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REVISIONS

This document has been revised according to the following schedule:

Revision	Date Approved	Nature of Revision	Prepared by
00	See title page	First Issue	L Hordijk and M Minnaar

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1.0 INTRODUCTION

Operational KNPS and Necsa (PDO) radioactive waste is currently being disposed of at Vaalputs. It is foreseen that large volumes of project and decommissioning radioactive waste will be disposed of at Vaalputs as well.

Vaalputs PCRSA is required as a component of the safety case for Vaalputs to demonstrate overall safety of the disposal system during the operational period and the period following closure of Vaalputs. To have an approved PCRSA for Vaalputs is currently the responsibility of the licence holder of the Vaalputs facility, which is currently Necsa (Vaalputs) and expected to be transferred to NRWDI in due course. The current Vaalputs PCRSA considered various waste inventories (routine KNPS operational waste, Necsa (PDO) waste, PBMR, and even future NPPs, etc.). However the Vaalputs PCRSA does not include:

- The inventory of all other KNPS operational waste for the lifetime of the plant,
- KNPS “historical waste” (i.e., “old” waste packages currently in storage that previously could not be sent to Vaalputs for disposal)
- KNPS life-extension related waste (KNPS has initiated a project to extend the life of the station by 20 years.)
- KNPS end-of-life decommissioning waste
- Radioactive waste that may be generated by future nuclear facilities (e.g. NPP, research reactor)
- Necsa special waste streams
- Necsa decommissioning waste
- Necsa Safari and other operational facilities decommissioning waste

The current PCRSA does not allow for the use of both the definitions for LILW-SL as extracted from the Radioactive Waste Management Policy and Strategy for the Republic of South Africa, 2005 [5] and as defined in the current Vaalputs Waste Acceptance Criteria [9]. The current PCRSA was last updated in 2007. Internationally, it is seen as good practice to update the PCRSA on a regular basis. It varies from 5 to 10 years, but preferably not more than 10 years.”

The Vaalputs PCRSA therefore needs to be updated to include all current and projected future operational, project and decommissioning radioactive waste.

It should be noted that reference in this document to “Necsa”, depending on the context, is either in the capacity of Vaalputs as the nuclear installation license holder (disposal operator) or in the capacity of Necsa (PDO) as waste generator. To distinguish between the two entities, the following terms are used: Necsa (PDO) as waste generator and Necsa (Vaalputs) as disposal operator.

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2.0 PURPOSE

This URS specifies the Eskom's and Necsa (PDO)'s requirements for the review and update of the Vaalputs PCRSA.

3.0 SCOPE

This User Requirements Specification (URS) is applicable to the review and update of the Vaalputs PCRSA ([6] and [7]) which need to be accepted by both Necsa (Vaalputs) and NRWDI.

4.0 REFERENCES

4.1 Normative

- | | | |
|-----|-------------------|---|
| [1] | NIL-27 | Nuclear Installation Licence (Variation 1) - Vaalputs Radioactive Waste Disposal Facility |
| [2] | Act No 46 of 1999 | Nuclear Energy Act, 1999 |
| [3] | Act No 53 of 2008 | National Radioactive Waste Disposal Institute Act, 2008 |
| [4] | IAEA, 2004 | Safety Assessment Methodologies for Near Surface Disposal Facilities, 2004 |

4.2 Informative

- | | | |
|------|-------------|--|
| [5] | DME, 2005 | Radioactive Waste Management Policy and Strategy for the Republic of South Africa, 2005 |
| [6] | VLP-SAC-012 | 2007 Vaalputs Post-closure Radiological Safety Assessment: Implementation of the Safety Assessment (MW Kozak, 2007); |
| [7] | VLP-SAC-013 | 2007 Vaalputs Post-closure Radiological Safety Assessment: Confidence in the Long-term Safety of Vaalputs (JJ van Blerk, 2007) |
| [8] | ASC-1004F | Technical Arguments in Support of Waste Container Longevity and its Influence on the Vaalputs Safety Case (JJ van Blerk, 2019) |
| [9] | VLP-WAC-001 | Waste Acceptance Criteria for Vaalputs, Necsa |
| [10] | RD-0016 | Requirements for authorisation submissions involving computer software and evaluation models for safety calculations (NNR, 2006) |

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5.0 ABBREVIATIONS

ISAM	Improvement of Safety Assessment Methodology
KNPS	Koeberg Nuclear Power Station
KOU	Koeberg Operating Unit
LILW-SL	Low and Intermediate Level Waste Short-Lived
LLW	Low Level Waste
Necsa	South Africa Nuclear Energy Corporation
NLM	The Nuclear Liabilities Management Department of Necsa. Responsible for radioactive waste management on the Necsa site.
NNR	National Nuclear Regulator
NRWDI	National Radioactive Waste Disposal Institute
OSG	Original Steam Generator
PCRSA	Post Closure Radiological Safety Assessment
PDO	Predisposal Operator
RP	Radiation Protection
RPVH	Reactor Pressure vessel head
SAFARI-1	SAFARI-1 research reactor on the Necsa site
URS	User Requirements Specification
WAC	Waste Acceptance Criteria

6.0 REQUIREMENTS

The contractor is required to review and update the Vaalputs PCRSA as it pertains to:

- KNPS radioactive waste inventory for past, current and future generated operational, project, life extension and decommissioning LILW-SL to be disposed of at Vaalputs.
- Necsa (PDO) radioactive waste inventory for past, current and future generated operational, project and decommissioning LILW-SL to be disposed of at Vaalputs, including SAFARI-1 and II
- Inventory (source term, nuclide and waste type) estimations shall be provided by both Necsa and KNPS pertaining to past (liability) current and future waste. This includes projections and assumptions on plant operational life time, decommissioning and decay after reactor end-of-life.
- Definition and evaluation of the disposal concept that will be used for the disposal of waste arising that are not suitable for disposal in the current trench dimensions (e.g. OSG, RPVH, etc.). Considering maximum depth requirement of 8m, but alternative horizontal layout for typical off-loading.

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- All issues related to confinement and isolation of waste that need clarification (e.g. reliance on waste package containment)
- Consider various historical and new waste packages, ISO containers, small square boxes for repackaging of 4x210L drums, large non-contained components e.g. OSG, RPVH, etc.
- Waste classification and the alternative definition of LILW-SL, as extracted from the Radioactive Waste Management Policy and Strategy for the Republic of South Africa 2005 [5] based on the outcome of the inherent intrusion scenario [5] and [9].
- The derivation of reference levels (activity concentrations and limits) for the site and per waste package, e.g. justification or revision of the LILW-SL limits, in line with current IAEA waste classification.
- The existing PCRSA and other documents related to this subject shall be considered, [6], [7] and [8].

Update of the PCRSA must be done within the ISAM framework for near surface disposal facilities that is internationally acceptable [4] and that is consistent with the IAEA as well as regulatory requirements, e.g. NNR requirements, and guidance. This includes appropriate quality checks, and peer review, on assumptions, input parameters, data and calculations.

The contractor shall follow the ISAM safety assessment methodology and provide to Eskom and Necsa (PDO) inputs and involvements as prescribed. These shall be done during meetings where all required parties are present. The contractor will be required to travel to the preferred premises should the meetings be held in person.

Contractor to specify during proposal phase what fundamental studies are required as input for the PSRCA, but which cannot be provided or done.

The PCRSA review shall be in the form of a report.

The report shall be reviewed by Eskom, Necsa (PDO), NRWDI and Necsa (Vaalputs). Upon review of the report by Necsa and Eskom, availability of the contractor will be required for attendance of clarification meetings. Eskom or Necsa (PDO) will arrange the clarification meetings which will either be held telephonically, virtual or in person and may include providing expert opinion to the NNR and/or the NRWDI. It is intended that both Necsa and NRWDI will be requested to accept the updated PCRSA. The contractor will be required to travel to the preferred premises should the meetings be held in person.

The contractor will be required to submit a description of their, and their possible subcontractors', expertise and experience, satisfy the NNR that the contractor is a suitable expert in the field of the PCRSA being reviewed. Where computer codes are used, they must be verified and validated in accordance with NNR RD-0016 [10].

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7.0 DOCUMENTATION

All the documents generated by the Contractor and accepted by the applicable parties shall be retained as a permanent record at NWRDI for the operational life of Vaalputs.

Copies shall be made available to Necsa (PDO) and KNPS.

Each document deliverable is to be provided in hardcopy and includes all required signatures.

Each document deliverable is also to be provided as a searchable electronic PDF format and includes all required signatures.

Each document deliverable is provided as an editable Microsoft Office file which corresponds to all final documentation issued.

All documentation, including drawings and operating and maintenance instruction manuals, are uniquely identified and cross-referenced with all related documents.

All documents provided by the Contractor as part of this project will become the property of Necsa (Vaalputs)/NRWDI.

8.0 DOCUMENTATION TO BE PROVIDED BY ESKOM AND NECSA

Eskom and Necsa (PDO) shall provide the estimated inventory (source term, nuclide and waste type) pertaining to past (liability), current and future waste. This includes projections of waste to be generated during the facilities operational life time, possible life-extension and decommissioning. It will also reflect the projections and assumptions on the facility lifetime, possible decay duration after reactor end-of-life and decommissioning duration.

Necsa (Vaalputs) will make available, as required, all safety case documents and information from previous safety assessments.

Eskom and Necsa (PDO), on request from the Contractor, provides copies of all applicable Eskom Standards, Procedures, Guides, Work instructions and Forms as well as applicable letters.

Contractor's personnel will only be provided access to documentation once a confidentiality agreement has been authorised per individual. The contractor will be held liable for confidentiality where such information is provided to sub-contractors