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| Title | **Probabilistic Seismic Hazard Assessment (PSHA) for MPR Siting – Scope of Work** |
| Doc. No. | MPR-EXT-SOW-0002 |
| Rev. No. | 1 |

## APPROVAL & DISTRIBUTION

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# 1 PURPOSE AND SCOPE

## 1.1 Purpose

The purpose of this Scope of Work (SOW) is to define the tasks, deliverables, responsibilities, and requirements for the Probabilistic Seismic Hazard Assessment (PSHA) of the proposed Multi-Purpose Reactor (MPR) site. The work will inform design-basis inputs for the reactor design, Site Safety Report (SSR), Environmental Impact Assessment (EIA), and Public Information Document (PID).

## 1.2 Scope

The Service Provider shall perform the following:

- Consider the available seismic hazard, geotechnical and geophysical information relevant to the Necsa Pelindaba site.
- Provide the PSHA chapter for the SSR with due consideration of regulatory requirements and international standards or guidance.
- Provide an addendum to cover the NEMA requirements for EIA.

# 2 REFERENCES AND ABBREVIATIONS

## 2.1 References

| This document conforms to the requirements of: | |
|---|---|
| [1] | N/a |

| This document refers to the following documents: | |
|---|---|
| [2] | Regulation R.927: Regulations on the Licensing of Sites for New Nuclear Installations, 2011 |
| [3] | Regulation R.388: Regulations on Safety Standards and Regulatory Practices, 2006 |
| [4] | NNR RG-0011 Rev 0: Interim Guidance for the Siting of Nuclear Facilities |
| [5] | NNR PP-0014 Rev 0: Considerations of External Events for New Nuclear Installations |
| [6] | NNR RG-0016: Guidance on the Verification and Validation of Evaluation and Calculation Models used in Safety and Design Analyses |
| [7] | IAEA SSR-1: Site Evaluation for Nuclear Installations, 2019 |
| [8] | IAEA SSG-9 Rev 1: Seismic Hazards in Site Evaluation for Nuclear Installations |
| [9] | IAEA SSG-89: Evaluation of Seismic Safety for Nuclear Installations |
| [10] | SHEQ-INS-0824: Seismic Evaluation Strategy |
| [11] | National Environmental Management Act, Act No. 107 of 1998, as amended in 2014 |

## 2.2 Abbreviations

| Abbreviation | Description |
|---|---|
| EIA | Environmental Impact Assessment |
| IAEA | International Atomic Energy Agency |
| LRM | Licensing and Regulatory Management |
| MPR | Multi-Purpose Reactor |
| N/a | Not Applicable |
| NEMA | National Environmental Management Act |
| NNR | National Nuclear Regulator |

| Abbreviation | Description |
|---|---|
| PID | Public Information Document |
| PSHA | Probabilistic Seismic Hazard Assessment |
| SOW | Scope of Work |
| SSG | Specific Safety Guide |
| SSR | Site Safety Report |

# 3 REQUIREMENTS

## 3.1 Project Execution

The Service Provider shall:

- Provide evidence of the proposed team's qualifications and relevant experience in PSHA for nuclear or similarly regulated sites.
- Supply reports and registers in editable Word and Excel formats as appropriate, together with final signed PDF copies.
- Include an indexed register of sources, the supporting records used during the generation, review, and a register documenting review comments and their resolution.

## 3.2 Regulatory and Standards Compliance Requirements

The Service Provider shall evaluate and demonstrate compliance as appliable, but not limited, to the following:

- SHEQ-INS-0824.
- Regulations R.927 of 2011.
- Regulations R.388 of 2006.
- NNR RG-0011, Revision 0.
- NNR PP-0014, Revision 0.
- NNR RG-0016, 2016.
- IAEA SSR-1, 2019.
- IAEA SSG-9 Rev 1.
- IAEA SSG-89, Revision 1.
- NEMA Act No. 107 of 1998, as amended in 2014

# 4 DELIVERABLES

| Deliverable | Minimum content |
|---|---|
| Inception package | Methodology, information needs, responsibilities, interfaces and detailed study programme. |
| Requirement evaluation log | Applicable requirements, available evidence, adequacy assessment, justification and identified shortcomings. |
| Draft and final reports and handover package | SSR PSHA report complying with regulatory requirements.<br>EIA Addendum Report to close identified gaps on NEMA requirements. |

# 5 SCHEDULE

The final reports and handover reports shall be completed within **12 weeks** from commencement, subject to timely access to the required records, personnel and site where required. The inception report shall define milestones for the draft assessment, Necsa review, and final handover. Any constraint affecting completion shall be promptly reported to Necsa with its implications and proposed resolution.

## 6 BUDGET

The Service Provider shall provide a priced breakdown covering and not limited where required to mobilisation, specialist personnel, reporting, disbursements and applicable taxes. No work outside the approved scope may be charged without prior written authorisation.

## 7 ASSUMPTIONS

| Number | Assumption | Based on |
|---|---|---|
| 7.1 | The existing seismic, geological, geotechnical and geophysical related reports will be available as an input to the successful Service Provider. | The source SOW identifies them as inputs to this study. |
| 7.2 | The final programme will be established upon contract award. | No approved dates were provided in the source SOW. |

## 8 EXISTING INFORMATION REGISTER

The following reports will be made available as an input to the successful Service Provider.

| Report Number | File Name | Title |
|---|---|---|
| Description DSA-DES-123 version 1.0 | DSA-DES-123 The 2008 Thabana Post-Closure.pdf | The 2008 Thabana Post-Closure Radiological Safety Assessment: Ground Hydrology |
| AFRICON Report 503681G/1998 | Hydrocensus report 1998 50368.01 REPORT.pdf | Geohydrological Census Conducted around the Pelindaba Site |
| GEA-1288 | GEA1288 PELINDAB Geohydrology.pdf | The Geohydrology of Pelindaba |
| NLM-GEA-10/005 | NLM-GEA-10-005 - Pelindaba Geological Assessment series Report no.6.pdf | Pelindaba Geological Assessment Series: Report No 6. Geology of possible sites for a proposed NTP reactor in the Pelindaba West area |
| PEL001101 | PEL001101 PSHA for PBMR Fuel Plant.pdf | Probabilistic Seismic Hazard Analysis and design Basis Seismic Ground Motion Report: Pelindaba Fuel Plant Site |
| Project No. 08-3975 | R4_Complete_Brits_Graben_Seismic_ Assessment.pdf | Assessment of the Brits Graben Pelindaba Fuels Plant, Pelindaba, South Africa |
| 428558/3 | Pelindaba Final Geotech Report-March 2012.pdf | Geotechnical and Geophysical Investigations for the Dedicated Isotope Production Reactor (DIPR) at Pelindaba |
| JW39/07/A878 | PBMR geotech Report.pdf | Geotechnical Investigation PBMR Pilot Fuel Plant, Pelindaba |

| Report Number | File Name | Title |
|---|---|---|
| 428558/2 | Pelindaba Final Geotech Report-March 2012.pdf | Appendix E<br>Seismic Field Testing for Proposed New Direct Isotope Production Reactor at Pelindaba |
| GEA 1519 | Seismic Report PBMR 2001.pdf | An Assessment of the Seismic Hazard at the site of the proposed PBMR Fuel Manufacturing Plant at Pelindaba |
| 428558/2 | Pelindaba Final Geotech Report-March 2012.pdf | Appendix F<br>Short report on borehole geophysical logging and surface seismic refraction surveys at the proposed Dedicated Isotope Production reactor (DIPR) Site, Pelindaba Complex, NW Province. Quick-log Geophysics & GAP Geophysics |
| JN255-NSE-NEC-R-3335 | JN255-NSE-NEC-R-3335 Rev 1 Site Investigation.pdf | Necsa Research Reactor: Screening of potential sites geotechnical investigations. Revision 1 |
| GCS Project Number: 23-0071 (MPR-EXT-DES-00001) | Appendix-7-7_Necsa-MPR_Geotech_Geophysics-Part-1-Report_2023.05.02.pdf | Geotechnical and Geophysical Survey Description for MPR Siting at Necsa |
| GCS Project Number: 23-0071 | 23-0071_Geohpysical Report_ERT_DraftV1-07-11-2023.pdf | Geophysical Survey for Necsa MPR Phase 2 Report |
| 23-0071R01 (MPR-EXT-DES-0002) | Appendix-7-5_Geological-Comparison-Report_Preliminary-Report_compressed.pdf | Geological comparison report for the proposed Necsa MPR Phase 2 siting process: Preliminary Report<br><br>This report contains soil tests, lab results and other historical references considered in Appendix C:<br>- Candidate sites for MPR project (Phase 2 site selection): Comparison with selection implications (Banzi Geotechnics and GCS Geotechnical) March 2023<br>- Review of seismic hazard assessment of the Necsa Industrial Park, with special reference to the proposed extension of Necsa's Pipe Storage Facility, Dr M Andreoli, 2020<br>- Groundwater Flow Model developed for the Pelindaba site, J van Blerk, 2011<br>- Report on continuous surface wave and down-hole seismic testing, Dr G Heymann, 2012<br>Site plans and geological maps for site 1 and 15 |

## 9 AUTHORISATION

This Scope of Work is approved as a true and accurate reflection of the scope deliverables and requirements for the PSHA of the preferred MPR site.
By signing the authorised representatives confirm acceptance of the scope and authorise execution of the work in accordance with this document and applicable Necsa procurement contract safety quality and regulatory requirements.

## 10 REVISION HISTORY

This document has been revised in accordance with the following schedule:

| Rev. No. | Date approved | Nature of Revision | Prepared |
|---|---|---|---|
| 1.0 | See title page | First issue. | H van Graan<br>L Makgopela |