

		<b>STANDARD</b>	Allocation Centre 38A	Reference Number <b>KSC-003</b>	Rev <b>6</b>
NNR: NO No.:	THE CHEMISTRY PROGRAMME				PAGE 1
KORC NO	ACCESS Nuclear Restricted	IMPORTANCE CATEGORY NSA	NEXT REVIEW DATE 2023-09-25	DATE AUTHORISED 2020-09-25	

<b>COMPILED / REVISED</b>	<b>REVIEWED</b>	<b>AUTHORISED</b>
(sgd) NG TASANA	(sgd) K GOVENDER	(sgd) N MSUMZA
NG TASANA	K GOVENDER	N MSUMZA
QC CHEMIST CHEMISTRY	HEAD OF TECHNICAL SUPPORT CHEMISTRY	CHEMISTRY MANAGER (ACTING)
<b>DATE</b> 2020-09-17	<b>DATE</b> 2020-09-22	<b>DATE</b> 2020-09-25

**THIS STANDARD HAS BEEN SEEN AND ACCEPTED BY:**

CM Davis	Document Custodian
A Maree	Head of Plant Chemistry (Acting)
C Muller	Head of Chemistry Training
P Sesinyi	Head of Analytical Chemistry (Acting)
H Morland	Senior Chemist
T Karsten	Radiation Protection Manager
N van Eeden	Chief Scientist
GE Visser	Head of Radiochemistry (Acting)

**ALARA RELATED**

<b>FCA</b> MONITORING	<b>ALARA REVIEW</b> YES 2020-09-16	<b>SUPERSEDES</b> KSC-003, Rev 5 dd. 2018-10-19 FULL REVIEW
--------------------------	--	--

## PAGE STATUS INDEX

[illegible][illegible]

	<b>CONTENTS</b>	<b>PAGE</b>
1.0	PURPOSE .....	4
2.0	SCOPE .....	4
3.0	DEFINITIONS AND ABBREVIATIONS .....	4
4.0	REFERENCES .....	4
5.0	REQUIREMENTS .....	4
6.0	ATTACHMENTS .....	6
	Appendix 1 – Level 2 Procedure Listing .....	7
	Appendix 2 – Chemistry Position on ISO 17025 Accreditation .....	9
	Appendix 3 – Justification .....	10

## **1.0 PURPOSE**

- 1.1 To define the Chemistry Programme at Koeberg Nuclear Power Station.

## **2.0 SCOPE**

- 2.1 Applicable to all areas of responsibility of the Chemistry Group.

## **3.0 DEFINITIONS AND ABBREVIATIONS**

N/A

## **4.0 REFERENCES**

### **4.1 Referenced Documents**

- 4.1.1 335-2, Rev 5: Koeberg Nuclear Power Station Management Manual
- 4.1.2 IAEA Draft Specific Safety Guide DS485, Ageing Management and Development of a Programme for Long Term Operation of Nuclear Power Plants
- 4.1.3 ISO 17025:2017: General requirements for the competence of testing and calibration laboratories
- 4.1.4 KAA-500, Rev 13: The Process for Controlled Documents
- 4.1.5 KSA-011, Rev 14: The Requirements for Controlled Documents

### **4.2 Applicable Documents**

- 4.2.1 In accordance with Appendix 1.
- 4.2.2. ISO 17025:2017: General requirements for the competence of testing and calibration laboratories

## **5.0 REQUIREMENTS**

The management expectations for the Chemistry Program implementation are elaborated on as defined in the applicable procedure KSC 006 (Chemistry Standard and Expectations).

### **5.1 Basis and Strategy**

- 5.1.1 The technical basis and strategic plans shall be defined for primary and secondary water chemistry.

**5.2 Safety Aspects of Long Term Operation**

- 5.2.1 Scope of the Programme based on understanding ageing shall be defined.
- 5.2.2 Preventive actions to minimise and control ageing degradation are included in the programme.
- 5.2.3 The Programme shall be able to detect ageing effects.
- 5.2.4 Monitoring and trending of ageing effects are included in the Programme.
- 5.2.5 The Programme is designed to mitigate ageing effects.
- 5.2.6 Acceptance criteria shall be defined and technically justified.
- 5.2.7 Corrective actions shall be implemented for non-compliance to chemistry specifications
- 5.2.8 Operating experience feedback and feedback of research and development results are used to optimise the Programme.
- 5.2.9 Quality assurance procedures, review and approval processes, and administrative controls shall be implemented.

**5.3 Operating**

- 5.3.1 Chemistry operating and permit-to-work responsibilities shall be defined.

**5.4 Monitoring/Surveillance**

- 5.4.1 Surveillance programmes shall be defined which cover primary, secondary and auxiliary systems as well as the environment, and which comply with all statutory, licensing, corporate and station/in-house requirements.
- 5.4.2 An analytical and radiochemistry capability shall be maintained in order to comply with the surveillance programmes and station requirements.

**5.5 Control**

- 5.5.1 The chemistry specifications of plant systems shall be documented, including a process to manage specification non-compliance.
- 5.5.2 Plant system chemistry shall be controlled under all conditions and states (including shutdown).
- 5.5.3 A data management system, which enables optimisation of plant system chemistry as well as short and long term trending shall be maintained.
- 5.5.4 Chemistry shall adopt a philosophy of 'Effective Pre-emptive Chemistry Control' – (EPCC).

**5.6 Assurance**

- 5.6.1 Quality control, OE and Self-Assessment programmes shall be implemented.
- 5.6.2 A technical support function shall exist to research and implement latest chemistry technologies and provide technical assistance to the line sections and station.
- 5.6.3 Technical alignment to the intent of ISO 17025 is applied in all the analytical techniques and associated QC/QA processes and practices. See Appendix 2 in the attachments.

**5.7 Administration**

- 5.7.1 An administration system shall be implemented covering record, procedure, budget, stores, procurement and cost control.

**5.8 Training**

- 5.8.1 A Chemistry training programme shall be implemented.

**6.0 ATTACHMENTS**

Appendix 1 – Level 2 Procedure Listing

Appendix 2 – Chemistry Position on ISO 17025 Accreditation

Appendix 3 – Justification

**APPENDIX 1**  
**LEVEL 2 PROCEDURE LISTING**

**Operating:**

KAA-667	Processing a Permit to Work
KAC-032	Chemistry Operating Responsibilities

**Monitoring/Surveillance:**

KAA-584	Radiation Instrumentation Management
KAA-595	Control of Chemistry Instrumentation, Analysers and Equipment
KAA-597	Environmental Surveillance Programme
KAA-598	SHE Management System
KAA-625	RFE Radiochemical Requirements
KAA-629	Responsibilities for Testing Absolute and Charcoal Filters
KAA-636	Management of the Radioactive Effluents Programme
KAA-688	The Corrective Action Process
KAA-703	Division of Responsibilities for Oils at Koeberg Nuclear Power Station
KAA-712	Marine Monitoring Strategy at Koeberg Nuclear Power Station
KAA-752	Koeberg Nuclear Power Station Oxygenation and Purification Process
KAA-811	The Integrated Koeberg Nuclear Emergency Plan
KBA0022CHEMSPEC00	Koeberg Chemistry Specifications
KBA0022CHEMJUSTIF1	Technical Bases for Koeberg Chemistry Specifications
KBA0022CHEMJUSTIF2	Justification for the Koeberg NPS Chemistry Operating Specifications
KEP-084	Chemical Spill Response Plan
KEP-I-006	ESL Operation Following Emergency Plan Activation
KEP-I-007	Collection of Post Accident Emergency Samples
KEP-I-010	Set-up of the Alternate ESL for Emergency Plan Duties
KGC-LUC-005	ESL Land Use Census Guide
KLC-001	Chemistry Sampling Points
KNC-001	Chemistry Operating Specifications for Safety Related Systems
KNC-002	Chemistry Operating Specifications for Availability Related Systems

**APPENDIX 1 (continued)****LEVEL 2 PROCEDURE LISTING****Control:**

KAA-751	The Control of Chemical Products at Koeberg Nuclear Power Station
KAA-688	The Corrective Action Process
KAC-029	Reporting of Chemistry Results
KAC-030	Chemistry Specification Change Control
KAC-031	Issuing of Chemicals by the Chemistry Group according to the CRACK Programme
KNC-001	Chemistry Operating Specifications for Safety Related Systems
KNC-002	Chemistry Operating Specifications for Availability Related Systems
KGC-006	Guidelines for Ion Exchange Resin Change-out in Plant System Demineralisers

**Assurance:**

KAA-584	Radiation Instrumentation Management
KAA-595:	Control of Chemistry Instrumentation, Analysers and Equipment
KAA-633	Control of Radioactive Sources and X-Ray Equipment
KAA-709	Process for Performing Safety Screenings, Safety Evaluations, Safety Justifications and Safety Cases
KSA-110	Standard for Self Assessments at KNPS
KSC-001	The Radiochemistry QC Programme
KSC-004	The Analytical Chemistry QC Programme
KGC-RQC	Implementation of the Radiochemistry Quality Control Programme

**Administration:**

KAA-500	The Process for Controlled Procedures
KAA-709	Process for Performing Safety Screenings, Safety Evaluations, Safety Justifications and Safety Cases
KSA-011	The Requirements for Controlled Documents
KSA-038	Requirements for Quality Records
KSC-006	Chemistry Standard and Expectation

**Training:**

KGT-054	Chemistry Training Programme Guide
---------	------------------------------------

## APPENDIX 2

## CHEMISTRY POSITION ON ISO 17025 ACCREDITATION

Chemistry Position on ISO 17025 Accreditation

Chemistry Programme

*Chemistry Programme***Chemistry Position on ISO 17025 Accreditation**

Rev. 0

Compiled by: HJ Morland Reviewed by N van Eeden

## ISO 17025 Accreditation for Koeberg Chemistry Laboratories

Technical alignment to the intent of ISO 17025 is applied in all the analytical techniques and associated QC/QA processes and practices in the Koeberg laboratories. The Koeberg Laboratories follow the plant specific procedures which contain the key elements for accreditation.

Official accreditation is not sought for the following reasons:

- The cost of maintaining official accreditation status.
- The resource burden of achieving and maintaining all of the administrative requirements of official accreditation, i.e. the documentation system.
- The Eskom Power Stations Laboratories each has its own station as its sole customer, therefore being officially accredited is not a requirement. (This is different to commercial analytical laboratories doing work for various paying customers, where being accredited has specific advantages over a competitor business that is not accredited.) QC/QA processes are in place to ensure compliance to the key technical aspects of ISO 17025.

Where analysis is required to be performed by an accredited laboratory, the services of the accredited Eskom Central Laboratories (RT&D) are utilised as far as possible.

Quality is further enhanced through the implementation of industry best practice which is achieved through membership of the *World Association of Nuclear Operators (WANO)*, the *Institute of Nuclear Power Operators (INPO)* and the *Electric Power Research Institute (EPRI)*. These organisations are periodically invited to perform peer reviews at the station, supplemented by various benchmarking mechanisms and exercises.

The environmental surveillance laboratory is a member of the *Analytical Laboratories for the Measurement of Environmental Radioactivity (ALMERA)* network established and coordinated by the *International Atomic Energy Association (IAEA)*.

END



## **APPENDIX 3**

### **JUSTIFICATION**

#### **Revision 5**

1. Added references to basis and strategy documents.
2. Included IAEA Safety Aspects of Long-term Operations.
3. Scheduled Review.

#### **Revision 6**

1. Update ISO 17025:2017: 'General requirements for the competence of testing and calibration laboratories' as reference document.
2. Include ISO 17025:2017 to paragraph 5.6.3.
3. Add Appendix 2 - Chemistry Position on ISO 17025 Accreditation.