

Appendix I: Integrated Implementation Plan

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1. Introduction

The Integrated Implementation Plan (IIP) is the culmination of the Global Assessment (GA) process and presents the safety improvement actions to be undertaken in support of the Case of Suitability for Continued Operations for the next ten years and the Long-Term Operation (LTO) where appropriate.

To this extent it should be noted that

- All the deviations identified during the PSR have valid, implementable, reasonable safety improvement actions;
- All the safety improvement actions are scheduled to be completed by the 4th PSR;
- The safety improvement actions are scheduled taking into consideration their ranking, impact on Defence-in-Depth (D-i-D) and Fundamental Safety Functions (FSF), provision for LTO, and whether the related deviation was from the NNR requirement or not;
- The IIP is suitably developed, reviewed, and authorised to ensure acceptance and organisational buy-in from the departments who will implement the safety improvements;
- The IIP supports the SCO.

2. Process used to develop the IIP

2.1 Existing Organisational Commitments

The IIP is compiled utilising existing Koeberg Nuclear Power Station (KNPS) processes (adapted to PSR where necessary) and commitments related to:

- The existing Nuclear Portfolio Investment Plan containing existing capital expenditure projects;
- The existing LTO commitments agreed between the NNR and Eskom;
- The PSR Ranking of safety improvements for the prioritisation and categorisation of the safety improvement actions.

2.2 Prioritisation and Categorisation

Proposed safety improvements actions identified, assessed, screened, and ranked during the GA process are prioritised and categorised in accordance with:

- i. Ranking Criteria (detailed explanation of the ranking criteria in Appendix H)
 - Safety improvement actions related to NNR requirements (H1, M1, L1)
 - Safety improvements actions to be completed prior LTO (H1)
 - Safety improvement actions that related to international benchmark criteria only (H2, M2, L2)

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ii. Safety improvement Type:

- Engineering (Modifications to Plant SSCs)
- Analytical (DSA or PSA updates or studies, hazard analysis)
- Programmatic (Programmes, procedures, or processes)
- Organisational (Organisational skills, capacity, training, competency, nuclear safety culture)
- Configuration Management (Engineering)

iii. Close-Out Commitment:

- H1 are safety improvement actions that are existing commitments and identified as required prior to LTO and safety improvements actions to resolve deviations that have a safety significance grading of High related to NNR requirements. These actions should be completed in accordance with the LTO safety case commitments;
- H2 safety improvement actions should be completed within 5 years from NNR acceptance of the IIP;
- M1 and M2 safety improvement actions should be completed between 5 years from NNR acceptance of the IIP but prior to the start of the 4th PSR;
- L1 and L2 safety improvement actions should be completed prior to the start of the 4th PSR.

2.3 Approval

Safety improvement actions and assigned due dates were reviewed and agreed upon by the respective Eskom group heads managers and/or potential organisational implementers of the actions identified during the GA screening process utilising safety and practicality criteria (Appendix G).

Safety improvement actions prioritised and categorised in accordance with §2.1 were presented to the Nuclear Engineering Manager (NEM) for his approval of the process followed to generate the safety improvement actions identified, the associated high-level timeframes, and endorsement to present the IIP to the Nuclear Safety Review Committee (NSRC).

At the NSRC held on 12th January 2022, the NSRC chairman endorsed the IIP in accordance with KNPS PSR standard, (240-161618963, Periodic Safety Review of KNPS).

The final approval of the IIP will be the acceptance of the IIP by the NNR, which will mark the end of this KNPS 3rd PSR.

2.4 Management and Progress Tracking

To ensure that IIP is implemented as per the schedule and that all actions are closed before the start of the KNPS 4th PSR, the strategy below details the endorsement, management and implementation tracking of the safety improvements:

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- Once the IIP is accepted by the NNR, Nuclear Engineering Manager (NEM) will appoint the suitable HOD to track the implementation of the actions on the IIP, approve Corrective Action (CA) closeouts and report to him on a 6-monthly basis.
- All the actions on the IIP will be raised as CAs on the CAP system, assigned to the relevant departments and have appropriate due dates aligned with the safety significance of the deviation to be resolved.
- The NEM will provide PSI actions closure progress feedback to the KOU executives on a 6-monthly basis.
- To ensure all departments adhere to the commitment made to the NNR, no CA can be extended without prior approval by the CNO.
- The NEM will have a CA for closeout of KNPS 3rd PSR, which will be marked by the closeout of all actions on the IIP. The due date for this CA will be 31st December 2029.

3. IIP Results

The list of PSI actions identified following the screening for proposed improvement process (Appendix G) was rationalised (Appendix H) down to 93 safety improvements for inclusion in the IIP. The PSI ranking task yielded 11 safety improvements ranked as H1, one H2, seven M1, seven M2, 35 L1 and 32 L2.

The 93 safety improvements were categorised as follows:

i. By Improvement Type:

- Engineering Modifications : 13
- Analytical Work (Studies, Analysis) : 39
- Programmatic (Programs, Processes, Procedures) : 31
- Organisational (Skills, Capacity, Culture) : 08
- Configuration Management (Paper Plant) : 02

- ii. Engineering modifications include all plant-related safety improvements identified through the PSR assessments. From the 13 plant safety improvements identified, 11 are existing modifications already forming part of the current Nuclear Portfolio Investment Plan (PIP), while two are new actions that were identified in this PSR. The two new modification actions are:

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- Recommendations of the action plan regarding containment airlocks of the EPP system must be executed to resolve all outstanding issues on the system;
 - Upgrade of the LLX 380V essential supplies protection to address the incorrect protection grading on LLx 380V AC switchboards equipped with CF5 contactors.
- iii. Analytical and programmatic work forms the bulk of the safety improvements as depicted in both the number of actions in the paragraph above as well as the class 5 estimate of the associated costs below:

NB: The class 5 cost estimate only applies to additional work identified in the PSR and not the value of the LTO work scope or existing investment funding approved as per Nuclear PIP

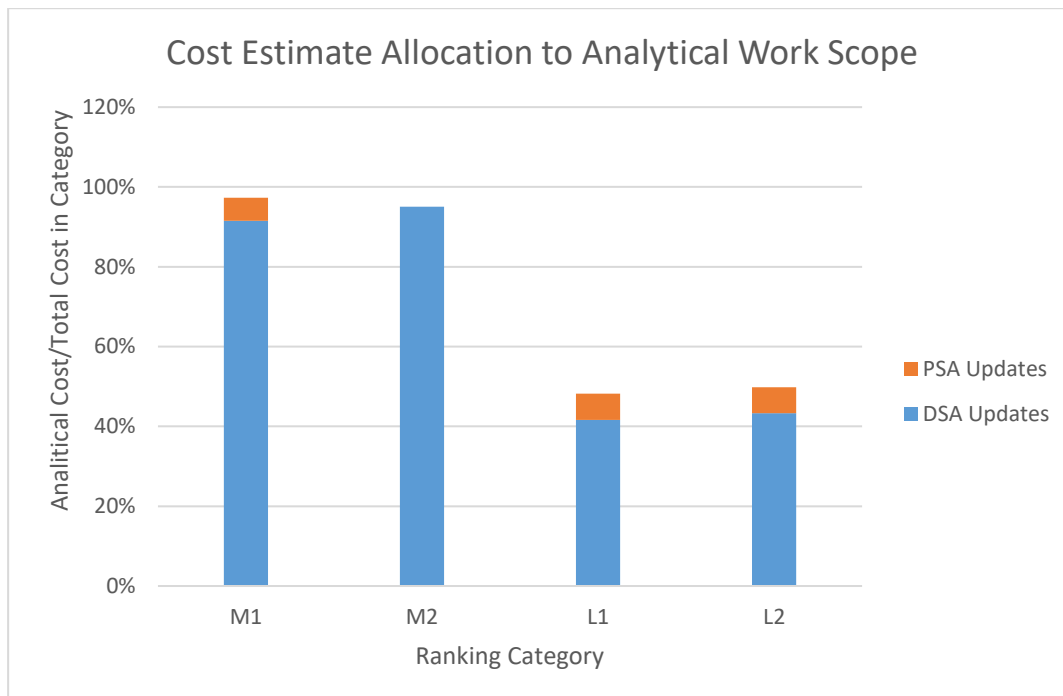
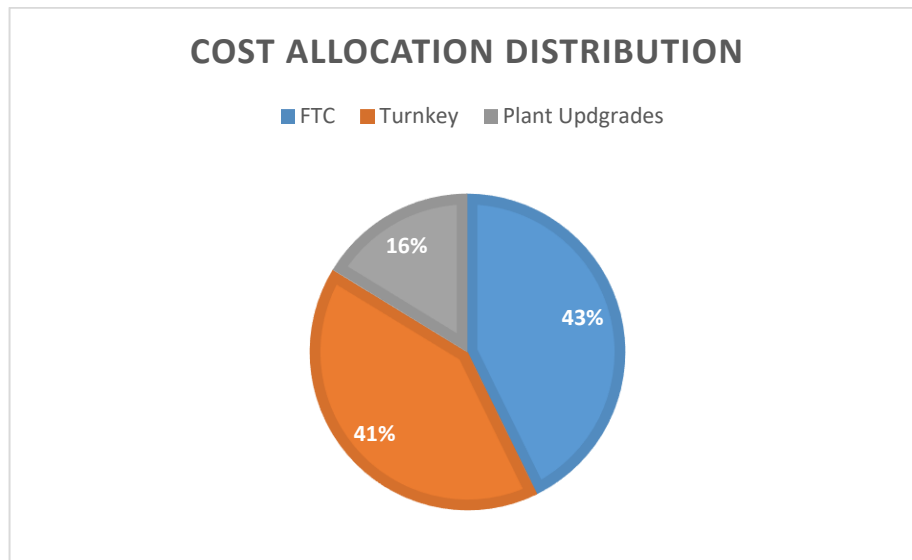


Figure 1: Cost Estimate Allocation to Analytical Work Scope

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- iv. The estimated IIP work scope split for the additional work identified through PSR from a resourcing perspective illustrated below:



Legend:

FTC – Work performed internal to the organisation utilising insourced resources.

Turnkey – Work performed external to the organisation by external independent companies.

Plant Upgrades – Modifications and plant refurbishment/restoration (civil)

Figure 2. Cost Allocation Distribution

- v. Utilising the ranking criteria to illustrate the distribution of safety improvement types:

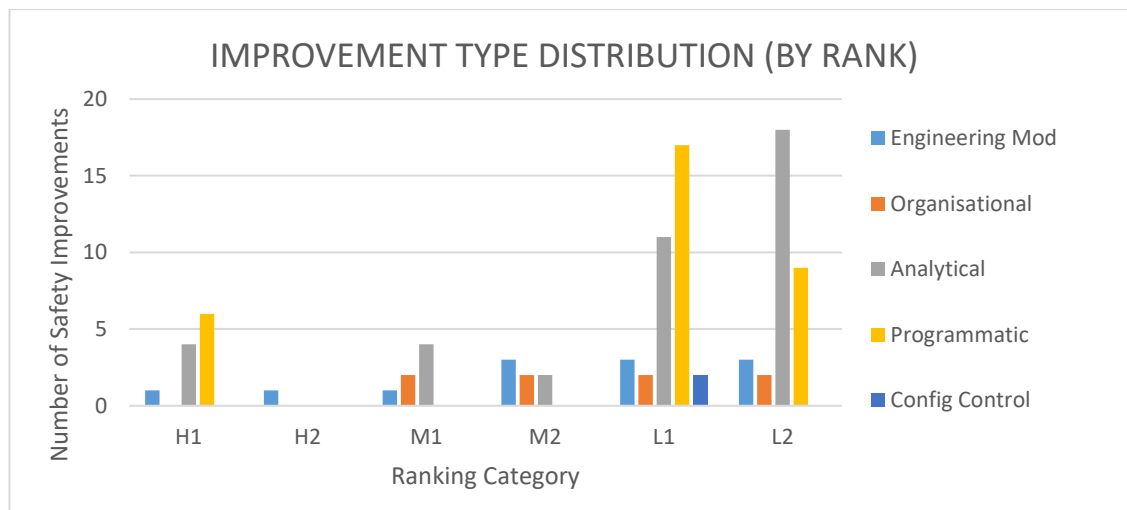
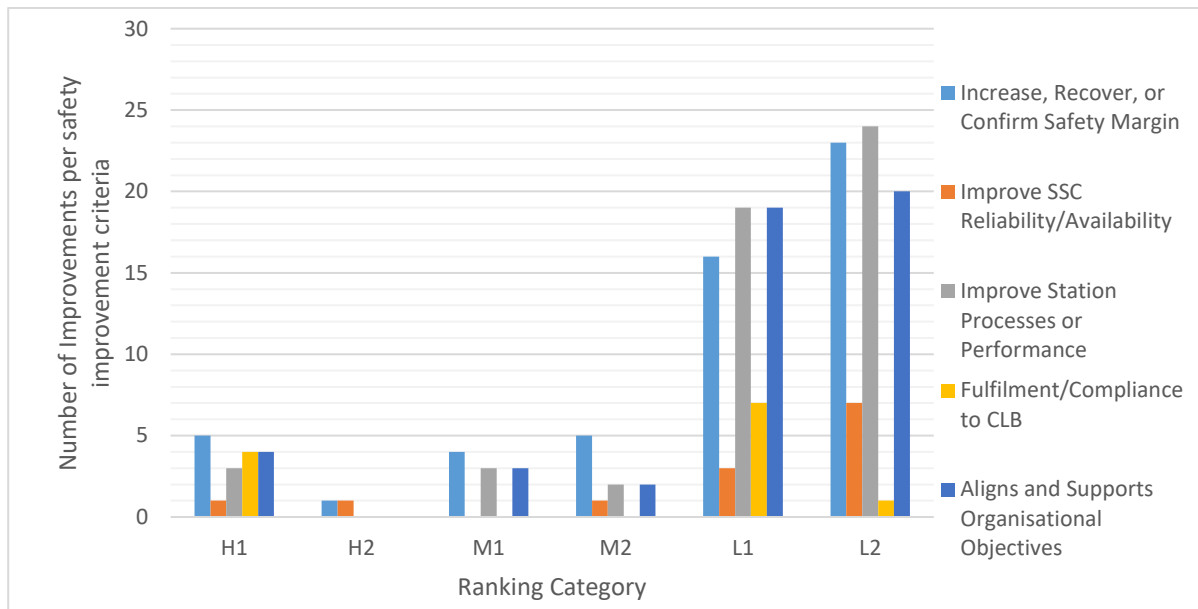


Figure 3. Improvement Type Distribution (By Rank)

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- vi. Utilising the safety improvement criteria to illustrate the distribution of safety improvement types:



NB: It should be noted that an improvement may be assigned to more than one safety improvement criteria

Figure 4. Distribution Of Safety Improvement Types

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vii. Utilising PSR PSI ranking due dates in accordance with Appendix H to illustrate ranked safety improvement distributions:

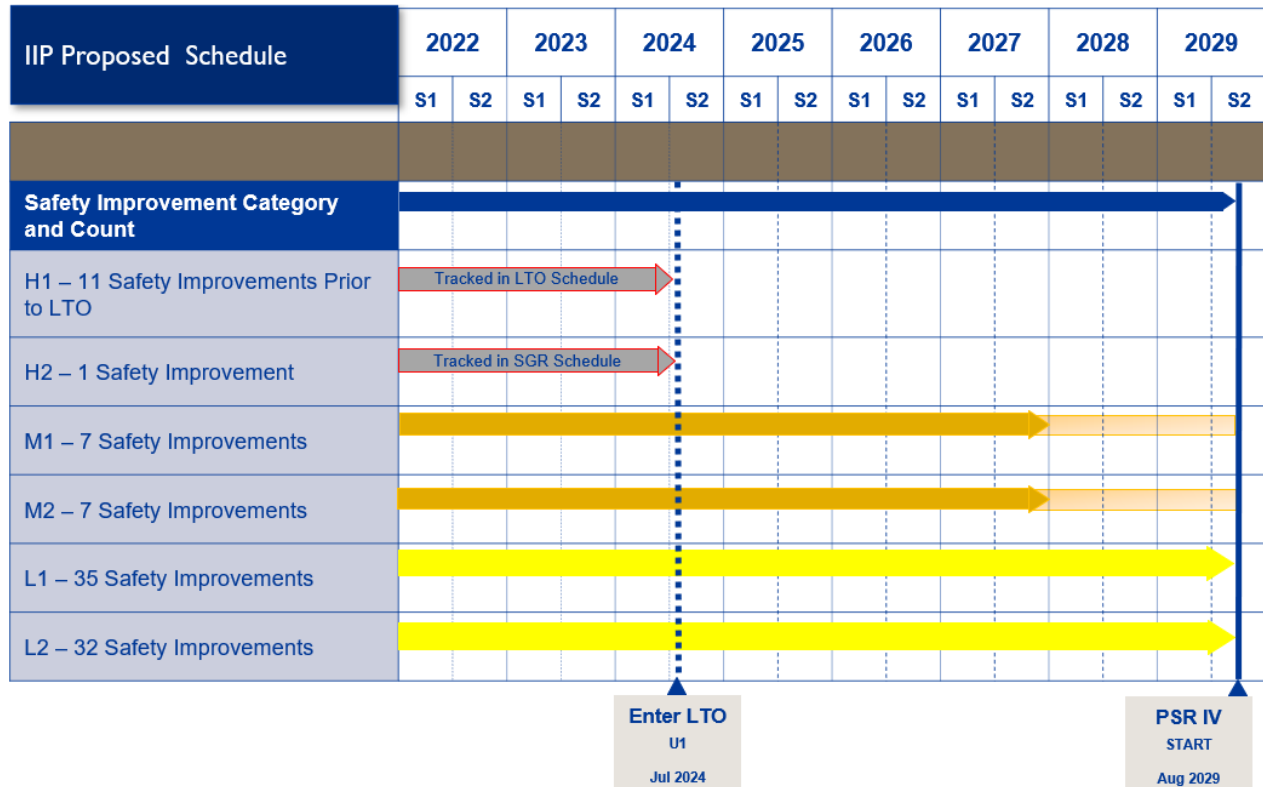


Figure 5. High-level Due Dates for each Safety Improvement Category

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4. IIP

The tables below show the list of safety improvements by rank (H, M and L), their associated due dates in accordance with Appendix H, and organisational proposed completion dates:

Table 1: H1 Safety Improvements

Safety Improvements Ranked as H1															
No	Identifier of safety Improvement	Safety Improvement Category	Proposed Safety Improvement	Area of safety Improvement	Related deviation(s)	Deviation Safety Significance Grading	Safety Improvement Ranking	NNR requirement	Required for LTO Entry	Tracking Reference N°	Outage dependency	Improvement Implemented before submitting final IIP proposal to NRR	Proposed completion date of Implementation as per IIP rankin	Organizational proposed completion date	Responsible department/ manager
1	1A-01-D1-R1	Ageing Management -RG 0027 Compliance	Update the SSC importance listing and classifications to be auditable to IAEA SSG-30 and ensure it can be easily utilised for AMP scoping	Programmatic (changes of procedures, processes and programmes)	1A-01-D1, 1A-02-D1, 4D-01-D1	LOW LOW DROP	H1	Yes	Yes	CR+K4:K31-132024-001 CA	No	No	30-Jun-24	As per LTO Safety Case Integrated Implementation Plan	NE SDED
2	2A-01-D1-R1		Develop and execute a comprehensive recovery plan of concrete structures affected by chloride induced rebar corrosion, including the containment buildings.	Engineering Modification	2A-01-D1	Low	H1	Yes	Yes	LTO - ICCP, Project N.GN16002, CR-132024-various CAs	No	No	30-Jun-24	As per LTO Safety Case Integrated Implementation Plan	Various
3	3C-02-D1-R1		Complete Equipment Qualification Time Limited Aging Analysis for qualified equipment prior to Long Term Operation.	Programmatic (changes of procedures, processes and programmes)	3C-02-D1	Low	H1	Yes	Yes	Proj C.GN08016, CR-132024-003 CA	No	No	30-Jun-24	As per LTO Safety Case Integrated Implementation Plan	NE EPG
4	3E-01-D1-R1		Develop and implement an environmental condition-monitoring programme, which includes temperature and radiation data, at local positions to capture additional data for further ageing analyses and residual life assessments of some Equipment Qualification equipment.	Programmatic (changes of procedures, processes and programmes)	3E-01-D1	Low	H1	Yes	Yes	Proj C.GN08016, CR-132024-004 CA	No	No	30-Jun-24	As per LTO Safety Case Integrated Implementation Plan	NE EPG
5	4A-02-D1-R1		Complete all actions identified in 240-156945472 - SALTO Ageing Management Assessment Report (Interim) Rev.1	Programmatic (changes of procedures, processes and programmes)	4A-02-D1	Low	H1	Yes	Yes	Proj C. GN08016, CR-132024-006 CA	No	No	30-Jun-24	As per LTO Safety Case Integrated Implementation Plan	NE IPD-K
6	4A-12-D1-R1		Update SAR with AMP and LTO details	Programmatic (changes of procedures, processes and programmes)	4A-12-D1	Drop	H1	Yes	Yes	SE 38545-001, CR102756-006, LTO - SALTO commitments, CR-132024-007 CA	No	No	31-Mar-24	As per LTO Safety Case Integrated Implementation Plan	NE KSCG
7	4E-01-D1-R1		Update RPV LOPP and Programme Manual	Analytical (Safety analyses, hazard analyses, safety studies)	4E-01-D1	Low	L1	Yes	No	SE 385545-035GA, CR-132024-various CAs	No	No	30-Jun-24	As per LTO Safety Case Integrated Implementation Plan	NE EPG

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KNPS 3rd PSR Safety Review

Global Assessment and Integrated Implementation Plan Report:

Appendix I – Integrated Implementation Plan

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Safety Improvements Ranked as H1															
No	Identifier of safety Improvement	Safety Improvement Category	Proposed Safety Improvement	Area of safety Improvement	Related deviation(s)	Deviation Safety Significance Grading	Safety Improvement Ranking	NNR requirement	Required for LTO Entry	Tracking Reference N°	Outage dependency	Improvement implemented before submitting final IIP proposal to NNR	Proposed completion date of Implementation as per IIP ranking	Organizational proposed completion date	Responsible department/ manager
8	4E-04-D1-R1	Ageing Management -RG 0027 Compliance	Update all programmes used for Ageing Management to align with the 9 attributes in RG-0027.	Programmatic (changes of procedures, processes and programmes)	4E-04-D1	Drop	H1	Yes	Yes	Proj C. GN08016;SE 38545 (13,25,29,35, etcetera), CR-132024-009 CA	No	No	30-Jun-24	As per LTO Safety Case Integrated Implementation Plan	NE EPG
9	4G-01-D1-R(1-3)		Develop, Plan, Implement, and Monitor the Technical Obsolescence Programme (TOP)	Analytical (Safety analyses, hazard analyses, safety studies)	4G-01-D1	Low	H1	Yes	No	CR-132024-010 CA / CR 133538-007	No	No	30-Jun-24	As per LTO Safety Case Integrated Implementation Plan	NE EPG
10	6C-23-D1-R1	Emergency Preparedness and Response	Re-assess and update the Emergency Plan Technical Basis to align with RG-0020 and other relevant international standards to cater for multi unit accidents	Analytical (Safety analyses, hazard analyses, safety studies)	6C-23-D1, 13A-24-D1	Drop Drop	H1	Yes	Yes	LTO-Commitment OPS-120, CR-132024-011 CA	No	No	30-Jun-24	As per LTO Safety Case Integrated Implementation Plan	NE PSAG
11	7A-30-D1-R1	Site Specific Characterisation	Update and authorise the Site Safety Report for use at Koeberg, including the completed SSHAC seismic hazard assessment.	Analytical (Safety analyses, hazard analyses, safety studies)	7A-16-D1, 7A-30-D1, 7B-03-D1, 7B-04-D1, 7D-02-D1, 7D-03-D1, 7H-02-D1	Low Medium Drop Medium Drop Low Medium	H1	Yes	Yes	DSSR N.KB00419 LTO SRA II - 100, SRA II - 110, SRA II - 120; CR-132024-016 CA	No	No	30-Jun-24	As per LTO Safety Case Integrated Implementation Plan	Nuclear Sites/ NE NSD

Table 2: H2 Safety Improvements

Safety Improvements Ranked as H2														
Identifier of safety Improvement	Safety Improvement Category	Proposed Safety Improvement	Area of safety Improvement	Related deviation(s)	Deviation Safety Significance Grading	Safety Improvement Ranking	NNR requirement	Required for LTO Entry	Tracking Reference N°	Outage dependency	Improvement Implemented before submitting final IIP proposal to NNR	Proposed completion date of Implementation as per IIP ranking	Organizational proposed completion date	Responsible department/ manager
1E-30-D1-R 1-7	Alignment of Plant Design with Design Basis	Restore the Control Room Envelope to within design basis limits	Engineering Modification	1E-30-D1	High	H2	No	No	07092-ZH, CR-132024-005 CA	No	No	28-Jun-27	As per LTO Safety Case Integrated Implementation Plan	NPM

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KNPS 3rd PSR Safety Review

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Table 3: M1 Safety Improvements

Safety Improvements Ranked as M1															
No	Identifier of safety Improvement	Safety Improvement Category	Proposed Safety Improvement	Area of safety Improvement	Related deviation(s)	Deviation Safety Significance Grading	Safety Improvement Ranking	NNR requirement	Required for LTO Entry	Tracking Reference N°	Outage dependency	Improvement Implemented before submitting final IIP proposal to NNR	Proposed completion date of Implementation as per IIP rank	Organizational proposed completion date	Responsible department/ manager
1	5A-01-D1-R1	Deterministic Safety Analyses Improvement	Justify or Perform analysis for the missing 18 unanalysed PIE's, for all plant states	Analytical (Safety analyses, hazard analyses, safety studies)	5A-01-D1	Medium	M1	Yes	No	CR 132024-012 CA	No	No	30-Aug-29	31-Oct-28	NE PSAG
2	6A-03-D1-R1	PSA Improvement	Develop a plant specific seismic PSA in accordance with ASME Capability Category II	Analytical (Safety analyses, hazard analyses, safety studies)	6A-03-D1	Low	M1	Yes	No	CR 132024-013 CA	No	No	30-Aug-29	15-Dec-26	NE PSAG
3	6A-03-D2-R1		Develop a High winds Tomado PSA in accordance with ASME Capability Category II	Analytical (Safety analyses, hazard analyses, safety studies)	6A-03-D2	Low	M1	Yes	No	CR 132024-020 CA	No	No	30-Aug-29	30-Nov-25	NE PSAG
4	7I-03-D1-R1	Plant Changes or Modifications	Implement EE-SRA Prioritised Modifications (Grp A, Grp B) committed to in K-26037-E	Engineering Modification	7I-03-D1 7F-01-D1 1B-20-D1	Medium Medium Medium	M1	Yes	No	EERI mods as per LTO schedule, CR 132024-014 CA	Yes	No	30-Aug-29	31-Mar-26	NPM
5	GI-001-R(1-5)	Deterministic Safety Analyses Improvements	Analyse and justify DEC-A and DEC-B events, and update all relevant safety case documentation	Analytical (Safety analyses, hazard analyses, safety studies)	GI-001, 1F-07-D1, 5A-04-D1, 5B-08-D1, 6C-08-D1, 7I-01-D1, 7I-01-D2	Medium Low Medium Medium Low Low Low	M1	Yes	No	CR 132024-017 CA	No	No	30-Aug-29	30-Nov-27	NE PSAG
6	GI-002-R(1-3)	Skills and Expertise Improvement	Identify and Develop Skills Gap Strategy that have resulted to several deviations during KNPS 3rd PSR in accordance with deviations listed in GI-002.	Organizational improvements (training, skills, capacity, competency, nuclear safety culture)	GI-002	Medium	M1	Yes	No	CR 132024-018 CA	No	No	30-Aug-29	30-Jun-24	HR
7	GI-005 0-R (1-3)	Financial	Determine the reasons for financial constraints identified as the apparent cause for several deviations in the KNPS 3rd PSR. Ensure that the causes are adequately addressed and will not adversely impact the implementation of the 3rd PSR IIP actions.	Organizational improvements (training, skills, capacity, competency, nuclear safety culture)	GI-005	Medium	M1	Yes	No	Various	No	No	30-Aug-29	30-Nov-23	NEM

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Table 4: M2 Safety Improvements

Safety Improvements Ranked as M2															
No	Identifier of safety Improvement	Safety Improvement Category	Proposed Safety Improvement	Area of safety Improvement	Related deviation(s)	Deviation Safety Significance Grading	Safety Improvement Ranking	NNR requirement	Required for LTO Entry	Tracking Reference N°	Outage dependency	Improvement Implemented before submitting final IIP proposal to NNR	Proposed completion date of Implementation as per IIP ranking	Organizational proposed completion date	Responsible department/ manager
1	1E-18-D1-R1	Plant Changes or Modifications	Improve flow balancing on HHSI flow indicators for balancing of the injection flow on the RIS high head injection lines to the RCP cold legs	Engineering Modification	1E-18-D1	Medium	M2	No	No	Mod 13030 CR132024-021 CA	Outage 127, 227	No	30-Aug-29	Unit 1: Outage 127 Unit 2: Outage 227 31-March-2026	NPM
2	1E-19-D1-R1		Assess and implement the necessary mitigation and modifications to eliminate the threat of loss of both RRI trains following a flooding event; noting that Modification 03030 has been raised to mitigate flooding of the RRI heat exchangers. A similar modification may be suitable to address the threat of flooding the RRI pumps and any other critical zones in the plant susceptible to this common cause failure.	Engineering Modification	1E-19-D1	Medium	M2	No	No	Mod 03030 CR132024-022 CA	Yes	No	30-Aug-29	31-Mar-24	NPM
3	5F-03-D4-R (1-3)	Safety Studies: Accident Mitigation Procedures	Perform sensitivity analysis on performance on PARs during reactor pit flooding and update SAG-7 accordingly.	Analytical (Safety analyses, hazard analyses, safety studies)	5F-03-D4	LOW	L2	No	No	CR132024-023 CA	No	No	30-Aug-29	31-May-29	NE PSAG
4	5F-03-D7-R (1-2)		Perform plant-specific support calculations to justify the use of the generic PWROG EOPs for KNPS taking the specific SI delivery curves from KNPS into account. Adapt the affected EOPs if needed based on the results of the support calculations.	Analytical (Safety analyses, hazard analyses, safety studies)	5F-03-D7	Medium	M2	No	No	CR132024-024 CA	No	No	30-Aug-29	30-Nov-26	NE PSAG
6	7I-03-D2-R (1-2)	EE-SRA Close-out	Review EE-SRA recommendations for suitability of implementation or disposition. Review EE-SRA recommendations for suitability of implementation or disposition and ensure that for recommendations that require plant modifications, the necessary modification processes are raised and tracked.	Organizational improvements (training, skills, capacity, competency, nuclear safety culture)	7I-03-D2 7I-03-D3	Medium	M2	No	No	LI40940-001, CR132024-026 CA	No	No	30-Aug-29	31-Mar-25	NE KSCG
7	GI-008-R(1-2)	Organisation	Conduct a review to determine the underlying causes that led to the tolerating of long standing issues or deviations from previous periodic reviews, as documented in GI-008 of the KNPS 3rd PSR. Raise the necessary corrective actions to ensure likelihood of this negative culture is reduced to acceptable levels.	Organizational improvements (training, skills, capacity, competency, nuclear safety culture)	GI-008	Medium	M2	No	No	CR132024-111 CA	No	No	30-Aug-29	30-Nov-23	NE EPSD

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Table 5: L1 Safety Improvements

Safety Improvements Ranked as L1															
No	Identifier of safety Improvement	Safety Improvement Category	Proposed Safety Improvement	Area of safety Improvement	Related deviation(s)	Deviation Safety Significance Grading	Safety Improvement Ranking	NNR requirement	Required for LTO Entry	Tracking Reference N°	Outage dependency	Improvement Implemented before submitting final IIP proposal to NNR	Proposed completion date of Implementation as per IIP ranking	Organizational proposed completion date	Responsible department/ manager
1	1B-26-D1-R1	Plant Changes	Improve PTR Syphon breaker capacity	Engineering Modification	1B-26-D1	LOW	L1	No	No	Mod 12031 CR132024-028 CA	Unit 1: Outage 126 Unit 2: Outage 226	No	30-Aug-29	Unit 1: Outage 126 Unit 2: Outage 226 31-March-2024	NPM
2	1G-03-D1-R(1-3)		Implement a DDR work down plan and introduce monitoring and reporting metrics for CSR/SR DDR's	Configuration Management	1G-03-D1	Low	L1	Yes	No	CR 108441, CR132024-029 CA	No	No	30-Aug-29	30-Jun-25	NE SDED
3	1I-13-D1-R1	Licensing	Obtain regulatory clarification on LD-1093 Section 7.2.2 for applicable periodicity and how it applies to simulator testing.	Programmatic (changes of procedures, processes and programmes)	1I-13-D1	Low	L1	Yes	No	CR132024-030 CA	No	No	30-Aug-29	30-Nov-23	OTG
4	2A-09-D1-R1	Civil Structures Ageing Management	Resource, Implement, and Monitor Civil Recovery Program of SR Buildings	Programmatic (changes of procedures, processes and programmes)	2A-09-D1	Low	L1	Yes	No	LI 38811, CR132024-031 CA	No	No	30-Aug-29	31-Aug-25	E&S
5	2A-09-D2-R1		Monitor Civil Recovery Program of SR Buildings - SR Civil Structures Health Reporting	Programmatic (changes of procedures, processes and programmes)	2A-09-D2	Drop	L1	Yes	No	CR132024-032 CA	No	No	30-Aug-29	31-May-24	SE Civils
6	3F-01-D1-R (1-2)	Equipment Qualification	Update EQ Programme with seismic intensities assigned to DEC events.	Programmatic (changes of procedures, processes and programmes)	3F-01-D1	LOW	L1	No	No	CR132024-033 CA	No	No	30-Aug-29	31-Mar-25	NE KSCG
7	4A-09-D1-R1	General Ageing Management Actions	Complete update of design procedures to specifically include consideration of ageing effects as per SE 38545-015 CA	Programmatic (changes of procedures, processes and programmes)	4A-09-D1	Drop	L1	Yes	No	CR132024-034 CA	No	No	30-Aug-29	30-Jun-26	NE SDED
8	4B-02-D1-R1(1-4)		Update Decommission Strategy and Plan with AMP requirements	Programmatic (changes of procedures, processes and programmes)	4B-02-D1	Drop	L1	Yes	No	CR132024-Various CAs	No	No	30-Aug-29	31-Jul-25	Various
9	5B-05-D1-R1	Deterministic safety Analysis	Update Radiological Consequence Analysis (Population and Census Data)	Analytical (Safety analyses, hazard analyses, safety studies)	5B-05-D1	Low	L1	Yes	No	CR132024-069 CA	No	No	30-Aug-29	30-Aug-27	NE PSAG
10	5B-10-D1-R1		Update CSBO analysis to demonstrate a safe end state is reached	Analytical (Safety analyses, hazard analyses, safety studies)	5B-10-D1	Low	L1	Yes	No	CR132024-070 CA	No	No	30-Aug-29	30-Aug-26	NE PSAG
11	5C-03-D1-R1		Compile justification for lack of reference utilised in DSA prior to SGR	Programmatic (changes of procedures, processes and programmes)	5C-03-D1	Drop	L1	Yes	No	CR132024-071 CA	No	No	30-Aug-29	31-May-27	NE PSAG
12	5C-05-D1-R1		Compile justification for lack of SA type QMS utilised for DSA prior to SGR	Programmatic (changes of procedures, processes and programmes)	5C-05-D1	Drop	L1	Yes	No	CR132024-072 CA	No	No	30-Aug-29	30-Aug-27	NE PSAG
13	5F-03-D5-R1		Verify that set points in EOPs are supported by analysis (calculation) results. If not perform the calculations.	Analytical (Safety analyses, hazard analyses, safety studies)	5F-03-D5	LOW	L1	No	No	CR132024-073 CA	No	No	30-Aug-29	31-May-27	NE PSAG
14	6A-02-D1-R1	PSA Improvements	Compile justification for inclusive/exclusion of SLB Induced SGR and update models	Analytical (Safety analyses, hazard analyses, safety studies)	6A-02-D1	Low	L1	Yes	No	CR132024-074 CA	No	No	30-Aug-29	28-Feb-26	NE PSAG

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Safety Improvements Ranked as L1															
No	Identifier of safety Improvement	Safety Improvement Category	Proposed Safety Improvement	Area of safety Improvement	Related deviation(s)	Deviation Safety Significance Grading	Safety Improvement Ranking	NNR requirement	Required for LTO Entry	Tracking Reference N°	Outage dependency	Improvement Implemented before submitting final IIP proposal to NNR	Proposed completion date of Implementation as per IIP schedule	Organizational proposed completion date	Responsible department/ manager
15	6A-02-D2-R1	PSA Improvements	Review CASK PSA subsumed initiators to identify LUHS/SEC pipe damage initiators and remodel	Analytical (Safety analyses, hazard analyses, safety studies)	6A-02-D2	Low	L1	Yes	No	CR132024-075 CA	No	No	30-Aug-29	30-Nov-25	NE PSAG
16	6A-02-D3-R1		Revise current internal flooding methodology to align with International Best Practise and update model	Analytical (Safety analyses, hazard analyses, safety studies)	6A-02-D3	Low	L1	Yes	No	CR132024-076 CA	No	No	30-Aug-29	30-Nov-25	NE PSAG
17	6A-02-D4-R1		Update Internal Hazards (fire and flooding) in the Spent Fuel Pool PSA	Analytical (Safety analyses, hazard analyses, safety studies)	6A-02-D4	Low	L1	Yes	No	CR132024-077 CA	No	No	30-Aug-29	30-Nov-25	NE PSAG
18	6A-03-D3-R1		Develop a plant specific external flooding PSA in accordance with ASME Capability Category II	Analytical (Safety analyses, hazard analyses, safety studies)	6A-03-D3	Low	L1	Yes	No	CR132024-078 CA	No	No	30-Aug-29	30-Nov-26	NE PSAG
19	6A-03-D4-R1		Update existing PSA models for LUHS to include all external threats	Analytical (Safety analyses, hazard analyses, safety studies)	6A-03-D4	Low	L1	Yes	No	CR132024-079 CA	No	No	30-Aug-29	30-Jun-28	NE PSAG
20	6B-09-D1-R1		Review and Update PSA reports to reflect the latest plant specific data	Analytical (Safety analyses, hazard analyses, safety studies)	6B-09-D1	Low	L1	Yes	No	CR132024-080 CA	No	No	30-Aug-29	30-Nov-25	NE PSAG
21	6D-06-D1-R1		Update Level 3 PSA and PC Cosyma model with latest DSSR population data	Analytical (Safety analyses, hazard analyses, safety studies)	6D-06-D1	Low	L1	Yes	No	CR132024-081 CA	No	No	30-Aug-29	31-Aug-27	NE PSAG
22	11C-01-D3-R(1-2)	Procedures	Rigorous enforcement of periodic scheduled procedure reviews of CSR and SR procedures	Configuration Management	11C-01-D3	Low	L1	Yes	No	CR132024-082 CA	No	No	30-Aug-29	30-Nov-23	TD&RM
23	12B-05-D1-R1	Organisation	Perform safety impact evaluation in support of organisational changes	Programmatic (changes of procedures, processes and programmes)	12B-05-D1	Low	L1	Yes	No	CR132024-083 CA	No	No	30-Aug-29	30-Nov-23	HR
24	13H-04-D1-R1	Plant Changes	Implement the Koeberg pager system replacement project or document an alternative reliable prompt communication system	Engineering Modification	13H-04-D1	Low	L1	Yes	No	Mod 11020 CR132024-084 CA	No	No	47360	31-Mar-24	NPM
25	14A-03-D2-R1	Radiological Safety	Develop a strategy to optimise testing of Iodine filters using a lower or non-active source during charcoal filter testing.	Programmatic (changes of procedures, processes and programmes) / Engineering (modifications to the plant)	14A-03-D2	LOW	L1	No	No	CR132024-085 CA	No	No	30-Aug-29	31-Oct-27	NucSysEng
26	14B-01-D1-R(1-3)		Updates to procedures and process related to monitoring and trending radioactive effluents (KAA636, Z38-49)	Programmatic (changes of procedures, processes and programmes)	14B-01-D1	Low	L1	Yes	No	CR132024-086 CA	No	No	30-Aug-29	31-Mar-24	Nuclear Support
27	14B-02-D1-R1		Improve reliability of Environmental Survey Lab (ESL) power supplies.	Engineering Modification	14B-02-D1	Low	L1	Yes	No	CR132024-087 CA	No	Yes	30-Aug-29	Q4/2021	ESL

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Safety Improvements Ranked as L1															
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28	14B-04-D1-R1	Radiological Safety	Benchmark effluent and environmental monitoring programmes and standards to international best practises	Programmatic (changes of procedures, processes and programmes)	14B-04-D1	Low	L1	Yes	No	CR132024-088 CA	No	No	30-Aug-29	31-Dec-23	Nuclear Support
29	14B-05-D2-R(1-3)		Improve processes and procedures for estimation of radioactive discharges and associated public dose	Programmatic (changes of procedures, processes and programmes)	14B-05-D2	Drop	L1	Yes	No	CR132024-089 CA	No	No	30-Aug-29	15-Dec-25	NE NSD
30	14B-06-D1-R1		Develop and implement an effective ground water monitoring programme capable of providing early contamination detection	Programmatic (changes of procedures, processes and programmes)	14B-06-D1	Low	L1	Yes	No	CR132024-090 CA	No	No	30-Aug-29	31-May-26	NE EPG
31	14C-02-D1-R1		Improve Quarterly and Annual Effluent and Environmental Monitoring Reports	Programmatic (changes of procedures, processes and programmes)	14C-02-D1	Drop	L1	Yes	No	CR132024-091 CA	No	No	30-Aug-29	31-Mar-24	Nuclear Support
32	GI-003-R(1-3)	Organisation	Implement leadership training interventions to improve management oversight as applicable	Organizational improvements (training, skills, capacity, competency, nuclear safety culture)	GI-003	Low	L1	Yes	No	CR132024-092 CA	No	No	30-Aug-29	31-Mar-24	HR
33	GI-004	Operating Experience	Review business decision on cancellation of International memberships (FROG, PWROG, etc.)	Programmatic (changes of procedures, processes and programmes)	GI-004	Low	L1	Yes	No	CR132024-Various CA	No	No	30-Aug-29	15-Dec-23	Various
34	GI-006-R(1-9)	Emergency Management	Combination of individual deviations and observations leading to the potential for impact on the effectiveness of the emergency preparedness and response to severe accidents affecting both units simultaneously	Programmatic (changes of procedures, processes and programmes)	GI-006, 4E-05-D1, 7H-09-D1, 7I-03-D3, 12E-38-D1, 13A-24-D2, 13A-54-D1, SF-13 OBS	Low Low Low Low Low Drop Low N/A	L1	Yes	No	CR132024-Various CAs	No	No	30-Aug-29	30-May-26	Various
34.1	GI-006		Develop a waste management strategy for design basis accidents and existing DEC A (comprehensive) accidents. Once the waste management strategy is developed raise actions to the applicable groups (e.g. RP, EP etc.) to compile or update the existing lower tier implementation documents.							CR132024-117 CA				30-Jun-24	NE PSAG
34.2	GI-006		Upon completion of the analysis of the full list of DEC-A and DEC-B accidents conducted by NE_PSAG under CR 132024-017 CA, update the waste management strategy developed under CR 132024-117 CA with the full list DEC A and DEC-B accidents. Once the waste management strategy is updated, raise actions to the applicable groups (e.g. RP, EP etc.) to compile the lower tier implementation documents.							CR132024-118 CA				31-Mar-28	NE PSAG
35	GI-007-R(1-3)	Organisation	Conduct a review to determine underlying causes for inconsistent demonstration of nuclear safety culture traits and implement identified solutions	Organizational improvements (training, skills, capacity, competency, nuclear safety culture)	GI-007	Low	L1	Yes	No	CR132024-095 CA	No	No	30-Aug-29	30-Jun-23	ISE MAN

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Table 6: L2 Safety Improvements

Safety Improvements Ranked as L2															
No	Identifier of safety Improvement	Safety Improvement Category	Proposed Safety Improvement	Area of safety Improvement	Related deviation(s)	Deviation Safety Significance Grading	Safety Improvement Ranking	NNR requirement	Required for LTO Entry	Tracking Reference N°	Outage dependency	Improvement implemented before submitting final IIP proposal to NERSA	Proposed completion date of implementation as per IIP ranking	Organizational proposed completion date	Responsible department/manager
1	1B-06-D1-R (1-2)	Codes and Standards	Implement actions to address shortfalls identified in codes and standards review for the design aspects of the plant and explicitly document that OE should consider periodic review of codes and standards	Programmatic (changes of procedures, processes and programmes)	1B-06-D1, 1B-32-D1, 1C-01-D1	LOW LOW LOW	L2	No	No	CR 132024-048 CA	No	No	30-Aug-29	30-Jun-27	NE SDED
2	1C-13-D1-R (1-2)	Plant Changes or Modifications	Prevent Clogging of HHSI valves	Engineering (modifications to the plant)	1C-13-D1	LOW	L2	No	No	Mod 13029, CR 132024-051 CA	Yes	No	30-Aug-29	Unit 1: Outage 127 Unit 2: Outage 227 31-March-26	NPM
3	1F-01-D1-R (1-2)	OTS/SAR	Update SAR, OTS, and associated documents to align with modern concept of Defence in Depth	Programmatic (changes of procedures, processes and programmes)	1F-01-D1	LOW	L2	No	No	CR 132024-055 CA	No	No	30-Aug-29	30-Aug-28	NE KSCG
4	2A-11-D1-R1	Plant Changes or Modifications	Modification to address incorrect protection grading of LLx 380V AV essential supply	Engineering (modifications to the plant)	2A-11-D1	LOW	L2	No	No	CR 132024-107 CA	Yes	No	30-Aug-29	15-Dec-23	ElecSysEng
5	2A-20-D1-R1	FME	Initiate organisational programmes to improve, drive, and monitor FME procedural compliance.	Organizational improvements (training, skills, capacity, competency, nuclear safety culture)	2A-20-D1	LOW	L2	No	No	CR 132024-060 CA	No	No	30-Aug-29	31-Mar-25	MEXM
6	2C-12-D1-R1	Plant Changes or Modifications	1. Present the EPP system recommendations of the action plan regarding containment airlocks to the station plant health committee and obtain concurrence on the necessary actions to be prioritised and executed to resolve all outstanding issues on the system affecting reliability of the airlocks. It has been identified in the KNPS 3rd PSR that the airlock condition is deteriorating and if left unattended it might result into breach of containment. 2. Once PHC concur with the list of actions to be prioritised, raise the necessary CAs for the relevant groups to execute work. Please note that it is an NNR requirement to track all the actions required to close deviations identified in the PSR. In addition, as per RG-0028 and the safety grading of the deviation, all the actions for EPP airlocks must be closed by 2029-03-31, please take this into consideration when raising the CAs.	Engineering (modifications to the plant)	2C-12-D1	LOW	L2	No	No	CR 132025-063 CA	Yes	No	30-Aug-29	30-Jun-23	NucSysEng
7	3E-05-D1-R (1-6)	DEC	Update EQ Programme with environmental parameters and service conditions related to DEC events.	Programmatic (changes of procedures, processes and programmes)	3E-05-D1	LOW	L2	No	No	CR132024-064 CA	No	No	30-Aug-29	31-Mar-25	NE KSCG
8	5B-04-D1-R (1 - 3)	Deterministic Safety Analysis Improvements	Update radiological consequence assumptions related to hydrogeological and hydrological parameters.	Analytical (Safety analyses, hazard analyses, safety studies)	5B-04-D1	LOW	L2	No	No	CR132024-066 CA	No	No	30-Aug-29	31-Jul-27	NE PSAG
9	5B-04-D2-R (1-2)		Update radiological consequence assumptions related to ground shine, inhalation of re-suspended material and ingestion pathways.	Analytical (Safety analyses, hazard analyses, safety studies)	5B-04-D2	LOW	L2	No	No	CR132024-067 CA	No	No	30-Aug-29	31-Jul-27	NE PSAG
10	5B-04-D3-R (1-2)		Update radiological consequence assumptions related to transport and accumulation of radionuclides in the biosphere.	Analytical (Safety analyses, hazard analyses, safety studies)	5B-04-D3	LOW	L2	No	No	CR132024-068 CA	No	No	30-Aug-29	31-Jul-27	NE PSAG

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Safety Improvements Ranked as L2															
No	Identifier of safety Improvement	Safety Improvement Category	Proposed Safety Improvement	Area of safety Improvement	Related deviation(s)	Deviation Safety Significance Grading	Safety Improvement Ranking	NNR requirement	Required for LTO Entry	Tracking Reference N°	Outage dependency	Implemented before submitting final IIP proposal to regulator	Proposed completion date of implementation as per IIP ranking	Organizational proposed completion date	Responsible department/ manager
11	5B-08-D2-R1	Deterministic Safety Analysis Improvements	Assess the impact of break size of the RCP pumps seal leakage on the results of the CSBO analysis.	Analytical (Safety analyses, hazard analyses, safety studies)	5B-08-D2	LOW	L2	No	No	CR132024-037 CA	No	No	30-Aug-29	30-Jun-26	NE PSAG
12	5D-02-D1-R1		Study and evaluate the maximum allowable related loop flow difference that meets secondary overpressure criterion.	Analytical (Safety analyses, hazard analyses, safety studies)	5D-02-D1	LOW	L2	No	No	CR132024-038 CA	No	No	30-Aug-29	30-Jun-28	NE PSAG
13	5D-02-D2-R1		Verify the uncertainties considered for the opening of the PORVs in FWLB analysis considering the specific containment conditions	Analytical (Safety analyses, hazard analyses, safety studies)	5D-02-D2	LOW	L2	No	No	CR132024-039 CA	No	No	30-Aug-29	30-Jun-26	NE PSAG
14	5F-03-D1-R1		Update KNPS SAMGs to align with latest revision of the generic SAMGs (US (PWROG-16059-P) or Euro)	Programmatic (changes of procedures, processes and programmes)	5F-03-D1	LOW	L2	No	No	CR132024-040 CA	No	No	30-Aug-29	30-Jun-26	NE PSAG
15	5F-03-D6-R1		Identify and justify any variances between KNPS EOPs and PWROG EOPs and document the results.	Analytical (Safety analyses, hazard analyses, safety studies)	5F-03-D6	LOW	L2	No	No	CR132024-041 CA	No	No	30-Aug-29	30-Jun-26	NE PSAG
16	5F-03-D8-R1		Perform plant specific validation for KNPS SAMGs and document it in the SAMG basis documents.	Analytical (Safety analyses, hazard analyses, safety studies)	5F-03-D8	LOW	L2	No	No	CR132024-042 CA	No	No	30-Aug-29	30-Jun-27	NE PSAG
17	6A-07-D2-R1	PSA Improvements	Review modelling of human-induced accident initiators to ensure dependencies between the initiator and subsequent human errors are appropriately modelled.	Analytical (Safety analyses, hazard analyses, safety studies)	6A-07-D2	LOW	L2	No	No	CR132024-043 CA	No	No	30-Aug-29	31-Oct-27	NE PSAG
18	6A-08-D1-R1		Update PSA models to account for operator error and equipment failure due to environmental and phenomenological conditions initiated by the accident.	Analytical (Safety analyses, hazard analyses, safety studies)	6A-08-D1	LOW	L2	No	No	CR132024-044 CA	No	No	30-Aug-29	30-Sep-28	NE PSAG
19	6A-08-D2-R1		Incorporate RCP pump trip into IB-LOCA as a functional event in the RiskSpectrum PSA model.	Analytical (Safety analyses, hazard analyses, safety studies)	6A-08-D2	LOW	L2	No	No	CR132024-045 CA	No	No	30-Aug-29	31-Jan-26	NE PSAG
20	6A-11-D1-R1		Update PSA model with identified mission time parameter changes.	Analytical (Safety analyses, hazard analyses, safety studies)	6A-11-D1	LOW	L2	No	No	CR132024-046 CA	No	No	30-Aug-29	31-May-29	NE PSAG
21	6A-12-D1-R1		Justify PSA parameters that do not have uncertainty distributions in the PSA models.	Analytical (Safety analyses, hazard analyses, safety studies)	6A-12-D1	LOW	L2	No	No	CR132024-047 CA	No	No	30-Aug-29	30-Aug-27	NE PSAG
22	6A-12-D2-R (1-2)		Perform sensitivity analysis on epistemic assumptions and/or uncertainties (Level 1 PSA) and assess impact on results.	Analytical (Safety analyses, hazard analyses, safety studies)	6A-12-D2	LOW	L2	No	No	CR132024-049 CA	No	No	30-Aug-29	30-Aug-28	NE PSAG
23	6B-16-D1-R (1-2)		Update PSA models to incorporate latest plant modifications and address identified modelling anomalies.	Analytical (Safety analyses, hazard analyses, safety studies)	6B-16-D1	LOW	L2	No	No	CR132024-050 CA	No	No	30-Aug-29	31-Jan-26	NE PSAG

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24	6B-18-D1-R (1-4)	PSA Improvements	Perform independent verification of PSA aspects not reviewed during the 2010 PSA Peer Review.	Analytical (Safety analyses, hazard analyses, safety studies)	6B-18-D1	LOW	L2	No	No	CR132024-052 CA	No	No	30-Aug-29	30-Jun-27	NE PSAG
25	6C-20-D1-R1		Document known limitations of various PSA studies that could impact applications.	Analytical (Safety analyses, hazard analyses, safety studies)	6C-20-D1	LOW	L2	No	No	CR132024-053 CA	No	No	30-Aug-29	30-Aug-26	NE PSAG
26	6C-21-D1-R (1-2)		Update procedure 331-33, KAA-847 and KAA-689 to establish links between updates in OTS, SRSM, and PSA.	Programmatic (changes of procedures, processes and programmes)	6C-21-D1	LOW	L2	No	No	CR132024-054 CA	No	No	30-Aug-29	30-Aug-24	NE PSAG
27	7G-02-D1-R (1-4)	Internal Hazard Analysis Improvements	Perform deterministic Fire Hazard Analysis.	Analytical (Safety analyses, hazard analyses, safety studies)	7G-02-D1	LOW	L2	No	No	CR132024-056 CA	No	No	30-Aug-29	30-Jun-27	NE PSAG
28	10C-04-D1-R1	HR Processes	Update procedure 238-187 to include post implementation evaluation of organisational changes.	Programmatic (changes of procedures, processes and programmes)	10C-04-D1	LOW	L2	No	No	CR132024-057 CA	No	No	30-Aug-29	31-Aug-23	HR
29	11C-03-D1-R (1-2)	SAR Updates	Update SAR to reflect SAMGs and the control thereof.	Programmatic (changes of procedures, processes and programmes)	11C-03-D1	LOW	L2	No	No	CR132024-059 Various	No	No	30-Aug-29	31-Mar-25	Various
30	12E-20-D1-R1	HR Processes	Update 238-202 to include Management System training in Leadership Training Programme.	Organizational improvements (training, skills, capacity, competency, nuclear safety culture)	12E-20-D1	LOW	L2	No	No	CR132024-061 CA	No	No	30-Aug-29	31-Oct-23	HR
31	14A-01-D1-R1	Radiological Safety	Update list of significant nuclides (incl. FE-55, Ni-63 and C-14) in standard 238-49 with effluent discharge limits (AADQs) Once Nuclear Support work is completed, raise the necessary implementation actions for relevant groups.	Programmatic (changes of procedures, processes and programmes)	14A-01-D1	LOW	L2	No	No	CR132024-062 CA	No	No	30-Aug-29	31-Mar-24	Nuclear Support
32	14A-03-D1-R (1-4)		Optimise the waste treatment system effluent release (TEU, TEG, TEP)	Programmatic (changes of procedures, processes and programmes) / Engineering (modifications to the plant)	14A-03-D1	LOW	L2	No	No	CR132024-065 CA	No	No	30-Aug-29	31-May-27	NE NSD

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