OSART MISSION WORKING NOTES

OUTLINES – LEADERSHIP & MANAGEMENT FOR SAFETY

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Contents

1. LEADERSHIP AND MANAGEMENT FOR SAFETY

1.1. Leadership for safety

1. How do managers demonstrate leadership for safety and commitment to safety? How are managers trained, coached and assessed to improve leadership skills? [GSR Part 2 Requirement 2; 3.1, 3.2] [GS-G-3.1; 4.2, 4.10] [GS-G-3.5; 3.16]

2. How are managers at all levels involved in field activities, and how do they assess and discuss conduct of work and compliance with management expectations and objectives? [SSR-2/2 (Rev.1) Requirement 9; 4.35] [GS-G-3.1; 3.6] [GS-G-3.5; 2.15]

3. How are managers using feedback on safety performance within their area of responsibility, and sharing and capturing this information across the organization for use in periodic safety reviews and to ensure continuous improvement? [SSR-2/2 (Rev.1) Requirement 5; 4.4] [GS-G-3.1; 6.9] [GS-G-3.5; 6.46]

4. How are managers encouraging an open reporting culture and a readiness to challenge acts or conditions that are adverse to safety? [SSR-2/2 (Rev.1) Requirement 24; 5.31] [GSR Part 2 Requirement 12; 5.2] [GS-G-3.1; 2.18, 4.3, 6.15, 6.53, 6.61, 6.62, 6.69] [GS-G-3.5; 2.4]

5. How do senior managers show that they are committed to establishing a strong nuclear safety policy including developing and fostering strong safety culture? [SSR-2/2 (Rev.1) Requirement 5; 4.1, 4.2] [GSR Part 2 Requirement 2; 3.1, 3.2, 3.3] [SSG-72; 5.5-5.11] [GS-G-3.1; 3.12] [GS-G-3.5; 3.12]

6. How do managers communicate and reinforce the safety policy, goals and objectives in day-to-day activities? [GSR Part 2 Requirement 2; 3.2, 3.3] [SSG-72; 5.8]

7. How does management ensure that its expectations for the management of safety are clearly understood and implemented? [SSR-2/2 (Rev.1) Requirement 5; 4.2] [SSG-72; 6.1, 6.3]

8. How do managers lead by example and demonstrate a motivation to improve plant safety performance and achieve the established safety goals and objectives? [SSR-2/2 (Rev.1) Requirement 5; 4.2, 4.5] [GSR Part 2 Requirement 2; 3.2] [SSG-72; 3.5, 3.10, 3.13, 3.14, 5.17-5.23, 6.1-6.3] [GS-G-3.1; 3.3, 3.6, 3.12]

9. How do managers demonstrate their understanding that safety encompasses the interactions between people, technology and the organization? [GSR Part 2 Requirement 2; 3.1] [GS-G-3.5; 2.32, 2.35-2.37]

10. How are managers and supervisors held accountable in relation to safety and for the achievement of assigned objectives? [GSR Part 2 Requirement 2; 3.1] [SSG-72; 3.19]

11. How is it ensured that the ultimate responsibility for commissioning and for safety is under the control of the plant organization? [SSR-2/2 (Rev.1) Requirement 25; 6.12, 6.13] [SSG-28; 3.15] (COMs – only relevant for Pre-OSART missions)

1.2. Management system

1.2.1. Generic aspects

12. How are the legal and regulatory arrangements defined, understood and implemented to ensure compliance with safety, protection of health and environmental requirements? [SSR-2/2 (Rev.1) Requirement 1; 3.1, 3.3] [GSR Part 2 Requirement 6; 4.12] [GS-G-3.1; 3.9] [GS-G-3.5; 3.6]

13. How is it ensured that all elements of management - including safety, health, environmental, quality, social and economic elements - are integrated in the management system? And how is it ensured that safety is not compromised? [SSR-2/2 (Rev.1) Requirement 1; 3.2, Requirement 2; 3.4-3.6, Requirement 17; 5.1] [GSR Part 2 Requirement 6; 4.9] [GS-G-3.1; 2.1-2.6]

14. How is it ensured that processes and activities are developed, effectively managed, documented and kept up-to-date without compromising safety? How is it assured that processes are structured, and their interaction is specified? [SSR-2/2 (Rev.1) Requirement 2; 3.5] [GSR Part 2 Requirement 10; 4.28, 4.29, 4.32]

15. How is it assured that new processes and modifications to existing processes do not compromise safety? [GSR Part 2 Requirement 6; 4.8, Requirement 10; 4.30, 4.32] [GS-G-3.1; 2.22-2.25, 3.2, 3.18-3.20] [GS-G-3.5; 3.29, 3.30, 5.4-5.6]

16. How do managers foster and encourage the involvement of all individuals within the organization in the implementation and continuous improvement of the management system? [GSR Part 2 Requirement 10; 4.32] [GS-G-3.1; 4.3] [GS-G-3.5; 6.66(b)]

17. How do managers demonstrate commitment to and responsibility for the establishment, implementation, assessment and continuous improvement of the management system? [SSR-2/2 (Rev.1) Requirement 2; 3.4-3.7] [GSR Part 2 Requirement 6; 4.8] [GS-G-3.1; 4.3, 6.1-6.10, 6.17, 6.18] [GS-G-3.5; 3.9, 3.13, 3.14, 6.66]

18. How is the effectiveness of the management system and its processes monitored and measured, and how are identified issues remedied? Which aspects are covered, and which measurement tools are applied? [GSR Part 2 Requirement 13; 6.1-6.8] [GS-G-3.1; 2.23, 4.3, 5.9, 5.18, 5.51, 6.1-6.11, 6.30, 6.47, 6.49] [GS-G-3.5; 6.6, 6.9]

19. How is risk assessment integrated in the management system? How is it assured that changes that could have significant implications for safety are appropriately analysed? What type of independent review is done before decisions significant for safety are made? [SSR-2/2 (Rev.1) Requirement 3; 3.9] [GSR Part 2 Requirement 6; 4.13, 4.14] [SSG-72; 5.10- 5.13] [GS-G-3.1; 5.9, 5.18] [GS-G-3.5; 3.15, 3.16]

20. How does the management system contribute towards the fostering and sustaining of a strong safety culture? [GSR Part 2 Requirement 12; 5.1, 5.2] [GS-G-3.1; 2.32-2.36] [GS-G-3.5; 2.33, 2.34, 2.36]

21. How is the effectiveness of the management system monitored and measured to confirm attained of expected results and identification of areas for improvement? [GSR Part 2, Requirement 13, 6.1-6.8] [GS-G-3.1; 2.2, 4.21, 5.35-5.49, 6.8-6.9, 6.11, 6.73] [GS-G-3.5; 6.21, 6.22] [SSG-72; 5.30-5.33]

22. What mechanisms are in use for the resolution of conflicts arising in the decision-making process? What mechanisms are used to identify and resolve impacts of security measures on safety and impact of safety measures on security? [GSR Part 2 Requirement 6; 4.10] [SSR-2/2 (Rev.1) Requirement 2; 3.5] [GS-G-3.1; 3.18, 5.2; 5.6]

23. How are the responsibilities and authority of the safety committees defined? What is the interface between these committees and plant governance functions (e.g. are these interfaces described in the management system/presented in the plant organizational chart)? [SSG-72; 5.27]

24. How are activities which involve inspection, testing and verification and validation managed? How are acceptance criteria and responsibilities for carrying out such activities specified? [GSR Part 2 Requirement 10; 4.31]

25. How do senior managers ensure that single hazard does not trigger a more severe plant state, leading to accident conditions by the hazard management? [SSG-77; 2.18]

26. How does the commissioning programme interface to the existing management system? [SSG-28; 2.16] (COMs – only relevant for Pre-OSART missions)

27. What administrative arrangements are developed and implemented within the operating organization to define the overall provisions for the management, performance and assessment of activities at the nuclear power plant during commissioning? [SSG-28; 3.1-3.4] (COMs – only relevant for Pre-OSART missions)

28. What topics applicable to safety during commissioning are included in the management system? [SSG-28; 3.5] (COMs – only relevant for Pre-OSART missions)

29. How does the management system describe the structure, content, extent and means of control of commissioning documents? [SSG-28; 3.7] (COMs – only relevant for Pre-OSART missions)

30. How does the management system support the development and enhancement of a safety culture in various commissioning activities? [SSG-28; 3.9] (COMs – only relevant for Pre-OSART missions)

31. What provisions are put in place within the commissioning programme to ensure that the safety, health, environmental, security and quality requirements for commissioning are met by all organizations participating in commissioning activities, including contractors? [SSG-28; 3.10] (COMs – only relevant for Pre-OSART missions)

32. How is it ensured that a body (organization or individual) responsible for commissioning maintains accountability to the organization (or an individual) responsible for compliance with the licence? What is the scope of this accountability? [SSG-28; 3.29] (COMs – only relevant for Pre-OSART missions)

33. How does plant management ensure that, during commissioning of the plant, configuration management principles are incorporated in the management system (regarding document control and records management, plant modifications and conformance of physical configuration to design requirements)? [SSR-2/2 (Rev.1)

Requirement 25; 6.1, 6.4, 6.7, 6.10, 6.14, 6.15] [SSG-28; 3.5, 3.6, 3.22, 3.32-3.35, 4.70, 4.72, 5.3, 5.4] (COMs – only relevant for Pre-OSART missions)

1.2.2. Responsibilities, policies, goals, and objectives

34. Who has prime responsibility for safety (license holder), and how is this responsibility for safety discharged? [SF-1; Principle 1] [SSR-2/2 (Rev.1) Requirement 1; 3.1] [GSR Part 2 Requirement 1; 2.1, 2.2] [GS-G-3.1; 2.10, 2.11] [SSG-72; 3.3]

35. How do senior management discharge their accountabilities? [GSR Part 2 Requirement 1; 2.1, 2.2, Requirement 3; 4.1, 4.2] [SSR-2/2 (Rev.1) Requirement 3; 3.8, 3.9] [GS-G-3.1; 3.1, 3.2]

36. What are the goals, strategies, plans and objectives of the organization? How do they support safety? [SSR-2/2 (Rev.1) Requirement 1; 3.2] [GSR Part 2 Requirement 4; 4.3, 4.4, 4.5] [GS-G-3.1; 2.14, 2.52-2.54, 4.22] [SSG-72; 3.15]

37. Are safety goals at various levels in the organization measurable, challenging and in line with strategies, plans and objectives? [GSR Part 2 Requirement 4; 4.4] [SSG-72; 3.16, 3.17, 3.19]

38. To what extent do managers at different levels in the organization conduct periodic review of goals, strategies and plans against the safety objectives? How actions are taken to address any deviation? [GSR Part 2 Requirement 4; 4.5, Requirement 13; 6.4] [GS-G-3.1; 2.14, 2.45, 3.10, 3.11, 6.19, 6.45, 6.48] [SSG-72; 3.18]

39. What are the responsibilities of the operating organization during commissioning and how does the operating organization discharge these responsibilities? [SSG-28; 2.34-2.36, 3.19-3.21, 3.22, 3.23] (COMs – only relevant for Pre-OSART missions)

40. What administrative and organizational arrangements are in place in the operating organization to review and accept the handover package? [SSG-28; 3.55] (COMs – only relevant for Pre-OSART missions)

41. What are the arrangements (hold points, milestones…) to review and approve the commissioning activities conducted by contractors? [SSG-28; 2.35] (COMs – only relevant for Pre-OSART missions)

1.2.3. Interested parties

42. Are interested parties identified and is there a strategy for interaction with them in place defined in the management system? [GSR part 2 Requirement 5; 4.6, 4.7]

Interface with the Regulatory Body

43. How is the liaison with regulatory body established to ensure a common understanding of, and to ensure compliance with, safety requirements and their interface with other requirements, such as those for security, protection of health or protection of the environment? [SSR-2/2 (Rev.1) Requirement 1; 3.3]

44. How are the regular discussions between regulator and plant management held on safety issues? [SSR-2/2 (Rev.1) Requirement 1; 3.3] [SSG-72; 4.1, 6.4, 6.8] [GS-G-3.5; 5.175]

45. What is the procedure for reporting events to the regulatory body? [SSR-2/2 (Rev.1); Requirement 2; 3.7] [SSG-72; 4.2]

Interface with the public

46. What are the processes and plans for interaction with the public? How they are implemented? [GSR Part 2 Requirement 5; 4.6, 4.7] [SSG-72; 4.10]

47. How the public is kept informed on the hazards, which arise from nuclear power plants? [GSR Part 2 Requirement 5; 4.6, 4.7] [SSG-72; 4.11]

48. How is the safety related information disseminated to the public? [SSR-2/2 (Rev.1) Requirement 21; 5.20] [GSR Part 2 Requirement 5; 4.6, 4.7] [SSG-72; 4.12]

49. How is the public informed about measures included in the emergency plan (evacuation, containment, iodine tablets, ...)? [SSR-2/2 (Rev.1) Requirement 18; 5.2] [SSG-72; 4.13]

Communication

50. In what way is the effectiveness of communications monitored, assessed and continuously improved based on information collected? [GS-G-3.1; 5.55] [SSG-72; 6.5]

51. How do managers communicate the decisions relevant to safety and their justification? [GSR Part 2 Requirement 2; 3.3]

52. What are the mechanisms for plant staff to report safety concerns to plant management? [GS-G-3.1; 2.18, 2.36, 4.3, 6.1, 6.15, 6.53, 6.55, 6.59, 6.61, 6.62, 6.69] [GS-G-3.5; 2.4, 2.26, 2.29(k), 3.14(e), 3.21(e)] [SSG-72; 6.3]

53. How are approved changes communicated to those affected? [GS-G-3.1; 5.54]

1.2.4. Organizational structure, processes, and interfaces

Interface within operating organization including corporate structures

54. What is the organization structure? How are responsibilities and accountabilities defined and documented in the management system? [SSR-2/2 (Rev.1) Requirement 1; 3.2, Requirement 3; 3.8, 3.9] [GSR Part 2 Requirement 6; 4.11] [SSG-72; 2.9-2.15, 2.19] [GS-G-3.1; 2.14, 2.28, 2.31, 2.54, 2.57, 2.61, 2.62, 3.5] [GS-G-3.5; 2.3]

55. How are the interfaces within the operating organization defined in the management system? [GSR Part 2 Requirement 6; 4.10-4.11] [GS-G-3.1; 2.10, 2.30, 2.31] [GS-G-3.5; 5.6(3)(d), 5.49(c), 5.82(c), 5.8(b)(f), 5.91(f), 5.95(b), 6.6(f)]

56. How are proposed organizational structure changes important to safety and their associated arrangements managed? [SSR-2/2 (Rev.1) Requirement 3; 3.9] [SSG-72 2.16-2.17]

57. How are new processes, changes to existing processes/projects/organizations, fluctuations in staffing and staff motivation (e.g. for plants facing shutdown) analysed with regard to their real or potential impact on safety, and how are they managed? How

are the final changes communicated and monitored? [SSR-2/2 (Rev.1) Requirement 3; 3.9] [GS-G-3.1; 2.22, 2.46, 3.16, 5.56-5.71, 6.5, 6.25, 6.77] [GS-G-3.5; 3.23, 5.40-5.72, 6.68] [SSG-71; 3.9, 5.2-5.4, 8.1-8.3] [SSG-72; 5.14] [SSG-75; 2.4]

58. How is coordination maintained between different plant groups, between the site organizations? [SSG-72; 4.3-4.9] [GSR Part 2 Requirement 6; 4.11] [GS-G-3.1; 2.31, 6.3]

59. How are departmental interfaces analyzed to evaluate and improve the efficiency of the entire organization? Does the plant train suitable personnel to perform such analysis? [SSG-75; 5.5, 5.24] [SSG-74; 2.11, 3.15, 4.31, 5.45, 5.48]

60. How are the interfaces with the corporate organization defined and understood at the plant? [SSR-2/2 (Rev.1) Requirement 3; 3.8] [GS-G-3.1; 2.28-2.31]

61. How is the clear division between the responsibilities and authority of the corporate entity and those of the plant managed and documented? [SSR-2/2 (Rev.1) Requirement 3; 3.8] [GS-G-3.1; 2.28-2.31]

62. How does the corporate organization monitor the plant operating and support functions, review the safety performance of the plant and provide assistance to the plant? [GS-G-3.1; 6.6]

Interface with external organizations

63. What is the scope of staff services provided from outside the operating organization and where are they defined in the management system? To what extent is there a clear division of responsibilities and authority between all parts of the operating organization and relevant outside organizations? How are the materials and services supplied by external organizations assessed to ensure they are fit for purpose? [SSR-2/2 (Rev.1) Requirement 1; 3.2, Requirement 2; 3.6, Requirement 3; 3.8, Requirement 5; 4.3, Requirement 7; 4.20, Requirement 24; 5.32] [GS-G-3.1; 2.28, 4.2]

1.2.5. Graded approach

64. How is graded approach used in the management system? [GSR Part 2 Requirement 7] [GSR Part 4 Requirement 1; 3.1]

65. Which criteria are used for grading, and how are these criteria documented in the management system? [GSR Part 2 Requirement 7; 4.15] [GSR Part 4 Requirement 1; 3.2-3.7]

1.2.6. Documentation and records

66. What does documentation of the management system include? [GSR Part 2 Requirement 8: 4.16] [GS-G-3.1; 2.45-2.51]

67. What is the process for issuance, validation, approval, dissemination, review and periodic updating of documentation, records and reports? [GSR Part 2 Requirement 8; 4.17, 4.18, 4.19, 4.20] [SSG-72; 7.103]

68. How are documentation, records and reports managed, e.g. by categorization according to their importance to safety? How are the different storage facilities for safety records appropriate for permanent retention of all the different types of storage media? How is this storage organised? How are retention times identified and controlled? [SSR-2/2 (Rev.1) Requirement 15; 4.52] [GSR Part 2 Requirement 8; 4.17-4.20] [GS-G-3.1; 5.24-5.28; 5.35-5.49] [SSG-72; 7.102-7.105]

1.2.7. Resources and staffing including contractors

69. How it is ensured that provisions for adequate resources and funding, including for the long-term management and disposal of radioactive waste, as well as for decommissioning of plant are made and during an emergency response? [GSR Part 2 Requirement 1; 2.2(e), Requirement 9; 4.21] [GS-G-3.1; 4.1, 4.2, 4.5] [SSG-72; 7.9]

70. How does the operating organization ensure that necessary knowledge, skills, attitudes and safety expertise are sustained at the plant, and how long-term objectives for staffing policy including succession planning are developed and met? [SSR-2/2 (Rev.1) Requirement 4; 3.10, 3.11] [GS-G-3.1; 4.6,4.7] [SSG-72; 7.10] [SSG-75; 2.1, 2.3, 2.8, 3.4]

71. How it is determined which competences and resources the organization has to retain or has to develop internally, and which competences and resources may be obtained externally, for ensuring safety? [GSR Part 2 Requirement 9; 4.22] [GS-G-3.1; 4.7] [SSG-77; 3.2, 3.16]

72. How are resources necessary to maintaining safe operation assessed and provided, in normal situation and in special situations in which a large number of personnel might be unavailable, such as during an epidemic or a pandemic? [SSR-2/2 (Rev.1) Requirement 4; 3.10-3.12, Requirement 7; 4.16-4.18] [GSR Part 2 Requirement 9; 4.21, 4.25] [GS-G-3.1; 2.23, 2.42, 3.4, 3.5] [GS-G-3.5; 4.17, 6.3(b)(c)] [SSG-75; 3.1-3.3] [SSG-72; 7.8, 7.11, 7.13]

73. How does senior management ensure that all individuals, including themselves, are competent to perform their assigned tasks, and to work safely and effectively; and understand the standards they are expected to apply in completing their tasks? [SSR-2/2 (Rev.1) Requirement 4; 3.10, 3.11, Requirement 7; 4.16-4.18] [GSR Part 2 Requirement 9; 4.21, 4.22, 4.23, 4.25, 4.26] [GS-G-3.1; 2.11, 2.21, 4.8-4.25] [GS-G-3.5; 3.19] [SSG-72; 7.16-7.18] [SSG-75; 3.26-3.31]

74. How are the necessary competences identified, developed and maintained in the organization, for contractors? [SSR-2/2 (Rev.1) Requirement 3; 3.10, 3.11, Requirement 7; 4.16-4.18] [GSR Part 2 Requirement 9; 4.21, 4.22, 4.23, 4.25] [GS-G-3.1; 2.61, 4.2, 4.6-4.8, 4.18, 5.60] [GS-G-3.5; 4.17] [SSG-72; 4.6, 7.10, 7.11, 7.15-7.18]

75. To what extent is an effective staff health policy to ensure fitness-for-duty established and maintained, with appropriate programme and administrative procedures in place? [SSR-2/2 (Rev.1) Requirement 4; 3.13, Requirement 8; 4.29] [SSG-72; 3.2] [SSG-75; 2.13, 2.15, 3.36] [SSG-76; 4.5]

76. What are the arrangements in the management system regarding the supply of items, products and services? How are they implemented? How does the plant ensure his responsibility when receiving items, products and services? How are the requirements

and principles for safety-grading communicated to suppliers? [SSR-2/2 (Rev.1) Requirement 2; 3.6] [GSR Part 2; Requirement 11; 4.33-4.36] [GSR Part 4 Requirement 1; 3.1-3.7] [GS-G-3.1; 5.50, 5.51] [GS-G-3.5; 4.3-4.6, 5.35-5.37] [SSG-72; 3.2, 4.9]

77. What are the arrangements in the management system regarding qualification, selection, evaluation, procurement, and oversight of the supply chain? [GSR Part 2 Requirement 11; 4.35] [GS-G-3.1; 5.50, 5.51]

78. What is the plant policy with respect to contractors, considering the primary responsibility of the operating organization for the safety of the plant? How are on-site contractor activities effectively, monitored, controlled and coordinated by the plant? [SSR-2/2 (Rev.1) Requirement 1; 3.1, Requirement 2; 3.6] [GSR Part 2 Requirement 11; 4.33, 4.35, 4.36] [SSG-72; 4.5-4.9] [SSG-74; 3.6-3.12, 3.15, 4.6, 4.36-4.38, 5.13, 5.18, 5.35, 5.46, 6.9] [GS-G-3.1; 2.18, 2.49, 5.18-5.23] [SSG-72; 4.9]

79. What is the plant competence to specify the scope and standard of a required product or service, and subsequently to assess whether the product or service supplied meets the applicable safety requirements? [GSR Part 2 Requirement 11; 4.34] [GS-G-3.1; 5.50, 5.51] [SSG-72; 4.6]

80. How is outage planning integrated into the commissioning work control process? How has the organisation prepared for the first refuelling outage, including for example the identification of Single Point Vulnerabilities, spare parts management strategy, establishment of outage planning tools, assessment of outage key safety functions, management of lifting devices, identifying and contracting external support? [SSR-2/2 (Rev.1) Requirement 32; 8.18-8.20] [SSG-74; 5.27-5.37] (COMs – only relevant for Pre-OSART missions)

1.3. Culture for Safety

81. How does the organization ensure that safety is the overriding priority? [SSR-2/2 (Rev.1) Requirement 5; 4.1-4.5] [GSR Part 2 Requirement 2; 3.1] [GS-G-3.1; 3.10-3.24] [SSG-72; 5.6-5.11]

82. How do all individuals in the organization contribute to promoting and fostering a strong safety culture? [GSR Part 2 Requirement 12; 5.1] [GS-G-3.1; 3.2-3.5, 3.7] [GS-G-3.5]

83. How does the organization ensure that all individuals accept their personal accountability for their attitudes and conduct with regard to safety? [SSR-2/2 (Rev.1) Requirement 5; 4.1-4.5] [GSR Part 2 Requirement 2; 3.1; Requirement 12; 5.2] [GS-G-3.1; 3.2]

84. How does the organization ensure that its managers and workforce understand and discharge their responsibility for safety? How is a common understanding of safety and safety culture, including awareness of radiation risks and hazards related to work, being developed? [SF-1 Principle 1] [GSR Part 2 Requirement 2; 3.1; Requirement 12; 5.1, 5.2]

85. How does the organization promote and assure procedure adherence? How it is assured that individuals understand the standards that they are expected to apply in completing their tasks and follow relevant processes, procedures and work instructions? [GSR Part 2 Requirement 9; 4.25]

86. How does the organization promote and assure a culture that supports trust and collaboration? [GSR Part 2 Requirement 12; 5.2]

87. How does the organization promote and assure a culture that supports reporting of problems relating to technical, human and organizational factors? [GSR Part 2 Requirement 12; 5.2]

88. How do managers demonstrate and support attitudes and behaviours that result in a sustainably strong safety culture? [SSR-2/2 (Rev.1) Requirement 5; 4.1, 4.2] [GSR Part 2 Requirement 2; 3.1] [GS-G-3.1; 2.35, 3.2, 3.3] [GS-G-3.5; 2.15, 2.33, 3.12(b)]

89. How are personnel encouraged to acknowledge errors and seek help when needed? [SSR-2/2 (Rev.1) Requirement 24; 5.31] [GS-G-3.1; 2.18, 6.51-6.54, 6.59]

90. How are plant staff encouraged to challenge potentially unsafe practices and identify and report deficiencies and correct unsafe behaviours, wherever and whenever they encounter them? [GSR Part 2 Requirement 12; 5.2] [GS-G-3.1; 2.15-2.19]

91. How does the organization promote and assure a culture that supports questioning and learning attitude? What are the main mechanisms, tools or resources assuring continuous learning? [GSR Part 2 Requirement 12; 5.2] [SSR-2/2 (Rev.1) Requirement 8; 4.30]

92. How does the organization promote and assure conservative and safety oriented decision-making? [SSR-2/2 (Rev.1) Requirement 8; 4.30] [GSR Part 2 Requirement 12; 5.2] [GS-G-3.1; 2.5, 2.36, 4.10, 5.2]

93. How is safety culture assessed? How are assessments analyzed, communicated to staff and acted upon? [GSR Part 2 Requirement 14; 6.9-6.11] [GS-G-3.1; 6.3, 6.7-6.11] [GS-G-3.5; 6.35-6.39]

94. What authority and responsibility are given to each individual or team to stop and review safety before starting a piece of work or beginning to carry out a procedure? [GS-G-3.1; 2.15, 2.31]

95. How does the operating organization involve the operating staff during the commissioning stage to ensure that attributes of safety culture become instinctive as early as possible? [SSG-28; 2.36] (COMs – only relevant for Pre-OSART missions)

1.4. Measurement, assessment, and continuous improvement

96. How are senior managers involved in the monitoring of safety performance? [SSR-2/2 (Rev.1) Requirement 9; 4.35] [SSG-72; 5.17, 5.21] [GS-G-3.1; 6.16]

97. Does management have a clear and consistent understanding of the most important strengths and weaknesses of the plant? [GS-G-3.1; 6.2, 6.6, 6.17-6.19, 6.25, 6.72]

98. How do managers monitor activities in their areas, and what responsibilities do they have for corrective actions and achievement of high-quality performance? [SSG-72; 3.18] [GSR Part 2 Requirement 13; 6.3] [GS-G-3.1; 3.18, 6.14, 6.19, 6.32, 6.50-6.58, 6.66-6.75] [GS-G-3.5; 6.3, 6.19, 6.23, 6.42]

99. Which indicators are in place to provide a clear picture of safety performance? How are they documented, reviewed, trended, communicated and evaluated in order to detect and to react to shortcomings and deterioration and to continuously improve plant safety performance by setting sufficiently challenging indicator? [SSR-2/2 (Rev.1) Requirement 9; 4.34, 4.37] [GS-G-3.1; 2.36, 5.31-5.33, 6.4, 6.8, 6.9, 6.69] [SSG-72; 3.13, 5.17, 5.21, 5.30] [GS-G-3.5; 6.3; 6.21-6.23]

100. How does the audit and review system monitor and evaluate safety performance? [SSR-2/2 (Rev.1) Requirement 9; 4.33-4.34] [SSG-72; 5.23] [GS-G-3.1; 6.3, 6.18, 6.23-6.25, 6.32]

101. How is the self-assessment programme established and implemented to continuously improve safety performance? [SSR-2/2 (Rev.1) Requirement 9; 4.34] [GSR Part 2 Requirement 13; 6.4] [GS-G-3.1; 6.1-6.30, 6.32] [GS-G-3.5; 6.1, 6.2, 6.4-6.23, 6.26-6.39] [SSG-72; 5.18-5.20]

102. How are external/independent assessments applied to improve safety performance? [SSR-2/2 (Rev.1) Requirement 9; 4.34] [GSR Part 2 Requirement 6; 4.14, Requirement 13; 6.4, 6.5] [GS-G-3.1; 6.1-6.43] [GS-G-3.5; 6.4, 6.6-6.23, 6.26-6.39] [SSG-72; 5.17-5.33]

103. To what extent is the safety performance of the operating organization regularly compared with that of similar organizations? [GS-G-3.1; 6.19, 6.47] [GS-G-3.5; 3.30, 6.27-6.30]

104. What opportunities are given to managers and plant personnel to look outside their organization in order to learn from best practices? [GSR Part 2 Requirement 13; 6.7] [GS-G-3.1; 6.8, 6.16] [GS-G-3.5; 3.30, 4.12, 6.23] [SSG-50; 2.1-2.6, 2.19, 2.36]

105. How are non-routine activities not covered by existing operating procedures, assessed, approved and carried out? [SSR-2/2 (Rev.1) Requirement 8; 4.27]

106. How does the organization ensure that managers are aware of the results of audits and oversight monitoring activities, and use the results of those activities to improve safety? [SSR-2/2 (Rev.1) Requirement 9; 4.33] [GS-G-3.1; 6.8, 6.39]

107. How are the causes of non-conformances and other safety issues identified and analyzed for their potential consequences? How are corrective and preventive actions taken? How is the effectiveness of these preventive and corrective actions monitored and reported? [SSR-2/2 (Rev.1) Requirement 9; 4.37] [GSR Part 2 Requirement 9; 4.33] [GS-G-3.1; 6.11-6.16] [GS-G-3.5; 6.44-6.60] [SSG-72; 5.30-5.32]

108. How does the operating organization retain “corporate memory” of why and how improvements have been made, e.g. in case of major plant modifications? [SSG-71; 10.7]

109. How are new or emergent management and performance concerns taken into account? [GS-G-3.1; 6.22]

110. How does the organization learn from internal and external operating experience? [GSR Part 2 Requirement 13; 4.50] [GS-G-3.1; 2.46, 4.13, 6.2] [GS-G-3.5; 6.61, 6.62]

111. What mechanisms are in place to involve staff in contributing ideas for improvement? [GSR Part 2 Requirement 12; 5.2] [GS-G-3.1; 6.1, 6.14, 6.51, 6.52, 6.82, 6.83] [GS-G3.5; 2.26, 3.1]

112. How are managers and supervising personnel trained to recognize and diagnose problems, to formulate and implement solutions, and to make adjustments as required by experience? [GS-G-3.1; 4.10-4.25, 6.50-6.77] [SSG-75; 5.17-5.44]

113. How are plant personnel encouraged to share ideas with their peers and to carry out evaluations of their own working practices and performance? [GS-G-3.1; 4.3, 6.1, 6.3, 6.12-6.19] [GS-G-3.5; 6.8-6.20]

114. What mechanisms are provided to enable experience and ideas to be transferred within the operating organization? [GS-G-3.1; 6.45, 6.82, 6.83] [GS-G-3.5; 2.18, 2.26, 4.14]

115. Is a knowledge management system established and does it include identified information and data that need to be collected, processed and made available for the management of safety? [GSR Part 2 Requirement 8; 4.20] [GS-G-3.1; 6.3, 6.18, 6.23-6.25, 6.32]

1.5. Human factors management

116. How is human performance analyzed, and how are results applied to improve the efficiency of the organization? Does the plant train suitable personnel to perform such analysis? [SSG-75; 5.5, 5.19, 5.24, 5.48] [SSG-74; 2.19, 3.3, 4.16, 4.21, 4.27, 5.21-5.26] [SSG-72; 7.91]

117. How are human performance tools consistently used to enhance safe performance? [SSR-2/2 (Rev.1) Requirement 8; 4.28, 4.29]

118. How does the individual performance appraisal system contribute to the achievement of established safety goals and objectives? In what way does the performance appraisal system include assessments of behaviours? [GS-G-3.1; 4.3]

1.6. Non-radiation-related safety programme

119. How does the management system integrate the non-radiation-related safety programme with the nuclear and radiation safety programmes? How are non-radiation risks and radiation risks integrated in the risk assessment process? [SSR-2/2 (Rev.1) Requirement 23; 5.26] [GSR Part 2; Requirement 6] [SSG-72; 5.20] [ILO-OSH 2001; 3.1] [ILO – Safety and health in construction; 2.2] [ILO – Safety in the use of chemicals at work; 2.2]

120. How are the non-radiation-related safety policy, programme and procedures defined and documented? [SSR-2/2 (Rev.1) Requirement 23; 5.26] [SSG-72; 7.65, 7.66] [GS-G-3.5;5.74] [ILO-OSH 2001; 3.5]

121. How are responsibilities assigned for non-radiation-related safety supervision? [GS-G-3.5; 5.73-5.77] [SSG-72; 7.67] [ILO-OSH 2001; 3.3]

122. How are the non-radiation-related safety programme and procedures reviewed and evaluated? [SSG-75; 5.44] [SSG-72; 7.66] [ILO-OSH 2001; 3.11]

123. How are the organizational structure, duties, responsibilities and lines of authority of the non-radiation-related safety officers described? [GS-G-3.5; 2.3] [ILO-OSH 2001; 3.3]

124. How are plant staff, suppliers, contractors and visitors trained, and how they possess the necessary knowledge, on non-radiation-related safety, including the knowledge to protect those personnel responding to the internal and external hazards (e.g., fire, natural hazards)? [SSR-2/2 (Rev.1) Requirement 23; 5.26] [SSG-72; 7.68] [SSG-75; 4.26, 5.2] [GS-G-3.5; 5.81] [SSG-77; 3.21]

125. How do non-radiation-related safety performance indicators align with the organization's objectives, and how are they monitored? [GS-G-3.1; 3.16, 5.17, 5.32, 5.33] [GS-G-3.5; 5.75, 6.3, 6.6] [ILO-OSH 2001; 3.13, 3.14]

126. How are minor non-radiation-related safety events and near-misses captured and analysed? How does the system encourage reporting of non-radiation-related safety hazards and violations of non-radiation-related safety requirements? [SSR-2/2 (Rev.1) Requirement 24; 5.27-5.31] [SSG-72; 5.31] [GS-G-3.5; 5.75-5.77] [ILO-OSH 2001; 3.12]

127. How are non-radiation-related safety aspects addressed in pre-job briefings? [SSG-74; 4.40, 5.16, 5.17, 5.23] [SSG-76; 4.30, 4.31] [ILO-OSH 2001; 3.6, 3.10.1.1, 3.10.5(b)]

128. How are non-radiation-related safety rules, procedures and instructions adhered to in the field and other workplaces? [SSR-2/2 (Rev.1) Requirement 23; 5.26] [GS-G-3.5; 5.73] [ILO-OSH 2001; 3.10.1, 3.11.4]

129. How is the non-radiation-related safety programme documented in the management system? What procedures are in place to support the programme? [SSR-2/2 (Rev.1) Requirement 23; 5.26] [GSR Part 2 Requirement 8; 4.16] [ILO-OSH 2001; 3.5]

[IAEA safety standards for this WNO: SF-1; SSR-2/2 (Rev. 1)*; GSR Part 2*; GSR Part 4 (Rev. 1); SSG-50; GS-G-3.1; GS-G-3.5; SSG-28; SSG-71; SSG-72*; SSG-74; SSG-75; SSG-76; SSG-77; ILO-OSH 2001; ILO - Safety and health in construction; ILO – Safety in the use of chemicals at work. (*main basis)]

Fact in bold: New fact
Fact not in bold and in Italic: Previously edited fact
Fact not in bold: Validated fact by counterpart
~~Fact strikethrough~~: Fact deleted (only after discussion with TL or DTL)

LMS: FACTS & Themes

1. LEADERSHIP AND MANAGEMENT FOR SAFETY

1.1. Leadership for safety (Q1-Q11)

Fact:

1.2. Management system (Q12- Q80)

Fact:

1.3. Culture for Safety (Q81-Q95)

Fact:

1.4. Measurement, assessment, and continuous improvement (Q96-Q115)

Fact:

1.5. Human factors management (Q116-Q118)

Fact:

1.6. Non-radiation-related safety programme (Q119-Q129)

Fact:

Performance Data:

Description	**2021**	**2022**	**2023**	**2024**
Unit Capability Factor (UCF) [Unit1/Unit2]				
Industrial Safety Accident Rates (TISA/ISA/CISA)				

1. LMS

No.	Issue summaries: (Brief five-line maximum description, neutral in tone, in order to present the subject of issues under development to the Plant Manager)	CI	CA	PMI	PMA
1					
2					
3					
4					
5					
6					
GP1	Good Practices: [brief description]				
GP2					

CI = Counterpart informed, CA = Counterpart agreed, PMI = Plant manager informed, PMA = Plant manager agreed

OSART MISSION WORKING NOTES

OUTLINES – TRAINING & QUALIFICATION

TQ: 67 Q > 9 Q / Day	Comments from TL
Day 1	
Day 2	
Day 3	
Day 4	
Day 5	
Day 6	
Day 7	
(Day 8)	

Contents

2. TRAINING AND QUALIFICATION

2.1. Organization and functions

2.1.1. Functions and responsibilities

1. How are organizational structure, responsibilities, levels of authority and functions defined and communicated within the training organization? Are they understood by personnel? [SSR-2/2 (Rev.1) Requirement 1; 3.2(b), (d), Requirement 3; 3.8, 3.9]

2. How are the goals, objectives and safety indicators related to training and qualification developed and managed? How are outcomes checked and measured within the organization? [SSR-2/2 (Rev.1) Requirement 1; 3.2(a), Requirement 9; 4.35, 4.37]

3. How are training and qualification policies and programmes kept up-to-date? What internal process is put in place in this regard? [SSR-2/2 (Rev.1) Requirement 3; 3.8, 3.9, Requirement 7; 4.21] [SSG-75; 4.1-4.4, 5.42, 5.43] [GS-G-3.1; 4.8]

2.1.2. Personnel

4. What is the staffing level, including the use of contractors, in the training area? How does the plant ensure that there are enough resources to implement the plant training policy and programme? [SSR-2/2 (Rev.1) Requirement 7; 4.23] [SSG-75; 4.9]

2.2. Qualification and training of personnel

2.2.1. Training policy

5. How is plant management involved in the development, implementation and evaluation of the overall training policy? How is it ensured that the policy is known, understood and supported by all concerned? [SSR-2/2 (Rev.1) Requirement 7; 4.18] [SSG-75; 4.2-4.4]

6. How is the systematic approach to training used for training plant personnel? [SSR-2/2 (Rev.1) Requirement 7; 4.20] [SSG-75; 4.14-4.15]

7. What qualification and competence requirements have been established for plant personnel performing safety related functions? [SSR-2/2 (Rev.1) Requirement 7; 4.16, 4.18]

8. What is the level of participation of managers in determining the training needs of their staff? How do they ensure that production needs do not unduly interfere with the conduct of the training programme? [SSR-2/2 (Rev.1) Requirement 7; 4.18] [SSG-75; 4.10, 4.11] [GS-G-3.1; 4.20] [SSG-76; 2.18, 2.23, 2.33]

9. How is classroom training controlled and structured to achieve training objectives in a timely and efficient manner? [SSG-75; 4.16(a)]

10. What guidelines have been prescribed for on-the-job training (OJT)? How are designated individuals trained to deliver OJT? [SSG-75; 4.16(b), 5.2, 5.3]

11. How is the importance of safety and safety culture promoted in training? [SSR-2/2 (Rev.1) Requirement 7; 4.19] [SSG-75; 4.6, 5.1, 5.2, 5.6, 5.16, 5.29, 5.40]

2.2.2. Initial and continuing training

12. What programmes are in place for initial and continuing training of each group of personnel at the plant? [SSR-2/2 (Rev.1) Requirement 7; 4.20] [SSG-75; 4.22-4.25]

13. How are work schedules established to take into account the time necessary for personnel to undergo formal continuous training on a regular basis? [SSG-75; 4.30]

14. What provisions have been made in training programmes for periodic confirmation of the competence of personnel? What continuing training is provided when an individual has been away from his authorized duties for an extended period of time? [SSR-2/2 (Rev.1) Requirement 7; 4.19] [SSG-76; 2.22] [SSG-75; 3.21, 7.8]

15. How are trainee's ability assessed in initial and continuing training? [SSR-2/2 (Rev.1) Requirement 7; 4.19] [SSG-75; 4.21]

16. What specific training is provided to address an employee's deficiencies in performance? [SSG-75; 4.22, 4.25]

17. How does the continuing training programme cover recent industry and plant-specific operating experience, identified problems in performance, plant modifications and procedural changes? [SSR-2/2 (Rev.1) Requirement 8; 4.29, Requirement 24; 5.27] [SSG-75; 4.25] [SSG-76; 2.22]

18. Is any specific training conducted in conjunction with modifications to the plant, to ensure that appropriate personnel are familiar with the modified systems, and know how to operate and maintain modified equipment in a safe and reliable manner? [SSG-75; 4.4, 4.22, 4.25, 5.11, 5.14, 5.47, 6.6]

19. Is any special training provided before commissioning a modified plant or putting plant back into operation? What topics does it cover? Who is responsible for the timely update of all affected documentation? [SSR-2/2 (Rev.1) Requirement 11; 4.43] [SSG-75; 5.14]

20. How does the organisation demonstrate that sufficient personnel responsible for fuel loading are qualified and trained, including involvement in having received appropriate reactivity management training and proper practical training on the fuel machine using dummy fuel assemblies, operations in the reactor cavity and spent fuel pit area? [SSR-2/2 (Rev.1) Requirement 25; 6.6, SSG-28; 4.42] (COMs – only relevant for Pre-OSART missions)

2.2.3. Training programmes for managers and supervisory personnel

21. How are supervisory skills, people and work management, interpersonal communications and human behaviour aspects addressed in training? [SSG-75; 5.19]

22. How is career development of management staff undertaken? [SSG-75; 5.20]

23. What means are in place to develop skills in team leadership, coaching, mentoring and communication, for managers and supervisory personnel, and for their potential successors? [SSG-75; 5.19]

2.2.4. Training programmes for operations personnel

24. How is the formal training of operators conducted? [SSG-75; 5.21- 5.28]

25. How are shift supervisors trained in supervisory techniques and communication skills? [SSG-75; 5.19]

26. What additional training is provided to improve operational performance for those operations that are critical to safety, for infrequent operations, and for routine operations that are carried out rarely (e.g. start-up of the plant)? [SSG-75; 4.25, 6.4] [SSG-76; 2.22]

27. How are control room operators trained on the plant-representative full-scope simulator? How are infrequent and abnormal situations and accident conditions used in simulator scenarios? [SSR-2/2 (Rev.1) Requirement 7; 4.24] [SSG-75; 4.16, 4.18-4.20, 4.29, 4.39, 4.41, 5.13, 5.26, 5.47, 6.1]

28. What considerations are given to training control room staff as a crew, so as to develop teamwork skills, team communication and team coordination? [SSG-75; 4.19]

29. How are simulator training sessions evaluated and documented? What remedial measures can be taken as a result of such evaluations? [SSG-75; 4.21]

30. What is the scope of the formal training delivered to plant operators? How does it cover theoretical and practical knowledge of plant systems (with emphasis placed on systems that are of safety significance), as well as their functions, layout and operation? [SSG-75; 5.22]

31. To what extent are the results of PSA used to demonstrate the importance of plant systems in preventing plant damage or severe accidents? [SSG-75; 5.23]

32. What are the practical and other training methods used during the training process to emphasize the importance of maintaining the plant within operational limits and conditions, of reactivity control and core cooling at all times - including the period when the plant is not in operation - and of the consequences of violating safety limits? [SSG-75; 5.23]

33. What are the practical and other training methods used during the training of control room operators to ensure their capabilities in plant diagnostics, control actions, administrative tasks and human factors such as attitudes and human–machine and human–human (teamwork) interfaces? [SSG-75; 5.24]

34. How does the plant ensure that operators are trained to be aware of the locations of radioactive materials in the plant, and of the controls to be applied to them? [SSG-75; 5.25]

35. How do operator training programmes take account of routines for normal operation of the plant and of the plant response to changes that could cause accidents if not counteracted? [SSG-75; 5.26]

36. To what extent do the training programmes for operators cover operating procedures for normal operation, for anticipated operational occurrences and, as far as practicable, for severe accident conditions, practiced at the simulator, so that trainees recognize the negative consequences of errors or of violations of procedures? [SSG-75; 5.26]

37. How does the plant ensure that field operators receive training commensurate with their duties and responsibilities, specifically detailed knowledge of the operational features of the plant, and hands-on experience? [SSG-75; 5.27]

38. What are the practical and other training methods used during the training process to emphasize the importance to safety of plant activities during shutdown or low-power operating states? [SSG-75; 5.28]

2.2.5. Training programmes for maintenance and technical personnel

39. How are maintenance and technical personnel trained to understand radiation risks and the technical and administrative means of optimizing protection and safety, including minimization of waste, radiation protection, safety rules, access controls and emergency procedures? [SSG-74; 4.39] [SSG-75, 5.2, 5.7, 5.9, 5.32]

40. What controls are established to ensure maintenance and technical personnel have the skills required to work on the equipment they are assigned to? [SSG-75; 3.1, 3.6, 4.16, 5.3, 5.31, 5.35, 7.5]

41. What refresher training is provided on activities that are normally performed infrequently? [SSG-75; 4.30]

42. How are past plant experiences and incidents relating to poor work practices in the nuclear industry and other potentially hazardous industries used in the training of maintenance and technical personnel? [SSG-75; 5.29, 5.32] [SSG-74; 4.35]

43. How does the plant guarantee the competence of contractor personnel involved in performing maintenance and technical work on site? [SSG-74; 4.37] [SSG-75; 3.37]

44. How is the concept of just-in-time training used in the training of maintenance and technical personnel? [SSG-75; 5.33]

45. How are training mock-ups and models used for the maintenance and technical work activities that cannot be practiced with the actual equipment? [SSG-75; 4.16, 5.31, 5.32, 5.36, 6.5]

46. What training is in place to demonstrate for personnel in functions not directly involved in fuel handling such as chemistry, engineering, maintenance and emergency preparedness are properly qualified? [SSG-28; 4.42] (COMs – only relevant for Pre-OSART missions)

47. What arrangements are in place to formally authorize/license personnel involved in the implementation of commissioning activities? [SSR-2/2 (Rev.1) Requirement 25; 6.6, SSG-28; 4.1] (COMs – only relevant for Pre-OSART missions)

48. How is it ensured that arrangements for contractors involved in the commissioning process correspond with the licensee's management system? [SSG-28; 4.3] (COMs – only relevant for Pre-OSART missions)

2.2.6. Training for emergencies

49. How are plant staff and staff from external emergency response organizations trained in handling emergency conditions? How is continuing training used to maintain proficiency? [SSR-2/2 (Rev.1) Requirement 7; 4.17] [SSG-75; 4.32, 4.35, 4.39, 4.40, 5.10, 5.17, 5.18, 5.27]

50. How are training programmes in accident management reviewed and updated to take account of new knowledge and operating experience? [SSG-75; 4.37, 4.38, 4.41-4.43, 5.21, 5.27, 6.1]

51. How does the plant ensure that there are a fully trained and qualified personnel available to detect, to report, to respond, to mitigate and to cope with hazards at all times? [SSG-75; 4.35] [SSG-77; 3.5, 3.6, 3.7]

52. What and how initial and refresher trainings, drills and exercises are undertaken by all plant personnel (including non-essential staff and visitors) to prevent and to promptly respond to all postulated internal and external hazards and their credible combinations? What mock-up training facilities or actual equipment are used for their trainings? [SSG-77; 10.1-10.13, Appendix I&II]

2.2.7. Training programmes for trainers

53. How are trainers provided with the necessary instructional and assessment skills? [SSR-2/2 (Rev.1) Requirement 7; 4.23] [SSG-75; 5.37, 5.38, 5.40]

54. How is the training provided by external organizations evaluated for quality, consistency and usefulness? [SSG-75; 5.41]

55. How do trainers maintain and update their technical and instructional skills? How often are they seconded/assigned to the operating plant? [SSR-2/2 (Rev.1) Requirement 7; 4.23] [SSG-75; 5.39]

2.2.8. Review and modification of training programmes

56. How are training programmes reviewed to take into account both changes in operational documentation and plant modifications? [SSR-2/2 (Rev.1) Requirement 11; 4.42]

57. How are feedbacks or information from operating experience and other factors incorporated in training programmes? [SSR-2/2 (Rev.1) Requirement 7; 4.18, 4.22] [SSG-75; 4.4, 5.44-5.46, 5.49-5.51]

58. How are training programmes reviewed to evaluate their effectiveness? [SSR-2/2 (Rev.1) Requirement 7; 4.21] [SSG-75; 4.45, 4.49, 5.42, 5.43] [GS-G-3.1; 4.20]

59. How is it ensured that updated operations procedures and any inputs from design changes have been introduced into Operations continuing training? [SSG-28; 4.43] (COMs – only relevant for Pre-OSART missions)

2.2.9. Training facilities and material

60. What facilities are available for classroom training, computer-based training and individual studies? [SSR-2/2 (Rev.1) Requirement 7; 4.24] [SSG-75; 6.1-6.3, 6.5]

61. What procedures and principles are applied to ensure consistency between the training facilities and real plant facilities, and between procedures used in the simulator and at the unit? Are the training facilities, computer models, simulators etc. updated in a timely manner to reflect current plant conditions and operating policy? [SSR-2/2 (Rev.1) Requirement 7; 4.21] [SSR-2/2 Requirement 10; 4.38] [SSG-75; 6.6]

62. What are the capabilities of the plant simulator to support training for normal plant operational states as well as for accident conditions? [SSR-2/2 (Rev.1) Requirement 7; 4.24] [SSG-75; 4.16, 4.39, 6.4]

2.2.10. Authorization

63. What procedures are in place to authorize persons whose duties have a direct bearing on safety? [SSR-2/2 (Rev.1) Requirement 7; 4.16] [SSG-75; 7.1-7.5]

64. How are individuals re-authorized periodically? [SSG-75; 7.7, 7,8]

2.3. Records and reports

65. How are various training documentation, consist of qualification and authorization records, reports and feedback associated with the training programmes maintained at the plant? How are they used to support management in monitoring the effectiveness of the training programme? [SSR-2/2 (Rev.1) Requirement 15; 4.52] [SSG-75; 4.45-4.47, 4.49]

2.4. Use of PSA and PSR

66. How are the results of PSA - or some of its applications - implemented in training programmes? [SSG-3; 10.36] [SSG-75; 4.38, 4.43, 5.12, 5.23]

67. How does the plant use the results from PSR to enhance the training and qualification programme? [SSR-2/2 (Rev.1) Requirement 12; 4.44, 4.47] [SSG-25; 3.8, 5.29, 5.41, 5.47, 5.86] [SSG-71; 3.9, 3.10]

[IAEA safety standards for this WNO: SSR-2/2 (Rev. 1)*; SSG-28; SSG-71; SSG-74; SSG-75*; SSG-76; SSG-77; GS-G-3.1; SSG-3; SSG-25. (*main basis)]

Fact in bold: New fact
Fact not in bold and in Italic: Previously edited fact
Fact not in bold: Validated fact by counterpart
~~Fact strikethrough~~: Fact deleted (only after discussion with TL or DTL)

TQ: FACTS & Themes

2. TRAINING AND QUALIFICATION

2.1. Organization and functions (Q1-Q4)

Fact:

2.2. Qualification and training of personnel (Q5-Q64)

Fact:

2.3. Records and reports (Q65)

Fact:

2.4. Use of PSA and PSR (Q66-Q67)

Fact:

Performance Data:

Description	2021	2022	2023	2024
Training schedule adherence (%)				
Number Line management observations of training				
Simulator unavailability (hours)				
Number Simulator defect backlog				
Simulator defect backlog average age (days)				
Simulator plant modification backlog average age (days)				

2. TQ

No.	Issue summaries: (Brief five-line maximum description, neutral in tone, in order to present the subject of issues under development to the Plant Manager)	CI	CA	PMI	PMA
1					
2					
3					
4					
5					
6					
GP1	Good Practices: [brief description]				
GP2					

CI = Counterpart informed, CA = Counterpart agreed, PMI = Plant manager informed, PMA = Plant manager agreed

OSART MISSION WORKING NOTES OUTLINES - OPERATIONS

OPS1: 71 Q > 10 Q / Day	Comments from TL
Day 1	
Day 2	
Day 3	
Day 4	
Day 5	
Day 6	
Day 7	
(Day 8)	

OPS2: 33 Q > 5Q / Day	Comments from TL
Day 1	
Day 2	
Day 3	
Day 4	
Day 5	
Day 6	
Day 7	
(Day 8)	

Contents

3. OPERATIONS [OPS1 and OPS2]

3.1. Organization and functions [OPS1]

3.1.1. Functions and responsibilities [OPS1]

1. How are organizational structure, responsibilities, levels of authority and functions defined and communicated within the operations organization? Are they understood by personnel? [SSR-2/2 (Rev.1) Requirement 1; 3.2(b)(d), Requirement 3; 3.8, 3.9] [SSG-72; 2.5, 2.6, 2.11, 2.12, 2.14] [SSG-76; 2.3-2.5]

2. How are the goals, objectives and safety indicators related to operations developed and managed? How are outcomes checked and measured within the organization? [SSR-2/2 (Rev.1) Requirement 9; 4.33-4.37, 3.2(a)] [SSG-76; 2.26-2.29]

3. What is the process for ensuring that operations policies and programmes are kept up-to-date? What internal process is put in place in this regard? [SSR-2/2 (Rev.1) Requirement 5; 4.5] [SSG-76; 2.7-2.16]

4. How are the interface responsibilities with other plant groups/departments defined, e.g. maintenance and fuel management, and how does the plant ensure effectiveness and mutual understanding? [SSG-76; 2.3, 2.34-2.41]

5. How does the senior management and shift staff including supervisor maintain capability to make appropriate and timely decisions based on their understanding on prevention, protection and mitigation features, their alternative actions, and their availability, vulnerability for all internal and external hazards as well as combination of hazards (consequential or correlated hazards occurring during or immediately after one hazard)? [SSG-77; 3.23, 3.24, 3.25, 3.26, 6.1-6.10]

6. What are the arrangements to supervise initial fuel loading by duly authorized personnel (licensed, if necessary) and to immediately report unexpected occurrences to the control room personnel? [SSR-2/2 (Rev.1) Requirement 25; 6.6, SSG-28; 4.45] (COMs – only relevant for Pre-OSART missions)

3.1.2. Personnel [OPS1]

7. What is the staffing level, including the use of contractors, in the operations area? How is it ensured that there are enough shift staff to cover workloads during both outages and plant operation, for normal as well as emergency conditions (including multiunit plants)? [SSR-2/2 (Rev.1) Requirement 4; 3.11] [SSG-70; 2.2, 5.2, 9.10, I.44] [SSG-72; 7.8-7.15] [SSG-76; 2.17, 2.20, 3.4, 3.9, 3.11, 4.1, 4.22]

8. How are operations personnel, including contractors, qualified for their assigned work? What measures have been taken to maintain an adequate level of experience, knowledge and proficiency? [SSR-2/2 (Rev.1) Requirement 4; 3.10-3.11] [SSG-75; 2.1-2.3, 2.8, 2.10, 3.29-3.33, 3.55-3.37, 4.1, 5.21-5.28] [SSG-76; 2.18, 2.19, 2.21, 2.23]

9. How are personnel performance reviews undertaken, and are these considered by the plant to be effective? [SSG-75; 3.5, 3.26, 4.21, 4.22, 4.46]

10. What regular re-qualification training is undertaken by operators, and is there a similar requirement if an operator has been on an extended absence from duty? [SSR-2/2 (Rev.1) Requirement 4; 3.12, Requirement 7; 4.19] [SSG-75; 3.21, 4.22, 4.28, 7.7, 7.8] [SSG-76; 2.22]

11. Within the plant's commissioning programme, what arrangements are in place to ensure that operating personnel, maintenance personnel, designers and other relevant staff, all participate in commissioning activities? [SSR-2/2 (Rev.1) Requirement 25; 6.6] [SSG-28; 2.3, 2.13, 3.16] (COMs – only relevant for Pre-OSART missions)

3.2. Operations equipment [OPS1]

12. Do the main control room and supplementary control room (sometimes known as the remote shutdown panel) facilities assure habitability and contain the necessary documents? [SSR-2/2 (Rev.1) Requirement 27; 7.7, 7.8] [SSG-76; 6.2, 6.4, 6.8]

13. Are effective methods in use to indicate system and equipment status? [SSG-76; 3.6, 3.7, 4.8-4.13, 4.15, 4.18, 4.35, 4.38-4.40, 4.54, 4.55, 5.34-5.39, 6.6, 6.7]

14. What communication systems are there available for ensuring adequate transfers of information to the operators in the main control room from additional and local control rooms, and how are they periodically evaluated? [SSR-2/2 (Rev.1) Requirement 27; 7.7, 7.8] [NS-G-2.1; Table A section 10] [SSG-76; 6.9-6.13]

15. What is the policy with respect to the number of lit annunciators in the control room and on alarm panels throughout the plant? How are alarms in the control room prioritized? [SSR-2/2 (Rev.1) Requirement 27; 7.9] [SSG-76; 6.7]

16. How does the plant ensure that both the equipment used by the operators and their working environment support safe and reliable operation of the plant, i.e. plant cleanliness, lighting, as well as noise levels and temperatures in the control room? [SSG-76; 6.1-6.3]

17. Does the plant information system provide all the safety related plant performance data? [SSR-2/2 (Rev.1) Requirement 27; 7.9]

18. Are there sufficient safety, emergency, first aid and firefighting facilities available? [SSR-2/2 (Rev.1) Requirement 23; 5.26] [SSG-76; 6.23]

19. What procedures for handover of the plant are established and used by the operating organization? [SSG-28; 3.50, 3.51] (COMs – only relevant for Pre-OSART missions)

20. How is it ensured that all systems are under the control of the operating group before the start of nuclear testing? [SSG-28; 3.52] (COMs – only relevant for Pre-OSART missions)

21. What administrative arrangements are in place to ensure the correct and timely transfer during the handover process of documentation corresponding to different systems? [SSG-28; 3.53] (COMs – only relevant for Pre-OSART missions)

22. What documentation is included in the acceptance package for each system in the handover process? [SSG-28; 3.54] (COMs – only relevant for Pre-OSART missions)

3.3. Operating rules and procedures [OPS1]

3.3.1. Operational limits and conditions (OLC) [OPS1]

23. How does the plant ensure that OLCs cover all modes of normal operation, including shutdown and outage stages? [SSR-2/2 (Rev.1) Requirement 6; 4.9]

24. What controls and procedures are in place to ensure compliance with OLCs? [SSR-2/2 (Rev.1) Requirement 6; 4.12] [Requirement 8; 4.26] [SSG-70; 2.11, 7.13, 9.1-9.7] [SSG-76; 4.23

25. How are deviations from OLCs appropriately reported and documented? [SSR-2/2 (Rev.1) Requirement 6; 4.13] [SSG-70; 2.11, 9.11] [SSG-76; 4.60, 5.66]

26. Are all entries to and exits from OLCs well documented? [SSR-2/2 (Rev.1) Requirement 6; 4.14, 4.15] [SSG-70; 9.11] [SSG-76; 4.55, 4.60]

27. How frequently are OLCs reviewed and revised? [SSR-2/2 (Rev.1) Requirement 6; 4.8]

28. Does the surveillance programme cover all safety systems? [SSR-2/2 (Rev.1) Requirement 6; 4.7, 4.12] [SSG-70; 2.4, 2.5, 2.11, 2.17, 6.1-6.5, 7.1, 9.11] [SSG-76; 5.22]

29. What arrangements are in place at the plant to ensure that relevant safety system settings and alarm settings, including those of instruments for radiological protection, are specified at the appropriate commissioning stages or sub-stages? [SSG-28; 2.22] (COMs – only relevant for Pre-OSART missions)

3.3.2. Restart following events or planned shutdowns [OPS1]

30. What are the plant's requirements and procedures for restart following refuelling or maintenance shutdowns? [SSR-2/2 (Rev.1) Requirement 8; 4.31] [SSG-74; 5.51-5.55, 8.64]

31. What is the policy regarding event investigations following a reactor trip, in order to ensure adequate system reliability for restart? [SSR-2/2 (Rev.1) Requirement 8; 4.31] [SSG-76; 5.48-5.49]

32. What management review takes place prior to restart, following refuelling or maintenance shutdowns? [SSR-2/2 (Rev.1) Requirement 8; 4.31] [SSG-74; 5.37, 5.56] [SSG-76; 3.2, 4.25, 5.5]

3.3.3. Operator aids [OPS1]

33. Are operator aids clearly understood, authorised and being properly used? [SSR-2/2 (Rev.1) Requirement 26; 7.5, 7.6] [SSG-72; 7.86(b)] [SSG-76; 6.14-6.17]

34. What controls are in place to prevent the use of non-authorized operator aids and other non-authorized material? [SSR-2/2 (Rev.1) Requirement 26; 7.5]

3.3.4. Operating procedures [OPS1]

35. What is the policy for procedure usage? [SSR-2/2 (Rev.1) Requirement 26; 7.1] [SSG-76; 4.23, 4.34, 5.70]

36. How does the plant ensure that the operating procedures for various reactor states comply with OLCs? [SSR-2/2 (Rev.1) Requirement 30; 7.23] [SSG-76; 4.26]

37. Are procedures clearly identified and readily accessible in the control room and in other operating locations, where necessary? [SSR-2/2 (Rev.1) Requirement 26; 7.1] [SSG-76]

38. Are procedures kept up-to-date, and are outdated procedures promptly replaced? [SSR-2/2 (Rev.1) Requirement 26; 7.4] [SSG-76; 4.25, 4.27]

39. Is there an adequate method for reporting and documenting procedure errors and problems? [SSG-76; 3.2, 4.25, 5.3]

40. Are there regular reviews to ensure procedures are technically correct? [SSR-2/2 (Rev.1) Requirement 26; 7.4] [SSG-76; 2.32]

41. For appropriate and timely action against predictable external hazards, what procedures are put in place by the plant to obtain local level notification and forecast data, depending on the predicted severity and lead time? How has the plant established clear procedures to provide instructions on timely actions to be implemented if precursors of different types of external hazards are observed? [SSG-77; 5.3, 5.9, 5.10, 5.11, 5.12]

42. How are operating and test procedures reviewed, verified and updated to reflect current plant configuration? [SSR-2/2 (Rev.1) Requirement 25; 6.5, 6.9] [SSG-28; 5.15, 5.16] (COMs – only relevant for Pre-OSART missions)

3.3.5. Normal operating procedures [OPS1]

43. Are the normal operating procedures clearly written, understood and supported by appropriate references? [SSR-2/2 (Rev.1) Requirement 26; 7.1, 7.2] [SSG-76; 2.4, 3.4, 3.6, 4.8, 4.23]

3.3.6. Operating procedures for anticipated operational occurrences, and emergency operating procedures [OPS1]

44. Are the emergency procedures clearly written, understood and supported by appropriate references? Are they easily accessible? [SSR-2/2 (Rev.1) Requirement 26; 7.1, 7.3] [SSG-76; 4.25] [SSG-70; 7.3, 7.15, 7.16, 7.23, 8.6]

45. Are symptom-based or event-based emergency operating procedures in use? Are responsibilities clearly defined? [SSR-2/2 (Rev.1) Requirement 26; 7.3] [SSG-70; 7.9, 7.14, 7.17-7.21]

46. How are the EOPs verified and validated? Were plant specific safety analyses used in the development of the EOPs? [SSR-2/2 (Rev.1) Requirement 26; 7.1, 7.3, 7.4] [SSG-76; 4.24]

47. Do alarm response procedures exist, and are they used? Are they available in the main control room and at relevant remote panels? [SSR-2/2 (Rev.1) Requirement 27; 7.9] [SSG-76; 4.28] [SSG-70; 7.7, 8.7]

3.3.7. Control of changes to procedures [OPS1]

48. Is there a well understood system for controlling temporary changes to procedures? [GS-G-3.1; 5.24]

49. Is information on temporary changes distributed to affected users in a timely manner? [GS-G-3.1; 5.27, 5.28]

50. How promptly are procedures replaced when changes are implemented? [GS-G-3.1; 5.27]

51. What are the requirements for periodic review and approval of operating procedures and supporting documentation? Are these requirements stipulated in configuration management procedures? [SSR-2/2 (Rev.1) Requirement 26; 7.4]

3.4. Conduct of operations [OPS1]

3.4.1. Shift routines and operating practices [OPS1]

52. In what way are operational issues and status reported and documented? [SSG-76; 4.18, 4.47, 4.54, 5.3, 5.5, 5.8, 5.22, 5.34, 5.66, 6.5]

53. What processes are in place to ensure adequate support to the shift supervisor on a 24/7 basis? [SSG-76; 2.35, 4.6, 7.11]

54. How does the plant minimize the volume of administrative tasks undertaken by the duty shift crew? [SSG-76; 4.2(footnote), 4.6]

55. How does the plant make sure that activities or emergencies on one unit do not affect the other unit(s)? [SSR-2/2 (Rev.1) Requirement 1; 3.2(d)] [SSG-76; 4.13, 7.8, 7.27, 7.30]

3.4.2. Control room [OPS1]

56. How does the plant ensure and verify that operators are attentive and responsive to plant conditions? [SSG-76; 3.4, 3.6]

57. How is it assured that shift turnovers and briefings are effective? [SSG-76; 4.15-4.22]

58. How are system and component status changes appropriately authorized? [SSG-76; 2.4, 4.53, 4.54]

59. How does the plant ensure that the key locking control system effectively supports system reliability? [SSG-76; 5.6, 5.18, 7.24]

60. Is control room access limited to appropriate personnel? [SSG-76; 4.2(footnote), 4.17]

61. Which verbal communication policy, e.g. 3-way communication, is applied at the plant? [SSR-2/2 (Rev.1) Requirement 8; 4.28] [SSG-76; 4.48-4.52]

62. How are reactivity manipulations planned, controlled and conducted? What is the role of operations management in these activities? [SSR-2/2 (Rev.1) Requirement 30; 7.20-7.23] [SSG-73; 2.28] [SSG-76; 5.26-5.32]

63. How does management support and encourage operations personnel to apply conservative decision-making? [SSR-2/2 (Rev.1) Requirement 8; 4.30] [SSG-76; 2.31]

3.4.3. Surveillance testing [OPS1]

64. How does the plant guarantee that the surveillance test programme is properly executed? [SSR-2/2 (Rev.1) Requirement 31; 8.2] [SSG-72; 7.37] [SSG-74; 9.1, 9.7] [SSG-76; 2.4, 4.4, 5.20

65. How are deviations discovered in the course of surveillance tests first evaluated and then rectified? [SSG-76; 5.23,5.34

66. How are the results of the surveillance programme made known to operations and on what timescale following the test? How are surveillance testing results trended and analysed for emergent issues? [SSG-76; 5.21, 5.22]

67. What inter-organizational arrangements are in place to ensure that procedures, including operating and surveillance procedures, are adequately validated during the commissioning stage? [SSR-2/2 (Rev.1) Requirement 25; 6.5, SSG-28; 2.12, 3.46, 4.38] (COMs – only relevant for Pre-OSART missions)

68. How is it ensured that personnel adhere to normal operating rules during the commissioning stage? [SSG-28; 3.47] (COMs – only relevant for Pre-OSART missions)

3.4.4. Field operations [OPS2]

69. How does the plant guarantee that operator rounds effectively verify system and equipment status? [SSG-76; 4.38-4.40, 4.42-4.44, 4.47, 6.4]

70. How does the plant control temporary storage areas? [SSR-2/2 (Rev.1) Requirement 28; 7.10]

71. Is plant cleanliness and good housekeeping evident, and do operator rounds effectively verify plant cleanliness and housekeeping? How and how often does the plant conduct walkdowns with the clear purpose of prevention, protection and mitigation of internal and external hazards? What corrective actions are being taken after any housekeeping issues found? [SSR-2/2 (Rev.1) Requirement 28; 7.10] [SSG-76; 4.41] [SSG-77; 8.1-8.6]

72. Do field operators report industrial safety problems? [SSG-76; 4.41]

73. What is the policy with respect to identification and labelling of safety related

equipment? [SSR-2/2 (Rev.1) Requirement 28; 7.12]

74. How are problems communicated between shifts and across departments? [SSG-74; 5.45-5.49] [SSG-76; 4.45, 4.46, 4.49]

75. How extensive is the foreign material exclusion programme? [SSR-2/2 (Rev.1) Requirement 28; 7.11] [SSG-73; 2.20, 3.11, 3.20, 4.2, 4.5, 4.23, 4.25-4.27, 5.19, 6.8, 6.9, 8.2] [SSG-76; 5.18, 5.19]

3.5. Work control [OPS2]

76. How is the shift crew made aware of systems and equipment that are out of service? [SSG-76; 5.9, 5.11, 7.5, 7.6]

77. How does the plant guarantee that sufficient redundant safety equipment is maintained in service or is available with adequate defence in depth? [SSR-2/2 (Rev.1) Requirement 31; 8.10] [SSG-74; 2.6, 2.11, 3.2, 5.14, 7.1, 8.4, 9.9, 9.21, 9.27, 9.29, 9.30, 9.35, 9.45, 9.46] [SSG-76; 5.13, 7.4] [SSG-77; 8.2 (b)]

78. How is the work process analysed for risk? [SSR-2/2 (Rev.1) Requirement 31; 8.6, 8.13] [SSG-74; 4.25, 4.28, 4.40, 5.14, 5.28, 5.30-5.32, 8.2, 8.3, 8.6, 10.5] [SSG-76; 5.10, 7.3]

79. What is the level of participation of operations personnel in work planning? [SSG-76, 7.10, 7.11]

80. What is the independent verification policy with respect to work authorizations? [SSG-76;7.2, 7.3]

81. Are equipment isolations clearly identified? [SSG-76; 7.23-7.34]

82. How is the operations department involved in outage activities to ensure proper configuration control and management of risk? [SSG-76; 7.20-7.22]

3.6. Fire prevention and protection programme [OPS2]

3.6.1. Equipment and systems [OPS2]

83. How does the plant guarantee that portable firefighting equipment is well maintained? [SSR-2/2 (Rev.1) Requirement 22; 5.21(c)] [SSG-77; 9.1-9.7, I.42] [SSG-76; 2.20, 6.23]

84. How is it confirmed that fire barriers are adequately maintained? [SSR-2/2 (Rev.1) Requirement 22; 5.21(c)] [SSG-77; 9.1-9.7, 10.7(a), I.10, I.14, I.42] [SSG-74; 5.46, 9.24] [SSG-76; 4.41]

85. What does the fire prevention and protection plant surveillance test programme consist of? What alternative measures are in place in the event of maintenance or breakdown of these facilities (e.g., assigning a fire watch during firefighting equipment repairs)? [SSG-77; 9.1-9.7, 10.7(a), I.42] [SSG-72; 7.36-7.38]

86. How does the plant ensure that there is systematic control of combustible materials and

ignition sources? [SSR-2/2 (Rev.1) Requirement 22; 5.21(b)] [SSG-77; I.23-I.41] [SSG-74; 4.30, 5.16, 8.41]

3.6.2. Firefighting personnel [OPS2]

87. How does the plant ensure that there is a fully qualified on-shift fire brigade available at all times? [SSG-77; 10.1-10.7(a), I.43-I.52] [SSG-75; 4.35]

88. How is it confirmed that personnel are suitably qualified and possess experience commensurate with their responsibilities? [SSG-77; 3.14, I.51]

89. What initial and refresher training is undertaken by the plant's fire team? [SSG-77; 10.1-10.9, I.43-I.51]

90. What fire control strategies are in place? E.g. restrictions on smoking, limited use of temporary wiring, etc. [SSG-77; I.33] [SSG-76; 4.41, 6.23]

91. Are the local civil firefighting groups adequately instructed and trained on site requirements and hazards? [SSR-2/2 (Rev.1) Requirement 22; 5.24] [SSG-77; 3.21, I.46, I.48] [SSG-75; 4.36]

92. What is the scope and frequency of fire drills and exercises? [SSR-2/2 (Rev.1) Requirement 22; 5.24] [SSG-77; 10.10-13]

93. What fire training facilities are used to train plant firefighters? [SSG-77; 3.7, 10.1-10.7]

3.6.3. Fire safety analyses [OPS2]

94. What is the status of the plant's fire hazards analysis and a risk of release of radioactive material in a fire? How frequently are they reviewed? [SSR-2/2 (Rev.1) Requirement 22; 5.22, 5.23] [SSG-77; 4.3, 4.4, 7.1-7.10]

95. How has the plant determined the adequacy of its fire protection systems? [SSR-2/2 (Rev.1) Requirement 22; 5.21] [SSG-77; 7.2] [SSG-70; I.45]

96. How does the plant assess the impact of plant modifications on fire safety measures? [SSR-2/2 (Rev.1) Requirement 22; 5.21(f)] [SSG-77; 7.10]

3.7. Control of plant configuration [OPS1]

97. How does the plant configuration control system ensure that changes to operational practices and operational documentation are properly handled, and that operations personnel are using the latest revisions of operational documents? [SSR-2/2 (Rev.1) Requirement 10; 4.38] [SSG-76; 2.4, 4.25, 4.55, 5.9, 5.33, 5.54, 7.5, 7.21, 7.41]

98. What is the system for obtaining operations department permission/authorisation for all maintenance activities before they are commenced, in order to keep continued configuration control and to ensure safe operation of the plant? [SSR-2/2 (Rev.1) Requirement 31; 8.10] [SSG-74, 3.15, 4.8, 4.30, 5.30, 5.31, 5.36, 5.49, 5.51, 5.52, 5.55, 9.9] [SSG-76; 7.5-7.9]

99. How does the system in place ensure that operating procedures remain fit for their purpose and are modified, verified, validated and approved, as necessary? How does the system ensure that all affected personnel use the latest versions of procedures? [SSR-2/2 (Rev.1) Requirement 26; 7.1-7.4] [SSG-70; 2.14-2.16, 7.11-7.13, 8.8] [SSG-76; 4.25-4.27]

3.8. Use of PSA and PSR [OPS2]

100. What kinds of PSA applications do operators use in their daily activities? Are operators trained to use them? [SSG-3; section 10]

101. Are operators familiar with PSA results, especially regarding human error as a contributing factor to core damage? Does the operations department use PSA applications for scheduling and planning work? [SSG-3; 5.107-5.111] [SSG-76; 5.16, 7.10]

102. What areas of plant operations did the last PSR review cover? Were operations personnel informed of the results of the last PSR, as regards operational practices? [SSG-25; 4.1, 8.11] [SSG-76; 2.28]

103. Did the last PSR identify any deviations from standard practices for plant operation, and were any recommendations prescribed as a result? What corrective measures were implemented? [SSG-25; 5.96] [SSG-76; 2.29]

104. How does the plant ensure that self-assessment techniques are effectively applied to operations activities? [SSR-2/2 (Rev.1) Requirement 9; 4.34] [SSG-72; 5.19] [SSG-76; 2.32, 5.31]

[IAEA safety standards for this WNO: SSR-2/2 (Rev. 1)*; SSG-28; SSG-70; SSG-72; SSG-73; SSG-74; SSG-75; SSG-76*; GS-G-3.1; SSG-3; SSG-25; SSG-77*. (*main basis)]

Fact in bold: New fact
Fact not in bold and in Italic: Previously edited fact
Fact not in bold: Validated fact by counterpart
~~Fact strikethrough~~: Fact deleted (only after discussion with TL or DTL)

OPS: FACTS & Themes

3. OPERATIONS [OPS1 and OPS2]
3.1. Organization and functions [OPS1] (Q1-Q11)

3.2. Operations equipment [OPS1] (Q12-Q22)

3.3. Operating rules and procedures [OPS1] (Q23-Q51)

3.4. Conduct of operations [OPS1] (Q52-Q68) / [OPS2] (Q69-Q96)

Fact:

3.7. Control of plant configuration [OPS1] (Q97-Q99)

3.8. Use of PSA and PSR [OPS2] (Q100-Q104)

Fact:

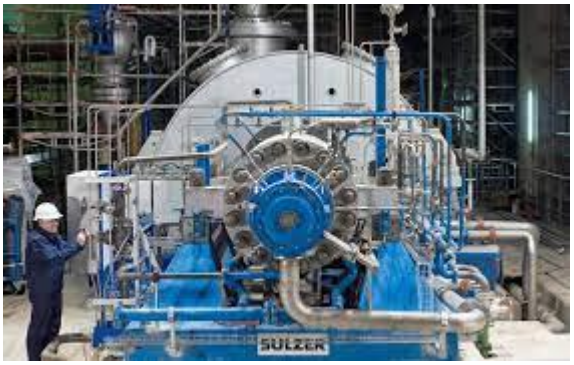
Performance Data:

Description	2021	2022	2023	2024
Number of Unplanned LCO entries				
Number of Operator Workarounds and burdens				
Number of Unplanned power changes				
Number of Operator Workarounds and burdens				
Number of Temporary modifications				

3. OPS

No.	Issue summaries: (Brief five-line maximum description, neutral in tone, in order to present the subject of issues under development to the Plant Manager)	CI	CA	PMI	PMA
1					
2					
3					
4					
5					
6					
GP1	Good Practices: [brief description]				
GP2					

CI = Counterpart informed, CA = Counterpart agreed, PMI = Plant manager informed, PMA = Plant manager agreed



OSART MISSION WORKING NOTES

OUTLINES - MAINTENANCE

MA: 79 Q > 11 Q / Day	Comments from TL
Day 1	
Day 2	
Day 3	
Day 4	
Day 5	
Day 6	
Day 7	
(Day 8)	

Contents

4. MAINTENANCE

4.1. Organization and functions

4.1.1. Functions and responsibilities

1. How are organizational structure, responsibilities, levels of authority and functions defined and communicated within the maintenance organization? Are they understood by maintenance personnel? [GSR Part 2; Requirement 2; 3.1] [SSR-2/2 (Rev.1) Requirement 1; 3.2(b), (d), Requirement 3; 3.8, 3.9] [SSG-72; 2.5, 2.6, 2.11, 2.12, 2.14] [SSG-74; 4.13; 4.16, 5.47]

2. How are the goals, objectives and safety indicators related to maintenance developed, managed, self-assessed, and communicated? How are outcomes checked, measured and are actions taken to address deviation and support continuous improvement? How are benchmarking activities effectively used to identify opportunities to improve maintenance performance? [GSR Part 2; Requirement 2; 3.2, 3.3; Requirement 4; 4.3 – 4.5] [SSR-2/2 (Rev.1) Requirement 9; 4.33-4.37] [SSG-74; 4.2; 4.33; 6.1; 6.2; 6.12-6.16] [GS-G-3.1; 6.4]

3. How are maintenance policies and programmes established, communicated and understood within the maintenance organization? What internal process is put in place to keep them up to date? [SSR-2/2 (Rev.1) Requirement 5; 4.1- 4.5] [GSR Part 2; Requirement 4; 4.5] [SSG-72; 3.1, 3.2, 3.7, 3.10, 3.16, 6.1-6.2] [SSG-74; 4.2, 4.27, 5.57] [SSG-50; 2.9, 2.68, 2.70, 2.71]

4.1.2. Personnel

4. Are there vacancies in the maintenance organization that are not filled for long period of time? How does the plant ensure that there is enough manpower to cover outage and operation workloads? [SSR-2/2 (Rev.1) Requirement 4; 3.11] [SSG-72; 7.8-7.15] [SSG-74; 3.12, 4.6, 4.14, 4.16-4.18] [GS-G-3.1; 4.1]

5. How are maintenance staff, including contractors, qualified for their assigned work to the same standard in the organization? What measures have been taken to maintain adequate levels of experience, knowledge and proficiency? [SSR-2/2 (Rev.1) Requirement 2; 3.6, Requirement 4; 3.10, 3.11, Requirement 7; 4.16, 4.20, 4.21] [SSG-72; 2.10, 4.3, 4.5, 4.6, 7.16-7.18, 7.68, 7.77] [SSG-74; 3.8, 3.11, 4.18, 4.35-4.43] [SSG-75; 3.1, 3.35-3.37, 4.1, 5.29-5.33, 5.35-5.36] [GS-G-3.1; 2.61, 4.6, 4.7, 4.17-4.19]

6. Within the plant's commissioning programme, what arrangements are in place to ensure that operating personnel, maintenance personnel, designers and other relevant staff, all participate in commissioning activities? [SSR-2/2 (Rev.1) Requirement 25; 6.6] [SSG-28; 2.3, 2.13, 3.16] (COMs – only relevant for Pre-OSART missions)

4.2. Maintenance facilities and equipment

7. How are maintenance facilities promoting safe and efficient completion of works? How does the plant establish that there are enough facilities for all maintenance work? [SSG-74; 5.61, 8.8-8.10, 8.22, 8.29, 8,40, 8.41] [SSG-72; 2.10, 3.15, 6.11, 7.4] [GSG-7; 3.57]

8. What training facilities and mock-ups are available for major activities? How are these effectively used to support maintenance activities? [SSR-2/2 (Rev.1) Requirement 7; 4.21, 4.24] [SSG-74; 8.17] [GSG-7; 2.1(a), 2.19, 3.16, 3.145, 6.84]

9. How are tools and equipment maintained and controlled? Is the quantity of consumable supplies adequate and available when needed? Are there history and outstanding cases of extending the maintenance window for a safety related plant system - that has been taken out of operation - owing to lack of spare parts? [SSR-2/2 (Rev.1) Requirement 31; 8.15-8.17] [SSG-74; 4.30, 8.9, 8.10, 8.25-8.49] [GS-G-3.5; 5.157 - 5.160]

10. How is measurement and testing equipment calibrated and controlled to ensure accuracy and traceability? [SSG-74; 8.18, 8.19] [GS-G-3.1; 5.34, 5.35] [GS-G-3.5; 5.25-5.29]

11. How are decontamination facilities and remote controlled tools used to minimize radiation doses? [SSG-74; 8.11-8.16, 8.20] [GSG-7; 3.75, 3.76, 3.112, 3.113, 9.35]

4.3. Maintenance programmes

12. How are different types of maintenance (preventive, corrective, predictive, etc.) balanced to minimize unplanned failure of safety related equipment and to optimize the maintenance programme? What maintenance programme are in place for the maintenance and inspection of equipment needed to detect and mitigate the internal and external hazards ? [SSR-2/2 (Rev.1) Requirement 31; 8.1] [SSG-74; 2.1, 2.6-2.8, 2.15] [SSG-77; 4.8; 5.7; 9.1-9.7]

13. How is safety classification for safety and non-safety related structures, systems and components (SSCs) performed and recorded during the plant's lifetime [SSG-30; 2.4, 2.7]

14. What administrative and organizational provisions are in place to ensure that the plant is adequately monitored and maintained during commissioning? [SSR-2/2 (Rev.1) Requirement 25; 6.14, SSG-28; 3.70] (COMs – only relevant for Pre-OSART missions)

4.3.1. Preventive maintenance programme

15. How are preventive maintenance activities managed and controlled to ensure timely completion? [SSR-2/2 (Rev.1) Requirement 31; 8.8] [SSG-74; 2.7, 2.10, 5.13]

16. How is the effectiveness of the preventive maintenance programme evaluated in terms of improving equipment reliability and availability? [SSR-2/2 (Rev.1) Requirement 3; 3.2(e),31; 8.5, 8.7] [SSG-74; 4.34, 5.20, 5.57-5.63, 6.2, 6.6-6.8]

17. How is identified equipment degradation managed and corrected? [SSR-2/2 (Rev.1) Requirement 31; 8.2, 8.4] [SSG-74; 6.6-6.11] [SSG-48; 5.10, 5.31, 5.33-5.35]

18. What kinds of predictive maintenance techniques are used? How are new, proven practices incorporated? How are these inputs used for revising the maintenance programme? [SSR-2 Rev.1) Requirement 31; 8.1, 8.5] [SSG-74; 2.7, 2.15, 5.57-5.63]

19. How are risk assessment results used to determine maintenance and inspection requirements? [SSR-2/2 (Rev.1) Requirement 31; 8.5, 8.6] [SSG-74; 2.6, 2.24, 4.25, 4.28, 4.30, 5.28, 5.31, 5.32, 8.2, 8.3, 8.6, 10.5] [SSG-48; 5.16, 5.23]

4.3.2. Corrective maintenance

20. What process is in place to effectively identify deficiencies? [SSR-2/2 (Rev.1) Requirement 31; 8.1, 8.2, 8.4, 8.12] [SSG-74; 2.8, 5.19, 6.6-6.11, 8.54-8.57] [GS-G-3.1; 6.53, 6.59-6.62] [SSG-76; 2.4, 3.2, 4.41, 4.44, 4.55, 4.62, 5.22, 5.65-5.69, 6.19, 6.27, 7.9]

21. How is the effectiveness of the corrective maintenance programme reviewed together with other maintenance activities holistically? How are improvements made in response to review results? [SSR-2/2 (Rev.1) Requirement 31; 8.4, 8.14] [SSG-74; 4.34, 5.20, 5.57-5.63, 6.2]

22. How is equipment degradation identified in maintenance work and shared with ageing management programme. What process is in place for this purpose? [SSR-2/2 (Rev.1) Requirement 14; 4.50, 4.51] [SSG-74; 2.20, 4.3, 4.5, 4.24, 7.4] [SSG-48; 5.9, 5.22-5.27, 5.30-5.32]

23. How is information on components susceptible to age-related failures processed and used? [SSR-2/2 (Rev.1) Requirement 14; 4.50, 4.51] [SSG-74; 6.13, 7.5] [SSG-48; 3.20, 3.21]

24. How is monitoring of ageing undertaken, and how are corrective actions taken for different inspection results? [SSR-2/2 (Rev.1) Requirement 14; 4.50, 4.51] [SSG-74; 7.6-7.8] [SSG-48; 4.17, 5.37-5.74]

4.3.3. In-Service Inspection

25. How does the plant ensure that In-Service Inspection (ISI) inspectors are qualified and knowledgeable of specific ISI techniques? [SSR-2/2 (Rev.1) Requirement 4; 3.10, 3.11] [SSG-72; 2.10, 4.3, 4.6, 7.16-7.18] [SSG-74; 4.6, 4.36]

26. How are ISI results being reviewed and analysed in the plant? How are corrective actions being taken? What actions does the plant take based on the output from its reviews of in-service inspections? [SSR-2/2 (Rev.1) Requirement 31; 8.4] [SSG-74; 6.6-6.11, 10.1-10.14, 10.31-10.35]

4.4. Procedures, records and maintenance history

27. How are maintenance procedures prepared, periodically reviewed and validated? How are temporary changes and deviations from procedures managed? How are new technologies and experience feedbacks incorporated into these procedures? [SSR-2/2 (Rev.1) Requirement 31; 8.3] [GSR Part 2; Requirement 10;4.32] [SSG-74; 3.4, 4.4, 4.10, 5.1-5.12]

28. How are maintenance procedures reviewed, verified and updated to reflect current plant configuration? [SSR-2/2 (Rev.1) Requirement 25; 6.5, 6.9] [SSG-28; 5.15, 5.16] (COMs – only relevant for Pre-OSART missions)

29. What inter-organizational arrangements are in place to ensure that maintenance procedures, are adequately validated during the commissioning stage? [SSR-2/2 (Rev.1) Requirement 25; 6.5, SSG-28; 2.12, 3.46, 4.38] (COMs – only relevant for Pre-OSART missions)

30. How are historical records and files periodically reviewed, trended, and analysed to identify the root causes of problems? How are these results used to improve maintenance performance? [SSR-2/2 (Rev.1) Requirement 15; 4.52, Requirement 31; 8.4] [SSG-74; 56.1-6.5]

31. What process is in place to trend safety performance and to analyse the causes of adverse trends in the maintenance area? [SSR-2/2 (Rev.1) Requirement 24; 5.29, 5.32, Requirement 31; 8.4, 8.6] [SSG-50; 2.4, 2.19, 2.24, 2.35, 2.42, 2.53, 2.54] [SSG-74; 5.19, 6.11-6.16]

4.5. Conduct of maintenance work

32. How is maintenance work properly authorized, executed, controlled and documented? [SSR-2/2 (Rev.1) Requirement 31; 8.7-8.10] [SSG-74; 3.3, 3.15, 4.20, 4.28, 5.13-5.15, 5.18] [GS-G-3.1; 2.21]

33. How is the safety of personnel and equipment ensured when conducting maintenance field activities? [SSR-2/2 (Rev.1) Requirement 31; 8.8, 8.9] [SSG-74; 4.27, 5.16, 5.17, 5.35]

34. How does the plant ensure that adequate resources are made available for maintenance activities? Are there any examples of cases where a lack of resources caused unnecessary delays in the completion of maintenance activities? [SSR-2/2 (Rev.1) Requirement 31; 8.12, 8.14, Requirement 32; 8.20] [GS-G-3.1; 4.1, 4.2] [SSG-74; 2.10, 2.11, 3.8-3.12, 4.16-4.18, 10.29, 10.30]

35. How is it confirmed that procedures are followed in the field as prescribed by plant requirements? [SSR-2/2 (Rev.1) Requirement 31; 8.3] [SSG-74; 3.8, 3.9, 5.5, 5.7, 5.8, 5.22, 5.23]

36. How are managers and supervisors effectively monitoring plant conditions, activities and coaching maintenance workers to reinforce correct behaviours and plant expectations? How are deviations trended, analysed, and managed? [SSR-2/2 (Rev.1) Requirement 9; 4.34, 4.35, 4.37] [GSR Part 2; Requirement 12; 5.2] [GS-G-3.1; 6.19] [GS-G-3.5; 6.3]

37. How are human performance tools used in the field? How are aspects of the working environment, that are impacting human performance, identified and controlled? [SSR-2/2 (Rev.1) Requirement 8; 4.28, 4.29, Requirement 31; 8.9] [GSR Part 2; Requirement 12; 5.12] [SSG-74; 2.19, 3.3, 4.21, 4.27, 4.35, 5.21-5.26, 5.61, 9.34]

38. How is the work of contractors controlled and monitored during both outage and online work? [SSR-2/2 (Rev.1) Requirement 5; 4.3, Requirement 7; 4.20] [SSG-74; 3.6-3.12]

39. How is post maintenance/modification testing carried out? [SSR-2/2 (Rev.1) Requirement 31; 8.10] [SSG-74; 5.52, 8.62, 8.64] [SSG-76; 6.22, 7.6, 7.14]

4.6. Material condition

40. What standards are in place to promote good material condition? How is plant material condition maintained to a high standard? How are those standards applied for the equipment needed to detect and mitigate internal and external hazards? [SSR-2/2 (Rev.1) Requirement 28; 7.10-7.12] [SSG-74; 4.30, 5.8, 10.1-10.9] [SSG-77; 8.2, 8.4]

41. How is degradation of material condition identified in a timely manner? How are corrective actions taken? [SSR-2/2 (Rev.1) Requirement 28; 7.10, Requirement 31; 8.12] [SSG-76; 2.4, 3.2, 4.41, 6.19, 6.22, 6.28]

42. How is the foreign material exclusion (FME) programme established, implemented, controlled and optimized in the field? [SSR-2/2 (Rev.1) Requirement 28; 7.11] [SSG-74; 5.38-5.44] [SSG-73; 2.20, 3.11, 3.20, 4.2, 4.5, 4.23, 4.25-4.27, 5.19, 6.8, 6.9, 8.2] [SSG-76; 4.41, 5.18, 5.19]

4.7. Work control

43. Describe the work control process in place at the plant. How is the effectiveness of the work control process monitored? [SSR-2/2 (Rev.1) Requirement 31; 8.8-8.10, 8.12, 8.13] [SSG-74; 5.13]

44. What approved work authorization documents are in place? [SSR-2/2 (Rev.1) Requirement 31; 8.9, 8.10] [SSG-74; 5.16, 5.17]

45. How are maintenance work prioritized and scheduled? How are work schedules reviewed when there are unexpected changes? How effective is the process in addressing safety-significant issues? [SSR-2/2 (Rev.1) Requirement 31; 8.12, 8.14] [SSG-74; 5.14, 5.15] [SSG-76; 2.4-2.6, 2.15, 7.9-7.11, 7.20] [GS-G-3.1; 5.2]

46. How is the maintenance backlog controlled, analysed and minimized? How is the cumulative impact on plant safety assessed, minimized and communicated? Are there any safety indicators to monitor this backlog? [SSR-2/2 (Rev.1) Requirement 31; 8.12, 8.14] [SSG-74; 5.19, 5.20]

47. How are material and manpower requirements considered during work planning? [SSR-2/2 (Rev.1) Requirement 31; 8.9, 8.11, 8.15] [GSR Part 2; Requirement 9; 4.25] [GS-G-3.5; 4.8-4.25] [SSG-74; 5.21-5.26]

48. How are maintenance related temporary modifications controlled and minimized? [SSR-2/2 (Rev.1), Requirement 11; 4.40-4.42, Requirement 31; 8.10, 8.12] [SSG-71; 6.1-6.11] [SSG-74; 5.53-5.54]

49. How is outage planning integrated into the work control process? [SSR-2/2 (Rev.1) Requirement 32; 8.18] [SSG-74; 5.27-5.37]

50. How is it confirmed that interfaces between maintenance and other groups in the plant are effective? [SSR-2/2 (Rev.1) Requirement 31; 8.11] [SSG-74; 5.45-5.49]

51. How is the ALARA principle incorporated into the planning and implementation of work activities? [SSR-2/2 (Rev.1) Requirement 8; 4.25, Requirement 20; 5.16, Requirement 31; 8.10] [SSG-74; 8.6, 9.5, 9.26, 9.29] [GSG-7; 2.10, 3.17, 3.21, 3.28, 3.42(b)]

4.8. Spare parts and materials

52. How are spare parts procured and then inspected upon receipt? What procedures govern the process? [SSR-2/2 (Rev.1) Requirement 31(Rev.1); 8.15, 8.16] [SSG-74; 8.25, 8.30, 8.36]

53. How are the quality and technical specifications of spare parts and materials maintained consistent with plant design? [SSR-2/2 (Rev.1) Requirement; 31; 8.16] [SSG-74; 8.28, 8.32]

54. What control measures has the plant implemented regarding the use of commercial-grade spare parts? [SSR-2/2 (Rev.1) Requirement 31; 8.16] [SSG-74; 8.28] [GS-G-3.5; 5.35-5.37]

55. How does the plant ensure that there are adequate spare parts and material management facilities to meet its needs? [SSR-2/2 (Rev.1) Requirement 31; 8.17] [SSG-74; 8.32]

56. How are appropriate environmental conditions maintained within storage facilities? [SSR-2/2 (Rev.1) Requirement 31; 8.15, 8.17] [SSG-74; 8.29, 8.39] [SSG-48; 3.28] [GS-G-3.5; 5.156]

57. How are stock levels defined, and what particular attention is paid to critical components? [SSR-2/2 (Rev.1) Requirement 31; 8.15, 8.16] [SSG-74; 8.27] [GS-G-3.5; 5.160]

58. How are CSFIs (counterfeit, suspect and fraudulent items) prevented from entering the plant for use in systems and components? How are certificates of spare parts from outside-suppliers checked and confirmed, and the quality of the supplied equipment trended and analysed periodically? [SSR-2/2 (Rev.1) Requirement 31; 8.15, 8.16] [SSG-74; 8.31, 8.38] [GS-G-3.5; 5.161, 5.162]

59. How does the plant guarantee that safety related spare parts and materials are traceable? [SSR-2/2 (Rev.1) Requirement 31; 8.15] [SSG-74; 8.37] [GS-G-3.5; 5.151, 5.154]

60. How is preventive maintenance performed on spare parts? [SSR-2/2 (Rev.1) Requirement 31; 8.17] [SSG-74; 8.50] [GS-G-3.5; 5.153]

61. What process is in place to deal with repairs and returns of spare parts, and surplus spare parts? [SSR-2/2 (Rev.1) Requirement 31; 8.15] [GS-G-3.5; 5.154, 5.158] [SSG-74; 8.51]

62. How are obsolete, non-conforming and damaged spare parts controlled? [SSR-2/2 (Rev.1) Requirement 31; 8.15] [SSG-74; 8.52] [GS-G-3.5; 5.162] [SSG-48; 3.27, 6.2]

63. Are periodic QA audits and self-assessments performed and, if so, at what frequency? [SSR-2/2 (Rev.1) Requirement 9; 4.33-4.35] [GS-G-3.1; 6.12] [SSG-74; 5.60-5.61]

4.9. Outage management

64. How is the organization and associated responsibilities for outage defined? [SSR-2/2 (Rev.1) Requirement 32; 8.20-8.22] [SSG-74; 5.27]

65. What continuous outage improvement process is in place to optimize outage performance? How are lessons learned from outages reviewed, addressed and implemented? [SSR-2/2 (Rev.1) Requirement 32; 8.18, 8.24] [SSG-74; 5.28]

66. How is outage preparation conducted? How does this effectively control the milestones of outage preparation and the outage scope freeze date? How does outage preparation take into account past lessons learned as well as external lessons? [SSR-2/2 (Rev.1) Requirement 32; 8.18, 8.24] [SSG-74; 5.37] [SSG-50; 2.68, 2.70-2.73]

67. How is nuclear safety reviewed during the outage preparation and execution? How are high-risk time windows optimized to minimize risk-exposure? How is defence-in-depth maintained throughout the outage? What process is in place to review changes to the outage in terms of their implications for outage safety? [SSR-2/2 (Rev.1) Requirement 6; 4.9, Requirement 32; 8.19, 8.20] [SSG-72; 7.1, 7.29-7.33, 7.53 (j), 7.83 (b)] [SSG-74; 5.28]

68. How is outage execution monitored in terms of safety, quality and schedule adherence? [SSR-2/2 (Rev.1) Requirement 32; 8.19] [SSG-74; 5.29]

69. How are contractors managed during the outage? What attention is given to the experience level of contractors present during the outage? [SSR-2/2 (Rev.1) Requirement 7; 4.20, Requirement 32; 8.21, 8.23] [SSG-74;4.6] [GS-G-3.5; 5.79-5.83]

70. For periods of increased risk (e.g. during outages or modifications, how are materials such as combustibles, temporary storages, chemical or radiological substances at the working area controlled to limit the risk of various internal hazards (fire, flooding, hazardous gases, etc.)? [SSR-2/2 (Rev.1) Requirement 22; 5.21, Requirement 32; 8.23] [SSG-74; 5.35] [GSG-7; 3.89, 3.95] [SSG-40; 2.11, 3.21, 6.105] [SSG-77; 8.4-8.6]

71. How are personnel trained in specific aspects related to the outage, such as any infrequently performed activities, specific configurations during the outage, high-risk time windows for the outage, etc.? [SSR-2/2 (Rev.1) Requirement 7; 4.16, 4.17, 4.19, 4.20, Requirement 32; 8.20] [SSG-75; 5.11] [SSG-74; 4.6, 4.38, 4.40, 5.33]

72. What long-term planning and scheduling is undertaken for plant outages? [SSR-2/2 (Rev.1) Requirement 32; 8.18] [SSG-74; 4.12, 4.18]

4.10. Configuration control

73. How is control of plant configuration ensured during maintenance and prior to the return-to-service of plant equipment? [SSR-2/2 (Rev.1) Requirement 10; 4.38, Requirement 31; 8.10] [SSG-74; 5.52]

74. What kinds of administrative procedures and controls are implemented to ensure control of plant configuration during maintenance and surveillance activities? [SSR-2/2 (Rev.1) Requirement 10; 4.38, Requirement 31; 8.3] [SSG-71; 7.1-7.5] [SSG-74; 5.50]

75. What control measures is in place for informing control room operators of all maintenance activities before they are commenced in order to maintain configuration control and ensure safe operation of the plant? [SSR-2/2 (Rev.1) Requirement 10; 4.38, Requirement 31; 8.8, 8.11] [SSG-74; 5.53-5.55]

4.11. Use of PSA, PSR and OEF

76. How does the maintenance department use PSA applications for risk informed decision making? [SSR-2/2 (Rev.1) Requirement 31; 8.5, 8.6, 8.13] [SSG-74; 2.6, 8.5] [SSG-3; 2.22, 10.33,10.36, 10.37, 10.52, 10.66]

77. How are the results of periodic safety reviews utilized to identify any necessary modifications, with a view to enhancing the maintenance programme? [SSR-2/2 (Rev.1) Requirement 12; 4.44, 4.47, Requirement 31; 8.13] [SSG-25; 3.8, 5.29, 5.41, 5.47, 5.86] [SSG-71; 2.5, 3.9] [SSG-74; 2.17, 6.13] [SSG-48; 4.19-4.22, 7.26]

78. How does the maintenance department use OEF for continuous improvement of its maintenance activities? [SSR-2/2 (Rev.1) Requirement 24; 5.27, Requirement 31; 8.5, 8.7] [SSG-74; 2.7, 2.12, 2.17, 3.1, 3.5, 3.14, 4.24, 4.33, 6.6, 6.12, 6.14-6.16, 8.5, 9.28, 10.12, 10.24]

79. How does the operating organization take into account the revised safety classification for safety and non-safety related SSCs to improve its maintenance programme based on PSA, PSR and OEF? [SSG-30; 2.3, 3.24]

[IAEA safety standards for this WNO: SSR-2/2 (Rev. 1)*; GSR Part 2; SSG-71; SSG-72; SSG-73; SSG-74*; SSG-75; SSG-76; SSG-77; GS-G-3.1; GS-G-3.5; SSG-3; SSG-25; SSG-28; SSG-30; SSG-40; SSG-48; SSG-50; GSG-7. (*main basis)]

Fact in bold: New fact

Fact not in bold and in Italic: Previously edited fact

Fact not in bold: Validated fact by counterpart

~~Fact strikethrough~~: Fact deleted (only after discussion with TL or DTL)

MA : FACTS & Themes

4. MAINTENANCE

4.1. Organization and functions (Q1-Q6)

Fact:

4.2. Maintenance facilities and equipment (Q7-Q11)

Fact:

4.3. Maintenance programmes (Q12-Q26

Fact:

4.4. Procedures, records and maintenance history (Q27-Q31)

Fact:

4.5. Conduct of maintenance work (Q32-Q39)

Fact:

4.6. Material condition (Q40-Q42)

Fact:

4.7. Work control (Q43-Q51)

Fact:

4.8. Spare parts and materials (Q52-Q63)

Fact:

4.9. Outage management (Q64-Q72)

Fact:

4.10. Configuration control (Q73-Q75)

Fact:

4.11. Use of PSA, PSR and OEF (Q76-Q79)

Performance Data:

Description	**2021**	**2022**	**2023**	**2024**
Number of Maintenance rework				
Number of Critical PMs in 2nd half of grace period at year end				
Number of Deferred critical PMs				
On-line critical component defect backlog				
On-line schedule completion (%)				
Outage critical component defect backlog				

Work Management:

Description	**2021**	**2022**	**2023**	**2024**
On-line schedule completion (%)				
Outage schedule completion (%)				
On-line critical scope survival (%)				
Outage critical scope survival (%)				

4. MA

No.	Issue summaries: (Brief five-line maximum description, neutral in tone, in order to present the subject of issues under development to the Plant Manager)	CI	CA	PMI	PMA
1					
2					
3					
4					
5					
6					
GP1	Good Practices: [brief description]				
GP2					

CI = Counterpart informed, CA = Counterpart agreed, PMI = Plant manager informed, PMA = Plant manager agreed

OSART MISSION WORKING NOTES OUTLINES – TECHNICAL SUPPORT

TS: 118 Q > 16 Q / Day	Comments from TL
Day 1	
Day 2	
Day 3	
Day 4	
Day 5	
Day 6	
Day 7	
(Day 8)	

Contents

5. TECHNICAL SUPPORT

5.1 Organization and functions

5.1.1. Functions and responsibilities

1. How are technical support functions responsibilities, and levels of authority defined in organizational structure and communicated within the organization? Are they understood by personnel? [SSR-2/2 (Rev.1) Requirement 1; 3.2(b), (d), Requirement 3; 3.8, 3.9] [SSG-72; 2.5, 2.6, 2.11, 2.12, 2.14] [SSG-73; 8.1, 8.2, 8.4] [SSG-74;4.13-4.19, 5.47]

2. How are the goals, objectives and safety indicators related to technical support developed and managed? How are outcomes monitored and measured within the organization? [GSR Part 2 Requirement 4; 4.3-4.4] [SSR-2/2 (Rev.1) Requirement 9; 4.33-4.37] [SSG-72; 3.15-3.19] [SSG-74; 2.12-2.16, 3.5, 4.2, 5.20, 5.28, 5.29]

3. How are technical support policies, goals, objectives and programmes kept up-to-date? What internal process is put in place in this regard? [GSR Part 2 Requirement 4; 4.5] [SSR-2/2 (Rev.1) Requirement 31; 8.1-8.3] [SSG-74 2.17, 3.1, 3.5]

4. How the responsibility for carrying out the safety assessment is defined? In what way the safety assessment is carried out and how the quality of the results is ensured? [GSR Part 4 Requirement 3; 4.2, 4.5, 4.6]

5. How the interfaces and communication lines between different groups within technical support function (i.e. design, operations, contractors, etc.) are specified and controlled? In what way are the interface responsibilities with other plant groups/departments defined, and how is mutual understanding guaranteed? [SSR-2/2 (Rev.1) Requirement 1; 3.2(f), Requirement 32; 8.22] [[SSG-73; 8.7] [SSG-74; 3.15, 3.16, 5.45-5.49]

6. In what way are the interface responsibilities with corporate organizations and contractors specified, supervised and evaluated? [SSR-2/2 (Rev.1) Requirement 5; 4.3] [SSG-71; 3.12-3.14] [SSG-72; 4.5, 4.7-4.10] [SSG-73; 8.8, 8.9] [SSG-74; 3.6-3.12]

7. How it is ensured that the plant design meets all applicable safety requirements. [SSR-2/1 (Rev.1) Requirement 1; 3.1]

8. How does the plant guarantee that technical support activities are effectively planned and scheduled during normal operation as well as during outages? [SSG-72; 7.29-7.31] [SSG-74; 4.17, 4.18, 4.25, 4.26, 5.14, 5.20-5.22, 5.23, 5.24]

5.1.3. Personnel

9. How the competences and resources needed to perform all relevant technical support activities are determined? How does the plant ensure that it has the necessary in-house or contracted human resources needed to perform all relevant technical support activities? [GSR Part 2 Requirement 9; 4.21, 4.22] [SSR-2/2 (Rev.1) Requirement 4; 3.11] [SSG-38; 4.21, 4.43, 4.44] [SSG-71; 2.17, 3.6, 3.12] [SSG-72; 7.8-7.15] [SSG-73; 8.8, 8.9] [SSG-74; 4.6] [SSG-77; 10.6]

10. How does the plant ensure that its technical support staff, including contractors, have

adequate experience and proficiency for the functions to be performed? [GSR Part 2 Requirement 9; 4.21, 4.22] [SSR-2/2 (Rev.1) Requirement 4; 3.10-3.11, Requirement 7; 4.16-4.19] [GSR part 4 Requirement 3; 4.2] [SSG-28; 3.60, 3.61] [GS-G-3.5; 6.34] [SSG-71; 3.6, 3.13] [SSG-72; 7.16-7.18] [SSG-73; 8.8-8.10] [SSG-74; 3.8, 3.9, 4.35-4.43] [SSG-75;2.2, 2.7-2.10, 3.1, , 3.35-3.37, 4.1, 5.34-5.36] [SSG-77; 3.6]

5.1.4. Monitoring, control, review and analysis of safety performance

11. How senior management monitors the technical support plans and goals, and evaluates the achievement of these plans and goals to check if they are still appropriate and valid? [SSR-2/2 (Rev.1) Requirement 9; 4.34] [GS-G-3.1; 6.6]

12. How is the technical support function used in the evaluation of plant safety performance? How is it ensured that technical support assessments are systematically taken into consideration for activities that may have an impact on safety? [SSR-2/2 (Rev.1) Requirement 8; 4.25] [GSR Part 2 Requirement 13; 6.2] [GSR part 4 Requirement 4; 4.4-4.15, Requirement 6; 4.19, Requirement 7; 4.20, 4.21, Requirement 9; 4.24-4.26, Requirement 11; 4.38-4.41] [GS-G-3.5; 6.27-6.29] [SSG-77; 7.1, 7.6, 7.10, 7.11]

13. How does the plant ensure that self-assessment techniques are effectively applied to technical support activities? [GSR Part 2 Requirement 14; 6.9] [SSR-2/2 (Rev.1) Requirement 9; 4.34] [GS-G-3.1; 6.12-6.15] [SSG-72; 5.19]

14. How it is ensured that basic and other(derived) acceptance criteria are properly set for the entire range of operational states and accident conditions, and fulfilled by the plant(s)? [SSG-2; 3.15-3.22]

5.1.5. Hazard management against internal and external hazards

15. How has the plant established the separate or integrated hazard management with the clear purpose of prevention, protection and mitigation of all internal and external hazards as well as combination of hazards (consequential or correlated hazards occurring during or immediately after one hazard) (hereafter ‘hazards’)? [SSG-77; 3.1, 3.18]

16. How are external organizations who have interfaces with the plant in the hazard management, instructed on site specific requirements? How are the communication processes with those external organization documented, updated, and trained in both the plant and external organization? In these communication processes, how and by whom is information obtained and responded on situations that may hinder the support of external organizations, such as extreme weather or temporary traffic increases? [SSR-2/2 (Rev.1) Requirement 22; 5.24] [SSG-75; 4.36] [SSG-77; 3.4, 3.14, 3.17]

17. How is it confirmed that the prevention and protection systems for hazards are updated and maintained, and that the system is appropriate during the commissioning phase? [SSG-77; 1.8] (COMs – only relevant for Pre-OSART missions)

5.2. Safety assessment

18. Has safety been assessed by the plant for all facilities and activities, consistent with a graded approach used in determining the scope and level of detail of the safety assessment? [SF-1; 3.15] [GSR Part 4 Requirement 1; 3.2-3.6]

19. In the assessment, how has the plant determined each response level, deployment of personnel, degree of management, and adequacy of its warning, monitoring, protection, and mitigation features commensurate with characteristic of each hazard and its potential impacts? [SSR-2/2 (Rev.1) Requirement 22; 5.21] [SSG-70; I.45] [SSG-77; 4.7, 4.8, 5,7, 5.8, 7.2]

20. How the results of plant hazard analysis for all credible hazards are included in the plant procedures and strategies for hazard management? How frequently are any changes in the plant safety assessments and hazard analysis reviewed for updating hazard management? Is there a specific organization in charge of performing reviews for changes to internal and external hazards? [SSR-2/2 (Rev.1) Requirement 22; 5.22] [SSG-77; 3.13, 4.3, 4.4, 5.1, 7.1-7.10]

5.2.1. Periodic safety review

21. What is the extent of the PSR performed on site? How is it ensured that the scope of the PSR includes all safety aspects of a nuclear power plant? [SSR-2/2 (Rev.1) Requirement 5; 4.4, Requirement 12; 4.44, 4.46] [SSG-25; 2.5-2.7, 2.12, 2.13, 2.17, 2.18, 4.1] [SSG-2; 8.27] [SSG-72; 7.53-7.56] [SSG-77; 3.13, 7.2, 7.9]

22. What process is there in place for review of safety factors and reporting its results? [SSG-25; 8.12-8.17]

23. How does the operating organization define the integrated implementation plan of safety improvements resulted from PSR, including ranking, prioritization and timing of safety improvements? [SSG-25; 8.20-8.23]

24. How often does the operating organization conduct a safety review to monitor the cumulative effects of plant modifications on plant safety? [SSR-2/2 (Rev.1) Requirement 12; 4.44] [SSG-71, 3.9, 6.8]

25. How does the plant evaluate the results from its PSR, and how are corrective actions documented and implemented? [SSR-2/2 (Rev.1) Requirement 12; 4.47] [SSG-25; 4.21, 4.25-4.28, 5.3, 5.4, 5.9-5.13, 6.1, 6.2, 6.6-6.12]

26. How does the plant use the PSR to enhance its technical support programmes (e.g. long-term operation, hazard management, plant modifications and surveillance)? [SSR-2/2 (Rev.1) Requirement 12; 4.44, 4.46-4.47] [SSG-25; 1.4, 2.10, 3.1-3.10, 5.28, 5.41, 5.46, 5.153] [SSG-71; 2.5, 3.9] [SSG-74; 7.7] [SSG-72, 7.35, 7.37, 7.55] [SSG-48; 4.6] [SSG-77; 7.2, 7.9]

27. What system is there in place to update the Safety Analysis Report (SAR) as a result of the PSR? [SSG-25; 3.8, 4.14, 9.3, 9.5] [SSG-61; 2.18-2.20]

28. Does the PSR review include changes to the hazards? Did the last PSR identify any major plant modifications, evaluation for the severity/magnitude of external hazards, off-site civil infrastructures, and/or ageing of structures, systems and components (SSCs), those affects on the plant hazard management and were any recommendations prescribed on the plant hazard management? What improvements (i.e. physical plant changes, organizational changes, operational changes, etc.) were implemented? [SSG-77; 3.13, 7.1-7.3, 7.8-7.10]

5.3. Programme for long-term operation

[Note: if LTO is reviewed as a separate module, on this particular subject, the TS reviewer will support the LTO reviewer, as per the WNO for LTO]

29. What is the plant policy in the area of long-term operation and ageing management? [GSR Part 2 Requirement 4; 4.3-4.5] [SSR-2/2 (Rev.1) Requirement 14; 4.50, 4.51] [GS-G-3.1; 3.10-3.12, 5.10] [SSG-48; 3.31, 4.3, 5.1, 7.7, 7.9]

30. If applicable, what process has been established for setting the scope of LTO? [SSG-48; 5.14-5.21]

31. If applicable, how has the plant prepared and justified safe operation beyond the timeframe established in the license conditions, design limits, safety standards and/or regulations? [SSR-2/2 (Rev.1) Requirement 16; 4.53, 4.54]

32. If applicable, to what extent has the plant used periodic safety review results in order to evaluate plant safety for long-term operation? [SSR-2/2 (Rev.1) Requirement 16; 4.53] [SSG-25; 3.1- 3.10]

33. If applicable, how is ageing management used to support long-term operation? [SSR-2/2 (Rev.1) Requirement 16; 4.53] [SSG-48; 4.5-4.6]

34. If applicable, how does the plant verify that all SCs within the scope of LTO are covered by appropriate programmes such as Ageing Management Programmes (AMPs), revalidation of time-limited ageing analyses or other existing programmes? [SSR-2/2 (Rev.1) Requirement 16; 4.54]

35. If applicable, are staff involved in LTO activities assigned specific job descriptions/task responsibilities? [GS-G-3.5]

36. If applicable, does the plant have plant-level documentation covering the LTO concept and approach? [SSG-48; 4.1, 4.6]

5.3.1. Ageing management

37. Has the plant an effective ageing management programme in place to ensure that the required safety functions of systems, structures and components are fulfilled over the entire lifetime of the plant? [SSR-2/2 (Rev.1) Requirement 14; 4.50, 4.51] [SSG-48; 2.6-2.21] [SSG-72; 7.106-7.108] [SSG-74; 2.20, 6.13, 7.4-7.8] [SSG-61; 3.13.16, 3.13.17]

38. What methodology is used to ensure a structured and consistent approach in implementing ageing management which ensures that the ageing management programme is coordinated with, and is consistent with, other relevant programmes, including those for periodic safety review, maintenance, equipment qualification, in-service inspection, surveillance and water chemistry? [SSG-48; 2.6-2.21]

39. What system, programme or arrangements are in place to manage obsolescence proactively? How clearly is the concept of obsolescence management? [SSG-48; 2.25-2.29]

40. How are the periodic safety review results utilized in ageing management? [SSR-2/2 (Rev.1) Requirement 12; 4.44, Requirement 14; 4.50] [SSG-48; 4.6]

41. What process is there in place for ageing management review to ensure and demonstrate that ageing is effectively managed and to identify ageing effects and degradation mechanisms? How systematically ageing management reviews are performed? [SSR-2/2 *(Rev.1)* Requirement 14; 4.50] [SSG-48; 5.22-5.26]

42. How are the information, methodology, results and conclusions regarding ageing management review documented? [SSG-48; 5.33-5.36]

43. How are the insights from surveillance programme utilized in ageing management? How are the relevant operating experience, results from research and development, and results of self-assessment and peer reviews collected, evaluated and utilized for improving the ageing management programme? [SSG-74; 7.6-7.8] [SSG-48; 2.21]

44. What review process is established for in-depth review and improvement of programmes and practices used to support the management of ageing effects during operation, including long term operation? [SSG-48; 5.59-5.63]

5.4. Use of PSA

[Note: if PSA applications are reviewed as a separate module, on this particular subject, the TS reviewer will support the PSA reviewer, as per the WNO for PSA]

45. What is the extent of the PSA analysis (Level 1, 2, 3, external, internal events)? How is it ensured that PSA analysis are performed to a scope and level of detail that correspond to the magnitude of the radiation risks, the frequency of the events included in the safety analysis, the complexity of the facility or activity? How is it used by the plant? [SSR-2/2 (Rev.1) Requirement 8; 4.32] [GSR part 4 Requirement 14; 4.50; Requirement 15; 4.53, 4.55; Requirement 24; 5.8] [GSR part 4 Requirement 24; 5.8] [SSG-3, 2.2, 2.3, 2.9, 2.10-2.20, 2.21-2.24, 2.27-2.29, 2.31, 10.6, 10.7]

46. How often is the PSA analysis updated to account for plant modifications? When was the PSA last reviewed, and how does it confirm that the existing PSA model is valid and reflects current plant configuration? [SSG-71; 4.10, 4.12] [SSG-3; 2.7, 2.8]

47. Are any PSA applications implemented and, if so, which ones exactly? To what extent is the technical support function involved in their development? What are the results? What examples can be put forward? [SSR-2/2 Requirement 31; 8.5, 8.6] [SSG-74; 2.6, 2.10, 2.17, 3.3, 4.25, 5.32, 8.5, 9.5, 9.28, 9.37] [SSG-3; 10.36, 10.37, 10.52]

48. Does the plant use the PSA results to evaluate changes to the allowed outage times [AOT] and to further develop the risk profile of a typical outage? [SSG-3; 2.9, 2.31, 9.66, 10.29]

49. How is the relevant operating experience taken into account and utilized in the PSA analysis? Does it include operating experience from the actual and similar facilities and activities? [GSR part 4 Requirement 14; 4.52]

5.5. Surveillance programme

[Note: TS reviewer should liaise with the OPS reviewer to observe surveillance testing both in

the field and in the control room]

5.5.1. Programme requirements

50. What surveillance programme is there in place to verify that provisions for safe operation that were considered in the design and assessed in construction and commissioning, and which are verified throughout operation as well as to verify that the safety margins are adequate and provide a high tolerance for anticipated operational occurrences, errors and malfunctions? [SSR-2/2 (Rev.1) Requirement 6; 4.12, Requirement 31; 8.2] [SSG-48; 4.38] [SSG-74; 9.1, 9.2, 9.6, 9.21]

51. How does the plant ensure that the surveillance programme is comprehensive, adequate, and in compliance with operational limits and conditions? [SSR-2/2 (Rev.1) Requirement 31; 8.1, 8.2] [SSG-72; 7.36-7.38] [SSG-74; 2.19-2.21, 9.3, 9.6, 9.9]

52. How does the plant ensure that the quality assurance principles are uses to enable the surveillance requirements to be derived in a graded manner where the extent of the requirements is consistent with the safety functions performed by the SSCs? [SSG-74; 4.33, 5.4, 5.24, 9.5]

53. How effectively and to what extent is the safety analysis report, operating experience and plant modifications are used to specify and update the surveillance programme? [GSR part 4 Requirement 24; 5.4, 5.5] [SSG-2; 7.12] [SSG-3; 2.31, 10.30, 10.34] [SSG-72; 7.37] [SSG-74; 4.3]

54. How does the plant ensure that the surveillance programme does detect an abnormal condition before it can give rise to significant consequences for safety? [SSR-2/2 (Rev.1) Requirement 31; 8.2] [SSG-72; 7.36] [SSG-74; 2.19, 2.20, 6.14, 9.37] [SSG-61; 3.13.10-3.13.12]

55. How is it ensured that the purpose and objectives of the commissioning tests are clearly defined and linked with safety criteria and characteristics mentioned in the (preliminary) safety analysis report? [SSR-2/2 (Rev.1) Requirement 25; 6.4] [SSG-28; 4.7] (COMs – only relevant for Pre-OSART missions)

5.5.2. Surveillance scheduling

56. What is the basis for the selected frequency of surveillance activities? [SSR-2/2 (Rev.1) Requirement 31; 8.5] [SSG-74; 5.13, 5.61, 5.62, 8.5, 9.5, 9.26-9.31, 9.37] [SSG-61; 3.13.10-3.13.12]

57. How does the plant ensure that surveillance activities are coordinated with maintenance and inspection activities, and planned in a way that operational limits and conditions and any other applicable regulatory requirements are always met? [SSR-2/2 (Rev.1) Requirement 31; 8.8] [SSG-74; 5.45, 10.10-10.14]

58. How does the plant ensure that surveillance activities include all necessary arrangements to verify the integrity of barriers? [SSG-74; 9.10-9.14]

5.5.3. Administrative controls and procedures

59. How does the plant ensure that administrative controls are established to implement the

surveillance programme and to achieve the objective of safe and reliable operation? [SSG-74; 4.29]

60. How does the plant ensure that its procedures for surveillance testing are comprehensive, clear and understood by personnel? [SSR-2/2 (Rev.1) Requirement 31; 8.3] [SSG-72; 5.14] [SSG-74; 5.1-5.12, 5.47]

61. How is it ensured that content and format of a typical surveillance procedure are clearly determined, including purpose, prerequisites, limiting conditions and precautions, step by step actions in a logical order, acceptance criteria and return to service? [SSG-74; 4.30-4.32, 5.8-5.12, 5.50-5.56]

62. How is data from the surveillance programme recorded, reported, stored and analysed? [SSR-2/2 (Rev.1) Requirement 31; 8.4] [SSG-74; 6.1-6.11]

63. What administrative and organizational arrangements are in place within the operating organization to ensure that the commissioning process is adequately documented, and that appropriate records on testing, results, analyses and deviations, if any, are safely kept? [SSR-2/2 (Rev.1) Requirement 25; 6.7, SSG-28; 4.5] (COMs – only relevant for Pre-OSART missions)

64. How is it ensured that design, operational and safety documentation for the nuclear power plant is updated during the commissioning process, in accordance with test results and the resolution of deviations? [SSR-2/2 (Rev.1) Requirement 25; 6.1, 6.10, SSG-28; 4.6] (COMs – only relevant for Pre-OSART missions)

5.5.4. Conduct of surveillance testing

65. How is it confirmed that the surveillance test programme is properly executed? [SSR-2/2 (Rev.1) Requirement 31; 8.2] [SSG-72; 7.37] [SSG-74; 9.9, 9.45-9.48] [SSG-76; 5.8, 5.9, 7.2]

66. What process or programme is there in place for reviewing surveillance activities and evaluating of each surveillance programme element to ensure identifying and correcting programme deficiencies? What is the scope of surveillance programme review? [SSG-74; 2.19-2.21, 4.15, 5.59-5.63, 6.6-6.8, 9.3, 9.55]

67. How are deviations discovered in the course of surveillance tests evaluated and rectified? [SSR-2/2 (Rev.1) Requirement 31; 8.2] [SSG-76; 4.55] [SSG-74; 2.26, 6.9-6.11]

68. How are the results of the surveillance programme made known to operations, and on what timescale following the tests themselves? [SSG-76; 5.22]

69. How does the plant ensure that its surveillance activities are properly authorized and are carried out in a safe way, and that results are properly documented? [SSR-2/2 (Rev.1) Requirement 31; 8.7-8.10] [SSG-74; 4.15, 9.45]

5.6. Plant modification system

70. How does the plant ensure that all modifications are properly identified, specified, screened, designed, evaluated, authorized, implemented and recorded? [SSR-2/2 (Rev.1) Requirement 11; 4.39, 4.40] [SSG-72; 7.96, 7.97] [SSG-71; 2.1-2.3, 2.12-2.17] [SSG-61;

3.13.18, 3.13.19]

71. What system is there in place to ensure that modifications are categorized, prioritized and divided into groups? [SSR-2/2 (Rev.1) Requirement 11; 4.41] [GSR Part 4 Requirement 4; 4.15] [SSG-71; 2.6-2.9, 4.2-4.3] [SSG-39; 2.162]

72. How is it confirmed that the safety analysis and hazard analysis for the plant remains valid in consideration of the cumulative effects of modifications relating to the configuration of the plant or to management systems? [SSG-71; 3.9] [SSG-39; 2.167] [SSG-77; 2.6, 4.3, 4.4, 5.1, 7.2, 7.7, 7.10]

73. What procedures are to be followed during implementation of a plant modification? [SSG-71; 2.14, 2.17, 2.18]

74. What system for modification control is there in place to ensure proper review, control and testing of all permanent and temporary modifications and adequate consideration of human and organizational factors? [SSR-2/2 (Rev.1) Requirement 11; 4.40, 4.42]

75. How is it confirmed that temporary modification procedures are effectively implemented? [SSR-2/2 (Rev.1) Requirement 11; 4.40] [SSG-76; 5.55]

76. What system is there in place to ensure that temporary modifications are limited in time and number? [SSR-2/2 (Rev.1) Requirement 11; 4.41] [SSG-71; 6.4, 6.5]

77. How frequently are checks made of installed temporary modifications to ensure continued applicability? [SSG-70; 2.15, 2.16, 7.11-7.13, 7.30, 9.11] [SSG-76; 5.58]

78. How does the plant analyze and ensure that the cumulative safety significance of existing temporary modifications is minimized? [SSR-2/2 (Rev.1) Requirement 11; 4.41]

79. How is it confirmed that all relevant plant documents and programmes are in accordance with a modification? [SSR-2/2 (Rev.1) Requirement 11; 4.42] [SSG-71; 10.1-10.7]

80. How does the plant assess the impact of plant modifications on hazard management processes and procedures? [SSR-2/2 (Rev.1) Requirement 22; 5.21(f)] [SSG-77; 7.10]

81. How are modifications documented during the commissioning period? [SSR-2/2 (Rev.1) Requirement 11; 4.39, 4.40] [SSG-71; 2.19, 7.12, 7.16, 7.17] (COMs – only relevant for Pre-OSART missions)

82. What special procedure is there for treating temporary plant modifications during commissioning? How are temporary modifications treated and documented? [SSR-2/2 (Rev.1) Requirement 11; 4.41] [SSG-28; 3.54, 4.74] (COMs – only relevant for Pre-OSART missions)

83. How is it ensured that modifications made during commissioning are consistent with design requirements? [SSR-2/2 (Rev.1) Requirement 11; 4.39] [SSG-28; 4.70, 4.71] (COMs – only relevant for Pre-OSART missions)

5.6.1. Modifications to computer hardware and software

84. What specific system is there in place to ensure safety and security when the hardware or

software of plant computer systems is modified? [SSR-2/2 (Rev.1) Requirement 11; 4.39, 4.42, Requirement 17; 5.1] [SSG-39; 2.158-2.162] [SSG-71; 2.11, 4.24, 7.15]

85. What configuration control process is applied to the initial development of I&C systems, changes made during development and modifications after they have been placed in service to ensure that items are assembled and installed correctly, and that the intended software version is installed correctly? [SSG-39; 2.45, 2.51] [SSG-71; 4.25-4.26, 7.18, 7.22]

5.6.2 Safety assessment of plant modifications

86. What system is there in place to ensure that the safety of plant modifications is assessed and evaluated with, for example, deterministic and probabilistic methods? [SSR-2/2 (Rev.1) Requirement 11; 4.40] [GSR part 4 Requirement 4; 4.6, 4.15, Requirement 24; 5.2] [SSG-2; 8.10-8.14] [SSG-3; 2.22-2.24] [SSG-71; 2.5, 3.9, 4.4]

87. How is it confirmed that appropriate safety analyses and independent review have been performed before any modification is commenced? [SSG-70; 2.8, 2.10, 2.14, 2.15, 2.17] [SSG-71; 3.5, 4.5]

88. How is it ensured that first-of-a-kind principal design features are in-plant functionally tested to verify their performance? [SSG-28; 4.8] (COMs – only relevant for Pre-OSART missions)

89. How is it ensured that the impact of commissioning modifications on test sequences and procedures is sufficiently assessed to avoid interferences with the intended design configuration, e.g. a new motor having different operating characteristics? Has an appropriate review been performed to ensure that safety implications are properly considered? [SSG-28; 4.74]

5.6.3. Administrative controls and procedures

90. How is it ensured that the administrative procedures for plant modifications are comprehensive, clear and understood by personnel? [SSR-2/2 (Rev.1) Requirement 11; 4.42] [SSG-72; 5.14] [SSG-71; 3.2, 7.1-7.5]

91. What process or procedure is there in place to control temporary modifications on the plant? [SSG-71; 6.3, 6.6, 6.7, 6.9]

92. How does the plant guarantee that all safety related modifications are reviewed and approved by operating staff? [SSR-2/2 (Rev.1) Requirement 11; 4.43] [SSG-70; 2.14] [SSG-76; 4.4, 4.41, 5.10, 5.53-5.55, 5.57] [SSG-71; 4.13, 6.11]

93. What is the process for revising normal and emergency operating procedures to reflect modifications in the plant? And how does the operating organization ensure that operations personnel are using the latest and approved versions of controlled documents? [SSR-2/2 (Rev.1) Requirement 11; 4.42] [SSG-71; 2.3, 4.23, 4.29, 10.1, 10.6, 10.7]

94. How does the plant ensure that its personnel are trained, and that all relevant documents necessary for plant operation are updated before the commissioning of any modified plant? [SSR-2/2 (Rev.1) Requirement 11; 4.42, 4.43] [SSG-71; 2.19, 3.10, 4.23, 5.4, 7.4, 7.17, 9.1-9.5, 10.4]

5.6.4. Control of plant configuration

95. What system is there in place to ensure consistency between design requirements, physical configuration and plant documentation? [SSR-2/2 (Rev.1) Requirement 10; 4.38, Requirement 11; 4.42] [SSG-71; 4.27] [SSG-61; 3.13.22]

96. How is it ensured that design basis documentation reflects the actual status of the plant over its lifetime? [SSR-2/1 (Rev.1) Requirement 14; 5.3] [SSG-71; 4.28, 7.16]

97. What documentation is included in the acceptance package for each system in the handover process? [SSG-28; 3.54] (COMs – only relevant for Pre-OSART missions)

98. How can it be ensured that all documents relevant to the safe and reliable operation of the plant are kept current and updated in a timely manner in the light of operating experience and the actual plant configuration? [GSR Part 2 Requirement 8; 4.18] [SSR-2/2 (Rev.1) Requirement 26; 7.4] [SSG-72; 7.98, 7.102-104] [SSG-71; 4.29]

99. How does this system ensure that plant procedures remain fit for purpose, and are modified, verified, validated and approved as necessary? How does it ensure that all affected personnel are using the latest versions of procedures? [SSR-2/2 (Rev.1) Requirement 26; 7.1-7.4] [SSG-71; 2.3, 4.23, 10.1-10.7]

100. Is there a procedure for determination of retention times for operational and maintenance records? [SSR-2/2 (Rev.1) Requirement 15; 4.52] [GSR Part 2 Requirement 8; 4.19-4.20]

101. How it is ensured in the process of work planning and execution that the plant configuration is maintained in accordance with the OLCs? [SSR-2/2 (Rev.1) Requirement 26; 7.2-7.4, Requirement 30; 7.19, Requirement 31; 8.10, Requirement 32; 8.19] [SSG-71; 2.7, 2.15, 3.2, 4.19-4.21] [SSG-73; 2.4, 2.32-2.35]

102. Does the organization apply methods of configuration management when modifying OLCs or operational procedures in order to ensure consistency with all other documentation? [SSR-2/2 (Rev.1) Requirement 26; 7.2-7.4] [SSG-70; 9.9]

5.6.5. Equipment qualification

103. How is it ensured that safety related items used in plant modifications are capable of fulfilling their intended functions for all anticipated conditions? [SSR-2/2 (Rev.1) Requirement 12; 4.44, Requirement 13; 4.48, 4.49] [GSR part 4 Requirement 7; 4.21, Requirement 10; 4.28] [SSG-71; 4.14, 4.18, 7.10] [SSG-72; 7.39-7.45]

5.7. Reactor core management (reactor engineering)

5.7.1 Handling of fresh fuel

104. What system does the plant have in place to ensure that fresh fuel has been manufactured and assembled in accordance with safety requirements? [SSR-2/2 (Rev.1) Requirement 30; 7.18, 7.19] [SSG-72; 7.48] [SSG-73; 2.3, 2.4, 2.20, 2.44, 2.57-2.61, 3.17]

105. How is it ensured that an effective system is there in place for the handling, receipt and storage of fresh fuel? [SSR-2/2 (Rev.1) Requirement 30; 7.26-7.29] [SSG-72; 7.48] [SSG-73; 2., 3.1-3.31]

5.7.2. Core management

106. How does the reactivity management programme ensure safe operation of the plant and guarantee that no fuel or core limitations are violated? [SSR-2/2 (Rev.1) Requirement 30; 7.20, 7.21] [SSG-72; 7.47] [SSG-73; 2.1-2.13, 2.27-2.31]

107. What monitoring programme does the plant have in place to ensure that that core parameters are monitored, analyzed for trends and evaluated and that actual core performance is consistent with core design requirements? [SSR-2/2 (Rev.1) Requirement 30; 7.21] [SSG-73; 2.32-2.35]

108. How is it ensured that an effective system is there in place for monitoring in-core fuel integrity, and how is failed fuel handled? [SSR-2/2 (Rev.1) Requirement 30; 7.24] [SSG-73; 2.44-2.55, 4.17, 5.5, 5.20]

109. How is it ensured that a fueling programme has been established in accordance with the design assumptions? [SSR-2/2 (Rev.1) Requirement 30; 7.19] [SSG-28; 4.43] (COMs – only relevant for Pre-OSART missions)

110. How did the operating organization ensure that a safe Reactivity Management Programme under a robust management system for quality has been developed, which defines duties and responsibilities of related departments (e.g. Operations, Core Physics, Engineering, Chemistry), outlining all activities related to reactivity management and ensuring safe and efficient maintenance of nuclear fuel? [SSR-2/2 (Rev.1) Requirement 30; 7.20] (COMs – only relevant for Pre-OSART missions)

111. How did the operating organization ensure that decisions, and the planning, evaluation, conduct and control of all operations, and on modifications or Design Changes involving the fuel that are liable to affect reactivity control, are undertaken by using approved procedures and respecting predefined operational limits for the core? Are all activities or Design Changes that potentially may affect core reactivity and nuclear fuel well monitored and controlled according to design and operating limits? [SSR-2/2 (Rev.1) Requirement 30; 7.20] (COMs – only relevant for Pre-OSART missions)

5.7.3. Handling of irradiated fuel

112. What system does the plant have in place to ensure fuel integrity and control of foreign materials during the refueling, unloading and storage of irradiated fuel? [SSR-2/2 (Rev.1) Requirement 30; 7.26-7.29] [SSG-73; 4.25]

113. What system is there in place for safe dispatch of spent fuel? [SSR-2/2 (Rev.1) Requirement 30; 7.29] [SSG-73; 7.1-7.7]

5.7.4. Handling and storage of core components

114. What system does the plant have in place for the handling and storage of core components? What procedures are there in place to ensure the controlled handling and proper storage of core components [SSR-2/2 (Rev.1) Requirement 30; 7.19, 7.26] [SSG-73; 6.1-6.9, 8.3]

5.7.5. Administrative controls and procedures

115. How does the plant ensure that its administrative procedures for core management are comprehensive, clear, understood and effectively implemented by personnel? [SSR-2/2 (Rev.1) Requirement 30; 7.19] [SSG-73; 3.2, 3.6, 3.7] [SSG-72; 7.5] [SSG-73; 2.29, 8.1, 8.2, 8.5]

116. What administrative controls are there in place to ensure review and approval of plant operating instructions and procedures for reactor core and fuel management? [SSG-72; 7.103] [SSG-73; 8.3]

5.8. Use of OEF

117. How does the technical support function use OEF for continuous improvement of its activities? [SSR-2/2 (Rev.1) Requirement 24; 5.27]

118. What system is there in place to maintain liaison with technical support organizations involved in the design, construction, commissioning and operation of the plant to feedback information on operating experience and to obtain advice, if necessary? [SSR-2/2 (Rev.1) Requirement 24; 5.32] [SSG-50; 2.70, 2.71, Appendix A.6.] [SSG-77; 7.4]

[IAEA safety standards for this WNO: SF-1; SSR-2/1 (Rev. 1); SSR-2/2 (Rev. 1)*; GSR Part 2; GSR Part 4 (Rev. 1); SSG-2 (Rev. 1); SSG-3; SSG-25; SSG-28; SSG-38; SSG-39; SSG-48; SSG-50; SSG-61; SSG-70; SSG-71*; SSG-72; SSG-73*; SSG-74; SSG-75; SSG-76; SSG-77; GS-G-3.1; GS-G-3.5. (*main basis)]

Fact in bold: New fact
Fact not in bold and in Italic: Previously edited fact
Fact not in bold: Validated fact by counterpart
~~Fact strikethrough~~: Fact deleted (only after discussion with TL or DTL)

TS: FACTS & Theme

5. TECHNICAL SUPPORT

5.1 Organization and functions (Q1-Q17)

Fact:

5.2. Safety assessment (Q18-Q28)

Fact:

5.3. Programme for long-term operation (Q29-Q44)

Fact:

5.4. Use of PSA (Q45-Q49)

Fact:

5.5. Surveillance programme (Q50-Q69)

Fact:

5.6. Plant modification system (Q70-Q103)

Fact:

5.7. Reactor core management (reactor engineering) (Q104-Q116)

Fact:

5.8. Use of OEF (Q117-Q118)

Fact:

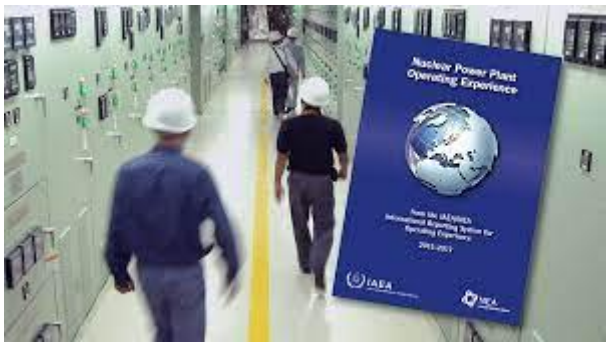
Performance Data:

Description	2021	2022	2023	2024
Procedure revision backlog				
Number of Plant system health – systems not at "green"/healthy status				
Number of unmitigated Single point vulnerabilities				

5. TS

No.	Issue summaries: (Brief five-line maximum description, neutral in tone, in order to present the subject of issues under development to the Plant Manager)	CI	CA	PMI	PMA
1					
2					
3					
4					
5					
6					
GP1	Good Practices: [brief description]				
GP2					

CI = Counterpart informed, CA = Counterpart agreed, PMI = Plant manager informed, PMA = Plant manager agreed



OSART MISSION WORKING NOTES

OUTLINES – OPERATING EXPERIENCE FEEDBACK

OEF: 91 Q > 13 Q / Day	Comments from TL
Day 1	
Day 2	
Day 3	
Day 4	
Day 5	
Day 6	
Day 7	
(Day 8)	

Contents

6. Operating Experience Feedback

6.1. General

1. How are organizational structure, responsibilities, levels of authority and functions defined and communicated within the operating experience feedback organization? Are they understood by personnel? [SSR-2/2 (Rev.1) Requirement 1; 3.2(b), (d), Requirement 3; 3.8, 3.9]

2. How are the roles, responsibilities, lines of communication and interfaces with corporate organizations as well as other external support organizations (manufacturers, research organizations and designers) defined and understood? [SSR-2/2 (Rev.1) Requirement 24; 5.32] [SSG-50; 2.70]

3. What is the organizational framework for an operating experience programme?[1] [SSG-50; 2.5]

4. What are the various elements of the Operating Experience programme currently in place? [SSR-2/2 (Rev.1) Requirement 24; 5.27] [SSG-72; 2.9 (o), 2.18, 3.2 (h)] [SSG-50; 2.4]

5. What is a system established and maintained in the operating organization for the storage, retrieval and searching of operating experience? What sort of tools this system provides for the personnel to enable their effective searching, using an appropriate coding or keyword system? [SSG-50; 2.79]

6. How does the plant establish and measure the effectiveness of its policies related to experience feedback during pre-operational stages? [SSR-2/2 (Rev.1) Requirement 1; 3.2(a), Requirement 5; 4.1, 4.2, 4.4, Requirement 24; 5.33] [SSG-50; 2.22, 2.75-2.78] (COMs – only relevant for Pre-OSART missions)

6.2. The Management System and the Role of Management

7. How are the operational goals/objectives related to OE implemented, communicated to the plant, reviewed and assessed? [SSR-2/2 (Rev.1) Requirement 1; 3.2(a)]

8. How does the operating organization establish and measure the effectiveness of its policies related to operating experience feedback? [SSR-2/2 (Rev.1) Requirement 1; 3.2(a), Requirement 5; 4.1, 4.2, 4.4, Requirement 24; 5.33] [SSG-72; 7.25] [SSG-50; 2.22, 2.76]

9. How do senior managers and all other managers advocate and support?

— the reporting of problems relating to technical, human and organizational factors and reporting of any deficiencies in structures, systems and components to avoid degradation of safety, including the timely acknowledgement of, and reporting back of, actions taken; [SSG-50; 2.10, 2.19]

— measures to encourage a questioning and learning attitude at all levels in the organization? [SSR-2/2 (Rev.1) Requirement 24; 5.31] [GSR Part 2 Requirement 7; 5.2] [SSG-50; 2.5, 2.8,2.13]

[1] An operating organization with a single nuclear installation should perform all functions of the operating experience programme for that installation. An operating organization that has multiple installations may judge it appropriate to centralize some of the operating experience functions.

— Does the management system include evaluation and timely use of the lessons from experience gained and from events that have occurred, both within the organization and outside the organization, and lessons from identifying the causes of events; [SSG-50; 2.9]
— lessons from identifying good practices? [GSR Part 2 Requirement 8; 6.7] [SSG-50; 2.9]

10. How are responsibilities, competence, qualification criteria and training requirements defined for corporate personnel involved in the feedback of operating experience? [SSG-50; 2.17]

11. How does management ensure that the findings of operating experience are used for learning at all levels of the organization and in all areas important for safety? [SSR-2/2 (Rev.1) Requirement 9; 4.33] [SSG-50; 2.10]

12. What kind of procedures does the management system include for the provision of feedback on operating experience from activities undertaken at the installation, as part of the operating experience programme implemented to prevent recurrence of events and to enhance safety? [SSR-2/2 (Rev. 1) Requirement 24; 5.31] [SSG-50; 2.11]

13. How does the operating organization implement its responsibility for instilling an attitude among plant personnel that encourages the reporting of all events, including low level events and near misses, potential problems related to equipment failures, shortcomings in human performance, procedural deficiencies or inconsistencies in documentation that are relevant to safety? [SSR-2/2 (Rev. 1) Requirement 24; 5.31] [SSG-50; 2.12]

14. How does management foster a ‘just culture’ in which shortcomings in human performance are used as learning opportunities and encourage the open reporting of potentially useful experience and a questioning attitude and reinforce it at all organizational levels? [SSG-50; 2.13]

15. How does management foster a positive environment for creating, maintaining and continuously improving the operating experience programme? [SSG-50; 2.16]

16. How does management ensure that the operating experience programme has sufficient dedicated staff with suitable training, qualifications and experience? [SSG-50; 2.17]

17. How does the management ensure that the operating experience programme is adequately supported, including with the necessary infrastructure and information technology tools to allow all staff easy access to relevant operating experience information? [SSG-50 2.18]

18. How does the management ensure that all personnel are informed about the objectives of the operating experience programme and their role in its implementation? [SSG-50; 2.19]

19. How does the management communicate expectations for the identification and reporting of events, performance weaknesses and negative trends should be communicated effectively to ensure that those expectations are met by everyone at the installation, including contractors? [SSG-50; 2.19]

20. How does the management ensure that corrective actions resulting from the operating experience programme are given appropriate priority within budgetary and staffing plans to ensure that they are implemented, with follow-up to review their effectiveness? [SSG-50; 2.20]

21. How does the management ensure that records of the operating experience programme are maintained, easily retrievable and retained for an appropriate period (for the life of the installation, if necessary)? [SSG-50; 2.21]

22. Does the management monitor and review the effectiveness of the operating experience programme on a regular basis, at a frequency commensurate with the type of installation and with the number and significance of the operating experience issues arising? [SSG-50; 2.22]

23. How are the responsibilities and functions for experience feedback during pre-operational phases defined and communicated? Are they understood by personnel? [SSR-2/2 (Rev.1) Requirement 1; 3.2(a)(b), Requirement 3; 3.8, 3.9] (COMs – only relevant for Pre-OSART missions)

6.3. Identification and Reporting

24. What kind of issues does the operating organization identify and feed into their operating experience programme? [SSG-50; 2.23]

25. What is the involvement of corporate management in establishing a 'just' (non-discriminatory and impartial) reporting system at the plant? [SSG-50; 6.52]

26. What kinds of sources of operating experience are identified by the operating organization? [SSG-50; 2.24]

27. What criteria and procedures have been developed to identify and report operating events at a plant in a timely manner? [SSG-50; 2.25]

28. What sources of in-house operating experience are identified? How is information from and access to these sources formally established and systematically screened? These sources should include: significant events, low-level events and near-misses; quality assurance reports; reports and data from operations activities, maintenance testing and in-service inspections; surveillance reports; results from plant-specific safety assessments; training feedback; no-blame reporting programmes; and performance indicators. [SSR-2/2 (Rev.1) Requirement 24; 5.27] [SSG-50; 2.24]

29. Does the plant operating experience programme include low level events and near misses? How does the plant management encourage the identification and reporting of low level events and near misses? [SSG-50; 2.27]

30. To what extent are the plant personnel and contractors aware of the reporting process? Is the process user-friendly? [SSR-2/2 (Rev.1) Requirement 24; 5.27] [SSG-50; 2.28]

31. How does the plant operating experience program envisage providing a feedback to individuals who report issues, due acknowledgement, and recognition from management to encourage future reporting? [SSG-50; 2.29]

32. What kind of arrangements are in the place in the plant operating experience program to provide an immediate review of events with significant challenges for the safety of the installation to ensure that appropriate immediate actions are taken to restore a safe state and to preclude recurrence? What is a process put in place within the plant operating experience programme to ensure that preliminary reports on events with significant challenges for the safety of the installation are reported to the regulatory body and to relevant external organizations in a timely manner? [SSG-50; 2.30]

33. What criteria and procedures have been established for staff to identify and report operating experience in a timely manner during pre-operational phases and how are low-level events and near-misses, potential problems relating to equipment failures, shortcomings in human performance, procedural deficiencies and inconsistencies in documentation actually identified and reported during pre-operational phases? [SSR-2/2 (Rev.1) Requirement 24; 5.31] [SSG-72; 6.13] [SSG-50; 2.10, 2.23] (COMs – only relevant for Pre-OSART missions)

6.4. Screening

34. How is internal and external operating experience screened to select and prioritise information for further investigation and analysis? [SSR-2/2 (Rev.1) Requirement 24; 5.27] [SSG-50; 2.36]

35. What are the screening criteria for significance and thresholds for internal and external operating experience? What do screening criteria include? [SSG-50; 2.31, 2.33, 2.34][2]

36. What are the plant requirements for a team to do the screening task? [SSG-50; 2.32, 2.33]

37. What kind of support and authority does the screening team receive from the plant management? [SSG-50; 2.32]

38. How results from the screening of all operating experience (internal and external, including those that are not applicable to the installation) are recorded and used? [SSG-50; 2.39]

39. How is internal and external experience feedback screened during pre-operational phases to select and prioritise information for further investigation and analysis? What are the screening criteria and thresholds for internal and external operating experience? [SSR-2/2 (Rev.1) Requirement 24; 5.27] [SSG-50; 2.31] (COMs – only relevant for Pre-OSART missions)

6.5. Investigation

[2] Screening criteria should include the actual or potential consequences of reported issues for nuclear safety, radiation protection, protection of the environment and non-radiation-related safety. Screening should include consideration of the possible implications of an issue for other areas of the installation or operating organization from those in which the issue was reported.

40. How is it arranged that events are investigated and analysed in accordance with their level of safety significance (actual as well as potential), severity and recurrence, and that all root causes and contributing factors are identified? [SSR-2/2 (Rev.1) Requirement 24; 5.28] [SSG-50; 2.40]

41. What kind of procedures are developed and implemented at the operating organization to specify criteria for the type of investigation that is appropriate for any category of event and commensurate with the actual or potential consequences of an event and the likelihood of its recurrence using appropriate analysis techniques? [SSG-50; 2.41, 2.42]

42. In what way does the investigation of safety significant events cover aspects like identification of direct and root causes, causes relating to equipment design, operation and maintenance, or human and organizational factors? [SSR-2/2 (Rev.1) Requirement 24; 5.28] [SSG-50; 2.40]

43. To what depth are event investigations carried out to address both the extent of condition and extent of cause? [SSG-50; 2.47]

44. What requirements are specified by the operating organization for individual investigators and investigations teams in terms of technical knowledge and skills in investigation techniques? [SSG-50; 2.43]

45. What type of training is provided to personnel performing event investigations and analyses? What knowledge do they have of plant design, procedures and operation, and what levels of experience and skills do they possess? What training in various root cause analysis techniques have they undertaken? [SSR-2/2 (Rev.1) Requirement 7; 4.22] [SSG-75; 5.5, 5.8] [SSG-50; 2.17, 2.43]

46. What kind of procedures are developed and implemented at the operating organization setting out how investigations should be conducted? [SSG-50; 2.44][3]

47. What level of analysis is specified for low-level events, near-misses and other adverse trends, so that generic implications, precursors to declining performance, and root causes of adverse trends can all be identified? [SSG-50; 2.42]

48. How does the operating organization ensure that events with significant implications for safety are investigated by a team with sufficient independence from the line management to identify and address organizational issues objectively? [SSG-50; 2.45]

49. What kind of arrangements is established at the operating organization to ensure that investigation is started as soon as practicable, consistent with maintaining the safety of the installation and that important information is not lost, invalidated or removed? [SSG-50; 2.46]

50. What kind of information and data is to be documented at the operating organization because of root cause analysis? [SSG-50; 2.47, 2.49]

[3] Procedures should be developed and implemented… defining the scope and mandate of the investigation, the methodology to be followed, the time frame, the specific techniques and tools to be used, the composition of the investigation team and the format of the final report.

51. What are the requirements in place in the operating organization to ensure that relevant internal and external operating experience is reviewed in an investigation to identify any other similar events and to learn from industry experience? [SSG-50; 2.48]

52. What are the requirements in place in the operating organization to ensure that multidisciplinary management team reviewed the completed investigation to provide additional assurance that all root causes and organizational contributors have been identified and corrective actions have been developed to address the causes and to prevent recurrence? [SSG-50; 2.50]

53. How does the operating organization ensure that the level of analysis applied to external operating experience commensurate with the significance of the operating experience and its ability to prevent similar events or to reduce the likelihood of their occurrence at the installation? [SSG-50; 2.51]

54. What consideration is given to ensuring that events occurring during pre-operational phases are investigated and analysed in accordance with their level of safety significance (actual as well as potential), severity and recurrence, and that all root causes and contributing factors are identified where needed? [SSR-2/2 (Rev.1) Requirement 24; 5.28] [SSG-50; 2.33-2.35] (COMs – only relevant for Pre-OSART missions)

55. What criteria and procedures are in place to specify the type of investigation that is appropriate for a commissioning event? Do they include guidelines for performing a full root cause analysis, an apparent cause analysis, and a trend analysis? [SSG-50; 2.41, 2.42] (COMs – only relevant for Pre-OSART missions)

56. In what timeframe are commissioning events investigated and interviews conducted to preserve information and physical evidence? [SSG-50; 2.26, 2.44-2.46] (COMs – only relevant for Pre-OSART missions)

6.6. Trending and Review

57. How and by whom are trends in operating experience (including for example equipment failures, industrial safety reports, radiological contamination reports, records of maintenance work and of shortfalls in human performance) examined for any precursors to adverse conditions for safety? [SSR-2/2 (Rev.1) Requirement 24; 5.29] [SSG-50; 2.52]

58. What is a process established in the operating organization for trending and review of operating experience to allow recognition of developing or emerging problems so that proactive measures can be taken before serious conditions arise? What is a role of operating organization in this process? How this process is conducted at the level of operating organization? [SSG-50; 2.53]

59. What kind of information and data are documented, collected and stored at the operating organization database(s) to enable the timely identification and review of adverse trends and recurring themes? How these data are arranged?[4] [SSG-50; 2.54]

[4] As a minimum, the attributes of each event or issue should be coded based on the affected structures, systems and components; the identified causes; and the actual or potential consequences for safety.

60. What type of coding system is applied for characterizing various events? How are these codes used to identify adverse trends and the potential for events to recur? How this coding system is harmonized between the installations of an operating organization, and with coding systems used in other national or international databases of operating experience, to facilitate the exchange of information? [SSG-50; 2.55]

61. Once identified, how is an abnormal trend treated at the corporate level? What type and level of analysis does it trigger? Is the threshold set low enough, and can a few examples of trending be provided? What follow-up actions are taken to verify that the adverse trend has been corrected? [SSR-2/2 (Rev.1) Requirement 24; 5.29] [SSG-50; 2.57]

62. What trend types are specified and reviewed at the operating organization?[5] [SSG-50; 2.56]

63. How and at what frequency the operating experience trend reports are provided to an appropriate level of management for review and for the implementation of actions to prevent higher level events from occurring? [SSG-50; 2.58]

6.7. Corrective Actions

64. Does the investigation of events and the review of external operating experience result in clear and well-defined corrective actions? To avoid recurrence of events, do these corrective actions address the fundamental causes of problems, including human and organizational factors, rather than just the symptoms? [SSR-2/2 (Rev.1) Requirement 24; 5.30] [SSG-72; 7.93] [SSG-50; 2.59]

65. How are corrective actions prioritised, scheduled, and implemented? For safety significant items, how are temporary corrective actions taken before final corrective actions are implemented? [SSR-2/2 (Rev.1) Requirement 24; 5.30] [GS-G-3.1; 6.71] [SSG-50; 2.61,2.66]

66. How are managers held accountable for meeting due dates for corrective actions? How are extensions to due dates for completing corrective actions controlled? [GS-G-3.1; 6.71, 6.74] [SSG-50; 2.65]

67. How does the plant evaluate the efficiency of corrective actions that have been implemented? Is the list of pending corrective actions constantly reviewed considering latest developments to confirm that the chosen actions are still relevant and called for? [SSR-2/2 (Rev.1) Requirement 24; 5.30] [GS-G-3.1; 6.74] [SSG-50; 2.65]

68. What kind of process is established in the operating organization to ensure that recommendations on corrective actions resulting from analysis of external operating experience are developed to prevent similar events or reduce the likelihood of their occurrence at the installation? [SSG-50; 2.60]

69. What kind of process is established in the operating organization to ensure that corrective actions are prioritized based on safety considerations and safety is not compromised by any corrective action? [SSG-50; 2.61]

70. What is a process established in the operating organization to ensure that?

[5] The types of trend for identification and review should include trends in low level events and near misses.

— The relevant manager(s) responsible for the implementation of a corrective action are included in its development and held accountable for its effective implementation;
— Senior management review and approve (a) major corrective actions resulting from internal events with significant implications for safety and (b) external operating experience providing major lessons;
— A periodic evaluation is carried out to review the status of corrective actions and effectiveness of those that have not been completed? [SSG-50; 2.62, 2.63, 2.64]

71. How does the plant ensure that for the major corrective actions that have not been completed?
— assessments are done periodically for these corrective actions in aggregate to check whether the risk to the installation is still acceptable;
— extensions to deadlines for, or the modification or cancellation of, major corrective actions are minimized and occur only with the approval of the senior management of the installation;
— the effectiveness of major corrective actions is reviewed after their completion? [SSG-50; 2.65]

72. What kind of process is established in the operating organization to ensure that if the recommended corrective actions take a long time to implement, the need for interim or compensatory corrective actions is analysed so that necessary actions are taken to minimize the risk of recurrence? [SSG-50; 2.66]

73. How does the operating organization track corrective actions through to completion and close out? [SSG-50; 2.67]

74. Does the investigation and review of commissioning events result in clear and well-defined corrective actions? [SSR-2/2 (Rev.1) Requirement 24; 5.30] [SSG-50; 2.59] (COMs – only relevant for Pre-OSART missions)

75. How are corrective actions arising from commissioning activities prioritised, scheduled, implemented and tracked? How does the plant ensure that important issues are solved before first fuel load? [SSR-2/2 (Rev.1) Requirement 24; 5.30] [SSG-50; 2.61, 2.62, 2.67] (COMs – only relevant for Pre-OSART missions)

6.8. Communication: Use, Dissemination and Exchange of Information

76. How is internal operating experience shared with national and international bodies? [SSR-2/2 (Rev.1) Requirement 24; 5.27] [SSG-50; 2.68]

77. What liaising arrangements are maintained with supporting organizations like manufacturers, research organizations and designers, to feedback information on operating experience to obtain the necessary advice as and when required? [SSR-2/2 (Rev.1) Requirement 24; 5.32] [SSG-50; 2.69]

78. What are the arrangements put in place in the operation organization to ensure that relevant operating experience is shared with other organizations in a timely manner at

appropriate levels (e.g. at the level of designers, constructors, installations or operating organizations, or national and international organizations?[6] [SSG-50; 2.70]

79. How does the operating organization ensure that lessons learned from internal and external operating experience are implemented in relevant processes, such as training, revision of procedures, work management, and design and modification of the installation? [SSG-50; 2.71]

80. What are the arrangements put in place in the operating organization to ensure that management encourage personnel to use the lessons from operating experience in their activities to improve safety and prevent events and reinforce these expectations periodically? [SSG-50; 2.72]

81. What are the arrangements put in place in the operating organization to make relevant operating experience readily accessible in a user-friendly form (with due regard for the sensitive nature of certain information) to all operating organization personnel for use in their work? [SSG-50; 2.73]

82. What sources of industry operating information are identified, and how is access to these sources formally established and systematically screened? Do these sources include organizations and publications such as: IAEA/NEA IRS, WANO/INPO, the national regulatory body, Generic Letters, bulletins, notices, owner groups, vendors' and manufacturers' problem notifications, arrangements to exchange feedback with other plants in construction and commissioning stage, engineering designer problem notifications, utility and industry event reports? How are these sources used to integrate all learning opportunities before first fuel load? [SSR-2/2 (Rev.1) Requirement 24; 5.27, 5.32] [SSG-50; 2.24, 2.36, 2.69, 2.70] (COMs – only relevant for Pre-OSART missions)

83. Which information system has been put in place to ensure information from commissioning can easily be retrieved for further analysis and how does the plant ensure that this information will remain easily retrievable during the whole life of the plant? [SSG-50; 2.21, 2.79] (COMs – only relevant for Pre-OSART missions)

84. How is the operational experience gained during commissioning fed back into the training programme? [SSG-28; 3.68] (COMs – only relevant for Pre-OSART missions)

6.9. Reviewing the Effectiveness of the Operating Experience Programme

85. What methods are used to determine the effectiveness of the operating experience programme? Does the methodology involve both self-assessments as well as peer reviews, especially those by external organizations? What are the scopes of the self-assessment and of the peer review, and how often are these performed? [SSR-2/2 (Rev.1) Requirement 24; 5.33] [SSG-72; 5.29, 5.30, 7.94]

86. What methods are used by the operating organization for assessments of the effectiveness of the operating experience programme? [SSG-50; 2.76]

[6] Recipients of different specified types of information may include organizations with planned or ongoing nuclear power programmes; technical support organizations in the nuclear field; vendor companies, including designers, engineering contractors and manufacturers; regulatory bodies; and centralized international reporting systems.

87. What kind of criteria and performance indicators are used by the operating organization for assessments of the effectiveness of the operating experience programme? [SSG-50; 2.77]

88. How does the operating organization use the results of various assessments of the effectiveness of the operating experience programme to identify areas for improvement and to address them by appropriate measures? [SSG-50; 2.78]

89. How does the commissioning department use OEF for continuous improvement of its commissioning activities? [SSR-2/2 (Rev.1) Requirement 24; 5.27-5.31] [SSG-28; 3.68] (COMs – only relevant for Pre-OSART missions)

6.10. Use of PSA and PSR

90. How is internal and external operating experience feedback integrated in the PSR programme? [SSR-2/2 (Rev.1) Requirement 12; 4.44] [SSG-25; 2.5, 4.15, 5.7, 5.54, 5.55, 5.64, 5.84-5.87, 5.89, 5.92, 5.93, 5.98, 5.100, 5.103, 5.105, 5.107-5.109, 5.114, 5.125, 8.13, 9.5, Appendix II; II.2.]

91. How does the operating organization ensure that relevant operating experience information is retained for use throughout the installation's operating lifetime, including as input for periodic safety review, deterministic and probabilistic safety assessment, the design and implementation of plant modifications, and ageing management? [SSG-50; 2.80]

[IAEA safety standards for this WNO: SSR-2/2 (Rev. 1)*; GSR Part 2; SSG-72; SSG-75; GS-G-3.1; SSG-25; SSG-28; SSG-50* (*main basis)]

Fact in bold: New fact

Fact not in bold and in Italic: Previously edited fact
Fact not in bold: Validated fact by counterpart
~~Fact strikethrough~~: Fact deleted (only after discussion with TL or DTL)

OEF: FACTS & Themes

6. Operating Experience Feedback
6.1. General (Q1-Q6)

Fact:

6.2. The Management System and the Role of Management (Q7-Q24)

Fact:

6.3. Identification and Reporting (Q25-Q34)

Fact:

6.4. Screening (Q35-QQ40)

Fact:

6.5. Investigation (Q41-Q57)

Fact:

6.6. Trending and Review (Q58-QQ64)

Fact:

6.7. Corrective Actions (Q65-Q76)

Fact:

6.8. Communication: Use, Dissemination and Exchange of Information (Q77-Q85)

Fact:

6.9. Reviewing the Effectiveness of the Operating Experience Programme (Q86-Q90)

Fact:

6.10. Use of PSA and PSR (Q91-Q92)

Fact:

Performance Data:

Description	**2021**	**2022**	**2023**	**2024**
Number of issues identified in CAP programme				
Number of Repeat CAP Issues identified				
Number of corrective actions to prevent repeat recurrence				
Corrective action timeliness				

6. OEF

No.	Issue summaries: (Brief five-line maximum description, neutral in tone, in order to present the subject of issues under development to the Plant Manager)	CI	CA	PMI	PMA
1					
2					
3					
4					
5					
6					
GP1	Good Practices: [brief description]				
GP2					

CI = Counterpart informed, CA = Counterpart agreed, PMI = Plant manager informed, PMA = Plant manager agreed

OSART MISSION WORKING NOTES

OUTLINES – RADIATION PROTECTION

RP: 99 Q > 14 Q / Day	Comments from TL
Day 1	
Day 2	
Day 3	
Day 4	
Day 5	
Day 6	
Day 7	
(Day 8)	

Contents

7. RADIATION PROTECTION

7.1. Organization and functions

7.1.1. Functions and responsibilities

1. How are radiation protection aspects covered by the plant management system? [SSR-2/2 (Rev.1) Requirement 15; 4.52, Requirement 20; 5.10-5.16] [GSG-7; 2.23-2.26]

2. How are organizational structure, responsibilities, levels of authority and functions defined and communicated within the radiation protection organization? Are they understood by personnel? [GSR Part 3 Requirement 4; 2.39-2.46] [SSR-2/2 (Rev.1) Requirement 1; 3.2(b), (d), Requirement 3; 3.8, 3.9] [GSG-7; 2.18, 2.19, 3.4]

3. How are goals, objectives and safety indicators related to radiation protection developed and managed? How are outcomes checked and measured within the organization? [SSG-72; 3.16-3.19, 7.63] [GSG-7; 3.64]

4. How are radiation protection policies and programmes kept up-to-date with industry practices? What internal process is put in place in this regard? [SSR-2/2 (Rev.1) Requirement 20; 5.10] [SSG-50; 2.70-2.73, 2.79, 2.80] [GSG-7; 3.13(e)]

5. How is the RP programme reviewed? [SSR-2/2 (Rev.1) Requirement 20; 5.10] [SSG-75; 5.44] [GSG-7; 3.106, 3.151; 3.157]

6. How is the RP group's performance evaluated? [GSR Part 3 Requirement 9; 3.15(h)] [SSR-2/2 (Rev.1) Requirement 9; 4.33] [GSG-7; 3.60(k), 4.7(b)]

7.1.2. Personnel

7. What is the staffing level, including the use of contractors, in the area of radiation protection? How does the plant ensure that there is enough manpower to cover outage and operation workloads? [SSR-2/2 (Rev.1) Requirement 4; 3.11] [SSG-74; 3.7-3.12, 4.6, 4.17, 4.18, 5.35] [GS-G-3.1; 4.1] [SSG-72; 7.8-7.15] [GSG-7; 8.26, 8.27]

8. How are radiation protection staff, including contractors, qualified for their assigned work? What measures have been taken to maintain adequate levels of experience, knowledge and proficiency? [SSR-2/2 (Rev.1) Requirement 4; 3.10, 3.11, Requirement 7; 4.16-4.19] [GSG-7; 3.23] [SSG-75; 3.30, 5.34] [RS-G-1.8; 11.1-11.4]

7.2. Radiation protection policy

9. How are administrative limits, policies and appropriate radiological goals established? [GSR Part 3 Requirement 5; 2.47] [SSR-2/2 (Rev.1) Requirement 5; 4.1-4.5, Requirement 20; 5.10-5.16] [SSG-72; 7.1, 7.2, 7.5, 7.61] [GSG-7; 3.64, 8.22]

10. How are ALARA principles defined and how are they understood? [GSR Part 3 Requirement 1; 2.10] [GSG-7; 2.10, 3.17, 3.21, 3.42(b)]

11. How is the independence and authority of the RP group ensured? [SSR-2/2 (Rev.1) Requirement 20; 5.12] [GSG-7; 3.157, 8.6]

12. In what way is the radiation protection group involved in the development of standards and operational procedures addressing radiological issues? [GSR Part 3 Requirement 4; 2.42, Requirement 5; 2.52, Requirement 9; 3.15(f)(g), Requirement 21; 3.76(d), Requirement 24; 3.94] [GSG-7; 3.49, 3.66]

13. How is the health of individuals taken into consideration when assigning work in the RCA? [GSR Part 3 Requirement 21; 3.76(f), Requirement 25; 3.108] [SSR-2/2 (Rev.1) Requirement 20; 5.15] [GSG-7; 10.1-10.8]

14. What special arrangements are in place to protect female workers and those under the age of 18 (who may be undergoing training)? [GSR Part 3 Requirement 28; 3.113-3.116] [GSG-7; 3.46; 4.23; 6.2, 6.4-6.8]

15. What type of counselling could be provided to workers, if needed? [GSG-7; 10.3(d), 10.5, 10.7, 10.8]

16. What types of interactions are in place with, for example, operations and maintenance groups, etc.? [SSR-2/2 (Rev.1) Requirement 31; 8.11, Requirement 31; 8.23] [GSG-7; 2.5, 3.9, 3.19, 3.20, 3.95(h)]

17. What are the different radiation concerns that have arisen in the past, and how were they resolved? [GSG-7; 3.18, 3.138]

18. Which factors are taken in consideration in the optimisation process? How does the plant know that the goal for waste management is optimal? [GSR Part 3 Requirement 11; 3.24, 3.25]

7.2.1. Training and qualification of non-radiation protection personnel

19. What RP training is provided to site personnel, including contractor personnel? [GSR Part 3 Requirement 21; 3.76(h), Requirement 26; 3.110] [GSG-7; 2.19, 3.3, 3.23, 3.60(j), 3.76(i), 3.89(i), 3.91, 3.141-3.156]

20. What special training is provided, such as practice on mock-ups and rehearsals of planned work? [GSG-7; 3.145]

21. How are RP information and training programmes documented? [GSR Part 3 Requirement 26; 3.110(c)] [GSG-7; 3.151]

7.2.2. Health surveillance

22. How is the health surveillance programme organized at the plant, and how are responsibilities assigned for making the necessary arrangements to assess and record occupational exposure and to survey the health of workers? [GSR part 3 Requirement 25] [GSG-7; 3.136-3.140, 10.8-10.9, 10.11-10.24]

7.2.3. Radiation protection records

23. Do the responsible organizations maintain a complete set of RP records that are readily available to the regulatory body or other interested parties? What are the retention times?

[GSR part 3 Requirement 4; 2.43(e), Requirement 14; 3.38(d), Requirement 16; 3.47, Requirement 17; 3.54, 3.55, Requirement 21; 3.76(i), 3.80, Requirement 23; 3.87(c), Requirement 24; 3.98, Requirement 25; 3.103-3.107, Requirement 26; 3.110(c), Requirement 30; 3.127(g), Requirement 32; 3.135(e), 3.137(b)] [GSG-7; 3.137-3.139, 10.28]

24. How are records from individual external contamination monitoring maintained and kept? [SSR-2/2 (Rev.1) Requirement 15; 4.52] [GSG-7; 3.136]

7.3. Radiation work control

7.3.1. Radiation work authorization

25. How is radiologically hazardous work planned? [GSR Part 3 Requirement 24; 3.94] [GSG-7; 3.94, 3.95]

26. How does the radiation work permit (RWP) programme work? [GSG-7; 3.96]

27. What RWP procedures are available, and how are they followed? [GSG-7; 3.96, 6.82(e)]

28. What special provisions are made for exceptional, radiologically hazardous work? [GSG-7; 3.43-3.48]

7.3.2. Control of designated areas and individual worksites

29. What are the layout and markings of controlled and supervised areas? [GSR Part 3 Requirement 24; 3.88, 3.91] [GSG-7; 3.174, 3.77]

30. How is access to the RCAs restricted, and what are the measures taken to control workers at the entrances to the RCAs? [GSR Part 3 Requirement 24; 3.90(a)-(f)] [GSG-7; 3.76, 3.77, 3.80]

31. How does the plant manage visitors to controlled areas or supervised areas? [GSR Part 3 Requirement 24; 3.88, Requirement 30; 3.128] [GSG-7; 3.111]

32. What are the arrangements at the exits from the RCAs for protecting against the spread of contamination? [GSR Part 3 Requirement 24; 3.90] [GSG-7; 3.76, 6.48, 9.28]

33. What local rules and procedures, to be followed in controlled areas, are available for the protection and safety of workers? [GSR Part 3 Requirement 24; 3.94(a)] [GSG-7; 3.34-3.42(a)]

34. What are the investigation or authorization levels set in procedures, and what are workers required to do if a level is exceeded? [GSR Part 3 Requirement 24; 3.94] [GSG-7; 3.87, 3.113, 3.119] [GSG-7; 3.42(b), 3.48]

7.3.3. Workplace monitoring programme

35. How comprehensive, timely and accurate is the programme for workplace monitoring in the RCAs and supervised areas? [GSR Part 3 Requirement 24; 3.96, 3.97] [GSG-7; 3.112-3.115]

36. How is the workplace monitoring programme used in the assessment of external and internal exposures? [GSR Part 3 Requirement 25; 3.100, 3.101] [GSG-7; 3.116-3.121]

7.4. Control of occupational exposure

7.4.1. Implementation of the ALARA principle

37. How does the plant ensure that ALARA principles are followed for all work planning and execution? What ALARA practices do workers apply? [SSR-2/2 (Rev.1) Requirement 8; 4.25] [GSR Part 3 Requirement 21; 3.77(a), Requirement 22; 3.83] [SSG-71; 4.9, 4.14, 7.6] [SSG-73; 2.48] [SSG-74; 4.39, 8.6, 9.5, 9.26, 9.29] [GSG-7; 3.8-3.18]

38. What approaches are used in relation to the ALARA principle, and how are dose constraints set? [GSR Part 3 Requirement 1; 2.10, Requirement 21; 3.77(b)] [GSG-7; 3.28-3.33]

39. What postings, labelling and special provisions are provided to make sure staff are aware of radiation hazards and of the need to keep dose ALARA? [GSR Part 3 Requirement 21; 3.76(d)] [GSG-7; 3.8-3.18 3.80, 3.83-3.86, 6.45, 6.48, 6.52, 3.174]

40. How are workers motivated to adhere to the ALARA principle? [GSG-7; 2.19, 3.98, 3.99]

41. How are supervisors/managers involved in controlling and optimising occupational exposures? [GSG-7; 2.18, 6.46]

42. What are the results and feedback of occupational exposure in terms of application of the ALARA principle? [GSG-7; 3.17, 3.33]

43. Is source term (corrosion and fission products) optimization part of the radiation protection programme? What measures are put in place to optimize the source term including changes to chemistry parameters? [GSR Part 3; 1.15, 3.23, 3.24, 3.76, 5.26]

7.4.2. Internal contamination monitoring

44. How is the internal contamination assessment programme established? [GSG-7;3.56, 3.97,3.103, 3.112, 3.116, 3.121, 3.135, 7.133-7.140][

45. What measures are used to protect workers from internal contamination? [GSG-7; 3.51, 3.60, 3.93, 9.7, 9.8, 9.10, 9.53-9.65]

46. How does workplace monitoring support assessment of internal contamination? [GSG-7; 7.135, 7.145, 7.152, 7.254]

47. What methods are used to calculate dose commitments? [GSG-7; 2.47, 2.59]

7.4.3. External radiation monitoring

48. What is the programme for the monitoring of external radiation exposures? [GSG-7; 3.65, 3.103, 7.1, 7.28]

49. What types of dosimeters are provided to radiation workers for routine monitoring? [GSG-7; 7.2, 7.3]

50. What additional dosimeters are available? [GSG-7; 7.4, 7.7-9]

51. What procedures and methods are in place to obtain a formal dose assessment in the event of the loss of a dosimeter and in the event of unexpected or unusual dosimeter readings? [GSG-7; 7.258, 10.31]

7.5. Radiation protection instrumentation, protective clothing and facilities

7.5.1. Portable, fixed dose rate and contamination measurement instrumentation

52. What are the inventories and locations of portable and fixed dose rate measurement instrumentation? [GSR Part 3 Requirement 21; 3.76(g)] [GSG-7; 3.76]

53. How are instruments calibrated, and what is the schedule for routine calibrations? [GSG-7; 3.105, 5.36, 7.5, 7.52] [GSG-7;7.72, 7.82-7.93, 7.102-7.109]

54. What is the procurement system for RP equipment, and how is new equipment tested? [GSG-7; 8.889(c), 9.41]

55. What arrangements are in place at the plant to ensure that relevant safety system settings and alarm settings, including those of instruments for radiological protection, are specified at the appropriate commissioning stages or sub-stages? [SSG-28; 2.22] (COMs – only relevant for Pre-OSART missions)

7.5.2. Individual dose monitoring equipment

56. What are the facilities and equipment for internal contamination monitoring and assessment of external exposures? [GSR Part 3 Requirement 21; 3.76(g)] [GSG-7; 3.65, 3.103, 3.107, 7.39, 7.133, 7.134, 7.138]

57. If other laboratories are contracted to provide monitoring services for internal contamination or assessment of external exposures, what are the contractual conditions, and the reporting and quality requirements, for the services supplied? [GSG-7; 7.139, 7.156, 8.74-8.82]

58. As regards internal contamination monitoring, what checks are undertaken to confirm the reliability of monitoring equipment? How is the performance of this equipment evaluated? [GSG-7; 7.59, 7.82-7.88] [GSG-7; 8.84-8.94]

59. As regards external contamination monitoring, what checks are undertaken to confirm the reliability of monitoring equipment? How is the performance of this equipment evaluated? [GSG-7; 7.72-7.81] [GSG-7;8.95-8.100]

7.5.3. Gaseous and liquid effluent monitoring equipment

60. What type of instrumentation is used, and what is the condition of the installed continuous monitoring system for gaseous and liquid effluents? [SSG-40; 6.59]

61. What is the range of key instrumentation, and is it sufficient for monitoring normal discharges, possible abnormal discharges and accidental releases? [RS-G-1.8; 5.22]

62. How is monitoring equipment calibrated and how are QA standards applied? [SSG-40; 4.17, 6.7(c)] [RS-G-1.8; 9.5]

63. What monitoring equipment is available, and what sampling procedures are in place to detect and to measure releases through normally unmonitored effluent pathways? [SSG-40; 6.60, 6.78]

7.5.4. Environmental monitoring instrumentation and equipment

64. What equipment is available for environmental monitoring? [RS-G-1.8; 5.23-5.25]

65. How is the equipment calibrated and what QA standards are applied? [GSG-7; 3.105] [RS-G-1.8; 9.5]

7.5.5. Instrumentation and equipment for emergency situations

66. What types and numbers of fixed and portable instruments are available for emergency situations, and where are they situated? Can they reasonably cover the needs of all personnel who would be involved in an emergency response? [GSR Part 3 Requirement 21; 3.76(g)] [GSG-7; 4.5-4.8]

67. What monitoring are available for emergency purposes? [GSG-7; 4.18-4.25]

68. How are instruments calibrated and maintained? [SSR-2/2 (Rev.1) Requirement 18; 5.7]

7.5.6. Protective clothing and equipment

69. What types and quantities of protective clothing and respiratory protective equipment are available? [GSR Part 3 Requirement 24; 3.95(a)] [GSG-7; 9.58-9.61]

70. How and where is all personal equipment, including equipment for use in an emergency, maintained and, if necessary, tested? [GSR Part 3 Requirement 24; 3.95(d)]

71. What instruction do workers receive on the use of protective respiratory equipment? What format does this instruction take? [GSR Part 3 Requirement24; 3.95(b)] [GSG-7; 9.54-9.57, 10.16]

72. What additional equipment is available for radiological control and how is it maintained? [GSG-7; 6.89, 9.1-9.7]

7.5.7. Facilities

73. What are the different plant facilities, necessary for effective radiological control in the operation and maintenance of the plant? [GSR Part 3 Requirement 21; 3.76(e)] [GSG-7; 3.76, 6.48]

74. How are change- and shower-rooms, stocks of protective clothing, personnel decontamination facilities and laundry all maintained? [GSR Part 3 Requirement 24; 3.90(h)] [GSG-7; 9.58-9.61]

75. What calibration facilities are available? [GSG-7; 7.104, 7.105] [SSG-74; 8.8-8.10]

76. How is the temporary storage of radioactive waste and contaminated materials, equipment and tools, arranged and maintained? [GSG-7; 3.65, 3.89, 3.95] [SSG-40; 6.90, 6.91, 6.94, 6.96, 6.97, 6.101]

77. How are decontamination facilities arranged and maintained? [SSG-74; 8.14-8.16] [GSG-7; 3.76]

7.6. Radioactive waste management and discharges

7.6.1. Radioactive waste management

78. How is the radioactive waste management programme established and implemented? [SSR-2/2 (Rev.1) Requirement 21; 5.18] [GSR Part 3 Requirement 9; 3.15(j), Requirement 31; 3.131]

79. What are the goals and objectives for minimizing radioactive waste? [SSR-2/2 (Rev.1) Requirement 21; 5.17] [SSG-40; 2.11]

80. How is radioactive waste classified and segregated? [SSG-40; 3.10, 6.3, 6.17-6.27]

81. What procedures are available for waste to be cleared from regulatory control? [SSG-40; 3.21, 6.9, 6.34]

82. How are storage areas or special storage locations, containers or other provisions, used to ensure that personal exposures are minimized? [SSG-40; 4.8, 6.89-6.91]

83. How does the plant optimise production and management of radioactive waste (and nuclear fuel)? Which factors are considered for the optimisation of radioactive waste management programme? [GSR Part 5: 2.5, 2.6]

7.6.2. Gaseous and liquid effluents

84. What are the authorized limits for gaseous and liquid releases, and what are the results of monitoring? [GSR Part 3 Requirement 31; 3.133] [SSG-40; 2.11]

85. What is the monitoring programme for gaseous and liquid releases? [SSR-2/2 (Rev.1) Requirement 21; 5.19] [GSR Part 3 Requirement 32; 3.137(a)] [RS-G-1.8; 5.15-5.22, 6.2, 6.3] [SSG-40; 6.10, 6.12]

86. What are the goals and objectives for gaseous and liquid effluents? [GSR Part 3 Requirement 31; 3.134(a)] [SSG-40; 2.12]

87. What procedures are in place to control effluent releases? [SSR-2/2 (Rev.1) Requirement 21; 5.19]

88. How are effluent release results reported and records maintained? [SSR-2/2 (Rev.1) Requirement 15; 4.52] [GSR Part 3 Requirement 32; 3.137(b)(c)(d)] [RS-G-1.8; 10.2-10.7, 10.12]

7.6.3. Environmental monitoring

89. How is the environmental monitoring programme established? [SSR-2/2 (Rev.1) Requirement 21; 5.20] [GSR Part 3 Requirement 32; 3.137(a)] [GSG-7; 3.89, 3.97-3.106] [RS-G-1.8; 5.23-5.30, 6.4-6.7]

90. What are the methods used for assessment of doses to members of public? [RS-G-1.8; 7.1-7.16]

91. How are environmental results reported and records maintained? [SSR-2/2 (Rev.1) Requirement 15; 4.52] [GSR Part 3 Requirement 32; 3.137(b)(c)(e)] [RS-G-1.8; 10.2-10.5, 10.8, 10.9 10.12]

7.7. Radiation protection support during emergencies

92. What are the RP department's responsibilities in an emergency, and how are its staff involved in the emergency response organization? [GSG-7; 2.23, 4.1-4.6]

93. What RP emergency procedures are available? [GSG-7; 3.89, 6.41, 6.75]

94. What is the environmental monitoring plan for an emergency exposure situation? [RS-G-1.8; 5.64-5.108]

95. Which RP personnel are involved in emergency training, and what is the frequency of their training? [GSG-7; 3.141, 4.8] [RS-G-1.8; 11.1-11.4]

96. How often are emergency drills and exercises run? [GSG-7; 4.8]

7.8. Use of PSA, PSR and OEF

97. How does the radiation protection department use the PSA or some of its applications (e.g. risk monitoring) to optimize radiation protection activities? [SSR-2/2 (Rev.1) Requirement 31; 8.5, 8.6] [SSG-74; 5.32] [SSG-3; 10.36, 10.37, 10.52]

98. How is the PSR used to enhance the radiation protection programme? [SSR-2/2 (Rev.1) Requirement 12; 4.44] [SSG-25; 3.8, 5.29, 5.41, 5.47, 5.86] [SSG-71; 2.5, 3.9, 4.10, 4.11] [SSG-74; 2.10, 7.7] [SSG-48; 5.37]

99. How does the radiation protection department use the OEF from radiation protection activities to drive continuous improvement? How are radiological events reported and analysed? [SSR-2/2 (Rev.1) Requirement 24; 5.27-5.33] [GSR Part 3 Requirement 4; 2.43(c), Requirement 9; 3.15(g), Requirement 16; 3.45-3.48, Requirement 21; 3.80] [GSG-7; 3.85, 3.108, 3.109, 3.122-3.124]

[IAEA safety standards for this WNO: SSR-2/2 (Rev. 1)*; GSR Part 3; SSG-71; SSG-72; SSG-73; SSG-74; SSG-75; GSG-7*; RS-G-1.8; SSG-3; SSG-25; SSG-28, SSG-40; SSG-48; SSG-50; GS-G-3.1;. (*main basis)]

Fact in bold: New fact
Fact not in bold and in Italic: Previously edited fact
Fact not in bold: Validated fact by counterpart
~~Fact strikethrough~~: Fact deleted (only after discussion with TL or DTL)

RP: FACTS & Themes

7. RADIATION PROTECTION
7.1. Organization and functions (Q1-Q8)
Fact:

7.2. Radiation protection policy (Q9-Q24)

Fact:

7.3. Radiation work control
7.3.1. Radiation work authorization (Q25-Q28)

Fact:

7.3.2. Control of designated areas and individual worksites (Q29-Q34)

Fact;

7.3.3. Workplace monitoring programme (Q35-Q36)

Fact:

7.4. Control of occupational exposure (Q37-Q51)

Fact:

7.5. Radiation protection instrumentation, protective clothing and facilities (Q52-Q77)

Fact:

7.6. Radioactive waste management and discharges (Q78-Q91)

Fact:

7.7. Radiation protection support during emergencies (Q92-Q96)

Fact:

7.8. Use of PSA, PSR and OEF (Q97-Q99)

Fact:

Performance Indicators:

Description	**2021**	**2022**	**2023**	**2024**
Number of internal contaminations				
Number of skin contaminations				
Collective Radiation exposure (mSv/y)				
Individual Dose exposure (mSv/y)				

7. RP

No.	Issue summaries: (Brief five-line maximum description, neutral in tone, in order to present the subject of issues under development to the Plant Manager)	CI	CA	PMI	PMA
1					
2					
3					
4					
5					
6					
GP1	Good Practices: [brief description]				
GP2					

CI = Counterpart informed, CA = Counterpart agreed, PMI = Plant manager informed, PMA = Plant manager agreed

OSART MISSION WORKING NOTES OUTLINES - CHEMISTRY

CH: 104 Q > Q 15 / Day	Comments from TL
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Contents

8. CHEMISTRY

8.1. Organization and functions

8.1.1. Functions and responsibilities

1. How are organizational structure, responsibilities, levels of authority and functions defined and communicated within the chemistry organization? Are they understood by staff? [SSR-2/2 (Rev.1) Requirement 1; 3.2(b), (d), Requirement 3; 3.8, 3.9] [SSG-13; 2.1, 2.2] [GSR Part 2 Requirement 8; 4.16]

2. How are the goals, objectives and safety indicators related to chemistry developed and managed? How are outcomes checked and measured within the organization? [SSR-2/2 (Rev.1) Requirement 9; 4.33-4.37] [GSR Part 2 Requirement 2; 3.2, 3.3, Requirement 5; 4.3-4.5] [SSG-13; 2.3, 2.5]

3. How it is ensured that the objective to protect people and the environment from harmful effects of ionizing radiation is achieved, overriding the demands of production and project schedules? [SSR-2/2 (Rev.1) Requirement 8; 4.25, Requirement 20; 5.11] [GSR Part 2 Requirement 1; 2.1]

4. How does the chemistry policy promote a strong safety culture, including a questioning attitude and a commitment to excellent performance in all activities important to safety? [SSR-2/2 (Rev.1) Requirement 5; 4.1, 4.2, Requirement 8; 4.30]

5. How is it ensured that appropriate resources including funding are made available? [GSR Part2 Requirement 1; 2.2(e), 4.21]

6. How are chemistry policies and programmes kept up-to-date with industry practices? What internal process is put in place in this regard? [SSR-2/2 (Rev.1) Requirement 31; 8.1-8.3] [SSG-13; 2.10]

7. In what ways is ensured that an effective and systematic self-assessment system is implemented to identify achievements and to address any degradation in safety performance? [SSR-2/2 (Rev.1) Requirement 9; 4.33, 4.34, 4.35]

8. How does the chemistry department use operating experience feedback (OEF) for continuous improvement of chemistry activities? [SSR-2/2 (Rev.1) Requirement 6; 4.8] [SSG-13; 2.4, 3.3, 8.14] [GSR Part 2 Requirement 13; 6.7]

8.1.2. Personnel

9. How is it ensured that the chemistry function is satisfactorily staffed during both operation and outages, including contracted resources, while having an adequate pool of competences, qualification, experience and proficiency? [SSR-2/2 (Rev.1) Requirement 4; 3.10, 3.11] [SSG-13; 2.8] [GSR Part 2 Requirement 9; 4.21]

10. Which arrangements exist for dealing with plant transients or for handling abnormal or demanding workloads? [SSG-13; 3.4(g), 4.7, 6.17, 7.8]

8.1.3. Chemistry staff training

11. How can it be demonstrated that line management has implemented systematic approach for training and qualification of staff? [SSR-2/2 (Rev.1) Requirement 7; 4.18] [SSG-13; 8.2, 8.3, 8.5] [GSR Part 2 Requirement 9; 4.22]

12. How does the line management identify the needs for training and ensure that operating experience, internal as well as external, is taken into account? [SSR-2/2 (Rev.1) Requirement 7; 4.18] [SSG-13; 8.2, 8.3, 8.5]

13. How is it ensured that a suitable training programme is established and maintained for the training of personnel before their assignment to safety related duties? [SSR-2/2 (Rev.1) Requirement 7; 4.16, 4.17, 4.19] [GSR Part 2 Requirement 9; 4.23]

14. How does the chemistry department monitor the training of its staff, including its managers and supervisors? [SSR-2/2 (Rev.1) Requirement 1; 3.2(b), Requirement 7; 4.16, 4.20, 4.21] [SSG-13; 8.8]

8.1.4. Interfaces with internal and external organizations

15. How is it ensured that interface responsibilities between chemistry and other organizational units within the plant are properly defined and understood? [SSR-2/2 (Rev.1) Requirement 1; 3.1] [SSG-13; 2.21]

16. Which reports on water chemistry and radiochemistry parameters are formulated and shared with other areas in the operating organization and with appropriate external organizations on a regular basis? [SSG-13; 2.23]

17. How is it confirmed that chemistry technical specifications and relevant procedures are well understood by staff in other departments, especially operations and radiation protection? [SSG-13; 2.22] [SSG-76; 2.35, 2.39, 5.62]

18. How is it ensured that contractor tasks are clearly defined and understood both by the contractors and by plant personnel? [SSR-2/2 (Rev.1) Requirement 5; 4.3] [SSG-13; 2.14]

19. How is it ensured that the organization retains responsibility for safety when contracting out any processes and when receiving any item, product or service in the supply chain? [GSR Part 2 Requirement 11; 4.33]

20. What relations does the chemistry department have with on-site and off-site organizations such as universities, laboratories, R&D organisations and regulatory body? [SSG-13; 2.18, 2.24]

21. What kind of technical support exists outside of the chemistry department, e.g. from the corporate body, the plant manufacturer? [SSG-13; 2.18, 2.24]

8.2. Chemistry programme

The chemistry programme should provide the information and support relating to chemistry and radiochemistry necessary to ensure safe operation, long term integrity of structures, systems and components, and minimization of build-up of radioactive material and limiting of radioactive and chemical discharges to the environment [SSG-13; 3.1]. In this chapter the

rationale and the comprehensiveness of the chemistry programme including the chemistry regime of the systems will be evaluated. The programme should be written down in a high-level document.
The following questions apply to all relevant structures, systems and components, such as:

- the primary circuit,
- the secondary circuit,
- safety related auxiliary systems,
- lubricating oil systems,
- and storage of Diesel fuel.

And to all operational stages like:

- start up,
- shut down,
- power operation,
- and outage.

8.2.1. Design of the Plant, Modifications and Chemistry Regime

22. What are the original design and materials used in the plant and which plant modifications that may have an impact on water chemistry, have been implemented since then? [SSR-2/2 (Rev.1); Requirement 6; 4.6, Requirement 11; 4.39]

23. Which chemistry regime has been implemented to comply with the respective design and materials, to ensure safe operation and long-term integrity of structures, systems and components? [SSR-2/2 (Rev.1); Requirement 6; 4.6, Requirement 11; 4.39, Requirement 29; 7.13] [SSG-13; 3.4, 5.11, 5.16-5.18, 5.21]

24. Which written statements, or national or international guidelines are the basis for the applied chemistry regime and are basis for the operational limits and conditions? [SSR-2/2 (Rev.1) Requirement 6; 4.6, 4.7]

25. What system is there in place to ensure consistency between the design requirements, physical configuration and documentation related to the plant's chemistry regime? [SSR-2/2 (Rev.1) Requirement 10; 4.38, Requirement 11; 4.42] [SSG-71; 2.13, 7.17, 10.1] [SSG-61; 3.13.18-3.13.22] [GSR Part 2 Requirement 8; 4.17, 4.18]

26. What are major changes in the chemistry programme and why were they implemented? [SSR-2/2 (Rev.1) Requirement 6; 4.8, Requirement 10; 4.38] [SSG-13; 2.19]

27. Which operating experience from the own plant and from other plants has been implemented into the existing chemistry regime? [SSR-2/2 (Rev.1) Requirement 6; 4.8] [SSG-13; 2.4, 3.3, 8.14]

28. How is it ensured that revisions to the procedures and processes are controlled, reviewed and recorded? How are independent experts involved? How is the regulator involved? [GSR Part 2 Requirement 6; 4.14, Requirement 8; 4.18, Requirement 10; 4.31] [SSR-2/2 (Rev.1) Requirement 11; 4.39]

29. How is the chemistry programme complemented by other maintenance, testing, surveillance and inspection programmes, e.g. ultrasonic testing of reactor pressure vessel penetrations, non-destructive examination (NDE, Bobin coil) of steam generator (SG) tubing etc.? [SSR-2/2 (Rev.1) Requirement 31; 8.1, 8.2] [SSG-70; 6.4] [SSG-74; 10.18]

30. During the commissioning phase, how where surfaces preconditioned before and during initial start-up in order to ensure appropriate, passivated surfaces in all systems? [SSG-13, 5.19]

8.2.2. Procedures, Parameters and Limits for Chemistry Control

31. Which chemistry procedures ensure compliance with the appropriate operational limits and conditions and ensure implementation of effective chemistry programme? [SSR-2/2 (Rev.1) Requirement 6; 4.12] [SSG-70; I.19]

32. How do chemistry procedures ensure that the primary water chemistry regime is appropriately selected, with account taken of its potential impact on ageing effects such as: (i) uniform corrosion and stress corrosion cracking of circuit materials, (ii) fuel cladding corrosion, (iii) activation and transport of corrosion products, (iv) dose rates, (v) crud induced power shifts and (vi) crud induced localized corrosion? [SSR-2/2 (Rev.1) Requirement 11; 4.39, Requirement 29; 7.13] [SSG-13; 3.4, 5.1, 5.2, 5.3, 5.5, 5.6, 5.18, 5.27] [SSG-74; 9.2, 9.11]

33. How do chemistry procedures ensure that the secondary side chemistry programme aims to minimize (i) corrosion in the integrated system, (ii) deposits in the steam generators, (iii) concentration of deleterious impurities in crevices of areas with restricted flow and (iv) condenser leaks in both water and air parts, and to increase the effectiveness of the steam generator blowdown purification system and condensate cleaning system (if used)? [SSR-2/2 (Rev.1) Requirement 11; 4.39] [SSG-13; 3.4] [SSG-74; 9.11, 9.40]

34. How do plant procedures ensure that the chemistry programme for auxiliary systems ensure safe operation and long-term integrity of structures, systems and components? [SSR-2/2 (Rev.1) Requirement 11; 4.39] [SSG-13; 3.4]

35. How is it ensured that appropriate chemistry control and diagnosis parameters are selected and applied to verify safe and reliable operation? [SSG-13; 3.4]

36. What are the relevant operational limits and conditions for these parameters and where are they specified? [SSR-2/2 (Rev.1) Requirement 6; 4.6] [SSG-70; 5.2, I.19]

37. Where and how have the necessary actions been implemented when specifications have been exceeded and what has been the basis for the timeframe given to return back to values below action levels? [SSR-2/2 (Rev.1) Requirement 6; 4.6, 4.9, 4.13, 4.15] [SSG-13; 3.3, 3.4(n), 4.4, 4.7, 4.46, 5.26(a), 6.2(c), 7.4, 7.8, 7.9]

38. How is it ensured that the procedures, schedules and methods associated with the chemistry programme are all effective, clearly understood and properly followed? [SSR-2/2 (Rev.1) Requirement 26; 7.1, 7.2, 7.4, 7.6] [SSG-13; 2.9, 2.10, 6.10]

39. How is the chemistry department involved in fresh fuel receipt and storage related activities? How is it involved in the control of fuel cladding for wet fresh fuel? How is it involved in monitoring fuel integrity and storage for irradiated fuel? How is it ensured that fuel cladding leaks are early identified? [SSR-2/2 (Rev.1) Requirement 30; 7.24, 7.25] [SSG-13; 4.10, 5.18, 6.22, 6.23] [SSG-74; 9.2, 9.10]

40. How is chemistry involved in the nuclear reactivity management programme? [SSR-2/2 (Rev.1) Requirement 30; 7.20; 7.23, 7.26]

8.2.3. Radiological aspects of the chemistry programme

41. Which procedures govern the monitoring and controlling of radioactive substances like fission products and activated corrosion products in the relevant systems like primary and secondary coolant, spent fuel pool, intermediate cooling systems? [SSR-2/2 (Rev.1) Requirement 29; 7.13, Requirement 30; 7.24, 7.25]

42. How is corrosion product transportation controlled in order to minimize the release and redeposition of activated corrosion products? [SSG-13: 5.13 & 5.14]

43. Which procedures and practices are implemented to monitor, control and continuously reduce, by means of water chemistry and for all operational states, dose rates of systems and components in the plant? [SSR-2/2 (Rev.1) Requirement 20; 5.16, Requirement 29; 7.13] [SSG-13; 5.1 – 5.8]

44. Which procedures and practices are implemented to monitor, control and continuously reduce, by means of water chemistry, generation of radioactive waste and discharges of liquid and gaseous radioactive effluents? [SSR-2/2 (Rev.1) Requirement 20; 5.11, Requirement 21; 5.19] [GSR Part 3 Requirement 31; 3.131-3.134] [SSG-13; 5.8, 5.20, 5.25, 5.26, 6.26, 6.27, 6.28]

45. Is it ensured that appropriate radiochemistry parameters are measured and evaluated to get all relevant information for chemistry surveillance? Which radioanalytical techniques are implemented? [SSR-2/2 (Rev.1) Requirement 29; 7.16] [SSG-13; 6.20, 6.21, 6.22, 6.27, 6.28]

8.3. Management of chemistry data

46. How is it ensured that analysis results are properly recorded, trended, evaluated, documented, archived and easily retrievable? [SSR-2/2 (Rev.1) Requirement 6; 4.12, Requirement 15; 4.52, Requirement 29; 7.15] [SSG-13; 7.1, 7.6, 7.7, 7.8] [GSR Part 2 Requirement 8; 4.20]

47. How is it ensured that software for calculations of chemistry processes important to safety are verified and validated? [SSG-13; 6.4]

48. How does the plant ensure that chemistry data are constantly evaluated to identify chemistry control problems and analytical errors, and to remove deficiencies? [SSR-2/2 (Rev.1); Requirement 6; 4.12, Requirement 14; 4.51] [SSG-13; 4.6]

49. How are responsibilities for reporting and assessment defined and implemented? [SSG-13; 7.9, 7.10]

50. How are long-term and short-term trends and transients identified and assessed? [SSG-13; 3.1, 3.4(k), 7.3-7.9]

51. How are operational transients, low level events and near-misses analysed and addressed? [SSR-2/2 (Rev.1) Requirement 8; 4.31, Requirement 24; 5.31] [SSG-13; 6.22]

52. How do you ensure that there is a timely response to correct any deviations from normal operational status, such as small deficiencies, adverse trends or fast transients of chemistry parameters? [SSR-2/2 (Rev.1) Requirement 6; 4.13, 4.14] [SSG-13, 3.4]

53. How do you ensure that there is timely reporting of evaluation results to management at the responsible level and to other users of such results (operators, maintenance staff, the system engineering group, technical support organizations, the regulatory body, etc.)? [SSR-2/2 (Rev.1) Requirement 6; 4.13, 4.14] [SSG-13; 3.4]

8.4. Chemistry surveillance and control programme

The operating organization should establish and implement a chemistry surveillance programme to verify the effectiveness of chemistry control in plant systems [SSG-13; 6.1]. Chemistry control includes the correct application of the appropriate chemistry regimes for safety systems and safety related systems. [SSG-13; 4.1]. In the following chapter the results of chemical surveillance and control should be reviewed and assessed for all the systems, structures and components and all operational stages as specified in the chemistry programme, i.e. the implementation of the chemistry programme in the field. It should be checked, if the specified parameters are properly monitored and limit values are obeyed and if appropriate measures and countermeasures are taken in a timely manner, if applicable. This part is usually done by reviewing trend data.

54. Which procedures govern the implementation of the chemistry surveillance and control programme? How is it ensured that the chemistry control programme includes all relevant parameters, specifications, limits and conditions, and sampling frequencies? [SSR-2/2 (Rev.1) Requirement 6; 4.6-4.15] [SSR-2/2 (Rev.1) Requirement 8; 4.26] [SSG-13; 3.3, 4.31, 5.6, 5.8, 6.10]

55. How is it confirmed that the chemistry surveillance and control programme is ensuring that the plant is operated in accordance with the design assumptions and intent developed to preserve the integrity of systems, structures and components? How the potential plant modifications are taken into consideration in surveillance and control programme? [SSR-2/2 (Rev.1) Requirement 6; 4.6, Requirement 14; 4.51] [SSG-13; 2.1, 2.6]

56. How does the chemistry department ensure that chemistry results are appropriately communicated to relevant staff in the plant? [SSG-13; 7.9]

57. How is it ensured that corrective actions in response to chemistry results are taken when necessary and in a timely manner? How effective is the system for responding to adverse chemical parameter variations in preventing limit values being exceeded? [SSR-2/2 (Rev.1) Requirement 1; 3.2(e)] [SSG-13; 2.10, 4.4, 5.26, 6.2(c), 7.4, 7.8]

8.4.1. Chemistry surveillance and control for the primary circuit

58. How can it be demonstrated that chemical parameters are properly monitored, analysed and controlled, e.g. boron, hydrogen, lithium/potassium concentrations, pH and corrosion-inducing contaminants? [SSR-2/2 (Rev.1) Requirement 29; 7.14] [SSG-13; 4.3, 4.11, 4.13, 6.17, 6.22]

59. How is it ensured that uniform corrosion processes and stress corrosion cracking processes, corrosion product transport and radioactivity build-up, are all properly monitored and minimized? [SSR-2/2 (Rev.1) Requirement 29; 7.16] [SSG-13; 3.4]

8.4.2. Chemistry surveillance and control for secondary circuits

60. How can it be demonstrated that chemical parameters are properly monitored, analysed and controlled on the secondary side, e.g. pH, corrosion products and concentration of dosed chemicals? [SSR-2/2 (Rev.1) Requirement 29; 7.14] [SSG-13; 4.42-4.44]

61. How is the integrity of the steam generators controlled? What is the quality and quantity of sludge in the steam generators? How is the current trend developing? How the hide-out return is followed in the blowdown water and how the results are utilised? [SSR-2/2 (Rev.1) Requirement 29; 7.16] [SSG-13; 4.45-4.49]

62. How often do condenser leakages occur, what are the reasons, what are the leakage rates, how long does it take to treat them? [SSG-13; 3.4(c)]

63. How is flow-accelerated corrosion on the secondary side controlled and minimized? [SSG-13; 4.43, 4.44]

64. How is it ensured that wet or dry conservation conditions for systems and components are within specifications and effective during outages? Which procedures give guidance how conservation is to be performed during outages having different duration? [SSG-13; 2.12]

8.4.3. Chemistry surveillance and control for safety related systems

65. How can it be demonstrated that chemical parameters are properly monitored, analysed and controlled in safety related systems like spent fuel pool, liquid poisoning systems, intermediate cooling systems etc.? [SSR-2/2 (Rev.1) Requirement 29; 7.14] [SSG-70; I.9]

66. How can it be demonstrated that chemical parameters are properly monitored, analysed and controlled in other relevant systems, e.g. in emergency cooling system, auxiliary and raw water systems? [SSR-2/2 (Rev.1) Requirement 29; 7.14] [SSG-13; 3.4(d)]

67. How are organic impurities in raw water controlled to produce demineralized water? [SSG-13; 4.30]

68. What arrangements are in place within the plant's commissioning programme to ensure adequate consideration of chemical preconditioning and/or passivation of the plant prior to active commissioning? What arrangements are in place at the plant to ensure that relevant safety system settings and alarm settings, including those of instruments for radiological protection, are specified at the appropriate commissioning stages or sub-stages? [SSG-28; 2.22, 2.6] (COMs – only relevant for Pre-OSART missions)

8.4.4. Chemistry surveillance and control for safety related lubricating oil systems and storage of diesel fuel

69. How can it be demonstrated that chemical parameters are properly monitored, analysed and controlled in safety related lubricating oil systems like emergency pumps and emergency diesel generators? [SSR-2/2 (Rev.1) Requirement 29; 7.14] [SSG-13; 3-4(j)]

70. How can it be demonstrated that the quality of stored diesel fuel is appropriate for use? [SSR-2/2 (Rev.1) Requirement 29; 7.14] [SSG-13; 3-4(j)]

8.4.5. Chemistry surveillance and control of radiological aspects

71. How can it be demonstrated that procedures and practices with regard to minimization of dose rates in the plant, generation of radioactive waste and release of radioactive materials to the environment are working well and effectively? [SSR-2/2 (Rev.1) Requirement 20; 5.11, Requirement 21; 5.17, 5.19, Requirement 29; 7.13] [SSG-70; 9.11, I.23- I25] [SSG-13; 5.1-5.21, 6.29]

72. How can it be shown that information exchange and cooperation between radiation protection and chemistry with regard to dose rates of systems and components is working well? [SSR-2/2 (Rev.1) Requirement 20; 5.16] [SSG-13; 5.2, 6.29]

73. How does the number of fuel cladding leaks trend? How are other leaks monitored and controlled like leaks from primary to secondary side etc.? [SSG-70; I.23-I.25] [SSG-13; 5.9, 5.10, 5.11, 5.26, 6.20 - 6.25]

74. How can it be shown that the clean-up system for controlling dissolved and suspended radioactive substances are working effectively? [SSG-13; 5.20, 6.24]

75. Which chemical decontamination techniques are applied and how is there effectiveness monitored? [SSG- 13; 5.4 5.22, 5.23, 5.24, 6.25]

8.5. Laboratories and measurements

8.5.1. Facilities and Instruments

76. How is it ensured that facilities and equipment are adequate for use in normal and accident conditions? [SSG-13; 2.7, 2.22, 6.31, 6.43]

77. How is it ensured that up-to-date equipment is being used? What equipment is currently on order? What kind of long-term investment plan the plant has for its laboratory equipment? [SSG-13; 6.36]

78. To what degree does the chemistry department have sufficient redundancy of analytical facilities and equipment to measure reliably the parameters required by operating limits and conditions? [SSG-13; 6.31]

79. How is it confirmed that appropriate manuals and/or supplier handbooks for all chemistry instruments/equipment are available in the laboratory? [SSG-13; 6.37]

80. How is it ensured that written procedures are being developed and are used for all on-line and laboratory analyses? [SSG-13; 6.10]

81. How is it ensured that analytical equipment is calibrated on time, using accurate calibration standards and procedures? [SSG-13; 6.10(g), 6.11, 6.12, 6.15, 6.35]

82. How is it ensured that appropriate chemical and radiochemical standards are being applied? [SSG-13; 6.12]

83. How is it ensured that reliable samples are taken? How is it ensured that samples are representative if they are taken by some other plant organisation? [SSG-13; 6.22 (b)]

84. How is the storage, replacement and ordering of hazardous chemicals managed? Which procedures are applied? [SSG-13; 9.7, 9.11]

85. How is industrial safety and radiological safety (e.g. proper radiation shielding) maintained? [SSG-13; 6.10(f), 6.33]

86. How is it ensured that housekeeping is adequate and controlled? [SSG-13; 6.32]

8.5.2. Quality assurance of results of analysis

87. How is it ensured that the quality assurance programme for chemistry results is well implemented and evaluated? [SSG-13; 2.23, 7.1, 7.2]

88. How is the quality of chemical analysis results assessed? How is the quality of chemical analysis compared with that of external laboratories, e.g. by means of inter-laboratory comparison-tests (round robin tests)? [SSG-13; 6.18, 6.38]

89. How is it ensured that quality control measurements are properly trended, evaluated, recorded, documented, archived and retrievable? [SSG-13; 7.6, 7.7, 7.8]

90. How does the plant ensure that chemistry data are constantly evaluated to identify analytical errors, and to remove deficiencies? [SSR-2/2 (Rev.1); Requirement 6; 4.12, Requirement 14; 4.51] [SSG-13; 4.6]

8.5.3. Post-accident sampling system

91. How is post-accident sampling performed? [GSR Part 7 Requirement 9; 5.32 (a, c)]

92. How is it ensured that sufficient staff are available for emergency purposes (on-call)? [GSR Part 7 Requirement 21; 6.9, 6.10] [SSG-13; 6.43]

93. How is it confirmed that procedures, training and retraining for obtaining, transporting and analysing samples in post-accident conditions are appropriate? [GSR Part 7 Requirement 25; 6.28] [SSR-2/2 (Rev.1) Requirement 18; 5.5] [SSG-13; 6.44, 8.8(b)]

94. To what extent is the operability of the post-accident sampling system well considered, well maintained and periodically tested? [SSR-2/2 (Rev.1) Requirement 18; 5.7] [SSG-13; 6.44, 8.8]

8.6. Quality control of operational chemicals and other substances

95. How are chemicals and other substances managed, especially hazardous chemicals? How the plant controls the chemicals used by contractors during steady-state operation and outages? [SSR-2/2 (Rev.1) Requirement 29; 7.17] [SSG-13; 3.4(s), 6.33, 8.13(a), 9.7]

96. What is the policy for preventing the use of chemicals and other substances that could have a negative impact on plant systems or the environment, or endanger the health of

staff? What kind of chemical acceptance analyses are conducted? [SSR-2/2 (Rev.1) Requirement 28; 7.12, Requirement 29; 7.17] [SSG-13; 5.5, 9.1]

97. How is the list of approved chemicals made available and implemented in the field? [SSG-13; 9.4]

98. How is the shelf life of chemicals and other substances controlled, both in warehouses and in the field? [SSG-13; 9.9, 9.10]

99. What is the labelling system for chemicals and substances to identify their designated field of use? [SSG-13; 2.9, 9.9, 9.10, 9.12, 9.13, 9.15]

100. How does the plant ensure that delivered chemicals and other substances are of appropriate quality, especially those intended for safety related systems including lube oil and diesel fuel? [SSG-13; 9.3, 9.6, 9.8, 9.17, 9.18]

101. How is it ensured that the material safety data sheets for all chemicals are available and up to date? [SSG-13; 9.14]

8.7. Use of PSA, PSR and ageing management

102. How does the chemistry department use PSA or some of its applications [e.g. risk monitoring] to optimize chemistry activities? [SSG-3; Annex I M13, M14] [GSR Part 4 Requirement 10; 4.35]

103. How are the PSR results used to enhance the chemistry programme? [SSR-2/2 (Rev.1); Requirement 12; 4.44]

104. How is chemistry involved in the ageing management programme of the plant? [SSR-2/2 (Rev.1) Requirement 14; 4.50, 4.51] [SSG-48; 2.6, 2.14, 2.17, 3.22, 4.16, 4.45, 5.10, 5.40, 5.42] [SSG-13 3.4(k)]

[IAEA safety standards for this WNO: SSR-2/2 (Rev. 1)*; GSR Part 2; GSR Part 3; GSR Part 4 (Rev. 1); GSR Part 7; SSG-3; SSG-13*; SSG-28; SSG-48; SSG-61; SSG-70; SSG-71; SSG-74; SSG-76; (*main basis)]

Fact in bold: New fact

Fact not in bold and in Italic: Previously edited fact

Fact not in bold: Validated fact by counterpart

~~Fact strikethrough~~: Fact deleted (only after discussion with TL or DTL)

CH: FACTS & Themes

8. CHEMISTRY

8.1. Organization and functions (Q1-Q21)

Fact:

8.2. Chemistry programme (Q22-Q45)

Fact:

8.3. Management of chemistry data (Q46-Q53)

Fact:

8.4. Chemistry surveillance and control programme (Q54-Q76)

Fact:

8.5. Laboratories and measurements (Q77-Q95)

Fact:

8.6. Quality control of operational chemicals and other substances (Q96-Q102)

Fact:

8.7. Use of PSA, PSR and ageing management (Q103-Q105)

Fact:

Performance Indicators:

Description	**2021**	**2022**	**2023**	**2024**
Number of Fuel Failures				
Number of Steam Generator Tube failures				
Number of leaks in Main Condenser tubes				
Chemistry Performance Index Value (12 rolling month)				
Number of LCO entries due to Chemistry data				
Number of most significant Chemistry events				
Number of CAP items open associated with Chemistry				
Chemistry self-assessment report (yes / no)				
Number of Intercomparison exercises carried out				

8. CH

No.	Issue summaries: (Brief five-line maximum description, neutral in tone, in order to present the subject of issues under development to the Plant Manager)	CI	CA	PMI	PMA
1					
2					
3					
4					
5					
6					
GP1	Good Practices: [brief description]				
GP2					

CI = Counterpart informed, CA = Counterpart agreed, PMI = Plant manager informed, PMA = Plant manager agreed

OSART MISSON WORKING NOTES

OUTLINES – EMERGENCY PREPARDNESS & RESPONSE

EPR: 71 Q > 10 Q / Day	Comments from TL
Day 1	
Day 2	
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Contents

9. EMERGENCY PREPAREDNESS AND RESPONSE

9.1. Organization and functions

9.1.1. Functions and responsibilities

1. What are the actions of the senior management to ensure that adequate arrangements are made for preparedness and response for a nuclear or radiological emergency? How clearly does the on-site plan describe the emergency response organization, including roles and responsibilities, executive and operational decision-making bodies, and interfaces with external organizations (including off-site emergency management organizations)? How does the operating organization ensure that they are well understood by all personnel? [GSR Part 2 Requirement 1; 2.2f] [GSR Part 7 Requirement 2; 4.5-4.9, Requirement 6; 5.2-5.4, 5.7, Requirement 20; 6.5, 6.6, Requirement 21; 6.8, 6.10, 6.11, Requirement 23; 6.17] [SSR-2/2 (Rev.1) Requirement 1; 3.2(b), (d), Requirement 3; 3.8, 3.9] [SSG-72; 2.11]

2. How have the safety and security measures related to emergency preparedness and response been designed and implemented in order not to compromise each other? [SF-1; 1.10] [GSR Part 7; 1.2, 1.5, 1.6, 1.9, 1.16, Requirement 2; 4.10(c, d), 4.14(b), Requirement 4; 4.22, 4.25; Requirement 6; 5.2, 5.5, 5.6, Requirement 8; 5.25; Requirement 13; 5.69] [SSR-2/2 (Rev.1) Requirement 17; 5.1]

9.1.2. Coordination with off-site authorities

3. What are the arrangements to ensure adequate coordination with off-site authorities (both in terms of preparedness and response)? What are the respective roles and responsibilities of the operating organization and of off-site authorities? How is this agreed to and accepted by the off-site authorities? How is it documented? [GSR Part 7; 1.6, Requirement 2; 4.10, Requirement 6; 5.3, 5.4, 5.6, 5.7, 5.9, Requirement 20; 6.5, Requirement 21; 6.7, Requirement 22; 6.12-6.15, Requirement 23; 6.17, 6.19, Requirement 24; 6.24] [GS-G-2.1; 5.2] [SSG-3; 2.30] [GSG-11; 4.7-4.9]

9.1.3. Management

4. How has the emergency management system been established? How has it been integrated into the overall management system? [GSR Part 7 Requirement 1; 4.1-4.3, Requirement 2; 4.16] [GSR Part 3 Requirement 43; 4.1-4.5] [GSR Part 2 Requirement 9; 4.10-11]

5. How are the goals, the objectives and the protection strategy related to EPR developed and managed? [GSR Part 7; 3.1, 3.2, Requirement 2; 4.16, Requirement 5; 4.27-4.31, Requirement 9; 5.40] [GSR Part 3 Requirement 44; 4.7-4.11]

6. What are the internal processes for development, periodic review and update of the on-site emergency plan, procedures and other relevant EPR policies and programmes? How are they based on lessons learned from research, operating experience including current industry practices, drills and exercises? [GSR Part 7 Requirement 2; 4.16, Requirement 23; 6.18, Requirement 25; 6.30, Requirement 26; 6.34, 6.36, 6.38] [SSR-2/2 (Rev.1) Requirement 18; 5.2-5.4]

7. How does the operating organisation ensure that EPR performance is effectively monitored and reviewed? How does the plant ensure that self-assessment is effectively applied to EPR activities? What indicators are used for the self-assessment? How are the corrective measures developed and implemented? [GSR Part 7; Requirement 2; 4.17] [SSR-2/2 (Rev.1) Requirement 9; 4.33-4.37] [SSG-76; 2.32]

8. How does the operating organization take charge of updating emergency response procedures following modifications to emergency response facilities and equipment? [SSR-2/2 (Rev.1) Requirement 11; 4.42]

9.1.4. Hazard assessment

9. To what extent does hazard assessment cover all possible hazards, including:
   - all radiological hazards from reactors, spent fuel pools, multi-facility events, radioactive sources on site and in-house waste management,
   - non-radiological hazards and internal hazards e.g. fire/flooding/chemical and explosive substances
   - external events (both natural and those caused by neighbouring industries)
   - credible combination of abovementioned hazards?

   What events affecting the facility are considered in the hazard assessment? How is the hazard assessment duly documented (e.g. in the FSAR)? [SSR-2/2 (Rev.1) Requirement 18; 5.4] [GSR Part 7 Requirement 4; 4.18-4.20, 4.22-4.24] [GSR Part 4 Rev. 1; 2.6(f), Requirement 8; 4.22(c), Requirement 24; 5.6] [GS-G-2.1; 3.24-3.26, 3.31, 6.7-6.9]

10. To what degree is the emergency plan based on this hazard assessment? How does it cover all identified potential emergencies, including low probability ones? [GSR Part 7 Requirement 4; 4.18-4.20, Requirement 23; 6.18(d)]

11. What is the availability of a plant-specific level 2 PSA? How is it taken into consideration (in view of the results of various events and actions) in the hazard assessment? If it is not available, what are the current perspectives on developing a plant-specific level 2 PSA.? [GSR Part 4 Rev. 1 Requirement 24; 5.6] [SSG-3; 2.30] [SSG-4; 8.1(d)(e), 8.2, 8.24-28]

12. To what extent are the results of the Level 2 PSA used to establish the emergency planning zones? [SSG-4; 8.26]

13. What change management process is used to review and, if required, revise the emergency arrangements (a) prior to any change in the facility or to any activity that may impact the existing hazard assessment and (b) when new information challenging the existing arrangements become available? [GSR Part 7 Requirement 4; 4.25, 4.26] [SSR-2/2 (Rev.1) Requirement 18; 5.4] [SSG-77; 7.9, 7.10]

9.1.5. Protection strategy

14. To what extent is the on-site protection strategy consistent and coordinated with the off-site protection strategy? How is an evacuation of on-site personnel factored into the off-site protection strategy? [GSR Part 7 Requirement 5; 4.30, 4.31] [GSR Part 3 Requirement 44; 4.7-4.11]

15. While construction and commissioning phase, what emergency arrangements are in place that cover the capability of maintaining protection and safety in the event of an accident;

mitigate the consequences of accidents if they do occur; protect site personnel and the public; protect the environment; coordinate response organizations, as appropriate, and communicate with the public in a timely manner? [SSR-2/2 (Rev.1), 5.2] (COMs – only relevant for Pre-OSART missions)

9.2. Emergency response

9.2.1. Managing emergency response operations

16. How does the operating organization ensure that transition from normal to emergency operations is made effectively, without jeopardizing safety? How is an arrangement for seamless emergency response organization (including responsible internal and external organization) changes across from early warning to the spectrum of gradual to severe hazard events? [SSR-2/2 (Rev.1) Requirement 18; 5.2] [SSG-77; 3.1, 3.10, 3.12-19]

17. How does the operating organization ensure that hazard management and the decision making in hazard management is harmonised with the plant's arrangements for emergency preparedness and response and the accident management programme? [SSG-77; 2.8, 3.11]

18. How is performance-based hazard management, based on clear, objective, measurable criteria and comparison of outcomes, implemented as an emergency response in low probability events or combinations of multiple hazards that were not anticipated in the hazard assessment? [SSG-77; 3.20, 6.1]

9.2.2. Identification, notification and activation

19. How clearly does the on-site emergency plan define the triggers for initiating an emergency response? What are they? How are they related to emergency action levels (EAL), plant parameters (critical safety functions) and radiological conditions? To what extent are the triggers clearly incorporated in the emergency operating procedures (EOPs)? [GSR Part 7 Requirement 7; 5.16] [GS-G-2.1; 4.2, 4.4, 4.5, 6.8]

20. What emergency classification system is in place, and how is the appropriate classification determined during an emergency? How is it based on plant parameters (critical safety functions) and radiological conditions? [SSR-2/2 (Rev.1) Requirement 18; 5.2]

21. What arrangements are made to promptly alert the off-site notification point? What is the notification process? Who decides to notify the regulator and the off-site authorities? What are the time requirements for classification and notification? [SSR-2/2 (Rev.1) Requirement 18; 5.2] [GSR Part 7 Requirement 7; 5.11-5.17] [SSG-72; 7.75] [GS-G-2.1; 6.11, 6.12]

22. What are the arrangements for international notification (e.g. for plants near national borders: notification of appropriate authorities of neighbouring countries)? [GSR Part 7 Requirement 7; 5.18-5.21]

9.2.3. Taking mitigatory actions

23. What are the arrangements for taking immediate mitigatory actions during an emergency? This should include damage control, firefighting, and the emergency actions needed to bring the situation under control and reduce any potential radiological consequences. How does

the operating organization ensure that the personnel taking mitigatory actions have the right tools to allow them to take these actions effectively? How much time does it take for the on-site response team to be deployed? How long is the on-site response team self-sufficient before off-site support has to be called in? How long does it take for off-site support to arrive? To what degree are the personnel sufficient to carry out mitigatory actions while executing the emergency operating procedures and SAMGs (for severe accidents)? How is this determined? How do the arrangements take into account the possible physical disruption to the plant as a result of the emergency? How is technical assistance and support provided to operating personnel? How is information conveyed to the response team? [GSR Part 7 Requirement 8; 5.23, 5.25, 5.27] [SSG-54; 3.44, 3.45, 3.46]

24. What arrangements are made for obtaining prompt support from off-site emergency services (police, medical and firefighting, etc.)? How is it determined when and under what conditions off-site assistance is needed? What arrangements are made to enable off-site support personnel to promptly access the facility, to be informed of on-site conditions and to be provided with the necessary protective equipment? [SSR-2/2 (Rev.1) Requirement 18; 5.4] [GSR Part 7 Requirement 8; 5.24, 5.26, 5.27]

25. What arrangements are in place to ensure that the operating organization is given sufficient authority to promptly take the necessary actions on-site to mitigate the consequences of an emergency? [GSR Part 7 Requirement 2; 4.15, Requirement 8; 5.23]

9.2.4. Taking urgent protective actions and other response actions

26. How is information about emergency conditions and response actions made available to all those concerned? [GSR Part 7 Requirement 9; 5.36]

27. What arrangements are made to save human life or to prevent serious injury? What arrangements are made to take other protective actions? [GSR Part 7 Requirement 9; 5.37, 5.39, 5.64]

28. What arrangements are in place for ensuring the safety of all persons on site? Such arrangements might include alarms, instructions, accounting, locating those who are unaccounted for, evacuation, decontamination, shelter, respiratory protection, iodine thyroid blocking, first-aid, suitable assembly points, safe escape routes, and monitoring in the on-site assembly areas and shelters. [GSR Part 7 Requirement 9; 5.41, 5.42] [GSG-7; 4.7, 4.8] [GS-G-2.1; 4.28, 4.29]

29. What arrangements are made to ensure that means and lines of communication on-site are available and reliable under the full range of emergency conditions? [GSR Part 7 Requirement 9; 5.43]

30. What is the role of the operating organization in protecting the public? What arrangements ensure it can perform this role? [SSR-2/2 (Rev.1) Requirement 18; 5.2] [GSR Part 7 Requirement 9; 5.32, 5.33, 5.34, 5.38] [GS-G-2.1; 4.25-4.26]

31. What arrangements are there for promptly assessing abnormal conditions at the facility throughout the different stages of an emergency? This should cover exposures and releases of radioactive material, radiological conditions on- and off-site, and any actual or potential exposures of the public, workers and emergency workers. What are the considerations of the operating organization concerning the expected response of instrumentation or systems

under abnormal conditions? [GSR Part 7 Requirement 9; 5.31, 5.32, 5.33, 5.34, Requirement 12; 5.62, Requirement 14; 5.82] [GS-G-2.1; 4.27, 6.9] [SSG-54; 2.29, 3.97, 3.98, 3.111]

9.2.5. Providing information, and issuing instructions and warnings to the public

32. What is the role of the operating organization in alerting the public? How is this role executed? [SSR-2/2 (Rev.1) Requirement 18; 5.2] [SSG-72; 4.13, 6.6] [GS-G-2.1 4.32-4.36]

33. Does the operating organization provide advance information on response preparations and actions to the permanent, transient and special population groups, and to special facilities within the emergency planning zones and perimeters? [GSR Part 7 Requirement 10; 5.45, 5.46]

9.2.6. Protecting emergency workers

34. What is the process for ensuring that on-site emergency workers are pre-designated and fit for their intended duty? [GSR Part 7 Requirement 11; 5.49]

35. What arrangements are made to register and integrate into emergency response operations any emergency workers who were not designated as such in advance of a nuclear or radiological emergency? Who is in charge of protecting them when they are on-site? [GSR Part 7 Requirement 11; 5.50] [GSR Part 3 Requirement 45; 4.12] [GSG-7; 4.7, 4.8, 4.19(c), 4.21(d)]

36. How does the procedure for deployment and protection of emergency workers take into account all hazards? [GSR Part 7 Requirement 11; 5.51]

37. What arrangements are made for protecting emergency workers? Such arrangements might cover training; managing, controlling and recording doses received; providing protective and monitoring equipment; iodine thyroid blocking; providing medical follow-up and psychological counselling; and obtaining informed consent for specific duties. [GSR Part 7 Requirement 11; 5.52, Requirement 26; 6.37] [GSG-7; 4.7, 4.8]

38. What equipment is available for protecting emergency workers on-site? How sufficient is it for the anticipated number of emergency workers? What are the dose management and control procedures? What are the arrangements for the protection of external emergency workers providing on-site assistance? What are the dose restrictions applied to on-site emergency workers and to those from off-site organizations who are operating on-site? What are the provisions for medical follow-up of emergency workers? [GSR Part 7 Requirement 11; 5.52-5.54, 5.56, 5.58, 5.59] [GSG-2; 3.11-3.12]

39. What arrangements are made to ensure that emergency workers who undertake actions in which the doses received are > 50mSv, do so voluntarily, are clearly and comprehensively informed of associated health risks, and are trained in the actions to take? What is the established process for decision-making in this regard? [GSR Part 7 Requirement 11; 5.54, 5.55, 5.57] [GSR Part 3 Requirement 45; 4.15-4.17] [GSG-2; 4.5]

40. How is information on doses received during a response and on associated health risks communicated to emergency workers? What processes are established for assessing

workers' fitness for duty following an emergency response? [GSR Part 7 Requirement 11; 5.60, 5.61, Requirement 21; 6.9] [GSG-2; 3.27-3.31]

9.2.7. Managing the medical response

41. What arrangements are provided for medical treatment of those individuals who are contaminated on the site? [GSR Part 7 Requirement 12; 5.64, 5.67] [GSG-2; 4.6]

42. What arrangements have been made with respect to managing a limited number of contaminated or overexposed individuals, including promptly providing first-aid, dose estimates, and transport to a pre-designated off-site medical facility for further treatment? How do these arrangements comply with the principle that lifesaving takes precedence over decontamination? How is the medical facility equipped to deal with contaminated patients? What support does the operating organization provide to the medical facility, in preparedness and in response? GSR Part 7 Requirement 12; 5.65] [GSG-7; 4.30-4.32] [GS-G-2.1; 4.45, 4.46]

9.2.8. Keeping the public informed during an emergency

43. What is the role of the operating organization in keeping the public informed during an emergency? [SSR-2/2 (Rev.1) Requirement 18; 5.2] [GSR Part 7 Requirement 13; 5.69]

44. What arrangements are made for providing coordinated and consistent information to those responsible for informing the public in the event of an emergency? How are these arrangements integrated within public communications arrangements at local and national levels? [GSR Part 7 Requirement 13; 5.70, 5.71, Requirement 20; 6.4] [GS-G-2.1; 4.36]

45. What arrangements are made for identifying and addressing incorrect information, and for responding to requests for information from the public and from the news media? How are these arrangements integrated within public communications arrangements at national level? [GSR Part 7 Requirement 13; 5.74, Requirement 20; 6.4] [GS-G-2.1; 4.36]

46. What arrangements are made to handle media enquiries in a timely manner during emergencies? [GSR Part 7 Requirement 13; 5.75]

9.2.9. Managing radioactive waste in a nuclear emergency

47. What are the arrangements for managing the on-site radioactive waste generated by an emergency? [GSR Part 7 Requirement 15; 5.84-5.88] [GSG-11; 4.180-4.183, 4.188-4.195]

9.2.10. Mitigating the non-radiological consequences of a nuclear emergency and emergency response

48. To what extent do the on-site emergency arrangements consider the non-radiological impacts on all site personnel (e.g. for protective actions)? How clearly are the respective arrangements described? [GSR Part 7 Requirement 16; 5.89, 5.90]

9.2.11. Termination of an emergency

49. What are the arrangements for terminating an emergency on site? Who takes the decision, on what basis, and how is the transition made to a planned exposure situation? [GSR Part 7 Requirement 18; 5.95-5.101] [GSG-11; 3.6-3.18, 4.7, 4.11, 4.13- 4.14]

9.2.12. Analysing the emergency and the emergency response

50. What arrangements are made to protect, preserve and record the data and information that is generated during an emergency and deemed to be important for analysing the emergency and the response? What measures are in place to carry out such an analysis? [GSR Part 7 Requirement 19; 5.102, Requirement 26; 6.37, 6.38] [GSG-11; 4.223]

9.3. Emergency preparedness

9.3.1. Staffing

51. How has the minimum shift staff complement (i.e. minimum number of qualified workers who must be present at all times to ensure adequate emergency response capability) been defined in the on-site emergency plan? How has the basis for this requirement been defined? To what degree does it provide sufficient resources for all foreseen emergencies? What is the staffing level, including contractors, in the EPR area? How sufficient is this staffing level for all emergency preparedness tasks? To what extent do the numbers of designated staff cover all the key positions in the emergency response organization? How is it ensured that at least one person is available at all times for each key position? [SSR-2/2 (Rev.1) Requirement 4; 3.10, 3.11] [GSR Part 7 Requirement 21; 6.8-6.11]

9.3.2. On-site emergency plan and procedures

52. How clear, complete and generally well organized are the emergency response plan and supporting procedures? How familiar are all personnel with their general content and with the portions that apply to them specifically? How is this ensured? How often is it reviewed? How do emergency procedures cover all aspects of the plan and all positions within the emergency response organization, and how are they validated? How are they used during exercises? How easily accessible are they? How ergonomic are they? [SSR-2/2 (Rev.1) Requirement 18; 5.3] [GSR Part 7 Requirement 23; 6.16, 6.18-6.21, Requirement 26; 6.36]

53. To what extent are there arrangements for coordinating the on-site emergency plan for each type of emergency and combinations thereof? What arrangements are there for the on-site emergency plan and procedures to be coordinated with the plans of all the other bodies that have responsibilities in an emergency, and with other plans? [GSR Part 7 Requirement 23; 6.17-6.19] [SSR-2/2 (Rev.1) Requirement 18; 5.4]

54. How is it ensured that emergency plans are in accordance with current safety analyses, accident mitigation studies, operating experience (e.g. from emergency drills and exercises) and good practices? [GSR Part 7 Requirement 26; 6.36] [SSG-25; 5.137]

55. What administrative and organizational provisions are in place to ensure adequate emergency preparedness and response during commissioning? [SSG-28; 3.72-3.76] (COMs – only relevant for Pre-OSART missions)

56. How have all normal, abnormal, emergency and severe accident documentation, procedures, drawings and supporting data been approved? [SSG-28, A3] (COMs – only relevant for Pre-OSART missions)

9.3.3. Emergency response facilities and locations

57. To what extent are the emergency response facilities and locations that support the on-site response appropriate in terms of the following characteristics? [SSR-2/2 (Rev.1) Requirement 18; 5.7] [GSR Part 7 Requirement 24; 6.22, 6.24-6.27] [GS-G-2.1; 5.5, Appendix VIII]
    - Adequate in size, suitably located, operable and habitable under emergency conditions.
    - Appropriately organized, equipped with adequate and reliable communications systems and backup power supplies.
    - Supplied with updated copies of all documents and displays of safety parameters (e.g. SPDS).
    - Stocked with adequate personnel protective equipment, food and water, sanitation etc., to sustain response personnel for the expected duration of the event.

9.3.4. Emergency equipment and resources

58. What equipment does support emergency functions? How sufficient is it? How adequate is its functioning under all foreseen emergency conditions? How well do people know how to operate emergency equipment? How often is it tested? What is its accessibility in all emergency conditions? [SSR-2/2 (Rev.1) Requirement 18; 5.7] [GSR Part 7 Requirement 24; 6.22, 6.23]

59. How are alternative supplies - such as supplies of water, compressed air and mobile electrical power, and including any equipment necessary for mitigating severe accident conditions - located and maintained in such a way as to withstand and that it is functional and readily accessible when needed in postulated emergency conditions? [GSR Part 7 Requirement 24; 6.23]

60. What arrangements are made to ensure that emergency equipment is continuously available and functional for use in an emergency (e.g. inventories, resupply, tests, calibrations)? [SSR-2/2 (Rev.1) Requirement 18; 5.7] [GSR Part 7 Requirement 26; 6.34, 6.35]

61. In what respect are on-site facilities and equipment located in places most suitable for their deployment? [GSR Part 7 Requirement 8; 5.27]

62. To what extent are on-site facilities and equipment covered by configuration control measures? [SSR-2/2 (Rev.1) Requirement 18; 5.7] [SSG-61; 3.7.30, 3.13.18-3.13.22]

9.3.5. Training, drills and exercises

63. How does the operating organization instruct its employees and all other persons on site regarding the arrangements for notifying them in case of an emergency, and their actions in case of an emergency? [GSR Part 7 Requirement 25; 6.29] [SSG-75; 4.35]

64. What are the provisions for selecting personnel and for delivering training and any other learning opportunities to ensure that they have the requisite knowledge, skills and abilities to perform their assigned response functions? What is the training programme? How is it tracked? How is it evaluated? [SSR-2/2 (Rev.1) Requirement 18; 5.5, 5.6] [GSR Part 7 Requirement 25; 6.28] [SSG-75; 4.31-4.33]

65. How are EPR staff, including contractors, qualified for their assigned work? What measures have been taken to maintain adequate levels of experience, knowledge and proficiency? [SSR-2/2 (Rev.1) Requirement 4; 3.10, 3.11, Requirement 18; 5.5] [SSG-75; 4.34]

66. What supplementary training is provided to those staff members who are required to perform specialized duties (e.g. TSC members)? [GSR Part 7 Requirement 25; 6.28, 6.31] [SSG-75; 4.37, 4.41] [SSG-54; 2.97, 3.112, 3.114]

67. What training is provided to support teams entering the plant? [GSR Part 7 Requirement 25; 6.28, 6.31] [SSG-75; 4.35]

68. What is the exercise programme to test response arrangements and capabilities, including organizational interfaces? What arrangements are made for evaluation of exercises and for follow-up actions to be taken based on findings? What arrangements are made for evaluation of exercises and for follow-up actions to be taken based on findings? How is the exercise evaluation methodology documented and how systematic and comprehensive is it? [SSR-2/2 (Rev.1) Requirement 18; 5.6] [GSR Part 7 Requirement 25; 6.30-6.33] [SSG-75; 4.43, 4,44, 4.45, 5.43]

69. How does the drills and exercises programme cover the aspects listed below?
    - All elements of the emergency plans are checked for effectiveness. [GSR Part 7 Requirement 25; 6.30] [SSG-75; 5.42-5.45]
    - Full-scale exercises are undertaken involving external organizations. [GSR Part 7 Requirement 25; 6.30] [SSG-75; 4.36]
    - Exercises and drills are realistic (e.g. exercises and drills outside of normal working hours, practice in taking samples while wearing protective clothing and respiratory equipment, using appropriate graphics, plant reaction based on best estimate calculations or on actual operating experience). [GSR Part 7 Requirement 25; 6.30] [SSG-75; 4.34, 4.40]
    - All staff responsible for critical response functions participate in drills and exercises on a sufficiently regular basis to confirm their ability to take on these functions. [GSR Part 7 Requirement 25; 6.31]
    - Experience feedback from drills and exercises is systematic. [GSR Part 7 Requirement 4; 4.19, Requirement 25; 6.30, Requirement 26; 6.34, 6.36] [SSG-75; 5.42, 5.44]
    - All those with a role in the emergency plan regularly participate in drills/exercises. [GSR Part 7 Requirement 25; 6.30-6.32]

70. How will the preparedness of plant staff and staff from external response organizations to perform their tasks be evaluated, and are arrangements in place to test and validate the emergency plan before the commencement of fuel loading? [SSR-2/2 (Rev.1) Requirement 18; 5.6] (COMs – only relevant for Pre-OSART missions)

9.4. Use of PSR and OEF

71. Which areas of EPR did the last PSR cover? How are EPR personnel informed of the results of the last PSR that relate to EPR practices? [SSG-25; 4.1, 8.11]

72. What were the results of the PSR of on-site and off-site facilities and equipment and emergency procedures and records? What issues were identified and what were the corrective measures proposed and implemented? [SSR-2/2 (Rev.1) Requirement 12; 4.44, 4.47] [SSG-25, 5.141-5.145]

73. How is operating experience information used in order to continuously improve EPR? [SSR-2/2 (Rev.1) Requirement 24; 5.27-5.31] [GSR Part 7 Requirement 23; 6.18(d), Requirement 26; 6.36]

[IAEA safety standards for this WNO: SF-1; SSR-2/2 (Rev. 1); GSR Part 2; GSR Part 3; GSR Part 4 (Rev. 1); GSR Part 7*; GS-G-2.1; GSG-2; GSG-7; GSG-11; SSG-3; SSG-4; SSG-25; SSG-28; SSG-54; SSG-61; SSG-72; SSG-75; SSG-76, SSG-77. (*main basis)]

Fact in bold: New fact
Fact not in bold and in Italic: Previously edited fact
Fact not in bold: Validated fact by counterpart
~~Fact strikethrough~~: Fact deleted (only after discussion with TL or DTL)

EPR: FACTS & Themes

9. EMERGENCY PREPAREDNESS AND RESPONSE

9.1. Organization and functions (Q1-Q15)

Fact:

9.2. Emergency response (Q16-Q50)

Fact:

9.3. Emergency preparedness (Q51-Q70)

Fact:

9.4. Use of PSR and OEF (Q71-Q73)

Fact:

Performance Indicators:

Description	2021	2022	2023	2024
Number of emergency exercises per year				
Emergency preparedness procedure update backlog				
Number of EP role holder who were not involved in a drill/exercise in 1 year				
Emergency equipment preventative and corrective maintenance backlog				

9. EPR

No.	Issue summaries: (Brief five-line maximum description, neutral in tone, in order to present the subject of issues under development to the Plant Manager)	CI	CA	PMI	PMA
1					
2					
3					
4					
5					
6					
GP1	Good Practices: [brief description]				
GP2					

CI = Counterpart informed, CA = Counterpart agreed, PMI = Plant manager informed, PMA = Plant manager agreed

OSART MISSION WORKING NOTES

OUTLINES – ACCIDENT MANAGEMENT

AM: 94 Q > 13 Q / Day	Comments from TL
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Contents

10. ACCIDENT MANAGEMENT

10.1. Organization and functions

10.1.1. Functions and responsibilities

1. How are organizational structure, responsibilities, levels of authority and functions of the severe accident management (SAM) emergency staff within the emergency response organisation (ERO)? How well are they understood by personnel? [SSR-2/2 (Rev.1) Requirement 1; 3.2(b), (d), Requirement 3; 3.8, 3.9] [SSG-54; 2.33, 2.85-2.94]

2. How are the goals, objectives and safety indicators related to severe accident management (SAM) developed and managed? How are outcomes checked and measured within the organization? [SSR-2/2 (Rev.1): Requirement 9; 4.33-4.37, Requirement 19; 5.8] [SSG-54; 3.1-3.10, 3.20]

3. How are SAM programmes kept up-to-date with industry practices and when new information on severe accident management becomes available? What internal process is put in place in this regard? To what degree does this process either directly or indirectly include contacts with research organizations, e.g. through the vendor or Owners Group? How effective is this process? To what degree does the SAMG package, including the background documentation, adequately reflect the latest available information? [SSR-2/2 (Rev.1): Requirement 19; 5.8-5.9, Requirement 10; 4.38, Requirement 11; 4.42] [SSG-54; 3.1, 3.2(6), 3.3(a), 3.118-3.123]

4. How are the chain of command and decision-making responsibilities defined for SAM order to avoid any delays in critical decision-making? [SSR-2/2 (Rev.1): Requirement 19; 5.8] [SSG-54; 2.85, 2.92, 2.94, 2.109, 3.74, 3.78, 4.11]

5. How is the transition of responsibility and authority defined, if the roles assigned to the members of the ERO are different in the preventive and mitigatory domains? [SSG-54; 2.30, 2.88, 3.44, 4.2]

6. Who in the ERO is responsible for execution of the SAM guidance? [SSG-54; 3.2(6)(a)]

7. What are the criteria and responsibilities for mobilisation of the SAM team? [SSG-54; 2.90]

10.1.2. Personnel

8. How are SAM staff qualified for their assigned work and tasks? How does the plant ensure that there are enough staff to cope with all identified severe accident situations? What measures have been taken to maintain an adequate level of experience, knowledge and proficiency? How is the performance of the SAM personnel tested under adverse conditions? [SSR-2/2 (Rev.1): Requirement 4; 3.10, 3.11, Requirement 19; 5.8E, 5.9] [SSG-75; 4.29, 4.41-44] [SSG-54; 2.32, 2.89, 2.95-2.98, 4.8]

9. How does SAMG training incorporate a mix of classroom training, exercises and drills? [SSG-54; 2.98, 2.103]

10. How does the plant ensure that training on severe accident phenomena is set at the appropriate technical level for individuals with different functions? [SSG-54; 2.101-102, 3.113]

11. How have personnel who will actually implement the SAMG strategies been trained on the unconventional line-ups that could be proposed? How have personnel who will be expected to use mobile equipment (such as mobile diesels and pumps) been trained on the use of that equipment to mitigate severe accidents? How are the extended periods of time applied in training, drills and exercises in order to represent the plan response, including the transmission of information during shift changes? [SSR-2/2 (Rev.1): Requirement 19; 5.8E] [SSG-75; 4.36, 4.42] [SSG-54; 2.103, 3.16, 3.17, 3.25, 3.114]

12. To what degree does the scope of training include severe accidents occurring simultaneously on more than one unit, from different initial reactor operating states, and in a spent fuel pool? [SSR-2/2 (Rev.1): Requirement 19; 5.8A] [SSG-75; 4.36] [SSG-54; 2.59, 2.96, 2.103, 3.114]

13. How does training include provisions for periodic confirmation of the competence of personnel? What is the maximum interval between refresher training? [SSR-2/2 (Rev.1) Requirement 7; 4.19] [SSG-75; 3.21, 4.22, 4.26, 4.28-4.30, 5.1] [SSG-54; 2.105]

14. To what extent are exercises and drills based on scenarios that will require application of a substantial portion of the overall SAMG package? [SSG-54; 3.115]

15. How do the exercises and drills involve the participation of all individuals and groups engaged in applying SAMGs, be it at local, national and, where appropriate, international level? [SSG-54; 2.101, 3.117]

16. What are the criteria for evaluating the effectiveness of an exercise or a drill? How is the performance of drills and exercises assessed? What feedback is obtained on training in order to improve the quality of the training? [SSG-54; 2.100, 2.106, 2.107]

17. How is SAM training provided on severe accidents initiated by external hazards? [SSG-76; 2.22] [SSG-54; 2.104]

10.2. Overview of the severe accident management programme

18. What is the general status of implementation of severe accident management? When was the process started and completed? How has it been updated and what is the schedule for next update? [SSR-2/2 (Rev.1): Requirement 19; 5.8, 5.8D] [SSG-54; 2.33, 3.99, 3.118-3.123]

19. How was the SAM programme developed? If generic SAM approaches (e.g. developed by a users' group) were used, how were the plant-specific differences incorporated? [SSG-54; 3.5, 3.58, 3.120]

20. If the SAM documentation was initially developed by a vendor or an external organization, how was it ensured that the transition from a generic to a plant-specific programme was handled appropriately? How is continued external support ensured (such as from the plant designer, vendor, engineering organizations, etc.)? [SSG-54; 3.5, 3.82, 3.120]

21. What set of documents is available to the plant to support the understanding, development, training and execution of SAM actions? [SSR-2/2 (Rev.1): Requirement 19; 5.8, 5.9] [SSG-54; 3.23, 3.24, 3.56]

22. For a multiple unit nuclear power plant, how have concurrent severe accidents affecting all units been considered in the accident management programme? [SSR-2/2 (Rev.1): Requirement 19; 5.8A] [SSG-54; 2.50, 2.59, 2.65-2.76, 2.94, 3.3e, 3.66, 3.106]

23. How is it ensured that accident management guidance accounts for all reasonably foreseeable mechanisms and conditions that could challenge fundamental safety functions or radioactive release barriers? To what extent does the SAM programme cover all plant states, including shutdown states, the spent fuel pool and multiple unit events? [SSR-2/2 (Rev.1): Requirement 19; 5.8F] [SSG-54; 2.11, 2.26, 2.28e, 2.31, 2.35, 2.37]

24. How have the extreme external hazards been considered in the SAM programme? [SSR-2/2 (Rev.1): Requirement 19; 5.8C] [SSG-54; 2.36, 2.82, 2.113, 3.66]

25. What contingency measures are included in the SAM programme (e.g. alternative supply of cooling water or electrical power)? How does the plant ensure that equipment is accessible and fully functional when needed? [SSR-2/2 (Rev.1): Requirement 19; 5.8C] [SSG-54; 2.36, 2.82, 2.113, 3.66]

10.3. Analytical support for severe accident management

26. What are the available background analyses and other supporting documentation relevant to the development of the plant-specific SAM guidelines? [SSG-54; 3.99-3.111] [SSG-61; 3.13.25-3.13.28]

27. What was the organization that developed the supporting documentation? How was its competence verified? [SSG-54; 3.82]

28. When was the last update of the plant-specific analyses performed? How was it ensured that the used computational tools were state-of-the-art? [SSG-54; 3.118]

29. How do the supporting analyses cover the progression towards severe accidents in the reactor core as well as in the spent fuel pool? [SSG-54; 3.105]

30. How do the supporting analyses cover the progression towards severe accidents for non-power reactor states, including shutdown states with open reactor or open containment? [SSG-54; 2.37, 3.99(c), 3.105]

31. How do the supporting analyses cover the situation with parallel occurrence of severe accidents on a site with multiple units? [SSG-54; 2.70-71, 3.106]

32. How do the supporting analyses cover severe accident phenomena that potentially challenge the integrity of fission product barriers, and particularly the containment integrity:
    - high-pressure core melt scenarios,
    - generation and combustion of combustible gases,
    - consequences of reactor vessel melt-through,
    - containment basemat melt-through, and

- containment over-pressurization?

[SSG-54; 2.14(c)(d), 3.8, 3.9, 3.100 (a)(b), 3.101]

33. How do the supporting analyses address the containment by-pass scenarios? [SSG-54; 2.14(d), 3.21(a)]

34. What is the scope of the plant-specific accident analyses that supported the development of the SAM guidelines? To what degree was this scope sufficient for identification of differences with the generic documentation (if a generic approach was used), or for comprehensive development of SAM guidelines (in case of a plant-specific approach)? [SSG-54; 3.5,3.56(a)(i) 3.108]

35. To what extent have the analysis results been evaluated and interpreted with due consideration given to computer code limitations and associated uncertainties? How have sensitivity analyses been employed, when relying on computer code results for defining critical decisions? [SSG-54; 3.65, 3.85, 3.102, 3.104]

36. How do the results of the analysis establish that conditions in work spaces occupied by personnel involved in severe accident management will remain habitable? How has the accessibility been assessed for places, where local SAM actions have to be executed? How has the plant considered the interface with radioactive waste management when assessing the accessibility to perform local SAM actions? [SSG-54; 2.24, 2.36, 2.50 (b)(e), 2.110, 2.111, 3.34(i), 3.51, 3.52, 3.111]

37. What are the arrangements for updating the supporting analysis? [GSR Part 4 Rev 1: Requirement 24; 5.10] [SSG-54; 3.118, 3.123]

10.4. Development of procedures and guidelines

38. To what extent have the plant-specific SAM guidelines been based on symptoms which are directly measurable? [SSR-2/2 (Rev.1): Requirement 26; 7.3] [SSG-54; 2.38, 3.94, 3.110(a)]

39. What are the SAM actions derived from the strategies? How have these actions been implemented in procedures and guidelines to ensure that they are properly defined? [SSG-54; 2.22, 3.2(4)(h), 3.30]

40. To what extent is the plant-specific background material readily available? And to what extent does it include the following items?
    - The technical basis for strategies and deviations from generic strategies;
    - A detailed description of instrumentation needs;
    - The results of the supporting analysis;
    - The basis for and a detailed description of steps in procedures and guidelines;
    - The basis for the calculations of set-points.

[SSG-54; 2.53-54,3.23-24, 3.56, 3.113]

41. How were priorities evaluated and established across the different strategies (for both preventive and mitigatory domains)? [SSG-54; 1.7, 2.14, 2.16, 2.17, 3.23, 3.110(f)]

42. In what manner has the basis for the selection of priorities for SAM strategies been documented? [SSG-54; 3.30, 3.40]

43. How is it ensured that the strategies used for the SAM procedures and guidelines are representative of severe accident phenomena? [SSG-54; 3.20-3.22]

44. To what extent have any available non-dedicated systems, unconventional line-ups and temporary conditions been included in the SAM programme and instructions? How have the possible restrictions of authorized access to such equipment been taken into account? [SSR-2/2 (Rev.1): Requirement 19; 5.8B] [SSG-54; 3.14, 3.16, 3.49]

45. How were the capabilities of the plant, personnel and systems evaluated? [SSG-54; 2.14, 2.77, 2.107, 3.85, 3.89]

46. To what extent have the long term strategies of SAM been developed? How has the plant considered avoiding accumulation of large amounts of contaminated water? [SSG-54; 3.29, 3.89]

47. How have the survivability and qualification of SAM equipment and instrumentation been ensured? How do the results of the analysis confirm the adequacy of the qualification or survivability of plant equipment used for SAM? If equipment dedicated to SAM has been installed, how has its survivability been checked for the expected accident conditions? [SSR-2/2 (Rev.1): Requirement 13; 4.48] [SSR-2/1 (Rev.1): Requirement 23; 5.37] [SSG-54; 2.79, 3.13]

48. To what extent have the positive and negative impacts of SAM actions been identified in the analyses, and to what degree have they been considered for all SAM actions and their assessment incorporated into procedures and guidelines? [SSG-54; 2.45, 2.58, 3.23, 3.24, 3.34, 3.110(d)]

49. What guidance has been developed to account for time constraints and pressures in the decision-making process and in the execution of local SAM actions? How have the time constraints in obtaining adequate measurement information been taken into account? [SSG-54; 2.39-2.41, 3.31, 3.66]

50. What practical impact did the uncertainties in the physical phenomena and in the predictions of the analytical models have on the procedures and guidelines? [SSG-54; 2.44, 3.4]

51. How were plant-specific challenges and vulnerabilities identified, such as degraded regional infrastructure and adverse working conditions, as well as degraded operating conditions for equipment? [SSR-2/2 (Rev.1): Requirement 19; 5.8F] [SSG-54; 3.2(2), 3.2(4)(a), 3.5, 3.12]

52. How were the strategies identified and prioritized? How were they evaluated for potential effectiveness and for potential negative impacts? [SSG-54; 2.17, 3.23]

53. If the programme is based on a generic approach, to what extent has an assessment of differences between the actual and generic reference plant designs been made, and applied to an assessment of the applicability of generic strategies? How are the differences presented in the background documentation? [SSG-54; 3.5, 3.56(a)(i), 3.108]

54. How is it ensured that available SAM relevant data and information from instrumentation data is available to all appropriate members of the emergency response teams? [SSG-54; 3.95-3.97]

55. To what extent have instrumentation limitations such as ranges and survivability been clearly identified in the guidelines or in other easily accessible documentation? [SSG-54; 3.96-3.98]

56. What are the identified needs for computational aids, and how have they been incorporated into the SAM guidelines? [SSG-54; 3.34(j), 3.54; 3.99(h), 3.110(j)]

57. To what extent does the structure of the procedures and guidelines require transition between the preventive and mitigatory domains? How clearly has this transition been defined? [SSG-54; 2.30, 3.5, 3.42, 3.44, 3.45, 3.55]

58. If EOPs are used in the mitigatory domain, how have the actions they prescribe been assessed to be appropriate? [SSG-54; 3.46]

59. To what extent do the SAM guidelines include all relevant parts of the emergency organization (operators, safety engineer, TSC)? [SSG-54; 2.85, 2.88]

60. How are the long-term implications or concerns of implementing the strategies evaluated? To what degree have exit conditions and a controlled stable state been defined? [SSG-54; 1.7(b)(iii), 2.14(f), 3.21, 3.47]

61. What are the requirements and means for overriding or blocking automatic protection system signals or interlocks? [SSG-54; 3.27, 3.48]

62. How are the procedures and guidelines documented and evaluated consistently concerning language and the use of specific terms? What support is available for documentation (e.g. a writer's guide? How has the user-friendliness of procedures and guidelines been evaluated? [SSG-54; 2.47-2.49, 3.31]

63. What is the process for reviewing and revising SAMG when changes are made in the facility or in activities that may impact the existing hazard assessment, or when new information becomes available that challenges existing arrangements? [SSR-2/2 (Rev.1): Requirement 18; 5.4, Requirement 19; 5.8] [SSG-54; 2.10, 3.118-3.123]

10.5. Plant emergency arrangements with respect to SAM

64. How have the SAM arrangements been implemented to be an integral part of the emergency arrangements and coordinated with the on-site emergency plan? How are the arrangements of accident management, emergency response as well as internal and external hazard management (for fire, natural hazards, etc.), integrated, harmonized, documented and implemented in the management system, in accordance with the magnitude of hazards' impact? [GSR Part 7 Requirement 8; 5.25] [GSG-2; III.22, III.23] [SSG-54; 2.27] [SSG-77; 2.8, 2.18, 3.8, 3.10, 3.11]

65. How does the plant coordinate interfaces with other components of plant operations, such as off-site emergency preparedness, or interfaces and interactions with other nuclear units on the same site? [SSG-54; 2.92-94, 3.71, 3.72]

66. How is it ensured that SAM functions can be implemented timely taking into account the time needed to establish the on-site emergency response organization? What are the criteria, responsibilities and required time responses for mobilization of the SAMG users? [SSG-54; 2.90, 3.74, 3.75, 3.79, 3.80, 4.2] [GS-G-2.1; 4.1, 4.2]

67. What are the arrangements to ensure that technical support centre staff is available to provide technical support by performing evaluations and recommending SAM actions to a decision-making authority, in both the preventive and mitigatory domains? [SSG-54; 2.89]

68. How is the team responsible for execution of the SAM measures staffed and qualified? [SSG-54; 4.8]

69. What kind of information does the technical support centre provide to the on-site and off-site emergency organisations needed for decision making (e.g. estimation of potential radiological consequences)? [SSG-54; 2.92]

70. How do the assigned SAM actions take into account high-stress conditions, behaviours and the reliability of personnel under adverse environmental conditions? [SSG-54; 3.18-3.19, 3.66]

71. How are the non-affected units on the same site managed in case of a severe accident? What are the pre-defined criteria for deciding whether the non-affected unit(s) should be shut down or placed in another safe state? [SSG-54; 2.68]

72. How has the effectiveness of multiple usages of such equipment (or response centres) that is shared by different units been proved for events that may occur simultaneously on several units (such as mobile equipment and filtered venting shared by two units)? [SSG-54; 2.69-71, 2.74-2.76]

73. How have such emergency arrangements as mobile and other non-permanent equipment that support the SAM functions been evaluated and tested for a range of potentially adverse conditions and potentially high radiation situations? [SSG-54; 2.18, 3.23, 3.90]

74. How is the resistance of the key SAM equipment to extreme external hazards assessed and taken into account in the SAM guidance? [SSG-54; 2.23, 2.31, 2.60-64, 2.67, 3.12]

75. How are facilities, instruments, tools, equipment, documentation and communication systems for the SAM programme kept available, maintained, and tested? What are the inspection (maintenance and testing) procedures for both mobile and fixed equipment to be used during severe accidents? [SSR-2/2 (Rev.1): Requirement 18; 5.7, Requirement 31; 8.14A] [SSG-54; 2.55, 2.83, 3.68, 3.98]

76. How have the methods and responsibilities for communication and coordination among the different parts of the emergency response organization been defined? How can the reliability of communication methods be ensured during severe accidents? [SSG-54; 2.85, 2.92, 2.115-2.116, 3.43, 3.71-72, 3.78, 3.81, 3.83, 4.4, 4.6]

77. To what extent have off-site emergency services or any other external support been integrated into emergency arrangements of SAM? [SSG-54; 3.2(4)(a), 3.78]

78. How has it been checked and tested that the responsibilities defined in the SAM have been sufficiently coordinated with the emergency plan to ensure a consistent and integrated response to severe accidents? [SSG-54; 2.27, 3.72]

10.6. Verification and validation of procedures and guidelines

79. What is the formal verification has been carried out for the SAM procedures and guidelines? [SSG-54; 2.56, 3.2(5), 3.61, 3.99(f)]

80. To what extent were the plant-specific procedures and guidelines fully and independently reviewed during their development, in accordance with the applicable QA programme? [SSG-54; 2.57-58, 3.67]

81. What type of validation programme was implemented, and how were the results and conclusions of the validation documented? What were the simulation methods chosen for validation (simulators, computer simulations, table-top exercises)? [SSG-54; 3.64-3.67]

82. How have all normal, abnormal, emergency and severe accident documentation, procedures, drawings and supporting data been approved? [SSG-28, A3] (COMs – only relevant for Pre-OSART missions)

83. Which scenarios were chosen for the validation process, in order to cover the full range of procedures and guidelines? [SSG-54; 2.57]

84. To what degree did the validation test the organizational aspects of SAM, especially the roles of evaluators and decision-makers? [SSG-54; 2.48, 2.54, 3,62]

85. How have the SAM procedures and guidelines been tested under conditions that realistically simulate the conditions present during an emergency? To what extent did this include simulations of other response actions, hazardous work conditions, time constraints and stress? [SSG-54; 2.48, 3.66]

86. How were the findings from validation fed back into the procedures and guidelines? [SSG-54; 2.58]

10.7. Control of plant configuration

87. How is the consistency ensured between the design requirements, physical configuration and plant documentation? How are the SAM hardware modifications and SAM documentation integrated into the physical configuration and plant documentation? [SSR-2/2 (Rev.1): Requirement 10; 4.38, Requirement 11; 4.42] [SSR-2/1 (Rev.1): Requirement 25; 5.37] [SSG-54; 2.10, 2.79, 3.2(6), 3.69-3.70, 3.90] [SSG-71; 2.13, 7.17, 10.1] [SSG-61; 3.13.18-3.13.22]

88. To what extent is the SAM development and implementation associated with hardware plant modifications and equipment upgrades? To what degree does the SAMG package, including the background documentation, reflect current plant configuration and the available mobile equipment designated for accident management? What is the process to update the SAMGs in response to plant modifications and changes in available mobile equipment? And how effective is this process? [SSR-2/2 (Rev.1): Requirement 11; 4.39, Requirement 19; 5.8] [SSG-54; 2.21, 2.52, 2.74-2.76, 2.77-2.84, 3.85-3.88]

10.8. Use of PSA, PSR and OEF

89. To what extent were the Level 1 and Level 2 PSAs used for identification of event sequences that may lead to severe accidents and for development of the SAM programme? [GSR Part 4 Rev. 1: Requirement 4; 4.13, Requirement 14; 4.50] [SSG-54; 3.7, 3.9, 3.107] [SSG-3; 3.2] [SSG-4; 2.2, 2.5, 2.15]

90. How was a Level 2 PSA used for evaluation of measures and actions to be carried out for mitigation of the effects of severe accidents? How was it used for determination of the effectiveness of the severe accident management measures? [SSG-4; 8.21, 8.22]

91. What is the procedure of the plant to update the Level 2 PSA? How have updates influenced the analyses of severe accident progression? What were the corrective measures taken, and how were the procedures and guidelines updated? [SSG-4; 5.11-5.13]

92. What are the results of the last PSR review? What were the issues identified with regard to severe accident management, e.g. from hazard analyses or other supporting analyses? What SAM activities did the plant initiate as a result of the PSR? [SSR-2/2 (Rev.1): Requirement 12; 4.44, 4.47] [SSG-25, 5.63, 5.77, 5.78, 5.83, 5.125]

93. What operating experience is reflected in the severe accident management guidance? What were the specific actions taken to update the SAMG and improve relevant plant provisions? [GSR Part 4 Rev. 1: Requirement 19; 4.61] [SSR-2/2 (Rev.1): Requirement 24; 5.27] [SSG-4; 3.4-3.6] [SSG-54; 2.10, 3.3(a), 3.7, 3.122]

94. How does the plant ensure that self-assessment techniques are effectively applied to SAM activities? [SSR-2/2 (Rev.1): Requirement 9; 4.34]

[IAEA safety standards for this WNO: SSR-2/1 (Rev.1); SSR-2/2 (Rev. 1)*; GSR Part 4 (Rev. 1); GSR Part 7; GSG-2; GS-G-2.1; SSG-3; SSG-4; SSG-25; SSG-28; SSG-54*; SSG-61; SSG-71; SSG-75; SSG-76; SSG-77. (*main basis)]

Fact in bold: New fact
Fact not in bold and in Italic: Previously edited fact
Fact not in bold: Validated fact by counterpart
~~Fact strikethrough~~: Fact deleted (only after discussion with TL or DTL)

AM: FACTS & Themes

10. ACCIDENT MANAGEMENT
10.1. Organization and functions (Q1-Q17)

Fact:

10.2. Overview of the severe accident management programme (Q18-Q25)

Fact:

10.3. Analytical support for severe accident management (Q26-Q37)

Fact:

10.4. Development of procedures and guidelines (Q38-Q63)

Fact:

10.5. Plant emergency arrangements with respect to SAM (Q64-Q78)

Fact:

10.6. Verification and validation of procedures and guidelines (Q79-Q86)

Fact:

10.7. Control of plant configuration (Q87-Q88)

Fact:

10.8. Use of PSA, PSR and OEF (Q89-Q94)

Fact:

Performance Data:

Description	**2021**	**2022**	**2023**	2024
Number of Emergency Preparedness Drills involving nuclear fuel melt				
Number of Tabletop Exercises involving the mitigation of severe accidents				
Number of mobile equipment deployment exercises				
Number of CAP items associated with Severe Accident Management Guidelines				
Number of CAP items associated with Severe Accident Management training				
Unavailability of equipment (or components) used to mitigate accidents beyond the original design basis (summation of weeks for each item then added together)				

10. AM

No.	Issue summaries: (Brief five-line maximum description, neutral in tone, in order to present the subject of issues under development to the Plant Manager)	CI	CA	PMI	PMA
1					
2					
3					
4					
5					
6					
GP1	Good Practices: [brief description]				
GP2					

CI = Counterpart informed, CA = Counterpart agreed, PMI = Plant manager informed, PMA = Plant manager agreed

OSART MISSION WORKING NOTES

OUTLINES – LONG TERM OPERATION

LTO; 93 Q > 13 Q / Day	Comments from TL
Day 1	
Day 2	
Day 3	
Day 4	
Day 5	
Day 6	
Day 7	
(Day 8)	

Contents

11. LONG TERM OPERATION

11.1. GENERAL

11.1.1. Principles and approach to AM and LTO

1. Does a clear policy exist in the area of AM and LTO, consistent with related IAEA Safety Standards? [SSR-2/2 (Rev.1); Requirement 1; 3.2 a, b, Requirement 16; 4.53, 4.54] [GS-G-3.1; 3.10-3.12, 5.10] [SSG-48; 3.31, 5.1, 7.7, 7.9]

2. Does the plant have plant level documentation covering principles and concept for AM and LTO? [SSR-2/2 (Rev.1); Requirement 16; 4.53, 4.54] [SSG-48; 5.1, 7.5, 7.6-7.8, 7.11-7.15]

3. Is PSR adequately used to support decision making for LTO? [SSR-2/2 (Rev.1); Requirement 16; 4.53] [SSG-25; 3.7, 3.10]

4. Are the plant personnel familiar with the LTO, its principles and concept and is it understood? [GSR Part 2 Requirement 9; 4.26] [SSG-48; 7.10]

11.1.2. Organizational arrangements for AM and LTO

5. Are the roles and responsibilities of all organization that participate in AM and LTO preparation properly defined and coordinated? [GSR Part 2 Requirement 6; 4.11, Requirement 9; 4.23] [SSR-2/2 (Rev.1); Requirement 3; 3.8-3.9] [SSG-48; 3.5, 5.4, 5.6]

6. Has the plant adopted a suitable organizational structure for preparation and implementation of the AM? [SSR-2/2 (Rev.1); Requirement 14; 4.50] [SSG-48; 5.1-5.3, 5.5]

7. Has the plant adopted a suitable organizational structure for preparation for LTO? [SSR-2/2 (Rev.1); Requirement 16; 4.53] [SSG-48; 3.31, 7.3, 7.4]

8. Are adequate resources (e.g. human resources, financial resources, tools and equipment, and external resources) allocated to support AM and LTO activities? [GSR Part 2; Requirement 9; 4.21-4.22, 4.24] [SSR-2/2 (Rev.1); Requirement 4; 3.11] [GS-G-3.1; 4.1, 4.2] [SSG-48; 5.1, 7.4]

9. Is personnel involved in AM and LTO activities properly qualified and trained? [GSR Part 2 Requirement 9; 4.23, 4.26] [SSR-2/2 (Rev.1); Requirement 4; 3.10] [SSG-48; 5.7, 6.9]

10. Do staff involved in AM and LTO activities have specific job descriptions/task responsibilities? [GSR Part 2 Requirement 9; 4.23, 4.24] [GS-G-3.1; 2.61, 2.62, 3.5] [SSG-48; 5.4, 5.6, 7.4]

11.1.3. Programme for LTO

11. Does the plant have a LTO programme, established in line with the plant's principles and strategy for LTO, and consistent with the IAEA Safety Standards? [SSR-2/2 (Rev.1); Requirement 16; 4.54] [SSG-48; 2.31, 3.31 - 3.32, 7.7 - 7.9, 7.16-7.19]

12. Is the LTO programme a set of activities, including evaluations, assessments, maintenance, inspections and testing, aimed at justifying and demonstrating plant safety for the planned period of long term operation? Does the LTO programme include scope setting, AMR, review of plant programmes and of AMPs, identification and revalidation of TLAAs, and the development of an implementation programme? Is the LTO programme based on national regulatory requirements and does it consider international best practices, operating experience and research findings? [SSR-2/2 (Rev.1); Requirement 16; 4.54] [SSG-48; 2.31, 3.3, 3.30, 4.8, 3.31 - 3.35, 7.7 - 7.9, 7.16-7.19]

13. Is the LTO programme well documented (e.g., assumptions, activities, evaluations, assessments and results of the evaluation of AMPs and plant programmes) and retained in an auditable and retrievable form? [SSR-2/2 (Rev.1); Requirement 16; 4.53-4.54] [SSG-48; 5.70 7.29]

14. Does the LTO programme address the safety improvements (such as modifications, major reconstructions and scheduled replacements) required as well as the related plant commitments and implementation schedule? [SSR-2/2 (Rev.1); Requirement 16; 4.53-4.54] [SSG-48; 7.18e), 7.19, 7.41]

15. Does the plant have programme(s) or action plan for the resolution of issues identified during the review of AMPs, EQ and TLAAs? [SSR-2/2 (Rev.1); Requirement 16; 4.53-4.54] [SSG-48; 7.18]

16. Has an evaluation of the existing NPP programmes and documentation been performed? Are evaluation results used as a basis for developing the foundation for successful LTO and will they remain effective for the planned period of LTO? Will this evaluation determine if modifications and/or new programmes are necessary to ensure that SSCs are available and qualified to perform their intended function for the planned period of LTO? [SSR-2/2 (Rev.1); Requirement 16; 4.53-4.54] [SSG-48; 7.11-7.15, 7.16-7.18]

17. Are recommendations and other suggestions arising from different types of reviews incorporated into plant activities? [SSR-2/2 (Rev.1); Requirement 12; 4.47, Requirement 16; 4.53-4.54] [SSG-25; 9.1-9.5] [SSG-48; 2.21, 7.18-7.19, 7.31]

11.1.4. Scope setting of SSCs for AM and LTO

18. Does the plant have a systematic scope setting process and methodology(ies), documented and applied to all plant SSCs? [SSR-2/2 (Rev.1); Requirement 16; 4.54] [SSG-48; 5.14, 5.15, 7.20]

19. Are the criteria for SSCs scope setting for AM and LTO consistent with IAEA Safety Standards? [SSR-2/2 (Rev.1); Requirement 16; 4.54] [SSG-48; 5.16, 5.17]

20. Were dedicated plant walk-downs used to check the completeness of the list of SSCs whose failure may prevent SSCs important to safety from performing their intended functions in addition to the analysis of plant documentation? [SSR-2/2 (Rev.1); Requirement 16; 4.54] [SSG-48; 5.19]

21. Are the results of the scope setting process clearly and well documented (such as list of SSCs in scope and out of scope, indicating e.g. information sources, intended function, safety class, other scoping criteria, etc.)? Are boundaries between SSC within the scope and SSC out of the scope clearly defined? [SSR-2/2 (Rev.1); Requirement 16; 4.54] [SSG-48; 5.18,5.20 - 5.21, 5.70, 7.18a), 7.29-7.30, 7.33]

22. Are the boundaries for SCs which include interfaces between different areas (mechanical, electrical, I&C and civil structures) like control valves clearly established? [SSR-2/2 (Rev.1); Requirement 16; 4.54] [SSG-48; 5.14, 5.18]

23. Have SCs commodities groups (group of components/ structures which have similar functions, similar materials or are in similar environment) been defined and if so, how? [SSR-2/2 (Rev.1); Requirement 16; 4.54] [SSG-48; 5.20]

24. Was a list or database of the plant SSCs (e.g., a master list) used as a basis for the scoping? Are the scoping process results provided in a list of SCs in the scope and a list of SCs out of the scope of AM/LTO? [SSR-2/2 (Rev.1); Requirement 16; 4.54], [SSG-48; 5.15, 5.17, 5.19, 5.21, 7.18(a), 7.20, 7.33]

25. If scope setting data is distributed into more than one database, how is data consistency assured? [SSR-2/2 (Rev.1); Requirement 16; 4.54], [SSG-48; 5.14-5.15, 7.20, 7.29-7.30, 7.33]

26. Have SCs commodity groups (group of components/structures which have similar functions, similar materials and are in similar environment) been defined and if so, how? [SSR-2/2 (Rev.1); Requirement 16; 4.54], [SSG-48; 5.20, 7.20]

11.2. PERIODIC SAFETY REVIEW (PSR)

27. Does the PSR (or similar safety assessment) provide comprehensive information on AM, equipment qualification and LTO (e.g. assumptions, activities, evaluations, assessments and results of the plant programme for AM, equipment qualification and LTO)? [SSR-2/2 (Rev.1); Requirement 12; 4.44, Requirement 14; 4.50, Requirement 16; 4.53] [SSG-48; 4.3, 4.6-4.8, 5.73, 7.37] [SSG-25; 3.8, 5.29, 5.42-5.44, 5.49-5.51]

28. If the PSR is used as a licensing tool, does it consider the entire planned period of long term operation and not just the ten years until the next PSR? Is the policy, principles and concept for AM and/or LTO adequately documented in the PSR report? [SSR-2/2 (Rev.1); Requirement 12; 4.44, Requirement 16; 4.53] [SSG-25; 3.7] [SSG-48; 4.3, 5.74, 7.2, 7.7, 7.38]

29. Does the scope of PSR review identify life limiting features of the plant in order to determine if there is a need to modify, refurbish or replace certain SSCs for the purpose of extending the operating lifetime of the nuclear power plant? [SSR-2/2 (Rev.1);

Requirement 12; 4.44, 4.47, Requirement 16; 4.53] [SSG-25; 3.2, 3.5] [SSG-48; 1.7, 7.15, 7.40]

30. Is the scope of national and international requirements, codes and standards, as well as practices used in the PSR appropriate and identified in the PSR basis document? [SSR-2/2 (Rev.1); Requirement 12; 4.44] [SSG-25; 4.6-4.9] [SSG-48; 4.6]

31. Does the periodic safety review aimed at providing justification of the adequacy of AM for the planned period of long term operation focus on safety factors 1 - 4 (plant design, actual condition of SSCs important to safety, equipment qualification, ageing) and considers also adequately safety factors 8, 9, and 10 (safety performance, use of experience from other plants and research findings, and management system that addresses quality management and configuration management)? [SSR-2/2 (Rev.1); Requirement 12; 4.44, Requirement 14; 4.50, Requirement 16; 4.53] [SSG-25; 3.6, 3.8] [SSG-48; 4.6, 4.8]

32. Does PSR review identify trends of reported events and their possible connection with degradation of SSCs? [SSR-2/2 (Rev.1); Requirement 12; 4.44] [SSG-25; 2.5, 5.94, 5.95] [SSG-48; 2.7, 3.35, 4.8, 5.56, 7.40]

33. Are the results of the previous PSR examined in order to detect any long-term trends in deteriorating safety performance? [SSR-2/2 (Rev.1); Requirement 12; 4.44, Requirement 16; 4.53] [SSG-25; 2.5, 5.94, 5.95]

34. Is long term operation properly justified by safety assessment (that includes scope setting, AMR and revalidation of TLAAs), with consideration given to the life limiting processes and features of SSCs in scope of the evaluation? [SSR-2/2 (Rev.1); Requirement 16; 4.53] [SSG-25; 3.1, 3.2, 3.6] [SSG-48; 2.30, 2.31, 5.61]

35. Does PSR global assessment provide safety justification for proposed long term operation by evaluating the cumulative effects of both ageing and obsolescence on the safety and reflecting the combined effects of all safety factors (findings and proposed improvements)? [SSR-2/2 (Rev.1); Requirement 16; 4.53] [SSG-25; 2.17, 4.21, 4.26-27, 6.6-6.9, 6.12, Appendix II.5] [SSG-48; 2.5, 2.30, 2.32]

36. Is the PSR prepared (e.g. development of a "basis document") and conducted in co-operation with the regulatory body? Is the PSR report that demonstrates safety for long term operation provided to the regulatory body for review and approval at a level of detail, and in a manner adequate for this purpose? [SSR-2/2 (Rev.1); Requirement 12; 4.45, Requirement 16; 4.54] [SSG-25; 4.5, 4.6, 6.6-6.9] [SSG-48; 7.40]

37. Does PSR review determine reasonable and practicable modifications to be made in order to ensure that a high level of safety is maintained during long term operation? Is justification for any improvements that cannot reasonably and practicably be made provided? [SSR-2/2 (Rev.1); Requirement 12; 4.47, Requirement 16; 4.54] [SSG-25; 3.5, 3.6, 3.10, 4.26-4.27, 5.12, 6.6-6.9, 8.14] [SSG-48; 1.7, 7.15, 7.40]

38. Does the integrated implementation plan to be developed after the PSR contain the reasonable and practicable safety improvement? [SSR-2/2 (Rev.1); Requirement 12; 4.47, Requirement 16; 4.54] [SSG-25; 2.18, 4.25, 6.7, 8.23, 9.1] [SSG-48; 1.7, 7.15, 7.40]

11.3. SAFETY ANALYSES REPORT

39. Are plant programmes and analyses relevant to AM and evaluation for long term operation properly documented in the safety analysis report (or in other current licensing basis documents)? Does the information clearly and adequately describe the current licensing basis and the design basis requirements for the plant? [SSR-2/2 (Rev.1); Requirement 1; 3.2(e)], [SSG-48; 3.11, 4.1 - 4.2], [SSG-25; 3.9], [SSG-61; 2.18, 2.19, 3.13.10-3.13.13, 3.13.16-3.13.20]

40. Is the justification for plant safety during the planned period of LTO properly documented in safety analysis report (both ageing aspects and safety upgrades)? [SSR-2/2 (Rev.1); Requirement 1; 3.2(e)], [SSG-48; 4.3, 4.10], [SSG-25; 3.9], [SSG-61; 2.18, 2.19, 3.13.10-3.13.13, 3.13.16-3.13.20]

41. Is the safety analysis report being updated to reflect the results of AM and LTO assessment activities (e.g., AMR, review of AMPs and plant programmes, revalidation of TLAAs)? [SSR-2/2 (Rev.1); Requirement 1; 3.2(e)], [SSG-48; 4.4, 7.36], [SSG-25; 3.9], [SSG-61; 2.18, 2.19, 3.13.10-3.13.13, 3.13.16-3.13.20]

42. Does the safety analysis report update include information describing the assumptions, activities and results of the plant programme for long term operation (including documentation of the revalidation of the TLAAs for the period of long term operation)? [SSR-2/2 (Rev.1); Requirement 1; 3.2(e)] [SSG-48;4.5, 7.36], [SSG-25; 3.9], [SSG-61; 2.18, 2.19, 3.13.10-3.13.13, 3.13.16-3.13.20]

11.4. AGEING MANAGEMENT REVIEW (AMR)

43. Is there a systematic process in place to perform AMR that is consistent with the IAEA safety standards? [SSR-2/2 (Rev.1); Requirement 14; 4.50, Requirement 16; 4.54] [SSG-48; 5.22 - 5.26]

11.4.1. Identification of relevant ageing effects and degradation mechanisms of SCs

44. Does the AMR systematically identify and assess all ageing effects and degradation mechanisms that have been experienced or are anticipated based on understanding of ageing and to evaluate the impact of ageing on the in-scope SSCs' capability to perform their intended functions? [SSR-2/2 (Rev.1); Requirement 14; 4.50, Requirement 16; 4.54] [SSG-48; 3.24, 5.27, 7.21, 7.23-7.25]

45. Is the comprehensive understanding of ageing effects and degradation mechanisms for SCs based on design data, fabrication data, operation and maintenance histories, acting stressors (including environmental conditions), results of ISI and surveillance, operating experience and results of research and development, results of walkdowns and condition assessments, and results of evaluation of TLAAs? [SSR-2/2 (Rev.1); Requirement 14; 4.50, Requirement 16; 4.54] [SSG-48; 5.28, 5.69, 7.21, 7.28]

46. Is knowledge of the characteristics of the ageing effect (e.g., necessary conditions under

which the effect occurs and rates of degradation), the related degradation mechanisms and their impact on the structure or component's intended function(s) adequately considered in the identification process? [SSR-2/2 (Rev.1); Requirement 14; 4.50, Requirement 16; 4.54] [SSG-48; 5.29, 7.21]

11.4.2. Identification of appropriate programme for AM

47. Were appropriate methods to detect, monitor, prevent and mitigate ageing effects and degradation mechanisms specified for each structure or component? [SSR-2/2 (Rev.1); Requirement 14; 4.51] [SSG-48; 5.30, 7.22, 7.24]

48. Are existing and proposed plant programmes that support LTO consistent with the IAEA recommendations including the nine attributes? [SSR-2/2 (Rev.1); Requirement 14; 4.51] [SSG-48; 3.33, 5.31-5.32, 5.38-5.41, 5.43-5.49, 7.18, 7.20, 7.24, 7.26-7.27]

49. Is there a process in place to ensure that programmes that are not effective are improved, modified, or new programmes are developed? [SSR-2/2 (Rev.1); Requirement 14; 4.51] [SSG-48;5.32, 7.24]

11.4.3. Reporting on the AMR

50. Is the approach to the AMR documented and justified in a way that logically demonstrates that the ageing effects will be adequately managed? [SSR-2/2 (Rev.1); Requirement 14; 4.51, Requirement 16; 4.54] [SSG-48; 5.33, 7.32]

51. Is all information and conclusions regarding the scope of the AMR documented and include the description and justification of the methods used (methodology), list of SCs subject to the AMR and their intended functions, and the information sources to accomplish the above? [SSR-2/2 (Rev.1); Requirement 14; 4.51, Requirement 16; 4.54] [SSG-48; 5.33-5.34, 7.33]

52. Does the documentation of the AMR results provide the following information?
    - Current performance and condition of individual SCs
    - Identification of the ageing effects and degradation mechanisms requiring management;
    - Understanding of ageing, monitoring of ageing, prevention and mitigation of ageing effects, as well as information on possible changes in the course of LTO;
    - Identification of the specific programmes or activities that will manage the effects of ageing for each structure, component, or commodity grouping in scope of the AMR and the need for development of new AMPs;
    - Description of how the programmes and activities will continue to identify and manage the effects of ageing such that the intended function of the SC will be maintained throughout the planned period of operation or LTO;
    - Description of application of results of the AMR in plant operation, maintenance and design;
    - List of substantiating references and source documents;
    - All information and documentation necessary for an effective management of ageing effects is developed and retained in an auditable and retrievable form.

[SSR-2/2 (Rev.1); Requirement 14; 4.51, Requirement 16; 4.54] [SSG-48; 5.33, 5.35-5.36, 5.70, 7.23, 7.29-7.31, 7.34-7.36]

11.5. AGEING MAMANGEMENT PROGRAMMES (AMPs)

53. Are AMPs and other plant programmes that are credited for managing ageing coordinated, implemented and periodically reviewed for improvements? Are they consistent with the nine attributes of an effective AMP? [SSR-2/2 (Rev.1); Requirement 14; 4.50] [SSG-48; 3.33, 5.37 - 5.38, 5.46, 7.26-7.27]

54. If the AMP involves inspection by sampling from a specific population of structures or components, does it describe and justify the methods used for selecting the samples to be inspected and the sample size (with respect to the performance of the SCs intended functions throughout its lifetime)? [SSR-2/2 (Rev.1); Requirement 14; 4.50] [SSG-48; 5.41]

11.5.1. Development of AMPs

55. Is the development of the AMPs based on the results of the AMR? Do the AMPs developed include provisions to prevent, detect, evaluate and mitigate the ageing effects of anticipated degradation mechanisms, based on the findings from the AMR? [SSR-2/2 (Rev.1); Requirement 14; 4.50] [SSG-48; 5.45, 5.48]

56. Are specific actions relating to the detection, monitoring and prevention or mitigation of ageing effects properly specified within each AMP (these may include maintenance, equipment qualification, in-service inspection, testing and surveillance, as well as for controlling operating conditions)? [SSR-2/2 (Rev.1); Requirement 14; 4.50] [SSG-48; 5.44]

57. Do all AMPs developed comply with relevant national regulatory requirements, codes and standards and the AM policy of the plant, and consistent with the nine attributes? Is justification provided if some of the attributes are not met? [SSR-2/2 (Rev.1); Requirement 14; 4.50] [SSG-48; 5.46]

58. Are appropriate acceptance criteria for ageing effects, based on the design basis, technical requirements and applicable regulatory requirements, codes and standards established to facilitate timely corrective actions? [SSR-2/2 (Rev.1); Requirement 14; 4.50] [SSG-48; 5.47]

59. Is the information on the current status of in-scope SCs collected for subsequent review of the effectiveness of the AMPs? Are performance indicators representing the effectiveness of the AMPs developed along with the development of the AMPs? [SSR-2/2 (Rev.1); Requirement 14; 4.50] [SSG-48; 5.49, 5.56]

11.5.2. Implementation of AMPs

60. Are AMPs implemented in a timely manner to ensure that the intended functions of structures or components continue to be met? Are data required for decisions on AM actions collected as a part of the AMP implementation? [SSR-2/2 (Rev.1); Requirement

14; 4.50] [SSG-48; 5.51, 5.53]

61. Are detailed implementation procedures that describe preventive and mitigatory actions, monitoring or inspection and assessment actions, acceptance criteria and corrective actions established and shared among the different units of the nuclear power plant (e.g. the operations, maintenance and engineering units) that are responsible for implementing AM programmes? [SSR-2/2 (Rev.1); Requirement 14; 4.50] [SSG-48; 5.52]

11.5.3. Review and improvement of AMPs

62. Is the effectiveness of AMPs periodically evaluated in the light of current knowledge and feedback from the programme? Are performance indicators, such as material condition, failure and degradation trends, newly revealed ageing, etc. established and used? [SSR-2/2 (Rev.1); Requirement 14; 4.50] [SSG-48; 3.35, 5.54, 5.56]

63. How are AMPs incorporated into the management system of the operating organization? [SSR-2/2 (Rev.1); Requirement 14; 4.50] [SSG-48; 5.55]

64. Are data and information newly acquired through the implementation of AMPs shared among responsible units and other internal or external organizations involved in AM? Are these data connected with the existing plant databases, such as the master equipment and component list? [SSR-2/2 (Rev.1); Requirement 14; 4.50] [SSG-48; 5.57]

65. Is an in-depth review of AM performed periodically (e.g. as part of PSR, of safety review for LTO, etc.) and does it demonstrate that ageing effects will continue to be identified and effectively managed? Are the results of the in-depth review documented and do they indicate findings and corrective actions as applicable (modifications of existing or development of new AMPs)? [SSR-2/2 (Rev.1); Requirement 14; 4.50] [SSG-48; 3.35, 5.61, 5.62]

66. Does the plant conclude, after reviewing the existing plant programmes and/or AMPs, that the management of ageing is not adequate in some cases? If so, does the plant modify the existing programme or develop a new programme for the purpose of LTO? [SSR-2/2 (Rev.1); Requirement 16; 4.54] [SSG-48; 3.33, 3.35, 5.37, 5.54, 5.58, 5.59, 5.60, 5.63]

67. Provide selected examples of improved or new AMPs detailed documentation for review (examples to be selected by the reviewer). Does the plant reviewed AMPs for consistency with IGALL AMPs and are areas for improvement in AMPs identified and incorporated? [SSR-2/2 (Rev.1); Requirement 16; 4.54], [SSG-48; 5.55, 5.59-5.62]

11.6. TIME LIMITED AGEING ANALYSES (TLAAs)

11.6.1. Identification of TLAAs

68. Has the plant identified all TLAAs? [SSR-2/2 (Rev.1); Requirement 16; 4.54], [SSG-48; 3.34, 5.64, 5.65, 7.14(b), 7.18(d)]

69. Which methods and information sources were used to identify the TLAAs? Is the

identification process (methods and information sources) documented? [SSR-2/2 (Rev.1); Requirement 16; 4.54], [SSG-48; 5.64, 5.65, 7.14(b), 7.18(d)]

11.6.2. Revalidation of TLAAs

70. Were all identified TLAAs revalidated using methods and criteria consistent with the IAEA recommendations? [SSR-2/2 (Rev.1); Requirement 16; 4.54], [SSG-48; 5.66-5.68, 7.14(b), 7.17, 7.18(d), 7.28]

71. What corrective or compensatory measures are taken in case TLAAs cannot be revalidated? [SSR-2/2 (Rev.1); Requirement 16; 4.54], [SSG-48; 3.34, 5.68]

72. Is the revalidation of TLAAs documented in an update to the FSAR? [SSR-2/2 (Rev.1); Requirement 16; 4.54], [SSG-48; 5.70-5.72, 7.36]

73. Provide selected examples of TLAA's revalidation detailed documentation for review (examples to be selected by the reviewer). [SSR-2/2 (Rev.1); Requirement 16; 4.54], [SSG-48; 7.30, 7.36]

11.7. DOCUMENTATION, DATABASE, RECORDS

11.7.1. Data collection and record keeping for mechanical SSCs

74. Are efficient data collection and record-keeping systems in place so that trend analyses can readily be performed to predict SSC performance? [SSR-2/2 (Rev.1); Requirement 15; 4.52] [SSG-48; 3.23, 5.9-5.12]

75. Do the data collection and record-keeping systems provide all information for AMR? [SSR-2/2 (Rev.1); Requirement 15; 4.52] [SSG-48; 3.23, 5.9-5.12]

76. Is design documentation, including documentation from suppliers, available? [SSR-2/2 (Rev.1); Requirement 15; 4.52] [SSG-48; 3.13-3.19, 5.9-5.12]

11.7.2. Documentation of AM and documentation in support of LTO

77. Are the assumptions, activities, evaluations, assessments and results of the plant programme for AM and/or for LTO including the list of plant's commitments documented in accordance with national regulatory requirements and consistent with the IAEA Safety Standards in an auditable and retrievable form (see details of refs. provided next)? [SSR-2/2 (Rev.1); Requirement 16; 4.53], [SSG-48; 5.70, 7.29-7.31, 7.33-7.35]

78. Does the documentation include respective methodologies (e.g. in the form of plant procedures, such as for scope setting, AMR, AMP review and improvement, TLAAs identification and revalidation, etc.)? [SSR-2/2 (Rev.1); Requirement 16; 4.53], [SSG-48; 7.29-7.30, 7.32]

79. Does the documentation also include demonstration that ageing effects will be managed

during the planned operating period? [SSR-2/2 (Rev.1); Requirement 16; 4.53], [SSG-48; 7.35]

80. Does the documentation include an update of the safety analysis report reflecting the assumptions, activities and results of the plant programme for AM, and/or for LTO? [SSR-2/2 (Rev.1); Requirement 16; 4.53], [SSG-48; 5.71-5.72, 7.36]

81. Are the assumptions, activities, evaluations, assessments and results of the plant programme for AM and/or for LTO reflected in the PSR report? Is the entire planned period of LTO considered? [SSR-2/2 (Rev.1); Requirement 16; 4.53], [SSG-48; 5.73, 7.37-7.38]

11.8. EQUIPMENT QUALIFICATION PROGRAMME

82. Are possible ageing effects considered for seismic qualification? [SSR-2/2 (Rev.1); Requirement 13; 4.48] [NS-G-2.13; 4.1-4.8]

83. Are the results of the scope setting, ageing management review, and TLAA revalidations for LTO adequately used to update equipment qualification programmes? [SSR-2/2 (Rev.1); Requirement 13; 4.48, Requirement 16; 4.54] [SSG-48; 4.23, 4.28-4.30]

84. Are adequate interfaces with LTO programmes in place? [SSR-2/2 (Rev.1); Requirement 13; 4.48] [SSG-48; 3.35, 4.18, 4.27, 4.30]

85. Has the plant evaluated the existing equipment qualification programmes for in-scope SCs against the nine attributes of an effective AMP for the intended period of operation (i.e. including LTO)? [SSR-2/2 (Rev.1); Requirement 13; 4.48, Requirement 16; 4.54] [SSG-48; 4.17]

86. Has it been demonstrated that environmental qualification will remain valid over the expected period of LTO? Does the demonstration support the technical justification that ageing effects will be managed effectively? Is timely replacement of equipment that cannot be qualified for the planned period of LTO adequately considered? Has a specific programme for replacement of mechanical, electrical and I&C equipment with qualified or stated lifetimes less than the planned LTO period been developed and implemented? [SSR-2/2 (Rev.1); Requirement 13; 4.48, Requirement 16; 4.54] [SSG-48; 4.25, 4.26, 4.28, 4.30, 5.25(6)]

87. Can you provide the qualification results on safety related mechanical, electric and I&C equipment located inside containment? Do these results specify whether the equipment has been qualified to perform its safety functions in environmental conditions equivalent to design basis accident conditions for the planned period of LTO? [SSR-2/1 (Rev.1); Requirement 30; 5.48-5.50] [SSG-48; 4.25, 4.26, 4.28]

88. Is equipment qualification status documented and maintained throughout the life of the plant and consistent with the IAEA Safety Standards? [SSR-2/2 (Rev.1); Requirement 13; 4.49] [SSG-48; 4.29]

11.9. TECHNOLOGICAL OBSOLESCENCE MANAGEMENT

89. Has a dedicated plant programme to manage technological obsolescence consistent with the IAEA safety standards been developed and implemented? Does it address all SSCs important to safety and the spare parts required to maintain these SSCs? [SSR-2/2 (Rev.1); Requirement 10; 4.38, Requirement 16; 4.54] [SSG-48; 3.20, 3.27, 6.1, 6.2]

90. Does the technological obsolescence programme involve the participation of the engineering, maintenance, operations and work planning units, plant senior management and supply chain organizations? [SSR-2/2 (Rev.1); Requirement 16; 4.54] [SSG-48; 6.3, 6.9]

91. Has the technological obsolescence programme been reviewed for consistency with the 9 attributes? Has it been made available to the regulatory body for review? [SSR-2/2 (Rev.1); Requirement 16; 4.54] [SSG-48; 4.17, 6.4, 6.5]

92. Are technological obsolescence programmes periodically reviewed based on new regulatory requirements, vendors' recommendations, operating experience, and new knowledge and research findings? [SSR-2/2 (Rev.1); Requirement 16; 4.54, Requirement 24; 5.27] [SSG-48; 3.3, 3.30, 3.33, 3.35, 6.10, 6.11]

93. Does the technological obsolescence programme include the three basic steps (identify and prioritize issues, implement solutions) and activities consistent with the IAEA Safety Standards? [SSR-2/2 (Rev.1); Requirement 16; 4.54] [SSG-48; 3.20, 6.6-6.8]

[IAEA safety standards for this WNO: SSR-2/1 (Rev.1); SSR-2/2 (Rev. 1)*; GSR Part 2; GS-G-3.1; NS-G-2.13; SSG-25; SSG-48*; SSG-61. (*main basis)]

11. LTO
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11. LTO

No.	Issue summaries; (Brief five-line maximum description, neutral in tone, in order to present the subject of issues under development to the Plant Manager)	CI	CA	PMI	PMA
1					
2					
3					
4					
5					
6					
GP1	Good Practices; [brief description]				
GP2					

CI = Counterpart informed, CA = Counterpart agreed, PMI = Plant manager informed, PMA = Plant manager agreed

OSART MISSION WORKING NOTES

OUTLINES - COMMISSIONING

COM: 83 Q > 11 Q / Day	Comments from TL
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Contents

12. COMMISSIONING

The purpose of commissioning is to ensure that the plant has been constructed in accordance with the design intent and can be operated safety.

12.1. The commissioning process

1. What arrangements are in place to ensure that the commissioning process is a progressive transition from construction to operation of the plant? [SSG-28; 2.1]

2. How is good coordination and communication (awareness by all participants of all the pertinent decisions) ensured among all the different participants in the commissioning process? [SSG-28; 2.2]

3. What is the scope and content of the commissioning manual or similar document regulating the commissioning process? [SSG-28; 5.6-5.9]

12.1.1. Commissioning programme

4. What is the scope of the commissioning programme? What documentation is there in place in support of the commissioning programme? [SSR-2/2 (Rev.1) Requirement 25; 6.1] [SSG-28; 2.4, 2.27, 2.28]

5. What arrangements are in place within the plant's commissioning programme to ensure that tests performed off-site are carried out in compliance with the commissioning test procedures? [SSG-28; 2.5]

6. How is it ensured that all commissioning activities are identified, and responsibilities for implementing and the reporting those activities are clearly specified, for all participant organizations? [SSG-28; 2.7]

7. How does the commissioning programme ensure that hold points are established and milestones are identified, including milestones at which the regulatory body's authorization is required before proceeding to the next commissioning stage? What oversight and supervision arrangements are in place? [SSR-2/2 (Rev.1) Requirement 25; 6.2, 6.3] [SSG-28; 2.9, 2.19]

8. What arrangements within the commissioning programme are in place to ensure that in the planning for commissioning, all the responsibilities for safety, at different milestones of the commissioning programme are allocated appropriately? [SSG-28; 2.8]

9. What process(es) are in place for the review and approval of the commissioning programme? [SSG-28; 2.10]

10. How does the plant ensure the correct scheduling of tests and related activities, the availability of suitable personnel and equipment, and the timely production of all necessary documentation? [SSG-28; 2.14]

11. How are commissioning activities on site controlled to ensure compliance with the commissioning programme? [SSG-28; 3.11]

12.1.2. Execution of the commissioning programme

12. How does the risk assessment process ensure that it is safe to carry out commissioning tests and that the tests fall within the range of assumptions made in the safety analysis report? [SSR-2/2 (Rev.1) Requirement 10; 4.38] [SSG-28; 2.23, 2.24]

13. How are risk assessments carried out before the commencement of each test, and the necessary precautions taken in accordance with its findings? How is the impact on test results assessed for equipment that has been inactive for a long period? [SSG-28; 2.23, 2.26]

14. What prerequisites have been established at the plant for determining the sequence of testing and how are potential adjustments to the specified sequencing managed? [SSG-28; 2.20, 2.21, 2.25, 2.26]

15. For multi-unit plants, what provisions are there to ensure that the safety of a unit already in operation is not jeopardized by the construction or commissioning of other units? [SSG-28; 2.29]

16. How does the plant ensure adequate and, where necessary, independent oversight and control of the quality of commissioning activities? [SSG-28; 3.12]

12.1.3. Role of the operating organization

(Covered by LMS)

12.2. Organization and management of commissioning

12.2.1. Management system for commissioning

(Covered by LMS)

12.2.2. Organizational arrangements for commissioning

17. What organizational arrangements are in place to achieve the safety objectives of the commissioning programme? [SSR-2/2 (Rev.1) Requirement 25; 6.1] [SSG-28; 3.13]

18. What are the principal tasks performed in commissioning, and how are the personnel performing these tasks defined in commissioning activities? [SSG-28; 3.14]

19. How is it guaranteed that the responsibilities of participants in the commissioning programme always remain clear, even if construction, commissioning and operating activities overlap? [SSG-28; 3.17, 3.18]

12.2.3. Operating & Commissioning group organization

20. How is the commissioning group organised? How does it ensure the proper co-ordination and performance of commissioning activities? [SSG-28; 3.24-3.28]

12.2.4. Functions and responsibilities in commissioning

21. How is the transfer of responsibilities guaranteed when structures, systems and components of the plant are handed over between groups involved in the overall commissioning? [SSG-28; 3.30]

12.2.5. Interfaces in commissioning

22. How are the interfaces between commissioning activities managed to ensure the safety of the plant and the protection of personnel? [SSR-2/2 (Rev.1) Requirement 25; 6.12] [SSG-28; 3.37-3.40]

23. How is adequate commissioning of the integrated system ensured, when some systems have been partially installed and, consequently, have been only partially commissioned? [SSG-28; 3.43]

24. What interfaces between construction activities and commissioning activities and between commissioning activities and operating activities are considered within the commissioning programme? [SSG-28; 3.40, 3.42, 3.44]

25. What are the responsibilities of the construction group, commissioning group, operating team and other participants such as: designers, manufacturers etc regarding commissioning activities? [SSG-28; 3.32. 3.33, 3.34, 3.35]

12.2.6. Transfer of systems and handover of the plant in commissioning

(Covered by LMS)

12.2.7. Resources for commissioning

26. What administrative and organizational provisions are in place to ensure that human resources and other resources are adequate during commissioning? [SSG-28; 3.56-3.59]

12.2.8. Qualification and Training for Commissioning

27. How is it ensured that personnel engaged in commissioning activities are suitably qualified and experienced for their designated level of responsibility, and for the relative importance to safety of their work? [SSR-2/2 (Rev.1) Requirement 4; 3.10-3.12] [SSG-28; 3.60-3.65]

28. How are individuals trained in how to recognize situations that are likely to give rise to errors and has the station defined error-reduction techniques to prevent error, such as pre-job briefings, self-checks, peer checks, three-way communication and conservative decision making? [GS-G-3.5, 2.37]

12.2.9. Measurement, assessment and improvement

29. What administrative and organizational provisions are in place to ensure the management of non-conformances during commissioning? [SSG-28; 3.67]
[Use of OEF - (Covered by OEF)]

12.2.10. Arrangements for emergency preparedness and response

(Covered by EPR)

12.2.11. Management of unexpected test responses in commissioning

30. How do commissioning test procedures identify the specific limits and conditions applicable to each test, and what actions are taken when these limits are approached? [SSG-28; 3.77]

12.3. Implementation of the commissioning programme

31. How is it ensured that tests performed off-site on structures, systems and components demonstrate the validity of the tests performed for current, as-installed conditions? [SSG-28; 4.4]

12.3.1. Scope of the Commissioning tests

32. How is it ensured that i) the scope of the tests is specified in terms of functions, parameters and requirements and ii) the use of in-factory tests is justified? [SSG-28; 4.8]

33. How is it ensured that acceptance criteria are clearly specified in test procedures with account taken of potential uncertainties in measurements? [SSG-28; 4.9]

34. How is it ensured that acceptance criteria are linked to the expectations, performance and requirements for safety and/or design? [SSG-28; 4.10]

35. To what extent are acceptance criteria clearly specified and justified to ensure first, that they demonstrate the achievement of test objectives for safety and secondly, that they are appropriately documented? [SSG-28; 4.11]

36. What provisions are in place to establish and verify that the acceptance criteria linked to safety requirements has been achieved at the end of each commissioning stage? What process is used should it be necessary to change the acceptance criteria? [SSG-28; 4.12]

12.3.2. Preparation for testing

37. How does the plant apply a graded approach for the preparation of test procedures, including their verification and approval? [SSG-28; 4.13]

38. How is it ensured that the commissioning programme presents the objectives and principles of commissioning in relation to the entire plant, the different systems and the different stages? [SSG-28; 4.14]

39. How is it ensured that test procedures specify in detail how each item of equipment, system or component will be commissioned? [SSG-28; 4.15]

40. What management and organizational provisions are in place to ensure that test procedures are subject to a thorough verification that involves the operating organization, designers and the regulatory body? [SSR-2/2 (Rev.1) Requirement 25; 6.9] [SSG-28; 4.16]

41. How is it ensured that test procedures correspond to normal plant operating procedures and cover the range of operational states (normal operation, anticipated operational occurrences) and accident conditions? [SSG-28; 4.17]

42. How is it ensured that surveillance tests sufficiently replicate the configuration and conditions that safety related components would face in emergency conditions, e.g. lack of some air-operated equipment, reduced inventories in supply tanks, interrelation with other safety systems, etc.? [SSG-28; 4.17]

43. What arrangements are in place to ensure that where possible a simulator or computer codes are used in the development, verification and validation of commissioning test procedures? [SSG-28; 4.18]

44. What provisions are in place for managing deviations from and/or changes to the normal plant operating configurations and associated compensatory measures, if applicable? [SSG-28; 4.19]

45. What techniques and methods of data analysis for measurement results are used in test procedures? [SSG-28; 4.20]

46. What management and organizational provisions are in place during the commissioning process to manage precision tools, calibrated tools, and measuring and testing equipment? [SSG-28; 4.21-4.24]

12.3.3. Prerequisites for testing

47. What prerequisites for testing are considered before the start of a test? [SSG-28; 4.25]

48. What administrative controls and organizational provisions are in place to ensure a safe transition from one commissioning stage/sub-stage to another in the commissioning programme? [SSR-2/2 (Rev.1) Requirement 25; 6.3] [SSG-28; 4.26, 4.27]

12.3.4. Testing stages and sequences

49. What aspects are addressed before the commencement of initial testing of any structure, system or component? [SSG-28; 4.28-4.31]

50. How is it ensured that pre-service inspections are performed during or at the end of cold/hot performance tests? [SSG-28; 4.32]

51. What is the scope of the cold performance tests? [SSG-28; 4.33, 4.34]

52. What is the scope of the hot performance tests? [SSG-28; 4.35-4.37]

53. What is the scope of the performance tests that need to be performed with the core loaded with fuel and with the reactor maintained in a subcritical condition? [SSG-28; 4.40]

54. What low power tests are performed? How are aspects such as behaviour and characteristics of the core, the cooling system, reactivity control systems, reactor physics parameters and shielding verified to be as expected, and how is it ensured that the

reactivity coefficients are as assumed in the safety analysis report? How are those aspects considered to authorize/permit power testing? [SSG-28; 4.55, 4.56, Annex A-20]

55. What arrangements are in place at the plant to ensure that relevant safety system settings and alarm settings, including those of instruments for radiological protection, are specified at the appropriate commissioning stages or sub-stages? [SSG-28; 2.22]

56. What reviews are arranged at the end of each stage to confirm that operational limits and conditions are adequate? To what extent do these reviews identify any constraints on plant operation that the commissioning tests have shown to be necessary? [SSR-2/2 (Rev.1) Requirement 6; 4.6-4.8] [SSG-28; 4.60]

12.3.5. Review, evaluation and reporting of test results

57. What reviews and evaluations are undertaken after each test? [SSG-28; 4.61-4.64]

58. What administrative and organizational arrangements are in place to ensure that the commissioning programme proceeds in an orderly manner, and to ensure that the stage-completion-and-approval documents can be produced in accordance with the schedule? [SSG-28; 4.65-4.67]

59. What arrangements are in place to ensure that the commissioning group comprehensively reports the test results to relevant participants in the commissioning programme? [SSG-28; 4.68]

12.3.6. Handling of deviations during commissioning

60. What provisions are established for dealing with situations when changes are to be made to the plant design, to the programmes or to the tests such as when unexpected results are obtained and when incidents occur? [SSR-2/2 (Rev.1) Requirement 25; 6.3] [SSG-28; 4.69]

61. What administrative and organizational arrangements are in place for i) dealing with unexpected test results or occurrences during commissioning and ii) assurance that adequate consideration is given to such occurrences? [SSR-2/2 (Rev.1); Requirement 25; 6.15] [SSG-28; 4.76]

62. What administrative and organizational arrangements are in place for dealing with modifications to plant systems or components during commissioning? [SSR-2/2 (Rev.1); Requirement 25; 6.10] [SSG-28; 4.70-4.75]

12.4 Fuel Load Readiness

12.4.1 Operability of all actual or potentially required nuclear systems:

63. What arrangements are in place to ensure that all prerequisites for the reactor to have fuel loaded into the vessel and to go critical have been met? [SSR-2/2 (Rev.1) Requirement 25; 6.11] [SSG-28; 4.39, Appendix A2]

64. How is it ensured that prerequisites for initial fuel loading are met and satisfied regarding testing, systems, equipment, documentation and personnel well in advance of planned

commencement of fuel loading? Is the satisfactory performance of the integrated plant systems and the containment clearly specified and documented, based on the safety analysis report and the existing regulatory requirements? [SSR-2/2 (Rev.1) Requirement 25; 6.11] [SSG-28; 4.41, 4.44]

65. What checks have taken place to ensure the operability of nuclear start-up instrumentation, in terms of proper calibration, location (source–fuel–detector geometry) and functionality, including audible and visual alarm indications in the control room as well as the response of the instrumentation to a neutron source? [SSG-28; Appendix A2]

66. What supporting core physics test equipment or power monitoring tools need to be available/ proven to prevent inadvertent criticality and for the timely detection of inadvertent criticality? [SSG-28; 4.43]

67. How is it ensured that inadvertent changes to the status of system and components including coolant quality and level, do not occur? (e.g. lockouts for valves, pumps and other equipment)? [SSG-28; Appendix A2]

12.4.2 Documentation and Procedures / programmes: required operational documents and drawings

68. What administrative, organisational and technical arrangements are in place to ensure safe and correct fuel loading? [SSG-28; 4.43]

69. How do Operations procedures provide clear and well-defined instructions for and control of the operations affecting core reactivity? [SSG-28; 4.46]

70. What are the prerequisites for reactivity to be increased to approach initial criticality? [SSG-28; 4.50, 4.51]

71. What provisions are in place to ensure that start-up proceeds in a safe and orderly manner? [SSG-28; 4.52-4.54]

72. How do procedures ensure that if actual measurements deviate from the predicted values, further fuel loading will be stopped until the circumstances have been analysed, the reasons for the deviations have been determined and reviewed, and any appropriate corrective action has been taken? [SSG-28; 4.46,]

73. How have all the requirements and procedures to test the fuel loading machine been completed before the commencement of fuel loading? [SSG-28; 4.42]

74. What arrangements are in place to clearly indicate the exact position for each fuel assembly in the loading procedures or the loading plan, as well as the positions to be documented during the fuel loading operations? [SSG-28; 4.43, 4.46, 4.47]

12.4.3 People: Trained plant personnel authorised for nuclear duties.

(Covered by TQ)

12.5. Documentation for commissioning

75. What arrangements govern the documentation for commissioning? [SSG-28; 5.1-5.4]

76. What arrangements are in place to ensure the continual updating of documents, so the requirements of the regulatory body are being met? [SSG-28; 5.2]

77. Are there arrangements in place to ensure that the documents submitted to the regulatory body in the framework of the licensing process remain updated, as appropriate, during the lifetime of the plant? [SSG-12; 2.18]

78. How is it ensured that the nuclear installation remains in compliance with the updated design basis, e.g. by carrying out detailed checks of structures, systems and components? [SSG-12; 3.72]

79. What commissioning programmes and procedures are in place to ensure that the commissioning of the plant fulfils the provisions of the commissioning programme? [SSG-28; 5.10-5.14]

80. What administrative and organizational arrangements are in place to ensure that commissioning activities are performed in accordance with specific, approved written procedures? [SSG-28; 5.15-5.18]

81. What topics are covered within the content of the test procedures? [SSG-28; 5.19-5.32]

82. What special procedure is there for the preparation, review and approval of test procedures and other procedures? [SSG-28; 5.33]

83. What administrative, organizational and technical provisions ensure that formal reports for each test are prepared and approved in accordance with the processes under the management system? [SSG-28; 3.54, 5.2, 5.33-5.40]

12.6 Control of plant configuration

(Covered by LMS)

[IAEA safety standards for this WNO: SSR-2/2 (Rev. 1)*; GS-G-3.5; SSG-12, SSG-28*. (*main basis)]

12. COM

FACTS:

12. COM

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1					
2					
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6					
GP1	Good Practices: [brief description]				
GP2					

CI = Counterpart informed, CA = Counterpart agreed, PMI = Plant manager informed, PMA = Plant manager agreed

OSART MISSION WORKING NOTES OUTLINES – TRANSITIONAL PERIOD FROM OPERATION TO DECOMMISSIONING

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13. TRANSITIONAL PERIOD FROM OPERATION TO DECOMMISSIONING

13.1. Organization and functions

13.1.1. Functions and responsibilities

1. How will the organizational structure reflect organizational changes during the transitional period, such as changes of internal interfaces and external interactions, as well as changes in the roles and responsibilities of plant personnel? [SSG-47; 3.21; 4.1; 4.4; 4.12]

2. What set of performance indicators exists to monitor and assess organizational performance against the new goals and objectives? [SSG-47; 2.14; 4.2; 4.25]

3. How are policies and programmes kept up-to-date with industry practices? What internal process is put in place in this regard? [SSR-2/2 (Rev.1) Requirement 31; 8.1-8.3]

13.1.2. Personnel

4. How does the plant ensure the availability of adequate resources (including funds, people, equipment and time) to properly manage the plant transition from operation to decommissioning? [SSR-2/2 (Rev.1) Requirement 33; 9.2] [GSR Part 6 Requirement 6; 3.4, Requirement 9; 6.1] [GS-G-3.5; Appendix II.22] [SSG-47; 2.14; 3.23; 4.13; 4.27; 5.34]

5. What methods does the plant intend to use to keep staff motivated and to retain the required pool of skilled and experienced personnel? [SSR-2/2 (Rev.1) Requirement 33; 9.2]

6. How is it ensured that the human resources management policy is alert and sensitive to changes in the minds of site personnel in relation to plant shutdown and career uncertainties? [SSR-2/2 (Rev.1) Requirement 33; 9.2]

7. What contingencies are in place within the human resources management policy, should key personnel leave the plant? [SSG-47; 2.14; 5.7; 5.11; 7.25]

8. What is the strategy for knowledge management and retention of knowledge, skills and abilities before, during and beyond the transitional period? [SSR-2/2 (Rev.1) Requirement 33; 9.5] [GSR Part 6 Requirement 7; 4.4] [SSG-47; 4.13; 4.14; 4.20; 5.7; 5.34; 6.3(b); 79.26]

9. How do training programmes address operational challenges such as the new organization and responsibilities, and the new configuration(s) of the plant? I.e. does the simulator reflect the current state of the plant? [SSR-2/2 (Rev.1) Requirement 7; 4.21] [GSR Part 6 Requirement 6; 3.4]

13.2. Management policies and activities

10. What is the policy with regard to ensuring that all necessary supply systems will be available for the entire transitional period, including uninterrupted power, and steam and cooling water supplies? [GSR Part 6 Requirement 6; 3.4]

11. What are the goals and objectives for the transitional period, and how are these communicated to stakeholders and integrated into plant procedures? [GSR Part 6 Requirement 7; 4.1, 4.6, Requirement 11; 7.16] [GS-G-3.5; 3.3-3.9, 6.3(c)]

12. What are the stated management policies and directives for the transitional period, especially those focusing on the new priorities of the plant? [SSG-47; 3.22; 5.6; 5.11; 7.20]

13. How is it ensured that management decisions adequately consider national and international experience, as well as proven and novel technologies and solutions? [SSG-47; 7.10(b); 7.11(f); 7.29; 7.34]

14. How adequate are management directives in ensuring continued focus on safe operations and existing radiological and conventional hazards? [SSG-47; 2.6; 2.9; 2.14; 2.15]

15. What integrated management system is established and implemented for the transitional period? What part of the system covers the supervision and management of services provided by contractors? [GSR Part 6 Requirement 6; 3.4, Requirement 7; 4.1]

13.2.1. Planning

16. How is it confirmed that the transitional plan is comprehensive, and identifies and addresses all safety related issues expected during the transitional period? [GSR Part 6 Requirement 6; 3.4, Requirement 10; 7.8]

17. To what extent does the plan include, inter alia: an overall schedule of activities; consideration of all changes in the interactions between and modifications to safety related systems and standby systems, including their removal from operational service; all SSC isolations during the transitional period; new facilities required for the decommissioning phase; plant configuration at each stage of the transitional period (e.g. defueling stages) and operational configuration of SSCs at the start of decommissioning; and changes to the spent fuel and waste management arrangements for the transitional period. [SSR-2/2 (Rev.1) Requirement 33; 9.6] [GSR Part 6 Requirement 10; 7.8, Requirement 14; 8.10]

18. What is the status of the decommissioning plan, and what is included? [SSR-2/2 (Rev.1) Requirement 33; 9.1] [GSR Part 6 Requirement 6; 3.4] [GS-G-3.5; Appendix VIII]

13.2.2. Documentation

19. How does the documentation management system ensure timely changes whilst also maintaining document validity over the transitional period? [GSR Part 6 Requirement 7; 4.6]

20. To what extent is the document storage and archive system designed to ensure easy retrieval of documents and records necessary for the transitional period? [SSR-2/2 (Rev.1) Requirement 15; 4.52]

13.3. Conduct of operations

13.3.1. Operational procedures

21. How were operating procedures, operator aids and drawings reviewed and modified to respond to operational changes during the transitional period? How are they kept up-to-date? [GSR Part 6 Requirement 7; 4.6]

22. How were the operational limits and conditions updated, including surveillance activities? [GSR Part 6 Requirement 12; 8.4]

13.3.2. Surveillance programme

23. How are changes to the surveillance programme and relevant functional tests justified to ensure that they safely correspond to the current plant status? [GSR Part 6 Requirement 12; 8.2] [SSG-47; 2.11; 5.18; 6.14; 7.41; 8.7; 8.8]

24. How have changes in surveillance/switchover frequencies of SSCs been controlled and analysed (if applicable)? [SSG-25; 5.41]

13.3.3. Control of plant configuration

25. What system is there in place to ensure consistency between design requirements, physical configuration and plant documentation? [SSR-2/2 (Rev.1) Requirement 10; 4.38, Requirement 11; 4.42] [SSG-71; 2.13, 7.17, 10.1] [SSG-61; 3.13.18-3.13.22, 3.21.7]

26. How is this system tailored to the transitional period, and how will the plant ensure it is implemented appropriately (i.e. the functional requirements are identified and fulfilled)? [SSR-2/2 (Rev.1) Requirement 33; 9.3] [GSR Part 6 Requirement 6; 3.4, Requirement 8; 5.3]

27. What does the configuration management policy state for the transitional period? For a multi-unit site, how are conflicts of configuration with other units at the same site effectively managed? [SSG-47; 5.2; 5.33; 7.14(b); 8.2; 8.5; 8.16]

28. How does plant management ensure that throughout the lifetime of the facility, the decommissioning plan is kept up-to-date, reviewed periodically and updated in case of changes? [GSR Part 6 Requirement 10; 7.1, 7.5]

29. Is the decommissioning plan revised in accordance with modifications to the facility and its operating history? [GSR Part 6 Requirement 10; 7.7]

30. How does the management system ensure that all relevant records are kept for appropriate retention times? [SSG-47; 4.3; 4.25; 6.3(d); 7.14;7.15; 8.22; 8.25; 9.24]

13.3.4. The plan for drainage of systems during the transitional period

31. What is the schedule for plant system isolation and drainage, and does it consider the resulting impact on the availability and operability of remaining systems? [SSG-47; 7.19; 8.2; 8.16] [SRS No. 36; 4.4]

13.3.5. Marking systems

32. What is the system for marking to indicate the current status of SSCs? I.e. a system for clear marking when SSCs are withdrawn from service; can be isolated; can be drained/filled; can be released for dismantling or be protected from inadvertent dismantling. [GS-G-3.5; 5.163, 5.164]

13.3.6. Hazard management

33. How does the operating organization ensure that hazard management against internal and external hazards (e.g. fire, flooding, hazardous substances, earthquake, etc.) is included in the decommissioning plan? [SSG-77; 2.15]

13.4. Work management and housekeeping

13.4.1. Maintenance programme

34. How does the maintenance programme ensure safe and reliable operation in the transitional period, and how is it kept up-to-date with the status of the plant? [SSG-47; 7.41; 8.8; 8.18; 9.16]

35. How does the plant control both extensions of the time periods between surveillances, and the curtailment of established preventive maintenance routines? I.e. proper engineering justification is undertaken. [SSG-47; 5.18; 5.35; 8.7; 8.9; 8.18]

36. What controls are there in place to manage maintenance work backlogs? [SSG-74; 5.19]

13.4.2. Work planning and control

37. How is it confirmed that work management procedures are appropriate for systematically performing and recording all activities? [GS-G-3.5; 5.62-5.64]

38. How is it confirmed that the removal of SSCs from operation is performed according to an approved procedure? [SSR-2/2 (Rev.1) Requirement 10; 4.38] [SSG-71; 4.8, 4.18]

13.5. Technical support activities for the transitional period

For this chapter, the Transitional Period reviewer should work in conjunction with the Technical Support reviewer.

39. What plant technical documents, such as operational limits and conditions (OLCs) or operational procedures and alarm set-points, are being or have been revised to reflect the transitional status of SSCs and the current operational mode of the plant? [SSG-70; 9.4, 9.12] [SSG-76; 2.14, 2.36, 3.6]

40. How is it confirmed that any configuration change is based on an engineering approach using calculations, testing and measurements, and considers decreasing demands in flow rates, temperatures regimes, etc.? [SSR-2/2 (Rev.1) Requirement 33; 9.3]

41. How is it confirmed that system links - common auxiliary systems shared with the other nuclear facilities on the same site, particularly between twin units - are analysed? [SSR-2/2 (Rev.1) Requirement 33; 9.4]

42. What method is used to confirm that radiological and conventional hazards are analysed, specifically those applicable to the transitional period, and that measures are taken for the prevention and control of these hazards? [GSR Part 6 Requirement 6; 3.4]

13.6. Special safety assessments and risk analyses required

43. How were the operational modes for the transitional period - new plant configurations, retirement of equipment and systems, staffing levels, modifications to OLCs, surveillance requirements and twin-units dependences (if applicable) - incorporated into the safety analysis report? [SSG-25; 5.27-5.29]

44. What risk management system was used for identification and analysis of nuclear, radiological and conventional hazards? [SSG-25; 5.75, 5.88]

45. Is the decommissioning plan supported by a safety assessment that includes identification and analysis of accidents that may occur or situations that may arise during decommissioning? [GSR Part 6 Requirement 3; 2.6]

13.7. Use of OEF

46. How was OEF used in the development of both the decommissioning plan and the transitional plan? How does the OEF programme ensure that lessons learned are shared and used to prevent the events that may be specific to this stage of plant operations? [GSR Part 6 Requirement 10; 7.5, Requirement 11; 7.15]

47. How is it confirmed that operational experience arising from the transitional phase is being recorded, evaluated and reported? [SSG-47; 4.21; 4.23; 4.26; 5.7; 5.11; 7.10(b); 7.11(f); 7.12; 7.14(b); 7.29; 7.34; 7.43]

13.8. Radiation protection requirements for the transitional period

13.8.1. Radiation protection requirements

48. How has it been confirmed that the radiation protection measures, possibly already undertaken, cover the whole of the transitional period? [GSR Part 6 Requirement 1; 2.1]

49. How do the radiation protection procedures consider issues that are specific to the transitional period? Give examples. [GSR Part 6 Requirement 1; 2.2] [SSG-47; 2.14; 2.15; 4.2; 4;19; 4.21; 4.22; 4.24; 7.27]

50. How have new solid and liquid waste treatment and storage facilities been reviewed for their site radiological impact? [GSR Part 6 Requirement 6; 3.4] [GS-G-3.5; 5.165-5.169] [SSG-47; 5.39-5.41]

51. What specific radiation protection measures have been developed to protect staff and contractors during the transitional period? [GSR Part 6 Requirement 1; 2.1, Requirement 6; 3.4] [SSG-47; 8.12]

13.8.2. Radiological characterization

52. How are potentially contaminated and/or activated materials - including radioactive waste on site - properly identified and documented? [GSR Part 6 Requirement 14; 8.9]

53. How is it confirmed that radiation levels, after changes in plant conditions, are frequently checked and recorded? [SSG-47; 8.22]

54. How are rooms in radiation controlled areas re-categorized to reflect changes in radiation conditions and contamination levels? [GSR Part 6 Requirement 6; 3.4]

13.8.3. Waste management

55. What consideration has been given to increases in the volume and variety of radioactive waste? [SSG-47; 8.34-8.36; 8.38; 8.42; 8.43]

56. What arrangements are there for radioactive waste management? [GSR Part 6 Requirement 6; 3.4, Requirement 14; 8.7, 8.8] [SSG-47; 8.37; 8.39-8.41]

13.9. Emergency planning and preparedness

57. How has the site emergency plan been reviewed, and how has it been confirmed that the emergency plan corresponds to the current plant configuration and staffing arrangements? [GSR Part 6 Requirement 6; 3.4] [SSG-47; 8.29; 8.31]

58. How has it been confirmed that both events arising from, e.g. on-site storage of spent fuel and fuel transport events have been considered in the Emergency Plan and in Procedures for Emergency Response? [SSG-47; 8.30]

13.10. Core management and fuel handling

59. What procedures will be used for the removal, storage and shipment of fuel? [SSG-47; 3.22; 5.6; 7.18; 8.43]

13.11. Chemistry

60. What water chemistry strategy has been adopted for the transitional period, and what is the scope of monitoring and control of chemistry for the current plant status? What preparations are being made for decommissioning/conservation, relevant to chemical conditioning, including operations on the opening of the vessel, removal of contaminated items, etc.? [SSG-13; 4.7, 6.20]

61. What provisions have been made for the storage and use of hazardous chemicals? [SSG-47; 2.13; 7.14(a); 7.28]

[IAEA safety standards for this WNO: SSR-2/2 (Rev. 1)*; GSR Part 6; GS-G-3.5; SSG-13; SSG-25; SSG-47*; SSG-61; SSG-70; SSG-71; SSG-74; SSG-76, SSG-77. (*main basis)]

13. TRAD
FACTS:

13. TRAD

No.	**Issue summaries:** (Brief five-line maximum description, neutral in tone, in order to present the subject of issues under development to the Plant Manager)	CI	CA	PMI	PMA
1					
2					
3					
4					
5					
6					
GP1	**Good Practices**: [brief description]				
GP2					

CI = Counterpart informed, CA = Counterpart agreed, PMI = Plant manager informed, PMA = Plant manager agreed

OSART MISSION WORKING NOTES OUTLINES – USE OF PSA FOR PLANT OPERATIONAL SAFETY IMPROVEMENTS

PSA: 199 Q > 28 Q / Day	Comments from TL
Day 1	
Day 2	
Day 3	
Day 4	
Day 5	
Day 6	
Day 7	
(Day 8)	

Contents

14. USE OF PSA FOR PLANT OPERATIONAL SAFETY IMPROVEMENTS

14.1. Organization and functions

14.1.1. Functions and responsibilities

1. How are organizational structure, responsibilities, levels of authority and functions defined and communicated within the organizational entity responsible for PSA (i.e. the PSA team)? Are they understood by the personnel involved in the activities related to PSA development or update, use of PSA results, and PSA applications? [SSR-2/2 (Rev.1) Requirement 1; 3.2(b), (d), Requirement 3; 3.8, 3.9] [GSR-4 Requirement 3; 4.1, 4.2].

In particular, the following supporting questions may assist in answering these questions:

2. In which plant documents are the overall organizational structure, responsibilities, levels of authority and functions of the organizational entity responsible for PSA described? Please provide such document(s) to the reviewer. [SSR-2/2 (Rev.1) Requirement 1; 3.2(b)] [GSR-4 Requirement 3; 4.2]

3. Is there understanding by the PSA team of the fact that the plant (operating organization) is responsible for safety assessment? Is this documented in plant policy documents and communicated to the staff? If yes, in which documents? Please provide such document(s) to the reviewer. [GSR-4 Requirement 3; 4.2] [SSG-72; 7.53]

4. Are the personnel involved in the activities related to PSA development or update, use of PSA results, and PSA applications familiar with these policy documents? [GSR-2 Requirement 9; 4.21-4.27] [GSR-4 Requirement 3; 4.2]

14.1.2. Personnel

5. How does the plant management ensure that the PSA analysis is performed by an experienced team, with active participation of plant specialists, and that results are used by experienced plant professionals in a manner that complements deterministic analyses, in compliance with applicable regulations and plant license conditions? [GSR-2 Requirement 9; 4.23] [SSR-2/2 (Rev.1) Requirement 4; 3.10, 3.11, Requirement 8; 4.32] [SSG-3; 3.3, 3.12] [SSG-75; 5.12, 5.23].

In particular, the following supporting questions may assist in answering this question:

6. Have the plant PSA specialists received a formal initial training on PSA development using relevant PSA software? If yes, when and where? [SSG-75; 4.16, 4.24, 5.12] [SSG-3; 3.12]

7. Does the plant training programme envisage further periodic training of plant PSA specialists to keep them informed on advanced developments in the PSA methodology and computer codes, as well as PSA applications? [GSR-2 Requirement 9; 4.21-4.27] [SSG-75; 6.6]. For example, do PSA specialists participate in international conferences on PSA?

8. To what degree is plant management also involved in the PSA-related training programme? [SSG-75; 4.43]

9. Is the number of plant staff involved in PSA-related activities sufficient for the scope of plant PSA applications, PSA update, and other PSA-related activities? How is this ensured? [GSR-2 Requirement 9; 4.21-4.27]

10. Is there a policy statement in plant procedures about complementary use of deterministic and probabilistic safety analyses? If yes, in which documents? Please provide such document(s) to the reviewer. [GSR-4 Requirement 15; 4.53-4.56] [SSR2/2 Requirement 8; 4.32, Requirement 12; 4.46]

11. What are regulatory requirements and plant license conditions in respect to PSA? Please provide relevant document(s) to the reviewer. [SSR-2/2 (Rev.1) Requirement 8; 4.32, Requirement 12; 4.44-4.46]

14.2. PSA project management

12. To what extent does the plant have a fully-developed PSA project organization, management scheme, and schedule? [SSG-3; 3.3, 3.4].

In particular, the following supporting questions may assist in answering this question:

13. In which documents PSA project organization, management scheme, and schedule are documented? [SSG-3; 3.3, 3.4] Please provide them to the reviewer.

14. What are the composition of the PSA team and the suitability of the team members' qualifications? [SSG-3; 3.3, 3.4, 3.10, 3.11]

15. If the PSA team is composed of external experts, are enough plant personnel involved in the development of the PSA (providing input data for operational experience and other inputs as required by PSA analyses)? [SSG-3; 3.4]

16. How are the PSA-related activities supported by relevant plant procedures? [SSR-2/2 (Rev.1) Requirement 1; 3.2(b)] [GSR-4 Requirements 22, 23, 24; 5.1-5.6] [SSG-3; 3.3, 3.8, 3.13].

In particular, the following supporting questions may assist in answering this question:

17. Does the plant have in place guidelines and procedures for PSA development and update? If yes, when were they issued and updated, as applicable? [SSG-3; 3.3, 3.8, 3.13] Please provide these procedures to the reviewer.

18. Does the plant have in place guidelines and procedures for conducting the plant-specific PSA applications? If yes, when were they issued and updated, as applicable? [SSG-3; 3.3, 3.8, 3.13] Please provide these procedures to the reviewer.

19. Does the plant have in place guidelines and procedures for internal and/or external review of PSA and plant-specific PSA applications? If yes, when were they issued and updated, as applicable? [SSG-3; 2.5, 2.6, 3.3] Please provide these procedures to the reviewer.

20. Are the procedures on PSA development/update, PSA applications, and internal or external PSA review understood and followed by the plant staff and/or contractors involved in PSA-related activities? Please provide a most recent report related to PSA applications to the reviewer. [SSG-3; 2.5, 2.6, 3.3]

21. To what extent are the PSA-related guidelines and procedures in compliance with international and national requirements, and in accordance with state-of-the-art PSA methodology? [SSG-3; 3.8, 5.98, 8.35, 8.47, 8.48, 8.72]

22. How is it verified that the PSA team is familiar with governing guidelines and procedures? [SSG-3; 3.8, 3.12]

23. How is the contractor support (if applicable) for PSA-related activities organized by the plant? [SSR-2/2 (Rev.1) Requirement 1; 3.2(d)].

In particular, the following supporting questions may assist in answering this question:

24. Does the plant involve contractors for PSA development and update? If yes, for which tasks? [SSR-2/2 (Rev.1) Requirement 1; 3.2(d)]. Please provide an example of such contract.

25. Does the plant involve contractors for conducting PSA applications? If yes, for which applications or tasks? [SSR-2/2 (Rev.1) Requirement 1; 3.2(d)] Please provide an example of such contract.

26. Does the plant involve contractors for review of PSA and PSA applications? [SSR-2/2 (Rev.1) Requirement 1; 3.2(d)] [SSG-3; 2.6] Please provide an example of such contract.

14.3. Development of PSA

Notes for the counterpart:

- The review of PSA development requires availability of a complete set of PSA documentation, including a summary report, a main report or reports, and annexes. It is preferable that the reviewer has got an access to the PSA documentation in electronic form.
- In addition, it is highly desirable that an access to the PSA computer model is organized for the reviewer.
- The subsections in this section of the document provide questions, which are based on the assumption that the reviewer has got an access to the PSA reporting documentation and the PSA model.

14.3.1. PSA objectives and scope and national safety goals

27. To what extent is the full range of possible radiation risks associated with the facility identified and analysed? [GSR-4 Requirement 6; 4.19] What is the actual scope of PSA analyses? [GSR-4 Requirement 2, Requirement 7; 4.20, Requirement 14] [SSG-3; 1.12, 1.13, 6.8] [SSG-4; 2.8-2.11].

In particular, the following supporting questions may assist in answering these questions:

28. Which stages of the plant's life are covered (design, operation)? [GSR-4 Requirement 4; 4.6]

29. What PSA levels are treated (1, 2, 3)? [GSR-4 Requirement 4; 4.5, 4.10, 4.55]

30. What initiating events and hazards are considered (internal initiating events, internal hazards, external hazards)? [GSR-4 Requirement 4; 4.5, 4.55] [SSG-77; 4.2, 5.1]

31. Which operational modes does the analysis encompass (full power, low power, shutdown, start-up, refuelling)? [GSR-4 Requirement 4; 4.5, 4.55]

32. Which radioactivity sources are considered (reactor core, refuelling pool, spent fuel handling facilities, waste storage tanks)? [GSR-4 Requirement 4; 4.5,4.55]

33. If the plant has several units at the site, was the risk of multi-unit (or multi-source) damage considered? (Note: currently, this is an area considered to be beyond state-of-the-art.) [GSR-4 Requirement 4; 4.5, 4.36A]

34. What are the PSA objectives stated in the PSA report or other plant documents? [SSG-3; 3.1, 3.2]

35. What are the probabilistic safety goals or criteria stated by the national regulatory authority? [SSG-3; 4.1]

36. What are the probabilistic safety goals or criteria stated by the plant for each type of probabilistic analyses (if this has been done)? [SSG-3; 2.11, 2.15]

37. How are the objectives and scope of the PSA correlated with national probabilistic safety goals or criteria? [SSG-3; 3.1, 3.2]

14.3.2. Completeness of PSA

38. How does the plant ensure that the full list of internal initiating events and internal and external hazards that could arise is addressed in the safety assessment, and that adequate levels of protection are provided against their consequences? [GSR-4 Requirement 10; 4.31, 4.32, 4.50, 4.51] [SSG-3; 5.13, 5.14] [SSG-77; 4.2, 5.1, 6.2, 6.3]

In particular, the following supporting questions may assist in answering this question:

(a) Analysis of initiating events and hazards

39. What are the PSA techniques used for identification of internal initiating events caused by random component failures and/or human errors (e.g. failure mode and effect analysis (FMEA), hazard and operability analysis (HAZOP), analysis of operational experience, review of initiating events lists for similar NPPs, etc.)? [SSG-3; 5.13, 5.14]

40. What are the approaches used for identification of internal and external hazards (e.g. analysis of generic and plant-specific operational experience, review of historic records, etc.)? [SSG-3; 6.3, 6.4, 6.8]

41. Were combinations of internal hazards considered in the PSA, including correlated hazards (e.g. internal flooding caused by fire extinguishing activities in case of an internal fire)? [SSG-3; 6.11, 6.12]

42. Were combinations of external hazards, both natural and human-induced, considered in the PSA, including correlated hazards (e.g. high-water precipitation and dam failure)? [SSG-3; 6.11, 6.12]

43. Were combinations of external and internal hazards considered in the PSA, including correlated hazards (e.g. seismic event and seismically-induced internal flood)? [SSG-3; 6.11, 6.12]

44. What were the screening criteria for analysing internal initiating events and internal and external hazards? [SSG-3; 5.33, 6.4, 6.14, 6.15]

45. Was a quantitative screening of initiating events and hazards by frequency performed? What was the screening value (threshold) for initiating events and hazards? [SSG-3; 5.33, 6.15, 6.16, 6.17, 6.20]

46. How are these frequency criteria for screening of initiating events and hazards correlate with the overall core damage frequency? [SSG-3; 6.16]

47. What was the approach for initiating events and hazards grouping (if applicable)? How was it ensured that the most conservative representative of the group was chosen as a representative event for PSA modelling? [SSG-3; 5.35, 5.36, 9.16, 9.17]

48. Was a consistent approach used for determination of frequencies of rare initiating events? [SSG-3; 5.121-5.127]

49. Were 'low frequency – high consequence' events (e.g. reactor vessel rupture for vessel-type reactors, LOCA in interfacing systems) included in the analysis at the stage of Level-1 PSA? How was it ensured that low frequency-high consequence internal initiating events and internal and external hazards were retained in the analysis from the viewpoint of Level-2 PSA? [GSR-4 Requirement 1; 3.3; Requirement 4; 4.12; Requirement 14; 4.50] [SSG-3; 5.130-5.132] [SSG-4; 7.6]

(b) <u>Analysis and modelling of plant response</u>

50. Were all types of dependent failures analysed and modelled in the PSA (i.e. functional dependencies, physical dependencies, human interaction dependencies, component common cause failures)? [SSG-3; 5.86-5.95]

51. Were passive safety systems (as applicable) and computer-based systems included in the analysis? [SSG-3; 5.116, 5.117-120]

52. Were mission times for system operation defined considering the time needed to reach a safe stable long-term shutdown state and for long term recovery actions to be established? [SSG-3; 5.135]

53. Were all types of human interactions (HIs) identified and respective human errors (HEs) included in the analysis (i.e. pre-accident HEs, HEs as initiators, HEs in response to the initiator including dependencies between HEs within the same accident sequence)? [SSG-3; 5.99, 5.101]

54. Were the HEs modelled in Level-1 PSA for internal initiating events re-considered in the analysis of internal and external hazards taking into account the specific impact of the associated accident scenario on performance shaping factors (e.g. impact of smoke on operators in internal fire PSA)? [SSG-3; 7.82]

55. Were plant-specific data used for calculation of component reliability parameters and initiating events frequencies? [SSG-3; 5.123]

56. Was a quantitative screening of accident sequences by their impact (i.e. the value of core damage frequency considering the value of conditional core damage probability) performed? What were the screening values (thresholds) for initiating events and hazards? Were they consistently defined taking into the cumulative impact of the accident scenarios screened out and the total CDF value? [SSG-3; 5.156, 6.16, 6.18, 6.21-6.25; 7.41-7.43]

57. Was the cumulative contribution of accident scenarios screened out from the consideration evaluated (for different hazards and initiating events evaluated)? Was this documented? [SSG-3; 7.42, 7.84, 8.4] [SSG-25; 6.9]

(c) Analysis and interpretation of PSA results

58. Level-1 and Level-2 PSA: Were uncertainty analyses for individual failure events in the PSA model and uncertainty propagation analyses performed? Were importance and sensitivity analyses towards major assumptions and uncertain data performed in order to evaluate the impact of these on the final risk assessment results? [SSG-3; 5.151-5.160, 9.58-9.60]

59. Level-1 and Level-2 PSA: To what extent is consideration given to using the results of uncertainty, importance, and sensitivity analyses in interpretation of PSA results? [SSG-3; 5.153, 5.157, 5.160]

60. Level-1 and Level-2 PSA: Are the insights and conclusions of the analysis presented in sufficient detail to support decision-making? [SSG-3; 3.20, 9.64, 9.65] [GSR-4 Requirement 20; 4.62, 4.64]

61. Level-1 PSA: Were importance analyses carried out to identify the components and systems that significantly contribute to the evaluated risk, as well risk-significant human interactions? [SSG-3; 9.64, 10.19]

62. Level-1 PSA: Were sensitivity analyses or other analyses performed to reveal any single-order cutsets (e.g. cutsets consisting of an initiating event and a single components failure or a single human error)? [SSG-3; 5.9, 5.144, 10.15, 10.18, 10.24]

63. Level-1 PSA: Which failure sources are the main contributors to the dominant accident sequences, and to what degree is their contribution justified by a presentation of relevant engineering insights? [SSG-3; 9.64, 9.65] [GSR Part 4 Requirement 20; 4.62, 4.64] [SSG-3; 3.20]

64. Level-1 PSA: Was the list of cutsets from the Level 1 PSA model used to identify where there are relative weaknesses in the design and operation of the plant considering the cutsets that make significant contributions to core damage frequency to identify the initiating event groups and the safety functions that make the greatest contributions to the core damage frequency? [SSG-3; 5.146, 5.149, 10.16]

65. Level-1 PSA: Were the contributions to the core damage frequency and the cutsets for individual groups of initiating events used to determine whether the design of the plant is balanced in that no particular group of initiating events and no particular accident sequence makes an unduly large contribution to the core damage frequency? The same consideration is applicable in principle to the results of the Level 2 PSA and Level 3 PSA. [SSG-3; 10.17]

66. Level-2 PSA: Based on the analysis performed, were significant failure modes of the primary circuit and the containment identified? Were dominant phenomena that lead to (early or late) containment failure identified? Were the structures, systems and components that have the highest importance for large release frequency or large early release frequency identified? Were these results used to identify weaknesses in the features provided for the prevention and mitigation of severe accidents? [SSG-4; 8.16]

14.3.3. PSA documentation and quality assurance

67. What form of quality assurance (QA) programme is there either in place or under development? [SSG-3; 3.13, 3.14]

68. How do the QA procedures provide for control of the constituent activities associated with PSA in the areas of organization, technical work and documentation? [SSG-3; 3.14]

69. How complete, comprehensive and up-to date is the PSA documentation? How easy is it to follow, review and update? To what degree does it comply with international and national requirements? [SSG-3; 3.7, 3.16, 3.17-3.22]

70. How is it ensured that all assumptions, exclusions and limitations are clearly documented and justified? [GSR-4 Requirement 20; 4.63, 4.64]

71. By what means are internal review process records maintained and documented so as to allow later extensions or reconstructions of the results of the study? [SSG-3; 3.6, 3.17]

14.3.4. Validation and review of the PSA - Independent verification

72. To what extent does the QA programme include provisions for independent reviews? [SSG-3; 3.13, 3.14]

73. To what degree is an internal PSA review process established and followed in accordance with the QA procedure? [SSG-3; 3.13]

74. What provisions for an external PSA review are stipulated in the QA procedure? When was the last external review performed? To what extent do the guidelines for the review process comply with international state-of-the-art review practices? [GSR-4 Requirement 21; 4.66-4.70] [SSG-3; 2.6]

75. How independent from the developers are the experts composing the external review team? [GSR-4 Requirement 21; 4.67] [SSG-3; 2.6]

76. To what degree does the independent review confirm that the input assumptions are valid, the analysis methodology and data used are suitable, and that the analysis reflects the actual status of the facility? [GSR Part 4 Requirement 24; 5.2-5.4]

77. What computer codes were used to support analytical methods? How were they validated as adequate for the purpose and scope of the analysis? How does the operating organization oversee improvements to the calculation tools and data that are used to carry

out the analysis? [GSR-4 Requirement 4; 4.14, Requirement 18; 4.60], [SSG-3; 2.5] [SSG-25; 5.67]

14.3.5. PSA updating programme

78. How often does management require PSA analyses to be updated, and what are the typical reasons for PSA update? [GSR-4 Requirement 4; 4.8, Requirement 20; 4.65, Requirement 24; 5.2, 5.10] [SSG-3 2.7, 2.8, 3.5, 5.8, 10.3] [SSG-4; 8.4]

79. When was the last PSA update performed, and what were the objectives of this update? How was the intention to perform the update documented (in a PSA update plan or other relevant document)? [SSG-3; 2.7]

80. How does the PSA update plan and schedule provide for periodic updates (even if no major design or operational changes have taken place) to keep the PSA model in line with state-of-the-art methodology (i.e. in response to new versions of the software used for the analysis, new data on operational experience, or more sophisticated analysis methods)? [SSG-3; 2.7, 2.8]

81. To what extent does the plant maintain a so-called 'Living' PSA model? If this is not the case – how often are the PSA model and the associated documentation updated (i.e. due to modifications in the design of safety systems or in the operation of the plant)? [SSG-3; 2.7, 10.3] [SSG-25; 5.72]

82. If the plant is using a Living PSA model – to what degree are the organizational and structural activities established so as to maintain the model in accordance with plant modifications? How is the process of data collection for the needs of the PSA update established? [SSG-3; 2.7, 2.8, 2.9]

83. If the PSA team is made up of experts from external organizations, are the interfaces with the plant PSA experts sufficiently well established for all information on changes in the plant to be effectively communicated? [SSG-3; 3.4]

84. To what extent are the resources allocated by management sufficient to keep the PSA model updated and maintained? [GSR-4 Requirement 1; 3.2, 3.5, Requirement 5; 4.18, Requirement 24; 5.2]

85. How is it ensured that the plant has a pool of capable personnel who can both advise plant management on the implementation of potential PSA applications and assist plant management in the decision-making process? [SSG-3; 2.7, 2.9]

14.4. Use of PSA and PSA applications

Note for the counterpart: Review of PSA applications requires availability of a complete set of the documentation (reports and annexes) describing how the PSA results are used by the plant departments and management, as well as the methodology for PSA applications, the analyses performed, and the results.

14.4.1. Use of PSA in decision-making

86. How are the goals, objectives and safety indicators related to PSA developed and managed?? [SSR-2/2 (Rev.1) Requirement 9; 4.33, 4.37]

87. How are the results of the PSA used to verify compliance with safety goals or criteria, which are usually formulated in terms of quantitative estimates of core damage frequency, frequencies of radioactive releases of different types, and societal risks? [GSR-4 Requirement 4; 4.14] [SSG-3; 2.2, 10.10, 10.13].

88. While making such verification, was consideration given to the results of the sensitivity studies and the uncertainty analysis that have been carried out that indicate the degree of confidence in meeting the criterion and/or target and the likelihood that it has been exceeded? [SSG-3; 10.15] [SSG-4; 8.9, 8.10]

89. Which safety performance indicators use information directly from the Level 1 PSA? [SSG-3; 10.76]

90. How does plant management ensure that safety is taken into account in decision-making by using the PSA results (and/or its applications)? [SSR-2/2 (Rev.1) Requirement 8; 4.32] [GSR-2 Requirement 3; 4.3] [INSAG-25; 20, 50].

In particular, the following supporting questions may assist in answering this question:
(a) Level-1 PSA results: Were the PSA results (including uncertainty, importance, and sensitivity analyses) used to provide an approach for determining whether:

91. There are no single order cutsets to confirm compliance with the single failure criterion for design-basis accident sequences; [SSG-3; 10.18]

92. The safety systems have adequate levels of diversity and redundancy; [GSR-4 Requirement 15; 4.55] [SSG-3; 2.31, 2.26, 10.6, 10.21, 10.23]

93. The design is balanced or additional measures need to be incorporated to reduce risk; [GSR-4 Requirement 15; 4.55] [SSG-3; 2.25, 2.31, 5.157, 10.17, 10.23]

94. There are sufficient levels of equipment qualification for structures, systems and components that experience harsh conditions in accident conditions; [SSG-3; 10.23]

95. There is sufficient separation and segregation of areas for hazards such as fire and flooding; [SSG-3; 10.23]

96. The design of the human–machine interface is adequate to ensure that the potential for human error has been reduced to a sufficiently low level; [SSG-3; 10.23]

97. Options for improvement of design or operation (assessed and ranked by the PSA) effectively tackle weaknesses in the design and operation. [SSG-3; 10.9]

(b) Level-2 PSA results: Were the PSA results (including uncertainty, importance, and sensitivity analyses) used to provide:

98. An approach for determining whether additional features for prevention or mitigation of accidents need to be provided considering (a) the significant failure modes of the primary circuit and the containment; (b) the dominant phenomena that lead to (early

or late) containment failure; (c) the structures, systems and components that have the highest importance for large release frequency or large early release frequency. What were relevant plant modifications? [SSG-4; 8.9];

99. An input into the development of severe accident management guidelines, which should be available when the plant goes into operation? [SSG-4; 8.6]

100. Were the PSA analysis results (e.g. Level-2 and/or Level-3, if the latter is available) used for planning of off-site and on-site emergency response and accident management? [GSR-4; Requirement 24; 5.6]

101. Were the PSA analysis used for different maintenance, surveillance and inspection activities to be planned? [GSR-4 Requirement 24; 5.5]

102. If PSA results were used by plant managers in decision making, how was this documented? Please provide a recent report or documentation demonstrating the use of PSA results to the reviewer. [GSR-4; Requirements 22-24; 5.8] [SSG-3; 3.7, 3.15, 3.16]

14.4.2. Communication of PSA-related insights

103. To what extent are the results of PSA communicated within the plant? To what extent does management take the initiative to communicate the results of the probabilistic safety assessment to other interested parties like designers, the regulatory body and a wide range of professionals? How is this information communicated? [GSR-4 Requirement 24; 5.9]

14.4.3. PSA application programme

104. Which PSA applications, if any, have been developed and implemented at the plant? Are they used for decision-making, who is using them (management and engineering, operations, maintenance personnel, regulatory bodies, designers or vendors) and how? [GSR Part 4 Requirement 24; 5.8] [SSG-3; 2.22]

105. How clearly are the objectives of the PSA application programme and each PSA application established? [SSG-3; 2.23] How is the scope and level of detail of the PSA adjusted so as to be commensurate with the practiced or intended PSA application(s)? [SSG-3; 5.8, 10.1-10.3] [SSG-4; 8.2-8.4]

106. Is there a formal framework in support of the decision-making process (i.e. organizational arrangements and specific PSA application guidelines developed for each PSA application)? [SSG-3; 2.23]

If guidelines for PSA applications are available, do they provide considerations regarding:

107. The necessity to re-consider the screening of accident scenarios (for different hazards and operational states) to ensure that the PSA applications do not omit the risk contributors, whose contribution was acceptably low in the ‘base case’ PSA, but became significant in particular PSA applications (e.g. applications dealing with plant configurations control)? [SSG-3; 5.8, 5.33, 6.14, 6.16, 6.17, 6.19]

108. The necessity to check the cumulative effect of all changes (especially permanent ones) implemented at the plant within the framework of an upgrading project or certain

time period as a result of PSA applications? [SSR-2/2 (Rev.1) Requirement 11; 4.39, 4.40] [SSG-3; 2.24, 2.28, 3.6] [SSG-25; 6.9]

109. To what extent are the changes in PSA models, data, assumptions, etc. that are required for specific applications, made in a controlled manner (information control; configuration control; documentation control; verification and validation; review)? How is it ensured that all changes are documented in a clear manner that provides a possibility to repeat the analysis when needed and to perform external reviews? [SSG-3; 3.16, 3.17]

110. How is the coordination between PSA applications and PSA updates performed? How does the PSA application programme ensure that changes at the plant that impact on the PSA applications are introduced in the PSA model and supporting documentation in a timely manner? [SSG-3; 2.7]

111. To what extent is an internal review procedure set and followed for all PSA applications? How is the external review process organized for PSA applications? How is the national regulatory authority involved in the review of PSA applications? [SSG-3; 2.6]

14.4.4. Applications in connection with design and plant modifications

Explanatory note: This application is dealing with use of PSA for design optimization and plant modifications. Does the plant use the PSA for such purposes? If yes, what is the scope of this application in terms of the considered SSCs?

112. Is the scope of the PSA suitable for implementation of this PSA application? [SSG-3; 10.1, 10.11]

113. How are the insights from deterministic safety analysis taken into account for this PSA application? [SSG-3; 10.6]

114. Is the PSA model suitable for implementation of this PSA application? [SSG-3; 2.5, 3.2, 3.15, 5.8, 5.33, 5.74, 5.82, 5.150, 8.101, 9.9, 9.70, 10.1, 10.2, 10.9]

115. How are the PSA results used to determine whether the proposed change to the design and/or operational practice will ensure a sufficiently low level of risk (e.g. core damage frequency versus risk criteria)? [SSG-3; 10.13-10.15].

In particular, the following supporting questions may assist in answering this question:

116. Are there any examples of when the PSA was used to identify weaknesses in design and operation? [SSG-3; 10.8, 10.9]

117. How does plant management analyse and use the importance values to identify areas of the design or operation of the plant where improvements need to be considered (components and systems that significantly contribute to risk)? [SSG-3; 10.20]

118. How was the PSA used for comparison of options proposed for modifications (design and/or operational practices including operator procedures)? [SSG-3; 10.8, 10.9, 10.25]

119. If several design changes were introduced within the framework of an upgrading project or certain time period, was their cumulative impact on risk metrics analysed?

Is this documented? [SSR-2/2 (Rev.1) Requirement 11; 4.39, 4.40] [SSG-3; 2.24, 2.28, 3.6] [SSG-25; 6.9]

120. What are the weaknesses, if any, in the design and operation of the plant (derived from a review and analysis of the cutsets to identify the initiating events and the safety functions that make the highest contribution to the CDF or LERF)? [SSG-3; 10.16] [SSG-4; 8.15]

121. What were specific plant modifications, if any, dealing with findings of Level-1 PSA?

122. What were specific plant modifications, if any, dealing with findings of Level-2 PSA?

123. What were specific plant modifications, if any, dealing with findings of Level-3 PSA (if this PSA is available)?

124. When design changes are reflected in the PSA model – to what degree is this correctly and sufficiently documented? What data are used in the updated model for new equipment? [SSG-3; 10.25] [SSG-4; 8.20]

14.4.5. Applications in connection with maintenance practices

Explanatory note: This application is dealing with use of PSA for optimization of maintenance practices, preventive maintenance planning, and evaluation of actual plant configurations. Does the plant use the PSA for such purposes? What is the scope of this application in terms of the considered SSCs?

125. Is the scope of the PSA suitable for implementation of this PSA application? [SSG-3; 10.1, 10.11]

126. How are the insights from deterministic safety analysis taken into account for this PSA application? [SSG-3; 10.6]

127. Is the PSA model suitable for implementation of this PSA application? [SSG-3; 2.5, 3.2, 3.15, 5.8, 5.33, 5.74, 5.82, 5.150, 8.101, 9.9, 9.70, 10.1, 10.2, 10.9].

In particular, the following supporting questions may assist in answering this question (in relation to SSCs considered in the PSA application):

128. Does the PSA model provide an explicit model of unavailabilities due to test and maintenance and capability to predict or bound the impact of maintenance programme changes on component failure rates and maintenance unavailabilities needed to support the application? [SSG-3; 5.8, 10.19]

129. Does the PSA model provide an explicit separate modelling of preventive and corrective maintenance (if preventive maintenance strategies are the matter of interest)? [SSG-3; 5.8, 10.19]

130. Is the level of detail of the PSA model in the areas affected by the maintenance programme changes sufficient? [SSG-3; 5.8, 10.19]

131. How are PSA results used to optimise the maintenance programme? What is the scope of the programme?

132. How does the programme ensure that maintenance activities do not reduce plant safety or heighten risk through increased equipment unavailability? [SSR-2/2 (Rev.1) Requirement 31; 8.13] [SSG-3; 10.33, 10.66] [SSG-72; 7.31] [SSG-25; 6.9].

In particular, the following supporting questions (stemming from the mentioned references) may assist in answering this question:

133. Is the PSA used for planning maintenance activities during at-power operation? If yes, how is this done? [SSR-2/2 (Rev.1) Requirement 31; 8.13] [SSG-3; 10.33]

134. Is the PSA used for planning maintenance activities during shutdown states? If yes, how is this done? [SSR-2/2 (Rev.1) Requirement 31; 8.13]

135. Is the PSA used for moving preventive maintenance activities from shutdown state to at-power operation? If yes, how is this done? [SSR-2/2 (Rev.1) Requirement 31; 8.13] [SSG-3; 10.33, 10.66]

136. What are the criteria in terms of risk metrics for allowable plant configurations with components taken out of service for maintenance that usually include instantaneous (conditional) risk while the component is in maintenance and cumulative (integrated) risk over the allowed outage time (AOT) period? [SSG-72; 7.31]

137. What is the approach for consideration of corrective maintenance that may be needed while the plant is in a particular configuration due to preventive maintenance? How does the plant respond to such emergent situations taking into account the AOT specified in the technical specification (TS)? [SSG-72; 7.31]

138. What is the approach for potential exceeding the AOT and providing regulatory compliance in this case? [SSG-72; 7.31]

139. If several changes to the maintenance practices were introduced within the framework of an upgrading project or certain time period, was their cumulative impact on risk metrics analysed? Is this documented? [SSG-25; 6.9]

140. How is the PSA used for evaluating actual past plant configurations occurred during at-power operation and shutdown states? Are all actual plant configurations happened during the preventive maintenance analysed taken into consideration all component unviability causes including corrective maintenance? [SSG-3; 5.74, 5.80, 5.82]

14.4.6. Risk monitoring

Explanatory note: This application is dealing with development and use of a PSA-based risk monitor software tools for instantaneous monitoring of risk changes due to changes in plant configurations (on-line use of risk monitor). Risk monitor may be also used for planning or analysing plant configurations (off-line use of risk monitor). Does the plant use the PSA for such purposes?

141. Is the PSA scope suitable for implementation of this PSA application? [SSG-3; 10.1, 10.11]

142. How are the insights from deterministic safety analysis taken into account for this PSA application? [SSG-3; 10.6]

143. Is the PSA model suitable for implementation of this PSA application? How was the model used? [SSG-3; 2.5, 3.2, 3.15, 5.8, 5.33, 5.74, 5.82, 5.150, 8.101, 9.9, 9.70, 10.1, 10.2, 10.9]

144. Has the plant implemented a risk monitor tool and, if so, is the tool used to assess and manage the risks associated with maintenance activities? [SSG-3; 10.37]

145. How is the PSA model used in the risk monitor tool or other configuration control programmes? [SSG-3; 3.2, 5.82, 10.1, 10.39-10.41, 10.45]

146. To what extent has the PSA model been modified for use in risk monitoring? [SSG-3; 10.40-10.45]

147. Does the plant use validated software for the risk monitor application? [SSG-3; 10.48]

148. What types of personnel use the risk monitor application? Please provide examples of use. [SSG-3; 10.51-10.53]

149. Is the risk monitor tool available in the main control room and maintenance department, and does it allow for both on-line and off-line use? [SSG-3; 10.46, 10.50, 10.51]

150. If the risk monitor is available in the main control room, how is it used by operators on-line? Who is providing an input to the risk monitor? Do operators have formal procedures for on-line use of the risk monitor? What training has been provided to operators relating to the use of risk monitors? [SSG-3; 10.50-10.53]

151. Do plant personnel use the risk monitor application to provide an indication of plant safety performance? [SSG-3; 10.76]

152. How is it ensured that the risk monitor model reflects the actual PSA model? How update of the risk monitor following the PSA update organized? [SSG-3; 10.51]

14.4.7. Applications in connection with accident mitigation

Explanatory note: This application is dealing with use of PSA for development or changing plant emergency operating procedures (EOPs), accident management programmes (AMP) and severe accident management guidelines (SAMGs). Does the plant use the PSA for such purposes? It should be noted that this application may also have a connection with design changes/modifications (the PSA application covered in Sub-section 14.4.4).

153. Is the PSA scope suitable for implementation of this PSA application? [SSG-3; 10.1, 10.11]

154. How are the insights from deterministic safety analysis taken into account for this PSA application? [SSG-3; 10.6]

155. Is the PSA model suitable for implementation of this PSA application? [SSG-3; 2.5, 3.2, 3.15, 5.8, 5.33, 5.74, 5.82, 5.150, 8.101, 9.9, 9.70, 10.1, 10.2, 10.9].

In particular, the following supporting questions may assist in answering this question:

156. How External and Internal Hazards PSA insights are used to identify potential vulnerabilities for accident sequences corresponding to hazards severity exceeding the design basis. How these insights have been accounted for in Hazards Management Programme? [SSG-77; 4.2, 5.1]

157. How does the PSA represent operator actions that refer to specific EOPs? Are the human reliability analysis (HRA) methods used in the PSA capable of evaluating/predicting the impact of procedure changes in order to support this application? [SSG-3; 5.98, 5.101, 7.38]

158. To what extent does the PSA explicitly represent operator actions that refer to specific AMP or SAMG? Are the HRA methods used in the PSA capable of evaluating/predicting the impact of changes in AMP or SAMG in order to support this application? [SSG-4; 8.21, 8.22]

159. Has the plant developed a full-scope Level 2 PSA and, if so, how does it use the analysis results to support NPP accident management? [SSG-4; 8.2]

160. How is the full-scope Level 2 PSA used to address severe accident mitigation strategies? [SSG-4; 8.2, 8.16-8.18, 8.21]

14.4.8. PSA-based evaluation and rating of operational events

Explanatory note: This application is dealing with use of PSA for evaluation and rating of operational events, which involve component failures and human errors due to various causes. Does the plant use the PSA for such purposes?

161. Is the PSA scope suitable for implementation of this PSA application? [SSG-3; 10.1, 10.11]

162. How are the insights from deterministic safety analysis taken into account for this PSA application? [SSG-3; 10.6]

163. Is the PSA model suitable for implementation of this PSA application? How was the model used? [SSG-3; 2.5, 3.2, 3.15, 5.8, 5.33, 5.74, 5.82, 5.150, 8.101, 9.9, 9.70, 10.1, 10.2, 10.9]

164. What consideration is given to ensuring that events are investigated and analysed in accordance with their level of safety significance? What are the most highly ranked events, and what are the contributors to these risks? [SSG-3; 10.78, 10.80]

165. Can the plant present examples of using PSA to analyse particular events (modelling of the impact of an unavailability of one or more SSCs, and/or failures to perform specific operator actions for the operational events under consideration)? What were insights or lessons learned? [SSG-3; 10.79, 10.81]

14.4.9. Risk-informed operating limits and conditions

Explanatory note: This application is dealing with use of PSA in connection with permanent or temporary changes to operating limits and conditions (OLC) specified in technical specification

requirements (TS) including allowed outage time (AOT), surveillance test intervals, etc. Does the plant use the PSA for such purposes? What is the scope of this application in terms of the SSCs considered?

166. Is the PSA scope suitable for implementation of this PSA application? [SSG-3; 10.1, 10.11]

167. How are the insights from deterministic safety analysis taken into account for this PSA application? [SSG-3; 10.6]

168. Is the PSA model suitable for implementation of this PSA application? [SSG-3; 2.5, 3.2, 3.15, 5.8, 5.33, 5.74, 5.82, 5.150, 8.101, 9.9, 9.70, 10.1, 10.2, 10.9].

In particular, the following supporting questions may assist in answering this question (in relation to SSCs considered in the PSA application):

169. Does the PSA explicitly model the areas affected by the OLC change? [SSG-3; 10.29-10.32, 10.35, 10.68, 10.69, 5.82, 5.102]

170. Do the component reliability models include explicitly test intervals (if relevant for the application)? [SSG-3; 5.8]

171. Do the component unavailability models include explicitly pre-accident human errors (if relevant for the application)? [SSG-3; 5.8]

172. Is the model symmetric (i.e. symmetric consideration of occurrence of an initiating event in relation to redundant equipment) (if relevant for the application)? [SSG-3; 5.8]

173. Are component unavailabilities due to test and maintenance modelled explicitly at component-level (if relevant for the application)? [SSG-3; 5.8]

174. To what extent does the plant use the PSA for temporary relaxation or strengthening of some of the OLC requirements (e.g. exceeding AOT)? If so – what is the scope of the programme? What risk metrics and probabilistic criteria are used? What results can be shown to support this statement? [SSG-3; 10.29-10.32, 10.35, 10.68, 10.69, 5.82, 5.102]

175. Does the plant use the PSA to optimize surveillance test intervals (STIs) considering the risk from unavailability due to undetected failures versus the risk from unavailability due to tests and test induced failures? If so – what is the scope of the programme? What risk metrics and probabilistic criteria are used? What results can be shown to support this statement? [SSG-3; 10.29-10.32, 10.35, 10.68, 10.69, 5.82, 5.102]

176. If several changes to OLCs were introduced within the framework of an upgrading project or certain time period, was their cumulative impact on risk metrics analysed? Is this documented? [SSR-2/2 (Rev.1) Requirement 11; 4.39, 4.40] [SSG-25; 6.9] [SSG-3; 2.24, 2.28, 3.6]

14.4.10. Risk-informed in-service inspection

Explanatory note: This application is dealing with use of PSA to optimize risk informed in-service inspection (RI-ISI) practices. RI-ISI consists of ranking the elements for inspection,

such as welds in piping systems, according to their risk significance and developing the inspection strategy (frequency, method, sample size, etc.) commensurate with their risk significance. Does the plant use the PSA for such purposes? What is the scope of this application in terms of the SSCs considered?

177. Is the PSA scope suitable for implementation of this PSA application? [SSG-3; 10.1, 10.11]

178. How are the insights from deterministic safety analysis taken into account for this PSA application? [SSG-3; 10.6]

179. Is the PSA model suitable for implementation of this PSA application? [SSG-3; 2.5, 3.2, 3.15, 5.8, 5.33, 5.74, 5.82, 5.150, 8.101, 9.9, 9.70, 10.1, 10.2, 10.9]

In particular, the following supporting questions may assist in answering this question (in relation to SSCs considered in the PSA application):

180. Is the model symmetric (i.e. symmetric consideration of occurrence of an initiating event in relation to redundant equipment)? [SSG-3; 3.2, 5.8, 5.82]

181. To what degree is the PSA model capable of estimating the consequences of pipe failures, including loss of function, secondary flooding, pipe whip, and other consequences of pipe breaks? [SSG-3; 10.59]

182. To what extent is the PSA model capable of supporting estimates of conditional core damage probability (CCDP) and conditional large early release probability (CLERP) for any assumed failure mode, within the scope of the piping systems selected for the RI-ISI programme? [SSG-3; 10.61]

183. If the plant implemented RI-ISI, what changes have been made to the PSA model to make it suitable for this application? [SSG-3; 10.58-10.60]

184. Which changes to the in-service inspection programme are based on the PSA results? How is this documented? [SSG-3; 10.64]

14.4.11. Graded quality assurance

Explanatory note: This application is dealing with use of PSA to consider whether changes can be made to the traditional quality assurance requirements for some of the structures, systems and components to bring the requirements more in line with the risk significance of the structures, systems and components. Does the plant use the PSA for such purposes?

185. What is the scope of this application in terms of the SSCs considered? [SSG-3; 10.70-10.75]

186. Is the PSA scope suitable for implementation of this PSA application? [SSG-3; 10.1, 10.11]

187. How are the insights from deterministic safety analysis taken into account for this PSA application? [SSG-3; 10.6]

188. Is the PSA model suitable for implementation of this PSA application? How was the model used? [SSG-3; 2.5, 3.2, 3.15, 5.8, 5.33, 5.74, 5.82, 5.150, 8.101, 9.9, 9.70, 10.1, 10.2, 10.9]

189. What importance measures are used in this application to determine risk significance of SSCs? What risk metrics and criteria are used for classification purposes? How is the analysis documented? Please provide examples of SSCs, for which the QA class was changed (both decreased and increased). [SSG-3; 10.71-10.75]

14.4.12. Personnel training

Explanatory note: This application is dealing with use of PSA to enhance training of plant personnel including operative crews, staff of maintenance shops, engineers, and managers by inclusion of insights from risk assessment in training programmes. Does the plant use the PSA for such purposes? What is the scope of this application in terms of the staff involved?

190. Is the PSA scope suitable for implementation of this PSA application? [SSG-3; 10.1, 10.11]

191. How are the insights from deterministic safety analysis taken into account for this PSA application? [SSG-3; 10.6]

192. Is the PSA model suitable for implementation of this PSA application? How was the model used? [SSG-3; 2.5, 3.2, 3.15, 5.8, 5.33, 5.74, 5.82, 5.150, 8.101, 9.9, 9.70, 10.1, 10.2, 10.9]

193. Were insights from the PSA used for identification of accident scenarios for enhancement of operator training, including training on the simulator? If yes, how was such use of the PSA documented? What were the benefits? [SSG-75; 4.38]

194. Were PSA-based enhancements in operator training backfitted to the PSA model? If yes, is the PSA model and human reliability analysis capable of evaluating the impact of training enhancement? [SSG-3; 3.2, 5.8]

195. Were insights from the PSA used for enhancement of training of plant maintenance personnel? If yes, how was such use of the PSA documented? What were the benefits? [SSG-75; 4.38]

196. Was training on the PSA approach and use of PSA results to support safe and efficient plant operation provided to NPP managers? If yes, how was such use of the PSA documented? What were the benefits? [SSG-75; 4.43]

14.5. Use of PSR and OEF to support PSA applications

197. How and to what extent is relevant operating experience feedback used in order to improve PSA models and applications? [GSR-4 Requirement 10; 4.27, Requirement 14; 4.52, Requirement 19; 4.61]

198. What, if any, were the findings of the last PSR regarding PSA? What were the prescribed corrective actions and have they been implemented? [SSG-25; 4.21, 5.61, 5.125, 8.14, 9.3, 9.4]

199. How does the plant use PSR in order enhance the PSA programme? [SSR-2/2 (Rev.1) Requirement 12; 4.44] [SSG-25; 3.8, 5.29, 5.41, 5.47, 5.86, 6.10, 8.14] [SSG-71; 4.10, 4.11]

[IAEA safety standards for this WNO: SSR-2/2 (Rev. 1)*; GSR Part 4 (Rev. 1); SSG-3*; SSG-4; SSG-25; SSG-71; SSG-72; SSG-74; SSG-75, SSG-77. (*main basis)]

14. PSA
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14. PSA

No.	Issue summaries: (Brief five-line maximum description, neutral in tone, in order to present the subject of issues under development to the Plant Manager)	CI	CA	PMI	PMA
1					
2					
3					
4					
5					
6					
GP1	Good Practices: [brief description]				
GP2					

CI = Counterpart informed, CA = Counterpart agreed, PMI = Plant manager informed, PMA = Plant manager agreed