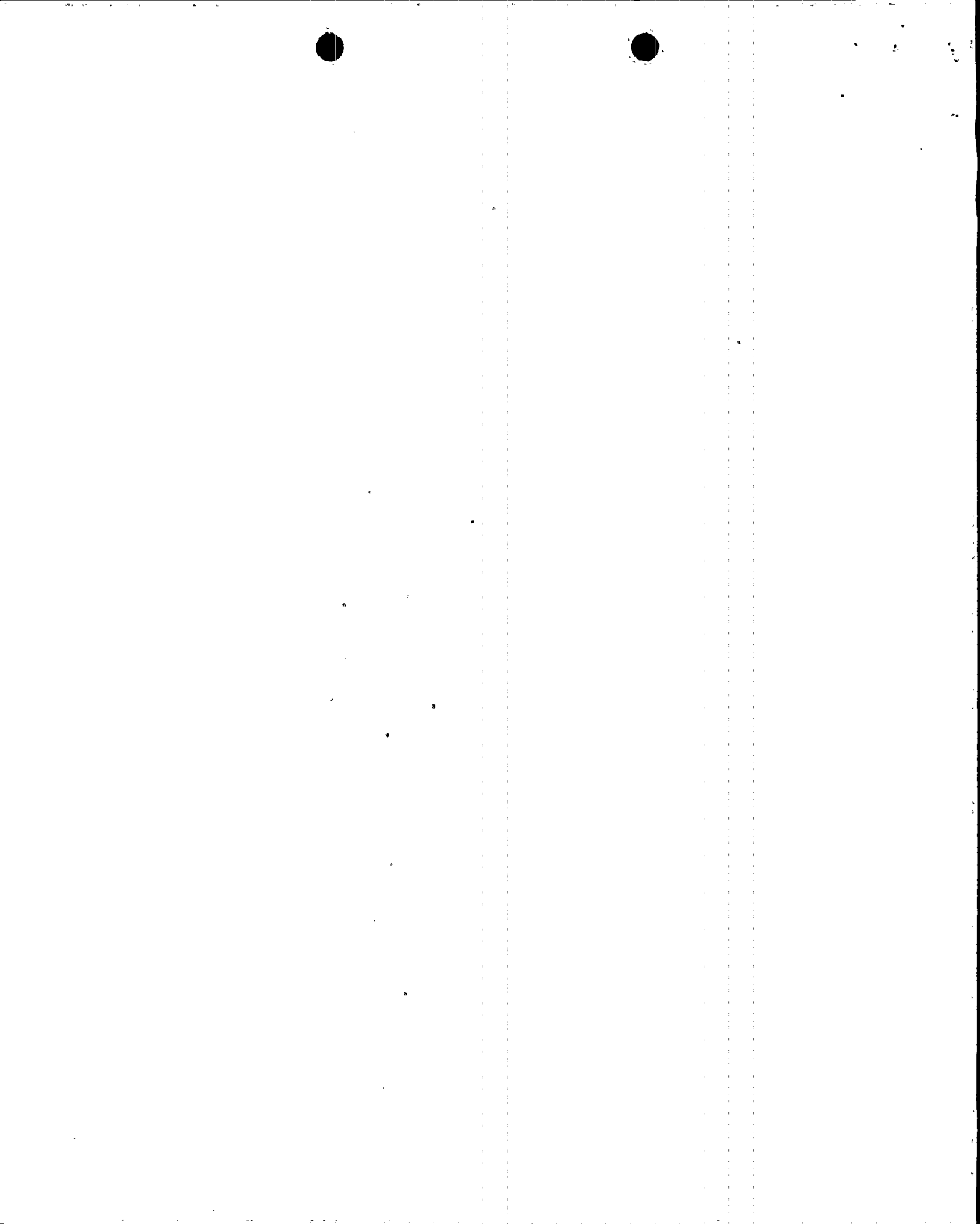


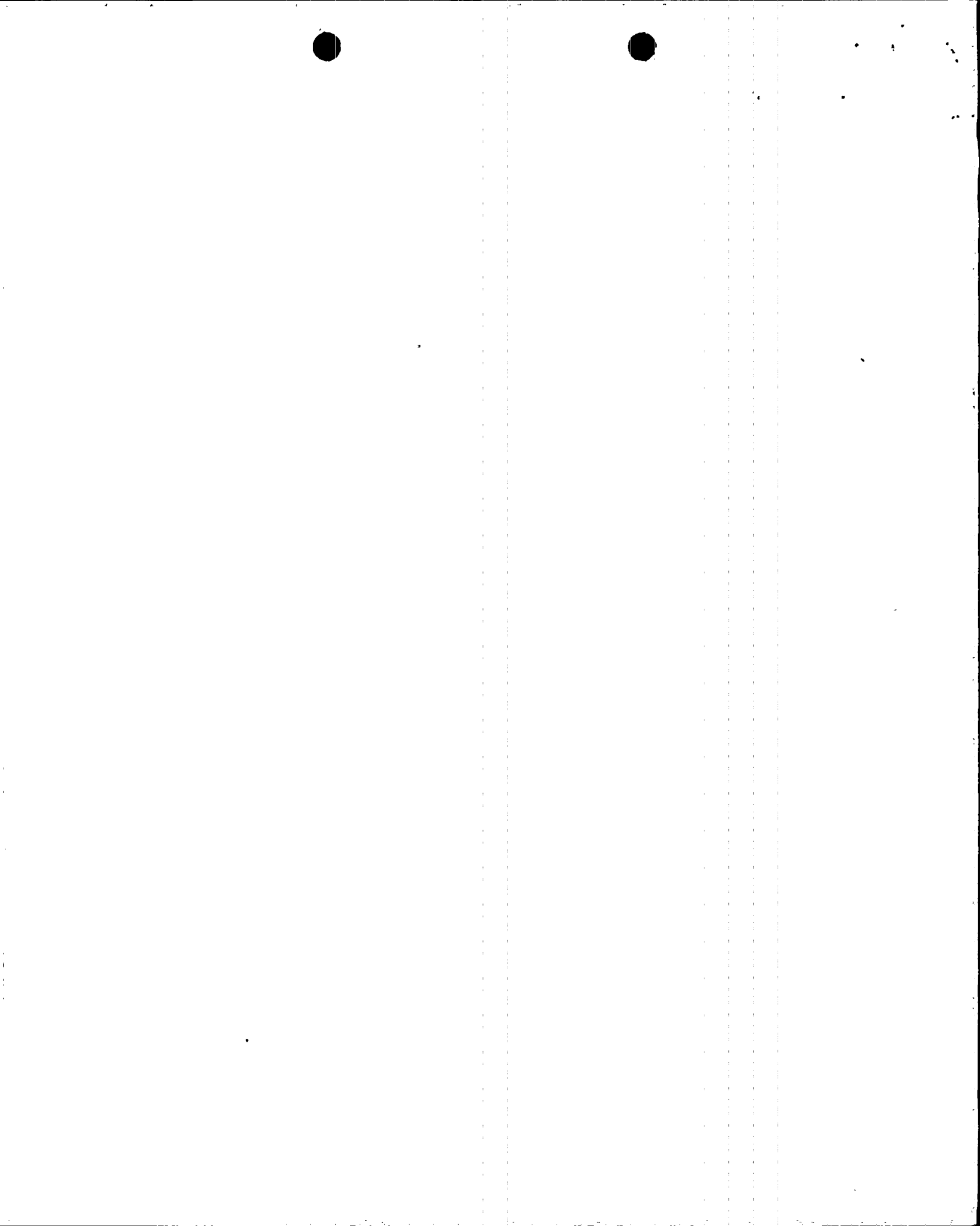
FIGURE 2.1-4 (CONT.)  
SIMPLIFIED SCHEMATIC OF PALO VERDE CVCS SHOWING AUXILIARY  
PORTION AND SOURCES OF BORATED WATER





## HISTORY OF AUXILIARY PRESSURIZER SPRAY SYSTEM

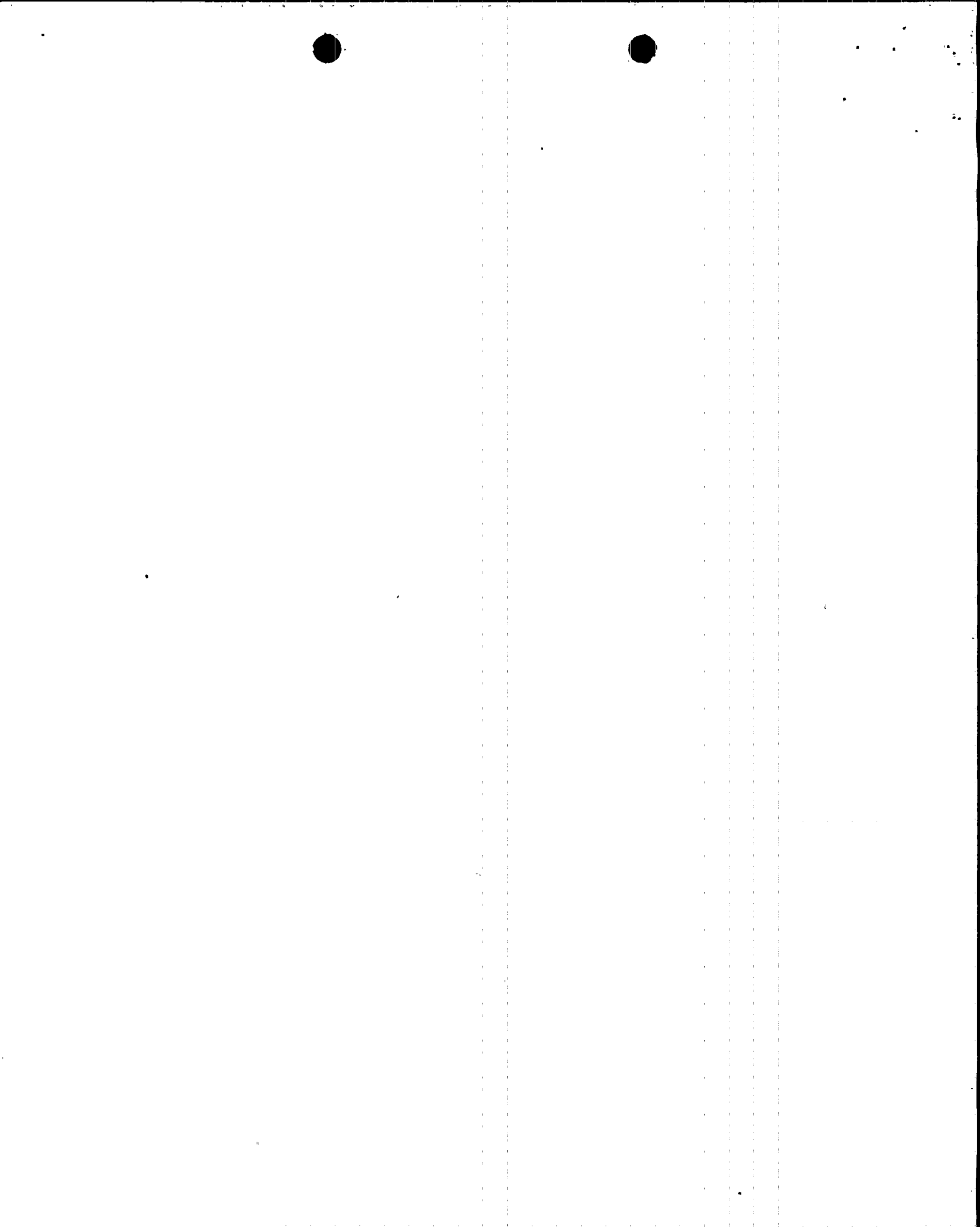
- o PRIOR TO BTP RSB 5-1 (1978), NO SAFETY RELATED FUNCTION
- o QUESTION 440.6 (ISSUED AND ANSWERED IN 1981), ADDRESSED SYSTEM 80 CONFORMANCE WITH BTP RSB 5-1
- o COMBUSTION ENGINEERING'S RESPONSE TO QUESTION 440.6 DESCRIBES OPERATION OF SPRAY SYSTEM AND THE PORTION OF CHARGING SYSTEM WHICH PROVIDES WATER TO SPRAY SYSTEM
- o REQUIREMENT TO CONFORM TO BTP RSB 5-1 MADE THE AUXILIARY PRESURIZER SPRAY SYSTEM (AND A PORTION OF THE CHARGING SYSTEM) SAFETY RELATED
- o AFTER REVIEWING C-E'S RESPONSE TO QUESTION 440.6, RSB TOOK POSITION THAT OPERATOR ACTIONS OUTSIDE OF CONTROL ROOM COULD ONLY BE USED TO MITIGATE SINGLE FAILURES
- o FOLLOWING APPEAL MEETING WITH DIRECTOR OF SYSTEMS INTEGRATION ON SEPTEMBER 17, 1981, SYSTEM 80 DESIGN WAS MODIFIED TO PROVIDE A MOTOR OPERATOR ON VALVE CH-141 (LATER RENUMBERED TO CH-536) AND TO PROVIDE EMERGENCY POWER TO CH-536 AND CH-501 FOLLOWING A LOP EVENT





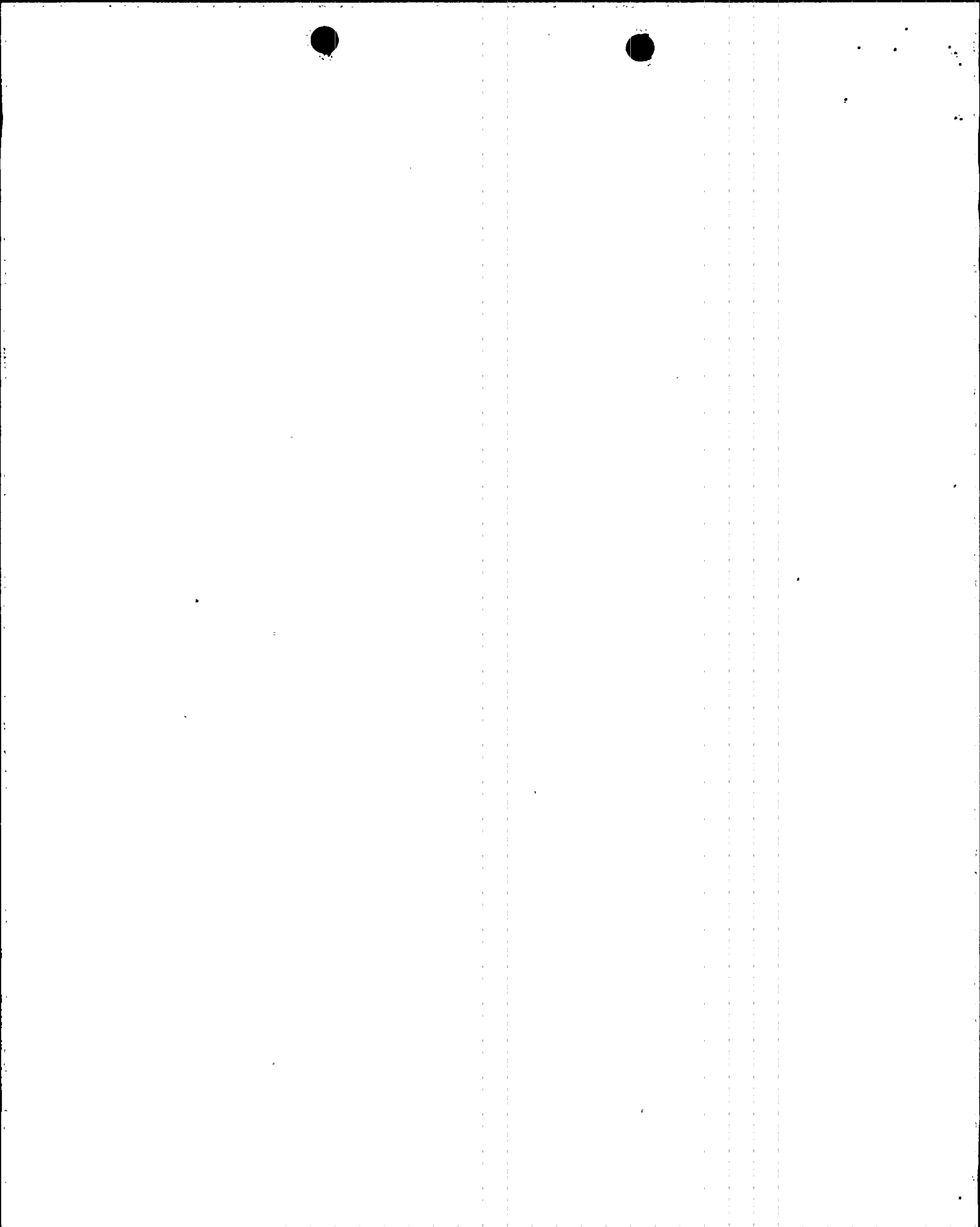
### HISTORY (CONT.)

- o SUPPLEMENT NO.1 OF THE CESSAR SAFETY EVALUATION REPORT (ISSUED MARCH 1983) CONCLUDED THAT "THE GUIDELINES OF BTP RSB 5-1 HAVE, THEREFORE, BEEN SATISFIED AND THIS ISSUE IS RESOLVED."
- o IN CEN-239, COMBUSTION ENGINEERING AND ARIZONA PUBLIC SERVICE RESPONDED TO NRC REQUEST FOR ADDITIONAL INFORMATION ON THE DESIGN AND OPERATION OF THE AUXILIARY PRESSURIZER SPRAY SYSTEM
- o CEN-239 STATED THAT "AUXILIARY SPRAY PROVIDES THE SAFETY-RELATED METHOD FOR RELATIVELY RAPID AND CONTROLLED DEPRESSURIZATION OF THE RCS TO COLD SHUTDOWN CONDITIONS. AS SUCH THE SYSTEM HAS A DEGREE OF PERFORMANCE CONSISTENT WITH THE NRC BRANCH TECHNICAL POSITION RSB 5-1."
- o IN NUREG-1044, NRC STAFF EXPRESSED CONCERN ABOUT SINGLE FAILURE VULNERABILITY OF VALVE CH-240. CONCERN WAS RESOLVED BY ADDING VALVE CH-239, IN SERIES WITH CH-240



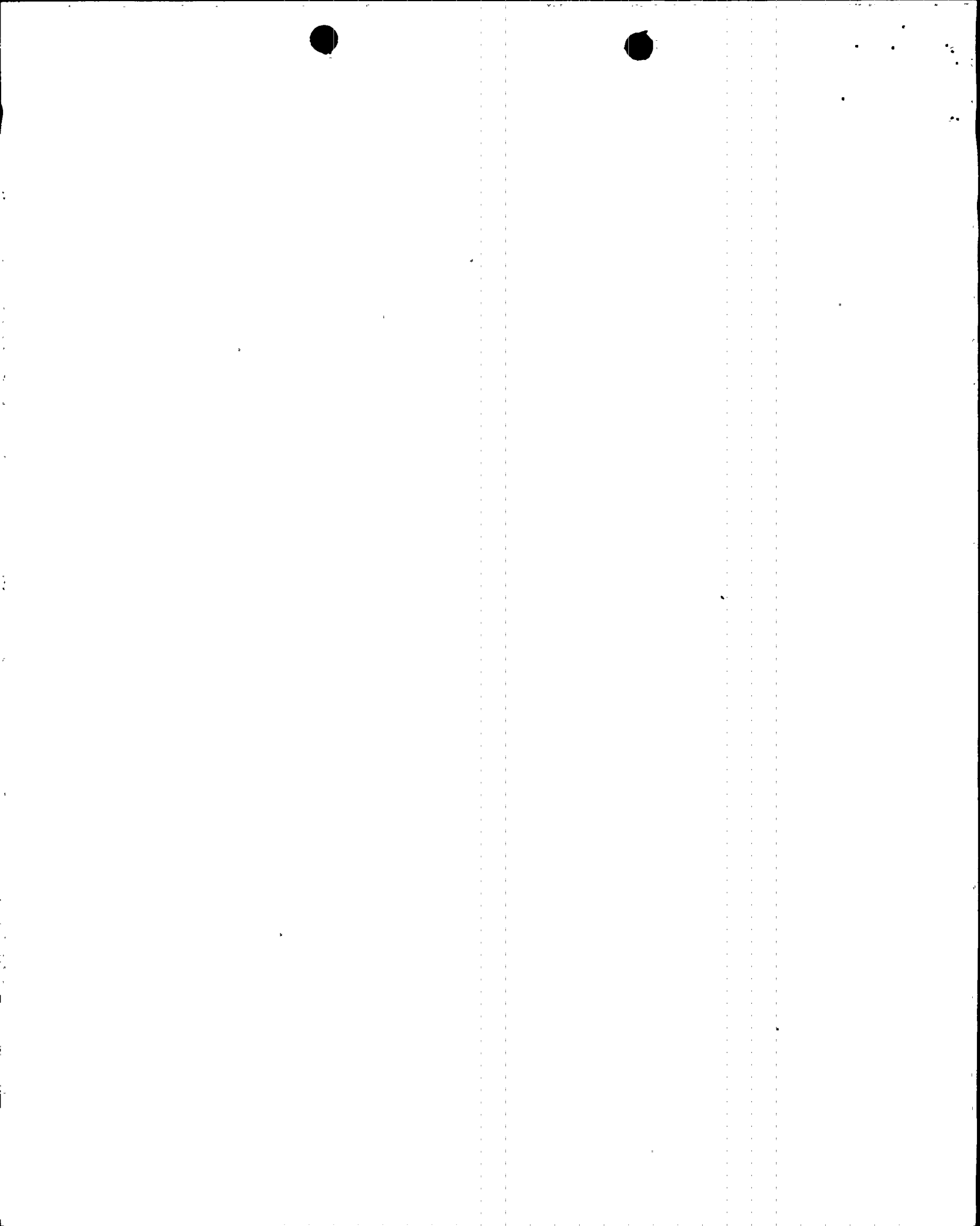
## STEAM GENERATOR TUBE RUPTURE (SGTR) ANALYSES

- o ORIGINAL ANALYSIS INCLUDED IN CESSAR-F (TENDERED IN 1978):
  - BASED ON CATEGORIZATION MATRIX OF CHAPTER 15 (IN ACCORDANCE WITH REG. GUIDE 1.70, REV.2)
  - TUBE RUPTURE ONLY
  - AUXILIARY PRESSURIZER SPRAY WAS NOT CREDITED FOR ANALYSIS TO CALCULATE OFFSITE DOSES
- o ANALYSIS REVISED TO BE CONSISTENT WITH STANDARD REVIEW PLANS (1981/1982):
  - SGTR WITH AND WITHOUT LOSS OF OFFSITE POWER
  - AUXILIARY PRESSURIZER SPRAY WAS NOT CREDITED FOR ANALYSIS TO CALCULATE OFFSITE DOSES
  - CREDIT WAS TAKEN FOR THREE SECOND TIME DELAY BETWEEN REACTOR TRIP AND LOSS OF OFFSITE POWER
- o NRC STAFF REQUIRED RE-ANALYSIS WITH ADDED SINGLE FAILURE AND RECOGNITION OF EMERGENCY OPERATING PROCEDURES PER CEN-152 (APRIL 1983)
- o SEPARATE ANALYSES WERE PERFORMED FOR CESSAR AND PALO VERDE (1984). BOTH ANALYSES RECOGNIZED USE OF AUXILIARY PRESSURIZER SPRAY (AS AN OPERATOR ACTION)
- o NEW PALO VERDE ANALYSIS IS BEING PERFORMED, WHICH DOES NOT USE AUXILIARY PRESSURIZER SPRAY IN THE FIRST TWO HOURS



SUMMARY

- o AUXILIARY PRESSURIZER SPRAY SYSTEM AND PORTION OF CHARGING SYSTEM ARE SAFETY GRADE, AS REQUIRED BY NRC TO MEET BTP RSB 5-1

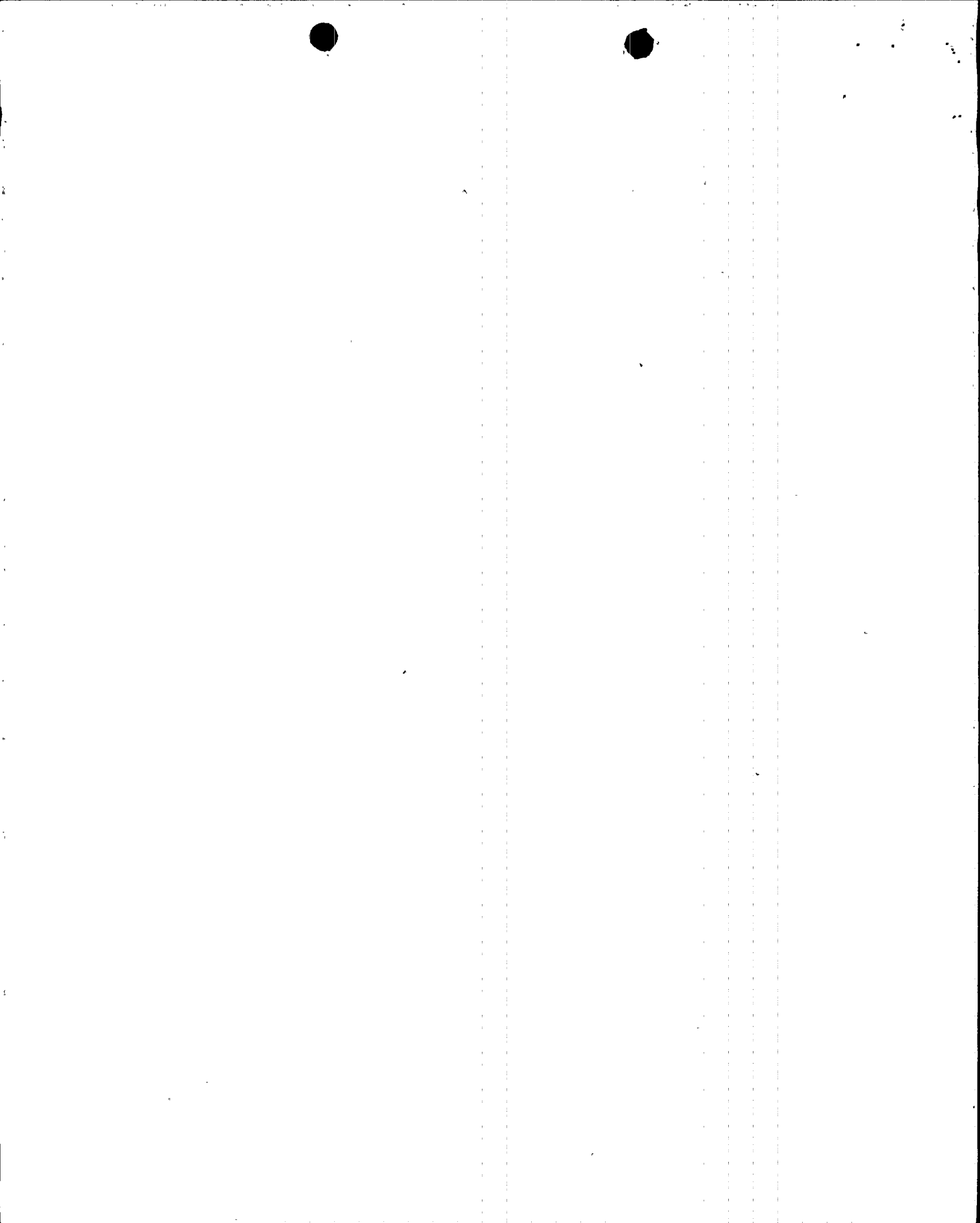


PVNGS-FSAR (APPENDIX 15A)

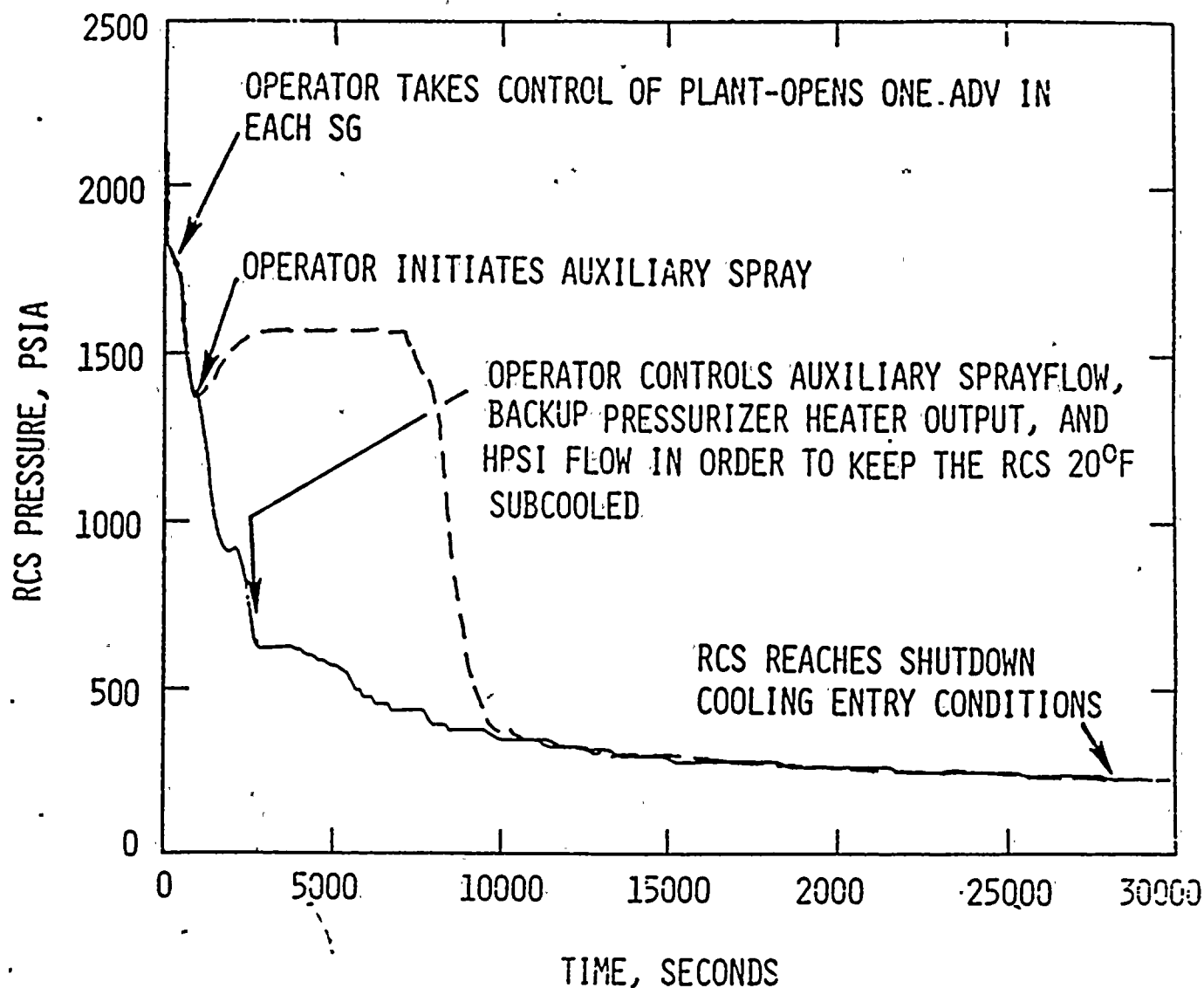
SGTR ANALYSIS RESULTS

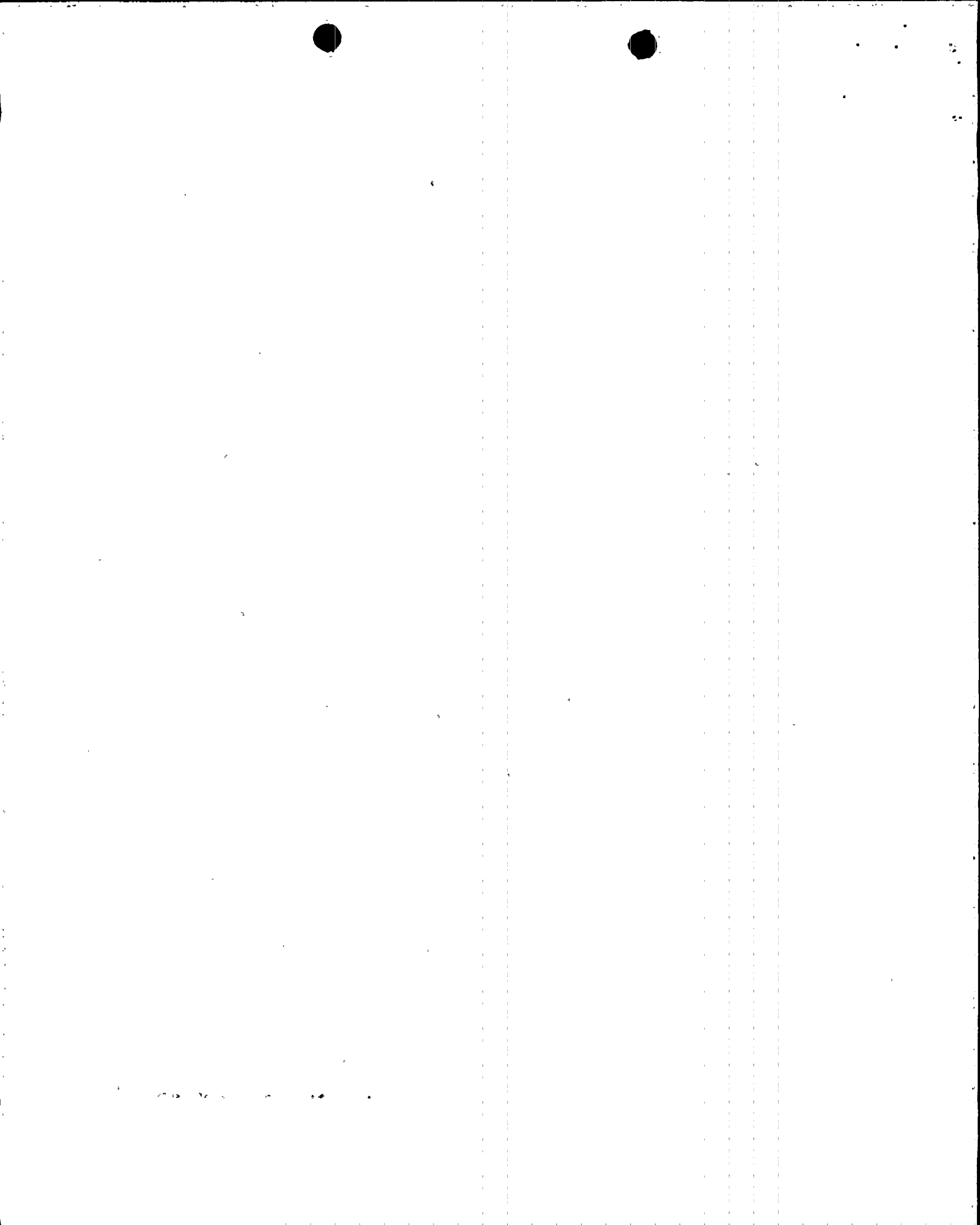
| <u>EVENT</u>             | <u>TIME</u><br>(SECONDS) | FSAR *<br><u>THYROID DOSE</u><br>(REM) | REVISED ANALYSIS*<br><u>THYROID DOSE</u><br>(REM) |
|--------------------------|--------------------------|--|---|
| SGTR &<br>STUCK OPEN ADV | 0                        | 0                                      | 0   |
| LOP                      | 51                       | 0                                      | 0   |
| AFAS                     | 132                      | 0                                      | 0   |
| ADV OPENS                | 460                      | 0                                      | 0   |
| MSIS                     | 513                      |  |   |
| SIAS                     | 581                      |  |   |
| AFW OVERRIDE             | 655                      |  |   |
| AUX SPRAY                | 1015/7200                | 115                                    | 115   |
| TUBES<br>RECOVERED       | 1385/1347                | 182                                    | 186   |
| 2 HP. DOSE<br>@ EAB      | 7200                     | 200                                    | 208   |

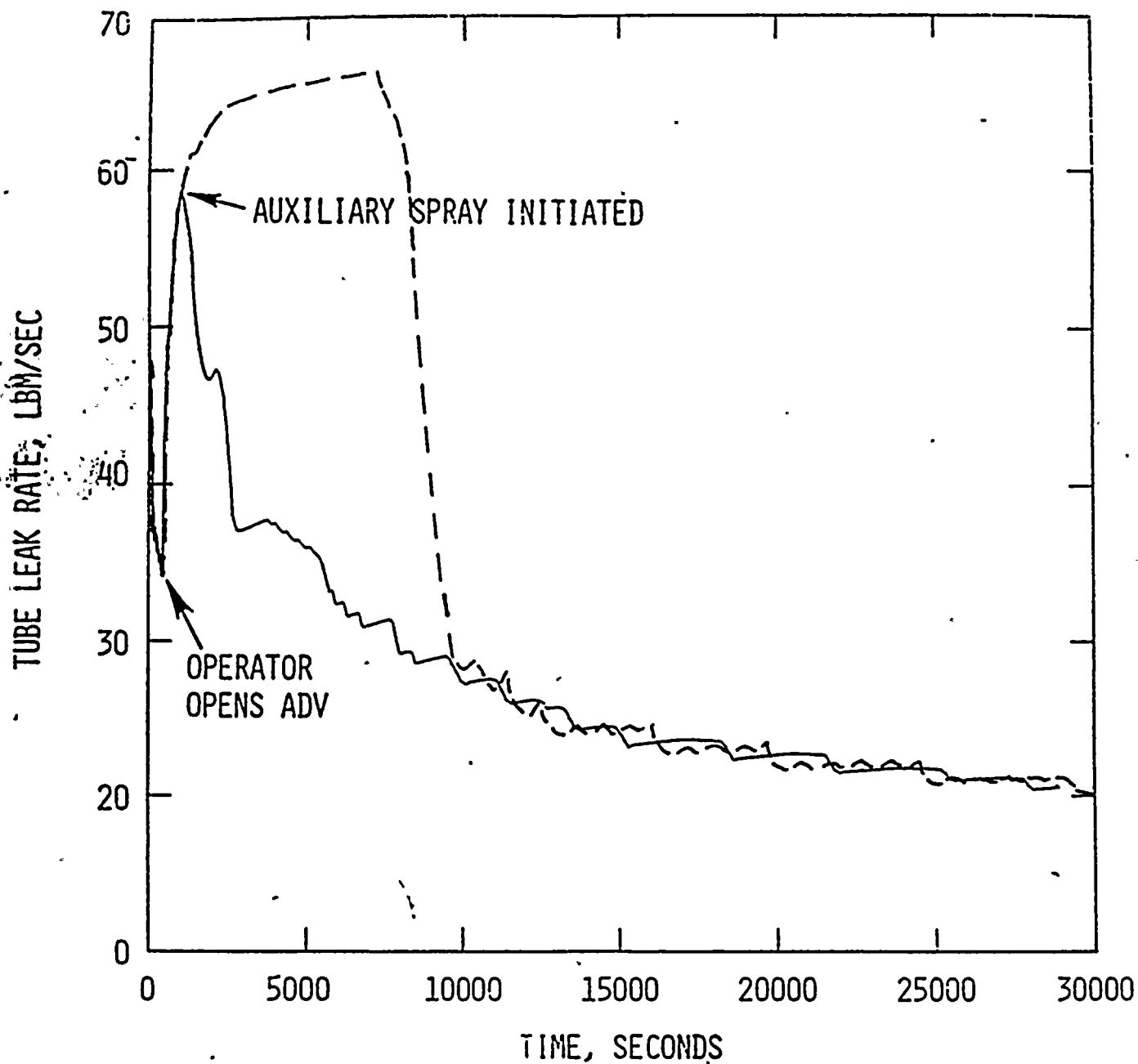
\* REGULATORY DOSE LIMIT IS 300 REM










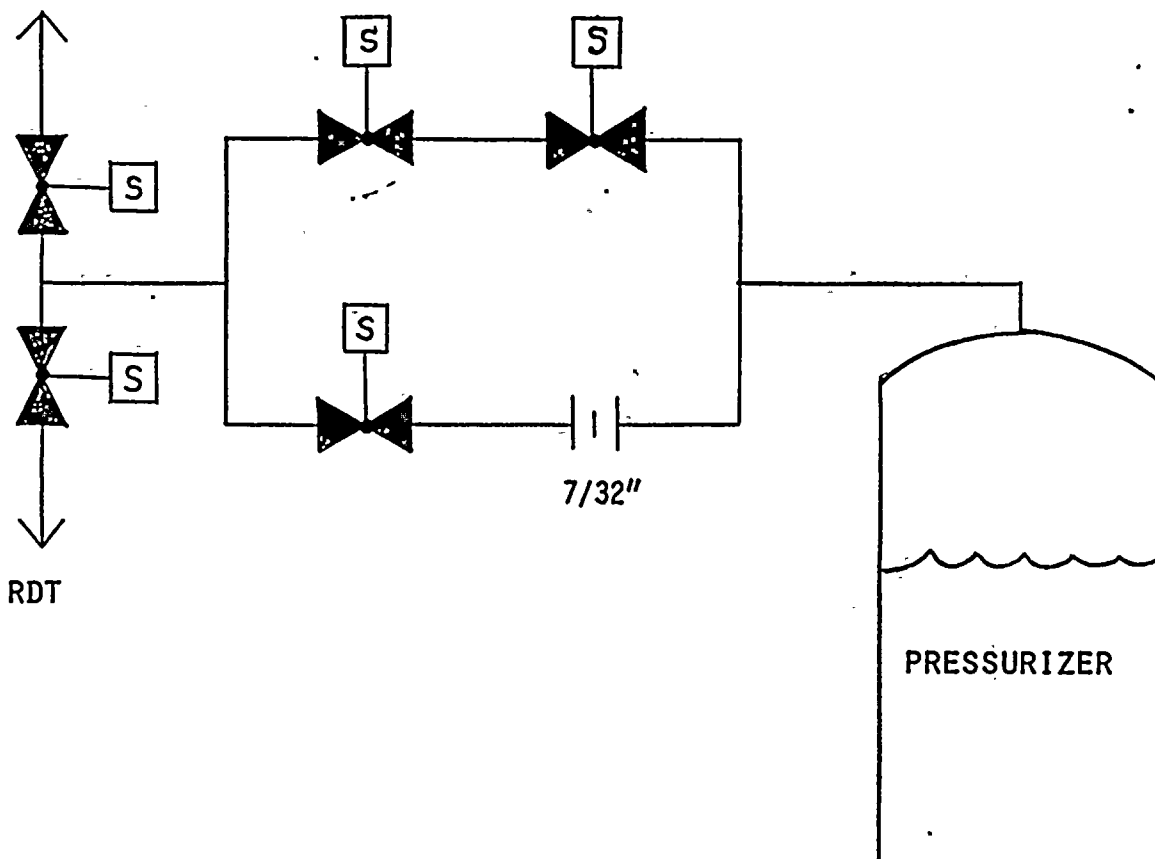


 Palo Verde Nuclear Generating Station  
FSAR

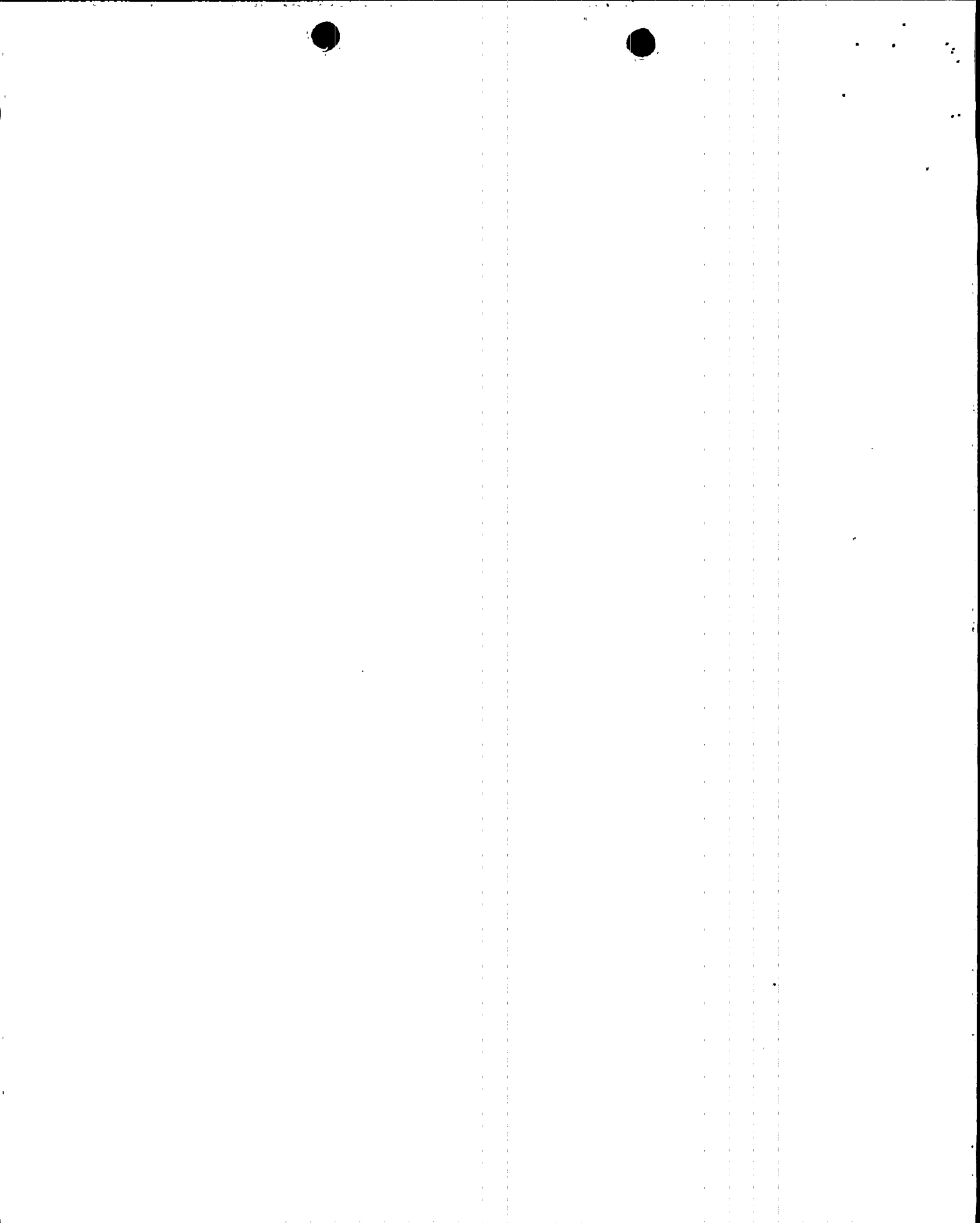
STEAM GENERATOR TUBE RUPTURE WITH LOSS  
OF OFFSITE POWER AND A FULLY STUCK  
OPEN ATMOSPHERIC DUMP VALVE  
TUBE LEAK RATE VS TIME  
Figure 15A-11 (Sheet 2 of 2)



CONTAINMENT  
ATMOSPHERE



PRESSURIZER VENT PATHS



PRESSURIZER VENT SYSTEM  
DEPRESSURIZATION DURING SGTR

- REDUNDANT CLASS 1E QUALIFIED VENT PATHS
- LIMITING PATH (7/32 INCH ORIFICE)
  - DEPRESSURIZATION RATE OF 3 PSI/MIN (vs 18 PSI/MIN WITH AUXILIARY PRESSURIZER SPRAY)
  - PROVIDES ACCEPTABLE DEPRESSURIZATION PERFORMANCE
- EMERGENCY OPERATING PROCEDURES ADVISE OPERATOR OF AVAILABILITY OF VENT TO BACKUP PRESSURIZER AUXILIARY SPRAY

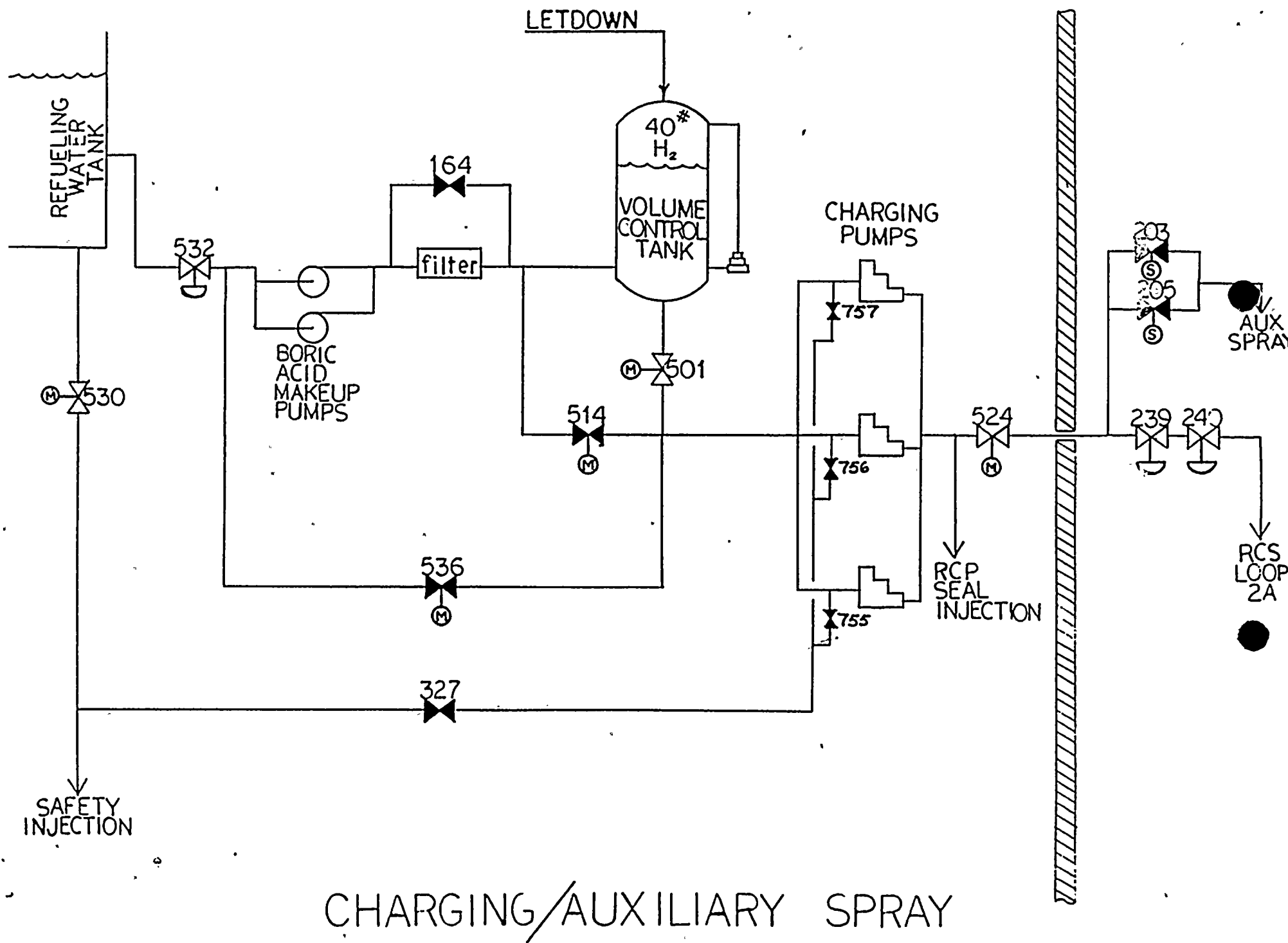




## EXISTING DESIGN

- o PRIMARY PATH FOR SAFE SHUTDOWN
- o VALVE BY VALVE FAILURE IN PRIMARY PATH
- o SUMMARY - MANUAL ACTIONS OUTSIDE CONTROL ROOM







OPERATOR ACTION

SUMMARY

FAILURE

V536 IN CLOSED POSITION

V501 TO CLOSE

MANUAL ACTION

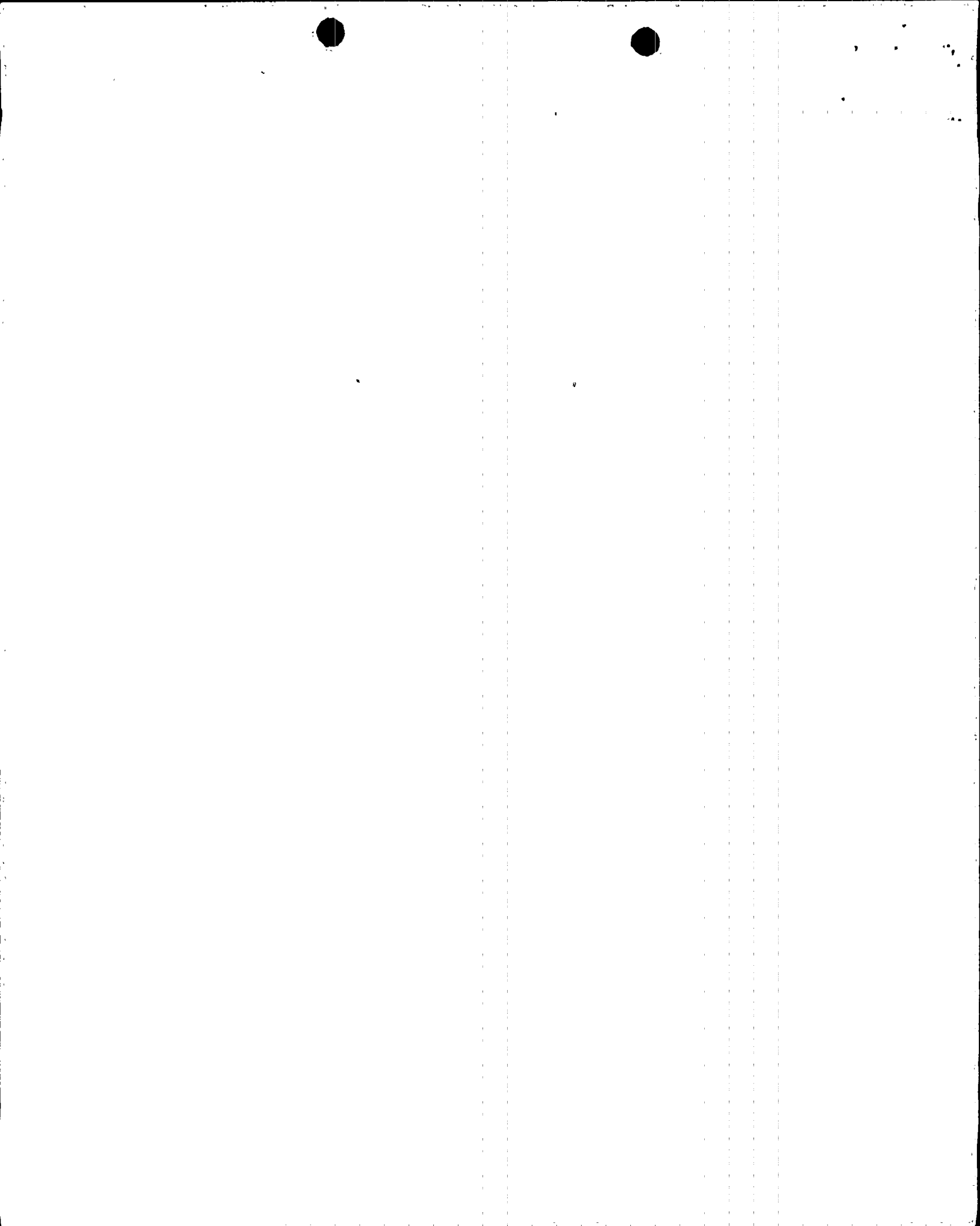
MANUALLY OPEN V327 AND V757,  
V756 OR V755

MANUALLY DEPRESSURIZE VCT,  
MANUALLY VENT THE CHARGING  
PUMPS



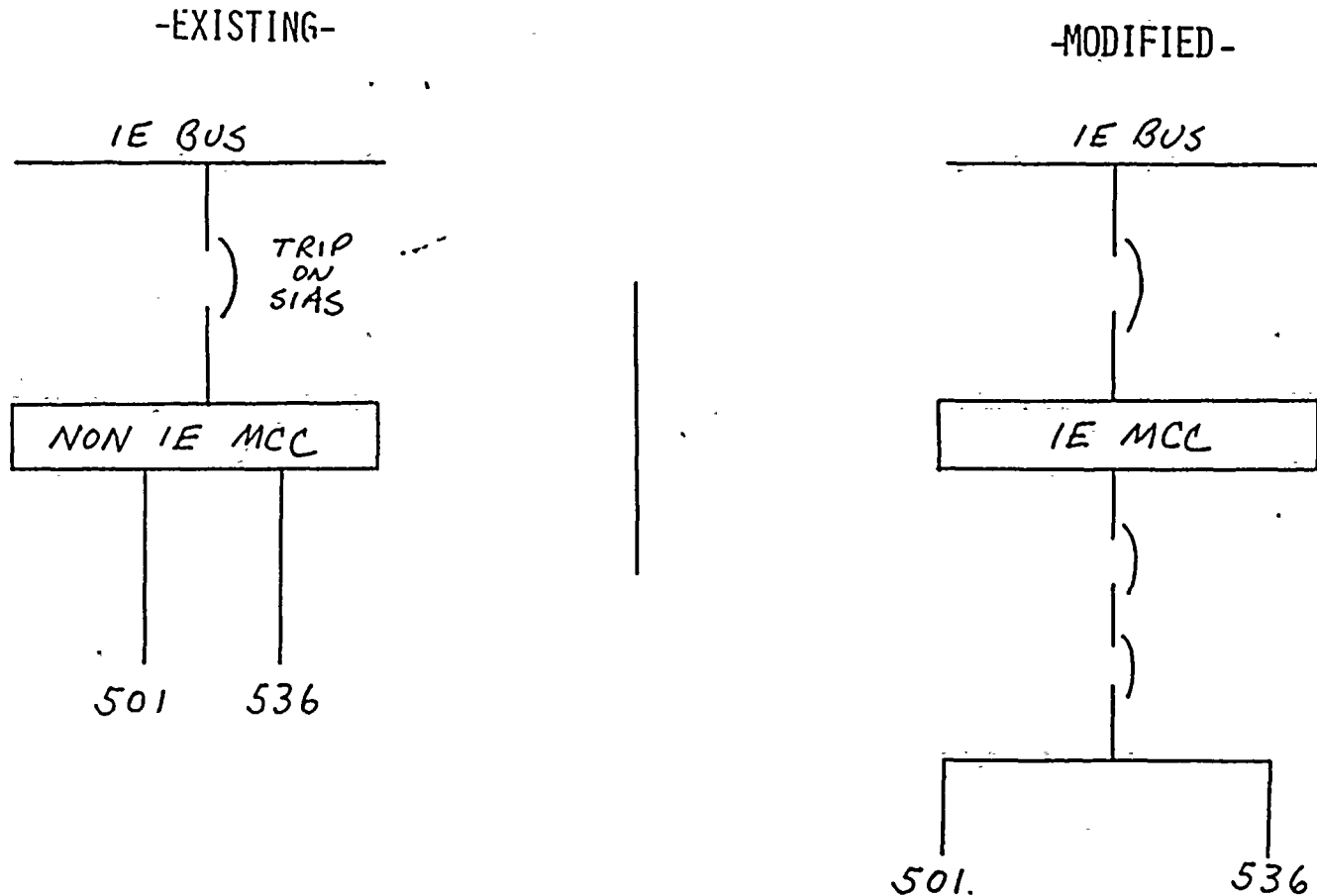
## CVCS ENHANCEMENT

- o REPORT OF ACTIONS UNDERTAKEN TO ADDRESS SEPTEMBER 12, 1985  
EVENT ( PER SEPTEMBER 20, 1985 MEETING )
- o THREE MODIFICATIONS PLANNED
  - ENSURE CONTINUED CONTROL OF V501 AND V536  
FOLLOWING LOP AND SIAS
  - ADD SECOND, DIVERSE REFERENCE LEG FOR VCT  
LEVEL MONITORING WITH ALARM
  - AUTOMATIC REALIGNMENT OF V501 AND V536





# VALVE POWER SUPPLY CHANGE

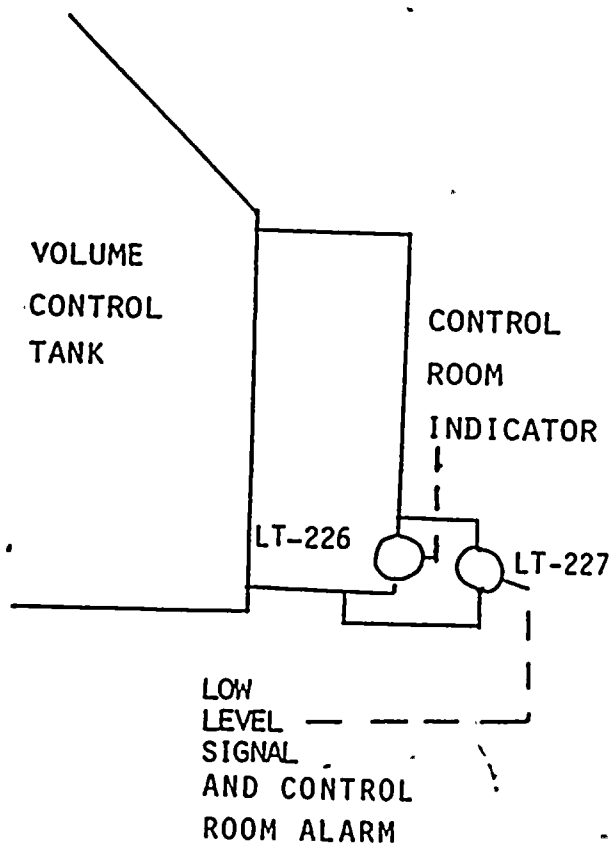


CHANGE ENSURES OPERABILITY FROM CONTROL ROOM AFTER SIAS AND LOP SUCH THAT SUCTION COULD BE ALIGNED TO RWT FROM VCT.

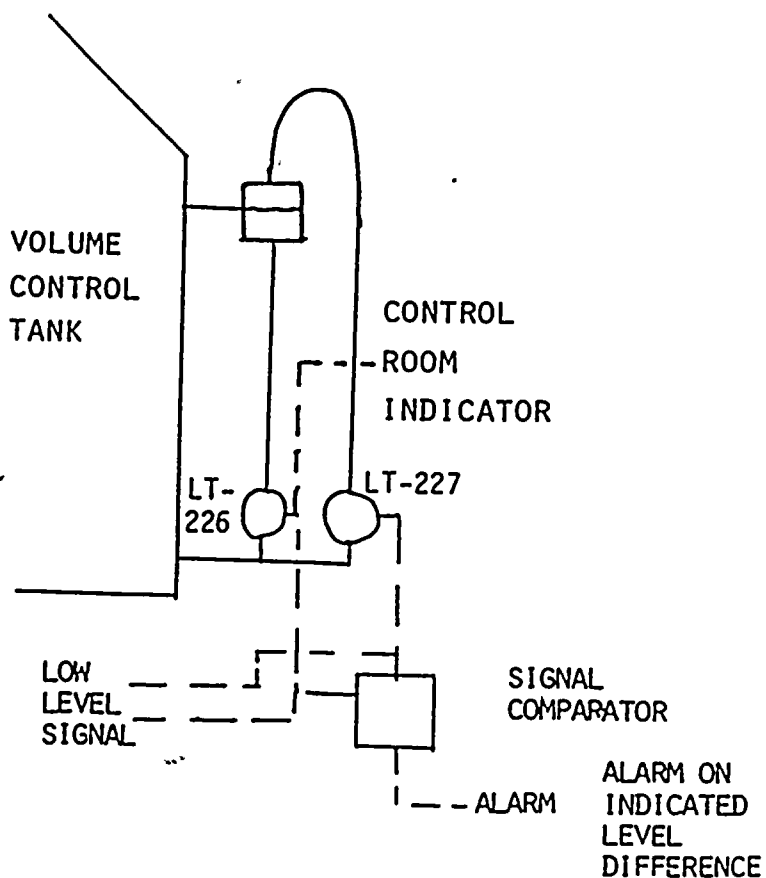


# VOLUME CONTROL TANK LEVEL INDICATION

## EXISTING

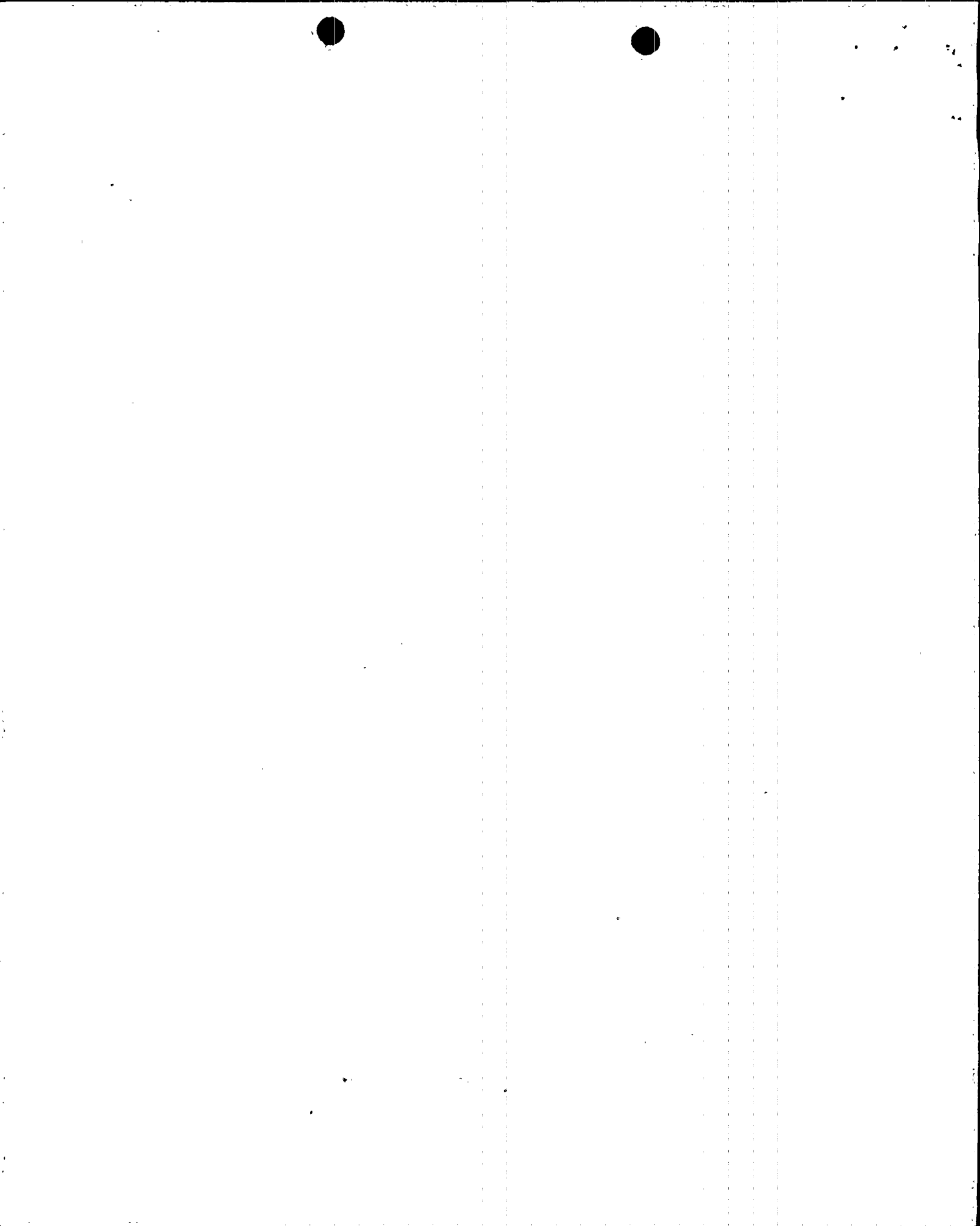


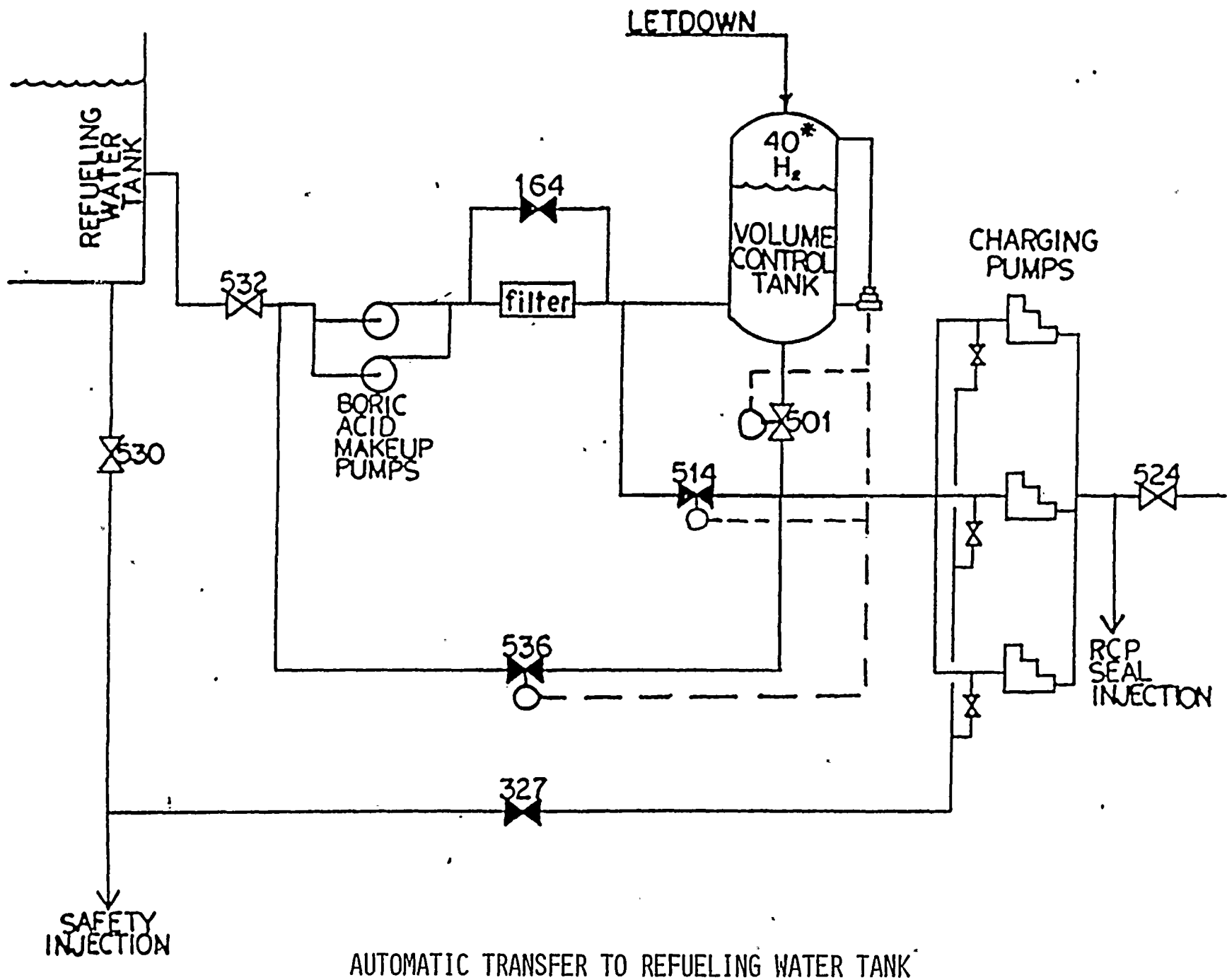
## MODIFIED

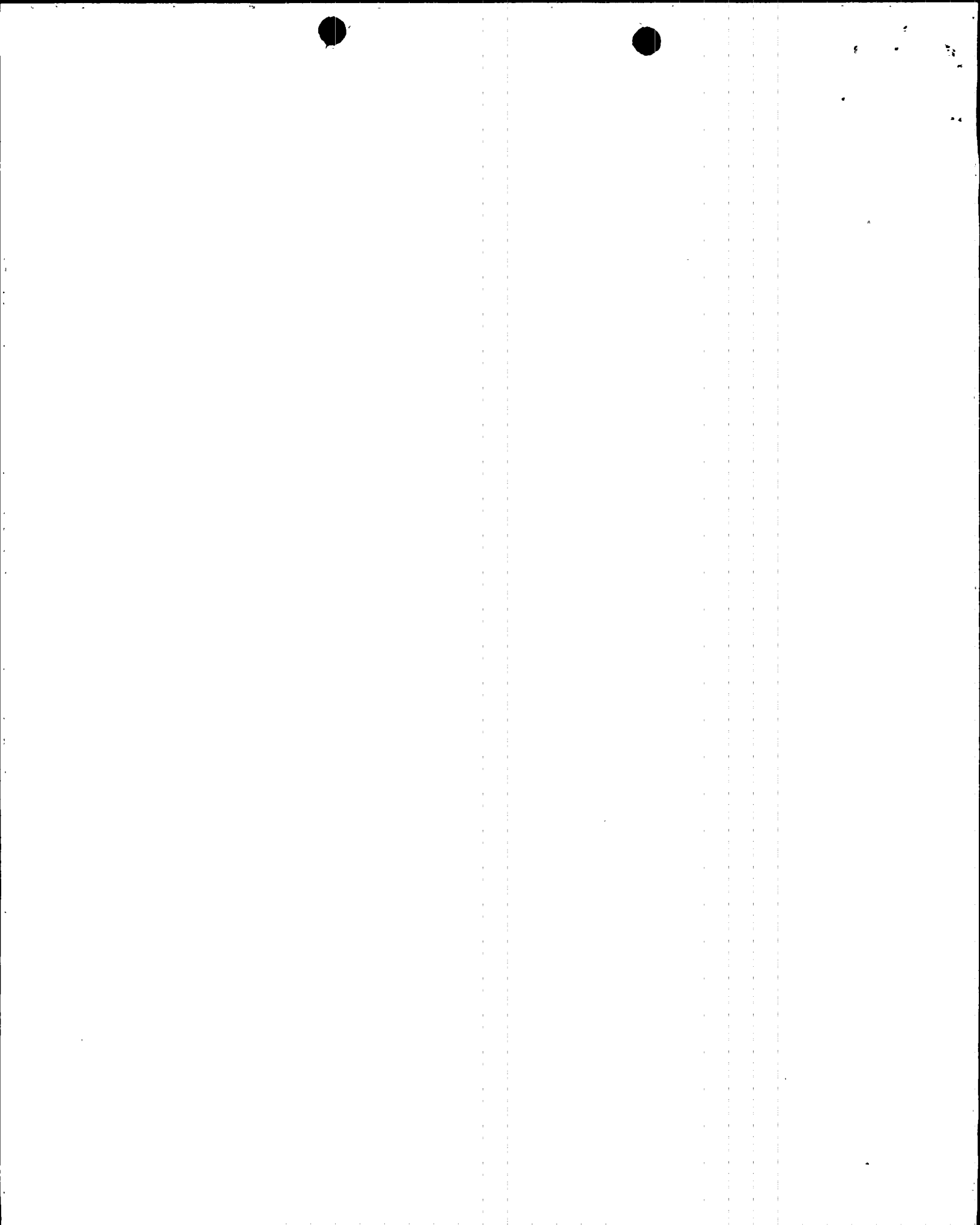


## IMPROVEMENTS

1. SEPERATE REFERENCE LEG TO EACH TRANSMITTER
2. ONE WET AND ONE DRY LEG TO PROVIDE DIVERSE REFERENCE
3. COMPARATOR ALARM PROVIDES INDICATION OF POSSIBLE LOSS OF CORRECT REFERENCE TO ONE OF THE TRANSMITTERS







## ENHANCEMENT EVALUATION

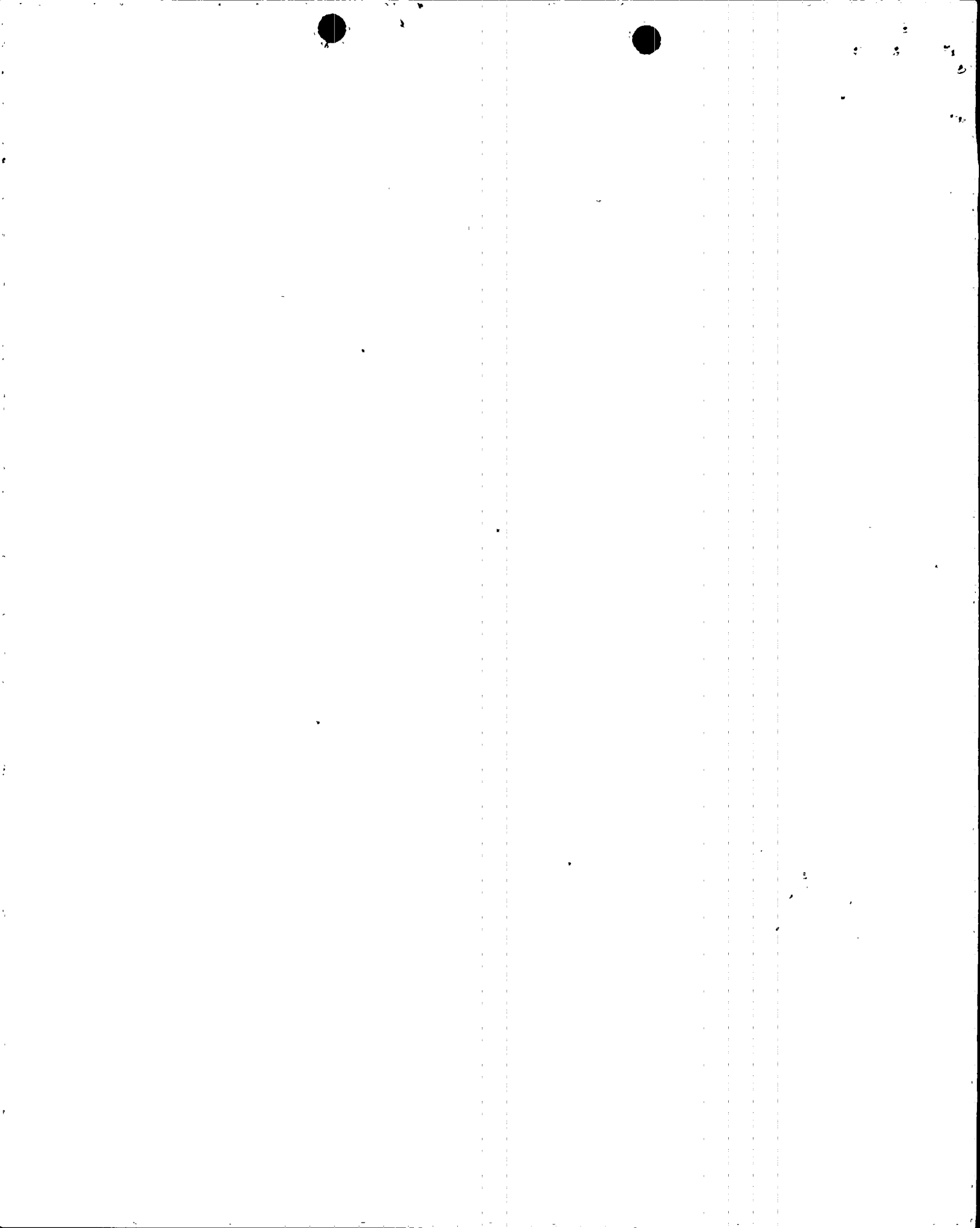
- o BORATED WATER SOURCE REMAINS AVAILABLE TO CONTROL ROOM OPERATOR FOLLOWING LOP AND SIAS
- o INACCURATE VCT LEVEL IS ALARMED IN CONTROL ROOM.
- o OPERATOR WORK LOAD REDUCED BY AUTO TRANSFER OF V501 AND V536





## ENHANCEMENT EVALUATION

- o BORATED WATER SOURCE REMAINS AVAILABLE TO CONTROL ROOM OPERATOR FOLLOWING LOP AND SIAS
- o INACCURATE VCT LEVEL IS ALARMED IN CONTROL ROOM
- o OPERATOR WORK LOAD REDUCED BY AUTO TRANSFER OF V501 AND V536



JAN 7 1986

MEETING SUMMARY DISTRIBUTION

~~C~~Docket No ~~50-529~~

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