RFQ Number	**NTP-PRJ-MM-RFQ-25-0054 – Rev 1B - PSR**
Request for Quotation Date	**2025/08/04**
RFQ Closing Date	**2025/08/08**
RFQ Closing Time	**15:00**
Compulsory Site Briefing	**Online clarification meeting to be requested if required**
Contact Person	**N/A**
Quotation Validity	**Itumeleng Mathibe / Tel: 012 305 5163**
Submission Details	**90 Days from the closing date**
RFQ Description	**Support services for the execution of a Periodic Safety Review (PSR) at SAFARI-1 in support of a nuclear installation license extension (Also referred to as Long-Term Operation (LTO))**

Dear Service Provider

Kindly provide a quotation for goods and or services as outlined in section 2 of this document.

1. Introduction

The South African Nuclear Energy Corporation Limited (Necsa) is a state-owned public company (SOC), registered in terms of the Companies Act, (Act No. 61 of 1973), registration number 2000/003735/06.

The Necsa Group engages in commercial business mainly through its wholly owned commercial subsidiaries: NTP Radioisotopes SOC Ltd (NTP), which is responsible for a range of radiation-based products and services for healthcare, life sciences and industry, and Pelchem SOC Ltd (Pelchem), which supplies fluorine and fluorine-based products. Both subsidiaries, together with their subsidiaries, supply local and global markets, earning valuable foreign exchange for South Africa and are among the best in their field in their respective world markets.

Necsa's safety, health, environment and quality policies provides for top management commitment to compliance with regulatory requirements of ISO 14001, OHSAS 18001 and RD 0034 (Quality and Safety Management Requirements for Nuclear Installations), ISO 9001 and ISO 17025.

Necsa promotes the science, technology and engineering expertise of South Africa and improves the public understanding of these through regular communications at various forums and outreach programmes to the community. We are a proudly South African company continuously striving, and succeeding in many respects, to be at the edge of science, technology and engineering related to the safe use of nuclear knowledge to improve our world.

For more information on Necsa, please visit: WWW.Necsa.co.za

2. Background

SAFARI-1 reached 60 years of safe operation in March 2025. Its Nuclear Installation License expires on 31 December 2030. Necsa intends to apply to the National Nuclear Regulator (NNR) to continue operating beyond the license expiry date until 31 December 2040. A Periodic Safety Review (PSR) is required to support Necsa's license application and to meet the timelines, it must be completed by July 2027. Work has already begun with the compilation of the PSR basis document and other preparatory processes for the PSR. To support Necsa's preparation for the license application to continue operating until 31 December 2040 (also referred to as Long Term Operation or Continued Safe Operation), the International Atomic Energy Agency (IAEA) has also been invited to conduct a Safety Aspects of Long-Term Operation (SALTO) support mission.

A description of the SAFARI-1 reactor is provided in **Annexure 1.**

3. Description

The requirement is for support services for the execution of a PSR at SAFARI-1. The outcome of the PSR will be used to support the continued safe operation of SAFARI-1 by 10 years beyond the current license expiry date of 31 December 2030.

4. Scope of Work

The Contractor's scope consists of **four** distinct aspects, all related to the PSR, namely:

I. Assist with the completion of the PSR basis document to comply with the guidance in IAEA SRS 99 and inputs from the NNR.

II. Provide specialists to conduct the safety factor reviews for Safety Factors 1 to 6 as described in IAEA SRS 99:

   a. Facility design (SF1)
   b. Actual condition of SSCs (SF2)
   c. Equipment qualification (SF3)
   d. Ageing (SF4)
   e. Utilisation (SF5)
   f. Deterministic safety assessment (SF6a)
   g. Probabilistic safety assessment (SF6b)

III. Lead the global assessment team and compile the global assessment report

IV. Compile the Integrated implementation plan

The Contractor is expected to execute the above Scope of Work in close technical collaboration with designated Necsa subject matter experts (SMEs). This collaboration will involve, but not be limited to, regular technical interface meetings, joint workshops for specific safety factors or systems as needed, and direct engagement with Necsa SMEs for clarification, data interpretation, and review of interim findings. The aim is to ensure the PSR accurately reflects SAFARI-1's design,

operational history, and existing safety analyses, and to facilitate effective knowledge sharing and validation.

The services required by the Contractor are further detailed below:

4.1 Provide input to the periodic safety review basis document

The development of the PSR basis document will be a collaborative effort between Necsa appointed experts and the contractor.

The contractor shall provide input to the PSR basis document as it pertains to Safety factors 1 to 6:

I. The scope and methodology of the reviews.
II. The list of international standards and guidelines to be used.
III. The list of design codes and standards for the original SAFARI-1 design and the list of modern codes and standards;
IV. The list of SSCs in-scope
V. The list of Regulatory requirements and guidelines to be used

The contractor shall provide input to the PSR basis document as it pertains to the PSR Global assessment:

VI. The global assessment methodology
VII. The grading process and prioritisation process
VIII. The overall safety and justification for continued operation approach
IX. The approach for the development of the integrated implementation plan

The contractor shall assist with the resolution of NNR comments relating to the development of the PSR basis document and its approval.

Deliverable: No outstanding NNR comments or concerns from the NNR on the PSR basis document related to the above inputs.

4.2 Conduct the Safety Factor (SF) Reviews 1 to 6

The contractor shall execute the safety factor reviews 1 to 6 in accordance with the PSR basis document and IAEA SRS-99 and it will include the following:

I. Collect data for the 10-year period under review.
II. Complete the review tasks as identified in the PSR basis document for each safety factor
III. Assess the regulatory requirements, codes and standards identified in the PSR basis document
IV. Document the positive and negative findings identified during the review process
V. Propose preliminary corrective actions and/or safety improvements to address the negative findings.
VI. Compile a safety factor report in accordance with the structure contained in the PSR basis

document

VII. Regular interaction with the Necsa counterpart to obtain support with making information available and obtain concurrence with the findings and the report.

The contractor shall address comments by the Necsa counterpart and the NNR.

Deliverables:

- Safety factor reports 1 to 6 in accordance with the PSR basis document and accepted by Necsa and submitted to the NNR;
- A list of findings and preliminary safety improvements for each safety factor.

4.3 Lead the Global Assessment and compile the Global Assessment report

The global assessment shall be conducted in accordance with the PSR basis document. The contractor shall lead a team of Necsa SME's to conduct the global assessment.

The contractor will be required to:

I. Conduct meetings to discuss the global assessment process with the global assessment team
II. Facilitate inputs from safety factor reviewers
III. Analyse and grade the findings
IV. Prioritise the safety improvements.
V. Determine the total effect of all the negative findings and their impact on safety
VI. Consider the existing safety improvements (identified outside the PSR) when compiling the Integrated Improvement Plan to avoid duplication and have an integrated view of the safety improvements to be implemented during LTO.

Deliverables

- A list of positive and graded negative findings.
- An integrated implementation plan of the actions and safety improvements that are traceable to the findings;
- A global assessment report documenting the overall safety of SAFARI-1 for continued safe operation for the period of LTO; and

5. Project team and categories of labour required

The Contractor shall provide suitably qualified and experienced resources to execute the works and meet the agreed timelines. It is envisaged that the contractor will provide a maximum of three resources to support the completion of the PSR basis document, a maximum of six resources during the safety factor review stage and three resources during the global assessment and IIP stage. All the resources must have demonstrable experience in conducting a periodic safety review at a research reactor and/or nuclear power plant. However, atleast two of the resources must have experience

specifically related to a research reactor periodic safety review. The Employer reserves the right to examine the certification of personnel chosen by the Contractor;

6. Timing and planning

The preliminary timeline for submission of all documentation to the NNR in support of Necsa's license extension application is 31 December 2027. This is to afford the NNR sufficient time to evaluate Necsa's application for a license extension. However, the PSR documentation, consisting of the individual PSR reports, global assessment report and integrated implementation plan, shall **be completed and submitted to the NNR no later than 1 July 2027**.

The overall project timeline is expected to start (task order issued): **15 September 2025**

The project is expected to end: **31 December 2027.**

7. Working hours and work location

Normal working hours apply, but there is flexibility for remote work and alternate working hours.

8. Training

Training, medical testing and security clearance will be required for staff who need to access the facility's site and networks.

9. Necsa's scope of supply

The *Employer* is responsible for the provision of:

- Training associated with enabling the *Contractor* to gain access to the site*;*
- Provide access to the relevant data needed for the PSR; and
- Facilitate communication with the NNR.

10. Pricing

- All prices quoted to include all applicable taxes.
- Price must be fixed and firm
- Price should include additional cost elements such as freight, insurance until acceptance, duty where applicable, disbursements etc.
- Quotation must be completed in full, incomplete quote could result in a quote being disqualified.
- Payment will be according to Necsa's General Conditions of Purchase.

11. Evaluation

a. Phase 1- Functionality Evaluation / Technical Evaluation

Where functional or technical evaluation criterion is applicable, assessment will be performed in terms of the criterion listed below and the criterion may include Technical, Performance, Quality and Risk.

If the Bidder's response to the Technical templates does not indicate that the Bidder can support an acceptable technical solution, the Bidder's response will be rejected and not evaluated further.

Together the Technical, Performance & Quality and Risk criteria make up the functionality criterion and a Bidder's Proposal will be evaluated for functionality out of a possible 100 points. Only RFQ responses achieving an evaluation score of greater than the set threshold points out of the possible 100 points and which score a number of points for functionality that is greater than or equal to the set threshold points of the number of points achieved by the highest scoring Bid for functionality will be selected to progress to the second stage.

b. Phase 2 - Evaluation In Terms of Preferential Procurement Policy Framework Act, 2022

This bid will be evaluated and adjudicated according to the 80/20-point system, in terms of which a maximum of 80 points will be awarded for price and 20 points will be allocated based on the specific goals (B-BBE status level).

	POINTS
PRICE	**80**
SPECIFIC GOALS (B-BBEE status level)	**20**
Total points for Price and SPECIFIC GOALS	**100**

Preference goal

B-BBEE status level contributor

B-BBEE Status Level of Contributor	Number of points (80/20 system)
1	20
2	18
3	14
4	12

5	8
6	6
7	4
8	2
Non-compliant contributor	0

12. Required Documentation

- **Tax Clearance Certificate (Tax pin issued by SARS)**
- **Declaration of interest (SBD 4)**
- **BEE Certificate / Applicable Affidavit if classified as EME**
- **Letter of Good Standing (COID) only if Applicable due to the nature of work required**
- **Any other document or certification that might have been requested on this RFQ**

13. Important

c. **Quotation must be submitted on or before the RFQ closing date and time stated above.**

d. **Orders above R 30 000 will be evaluated according to the PPPFA 80/20-point system and a functionality scorecard where applicable and the ones above R 1 Million will be subjected to the tender process.**

e. **This RFQ is subjected to the Necsa's General Conditions of Purchase, Preferential Procurement Policy Framework Act 2000 and the Preferential Procurement Regulations, 2022, the General Conditions of Contract (GCC) and, if applicable, any other legislation or special conditions of contract**

f. **Failure on the part of a bidder to submit proof of B-BBEE Status level of contributor together with the bid, will be interpreted to mean that preference points for specific goals are not claimed.**

g. **The purchaser reserves the right to require of a bidder, either before a bid is adjudicated or at any time subsequently, to substantiate any claim in regard to specific goals, in any manner required by the purchaser.**

h. **For a Bidder to obtain clarity on any matter arising from or referred to in this document, please refer queries, in writing, to the contact details provided above. Under no circumstances may any other employee within Necsa be approached for any information. Any such action might result in a disqualification of a response submitted in competition to this RFQ.**

i. **No goods and/or services should be delivered to Necsa without an official Necsa Purchase order.**

j. **Necsa reserves the right to; cancel or reject any quote and not to award the RFQ to the lowest Bidder or award parts of the RFQ to different Bidders, or not to award the RFQ at all.**

k. The supplier shall under no circumstances offer, promise or make any gift, payment, loan, reward, inducement, benefit or other advantage, which may be construed as being made to solicit any favour, to any Necsa employee or its representatives. Such an act shall constitute a material breach of the Agreement and the Necsa shall be entitled to terminate the Agreement forthwith, without prejudice to any of its rights

l. By responding to this request, it shall be construed that: the bidder, hereby acknowledge to be fully conversant with the details and conditions set out in the Necsa's General Conditions of Purchase, Preferential Procurement Policy Framework Act 2000 and the Preferential Procurement Regulations, 2022, the General Conditions of Contract (GCC), Technical Information and Specifications attached, and hereby agree to supply, render services or perform works in accordance therewith

Annexure 1 – general description of the SAFARI-1 reactor

SAFARI-1 is a tank-in-pool type research reactor of similar design to the ORR reactor at Oak Ridge, Tennessee, USA. SAFARI-1 is a high neutron flux, light water-moderated and cooled, beryllium and light water reflected research reactor designed and built as a general research tool, falling in the class of research reactors commonly known as Materials Test Reactors (MTRs). The reactor currently uses low-enriched uranium-silicon aluminium alloy plate-type fuel assemblies of conventional MTR design and can be operated at thermal powers up to 50 MW. The present operation of the reactor is limited, for various reasons (historical, economics and technical), to 20 MW thermal, which is reflected in the operating licence.

The reactor facility is situated on the Pelindaba site of Necsa in Northwest Province, approximately 27 kilometres west of the Pretoria central business district. The region is rural in nature, except for a few small towns around the Hartbeespoort dam.

The Pelindaba site is ideally suited to an installation such as the SAFARI-1 reactor facility, since it is very stable, with no recent seismic activity. The reactor facility is located at the top of a low hill.

The main buildings and structures comprising the reactor facility are:

- The reactor building, consisting of the reactor hall, a process wing containing the primary and secondary cooling systems, inlet and exhaust ventilation fan yards, an electrical wing, various laboratories and an office wing;
- The cooling towers, comprising the ultimate heat sink for the facility; and
- A ventilation exhaust chimney stack.

The reactor building is a multi-level structure, housing all the nuclear systems, including the reactor itself. The reactor hall is an engineered confinement structure, designed to prevent or minimise radiation and radioactive contamination leakage under all conditions. Within the reactor hall is the reactor pool, containing the reactor vessel and core, and a storage pool.

The upper volume of the reactor hall, houses a 25-ton gantry crane. The crane is also equipped with a 2.5-ton auxiliary hoist.

Within the reactor hall, a series of rooms contain the equipment for the reactor, pool and secondary water systems. These include:

- Pool Equipment Room
- Pump Compartments
- Reactor Heat Exchanger Compartment
- Chemical Mixing Compartment
- Degasifier Compartment
- Reactor Demineraliser Compartments
- Reactor Demineraliser Pump and Filter Compartment
- Secondary Pumps and Storage Tank Compartment

The electrical and ventilation wing is divided into two main areas. One side houses the reactor ventilation supply equipment, and the other side is made up of a series of rooms, which contain the transformers, batteries, interconnected Uninterrupted Power Supply (UPS) and the diesel generator.

An emergency control room is equipped with emergency communications equipment, emergency procedures as well as a computer, which is connected to the building network.

The three cooling towers consist of outer shells of concrete; each is divided into two cells with a common basin. Inside each cell, the air circulation is provided by means of a galvanised steel fan driven by a motor.

The tank room floor area is filled with storage tanks containing demineralised and process water. The core of the reactor is enclosed inside a tank, known as the reactor vessel, which in turn is located in an almost 9 m deep pool of water. The Reactor vessel is a welded aluminium cylindrical tank with flanged heads at either end. The overall height between flange faces is about 4.5 m with an internal diameter of about 1.6 m. The vessel was designed for an internal pressure of about 250 kPa and a temperature of about 65 'C.

The pool is divided into three parts, which can be separated from each other by means of removable gates. The three parts are:

- The reactor pool where the reactor vessel is located.
- The storage pool is used mainly for the storage of irradiated fuel elements and radioactive equipment
- The canal pool forms part of the laboratory area and connects the pool to the hot cell. It is used for transporting active equipment, elements and irradiated samples to the hot cells.

The primary cooling system of the reactor circulates cooling water through the reactor vessel to cool the core. A separate cooling system circulates water through the pool to control the pool water temperature and purify the water. Both of these circulating systems are closed loops and the heat they carry away from the reactor is transferred via heat exchangers to a secondary cooling system, which is an open circuit system that disposes of the heat through evaporation-type cooling towers to the atmosphere.

To maintain the purity of the primary coolant, it is subjected to demineralisation and degasification systems. There are two demineralisers for the primary coolant.

Further technical details are available, for free download, of a tank-in-pool, Oak Ridge Research reactor type here. https://digital.library.unt.edu/ark:/67531/metadc1035054/.