Eskom	Procedure	Nuclear Engineering

Title: **Safety Evaluation Process**

(Process for performing Safety Screenings, Safety Evaluations, Safety Justifications)

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Compiled by	Functional Responsibility	Authorised by
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Safety Case Group	**Safety Case Group**	**Nuclear Engineering**
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Nuclear Additional Classification Information

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ALARA Review:	**No**
Functional Control Area:	**Safety Case Group**

Content

Page

1. Introduction

Koeberg Nuclear Power Station's Safety Evaluation Process is part of the plant's licence to operate and is in continual use. This document guides the Safety Evaluation Process.

2. Supporting Clauses

2.1 Scope

The document covers the compilation and administration of the Safety Evaluation Process, whose use includes, but is not limited to, the following areas.

2.1.1.1 Changes to the plant – modifications and temporary alterations (TAFs). This includes CSR, SR, AR and NSA Designs, Minor Modifications and temporary changes;

2.1.1.2 Changes to off-site structures or parameters that may affect Koeberg plant or design basis (as defined in KAA-558 [HV yard and off-site supplies]);

2.1.1.3 Changes to the SAR, OTS, SRSM, Chemical Specifications, SAMGs, Emergency Plan, EOPs and RPLR;

2.1.1.4 Special tests or experiments;

2.1.1.5 Justification for Continued Operation;

2.1.1.6 Changes to procedures (as defined in KAA-500);

2.1.1.7 Changes to set-points referenced in the SAR, OTS, SRSM, ChemSpec, SAMGs, Emergency Plan, EOPs and RPLR;

2.1.1.8 Changes to the In-Service Inspection programme (as defined in KAA-572);

2.1.1.9 Degraded or changed plant conditions;

2.1.1.10 Maintenance Programme waivers;

2.1.1.11 Classification downgrades;

2.1.1.12 Changes concerning containers and casks for storage and transport of nuclear fuel;

2.1.1.13 Equivalencies.

2.1.2 Purpose

2.1.2.1 To describe the process and responsibilities for performing Safety Screenings, Safety Evaluations and Safety Justifications for activities or plant conditions, the consequence of which could have an impact on the Koeberg Design Basis or Koeberg Current Licensing Basis.

2.1.2.2 To ensure consistency of Safety Screenings, Safety Evaluations and Safety Justifications.

2.1.2.3 To ensure quality and configuration control of the Safety Evaluation Process.

2.1.3 Applicability

This document shall apply throughout the Koeberg Operating Unit (KOU).

2.2 Normative and Informative References

The most recent edition of the documents listed in the following paragraphs shall apply when using this document.

2.2.1 Normative References

[1] KSA-011: The Requirements for Controlled Documents

[2] KSA-066: (240-146271009) Standard for Nuclear Design and Licensing Basis Evaluations

[3] NEI 96-07: Guidelines for 10 CFR 50.59 Implementation.

2.2.2 Informative References

[4] 238-54: Radiological Protection Licensing Requirements for Koeberg Nuclear Power Station

[5] 238-19: Generation Division Radiation Protection Manual

[6] KAA-500: The Process for Controlled Documents

[7] KAA-501: Project Management Process for Koeberg Nuclear Power Station Modifications

[8] KAA-502: Project Management Process for New Facilities and Changes to Existing Facilities at Koeberg Nuclear Power Station

[9] KAA-503: Modifications to Simulator

[10] 331-143 – KAA-504: The Equivalency Process to Change Plant

[11] KAA-505: Modifications to Software on the KIT System

[12] 331-88 – KAA-506: Temporary Alterations to Plant, Plant Structures or Operating Parameters that Affect the Design Base

[13] KAA-558: Modifications to Off Site Plant and Structures that Affect the Safety and Operation of Koeberg Nuclear Power Station (HV yard, off-site alternative supply and Interconnected Power System)

[14] 331-91 – KAA-562: Control of Equipment and Software Classifications

[15] 331-177 – KAA-572: Process and Responsibilities for the Development and Implementation of the In-Service Inspection Programme

[16] KAA-598: SHE Management System

[17] KAA-647: Control of Non-Routine Testing and Infrequently Performed Activities

[18] KAA-665: KORC Constitution

[19] KAA-688: The Corrective Action Process

[20] KAA-689: Control of the Operating Technical Specifications

[21] KAA-690: Operability Determinations

[22] KAA-697: Control of the Safety Analysis Report

[23] KAA-737: Process for the Review of Fuel Management Strategy or Fuel Design Changes

[24] KAA-803: Processing Minor Modifications

[25] KAA-815: Design Changes To Plant, Plant Structures Or Operating Parameters

[26] KAA-847: Control of the Safety Related Surveillance Manual

[27] KAA-835 (was KAM-534): Work Activity Monitoring Process

[28] KAB-018: The Operating Department Procedure Change Process

[29] KGA-018: Safety Case Preparation

[30] KGA-025: (240-142639998) Safety Screening and Safety Evaluation Guide

[31] KGA-029: Safety Justification Preparation

[32] 331-94: Importance Category Classification Listing

[33] KTA-001: Training and Qualification Requirements for Nuclear Safety Review Committees

[34] KTA-005: (240-146088803) Training and Qualification Requirements for Safety Screenings and Evaluations

[35] KBA0022OTS0000001: Operating Technical Specifications

[36] KBA0022SRSM000000: Safety Related Surveillance Manual

[37] KBA0022CHEMSPEC00: Chemical Specifications

[38] 36-197: KLBM – Koeberg Licensing Basis Manual

2.3 Definitions

2.3.1 Authorised Safety Screener or Safety Evaluator – A person who has been authorised, according to KTA-005 requirements, to perform Safety Screenings and Safety Evaluations.

2.3.2 Current Licensing Basis – CLB refers to the Koeberg Safety Case applicable at any time during operation of the plant, all license-binding documentation and NNR licence documents. Project management documentation applicable during licensing stages (e.g. during modifications), which are not relevant to the operational phase, must not be included. The CLB therefore includes:

- Safety Analysis Report (SAR)
- General Operating Rules (GOR)
- Other safety related programmes applicable during licensing
- SAR and GOR supporting documentation
- Any other licensing documentation (KLBM).

2.3.3 Design Basis – Specific functions performed by systems, structures and components (SSCs) and specific values or ranges of values chosen for controlling functions as defined by design reference bounds. Design Basis functions are functions performed by SSCs that are (1) required by, or otherwise necessary to comply with, regulations, license conditions, orders or technical specifications, or (2) credited in licensee safety analyses.

The following documents should be used for design basis information for SSCs:

- SAR;
- DSE;
- Protection Design Files;
- Set Point Manuals.

2.3.4 General Operating Rules – The GOR comprises safety documentation in support of the SAR and includes programmes for the control of operating, maintenance, inspection and radiological protection. Koeberg documentation that forms part of the GOR includes the following:

- Site Emergency Plan
- Operating Technical Specifications;
- Safety Related Surveillance Manual;
- Radiological Protection Standard;
- Maintenance Bases Programme;
- Surveillance, Inspection and Testing Programmes;
- Normal, Incident and Emergency Operating Procedures;
- The bases for the GOR are derived from the SAR, and therefore the GOR cannot be revised or amended without first confirming that the assumptions or statements made in the SAR will not be invalidated. If these assumptions or statements are no longer valid, then the safety analyses must be re-done, or statements in the SAR amended, to justify the change in the GOR.

2.3.5 Important to Safety – an important to safety SSC is that which is:

- Importance Category classified CSR or SR;
- An SSC function whose failure could prevent satisfactory accomplishment of the safety functions specified for SSCs classified as CSR or SR;
- An SSC whose failure could result in generating an accident initiating event;
- Used for post-accident monitoring of systems and plant parameters (e.g. indications and alarms used in the EOPs and FRPs).

2.3.6 Modification – Any change, deletion or addition to structures, systems or components, or part thereof, or changes to operating parameters.

2.3.7 Originator – A person appointed by the technical group or department that is best suited to ensure that the proposed activity or condition is correctly defined, reviewed and authorised in accordance with applicable procedures.

2.3.8 Safety Evaluation Process – Safety Screening, Safety Evaluation and Safety Justification

2.3.8.1 Safety Screening – The process used to determine whether an activity or condition could have an impact on the design or licensing basis.

2.3.8.1.1 Screen In – The Safety Screening screens in to the Safety Evaluation Process if the Safety Screening determines that the activity or condition could have an impact on the design basis or licensing basis.

2.3.8.1.2 Screen Out – The Safety Screening screens out to the Safety Evaluation Process if the Safety Screening determines that the activity or condition does not have an impact on the design basis or licensing basis.

2.3.8.2 Safety Evaluation – The process used to compare the safety impact of a proposed change to the originally analysed condition as documented in the SAR.

2.3.8.3 Un-reviewed Safety Question (USQ) – A proposed change, test, experiment, or plant condition shall be deemed to involve an un-reviewed safety question if:

- there may be an increase in the frequency of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the safety analysis documents;
- the design basis limit for a fission product barrier is exceeded or altered, or there is a departure from a method of evaluation used in the design basis or accident analysis;
- there is a more than minimal increase in Koeberg baseline risk;
- a possibility is created for an accident of a different type, or a malfunction of an SSC with a different result, than previously evaluated in the safety analysis documents;

2.3.8.4 Safety Justification – The technical basis for demonstrating the safety of:

- a proposed change to the SAR;
- a proposed or potential change to the plant;
- a proposed special test or experiment;
- a proposed change to the OTS, SRSM, Chemical Specifications, SAMGs, Emergency Plan, EOPs or RPLR;
- continued or limited operation of otherwise inoperable equipment,

when the proposed activity or condition constitutes a USQ.

Notes:

- EPRs, PSA studies, and World or EDF experience are “tools” for performing Safety Justifications.
- For every Safety Justification, a Safety Evaluation must be performed to identify whether or not there is a USQ and to address aspects that might not be addressed in the Safety Justification.
- A Safety Justification may also be performed to justify activities or conditions where no USQ is identified but a detailed justification is required for complete understanding.

2.3.8.5 Safety Case – A submission to a reviewer or review body to demonstrate that:

- The activities, including installation activities, have been evaluated for their safety impact including with respect to that previously analysed in the SAR;
- The Safety Justification has been performed if the activity or condition involves a USQ;
- The impact on all operating processes has been considered and changes or updates are identified where necessary. This includes updates to the SAR.

2.3.9 Temporary Alteration – A temporary change made to plant equipment, components, or systems that do not conform to approved configurations or existing design parameters.

2.4 Abbreviations

Abbreviation	Explanation
AR	Availability Related – Importance category
CLB	Current Licensing Basis
CSR	Critically Safety Related – Importance category
DPSA	Deterministic and Probabilistic Safety Assessment
DSE	Elementary System Description (Dossier de Système Élémentaire)
EDF	Electricité de France
EOP	Emergency Operating Procedure
EP	Emergency Plan
GOR	General Operating Rules
KAPS	Koeberg Accident Procedures Sub-committee
KLBM	Koeberg Licensing Basis Manual
KORC	Koeberg Operations Review Committee
KOSC	Koeberg Operability Sub-Committee
KSCG	Koeberg Safety Case Group
NAR	Nuclear Approval Request
NNR	National Nuclear Regulator
NSA	Not Safety or Availability related – Importance category
OTS	Operating Technical Specifications (considered to be part III-6 of the SAR)
PSA	Probabilistic Safety Assessment
RPLR	Radiological Protection Licensing Requirements
SAMG	Severe Accident Management Guideline
SAR	Safety Analysis Report
SDRG	Safety Documentation Review Group
SR	Safety Related – Importance category
SRSM	Safety Related Surveillance Manual (previously part of OTS)
SSC	System, Structure, or Component
TD&RM	Technical Documents and Records Management
USQ	Unreviewed Safety Question

2.5 Roles and Responsibilities

2.5.1 Originator

Responsibilities include:

- conducting an activity that incorporates the Safety Evaluation Process, obtaining input from an authorised safety screener or safety evaluator and ensuring that the Safety Evaluation Process document is approved as required;
- liaising with relevant group(s) to implement changes to CLB documents, e.g. OTS, SRSM, SAR and, where applicable, with the Koeberg Licensing Group to obtain NNR approval;
- ensuring that the proposed activity (change, test or experiment) or condition is correctly defined, reviewed, authorised and the solution is implemented in accordance with applicable procedures.

2.5.2 **Preparer** (Compiler)

Responsibilities include:

- ensuring valid authorisation as a safety screener or safety evaluator;
- confirming that the latest revision of the applicable forms is used;
- being knowledgeable of the proposed activity (change, test or experiment) or condition;
- performing and processing Safety Screenings and Safety Evaluations through preparation, review, approval, uploading to SharePoint and submission to TD&RM for records retention;
- assessing the impact on technical specifications, licence conditions and SAR, and resolving issues with the independent reviewer as appropriate;
- recognising when specialist assistance and advice is necessary (including from KORC), and obtaining it;
- identifying additional reviews that may be required;
- liaising with the Koeberg Licensing Group if a USQ is identified, in order to develop a licensing framework involving all relevant departments as required and to inform the NNR;
- ensuring that the archiving of KAA-709 records, with KIS reference PH5.3.3, is included on the Group's Record Retention Matrix (Quality Records List: KFI-RE-007);
- creating a Record Cover Slip (KFI-RE-001) with KIS reference PH5.3.3 and Record Transfer Acknowledgement (KFI-RE-004), and ensuring that "Safety Case Group" is included in the 'Distribution / Copies' block at the bottom-left of the KFI-RE-001 form;
- sending the Record Cover Slip and the signed original of the relevant Safety Evaluation Process documents to TD&RM within 4 weeks of approval of the document.

2.5.3 Independent Reviewer

An independent reviewer must not have any direct responsibility for or involvement in the work under review.

Responsibilities include:

- ensuring valid authorisation as a safety evaluator;
- performing independent reviews of Safety Evaluation Process documents;
- assessing the impact on technical specifications, licence conditions and SAR, and resolving issues with the preparer, responsible managers or Koeberg Licensing Group, as applicable;
- verifying that the correct process requirements have been followed;
- identifying additional reviews as necessary.

2.5.4 **Additional Reviewer** (Safety Evaluation)

An additional review group can be specified in a Safety Evaluation for it to be reviewed by a Subject Matter Expert (SME). It is not required that Additional Reviewers be authorised as safety screener or safety evaluator.

Responsibilities include:

- performing an independent subject matter review of a Safety Evaluation;
- assessing the impact of the activity or condition on plant equipment, operation, reliability and safety.

2.5.5 **Approver** (Safety Screening)

Responsibilities include:

- approving Safety Screening documents;
- ensuring that applicable reviews have been performed;
- must be an authorised safety screener or safety evaluator.

2.5.6 KORC, KOSC and KAPS Chairman

The KORC Chairman responsibilities include approving Safety Evaluations, Safety Justifications and Safety Cases.

KOSC and KAPS are sub-committees of KORC, and approvals may be delegated to these committees and their Chairmen, where required.

2.5.7 DPSA Group Manager

The Deterministic and Probabilistic Safety Assessment Group responsibilities include:

- ensuring independent review of Safety Evaluations and Safety Justifications by an authorised safety evaluator.

2.5.8 Group Heads, Department Heads

Responsibilities include:

- recommending personnel to be qualified in accordance with the requirements of KTA-005 to perform Safety Screenings and Safety Evaluations;
- ensuring Safety Screenings and Safety Evaluations are prepared according to this procedure;
- assigning responsibilities to safety screeners and safety evaluators with applicable authorisation for preparing and reviewing Safety Evaluation Process documents in accordance with this procedure;
- approving Safety Screenings, where applicable, only if authorised as a safety screener or safety evaluator.

2.5.9 Koeberg Safety Case Group Manager

Responsibilities include:

- providing a process for the tracking of Safety Screening, Safety Evaluation and Safety Justification documents;
- monitoring technical adequacy by assessing samples of completed Safety Screenings and Safety Evaluations – see paragraph 2.6 below.

2.5.10 Nuclear Engineering Manager

Responsibilities include:

- providing oversight of the Safety Evaluation Process and implementation of the requirements of this procedure;
- ensuring that station-wide personnel qualification and training requirements are in place for preparation and review of all Safety Screenings and Safety Evaluations;
- ensuring, as custodian of the Koeberg design and licence basis, independent review of Safety Evaluations and Safety Justifications – see paragraphs 2.5.7 above and 2.6 below.

2.5.11 TD&RM

Responsibilities include:

- saving all submitted Safety Screening, Safety Evaluation and Safety Justification documents for retrieval via Excalibur;
- sending copies of the saved document with the archive reference number to the originator, including the Koeberg Safety Case Group in the distribution list.

2.5.12 Training Management

Responsibilities include:

- ensuring that the process for authorising safety screeners and safety evaluators is implemented in accordance with KTA-005.

2.5.13 Implementer

Responsibilities include:

- implementing the activity following approval of the relevant governing process and the Safety Evaluation Process document(s);
- verifying that the Safety Screening, Safety Evaluation, Safety Justification, Safety Case and NAR are valid, as applicable.

Where plant modifications are involved, responsibilities are:

- compiling and presenting the Safety Case, where applicable;
- liaising with relevant groups to execute changes to documents affected by the design, which may include SAR, OTS, SRSM, etc. Liaise also, where applicable, with the Koeberg Licensing Group to obtain NNR approval.

2.6 Process for Monitoring

It is the responsibility of the KSCG (Koeberg Safety Case Group), ref. 2.5.9 above, to assess samples of completed Safety Screenings and Safety Evaluations for technical adequacy. This is done by randomly selecting between seven and ten Safety Screenings and between two and five Safety Evaluations per year A short report, defined by the KSCG, is produced for each assessment and is saved in a folder of the Safety Case Group on the g:drive.

2.7 Related or Supporting Documents

2.7.1 The Safety Evaluation Process Guide 240-142639998 (KGA-025) explains various aspects of this document.

2.7.2 This document supersedes 240-143604773 (revision 2).

2.7.3 Concerning 2.6 above, a short, informal report, defined by the KSCG, is produced for assessments and is saved in a folder of the Safety Case Group on the g:drive.

2.7.4 Safety Screenings, Safety Evaluations, Safety Justifications and Safety Cases are permanent plant records stored for the lifetime of the station.

3. Process

3.1 General

The Process phases are defined below.

3.2 Initiation

The Safety Evaluation Process is initiated when a change process that is to be performed, or an existing or potential plant condition, could affect the licensing basis or the safety-related design of the plant described in the SAR. Activities as listed in 2.1 initiate the process.

The SharePoint application 'Nuclear Safety Screenings' is used to initiate the Safety Evaluation Process by using the [New Safety Screening] button and entering a title for the Safety Screening. The SharePoint application then presents the Safety Screening for editing in MS Word.

Safety Screenings and Safety Evaluations may also be done outside of the SharePoint application where necessary, either using numbers assigned by SharePoint or using numbers assigned by the KSCG.

3.3 Safety Screening

The activity or condition is screened to determine whether or not it could have an impact on the design or licensing basis.

Safety Screening preparation is guided by Appendix S of KGA-025.

3.4 Safety Evaluation

The change, test, or condition is evaluated for its safety impact on the Current Licensing Basis.

Safety Evaluation preparation is guided by Appendix E of KGA-025.

3.5 Safety Justification

A Safety Justification gives the technical basis for demonstrating the safety of:

- a proposed change to the SAR, OTS, SRSM, SAMGs, Emergency Plan, EOPs or RPLR,
- a potential or proposed change to the plant,
- a proposed special test or experiment,
- continued or limited operation of otherwise inoperable equipment,

when the proposed activity (change, test or experiment) or condition constitutes a USQ.

See the Safety Justification Preparation guide, KGA-029 (240-156067953).

3.6 Safety Case

A compiled document that demonstrates that the Safety Evaluation Process has been applied to an activity or condition to assess its safety impact, that there is a Safety Justification if a USQ was identified, that the impact has been considered on all operating processes, SAR, OTS, SRSM, SAMGs, Emergency Plan, EOPs and RPLR, and that changes or updates are identified where necessary.

A Safety Case includes more than described above, see KGA-018 (240-153364501).

3.7 Approval

Safety Screenings are approved by an authorised safety screener or evaluator and Safety Evaluations, Safety Justifications and Safety Cases are presented to KORC, or its sub-committees KOSC or KAPS for approval.

Safety Screenings and Safety Evaluations that are approved using the SharePoint work-flow process are signed and dated, and uploaded to SharePoint for TD&RM to process.

Safety Screenings, Safety Evaluations and Safety Justifications that are approved not using SharePoint are sent with cover-slip to TD&RM for archiving.

3.8 Implementation of an Activity

Safety Cases are presented to KORC or its sub-committee KOSC for approval of the implementation of the activity in accordance with the relevant Koeberg procedures.

3.9 Validity

3.9.1 Safety screenings, Safety Evaluations and Safety Justifications are valid as long as the specified plant conditions and design base documentation remain the same. However, if plant conditions change or relevant documentation changes before implementation, a safety screening must be performed.

3.9.2 For plant modifications, a Safety Screening will be performed before any plant change is implemented should 18 months elapse since the approval of the applicable Safety Evaluation Process document(s).

3.9.3 A Safety Screening must be performed with every extension of an installed Temporary Alteration.

3.9.4 In the case of a non-conformance, a Safety Screening, Safety Evaluation or Safety Justification is valid for one fuel cycle. The conditional release and associated safety documentation must be reviewed before start-up of the unit, following a refuelling outage.

3.9.5 Safety Evaluation Process documents compiled for a specific change may not be used in more than one change process, unless it can be shown, through an additional Safety Screening, that the initial compilation satisfies the intent and impact of the additional change process.

3.9.6 If a review or revision is required, the latest version of the applicable document of this procedure must be used.

The Work Flow Responsibility Matrix is given in Appendix 1.

4. Acceptance

This minor update has been seen and accepted by:

Name	Designation
Shivani Fagan	Senior Physicist - PSA

5. Revisions

The validity statements of paragraph 3.9 were unintentionally left out of revision 2 of this document and are now included, with this revision set to revision 3.

Note: *Start with the latest Revision History in the first row and go backwards.*

240-143604773 (KAA-709) Safety Evaluation Process

Date	Rev.	Compiler	Remarks
March 2021	3	Cate Pretorius	Inclusion of 3.9 'Validity', and minor clarifications and updates.
May 2019	2	Cate Pretorius	Revision of old format Koeberg document KAA-709 rev. 6 to rev. 2 in the current 240… number format
May 2019	1	Cate Pretorius	Revision 1 is skipped to aid management of the Safety Evaluation Process and forms
November 2018	0	Cate Pretorius	Draft of old format Koeberg document KAA-709 to the current 240… number format

240-146184895 – KFA-047 – Safety Screening

Date	Rev.	Compiler	Remarks
March 2021	3	Cate Pretorius	The header is updated and the drop-down menu for 1.1 "This Safety Screening is for:" is updated.
May 2019	2	Cate Pretorius	Revision of old format Koeberg form KFA-047 rev. 1 to rev. 2 in the current 240… number format
May 2019	1	Cate Pretorius	Revision 1 is skipped to aid management of the Safety Evaluation Process and forms
November 2018	0	Cate Pretorius	Draft of old format Koeberg form KFA-047 rev. 1 to the current 240… number format

240-146210185 – KFA-048 – Safety Evaluation

Date	Rev.	Compiler	Remarks
March 2021	3	Cate Pretorius	The header is updated and the drop-down menu for 1.0 “A Safety Evaluation is required for:” is updated.
May 2019	2	Cate Pretorius	Revision of old format Koeberg form KFA-048 rev. 1 to rev. 2 in the current 240… number format
May 2019	1	Cate Pretorius	Revision 1 is skipped to aid management of the Safety Evaluation Process and forms
November 2018	0	Cate Pretorius	Draft of old format Koeberg form KFA-048 rev. 1 to the current 240… number format

240-146211153 (KFA-049) Licence Impact Form

Date	Rev.	Compiler	Remarks
March 2021	3	Cate Pretorius	The header is updated and 3.0 is updated.
May 2019	2	Cate Pretorius	Revision of old format Koeberg form KFA-049 rev. 1 to rev. 2 in the current 240… number format
May 2019	1	Cate Pretorius	Revision 1 is skipped to aid management of the Safety Evaluation Process and forms
November 2018	0	Cate Pretorius	Draft of old format Koeberg form KFA-049 rev. 1 to the current 240… number format

6. Development Team

The following people were involved in the development of this document:

- S Morgan: Document Custodian – Safety Case Group
- C Pretorius: IPD-K – Safety Case Group

7. Acknowledgements

N/A

8. Appendices

Appendix 1 – Work Flow Responsibility Matrix

Appendix 2 – Editorial Changes

Appendix 3 – Safety Screening Form (KFA-047 240-146184895)

Appendix 4 – Safety Evaluation Form (KFA-048 240-146210185)

Appendix 5 – List of Initiating Events

Appendix 6 – Licence Impact Form (KFA-049 240-146211153)

Appendix 7 – Justification

Note: Forms KFA-047, KFA-048 and KFA-049 are available electronically in G:\Nuclear Engineering\Design Eng\SAFEVAL\Forms.

Appendix 1 – Work Flow Responsibility Matrix

[A] Initiation, [B] Safety Screening, [C] Safety Evaluation, [D] Safety Justification, [E] Implementation

WORK FLOW RESPONSIBILITY MATRIX — **APPENDIX 1**

R – Responsible
A – Approve
F – File
• – Outside Matrix Scope
Y/N or N/Y – Decision
C – Concur
I – Informed
S – Service
[ ] – Mandatory Requirement
( ) – As Appropriate / Required
Flow Path
Main Flow → Secondary Flow

ACTIVITIES	1	2 ORIGINATOR	3 PREPARER - AUTHORISED SAFETY SCREENER or SAFETY EVALUATOR	4 REVIEWER AUTHORISED SAFETY EVALUATOR	5 APPROVER - AUTHORISED SAFETY SCREENER or SAFETY EVALUATOR	6 KORC, KOSC or KAPS	7 NNR	8 SDRG	9 KOEBERG LICENSING GROUP	10 DPSA	11 TD&RM	12	**NOTES & REFERENCES**
[A] INITIATION													Safety Evaluation Process
1. An activity, plant condition or test is identified that requires assessment by the Safety Evaluation Process.		[R]											KAA-500, KAA-501, KAA-503, KAA-504 (331-143), KAA-505, KAA 506 (331-88), KAA-558, KAA-562 (331-91), KAA-572 (331-177), KAA-647, KAA-689, KAA-690, KAA-697, KAA-737, KAA-803, KAA-815, KAA-847, KAB-018.
[B] SAFETY SCREENING													KFA-047
1. Use the SharePoint 'Nuclear Safety Screenings' application.			[R]										https://portal.eskom.co.za/sites/nss/_layouts/15/start.aspx#/SitePages/Home.aspx
2. Prepare the Safety Screening. The Safety Screening form is also available in the SafEval\Forms folder.			[R]										Complete the Safety Screening KFA-047 presented by SharePoint. KGA-025 provides guidance.
3. Review Safety Screening. The reviewer must not be involved with the activity or condition being screened.				[R]									Reviewer must not approve the Safety Screening.
4. Does the activity or condition warrant being presented to KORC for information?			Y/N										
5. Present to KORC.			[R]			[I]							
6. Safety Screening approval preferably by another screener or evaluator. Approved?					[R] Y/N								Go back to relevant step for rework as required.
7. Safety Screening approved not using SharePoint. (See paragraph 3.7 in this document.			[R]										Send original, signed, approved Safety Screening to TD&RM within 4 weeks.
8. Is a Safety Evaluation required?			Y/N										Go to [E] Implementation
													Go to [C] Safety Evaluation
[C] SAFETY EVALUATION													KFA-048

WORK FLOW RESPONSIBILITY MATRIX | **APPENDIX 1**

R – Responsible
A – Approve
F – File
• – Outside Matrix Scope
Y/N or N/Y – Decision
C – Concur
I – Informed
S – Service
[ ] – Mandatory Requirement
( ) – As Appropriate / Required
Flow Path
Main Flow ⟷ Secondary Flow

ACTIVITIES	1	2 ORIGINATOR	3 PREPARER - AUTHORISED SAFETY SCREENER or SAFETY EVALUATOR	4 REVIEWER AUTHORISED SAFETY EVALUATOR	5 APPROVER - AUTHORISED SAFETY SCREENER or SAFETY EVALUATOR	6 KORC, KOSC or KAPS	7 NNR	8 SDRG	9 KOEBERG LICENSING GROUP	10 DPSA	11 TD&RM	12	NOTES & REFERENCES
1. If a completed Safety Screening requires a Safety Evaluation, then SharePoint supplies a Safety Evaluation form with a Safety Evaluation number.				[R]									If the Safety Screening identified that a Safety Evaluation is required. The Safety Evaluation form KFA-048 is also available in the SafEval\Forms folder
2. Prepare the Safety Evaluation. This includes having additional reviews done, if required.				[R]									Complete the Safety Evaluation form KFA-048. KGA-025 provides guidance. Obtain other reviews as necessary.
3. Perform an evaluation on PSA, SAMGs and EP.										[R]			Reviewer must be authorised as a safety evaluator
4. Perform an evaluation on EOPs.												[R]	Reviewer must be authorised as a safety evaluator
5. Review the Safety Evaluation.				[R]									Review to be performed by another authorised safety evaluator who has not been involved in the original preparation.
6. Is a USQ identified?				Y/N									
7. Prepare the change package in accordance with the governing process.		[R]											KAA-500, KAA-501, KAA-503, KAA-504 (331-143), KAA-505, KAA 506 (331-88), KAA-558, KAA-562 (331-91), KAA-572 (331-177), KAA-647, KAA-689, KAA-690, KAA-697, KAA-737, KAA-803, KAA-815, KAA-847, KAB-018.

WORK FLOW RESPONSIBILITY MATRIX — **APPENDIX 1**

R – Responsible
A – Approve
F – File
• – Outside Matrix Scope
Y/N or N/Y – Decision
C – Concur
I – Informed
S – Service
[ ] – Mandatory Requirement
( ) – As Appropriate / Required
Flow Path:
Main Flow ⟷ Secondary Flow

ACTIVITIES	1	2 ORIGINATOR	3 AUTHORISED SAFETY SCREENER	4 AUTHORISED SAFETY EVALUATOR	5 APPROVER	6 KORC, KOSC or KAPS	7 NNR	8 SDRG	9 KOEBERG LICENSING GROUP	10 DPSA	11 SDE	12 TD&RM	**NOTES & REFERENCES**
8. Prepare a Safety Case.			[R]										KGA-018 describes criteria.
9. Review the Safety Case.				[R]									
10. Present the Safety Evaluation and Safety Case, if performed, to KORC or its sub-committee KOSC or KAPS for approval.		[R]				[A]							KGA-018, KAA-665. The Safety Case confirms that all aspects have been considered for safe implementation. KORC may delegate responsibility to a sub-committee. See KAA-697 for SAR changes.
11. Approved?						Y/N							Return to appropriate step in process for revision, etc.
12. Send the original, signed, approved document(s) to TD&RM within 4 weeks.				[R]									Go to [E] Implementation.
13. Evaluation identifies a USQ or requires a change to OTS, SRSM, or RPLR). Either:		[R]											From [E] 3.
13.1 Cancel the initiating activity, OR		[R]											
13.2 Redesign, OR		[R]											Go to [A] Initiation.
13.3 Discuss with the Koeberg Licensing Group and prepare a Safety Justification.		[R]							[C]				Discuss safety framework and strategy. NNR must be notified as soon as possible of the existence of a USQ.

WORK FLOW RESPONSIBILITY MATRIX — **APPENDIX 1**

R – Responsible
A – Approve
F – File
• – Outside Matrix Scope
Y/N or N/Y – Decision
C – Concur
I – Informed
S – Service
[ ] – Mandatory Requirement
( ) – As Appropriate / Required
Flow Path:
Main Flow ⟷ Secondary Flow

ACTIVITIES	1	2 ORIGINATOR	3 AUTHORISED SAFETY SCREENER	4 AUTHORISED SAFETY EVALUATOR	5 APPROVER	6 KORC, KOSC or KAPS	7 NNR	8 SDRG	9 KOEBERG LICENSING GROUP	10 DPSA	11 SDE	12 TD&RM	**NOTES & REFERENCES**
[D] SAFETY JUSTIFICATION													
1. Obtain a Safety Justification number.				[R]									From the Safety Case Group
2 Prepare and review a Safety Justification.				[R]									KSA-066, KGA-029.
3. Perform a PSA review.										[R]			Determine the impact on PSA. PSA reviewer should be authorised as a Safety Evaluator
4. Perform a Design Engineering review.											[R]		Review Design Base impact.
5. Prepare the change package in accordance with the governing process.		[R]											KAA-500, KAA-501, KAA-503, KAA-504 (331-143), KAA-505, KAA 506 (331-88), KAA-558, KAA-562 (331-91), KAA-572 (331-177), KAA-647, KAA-689, KAA-690, KAA-697, KAA-737, KAA-803, KAA-815, KAA-847, KAB-018.
6. Prepare a Safety Case.			[R]	[R]									KGA-018.
7. Present the Safety Justification and Safety Case to KORC for approval.		[R]				[A]							KGA-018. KORC may delegate to a sub-committee.
8. KORC approval received?					Y/N								Return to relevant step, as required.
9. Forward the Safety Evaluation document(s) to the Koeberg Licensing Group.		[R]											1. Ensure OTS, SRSM and SAR updates, if required, are part of the Safety Case. 2. Send original, signed, approved document(s) to TD&RM within 4 weeks.
10. Perform QC checks, obtain SDRG approval if it accompanies a document requiring NNR approval. Send the Safety Justification via the Licensing Group to the NNR.		[S]						[A]	[R]				OTS, SRSM and SAR changes require SDRG approval. Go to [E] Implementation.

WORK FLOW RESPONSIBILITY MATRIX — APPENDIX 1

R – Responsible
A – Approve
F – File
• – Outside Matrix Scope
Y/N or N/Y – Decision
C – Concur
I – Informed
S – Service
[ ] – Mandatory Requirement
( ) – As Appropriate / Required
Flow Path:
Main Flow Secondary Flow

ACTIVITIES	1	2 IMPLEMENTOR	3 AUTHORISED SAFETY SCREENER	4 AUTHORISED SAFETY EVALUATOR	5 APPROVER	6 KORC	7 NNR	8 SDRG	9 KOEBERG LICENSING GROUP	10 DPSA	11 TD&RM	12 KSCG	NOTES & REFERENCES
[E] IMPLEMENTATION													From [B] 8, [C] 12, [D] 10.
1. NNR approval required?		N/Y											Refer to Appendix 6 (Licence Impact Form, KFA-049.)
2. Obtain NNR approval.							[A]		[R]				GGP-0805.
3. NNR approval received?							Y/N						Go to [C] 13 if USQ is involved. Otherwise, return to relevant step, as required or cancel activity.
4. Send original forms to TD&RM as records. Save the electronic copies of the completed Safety Evaluation document(s).		[R]											See section 2.5.7.
5. TD&RM to notify KSCG on receiving the forms. KSCG to confirm completion, cover slip and return the forms.											[R]	[S]	See section 2.5.13.
6. Perform activity in accordance with governing process.		[R]											KAA-500, KAA-501, KAA-503, KAA-504 (331-143), KAA-505, KAA 506 (331-88), KAA-558, KAA-562 (331-91), KAA-572 (331-177), KAA-647, KAA-689, KAA-690, KAA-697, KAA-737, KAA-803, KAA-815, KAA-847, KAB-018.

Appendix 2 – Editorial Changes for Safety Screenings

Optional: see KAA-709 Editorial Changes form in G:\Nuclear Engineering\Design Eng\SafEval\Forms

For editorial changes a full Safety Screening is not required, however a Safety Screening must be completed as a record, indicating in section 2.1 that it is for an editorial change, stating the applicable Editorial Change condition(s), not completing sections 3.0 to 5.0 and completing all other sections of the Safety Screening. It is optional to complete a KAA-709 Editorial Changes form.

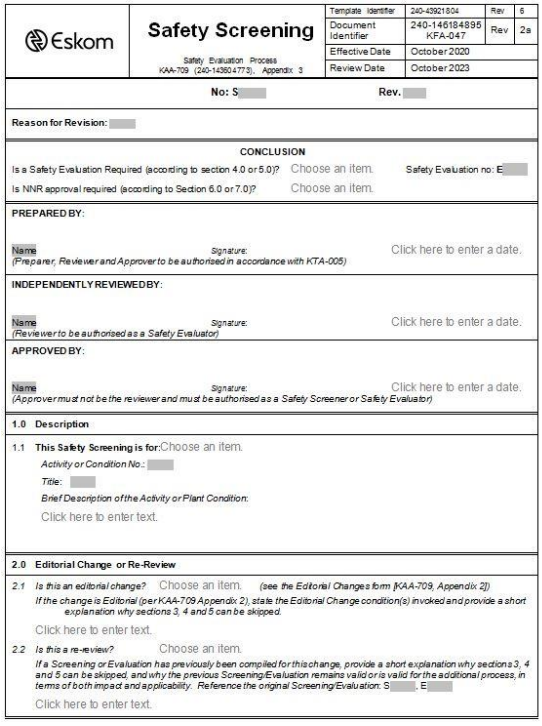
Editorial changes are:

1. Incorporation of information already approved as required by KORC, NNR or SDRG (e.g. changes to match approved Operating Technical Specification changes or changes based on NNR requirements).
2. Editorial changes in text, tables or drawings:
   - corrections to grammar, punctuation, spelling, format or typographical errors, or the relocation of information;
   - minor changes that do not affect the intent of information;
   - changes to the table of contents or page numbers;
   - administrative number changes;
   - corrections of mistakes made during incorporation of requested changes (correct information has previously received a Safety Screening);
   - corrections of inconsistencies where there are documents supporting accurate information in another authorised document;
   - minor clarifications which involve rearranging information in the procedure or document to be more easily understood;
   - changes based on approved equivalency evaluations;
   - changes to position titles when no responsibilities or reporting chain for that position have changed;
   - changes to references to other drawings or documents;
   - additions to or revisions of identification numbers already shown on other approved drawings or documents

.

Appendix 3 – Safety Screening (Form KFA-047 240-146184895)

Revision 3 of this form is available at:
G:\Nuclear Engineering\Design Eng\SAFEVAL\Forms



Eskom | **Safety Screening** | Safety Evaluation Process KAA-709 (240-143604773), Appendix 3

Template Identifier	240-43921804	Rev	6
Document Identifier	240-146184895 KFA-047	Rev	2a
Effective Date	October 2020		
Review Date	October 2023		

No: S **Rev.**

Reason for Revision:

CONCLUSION

Is a Safety Evaluation Required (according to section 4.0 or 5.0)? Choose an item. Safety Evaluation no: E

Is NNR approval required (according to Section 6.0 or 7.0)? Choose an item.

PREPARED BY:

Name Signature: Click here to enter a date.
(Preparer, Reviewer and Approver to be authorised in accordance with KTA-005)

INDEPENDENTLY REVIEWED BY:

Name Signature: Click here to enter a date.
(Reviewer to be authorised as a Safety Evaluator)

APPROVED BY:

Name Signature: Click here to enter a date.
(Approver must not be the reviewer and must be authorised as a Safety Screener or Safety Evaluator)

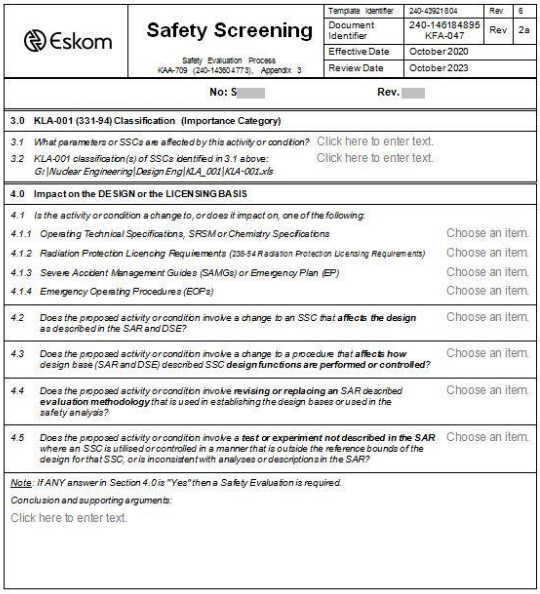
1.0 Description

1.1 **This Safety Screening is for:** Choose an item.
Activity or Condition No.:
Title:
Brief Description of the Activity or Plant Condition:
Click here to enter text.

2.0 Editorial Change or Re-Review

2.1 *Is this an editorial change?* Choose an item. *(see the Editorial Changes form [KAA-709, Appendix 2])*
If the change is Editorial (per KAA-709 Appendix 2), state the Editorial Change condition(s) invoked and provide a short explanation why sections 3, 4 and 5 can be skipped.
Click here to enter text.

2.2 *Is this a re-review?* Choose an item.
If a Screening or Evaluation has previously been compiled for this change, provide a short explanation why sections 3, 4 and 5 can be skipped, and why the previous Screening/Evaluation remains valid or is valid for the additional process, in terms of both impact and applicability. Reference the original Screening/Evaluation: S, E
Click here to enter text.



Eskom | **Safety Screening** | Safety Evaluation Process KAA-709 (240-143604773), Appendix 3

Template Identifier	240-43921804	Rev	6
Document Identifier	240-146184895 KFA-047	Rev	2a
Effective Date	October 2020		
Review Date	October 2023		

No: S **Rev.**

3.0 KLA-001 (331-94) Classification (Importance Category)

3.1 *What parameters or SSCs are affected by this activity or condition?* Click here to enter text.
3.2 *KLA-001 classification(s) of SSCs identified in 3.1 above: G:\Nuclear Engineering\Design Eng\KLA_001\KLA-001.xls* Click here to enter text.

4.0 Impact on the DESIGN or the LICENSING BASIS

4.1 *Is the activity or condition a change to, or does it impact on, one of the following:*
4.1.1 *Operating Technical Specifications, SRSM or Chemistry Specifications* Choose an item.
4.1.2 *Radiation Protection Licencing Requirements (235-54 Radiation Protection Licensing Requirements)* Choose an item.
4.1.3 *Severe Accident Management Guides (SAMGs) or Emergency Plan (EP)* Choose an item.
4.1.4 *Emergency Operating Procedures (EOPs)* Choose an item.

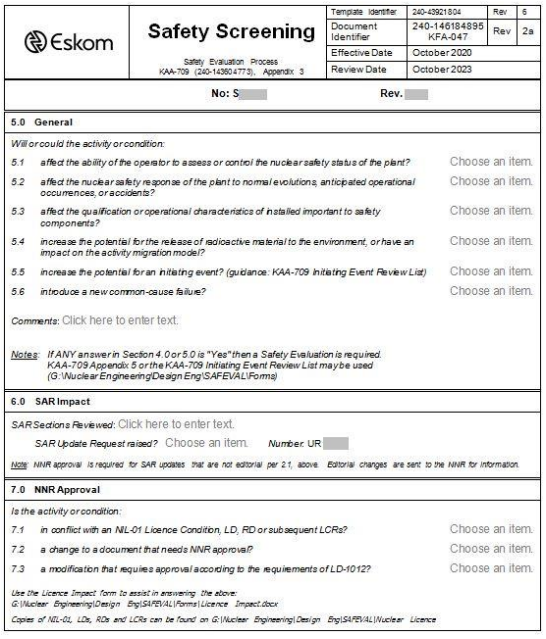
4.2 *Does the proposed activity or condition involve a change to an SSC that **affects the design** as described in the SAR and DSE?* Choose an item.

4.3 *Does the proposed activity or condition involve a change to a procedure that **affects how** design base (SAR and DSE) described SSC **design functions are performed or controlled**?* Choose an item.

4.4 *Does the proposed activity or condition involve **revising or replacing an** SAR described **evaluation methodology** that is used in establishing the design bases or used in the safety analysis?* Choose an item.

4.5 *Does the proposed activity or condition involve a **test or experiment not described in the SAR** where an SSC is utilised or controlled in a manner that is outside the reference bounds of the design for that SSC, or is inconsistent with analyses or descriptions in the SAR?* Choose an item.

Note: If ANY answer in Section 4.0 is "Yes" then a Safety Evaluation is required.
Conclusion and supporting arguments:
Click here to enter text.



Eskom | **Safety Screening** | Safety Evaluation Process KAA-709 (240-143604773), Appendix 3

Template Identifier	240-43921804	Rev	6
Document Identifier	240-146184895 KFA-047	Rev	2a
Effective Date	October 2020		
Review Date	October 2023		

No: S **Rev.**

5.0 General

Will or could the activity or condition:

5.1 *affect the ability of the operator to assess or control the nuclear safety status of the plant?* Choose an item.
5.2 *affect the nuclear safety response of the plant to normal evolutions, anticipated operational occurrences, or accidents?* Choose an item.
5.3 *affect the qualification or operational characteristics of installed important to safety components?* Choose an item.
5.4 *increase the potential for the release of radioactive material to the environment, or have an impact on the activity migration model?* Choose an item.
5.5 *increase the potential for an initiating event? (guidance: KAA-709 Initiating Event Review List)* Choose an item.
5.6 *introduce a new common-cause failure?* Choose an item.

Comments: Click here to enter text.

Notes: If ANY answer in Section 4.0 or 5.0 is "Yes" then a Safety Evaluation is required. KAA-709 Appendix 5 or the KAA-709 Initiating Event Review List may be used (G:\Nuclear Engineering\Design Eng\SAFEVAL\Forms)

6.0 SAR Impact

SAR Sections Reviewed: Click here to enter text.
SAR Update Request raised? Choose an item. *Number:* UR

Note: NNR approval is required for SAR updates that are not editorial per 2.1, above. Editorial changes are sent to the NNR for information.

7.0 NNR Approval

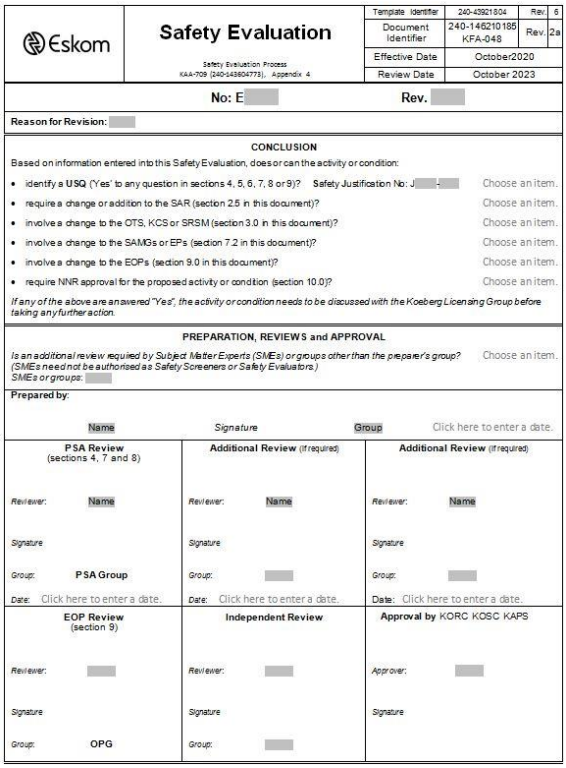
Is the activity or condition:

7.1 *in conflict with an NIL-01 Licence Condition, LD, RD or subsequent LCRs?* Choose an item.
7.2 *a change to a document that needs NNR approval?* Choose an item.
7.3 *a modification that requires approval according to the requirements of LD-1012?* Choose an item.

Use the Licence Impact form to assist in answering the above: G:\Nuclear Engineering\Design Eng\SAFEVAL\Forms\Licence Impact.docx
Copies of NIL-01, LDs, RDs and LCRs can be found on G:\Nuclear Engineering\Design Eng\SAFEVAL\Nuclear Licence

Appendix 4 – Safety Evaluation (Form KFA-048 240-146210185)

Revision 3 of this form is available at: G:\Nuclear Engineering\Design Eng\SAFEVAL\Forms



Eskom | **Safety Evaluation** | Safety Evaluation Process KAA-709 (240-143604773), Appendix 4

Template Identifier	240-43921804	Rev.	6
Document Identifier	240-146210185 KFA-048	Rev.	2a
Effective Date	October2020		
Review Date	October 2023		

No: E **Rev.**

Reason for Revision:

CONCLUSION

Based on information entered into this Safety Evaluation, does or can the activity or condition:

- identify a **USQ** ('Yes' to any question in sections 4, 5, 6, 7, 8 or 9)? Safety Justification No: J - Choose an item.
- require a change or addition to the SAR (section 2.5 in this document)? Choose an item.
- involve a change to the OTS, KCS or SRSM (section 3.0 in this document)? Choose an item.
- involve a change to the SAMGs or EPs (section 7.2 in this document)? Choose an item.
- involve a change to the EOPs (section 9.0 in this document)? Choose an item.
- require NNR approval for the proposed activity or condition (section 10.0)? Choose an item.

If any of the above are answered "Yes", the activity or condition needs to be discussed with the Koeberg Licensing Group before taking any further action.

PREPARATION, REVIEWS and APPROVAL

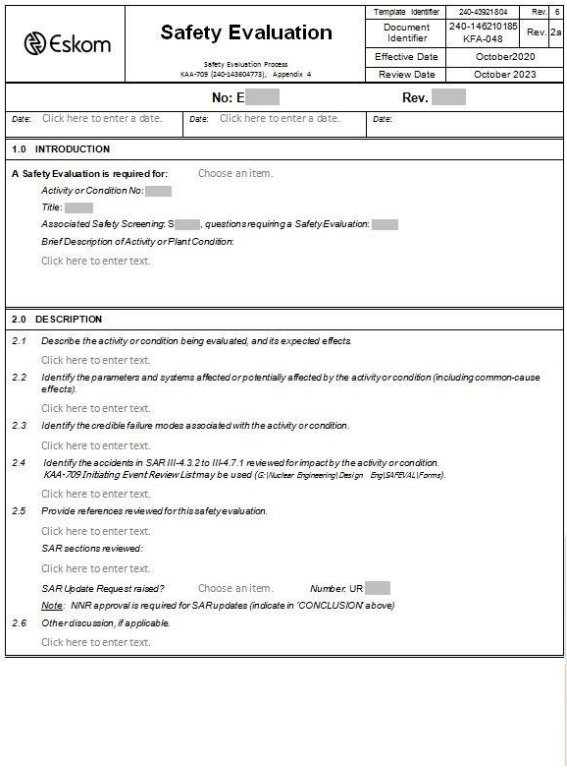
Is an additional review required by Subject Matter Experts (SMEs) or groups other than the preparer's group? Choose an item.
(SMEs need not be authorised as Safety Screeners or Safety Evaluators.)
SMEs or groups:

Prepared by:

Name | Signature | Group | Click here to enter a date.

PSA Review (sections 4, 7 and 8)	**Additional Review** (if required)	**Additional Review** (if required)
Reviewer: Name	*Reviewer:* Name	*Reviewer:* Name
Signature	*Signature*	*Signature*
Group: PSA Group	*Group:*	*Group:*
Date: Click here to enter a date.	*Date:* Click here to enter a date.	*Date:* Click here to enter a date.

EOP Review (section 9)	**Independent Review**	**Approval by** KORC KOSC KAPS
Reviewer:	*Reviewer:*	*Approver:*
Signature	*Signature*	*Signature*
Group: OPG	*Group:*	



Eskom | **Safety Evaluation** | Safety Evaluation Process KAA-709 (240-143604773), Appendix 4

Template Identifier	240-43921804	Rev.	6
Document Identifier	240-146210185 KFA-048	Rev.	2a
Effective Date	October2020		
Review Date	October 2023		

No: E **Rev.**

Date: Click here to enter a date. | *Date:* Click here to enter a date. | *Date:*

1.0 INTRODUCTION

A Safety Evaluation is required for: Choose an item.
Activity or Condition No:
Title:
Associated Safety Screening: S , questions requiring a Safety Evaluation:
Brief Description of Activity or Plant Condition:
Click here to enter text.

2.0 DESCRIPTION

2.1 Describe the activity or condition being evaluated, and its expected effects.
Click here to enter text.

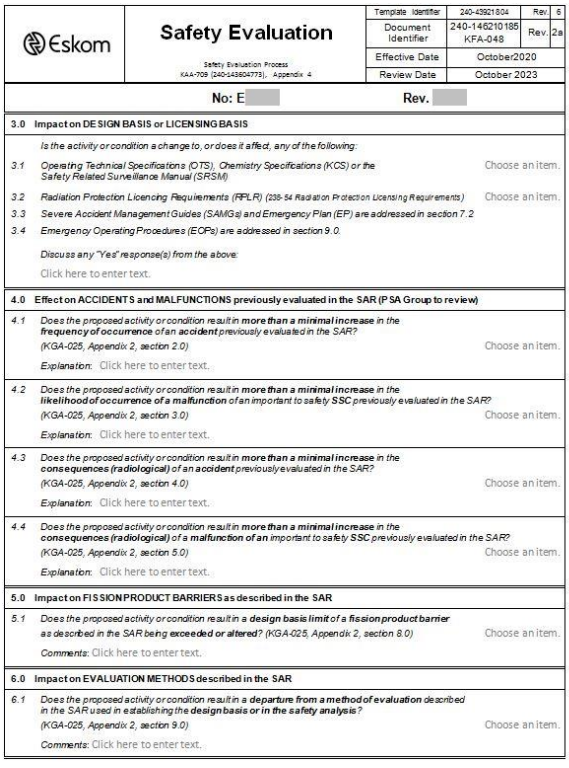
2.2 Identify the parameters and systems affected or potentially affected by the activity or condition (including common-cause effects).
Click here to enter text.

2.3 Identify the credible failure modes associated with the activity or condition.
Click here to enter text.

2.4 Identify the accidents in SAR III-4.3.2 to III-4.7.1 reviewed for impact by the activity or condition. KAA-709 Initiating Event Review List may be used (G:\Nuclear Engineering\Design Eng\SAFEVAL\Forms).
Click here to enter text.

2.5 Provide references reviewed for this safety evaluation.
Click here to enter text.
SAR sections reviewed:
Click here to enter text.
SAR Update Request raised? Choose an item. *Number: UR*
Note: NNR approval is required for SAR updates (indicate in 'CONCLUSION' above)

2.6 Other discussion, if applicable.
Click here to enter text.



Eskom | **Safety Evaluation** | Safety Evaluation Process KAA-709 (240-143604773), Appendix 4

Template Identifier	240-43921804	Rev.	6
Document Identifier	240-146210185 KFA-048	Rev.	2a
Effective Date	October2020		
Review Date	October 2023		

No: E **Rev.**

3.0 Impact on DESIGN BASIS or LICENSING BASIS

Is the activity or condition a change to, or does it affect, any of the following:

3.1 Operating Technical Specifications (OTS), Chemistry Specifications (KCS) or the Safety Related Surveillance Manual (SRSM) Choose an item.

3.2 Radiation Protection Licencing Requirements (RPLR) (235-54 Radiation Protection Licensing Requirements) Choose an item.

3.3 Severe Accident Management Guides (SAMGs) and Emergency Plan (EP) are addressed in section 7.2

3.4 Emergency Operating Procedures (EOPs) are addressed in section 9.0.

Discuss any "Yes" response(s) from the above:
Click here to enter text.

4.0 Effect on ACCIDENTS and MALFUNCTIONS previously evaluated in the SAR (PSA Group to review)

*4.1 Does the proposed activity or condition result in **more than a minimal increase** in the **frequency of occurrence** of an **accident** previously evaluated in the SAR?* Choose an item.
(KGA-025, Appendix 2, section 2.0)
Explanation: Click here to enter text.

*4.2 Does the proposed activity or condition result in **more than a minimal increase** in the **likelihood of occurrence of a malfunction** of an important to safety **SSC** previously evaluated in the SAR?* Choose an item.
(KGA-025, Appendix 2, section 3.0)
Explanation: Click here to enter text.

*4.3 Does the proposed activity or condition result in **more than a minimal increase** in the **consequences (radiological)** of an **accident** previously evaluated in the SAR?* Choose an item.
(KGA-025, Appendix 2, section 4.0)
Explanation: Click here to enter text.

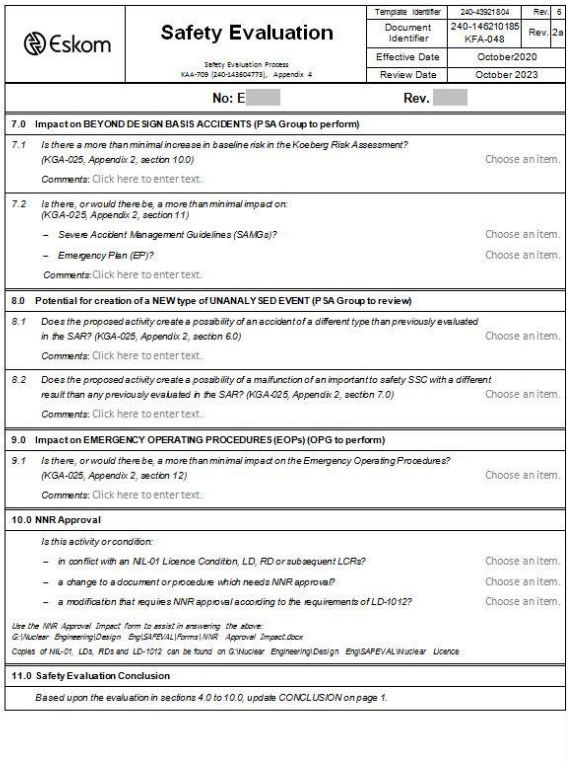
*4.4 Does the proposed activity or condition result in **more than a minimal increase** in the **consequences (radiological)** of a **malfunction of an** important to safety **SSC** previously evaluated in the SAR?* Choose an item.
(KGA-025, Appendix 2, section 5.0)
Explanation: Click here to enter text.

5.0 Impact on FISSION PRODUCT BARRIERS as described in the SAR

*5.1 Does the proposed activity or condition result in a **design basis limit of a fission product barrier** as described in the SAR being **exceeded or altered**? (KGA-025, Appendix 2, section 8.0)* Choose an item.
Comments: Click here to enter text.

6.0 Impact on EVALUATION METHODS described in the SAR

*6.1 Does the proposed activity or condition result in a **departure from a method of evaluation** described in the SAR used in establishing the **design basis or in the safety analysis**?* Choose an item.
(KGA-025, Appendix 2, section 9.0)
Comments: Click here to enter text.



Eskom | **Safety Evaluation** | Safety Evaluation Process KAA-709 (240-143604773), Appendix 4

Template Identifier	240-43921804	Rev.	6
Document Identifier	240-146210185 KFA-048	Rev.	2a
Effective Date	October2020		
Review Date	October 2023		

No: E **Rev.**

7.0 Impact on BEYOND DESIGN BASIS ACCIDENTS (PSA Group to perform)

7.1 Is there a more than minimal increase in baseline risk in the Koeberg Risk Assessment? (KGA-025, Appendix 2, section 10.0) Choose an item.
Comments: Click here to enter text.

7.2 Is there, or would there be, a more than minimal impact on: (KGA-025, Appendix 2, section 11)
- *Severe Accident Management Guidelines (SAMGs)?* Choose an item.
- *Emergency Plan (EP)?* Choose an item.

Comments: Click here to enter text.

8.0 Potential for creation of a NEW type of UNANALYSED EVENT (PSA Group to review)

8.1 Does the proposed activity create a possibility of an accident of a different type than previously evaluated in the SAR? (KGA-025, Appendix 2, section 6.0) Choose an item.
Comments: Click here to enter text.

8.2 Does the proposed activity create a possibility of a malfunction of an important to safety SSC with a different result than any previously evaluated in the SAR? (KGA-025, Appendix 2, section 7.0) Choose an item.
Comments: Click here to enter text.

9.0 Impact on EMERGENCY OPERATING PROCEDURES (EOPs) (OPG to perform)

9.1 Is there, or would there be, a more than minimal impact on the Emergency Operating Procedures? (KGA-025, Appendix 2, section 12) Choose an item.
Comments: Click here to enter text.

10.0 NNR Approval

Is this activity or condition:
- *in conflict with an NIL-01 Licence Condition, LD, RD or subsequent LCRs?* Choose an item.
- *a change to a document or procedure which needs NNR approval?* Choose an item.
- *a modification that requires NNR approval according to the requirements of LD-1012?* Choose an item.

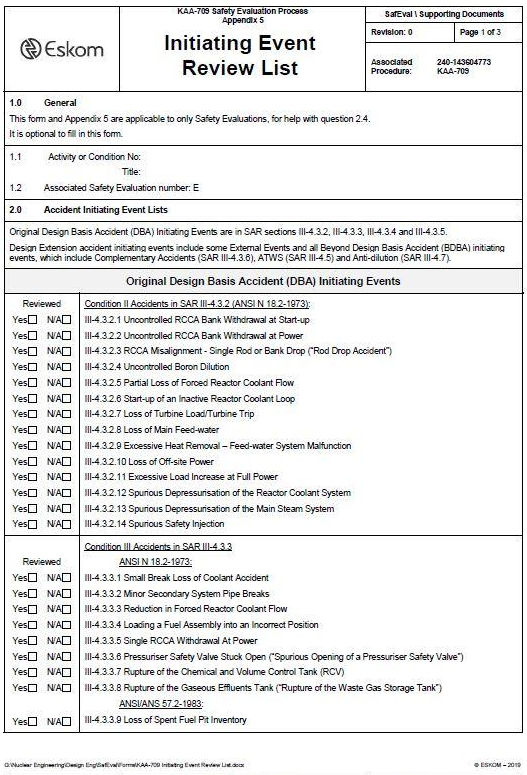
Use the 'NNR Approval Impact' form to assist in answering the above: G:\Nuclear Engineering\Design Eng\SAFEVAL\Forms\NNR Approval Impact.docx
Copies of NIL-01, LDs, RDs and LD-1012 can be found on G:\Nuclear Engineering\Design Eng\SAFEVAL\Nuclear Licence

11.0 Safety Evaluation Conclusion

Based upon the evaluation in sections 4.0 to 10.0, update CONCLUSION on page 1.

Appendix 5 – Initiating Event Review List

This form is available at:
G:\Nuclear Engineering\Design Eng\SAFEVAL\Forms\ KAA-709 Initiating Event Review List



Eskom | KAA-709 Safety Evaluation Process Appendix 5 | **Initiating Event Review List** | SafEval \ Supporting Documents | Revision: 0 | Page 1 of 3 | Associated Procedure: 240-143604773 KAA-709

1.0 General

This form and Appendix 5 are applicable to only Safety Evaluations, for help with question 2.4.
It is optional to fill in this form.

1.1 Activity or Condition No:
Title:
1.2 Associated Safety Evaluation number: E

2.0 Accident Initiating Event Lists

Original Design Basis Accident (DBA) Initiating Events are in SAR sections III-4.3.2, III-4.3.3, III-4.3.4 and III-4.3.5.

Design Extension accident initiating events include some External Events and all Beyond Design Basis Accident (BDBA) initiating events, which include Complementary Accidents (SAR III-4.3.6), ATWS (SAR III-4.5) and Anti-dilution (SAR III-4.7).

Original Design Basis Accident (DBA) Initiating Events

Reviewed	
	Condition II Accidents in SAR III-4.3.2 (ANSI N 18.2-1973):
Yes☐ N/A☐	III-4.3.2.1 Uncontrolled RCCA Bank Withdrawal at Start-up
Yes☐ N/A☐	III-4.3.2.2 Uncontrolled RCCA Bank Withdrawal at Power
Yes☐ N/A☐	III-4.3.2.3 RCCA Misalignment - Single Rod or Bank Drop ("Rod Drop Accident")
Yes☐ N/A☐	III-4.3.2.4 Uncontrolled Boron Dilution
Yes☐ N/A☐	III-4.3.2.5 Partial Loss of Forced Reactor Coolant Flow
Yes☐ N/A☐	III-4.3.2.6 Start-up of an Inactive Reactor Coolant Loop
Yes☐ N/A☐	III-4.3.2.7 Loss of Turbine Load/Turbine Trip
Yes☐ N/A☐	III-4.3.2.8 Loss of Main Feed-water
Yes☐ N/A☐	III-4.3.2.9 Excessive Heat Removal – Feed-water System Malfunction
Yes☐ N/A☐	III-4.3.2.10 Loss of Off-site Power
Yes☐ N/A☐	III-4.3.2.11 Excessive Load Increase at Full Power
Yes☐ N/A☐	III-4.3.2.12 Spurious Depressurisation of the Reactor Coolant System
Yes☐ N/A☐	III-4.3.2.13 Spurious Depressurisation of the Main Steam System
Yes☐ N/A☐	III-4.3.2.14 Spurious Safety Injection
	Condition III Accidents in SAR III-4.3.3
Reviewed	ANSI N 18.2-1973:
Yes☐ N/A☐	III-4.3.3.1 Small Break Loss of Coolant Accident
Yes☐ N/A☐	III-4.3.3.2 Minor Secondary System Pipe Breaks
Yes☐ N/A☐	III-4.3.3.3 Reduction in Forced Reactor Coolant Flow
Yes☐ N/A☐	III-4.3.3.4 Loading a Fuel Assembly into an Incorrect Position
Yes☐ N/A☐	III-4.3.3.5 Single RCCA Withdrawal At Power
Yes☐ N/A☐	III-4.3.3.6 Pressuriser Safety Valve Stuck Open ("Spurious Opening of a Pressuriser Safety Valve")
Yes☐ N/A☐	III-4.3.3.7 Rupture of the Chemical and Volume Control Tank (RCV)
Yes☐ N/A☐	III-4.3.3.8 Rupture of the Gaseous Effluents Tank ("Rupture of the Waste Gas Storage Tank")
	ANSI/ANS 57.2-1983:
Yes☐ N/A☐	III-4.3.3.9 Loss of Spent Fuel Pit Inventory

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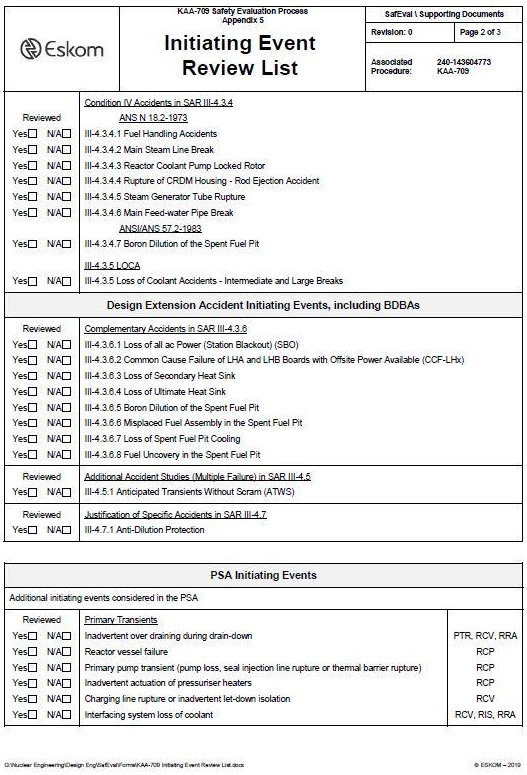

Eskom | KAA-709 Safety Evaluation Process Appendix 5 | **Initiating Event Review List** | SafEval \ Supporting Documents | Revision: 0 | Page 2 of 3 | Associated Procedure: 240-143604773 KAA-709

Reviewed	
	Condition IV Accidents in SAR III-4.3.4
	ANS N 18.2-1973
Yes☐ N/A☐	III-4.3.4.1 Fuel Handling Accidents
Yes☐ N/A☐	III-4.3.4.2 Main Steam Line Break
Yes☐ N/A☐	III-4.3.4.3 Reactor Coolant Pump Locked Rotor
Yes☐ N/A☐	III-4.3.4.4 Rupture of CRDM Housing - Rod Ejection Accident
Yes☐ N/A☐	III-4.3.4.5 Steam Generator Tube Rupture
Yes☐ N/A☐	III-4.3.4.6 Main Feed-water Pipe Break
	ANSI/ANS 57.2-1983
Yes☐ N/A☐	III-4.3.4.7 Boron Dilution of the Spent Fuel Pit
	III-4.3.5 LOCA
Yes☐ N/A☐	III-4.3.5 Loss of Coolant Accidents - Intermediate and Large Breaks

Design Extension Accident Initiating Events, including BDBAs

Reviewed	
	Complementary Accidents in SAR III-4.3.6
Yes☐ N/A☐	III-4.3.6.1 Loss of all ac Power (Station Blackout) (SBO)
Yes☐ N/A☐	III-4.3.6.2 Common Cause Failure of LHA and LHB Boards with Offsite Power Available (CCF-LHx)
Yes☐ N/A☐	III-4.3.6.3 Loss of Secondary Heat Sink
Yes☐ N/A☐	III-4.3.6.4 Loss of Ultimate Heat Sink
Yes☐ N/A☐	III-4.3.6.5 Boron Dilution of the Spent Fuel Pit
Yes☐ N/A☐	III-4.3.6.6 Misplaced Fuel Assembly in the Spent Fuel Pit
Yes☐ N/A☐	III-4.3.6.7 Loss of Spent Fuel Pit Cooling
Yes☐ N/A☐	III-4.3.6.8 Fuel Uncovery in the Spent Fuel Pit
Reviewed	Additional Accident Studies (Multiple Failure) in SAR III-4.5
Yes☐ N/A☐	III-4.5.1 Anticipated Transients Without Scram (ATWS)
Reviewed	Justification of Specific Accidents in SAR III-4.7
Yes☐ N/A☐	III-4.7.1 Anti-Dilution Protection

PSA Initiating Events

Additional initiating events considered in the PSA

Reviewed	Primary Transients	
Yes☐ N/A☐	Inadvertent over draining during drain-down	PTR, RCV, RRA
Yes☐ N/A☐	Reactor vessel failure	RCP
Yes☐ N/A☐	Primary pump transient (pump loss, seal injection line rupture or thermal barrier rupture)	RCP
Yes☐ N/A☐	Inadvertent actuation of pressuriser heaters	RCP
Yes☐ N/A☐	Charging line rupture or inadvertent let-down isolation	RCV
Yes☐ N/A☐	Interfacing system loss of coolant	RCV, RIS, RRA

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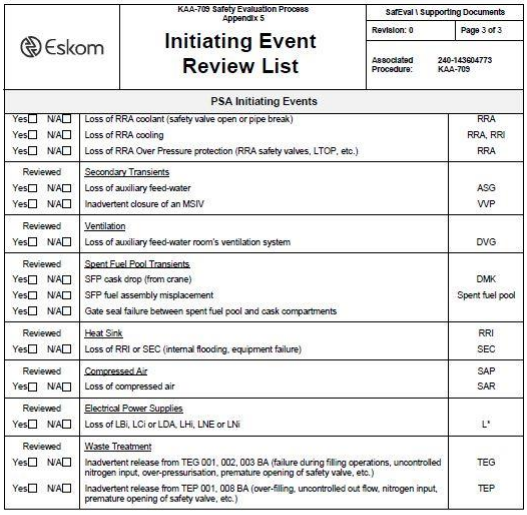

Eskom | KAA-709 Safety Evaluation Process Appendix 5 | **Initiating Event Review List** | SafEval \ Supporting Documents | Revision: 0 | Page 3 of 3 | Associated Procedure: 240-143604773 KAA-709

PSA Initiating Events

Yes☐ N/A☐	Loss of RRA coolant (safety valve open or pipe break)	RRA
Yes☐ N/A☐	Loss of RRA cooling	RRA, RRI
Yes☐ N/A☐	Loss of RRA Over Pressure protection (RRA safety valves, LTOP, etc.)	RRA
Reviewed	Secondary Transients	
Yes☐ N/A☐	Loss of auxiliary feed-water	ASG
Yes☐ N/A☐	Inadvertent closure of an MSIV	VVP
Reviewed	Ventilation	
Yes☐ N/A☐	Loss of auxiliary feed-water room's ventilation system	DVG
Reviewed	Spent Fuel Pool Transients	
Yes☐ N/A☐	SFP cask drop (from crane)	DMK
Yes☐ N/A☐	SFP fuel assembly misplacement	Spent fuel pool
Yes☐ N/A☐	Gate seal failure between spent fuel pool and cask compartments	
Reviewed	Heat Sink	RRI
Yes☐ N/A☐	Loss of RRI or SEC (internal flooding, equipment failure)	SEC
Reviewed	Compressed Air	SAP
Yes☐ N/A☐	Loss of compressed air	SAR
Reviewed	Electrical Power Supplies	
Yes☐ N/A☐	Loss of LBI, LCI or LDA, LHI, LNE or LNI	L*
Reviewed	Waste Treatment	
Yes☐ N/A☐	Inadvertent release from TEG 001, 002, 003 BA (failure during filling operations, uncontrolled nitrogen input, over-pressurisation, premature opening of safety valve, etc.)	TEG
Yes☐ N/A☐	Inadvertent release from TEP 001, 008 BA (over-filling, uncontrolled out flow, nitrogen input, premature opening of safety valve, etc.)	TEP

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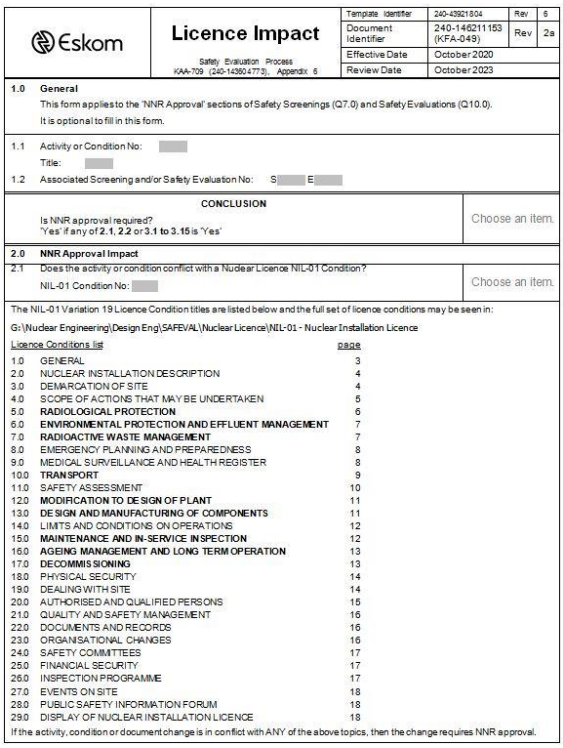
Appendix 6 – Licence Impact (Form KFA-049 240-146211153)

Revision 3 of this form is available at:
G:\Nuclear Engineering\Design Eng\SAFEVAL\Forms\240-146211153 (KFA-049) Licence Impact



Eskom | **Licence Impact** — Safety Evaluation Process KAA-709 (240-143604773), Appendix 6

Template Identifier	240-43921804	Rev	6
Document Identifier	240-146211153 (KFA-049)	Rev	2a
Effective Date	October 2020		
Review Date	October 2023		

1.0 General

This form applies to the 'NNR Approval' sections of Safety Screenings (Q7.0) and Safety Evaluations (Q10.0).

It is optional to fill in this form.

1.1 Activity or Condition No:

Title:

1.2 Associated Screening and/or Safety Evaluation No: S E

CONCLUSION

Is NNR approval required?
'Yes' if any of **2.1**, **2.2** or **3.1** to **3.15** is 'Yes' — Choose an item.

2.0 NNR Approval Impact

2.1 Does the activity or condition conflict with a Nuclear Licence NIL-01 Condition? — Choose an item.

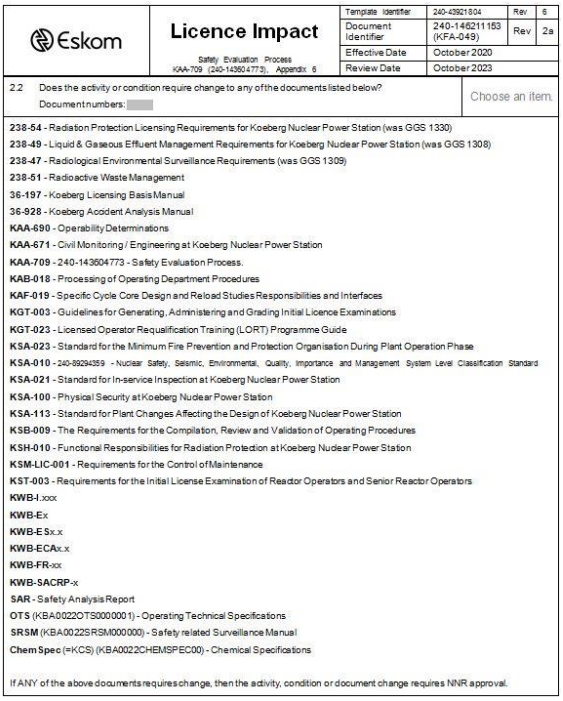
NIL-01 Condition No:

The NIL-01 Variation 19 Licence Condition titles are listed below and the full set of licence conditions may be seen in:

G:\Nuclear Engineering\Design Eng\SAFEVAL\Nuclear Licence\NIL-01 - Nuclear Installation Licence

Licence Conditions list		page
1.0	GENERAL	3
2.0	NUCLEAR INSTALLATION DESCRIPTION	4
3.0	DEMARCATION OF SITE	4
4.0	SCOPE OF ACTIONS THAT MAY BE UNDERTAKEN	5
5.0	**RADIOLOGICAL PROTECTION**	6
6.0	**ENVIRONMENTAL PROTECTION AND EFFLUENT MANAGEMENT**	7
7.0	**RADIOACTIVE WASTE MANAGEMENT**	7
8.0	EMERGENCY PLANNING AND PREPAREDNESS	8
9.0	MEDICAL SURVEILLANCE AND HEALTH REGISTER	8
10.0	**TRANSPORT**	9
11.0	SAFETY ASSESSMENT	10
12.0	**MODIFICATION TO DESIGN OF PLANT**	11
13.0	**DESIGN AND MANUFACTURING OF COMPONENTS**	11
14.0	LIMITS AND CONDITIONS ON OPERATIONS	12
15.0	**MAINTENANCE AND IN-SERVICE INSPECTION**	12
16.0	**AGEING MANAGEMENT AND LONG TERM OPERATION**	13
17.0	**DECOMMISSIONING**	13
18.0	PHYSICAL SECURITY	14
19.0	DEALING WITH SITE	14
20.0	AUTHORISED AND QUALIFIED PERSONS	15
21.0	QUALITY AND SAFETY MANAGEMENT	16
22.0	DOCUMENTS AND RECORDS	16
23.0	ORGANISATIONAL CHANGES	16
24.0	SAFETY COMMITTEES	17
25.0	FINANCIAL SECURITY	17
26.0	INSPECTION PROGRAMME	17
27.0	EVENTS ON SITE	18
28.0	PUBLIC SAFETY INFORMATION FORUM	18
29.0	DISPLAY OF NUCLEAR INSTALLATION LICENCE	18

If the activity, condition or document change is in conflict with ANY of the above topics, then the change requires NNR approval.



Eskom | **Licence Impact** — Safety Evaluation Process KAA-709 (240-143604773), Appendix 6

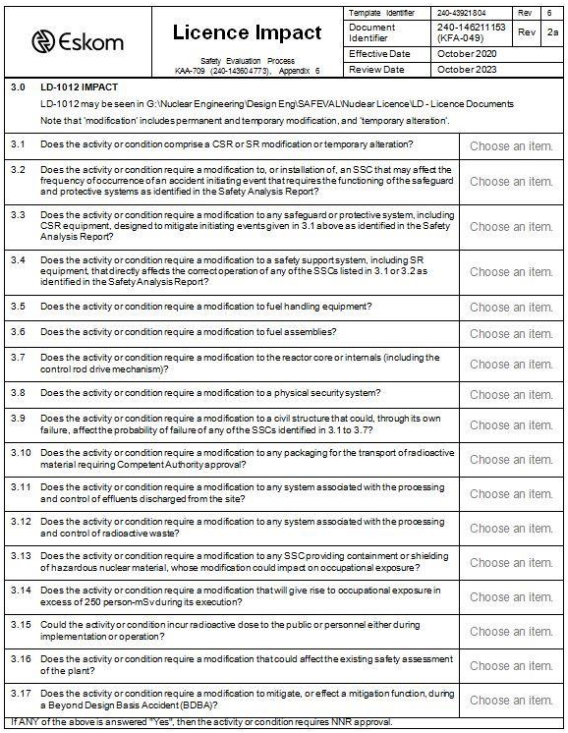
Template Identifier	240-43921804	Rev	6
Document Identifier	240-146211153 (KFA-049)	Rev	2a
Effective Date	October 2020		
Review Date	October 2023		

2.2 Does the activity or condition require change to any of the documents listed below? — Choose an item.

Document numbers:

238-54 - Radiation Protection Licensing Requirements for Koeberg Nuclear Power Station (was GGS 1330)
238-49 - Liquid & Gaseous Effluent Management Requirements for Koeberg Nuclear Power Station (was GGS 1308)
238-47 - Radiological Environmental Surveillance Requirements (was GGS 1309)
238-51 - Radioactive Waste Management
36-197 - Koeberg Licensing Basis Manual
36-928 - Koeberg Accident Analysis Manual
KAA-690 - Operability Determinations
KAA-671 - Civil Monitoring / Engineering at Koeberg Nuclear Power Station
KAA-709 - 240-143604773 - Safety Evaluation Process.
KAB-018 - Processing of Operating Department Procedures
KAF-019 - Specific Cycle Core Design and Reload Studies Responsibilities and Interfaces
KGT-003 - Guidelines for Generating, Administering and Grading Initial Licence Examinations
KGT-023 - Licensed Operator Requalification Training (LORT) Programme Guide
KSA-023 - Standard for the Minimum Fire Prevention and Protection Organisation During Plant Operation Phase
KSA-010 - 240-89294359 - Nuclear Safety, Seismic, Environmental, Quality, Importance and Management System Level Classification Standard
KSA-021 - Standard for In-service Inspection at Koeberg Nuclear Power Station
KSA-100 - Physical Security at Koeberg Nuclear Power Station
KSA-113 - Standard for Plant Changes Affecting the Design of Koeberg Nuclear Power Station
KSB-009 - The Requirements for the Compilation, Review and Validation of Operating Procedures
KSH-010 - Functional Responsibilities for Radiation Protection at Koeberg Nuclear Power Station
KSM-LIC-001 - Requirements for the Control of Maintenance
KST-003 - Requirements for the Initial License Examination of Reactor Operators and Senior Reactor Operators
KWB-I.xxx
KWB-Ex
KWB-ESx.x
KWB-ECAx.x
KWB-FR-xx
KWB-SACRP-x
SAR - Safety Analysis Report
OTS (KBA0022OTS0000001) - Operating Technical Specifications
SRSM (KBA0022SRSM000000) - Safety related Surveillance Manual
Chem Spec (=KCS) (KBA0022CHEMSPEC00) - Chemical Specifications

If ANY of the above documents requires change, then the activity, condition or document change requires NNR approval.



Eskom | **Licence Impact** — Safety Evaluation Process KAA-709 (240-143604773), Appendix 6

Template Identifier	240-43921804	Rev	6
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3.0 LD-1012 IMPACT

LD-1012 may be seen in G:\Nuclear Engineering\Design Eng\SAFEVAL\Nuclear Licence\LD - Licence Documents

Note that 'modification' includes permanent and temporary modification, and 'temporary alteration'.

3.1	Does the activity or condition comprise a CSR or SR modification or temporary alteration?	Choose an item.
3.2	Does the activity or condition require a modification to, or installation of, an SSC that may affect the frequency of occurrence of an accident initiating event that requires the functioning of the safeguard and protective systems as identified in the Safety Analysis Report?	Choose an item.
3.3	Does the activity or condition require a modification to any safeguard or protective system, including CSR equipment, designed to mitigate initiating events given in 3.1 above as identified in the Safety Analysis Report?	Choose an item.
3.4	Does the activity or condition require a modification to a safety support system, including SR equipment, that directly affects the correct operation of any of the SSCs listed in 3.1 or 3.2 as identified in the Safety Analysis Report?	Choose an item.
3.5	Does the activity or condition require a modification to fuel handling equipment?	Choose an item.
3.6	Does the activity or condition require a modification to fuel assemblies?	Choose an item.
3.7	Does the activity or condition require a modification to the reactor core or internals (including the control rod drive mechanism)?	Choose an item.
3.8	Does the activity or condition require a modification to a physical security system?	Choose an item.
3.9	Does the activity or condition require a modification to a civil structure that could, through its own failure, affect the probability of failure of any of the SSCs identified in 3.1 to 3.7?	Choose an item.
3.10	Does the activity or condition require a modification to any packaging for the transport of radioactive material requiring Competent Authority approval?	Choose an item.
3.11	Does the activity or condition require a modification to any system associated with the processing and control of effluents discharged from the site?	Choose an item.
3.12	Does the activity or condition require a modification to any system associated with the processing and control of radioactive waste?	Choose an item.
3.13	Does the activity or condition require a modification to any SSC providing containment or shielding of hazardous nuclear material, whose modification could impact on occupational exposure?	Choose an item.
3.14	Does the activity or condition require a modification that will give rise to occupational exposure in excess of 250 person-mSv during its execution?	Choose an item.
3.15	Could the activity or condition incur radioactive dose to the public or personnel either during implementation or operation?	Choose an item.
3.16	Does the activity or condition require a modification that could affect the existing safety assessment of the plant?	Choose an item.
3.17	Does the activity or condition require a modification to mitigate, or effect a mitigation function, during a Beyond Design Basis Accident (BDBA)?	Choose an item.

If ANY of the above is answered "Yes", then the activity or condition requires NNR approval.

Appendix 7 – Justification

KAA-709

Revision 6

a) Full Review

b) Resolve the non-conformance identified in the QA audit report QA0860.

c) Other changes are made to clarify the intent of the procedure.

Revision 7

a) Full Review

b) SRSM separation from OTS is reflected.

c) Removal of OTS and SRSM from definition of design bases.

d) Appendix 5 revised to reflect new OTS plant domains.

e) Section 2.1 of screening form revised to allow for editorial changes without NNR approval.

f) Minor editorial changes are made due organisational restructuring.

240-143604773

Revision 1

a) Revision 1 is skipped to aid management of the Safety Evaluation Process, the Safety Screening form and the Safety Evaluation form.

Revision 2

a) Update and Conversion from old Koeberg format KAA-709 to current format 240-143604773

Revision 3

a) Included paragraph 3.9 ‘Validity’ that was unintentionally omitted from the previous version.

b) KFA-049, 3.0 LD-1012 IMPACT – A note is added:
Note that ‘modification’ includes permanent and temporary modification, and ‘temporary alteration’.

c) KFA-049, 3.1 is added:
Does the activity or condition comprise a CSR or SR modification or temporary alteration?

d) KFA-049, 3.15 is added:
Could the activity or condition incur radioactive dose to the public or personnel either during implementation or operation?

e) Various clarification inclusions