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Toro Energy

Lake Maitland Peer Review

**Peer Review – Ecological and Human
Health Risk Assessment**

4 December 2014



Date: 4/12/2014

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**TORO ENERGY
LAKE MAITLAND
PEER REVIEW – ECOLOGICAL AND HUMAN HEALTH RISK
ASSESSMENT**

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EXECUTIVE SUMMARY

The Ecological and Human Health Risk Assessment was completed employing sound assumptions and appropriate background sampling (empirical data).

The screening of the sources, pathways and receptors was conservatively completed and employed in an appropriate conceptual site exposure model.

The Contaminants of Potential Concern (COPC) include radionuclides and radon. Metals were also observed to be above typical background concentrations and may require further investigation.

The reviewer agrees with the ultimate finding that the HHRA and ERA conclude that the Lake Maitland Uranium Project (LMUP) will not form any considerable incremental risk with respect to human or ecological risk.

The review would advise that although the HHRA and ERA were soundly conducted employing conservative measures, it would be recommended that further (minor) sediment and air-dust survey be completed, in order to confirm observed background concentrations and in order to establish fresh or recent levels.

It has been noted within the HHRA and ERA document that special attention will be required to be paid to emission limits associated with the plant mining and processing technology in order to ensure that the operational impact is closely monitored during normal operations.

The reviewer acknowledges the quality of the preparation and assumptions employed in the HHRA and ERA, and limits the conclusions and observations made to the uranium mining approach, mine layout and processing technology evaluated as part of the Lake Maitland Uranium Project. Should there be any deviation to the abovementioned mining processes, layouts or processing technology, it would be likely that the HHRA and ERA should be revisited.

The reviewer acknowledges that the Peer Review undertaken is based on a single report provided, and there has been no opportunity to interrogate raw field data or modelling (ERICA) input files, in order to verify actual values used in the formulation of the final modelling outputs.

1 INTRODUCTION

Toro Energy Limited (Toro) acquired the Lake Maitland uranium deposit from Mega Uranium in August 2013 and plans to seek environmental approval for the mining of this deposit as well as the Millipede deposit. Toro plans to process ore from Centipede and Lake Way along with ore from Millipede and Lake Maitland at one central processing plant located adjacent to the Centipede deposit. Toro intends to refer the Millipede and Lake Maitland deposits to the Environmental Protection Authority (EPA) for assessment, which will require detailed surveys and studies across all proposed disturbance areas.

Mega Uranium undertook and completed environmental assessments and surveys across the Lake Maitland project sufficient to allow the proposal to be assessed under an Environmental Review and Management Programme (ERMP) (equivalent to the current PER level) in 2009. Initial discussions between the OEPA and Toro indicate that the existing environmental assessments and surveys for Lake Maitland would be acceptable for submission in a PER following peer review for correctness of content and adequacy. Toro have sought the advice and recommendations of *Ecolgia* Environment and appropriate sub-consultants who will undertake a peer review of the following reports:

- Regional and local flora
- Terrestrial fauna
- Short Range Endemic invertebrates (SREs)
- Stygofauna
- Troglifauna
- Aquatic Ecology
- Sediments and erosion
- Soils and waste rock characterization and geochemical assessment
- Human health and ecological risk assessment (human and non-human biota) and
- Air quality impact assessment and monitoring

This peer review report pertains to the *Ecological and Human Health Risk Assessment* report which was undertaken by Golder Associates *Sarah McKiernan (Senior Toxicologist) and Peter Di Marco (Principal) June 2011*.

This peer review has been undertaken by Mr Giacomo Collica, Principal at Emission Assessments Pty Ltd.

1.1 LEGISLATION AND POLICY BACKGROUND OF PEER REVIEW

1.1.1 Compliance

This peer review will satisfy the requirements of all necessary statutory legislation, guidance and policy, including but not limited to:

Human health and ecological risk assessment:

- National Environment Protection (Assessment of Site Contamination) Measure 1999 (amended 2013): Volume 5, Schedule B4, Guideline on Site Specific Health Risk Assessment Methodology; and
- National Environment Protection (Assessment of Site Contamination) Measure 1999 (amended 2013): Volume 6, Schedule B5a, Guideline on Ecological Risk Assessment.

1.1.2 Approach

A review was undertaken of all environmental reports pertaining to the acquired Lake Maitland Project for breadth of scope, technical methodology, correctness of content and adequacy. The main findings of the peer review were to determine:

- a) Correctness of findings and conclusions of all reports;
- b) Adequacy of scope, methodology and results of all reports;
- c) Compliance of all reports with statutory legislation and policy; and
- d) Recommendations to address knowledge gaps (if applicable).

2 REVIEW RESULTS

2.1 CORRECTNESS OF FINDINGS AND CONCLUSIONS

The summary and findings was representative of the measurements and assumptions made throughout the report.

The conclusion and advice offered were consistent with the findings of the investigations and all assumption made with respect to Ecological and Human Health Risk. The Risk Assessment undertaken was also comprehensive and well formulated.

Due to the elevated background levels, ultimately the operators and owners of this facility will need to ensure that a focus on emission mitigation (radioactive and others) are a central focus, in order to mitigate ecological and human health risk.

2.2 ADEQUACY OF SURVEY

2.2.1 Scope of Works

Mega Lake Maitland Pty Ltd (Mega Lake Uranium) retained Golder Associates to undertake a human health risk and ecological risk assessment (HHRA and ERA). Golder Associates personnel completed the scope of work effectively by employing well founded and commonly employed approaches. Where assumptions were required to be entered (no empirical data available), then conservative measures were employed.

The level of the survey / investigation completed was sound, and met expectations.

2.2.2 Sampling/Survey adequacy

The methodology employed to complete the HHRA and ERA was sufficient to confirm the observations.

The observations regarding the Chemical / Receptor / Exposure Path Ways and Risk are well formulated and appropriate for an operation of this type and size.

The review of the baseline characterisation / observations was accurately made based on the data available. Guideline values employed for Groundwater, Soil, Sediments Vegetation, Surface Water and Air-Dust are adequate and commonly employed in this type of assessment.

It should be noted that although Sediment surveys were soundly conducted, they will continue to form a significant finding with respect to HHRA and ERA. Further attention may be required in this area, with respect to investigation.

It is noted that Bush Tucker has been removed from this report, and not reviewed by the reviewer.

Issue Identification was well completed and constitutes a fair representation of associated risk. There were no gaps identified in this section.

The toxicity Assessment (Section 5 and Section 6) were both completed conservatively and hence form a fair representation of the area and potential future impact for this development.

2.2.3 Results

The conclusion and recommendations made as part of the HHRA and ERA were accurately interpreted and predicated on a set of conservative, well formulated assumptions.

2.3 CURRENCY OF RESULTS

It is the opinion of the reviewer that the assessment may still be maintained as current based on the proposed operations not being modified with respect to plant and mine layout, mining technology or processing technology or transportation.

No further work will be required to meet current legislation. It may be considered to further investigate (minor investigation required) sediment and air-dust quality to ensure that background levels were accurately determined and have not changed. This confirmatory sampling may be useful during plant construction and early operational periods. This investigation should also consider metals in both sediment and air-dust.

2.4 COMPLIANCE

The assessment was compliant with

- National Environment Protection (Assessment of Site Contamination) Measure 1999 (amended 2013): Volume 5, Schedule B4, Guideline on Site Specific Health Risk Assessment Methodology; and
- National Environment Protection (Assessment of Site Contamination) Measure 1999 (amended 2013): Volume 6, Schedule B5a, Guideline on Ecological Risk Assessment.

2.5 RECOMMENDATIONS AND GAP ASSESSMENT

There are no knowledge gaps that should be investigated. The assessment and assumptions made, along with the empirical evaluation conducted over a period of years is adequate to establish and support conclusions provided.

No further studies are required. It is suggested that confirmatory Sediment and Air-Dust survey (minor investigation) be conducted prior to construction phase to ensure background levels were accurately determined and have not significantly changed. This confirmatory sampling may be useful during plant construction and early operation periods. This investigation should also consider metals in both sediment and air-dust.

3 CONCLUSIONS

The HHRA and ERA were conservatively completed and representative for the observation and conclusions made.

It should be noted that any significant changes to plant layout or operations should be carefully considered with respect to HHRA and ERA.

There are no further recommendations. Should the final plant design and or mining layout alter, a HHRA and ERA should be revisited.

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4 REFERENCES

National Environment Protection (Assessment of Site Contamination) Measure 1999 (amended 2013):
Volume 5, Schedule B4, Guideline on Site Specific Health Risk Assessment Methodology; and

National Environment Protection (Assessment of Site Contamination) Measure 1999 (amended 2013):
Volume 6, Schedule B5a, Guideline on Ecological Risk Assessment.