ENCLOSURE 6

APP-OCS-GEH-323 Revision B,

"AP1000™ Human Factors Engineering Integrated System Validation Scenario Information"

(Non-Proprietary)

Westinghouse

Westinghouse Non-Proprietary Class 3

AP1000™

Human Factors Engineering Integrated System Validation Scenario Information (Non-Proprietary)

APP-OCS-GEH-323,
Rev. B

May 2010

APPROVALS

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REVISION HISTORY

RECORD OF CHANGES

Revision	Author	Description	Completed
A	Robert B. Fuld Donald W. Briggs	Preliminary Issue	01/10
B	Donald W. Briggs	The first issue of this document (APP-OCS-GEH-323) is non-proprietary and is being issued at revision B to correspond to the revision of the proprietary document (APP-OCS-GEH-321). Added detailed information in Appendix A, Scenarios 1, 2, and 12. Added detailed information in Appendix B, Observer Guides 1, 2, and 3. Deleted Appendix F (information is contained in APP-OCS-GEH-320). Update to Appendix D in-line with the integrated system validation (ISV) scope of simulation. Format and minor editorial changes, including the renumbering of scenarios and summary descriptions added to Section 2, "Scope." Added proprietary markings.	See EDMS

DOCUMENT TRACEABILITY & COMPLIANCE

Created to Support the Following Document(s)	Document Number	Revision
AP1000 Human Factors Engineering Integrated System Validation Plan	APP-OCS-GEH-320	D

OPEN ITEMS

Item	Description	Status
1	Provide scenario-specific observer guides for each integrated system validation (ISV) scenario in Appendix A.	DI-OI-024152
2	Finalize bracketed values and references for each ISV scenario in Appendix A.	DI-OI-024153

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ACRONYMS AND TRADEMARKS

Acronyms used in the document are defined in WNA-PS-00016-GEN, "Standard Acronyms and Definitions" (Reference 2), APP-GW-G0X-001, "List of AP1000 Systems" (Reference 6), or included below to ensure unambiguous understanding of their use within this document.

Acronym	Definition
ADS	Automatic Depressurization System
AFD	Axial Flux Difference
CLP	Cask Loading Pit
COLR	Core Operating Limits Report
CSFST	Critical Safety Function Status Tree
IC	Initial Condition
ISV	Integrated System Validation
MSSV	Main Steam Safety Valve
MTC	Moderator Temperature Coefficient
MTIS	Maintenance, Test, Inspection, and Surveillance
NI	Nuclear Instrument
PDSP	Primary Dedicated Safety Panel
QPTR	Quadrant Power Tilt Ratio
RIHA	Risk-Important Human Action
RTCOT	Reactor Trip Channel Operability Test
RTS	Reactor Trip System
SART	Situational Awareness Rating Technique
SDM	Shutdown Margin
TLX	Task Load Index

GLOSSARY OF TERMS

Standard terms used in the document are defined in WNA-PS-00016-GEN, "Standard Acronyms and Definitions" (Reference 2), or included below to ensure unambiguous understanding of their use within this document.

Term	Definition
Discrepancy	A discrepancy from guidance and criteria identified during the execution of human factors engineering (HFE) verification and validation activities.
Exception	A justified (i.e., documented and approved) departure from specified guidance or requirements.
Human Engineering	A departure of the AP1000™ HFE design.
Pass/Fail Criteria	Objective, scenario-specific acceptance criteria based on safety limits and time windows for risk-important human actions.

REFERENCES

1. APP-OCS-GEH-320 (Proprietary), Rev. D, "AP1000 Human Factors Engineering Integrated System Validation Plan," Westinghouse Electric Company LLC.

2. WNA-PS-00016-GEN (Proprietary), Rev. 4, "Standard Acronyms and Definitions," Westinghouse Electric Company LLC.

3. APP-GW-GL-011, Rev. 0, "AP1000 Identification of Critical Human Actions and Risk Important Tasks," Westinghouse Electric Company LLC.

4. APP-OCS-GEH-420 (Proprietary), Rev. B, "AP1000 Human Factors Engineering Discrepancy Resolution Process," Westinghouse Electric Company LLC.

5. APP-STS-T5-001 (Proprietary), Rev. C, "AP1000 Full Scope Training Simulator Test Plan," Westinghouse Electric Company LLC.

6. APP-GW-G0X-001, Rev. 7, "List of AP1000 Systems," Westinghouse Electric Company LLC.

7. APP-GW-GL-022 (Proprietary), Rev. 8, "AP1000 Probabilistic Risk Assessment," Westinghouse Electric Company LLC.

8. APP-OCS-J1R-220 (Proprietary), Rev. B, "Operational Sequence Analysis (OSA-2) Summary Report," Westinghouse Electric Company LLC.

BIBLIOGRAPHY

1. APP-GW-GJP-101 (GOP-101) (Proprietary), Rev. F, "Load Following," Westinghouse Electric Company LLC.

2. APP-GW-GJP-102 (GOP-102) (Proprietary), Rev. D, "Lowering Power," Westinghouse Electric Company LLC.

3. APP-GW-GJP-103 (GOP-103) (Proprietary), Rev. D, "Plant Cooldown From Mode 3 To Mode 5," Westinghouse Electric Company LLC.

4. APP-GW-GJP-106 (GOP-106) (Proprietary), Rev. D, "Plant Heatup From Mode 5 To Mode 4," Westinghouse Electric Company LLC.

5. APP-GW-GJP-107 (GOP-107) (Proprietary), Rev. D, "Plant Heatup From Mode 4 To Normal Operating Temperature," Westinghouse Electric Company LLC.

6. APP-GW-GJP-108 (GOP-108) (Proprietary), Rev. C, "Plant Startup From Normal Operating Temperature To Less Than 5% Power," Westinghouse Electric Company LLC.

7. APP-GW-GJP-109 (GOP-109) (Proprietary), Rev. C, "Plant Power Escalation From 2% to 100% Power," Westinghouse Electric Company LLC.

8. APP-GW-GJP-111 (GOP-111) (Proprietary), Rev. C, "Inverse Count Rate Ratio," Westinghouse Electric Company LLC.

9. APP-GW-GJP-112 (GOP-112) (Proprietary), Rev. A, "Critical Rod Position/Boron Concentration Calculation," Westinghouse Electric Company LLC.

10. APP-ASS-GJP-101 (ASS-101) (Proprietary), Rev. B, "Auxiliary Steam Supply System," Westinghouse Electric Company LLC.

11. APP-BDS-GJP-101 (BDS-101) (Proprietary), Rev. G, "Blowdown System," Westinghouse Electric Company LLC.

12. APP-CDS-GJP-101 (CDS-101) (Proprietary), Rev. E, "Condensate System," Westinghouse Electric Company LLC.

13. APP-CFS-GJP-101 (CFS-101) (Proprietary), Rev. B, "Turbine Island Chemical Feed System," Westinghouse Electric Company LLC.

14. APP-CPS-GJP-101 (CPS-101) (Proprietary), Rev. B, "Condensate Polishing System," Westinghouse Electric Company LLC.

15. APP-CVS-GJP-101 (CVS-101) (Proprietary), Rev. F, "Chemical Volume and Control System," Westinghouse Electric Company LLC.

BIBLIOGRPAHY (cont.)

16. APP-CWS-GJP-101 (CWS-101) (Proprietary), Rev. D, "Circulating Water System," Westinghouse Electric Company LLC.

17. APP-ECS-GJP-101 (ECS-101) (Proprietary), Rev. B, "Main AC Power System," Westinghouse Electric Company LLC.

18. APP-FWS-GJP-101 (FWS-101) (Proprietary), Rev. D, "Feedwater System," Westinghouse Electric Company LLC.

19. APP-GSS-GJP-101 (GSS-101) (Proprietary), Rev. B, "Gland Seal System," Westinghouse Electric Company LLC.

20. APP-HDS-GJP-101 (HDS-101) (Proprietary), Rev. D, "Heater Drain System," Westinghouse Electric Company LLC.

21. APP-LOS-GJP-101 (LOS-101) (Proprietary), Rev. B, "Main Turbine and Generator Lube Oil System," Westinghouse Electric Company LLC.

22. APP-MSS-GJP-101 (MSS-101) (Proprietary), Rev. D, "Main Steam System," Westinghouse Electric Company LLC.

23. APP-MTS-GJP-101 (MTS-101) (Proprietary), Rev. F, "Main Turbine System," Westinghouse Electric Company LLC.

24. APP-PCS-GJP-101 (PCS-101) (Proprietary), Rev. D, "Passive Containment Cooling System," Westinghouse Electric Company LLC.

25. APP-PXS-GJP-101 (PXS-101) (Proprietary), Rev. D, "Passive Core Cooling System," Westinghouse Electric Company LLC.

26. APP-RCS-GJP-101 (RCS-101) (Proprietary), Rev. D, "Reactor Coolant System," Westinghouse Electric Company LLC.

27. APP-RNS-GJP-101 (RNS-101) (Proprietary), Rev. D, "Normal Residual Heat Removal System," Westinghouse Electric Company LLC.

28. APP-SGS-GJP-101 (SGS-101) (Proprietary), Rev. D, "Steam Generator System," Westinghouse Electric Company LLC.

29. APP-TCS-GJP-101 (TCS-101) (Proprietary), Rev. A, "Turbine Building Closed Cooling Water System," Westinghouse Electric Company LLC.

30. APP-TOS-GJP-101 (TOS-101) (Proprietary), Rev. B, "Main Turbine Control and Diagnostics System," Westinghouse Electric Company LLC.

BIBLIOGRPAHY (cont.)

31. APP-VBS-GJP-101 (VBS-101) (Proprietary), Rev. B, "Nuclear Island Nonradioactive Ventilation System," Westinghouse Electric Company LLC.

32. APP-VCS-GJP-101 (VCS-101) (Proprietary), Rev. B, "Containment Recirculation Cooling System," Westinghouse Electric Company LLC.

33. APP-ZOS-GJP-101 (ZOS-101) (Proprietary), Rev. C, "Onsite Standby Power System," Westinghouse Electric Company LLC.

34. APP-GW-GJP-201 (E-0) (Proprietary), Rev. 3, "Reactor Trip Or Safeguards Actuation," Westinghouse Electric Company LLC.

35. APP-GW-GJP-202 (E-1) (Proprietary), Rev. 3, "Loss Of Reactor Or Secondary Coolant," Westinghouse Electric Company LLC.

36. APP-GW-GJP-203 (E-2) (Proprietary), Rev. 3, "Faulted Steam Generator Isolation," Westinghouse Electric Company LLC.

37. APP-GW-GJP-204 (E-3) (Proprietary), Rev. 3, "Steam Generator Tube Rupture," Westinghouse Electric Company LLC.

38. APP-GW-GJP-205 (ECA-1.1) (Proprietary), Rev. 3, "LOCA Outside Containment," Westinghouse Electric Company LLC.

39. APP-GW-GJP-206 (ES-0.1) (Proprietary), Rev. 3, "Reactor Trip Response," Westinghouse Electric Company LLC.

40. APP-GW-GJP-207 (ES-0.2) (Proprietary), Rev. 3, "Natural Circulation Cooldown," Westinghouse Electric Company LLC.

41. APP-GW-GJP-208 (ES-1.1) (Proprietary), Rev. 3, "Passive Safety Systems Termination," Westinghouse Electric Company LLC.

42. APP-GW-GJP-209 (ES-1.2) (Proprietary), Rev. 3, "Post LOCA Cooldown and Depressurization," Westinghouse Electric Company LLC.

43. APP-GW-GJP-238 (ES-0.4) (Proprietary), Rev. 0, "Steam Dump To Atmosphere," Westinghouse Electric Company LLC.

44. APP-GW-GJP-240 (ES-1.3) (Proprietary), Rev. 0, "ADS Stage 1-3 Actuation Response," Westinghouse Electric Company LLC.

45. APP-GW-GJP-250 (F-0) (Proprietary), Rev. 1, "Critical Safety Function Status Trees," Westinghouse Electric Company LLC.

BIBLIOGRPAHY (cont.)

46. APP-GW-GJP-210 (FR-C.1) (Proprietary), Rev. 2, "Response to Inadequate Core Cooling," Westinghouse Electric Company LLC.

47. APP-GW-GJP-223 (FR-S.1) (Proprietary), Rev. 0, "FR-S.1 Response to Nuclear Power Generation – ATWS," Westinghouse Electric Company LLC.

48. APP-GW-GJP-230 (SDF-0) (Proprietary), Rev. 1, "Shutdown Critical Safety Function Status Tree," Westinghouse Electric Company LLC.

49. APP-GW-GJP-231 (SDP-1) (Proprietary), Rev. 2, "Response To Loss Of RCS Inventory During Shutdown," Westinghouse Electric Company LLC.

50. APP-GW-GJP-232 (SDP-2) (Proprietary), Rev. 2, "Response To Loss Of RNS During Shutdown," Westinghouse Electric Company LLC.

51. APP-GW-GJP-233 (SDP-3) (Proprietary), Rev. 3, "Response To High Containment Radiation During Shutdown," Westinghouse Electric Company LLC.

52. APP-GW-GJP-234 (SDP-4) (Proprietary), Rev. 1, "SDP-4 Response To Rising Nuclear Flux During Shutdown," Westinghouse Electric Company LLC.

53. APP-GW-GJP-235 (SDP-5) (Proprietary), Rev. 1, "SDP-5 Response To RCS Cold Overpressure During Shutdown," Westinghouse Electric Company LLC.

54. APP-GW-GJP-236 (SDP-6) (Proprietary), Rev. 0, "SDP-6 Response To Unexpected RCS Temperature Changes During Shutdown," Westinghouse Electric Company LLC.

55. APP-GW-GJP-305 (AOP-305) (Proprietary), Rev. 1, "Fire Response Emergency," Westinghouse Electric Company LLC.

56. APP-GW-GJP-306 (AOP-306) (Proprietary), Rev. B, "Evacuation of Control Room," Westinghouse Electric Company LLC.

57. APP-GW-GJP-311 (AOP-311) (Proprietary), Rev. D, "Rod Control System Malfunction," Westinghouse Electric Company LLC.

58. APP-GW-GJP-312 (AOP-312) (Proprietary), Rev. B, "Malfunction of Nuclear Instrumentation or Flow Streaming," Westinghouse Electric Company LLC.

59. APP-GW-GJP-321 (AOP-321) (Proprietary), Rev. B, "Malfunction of DDS," Westinghouse Electric Company LLC.

60. APP-GW-GJP-323 (AOP-323) (Proprietary), Rev. C, "Loss Of 6.9KV Or 480 Volt Bus Power," Westinghouse Electric Company LLC.

BIBLIOGRPAHY (cont.)

61. APP-GW-GJP-328 (AOP-328) (Proprietary), Rev. B, "Malfunction of Feedwater Heaters and Extraction Steam," Westinghouse Electric Company LLC.

62. APP-GW-GJP-332 (AOP-332) (Proprietary), Rev. B, "Turbine Trip Without Reactor Trip," Westinghouse Electric Company LLC.

63. APP-GW-GJP-338 (AOP-338) (Proprietary), Rev. B, "Passive Containment Cooling System Malfunctions," Westinghouse Electric Company LLC.

64. APP-GW-GJP-342 (AOP-342) (Proprietary), Rev. B, "Reactor Coolant Pump Malfunctions," Westinghouse Electric Company LLC.

65. APP-GW-GJP-343 (AOP-343) (Proprietary), Rev. B, "Loss of Normal Residual Heat Removal," Westinghouse Electric Company LLC.

66. APP-RCS-GJP-401 (RCS-401) (Proprietary), Rev. A, "Alarm Response Procedure – Reactor Coolant System," Westinghouse Electric Company LLC.

67. APP-DAS-GJP-801 (DAS-801) (Proprietary), Rev. A, "DAS Channel Check," Westinghouse Electric Company LLC.

68. APP-IDS-GJP-801 (IDS-801) (Proprietary), Rev. A, "7-Day Surveillance Test of Station Batteries," Westinghouse Electric Company LLC.

69. APP-PMS-GJP-802 (PMS-802) (Proprietary), Rev. B, "Calorimetric Heat Balance Comparison To Nuclear And Delta T Power," Westinghouse Electric Company LLC.

70. APP-PMS-GJP-803 (PMS-803) (Proprietary), Rev. A, "Incore Detector Comparison To Nuclear Instrument Channel Axial Flux Difference," Westinghouse Electric Company LLC.

71. APP-PMS-GJP-806 (PMS-806) (Proprietary), Rev. A, "ESF Safety Feature Actuation Channel Check," Westinghouse Electric Company LLC.

72. APP-PMS-GJP-814 (PMS-814) (Proprietary), Rev. A, "Determine QPTR With Power Range NI or Incore Instrumentation," Westinghouse Electric Company LLC.

73. APP-PXS-GJP-801 (PXS-801) (Proprietary), Rev. A, "CMT Valve Surveillance and IST Testing," Westinghouse Electric Company LLC.

74. APP-RXS-GJP-802 (RXS-802) (Proprietary), Rev. A, "Core Reactivity Surveillance Test," Westinghouse Electric Company LLC.

BIBLIOGRPAHY (cont.)

75. APP-SGS-GJP-801 (SGS-801) (Proprietary), Rev. A, "Steam Generating System IST/Surveillance Test," Westinghouse Electric Company LLC.

76. APP-VLS-GJP-801 (VLS-801) (Proprietary), Rev. A, "Hydrogen Igniter Surveillance Test," Westinghouse Electric Company LLC.

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SECTION 1
PURPOSE

This document is created to support APP-OCS-GEH-320, "AP1000 Human Factors Engineering Integrated System Validation Plan" (Reference 1). Reference 1 contains the plan for the conduct of Integrated System Validation (ISV). This document supplements Reference 1 with detailed information, such as scenario descriptions, observer guides, scope of simulation, etc.

This document is separate from Reference 1 to enhance security for the detailed scenarios, and to facilitate the iterative refinement of the scenarios in response to further procedure development and simulator testing. Access to this document in EDMS is to be limited.

Combined, this document and Reference 1 comprise the complete ISV plan.

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SECTION 2
SCOPE

This document supplements the contents of the ISV Plan with the following information:

- Appendix A – Scenario Specifications

  This Appendix provides the detailed scenario descriptions for the 24 ISV scenarios. This information includes the scenario objectives, the crew participants, risk-important tasks, maintenance, test, inspection, and surveillance (MTIS) activities, initial conditions (ICs), a description of the sequence of events, key variable to be measured, pass/fail criteria, and the diagnostic criteria.

- Appendix B – Observer Guides

  This Appendix provides the Observer Guides. The current revision of this document contains three examples, and a future revision will contain the Observer Guides for all 24 scenarios.

  The Observer Guides identify the scenario key events and the expected crew behavior/actions based on the simulated events and applicable procedures. Any applicable risk-important tasks are included. Each Guide contains evaluation items such as the human-system interface (HSI) resources, staffing, workload, and situation awareness. Spaces are provided to record the observations.

- Appendix C – Simulation Verification Plan

  This Appendix provides the simulator testing process in preparation for ISV. Each of the four phases of testing is outlined in preparation for ISV. This information includes the duration of testing.

- Appendix D – Scope of Simulation

  This Appendix provides information regarding the scope of the simulation to support running the ISV scenarios. Two lists are provided; all of the systems that are in-scope, and all of the systems that are out of scope.

- Appendix E – Index of Special Tasks

  This Appendix provides a table of the risk-important tasks, the MTIS activities performed on safety-significant components, and important tasks selected from the task analysis that are included in ISV.

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APPENDIX A
SCENARIO SPECIFICATIONS

Specifications are provided for each of the following ISV scenarios:

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A.1 SCENARIO 1 – PLANT SHUTDOWN FROM MODE 1 TO MODE 3

A.1.1 Scenario Description

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A.1.2 Scenario Objectives

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A.1.3 Scenario Participants

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A.1.4 Risk-Important Human Actions and MTIS Activities

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A.1.5 Initial Conditions

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A.1.6 Sequence of Events

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A.1.7 Detailed Scenario Description

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A.1.8 Key Variables

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A.1.9 Termination Criteria

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A.1.10 Pass/Fail Criteria

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A.1.10.1 General Safety Limits

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A.1.10.2 Risk-Important Human Actions

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A.1.10.3 Technical Specifications

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A.1.11 Diagnostic Criteria

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A.2 SCENARIO 2 – PLANT COOLDOWN FROM MODE 3 TO COLD SHUTDOWN

A.2.1 Scenario Description

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A.2.2 Scenario Objectives

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A.2.3 Scenario Participants

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A.2.4 Risk-Important Human Actions and MTIS Activities

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A.2.5 Initial Conditions

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A.2.6 Sequence of Events

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A.2.7 Detailed Scenario Description

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A.2.8 Key Variables

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A.2.9 Termination Criteria

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A.2.10 Pass/Fail Criteria

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A.2.10.1 General Safety Limits

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A.2.10.2 Risk-Important Human Actions

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A.2.10.3 Technical Specifications

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A.2.11 Diagnostic Criteria

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A.3 SCENARIO 3 – PLANT HEATUP FROM MODE 5 TO MODE 4

A.3.1 Scenario Description

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A.3.2 Scenario Objectives

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A.3.3 Scenario Participants

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A.3.4 Risk-Important Human Actions and MTIS Activities

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A.3.5 Initial Conditions

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A.3.6 Sequence of Events

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A.3.7 Key Variables

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A.3.8 Termination Criteria

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A.3.9 Pass/Fail Criteria

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A.3.9.1 General Safety Limits

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A.3.9.2 Risk-Important Human Actions

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A.3.9.3 Technical Specifications

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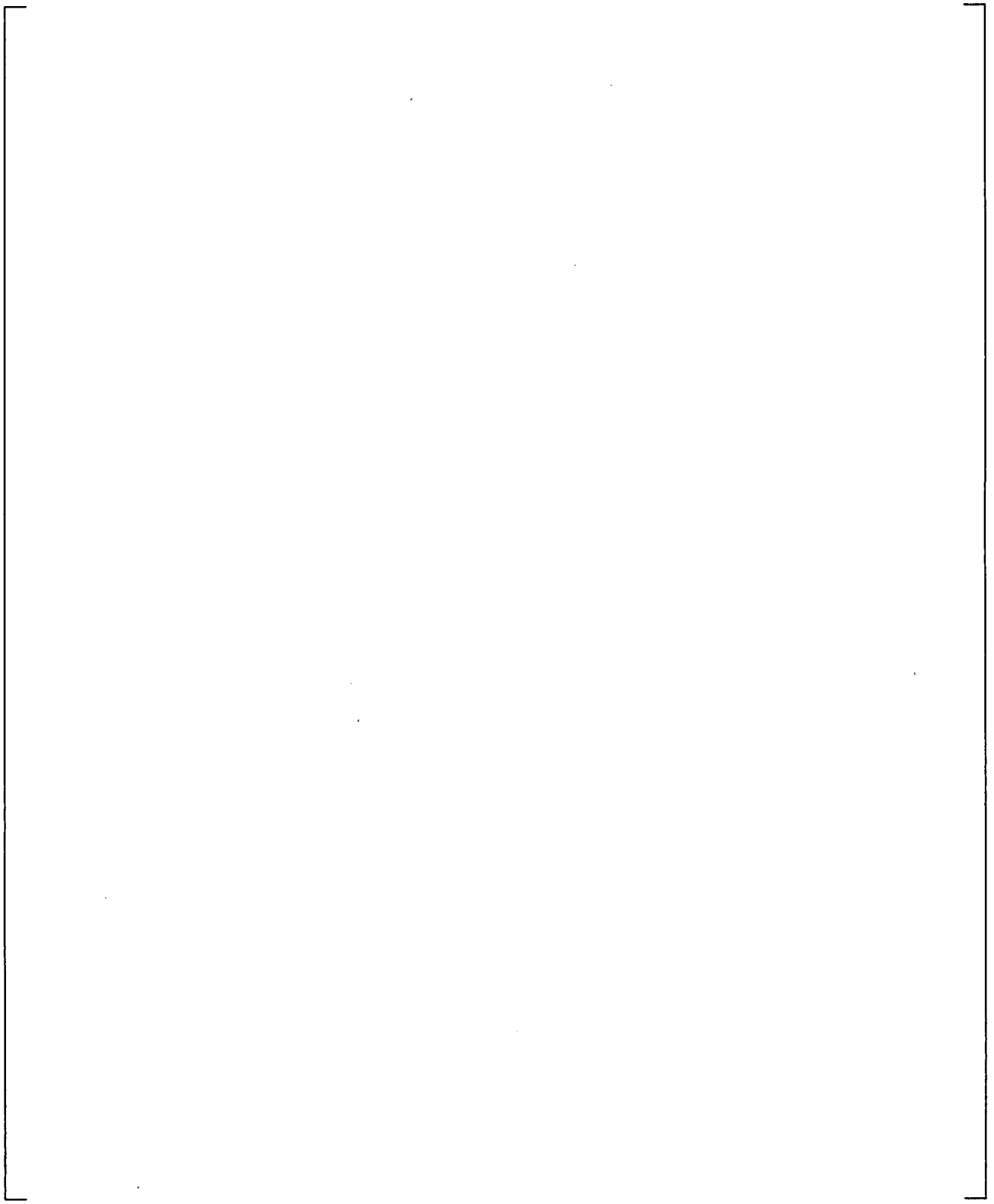

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A.3.10 Diagnostic Criteria

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A.4 SCENARIO 4 – PLANT HEATUP FROM MODE 4 TO MODE 3

A.4.1 Scenario Description

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A.4.2 Scenario Objectives

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A.4.3 Scenario Participants

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A.4.4 Risk-Important Human Actions and MTIS Activities

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A.4.5 Initial Conditions

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A.4.6 Sequence of Events

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A.4.7 Key Variables

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A.4.8 Termination Criteria

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A.4.9 Pass/Fail Criteria

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A.4.9.1 General Safety Limits

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A.4.9.2 Risk-Important Human Actions

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A.4.9.3 Technical Specifications

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A.4.10 Diagnostic Criteria

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A.5 SCENARIO 5 – PLANT STARTUP FROM MODE 3 TO MODE 2

A.5.1 Scenario Description

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A.5.2 Scenario Objectives

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A.5.3 Scenario Participants

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A.5.4 Risk-Important Human Actions and MTIS Activities

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A.5.5 Initial Conditions

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A.5.6 Sequence of Events

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A.5.7 Key Variables

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A.5.8 Termination Criteria

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A.5.9 Pass/Fail Criteria

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A.5.9.1 General Safety Limits

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A.5.9.2 Risk-Important Human Actions

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A.5.9.3 Technical Specifications

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A.5.10 Diagnostic Criteria

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A.6 SCENARIO 6 – PLANT STARTUP FROM MODE 2 TO MODE 1

A.6.1 Scenario Description

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A.6.2 Scenario Objectives

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A.6.3 Scenario Participants

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A.6.4 Risk-Important Human Actions and MTIS Activities

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A.6.5 Initial Conditions

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A.6.6 Sequence of Events

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A.6.7 Key Variables

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A.6.8 Termination Criteria

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A.6.9 Pass/Fail Criteria

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A.6.9.1 General Safety Limits

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A.6.9.2 Risk-Important Human Actions

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A.6.9.3 Technical Specifications

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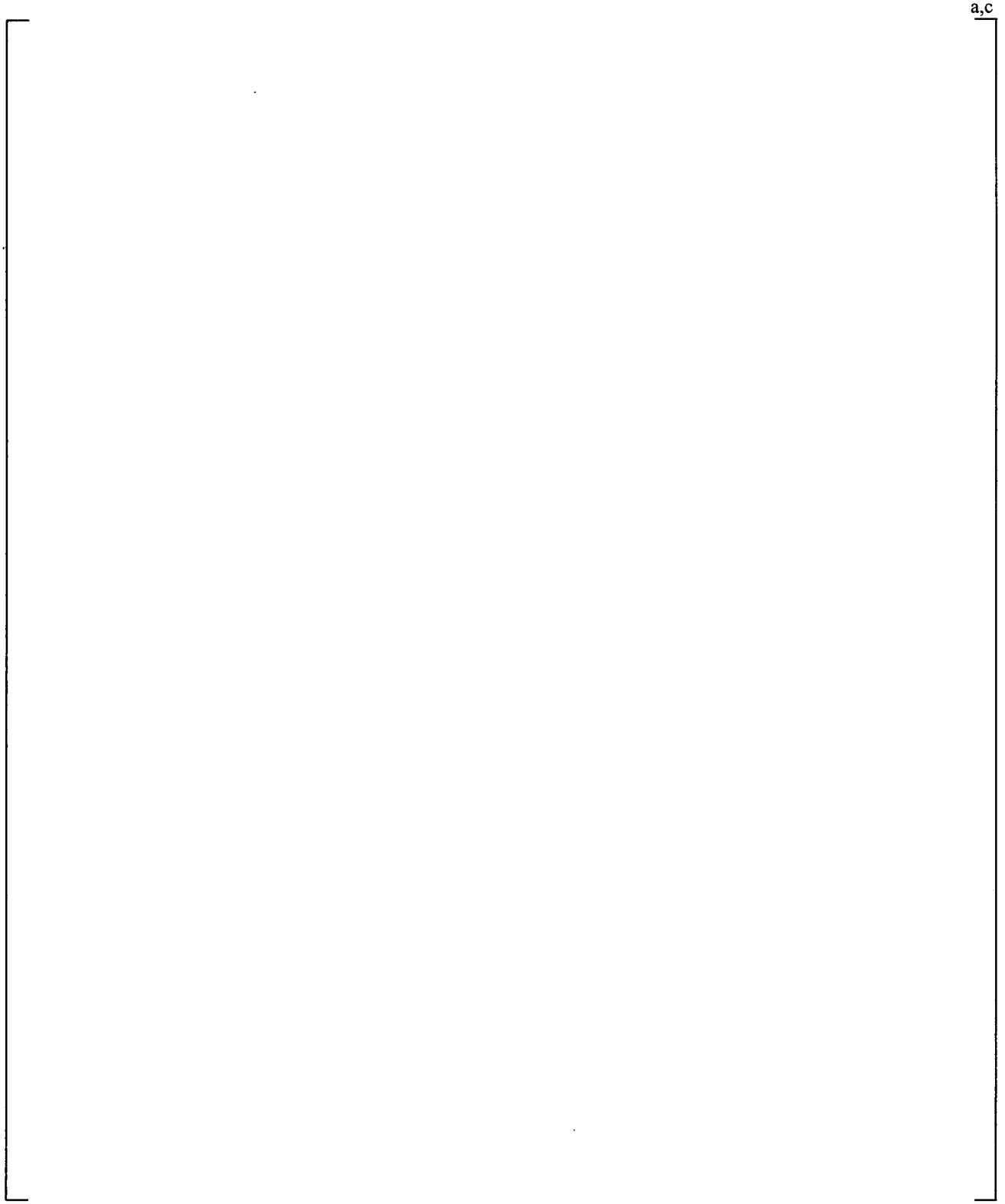

A.6.10 Diagnostic Criteria

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A.7 SCENARIO 7 – PLANT SHUTDOWN AND COOLDOWN FROM REMOTE SHUTDOWN WORKSTATION DUE TO FIRE IN THE MCR

A.7.1 Scenario Description

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A.7.2 Scenario Objectives

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A.7.3 Scenario Participants

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A.7.4 Risk-Important Human Actions and MTIS Activities

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A.7.5 Initial Conditions

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A.7.6 Sequence of Events

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A.7.7 Key Variables

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A.7.8 Termination Criteria

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A.7.9 Pass/Fail Criteria

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A.7.9.1 General Safety Limits

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A.7.9.2 Risk-Important Human Actions

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A.7.9.3 Technical Specifications

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A.7.10 Diagnostic Criteria

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A.8 SCENARIO 8 – ANTICIPATED TRANSIENT WITHOUT SCRAM (LOSS OF FEEDWATER)

A.8.1 Scenario Description

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A.8.2 Scenario Objectives

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A.8.3 Scenario Participants

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A.8.4 Risk-Important Human Actions and MTIS Activities

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A.8.5 Initial Conditions

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A.8.6 Sequence of Events

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A.8.7 Key Variables

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A.8.8 Termination Criteria

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A.8.9 Pass/Fail Criteria

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A.8.9.1 General Safety Limits

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A.8.9.2 Risk-Important Human Actions

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A.8.9.3 Technical Specifications

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A.8.10 Diagnostic Criteria

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A.9 SCENARIO 9 – ANTICIPATED TRANSIENT WITHOUT SCRAM (STEAM LINE BREAK)

A.9.1 Scenario Description

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A.9.2 Scenario Objectives

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A.9.3 Scenario Participants

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A.9.4 Risk-Important Human Actions and MTIS Activities

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A.9.5 Initial Conditions

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A.9.6 Sequence of Events

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A.9.7 Key Variables

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A.9.8 Termination Criteria

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A.9.9 Pass/Fail Criteria

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A.9.9.1 General Safety Limits

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A.9.9.2 Technical Specifications

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A.9.10 Diagnostic Criteria

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A.10 SCENARIO 10 – SMALL BREAK LOCA WITH FAILURE OF AUTOMATIC DEPRESSURIZATION SYSTEM

A.10.1 Scenario Description

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A.10.2 Scenario Objectives

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A.10.3 Scenario Participants

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A.10.4 Risk-Important Human Actions and MTIS Activities

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A.10.5 Initial Conditions

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A.10.6 Sequence of Events

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A.10.7 Key Variables

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A.10.8 Termination Criteria

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A.10.9 Pass/Fail Criteria

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A.10.9.1 General Safety Limits

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A.10.9.2 Risk-Important Human Actions

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A.10.9.3 Technical Specifications

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A.10.10 Diagnostic Criteria

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A.11 SCENARIO 11 – MEDIUM BREAK LOCA WITH FAILURE OF CMT ACTUATION

A.11.1 Scenario Description

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A.11.2 Scenario Objectives

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A.11.3 Scenario Participants

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A.11.4 Risk-Important Human Actions and MTIS Activities

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A.11.5 Initial Conditions

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A.11.6 Sequence of Events

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A.11.7 Key Variables

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A.11.8 Termination Criteria

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A.11.9 Pass/Fail Criteria

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A.11.9.1 General Safety Limits

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A.11.9.2 Risk-Important Human Actions

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A.11.9.3 Technical Specifications

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A.11.10 Diagnostic Criteria

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A.12 SCENARIO 12 – LARGE BREAK LOCA WITH INADEQUATE CORE COOLING

A.12.1 Scenario Description

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A.12.2 Scenario Objectives

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A.12.3 Scenario Participants

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A.12.4 Risk-Important Human Actions and MTIS Activities

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A.12.5 Initial Conditions

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A.12.6 Sequence of Events

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A.12.7 Detailed Scenario Description

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A.12.8 Key Variables

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A.12.9 Termination Criteria

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A.12.10 Pass/Fail Criteria

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A.12.10.1 General Safety Limits

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A.12.10.2 Risk-Important Human Actions

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A.12.10.3 Technical Specifications

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A.12.11 Diagnostic Criteria

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A.13 SCENARIO 13 – LARGE BREAK LOCA WITH FAILURE OF IRWST SENSORS

A.13.1 Scenario Description

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A.13.2 Scenario Objectives

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A.13.3 Scenario Participants

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A.13.4 Risk-Important Human Actions and MTIS Activities

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A.13.5 Initial Conditions

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A.13.6 Sequence of Events

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A.13.7 Key Variables

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A.13.8 Termination Criteria

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A.13.9 Pass/Fail Criteria

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A.13.9.1 General Safety Limits

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A.13.9.2 Risk-Important Human Actions

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A.13.9.3 Technical Specifications

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A.13.10 Diagnostic Criteria

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A.14 SCENARIO 14 – STEAM GENERATOR TUBE RUPTURE

A.14.1 Scenario Description

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A.14.2 Scenario Objectives

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A.14.3 Scenario Participants

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A.14.4 Risk-Important Human Actions and MTIS Activities

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A.14.5 Initial Conditions

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A.14.6 Sequence of Events

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A.14.7 Key Variables

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A.14.8 Termination Criteria

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A.14.9 Pass/Fail Criteria

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A.14.9.1 General Safety Limits

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A.14.9.2 Risk-Important Human Actions

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A.14.9.3 Technical Specifications

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A.14.10 Diagnostic Criteria

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A.15 SCENARIO 15 – STEAM GENERATOR TUBE RUPTURE WITH FAILED AUXILIARY SPRAY VALVE

A.15.1 Scenario Description

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A.15.2 Scenario Objectives

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A.15.3 Scenario Participants

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A.15.4 Risk-Important Human Actions and MTIS Activities

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A.15.5 Initial Conditions

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A.15.6 Sequence of Events

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A.15.7 Key Variables

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A.15.8 Termination Criteria

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A.15.9 Pass/Fail Criteria

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A.15.9.1 General Safety Limits

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A.15.9.2 Risk-Important Human Actions

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A.15.9.3 Technical Specifications

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A.15.10 Diagnostic Criteria

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A.16 SCENARIO 16 – STATION BLACKOUT WITH FAILURE OF CMT INJECTION (MODE 5)

A.16.1 Scenario Description

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A.16.2 Scenario Objectives

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A.16.3 Scenario Participants

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A.16.4 Risk-Important Human Actions and MTIS Activities

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A.16.5 Initial Conditions

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A.16.6 Sequence of Events

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A.16.7 Key Variables

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A.16.8 Termination Criteria

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A.16.9 Pass/Fail Criteria

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A.16.9.1 General Safety Limits

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A.16.9.2 Risk-Important Human Actions

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A.16.9.3 Technical Specifications

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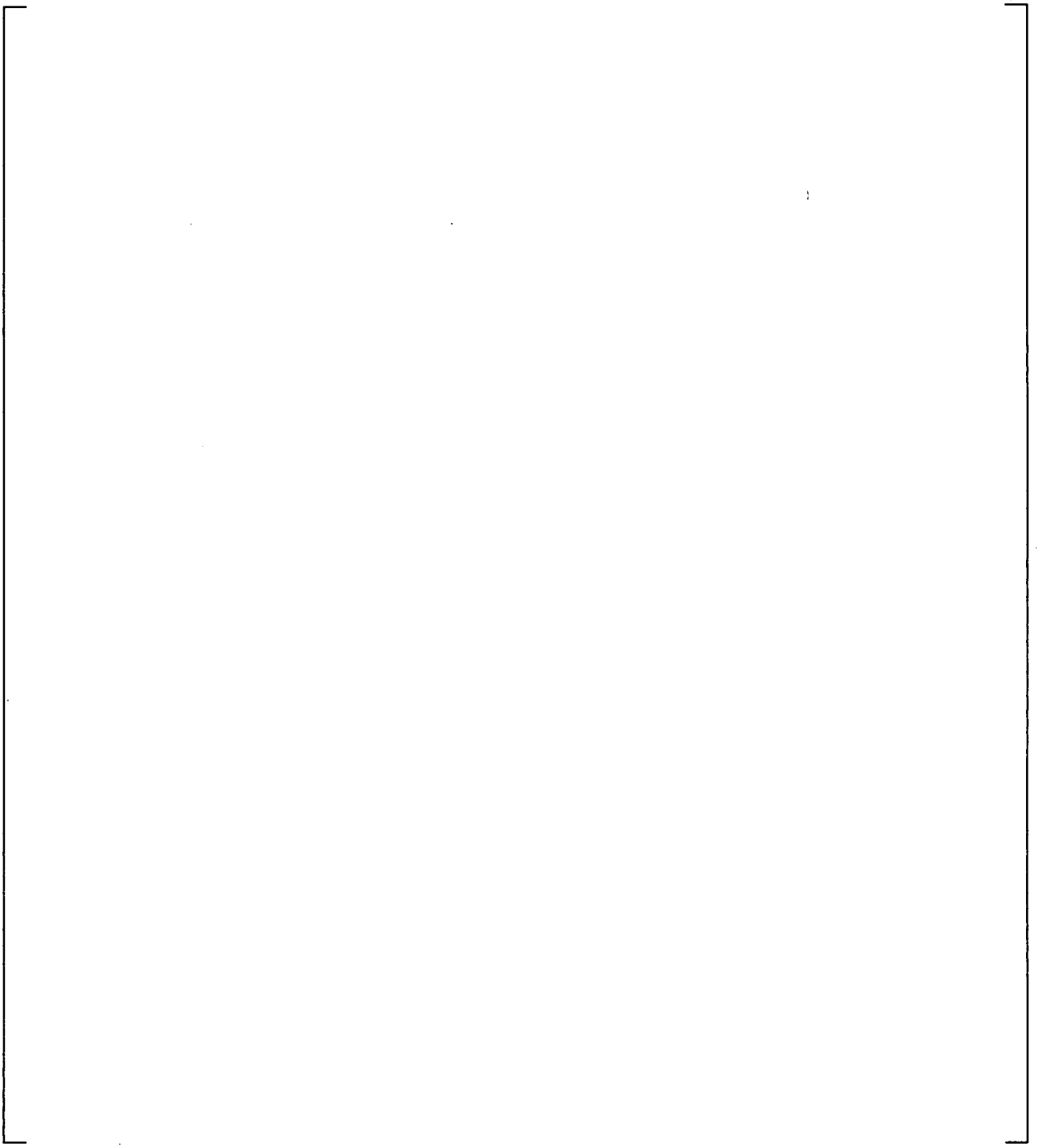

A.16.10 Diagnostic Criteria

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A.17 SCENARIO 17 – RNS LINE BREAK DURING PLANT COOLDOWN (MODE 5)

A.17.1 Scenario Description

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A.17.2 Scenario Objectives

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A.17.3 Scenario Participants

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A.17.4 Risk-Important Human Actions and MTIS Activities

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A.17.5 Initial Conditions

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A.17.6 Sequence of Events

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A.17.7 Key Variables

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A.17.8 Termination Criteria

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A.17.9 Pass/Fail Criteria

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A.17.9.1 General Safety Limits

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A.17.9.2 Risk-Important Human Actions

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A.17.9.3 Technical Specifications

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A.17.10 Diagnostic Criteria

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A.18 SCENARIO 18 – LOSS OF RNS DURING MID-LOOP OPERATION (MODE 5)

A.18.1 Scenario Description

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A.18.2 Scenario Objectives

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A.18.3 Scenario Participants

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A.18.4 Risk-Important Human Actions and MTIS Activities

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A.18.5 Initial Conditions

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A.18.6 Sequence of Events

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A.18.7 Key Variables

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A.18.8 Termination Criteria

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A.18.9 Pass/Fail Criteria

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A.18.9.1 General Safety Limits

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A.18.9.2 Risk-Important Human Actions

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A.18.9.3 Technical Specifications

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A.18.10 Diagnostic Criteria

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A.19 SCENARIO 19 – TURBINE TRIP WITH LOSS OF DDS

A.19.1 Scenario Description

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A.19.2 Scenario Objectives

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A.19.3 Scenario Participants

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A.19.4 Risk-Important Human Actions and MTIS Activities

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A.19.5 Initial Conditions

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A.19.6 Sequence of Events

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A.19.7 Key Variables

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A.19.8 Termination Criteria

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A.19.9 Pass/Fail Criteria

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A.19.9.1 General Safety Limits

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A.19.9.2 Risk-Important Human Actions

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A.19.10 Technical Specifications

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A.19.11 Diagnostic Criteria

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A.20 SCENARIO 20 – STEAM LINE BREAK UPSTREAM OF MSIVS INSIDE CONTAINMENT

A.20.1 Scenario Description

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A.20.2 Scenario Objectives

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A.20.3 Scenario Participants

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A.20.4 Risk-Important Human Actions and MTIS Activities

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A.20.5 Initial Conditions

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A.20.6 Sequence of Events

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A.20.7 Key Variables

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A.20.8 Termination Criteria

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A.20.9 Pass/Fail Criteria

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A.20.9.1 General Safety Limits

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A.20.9.2 Risk-Important Human Actions

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A.20.9.3 Technical Specifications

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A.20.10 Diagnostic Criteria

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A.21 SCENARIO 21 – LOSS OF INSTRUMENT AIR

A.21.1 Scenario Description

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A.21.2 Scenario Objectives

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A.21.3 Scenario Participants

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A.21.4 Risk-Important Human Actions and MTIS Activities

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A.21.5 Initial Conditions

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A.21.6 Sequence of Events

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A.21.7 Key Variables

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A.21.8 Termination Criteria

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A.21.9 Pass/Fail Criteria

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A.21.9.1 General Safety Limits

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A.21.9.2 Risk-Important Human Actions

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A.21.9.3 Technical Specifications

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A.21.10 Diagnostic Criteria

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A.22 SCENARIO 22 – HIGH RCP VIBRATION WITH LOSS OF OFF-SITE POWER

A.22.1 Scenario Description

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A.22.2 Scenario Objectives

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A.22.3 Scenario Participants

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A.22.4 Risk-Important Human Actions and MTIS Activities

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A.22.5 Initial Conditions

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A.22.6 Sequence of Events

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A.22.7 Key Variables

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A.22.8 Termination Criteria

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A.22.9 Pass/Fail Criteria

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A.22.9.1 General Safety Limits

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A.22.9.2 Risk-Important Human Actions

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A.22.9.3 Technical Specifications

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A.22.10 Diagnostic Criteria

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A.23 SCENARIO 23 – LOSS OF SERVICE WATER

A.23.1 Scenario Description

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A.23.2 Scenario Objectives

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A.23.3 Scenario Participants

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A.23.4 Risk-Important Human Actions and MTIS Activities

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A.23.5 Initial Conditions

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A.23.6 Sequence of Events

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A.23.7 Key Variables

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A.23.8 Termination Criteria

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A.23.9 Pass/Fail Criteria

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A.23.9.1 General Safety Limits

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A.23.9.2 Risk-Important Human Actions

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A.23.9.3 Technical Specifications

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A.23.10 Diagnostic Criteria

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A.24 SCENARIO 24 – ELECTRICAL GRID INSTABILITY LEADING TO LOSS OF HEAT SINK

A.24.1 Scenario Description

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A.24.2 Scenario Objectives

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A.24.3 Scenario Participants

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A.24.4 Risk-Important Human Actions and MTIS Activities

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A.24.5 Initial Conditions

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A.24.6 Sequence of Events

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A.24.7 Key Variables

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A.24.8 Termination Criteria

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A.24.9 Pass/Fail Criteria

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A.24.9.1 General Safety Limits

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A.24.9.2 Risk-Important Human Actions

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A.24.9.3 Technical Specifications

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A.24.10 Diagnostic Criteria

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(Last Page of Appendix A)

APPENDIX B
OBSERVER GUIDES

Scenario-specific observer guides will be provided to observers for each ISV scenario as specified in Appendix A.

This Appendix provides the Observer Guides for the following scenarios:

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B.1 SCENARIO 1 OBSERVER GUIDE: [ ]a,c

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EVALUATION ITEMS

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B.2 SCENARIO 2 OBSERVER GUIDE: [ ]a,c

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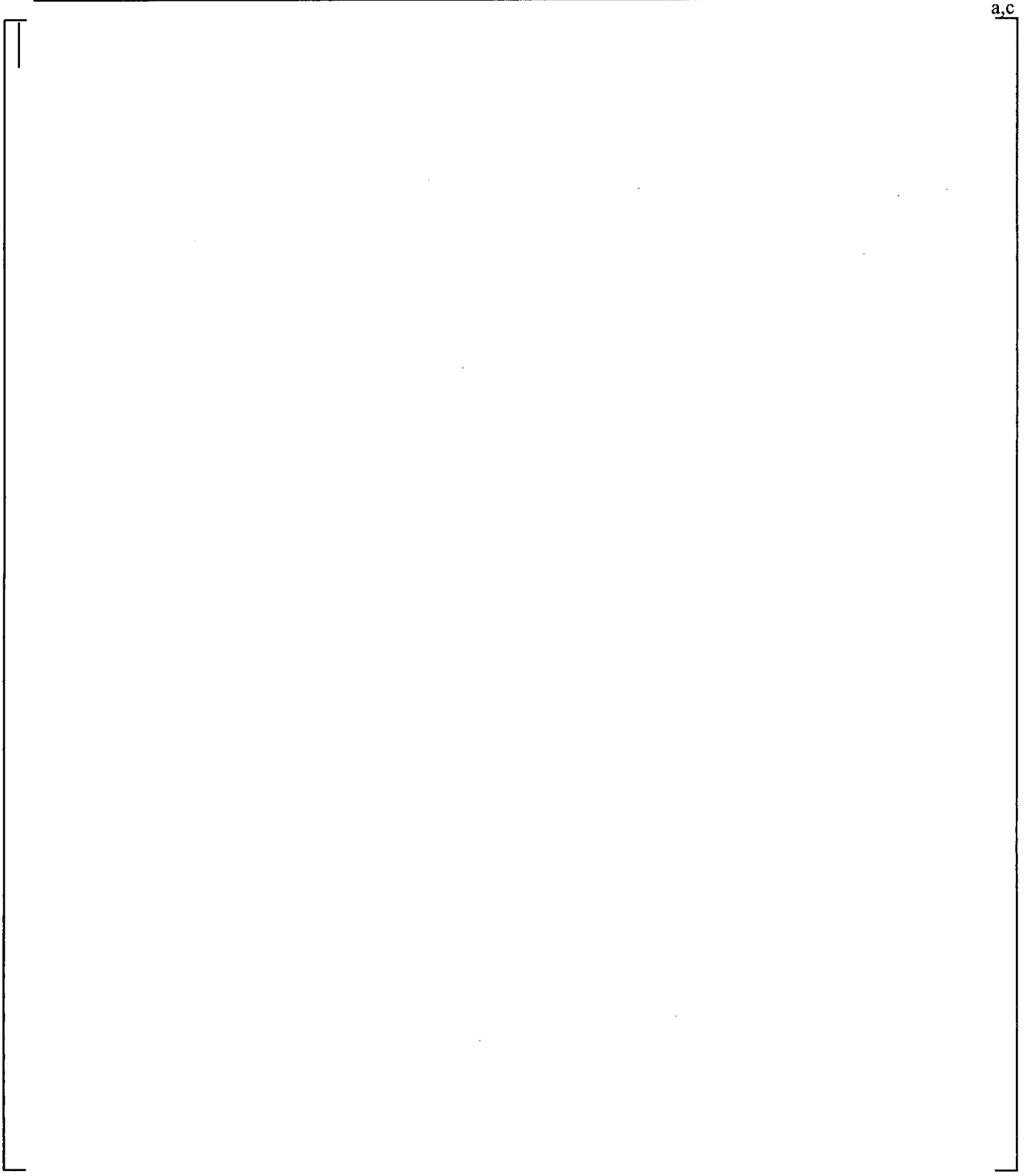

EVALUATION ITEMS

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B.3 SCENARIO 12 OBSERVER GUIDE: [ ]a,c

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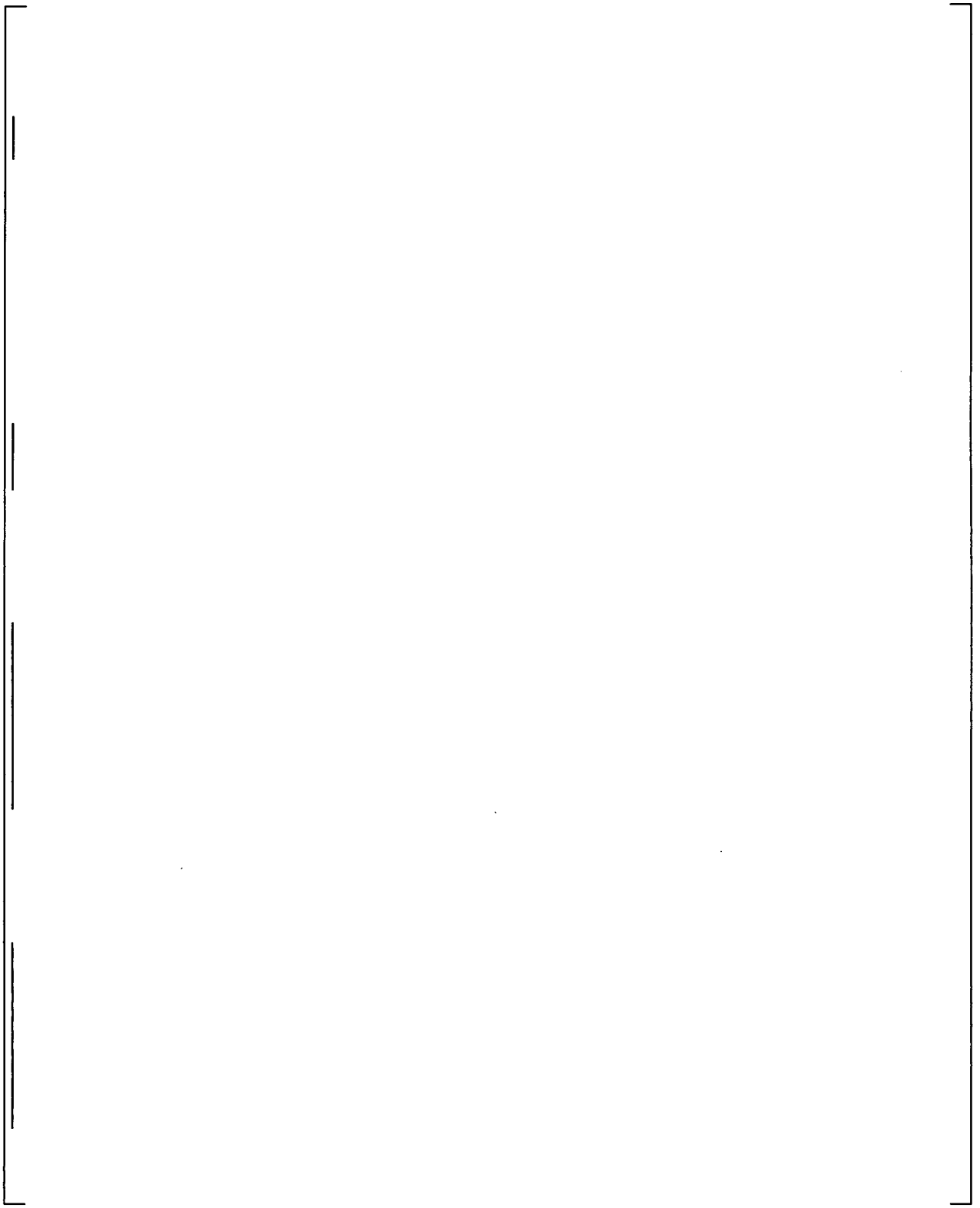

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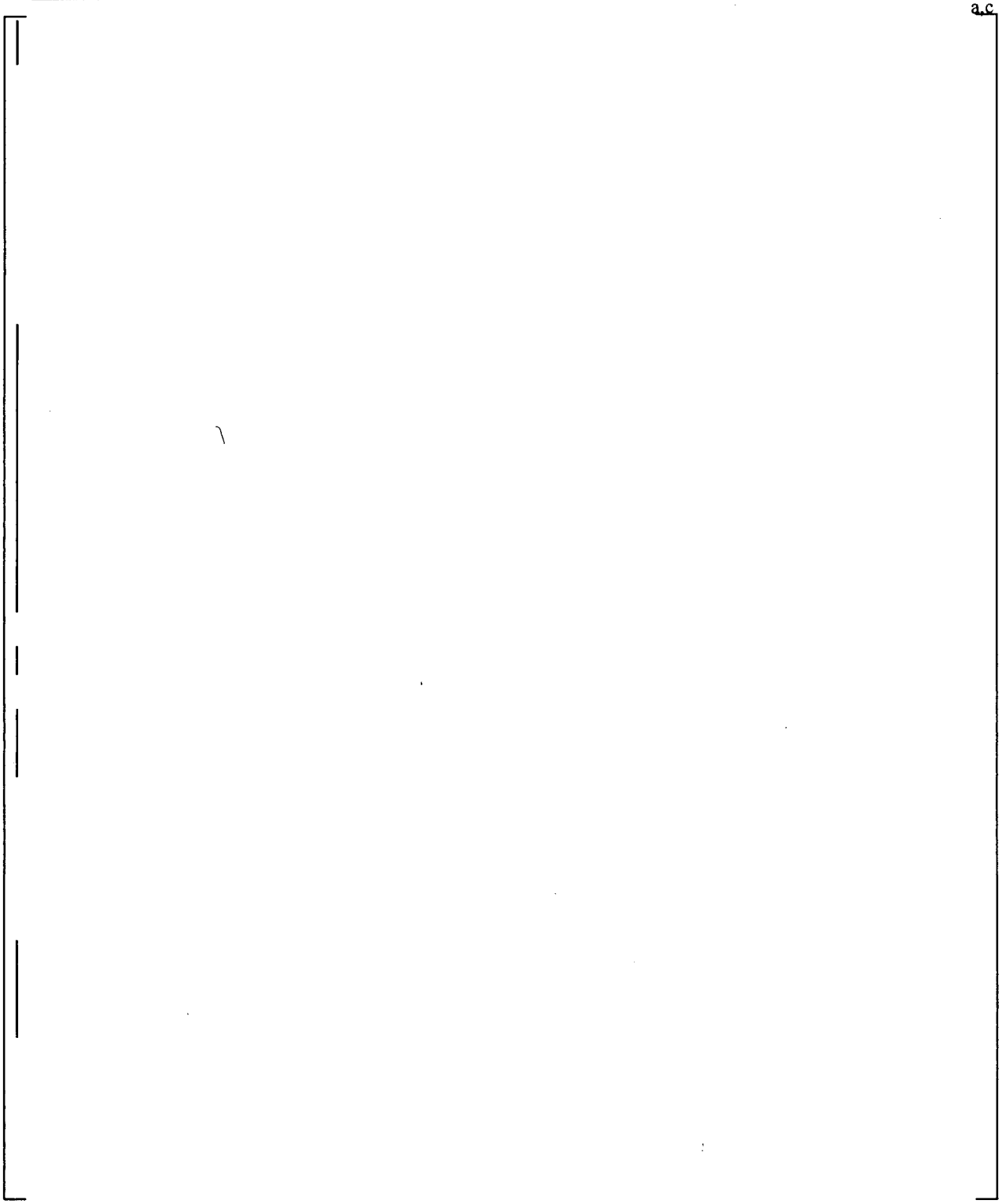

EVALUATION ITEMS

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APPENDIX C
SIMULATOR TESTING

The objective of simulator testing in preparation for ISV is to demonstrate that the simulator responds in a manner similar to the reference unit while utilizing the operating procedures. [

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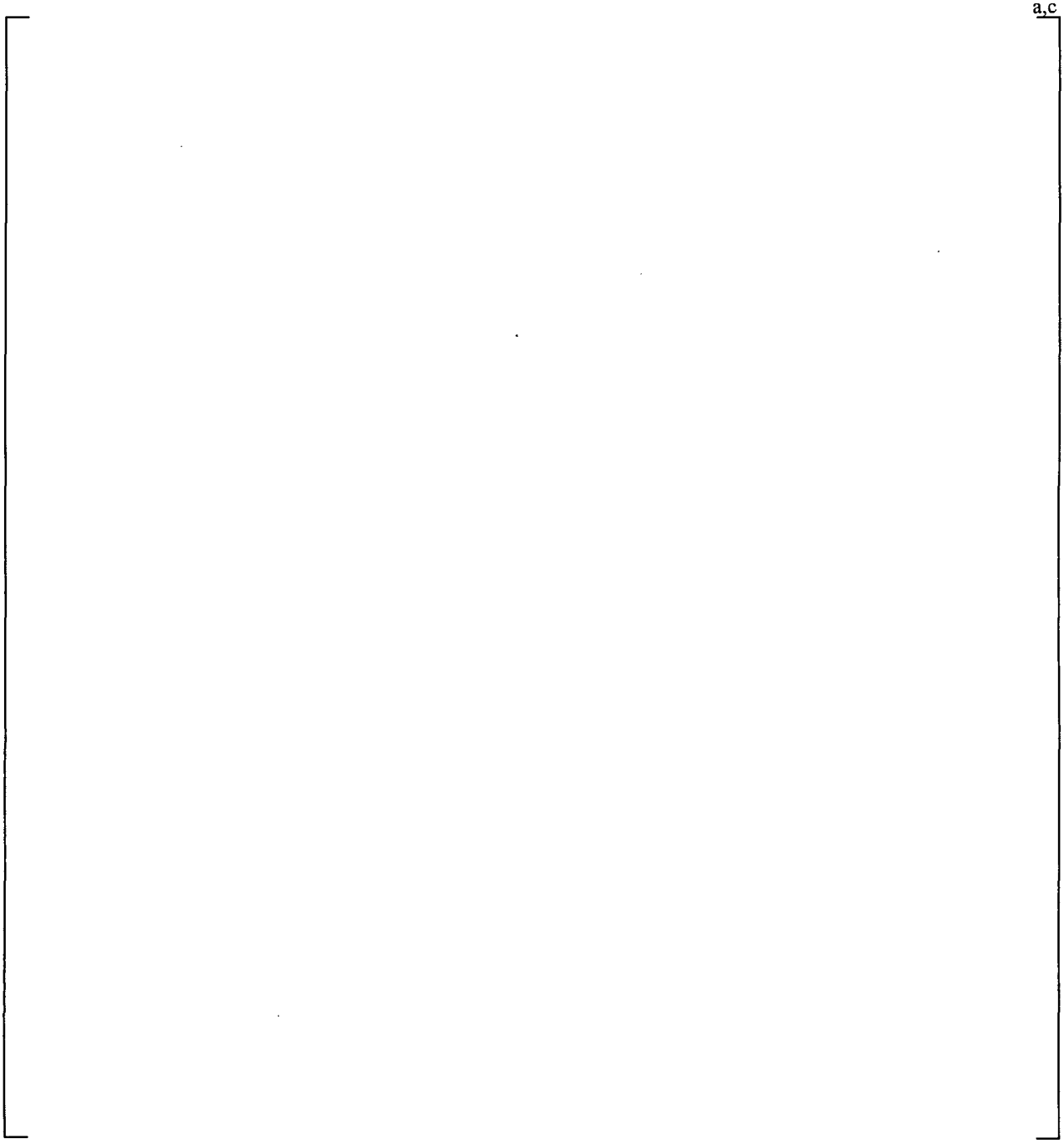

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APPENDIX D
SCOPE OF SIMULATION

The ISV facility will sufficiently represent the MCR HSI resources and the integrated plant for the purposes of ISV. [

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The following systems are not included for ISV. While the exclusion of these systems reduces test bed completeness, their absence will not impact the ISV.

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APPENDIX E
TASKS OF SPECIAL INTEREST

The following table correlates tasks of special interest to the scenarios in which the tasks are expected to be exercised for ISV purposes. Tasks of special interest include RIHAs, MTIS activities performed on safety-significant components, and important tasks selected from task analysis.

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