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THE NAMIBIAN URANIUM INSTITUTE (NUI)

Always learning, always improving the way we work

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The Namibian Uranium Institute (NUI) is considered by most as “a centre of excellence” and although it is financially supported by the Namibian Uranium Association (NUA) it is operating independently. It is scientifically guided by respected independent scientists. By combining the NUI’s independence and resources, the NUI creates something unique in the field of preventative science. In accordance with its mission, the NUI engages with all stakeholders such as the Government of Namibia, workers, the industry, the public, visitors and scientists from around the world and institutions of learning during its various meetings and training

FOREWORD

workshops. It assists individual members of the exploration and mining fraternity in complying with regulations and through education, consultation and compliance monitoring.

The main focus of the NUI is on health promotion and the prevention of accidents and diseases. The NUI’s role is to support a strong safety culture, based on a commitment to a framework of common, internationally shared sustainable development principles. Since the reduction of risk factors is the scientific basis for primary prevention, the NUI promotes the development of an integrated strategy for prevention of several diseases, rather than focusing on individual ones.

At its core the NUI is a teaching facility. Affiliated with the Polytechnic of Namibia, the NUI has established itself as a reliable source of information and support for a never-ending campaign to improve knowledge, safety and the implementation of leading practices in the field of health, environmental management and radiation safety and security.

The NUI supports independent medical evaluation of employees and ex-employees as part of its commitment to implement leading practice standards, thereby protecting and promoting the health of both employees and the environment. The Namibian Lung Clinic is an example of a “smart partnership” between the University of Bern, the Dr Paul Coulson Foundation, the Polytechnic of Namibia and Erongo Medical Services. The Namibian Lung Clinic (NLC) provides independent specialist consultation and evaluation of patients.

The nuclear industry and uranium mining evokes strong opposing views. I respect the views of all stakeholders. I know that we will always grapple with the question whether uranium mining is in the best interest of our country. History will provide the answer. The NUI does, however, undertake to always remind all that they should prevent accidents, implement best practices in the field of health, environmental management and radiation safety. The exploration and mining community must at all times treat the environment and the health of the people with respect and to go

about their activities in such a manner that history will one day tell that exploration and mining were indeed in the best interest of the people of Erongo and the beautiful country of Namibia. The NUI will achieve its objectives through transparent consultation, evidence based teaching and continuous improvement.

Wotan Swiegers

Executive Director, Namibian Uranium Institute

PREAMBLE

Uranium mining remains a controversial subject, principally because of its legacy regarding environmental and health issues created during the early phase of the industry. Uranium mining and milling has however evolved significantly over the years and can and should be mined in a way that protects workers, the public and the environment. Today, uranium mining is conducted in Namibia under significantly different circumstances than in the past and is now the most regulated and one of the safest forms of mining in the world. In this regard the NUI has and continues to play a significant role.

Modern ways of mining uranium, proper risk analysis combined with strictly enforced regulatory standards is the only acceptable way forward. The focus must be on safety and environmental impacts must be limited according to acceptable standards. Mine workers, at all levels, must be properly trained and appropriately equipped to ensure that radiation and other potential hazards are prevented or minimized to prevent negative impacts. In a recently published document “Managing Environmental and Health Impacts

“ *Successful uranium producing countries must provide assurance that uranium mining is conducted in a safe, environmentally responsible manner.*

Nuclear Energy Agency

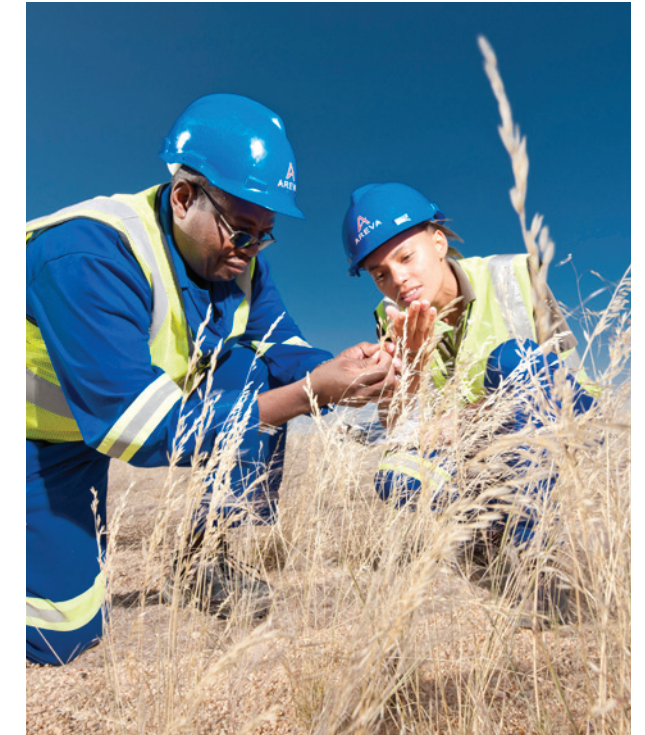
of Uranium Mining” the Nuclear Energy Agency (NEA) stressed that successful uranium producing countries **must provide assurance that uranium mining is conducted in a safe, environmentally responsible manner**. In many ways Namibia is already an excellent example of how to implement and continuously improve the key components for achieving the following goals:

- establishing the appropriate regulatory framework;
- planning for closure before the mine begins production;
- requiring companies to post financial assurance to cover the costs of remediation;

- applying leading practices to minimise the radiation exposure of workers and the local population, protect water resources and safely manage and dispose of tailings and problematic waste rock;
- instituting a programme of public consultation and information sharing, beginning with an effective and all-encompassing environmental impact assessment process;
- conducting effective environmental monitoring programmes throughout the life of the mine facility.

In the same report the NEA recommends:

- Governments, industry, regulatory agencies and the public should work together effectively to make sure that leading practice uranium mining becomes normal practice in order to leave a positive legacy for future generations.
- For countries currently producing uranium, the life cycle framework to manage health



and environmental impacts described in this report should be taken into consideration when evaluating the effectiveness of existing frameworks.

- Uranium producers should be open and transparent about their operations in order to provide the information necessary to evaluate practices.
- Those purchasing uranium should ensure that uranium is preferentially purchased from producers using leading practices outlined in this report.

A SHORT HISTORY OF THE NAMIBIAN URANIUM INSTITUTE



The Namibian Uranium Association (NUA)'s members engaged in uranium mining and processing, recognized that managing radiation, health and safety, waste and the environment, is of paramount importance for the protection of workers, the public and the environment. Responsible management of uranium mining and processing projects applies at all stages: from planning to exploration through development, construction and operations, and on to decommissioning.

The genesis of the Namibian Uranium Institute (NUI) stemmed also from the uranium industry's realization that the uncontrolled and uncoordinated "uranium exploration rush" in 2007 onwards posed a significant risk to the industry itself. The NUI was thus originally set up in an environment with little regulation relating to the uranium industry, forcing it to focus heavily on the need for regulation. The NUI has successfully initiated many well-coordinated projects around SHERQ and assisted with the creation of recommendations on legislation. Through the NUI, the uranium mining and exploration fraternity is working closely with the Government and state agencies to ensure the sustainable development of Namibia's uranium resources.

Now the situation is changing. Whilst the NUI continues to focus on specialized skills in the fields of health, environmental management and radiation safety, it had to align itself with the Government's vision in terms of national training and occupational health service delivery. Close academic ties had to be developed with the Polytechnic of Namibia (soon to be rebranded



as the **Namibian University for Science and Technology**) and Government's new **Namibia Energy Institute**. This process is ongoing.

The NUI is currently still financially supported by the NUA and tasked to promote a positive, responsible, integrated safety and preventative culture at all levels amongst the NUA community. It assists individual members in complying with regulations and mandates. The NUI accomplishes its role of regulatory liaison through education, consultation, and compliance monitoring.

- The NUI supports Uranium management on environmental, health and safety issues and actively promotes integrating these issues into the business plan and day-to-day operations of the company.

- The NUI supports **HSE departmental efforts** to recognize, evaluate and control hazards, and integrate environmental, health and safety considerations into their daily operations and planning, by imparting knowledge and affirming roles and responsibilities.
- The NUI supports **employee's efforts** to maintain a safe and healthy workplace by providing training, information, consultation, and effective feedback in a courteous, ethical, professional and timely manner.
- The NUI provides necessary services to **the community** to monitor and ensure a safe and healthy living, learning and working environment.
- The NUI also supports **universal compliance** by coordinating that certain regulatory-required reports are submitted to the Government and authorities.

FOCUS AREAS

Focus on Transparency and Dialogue

Sustained and effective communication is essential for any organization. This is especially true in the case of the uranium industry where information and transparency are crucial. The NUI's interaction with Government, labour and other stakeholders is consistent and sustained. The scientific committee of the NUI includes respected independent scientists. The main forum for interaction is the Isaac Newton Forum, an initiative by the Scientific Committee of the Namibian Uranium Institute (NUI) to stimulate debate and to build bridges of understanding and tolerance between people.

Focus on Prevention

The NUI has taken to heart a simple but enduring principle: those who create risk are best placed to control that risk, whether employers, contractors or managers. Every uranium mine has an occupational health policy and strategy (either separate or integral with safety and/or environment), con-

Namibia's uranium industry has one of the best combined health and safety records in the world.

sistent with the company's statement of business practice. It is therefore not surprising that Namibia's uranium industry has one of the best combined health and safety records in the world.

Many studies have shown that supporting preventative and self-management programmes lead to dramatically improved outcomes. The NUI is a proponent of the prevention of injuries and illness associated with work and home. The NUI supports wellness programmes, risk assessments and appropriate health, environmental and radiation safety training. Zero harm is our objective. We actively support the NOSA programme and assist member companies to implement internationally recognized programmes such as ISO 140011 and OHSAS.



Focus on Standards, Guidelines, Training and Continuous Improvement

At its core the NUI is a teaching facility. The word "institute" comes from the Latin words "institutum" meaning "facility" and "instituere" meaning "to create and educate". The NUI already established itself as a reliable source of information and support for a never-ending campaign to improve knowledge, safety and the implementation of best practices in the field of health, environmental management and radiation safety. The NUI draws on existing information and uses the evidence generated from its work, alongside with the guidelines provided by the Namibian Government, Chamber of Mines of Namibia, WNA and the International Atomic Energy Agency (IAEA) to influence policy and best practice for the future. The NUI is playing a leading role in producing and implementing best practice standards to protect and promote the Namibian "uranium brand" and to co-ordinate occupational health, radiological safety and environmental management issues.



The NUI's facilities include a Uranium Information Centre, a Training Centre and Medical and Laboratory facilities for training and research. As part of its product stewardship mission, the NUI developed partnerships with various service providers to develop a suite of standards, guidelines and training courses to cater for the needs of the uranium industry in Namibia. The Uranium Institute is officially registered with the Ministry of Labour and Social Welfare as an Authorized Inspection Authority (A.I.A Certificate 11/13) for competencies in Health, Environment and Radiation Safety/Security and Radiation.

Focus on Wellness and Health Management

Occupational medical programmes are in place at all mine sites to ensure that all employees are fit to perform their work safely. The programmes' objectives are to identify and minimize occupational exposure and to screen for early evidence of both non-occupational and occupational diseases.

The NUI's Executive Director coordinates the development, promotion and maintenance of workplace policies and programmes that ensure the physical, social and emotional wellbeing of employees and their families. In Namibia, all uranium mining and milling operations are undertaken under the Health and Safety Regulations of the Labour Act, the Atomic Energy and Radiation Protection Act and the Workers Compensation Act of Namibia. It sets strict health standards for exposure for both, workers and members of the public. Particular attention is paid to radon, a radioactive inert gas which is released to the atmosphere in very small quantities when the ore is mined and crushed. Uranium itself is only slightly radioactive. Precautions taken during the mining and milling of uranium ores to protect workers' health include:

- Efficient dust control, because the dust may contain radioactive constituents and emit radon gas;
- Limiting the radiation exposure of workers in mining, milling and tailings areas so that it is as low as possible and in any event does not



exceed the allowable dose limits set by the authorities;

- The use of radiation detection equipment in all mines and plants; and
- The enforcement of strict personal hygiene standards for workers handling uranium oxide concentrate.

Focus on Government Support

The concept of sustainable development is one of the cornerstones on which Namibia's National Constitution and National Development Plan is built. Namibia also committed itself internationally to a sustainable future, by adopting the United Nations Agenda 21 principles which cut across all sectors – social, economic and ecological.



The NUI interact continuously with the governmental agencies in Namibia and is a proponent for the implantation of leading practice from "cradle to grave" which supports planning for mine closure before mine production is licensed to ensure that the mining lease area is returned to an environmentally acceptable condition. Most of the uranium exploration and mining activities occur in the Central Namib, an ecologically-sensitive area containing parts of the Namib Naukluft National Park and Dorob National Park. Continued uranium exploration and mining could have a considerable effect on the natural environment as well as a cumulative impact on water and energy requirements, transportation, housing, schooling, and medical services. In 2009 after the Government of Namibia put a moratorium on the licensing of uranium exploration and mining, the uranium industry initiated a Strategic Environmental

Social Economic Assessment (SEA) study. The SEA was independently conducted by the Ministry of Mines and Energy (MME), Directorate Geological Survey of Namibia (GSN-DEEG) and its German Cooperation partner BGR through the Southern African Institute for Environmental Assessment (SAIEA). It was the first ever SEA & Strategic Environmental Management Plan (SEMP) for a mineral province.

The Strategic Environmental Management Plan (SEMP) is an over-arching framework and road-map for addressing the cumulative impacts of a suite of existing and potential developments linked to uranium mining. The Government takes overall responsibility for implementing the SEMP, through a close partnership between Ministry of Mines and Energy (MME) and Ministry of Environment and Tourism (MET). This is done through a broad-based steering committee that oversees the functioning of a small SEMP secretariat based at the Geological Survey within the MME. Implementation of the SEMP began in earnest in 2011 and reports were published in 2012 and 2014.

Focus on Evaluation and Self-auditing

The collection of baseline environmental data, environmental monitoring and public consultation throughout the life cycle of the mine enables verification that a facility is operating as planned, provides early warning of negative impacts on the environment and keeps stakeholders informed of developments.

Central to the NUI's strategy for improving knowledge and the implementation of quality of health, environment and radiation safety is a rigorous programme of evaluation and auditing. In 2012 and 2013, the NUI continued to work with the World Nuclear Association's (WNA) Sustainable Development Working Standardization Task Group in developing a standardized list of items, with the goal to establish an internationally standardized reporting (Checklist) between miners and utilities on the SD performance of uranium/processing sites. Nuclear utilities are required to evaluate the sustainable development performance of their suppliers, especially when they are ISO 14001 certified.



The relationship with the Namib Ecological Restoration and Monitoring Unit is crucial. NERMU was established to function as a monitoring agent for the SEMP, to drive restoration research and implementation and to develop skills in critical environmental management-related fields. The project's seed funding period ended in early 2013, but a no-cost extension was granted until the end of 2021 to allow more opportunity to seek for sustainable funding. The Unit, housed at the Gobabeb Research and Training Centre, continues to monitor selected indicators in the SEMP, assist the SEMP Office, and to develop and implement training courses and research projects on restoration and mitigation of mining impacts.

Opinion Research

Negative public perceptions of uranium mining are largely based on the adverse health and environmental impacts of outdated past practices used when uranium mining was undertaken for military purposes. The driving force, as in all types of mining at the time, was maximising production, with little regard for health, safety and the environment. This early mining period left society with serious legacies of environmental damage and health impacts on workers and, in some cases, on the public. Today, societal expectations and regulation of the industry are directed much more towards radiation protection, environmental stewardship, health and safety. Managing Environmental and Health Impacts of Uranium Mining NEA No. 7062; NUCLEAR ENERGY AGENCY.

In Namibia, workers, the public, visitors and scientists from around the world and from various institutions of learning visit the NUI. The NUI regularly conducts surveys to determine opinions and attitudes towards the uranium industry in Namibia.

The Strategic Environmental Management Plan

The Strategic Environmental Management Plan (SEMP) is an over-arching framework and road-map for addressing the cumulative impacts of a suite of existing and potential developments linked to uranium mining. The Government takes over all responsibility for implementing the SEMP through a close partnership between Ministry of Mines and Energy (MME) and Ministry of Environment and Tourism (MET). This is done through a broad-based steering committee that oversees the functioning of a small SEMP secretariat based at the Geological Survey within the MME. Implementation of the SEMP began in earnest in 2011 and culminated in the preparation of the first draft Annual SEMP monitoring Report, which was published in early 2013.

- *The Namib Environmental Restoration and Monitoring Unit (NERMU)*

NERMU was established to function as a key monitoring agent for the SEMP, to drive restoration, research and implementation, and to develop skills



in critical environmental management-related fields. The Ministry of Mines and Energy (MME) worked with their German Partners to secure funding for this unit, which led to the establishment of NERMU at Gobabeb. The German Federal Ministry for Economic Cooperation and Development, through the Technical Cooperation Project between the German Federal Institute for Geosciences and Natural Resources (BGR) and the Geological Survey of Namibia (GSN), provided seed funding in 2011 and awarded a grant for 2012 – 2014. NERMU continues to assist the SEMP Office.

• *The SEMP Report*

The Geological Survey of Namibia, Ministry of Mines and Energy, continued to run the SEMP office that coordinates the monitoring under the Strategic Environmental Management Plan (SEMP). This management plan provides strategic directions to the uranium industry, government and other stakeholders in the central Namib. Additionally, it assists to continuously monitor the cumulative impacts in the Erongo region.

The second Annual Report compiled by the SEMP team at the Geological Survey of Namibia was released in May 2014. The 2012 SEA scenario for the uranium mining sector resembles Scenario 1 of the Strategic Environmental Assessment (below expectations), as Rio Tinto’s Rössing and Paladin’s Langer Heinrich were the only two uranium mines in operation. About 4500 t U were produced in 2012 including 251 t from Areva Resources Namibia’s pilot test at Trekkopje. The construction of Swakop Uranium’s Husab project commenced in October 2012. Environmental approval for Bannerman Resources Namibia was submit-

ted in 2012. Like Reptile Uranium Namibia, Bannerman is waiting for a mining licence. Amongst the probably emerging mines is also Valencia, however, because of its low grade and unfavourable uranium prices, mining have not started. A mining licence was issued to Zhonghe Resources in November 2012.

The second Annual SEMP Report covers the period up to the end of the year 2012. The SEMP Operational Plan has 12 Environmental Quality Objectives (EQOs) that are a collective proxy for measuring the extent to which the developments in the uranium sector are moving the Erongo Region towards or away from a desired future state. There are 38 desired outcomes, 46 targets, and 125 indicators spread across the EQOs. The EQOs each articulate a specific goal, provide a context, set standards and elaborate on a number of key indicators that need to be monitored. These collectively make up the SEMP which is the framework within which individual projects have to be planned and implemented, and within which a number of institutions have to undertake certain actions. The desired outcome is that the devel-

opment and utilization of Namibia’s uranium resources will contribute significantly to the goal of sustainable development for the Erongo Region and indeed Namibia as a whole.

The focus of the report is once again on the assessment of compliance with the EQOs and how these were carried out. Relevant data are presented to support the assessment. All indicators for the various EQOs have been assessed according to a colour-coded system, and overall, indicators performed as follows (2011 figures for comparison):

Status (%)	2012	2011
NOT MET	20 (16%)	14 (11%)
IN PROGRESS	39 (31%)	44 (33%)
MET	58 (46%)	64 (51%)
EXCEEDED	1 (1%)	1 (1%)

Evidently, mining is associated with positive synergies such as employment, infrastructures and various socio-economic benefits; however the potentially negative effects (e.g. air quality and radiation, effect on tourism) are amongst the major public concerns. Nonetheless, the central Namib still remains a top destination for tourism and development. The 2012 assessment proves that land users within the region are collaborative and caring for the social, economic, and natural environment.

Compared to the 2011 report, the uranium activities have not significantly reduced the visual attractiveness of the Central Namib, and the respective indicator is even EXCEEDED. 46 percent of the total indicators are MET, with 100% MET attained in EQO 1(Socio-Economic Development) and EQO 2 (Employment). Governance (EQO10), Mine Closure and Future Land Use (EQ12) and Effect on Tourism (EQO7), Heritage and the Future (EQO11) are amongst the best performing EQOs; followed by the Infrastructure (EQO3), Water (EQO4) and the Effect on Tourism EQO (EQO7). The number of indicators that are in-progress has reduced from

33% in 2011 to 31% in 2012. Sixteen percent of the indicators are NOT MET. Six percent of the indicators did unfortunately not have sufficient data to be fully assessed; therefore they are also rated as NOT MET and included in the 16%.



**Werner Ewald**

Chairman of the Sustainable Development Committee

The NUA has established a standing committee, the Sustainable Development Committee, which works very closely with the NUI. The aim of the Sustainable Development committee is to ensure that the uranium supplied as fuel for the nuclear fuel cycle is produced, transported, stored, managed and used in a socially, economically and environmentally responsible manner, without causing harm at any stage. The Sustainable Development Committee appoints Working Groups to address common issues and aims to set world's best practice standards for all aspects of the Namibian uranium industry.

Sustainable Development Committee:

Chair: Werner Ewald

Working Group: Radiation Safety – Chair: Dr. Gunhild von Oertzen

Working Group: Swakop River Farmers – Chair: Mike Leech

Working Group: Water Quality – Chair: Rainer Schneeweiss



left to right:

Monika Ruppel - Administrator

Frolian Andjamba - Environmental Guide

Ailly Namupala - Communication Officer

front:

Dr. Wotan Swiegers - Executive Director of the
Namibian Uranium Institute

SCIENTIFIC AND TECHNICAL ADVISORS

Prof. G. Obermair

Prof. S. Moyo

Prof. C. von Garnier

Dr. D. von Oertzen

Dr. G. Schneider

Mr. E. Mueller

Mr. B. Munro



Director
P.O. Box 2747
Swakopmund 9000
Namibia

Tel: +264 (64) 402393 | Fax: +264 (64) 402394
E-mail: director@namibianuranium.org | Website: www.namibianuranium.org