Ministry of Mines and Energy

Geological Survey of Namibia
Bundesanstalt für Geowissenschaften und Rohstoffe (BGR)

Strategic Environmental Management Plan (SEMP) for the Central Namib Uranium Rush 2011 Annual Report

February 2013

Prepared by

Geological Survey of Namibia

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Copies of this report and the Strategic Environmental Assessment report may be obtained from the Geological Survey of Namibia, Ministry of Mines and Energy. Electronic copies (pdf format) are available from the Uranium Institute website (www.namibiauraniuminstitute.com), the NERMU website (http://www.gobabebtrc.org/index.php?option=com_content&view=article&id=139&Itemid=136) and the Ministry of Mines and Energy website (www.mme.gov.na).

ABBREVIATIONS

BGR	German Federal Institute for Geosciences and Natural Resources
BMR	Bannerman Mining Resources
EC	Environmental Contract
ECB	Electricity Control Board
EEC	Employment Equity Commissioner
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPZ	Export Processing Zone
EPL	Exclusive Prospecting License
EQO	Environmental Quality Objective
ESIA	Environmental and Social Impact Assessment
FFI	Fauna and Flora International
GRN	Government of the Republic of Namibia
GSN	Geological Survey of Namibia
HERSS	Health, Environment, Radiation Safety and Security
HR	Human Resources
IAEA	International Atomic Energy Agency
ICRP	International Commission on Radiological Protection
LHM	Langer Heinrich Uranium Mine
LLA	Landscape Level Assessment
LTI	Loss Time Injury
MC	Mining Commissioner
MCP	Mine Closure Plan
MET	Ministry of Environment and Tourism
ML	Mining License
MoE	Ministries of Education
MoHSS	Ministry of Health and Social Services
MoLSW	Ministry of Labour and Social Welfare
MME	Ministry of Mines and Energy
MPMRAC	Minerals Prospecting and Mining Rights Advisory Committee
MVA	Motor Vehicle Accident Fund
NAA	Neutron Activation Analysis
NACOMA	Namibian Coast Conservation and Management Project
NDP	National Development Plans
NIMT	Namibia Institute of Mining Technology
NRPA	National Radiation Protection Authority
PON	Polytechnic of Namibia
SANS	South African National Standards
SC	Steering Committee of the SEMP
SEA	Strategic Environmental Assessment of the Central Namib Uranium Rush
SEMP	Strategic Environmental Management Plan
SME	Small and Medium Enterprises
SU	Swakop Uranium
RUL	Rössing Uranium Limited
RUN	Reptile Uranium Namibia
UNAM	University of Namibia
VTC	Vocational Training Centre

EXECUTIVE SUMMARY

At the time of completion of this report in January 2013, the uranium mining sector most closely resembles Scenario 1 (below expectations) as defined in the SEA. Rio Tinto Rössing and Langer Heinrich are the only two uranium mines in operation. Construction of Swakop Uranium's Husab mine is expected to start in early 2013, while AREVA's Trekkopje mine will be mothballed in June 2013 due to the low uranium price. The Bannerman, Marenica, Reptile and Valencia uranium projects have been postponed for the same reason, though Reptile's iron ore mine may go ahead.

This is the first annual report produced under the Strategic Environmental Management Plan for the Namibian Uranium Province, and covers the period up to the end of 2011. The SEMP Operational Plan (Annexure 1) currently has 12 Environmental Quality Objectives (EQOs) that are a collective proxy for measuring the extent to which the Uranium Rush is 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 development and utilization of Namibia´s uranium resources will contribute significantly to the goal of sustainable development for the Erongo Region and Namibia as a whole.

All indicators for the various Environmental Quality Objectives (EQOs) have been assessed according to the following colour-coded system:

Status:	***NOT MET***	***IN PROGRESS***	***MET***	***EXCEEDED***

The focus of the report is on the assessment of compliance with the EQOs and how these were carried out. Relevant data are presented to support the assessment.

Overall, indicators performed as follows:

Status:	***14 (11%)***	***41 (33%)***	***64 (51%)***	***1 (1%)***

Five indicators could not be assessed during this reporting period.

Figure 1 shows the results for each EQO to identify sectors that did well and enable shortcomings to be brought to the attention for the responsible organisations. EQOs for which 100% of the indicators were MET are: EQO1 Socio-economic Development, EQO2 Employment and EQO6 Health, though the latter was mainly met in the private healthcare sector. Mostly MET with only one indicator IN PROGRESS were EQO8 Water and EQO12 Closure and Land Use. EQO11 Heritage and Future was mostly MET, only the ongoing research classified as IN PROGRESS brought down the overall rating. EQO10 Governance was MET or IN PROGRESS and will benefit from the matter of two impractical indicators being resolved before the next report.

Of concern are those EQOs where some of the requirements were NOT MET. The highest number of six was reported for EQO3 Infrastructure and can be summarised as follows: 1) The D1984 between Swakopmund and Walvis Bay has not yet been tarred, 2) The average waiting time for a ship to berth is more than 12 hours, 3) and 4) Waste sites were not audited, 5) Hazardous waste sites did not only accept the waste classes for which they were licensed, and 6) There was no water and air quality monitoring at waste sites. The other underperforming EQOs each had one indicator NOT MET: EQO5 Air Quality and Radiation: There was no accredited weather station at Swakopmund, EQO7 Tourism: Not all EIAs included a visual impact assessment, EQO8: Ecological Integrity: Species

extinction risk was generally not addressed in EIAs, and EQO9 Education: The target of 50% of all English and science marks in Grade 10 and 12 examinations being a D or better was NOT MET.

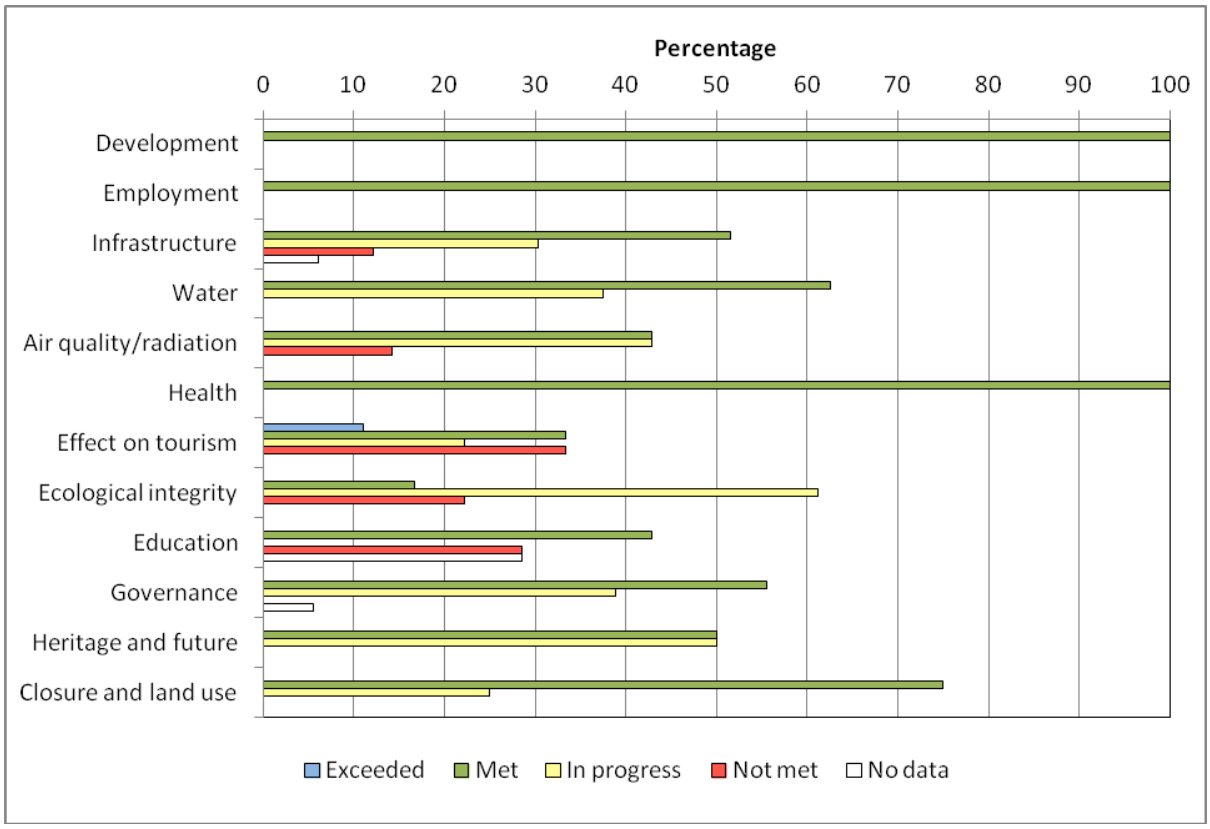

Figure 1: Summary of results for the 12 EQOs

Eight indicators (6%) could not be assessed, because of lack of data or because they turned out to be impractical and/or represent duplication. This will have to be addressed before the compilation of the next report. As this report is the first of its kind, some problems inherent to first-time-attempts were experienced. As the stakeholder group is very large, submission of data was not necessarily in a standard format, and in some cases we were not able to obtain the required data. It is hoped that these problems will be ironed out with the compilation of the 2012 report.

Following publication of this report it is expected that all stakeholders will take note of the results and attempt to address any shortcomings that were identified within their respective areas of influence. The aims of the SEMP to safeguard the Erongo Region while getting the most out of our natural resources can only be achieved by making every effort towards continued improvement.

ACKNOWLEDGEMENTS

We would like to extend our gratitude to all those people who were fundamental to the SEA process, including those who deserved special mention, but were not acknowledged by name in the printing of the SEA report.

We would also like to thank the SEMP Steering Committee members, who have been instrumental in the SEMP activities as well as for giving guidance through this process. Two persons deserve special mention because of their outstanding contributions, namely Sandra Müller of AREVA and Dr Wotan Swiegers of the Uranium Institute (UI).

The UI in Swakopmund hosted the SEMP Steering Committee meetings. The UI working group has been in contact with the uranium industry and supplied much of the data to complete this report to the SEMP Office.

Members of the uranium industry in Namibia have voluntarily increasingly applied the SEA/SEMP to guide their mine and exploration plans to minimize and manage potential environmental impacts.

The Southern African Institute for Environmental Assessment (SAIEA) has laid the foundation for this report through their lead in developing the SEA and the SEMP.

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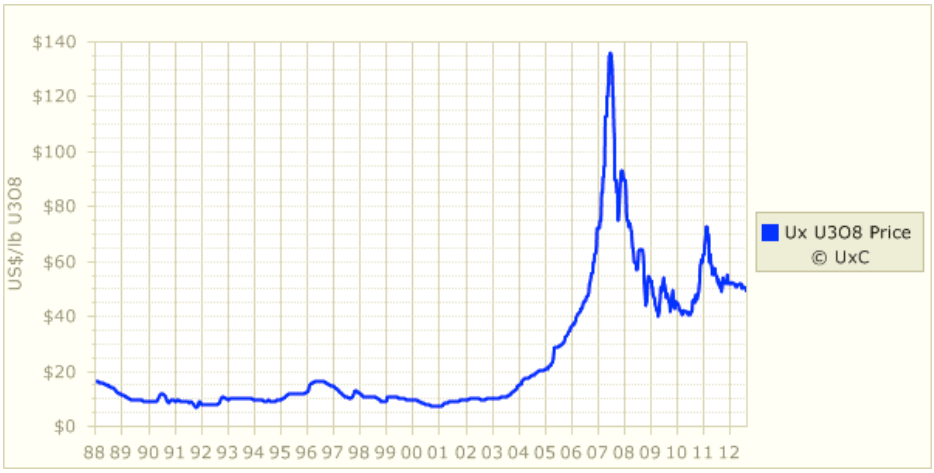
Figure 1: Yearly uranium (U_3O_8) price from 1988 till 2012 (Source: The Ux Consulting Company, LLC**)**

1 INTRODUCTION

1.1 SEMP Background: The SEA

On behalf of the Ministry of Mines and Energy (MME), the Project of Technical Cooperation between the Geological Survey of Namibia (GSN) and the German Federal Institute for Geosciences and Natural Resources (BGR), conducted the worldwide first Strategic Environmental Assessment (SEA), for a mining area, in this case on uranium mining and exploration in western central Namibia. In 2009, the Southern African Institute for Environmental Assessment (SAIEA) was contracted by the project, to undertake the SEA for the Central Namib "Uranium Rush".

Over the past 30 years, prospecting for uranium in Namibia was at a relatively low intensity, but this changed from 2006 onwards, when it was estimated that the supplies of both primary and secondary uranium would be unlikely to meet projected nuclear reactor requirements in the short or medium term. This led to concerns about the security of uranium supplies, which in turn saw uranium prices rising (Figure 1). This in turn triggered renewed interest in uranium exploration; with a scramble for prospecting rights in the Central Namib resulting in MME in 2007 placing a moratorium in on issuing further uranium prospecting licenses. The moratorium was to ensure that the authorities and other stakeholders could consider how best to manage the "Uranium Rush". As the moratorium does not prevent MME from upgrading an existing prospecting license to a mining license, the moratorium was not likely to significantly slow down the 'rush' to develop new mines. The SEA was thus expected to provide a strategic direction to the uranium industry, government and other stakeholders in the Central Namib.



The SEA differed from most other SEAs conducted elsewhere because it was addressing neither a policy, a plan nor a programme, but rather a collection of projects, each being conducted by individual companies that are not related to each other and that were, in many cases, being undertaken in isolation of each other.

The overall objectives of the SEA were as follows:

- Develop and assess **viable scenarios** of mining and associated developments as a basis for subsequent decision-making and formal planning.
- Provide **recommendations** on accepted overall strategic approaches for sustainable mining development in the Erongo Region.
- Provide **guidance for overall solutions** on crucial (cumulative) impacts and challenges stemming from the mining operations.
- Outline a **Strategic Environmental Management Plan** (SEMP).

1.2 The SEMP

The SEA identified the need to continuously monitor a broad set of parameters within a Strategic Environmental Management Plan (SEMP). The logical consequence of an SEA is the guidance on how sustainability principles can be mainstreamed throughout the life cycle of activities and projects. This guidance is provided through the Strategic Environmental Management Plan (SEMP) which is overseen by a broad-based SEMP Steering Committee and managed by a dedicated SEMP office (Figure 2).

The SEMP therefore is an **over-arching framework** and roadmap for addressing the cumulative impacts of a suite of existing and potential developments. The manner in which this is achieved is by setting limits of environmental quality (i.e. performance targets) that need to be achieved by the proponents of individual projects. The SEMP does not remove the obligation from a developer for conducting a project-specific Environmental Impact Assessment (EIA) and abiding by a site-specific Environmental Management Plan (EMP). Thus, the SEMP is intended to guide both mining and other related industrial developments in the Erongo Region so that they do not unnecessarily compromise the natural, social, economic and physical environments.

Through the SEA it was recommended that the best way for Namibia to manage the Uranium Rush is for decision makers at all levels to enter into meaningful partnerships with each other, so that the country can utilise all available skills. The Government is to take overall responsibility for implementing the SEMP, through a close partnership between MME and MET. This is done through a broad-based steering committee that oversees the functioning of the SEMP office to administer the SEMP based in Windhoek at the GSN. The SEMP office has staff who manage and collate the monitoring, communication and reporting. The first SEMP Steering Committee (SC) meeting was held in November 2010, and subsequently three more SC meetings have been held.

The Terms of Reference for the SEMP Steering Committee are as follows:

- Voluntarily serve the SEMP process (i.e. no salary, sitting allowance, per diem, etc.);
- Appoint/reappoint the SEMP coordinator and;
- Approve annual work plans and responsibilities;
- Source funds for the budget;
- Review and approve the annual SEMP report;
- Advise GRN on SEMP concerning the developments and dynamics of the uranium mining industry (i.e. refine/adjust scenarios); and
- The SEMP coordinator should be an institution, which is contracted by the GRN through the Steering Committee, to develop and nurture partnerships, oversee monitoring and data gathering, and compile the SEMP annual report.

The responsibilities of the SEMP SC according to the Terms of Reference (TOR) include:

1. To evaluate the implementation of the SEA recommendations
2. To provide general guidance and direction to the SEMP
3. To make recommendations on the implementation of the SEMP
4. To give strategic and technical input into the SEMP process
5. To monitor work done by working groups within the SEMP, and to deliver monitoring data including data interpretation to the SEMP Office at GSN following the SEMP report template in a timely manner
6. To seek specialist advice where appropriate and appoint External Reviewer(s)
7. To create mechanisms for interaction with the line ministries, Erongo Regional Council, private sector, and other stakeholders
8. Review and approve the annual SEMP report
9. To ensure dissemination of information within each of the participating institutions
10. To ensure and facilitate communication with the public and stakeholders

Figure 2: The SEMP Structure

11. To develop and oversee a communication strategy
12. To seek additional funding to support the SEMP activities

2 THE SEMP OPERATIONAL PLAN

At the time of completion of this report in January 2013, the uranium mining sector most closely resembles Scenario 1 (below expectations) as defined in the SEA. Rio Tinto Rössing and Langer Heinrich are the only two uranium mines in operation. Construction of Swakop Uranium's Husab mine is expected to start in early 2013, while AREVA's Trekkopje mine will be mothballed in June 2013 due to the low uranium price. The Bannerman, Marenica, Reptile and Valencia uranium projects have been postponed for the same reason, though Reptile's iron ore mine may go ahead. Marenica, Reptile, Valencia and Zhonghe have ongoing exploration activities and are members of the Uranium Institute. The other exploration companies are not represented and were therefore not approached for information on their compliance with the EQOs. This shortcoming should be corrected in the next SEMP report.

The EQO information contained in this report pertains to 2011 and is compared to previous years if figures were available. As this is the first SEMP report, the most recently available data are mentioned, where these were not available for 2011. If no year is indicated, the data are from 2011, as received by the SEMP office by April 2012.

Fundamental to the development of the SEMP was setting the Environmental Quality Objectives (EQOs) to try and define the limits of acceptable change that can be tolerated due to the Uranium Rush. 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 (Table 1). These collectively make up the SEMP which is the framework within which individual projects need to be planned and implemented and within which a number of institutions need to undertake certain actions. **The desired outcome** is thus that the development and utilization of Namibia´s uranium resources will contribute significantly to the goal of sustainable development for the Erongo Region and Namibia as a whole.

The SEMP Operational Plan (Annex 1) currently has 12 Environmental Quality Objectives (EQOs) that are a collective proxy for measuring the extent to which the Uranium Rush is moving the Erongo Region towards or away from a desired future state (Table 1). There are 38 desired outcomes, 46 targets, and 127 indicators spread across the EQOs.

The SEMP office collates the data required to assess the key performance indicators listed in the EQOs to compile the annual SEMP report. With assistance from its many partners, the SEMP office produces an annual SEMP report that provides a clear indication of what targets are being EXCEEDED, MET, IN PROGRESS or NOT MET, through the EQOs.

Monitoring for EQOs does not end with the collection of environmental information but includes their evaluation, interpretation, reporting and recommendations for corrective action. Information received through monitoring can be of assistance when considering appropriate remedial action by the relevant stakeholders.

No.	Environmental Quality Objective (EQO)	Aims of EQO
1	Socio-Economic Development	The Uranium Rush improves Namibia and the Erongo region's sustainable socio-economic development and outlook without undermining the growth potential of other sectors.
2	Employment	Promote local employment and integration of society.
3	Infrastructure	Key infrastructure is adequate and well maintained, thus enabling economic development, public convenience and safety.
4	Water	To ensure that the public have the same or better access to water in future as they have currently, and that the integrity of all aquifers remains consistent with the existing natural and operational conditions (baseline). This requires that both the quantity and quality of groundwater are not adversely affected by prospecting and mining activities.
5	Air quality and radiation	Workers and the public do not suffer significant increased health risks as a result of radiation exposure from the Uranium Rush.
6	Health	Workers and the public do not suffer significant increased health risks from the Uranium Rush.
7	Effect on tourism	The natural beauty of the desert and its sense of place are not compromised unduly by the Uranium Rush; and to identify ways of avoiding conflicts between the tourism industry and prospecting/mining, so that both industries can coexist in the Central Namib. The Uranium Rush does not prevent the public from visiting the usually accessible areas in the Central Namib for personal recreation and enjoyment; and to identify ways of avoiding conflicts between the need for public access and mining.
8	Ecological integrity	The ecological integrity and diversity of fauna and flora of the Central Namib is not compromised by the Uranium Rush. Integrity in this case means that ecological processes are maintained, key habitats are protected, rare and endangered and endemic species are not threatened. All efforts are taken to avoid impacts to the Namib and where this is not possible, disturbed areas are rehabilitated and restored to function after mining/development.
9	Education	In the Erongo Learning Region, people continue to have affordable and improved access to basic, secondary and tertiary education, which enables them to develop and improve skills and take advantage of economic opportunities.
10	Governance	Institutions that are responsible for managing the Uranium Rush provide effective governance through good leadership, oversight and facilitation, so that all legal requirements are met by all parties involved, either directly or indirectly, in prospecting and mining of uranium.
11	Heritage and future	Namibia's international image is maintained and enhanced, as the 'Namib Uranium Province' builds a good international reputation as a result of generally reliable, ethical, trustworthy and responsible practices/behaviour and more specifically, because of environmentally, socially and financially responsible uranium mining operations. Uranium exploration and mining - and all related infrastructure

No.	Environmental Quality Objective (EQO)	Aims of EQO
		developments - will have the least possible negative impact on archaeological heritage resources. Survey, assessment and mitigation will result in significant advances in knowledge of archaeological heritage resources, so that their conservation status is improved and their use in research, education and tourism is placed on a secure and sustainable footing
12	Mine closure and future land use	To maximize the sustainable contribution mines can make post closure to society and the region, and to minimize the social, economic and biophysical impacts of mine closure.

Table 1: The Environmental Quality Objectives of the SEMP Operational Plan

3 URANIUM MINING AND EXPLORATION IN THE ERONGO REGION

There are currently five (5) mining licenses (ML) and eighteen (18) exclusive prospecting licenses (EPL) granted for the Erongo region. Of the five mining licenses only two of the mines (Rio Tinto's Rössing Uranium Mine and Paladin Energy's Langer Heinrich Mine) are fully operational with expansion plans, and Swakop Uranium´s Husab Mine is in the process of being built. Only a few of the exploration companies are in advanced stages. Of these, Bannerman Mining Resources Namibia has put in an application for a mining license, and Valencia has already obtained one. Marenica, Reptile, Valencia and Zhonge have ongoing exploration activities, but not much is known about the other companies.

Mining Licenses (ML)	Exclusive Prospecting License (EPL)
1. Areva Resources Namibia (Trekkopje Mine)	1. Ancash Investments
2. Paladin Energy (Langer Heinrich Mine)	2. Bannerman Mining Resources Namibia (Pty) Ltd
3. Rio Tinto (Rössing Uranium Mine)	3. Cheetah Minerals Exploration
4. Swakop Uranium (Husab Mine)	4. Dunefield Mining Company
5. Forsys (Valencia Mine)	5. Erongo Energy
	6. Extract Resources (Namibia)/Swakop Uranium
	7. Green Mineral Resources
	8. Paladin Energy (Langer Heinrich Mine)
	9. Marenica Minerals (Pty)Ltd
	10. Namura
	11. Nova Energy Namibia
	12. Petunia Investments Three
	13. Pitchstone
	14. Reptile Uranium Namibia (Pty) Ltd
	15. SWA Uranium Mines
	16. Uramin/Areva Resources Namibia (pending)
	17. VTB Namibia
	18. Zhonghe Resources (Namibia) Development

Table 2: Current Mining and Exploration Licenses in the Erongo Region

licenses (October 2012).

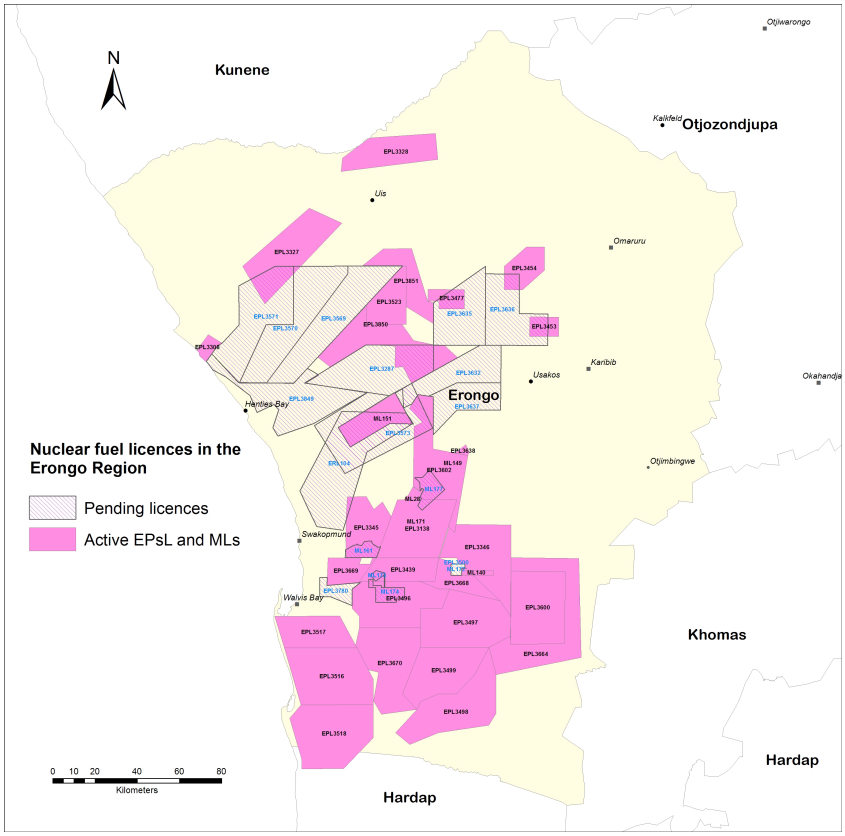


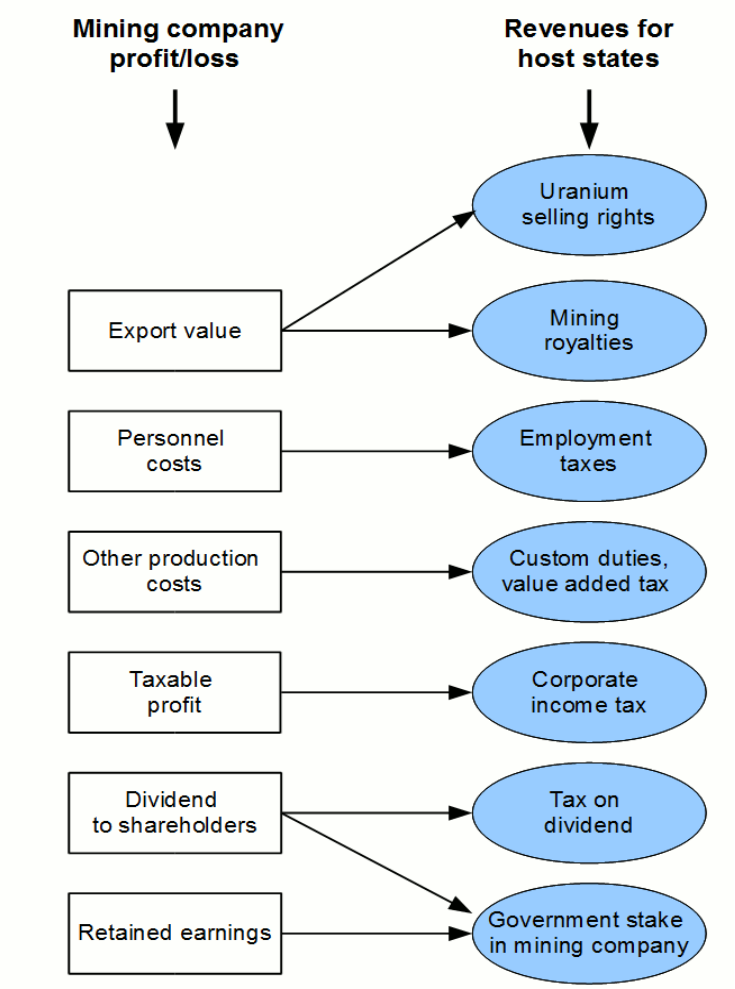
Figure 4: Potential sources of revenue from uranium mining companies for host countries

4 NARRATIVE REPORT ON EACH ENVIRONMENTAL QUALITY OBJECTIVE (EQOs)

EQO 1.	Socio-Economic Development
Aims of this EQO: The Uranium Rush improves Namibia´s and the Erongo region's sustainable socio-economic development and outlook without undermining the growth potential of other sectors.	

Discussion

There are various potential revenues that may accrue to countries which host uranium mines. These potential sources of revenue (indicated by the blue ovals in Figure 4) comprise various taxes, royalties and other contributions (Kate & Wilde-Ramsing 2011). For the purpose of this report we will concentrate on mining royalties and corporate income taxes.



Desired Outcome 1.1.	**Income and economic opportunities from the Uranium Rush are optimized**
Target 1.1.1.	**Contribution of mining to the economy increases over time**
Indicator 1.1.1.1.	**Royalties are paid in full by mining companies**
Status:	***MET***

Mining royalties generally comprise a percentage of the export value of the uranium. Royalties are only levied on products sold. Even if the mining company is not making taxable profits but exports large quantities of product, royalties can still be a reliable source of revenue. The uranium royalty rate in 2010 for Rössing Uranium was 6% and for Langer Heinrich Uranium Ltd it was 3% .

- Only two uranium mines are in full production. Rössing Uranium has been paying royalties since 2009 and Langer Heinrich Mine (LHM) has been paying royalties since start-up.
- Valencia and AREVA Namibia are still in the mine development stage. No royalties were therefore due to be paid.
- Swakop Uranium's Husab Mine is under construction only, and therefore no royalties were paid.
- Many other companies such as Bannerman for example, are still in the exploration phase and not generating income from the sale of uranium.

Status: Because all companies that should and could be paying royalties are doing so, the status of this indicator is therefore taken as MET.

Indicator 1.1.1.2.	**Corporate taxes are paid in full by mines and associated companies.**
Status:	***MET***

Corporate income tax is a percentage of the taxable profit generated by the mining company. In addition to mining royalties and employment taxes, corporate income tax is a very important source of revenue. However, whether or not profits are made very much depends on the reported spot price of uranium and prices agreed upon in long-term contracts with buyers. Profits also depend on production costs and the cycle of the mine, since a mine will typically not make profits in the early years (lower production and offsetting of capital costs) before getting to peak production and profit. Rössing Uranium made a loss of N$ 43 million in 2010, and therefore paid no corporate tax. The Langer Heinrich Mine has been in a constant stage of expansion since its start-up, and as the Capital expenditure is tax deductible over a three-year period, no corporate taxes have been paid to date.

In the case of Trekkopje, Bannerman, and Husab, company tax that accumulates during the construction phase will be written off against future operating profits. These companies are therefore unlikely to pay company tax in the next few years. Contributions to the national economy are being made in terms of taxes paid on employees' and contractors' salaries and VAT on purchases.

Status: However, because the companies were not required to pay tax within the applicable fiscal regime, the status of this indicator is therefore still taken as MET.

Indicator 1.1.1.3.	Increasingly, inputs that can be sourced locally are not imported.
Status:	*MET*

In 2010 most of **Rössing Uranium's** procurement expenditure was on Namibian-registered suppliers, amounting to N$1.6 billion, accounting for 67% of the total procurement expenditure.

Langer Heinrich Uranium Mine has a policy of supporting Namibian businesses, with specific emphasis on businesses situated in Swakopmund and Walvis Bay. A constant effort is made to support small and medium enterprises (SMEs) and female-owned businesses and to assist in the development of these businesses with the support of the current supplier base.

Local businesses are encouraged to tender for projects at **Trekkopje Mine**. Tenders for purchases and projects are evaluated in terms of quality, price and delivery time. Namibian companies are selected if their offers are competitive. Local businesses were concerned about foreign companies getting the bulk of the mine construction tenders and opening branch offices in Namibia that will be able to offer more competitive prices due to the economy of scale. However, most Namibian companies do not have the required equipment and level of skill required by large-scale projects, such as building a uranium processing plant.

AREVA has looked at ways in which local companies can benefit from the presence of the mine. For instance, non-core services were already outsourced to local SMEs. Once the mine is in operation it will provide more funds towards improving SMEs that offer services to the mining industry as part of its corporate social responsibility programme. For construction work, foreign and local companies have formed joint ventures or partnerships. These businesses are gaining income and experience by being exposed to the level of work and expertise needed to fulfil the contract. Many items of mining equipment can now be sourced locally and are comparable in price to South African imports.

At **Swakop Uranium** (SU) local expertise is used as far as is possible without compromising quality and deadlines. SU has held two meetings with potential local suppliers and a bidders list of qualified concerns has been established.

Bannerman Mining Resources (BMR) uses primarily local businesses for its exploration activities. All drilling, sample analysis and rehabilitation are done by Namibian contractors. BMR has also transferred its metallurgical test work from Perth, Australia to Swakopmund, Namibia in 2011. The Bannerman Resources project design team in Australia uses Australian based consulting engineers to assist with the design of the future mine and process plant. BMR has helped two local SMEs in establishing and expanding their businesses. Elga Environmental Rehabilitation cc is an SME established through the help of BMR, while Metzger Drilling has grown considerably primarily due to the activities of BMR. Once the mine is in operation it will provide more funds through its corporate social responsibility programme towards improving SMEs that offer services to the mining industry as part of its corporate social responsibility programme.

Reptile Uranium Namibia (RUN) acquires 88% of goods and services locally and 12% foreign goods and services from abroad.

Status: The indicator can therefore be considered to be MET.

Indicator 1.1.1.4.	Processing companies connected to uranium mines are not granted EPZ status.			
Status:			*MET*	

Export Processing Zone (EPZ) status is granted to a manufacturer who derives an income from the export of goods manufactured or produced by it to another country and is entitled to an additional deduction of 25% of specified types of expenses. The only processing company with an EPZ is AREVA Processing Namibia, which is thus exempt from VAT. AREVA Processing Namibia was the second processing company to obtain an EPZ status after Scorpion Zinc set a precedent. The decision to award EPZ status was made by the Ministry of Trade & Industry. While not currently revenue-generating, the company provides an income and job experience to many Namibians.

Status: The indicator is taken as MET, because there are no new EPZs and the award of the existing EPZ status pre-dates the SEMP.

EQO 2.	Employment
Aims of this EQO: Promote local employment and integration of society.	

Namibia is endowed with natural resources such as mineral resources, agricultural stock, fisheries, wild life and tourism destinations. Despite this considerable wealth, unemployment rates are still above fifty per cent, which is an unacceptable condition for a country with a relatively small population of 2.4 million. Large numbers of Namibians seeking jobs in the formal sector cannot be accommodated due to a lack of necessary skills or training. While the unemployment problem remains chronic, the government is aggressively pursuing education reform to overcome this problem. The National Development Plans (NDP) and Vision 2030 are also quite clear on employment issues. There are government policies aimed at promoting growth and employment and reducing poverty and inequality. These include fast-tracking the development of new skills and development centres, expanding institutions such as the Namibia Institute of Mining and Technology (NIMT) and to extend the mining and engineering faculties at the University of Namibia (UNAM) and the Polytechnic of Namibia (PON) to produce skilled and semi-skilled labour as well as qualified managers in order to operate in a safe and efficient manner.

While this demand may not be able to be met from Namibians in the short-term, the objective should be to develop the local skills base over time. Conversely, employment creation is not only the duty of the government; it needs the assistance of the private sector such as the mining industry and innovative people that can bring change. Despite the fact that the mining sector in 2010 employed only about 0.74% of the population of the total labour force, it is still the largest private sector employer in the country. 6847 direct jobs were provided by the mining industry in 2010, and 2066 of these were in uranium mining. Jobs in the supply and service industries need to be added to this. The expansion of uranium mining in the Erongo Region will therefore be accompanied by high public expectations that many new jobs will be created, directly and indirectly. As there is a provision in the Namibian Affirmative Action legislation to preferentially employ locals, mining companies need to invest in and develop on-going skills development programmes (e.g. bursaries, courses, on-the-job training and mentoring programmes) in order to maximize the benefits of uranium mining for all Namibians. Such development programmes are common practice for the mining companies.

Desired Outcome 2.1.	**Mainly locals are employed**
Target 2.1.1.	**Uranium companies hire locally where possible**
Indicator 2.1.1.1.	**During the operational phase all companies to comply with their employment equity target (certificate)**
Status:	***MET***

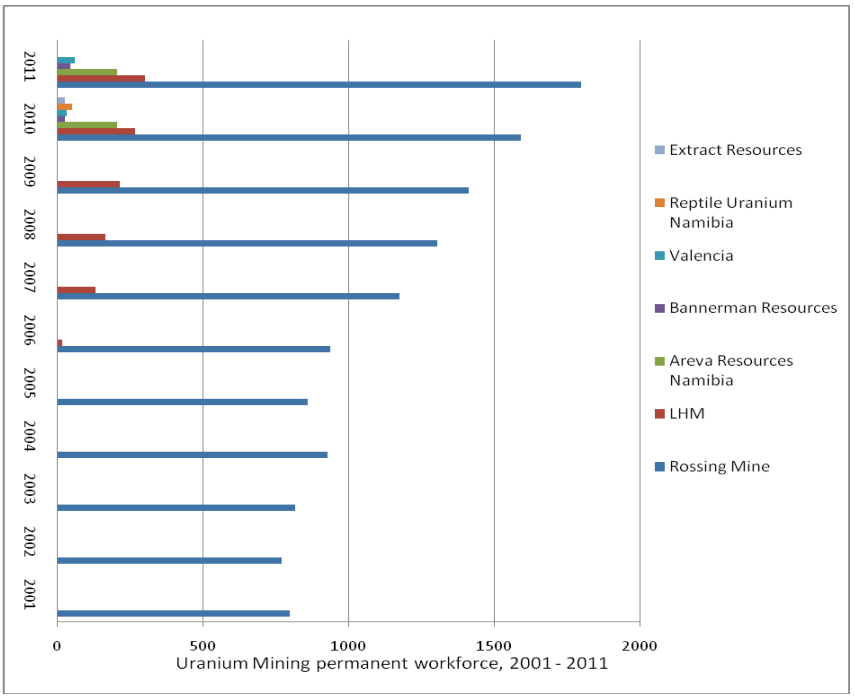
Figure 5: Uranium mining permanent work force 2001-2011 (EEC, 2011)

This indicator has been met, because Employment Equity Certificates were awarded to Rössing, Langer Heinrich, Trekkopje, Valencia, Bannerman Mining Resources and Reptile Uranium Namibia.

Disclaimer: No data were supplied by Extract Resources (Swakop Uranium), Zonghe Resources, Ancash Investments, Petunia Investments Three, Dunefield Mining Company, Erongo Energy, Marenica Minerals, Nova Energy Namibia and Cheetah Minerals Exploration.

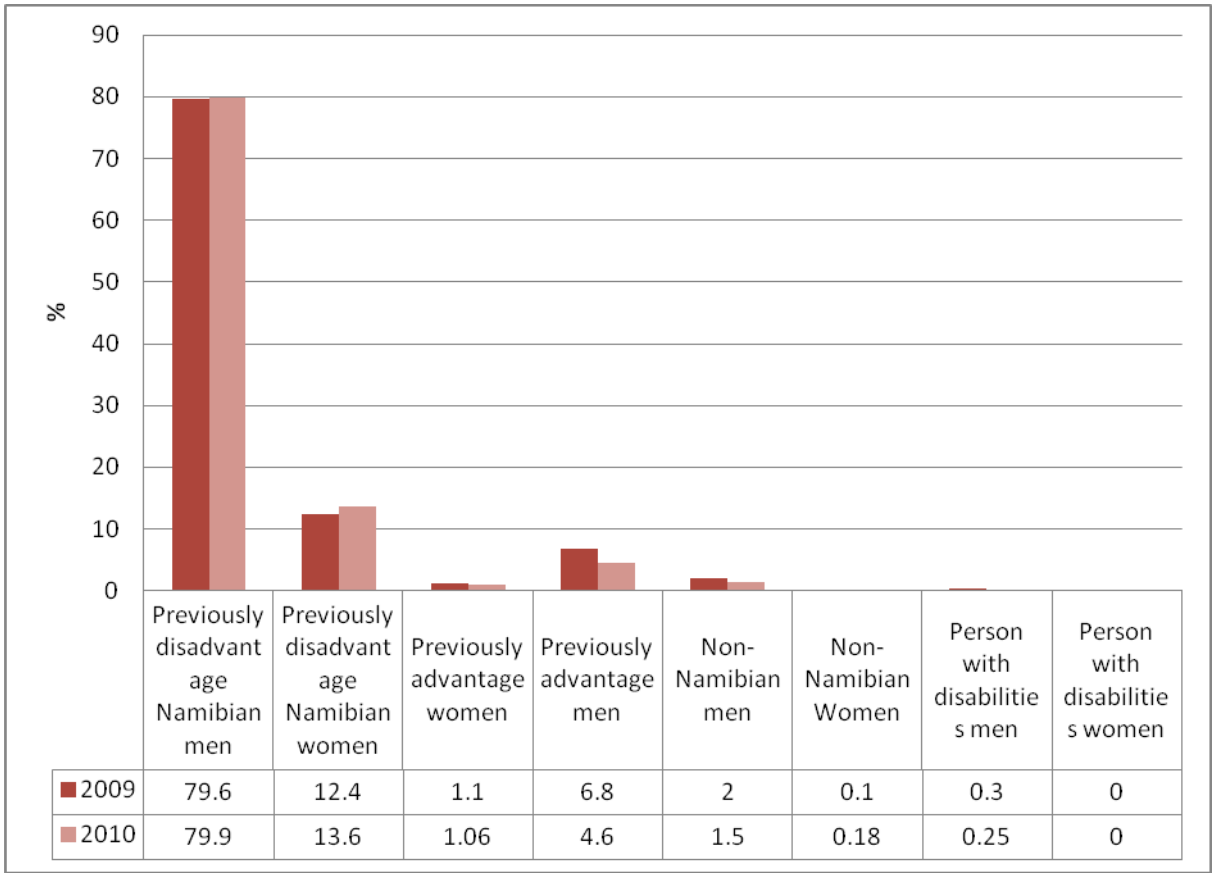
The purpose of the Affirmative Action (Employment) Act, 1998 (Act 29 of 1998), is to achieve equal opportunity in employment in accordance with Article 10 and Article 23 of the Namibian Constitution; to provide for the establishment of the Employment Equity Commission; to redress through appropriate affirmative action plans the conditions of disadvantage in employment experienced by persons in designated groups arising from past discriminatory laws and practices; to institute procedures to contribute towards the elimination of discrimination in employment; and to provide for matters incidental thereto. Companies that employ 25 or more people are required to have an affirmative plan (companies with less than the requirements can also hand in a voluntarily affirmative action plan). The substantive content and processes are explained in Annex 2.

According the 2011 Annual Review of the Chamber of Mines (CoM), 6,847 permanent direct jobs were provided by all mines, excluding exploration companies, associated companies, the Namibian Institute of Mining and Technology (NIMT) and the Tsumeb Custom Smelter. The CoM report further states that, about 2,219 direct permanent jobs were provided in 2010 by uranium mines and some of the advanced uranium exploration companies (Figure 5). In addition, the mining industry continues to invest heavily in people through activities such as training, partaking in community development, awarding of bursaries and apprenticeship and investing in environmental research.



For the past reporting year Rössing Uranium Ltd, Langer Heinrich Mine, Trekkopje Mine, Reptile Uranium, and Bannerman Mining Resources Namibia were certified as having complied with stipulations of the Affirmative Action (Employment) Act, 1998 (No. 29 of 1998) (pers. comm. Rössing Uranium, 2012). Systems were put in place to ensure that existing employment barriers are eliminated and the creation of new barriers is prevented.

In 2010, **Rössing Mine** had a total staff complement of 1,592 permanent employees (Figure 5), compared to 1,415 employees at the end of 2009 (Figure 5), of which 98 per cent were Namibians (Figure 6), 1.3 per cent permanent residence permit holders and 0.7 per cent work permit holders. Female representation among employees increased slightly from 11 per cent in 2009 to 14 per cent in 2010 (Figure 6). Of the employees recruited during 2010, 13 per cent were female and 87 per cent male, compared to 16.4 per cent female and 83.6 per cent male in 2009 (Figure 6). For many years Rössing have been taking in apprentices to do their internship as electricians, carpenters or engineering technicians of which some of these interns where later recruited by the Rössing Mine. In addition to the mine's permanent employees, an average of nearly 1,800 contractors were on site every day during 2010 (Rössing, 2011; pers. comm. Rössing Uranium, 2012).

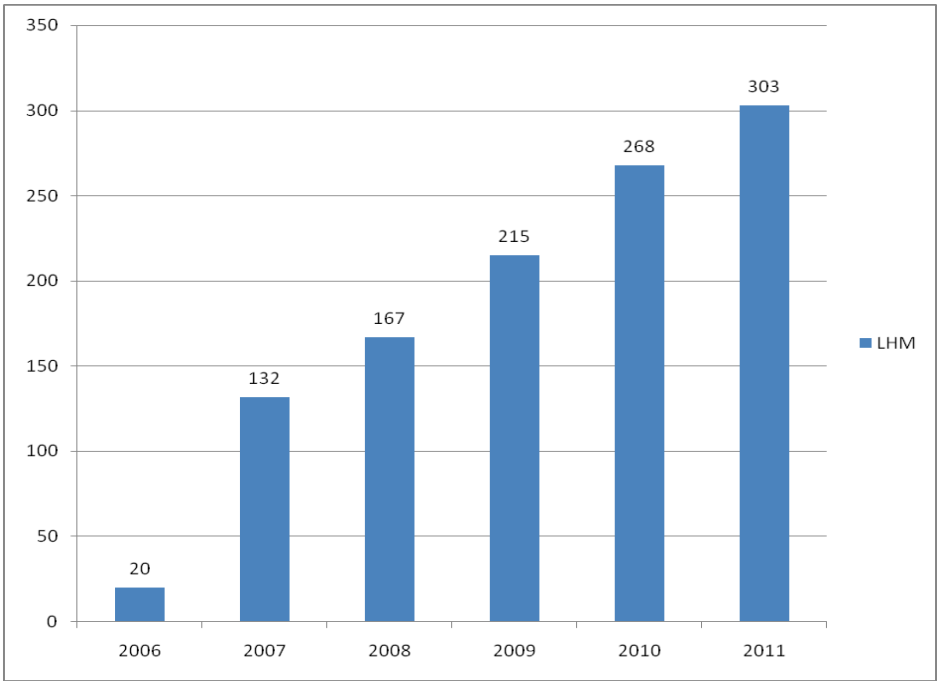


	Previously disadvantage Namibian men	Previously disadvantage Namibian women	Previously advantage women	Previously advantage men	Non-Namibian men	Non-Namibian Women	Person with disabilities men	Person with disabilities women
2009	79.6	12.4	1.1	6.8	2	0.1	0.3	0
2010	79.9	13.6	1.06	4.6	1.5	0.18	0.25	0

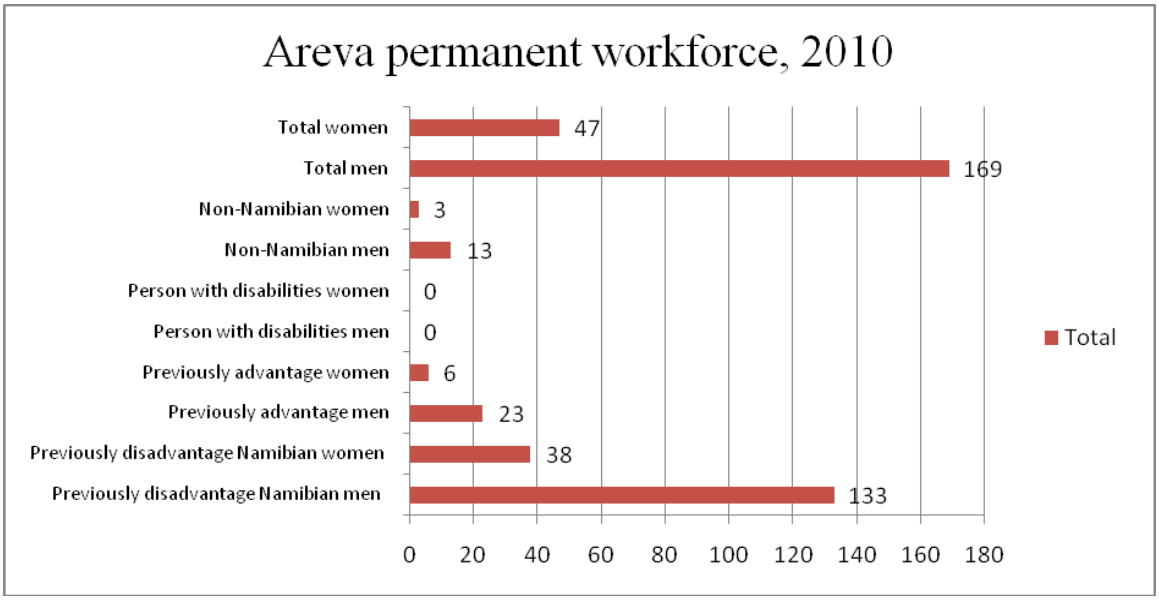
The manpower requirements at **Langer Heinrich Mine** increased by 23% from 260 to 320 employees (Figure 7) in 2011 due to the impact of the Stage 3 expansion. The increase is largely represented by Namibians, with only 4% of the total permanent workforce being non-Namibian. Over the years, approximately 80 artisan learners (apprentices) were provided with opportunities to gain practical experience through collaboration with NIMT. Promising apprentices are earmarked for future employment opportunities. In collaboration with the Ministries of Education (MoE), and Ministry of Mines and Energy (MME), Namibian students studying at the Zimbabwe School of Mines are also given the opportunity to gain practical exposure which will enable them to complete their studies and hopefully gain employment with the mine in future (LHM, 2011).

Figure 8: Areva Resource Namibia permanent workforce, 2010 (LLC, 2011)

Figure 7: Langer Heinrich Mine permanent workforce, 2006 -2011 (LHM, 2011)



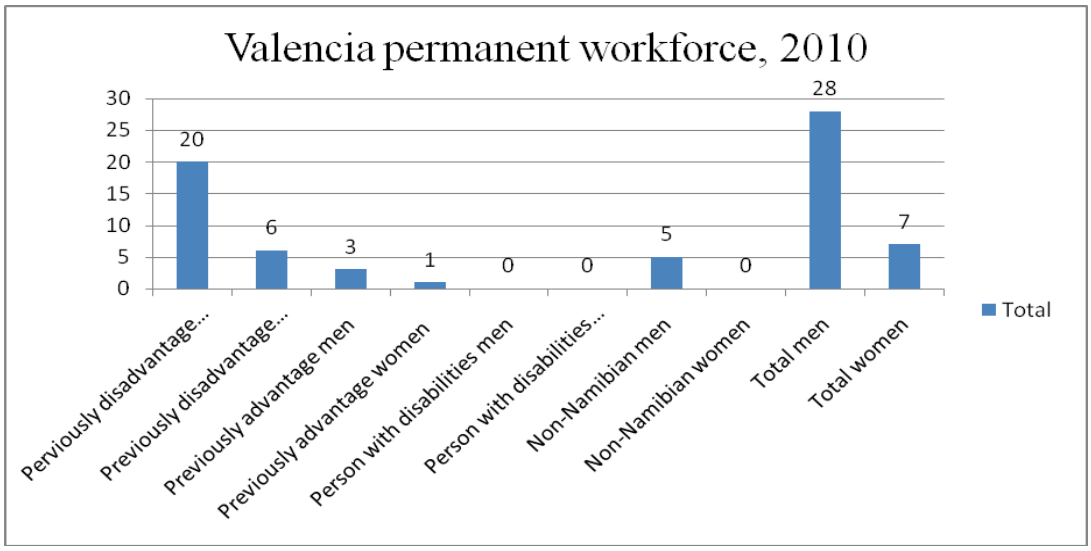
At the start of 2010, **Trekkopje Mine** employed 250 people (Areva, 2011b) (Figure 8). Through operation of the mine and other projects, the company contributes to revitalizing the local economy, notably by offering training programmes (Areva, 2011a). While the project is, however, still not in the production state, there were nevertheless up to 1,500 contractors working on site during peak construction in 2011 (pers. comm. Areva, 2012). The total operational workforce including contractors was approximately 1,100 in 2010. This includes 216 AREVA Namibia employees, 98% of whom were Namibian.



Valencia's workforce profile consists of 35 permanent direct employees (Figure 9). The company intends to establish an Affirmative Action Committee that will be representative of all designated

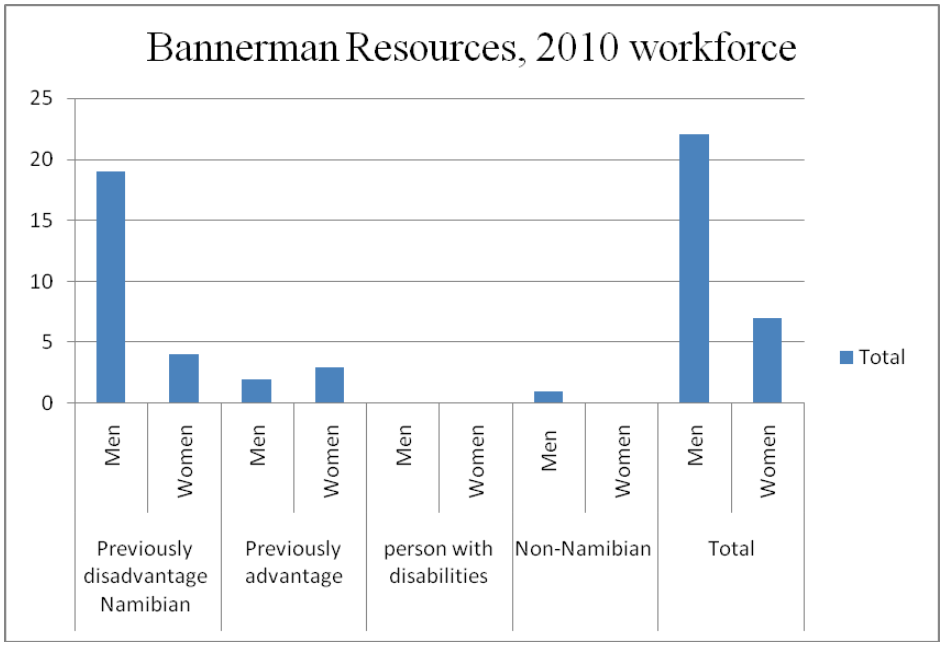
Figure 10: Bannerman Mining Resources Namibia permanent workforce, 2010 (EEC, 2011)

groups at all levels of the company to monitor the implementation of the plan. In the meantime, Valencia has developed policies such as Affirmative Action Policy, Recruitment Policy, Health and Safety Policy, Disciplinary and Grievance Policy, and Training and Development Policy.



Swakop Uranium had a workforce of 27 permanent and 89 temporary employees at the end of 2010. SU reaffirmed their approach in terms of best practice standards in occupational health and safety, employment equity, conditions of employment, training and development and industrial relations (Swakop Uranium, 2012).

Currently **Bannerman Mining Resources Namibia** workforce is 97% Namibian with 83% previously disadvantaged and 28% female (Figure 10). All contractors used in the exploration activities are Namibian.



Conclusion on EQO 2

The uranium mining sector directly employs about 2.5% of the total labour force in Namibia, and complies with national and company-level equity targets. The expansion of uranium mining in the Erongo Region will obviously be accompanied by high public expectations that many new jobs will be created, directly and indirectly.

Status: All companies have complied with their employment equity targets, and the indicator is therefore MET.

EQO 3.	**Infrastructure**
Aims of this EQO: Key infrastructure is adequate and well maintained, thus enabling economic development, public convenience and safety for the citizens, mines and other affected parties in the Erongo region.	

This EQO covers aspects relating to housing of mine employees, transport infrastructure, electricity, port facilities, and handling of waste in the towns within the region.

Indicators related to towns:

Desired Outcome 3.1.	**Existing, proclaimed towns are supported**			
Target 3.1.1.	**Most employees are housed in proclaimed towns**			
Indicator 3.1.1.1.	**Mines do not create mine-only townships or suburbs**			
Status:			***MET***	

Indicator 3.1.1.2.	**There are no on-site hostels during the operational phase of a mine**			
Status:			***MET***	

These two indicators of EQO 4 deal with housing of mine employees in existing and proclaimed towns. It targets to have most mine employees housed in proclaimed towns, and not in mine-only townships or hostels.

Status: Both Indicators 1 and 2 have been met, as no mines have created mine-only townships or on-site hostels. Table 3 below shows the results of information collected by the UI.

	Indicators	
Mining Companies	**Mines do not create mine-only townships or suburbs**	**There are no on-site hostels during the operational phase of a mine.**
Trekkopje	Trekkopje employees live in existing towns and no company housing development is planned.	See left
Langer Heinrich	LHM employees live in Swakopmund and Walvis Bay and no company housing development (township or suburb) is planned.	The only people staying over at the mine site are approximately 35 employees from the drilling contractor. Also, as part of the Stage 4 EIA, LHM included a temporary construction camp for the proposed expansion project (approximately 2 year construction period).
Rössing	Almost 60% of all Rössing employees reside in Swakopmund, 24% in Arandis and 16% in Walvis Bay. There are no on-site hostels.	See left
Swakop Uranium	Home ownership will be encouraged. SU's housing policy will enable staff to secure their own housing in a town of their choice.	A contractor's construction camp will operate during the construction phase only.
Bannerman	All BMR employees live in existing Swakopmund at this stage.	Not applicable
Reptile Uranium	No township or suburb has been developed by Reptile Uranium Namibia.	Reptile Uranium Namibia has no on-site hostels

Table 3: Results of two Indicators in Desired Outcome 1, Infrastructure: Existing, proclaimed towns are supported

Indicators related to transport:

Desired Outcome 3.2.	**Roads in Erongo are adequate for Uranium Rush and other traffic**
Target 3.2.1.	**Roads are well maintained, traffic frequency is acceptable for tourism/other road users and traffic is safe**

One of the recommendations of the SEA was a major upgrading of roads, required to reduce the congestion and dangerous driving conditions currently prevailing on several roads at the coast, especially the B2 between Walvis Bay and Swakopmund, the D1984 from Walvis Bay to Swakopmund behind the dunes, the B2 from Swakopmund to Arandis, as well as the C28, up to the Langer Heinrich turnoff. The report highlighted that the expected increase in traffic (up by as much as 59% on the B2, 80% on the C28 and 56% on the C34 under Scenario 3), justifies the need for significant spending on road upgrading. Another alternative proposed in the report is to build a commuter rail link between Swakopmund and Arandis, with a transport hub at Arandis providing transport to Valencia, Rössing, Husab and Trekkopje mines.

Overall, progress is being made in upgrading roads infrastructure in the Erongo Region, both by Roads Authority as well the mines operating in the region. These include a project proposal for upgrading of the road behind the dunes between Walvis Bay and Swakopmund to bitumen standard; the feasibility study of this road commenced on the 1 September, 2011 (pers. comm. Roman Veron, Roads Authority, 2011). Other efforts include contributions of money by mines such as LHM (for a 40 km section of the C28), Swakop Uranium (N$1.25 million) and Bannerman Resources (N$ 799,674) to tar other sections of the C28. The status of each Indicator related to the provision of transport infrastructure within the Erongo Region is discussed per indicator below (information mainly coming from the Roads Authority and the Mines).

Indicator 3.2.1.1.	**All key gravel roads (C28, Moon landscape (D 1991) Welwitschia drive, Goanikontes (D 4570), Walvis to Kuiseb (C 14) are graded timeously to avoid deterioration**			
Status:		***IN PROGRESS***		

BMR ensures that sections of the Welwitschia drive are graded monthly at a cost of N$ 5,000/month. No information was provided concerning grading of the other gravel roads.

Status: This indicator was not fully met, notwithstanding BMR's contribution of funds for grading parts of the road, and classified as IN PROGRESS.

Indicator 3.2.1.2.	**Un-surfaced roads carrying >250 vehicles per day, need to be tarred**			
Status:		***IN PROGRESS***		

The SEMP office did not get information concerning traffic on un-surfaced roads. Further sections of the C28 were tarred. LHM provided funds for the tarring of approximately 40 km of the C28 road (from the D1984 to the LHM access road). The access road to LHM and haul roads are not tarred. Swakop Uranium's contribution towards tarring another part of the C28 was N$1.25M and BMR contributed N$ 799,674 for another part. The busy part of the C28 road (i.e. access to mines and EPLs, as well as sites frequented by tourists) remains incompletely tarred.

The Roads Authority is planning a Feasibility Study for the Upgrading of Bethanie – Maltahöhe – Solitaire – Walvis Bay Road Link (tender to be advertised during November 2011. (pers. comm. Roman Vernon, Roads Authority, 2011). The Feasibility study to upgrade the Walvis Bay – Swakopmund road (the road behind the dunes) to Bitumen Standard commenced on 1 September 2011 (pers. comm. Roman Vernon, Roads Authority, 2011).

Status: Without data on traffic volumes it was not possible to fully evaluate the status of this indicator. A busy mining and tourism road (C28) was partly tarred, but this task remains to be completed. Meeting this indicator is therefore in progress.

Indicator 3.2.1.3.	**The B2 tar road is free of pot-holes and crumbling verges**			
Status:			***MET***	

The RA reported that there are no pot-holes or crumbling verges.

Status: The indicator has therefore been met.

Indicator 3.2.1.4.	Road markings and signage are in place and in good condition			
Status:			*MET*	

The RA reported that signage is in place, although markings were not specifically mentioned.

Status: The indicator can therefore be considered to be met.

Indicator 3.2.1.5.	Accidents at intersections and turn-offs decline from current trends			
Status:				

In 2010, Erongo Region had the second highest recorded percentage of vehicle accidents in the country (13%), following Khomas with 45% (MVA Annual Report, 2010). The recorded statistics peaked during the festive seasons, mainly because the region serves as the main holiday destination for locals and tourists.

Status: No information was available concerning the location of accidents specifically at intersections and turn-offs, and the status is therefore unclear. It is not expected that the information will become available in future and it is therefore recommended to review this indicator.

Indicator 3.2.1.6.	D1984 (Swakopmund to Walvis-Bay east of dunes) is tarred and designated an industrial vehicle route			
Status:		*IN PROGRESS*		

The Feasibility study to upgrade the Walvis Bay – Swakopmund road (the road behind the dunes) to Bitumen Standard commenced on 1 September 2011 (pers. comm. Roman Vernon, Roads Authority, 2011)

Status: This road is not yet tarred, despite the urgent need to do so. Meeting this indicator is therefore in progress.

Indicator 3.2.1.7.	90% of traffic on the B2 coastal road (between Swakopmund and Walvis Bay, west of the dunes) is light vehicles (< 3 tons)			
Status:	*NOT MET*			

As part of the study of the D1984, the Roads Authority also monitored traffic on the B2, but these data were not obtained by the SEMP office. However, as the D1984 has not yet been upgraded, it is clear that the majority of vehicles > 3 tons still use the B2, and therefore less than 90% of traffic is represented by light vehicles, in particular as this is the first sections of the so-called Trans-Kalahari Highway. There is only one exception, namely the holiday period 2011/2012, during which the Swakopmund town council banned heavy traffic, and such traffic therefore had to use the D1984 during December 2011.

Status: Baseline data still need to be obtained from RA, however, because of the lack of upgrade of the D1984, it is clear that the indicator could not be met.

Indicator 3.2.1.8.	**Mining traffic on predominantly tourist roads meets agreed conditions**			
Status:			***MET***	

Trekkopje and Rössing: There are no tourist roads.

Langer Heinrich: uses the C28, which is also a tourism road. All mine vehicles are roadworthy, regularly serviced and have satellite tracking, the speed limit is 100km/h.

Swakop Uranium: uses the C28 and the D1991 to get to the mine construction site. All drivers and visitors are inducted on site road traffic rules, including observance of speed limits.

Bannerman: uses the C28 and D1991 to get to its exploration activities. Due to its small exploration workforce, vehicles of BMR represent only about 5% of the total traffic along this route. BMR vehicles are monitored via satellite to ensure speed limits are adhered to.

Status: The three mining companies that traverse tourism roads have clear management steps in place concerning their traffic, and the indicator is therefore met.

Desired Outcome 3.3.	**Optimum use of rail infrastructure**			
Target 3.3.1.	**Most bulk goods are transported by rail**			
Indicator 3.3.1.1.	**80% of all bulk goods (all reagents and diesel) delivered to mines and associated industries, are transported by rail**			
Status:			***MET***	

Besides Rössing, no other mining company transports its goods to the mine site by rail, although most have considered the use of rail as an option. The conclusion was that for mines far from the existing railway construction of a new track would be prohibitively expensive.

- **Rössing**: Sulphuric acid, ammonium-products and diesel deliveries are all transported by rail to the Rössing mine. This mine therefore meets the expectations for this indicator.
- **Trekkopje:** The mine will make use of rail deliveries for its future operational phase. Bulk reagents will be transported by rail to Arandis, from where it would be taken by private road to the mine (pers. comm. Sandra Müller, Areva, 2012).
- **LHM:** The mine does not plan to construct a new railway line to the mine (see comment above).
- **Swakop Uranium**: Rail was considered as an option to transport materials between the Husab Mine and port, but it was considered to be technically difficult and not cost effective.
- **Bannerman**: At this stage no bulk goods are used in the BMR exploration activities.

Status: The available information did not allow this indicator to be assessed accurately. An estimate of the relative amounts of bulk goods transported to Rössing and LHM indicates that Rössing's transport by rail probably constituted at least 80% of the total mass. This will be confirmed in the 2012 report. The overall status for 2011 is considered to be MET.

Desired Outcome 3.4.	**Walvis Bay Harbour is efficient and safe**
Target 3.4.1.	**The harbour authorities provide reliable, accessible and convenient loading, offloading and handling services**
Indicator 3.4.1.1.	**Average loading/offloading rate for containers is >25 containers per hour**

Status:			***MET***	

For 2010/2011 NAMPORT achieved an average loading/offloading rate of more than 25 containers per hour. In addition, NAMPORT is putting measures in place to improve the rate by planning to do the following:

- replacing the old terminal system with NAVIS SPARCS N4 which will optimise container terminal operations,
- better stacking and reduces digging through the use of Rubber Tyre Gantries (RTGs), and
- implementation of the third shift system which will minimise delays caused by lunch breaks (NAMPORT, 2010).

Status: MET

Indicator 3.4.1.2.	**Average waiting time for ships to obtain a berth is <12 hours**

Status:	***NOT MET***			

The waiting time at the port for a ship to obtain a berth was 21 hours as opposed to the targeted 9 hours. This delay was mainly due to the unanticipated vessel visits and inefficiencies in vessel cargo operations (NAMPORT, 2010)

Status: NOT MET

Indicator 3.4.1.3.	**No oil/ chemicals/ contaminants/ sewerage spills enter the Ramsar site**

Status:			***MET***	

According to NamPort, no contamination of whatever nature has entered the Walvis Bay Lagoon Ramsar site (pers. comm. Tim Eimann, NamPort, 2012).

Status: MET

Desired Outcome 3.5.	**Electricity is available and reliable**
Target 3.5.1.	**Electricity is available and reliable for public**

Generally this Desired Outcome targets the availability and reliability of electricity to the public and industries, and aims to avoid disruptions in electricity supply as a result of the Uranium Rush. It further monitors the (desired) increased use of renewable energy.

Indicators for electricity availability and reliability all appear to be met. Information provided from NamPower indicates that electricity in the Erongo Region meets the Electricity Control Board (ECB) standards, and no outages as a result of Uranium Rush are experienced in the region. Outages were, however, experienced in Walvis Bay, which were unavoidable side-effects in commissioning the Anixas Diesel Power Station when some tests required the grid to be isolated or in island mode (pers. comm. Margaret Mutschler, NamPower, 2011). Generally, efforts are being made to increase the power supply to the region in order to meet the region's electricity demand; an example is the proposed coal-fired power station in the Erongo Region. Full details of the electricity situation in Erongo Region provided by NamPower are presented as short reports per Indicator below.

Indicator 3.5.1.1.	**The public does not suffer disruptions in electricity supply as a result of the Uranium rush**			
Status:			***MET***	

NamPower reports no outages as a result of the Uranium Rush. Anixas's commissioning required some outages for Walvis Bay. It is unavoidable when commissioning a power station to the transmission grid that some tests require the grid to be isolated or in island mode. This requires partial or complete outages for some areas – depending on the location of the power station. Other outages were related to maintenance of +installations; however, no outage occurred as a result of the Uranium rush. In fact, no load shedding at all was experienced in the entire country, and therefore also not in the Erongo Region (pers. comm. Margaret Mutschler, NamPower, 2011).

Status: MET

Target 3.5.2.	**Electricity is available and reliable for industry**			
Indicator 3.5.2.1.	**Industrial development is not delayed by electricity shortage**			
Status:			***MET***	

During the year under review, NamPower received 2 industrial supply applications, one from ErongoRed (80 MW) and one from Husab Mine (110 MW), both of which have been approved by NamPower. In the case of ErongoRed NamPower is even facilitating the connections (pers. comm. Margaret Mutschler, NamPower, 2011).

Status: During 2011 NamPower has been able to approve all industrial supply applications received, and the indicator is therefore MET.

Target 3.5.3.	**The public do not suffer disruptions in electricity supply as a result of the Uranium Rush**			
Indicator 3.5.3.1.	**No investment decision has been deferred because of electricity unavailability, and planning is in place to accommodate other sectors**			
Status:			***MET***	

No industrial supply application has been declined by NamPower (pers. comm. Margaret Mutschler, NamPower, 2011), and NamPower is in an advanced stage of planning for a coal-fired power station at Arandis.

Status: As all industrial supply applications have been approved, no investment decision could have been deferred because of electricity unavailability. In addition, planning is advanced for additional power generation, and this indicator is therefore MET.

Indicator 3.5.3.2.	**Electricity quality of supply meets ECB standard**			
Status:			***MET***	

Power outages (such as the Anixas installation) are within Quality of Service, and therefore meet ECB standards (pers. comm. Margaret Mutschler, NamPower, 2011).

Status: MET

Indicator 3.5.3.3.	**Electricity provision (generation, distribution and transmission) does not compromise human health**			
Status:			***MET***	

NamPower's EIA and EMPs are approved internally and by MET, they are fully implemented and rigorously enforced by NamPowers SHE committee. This committee also undertakes internal audits for every project. In addition, the fact that no LTI on projects in the Erongo Region occurred, is a further indication that human health was not compromised (pers. comm. Margaret Mutschler, NamPower, 2011). LHM conducted an EIA for additional power supply to LHM as part of the Stage 4 expansion project. The indicator also refers to potential health impacts from coal-fired power station emissions. According to the EIA the design of the proposed power station near Arandis includes the required emission control systems.

Status: MET

Indicator 3.5.3.4.	**Mines and associated industries pursue renewable power supply options as far as possible**			
Status:			***MET***	

NamPower has an extensive renewable energy policy and plan, comprising wind, solar, photo-voltaic panels and hydro-electricity schemes (small and big). The current average contribution of hydropower from Ruacana to the nation's power supply is 50% (pers. comm. Margaret Mutschler, NamPower, 2011). Namibia is therefore well advanced in the use of renewable power.

Some companies (AREVA, Rössing) have carried out studies on additional wind or solar power supply options. The economic analysis concluded that solar power generation was technically feasible but prohibitively expensive. It was therefore decided not to pursue the option further (pers. comm. Sandra Müller, Areva, 2012). Rössing has implemented solar power generation in the case of some boreholes from which water is extracted. Mining companies support NamPower's renewable energy projects, since implementation of their own systems is limited due to economic and technical issues.

Status: Bearing in mind 50% renewable energy generation by NamPower the status can be regarded as MET.

Desired Outcome 3.6.	**Waste sites have adequate capacity**
Target 3.6.1.	**All sewage, domestic and hazardous waste sites are properly designed and have sufficient capacity for next 20 years, taking into account the expected volumes from mines and all associated industries**
Indicator 3.6.1.1.	**Municipalities have sufficient capacity of sewage works and waste sites based on actual and predicted volumes of waste**
Status:	***MET***

Definition: This indicator refers to sewage plants and waste sites that are used by the uranium industry or its contractors, or are situated in towns where the mines' employees reside. These currently include the sewage plants and domestic landfills at Arandis, Swakopmund and Walvis Bay, as well as the hazardous waste facility at Walvis Bay. Very few mine employees live at Henties Bay or Usakos, and the waste facilities at these towns should therefore be excluded for the time being.

Walvis Bay and Swakopmund have sufficient capacity in their waste sites. The waste site at Arandis is too small and poorly managed; the town council is planning to create a new landfill. The hazardous waste facility at Walvis Bay can accommodate the region's hazardous waste volumes and has space for further expansion. Hazardous waste sites at Arandis or Swakopmund are therefore not required. The operating mines do not use the hazardous waste site in Windhoek (pers. comm. Sandra Müller, Areva, 2012).

Swakopmund is currently building new sewerage works. The capacity of the sewage treatment plants at Walvis Bay and Arandis is still sufficient, but will be upgraded as the need arises.

Status: MET

Indicator 3.6.1.2.	**Independent audits are undertaken for waste sites**
Status:	***NOT MET***

No audits are being conducted.

Status: NOT MET

Indicator 3.6.1.3.	**Independent audit proves sufficient capacity of Walvis Bay and Windhoek hazardous waste sites; and Swakopmund, Walvis Bay, Arandis and Usakos non-hazardous waste sites with a 20 year life-span**
Status:	

No audits are being conducted. It is not clear who is supposed to carry out these audits and against which standard the waste sites are to be audited. Namibia currently does not have legislation governing waste management. Once the Waste Management and Pollution Control Bill becomes law there will be an appropriate standard. It is suggested that compliance reporting of indicators 3.6.1.2 and 3.6.1.3. is postponed until the law is promulgated.

Status: Currently not applicable

Indicator 3.6.1.4.	**All new waste sites undergo an EIA prior to construction and receive a licence to operate**			
Status:		***IN PROGRESS***		

In terms of the EMA, all new waste sites have to undergo an EIA prior to construction and commission. However, at present there are no licenses required.

Status: As this indicator is only partly met, it is assessed to be IN PROGRESS.

Desired Outcome 3.7.	**Waste sites are properly managed**			
Target 3.7.1.	**The management of waste sites meets national standards**			
Indicator 3.7.1.1.	**Waste site managers are adequately trained (Where managers have attended at least a one-week course in waste management at a reputable training institution)**			
Status:		***IN PROGRESS***		

At the municipalities of Walvis Bay and Swakopmund, waste site managers are trained.

Status: As waste site managers are only trained at two of the relevant municipalities in the Erongo Region, this indicator is only partly met and therefore IN PROGRESS.

Indicator 3.7.1.2.	**Site manifests which record non-hazardous wastes, volumes and origins are kept**			
Status:		***IN PROGRESS***		

Records are kept at the municipalities of Walvis Bay and Swakopmund, but not at Arandis.

Status: As no data was available from sites other than Walvis Bay and Swakopmund, this indicator is only partly met and therefore IN PROGRESS

Indicator 3.7.1.3.	**Only hazardous waste classes for which the sites are licensed are accepted**			
Status:			***MET***	

Walvis Bay has the only hazardous waste facility in the region and keeps a record of hazardous waste deposited.

Status: MET

Indicator 3.7.1.4.	Water and air quality monitoring data at waste disposal sites show no non-compliance readings			
Status:	*NOT MET*			

Municipalities do not monitor water and air quality at waste disposal sites, because there is no legal requirement to do so and no standards set, therefore it is impossible to identify non-compliance.

Status: NOT MET

Indicator 3.7.1.5.	Municipal budgets are sufficient to comply with the site licence requirements relating to pollution control			
Status:		*IN PROGRESS*		

The municipalities of Walvis Bay and Swakopmund have a title in their budgets for compliance with the site license requirements in relation to pollution control, the other municipalities do not. The indicator is therefore only partially met.

Status: IN PROGRESS

Indicator 3.7.1.6.	Tailings management is in compliance with DWAF industrial effluent exemption permit conditions			
Status:			*MET*	

Both, DWAF and UI have confirmed that the tailing s management is in compliance with the relevant permit conditions.

Status: MET

Desired Outcome 3.8.	Recycling is common practice in the Central Namib			
Target 3.8.1.	A sustainable waste recycling system is operational in the Central Namib, servicing the uranium mines and the public			
Target 3.8.2.	A waste recycling depot is established			
Status:		*IN PROGRESS*		

Walvis Bay, Swakopmund and Arandis have waste recycling depots for glas, paper and plastic. The other municipalities are currently not relevant to the mining industry. It is not clear if the waste recycling system will be sustainable, and the indicator is therefore only partially met.

Status: IN PROGRESS

Indicator 3.8.2.1.	Waste recycling operators have sufficient capacity to collect, transport and recycle waste in a safe and responsible manner			
Status:		*IN PROGRESS*		

There are four recycling operators with sufficient capacity in Walvis Bay, and one each in Swakopmund and Arandis. Their capacity to collect, transport and recycle waste is threatened by high transport costs, low prices paid by recyclers in South Africa, and hence the absence of a recycling industry in Namibia.

Status: IN PROGRESS

Indicator 3.8.2.2.	Volumes of waste disposed to landfill per capita decreases			
Status:		*IN PROGRESS*		

Due to the recycling taking place in Walvis Bay, waste volumes have indeed decreased in this municipality. Swakopmund is about to implement the 2 bin system, but there is no information from the other municipalities.

Status: IN PROGRESS

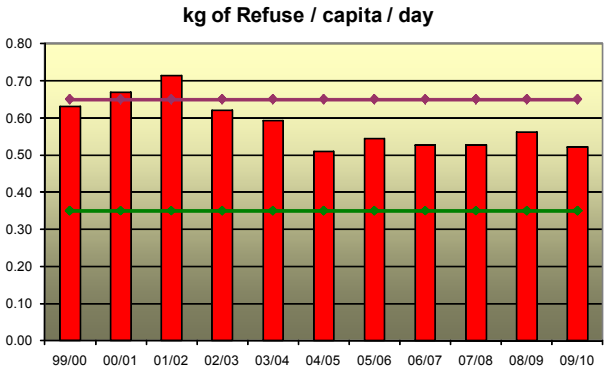


Figure 11: Amount of refuse removed in Walvis Bay, 2000-2010

EQO 4.	Water

Aims of this EQO: To ensure that the public have the same or better access to water in future as they have currently, and that the integrity of all aquifers remains consistent with the existing natural and operational conditions (baseline). This requires that both the quantity and quality of groundwater are not adversely affected by prospecting and mining activities.

Trekkopje Mine: Trekkopje mine has only local, saline groundwater without downstream users. There are no major aquifers that support wetlands, riparian vegetation or phreatophytes. The groundwater monitoring programme has demonstrated that the quality of the water has so far not been affected by the mine. The natural quality is unsuitable for human or stock consumption and does not conform to the national water quality standards. The water levels of the production boreholes were lowered by pumping in 2009 and 2010, but recovered when abstraction was suspended in 2011. The construction of a 20 million m^3 pa desalination plant and the formation of EDC (Erongo Desalination Company) is a positive investment made by AREVA that will permit mining of the Trekkopje deposit without groundwater extraction, and benefit other bulk water users in the Erongo Region for some decades to come.

Langer Heinrich Uranium: Langer Heinrich Mine has an extensive groundwater monitoring programme to monitor both the water quality and the water levels with various monitoring boreholes along the Swakop River. A number of these are upstream boreholes used to measure water levels on a monthly basis and a few downstream boreholes are sampled and examined for pollution on a quarterly basis. Additional boreholes within the nearest farm areas are monitored for water level change and potential impacts of abstraction. Several non-permanent monitoring boreholes in the Gawib River channel are monitored for water level changes and pollution indicators on a monthly basis and selected boreholes are monitored on a quarterly basis for metals and annually for radio nuclides. Permanent monitoring boreholes continue to be drilled away from mining activities whenever necessary.

In (middle) 2011 borehole water levels rose quite substantially in certain areas as a result of the good rains observed upstream. Water levels in all areas have since stabilised or are at levels as noted before the rain events in early 2011.

Rössing Uranium: Freshwater constitutes about one-third of the total water consumption at Rössing, since about two-thirds are recycled water, obtained from the tailings storage facility. Freshwater is supplied by NamWater. Abstraction of saline groundwater from the Khan River ceased at the end of 2009 so as to conserve the groundwater resources. However, abstraction from the Khan River resumed in August 2011, when the aquifer had received substantial recharge. The Department of Water Affairs and Forestry (DWAF) granted an abstraction permit which is valid until 2014. The abstraction of 600m^3/day is below the safe allowable abstraction limit according to DWAF. Vegetation and water levels in the Khan and Swakop Rivers are monitored and measured in fulfilment of legal requirements and as part of internal water quality monitoring and vegetation monitoring programmes.

Bannerman Resources: Bannerman uses very limited amounts of water in its exploration activities. Water is primarily used for human consumption and washing purposes and this is obtained from the existing Swakop – Rössing pipeline. Once mine development starts, only desalinated water will be used by BMR.

Swakop Uranium: Background or groundwater quality baseline concentrations sometimes do NOT meet the Namibian Guideline Values for Drinking Water due to the natural chemistry. Groundwater quality is monitored in 21 boreholes, including three each in the Khan and Swakop Rivers; no

adverse effects on groundwater have been reported. Water will be utilised from the Ida Dome compartment of the Swakop River only if NamWater is unable to supply required volumes during construction. Currently, no abstraction occurs, other than that done on site for drilling. Borehole levels are monitored. Desalinated water will be provided for the Husab Mine once it is in operation.

Desired Outcome 4.1.	**Water for urban and rural communities is of acceptable quality**			
Target 4.1.1.	**Uranium Rush does not compromise community access to water of appropriate quality:** **Urban users** **Rural communities supplied by DWA** **Commercial farmers (own supplier)** **Lower Swakop River small holdings**			
Indicator 4.1.1.1.	**Aesthetic/physical, inorganic, radio-nuclide and bacteriological determinants conform to minimum required quality as prescribed in the national water quality standards**			
Status:			***MET***	

The indicator has been MET because the potable water supplied to all communities and farmers is of acceptable quality. Urban users are supplied by NamWater from the Kuiseb River (Walvis Bay) or Omaruru Delta (Swakopmund, Arandis, Henties Bay) with water of Group A (excellent) or B (good) quality according to the Namibian standard. Some rural communities are also supplied by NamWater (e.g. Usakos from the Khan River upstream of the mines, Spitzkoppe from a local river), while other communal and commercial farmers have boreholes drilled into bedrock aquifers. None of these drinking water sources are affected by uranium mining.

Smallholdings along the lower Swakop River obtain their drinking water from the NamWater pipeline to Rössing which is of the same quality as the supply to Swakopmund. They only use the saline Swakop River groundwater to irrigate certain crops and for commercial purposes.

Due to the special public interest and concerns about the water quality of the lower Khan and Swakop Rivers, the SEA study identified 18 boreholes in this area as part of the SEMP water quality monitoring network (Figure 122). Water samples were collected in 2009 as part of the baseline studies. Subsequent water samples were then taken from the recommended boreholes in 2010 and 2011 by the Geological Survey of Namibia and the Department of Water Affairs. The main findings from the SEMP monitoring studies were:

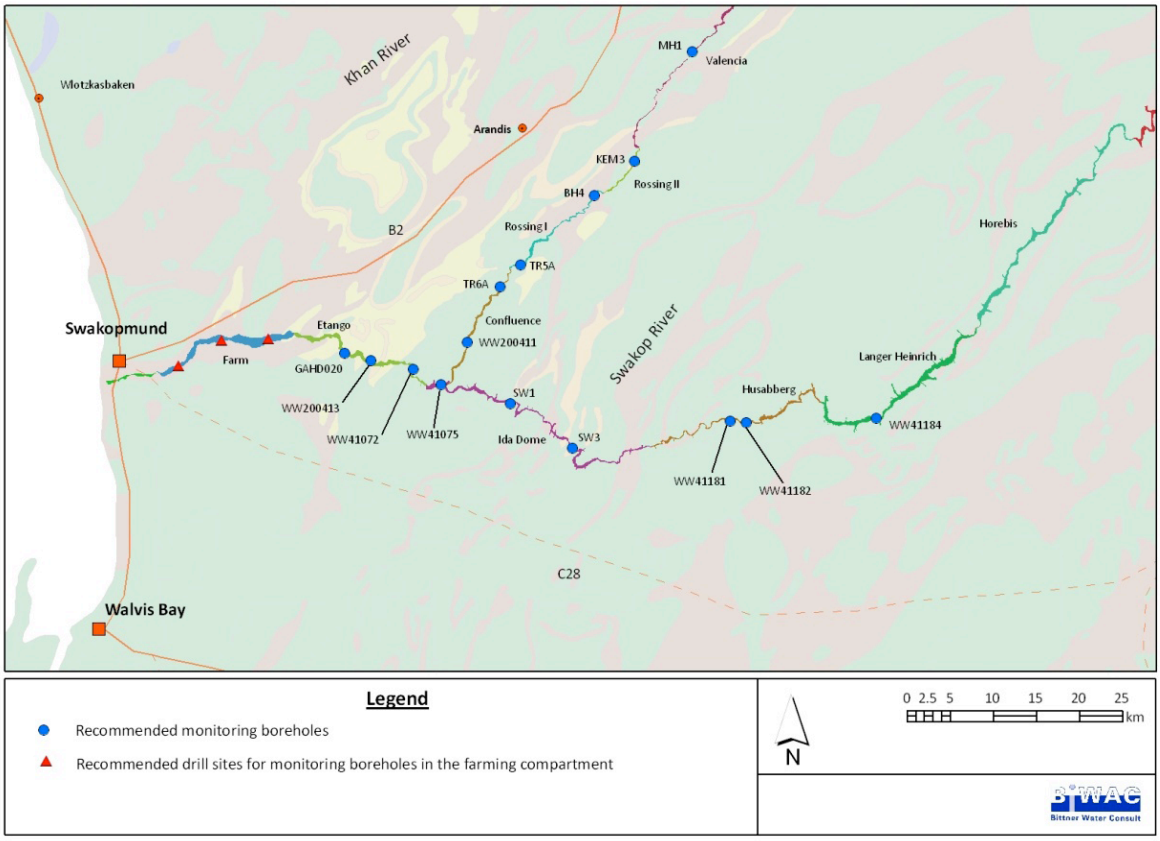
2010:

- Heavy metals (i.e. arsenic, zinc, lead, cadmium) concentrations are well below (0.1 mg/l for As, 1 mg/l for Zn, 0.05 mg/l for Pb, 0.01 mg/l for Cd) the Namibian guideline of maximum values for drinking water;
- Uranium and Electrical Conductivity concentrations are similar to the 2009 results (Kringle et al., 2010)
- Water in the study area is naturally saline, and doesn't meet the Namibian Standards for Drinking water.

Figure 12: Location of the 18 monitoring boreholes of the SEMP monitoring network

2011:

- Generally, concentrations of cations and anions of analysed elements (including uranium) in 2011 were lower than those recorded in 2010. This is attributed to dilution caused by higher rainfalls received in 2011.



Water samples were analysed for anion, cation and trace elements and compared to Namibian guideline values. Radionuclide analysis was only done in 2009, and no bacteriological determinants were analysed in either surveys. This should be addressed during the next survey in 2012.

It should be noted that groundwater from the monitored sections of the Khan and Swakop rivers does not comply with the drinking water standard and is not used for human consumption. As described the SEA report this is due to natural salinity and interaction with uranium deposits, and not an indication of pollution from the mines.

Status: Water supplied to the various users in the Erongo Region was of the required quality and the indicator was therefore MET. For the next report, more water quality analyses will be collected from NamWater and DWAF to substantiate the information provided.

Desired Outcome 4.2.	**The natural environment, urban and rural communities have access to adequate water**
Target 4.2.1.	**Uranium Rush does not compromise surface and groundwater movement and availability**
Indicator 4.2.1.1.	**No unusual loss of wetland and riparian vegetation**

Status:		***IN PROGRESS***		

Measuring of this indicator is included in the monitoring program currently being developed by NERMU. However, there are no data yet, as it will take a while to develop this programme, which is dependent on additional funding and appointment of suitable staff.

Status: IN PROGRESS

Indicator 4.2.1.2.	**No unusual loss of phreatophytes (deep-rooted plants dependent on water from the saturated zone of groundwater)**

Status:		***IN PROGRESS***		

Measuring of this indicator is included in the monitoring program currently being developed by NERMU. However, there are no data yet, as it will take a while to develop this programme, which is dependent on additional funding and appointment of suitable staff.

Though the NERMU monitoring programme is not yet in place there is information on the status of the vegetation in the Khan and Swakop rivers. This could be used as baseline against which further impact of the uranium rush will be measured in future reports.

RUL has monitored the Khan river from KEM3 to TR6A since 1988 and found no unusual or irreversible loss of wetlands and riparian vegetation (Müller, 2003).

Loss of *Faidherbia albida* trees was reported for the Swakop river in the vicinity of LHM, but this was most likely caused by the reduction in runoff after construction of the Swakoppoort dam (no studies to confirm this). Hydrological modelling of the Langer Heinrich compartment showed that abstraction did not exceed the sustainable yield (BIWAC studies). There is also relevant and interesting information on groundwater on the UI website under frequently asked questions.

Status: IN PROGRESS

Indicator 4.2.1.3.	**Borehole levels fluctuate within existing norms**

Status:		***IN PROGRESS***		

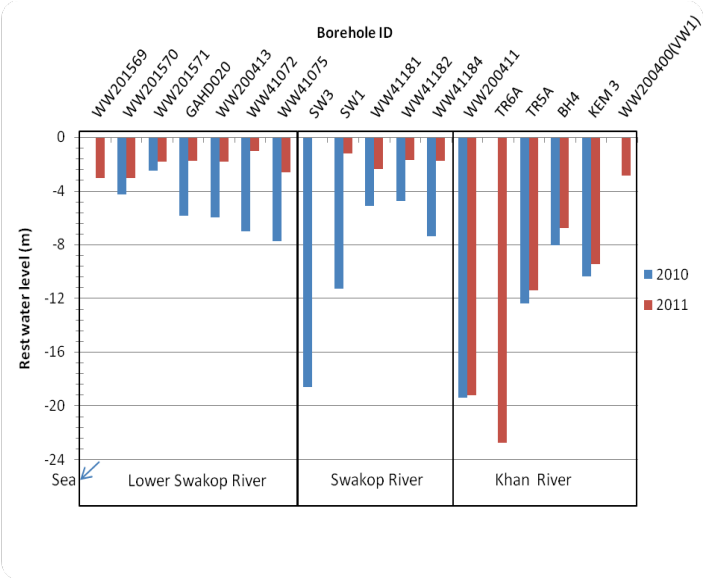
2010 and 2011:

- Water levels were variable, and the baseline is still being established (Figure 13).
- Due to the floods, water levels measured in the Swakop River in 2011 are higher than those measured in 2010, but differences were only slight in the Khan.

Figure 13: Rest water levels of the 18 monitoring boreholes in 2010 and 2011

- Groundwater abstraction from Swakop and Khan River controlled by the DWAF permit system

Rössing has measured borehole water levels over many years (also in the lower Swakop farm area) and these data could be used to determine the range of fluctuation ("existing norms"), which is mainly determined by recharge from runoff (2010 = before flooding, 2011 = after flooding). With a bit more effort this indicator could be MET.



Status: The baseline still needs to be defined through groundwater monitoring conducted by DWA, and in the meantime data for borehole levels are being collected. This indicator is therefore IN PROGRESS.

Indicator 4.2.1.4.	**Aquifer water will be made available to domestic users at approved NamWater rates**			
Status:			***MET***	

The background to this indicator is that the coastal municipalities and the mines agreed in the past that NamWater would supply desalinated water to the mines and aquifer water (Kuiseb and Omaruru) to the towns. In practice the water from the desalination plant and the aquifers would be mixed, but only the mines would be charged the higher tariff, while the domestic users would enjoy the improved water quality at the normal tariff.

Status: Up to now, NamWater is still supplying domestic users from the aquifers at approved rates and the status is thus MET.

Indicator 4.2.1.5.	**Disaster management plans are in place and implemented**			
Status:			***MET***	

The Rössing, Langer Heinrich and Trekkopje Mines all have emergency plans in which water is addressed. In addition, the Kuiseb Basin Management Committee worked on a flood emergency plan. Emergency response procedures are also being developed for the Husab Mine Site and includes water (pers. comm. Angie Kanandjembo,Swakop Uranium, 2012).

Status: MET

Desired Outcome 4.3.	**Water for industrial purposes is available and reliable**
Target 4.3.1.	**Additional water resources (notably desalinated water) are developed to meet industrial demand**
Indicator 4.3.1.1.	**Industrial investors are not lost because of water unavailability**
Status:	***MET***

Industrial water supply applications were received by NamWater in 2010 and 2011, and all of these were granted (pers. comm. NamWater 2012).

Status: MET

Indicator 4.3.1.2.	**Desalinated water meets mine demand by 2014**
Status:	***MET***

At present, only Trekkopje Mine uses desalinated water. However, a second desalination plant is planned by NamWater. The Erongo desalination plant has spare capacity that could be used to supply other mines until NamWater's own plant is built. The only impediment is the completion of the contract between AREVA and NamWater which is apparently imminent.

Status: For 2011, this indicator has been MET because AREVA used desalinated water and the other mines are not required to use it until 2014. The indicator might still be met by 2014 for the other mines.

EQO 5.	**Air quality and radiation**
Aims of this EQO: Workers and the public do not suffer significant increased health risks as a result of radiation exposure from the Uranium Rush.	

Desired Outcome 5.1.	**Annual radiation exposures to the public via air are not significantly increased as a result of the Uranium Rush.**
Target 5.1.1.	**More accurate public dose assessments shall demonstrate that the cumulative radiation dose to members of the public does not exceed 1 mSv/a, or that the dose to members of the public does not exceed 0.25 mSv/a for contributions from any single operation.**
Indicator 5.1.1.1.	**Gross alpha/beta-analysis and determination of uranium and thorium by NAA within the inhalable (PM10) fraction of air filters.**
Status:	***IN PROGRESS***

A study to identify the individual sources of dust in the Erongo Region is currently being carried out by a student employed by NRPA, and will provide information relevant to this indicator. Analysis of dust filters from the SEMP office's PM10 air quality monitor at Swakopmund has not yet started due

to logistical problems. A person based at Swakopmund will be trained in instrument maintenance and data collection (pers. comm. Sandra Müller, Areva, 2012).

Status: The study is ongoing and the indicator is therefore IN PROGRESS.

Indicator 5.1.1.2.	**Gross alpha/beta-analysis and determination of uranium and thorium by NAA within dust fallout samples.**			
Status:		***IN PROGRESS***		

A study is currently carried out by a student employed by NRPA, and will provide information on this indicator. This indicator is not well suited for the purpose of assessing public exposure to radiation because the coarse-grained fallout dust settles within a few hundred metres at most and does not spread beyond the mine sites (refer to air quality study in SEA report). It is recommended to focus on radioactivity analysis of PM10 dust filters and ensure that all mines gather the required data.

Status: The study is ongoing and the indicator is therefore IN PROGRESS.

Indicator 5.1.1.3.	**Radon exhalation rates from ground through continuous monitoring**			
Status:			***MET***	

More than 100 passive radon gas monitors were placed in the Erongo region at locations surrounding the current and proposed future mining operations as well as in areas where people live. The radon monitoring locations, some of which coincide with the dust fallout buckets are shown in Figure. The radon gas monitors (RGMs) were placed on a 2-monthly deployment rotation from August 2009 to August 2011. Radon gas monitoring was discontinued in August 2011 as the SEMP Office felt the necessary baseline data had been collected.

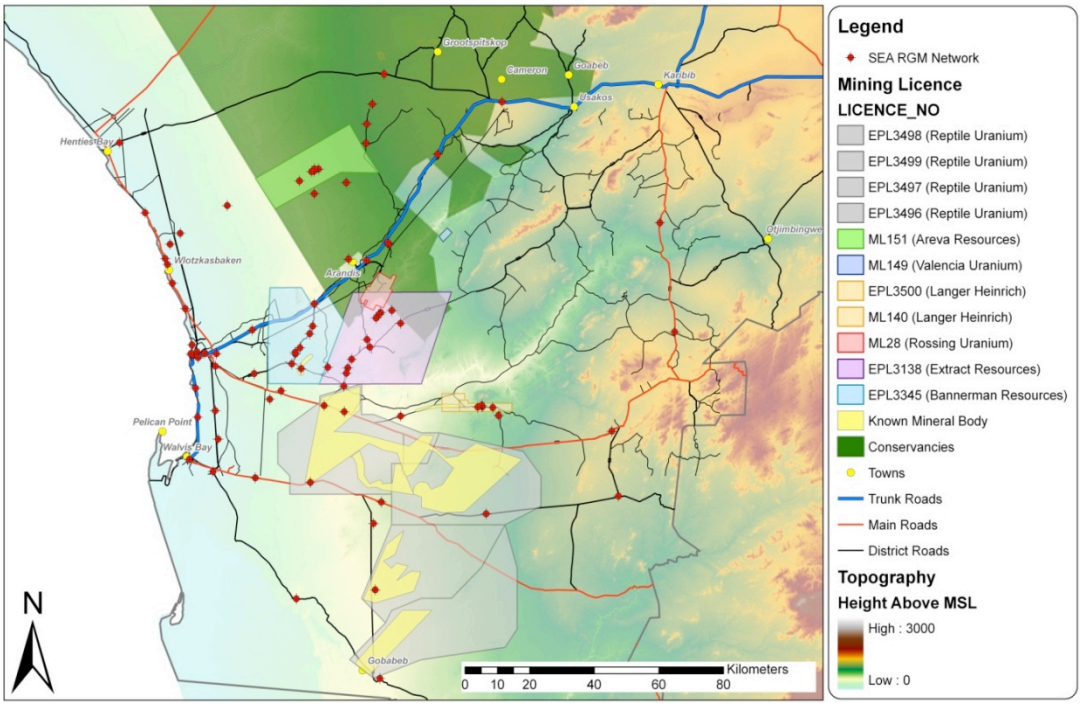


Figure 14: Radon gas monitoring network

The radon inhalation dose is calculated from the airborne radon concentration in becquerel per cubic metre (Bq/m^3) according to the following equation:

$$Dose_{Inh\_Rn} = Conc_{Rn} \times DCF_{Rn} \times EP_{pub}$$

where

$Dose_{Inh\_Rn}$	= Inhalation dose from airborne Radon concentration	[µSv.year^{-1}]
$Conc_{Rn}$	= Airborne Radon concentration	[Bq.m^{-3}]
DCF_{Rn}	= Dose conversion factor for Radon inhalation	[µSv.year^{-1}. Bq.m^{-3}]
Bq.m^{-3}	= Annual public exposure period to Radon	[h.year^{-1}]

The values are on average 0.11 mSv over two months and 0.68 mSv for the entire year. This is well below the annual dose limit for members of the public of 1 mSv per year in addition to the natural background. It should be noted that the dose measured by the RGMs includes radiation from the natural background. It is not possible to determine from these measurements how much of the radon concentration is background and how much is contributed by the mines.

Period	Dose over two months (millisieverts)	Average dose over the year (millisieverts)
Jul-Aug 2010	0.16	
Sep-Oct 2010	0.14	
Nov-Dec 2010	0.07	
Jan-Feb 2011	0.07	
Mar-Apr 2011	0.12	
May-Jun 2011	0.12	
Jul 2010-Jun 2011	**0.11**	**0.68**

Table 4: Radon inhalation dose based on RGM data from August 2010 to June 2011

The SEMP Office has installed three real time radon monitors in the Erongo Region, i.e. at Arandis, Swakopmund and Walvis Bay. These instruments recorded radon concentrations in the atmosphere between February and August 2011. Further data collection was hampered by logistical problems, but will resume in 2012. Table 5 shows the average and weighted average values for the three stations. The data ranges are quite similar, though the average at Arandis is slightly higher. The radon inhalation exposure calculated from these figures is in the order of 0.22-0.36 mSv/a. The radon dose to inhabitants of the three towns is thus approximately half of the average dose of 0.68 mSv/a determined by the radon cup network across the Erongo region. This result makes sense because many of the radon cups were placed close to radioactive materials on mine sites and thus registered higher radon concentrations than cups placed in residential areas.

Location	Average radon concentration (Bq/m^3)	Weighted average radon conc. (Bq/m^3)	Monitoring period (days)
Arandis	14.9	17.0	142
Swakopmund	10.2	12.1	187
Walvis Bay	11.5	13.4	193

Table 5: Ambient atmospheric radon concentrations from February to August 2011

Status: MET

Further information pertinent to the desired outcome "Annual radiation exposures to the public via air are not significantly increased as a result of the Uranium Rush" can found under indicator 6.1.1.1.

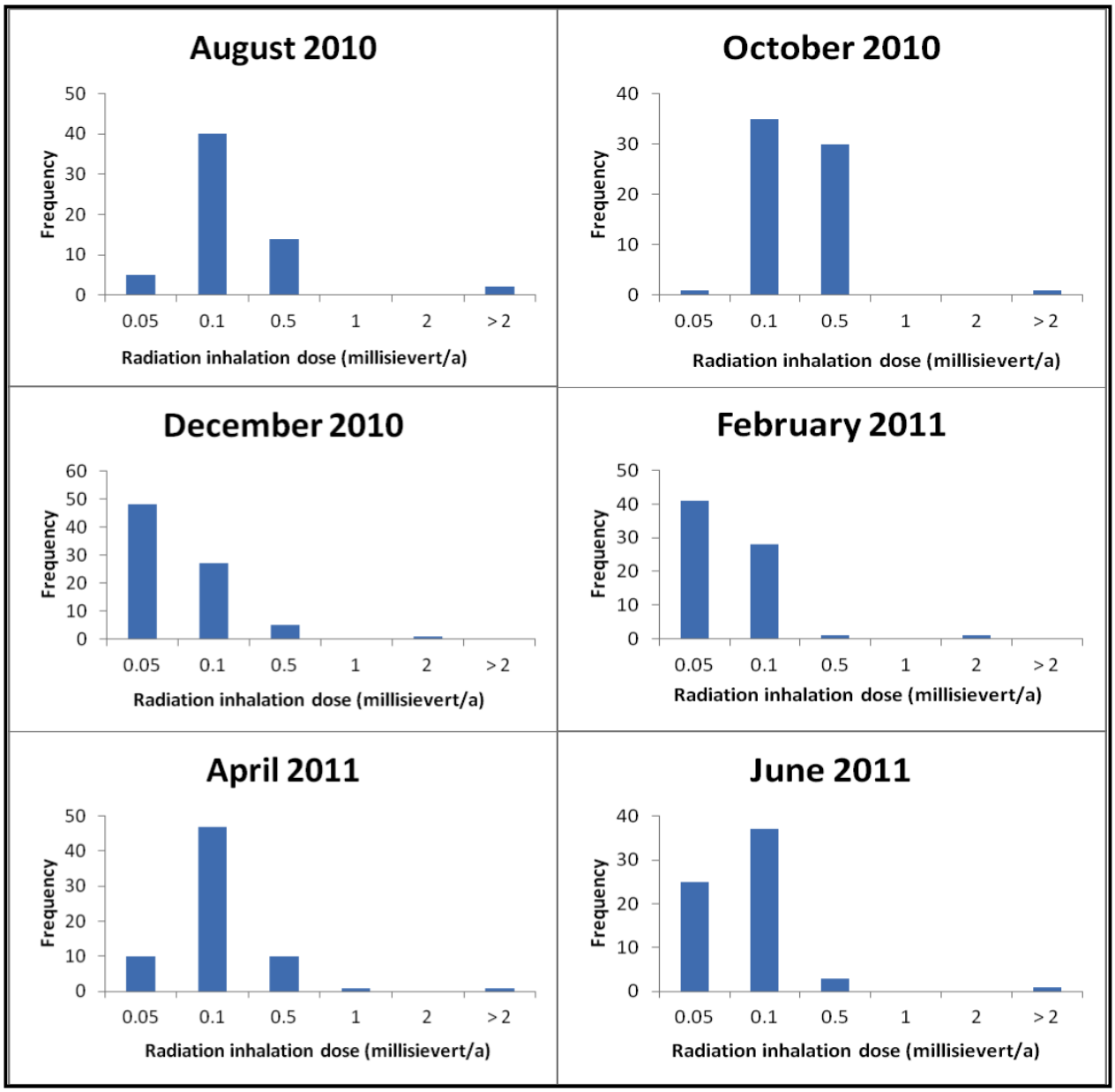


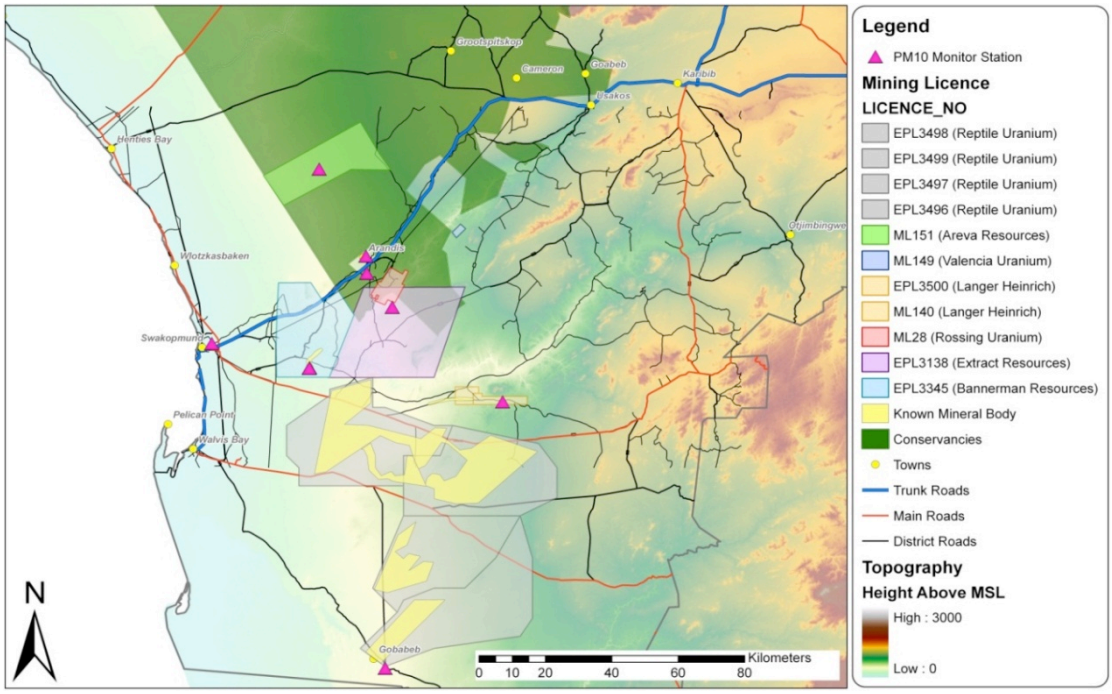
Figure 15: Radon inhalation dose distribution based on radon gas monitoring in the Erongo Region for the periods: a) August 2010 to October 2010; b) October 2010 to December 2010; c) December 2010 to February 2011; d) February 2011 to April 2011; e) April 2011 to June 2011; and f) June 2011 to August 2011

Figure 16: Location of PM10 monitoring stations in the western Erongo Region

Desired Outcome 5.2.	**Annual human exposures to particulate concentrations are acceptable (IFC Standard).**			
Target 5.2.1.	**Ambient PM10 concentrations at public locations and mines should not exceed the required target/limit to be set for the Erongo Region for both annual and 24-hour averages. The target/limit should be based on international guidelines but should consider local environmental, social and economic conditions.**			
Indicator 5.2.1.1.	**Ambient PM10 monitoring (µg/m^3) at Swakopmund**			
Status:		***IN PROGRESS***		

Inhalable (PM10) fraction of air filters: Background

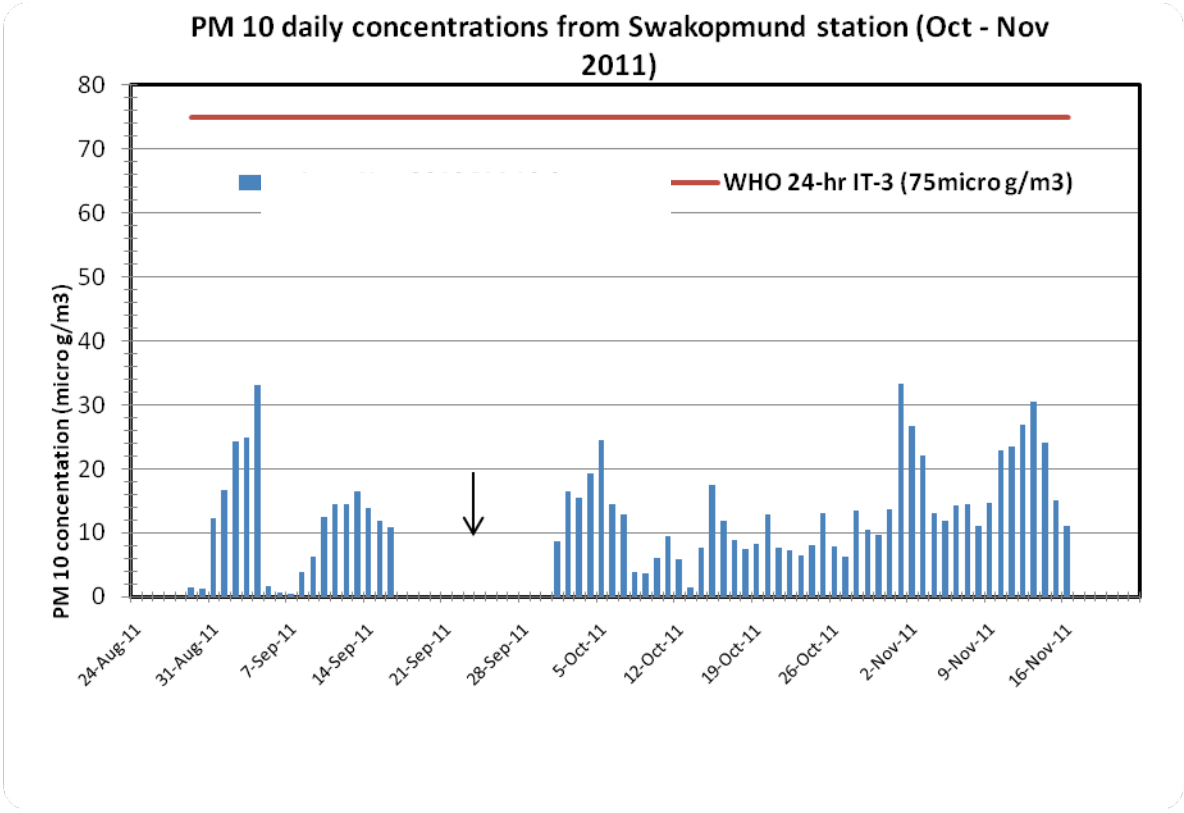
The inhalable dust fraction monitoring is aimed at ensuring that ambient PM10 concentrations at public locations and mines do not exceed the required target/limit for both annual and 24-hour averages. The limit used is based on the World Health Organization's (WHO) 24-hour interim target 3 (IT-3) of 75 µg/m³. The PM10 and meteorological data was collected at the Swakopmund station (NamWater station) using an instrument known as E-Sampler (Figure). Other stations shown in Figure 17 are operated by various mines.

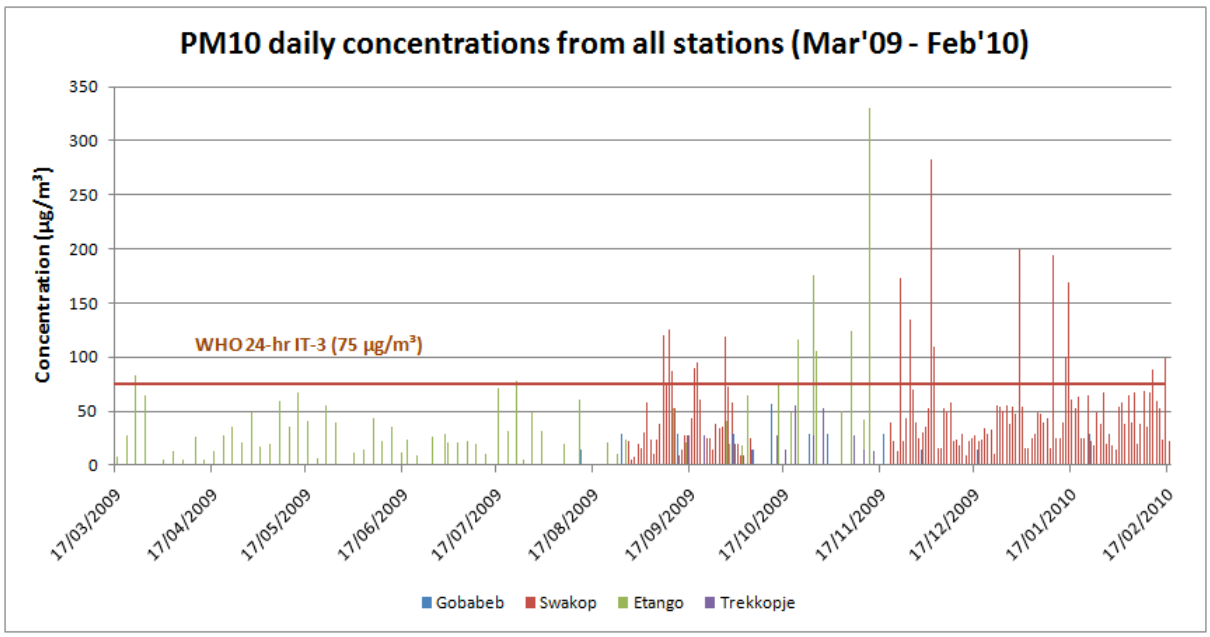


The Swakopmund data were collected over a period of 95 days between August and November 2011. The data do not fully cover the three months period due to the following reasons: monitoring started from mid-August onwards, thus data only covers half of the month of August; some data were lost as a result of downloading data after 45days which led to the sampler overwriting some of the data. The data collected include PM10 concentrations, ambient temperature (AT), barometric pressure (Pa), wind speed (WS), relative humidity (RH), and wind direction (WD).

) **Figure 17: (a) August – November 2011 PM10 concentrations for Swakopmund, compared to; (b) that from Gobabeb, Etango, Trekkopje and Swakopmund for the period March 2009 to February 2010 (Source: Liebenberg-Enslin et al., 2010)**

Results: Analysis of the PM10 measurements taken at the Swakopmund station recorded an average PM10 concentration of 12.95µg/m³ over the 3-month period, and a maximum average daily concentration of 33.32µg/m³. These concentrations are below the WHO's air quality guideline daily concentrations of 75µg/m³.





Comparing the Swakopmund PM10 results for August-November 2011 with those obtained from September 2009-February 2010 during the SEA study, the PM10 daily concentration for August-November 2011 is lower than the previous longer period, which averaged at 21 µg/m³ and had a maximum of 283 µg/m³.

The measured average PM10 concentrations at Swakopmund are also lower than predicted for scenario 1, 2 and 3 of 50, 51, and 52 µg/m³, respectively. There are two likely explanations for this: 1) The monitoring period was very short and did not cover high wind speed events which would contribute to a higher average PM10 concentration, 2) The E-Sampler gives realtime measurements to which a correction factor must be applied based on gravimetric analysis of dust deposited on a filter. This factor has not yet been determined for the Swakopmund station and the dust levels may thus be underestimated.

The PM10 concentration correlates negatively with the relative humidity, indicative of lower dust deposition on days with increased humidity. Correlation with wind speeds was not attempted.

The SEA study included PM10 data from the mines as summarised in Figure 18b, indicating that PM10 concentrations exceeded the WHO limit on more than 20 days in 2009-10. Interpretation of the data would require wind speeds and directions for the relevant periods, as well as information on dust-generating activities that took place in the vicinity of the monitoring stations.

Conclusions: PM10 concentrations at Swakopmund were low and below WHO AQG IT-3 standard (75 µg/m³) in Swakopmund during the period of August-November 2011. At the moment this PM10 concentration cannot be pinned to a particular source, thus it is fair to assume that the recorded concentrations may be due to different sources such as mining and all associated activities, as well as vehicle movement on paved and unpaved roads. The university project (Wits University) of I Shaduka of NRPA entitled "Fingerprinting of sources of the dust in the Erongo Region" will further enable the identification of the source of the dust occurring in Swakopmund and other places within the region.

As recommended in the SEA report, ambient air quality guidelines and targets should be developed for the Erongo Region (and eventually Namibia) taking into consideration risks to health, technological feasibility, economic considerations, and other political and social factors. The guidelines used in this study should be adopted in the interim, with the allowable number of occasions based on the east wind conditions. The annual average guideline should thus account for the average background concentrations due to east wind conditions.

Status: IN PROGRESS

Indicator 5.2.1.2.	**Collection of data from an accredited meteorological station at Swakopmund measuring hourly average wind speed, wind direction, temperature, solar radiation, humidity and rainfall.**			
Status:	***NOT MET***			

Data from the Swakopmund and Walvis Bay meteorological stations was considered not to be sufficient for the whole region. It was therefore suggested in one of the SC meeting that meteorological data collected by farmers and from the SEMP PM10 station be used. While this was done, it needs to be noted that farmers and the PM10 station are not accredited.

Status: The indicator has therefore not been met.

Desired Outcome 5.3.	**Nuisance dust resulting from the Uranium Rush is within acceptable thresholds.**
Target 5.3.1.	**Dust fallout levels at residences in towns should not exceed the recommended limit of 600 mg/m^2/day.**
Indicator 5.3.1.1.	**Continuous dust fallout measurements (mg/m^2/day) on a regional scale e.g. maintain existing SEA dust fallout network.**
Status:	***MET***

Target 5.3.2.	**Mitigation measures to be implemented by mines at all major dust generating sources such as haul roads, materials transfer points and crushing operations. The best practical dust suppression methods should be implemented and monitored through dust fallout buckets at strategic locations.**
Indicator 5.3.2.1.	**Mines must implement a dust fallout network, measuring dust fallout at main dust generating sources and mine license boundaries.**
Status:	***MET***

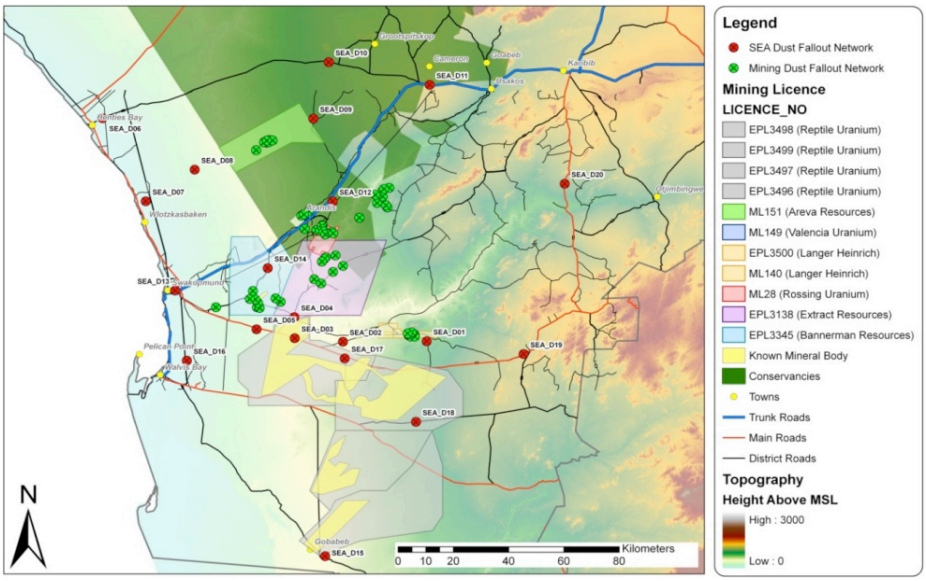
Indicators 5.3.1.1 and 5.3.2.1 are related and therefore discussed together. The existing dust fallout network was discontinued in August 2011, however, most of the advanced projects have established a dust fallout network (Figure 18). No information exists for more than half of the nuclear fuel exploration companies in the region though, and some of these appear to be EPLs held as investment only. Mitigation measures such as dust suppression are used by some companies.

Dust-fallout monitoring was carried out using the network that was established in August 2009. The data collected so far spans a period of 24 months (August 2009 to July 2011). Monitoring was discontinued in August 2011 as the SEMP Office felt that the data already collected was sufficient to establish a baseline. The two-year baseline was however not representative of normal conditions because it covered a season of exceptional rainfall (when the area is less dusty), while high-velocity east wind events were less frequent than normal. Data collected by the mines will be used as of 2012 to determine if this indicator is met.

In order to provide an indication of the significance of recorded dust fallout, reference is made to the maximum monthly dust fallout limits as provided by Germany (350 mg/m^2/day in general areas) and South Africa (as South African National Standards (SANS), 600 mg/m^2/day for residential and light commercial areas).

The main findings are summarized as follows:

- In general, dust deposition throughout the Erongo region is below 100 mg/m^2/day. Of the 468 samples collected over the period August 2009 to July 2011, five samples exceeded the German limit and one sample exceeded the SANS limit (Figure, Figure, Figure).
- Air quality modelling shows that fallout dust settles close to the source. It is therefore not necessary for the SEMP office to monitor dust fallout on a regional basis. Efforts should rather focus on regional PM10 monitoring because this fine dust fraction may reach the public.



Trends per site are described as follows:

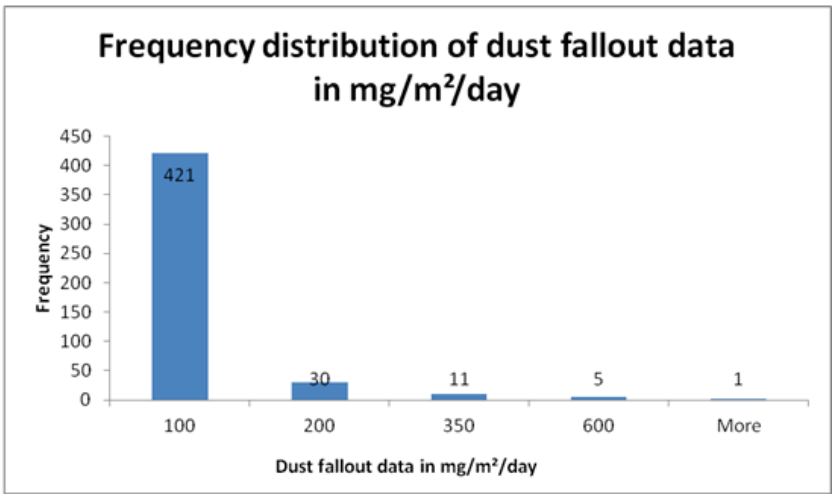
- SEA_D01, located at the Bloedkopje campsite has relatively uniform dust fallout (89-9 mg/m^2/day). All months fall in the range below 100 mg/m^2/day, except for March 2011 (327 mg/m^2/day) and July 2011 (137 mg/m2/day). The March 2011 high value could be attributed to the fact that the dust bucket stayed too long without being exchanged. The November and December dust fallout values remain the lowest. This was attributed to tampering in 2009, but 2010 data indicate that these values are in fact correct.
- SEA_D02 dust fallout is generally below 100 mg/m^2/day except for March (393 mg/m^2/day) and April (136 mg/m^2/day). The trend indicates that the period from March 2011 to July 2011 had the highest dust fallout compared to the rest of the monitoring period. This site is located next to the Langer Heinrich access road.
- SEA_D03, located next to the C28 recorded the highest dust fallout during June and July 2010 (194 – 181 mg/m2/day respectively) as well as in June 2011 (131 mg/m^2/day). The lowest fallout is recorded in November, December and January for both 2010 and 2011.
- At SEA_D04, in the Husab Mining License near the intersection of the Welwitschia road and the D1991, dust fallout ranges between 74 and 11 mg/m^2/day, with the highest levels recorded in August, September and October for both 2009 and 2010.
- SEA_D05 site is within the Reptile Uranium prospecting license area, a few hundred metres from the C28. The dust fallout trend here is similar to that of SEA_D04 where the highest recorded fallout is during the period of August to November (2009 and 2011). Dust fallout ranges between 118 and 5 mg/m^2/day.
- SEA_D06 is located a few kilometres inland from Henties Bay, along the Uis-Spitzkoppe road. The highest dust fallout is 49 mg/m^2/day (June 2011). For all other months, dust fall out is below 30 mg/m^2/day.
- SEA_D07 and SEA_D08 are located within the Trekkopje mining license along the AREVA desalination plant pipeline. SEA_D07 shows an increase in dust fall out in April 2011, with that month recording the highest dust fallout for the site (167 mg/m^2/day. The rest of the months had very little fallout, as low as 3 mg/m^2/day. SEA_D08 shows a decrease in dust fallout since the start of the monitoring in 2009, which is linked to the end of pipeline construction activities. The period of October 2010 to July 2011 had the lowest records (min 1 mg/m^2/day) while the highest dust fallout was recorded in February and March 2010 (138 mg/m^2/day).
- SEA_D09 , located between Trekkopje Mine, the Marenica EPL and Spitzkoppe shows low dust fallout within a narrow range (38-2 mg/m^2/day), with the highest dust fallout occurring

Figure 19: Frequency distribution graph of dust fallout data

in September 2009. An anomalous reading of 1109 mg/m^2/day recorded in January 2010 does not fit into the trend exhibited by the bucket and has thus been omitted from the graphs.

- SEA_D10 near Spitzkoppe shows low dust fallout, with all months recording fallouts bellow 100 mg/m^2/day. The highest dust fallout occurred in July 2011 (77 mg/m^2/day).
- SEA_D11 and SEA_D12 are both located along the Swakopmund/Omaruru road and show similar trends. Both have dust fallout less than 100 mg/m2/day with SEA_D11 (44 - 1 mg/m^2/day) recording a lower range than SEA_D12 (62 - 1 mg/m^2/day).
- SEA_D13 is located outside Swakopmund near the airport and generally has a low dust fallout. The highest records were in August 2009, June 2010 and July 2011 (193, 220 and 200 mg/m^2/day respectively). The trend indicates a general increase in dust fallout from June through to September (the east wind season) and a drop of dust fallout during the rest of the year.
- SEA_D14 is located along the road to Goanikontes and shows a low dust fallout (bellow 100 mg/m^2/day). The highest dust fallout, 129 mg/m^2/day, was recorded in July 2011.
- SEA_D15 is located at the Gobabeb Research Station to the south of the study area. Dust fallout varies with no discernible trend. The maximum recorded dust fallout was in August 2010 (193 mg/m^2/day).
- SEA_D16, located about 150m from the D1984 road, shows on average the highest dust fallout collected during the monitoring scheme. The dust fallout levels exceeded the German standards of 350 mg/m^2/day during 4 monitoring periods: October 2009 and 2010 (368 and 443 mg/m^2/day respectively), September 2010 (401 mg/m^2/day) and July 2011 (1511 mg/m^2/day). Dust fallout levels in July 2011 also exceeded the SANS standards of 600 mg/m^2/day. There is a general increase in dust fallout during the period August to November after which the levels decrease to less than 200 mg/m^2/day.
- SEA_D17 show low dust fallout in general with all the levels below 100 mg/m^2/day and most of the dust fallout within a narrow range (50 – 2 mg/m^2/day). The highest recorded dust fallout (95 mg/m^2/day) occurred in November 2009.
- SEA_D18, SEA_D19 and SEA_D20 are regarded as background sites. SEA_D18 is located along the D1982, SEA_D19 is along the C28 and SEA_D20 is on the C32. These roads have low traffic volumes and the surrounding environment is covered with grass with limited farming activities. Dust fallout levels at all three sites are low with SEA_D19 recording the highest levels (81 mg/m^2/day). All three dust buckets have levels that fall within narrow ranges; SEA_D18 (35 – 2 mg/m^2/day), SEA_D19 (81 – 2 mg/m^2/day) and SEA_D20 (35 – 5 mg/m^2/day).

It is evident from the data collected and from the graphs that it is hard to pick up yearly trends from the data collected so far. It was thus considered that the monitoring network be resumed for at least 2 more years. This will ensure that enough data is collected to record trends. However, the proposal proved not to be feasible and the monitoring will in future be carried out in cooperation with the mines as stated in indicator 5.3.2.1.



Status: MET

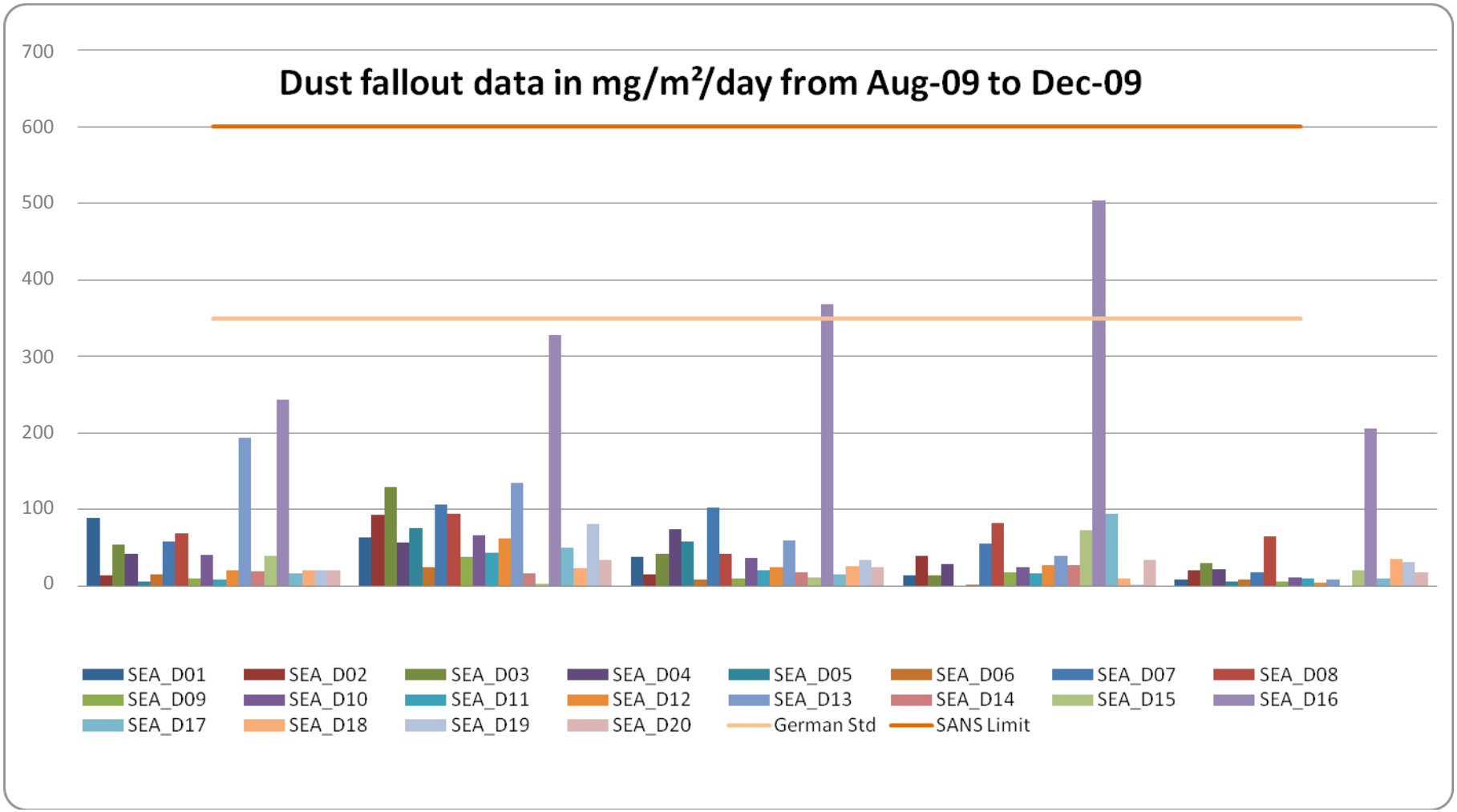


Figure20: Graph of Dust fallout data per sample location in 2009

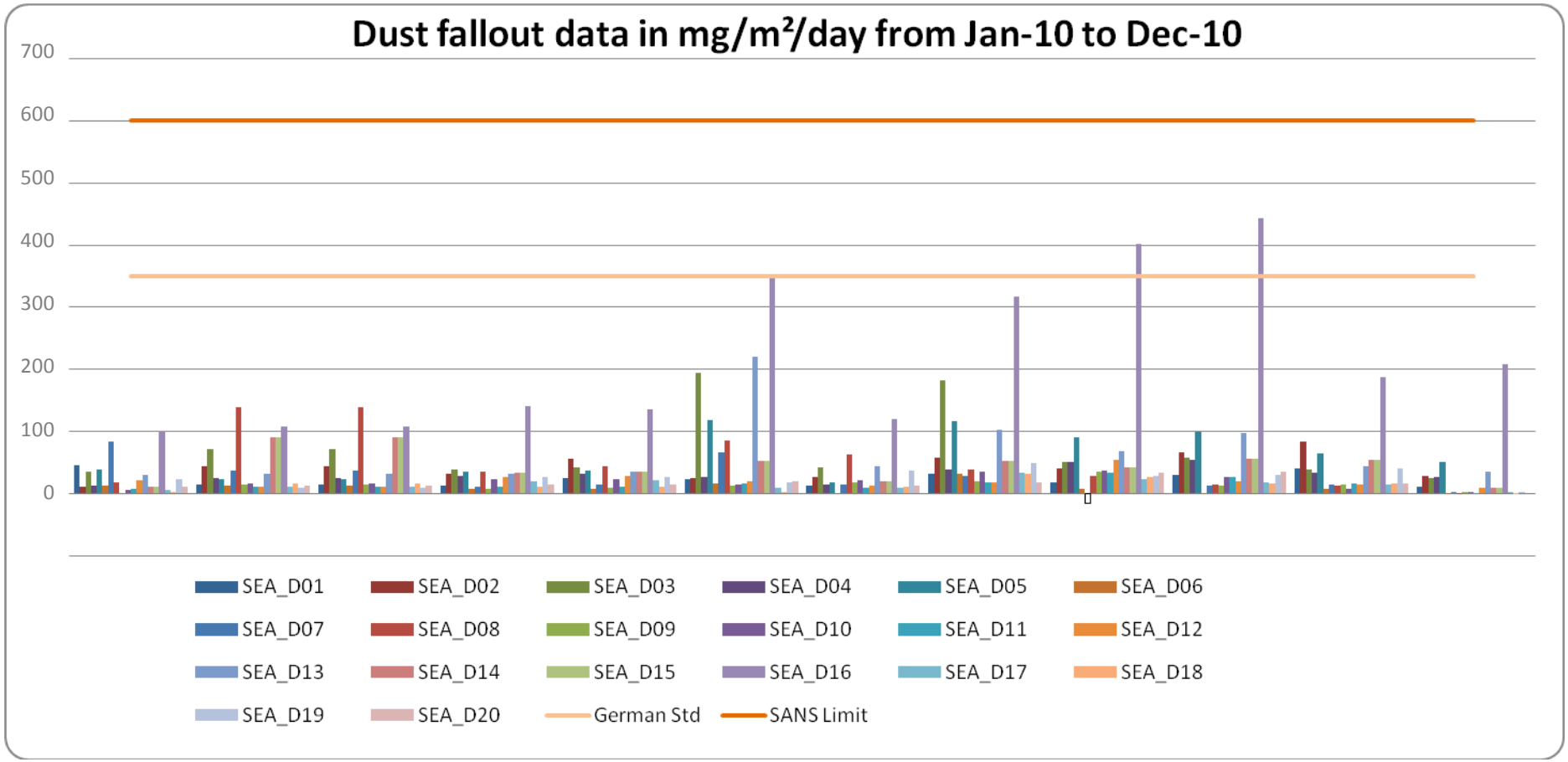


Figure21: Graph of dust fallout data per sample location in 2010

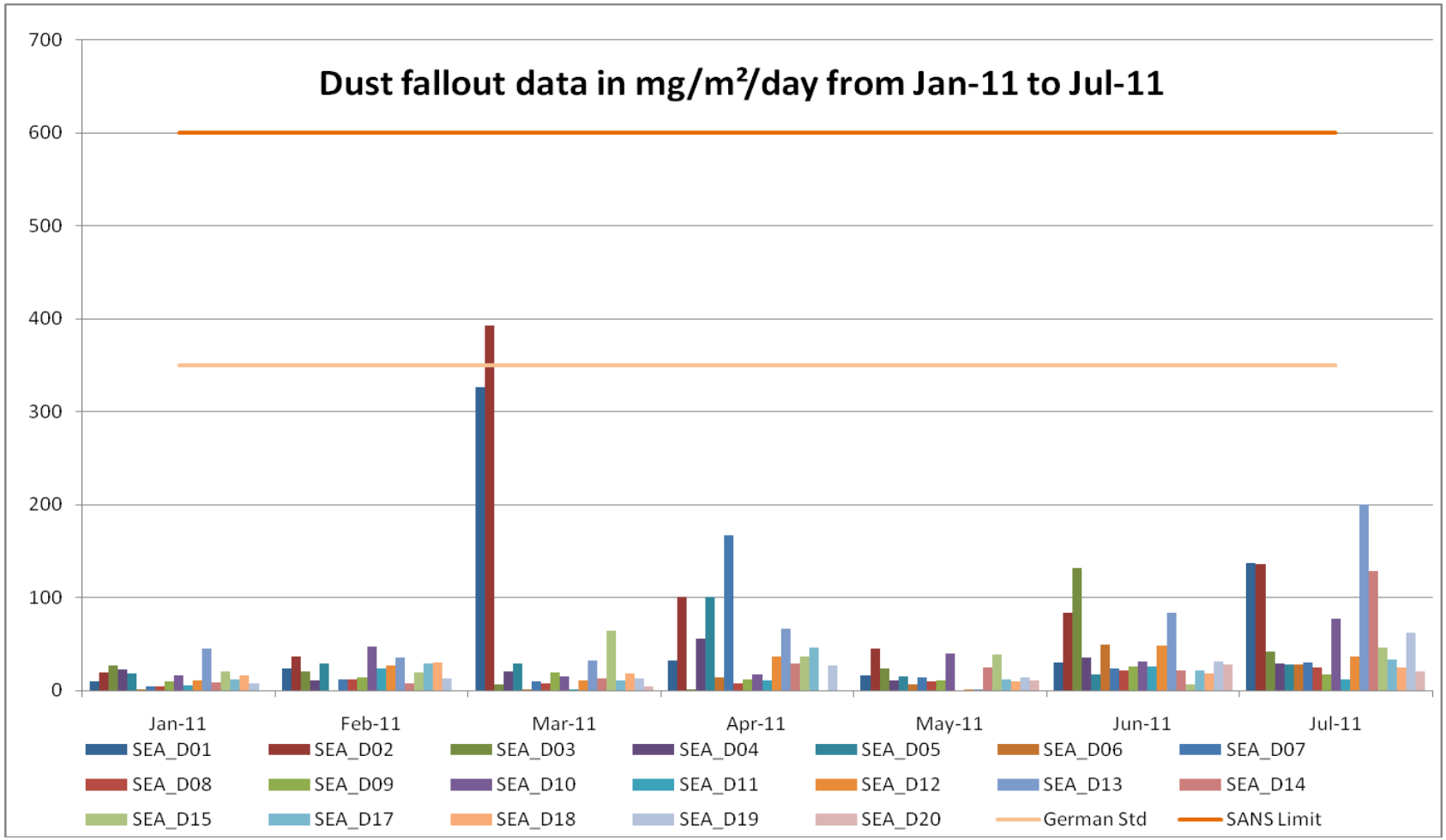


Figure22: Graph of dust fallout data per sample location in 2011

EQO 6.	Health

Aims of this EQO: Workers and the public do not suffer significant increased health risks from the Uranium Rush.

Uranium mining always has positive and negative health consequences, for both the workforce employed and the community. Uranium ore emits radon gas; the health effects of high exposure to radon are a particular problem in the mining of uranium and in the neighbouring communities. The main deleterious effects on workforce health are usually accidents, dust related lung disease and specific metal toxicity. All these are preventable. The positive effects are related to employment itself, bringing prosperity and even improved health care if there is adequate corporate social responsibility and taxes and levies are invested responsibly by government (SEA, 2010).

According to the Uranium Institute (2012), through the Chamber of Mines, uranium mines and exploration companies adhere to a Code of Conduct that defines principles of behaviour and standards of practice for its members, with the aim of guiding improvements in performance in the Namibian mining industry. The uranium industry in Namibia has openly stated that it has a collective responsibility for leading practice in the stewardship of its product. The Chamber of Mines in Namibia through the Uranium Stewardship Committee has also developed standards known as Health, Environment, Radiation Safety and Security (HERSS) Standards. These standards are based on practices applied by major international mining companies, partly adapted to Namibian conditions and legal requirements. They are the minimum requirements that are compulsory for members of the Uranium Stewardship Committee and new companies in the Namibian uranium industry are encouraged to use the guidelines when compiling their health, safety, environment and radiation safety management plans.

The HERSS Standards provide:

- A framework for management of Health, Environment, Radiation Safety and Security in the Namibian Uranium Industry.
- A reference point against which continuous quality improvement in healthcare, environment, management, radiation safety and security can take place.

The Erongo Region has three State hospitals in Swakopmund, Walvis Bay and Usakos respectively, 5 health centres and 12 health clinics (Figure) (MoHSS, 2011). Given the current population with the most majority being treated in public health care, hospitals, health centres and clinics are said to be inadequate to cope with the increased population in terms of capacity, equipment, and accessibility (SEA, 2010; MoHSS, 2008). Ambulance services are also inadequate to cope with the already high number of road traffic accidents, as well as general medical emergencies. Private healthcare operates in parallel to the public health system and there are adequate facilities available at the private hospitals in Swakopmund and Walvis Bay. However private health insurance is only available to the more effluent or those in good employment, including mine workers.

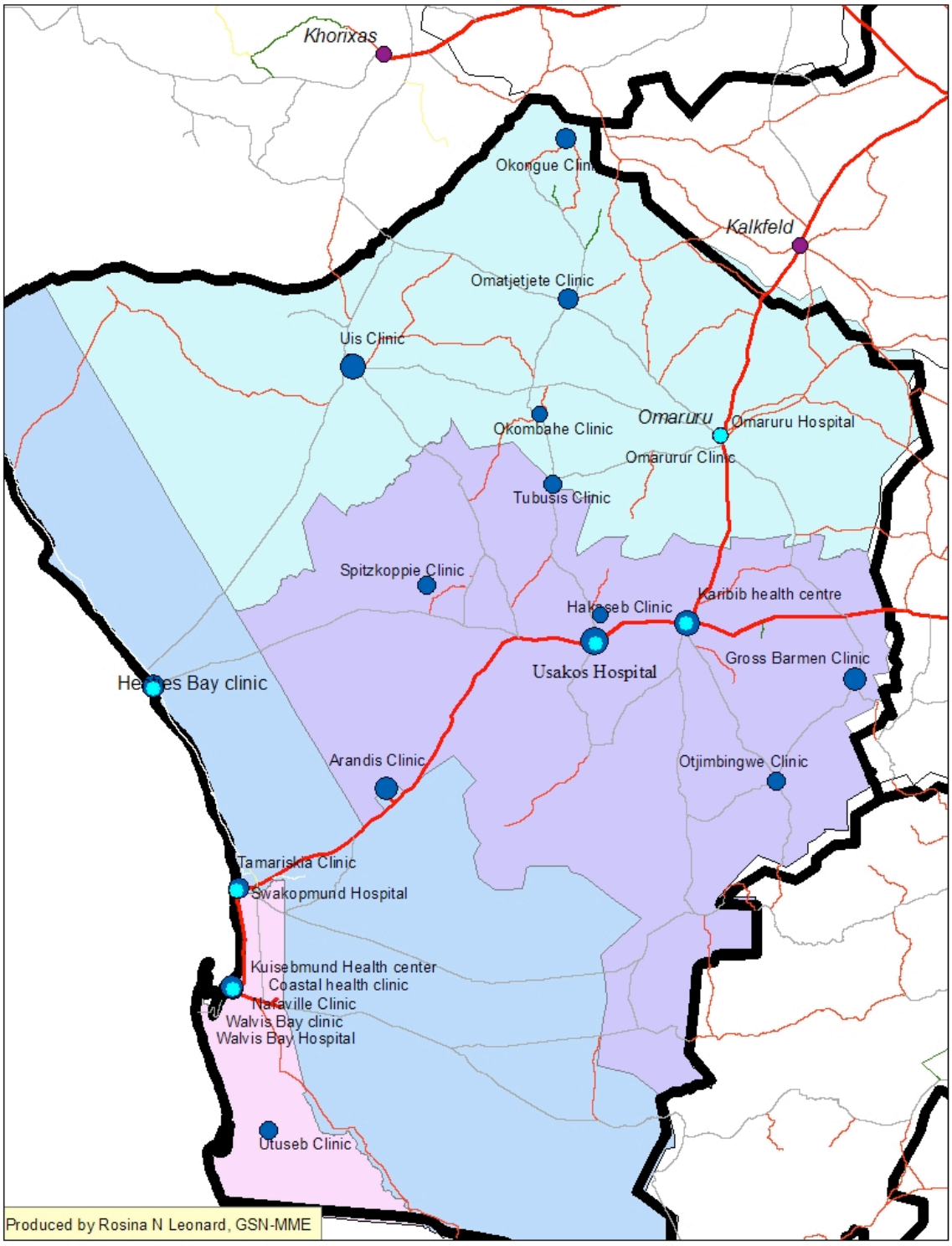


Figure23: Public hospitals, health centres and clinics in Erongo Region

Desired Outcome 6.1.	**Disease rates amongst the public and employees of the mining and associated industries are not increased as a result of the Uranium Rush**
Target 6.1.1.	**Increments in the concentrations of uranium, thorium and health-relevant nuclides of the uranium, thorium and actinium decay chains such as Ra-226 and Ra-228 (above respective background concentrations) in air and water (ground and surface) that originate from uranium mines, must be constrained so that the cumulative radiation dose to members of the public is reasonably minimized and does not exceed 1 mSv per annum above background.**
Indicator 6.1.1.1.	**Public dose assessments produced by each mine project**
Status:	***MET***

Target 6.1.2.	**Dose limits for practitioners working with radiation sources, e.g. mine employees, industrial radiographers, medical radiographers, radiologists (doctors) are reasonably minimized and do not exceed 20 mSv per annum averaged over 5 years, i.e. 100 mSv/a over a 5 year period with a ceiling of 50 mSv per annum in a single year.**
Indicator 6.1.2.1.	**Measured change in absorbed radiation dose of uranium mine workers and medical professionals (designated radiation workers)**
Status:	***MET***

Target 6.1.3.	**No measurable increase, directly or indirectly attributable to uranium mining and its support industries in the incidence rates of the following:** **Industrial lung disease (including pneumoconiosis)** **- Lung cancer** **- Other industrial related cancers** **- Industrial induced renal damage** **- HIV/ AIDS** **- Tuberculosis** **- Industrial dermatitis**
Indicator 6.1.3.1.	**Measured change in the incidence rate of industrial diseases amongst uranium mine workers.**
Status:	***MET***

Indicator 6.1.3.2.	**Measured change in the incidencerate of diseases scientifically attributed to radiation amongst members of the public, uranium mine workers and medical personnel.**
Status:	***MET***

Target 6.1.4.	**No increase in road accidents directly attributable to Uranium mining and its support industries.**
Indicator 6.1.4.1.	**Measured change in the number of fatal road accidents per road user over 1 year.**
Status:	***MET***

Indicators 6.1.1.1., 6.1.2.1., 6.1.3.1., 6.1.3.2. and 6.1.4.1 are all related are therefore discussed here together. The diseases are as follows: Industrial lung disease (including pneumoconiosis), lung cancer, other industrial related cancers, industrial induced renal damage, HIV/ AIDS, Tuberculosis and Industrial dermatitis.

Increase in uranium mining and exploration activities means increase in population, more dust, more radiation exposure of the workforce and public and probably increase in the number of accidents both at work and on public roads. In addition workers and the public are exposed to unwanted effects that can arise with an increase in commercial sex workers, drug and alcohol abuse. Some mine workers could be exposed to potentially hazardous substances such as uranium dust, volatile chemical fumes and welding fumes. Workers and the public who will be active in specific areas of potential high occupational exposure have a high chance of developing industrial related diseases (diseases such as Industrial lung disease, including pneumoconiosis, lung cancer, other industrial related cancers and Tuberculosis) that are directly attributed to uranium. Some uranium workers are exposed to potentially hazardous substances such as uranium dust, volatile chemical fumes and welding fumes.

The likely pathways for public exposure to radiation are the following:

- Direct external exposure to radiation from mineralized sources;
- Aquatic pathway through radio-nuclides that are carried in surface and groundwater;
- Atmospheric pathway through radon gas and radio-nuclides in dispersed dust; and
- Secondary pathways that include: radiation from contaminated soils, ingestion of the contaminated soils, the eating of crops that are grown on radioactively contaminated land/soil, and/or eating radioactive contaminated fish and/or animals.

At Rössing Mine, Langer Heinrich Mine, and Trekkopje Mine, there is an assurance that the effective dose equivalent to members of the public as a result of mining operations is limited to the recommendations of the Namibian Atomic Energy Board Regulations as provided for by the Atomic Energy and Radiation Act, No. 5 of 2005. The dose assessments performed for each of the various operational projects indicate that potential radiation impacts to employees and the public is relatively low, and below the ICRP limit of 20 mSv/a for workers and 1 mSv/a for the public (Rössing, et al, per comm., Feb 2012) In addition, mine-wide surveys were carried out at all mines with the aim of gauging employees concern about radiation safety (CoM, 2011). With the low grade ore that most mines handle, radiation levels are definitely higher in mining areas than in the towns, but the exposure level at the mines is still well below the limit (CoM, 2011).

Mine employee exposure monitoring is performed regularly and continuously and results are reported to the National Radiation Protection Authority (NRPA) at 6-month intervals. Additionally,

the BGR-GSN project has set up independent radon monitoring stations in Swakopmund, Walvis Bay and Arandis and a PM10 monitoring station in Swakopmund to monitor radon and its progeny and particulate matters of less than 10µ (see detailed information in EQO 5) in the air. Weighted average worker doses at Rössing Mine are about 2 mSv/a, while individual exposures have never exceeded the annual occupational dose limit (Rössing, per comm, Feb 2012).

RUL-commissioned studies on occupational health of workers employed over a 20-year period have failed to identify any significant increase in occupation related disease (Rössing, 2012). A study was also conducted on occupational health in the Namibian uranium industry as part of the continuous monitoring on the health of uranium workers, prescribed by the Namibian Labour Law Health and Safety Regulations (1992) (Strauss, 2012). The study included tracking of diseases and conditions which are possibly related to workplace exposures (Strauss, 2012). These conditions include diseases like noise induced hearing loss, tuberculosis, lung cancer and obstructive lung disease (Strauss, 2012). The results concluded that no new cases of lung fibrosis or silicosis, noise induced hearing loss or radiation related health concerns were reported over the past year (Table).

The assessment performed for various operational projects indicates that potential radiation impacts top employees and the public are well below the ICRP limit of 20 mSv/a for employees and 1 mSv/a for members of the public.

Key Performance Indicators	2007	2008	2009	2010	2011	Target for 2012
Employees						
No. of Medical Examinations	1175	1307	1415	7523	10251	1668
Production						
Uranium oxide produced (tonnes)	3046	4108	4150	3628	2137	2973
Health, Safety and Environment						
Number of personal annual radiation exposures above 20 mSv	0	0	0	0	0	0
New cases of pneumoconiosis	1	0	0	0	0	0
New cases of dermatitis	0	0	0	1	1	0
New cases of hearing loss	0	0	0	0	0	0
New cases of chronic bronchitis	0	0	0	0	0	0
All injury frequency rate (AIFR)	0.71	0.91	0.73	0.89	0.81	0.65
Number of lost-time injuries	9	8	6	14	11	0

Table 6: Medical surveillance of Occupational Disease in Namibian uranium industry

Safety is a top priority and the industry is driven by the motto that "one injury is one too many", hence programmes such as the Inter-Mine Safety Competition, and Safety Peer reviews are undertaken to enhance safety amongst the mines (CoM, 2011).

Although the Erongo Region is ranked third amongst the regions for road accidents (Figure) with a 6% fatality in the statistics for 2009- 2010 for road accidents in Namibia (Figure), none of these fatal accidents are related to uranium mining (MVA, 2011). Neither mine personnel nor contractors were involved in any work-related fatal road accidents in 2011 (RUL and LHM to the SEMP, Feb 2012).

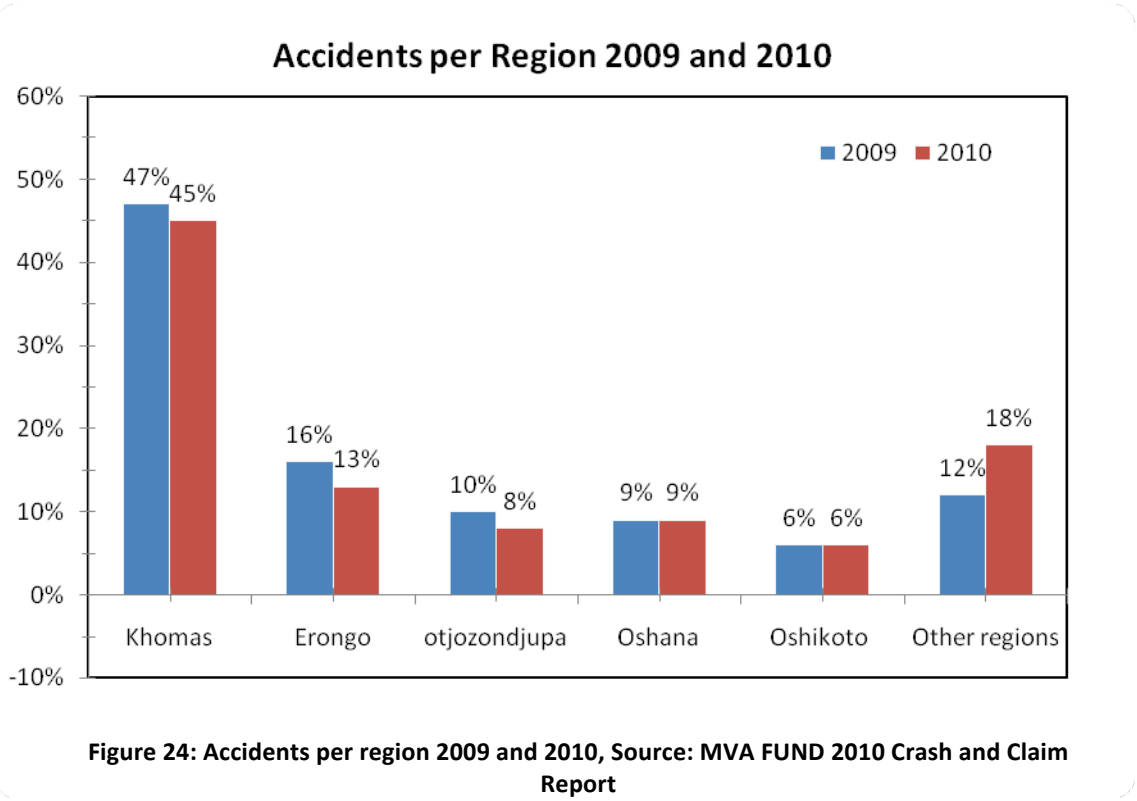


Figure 24: Accidents per region 2009 and 2010, Source: MVA FUND 2010 Crash and Claim Report

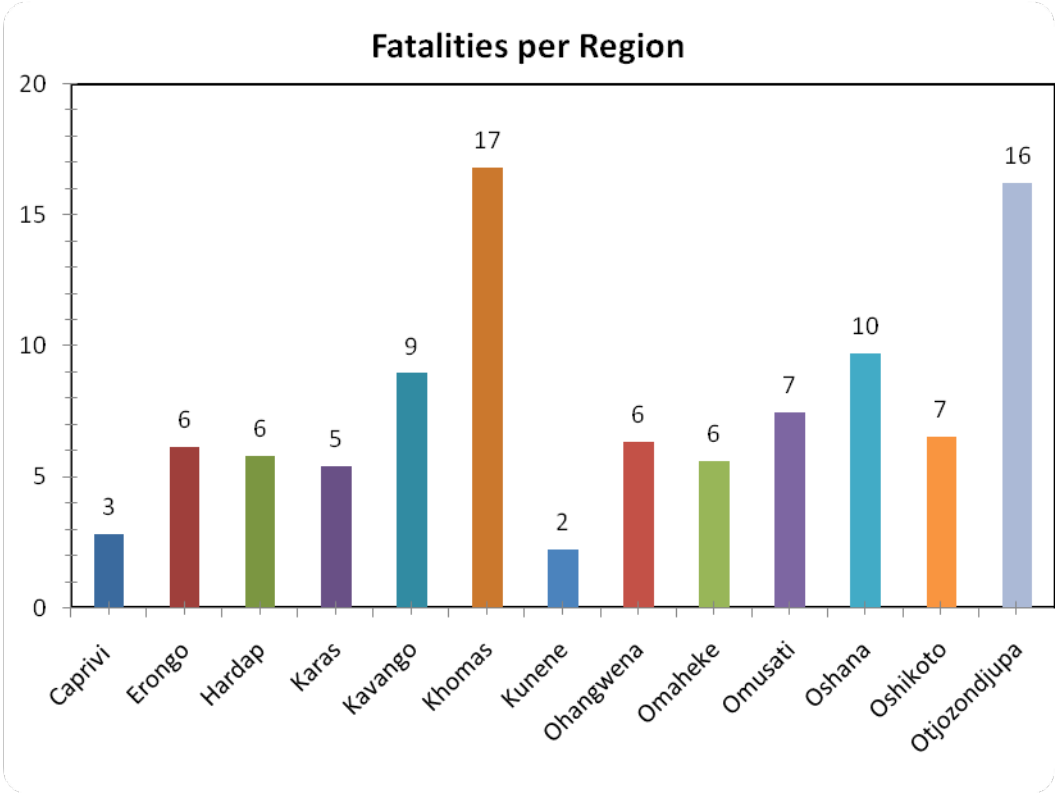


Figure 25: Accidents Fatality in Namibia, 2009 and 2010, Source: MVA FUND 2010 Crash and Claim Report

Desired Outcome 6.2.	**Improved Healthcare Facilities and Services are able to meet the increased demand for healthcare resulting from the Uranium Rush.**
Target 6.2.1.	**An increase in qualified health workers available to all in the Erongo Region, reaching 2.5 per 1000 of the population by 2020**
Indicator 6.2.1.1.	**Number of available qualified healthcare personnel: 2.5 per 1000 of population;** **Number of Medical Practitioners: 1 Per 1000 of population;** **Number of Dental Practitioners: 1 per 2000 of population;** **Number of nurses: 2.5 per 1000 of population;** **Pharmacists: 1 per 2000 of population**
Status:	***MET***

Target 6.2.2.	**An increase in registered healthcare facilities in Erongo, available to all, reaching 2.5 acute care beds per 1000 population and 0.5 chronic care beds per 1000 population by 2020**
Indicator 6.2.2.1.	**Number of available registered healthcare facilities: 1 per 1000**
Status:	***MET***

Target 6.2.3.	**An increase in ambulances in Erongo, reaching 1 per 20,000 by 2020.**
Indicator 6.2.3.1.	**Number of available ambulances: 1 per 20,000.**
Status:	***MET***

Indicators 6.2.1.1., 6.2.2.1. and 6.2.3.1 are related and are therefore discussed together. Although Namibia's health worker capacity is above the WHO benchmark of 2.4 health workers per 1000 population, there is a disparity in health worker capacity between the private and the public sector. The private sector has 8.0 health workers per 1000 inhabitants while the public sector has just below 2.0 health workers per 1000 inhabitants. In the Erongo Region, health facilities and health personnel are unquestionably inadequate. The region has a total of 5 health centres and 12 health clinics. However, it is expected that with the increased number of mines in the region, the health system will also improve. Under the current "Below expectation" scenario, there is no significant change in the number of health clinics due to inadequate funding (Annex 3).

The Ministry of Health and Social Services (MoHSS) drafted a long term Human Resources (HR) strategic framework focusing on future improved health needs and supply in the country for a period of 30 years (1997–2027). In parallel, a medium term Human Resources Plan (1997-2007 and five years HR development plan (2000–2005; 2008–2012) were developed to serve as guidelines for HR planning. Additional health infrastructure and social welfare personnel are still required, especially in the public sector, to deliver effective health and social services which is currently not available as a result of poor governance and insufficient human resources (MoHSS, 2008).

On the other hand, mining has thus far invested in the health sector of the Erongo Region through the Chamber of Mines Code of Conduct and the implementation of the Uranium Stewardship

Committee (USC)'s HERSS Standards. Each mine has an onsite health facility that caters for minor injuries while major injuries are referred to advanced healthcare facilities in Swakopmund and Walvis Bay. All the members of the USC have existing contracts with either EMED or ISOS for 24/365 coverage. As part of its social responsibility to the community, AREVA has donated a local ambulance to the town of Arandis (pers. comm. Sandra Müller, Areva, 2012).

Conclusions

The current mining scenario of less than four mines operating in the Central Namib has not seen any significant changes in regards to the health system of the Erongo Region. Although a donation of an ambulance was made in the year 2011, health facilities and health personnel still remain inadequate since the previous data collection for the SEA. While the private health sector has 8 health workers per 1000 population, this figure is below 2 for the public health sector. Although uranium production at RUL and LHM and extensive exploration activities in the uranium province have been on-going, radiation impacts to employees and the public have remained well below the ICRP limit of 20 mSv/a for workers and 1 mSv/a for the public. Radiation exposure monitoring is performed regularly and continuously at mines and at receptors points. No new cases of lung fibrosis or silicosis, noise induced hearing loss or radiation related health concerns were reported over the past year and no fatal accidents were attributable to uranium mining-related activities.

Status: MET, however with the qualification that they are only met in the private sector, and not in the public sector.

EQO 7.	**Effect on tourism**

Aims of this EQO:

The natural beauty of the desert and its sense of place are not compromised unduly by the Uranium Rush; and to identify ways of avoiding conflicts between the tourism industry and prospecting/mining, so that both industries can coexist in the Central Namib.

The Uranium Rush does not prevent the public from visiting the usually accessible areas in the Central Namib for personal recreation and enjoyment; and to identify ways of avoiding conflicts between the need for public access and mining.

Residents and tourists to the central Namibian coast define their quality of life as being enhanced by opportunities for sport, exploring the desert by vehicle, relaxing on the beach and living in tranquil towns, angling or adventure activities. Tourism products in the Central Namib include adventure tourism (e.g. parachuting and quad biking), business tourism (e.g. workshops and conferences), consumptive tourism (e.g. hunting and fishing) and ecotourism (excursions into the desert). Unsurprisingly, the tourism sector is of considerable importance to the Namibian economy, but even more so for the coast: national bed occupancy was 53% in 2008 compared to 63% in Swakopmund and surrounds (SAIEA 2010).

The key concerns with regard to the impacts on tourism are 1) concerns or perceptions over public health due to radiation exposure, 2) decreased sense of place (as a result of visual impacts and noise), 3) actual or perceived loss of unique biodiversity, and 4) reduced accessibility to sites of tourism importance.

The SEMP attempts to monitor the effects of impacts on inter alia the four key concerns expressed above.

Desired Outcome 7.1.	**Central Namib is accessible to the public (within the regulations of the National Park**			
Target 7.1.1.	**Uranium Rush does not result in net loss of publicly accessible areas.**			
Indicator 7.1.1.1.	**Areas of importance for recreation that are not yet alienated by mining or prospecting are declared 'red flag' for prospecting or mining. These include: The Walvis-Swakop dunes, Messum Crater, Spitzkoppe (Gross and Klein), Brandberg, the Ugab, Swakop, Khan, Kuiseb and Swakop Rivers, the coastal area between the Ugab River Mouth and the tidal mud banks south of Sandwich Harbour (between lower mark and the main coastal road), the Welwitschia Drive (can possibly be offset) and Park campsites (can be offset).**			
Status:		***IN PROGRESS***		

The Strategic Environmental Assessment for the Uranium Rush (SAIEA 2010; p7-66) identified "red" and "yellow" tourism zones that indicate important tourism and recreation areas in the Central Namib (see 6). GSN/MME commissioned the SEA because of their desire that mining development should be done in an environmentally responsible way as far as possible. However, while the policy on mining and exploration in protected areas is in an advanced stage, it is still in a draft form. The declaration of tourism zones will therefore necessarily depend on voluntary acceptance of the principles and maps as defined in the SEA. Nevertheless, MET and MME are currently cooperating to address the issue of red and yellow flag areas. Until such time that the policy is complete, it cannot be official policy of MME, but MME has in the meantime requested a map from MET indicating such areas (pers. comm. Gabi Schneider, GSN, 2012).

Status: The status of this indicator is therefore considered to be IN PROGRESS

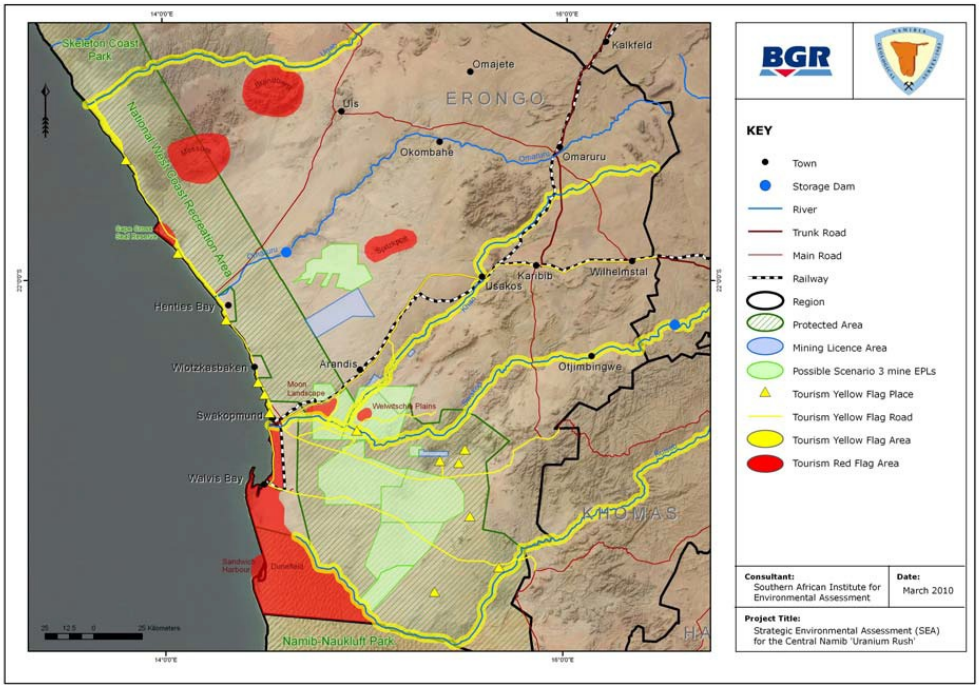


Figure 26: Red and yellow flag zones for tourism as identified in the SEA for the Uranium Rush (SAIEA 2010)

Indicator 7.1.1.2.	**All new listed mineral developments undergo an EIA and EMP prior to final design and implementation, and in all cases, the issue of public access is assessed in a specialist report.**
Status:	***NOT MET***

All current mining projects had undergone an EIA and had drafted an EMP before final design and implementation. Because of problems in sourcing all EIAs, it is however not possible to determine whether all exploration projects have drafted an EMP.

See Annex 4 for a list of EIAs that are in NERMU's possession. Only eight of these EIAs were prepared or updated after the publication of the SEA, also none of these considered public access.

Status: This indicator is therefore considered NOT MET.

Indicator 7.1.1.3.	**All projects are closed, decommissioned and rehabilitated in such a way that addresses public access needs.**
Status:	***NOT MET***

No projects have closed or been decommissioned in the reporting period. In lieu of that, we assessed whether those mines in the design or operational phase that had already prepared closure plans considered public access needs in the design of rehabilitation or decommissioning projects. However, one could also argue that this can only be assessed once projects are indeed closed.

Status: Although in some cases (e.g. the Omahola project of Reptile Uranium which lies off all existing tourist routes besides the horse safari) public access is less of a problem, none did so explicitly, leading us to decide that the indicator has not been met.

Desired Outcome 7.2.	**Uranium Rush does not significantly reduce the visual attractiveness of the Central Namib.**
Target 7.2.1.	**Direct and indirect visual scarring from the Uranium Rush is avoided or kept within acceptable limits.**
Indicator 7.2.1.1.	**Tour operators continue to regard areas such as the dunes, the coastline, Moon Landscape, Welwitschia Flats, Swakop and Khan River areas, and Spitzkoppe as a 'significant' component of their tour package.**
Status:	***IN PROGRESS***

A pilot questionnaire survey of a selected (and hence unlikely to be truly representative) group of tour operators showed that not all operators depend on the attractions defined in the indicator; the majority depended on Swakopmund town. Only two of eight respondents utilized more than 2 attractions. Of the others, most depended on the Moon Landscape, the coastal dunes, or the Walvis Lagoon. See Annex 6 for the full results of the pilot survey.

The current survey is a pilot for a baseline survey. As such it is not possible to measure the indicator, which requires an assessment of change ("…continue to regard areas such as the dunes…"), at this

time. The pilot survey further showed up the need for an important correction to the questionnaire: the question assessing the extent to which certain attractions make up a part of the operator's tour package currently cannot determine whether the operator's suite of products is the result of changes in response to a changing environment or not.

Status: The indicator is therefore considered to be IN PROGRESS.

Indicator 7.2.1.2.	**Tourists' expectations are 'met or exceeded' more than 80% of the time in terms of their visual experience in the Central Namib.**			
Status:				***EXCEEDED***

A questionnaire to assess the tourists' expectations has been developed and piloted (see Annex 6). This questionnaire, being a pilot study, polled only 19 tourists (19 returns out of 45 questionnaires that were distributed). Among other questions, tourists had to rate the extent to which their expectations were met on a 5-point scale (1 = disappointed, 3 = met, 4 & 5 = exceeded) for 18 specific attractions in the Central Namib. A total of 157 out of 168 ratings were 3 or higher. This represents 93.5% of all responses.

Status: The indicator is therefore exceeded, but note that numerous qualifiers to this answer are discussed in the report on the survey (Annex 7). Also note that the target of 200 tourists to be polled may be unrealistically high.

Indicator 7.2.1.3.	**All developers commission EIAs prior to final design, and outcomes-based EMPs guide implementation and decommissioning. In all cases, visual impacts and sense of place are addressed.**			
Status:	***NOT MET***			

This indicator is being assessed on the EIAs in our possession (Annex 4). This is not a full reflection of all the relevant projects. It is clear that this indicator should be split into three separate ones that each answer a single question:

- Of eight developers, eight (100%) commissioned EAIs prior to final design
- Indicator status: Met
- Of eight projects, seven (87.5%) have outcomes-based EMPs and one (12.5%) are yet uncertain
- Indicator status: Not met
- For eight projects, seven (87.5%) visual impacts and impacts on sense of place have been assessed and for the rest (12.5%) this has not been done.
- Indicator status: Not met

Status: The overall assessment is therefore NOT MET

Desired Outcome 7.3.	**Areas of significant natural beauty or sense of place are afforded proper protection (without undermining existing legal rights).**
Target 7.3.1.	**Improved protection of listed areas.**
Indicator 7.3.1.1.	**MME recognizes and respects 'red flag' status for areas regarded as being significantly beautiful. These include:** **- Coastal strip,** **- Major dunefields,** **- Moon Landscape,** **- Spitzkoppe,** **- Brandberg,** **- Messum crater,** **- Sandwich harbour,** **- westward flowing rivers (notably Khan, Swakop and Kuiseb)**
Status:	***MET***

Indicator 7.3.1.2.	**MME recognizes and respects 'yellow flag' status for areas regarded as being scenically attractive. These include:** **- Gravel plains,** **- Inselbergs (other than those listed above),** **- River washes (other than rivers listed above),** **- Lichen fields.**
Status:	***MET***

Indicators 7.3.1.1 and 7.3.1.2 are related and therefore discussed together here. MME does not currently have a formal policy whereby red flag areas can be recognized (but see Desired outcome 1 above). However, MME has indicated very clearly a willingness to accept scientifically well-justified arguments for such zones (e.g. the Landscape Level Assessment, MET 2012) and has even contributed to the recommendations for such zones that came out of the Mining in Protected Areas Conferences (Anonymous 2011). MME sees this objective as best served through a broad landscape-scale assessment of biodiversity and land-use (tourism) vulnerabilities. Although these points were therefore mainly made in relation to biodiversity, the concept will most likely also apply for tourism red and yellow zones.

Status: Both indicators are therefore MET.

Indicator 7.3.1.3.	**Number of new mines and prospecting licenses in protected areas.**			
Status:			***MET***	

A moratorium currently exists on all new prospecting licenses in the area of relevance to the SEMP, and without these, new mines will therefore only develop in areas where EPLs were previously granted (pers. comm. Gabi Schneider, GSN, 2012).

Status: The indicator is therefore MET.

EQO 8.	**Ecological integrity**

Aims of this EQO: The ecological integrity and diversity of fauna and flora of the Central Namib is not compromised by the Uranium Rush. Integrity in this case means that ecological processes are maintained, key habitats are protected, rare and endangered and endemic species are not threatened. All efforts are taken to avoid impacts to the Namib and where this is not possible, disturbed areas are rehabilitated and restored to function after mining/development.

Introduction

The Central Namib might appear to be a barren environment, but its climatic variations superimposed on diverse landscapes and substrates support a great variety of living creatures. The most impressive diversity is found in those groups which normally are cryptic or go unnoticed, namely reptiles and invertebrate groups such as insects and arachnids, and they display many remarkable adaptations for survival in the Namib. The area is known as a hotspot of species diversity in these groups; most particularly in geckos and sand lizards, beetles, scorpions and solifuges. Some of these species, as well as other more conspicuous mammals and birds, are conservation priorities on the basis of endemicity and rarity, and almost all desert species are specialized to live in arid conditions of some sort.

The SEMP addresses concerns about the likely impacts on biodiversity by monitoring the protection of critical habitats and processes, the extent of direct impacts and the measures put in place to ensure persistence of all species.

Desired Outcome 8.1.	**The ecological integrity of the Central Namib is maintained.**			
Target 8.1.1.	**The mining industry and associated service providers avoid impacts to biodiversity and ecosystems, and where impacts are unavoidable, minimisation, mitigation and/or restoration and offsetting of impacts is achieved.**			
Indicator 8.1.1.1.	**Important biodiversity areas [red or yellow flag areas] are taken into consideration when adjudicating prospecting and mining applications.**			
Status:		***IN PROGRESS***		

In the SEA (SAIEA, 2010) red and yellow flag zones were defined for both biodiversity (Figure) and tourism/recreation (Figure). Tourism zones were dealt with in EQO7. For the same reasons as in that case we here consider the indicator as IN PROGRESS.

The same principles and conditions that were relevant for the tourism zonation also apply to the biodiversity zones, except that in this case the LLA project (MET 2012), in which NERMU played a part, has established a robust decision-support tool and database that allows a more direct determination of areas of critical biodiversity value. The tool's real value lies in its ability to assist with the identification and definition of no-go or offset areas on a case by case basis or at the regional scale

The basic output of this process is a map of the "irreplaceability" of biodiversity across the landscape of the Central Namib (Figure). This irreplaceability value (IRV) is a modelled output based on several layers of spatial data that represent the biophysical world and ecological processes. The modelling process attempts to find the most parsimonious spatial arrangement given a set of target conservation values and a "fragmentation cost". For instance, light colours on the map indicate areas where disturbance (mining) has little impact on the potential to meet conservation targets across the landscape. In contrast, darker areas indicate areas where disturbance will significantly affect the potential to reach conservation targets across the whole landscape.

The irreplaceability map is the basis for further calculation of critical biodiversity areas – these are typically areas that simultaneously have high IR values and a high threat status (Figure). These critical biodiversity areas are the closest analogue to a "red flag" biodiversity zone, but are based upon actual data. Theoretically the motivation for avoiding all impacts in a red zone (i.e. a no-go) is based mostly on the emotional value that humans assign to the biodiversity character of such an area backed up by expert opinion. The motivation for avoiding impacts in a critical biodiversity area is based on the reasoned argument that such impacts will have a cost elsewhere in the landscape as it becomes more difficult to reach conservation targets AND lower threat and risk to biodiversity features. This is a significant improvement over the expert-based system of red and yellow flags, but is more labour intensive and requires specialist input. More detail can be found in the LLA Report (MET 2012).

Status: The indicator is therefore considered to be IN PROGRESS

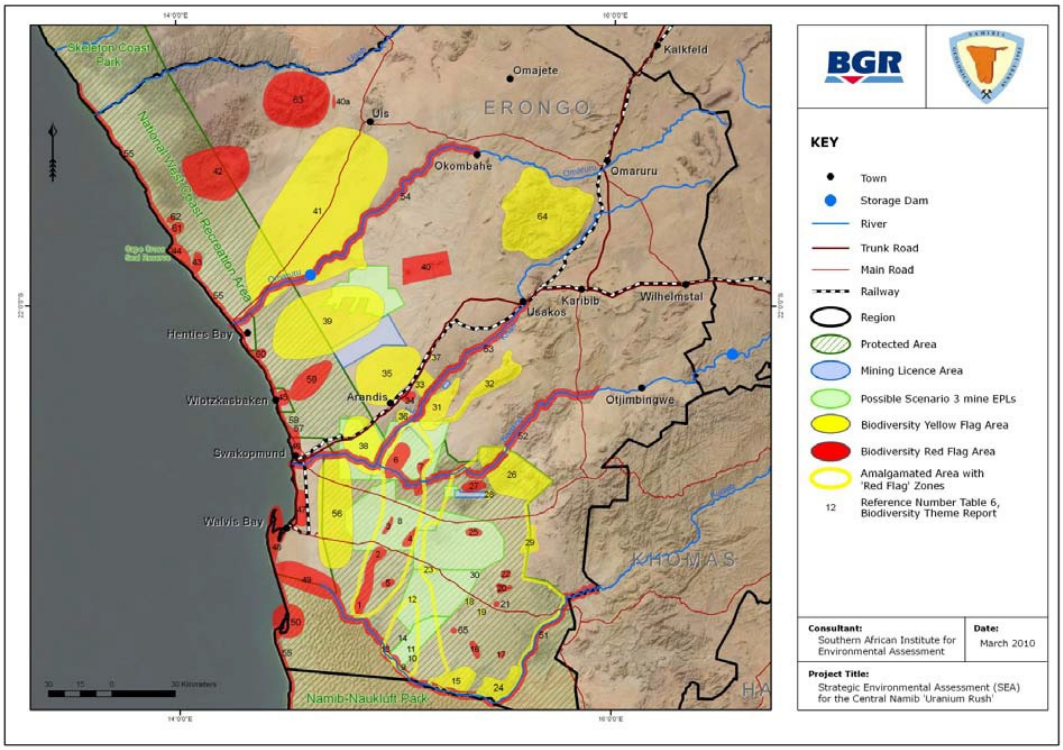


Figure 27: Red and yellow flag zones for biodiversity as identified in the SEA for the Uranium Rush (SAIEA, 2010)

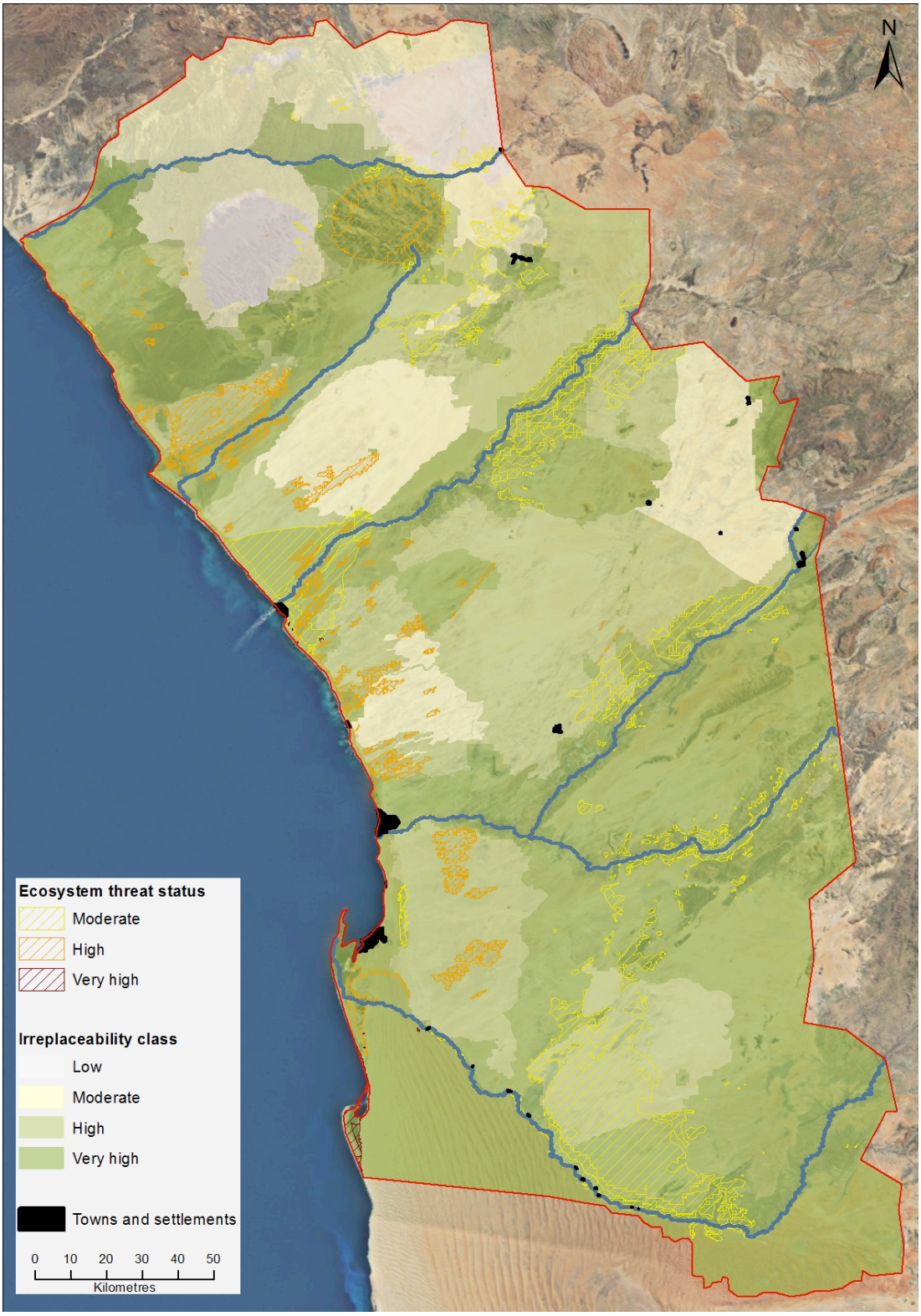


Figure 28: A map showing the spatial pattern of biodiversity Irreplaceability Values across the Central Namib landscape, as determined using a MARXAN modelling approach. Darker green colours indicate areas that contain biodiversity patterns and processes that are critical to maintain the biodiversity character of the landscape – disturbances here will mean that it becomes much more difficult to meet conservation targets at the landscape scale. Threat status is based on total extent of habitat and areas conserved. Please note this is a draft map reproduced only for illustration of the concept, with permission from MET (2012)

Indicator 8.1.1.2.	As far as possible these areas should be avoided. If this is not possible biodiversity offsets must be sought to offset loss occurring in the area. If an offset is not possible then the no-go option should be explored.
Status:	***IN PROGRESS***

MME does not currently have a formal policy whereby red flag areas can be recognized. However, MME has indicated very clearly a willingness to accept scientifically well-justified arguments for such zones (e.g. the Landscape Level Assessment, MET 2012) and has even contributed to the recommendations for such zones that came out of the Mining in Protected Areas Conferences (Anonymous 2011). MME sees this objective as best served through a broad landscape-scale assessment of biodiversity and land-use vulnerabilities.

Status: The indicator is therefore IN PROGRESS

Indicator 8.1.1.3.	GRN keeps a record of all decisions made regarding prospecting and mining applications so that applications denied on biodiversity grounds are not awarded in the future, unless alternative approaches are adopted to avoid impact, mitigate or offset the impact.
Status:	***MET***

MME keeps records in the form of minutes of the MPMRAC. The Mining Commissioner´s office furthermore keeps a record of licenses granted and refused. A list of licenses granted and pending is also on MME's webpage (all pers. comm. Gabi Schneider, GSN, 2012). Data were not available from MET. The issue of whether any subsequent applications for licences in the same area has been influenced by a previous decision is not, at the moment, possible to determine, because it will require very careful scrutiny of the Mining Commissioner's records. However, as a moratorium on granting exploration licenses for nuclear fuels is in place, no new licenses can be granted in the same area where such have been previously refused on the basis of biodiversity issues at present.

Status: The Indicator status is therefore MET.

Indicator 8.1.1.4.	Mines have specific programmes and projects to actively avoid, mitigate, restore or offset their impacts, with impact AVOIDANCE predominating.
Status:	***MET***

Some aspects of this indicator cannot yet be measured, because it expects a process that cannot yet occur (offsets). However, in general all EIAs currently in our possession (Annex 4) are following the basics of the mitigation hierarchy.

Status: The indicator status is therefore considered as MET.

Indicator 8.1.1.5.	Biodiversity footprints of mines are minimized.			
Status:		***IN PROGRESS***		

Ideally this indicator requires an assessment of whether different footprint options were considered and the smallest one, which simultaneously has the least biodiversity impacts, was chosen. The decision-making process is however seldom documented in such detail. In addition, cases exist where footprints had to be increased in order to avoid a specific biodiversity impact. In lieu of that, we aim to assess changes over time in the percentage of disturbed sensitive habitat on site. The current estimate is therefore considered to be a baseline survey, based on EIAs in our possession (Annex 4).

AREVA (pers. comm. Sandra Müller, Areva, 2012) reported that the total disturbed area is 1,436 ha, 5% of which is in a sensitive area. In addition, a vegetation survey, part of their EIA, identified sensitive habitats and made recommendations to avoid them. Further data are awaited and will be included in the 2012 SEMP report.

Further data are awaited.

Status: IN PROGRESS (baseline estimate)

Indicator 8.1.1.6.	**Infrastructure corridors are carefully planned to avoid ecologically sensitive areas, and demonstrate:** - **consideration of alternatives,** - **optimization of service provision; and** - **commitment to the 'green route'**			
Status:		***IN PROGRESS***		

The current indicator formed part of a questionnaire sent to mines (Appendix 7). Similar to Indicator 8.1.1.5 this will be described more fully in the next report. Trekkopje indicated that they had moved their water pipeline (running from the desalination plant at Wlotzkasbaken) to avoid impacts on a lichen zone (pers. comm. Sandra Müller, Areva, 2012). However, data are too little, and EIAs in our possession (Annex 4) also do not stipulate enough detail to draw strong inferences and we therefore consider this indicator as still IN PROGRESS.

Status: IN PROGRESS

Indicator 8.1.1.7.	Mines share infrastructure as much as possible, thus minimizing infrastructure proliferation.			
Status:		***IN PROGRESS***		

See previous. This indicator can also be answered by a detailed study of all EIAs (Annex 4), but the database of linear infrastructure EIAs is still too small to draw any inferences.

Status: The indicator is therefore still IN PROGRESS

Indicator 8.1.1.8.	**Infrastructure planning and investment takes into account future demand, thus reducing the need for additional impacts (e.g. 1 pipeline, not 3).**			
Status:		***IN PROGRESS***		

See previous. AREVA confirmed that their pipelines and powerlines were designed to handle future loads. Recent EIAs carried out by NamPower and NamWater for new lines to Langer Heinrich Mine have taken into account the potential needs of other projects (e.g. Bannerman, Reptile and Husab).

Status: IN PROGRESS

Desired Outcome 8.2.	**Mining industry becomes a conservation partner.**			
Target 8.2.1.	**Mines and associated industries support conservation efforts in Namibia.**			
Indicator 8.2.1.1.	**Mining companies (particularly those operating in the NNP) partner with conservation organisations to effectively manage their biodiversity impacts (both direct and indirect).**			
Status:			***MET***	

Rio Tinto (Rössing) has partnerships with Birdlife International and Fauna & Flora International (FFI) and cooperates with local conservation organisations such as Coastal Environmental Trust of Namibia, Millenium Seed Bank Project (MSBP) and National Botanical Research Institute (NBRI). Langer Heinrich, Trekkopje and Valencia also work with the NBRI and MSBP, while AREVA's head office has partnered with FFI. LHM and Swakop Uranium cooperate with NERMU on biodiversity and rehabilitation projects. Reptile and Bannerman are only at the exploration stage and not yet required to comply with this indicator.

Status: MET

Indicator 8.2.1.2.	**Mining companies commit to sustainable offset initiatives to ensure a 'no nett loss' to biodiversity as a result of their operations. This will involve partnering with long term conservation partners (GRN, NGOs and communities).**			
Status:		***IN PROGRESS***		

Since there is also no official policy on biodiversity offsets in Namibia as yet, operating mines are holding back on a firm commitment to offsets and partnerships. Rio Tinto and AREVA have a "no net loss" policy. Rössing Uranium is currently busy with an initiative that will directly result in the quantification and identification of biodiversity offset areas. Discussion of offsets has started with FFI being the link between the mining industry and government.

Status: IN PROGRESS

Indicator 8.2.1.3.	**Additional conservation projects are supported (e.g. wetland bird counts, wildlife surveys, Namib Bird Route, coastal management, research, public awareness) as part of the companies' social responsibility programmes.**			
Status:		***IN PROGRESS***		

Rössing supports wetland bird conservation by holding annual birdwatching events at the coast and at the same time raising public awareness. RUL has also carried out wildlife surveys on the mine site and initiated the Namib Bird Route in cooperation with Birdlife International. In 2011, all members of the Uranium Institute supported NACOMA's coastal biodiversity week and beach clean-up events. LHM and SU support NERMU's rehabilitation research. Trekkopje Mine provides logistical support to the annual wildlife counts in the #Gaingu Conservancy. Most mines have biodiversity research projects that are described in more detail in their annual stakeholder reports.

Status: IN PROGRESS

Indicator 8.2.1.4.	**Protection and management of key biodiversity offset areas is supported (e.g. NW Kunene, Messum, Spitzkoppe, Brandberg and other special areas in Namibia).**			
Status:		***IN PROGRESS***		

Only Rössing Uranium is currently busy with an initiative that will directly result in the quantification and identification of biodiversity offset areas. One of the outcomes of the LLA project (MET 2012) is the definition of potential offset areas based on data that support a robust ecological framework. The maps and models produced in the LLA project will immensely improve the process of identifying and protecting biodiversity offset areas.

Status: Because of these positive initiatives, we consider this indicator as IN PROGRESS.

Desired Outcome 8.3.	**No species become extinct because of the Uranium Rush.**			
Target 8.3.1.	**Authorisation to mine is denied if the extinction of a species is likely.**			
Indicator 8.3.1.1.	**All EIAs and EMPs must consider extinction possibility, and resources must be available for reasonable investigation and management.**			
Status:	***NOT MET***			

This indicator actually consists of two separate parts. The first part asks whether EIAs and EMPs consider extinction. Out of nine EIA reports available to us, three (37.5%) have considered extinction (which we considered as a statement where risk of extinction was explicityly or implicitly considered), five (62.5%) have not, and one (12.5%) is uncertain. However, it needs to be borne in mind that the list of EIAs available is not complete, so that figures may still change once all EIAs have been sourced.

The second part requires a value judgment whether resources made available are enough to be able to manage this risk in future. Quantitative targets would need to be set that match the risk and significance.

Status: We consider this indicator as NOT MET, because so few of the EIAS and EMPs make explicit reference to assessing extinction risk. Importantly, this does not imply that developers are wilfully disregarding the issue, but it does mean that more explicit attention should be paid to it.

Indicator 8.3.1.2.	**Species extinction is avoided.**
Status:	***NOT MET***

Evaluating this indicator is not straightforward. Firstly, only a few mines considered extinction possibility in their EIAs, so theoretically only they can even consider avoiding extinction where there is a high risk of this occurring. However, even those that considered extinction did not calculate risk of extinction per species, so even they were by definition not able to avoid extinction or show that they did or are trying to do so. Secondly, it is not clear whether this indicator is measuring the outcome of a set of management actions (in other words, where extinction risk was high, measures to avoid extinction were put in place, and subsequent to these the risk of extinction declined), or whether a management response to high risk of extinction is by itself adequate proof that extinction will be avoided.

Status: Assuming the latter (the most liberal interpretation), the indicator is NOT MET, since none of the mines that considered extinction in their EIAs, or as part of biodiversity specialist studies, made commitments in their EMPs designed specifically to avoid extinction. An exception may be one mine that put in place a monitoring programme to assess population changes in species at risk of extinction and another that committed to do research for the same reason.

Desired Outcome 8.4.	**No secondary impacts occur**
Target 8.4.1.	**No secondary impacts occur**
Indicator 8.4.1.1.	**Off-road driving, poaching, illegal camping, littering by mine personnel, are explicitly prevented by mining companies.**
Status:	***NOT MET***

Mines and exploration companies include these preventions in their environmental management plans and induction programmes for new employees and contractors. Compliance is monitored through inspections and audits.

However, incidents of poaching have increased drastically in the Central Namib National Parks. The same is true for transgressions of off-road driving. Most mines do not appear to have any strict policies or procedures in order to prevent such incidents. Furthermore, wildlife mortalities through road kills involving mining vehicles are on the rise (all pers. comm. Manie Le Roux, Chief Control Warden Central Parks, MET, 2012). Nevertheless, it is at present not possible to link poaching and transgressions of off-road driving directly to the exploration and mining activities, and the culprits could just as well be members of the public.

Status: It is therefore concluded that this indicator is NOT MET.

Indicator 8.4.1.2.	**Improved vigilance and visibility of law enforcement personnel, with structured support from civil society (e.g. Honorary Wardens) reduces park/conservation transgressions.**
Status:	***NOT MET***

MET has not been able to significantly improve vigilance and visibility due to a lack of resources. Existing resources (e.g. staff, vehicles and petrol) have not been increased concomitantly to the increase in mining activities. Also, the concept of Honorary Wardens (see also 10.3.1.2) is still under discussion and will take some time to be implemented (all pers. comm. Manie Le Roux, Chief Control Warden Central Parks, MET, 2012).

Status: In combination with the status of the previous indicator 8.4.1.1. also this indicator has to be considered as NOT MET.

Desired Outcome 8.5.	**Water quality and quantity does not decrease to the extent that it negatively affects biodiversity.**
Target 8.5.1.	**Water table levels, and water quality standards are described and ephemeral river ecosystems are monitored to ensure that these standards are not compromised.**
Status:	***IN PROGRESS***

The NERMU monitoring programme for biodiversity is being developed, and the riverine vegetation will form part of this (see also 4.2.1.3.).

Status: IN PROGRESS

Indicator 8.5.1.1.	**Results from monitoring are fed back to regulators and impacting companies so that negative impacts on riverine vegetation, springs and pans can be dealt with appropriately.**
Status:	***IN PROGRESS***

As indicated above, the NERMU monitoring programme for biodiversity is being currently under development. Once results are available, these will be fed back to regulators and impacting companies.

Status: The indicator is therefore IN PROGRESS.

EQO 9.	**Education**

Aims of this EQO: In the Erongo Learning Region, people continue to have affordable and improved access to basic, secondary and tertiary education, which enables them to develop and improve skills and take advantage of economic opportunities.

Desired Outcome 9.1.	**Improved quality of school education.**
Target 9.1.1.	**Improved results.**
Indicator 9.1.1.1.	**75% of grade 1 enrolments complete grade 10.**
Status:	

Status: Undetermined

Indicator 9.1.1.2.	**75% of grade 10 graduates obtain a NSSC.**
Status:	

Status: Undetermined

Indicator 9.1.1.3.	**National examination results in Grade 10 and 12 in maths, English and science are a D or better for more than 50% of learners from public (GRN) schools.**
Status:	***NOT MET***

Indicator 9.1.1.4.	**Region improves performance in reading and mathematics.**
Status:	***NOT MET***

Status: Undetermined

All the indicators for the target 'improved results' as listed above mainly fall within the mandate of the Ministry of Education as the governing body. No data are available for this report for indicators 1, 2 and 4. Data for indicator 3 were obtained from the website of the Directorate of National Examinations and Assessments for the Ministry of Education. Although indicator 3 makes specific reference to government schools, the assessment includes both private and government schools; thus, for the purpose of this assessment, indicator 3 is hereafter modified to read 'National Examination results in maths, English and science is a D or better for more than 50% of learners in Grade 10 and 12'.

Science subjects for grade 10 are defined as physical science, life science and geography; for grade 12, which is the E1 subject stream, science subjects include biology, physical science and geography. The grade symbol defined as D or better applies directly to grade 10 (junior secondary certificate) and grade 12 ordinary level examination results, while for grade 12 higher level examination results a score 3 or better is regarded as equivalent to a D.

For Grade 10, the target was met for English and mathematics in 2010, but it was not met for all science subjects except geography. In 2009 and 2008 the situation was the same. For Grade 12 ordinary exams, the target was met for English in 2010, but not for mathematics and all science subjects. Again, this situation was the same in 2008 and 2009. In case of the higher exams, the target was met for all subjects in 2008 and 2009, while no data yet were available for 2010.

Status: Overall, it needs to be concluded that the status has not been met.

Desired Outcome 9.2.	**Increased availability of technical skills in Erongo.**
Target 9.2.1.	**More qualified artisans, technicians, geologists, accountants and engineers.**
Indicator 9.2.1.1.	**Increasing number of graduates from NIMT, Polytechnic of Namibia, proposed VTC facility in Walvis Bay and UNAM.**
Status:	***MET***

Data used in the assessment of indicator 1 is from annual reports of the University of Namibia (UNAM) and the Polytechnic of Namibia (PON). The assessment is based on the graduation statistics of the tertiary institutions as a whole. The target is met for indicator 1 for UNAM and Polytechnic. There has been an increase in the number of graduates, which is a reflection of the growth in some faculties. According to UNAM's Annual Report for 2009, the faculties of Agriculture and Natural Resources, Economics and Management Science, Humanities and Social Sciences and Law showed a major increase in their number of graduates compared to 2008 (Figure). The Polytechnic of Namibia also shows a significant overall increase in the number of graduates in 2010 (Figure). At NIMT, there has been a steady increase of graduates, with 232 in 2009, 254 in 2010, and 282 in 2011 (pers. comm. Gisela Fassbinder, NIMT, 2012). Data from other VTCs were not available at the time of compilation.

Status: In view of the progress made by NIMT, UNAM and Polytechnic, the indicator is considered to be met.

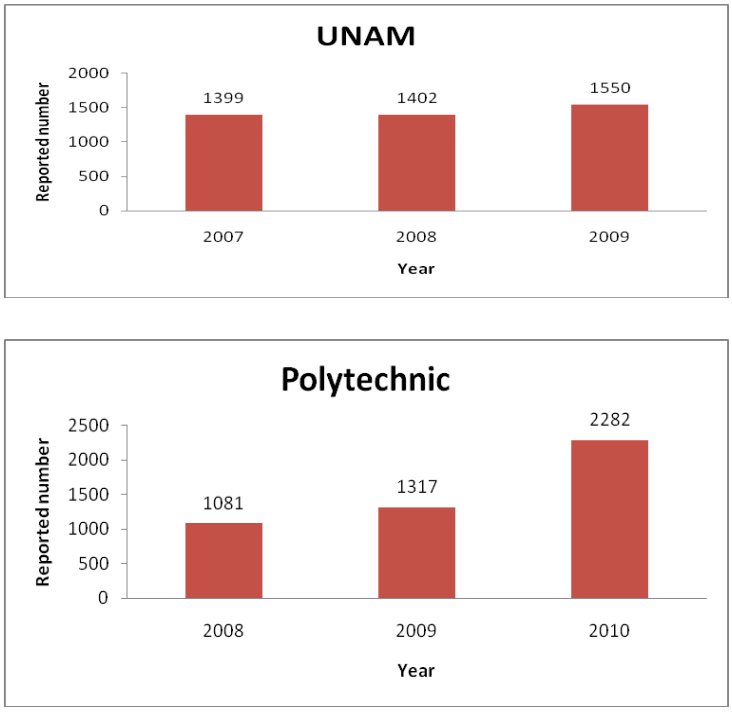


Figure 29: Total number of students graduating from UNAM and the Polytechnic

Indicator 9.2.1.2.	Every mine has funds/ a skills development programme for employees (3% of wage cost).			
Status:			*MET*	

Indicator 9.2.1.3.	Each mine has 10% more bursary holders than work-permit holders.			
Status:			*MET*	

Indicators 9.2.1.2 and 9.2.1.3 are related and therefore assessed together based on data obtained from the annual reports of the Chamber of Mines, the Uranium Institute, and the respective mining and exploration companies. This indicator mainly focuses on mining companies, but data from companies that are in the development stage are included, if available and applicable. They were assessed together for each mining/exploration company as follows:

Rössing Uranium: Target met

In 2010, Rössing supported 96 employees (6% of the workforce) in training and development programmes including full time studies at technical colleges (9) and university (5), correspondence programmes (47), a Leadership Development Programme (29) and limited-contact studies (9). An unaccounted number of the workforce has also attended various internal training and development courses, e.g. Health, Safety and Environment courses. The company spent N$18.4 million on skills development in 2009, a figure which included bursaries, bursary apprenticeships, educational assistance for children of Rössing employees and other training programmes. Rössing spent N$15.5 million on training and development in 2010, benefitting 417 participants. This includes trade bursaries (142), trade job attachments (9), apprentice employees (3), college and university bursaries (69), European scholarship awards (2) and development positions (7). Furthermore, 99 children of employees at tertiary institutions were financially supported. The Rössing Uranium workforce had a total of 0.7% (11 individuals) work permit holders in 2010, whereas the number of bursary beneficiaries totalled 312.

Trekkopje Mine: Target met

Trekkopje Mine meets the target of 3% of wage cost set for indicator 2, reaching up to 4.5% in 2010 and 6.9% of wage cost in 2011. The company currently supports eight bursary holders who are studying geology, metallurgy, mechanical, electrical and mining engineering. AREVA also promotes educational, learning and development opportunities for its workforce. Training and development opportunities are based on individual performance and development plans. Options range from short-term courses held at the training centre on site to part-time studies over several years. In 2011 there were 9 employees on the study assistance scheme while 21 employees were busy obtaining their Grade 12 with mathematics and science through NAMCOL. On-the-job training programmes were implemented in 2009 to equip learner operators without prior experience in mining with practical and theoretical skills in the fields of geology, engineering and metallurgy. Two Engineering learner operators attend NIMT to qualify as artisans.

Langer Heinrich Uranium: Target met

The mine has introduced a full-time bursary scheme in 2010, currently sponsoring 3 students in geology, 2 in mining engineering and 1 in metallurgical engineering.

Langer Heinrich Uranium provides extensive internal and external training to ensure that most if not all of its employees will become skilled and competent to do their work. The company also has a management development programme, run through the University of Stellenbosch, into which five supervisory and middle management employees are registered annually. The company has also embarked on an on-going series of business simulation training-sessions since 2006 and about 75% of the current workforce underwent this training in line with the company's drive to have all its employees through this program.

A part-time study assistance scheme was implemented to support employees who wish to improve their educational qualifications while employed. Langer Heinrich Uranium has also introduced a fulltime bursary

scheme in 2010, currently sponsoring three students in geology, two in mining engineering and one in metallurgical engineering.

Swakop Uranium: Target met

Swakop Uranium's Husab Uranium Project, received its Mining License on the 30th November 2011; mining is yet to commence. The following has been reported by them:

- Swakop Uranium has provided university bursaries for engineering and accounting student.
- As the company is not able to provide the 6-month required practical work in this phase, investigations on how it can partner with NIMT in the pre-operational phase are underway.
- The company will comply with the forthcoming skills development levy and once operational, the mine will have training and development programmes.
- Swakop Uranium will comply with the Employment Equity Act and will implement the relevant understudy programmes for all Non-Namibian employees.

Bannerman Resources: Target met

Bannerman Resources promotes education and learning opportunities for its workforce and spent over 3% of its wage bill on skills development (pers. comm. Werner Ewald, Bannermann, 2012). The internal bursary scheme supports on average four employees of the total complement of 28 employees. Training and development opportunities are based on individual performance and development plans. Study assistance is available for employees who want to upgrade their tertiary qualification in line with the company's requirements. BMR has also assisted an external student to obtain her medical doctorate degree. The company also has a training centre where programmes such as induction, health, safety and environment courses and defensive driving courses are given.

Reptile Uranium Namibia: Target met

Reptile Uranium Namibia spends 7% of its wage bill on training, and has no employees holding a work permit.

Other education-related initiatives by the mines/exploration companies:

Trekkopje:

- Donation to Erongo Development Foundation for construction of a classroom at the Kolin Foundation secondary school at Arandis
- Donation of furniture and kitchen equipment for school hostels in Erongo
- DRC School Project, Swakopmund – construction of an additional classroom
- Hope's Promise Orphan Ministries – construction of a sports field and store at their school in Arandis
- Katora Primary School, Spitzkuppe – supply of furniture and kitchen equipment, upgrading of ablution facilities, construction of a security fence, training of librarian and donation of books
- COSDEF Mahetago vocational training centre, Swakopmund – donation of paint
- Mondesa Youth Opportunities, Swakopmund – conversion of containers to library
- Government schools in Erongo – contributions to annual prize-giving ceremonies

Langer Heinrich Uranium:

- Practical training:
  - About 80 artisan learners (apprentices) annually in conjunction with the Namibian Institute of Mining and Technology as part of their curriculum.
  - In collaboration with the Ministries of Education, and Mines and Energy, Namibian students studying at the Zimbabwe School of Mines and the Polytechnic of Namibia,
- The Namibian Mathematics Congress - – an initiative during which more than 300 mathematics educators are trained to improve their skills
- The Mondesa Youth Opportunity – aiming to provide educational assistance (mathematical, English, computer and other skills to top performers up to Grade 10) to disadvantaged children from the Mondesa / DRC townships in Swakopmund.

- Orison Maths Support and Enrichment Programme for Secondary School Learners - Aims at improving mathematical understanding, knowledge and skills
- Sporting Sponsoring Blue Waters – Designed to foster youth development through sporting participation
- Text books – Sponsoring local schools with much needed commodities (books) and therefore supporting the Government's vision.

Rössing:

- In 2010 an amount of N$11.7 million was utilized for educational activities by the Rössing Foundation through its Language and Mathematics and Science Centres, with the objective to allow Grade 12 learners to enter higher education institutions. Two of these centres are located in the Erongo Region –: in Swakopmund and Arandis.

Bannerman Resources:

- Erongo Development Foundation – donation of N$ 200,000/year for three years to support educational initiatives
- Erongo Development Foundation – BMR has secured via the Australian Government's Direct Aid Programme N$ 227,000 in order to assist 7 young individuals to obtain their trade at the Namibian Institute of Mining and Technology starting in 2012
- BMR has supported 600 underprivileged primary school children during 2011 and 2012 by supplying them with school clothes and paying their annual school fees.
- Although BMR is not yet an operating mine education is a primary focus of its CSR activities.

Status: The indicators are considered to be MET because of all the activities listed above.

EQO 10.	**Governance**
Aims of this EQO: Institutions that are responsible for managing the Uranium Rush provide effective governance through good leadership, oversight and facilitation, so that all legal requirements are met by all parties involved, either directly or indirectly, in prospecting and mining of uranium.	

Desired Outcome 10.1.	**Prospecting and mining avoids environmentally high value, sensitive areas.**			
Target 10.1.1.	**Sensitive areas in need of protection are not generally available for prospecting or mining.**			
Indicator 10.1.1.1.	**Declared 'red flag' areas undergo the required high level of scrutiny before mineral licenses are considered (see other EQOs for lists & Figures 26 and 27 for the required decision making process).**			
Status:		***IN PROGRESS***		

In April 2011, MET, through its Strengthening the Protected Areas Network (SPAN) programme, commissioned Fauna and Flora International (FFI), in collaboration with international and local specialists, to undertake a Landscape Level Assessment (LLA) of key biodiversity, vulnerability and land-use within the uranium province in the Central Namib. This includes the need for a landscape assessment of biodiversity in the Erongo region and the identification of biodiversity priority areas in the landscape. The LLA is employing a systematic conservation planning approach to develop a decision support tool that will:

- Identify priority areas for biodiversity and ecosystem services in the Central Namib, based on defensible data and a robust methodology.

- Support decision-makers and stakeholders in evaluating the cumulative impacts of mining and other land-uses on biodiversity and ecosystem services.

The LLA is producing a series of maps and data sets that will help to better understand the impacts of uranium mining and other developments for the environment and identify where conservation priorities and other land uses may be found within the landscape. The planning tool is being complemented by an economic valuation of different land uses and natural assets in terms of direct use values (MET 2012).

While the current red and yellow flag areas used in the SEA study are being refined, MET has acknowledged their existence and together with MME had a conference on "Mining in Protected areas" to facilitate dialogue between the various stakeholders. MET is also drafting a policy aligned with the Environmental Management Act, which together with the results of the LLA, would ensure that prospecting and mining avoids environmentally high value sensitive areas.

Status: The outcome of FFI's landscape level assessment will be used to clearly define red flag areas. The status is therefore IN PROGRESS

Indicator 10.1.1.2.	**Where possible, red flag areas remain undisturbed by mining or other developments that have high impacts on biodiversity, heritage and or sense of place.**			
Status:		***IN PROGRESS***		

Indicator 10.1.1.3.	**If development (especially mining) is to take place in a yellow flag area, strict conditions are attached with the approval certificate.**			
Status:		***IN PROGRESS***		

Indicators 10.1.1.2. and 10.1.1.3. are related and are therefore assess together here. MET and MME are currently drafting a Policy for Exploration and Mining in Protected Areas, and are considering yellow and red flag areas that will be defined as described above. However, the Husab Mine site cannot be accessed without going through a red or yellow flag area.

Status: IN PROGRESS

Indicator 10.1.1.4.	**No new power lines, pipelines or roads linked to the Uranium Rush are routed through red flag areas, and preferably also not through yellow flag areas.**			
Status:		***IN PROGRESS***		

Considering flagged areas before building infrastructure requires a clear definition of these areas, which is currently not available.The outcome of FFI's landscape level assessment will be used to clearly define red flag areas.

Status: IN PROGRESS

Desired Outcome 10.2.	**Good governance is maintained in the issuing of mineral licenses.**
Target 10.2.1.	**The defined process is always followed in the allocation of all kinds of mineral licenses and the establishment of supporting infrastructures.**
Indicator 10.2.1.1.	**Mineral licenses are given only after full consultation of, and consensus within, the Mineral Rights Committee and the relevant status of areas in question (red and yellow flag areas).**
Status:	***MET***

In the meantime Swakop Uranium has been granted a mining license in a red flag area. Infrastructure to access the mine site will have to go through red and yellow flag areas. The indicators in this desired outcome have been given a MET status because the required decision making process has been followed and the mining licence has been awarded to Swakop Uranium with the relevant conditions.

Status: MET

Indicator 10.2.1.2.	**No evidence of corruption in the allocation of mineral licenses.**
Status:	***MET***

A most challenging aspect is the ability to detect if any corruption has occurred during the allocation of mining /exploration licenses, but there were no reports of such.

Status: MET

Indicator 10.2.1.3.	**No prospecting, mining or major infrastructure projects are permitted (anywhere) before full EIAs are completed and approved. Minimum EIA standards as in the EMA and regulations, are adhered to, including:** **- Clear TORs** **- Use of independent consultants** **- Public consultation** **- Specialist studies** **- Consideration of alternatives** **- Avoid and/or minimise adverse impacts** **- Include an EMP and closure and restoration plan** **- Professional review of EIA and EMP.s**
Status:	***MET***

The commencement of the Environmental Management Act and its associated regulations which describe the above EIA process were gazetted in February 2012. Prior to this, the uranium industry followed the 1995 Environmental Assessment Policy which includes similar provisions.

During the reporting period, Swakop Uranium's Husab Mine has been granted a mining license in a red flag area. Full EIAs for the Husab mine and for the linear infrastructure have been submitted to MET, and Environmental Clearance Certificates have been awarded for both.

Status: The status can therefore be considered as MET.

Desired Outcome 10.3.	**Prospecting and mining activities are properly monitored.**
Target 10.3.1.	**Post-implementation monitoring is regular, efficient and outcomes-based.**
Indicator 10.3.1.1.	**GRN agencies (notably MME, MET, MAWF, MoHSS) inspect active mines at least once per annum, and closed mines at least once every 3 years.**

Status:			***MET***	

The Division of Environmental Geology in the Geological Survey of Namibia and the Mines Inspectorate in the Directorate of Mines are mandated to monitor current and abandoned mine sites. Active and abandoned mine site monitoring took place, as well as training for stakeholders from various agencies. A manual for the assessment of abandoned mine sites was developed.

Status: The indicator is therefore considered to be MET.

Indicator 10.3.1.2.	**Honorary conservators are appointed by MET to assist with monitoring, including of unauthorised secondary (off-mine) activities such as off-road driving, poaching and littering.**

Status:		***IN PROGRESS***		

The issue of Honorary Conservators is still under discussion at MET (see also 8.4.1.1.).

Status: IN PROGRESS

Indicator 10.3.1.3.	**Honorary conservators and MET take accurate and consistent measurements of key indicators.**

Status:		***IN PROGRESS***		

No report – Whether MME, MET, MAWF and MoHSS can measure key indicators and what these indicators could be must be discussed by the Steering Committee.

Status: IN PROGRESS

Indicator 10.3.1.4.	**International agencies regularly inspect mines and provide independent opinion on their performance**

Status:			***MET***	

In 1983 Namibia became a member state of the International Atomic Energy Agency (IAEA), and thus committed itself to mandatory inspections. The IAEA carries out different types of on-site inspections and visits under comprehensive safeguards agreements and at 4 years intervals. The activities IAEA inspectors perform during and in connection with on-site inspections or visits at facilities may include auditing the facility´s accounting and operating records and comparing these records with the State´s accounting reports to the agency; verifying the nuclear material inventory and inventory changes; taking environmental samples; and applying containment and surveillance measures (e.g., seal application, installation of surveillance equipment) (IAEA Safeguards, 2012).

Status: MET

Indicator 10.3.1.5.	Results of monitoring improve practice and are disclosed to the public through existing channels and in an annual SEMP report, or more regularly.			
Status:			*MET*	

As this is the first SEMP report (2011), it cannot be assessed whether the monitoring provided by the SEMP has improved, but this will, of course, be possible from the second SEMP report (2012) onwards. All information is channelled to the public through the SEMP office, NERMU and the UI.

Status: As the 2011 SEMP has been presented to the public, the indicator is considered to be MET.

Indicator 10.3.1.6.	Where appropriate, the public are able to participate in physical monitoring.			
Status:				

This indicator was found to be impractical.

Status: Undetermined

Indicator 10.3.1.7.	Through existing channels and /or the SEMP office, the public can report observations of illegal activities or unwanted impacts.			
Status:		*IN PROGRESS*		

The Geological Survey of Namibia as well as the Directorate of Mines in the Ministry of Mines and Energy are mandated to monitor current and abandoned mine sites in Namibia. Monitoring is not only carried out locally but through Namibia's membership in the IAEAS on an international front as well.

Through the project of technical cooperation between the Federal Institute for Geosciences and Natural Resources (BGR) and the Geological Survey of Namibia (GSN), a "Risk Assessment Manual" was fully adapted and customized with support of highly recognized specialists in the various fields of environmental risks from the southern African region. The manual takes into account specifics of the minerals mined in the past in Namibia, beneficiation processes, as well as the environmental and the legal situation. It has guidelines for assessing safety and contamination risks with further detail of classifying the risk according to the geological and physical situation on the ground. It also includes sample forms so that appropriate evaluation is always carried out in a systematic way according to guidelines, which further make it easier to incorporate the collected data into a database. A one-day high-level information workshop to roll-out the manual was conducted for ministries and stakeholders concerned with issues related to current and abandoned mine sites.

The results of these monitoring activities will be disclosed to the public via the SEMP Office website which is currently under construction. The website will serve as a platform where the SEMP Office can disclose its findings to the public and allow the public to report their observations.

Status: IN PROGRESS

Desired Outcome 10.4.	**Non-compliance is rectified.**
Target 10.4.1.	**Transgressions are noted and acted upon timeously.**
Indicator 10.4.1.1.	**The activities of proponents/ developers/ service providers who have caused unauthorised negative impacts, are suspended, and they are forced to remedy impacts.**
Status:	***MET***

Indicator 10.4.1.2.	**If impacts are not remedied, the operation is closed and the project authorisation is cancelled.**
Status:	***MET***

Indicator 10.4.1.3.	**Fines are issued for non-compliance.**
Status:	***MET***

Indicators 10.4.1.1., 10.4.1.2. and 10.4.1.3. are related and therefore discussed together here. No unauthorised negative impacts occurred during the reporting period.

Status: MET

Indicator 10.4.1.4.	**All incidences of non-compliance are publicised through the media and noted in the annual SEMP report.**
Status:	***MET***

The issues of non-compliance if they do occur are dealt with in the Mining Commissioners' office, in the Ministry of Mines and Energy. The following aspects have been reported for the 2011 period.

- Health and Safety: All companies do comply with health and safety requirements. No non-compliance has been reported to the Commissioner.
- Annual License Fees: A number of companies do not comply with annual fee payments. Once this is detected at the Mining Commissioner's (MC) office, the company or companies are required to pay a penalty. It is calculated at one-third of one percent per day of delay on the outstanding fee, that is: penalty = ⅓ *1/100* (Number of delay) * (Fee payable).
- Technical Expertise and Training: EPL renewals are put on hold unless companies submit proof of employment of expertise and training, preference to be given to Namibians in terms of Section 50 (b) & (c) of the Minerals Act, No. 33 of 1992.
- Environmental Issues (Environmental Management Plan (EMP), Environmental Contract (EC), and Environmental & Social Impact Assessment Report (ESIA): All exploration companies are required to submit EMPs for approval before activities commence; once approved they are issued with an EC. All mining companies are required to submit ESIA for approval before activities commence, once approved they are issued with an EC. All the uranium exploration companies have complied.

Status: Non-compliance with license fee requirements has herewith been reported in the SEMP report, and the indicator is therefore met.

Conclusion on EQO 10

On the whole, the EQO has been met. The most challenging aspect is the ability to detect if any corruption has occurred during the allocation of mining /exploration licenses, but there were no reports of such.

Another challenge lies in desired outcome three; where the indicator requires that honorary conservators are appointed by MET to assist with monitoring activities. Discussion should be held with MET to find out if plans are underway to appoint the honorary conservators so as to improve the ability to address indicator three.

EQO 11.	**Heritage and future**

Aims of this EQO:

- Namibia's international image is maintained and enhanced, as the 'Namib Uranium Province' builds a good international reputation as a result of generally reliable, ethical, trustworthy and responsible practices/behaviour and more specifically, because of environmentally, socially and financially responsible uranium mining operations.
- Uranium exploration and mining - and all related infrastructure developments - will have the least possible negative impact on archaeological and palaeontological heritage resources.
- Survey, assessment and mitigation will result in significant advances in knowledge of archaeological and palaeontological heritage resources, so that their conservation status is improved and their use in research, education and tourism is placed on a secure and sustainable footing.

Desired Outcome 11.1.	**Namib uranium is regarded as a 'green' product.**			
Target 11.1.1.	**The 'Namib Uranium Province' is regarded internationally as an area where reliable, trustworthy, ethical, and environmentally, socially and financially responsible companies prospect and mine for uranium.**			
Indicator 11.1.1.1.	**No critical international voices about the operations and performance of the Namib Uranium Province among any key international stakeholders (other than those international stakeholders opposed to uranium mining and/or nuclear power anyway, in principle/on ideological grounds).**			
Status:			***MET***	

For EQO 11.1, proposed sources of data in the SEMP workplan include professional journals, "relevant websites," tour operators, tourists, and numerous government and international organizations. One option would be to survey representatives from all noted organizations. Given the focus on "critical international voices" and the underlying concern with the *perception* of the Namib uranium province, however, it was decided that the bulk of reporting efforts would focus on a systematic review of media coverage of Namibian uranium (Systematic but not comprehensive: this approach samples the total coverage in a non random fashion, in part relying on Google News' algorithm to find more influential articles).

As such, a database and coding scheme were developed, permitting content analysis (e.g. Hsieh and Shannon, 2006; Neuendorf, 2002; Kohlbacher, 2006) of hundreds of articles published over the course of the year. Both indicators can be measured with some confidence in this way and trends can be tracked over the years.

The content analysis involved "coding" of the articles along several lines. Two codes were developed specifically to measure the two indicators proposed in the SEA report: *Critical Voices* and *Evidence* marked the presence or absence of, respectively, critical voices about the operations and performance of the uranium province and evidence of unreliable, unethical, or irresponsible conduct on the part of mining

firms. Further codes marked the presence of certain issues: concerns over water, infrastructure, governance, and so forth. Annexure 8 contains a detailed description of the approach.

Google News was the primary source of data: a search was run for articles containing the terms "Namibia" and "uranium" during the year 2011. This service has its flaws but covers hundreds of international news sources and is freely available. The websites of the IAEA and World Nuclear News (the reporting arm of the World Nuclear Association) were also searched, as were the sites of *Mining Journal* (which encompassed several other journals), *International Mining*, and *Africa Mining Intelligence*.

In the end, 387 articles from 1 January 2011 to 1 January 2012 were surveyed, entered into a database, and results were analysed. Most analyses were undertaken on 283 articles that were coded as making some substantial comment on the industry or the province.

Key findings:

Strict adherence to the wording of the indicators ("no critical international voices"; "no evidence") would mean that a single article could cause the indicator to be scored as NOT MET. A standard of no more than 10% of relevant articles voicing criticism or showing evidence was decided on as both more reasonable and still conservative. By these standards, both indicators are met.

For the first indicator, focusing on "critical international voices", just 6% of articles voiced any criticism of the operation or management of the uranium province. These "international" voices include seven articles that are reprints of *The Namibian* or *New Era* at AllAfrica.com. Since AllAfrica.com is an international resource, it was decided to code these articles as international rather than domestic. They comprise most of the critiques of inequality and a lack of spreading the benefits of mining (Nunuhe 2011; Froese, 2011a; "Namibia: Rein", 2011; Sasman, 2011), accusations of racism at a mine (Hartman, 2011b), an article mentioning the boom's negative effects on the property market (Duddy, 2011) and opposition to Vision Industrial Park (Hartman, 2011b).

Governance was the most commonly-applied code: largely because any substantive concern generally incorporated—or was accompanied by—a concern about governance. Half of these critical articles touched on the economy, complaining about the distribution of benefits from mining, either arguing that companies and government do too little to spread wealth (Nunuhe, 2011; "Namibia: Rein", 2011; Froese, 2011a; Froese, 2011b; Sasman, 2011), or reacting to perceived government efforts to capture more benefits for the country (Regan, 2011). Several articles discussed concerns about radiation safety, occupational health and safety, environmental factors, and infrastructure matters, but mostly in passing: none focused on single matters of concern in any of these categories.

Six articles dealt solely with security concerns (and implicit concerns about governance). Four were Wikileaks cables reporting on the collapse of a deal involving Forsys Metals in 2009 and accompanying diplomatic concerns about links to Iran (The Telegraph, 2011a; The Telegraph, 2011b; The Telegraph, 2011c; The Telegraph 2011d). Two were reports on attempts in the United States' Congress to block a Rio Tinto copper mine in Arizona that cited Rio Tinto links to Iran through Rössing mine (JTA, 2011; Daly, 2011). These two articles were the only ones not coded as reflecting concern over the governance of the province: details of the perceived nature of the connection were too slight. The continued association of Namibian uranium with Iran may be of concern because of its effects on perceptions of Namibian uranium. It is difficult, however, to connect this to the actions or inactions of SEMP stakeholders.

The evidence suggests that the most common impetus for critical voices is concern over distribution of economic impacts—but these voices come largely from inside Namibia. Security concerns are also substantial on the international stage, but these are focused on worries about Iran that are based on little evidence of actual misconduct.

Status: Based on the applied standard, this indicator was MET.

Indicator 11.1.1.2.	There is no evidence of unreliable, unethical and/or environmentally, socially and financially irresponsible conduct by operating uranium mines or prospecting activities.			
Status:			*MET*	

Six percent of relevant articles sampled (16 out of 283) showed (or claimed) some such evidence. Not all of these are the same articles that voiced criticism: some articles showed critique without evidence as well as vice versa.

The spread of issues discussed looks similar to that seen in the "critical voices" case, although the addition of domestic articles and some new articles changes the picture somewhat. Governance was a common factor once again, and an even higher proportion of articles discuss economic concerns. Matters of economic inequality (Asino, 2011; Froese, 2011; Sasman, 2011; "Namibia: Rein", 2011; Nunuhe, 2011) and housing dislocation (Duddy, 2011) were once again present, as were racism (Hartman, 2011b), and general environmental, tourism-related, and social concerns (Fischer, 2011; Hartman, 2011a). In one article (Sasman, 2011), concerns about economic inequality were explicitly linked to the strikes at Rössing. These strikes came up often in the survey but were only linked to critiques of the uranium province and evidence of "irresponsible" conduct in this one case.

Security is a prominent concern, although for a different reason: as it happens, seven articles discussed uranium thefts from Areva (Ekongo, 2011a, 2011b, 2011c; "Namibia: 4 Charged", 2011; Bosch & Stoddard, 2011; Nakale, 2011).

The majority of articles were relatively neutral; very few made positive assessments of the industry.

Finally, it should be noted that all of the articles cited for the "no critical evidence" and "no evidence" indicators came from general news sources. Professional organizations and journals had no critical words or evidence of poor conduct: to the extent that this portion of the EQO is concerned only with "key international stakeholders", this may indicate a higher degree of success.

Note on the indicators:

A clear problem with these indicators is the potential open-ended nature of any approach to measuring them; the SEMP team is asked, in effect, to prove an absence. As such, a less conservative standard of 10% negative coverage was chosen.

A more fundamental problem with the indicators is, as was noted above, the nature of expert perception. It is possible for the indicators to score as NOT MET for no fault of industry, regulators, or others. Monitoring international (and domestic) perceptions of the industry is certainly worthwhile, but this indicator is not as amenable to direct intervention as others in the SEMP.

Note on monitoring methods:

Systematic content analysis of media and professional coverage of the Namib uranium province has the advantage of being relatively straightforward, with the possibility of producing year-on-year comparisons and highlighting unknown problems for perceptions of Namibian uranium. The method chosen does have several drawbacks, however.

The coding process itself is undoubtedly subjective and could suffer from a lack of consistency between different coders. Training and a detailed codebook that provides instruction on how to score borderline cases can help address this issue. Comparison of two coders' analyses of the same set of articles could also help identify problem areas, as would open discussion of codes. Grey areas will probably always remain, however.

Another problem is that content analysis is relatively time-intensive: while this year the need to build up the system from scratch took extra time, given 400 or more articles per year it seems likely that annual monitoring would take one person a week or more of work. The workload could be reduced by focusing the sample more tightly or by discarding some coding categories or sources.

Finally, the method tells us a great deal about *what is being said* about Namibian uranium, but not *how those messages are received* by key international stakeholders. A survey, focus group work, or other more direct methods of data gathering could answer this question. It might also address the negative bias of media content analysis, which tends to find negative coverage but has trouble detecting positive opinions—which rarely make news. Given the range of stakeholders and the target of the industry being "internationally [well] regarded", however, these methods would likely entail even more effort or expense.

Conclusions and recommendations:

The study generally shows progress towards the goal of the Namibian uranium province having a good reputation—or at least towards lacking a bad reputation—especially among "key international stakeholders". Very few articles were critical of the uranium province, and very few provided evidence of unreliable, unethical, or irresponsible conduct on the part of uranium companies.

To the extent that there was poor performance, it appeared to be due most of all to concerns about the economic impact of mining. Many of those concerned about this were domestic rather than international sources. Environmental impact, radiation safety, and other substantive concerns, meanwhile, were surprisingly thin on the ground in this sample.

One lesson the data shows quite clearly, however, is that the target in this section is a matter of perceptions, and in this arena positive actions on the part of stakeholders will only be loosely coupled to outcomes. This means that singular events such as the theft of uranium or the existence of links between Rössing and Iran can have an outsized impact in international media, while even prolonged and engaged attempts at good conduct may have little to no effect. The sample did not, for instance, include any articles about the SEA or SEMP.

That is not to say that some of the issues highlighted here could not be addressed by continued action: strengthened governance measures (such as the SEMP, common standards adopted through the UI, or new national environmental and radiation protection regulations) could address other complaints such that perceptions get better.

Addressing this potential disconnection between stakeholder effort and global public perception will be difficult, as will the methodological problems inherent in monitoring these indicators. The current monitoring regime, however, can make headway into addressing whether or not the target is being met.

Status: Based on the applied standard, this indicator was MET.

Desired Outcome 11.2.	**The integrity of archaeological and paleontological heritage resources is not unduly compromised by the U-rush.**			
Target 11.2.1.	**Mining industry and associated service providers avoid impacts to archaeological resources, and where impacts are unavoidable, mitigation, restoration and /or offsetting are achieved.**			
Indicator 11.2.1.1.	**All mining and related developments are subject to archaeological assessment** **No unauthorised impact occurs**			
Status:			***MET***	

We assessed this by searching for the keywords "archaeo" and "paleo" in each main EIA report (Annex 4), reasoning that if the words do not occur, the proponent did not consider this possibility at all. Of eight projects, eight (100%) have done archaeological assessments, however, none included a paleontological assessment. However, it needs to be noted that this was not specifically required in the indicator, and should be changed for the next reporting period.

Status: The indicator is therefore MET.

Indicator 11.2.1.2.	**Mining companies adhere to local and international standards of archaeological assessment.**			
Status:		***IN PROGRESS***		

Mining companies are largely adhering to such standards and best practice (pers. Comm.. Alma Nankela, NHC, 2012). However, local and international standards still have to be more explicitly defined in consultation with the NHC.

Status: The indicator therefore is assessed to be IN PROGRESS.

Desired Outcome 11.3.	**Integration of archaeological and environmental knowledge in a balanced working model of Namib Desert environmental processes.**			
Target 11.3.1.	**Development of a general research framework to identify gaps in scientific knowledge.**			
Indicator 11.3.1.1.	**Research in progress.**			
Status:			***MET***	

Active research is taking place by Dr John Kinahan of Quaternary Research Services and Dr Alma Nankela of the NHC (both pers. comm. NHC, 2012).

Status: MET

Indicator 11.3.1.2.	**Working model of Namib Desert developed.**			
Status:		***IN PROGRESS***		

Indicator 11.3.1.3.	**Model providing information to guide decision making about development in the Namib desert.**			
Status:		***IN PROGRESS***		

Indicator 11.3.1.4.	**Development of diachronic models to determine the effects of climatic and other environmental changes.**			
Status:		***IN PROGRESS***		

Indicators 11.3.1.2., 11.3.1.3. and 11.3.1.4 are related and therefore discussed together here. According to Dr Kinahan, his ongoing work will lead to the development of a diachronic model to determine the effects of climatic and other environmental changes (pers. comm. J. Kinahan, QRS, 2012).

Status: The indicator is therefore still in PROGRESS.

EQO 12.	**Mine closure and future land use**
Aims of this EQO: To maximize the sustainable contribution mines can make post closure to society and	

the region, and to minimize the social, economic and biophysical impacts of mine closure.

The mine closure framework was finalized by the Chamber of Mines of Namibia (CoM) in May 2010. The purpose of the Namibian Mine Closure Framework (NMCF) is to provide guidance for the Namibian mining industry on how to develop relevant, practical and cost effective closure plans and to lay down minimum requirements for all members of the CoM bound by the Chamber's Code of Conduct and Ethics (COC). NERMU is establishing communication with the uranium mining sector concerning appropriate closure and restoration planning in the Central Namib.

Desired Outcome 12.1.	**Companies have approved closure plans in place which ensure that there are no significant post-closure long term negative socio-economic, health and biodiversity effects from the mine. These plans should address planned as well as premature closure.**			
Target 12.1.1.	**The planning process is initiated early (in the feasibility study stage) to ensure that reasonable opportunities for post closure development are not prevented by inappropriate mine design and operations.** **Mine closure plans need to be based both on expert and stakeholders input, and consider site-specific risks, opportunities and threats as well as cumulative issues. These must include socioeconomic opportunities for nearby communities and the workforce, demolition and rehabilitation and post closure monitoring and maintenance.** **The plan needs to contain accepted and agreed objectives, indicators and implementation targets.** **The plan needs to be subjected to periodic critical internal and external reviewed, must have written GRN approval.**			
Indicator 12.1.1.1.	**The contents of the plan are consistent with the IAEA guidelines, Namibian regulations and policies and the Namibian Mine Closure Framework.**			
Status:			***MET***	

Planning for closure of the **Rössing Mine** began in 1991 to accommodate anticipated operational changes for the remaining life of the mine, as well as the vision for decommissioning. In support of the continuous planning process, several social and technical closure studies were done and have been updated since 1991, which have significantly increased the knowledge base regarding mine closure. Closure planning was formally reported to the Rössing Board of Directors in 2002. Rössing's Closure Plan was updated during 2005 and 2011, taking into account all relevant legislation and requirements listed above, as well as Rio Tinto guidance.

Langer Heinrich Mine developed a Mine Closure Plan in line with the IAEA guidelines, Namibian regulations and policies and the Namibian Mine Closure Framework. The relevant findings of the EIAs conducted were included in the mine closure planning process. The LHM MCP was developed in consultation with stakeholders, including the relevant authorities. Only one option is currently included (most "conservative" option) as part of the LHM MCP, which is as follows: LHM is located within a national park and future post mining land use will probably include tourist activities. To achieve this the mine site will need to be returned to as close as possible to its original condition. In line with the above, the Plan is based on the following high level closure needs: remove all infrastructure; re-establish a landscape that can, over time, regenerate sustainable endemic vegetation communities; ensure that an ecologically functioning (in terms of fauna & flora) environment is left behind; ensure natural and unpolluted (above naturally-occurring levels) groundwater and surface water flows through the Gawib River valley and its drainage lines such that it is able to support the appropriate desert ecosystem, including the *Acacia erioloba* forest; re-establish as far as possible the sense of place; reintegrate the entire area with the NNP

in terms of fauna and flora and visual aesthetics and sense of place; consider socio-economic factors such as employees, suppliers and community.

Trekkopje's closure planning process was initiated in the feasibility study stage to ensure that reasonable opportunities for post-closure development are not prevented by inappropriate mine design and operations. The conceptual closure plan with closure objectives was presented in the 2008 ESIA (Ref. 1). During the exploration and pilot testing phases, cost estimates for premature closure were compiled based on the status of the project development at the end of each year.

Swakop Uranium's closure plan was developed using guidance from several Namibian Acts, Policies, draft regulations, and the Mine Closure Framework. The contents of the plan are consistent with the IAEA guidelines and the Namibian Mine Closure Framework. Compliance with Namibian regulations and policies still needs to be planned for the future operation. Stakeholders have been consulted at a high level as part of the ESIA process. The plan includes retrenchment of the workforce, demolition and rehabilitation, post-closure monitoring and maintenance. Socioeconomic opportunities for nearby communities are provided during the operation of the mine and the exit strategy kicks in before the mine closes. The updated plan will be presented to government to obtain written approval of the objectives, indicators and implementation targets. The plan will be reviewed periodically by internal and external parties and updated at least every five years.

Reptile Uranium Namibia performs rehabilitation immediately following completion of the field exploration programme. Rehabilitation costs form part of overall exploration costs and are budgeted for accordingly. Therefore no financial sureties are provided. There are no permanent structures erected on any of Reptile Uranium Namibia's exclusive prospecting licence areas. All temporary storage areas will be removed and the environment rehabilitated. A Namib Naukluft Park Warden will sign off on all rehabilitated areas that have met agreed standards.

Bannerman has formulated its closure plan as part of the current ESIA and tabled it with the application for environmental clearance.

Status: The indicator is MET.

Desired Outcome 12.2.	**Mines have adequate financial resources to close operations responsibly and to maintain adequate aftercare.**
Target 12.2.1.	**The financial provision for mine closure needs to be based on cost calculations including:** **employee costs (retrenchment provision, new employment opportunities, re-training costs);** **social aspects (sustainability of associated communities), an exit strategy (that is, the process by which mines cease to support initiatives), social transition (that is, communities receiving support for transition to new economic activities);** **demolition and rehabilitation costs (infrastructure break-down, salvage and/or disposal at the site or transition to end uses), ecosystem rehabilitation costs of the site;** **post closure monitoring and maintenance; and** **project management (administration and management costs during the decommissioning period).** **Companies, in conjunction with regulators, need to establish an independent fund to provide adequate financial resources to fully implement closure**
Indicator 12.2.1.1.	**Closure cost estimations contained in the closure plan.**
Status:	***MET***

Rössing: In 2003, Rio Tinto's costs were subject to an interim review with the Closure Plan scope and costs undergoing a major review in June 2004 after Rio Tinto introduced a new Closure Standard. Operations were required to become compliant with the Standard by July 2005 and Rössing was requested to submit an updated Closure Plan for review that same year. Based on the above, the October 2005 update of Rössing's Closure Plan was prepared in a way that satisfied all requirements. A Closure Vision and concomitant Closure Principles were used to develop a Closure Strategy, based on knowledge of a wide range of aspects.

The 2005 Plan foresaw the potential closure of Rössing in 2009 or 2016, based on the prevailing business climate at the time. This situation has changed significantly since then, with closure now being planned for 2025, as proposed in the current Life-of-mine Plan (V10). The 2011 Closure Plan presents a defined closure strategy, an extensive knowledge base, and the costing and scheduling of activities that were developed for the 2025 closure scenario. Rössing's Closure Plan was updated during 2011, taking into account all relevant legislation and Rio Tinto guidance. The 2011 Closure Plan is currently under review by Rio Tinto. The plan contains closure cost calculations as stipulated and the figures will be made public after the review process.

Langer Heinrich Mine: LHU's Mine Closure Plan is based on the principle of progressive rehabilitation, meaning the rehabilitation will commence as part of the operations phase of the mine and initial costs will be included as part of the operational budget. The final closure cost was calculated, taking the above mentioned option and needs into consideration and is included in the MCP.

Trekkopje: The first cost estimates for decommissioning and rehabilitation at the end of mine-life were for Trekkopje were prepared in 2010. The plan was reviewed and updated in 2012. It will be further reviewed periodically by internal and external parties and updated at least every five years. The sustainability of mine-supported projects by AREVAin associated communities will be monitored during the last years of mine operation. An exit strategy will be prepared to ensure that projects are self-sustaining. Since AREVA is not planning to establish its own mining town there should be no communities entirely dependent on

the mine for their livelihood. Small businesses that supply services to the mine will however receive support during the transition to new economic activities, should this be required.

Swakop Uranium: Cost estimates are included in the closure cost section of the Husab EIA.

Bannermann: At BMR, closure cost estimations are contained in the closure plan which is part of BMR's ESIA process. Financial provisions in the current mine closure plan include the following items: provision for employee retrenchment (costs for skills upgrading and training to prepare employees for new employment opportunities will be carried by the HR department during the last years of mine operation); demolition and rehabilitation costs (infrastructure breakdown, salvage or disposal at the site or transition to end uses); ecosystem rehabilitation costs; post-closure monitoring and maintenance; and project management (administration and management costs during the decommissioning period).

Status: The indicator is MET.

Indicator 12.2.1.2.	**Financial sureties are available.**			
Status:			***MET***	

Rössing: At Rössing Uranium, financial provisions in the current mine closure plan include the following items: provision for employee retrenchment (costs for skills upgrading and training to prepare employees for new employment opportunities will be carried by the HR department during the last years of mine operation); demolition and rehabilitation costs (infrastructure breakdown, salvage or disposal at the site or transition to end uses); ecosystem rehabilitation costs; post-closure monitoring and maintenance; and project management (administration and management costs during the decommissioning period).

Trekkopje: The company has included adequate financial resources in its budget. The establishment of an independent fund depends on the new mining legislation and requirements of the regulator. The annual closure cost estimates were audited by Deloitte &Touche and confirmed to be in compliance with financial reporting standards.

Swakop Uranium: At SU, provision has been made in the feasibility study estimate. Financial sureties are available, but not yet in place as the company has only been doing exploration work.

Bannermann: Financial sureties will be made available when applying for the ML.

Status: MET

Desired Outcome 12.3.	**The Government has appropriate mechanisms in place to approve mine closure plans, financial instruments chosen for implementation and to effect relinquishment back to the state.**			
Target 12.3.1.	**Adequate regulations applicable to mine closure are contained in the relevant legislation.**			
Indicator 12.3.1.1.	**Mine closure regulations are adequate to govern:** **review and approval of mine closure plans;** **financial guarantees and sureties;** **implementation review,** **relinquishment and transfer of liabilities to the subsequent land owner.**			
Status:		***IN PROGRESS***		

Government is in the process of updating the relevant legislation in order to establish adequate regulations applicable to mine closure. The mining industry needs closure regulations that are adequate to govern

review and approval of mine closure plans, financial guarantees and sureties, implementation review, as well as relinquishment and transfer of liabilities to the subsequent land owner.

Status: The indicator is therefore IN PROGRESS.

5 LIMITATIONS AND CONSTRAINTS

General Comments

There are a number of limitations and constraints that have become apparent during the compilation and writing of this report. These can be broadly classified as

- Problems with interpretation of indicators, mainly relating to ambiguities in how indicators have been defined.
- Obtaining reliable, referenced data
- Information provided by respondents was often not supported by citations of references that could provide further information or substantiation or add value to the information content.
- Many responses were vague or gave long explanations without answering the question.
- Some responses, e.g. to EQO 4 did provide good information, but this did not relate to the EQO or its desired outcomes (DO) in question nor did it fit in elsewhere. In the meantime, the particular indicator supposedly being addressed was not actually assessed. The SEMP office can learn from that experience and adjust future assessments to encompass this kind of information.
- The process of report compilation and cooperation by partners

Comments by EQO

EQO 1: No problems were experienced with reporting on the socio-economic development indicators.

EQO 2: All affirmative action reports at the employment equity offices are available as hard copies only and not well arranged. In addition, these reports were not allowed to leave the Employment Equity Commissioner's offices, nor was the SEMP officer allowed to make copies. This makes the data collection lengthy and in most cases company reports are not found. Although the data source for the EQO can also be CoM and the mines, independent verification is still needed from the Employment Equity Commissioner's side. It is, however, difficult to determine when the current data collecting duty will improve as it is unknown as to when the Ministry of Labour and Social Welfare (MoLSW) will digitise affirmative action reports.

EQO 3: Scoring the status performance of Desired Outcome 3.2 as per SEA report (MET/NOT MET/EXCEEDED) does not seem to apply well to the road infrastructure indicators, and thus modification will be necessary. Example: If the target is to have a certain road tarred, and currently only the feasibility study to tar the road is conducted, we cannot use the scores provided, thus in such cases the term "IN PROGRESS" was introduced as a more appropriate rating.

Indicator 3.2.1.5. "Accidents at intersections and turn-offs decline from current trends": There is effectively no possibility of monitoring this indicator in a way that the objective can be achieved, because data on accidents are not spatially referenced (hence impossible to say whether it occurred at intersections and turn-offs), and because it is so difficult to attribute increases or decreases to the effect of the uranium rush. It is recommended that the indicator should be reformulated according to how the police monitor these accidents.

The indicators for waste management under 3.6 require a better definition of which municipalities should be included, e.g. all towns in the Erongo Region or only those with waste facilities used by the mines and their suppliers and employees. The issue of independent audits also needs to be addressed.

General comment on the infrastructure information provided: Though most indicators were answered to, any form of reference for the information provided would give the report more value and a means for backing the provided answers, i.e. according to Road Authority's document so and so.

EQO 4: The fact that the SEA study concentrated on the water quality of the lower Khan and Swakop rivers, while the desired outcome in 4.1 was to ensure acceptable water quality for all users in the Erongo Region caused some confusion. To report on indicator 4.1.1.1. it will be necessary to collect more water quality data, either for the entire region or for the water users who may be affected by the uranium industry. The latter would be the recommended option and the Steering Committee should agree on the places to be monitored.

Indicators 4.2.1.1., 4.2.1.2. and 4.2.1.3. would benefit from a study of historic background information if the relevant data can be made available by the mines.

EQO 5: Air quality and radiation monitoring are highly specialised fields that require training in the operation and maintenance of instruments such as radon and PM10 monitors, as well as data evaluation. In spite of commendable efforts by GSN these skills are currently not available in government ministries and independent data collection remains a challenge.

EQO 6: 6.1.3.1. "Measured change in the incidence rate of industrial diseases amongst uranium mine workers." It is easy to measure such diseases among direct employees of uranium mines. To know the rates among support industries employees and how they relate to increased uranium mining will not, however, be easy to quantify.

6.1.3.2. "Measured change in the incidence rate of diseases scientifically attributed to radiation amongst members of the public, uranium mine workers and medical personnel." Mines might invest in detailed health research of their employees; the same does not however, apply to supporting industries. These supporting industries are also difficult to identify.

6.1.4.1. "Measured change in the number of fatal road accidents per road user over 1 year." This indicator should rather measure accidents directly attributed to uranium mining as these are recorded by mining and exploration companies. MVA or Namibia National Road Safety will most likely not ask if an accident on a public road is caused by uranium mines or associated industry unless a vehicle is clearly marked as mine property.

EQO 7: There were some uncertainties about the definition of the tourism-related indicators, e.g. which developments should be included, and issues with the declaration of red and yellow flag areas, which are discussed in a similar way in EQOs 8 and 10. Too much repetition should be avoided. It was impossible to obtain copies of all relevant EIAs.

EQO 8: Many ecological indicators require information to be provided to NERMU by the mining industry. An effective reporting and verification system has to be set up.

Desired outcome 8.3: "No species become extinct because of the uranium rush" should be revised. The wording of these two indicators is not practical for reporting. The desired outcome should be changed to: "No identified species become extinct because of the Uranium Rush." The target then becomes: "Authorisation to mine is denied if the extinction of an identified species is likely." Possible wording of the first indicator: "All EIAs and EMPs must consider extinction possibility, and resources must be available for reasonable investigation and management if species at risk are identified." The second indicator "species extinction is avoided" can then be measured by reporting whether or not the species of concern is still present at the relevant site (e.g. Husab sand lizard at SU and LHM).

Desired outcome 8.3: "No species become extinct because of the uranium rush" should be revised. The wording of these two indicators is not practical for reporting. The desired outcome should be changed to: "No identified species become extinct because of the Uranium Rush." The target then becomes: "Authorisation to mine is denied if the extinction of an identified species is likely." Possible wording of the first indicator: "All EIAs and EMPs must consider extinction possibility, and resources must be available for reasonable investigation and management if species at risk are identified." The second indicator "species extinction is avoided" can then be measured by reporting whether or not the species of concern is still present at the relevant site (e.g. Husab sand lizard at SU and LHM).

EQO 9: Indicators for Desired Outcome 9.1 should be reviewed. Indicator 9.1.1.1 describes a broad population of learners and can produce incorrect results given the dynamics of learner population changes that occur during the time period from enrolment in grade 1 to grade 10. There are a number of influencing factors that need to be looked at before determining the approach for assessment. Since the focus is on grade 1, is this indicator tracing the number of grade 1 pupils enrolled in the region during a specific year, and then making a comparison with the number of learners who passed grade 10, using a ten year gap (assuming that those are the same learners who will be enrolled in grade 10 in the year of assessment? Or should the number of grade 10 pupils and grade 1 learners for a specific year be compared (assuming that the same number of learners who enrolled in grade 10 is equal to the number as the grade 1 pupils enrolled for that specific year)?

Indicator 9.1.1.3 should be modified to include learners from both public and private schools for ease of assessment. Indicator 9.1.1.4 requires maths and reading performance to be compared. It is not clear how reading is scored and can be compared objectively.

A working group should convened to better define these indicators. This should include the responsible persons from the Ministry of Education who can provide the information in future.

Indicator 9.2.1.2. "Every mine has funds/ a skills development programme for employees (3% of wage cost)." is poorly defined and could be made more specific, e.g. "Funds for skills development programme for employees exceed 3% of wage cost for every operating mine."

EQO 10: The issue of red and yellow flag areas is repeated again. A challenging indicator is 10.2.1.2. "no evidence of corruption in the allocation of mineral licences." The current approach is to screen for reports of corruption, rather than cases brought to the Anti-Corruption Commission.

EQO 11: Challenges experienced with the reputation of the Namibian uranium industry are fully discussed in the relevant section of this report. Strict adherence to the wording of the indicators ("no critical international voices"; "no evidence") would mean that a single article could cause the indicator to be scored as NOT MET. A standard of no more than 10% of relevant articles voicing criticism or showing evidence would be more reasonable and still conservative.

QO12: No problems were experienced with the indicators for mine closure and future land use.

A detailed table of problematic indicators that need to be addressed can be found in Annexure 9.

Process of Report Compilation and Cooperation by Partners

Besides data collected during the SEA and SEA/SEMP transition, much of the information currently used in this report comes from the Uranium Institute (UI) working group. The compilation of the first SEMP report was a difficult task due to the different subtopics within the topic under discussion. The same kind of complexities and time delays with which SAIEA had to deal with in compiling the SEA affected the compilation of the SEMP report. Neither the SEMP SC nor the SEMP Office was able to match the task of managing the efficient compilation of the SEMP reporting process, including the enormous task of communication with reporting parties and stakeholder feedback. This has resulted in many delays and lack of standardisation, despite considerable efforts by many institutions and individuals.

The responsibilities of the SEMP SC (see Introduction) include "5: To monitor work done by working groups within the SEMP, and to deliver monitoring data including data interpretation to the SEMP Office at GSN following the SEMP report template in a timely manner." The SEMP operational plan specifies the reporters who should tackle the different EQOs, and report to the SEMP office. The Steering Committee is chosen from specific fields of expertise and mandated institutions to contribute and monitor certain aspects of the SEMP Operational plan. Inadequate commitment and contributions from many members of the SEMP SC presented difficulties for compiling this SEMP report. Furthermore, it was expected from the SEMP Office to collect and interpret data beyond their fields of expertise for the SEMP report

Inadequate commitment by the SEMP SC for the SEMP report made the task difficult. For the SEMP to be effective, the SC members should revisit the TOR, to re-acquaint themselves with their duties as being part of the SEMP SC. Following the expectations raised by the SEA, the SC has the responsibility for

ensuring that the uranium industry contributes towards the sustainability of the Central Namib. Furthermore the SC needs to ensure that the SEMP report is accurate, compliant, and neither questionable nor mediocre. It needs to meet the needs of all stakeholders in the area. Some partners, such as the UI working group, made considerable efforts in assisting the SEMP. However, the SEMP, by its nature, requires collective effort and cooperation by many institutions and individuals.

6 DISCUSSION

EQO 1.	Socio-Economic Development

Aims of this EQO: The Uranium Rush improves Namibia´s and the Erongo region's sustainable socio-economic development and outlook without undermining the growth potential of other sectors.

The four indicators for EQO1 have all been MET for the 2010-2011 reporting period. All companies that should be paying royalties were doing so, but corporate taxes were not levied within the applicable fiscal regime. In terms of procurement, inputs that could be sourced locally were increasingly not imported, and no new processing companies were awarded EPZ status. The award of the existing EPZ status pre-dates the SEMP.

EQO 2.	Employment

Aims of this EQO: Promote local employment and integration of society.

This indicator aims to ensure that mainly locals (Namibians and specifically residents of the Erongo Region) are employed. It has been MET, because Employment Equity Certificates were awarded to Rio Tinto Rössing, Langer Heinrich, AREVA Resources Namibia, Valencia, Bannerman Mining Resources and Reptile Uranium Namibia. Companies with less than 25 employees are not required to have an affirmative action plan, e.g. smaller companies in the exploration phase.

The uranium mining sector directly employs about 2.5% of the total labour force in Namibia, and complies with national and company-level equity targets. The expansion of uranium mining in the Erongo Region will obviously be accompanied by high public expectations that many new jobs will be created, directly and indirectly.

EQO 3.	Infrastructure

Aims of this EQO: Key infrastructure is adequate and well maintained, thus enabling economic development, public convenience and safety.

A multitude of desired outcomes and targets fall under EQO3 and progress in meeting the indicators has been quite mixed for the time under review. The first two indicators have been MET, as no companies have created mine-only **townships or on-site hostels**.

Concerning **road traffic** the target is: "Roads are well maintained, traffic frequency is acceptable for tourism/other road users and traffic is safe." The nine indicators under this heading were evaluated as follows: 4 were MET, 3 were IN PROGRESS, 1 was NOT MET and 1 was undetermined. The indicators MET pertained to 1) the absence of pot-holes or crumbling verges on the B2 and 2) all signage and markings being in place (Roads Authority). 3) The three mining companies that traverse tourism roads have clear management steps in place concerning their traffic and 4) 80% of all bulk goods are transported to the mines by rail (Rössing). Indicators that were classified as IN PROGRESS were: 1) Key gravel roads should

be graded timeously to avoid deterioration and 2) roads carrying more than 250 vehicles per day should be tarred. Notwithstanding the industry's contribution of funds for grading some tourist roads more needs to be done. A busy mining and tourism road (C28) was partly tarred. 3) The D1984 (Swakopmund to Walvis Bay east of dunes) should be tarred and designated an industrial vehicle route. The feasibility study to upgrade the D1984 to bitumen standard commenced on 1 September 2011. Once the D1984 has been upgraded 90% of traffic on the B2 between Swakopmund and Walvis Bay should be light vehicles. Because of the lack of upgrade of the D1984 it is clear that the indicator was NOT MET. No information was available concerning the location of accidents specifically at intersections and turn-offs, and the status is therefore undetermined. It is not expected that the information will become available in future and it is therefore recommended to review this indicator.

Three indicators were set for **NamPort** and two of these were MET: The average loading/offloading rate for containers was >25 per hour and no contamination of whatever nature has entered the Walvis Bay lagoon Ramsar site. The average waiting time for ships to obtain a berth was 21 hours (Namport Annual Report, 2010) and the target of <12 hours was NOT MET.

All six indicators for **electricity** availability and reliability were MET. Information provided from NamPower indicates that electricity in the Erongo Region meets the Electricity Control Board standards, and no outages as a result of Uranium Rush are experienced in the region. Generally, efforts are being made to increase the power supply to the region in order to meet the region's electricity demand, e.g. by constructing a coal-fired power station in the vicinity of Arandis. EIAs are carried out and findings are implemented to ensure that electricity provision does not compromise human health. NamPower is also pursuing renewable power generation options with approximately 50% of the country's demand being met by hydroelectric power.

Of the eleven indicators for **waste management**, 2 were MET, 7 IN PROGRESS and 4 NOT MET. The apparent low compliance with the EQO can at least partly be ascribed to the absence of Namibian legislation governing waste management. Once the Waste Management and Pollution Control Bill becomes law there will be an appropriate standard against which waste facilities can be audited. Two of the NOT MET indicators refer to independent auditing of waste sites. The other two involve licensing of hazardous waste sites (Walvis Bay) and air and water quality monitoring, both are grey areas in the absence of a licensing system and quality standards. The two indicators MET pertain to the capacity of municipal waste sites and sewage works and to the tailings management at the operating mines (RUL and LHM) which was confirmed to be in compliance with the relevant permit conditions (DWAF). All other indicators were classified as IN PROGRESS, partly because of uncertainty which municipalities should be included in the report and partly due to incomplete systems or compliance. Examples are: All new waste sites have to undergo an EIA prior to construction and receive a licence (at present no licences are required). At the municipalities of Walvis Bay and Swakopmund, waste site managers are trained and records of volumes are kept, but not at other towns. The municipalities of Walvis Bay and Swakopmund have a title in their budgets for compliance with the site licence requirements in relation to pollution control. Recycling depots have been established and operators have sufficient capacity, but data on the expected decrease in waste to landfill are not yet available.

EQO 4.	**Water**
Aims of this EQO: To ensure that the public have the same or better access to water in future as they have currently, and that the integrity of all aquifers remains consistent with the existing natural and operational conditions (baseline). This requires that both the quantity and quality of groundwater are not adversely affected by prospecting and mining activities.	

Seven of eight indicators for this EQO have been MET, one is IN PROGRESS. 1) Water for urban and rural communities is of acceptable quality. Urban users are supplied by NamWater from the Kuiseb River (Walvis Bay) or Omaruru Delta (Swakopmund, Arandis, Henties Bay) with water of Group A (excellent) or B (good) quality according to the Namibian standard. 2) and 3) Available evidence (e.g. Rössing's monitoring in the Khan River since 1988) indicates that no wetlands or riparian vegetation including

phreatophytes were lost as a result of the mining industry's activities. A monitoring programme for these indicators is currently being developed by NERMU. 4) NamWater is still supplying domestic users from the coastal aquifers at approved rates. 5) The operating or more advanced mines have disaster management plans in place and implemented. 6) No industrial investors were lost because of water unavailability (NamWater). 7) In 2011, AREVA used desalinated water and the other mines are not required to use it until 2014. Indicator IN PROGRESS: The SEMP Office needs a longer time series to establish if borehole levels fluctuate within existing norms.

EQO 5.	**Air quality and radiation**

Aims of this EQO: Workers and the public do not suffer significant increased health risks as a result of radiation exposure from the Uranium Rush.

This EQO has seven indicators, of which 3 were MET, 3 IN PROGRESS and 1 NOT MET. The first three indicators address radiation and the Desired Outcome that "Annual radiation exposures to the public via air are not significantly increased as a result of the Uranium Rush." The SEMP Office monitored inhalable and fallout dust fractions, as well as radon gas exhalation. The results of a study on dust are still awaited (2x IN PROGRESS), while radon measurements are reported (MET). The exposure to radon was well below the annual dose limit for members of the public of 1 mSv in addition to the natural background. The four dust indicators refer to ambient inhalable and fallout dust. Inhalable dust monitoring proved to be challenging and is still IN PROGRESS. The Swakopmund station recorded an average PM10 concentration of 13 µg/m³ over 3 months and a maximum average daily concentration of 33 µg/m³, which is below the WHO's air quality guideline of 75 µg/m³. The indicator requiring an accredited meteorological station at Swakopmund was NOT MET. Monitoring of dust fallout was done, both by the SEMP Office and the mines. The results are presented in this report and the two indicators have been MET. In general, dust deposition throughout the Erongo region was below 100 mg/m^2/day. Of the 468 samples collected in 2009-2011, only one (next to the busy D1984 road) exceeded the SANS limit of 600 mg/m^2/day.

EQO 6.	**Health**

Aims of this EQO: Workers and the public do not suffer significant increased health risks from the Uranium Rush.

The current mining scenario of less than four mines operating in the Central Namib has not seen any significant changes with regards to the health system of the Erongo Region. Although uranium production at RUL and LHM and extensive exploration activities have been going on, radiation impacts to employees and the public have remained well below the ICRP limit of 20 mSv/a for workers and 1 mSv/a for the public. Radiation exposure monitoring is performed regularly and continuously at mines and at receptors points. No new cases of industrial diseases were reported over the past year and no fatal accidents were attributable to mining-related activities (5 indicators MET). Although Namibia's health worker capacity is above the WHO benchmark of 2.4 health workers per 1000 population, there is a disparity between the private and the public sector. The private sector has 8.0 health workers per 1000 inhabitants, while the public sector has just below 2.0. Public health facilities and personnel in the Erongo Region remain inadequate (3 indicators MET for the private sector, but not in the public sector).

EQO 7.	Effect on tourism

Aims of this EQO:

- The natural beauty of the desert and its sense of place are not compromised unduly by the Uranium Rush; and to identify ways of avoiding conflicts between the tourism industry and prospecting/mining, so that both industries can coexist in the Central Namib.
- The Uranium Rush does not prevent the public from visiting the usually accessible areas in the Central Namib for personal recreation and enjoyment; and to identify ways of avoiding conflicts between the need for public access and mining.

The nine indicators for the tourism EQO are spread over all categories: 1 EXCEEDED, 3 MET, 3 IN PROGRESS, 1 NOT MET and 1 currently not applicable. Tourists' expectations of their experience in the Central Namib were EXCEEDED in more than 90% of the responses to a questionnaire prepared by NERMU. The three indicators regarded as MET task MME with the protection of scenically attractive areas, other than those identified as tourism red and yellow flag areas. MME will consider this point in future before awarding new EPLs or MLs. IN PROGRESS is the identification of red and yellow flag areas which will be discussed in EQO8, the requirements public access needs to be considered in EIAs and mine closure plans. The latter indicator could not be measured for 2010-11 because no projects were closed (not applicable). There was also a pilot survey of tour operators to find out if they continued to regard certain areas (potentially affected by mining) as significant component of their tour package. The results were inconclusive and the indicator rated as IN PROGRESS. NOT MET was the requirement that all EIAs must address visual impact and sense of place. Visual impact assessments were done in 14 out of 20 EIAs.

EQO 8.	Ecological integrity

Aims of this EQO: The ecological integrity and diversity of fauna and flora of the Central Namib is not compromised by the Uranium Rush. Integrity in this case means that ecological processes are maintained, key habitats are protected, rare and endangered and endemic species are not threatened. All efforts are taken to avoid impacts to the Namib and where this is not possible, disturbed areas are rehabilitated and restored to function after mining/development.

Bearing in mind the importance of ecological integrity EQO8 forms one of the centre pieces of the SEMP and contains 18 indicators. For the 2011 reporting period, 4 indicators were classified as MET, 12 as IN PROGRESS, and 1 each NOT MET and undetermined. In the SEA (SAIEA, 2010) red and yellow flag zones were defined for both biodiversity and tourism (EQO7). The same principles that were relevant for the tourism zonation also applied to the biodiversity zones, except that in this case the Landscape Level Assessment (LLA) project has established a decision-support tool that allows a more direct determination of critical biodiversity areas. MME has indicated a willingness to accept scientifically well-justified arguments for such zones (e.g. from the LLA, MET 2012) and has contributed to the recommendations for such zones at the Mining in Protected Areas conferences. Considering this ongoing process the first two indicators were regarded as IN PROGRESS. MME keeps records of prospecting and mining applications and will be able to determine if any were denied on biodiversity grounds. For now, a moratorium on granting exploration licenses for nuclear fuels is in place and no new licenses have been granted in 2010-11. The Indicator status is therefore MET. The same status (MET) applies to the indicator requiring mine EIAs to apply the mitigation hierarchy.

To determine if biodiversity footprints of mines are minimized a baseline estimate has to be carried out and this is still IN PROGRESS. Another three indicators were classified as IN PROGRESS because of delays in data collection. These involve the planning and sharing of infrastructure corridors, as well as the design of power and pipelines taking into account future needs. Three indicators are concerned with biodiversity

offsets and additional conservation projects. Since there is also no official policy on biodiversity offsets in Namibia as yet operating mines are holding back on a firm commitment to offsets and partnerships. AREVA has a 'no net loss' policy and Rössing Uranium is busy with an initiative that will directly result in the quantification and identification of biodiversity offset areas. Discussion of offsets has started with FFI being the link between the mining industry and government. Two indicators are thus IN PROGRESS while the one measuring additional conservation projects has been MET. The report on EQO8 contains many examples of national and international partnerships with NGOs and support to conservation initiatives.

EIAs and EMPs should make explicit reference to extinction risk and species extinction should be avoided. These indicators are poorly worded and not easy to measure. The first was regarded as NOT MET, because few of the EIAs mentioned extinction risk and NERMU was unsure how to approach assessing the second indicator (Refer to comments in chapter 5). Secondary impacts such as off-road driving and littering by mine personnel must be avoided. Mines and exploration companies include prevention measures in their environmental management plans and induction programmes for new employees and contractors. Compliance is monitored through inspections and audits (MET). Third party verification can be obtained by discussions with MET Parks staff to obtain copies of monthly reports. The concept of Honorary Wardens is still under discussion (IN PROGRESS). The last two indicators direct NERMU to develop a monitoring programme for biodiversity in river courses and wetlands, and to report the results to regulators so that action can be taken. This is still IN PROGRESS.

EQO 9.	**Education**

Aims of this EQO: In the Erongo Learning Region, people continue to have affordable and improved access to basic, secondary and tertiary education, which enables them to develop and improve skills and take advantage of economic opportunities.

In summary, 3 indicators were undetermined, 1 NOT MET and 3 MET. The first four indicators address the desired improvement in the quality of school education. It was however not possible to measure if 75% of grade 1 enrolments completed grade 10 and if 75% of grade 10 graduates obtained a NSSC, and neither if the region improved in reading and mathematics as no statistics were available. The target of 50% of all English and science marks being a D or better was NOT MET, even though the data included public and private schools. Increasing numbers of graduates from NIMT, Polytechnic and UNAM were recorded and this indicator was MET. Operating mines are required to fund a skills development programme for employees at 3% of total wage cost and have 10% more bursary holders than work-permit holders. These conditions were MET and the also mines reported on additional initiatives to support education in the Erongo Region that form part of their corporate social responsibility.

EQO 10.	**Governance**

Aims of this EQO: Institutions that are responsible for managing the Uranium Rush provide effective governance through good leadership, oversight and facilitation, so that all legal requirements are met by all parties involved, either directly or indirectly, in prospecting and mining of uranium.

Governance is measured against 18 indicators; of these 10 were MET, 6 IN PROGRESS and 2 undetermined. The first desired outcome is the protection of sensitive areas by government not allowing mining and related developments. Considering flagged areas before issuing licenses requires a clear definition of the red flag areas, for which the landscape level assessment will be used. The status of the first four indicators is therefore IN PROGRESS. In the meantime, good governance is maintained in issuing mineral licences. During the reporting period, Swakop Uranium's Husab Mine has been granted a mining license in a red flag area. Full EIAs for the mine and its linear infrastructure were submitted and Environmental Clearance Certificates were issued with the relevant conditions. This indicator and the

following one that sets out the standard for EIAs have both been MET. There were no reports of corruption during the allocation of licences and this indicator was MET as well.

The Division of Environmental Geology in the Geological Survey of Namibia and the Mines Inspectorate in the Directorate of Mines are mandated to monitor current and abandoned mine sites. Mine site monitoring took place and the indicator is therefore considered to be MET. The issue of Honorary Conservators is still under discussion (IN PROGRESS), but the requirement for government agencies to measure key indicators has to be better defined and remains undetermined.

Namibia is a member state of the International Atomic Energy Agency (IAEA), and thus committed to mandatory inspections. The IAEA carries out on-site inspections and visits under comprehensive safeguards agreements; the indicator for international inspection is thus MET. The requirement for reporting to the public has been MET by publishing the 2011 SEMP report. The indicator allowing the public to participate in physical monitoring was found to be impractical and will be reviewed (undetermined). The results of these monitoring activities will however be disclosed to the public via the SEMP Office website which is currently under construction. The website will also serve as a platform for the public to report their observations (IN PROGRESS). The last four indicators referring to the management of non-compliances were all MET. The issue raised was some companies' failure to pay licence fees.

EQO 11.	**Heritage and future**

Aims of this EQO:

- Namibia's international image is maintained and enhanced, as the 'Namib Uranium Province' builds a good international reputation as a result of generally reliable, ethical, trustworthy and responsible practices/behaviour and more specifically, because of environmentally, socially and financially responsible uranium mining operations.
- Uranium exploration and mining - and all related infrastructure developments - will have the least possible negative impact on archaeological and palaeontological heritage resources.
- Survey, assessment and mitigation will result in significant advances in knowledge of archaeological and palaeontological heritage resources, so that their conservation status is improved and their use in research, education and tourism is placed on a secure and sustainable footing.

The indicator for international image are as follows: "No critical international voices about the operations and performance of the Namib Uranium Province among any key international stakeholders" and "There is no evidence of unreliable, unethical and/or environmentally, socially and financially irresponsible conduct by operating uranium mines or prospecting activities." Strict adherence to the wording of the indicators would mean that a single article could cause the indicator to be scored as not met. A standard of no more than 10% of relevant articles voicing criticism or showing evidence was decided on as both more reasonable and still conservative. By these standards, both indicators are MET.

Six heritage indicators require that all mining and related developments are subject to archaeological assessment and that no unauthorised impacts occur. Of eight projects for which EIAs were available, 100% have done archaeological assessments (MET). The setting of standards for archaeological assessments is still IN PROGRESS. Active research is taking place by Dr John Kinahan of Quaternary Research Services and Dr Alma Nankela of the NHC (indicator MET) and according to Dr Kinahan, his work will lead to a working model of the Namib. Compliance with the last three indicators is thus still IN PROGRESS.

EQO 12.	Mine closure and future land use
Aims of this EQO: To maximize the sustainable contribution mines can make post closure to society and the region, and to minimize the social, economic and biophysical impacts of mine closure.	

The indicators for this EQO stipulate that the contents of the mines' closure plans must be consistent with the IAEA guidelines, Namibian regulations and policies and the Namibian Mine Closure Framework and continue to list the relevant requirements. All mines that are required to have closure plans have prepared their plans in compliance with these requirements and made provision for closure funding. The first three indicators have been MET but the last one is IN PROGRESS because government is busy updating the regulations on mine closure.

7 CONCLUSIONS

Overall the desired outcome of the SEA/SEMP is that the uranium mining and exploration in the Central Namib will contribute significantly to the goal of sustainable development of the Erongo Region and Namibia. The membership of the mining and exploration companies of the Chamber of Mines is an added advantage that they fully comply and operate with regulations, acts, policies and even within set frameworks. This SEMP report reflects commitment and that there is no doubt that uranium mining in the Erongo Region, even though sometimes taking place in a national park, contributes towards moving the region towards sustainable development.

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Annex 1: SEMP OPERATIONAL PLAN

EQO 1: Socio-Economic Development	**Aim of this EQO: The Uranium INDUSTRY improves Namibia and the Erongo Region's sustainable socio-economic development and outlook without undermining the growth potential of other sectors.**			**SEMP Officer: KN**
Desired outcome	**Target**	**Indicators**	**Reporter**	**status**
Income and economic opportunities from the Uranium industry are optimised.	Contribution of uranium mining to the economy increases over time.	Royalties are paid in full by mining companies.	SEMP office	• Met
		Corporate taxes are paid in full by mines and associated companies.	SEMP office	• Not Met
		Increasingly, inputs that can be sourced locally are not imported.	UI	• Met
		Uranium mines and processing plants are not granted EPZ status.	SEMP office	• met

EQO 2: Employment	Aim of this EQO: Promote local employment and integration of society			SEMP Officer: RL
Desired outcome	**Target**	**Indicators**	**Reporter**	**status**
1. Mainly locals are employed.	Uranium companies hire locally where possible.	During operational phase all companies to comply with their employment equity target (certificate).	UI	• Met for both mining and exploration companies

EQO 3: Infrastructure	Aim of this EQO: Key infrastructure is adequate and well maintained, thus enabling economic development, public convenience and safety.			SEMP Officer: IH
Desired outcome	**Target**	**Indicators**	**Reporter**	**status**
1. Existing, proclaimed towns are supported.	Most employees are housed in proclaimed towns.	Mines do not create mine-only townships or on site accommodation	UI	• None of the mines have created mine only township or on site accommodation • Met
		There are no on-site hostels during the operational phase of a mine.	UI	• • Met
2. Roads in Erongo are adequate for Uranium Rush and other traffic.	Roads are well maintained, traffic frequency is acceptable for tourism/other road users and traffic is safe	All key gravel roads (C28, Moon landscape (D 1991) Welwitschia drive, Goanikontes (D 4570), Walvis to Kuiseb (C 14)) are graded timeously to avoid deterioration.	Roads Authority	• SU, LHM, BRN contributed funds to section of road leading to their ML • • Progress made
		Un-surfaced roads carrying >250 vehicles per day, need to be tarred	RA	• RA has undertaken feasibility study for upgrading road… • Progress made
		The B2 tar road is free of pot-holes and crumbling verges.	RA	• (no information contributed) • RA – indicator met
		Road markings and signage are in place and in good condition.	RA	• Met • Observations by SC indicate that indicator has been met.
		Accidents at intersections and turn-offs decline from current trends.	RA	• no possibility of monitoring this indicator and to be removed from the operational plan, or to formulate it according to how the police monitors these accidents.
		D1984 (Swakopmund to Walvis-Bay east of dunes) is tarred and designated an industrial vehicle route	RA	• Feasibility study done • Progress made
		90% of traffic on the B2 coastal road (between Swakopmund and Walvis Bay, west of the dunes) is light vehicles (< 3 tons)	RA	• No info
		Mining traffic on predominantly tourist roads meets agreed conditions	CTAN	• Met
3. Optimum use of rail infrastructure.	Most bulk goods for mines are transported by rail	>80% of all bulk goods (all reagents and diesel) delivered to mines and associated industries, are transported by rail (not reporting on it this year)	• • TransNamib • UI	• Nothing for LHU • Met for Rossing only •

EQO 3: Infrastructure	Aim of this EQO: Key infrastructure is adequate and well maintained, thus enabling economic development, public convenience and safety.			SEMP Officer: IH
Desired outcome	**Target**	**Indicators**	**Reporter**	**status**
4. Walvis Bay Harbour is efficient and safe	The harbour authorities provide reliable, accessible and convenient loading, offloading and handling services	Average loading/offloading rate for containers is >25 containers per hour	Namport	• No data received
		Average waiting time for ships to obtain a berth is <12 hours	Namport	
		No oil/ chemicals/ contaminants/ sewerage spills enter the Ramsar site	Namport	
5. Electricity is available and reliable	Electricity is available and reliable for public	The public does not suffer disruptions in electricity supply as a result of the U rush	NamPower	• No power outages as a result of the U-rush • Met
	Electricity is available and reliable for industry	Industrial development is not delayed by electricity shortage	NamPower	• • Met
		No investment decision has been deffered because of electricity unavailability, and planning is in place to accommodate other sectors	NamPower	• Board approved • Met
	The public do not suffer disruptions in electricity supply as a result of the Uranium Rush	Electricity quality of supply meets ECB standard	NamPower	• Met
		Electricity provision (generation, distribution and transmission) does not compromise human health	NamPower WB Mun.	• Met • According to Nampower met but WB Mun commissioning a study
		Mines and associated industries pursue renewable power supply options as far as possible	NamPower	• no sufficient data available for conclusion, however nampower has a comprehensive policy in place (e.g 4th turbine in Ruacana)
6. Waste sites have adequate capacity.	All sewage, domestic and hazardous waste sites are properly designed and have sufficient capacity for next 20 years, taking into account the expected volumes from mines and all associated industries.	Municipalities have sufficient capacity of sewage works and waste sites based on actual and predicted volumes of waste	WalvisBay Municipality	• Data from WB and Swakop Mun. only • More data needed for the other municipalities
		Independent audits are undertaken for waste sites	WalvisBay Municipality	• No data received • Not met, no audits being conducted.
		Independent audit proves sufficient capacity of Walvis Bay and Windhoek hazardous waste sites; and Swakopmund, Walvis Bay, Arandis and Usakos non-hazardous waste sites with a 20 year life-span		•
		All new waste sites undergo an EIA prior to	WalvisBay	• Met in terms of the EMA, however currently no

EQO 3: Infrastructure	Aim of this EQO: Key infrastructure is adequate and well maintained, thus enabling economic development, public convenience and safety.			SEMP Officer: IH
Desired outcome	**Target**	**Indicators**	**Reporter**	**status**
		construction and receive a licence to operate.	Municipality	licenses are required. •
7. Waste sites are properly managed	The management of waste sites meets national standards.	Waste site managers are adequately trained (Where managers have attended at least a one-week course in waste management at a reputable training institution, per year)	WalvisBayMunicipality (municipalities working group)	• Partly met; data received from WB Mun and Swakop Mun • Met
		Site manifests which record all wastes, their nature, volumes and origins are kept.	Municipalities working group	• Records of waste are kept except origins • Partially Met
		Only hazardous waste classes for which the sites are licensed are accepted.	WalviBay Municipality	• Partially Met • WB keeps record, Swakop not, no info from other municipalities
		Water and air quality monitoring data at waste disposal sites show no non-compliance readings.	WalviBay Municipality	• (comment from OS) • Not Met
		Municipal budgets are sufficient to comply with the site licence requirements relating to pollution control.	WalviBay Municipality	• Swakop Mun. budgets and … • • Met
		Tailings management is in compliance with DWAF industrial effluent exemption permit Separate targets required for tailings and waste rocks	UI DWAF	• Met
8. Recycling is common practice in the central Namib.	A sustainable waste recycling system is operational in the central Namib, servicing the uranium mines and the public.	Waste recycling established.	WalvisBay Municipality.	• Partially Met
		Waste recycling operators have sufficient capacity to collect, transport and recycle waste in a safe and responsible manner	WalvisBay Municipality.	• 4 recycling operator in WB • No other info • Met
		Volumes of waste disposed to landfill per capita decreases.	WalvisBay Municipality	• WB complies… • Swk mun to implement 2 bin system… • No data from other municipalities • partially Met

EQO 4: Water	Aim of this EQO: To ensure that the public have the same or better access to water in future as they have currently, and that the integrity of all aquifers remains consistent with the existing natural and operational conditions (baseline). This requires that both the quantity and quality of groundwater are not adversely affected by prospecting and mining activities.			SEMP Officer: AH
Desired outcome	**Target**	**Indicators**	**Reporter**	**status**
1.Water for urban and rural communities is of acceptable quality Ground water quality (full comment from RE)	Uranium Rush does not compromise community access to water of appropriate quality[1]: Urban users Rural communities supplied by DWA Commercial farmers (own supplier) Lower Swakop River small holdings	Aesthetic/physical, inorganic, radio-nuclide and bacteriological determinants conform with minimum required quality as prescribed in the national water quality standards.Add samples from residential areas during monitopring.	DWAF	• • Met as uranium mining does not impact on drinking water…..
2.The natural environment, urban and rural communities have access to adequate water	Uranium Rush does not compromise surface and groundwater movement[2] and availability	No unusual loss of wetland and riparian vegetation due to uranium industry	NERMU	• No data
		No unusual loss of phreatophytes due to uranium industry		
		Borehole levels fluctuate within existing norms	DWAF	• Met
		Aquifer water will be made available to domestic users at approved NamWater rates	DWAF	• No tariffs charged on abstractions • Groundwater abstraction from Khan and Swakop rivers are controlled by DWAF permit system • Status? (met)
		Disaster management plans are in place and implemented.	DWAF Namwater (disruptions) WB Mun.	• No data • Kuiseb basin management committee worked on emergency plan
3. Water for industrial purposes is available and reliable	Additional water resources (notably desalinated water) are developed to meet	Industrial investors are not lost because of water unavailability	NamWater	Met

[1] It is acknowledged that groundwater in some areas is naturally brackish or saline and does not conform to the national water quality standards

[2] It is specifically recommended that no groundwater be used for any mining operations, other than water made available through pit dewatering

EQO 4: Water	Aim of this EQO: To ensure that the public have the same or better access to water in future as they have currently, and that the integrity of all aquifers remains consistent with the existing natural and operational conditions (baseline). This requires that both the quantity and quality of groundwater are not adversely affected by prospecting and mining activities.			SEMP Officer: AH
Desired outcome	**Target**	**Indicators**	**Reporter**	**status**
	industrial demand.	Desalinated water meets mine demand by 2014	Namwater	Not met (currently only AREVA uses desalinated water)

EQO 5: Air quality & Radiation	Aims of this EQO: Workers and the public do not suffer significant increased health risks as a result of radiation exposure from the Uranium Rush			MH & IH
Desired outcome	**Target**	**Indicators**	**Reporter**	**Status**
1. Annual radiation exposures to the public via air are not significantly increased as a result of the Uranium Rush	More accurate public dose assessments shall demonstrate that the cumulative radiation dose to members of the public does not exceed 1 mSv/a, or that the dose to members of the public does not exceed 0.25 mSv/a for contributions from any single operation.	Gross alpha/beta-analysis and determination of uranium and thorium by NAA within the inhalable (PM10) fraction of air filters	NRPA	• In progress, • study currently being carried out by a student employed at NRPA
		Gross alpha/beta-analysis and determination of uranium and thorium by NAA within dust fallout samples.	NRPA	• In progress, • Study is currently being carried out by a student.
		Radon exhalation rates from ground through continuous monitoring. Indicator required for Radon equipments.	NRPA	• met • The existing RGM monitoring network has been discontinued since August 2011. The data has been interpreted in the assessment portion of the report.
2.Annual human exposures to particulate concentrations are acceptable (IFC Standard	Ambient PM10 concentrations at public locations and mines should not exceed the required target/limit to be set for the Erongo Region for both annual and 24-hour averages. The target/limit should be based on international guidelines but should consider local environmental, social and economic conditions	Ambient PM10 monitoring (µg/m^3) at Swakomund,	NRPA	• met • A PM10 Sampler machine in Swakopmund is up and running and the first batch of data has been collected. The data has been interpreted in the assessment portion of the report.
		Collection of an accredited meteorological station at Swakopmund measuring hourly average wind speed, wind direction, temperature, solar radiation, humidity and rainfall.	SEMP	• • Met • not within the mandate of SEMP to dictate that a meteorological station be built. • Meteorological data to be obtained at Meteorological office in WB. • (MH to contact JH for info on how to get more data) • SEMP suggests that some of the data be obtained from the PM-10 sampler and radon and progeny machine situated at the NamWater facilities in Swakopmund.
3.Nuisance dust resulting from the Uranium Rush is within acceptable thresholds	Dust fallout levels at residences in towns should not exceed the recommended limit of 600 mg/m^2/day.	Continuous dust fallout measurements (mg/m^2/day) on a regional scale e.g. maintain existing SEA dust fallout network	SEMP	• met • The data has been interpreted in the assessment portion of this report.

EQO 5: Air quality & Radiation	Aims of this EQO: Workers and the public do not suffer significant increased health risks as a result of radiation exposure from the Uranium Rush			MH & IH
Desired outcome	**Target**	**Indicators**	**Reporter**	**Status**
	Mitigation measures to be implemented by mines at all major dust generating sources such as haul roads, materials transfer points and crushing operations. The best practical dust suppression methods should be implemented and monitored through dust fallout buckets at strategic locations.	Mines must implement a dust fallout network, measuring dust fallout at main dust generating sources and mine license boundaries	SEMP	• Most of the advanced projects have a dust fallout network established. No information exists for more than half of the nuclear fuel exploration companies in the region though. Mitigation measures such as dust suppression are used by some companies. • Status: met (mining operations have dust fallout networks)
1. Annual radiation exposures to the public via air are not significantly increased as a result of the Uranium Rush	More accurate public dose assessments shall demonstrate that the cumulative radiation dose to members of the public does not exceed 1 mSv/a, or that the dose to members of the public does not exceed 0.25 mSv/a for contributions from any single operation.	Gross alpha/beta-analysis and determination of uranium and thorium by NAA within the inhalable (PM10) fraction of air filters	NRPA	• Mine radiation management reports (that are sent to the NRPA) • NRPA verification reports •
		Gross alpha/beta-analysis and determination of uranium and thorium by NAA within dust fallout samples.	NRPA	• Mine radiation management reports (that are sent to the NRPA) • NRPA verification
		Radon exhalation rates from ground through continuous monitoring.	NRPA	• Mine radiation management reports (that are sent to the NRPA)
2.Annual human exposures to particulate concentrations are acceptable (IFC Standard	Ambient PM10 concentrations at public locations and mines should not exceed the required target/limit to be set for the Erongo Region for both annual and 24-hour averages. The target/limit should be based on international guidelines but should consider local environmental, social and	Ambient PM10 monitoring (µg/m^3) at Swakomund,	NRPA	• Mine air quality management reports • Chamber of Mines annual reports • Erongo PM10 and dust fallout monitoring database • MME Annual Reports • Met (below 75 µg/m^3) WhO guidelines
		Collection of an accredited meteorological station at Swakopmund measuring hourly average wind speed, wind direction, temperature, solar radiation, humidity and rainfall.	SEMP	• Get data from currently existing stations, Meteorological Bureau

EQO 5: Air quality & Radiation	Aims of this EQO: Workers and the public do not suffer significant increased health risks as a result of radiation exposure from the Uranium Rush			MH & IH
Desired outcome	**Target**	**Indicators**	**Reporter**	**Status**
	economic conditions			
3.Nuisance dust resulting from the Uranium Rush is within acceptable thresholds	Dust fallout levels at residences in towns should not exceed the recommended limit of 600 $mg/m^2/day$.	Continuous dust fallout measurements ($mg/m^2/day$) on a regional scale e.g. maintain existing SEA dust fallout network	SEMP	• Met • Erongo PM10 and dust fallout monitoring database
	Mitigation measures to be implemented by mines at all major dust generating sources such as haul roads, materials transfer points and crushing operations. The best practical dust suppression methods should be implemented and monitored through dust fallout buckets at strategic locations.	Mines must implement a dust fallout network, measuring dust fallout at main dust generating sources and mine license boundaries	SEMP	• Met • Mine air quality management reports • MME Annual Reports • Chamber of Mines annual reports • Erongo dust monitoring database

EQO 6: Health	Aims of this EQO: Workers and the public do not suffer significant increased health risks from the Uranium Rush			SEMP Officer: RL
Desired outcome	**Target**[3]	**Indicators**	**Reporter**	**Status**
1.Disease rates amongst the public and employees of the mining and associated industries are not increased as a result of the Uranium Rush	Increments in the concentrations of uranium, thorium and health-relevant nuclides of the uranium, thorium and actinium decay chains such as Ra-226 and Ra-228 (above respective background concentrations) in air and water (ground and surface) that originate from uranium mines, must be constrained so that the cumulative radiation dose to members of the public is reasonably minimized and does not exceed 1 mSv per annum above background.	Public dose assessments produced by each mine project	UI	Met (add why)
	Dose limits for practitioners working with radiation sources, e.g. mine employees, industrial radiographers, medical radiographers, radiologists (doctors) are reasonably minimized and do not exceed 20 mSv per annum averaged over 5 years, i.e. 100 mSva over a 5 year period with a ceiling of 50 mSv per annum in a single year.	Measured change in absorbed radiation dose of uranium mine workers and medical professionals (designated radiation workers)	UI	Met

[3] There are other indicators relevant to this EQO that are not included here, such as minimising opportunity costs, co-investing in infrastructure, etc. They are omitted because they are covered by other EQOs.

EQO 6: Health	Aims of this EQO: Workers and the public do not suffer significant increased health risks from the Uranium Rush			SEMP Officer: RL
Desired outcome	**Target**[3]	**Indicators**	**Reporter**	**Status**
	No measurable increase, directly or indirectly attributable to uranium mining and its support industries in the incidence rates of the following: Industrial lung disease (including pneumoconiosis) Lung cancer Other industrial related cancers Industrial induced renal damage HIV/ AIDS Tuberculosis Industrial dermatitis	Measured change in the incidence rate of industrial diseases amongst uranium mine workers.	UI	met
		Measured change in the incidence rate of diseases scientifically attributed to radiation amongst members of the public, uranium mine workers and medical personnel	UI	met
	No increase in road accidents directly attributable to Uranium mining and its support industries.	Measured change in the number of fatal road accidents per road user over 1 year	UI	Met
2.Improved Healthcare Facilities and Services[4] are able to meet the increased demand for healthcare resulting from the Uranium Rush	An increase in qualified health workers available to all in the Erongo Region, reaching 2.5 per 1000 of the population by 2020	Number of available qualified healthcare personnel: 2.5 per 1000 of population Number of Medical Practitioners: 1 Per 1000 of population Number of Dental Practitioners: 1 per 2000 of population	SEMP Office	Public sector: Not met Private Sector: met Public sector: Not met Private Sector: met Public sector: Not met Private Sector: met

[4] There is no consensus on the ideal number of healthcare workers per 1000 of population, which differs from region to region depending on a large number of fundamental factors. The figures stated here are based on the consensus opinion of the group of local medical practitioners in Erongo region.

EQO 6: Health	Aims of this EQO: Workers and the public do not suffer significant increased health risks from the Uranium Rush			SEMP Officer: RL
Desired outcome	**Target**[3]	**Indicators**	**Reporter**	**Status**
		Number of nurses: 2.5 per 1000 of population Pharmacists: 1 per 2000 of population		Public sector: Not met Private Sector: met
	An increase in registered healthcare facilities in Erongo, available to all, reaching 2.5 acute care beds per 1000 population and 0.5 chronic care beds per 1000 population by 2020	Number of available registered healthcare facilities: 1 per 1000	SEMP Office	Public sector: Not met Private Sector: met
	An increase in ambulances in Erongo, reaching 1 per 20,000 by 2020	Number of available ambulances: 1 per 20000	SEMP Office	Public sector: Not met Private Sector: met

EQO 7: Effect on Tourism	Aims of this EQO: **The natural beauty of the desert and its sense of place are not compromised unduly by the Uranium Rush; and to identify ways of avoiding conflicts between the tourism industry and prospecting/mining, so that both industries can coexist in the central Namib.** **The Uranium Rush does not prevent the public from visiting the usually accessible areas in the central Namib for personal recreation and enjoyment; and to identify ways of avoiding conflicts between the need for public access and mining.**			SEMP Officer: MH
Desired outcome	**Target**	**Indicators**	**Reporter**	**status**
1.Central Namib is accessible to the public (within the regulations of the National Park)	Uranium Rush does not result in net loss of publicly accessible areas	Areas of importance for recreation[5] that are not yet alienated by mining or prospecting are declared 'red flag' for prospecting or mining. These include: The Walvis-Swakop dunes, Messum Crater, Spitzkoppe (Gross and Klein), Brandberg, the Ugab, Swakop, Khan, Kuiseb and Swakop Rivers, the coastal area between the Ugab River Mouth and the tidal mud banks south of Sandwich Harbour (between lower mark and the main coastal road), the Welwitschia Drive (can possibly be offset) and Park campsites (can be offset).	NERMU	• Data sources: MME, NHC, Public, EIA,EMP,MET, DEA and *mining companies* • These areas have already been identified as red zones in the SEA, but currently there is no policy in either MET or MME to incorporate the intent of red- or yellow zones. Policy should be developed. • "Offsets" for the Welwitschia drive (i.e. alternative routes) have only been identified informally as part of the EA process of Bannerman's Etango project. No discussions have been started to find alternatives for the campsites. • **Indicator score: Uncertain how to interpret**
		All new mine related listed developments[6] undergo an EIA and EMP prior to final design and implementation, and in all cases, the issue of public access is assessed in a specialist report	NERMU	• Data sources: MET, MME • There is currently no easy way to assess whether new developments do undergo the EA process, because there is no central register of planned projects (i.e., there is no "list" of developments apart from the MET's database of EA documents). The challenge is thus to determine whether there are projects that do not undergo the EA process. • **Indicator score: Uncertain how to interpret**
		All projects are closed, decommissioned and rehabilitated in such a way that safely addresses	NERMU	• Data sources: MET, MME,EIAs, EMPs closure plans

[5] These are the places regarded as commonly used for recreation by locals.
[6] Listed means the activity is required to have an EIA under the Environmental Management Act of 2007.

EQO 7: Effect on Tourism	Aims of this EQO: **The natural beauty of the desert and its sense of place are not compromised unduly by the Uranium Rush; and to identify ways of avoiding conflicts between the tourism industry and prospecting/mining, so that both industries can coexist in the central Namib.** **The Uranium Rush does not prevent the public from visiting the usually accessible areas in the central Namib for personal recreation and enjoyment; and to identify ways of avoiding conflicts between the need for public access and mining.**			SEMP Officer: MH
Desired outcome	**Target**	**Indicators**	**Reporter**	**status**
		public access needs.		• No projects have closed or been decommissioned in the reporting period. • **Indicator score: met**
2. Uranium Rush does not significantly reduce the visual attractiveness of the Central Namib	Direct and indirect visual scarring from the Uranium Rush is avoided or kept within acceptable limits.	Tour operators continue to regard areas such as the dunes, the coastline, Moon Landscape, Welwitschia Flats, Swakop and Khan River areas, and Spitzkoppe as a 'significant' component of their tour package.	NERMU	• Data sources: MET, Tour operators (70% of total) • Questionnaire to assess the impressions of tour operators is being developed. Random sample of operators will be polled as part of a comprehensive questionnaire survey. • **Indicator score: Not yet measured**
		Tourists' expectations are 'met or exceeded' more than 80% of the time in terms of their visual experience in the central Namib.	NERMU	• Data sources: Tourists (at least 200 that have undertaken a desert tour) • Questionnaire to assess the tourists' expectations have been developed and piloted (see Appendix 1 and 2). This questionnaire, being a pilot study, polled only 19 tourists (19 returns out of 45 questionnaires that were distributed). Among other questions, tourists had to rate the extent to which their expectations were met on a 5-point scale (1 = disappointed, 3 = met, 4 & 5 = exceeded) for 18 specific attractions in the central Namib. A total of 157 out of 168 ratings were 3 or higher. This represents 93.5% of all responses. • **Indicator score: Exceeded** • Note that numerous qualifiers to this answer are discussed in Appendix 2. • Note that the target of 200 tourists may be too high.

EQO 7: Effect on Tourism	Aims of this EQO: **The natural beauty of the desert and its sense of place are not compromised unduly by the Uranium Rush; and to identify ways of avoiding conflicts between the tourism industry and prospecting/mining, so that both industries can coexist in the central Namib.** **The Uranium Rush does not prevent the public from visiting the usually accessible areas in the central Namib for personal recreation and enjoyment; and to identify ways of avoiding conflicts between the need for public access and mining.**			SEMP Officer: MH
Desired outcome	**Target**	**Indicators**	**Reporter**	**status**
		All developers commission EIAs prior to final design, and outcomes-based EMPs guide implementation and decommissioning. In all cases, visual impacts and sense of place are addressed. This should be broken down into 3 different indicators	NERMU	• Data sources: EIA reports (visual specialist studies) • List of developers and projects is still in development. About 69% of relevant EIAs have been sourced. See Appendix 3 for list of EIAs consulted for this EQO, and Appendix 4 for a summary o scores and results. • Of 20 developers, 20 (100%) commissioned EAIs prior to final design **Indicator score: Met** • Of 20 projects, 18 (90%) have outcomes-based EMPs and 2 (10%) are yet uncertain **Indicator score:Not met** • For 20 projects, 14 (70%) visual impacts and impacts on sense of place have been assessed • **Indicator score:Not met**
3 .Areas of significant natural beauty or sense of place[7] are afforded proper protection (without undermining existing legal rights).	Improved protection of listed areas.	MME recognizes and respects 'red flag' status for areas regarded as being significantly beautiful. These include: Coastal strip, Major dunefields, Moon Landscape, Spitzkoppe, Brandberg, Messum crater, Sandwich harbour, westward flowing rivers (notably Khan, Swakop	NERMU	• Data sources: MET-DEA, Mines, NHC, MME, NERMU • The red flag areas have been taken into consideration in the Linear EIA for Husab Mine. A specialist and affected parties consultation meeting was held during which the red flag biodiversity areas were used to plan linear infrastructure. • However, the red and yellow flag areas are the subject of a comprehensive study looking at biodiversity vulnerability across the region. As

[7] In this case, sense of place takes into account natural beauty, biodiversity, heritage value, tourism value and environmental vulnerability.

EQO 7: Effect on Tourism	Aims of this EQO: **The natural beauty of the desert and its sense of place are not compromised unduly by the Uranium Rush; and to identify ways of avoiding conflicts between the tourism industry and prospecting/mining, so that both industries can coexist in the central Namib.** **The Uranium Rush does not prevent the public from visiting the usually accessible areas in the central Namib for personal recreation and enjoyment; and to identify ways of avoiding conflicts between the need for public access and mining.**			SEMP Officer: MH
Desired outcome	**Target**	**Indicators**	**Reporter**	**status**
		and Kuiseb)		part of this process, some of the areas mentioned in the indicator may be confirmed, while others may change. However, the LLA project does not include an assessment of aesthetic landscapes. • **Indicator score: in progress** • **Discussions between mme and met are ongoing**
		MME recognizes and respects 'yellow flag' status for areas regarded as being scenically attractive. These include: Gravel plains, Inselbergs (other than those listed above), River washes (other than rivers listed above), Lichen fields.	NERMU	• See above • **Indicator score: same as above**
		decrease in number of mines and prospecting licenses in protected areas (report as a trend: increasing or decreasing)	NERMU	• Data sources: MET • Not yet done • The whole concept of mining in protected areas is currently being reviewed as part of a MME/MET-driven process and NERMU is taking part • No MLs or EPLs granted • **Indicator score: met**

EQO 8: Ecological integrity	Aim of this EQO: The ecological integrity and diversity of fauna and flora of the central Namib is not compromised by the Uranium Rush. Integrity in this case means that ecological processes are maintained, key habitats are protected, rare and endangered and endemic species are not threatened. All efforts are taken to avoid impacts to the Namib and where this is not possible, disturbed areas are rehabilitated and restored to function after mining/development.			SEMP Officer: AH
Desired outcome	**Target**	**Indicators**	**Reporter**	**Status**
1.The ecological integrity of the central Namib is maintained	The mining industry and associated service providers avoid impacts to biodiversity and ecosystems, and where impacts are unavoidable, minimisation, mitigation and/or restoration and offsetting of impacts is achieved.	Important biodiversity areas [red or yellow flag areas (see Figure 8.7)] are taken into consideration when adjudicating prospecting and mining applications.	MET	• MET TO REPORT • Data sources: EMA, Mines, ELAs, EIAs, MME, NERMU • Although one of the data sources is here given as EIAs, this indicator measures performance by the regulator, not the EIA. • The red and yellow flag areas are currently being reviewed by NERMU as part of a comprehensive study looking at biodiversity vulnerability across the region. As part of this process, some of the areas mentioned in the indicator may be confirmed, while others may change. • In addition, the concept of mining in protected areas is currently being reviewed as part of an MME/MET-driven process • A significant constraint remains the lack of a recognised process through which these issues can be considered in the standard EA and Licence application processes
		As far as possible these areas should be avoided. If this is not possible biodiversity offsets must be sought to offset loss occurring in the area. If an offset is not possible then the no-go option should be explored	MET	• MET TO REPORT • See previous
		GRN keeps a record of all decisions made regarding prospecting and mining applications so that applications denied on biodiversity grounds are not awarded in the future, unless alternative approaches are adopted to avoid impact, mitigate or offset the impact.	NERMU	• Data sources: Mineral Rights committee (GS) • Appropriate authority: Mineral Rights Committee. • **Indicator score: Met**
		Mines have specific programmes and projects to actively avoid, mitigate, restore or offset their	NERMU	• Data sources: EIAs, EMA • All EIAs are following the basics of the mitigation

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Desired outcome	**Target**	**Indicators**	**Reporter**	**Status**
		impacts, with impact AVOIDANCE predominating		hierarchy. However, because it is often not possible to decide whether a specific management action is directed towards avoidance or not (most management actions are defined as "mitigations", but these sometimes include avoidance measures), it is not possible to decide whether avoidance predominates. • **Indicator score: met**
		Biodiversity footprints of mines are minimized	NERMU	• Data sources: EIAs, EMA • This indicator requires an assessment of whether different footprint options were considered and the smallest one, which simultaneously has the least biodiversity impacts, was chosen. The decision-making process is however seldom documented in such detail. In addition, cases exist where footprints had to be increase in order to avoid a specific biodiversity impact. (Theo to rephrase) • **Indicator score: ?**
		Infrastructure corridors are carefully planned to avoid ecologically sensitive areas, and demonstrate: consideration of alternatives, optimization of service provision; and commitment to the 'green route'	NERMU	• Data sources: EIAs, EMA • Linear infrastructure EIAs are under-represented in the database. These are being sourced from Namwater and Nampower. • **Indicator score: Not yet measured**
		Mines share infrastructure as much as possible, thus minimizing infrastructure proliferation	NERMU	• Data sources: EIAs, EMA • Linear infrastructure EIAs are under-represented in the database. These are being sourced from Namwater and Nampower. • **Indicator score: met**
		Infrastructure planning and investment takes into account future demand, thus reducing the	NERMU	• Data sources: EIAs, EMA • This requires very detailed reading of EIAs, with no

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Desired outcome	**Target**	**Indicators**	**Reporter**	**Status**
		need for additional impacts (e.g. 1 pipeline, not 3)		clear concept of when a developer is doing this or not • Enquire with Namwater, Nampower… • To send indicators to WS for circulation • **Indicator score: Uncertain how to interpret**
2.Mining industry becomes a conservation partner	Mines and associated industries support conservation efforts in Namibia	Mining companies (particularly those operating in the NNP) partner with conservation organisations to effectively manage their biodiversity impacts (both direct and indirect)	NERMU	• Data sources: Mines; Conservation organisations • **Indicator score: Not yet measured**
		Mining companies commit to sustainable offset initiatives to ensure a 'no nett loss' to biodiversity as a result of their operations. This will involve partnering with long term conservation partners (GRN, NGOs and communities)	NERMU	• Data sources: Mines; Conservation organisations • **Indicator score: Not yet measured**
		Additional conservation projects are supported (e.g. wetland bird counts, wildlife surveys, Namib Bird Route, coastal management, research, public awareness) as part of the companies' social responsibility programmes	NERMU	• Data sources: Mines; Conservation organisations • **Indicator score: Not yet measured**
		Protection and management of key biodiversity offset areas is supported (e.g. NW Kunene, Messum, Spitzkoppe, Brandberg and other special areas in Namibia)	NERMU	• Data sources: Mines; Conservation organisations • **Indicator score: Not yet measured**
3.No species[8] become extinct because of the Uranium Rush	Authorisation to mine is denied if the extinction of a species is likely	All EIAs and EMPs must consider extinction possibility, and resources must be available for reasonable investigation and management	NERMU	• Data sources: All EIA's, RoD's,MET • We assessed this by searching for the keyword "extinction" in each main EIA report, reasoning that if the word extinction does not occur, the proponent did not consider this possibility at all. Of 20 projects,

[8] There is incomplete knowledge of Namib biodiversity, and it is therefore not possible to know exactly what species occur and where.

EQO 8: Ecological integrity	**Aim of this EQO: The ecological integrity and diversity of fauna and flora of the central Namib is not compromised by the Uranium Rush. Integrity in this case means that ecological processes are maintained, key habitats are protected, rare and endangered and endemic species are not threatened. All efforts are taken to avoid impacts to the Namib and where this is not possible, disturbed areas are rehabilitated and restored to function after mining/development.**			**SEMP Officer: AH**
Desired outcome	**Target**	**Indicators**	**Reporter**	**Status**
				3 (15%) have considered extinction, 16 (80%)have not, and 1 (5%) is yet uncertain • **Indicator score: Not met**
		Species extinction is avoided	NERMU	• Data sources: MME, MET • With so few documented cases where extinction was considered at all, it becomes impossible to determine whether adequate measures were put in place to avoid extinction. • One study did explicitly mention the lack of knowledge as being a limitation in managing the risk of extinction, and recommended further specific studies into the subject. • **Indicator score: Uncertain how to interpret**
4.No secondary impacts occur	No secondary impacts occur	Offroad driving, poaching, illegal camping, littering by mine personnel, are explicitly prevented by mining companies	MET	• MET's EQO • Data sources: MET, NERMU • Discussions with MET Parks staff to obtain copies of monthly reports, or summaries of these, are underway • **Indicator score: Not yet measured**
		Improved vigilance and visibility of law enforcement personnel, with structured support from civil society (e.g. Honorary Wardens) reduces park/conservation transgressions	MET	• MET's EQO • Data sources: MET-Parks and Wildlife • Discussions with MET Parks staff to obtain copies of monthly reports, or summaries of these, are underway • **Indicator score: Not yet measured**
5.Water quality and quantity does not decrease to the extent that it negatively affects	Water table levels, and water quality standards are described and ephemeral river ecosystems are	Regular monitoring of indicator species in all ephemeral rivers is in place	NERMU	• Data sources: MET, DWAF, Mines • Not yet done, but this also requires specialist input by Gobabeb, who has only recently obtained funding to take this forward. • **Indicator score: Not yet measured**

EQO 8: Ecological integrity	**Aim of this EQO: The ecological integrity and diversity of fauna and flora of the central Namib is not compromised by the Uranium Rush. Integrity in this case means that ecological processes are maintained, key habitats are protected, rare and endangered and endemic species are not threatened. All efforts are taken to avoid impacts to the Namib and where this is not possible, disturbed areas are rehabilitated and restored to function after mining/development.**			**SEMP Officer: AH**
Desired outcome	**Target**	**Indicators**	**Reporter**	**Status**
biodiversity	monitored to ensure that these standards are not compromised	Results from monitoring are fed back to regulators and impacting companies so that negative impacts on riverine vegetation, springs and pans can be dealt with appropriately	NERMU	• Data sources: MET, DWAF, Mines • **Indicator score: Not yet measured**

EQO 9: Education	Aims of this EQO: In the Erongo Learning Region, people continue to have affordable and improved access to basic, secondary and tertiary education, which enables them to develop and improve skills and take advantage of economic opportunities.			SEMP Officer: AH
Desired outcome	**Target**	**Indicators**	**Reporter**	**Status**
1.Improved quality of school education	Improved results	75% of grade 1 enrolments complete grade 10	MoE	• No data
		75% of grade 10 graduates obtain a NSSC	MoE	• No data
		National Examination Results in Grade 10 and 12 in maths, English and science is a D or better for more than 50% of learners from public (GRN) schools	MoE	Grade 10 • 2010: target met for English and additional mathematics; target not met for all science subjects (except for geography) • 2009: target met for English and mathematics; target not met for all science subjects (except for geography) • 2008: target met for English and mathematics; target not met for all science subjects (except for geography) Grade 12 • Ordinary exams: • 2010: target met for English and not met for mathematics and science • 2009: target met for English; target not met for mathematics and science • 2008: target met for English; target not met for mathematics and science • Higher exams: • 2010: no data • 2009: target met for all subjects • 2008: target met for all subjects • Overall: target met • **Data source: http://www.dnea.gov.na/**
		Region improves performance in reading and mathematics	MoE	• No data
2. Increased availability of technical skills in	More qualified artisans, technicians, geologists, accountants and engineers	Increasing number of graduates from NIMT, Polytechnic of Namibia, proposed VTC facility in Walvis Bay and UNAM	MoE	• In progress: • Insufficient data (but met for UNAM and Polytechnic)

EQO 9: Education	Aims of this EQO: In the Erongo Learning Region, people continue to have affordable and improved access to basic, secondary and tertiary education, which enables them to develop and improve skills and take advantage of economic opportunities.			SEMP Officer: AH
Desired outcome	**Target**	**Indicators**	**Reporter**	**Status**
Erongo		Every mine has funds/ a skills development programme for employees (3% of wage cost)	UI	• Met
		Each mine has 10% more bursary holders than work-permit holders	UI	• Met

EQO 10: Governance	Aims of this EQO: Institutions that are responsible for managing the Uranium Rush provide effective governance through good leadership, oversight and facilitation, so that all legal requirements are met by all parties involved, either directly or indirectly, in prospecting and mining of uranium.			SEMP Officer: MH
Desired outcome	**Target**	**Indicators**	**Reporter**	**status**
1. Prospecting and mining avoids environment-tally high value, sensitive areas.	Sensitive areas in need of protection, are not generally available for prospecting or mining	Declared 'red flag' areas undergo the required high level of scrutiny before mineral licenses are considered (see other EQOs for lists & Figures 8.8 and 8.9 for the required decision making process) Referred to LLA	SEMP office-MME	• this EQO needs to be restructured as its targets and indicators are out of the sphere of influence of SEMP. • FFI is currently doing a study to clearly define red flag areas. • MET is currently drafting a policy for mining in protected areas and are considering Red and yellow flag areas. • The Husab Mine site cannot be accessed without going through a red or yellow flag area • In progress
		Where possible, red flag areas remain undisturbed by mining or other developments that have high impacts on biodiversity, heritage and or sense of place.	SEMP office-MME	
		If development (especially mining) is to take place in a yellow flag area, strict conditions are attached with the approval certificate (applicable to Husab who complies0	SEMP office-MME	
		No new powerlines, pipelines or roads linked to the Uranium Rush are routed through red flag areas, and preferably also not through yellow flag areas.	SEMP office-MME	
2. Good governance is maintained in the issuing of mineral licenses.	The defined process is always followed in the allocation of all kinds of mineral licenses and the establishment of supporting infrastructures	Mineral licenses[9] are given only after full consultation of, and consensus within, the Mineral Rights Committee and the relevant status of areas in question (red and yellow flag areas)	SEMP office-MME	• Swakop Uranium has been awarded a mining licence with conditions • met
		No evidence of corruption in the allocation of mineral licenses	SEMP office MME	• See 1 above
		No prospecting, mining or major infrastructure projects are permitted (anywhere) before full EIAs are completed and approved. Minimum EIA standards as in the EMA and regulations, are adhered to, including: Clear TORs Use of independent consultants Public consultation	SEMP office MME	• Full EIA's for the Husab mine and for the Linear Infrastructure are submitted to the MET and Environmental Clearance Certificates have been awarded for both. • met

[9] Meaning for uranium or any other minerals

EQO 10: Governance	Aims of this EQO: Institutions that are responsible for managing the Uranium Rush provide effective governance through good leadership, oversight and facilitation, so that all legal requirements are met by all parties involved, either directly or indirectly, in prospecting and mining of uranium.			SEMP Officer: MH
Desired outcome	**Target**	**Indicators**	**Reporter**	**status**
		Specialist studies Consideration of alternatives Avoid and/or minimise adverse impacts Include an EMP and closure and restoration plan Professional review of EIA and EMP.		
3. Prospecting and mining activities are properly monitored	Post-implementation monitoring is regular, efficient and outcomes-based	GRN agencies (notably MME, MET, MAWF, MHSS) inspect active mines at least once per annum, and closed mines at least once every 3 years - met	SEMP office-MME	• The Division of Environmental Geology in the Geological Survey of Namibia is mandated to monitor current and abandoned mine sites. • Active and abandoned mines monitoring training took place where stakeholders from various agencies were trained. A manual is available in softcopy.
		Honorary conservators are appointed by MET to assist with monitoring, including of unauthorised secondary (off-mine) activities such as offroad driving, poaching and littering.	SEMP office-MME	
		Above agencies take accurate and consistent measurements of key indicators - met	SEMP office-MME	
		International agencies regularly inspect mines and provide independent opinion on their performance	SEMP office-MME	• Out of SEMP jurisdiction • IAEA conducts inspections at 4 years intervals • More info to be received from UI working group • Met
		Results of monitoring improve practice and are disclosed to the public through existing channels and in an annual SEMP report, or more regularly	SEMP office-MME	• SEMP Report in Progress • Info to be channelled through SEMP office, NERMU, UI… • Met
		Where appropriate, the public are able to participate in physical monitoring.	SEMP office-MME	• Indicator impractical
		Through existing channels and /or the SEMP office, the public can report observations of illegal activities or unwanted impacts.	SEMP office-MME	• To be incorporated in the SEMP website currently being designed. • ongoing
4. Non-compliance is rectified.	Transgressions are noted and acted upon timeously	The activities of proponents/ developers/ service providers who have caused unauthorised negative impacts, are suspended, and they are forced to remedy impacts	SEMP office-MME	• GRN reports and corres-pondence • SEMP report. • Media

EQO 10: Governance	Aims of this EQO: Institutions that are responsible for managing the Uranium Rush provide effective governance through good leadership, oversight and facilitation, so that all legal requirements are met by all parties involved, either directly or indirectly, in prospecting and mining of uranium.			SEMP Officer: MH
Desired outcome	**Target**	**Indicators**	**Reporter**	**status**
				• MH to contact mining directorate
		If impacts are not remedied, the operation is closed and the project authorisation is cancelled	SEMP office-MME	• Out of SEMP Jurisdiction • MH to contact mining directorate in MME
		Fines are issued for non-compliance	SEMP office-MME	
		All incidences of non-compliance are publicised through the media and noted in the annual SEMP report.	SEMP office-MME	

EQO 11: Heritage and Future	Aims of this EQO: **Namibia's international image is maintained and enhanced, as the 'Namib Uranium Province' builds a good international reputation as a result of generally reliable, ethical, trustworthy and responsible practices/behaviour and more specifically, because of environmentally, socially and financially responsible uranium mining operations.** **Uranium exploration and mining - and all related infrastructure developments - will have the least possible negative impact on archaeological heritage resources.** **Survey, assessment and mitigation will result in significant advances in knowledge of archaeological heritage resources, so that their conservation status is improved and their use in research, education and tourism is placed on a secure and sustainable footing.**			SEMP Officer: RL
Desired outcome	**Target**	**Indicators**	**Reporter**	**Status**
1. Namib uranium is regarded as a 'green' product.	The 'Namib Uranium Province' is regarded internationally as an area where reliable, trustworthy, ethical, and environmentally, socially and financially responsible companies prospect and mine for uranium.	No critical international voices about the operations and performance of the Namib Uranium Province among any key international stakeholders (other than those international stakeholders opposed to uranium mining and/or nuclear power anyway, in principle/on ideological grounds)	SEMP office-MME	• 6% (15of 250) relevant international articles surveyed discuss or constitute critical voices on Namibian uranium (another 9 articles are included if domestic articles are also counted). • Key topics: economic benefits of uranium, regulatory and tax concerns, security (over 25% concern Wikileaks and potential Iran connections) • **Status: Met**
		There is no evidence of unreliable, unethical and/or environmentally, socially and financially	SEMP office-MME	• 6% (16 of 283) of relevant articles present some such evidence.

EQO 11: Heritage and Future	**Aims of this EQO:** **Namibia's international image is maintained and enhanced, as the 'Namib Uranium Province' builds a good international reputation as a result of generally reliable, ethical, trustworthy and responsible practices/behaviour and more specifically, because of environmentally, socially and financially responsible uranium mining operations.** **Uranium exploration and mining - and all related infrastructure developments - will have the least possible negative impact on archaeological heritage resources.** **Survey, assessment and mitigation will result in significant advances in knowledge of archaeological heritage resources, so that their conservation status is improved and their use in research, education and tourism is placed on a secure and sustainable footing.**			**SEMP Officer: RL**
Desired outcome	**Target**	**Indicators**	**Reporter**	**Status**
		irresponsible conduct by operating uranium mines or prospecting activities		• Almost half discuss uranium theft. Economic questions also prominent • As with previous indicator, few of these articles discuss environmental or health impacts • **Status: Met**
2. The integrity of archaeological and palaeontological heritage resources is not unduly compromised by the U-rush	Mining industry and associated service providers avoid impacts to archaeological resources, and where impacts are unavoidable, mitigation, restoration and /or offsetting are achieved.	All mining and related developments are subject to archaeological assessment No unauthorised impact occurs	NERMU	• Data sources: National Heritage Council and National Museum as repositories of data and materials.Mines EIAs • We assessed this by searching for the keyword “archaeo” in each main EIA report, reasoning that if the word does not occur, the proponent did not consider this possibility at all. Of 20 projects, 20 (100%) have done archaeological assessments • **Indicator score:Met**
		Mining companies adhere to local and international standards of archaeological assessment.	NERMU	• Data sources: National Heritage Council; Mines EIAs • Local and international standards still have to be more explicitly defined in consultation with the NHC • Contact made with NHC, but no clear answer yet

EQO 11: Heritage and Future	Aims of this EQO: **Namibia's international image is maintained and enhanced, as the 'Namib Uranium Province' builds a good international reputation as a result of generally reliable, ethical, trustworthy and responsible practices/behaviour and more specifically, because of environmentally, socially and financially responsible uranium mining operations.** **Uranium exploration and mining - and all related infrastructure developments - will have the least possible negative impact on archaeological heritage resources.** **Survey, assessment and mitigation will result in significant advances in knowledge of archaeological heritage resources, so that their conservation status is improved and their use in research, education and tourism is placed on a secure and sustainable footing.**			SEMP Officer: RL
Desired outcome	**Target**	**Indicators**	**Reporter**	**Status**
				• **Indicator score:Not yet measured**
3. Integration of archaeological and environmental knowledge in a balanced working model of Namib Desert environmental processes.	Development of a general research framework to identify gaps in scientific knowledge.	Research in progress,	NERMU	• Data sources: Gap analysis and research framework • Meeting with John Kinahan, discussed at length • Contact made with NHC, but no clear answer yet • **Indicator score: Not yet measured**
		Working model of Namib desert developed	NERMU	• Data sources: National Heritage Council • Meeting with John Kinahan, discussed at length • Contact made with NHC, but no clear answer yet • **Indicator score: Not yet measured**
		Model providing information to guide decision making about development in the Namib desert	NERMU	• Data sources: National Heritage Council • Meeting with John Kinahan, discussed at length • Contact made with NHC, but no clear answer yet • **Indicator score: Not yet measured**
		Development of diachronic models to determine the effects of climatic and other environmental changes	NERMU	• Data sources: National Heritage Council • Meeting with John Kinahan, discussed at length • Contact made with NHC, but no clear answer yet

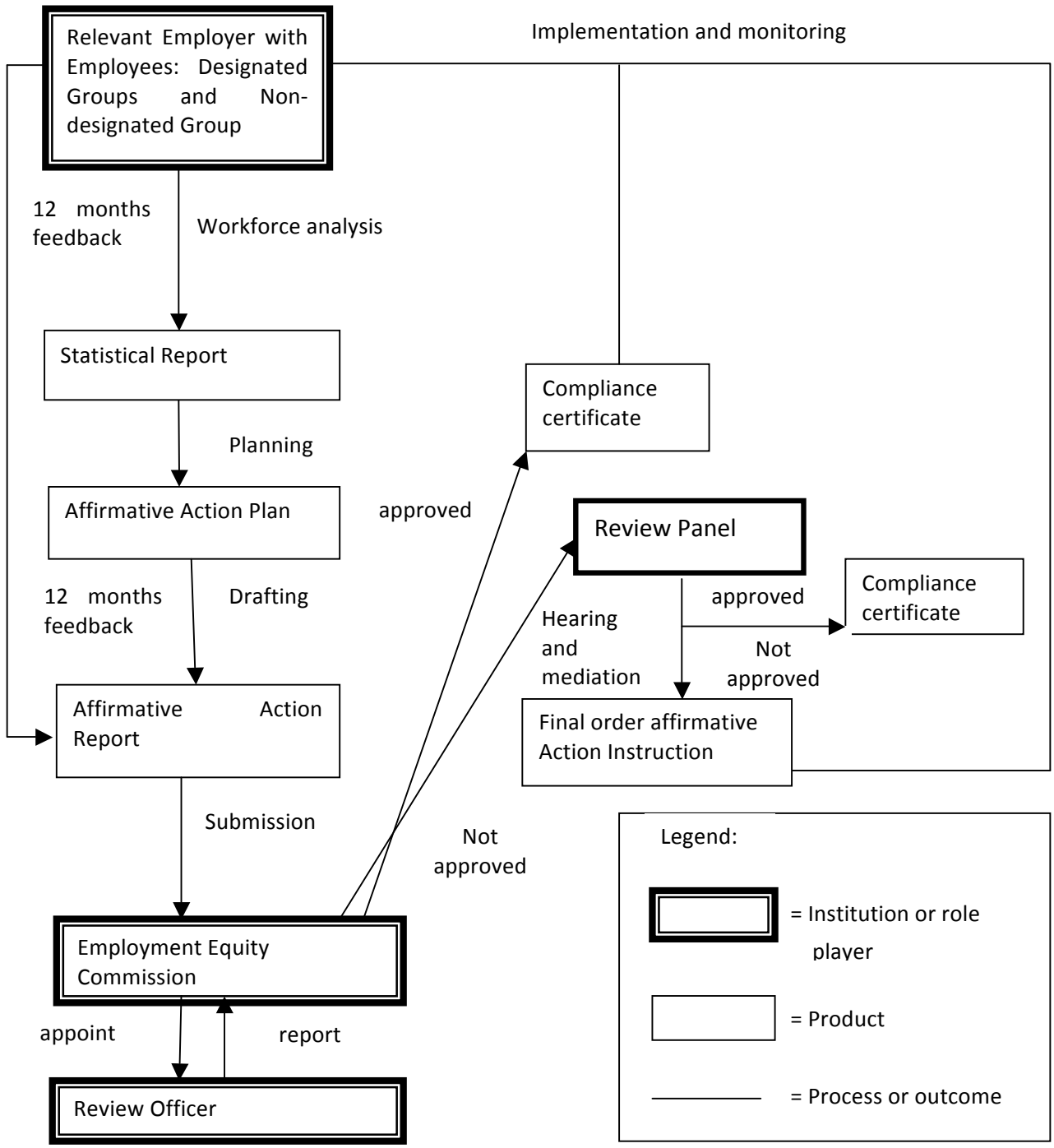
EQO 11: Heritage and Future	Aims of this EQO: Namibia's international image is maintained and enhanced, as the 'Namib Uranium Province' builds a good international reputation as a result of generally reliable, ethical, trustworthy and responsible practices/behaviour and more specifically, because of environmentally, socially and financially responsible uranium mining operations. Uranium exploration and mining - and all related infrastructure developments - will have the least possible negative impact on archaeological heritage resources. Survey, assessment and mitigation will result in significant advances in knowledge of archaeological heritage resources, so that their conservation status is improved and their use in research, education and tourism is placed on a secure and sustainable footing.			SEMP Officer: RL
Desired outcome	**Target**	**Indicators**	**Reporter**	**Status**
				• Indicator score: Not yet measured

12. Mine Closure & Future Land use	**Aim of this EQO: To maximize the sustainable contribution mines can make post closure to society and the region, and to minimize the social, economic and biophysical impacts of mine closure.**			**SEMP Officer: KN**
Desired outcome	**Target**	**Indicators**	**Reporter**	**Status**
1. Companies have approved closure plans in place which ensure that there are no significant post-closure long term negative socio-economic, health and biodiversity effects from the mine. These plans should address planned as well as premature closure.	• The planning process is initiated early (in the feasibility study stage) to ensure that reasonable opportunities for post closure development are not prevented by inappropriate mine design and operations. • Mine closure plans need to be based both on expert and stakeholders input, and consider site specific risks, opportunities and threats as well as cumulative issues. These must include socioeconomic opportunities for nearby communities and the workforce, demolition and rehabilitation and post closure monitoring and maintenance. • The plan needs to contain accepted and agreed objectives, indicators and implementation targets. • The plan.needs to be subjected to periodic critical internal and external reviewed, must have written GRN approval.	The contents of the plan are consistent with the IAEA guidelines, Namibian regulations and policies and the Namibian Mine Closure Framework.	SEMP office-MME	• As most operate within the park this is adhered to. • Met
2.Mines have adequate financial resources to	The financial provision for mine closure needs to be based on	Closure cost estimations contained in the closure plan	UI	• Closure cost estimates are reviewed with expansion and life of mine

12. Mine Closure & Future Land use	Aim of this EQO: To maximize the sustainable contribution mines can make post closure to society and the region, and to minimize the social, economic and biophysical impacts of mine closure.			SEMP Officer: KN
Desired outcome	**Target**	**Indicators**	**Reporter**	**Status**
close operations responsibly and to maintain adequate aftercare	cost calculations including: • employee costs (retrenchment provision, new employment opportunities, re-training costs); • social aspects (sustainability of associated communities), an exit strategy (that is, the process by which mines cease to support initiatives), social transition (that is, communities receiving support for transition to new economic activities); • demolition and rehabilitation costs (infrastructure break-down, salvage and/or disposal at the site or transition to end uses), ecosystem rehabilitation costs of the site; • post closure monitoring and maintenance; and • project management (administration and management costs during the decommissioning period). Companies, in conjunction with regulators, need to establish an independent fund to provide adequate financial resources to fully implement closure.	Financial sureties are available		• **Status: Met** • The mines have set aside funds for mine closure, and exploration companies are to set funds aside for closure • **Status: met**

12. Mine Closure & Future Land use	**Aim of this EQO: To maximize the sustainable contribution mines can make post closure to society and the region, and to minimize the social, economic and biophysical impacts of mine closure.**			**SEMP Officer: KN**
Desired outcome	**Target**	**Indicators**	**Reporter**	**Status**
3. The Government has appropriate mechanisms in place to approve mine closure plans, financial instruments chosen for implementation and to effect relinquishment back to the state.	Regulations applicable to mine closure are contained in the relevant legislation	Mine closure regulations are adequate to govern: review and approval of mine closure plans; financial guarantees and sureties; implementation review, relinquishment and transfer of liabilities to the subsequent land owner.	SEMP office-MME	• Mine Closure framework finalized, and adhered to by CoM members • Closure also in the minerals act and EMA • **Status: met**

Annex 2: THE SUBSTANTIVE CONTENT AND PROCESSES OF THE AFFIRMATIVE ACTION (EMPLOYMENT) ACT



Annex 3: HEALTH FACILITIES IN ERONGO REGION FOR 2009/2010

REGION: Erongo , Facilities for 2009/2010									
Health	**Hospital**	**#**	**No. of beds**	**No.**	**No. of beds**	**Clinics**	**No.**	**No. of beds**	**Total**
District									
Omaruru	Omaruru	1	145			Omaruru	1		145
						Okombahe	1		
						Omatjete	1		
						Uis	1		
Swakopmund	Swakopmund	1	106	1		Arandis	1		106
						Hentiesbay	1		
						Tamariskia	1		
Usakos	Usakos	1	75	1		Hakaseb	1		75
						Otjimbing we	1		
						Spitskoppe	1		
						Tubusis	1		
Walvis Bay	Walvis Bay	1	87	1		Narraville	1		87
						Costal	1		
						Utuseb	1		
						Walvis Bay	1		
4	**4**	**4**	**413**	**3**		**15**	**15**		**413**
Population (2009)		**119,382**							
Bed per population/1000		**0.413**							
Pop. Per Hospital		**29,846**							
Pop. Per Health Centre		**59,691**							
Pop. Per Clinic		**7,959**							

Source: http://www.healthnet.org.na/facilities.

Annex 4: EIAs UNDERTAKEN

Indicators						Post 2010 (post SEA) EIAS			
						10	11	12	
EQO	Des. Outc.	Target	Indicator	Sub-indicator		Percentage			Evaluation
						YES	NO	UNCERTAIN	
7	1	1.1	1.1.1		7:1.1.1.1	0	0	0	Not met
7	2	2.1	2.1.3	2.1.3.1	7:2.1.3.1	100	0	0	Met
7	2	2.1	2.1.3	2.1.3.2	7:2.1.3.2	87.5	0	12.5	Not met
7	2	2.1	2.1.3	2.1.3.3	7:2.1.3.3	87.5	12.5	0	Not met
8	1	1.1	1.1.4		8:1.1.4.1	100	0	0	Met
8	1	1.1	1.1.5		8:1.1.5.1	0	0	100	Uncertain
8	1	1.1	1.1.6		8:1.1.6.1	0	0	100	Uncertain
8	1	1.1	1.1.7		8:1.1.7.1	0	0	100	Uncertain
8	1	1.1	1.1.8		8:1.1.8.1	0	0	100	Uncertain
8	3	3.1	3.1.1		8:3.1.1.1	12.5	87.5	0	Not met
11	2	2.1	2.1.1		11:2.1.1.1	100	0	0	Met

These are all the EIAs we have that were done post 2010, when the SEA was published

Annex 5

Planning for the Namib after Mining

NERMU PROGRESS REPORT	
RESULTS AREA 1: Monitoring of indicators related to EQO 7 and EQO 8	
PROJECT	MONITORING OF TOURISM BY NERMU
REPORT PERIOD	1 October to 31 December 2011
AUTHOR/S	Theo Wassenaar, Lahja Tjilumbu, Cornelis van der Waal, Taimi Kapalanga
DATE	17 February 2012
PURPOSE OF PROJECT	To design and field test a questionnaire for tourists, with the aim of determining whether their expectations of the central Namib are being met or exceeded more than 80% of the time, as defined by the SEMP EQO 7.

Introduction

Guidance on how sustainability principles can be mainstreamed throughout the life cycle of mining activities and projects is provided through the Uranium SEA's Strategic Environmental Management Plan (SEMP). The SEMP is an over-arching framework and roadmap for addressing the cumulative impacts of a suite of existing and potential developments.

NERMU at Gobabeb has been identified as a key agency to monitor a number of indicators falling into three of the Environmental Quality Objectives (EQOs) (Wassenaar 2011). One of these is EQO 7: Effect on Tourism.

This is the first progress report by NERMU about the SEMP tourism theme and gives an overview of the activities engaged in, results achieved and challenges encountered during the period October to December 2011.

Background and objectives

Two of the desired outcomes of EQO7 are:

1. That the natural beauty of the desert and its sense of place are not compromised unduly by the Uranium Rush; and to identify ways of avoiding conflicts between the tourism industry and prospecting/mining, so that both industries can coexist in the central Namib.

2. The Uranium Rush does not prevent the public from visiting the usually accessible areas in the central Namib for personal recreation and enjoyment; and to identify ways of avoiding conflicts between the need for public access and mining. Tourists' expectations are 'met or exceeded' more than 80% of the time in terms of their visual experience in the central Namib.

The targets set to meet these aims are (1) that Uranium Rush does not result in a net loss of publicly accessible areas, and (2) that the direct and indirect visual scarring from the Uranium Rush is avoided or kept within acceptable limits (SEMP). The first target is gauged through studying EIAs of projects already under way or being undertaken now. The second target, in particular, is a critical aspect for the tourism industry and is the one that is being monitored through polling tourists and tour operators respectively to gauge their experiences and perceived value of tourism products.

The SEMP is not a once-off effort; monitoring will carry on for a number of years. At this stage it is therefore very important to lay a foundation that will allow an evaluation of changes in people's perceptions over years. We therefore used the opportunity of the first SEMP report to 1) commence the collection of published EAs and establish a procedure to obtain EIAs in the future (answering to the first target above) and 2) to develop the framework (the structure of questionnaires and the process of surveying tourist and tour operators' perceptions). Essentially, we want to find out what needs to be measured to indicate success or failure.

The current report therefore reflects our efforts to develop the methodology to quantify the Indicator under EQO 7: 'Tourists' expectations are 'met or exceeded' more than 80% of the time in terms of their visual experience in the central Namib''. In addition, a draft Questionnaire was developed to assess tour operators' perceptions, but this has not been tested yet.

Activities

The following activities were undertaken during the report period:

1. ***Compiling EIAs***: After a meeting with Saima Angula of the Directorate of Environmental Affairs, we compiled a list of all EIA studies that have been conducted in the central Namib since Independence. From this list we selected all the relevant projects, focusing on mining, exploration, or related developments. Through making personal contact with both the project proponents and their environmental consultants, we then started sourcing and copying electronic versions of all the EIAs in this list that we could obtain. The list now comprises ten project EIAs, with a further ~10 being potentially available in this format. The electronic copies have been stored on a central database but have not yet been analysed.

2. ***Developing a questionnaire to assess tourist perceptions***: The approach adopted to gauge the perceptions of tourists with regards to their experience of the Central Namib and perceptions on mining in this area was by way of a structured questionnaire. The questionnaire was developed by Theo Wassenaar, who based it on draft questionnaire developed by Mary Hikumuah and a student from the University of Freiburg. Mary Seely (Gobabeb/DRFNN), Mary Hikumuah (MME/GSN), Mark Gardiner and Michelle Pfaffenthaler (FI) provided inputs. The questionnaire consisted of 91 questions, involving two-way (yes/no), scaled (1-5; low-high) and open-ended questions where the respondent could reflect his/her own thoughts. Open-ended questions were kept to the minimum however, as structured questions were deemed more objective, thus more suited for monitoring purposes.
   A great deal of effort was put into defining contextual questions. These are the questions that establish the background of the respondent. We deemed this to be necessary because the answers to the question of whether their expectations were being met or exceeded can be influenced by numerous variables such as their country of origin, their previous experience of the Namib and of mining. This ancillary information permits a more intelligent analysis.

3. ***Distribution of questionnaires***: The questionnaire was printed and copies distributed to tour operators in Swakopmund in December 2011. The idea was to engage the tour operators to distribute questionnaires to their clients, and to assist in retrieving completed questionnaires. Five tour operators were contacted before the time, all of which indicated their willingness to participate and to help in this exercise. In total 45 questionnaires were distributed to 10 different tour operators or tourist destinations. Two questionnaires were completed with the help of Gobabeb staff members questioning respondents in Swakopmund on the street or beach (one was not fully completed because of other urgent commitments).
   The questionnaires were explicitly designed to be used in a pilot survey, with the hope that the first round of the survey will teach us how to design the final version. For that reason we distributed fewer than 50 questionnaires in total.

4. ***Analysis of results***: 19 questionnaires were returned. The data were entered into the computer and qualitatively analysed (the low return rate precluded a statistical analysis). The raw data and analysis are available upon request. In the current report we only summarise some of the variables and discuss their relative implications. It is not possible to analyse and interpret the results within their appropriate context; that will require a much larger number of responses.

Preliminary results

Questionnaire response rates

Of the 47 questionnaires send out, 19 were received back giving a total response rate of 40 %. Ten people confronted directly on the beach or street in Swakop, were not willing to participate. If the 10 tourists that were directly approached and refused to partake are included, the response rate drops to 33 %. Broken down into the distribution method used, the following patterns emerged:

Target group	Questionnaires handed out	Number returned (%)
Tour operators	35	13 (37%)
Hotel Europa Hof	10	4 (40%)
Individuals approached directly on the street/beach	2 (10 refused to participate)	2 (100% or 20 %)*
Total	**47**	**19 (39%)**

*Depends how the response rate is calculated

In addition, while ten tour operators were supportive of the research, two companies refused to participate, citing lack of interest, or because the company's office was not dealing with tourists directly. Ten people confronted directly on the beach or street in Swakop were not willing to participate.

Respondent profiles

The greatest proportion (37 %) of respondents originated from European countries (Germany, France, UK and Belgium), followed by Namibians (26 % of total; Figure 1). Of the foreign respondents, 50 % (n=6) have visited Namibia before. The age of respondents ranged from 26 to 59 years with a mean of 42 years of age.

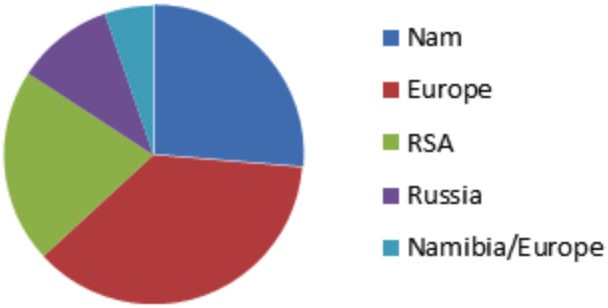


Figure 1 The composition of respondents in terms of the country of origin.

Five of the respondents were female and 14 male, and the majority (74 %) of respondents received education at a tertiary level. Twenty one percent of the respondents indicated a high school education (n=4), with one respondent indicating "other" education.

Gauging the interest and quality of experience of tourists with regards to the Central Namib

Scenic landscapes were apparently the most interesting aspect of the Central Namib for respondents, because 17 out of 18 respondents that responded to this question scored this aspect the highest score, with no scores below 3 (Table 2). Respondents also expressed high interest in (highest median values = 5) in cultural/ethnic aspects, the unique fauna and flora, the scenic landscapes, the wilderness experience and the built environment (Table 2). A less interesting aspect was the history of the Central Namib (median = 4), with mining attracting the least interest (median = 3; Table 2).

Table 2 Frequency of responses of tourists asked to estimate their interest in different aspects of the Central Namib on a 5 point scale (1=lowest, 5=highest). Note that many respondents left open a few questions on each questionnaire – hence the total across all scores do not necessarily reflect the total received.

Topic	Response frequency					Median
	Lowest				Highest	
	1	2	3	4	5	
Cultural aspects/ethnic groups	0	1	1	4	11	**5**
History	0	0	3	6	8	**4**
Unique fauna & flora	0	1	2	3	12	**5**
Scenic landscapes	0	0	0	1	17	**5**
Wilderness experience	1	0	1	2	14	**5**
Mining	6	1	3	2	4	**3**
Built environment	2	2	2	1	8	**5**
Other	1	0	0	0	5	**5**

Respondents felt that Brandberg, Henties Bay town, Sandwich Harbour, the Moon Landscape, the Namib Naukluft/Dorob National Parks, the Welwitschias, camping in the desert and guided desert trips far exceeded their expectations with regards to scenic quality and a sense of place. Also exceeding expectations, but to a lesser extent, were the Messum Crater, the Omaruru, Ugab and Kuiseb Rivers followed by Walvis Bay Town, Spitzkoppe, the Swakop and Khan Rivers, Walvis Bay Lagoon and bird watching. Historical and cultural expectations were apparently not exceeded (score = 3; Table 3).

No respondent was completely disappointed (score of 1) by any of the attractions or activities, but surprisingly many people (4 of 11) thought that bird watching was at least partially disappointing (a score of 2) (Table 3). About 30 % of respondents (n=17) indicated that they were prevented to visit attractions they intended to visit, but the reasons had nothing to do with mining or industry. Reasons given were fencing at Spitzkoppe, too wet conditions in the Hoanib River and restrictions to enter the dune areas in a National Park.

Table 3 Respondent's experience relative to expectations of the scenic quality and a sense of place of various places and activities in the Central Namib. The degree to which experiences exceeded expectations were estimated on a 5-point scale by respondents (1 = disappointed; 5 = far exceeded expectations).

Place or activity	Response frequency					Median
	Disappointed				Exceeding expectations	
	1	2	3	4	5	
Brandberg	0	0	1	2	4	**5**
Walvis Bay town	0	2	3	4	5	**4**
Messum Crater	0	0	1	1	2	**4.5**
Henties Bay town	0	1	2	2	7	**5**
Spitzkoppe	0	0	1	4	4	**4**
Omaruru and/or Ugab Rivers	0	0	0	3	3	**4.5**
Sandwich Harbour	0	1	1	0	4	**5**
Swakop and/or Khan River	0	0	3	3	4	**4**
Walvis Bay Lagoon	0	1	3	3	3	**4**
Kuiseb River	0	0	1	3	4	**4.5**
The Moon landscape	0	0	3	1	7	**5**
Namib Naukluft / Dorob Parks	0	0	0	2	11	**5**
The Welwitschias	0	0	2	3	8	**5**
Historical / cultural attractions	0	2	4	1	4	**3**
Bird watching	0	4	1	1	5	**4**
Camping in the desert	0	0	1	1	9	**5**
Guided desert trips	0	0	2	1	8	**5**
Other (Spatial planning Q#3):	0	0	0	0	1	**5**

To the question whether they have encountered any developments that increased the visual attractiveness of the region, 21% of responses (n=14) agreed, bizarrely citing developments at Henties Bay, Mile 4 and Long Beach, as well as upgraded camp sites. According to respondents, positive changes in the Central Namib included the proclamation of the Dorob National Park and presumably the upgrading of roads (response stated only "roads").

To the question whether they have encountered any developments that *decreased* the visual attractiveness of the region, 25% of responses (n=12) agreed. Negative developments included mines, urban expansions, new estates, litter along the road and power line structures. Respondents also

perceived negative changes in the Central Namib like more visible signs of mining and equipment, expanding home developments and increased traffic.

Tourist perceptions and experience of mining

Respondents' stated interest in Uranium mining varied from very low (score = 1) to very high interest (score =5, Table 4). In general, perceived knowledge about Uranium mining tended to be low (median = 2, Table 4), although more than 88 % of respondents indicated that they knew that Uranium was mined in Namibia. Only 29 % of respondents indicated that they either had visited the Uranium Institute or were planning to do so (Figure 2). Twenty three per cent of respondents indicated that they were not aware that the Institute existed (Figure 2). In comparison, respondents were more interested in visiting the Namib Information Centre, and more people were aware of this facility (Figure 2).

Responses to the question "Do you support the use of nuclear fuels as an energy source?", were evenly distributed ("yes" = 5; "no" = 4; "maybe" = 5). Nevertheless, asked if they support the drive to establish a Uranium mining industry, considering that Namibia is a developing country, 56 % (n=9) of respondents were supportive compared to 25 % that were against this (19 % of respondents undecided).

Responses suggest a general lack of knowledge about environmental law and policies and respondents indicated that they were rarely aware of attempts by mines and government to protect the environment in Namibia (median = 2; Table 4). About 47 % of respondents also thought that the environmental impact of Uranium mining will be negative (n=8), compared to 29 % (n=5) that were positive. Twenty four per cent of respondents (n=4) were undecided in this regard. Loss of ecological integrity and biodiversity, loss of attractive scenic landscapes ("visual scarring") and loss of sence of place were the aspects that respondents felt would be the most negatively impacted (Table 5).

Table 4 Tourist response frequencies on a 5-point scale of various aspects of mining**.**

Aspect of mining asked	Frequency of response					Median
	Low				High	
	1	2	3	4	5	
Interest in uranium mining	5	2	5	1	4	**3**
Knowledge of uranium mining	8	4	4	1	1	**2**
Knowledge of environmental policies and environmental law in general	7	4	3	2	2	**2**
Knowledge of attempts by mines and the government in protecting the environment in Namibia	8	4	3	0	2	**2**

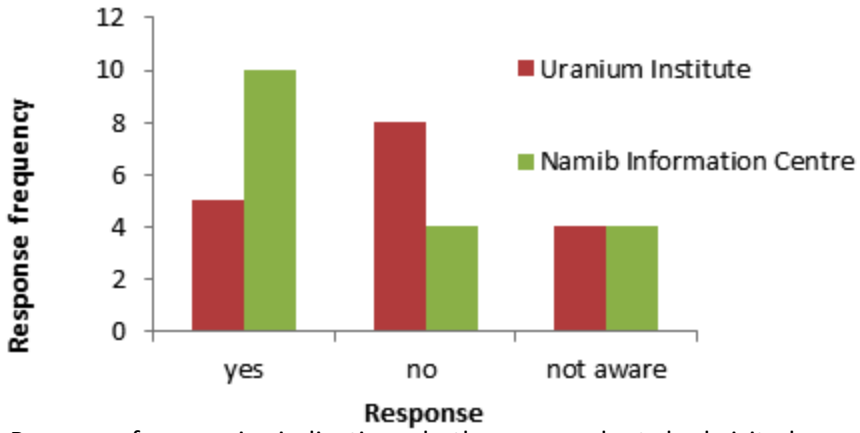


Figure 2 Response frequencies indicating whether respondents had visited or are planning to visit (yes), had not visited or were not planning to visit the Uranium Institute or Namib Information Centre (no), or were unaware that these destinations exist.

Table 5 Frequencies of the aspects that respondents felt would be the most negatively impacted by Uranium mining

Aspect	Frequency
Loss of ecological integrity and biodiversity	6
Loss of attractive scenic landscapes ("visual scarring")	5
Loss of sense of place	5
Air pollution (dust and radon)	3
Pollution of groundwater	2
Social problems	2

Outputs: Reports, publications and presentations

No formal outputs such as reports, publications or presentations were made during the period covered by this report.

Conclusions, challenges and future directives

If the current report is anything to go by, tourists' expectations are apparently generally being "met or exceeded". However, care must be taken with such a low total number of respondents. Low response rates are common with questionnaire surveys, dictating that a large number of questionnaires should be distributed for meaningful results. However, the present study was explicitly a pilot study designed to highlight inconsistent questions, illogical combinations, layout/clarity problems and procedure/process. Although the data remains useful for inclusion in a future database, the low number of respondents prevents any confident conclusions. The average perception of people, the significance of a relatively high regard for scenic landscapes, ecological integrity and the environment, the overall negative perception of mining's environmental impacts and odd responses such as the relatively higher regard for urban developments on the coast than for places like Messum Crater[10] can therefore only serve as flags for future investigations.

In addition, some key conclusions about the process and method can be drawn. For instance, Tables 3 - 5 in this report already provides a good basis for future surveys. For example, if the frequency of scores between 3 and 5 in Table 3 represent 80% of the returns, the indicator is being met (score 3) or exceeded (scores 4 and 5). Systematic decreases in this percentage will indicate an impact by mining (or other industries) on tourism.

Another interesting example that underlines the importance of having a large database and of placing answers into their demographic and experiential context is the relatively high regard for Henties Bay, Dolphin Beach and Langstrand. This was provided by one person from the RSA who has apparently been visiting Namibia annually since 2007, has been to all the regions before and likes the built environment, but still did not consider the towns as exceeding his expectations.

There are not many solutions to the problem of obtaining a higher response rate. One way would be to distribute many more questionnaires than needed, but this could easily have the opposite effect and put people off answering completely. More effort could also be put into soliciting answers by conducting personal interviews. However, people that were directly approached were very often (10 out of 12 times) not willing to participate, placing some doubt on whether the personal interview will ever be successful in

[10] This result may also have been caused by the way the question was structured. Some respondents left entries blank instead of marking it "Not applicable". It is therefore not possible to determine whether the four people that gave Messum Crater high scores represented the total number of respondents that visited Messum or not. If it is, Messum will score very high because expectations were met or exceeded for all four respondents (i.e. 100%).

surveying enough respondents to answer the SEMP indicator. Although some of the operators were unsuccessful in disseminating questionnaires to their clients, it is therefore probably still better to approach tourists through their operators. The fact that some tour operators were also unwilling to assist does however suggest that the project and its aims need better marketing among both the public and the tourism industry.

Other possible ways to increase response rates include shortening the questionnaire. The questionnaire layout and format was generally well accepted, with only one respondent criticizing the use of white font on a dark background and suggesting a simpler layout. This will be considered for the improved questionnaire.

It is important to get the format and content of the questionnaire right from the start. Future changes in questions or scoring systems will effectively prevent meaningful analysis. On the other hand, by increasing the respondent sample size, and following consistent methodology to design the questions and to distribute questionnaires, the questionnaire approach provides a good way to monitor the SEMP indicator that states that "tourists' expectations should be "met or exceeded" more than 80% of the time in terms of their visual experience in the central Namib". A larger sample size is, however, required to confirm this.

References

Wassenaar, T.D. 2011. Monitoring of the SEMP by NERMU. Proposal and plan for monitoring and research tasks for SEMP 2011.

Annex 6

Ministry of Mines and Energy

STRATEGIC ENVIRONMENTAL MANAGEMENT PLAN FOR THE CENTRAL NAMIB URANIUM PROVINCE

Background

Mining for various minerals has been ongoing in the central Namib (Figure 1) since 1901, and the first uranium mine was commissioned in 1976. The relatively low intensity of mining and exploration changed recently when a predicted world-wide scarcity in nuclear fuels resulted in a sudden scramble for uranium exploration licences and unprecedented growth in the uranium mining industry. Over the last half decade or so, one uranium mine has been commissioned (bringing the current total to two), one more is in an advanced stage of construction and at least one more has recently received environmental clearance, and will likely begin construction by 2013.

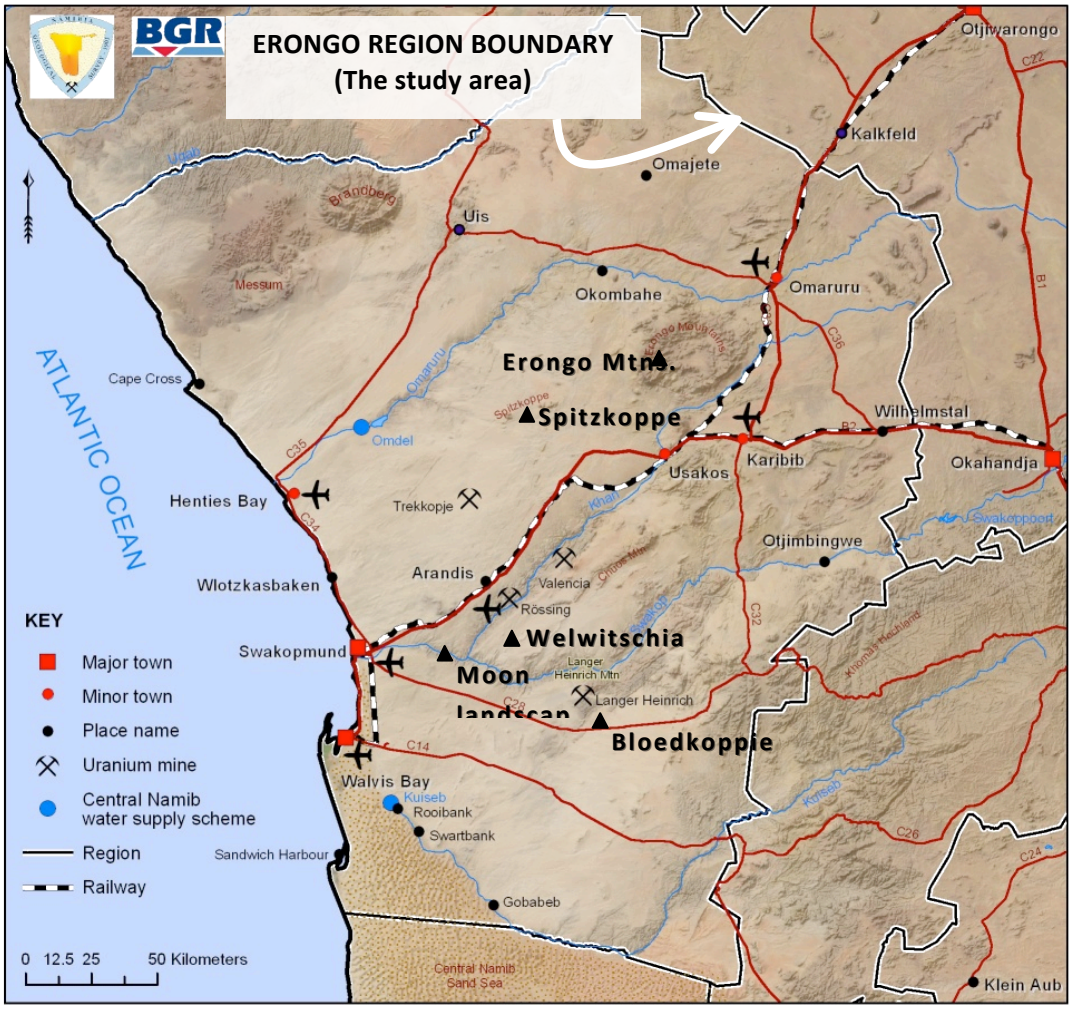


Figure 1: The geographical focus of this study is the central Namib and the Erongo Region.

This "mining rush" is of course a vital part of Namibia's economic growth prospects, but could also potentially result in harm to the central Namib's environment. The Ministry of Mines and Energy commissioned a Strategic Environmental Assessment (SEA) to ensure that the utilisation of our mineral resources is not accompanied by environmental degradation. The SEA's primary tool to implement the principles of sustainable utilisation is the Strategic Environmental Management Plan (the SEMP), in which 12 so-called "Environmental Quality Objectives" (EQOs) were defined. Each EQO deals with a different theme, e.g. air, water, infrastructure, biodiversity and tourism. Within each theme a number of desired outcomes, specific environmental management targets and indicators for monitoring were identified.

This questionnaire is related to the monitoring of mining impacts on tourism (EQO 7), which is a crucially important aspect because a large part of the economy in the central Namib has always depended on tourists visiting the area for its various attractions. These qualities could easily be lost without careful management. It is thus crucial that we understand and monitor how the developments around uranium mining affect the scenic values, the quality of the tourist experience, the perception of biodiversity integrity and the size and health of the tourism industry. The questions you will be answering in this questionnaire will help us to gauge the size of the impacts and to monitor it over time. The questions were designed to capture anonymous information about the respondent (yourself), and to then assess your perceptions and experiences as a specific type of tourist. Finally, we would like to get your opinion on how to improve things.

We thank you for your participation in this and for your help in ensuring a sustainable utilisation of the Namib's natural resources, to the benefit of both ourselves and future generations! Find out more about the SEA and the SEMP, and become informed about the Namib environment, by visiting XXXX.com[11] and XXX.com and the Uranium Institute and Namib I in Swakopmund.

<u>This is the way that the indicators that we are monitoring are defined in the SEMP:</u>

STRATEGIC ENVIRONMENTAL MANAGEMENT PLAN FOR THE CENTRAL NAMIB URANIUM PROVINCE
Environmental Quality Objective 7: Effect on Tourism
Aims of this EQO:

- *The natural beauty of the desert and its sense of place are not unduly compromised by the Uranium Rush;*
- *Ways of avoiding conflicts between the tourism industry and prospecting/mining are identified, so that both industries can coexist in the central Namib;*
- *The Uranium Rush does not prevent the public from visiting the usually accessible areas in the central Namib for personal recreation and enjoyment;*
- *Ways of avoiding conflicts between the need for public access and mining are identified.*

Desired outcome 2[12]: *The Uranium Rush does not significantly reduce the visual attractiveness of the Central Namib.*
Target: *Direct and indirect visual scarring from the Uranium Rush is avoided or kept within acceptable limits.*
Indicator: *Tourists' expectations are 'met or exceeded' more than 80% of the time in terms of their visual experience in the central Namib.*

Gobabeb Research and Training Centre: Namib Ecological Restoration and Monitoring Unit
Geological Survey of Namibia
Bundesanstalt für Geowissenschaften und Rohstoffe (BGR) (Federal Institute for Geosciences and Natural Resources)

[11] *Websites under construction*
[12] *Desired outcome 1 relates to the impact on tour operators*

TOURISM QUESTIONNAIRE 2011-2012

Kindly complete the questionnaire below (about 15 minutes). If a specific question is not applicable, please tick the "na" box.

Where are you now?		Date:	

Some anonymous information about yourself: Here we want to find out where you come from and what your interests are

1 Country of origin:			2 SEX:	MALE	FEMALE	
3 Present residence:			4 Year of birth:			
5 Educational level:	Primary school	High school	Tertiary (e.g. University)	Other (list):		na
6 How often do you read/listen to the news?	never	1/day	1/week	1/month	<1/month	

FOREIGN VISITORS: Your past tourism experience: Here we want to find out about your past tourism experience in Namibia and elsewhere. This will help us to put your answers in the proper context.

1 Have you visited Namibia before this time?	YES	NO	2 If you answered YES, please select the regions that you visited during your previous visits from the list below

Northwest (Kunene Region)	Central North (incl. Etosha)	Northeast (Kavango & Caprivi)
Erongo (central Namib)	Central regions (Windhoek & surrounds)	East-central (incl. Waterberg Reserve)
Sperrgebiet (southern Namib)	South-central (Karas Region)	South-east (Karas Region & Kalahari)

3 If you answered YES, please mark the dates of your previous visits in the list below:

<1992	<1996	<2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

4 How long (number of days) have you been in Namibia for your current stay?						
5 How long (number of days) do you plan on staying in total?	<3d	3-10d	10-20d	20-30d	>30d	na
6 Have you visited other regions in Namibia before your current visit to the central Namib?	YES	NO				
7 Are you planning to visit other regions in Namibia after your current visit to the central Namib?	YES	NO				
8 How often per year do you visit countries other than your own as a tourist?	<1x	1x	2x	3x	>3x	na

9 How many times in the past 5 years?	1	2	3	4	5	6	7	8	9	10/>	na

NAMIBIAN RESIDENTS: Your past tourism experience: Here we want to find out about your past tourism experience in Namibia and elsewhere. This will help us to put your answers in the proper context

1 How often per year do you visit countries other than Namibia as a tourist?	0	<1x	1x	2x	3x	>3x	na				
2 How many times in the past 5 years?	1	2	3	4	5	6	7	8	9	10/>	na
3 How often per year do you visit regions within Namibia as a tourist?	0	<1x	1x	2x	3x	>3x	na				
4 How often per year do you visit the central Namib as a tourist?	0	<1x	1x	2x	3x	>3x	na				
5 How many times in the past 5 years?	1	2	3	4	5	6	7	8	9	10/>	na

6 If more than zero times, please mark the dates of your previous visits in the list below:

<1992	<1996	<2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Your current experience in the central Namib: Here we want to find out about your current trip. This will help us to gauge and then monitor the impacts of mining on tourism.

This section should be completed by all respondents, including both Namibian residents and foreign visitors

1	Did you look for information on Namibia before you visited?	YES	NO											
2	Select the topics that you studied:	environment	social issues	current affairs	economy	culture	history							
3	What was your main source/s of information about Namibia and/or the central Namib?													
	Guidebook	Friends	Internet	Travel agent	Other (list):									na
4	How long is your current excursion?	1d	>1d	5	Where did you go?									
6	Are you conducting your current trip as part of an organised tour?	YES	NO	na										
7	If yes, what is the size of the group?	<5	5-10	10-30	30-50	>50	na							

How interested are you in the following aspects of the Namib (1=not interested at all, 5=very interested)

8	Cultural aspects/ethnic groups	1	2	3	4	5	na	9	History	1	2	3	4	5	na
10	Unique fauna & flora	1	2	3	4	5	na	11	Scenic landscapes	1	2	3	4	5	na
12	Wilderness experience	1	2	3	4	5	na	13	Mining	1	2	3	4	5	na
14	Built environment	1	2	3	4	5	na	15	Other	1	2	3	4	5	na

For each activity conducted, or attraction or feature that you visited, rate the extent to which its scenic quality and/or sense of place met your expectations (1=did not meet expectations at all, 5=far exceeded my expectations)

16	Swakopmund town	1	2	3	4	5	na	17	Brandberg	1	2	3	4	5	na
18	Walvis Bay town	1	2	3	4	5	na	19	Messum Crater	1	2	3	4	5	na
20	Henties Bay town	1	2	3	4	5	na	21	Spitzkoppe	1	2	3	4	5	na
22	Omaruru and/or Ugab Rivers	1	2	3	4	5	na	23	Sandwich Harbour	1	2	3	4	5	na
24	Swakop and/or Khan River	1	2	3	4	5	na	25	Walvis Bay Lagoon	1	2	3	4	5	na
26	Kuiseb River	1	2	3	4	5	na	27	The Moon landscape	1	2	3	4	5	na
28	Namib Naukluft / Dorob Parks	1	2	3	4	5	na	29	The Welwitschias	1	2	3	4	5	na
30	Historical / cultural attractions	1	2	3	4	5	na	31	Bird watching	1	2	3	4	5	na
32	Camping in the desert	1	2	3	4	5	na	33	Guided desert trips	1	2	3	4	5	na
34	Other (list):									1	2	3	4	5	na

35	Were / are you prevented from visiting any attractions that you had planned to visit?	YES	NO	
36	If yes, why are/were they off-limits?			na
37	If yes, which ones are/were off-limits?			na
38	Have you encountered any developments that increased the visual attractiveness of the region?	YES	NO	
39	If yes, which ones?			na
40	Have you encountered any developments that decreased the visual attractiveness of the region?	YES	NO	
41	If yes, which ones?			na
42	Since your last visit, which changes in the central Namib are positive?			na
43	Since your last visit, which changes in the central Namib are negative?			na

<u>Your thoughts on and experiences of mining</u>: Here we want to find out what your position is on mining, and what your knowledge and experience of mining is. This will help us to gauge and then monitor the impacts of mining on the tourist's experience.

1 Rate your interest in uranium mining (1=no interest, 5=very interested):	1	2	3	4	5	na
2 Have you visited, or are you planning to visit the Uranium Institute?	YES	NO	NOT AWARE			
3 Have you visited, or are you planning to visit the Namib *i* information centre?	YES	NO	NOT AWARE			
4 Rate your knowledge of uranium mining (1=no knowledge, 5=very knowledgeable):	1	2	3	4	5	na
5 Rate your knowledge of environmental policies and environmental law in general (1=no knowledge, 5=very knowledgeable):	1	2	3	4	5	na
6 Rate your knowledge of attempts by mines and the government in protecting the environment in Namibia (1=no knowledge, 5=very knowledgeable):	1	2	3	4	5	na

7 What is the (approximate) GDP of Namibia (in billions of US$)?	<1	1-5	5-10	10-30	>30	DON'T KNOW
8 What is the (approximate) population of Namibia (in millions)?	<1	1-3	3-6	6-10	>10	DON'T KNOW

9 Do you support the use of nuclear fuels as an energy source?	YES	NO	MAYBE	na
10 Are you aware that Namibia is mining uranium? YES NO 11 Did you become aware	before	or	after	arrival?
12 Knowing that Namibia is a developing country, do you support its drive to establish a uranium mining industry?	YES	NO	MAYBE	na
13 Did your tour operator inform you about the extent and potential impacts of uranium mining?	YES	NO		na
14 Do you think the overall environmental impacts of uranium mining will be	NEGATIVE	or	POSITIVE	or DON'T KNOW

15 If you answered NEGATIVE, select what you think might be the most important potential impacts:

Loss of ecological integrity and biodiversity	Loss of sense of place	Loss of attractive scenic landscapes ("visual scarring")	Pollution of groundwater	Air pollution (dust and radon[13])	Social problems	na

16 Did/have you visit/ed any mines in the central Namib?	YES	NO			
17 If yes, what is/was the reason/s for your visit?	Professional	Interested in mining	General curiosity	Organised tour	na
18 If no, would you consider a guided tour to a uranium mine/exploration site?	YES	NO	MAYBE	na	
19 Knowing that Namibia is a major uranium producer, would you travel to Namibia again?	YES	NO			
20 Do you think mining should be allowed in a national Protected Area?	YES	NO	DEPENDS	na	
21 Do you think other industries (incl. agriculture) should be allowed in a national Protected Area?	YES	NO	DEPENDS	na	
22 Are you aware of other places in the world where mining occurs in a national Protected Area?	YES	NO			
23 If yes, which are they?					
24 Are you aware of areas in the National Parks of the central Namib that are protected from any exploitation including mining?	YES	NO	na		
25 If yes, which are they?					

[13] *Radon is one of the decay products of uranium. It is a gas and is present everywhere, but its concentration could potentially be increased where uranium minerals are mined.*

Some final thoughts:

1 Do you have any general comments regarding your experience in the Namib as a tourist, especially with reference to the mining industry and your perceptions of it?

	na

2 How could this questionnaire be improved?

	na

3 Are you interested in receiving information about uranium mining, biodiversity protection, and environmental management in the Namib? If yes, kindly provide your e-mail address[14]:

	na

THANK YOU!

The SEMP team thanks you for your participation in this study, and for your contribution in ensuring that the Namib's resources are utilised in an environmentally responsible manner! Remember to regularly visit the Uranium Institute in Swakopmund, or XXXX.com[15] and XXX.com for updates on the uranium mining industry in the central Namib and how its environmental impacts are being managed.

You are also welcome to contact Theo Wassenaar (theo.wassenaar@gobabeb.org), Kaarina Ndalulilwa (kndalulilwa@mme.gov.na), or Mary Hikumuah (mhikumuah@mme.gov.na) for more information.

[14] *By providing your address, you agree to receive regular updates from us. All contact information will be used solely for sending newsletters and updates on the SEMP. E-mail addresses are considered confidential and will not be shared with third parties.*

[15] *Websites under construction*

Annex 7: MINE QUESTIONNAIRE

Ministry of Mines and Energy

Geological Survey of Namibia
Bundesanstalt für Geowissenschaften und Rohstoffe (BGR)

Strategic Environmental Management Plan (SEMP) for the Central Namib Uranium Rush 2011 Annual Report

Questions to mines related to Indicators in 3 EQOs

Kindly answer the following questions

Question 1.1 (all mines and exploration companies): Do you have a closure plan?

Answer (Y/N):

Question 1.2 (all mines and exploration companies): Have you closed or rehabilitated a mining, exploration or related project?

Answer (Y/N):

Question 1.3 (all mines and exploration companies): If your answer to the prevous question was yes, was it done in such a way that public access needs were addressed?

Answer (Y/N):

Question 2 (Operational mines): Do you have specific programmes and projects to actively avoid, mitigate, restore or offset your expected impacts?

Answer (Y/N):

Question 3 (Operational mines): Would you say that AVOIDANCE is the predominant approach?

Answer (Y/N):

Question 4: (Operational mines): If not, which of the strategies in the mitigation hierarchy (avoid, minimize, mitigate, offset) is your dominant approach?

Answer (Y/N):

Question 5: (Operational mines): During your planning and design stage, did you explicitly attempt to minimize the size of your footprint effect on sensitive biodiversity?

Answer (Y/N):

Question 6.1: (Operational mines): In planning and designing your linear infrastructure, did you explicitly try to avoid ecologically sensitive areas?

Answer (Y/N):

Question 6.2: (Operational mines): Did you consider alternative routes specifically to avoid ecologically sensitive areas?

Answer (Y/N):

Question 7: (Operational mines): In planning and designing your linear infrastructure, did you explicitly take into account future demand, thus reducing the need for additional impacts (e.g. 1 pipeline, not 3)?

Answer (Y/N):

Question 8: (Operational mines): Do you have any working partnerships with conservation organizations? What are the objectives for these?

Answer (Y/N):

Objectives of partnerships:

Question 8.1 (Operational mines): Are you committed to a no-net-loss to biodiversity?

Answer (Y/N):

Question 8.2 (Operational mines): Are you considering sustainable offsets to ensure this?

Answer (Y/N):

Question 8.3 (Operational mines): If you have partnerships with NGOs, conservation organizations or the MET, do these involve offset targets?

Answer (Y/N):

Question 8.4 (Operational mines): Are you supporting additional conservation projects (e.g. wetland bird counts, wildlife surveys, Namib Bird Route, coastal management, research, public awareness)? If yes, what are these?

Answer (Y/N):

List of conservation projects supported by your company:

Question 9 (Operational mines): Have you identified biodiversity offset areas (e.g. NW Kunene, Messum, Spitzkoppe, Brandberg and other special areas in Namibia)? If yes, what are these?

Answer (Y/N):

List of biodiversity offsets defined by your company:

Annex 8: EQO 11.1: "NAMIB URANIUM IS REGARDED AS A 'GREEN' PRODUCT"

Introduction

EQO 11.1 reads as follows:

"Namib uranium is regarded as a 'green' product."

This EQO is to be measured by two indicators:

- No critical international voices about the operations and performance of the Namib Uranium Province among any key international stakeholders (other than those international stakeholders opposed to uranium mining and/or nuclear power anyway, in principle/on ideological grounds)
- There is no evidence of unreliable, unethical and/or environmentally, socially and financially irresponsible conduct by operating uranium mines or prospecting activities

Proposed sources of data in the SEMP workplan include professional journals, "relevant websites," tour operators, tourists, and numerous government and international organizations. One option would be to survey representatives from all noted organizations. Given the focus on "critical international voices" and the underlying concern with the *perception* of the Namib uranium province, however, it was decided that the bulk of reporting efforts would focus on a systematic review of media coverage of Namibian uranium.[16]

The results of that assessment are below, followed by sections describing the method in detail.

Assessment

For EQO 11.1, proposed sources of data in the SEMP workplan include professional journals, "relevant websites," tour operators, tourists, and numerous government and international organizations. As such, a database and coding scheme were developed, permitting content analysis (e.g. Hsieh and Shannon, 2006; Neuendorf, 2002; Kohlbacher, 2006) of hundreds of articles published over the course of the year. In this way, indicators can be measured with some confidence and trends can be tracked over the years.

Google News was the primary source of data: a search was run for articles containing the terms "Namibia" and "uranium" during the year 2011. This service has its flaws but covers hundreds of international news sources and is freely available. The websites of the IAEA and World Nuclear News (the reporting arm of the World Nuclear Association) were also searched, as were the sites of *Mining Journal* (which encompassed several other journals), *International Mining*, and *Africa Mining Intelligence*. See the methods section for a detailed discussion of sources.

In the end, 387 articles from January 1 2011 to January 1 2012 were surveyed, entered into a database, and results were analyzed. Not all 387 articles surveyed were appropriate for analysis, however. In each of the eleven substantive coding areas, some articles presented insufficient data (sometimes because full text was not available). Further, about 26% (99 of 387) of articles surveyed were classed as "incidental": dealing only extremely marginally with the Namibian uranium industry. Most analyses were undertaken on the 283 remaining articles that were coded as making some substantial comment on the industry or the province.

[16] Systematic but not comprehensive: this approach samples the total coverage in a nonrandom fashion, in part relying on Google News' algorithm to find more influential articles.

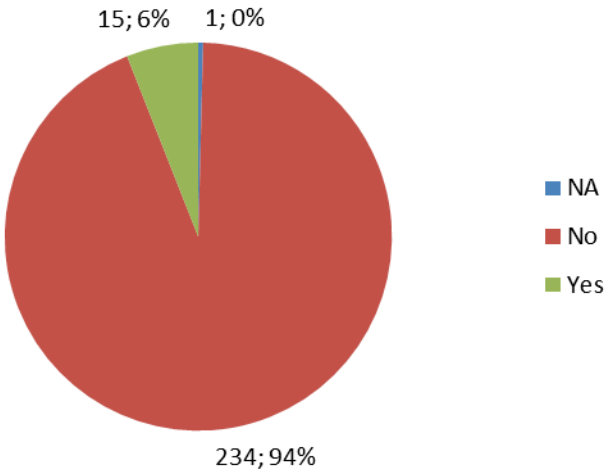
Key findings:

Strict adherence to the wording of the indicators ("no critical voices"; "no evidence") would that mean that a single article could cause the indicator to be scored as "not met". A standard of no more than 10% of relevant articles voicing criticism or showing evidence was decided on as both more reasonable and still conservative.

By these standards, both indicators are met.

Indicator 1: "No critical international voices"

For the first indicator, focusing on "critical international voices", just 6% of articles voiced any criticism of the operation or management of the uranium province.[17]



International articles containing critical voices (non-incidental, n = 250)

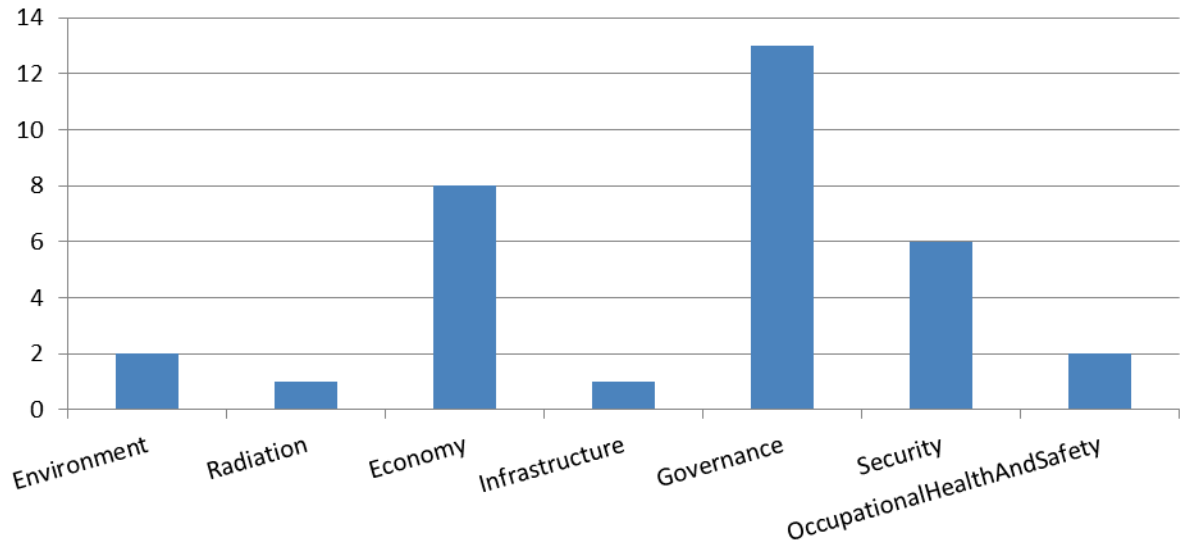
The following figure2 illustrates the subjects discussed in these fifteen critical articles.[18] Governance was the most commonly-applied code: largely because any substantive concern generally incorporated—or was accompanied by—a concern about governance. Half of these critical articles touched on the economy, complaining about the distribution of benefits from mining: either arguing that companies and government do too little to spread wealth (Nunuhe, 2011; "Namibia: Rein", 2011; Froese, 2011a; Froese, 2011b; Sasman, 2011) or reacting to perceived government efforts to capture more benefits for the country (Regan, 2011). Several articles discussed concerns about radiation safety, occupational health and safety, environmental factors, and infrastructure matters, but mostly in passing: none focused on single matters of concern in any of these categories.

Six articles dealt solely with security concerns (and implicit concerns about governance). Four were Wikileaks cables reporting on the collapse of a deal involving Forsys Metals in 2009 and accompanying diplomatic concerns about links to Iran ("CANADA CONFIRMS", 2011; "CANADA CONCERNED", 2011; "CANADA IMPOSES", 2011; "CANADA SEEKING", 2011). Two were reports on attempts in the United States' Congress to block a Rio Tinto copper mine in Arizona that cited Rio

[17] These "international" voices include seven articles that are reprints of *The Namibian* or *New Era* at AllAfrica.com. Since AllAfrica.com is an international resource, it was decided to code these articles as international rather than domestic. They comprise most of the critiques of inequality and a lack of spreading the benefits of mining (Nunuhe 2011; Froese, 2011a; "Namibia: Rein", 2011; Sasman, 2011), accusations of racism at a mine (Hartman, 2011b), an article mentioning the boom's negative effects on the property market (Duddy, 2011), opposition to Vision Industrial Park (Hartman, 2011b).

[18] Note that some articles were coded with more than one issue.

Tinto links to Iran through Rössing mine ("Dems fail", 2011; Daly, 2011).[19] The continued association of Namibian uranium with Iran may be of concern because of its effects on perceptions of Namibian uranium—but it is difficult to lay this at the doorstep of the actions or inactions of SEMP stakeholders.



Frequency of discussion of issues among 15 articles with "critical international voices"

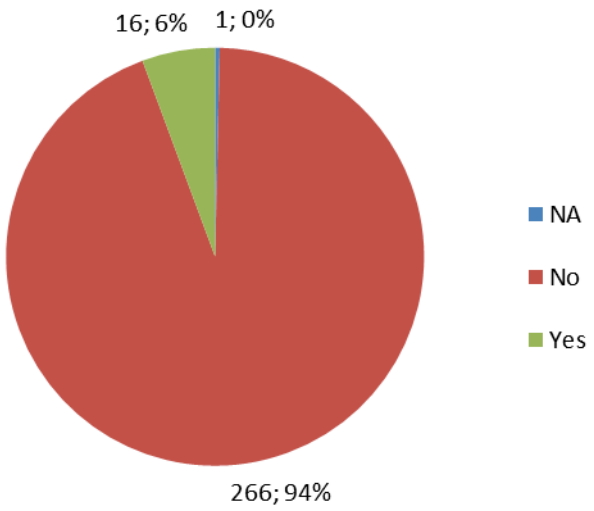
Broadening the criteria for "critical voices" slightly to include domestic articles yielded nine more "critical voices". Here there was a continued emphasis on economic impacts of uranium mining and governance thereof: in particular on ensuring a greater share for Namibia and a smaller share for elites ("Authorities are Callous", 2011; Tarr, 2011; Shimwafeni, 2011; Heita, 2011; Asino, 2011; Kaure, 2011). Also of interest, one noted concerns about economic diversification in Swakopmund (Samuehl, 2011), another mentioned concerns over mine closure funds (Leuschner, 2011), and a final article discussed concerns over capacity for dealing with environmental problems arising from uranium-linked industrialization (Fischer, 2011).

The evidence here suggests that the most common impetus for critical voices is concern over distribution of economic impacts—but these voices come largely from inside Namibia. Security concerns are also substantial on the international stage, but these are focused on worries about Iran that are based on little evidence.

Indicator 2: "No evidence of unreliable, unethical and/or […] irresponsible conduct"

6% of relevant articles sampled (16 out of 283) showed (or claimed) some such evidence (see Figure 3). Not all of these are the same articles that voiced criticism: some articles showed critique without evidence as well as vice versa.

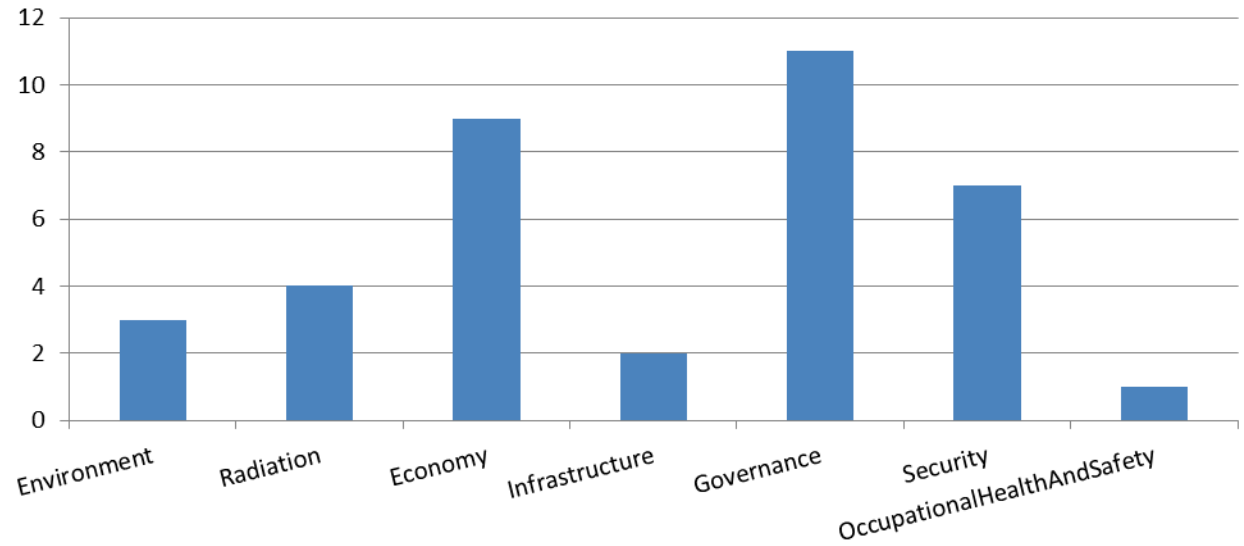
[19] These two articles were the only ones not coded as reflecting concern over the governance of the province: details of the perceived nature of the connection were too slight.



Articles containing evidence of poor conduct (non-incidental only, n = 283)

The spread of issues discussed looks similar to that seen in the "critical voices" case, although the addition of domestic articles and some new articles changes the picture somewhat (see Figure 4). Governance was a common factor once again, and an even higher proportion of articles discuss economic concerns. Matters of economic inequality (Asino, 2011; Froese, 2011; Sasman, 2011; "Namibia: Rein", 2011; Nunuhe, 2011) and housing dislocation (Duddy, 2011) were once again present, as were racism (Hartman, 2011b), and general environmental, tourism-related, and social concerns (Fischer, 2011; Hartman, 2011a). In one article (Sasman, 2011), concerns about economic inequality were explicitly linked to the strikes at Rössing: strikes which came up often in the survey but which were only linked to critiques of the uranium province and evidence of "irresponsible" conduct in this one case.

Security is again a striking concern, although for a different reason: as it happens, all seven new articles discussed uranium thefts from Areva ("Namibie: Fûts", 2011; Ekongo, 2011a, 2011b, 2011c; "Namibia: 4 Charged", 2011; Bosch & Stoddard, 2011; Nakale, 2011). Three of these stories were from non-Namibian sources. Several of the incidences for the "radiation" code were related to these stories.



Frequency of discussion of issues among 16 articles showing evidence of poor conduct

It should be noted that there are several major stories that do not feature in this analysis: the ongoing sagas of financial negotiations around the Husab and Etango uranium projects, which took up many dozens of articles in the database, do not show up because no critical opinions or evidence of poor conduct were presented in those stories. The strikes at Rössing likewise inspired a number of stories—but few of these were linked to critical statements or evidence of poor conduct.[20]

The majority of articles were relatively neutral; very few made positive assessments of the industry.

Finally, it should be noted that all of the articles cited for the "no critical evidence" and "no evidence" indicators came from general news sources. Professional organizations and journals had no critical words or evidence of poor conduct: to the extent that this portion of the EQO is concerned only with "key international stakeholders", this may indicate success.

Note on the indicators:

A clear problem with these indicators is the potential open-ended nature of any approach to measuring them; the SEMP team is asked, in effect, to prove an absence. As such, a less conservative standard of 10% negative coverage was chosen.

A more fundamental problem with the indicators is, as was noted above, the nature of expert perception. It is possible for the indicators to scored as "not met" for no fault of industry, regulators, or others. Monitoring international (and domestic) perceptions of the industry is certainly worthwhile, but this indicator is not as amenable to direct intervention as others in the SEMP.

Note on monitoring methods:

Systematic content analysis of media and professional coverage of the Namib uranium province has the advantage of being relatively straightforward, with the possibility of producing year-on-year comparisons and highlighting unknown problems for perceptions of Namibian uranium. The method chosen does have several drawbacks, however.

The coding process itself is undoubtedly subjective and could suffer from a lack of consistency between different coders. Training and a detailed codebook (see annexure) that provides instruction on how to score borderline cases can help address this issue. Comparison of two coders' analyses of the same set of articles could also help identify problem areas, as would open discussion of codes.

[20] Unless one were to take the very existence of strikes as evidence of "unreliable" or "unethical" conduct in the areas of governance and economic activity. The strikes themselves are arguably a "critical" voice, although decidedly domestic.

Grey areas will probably always remain, however.

Another problem is that content analysis is relatively time-intensive: while this year the need to build up the system from scratch took extra time, given 400 or more articles per year it seems likely that annual monitoring would take one person a week or more of work. The workload could be reduced by focusing the sample more tightly or by discarding some coding categories or sources.

Finally, the method tells us a great deal about *what is being said* about Namibian uranium, but not *how those messages are received* by key international stakeholders. A survey, focus group work, or other more direct methods of data gathering could answer this question. It might also address the negative bias of media content analysis, which tends to find negative coverage but has trouble detecting positive opinions—which rarely make news. Given the range of stakeholders and the target of the industry being "internationally [well] regarded", however, these methods would likely entail even more effort or expense.

Conclusions and recommendations

The study shows generally progress towards the goal of the Namibian uranium province having a good reputation—or at least towards lacking a bad reputation—especially among "key international stakeholders". Very few articles were critical of the uranium province, and very few provided evidence of unreliable, unethical, or irresponsible conduct on the part of uranium companies.

To the extent that there was poor performance, it appeared to be due most of all to concerns about the economic impact of mining. Many of those concerned about this were domestic rather than international sources. Environmental impact, radiation safety, and other substantive concerns, meanwhile, were surprisingly thin on the ground in this sample.

One lesson the data shows quite clearly, however, is that the target in this section is a matter of perceptions, and in this arena positive actions on the part of stakeholders will only be loosely coupled to outcomes. This means that singular events such as the theft of uranium or the existence of links between Rössing and Iran can have an outsized impact in international media, while even prolonged and engaged attempts at good conduct may have little to no effect. The sample did not, for instance, include any articles about the SEA or SEMP.

That is not to say that some of the issues highlighted here could not be addressed by continued action: strengthened governance measures (such as the SEMP, common standards adopted through the UI, or new national environmental and radiation protection regulations) could address other complaints such that perceptions get better.

Addressing this potential disconnect between stakeholder effort and global public perception will be difficult, as will the methodological problems inherent in monitoring these indicators. The current monitoring regime, however, can make headway into addressing whether or not the target is being met.

A clear problem with these indicators is the potential open-ended nature of any approach to measuring these indicators; the SEMP team is asked, in effect, to prove an absence.

It was determined that one useful way to approach the problem is to systematically review media coverage of Namibian uranium. Both indicators can be measured with some confidence in this way. As such, a database and coding scheme were developed, permitting content analysis (Hsieh and Shannon 2006, Neuendorf 2002, Kohlbacher 2006) of hundreds of articles published over the course of the year.

Data sources

Complete coverage is impossible: databases have holes (see later notes on Google News) and some articles do not appear online. Clearly outlining the sources that will be searched does, however,

ensure that year-on-year comparison will be possible. Additional articles that came to the attention of the team were added on an ad-hoc basis.

Data gathering and analysis is eased by a reliance on primarily digital sources. Any approach to a systematic review of media coverage must, however, take into account limitations in GRN capacity: professional media databases (Lexis-Nexis, EBSCO, SearchPremier, etc) are expensive. In addition, GRN does not subscribe online to all relevant sources. Since Google provides a free and powerful alternative with its Google News service, it was decided that Google News would be the primary source for compiling non-specialist articles dealing with Namibian uranium:

A search was made of Google News from 01/01/2011 through 31/12/2011, as well as of the professional journals, newsletters, and associations listed below. Unless otherwise noted, the search was for "Namibia uranium".

Sources:

- International Atomic Energy Agency News Centre (Note: the site's search function does not seem to be able to manage a search for "namibia AND uranium". A search for "Namibia" was conducted instead, and articles not mentioning uranium were filtered manually.)
- International Mining (On this site a simple query for "namibia uranium" was done through the site search bar on the main page.)
- Mining Environmental Management (available through Mining Journal site)
- Mining Journal (This site, which covers several publications has an archival search area allowing for a date-specific search for "Namibia uranium". Sadly many articles were not available in full and had to be checked through the paper version.)
- Mining Magazine (available through Mining Journal site)
- African Mining Intelligence (Note: here there was an option to limit searches to Namibia only. "Uranium" was the only search term in this case.)
- Mining, People and the Environment (available through Mining Journal site)
- World Nuclear News, issued by the World Nuclear Association (Some articles show up in Google News. Duplicates are deleted from the database.)

Among others, the following prominent professional journals were not reviewed:

- Africa Energy and Mining
- African Mines Online
- Mining Mirror
- Mining Review Africa
- Modern Mining

Potential problems

Inter-coder reliability is questionable. Different people engaged to maintain the database as years go by may have different standards for what constitutes, for instance, positive or negative coverage of the uranium industry.

Google News has the advantage of being freely available, but its search and display methodology, based on a proprietary algorithm, is opaque. Its coverage is not complete, and not always consistent between users.[21]

Database design

Data is entered into a flat file MS Access database with one table for data entry and storage one query (and associated pivot tables) for data analysis. The table, "News tracker" (see Figure 1) contains a number of informational fields (*Source*, *Article Title*, *Date*, *Link*, *Summary*, *Coding*), two automated database management fields (*ID* and *Date added*), two informational codes (*Location*, *DB*) and twelve analytical coding fields (*Assessment*, *Investment*, *Incidental*, *CriticalVoices*, *Evidence*, *Environment?*, *Radiation?*, *Economy?*, *Infrastructure?*, *Security?*, *Governance?*, *Occupational Health and Safety?*).

Coding fields are discussed in subsequent sections. During data entry, codes are reduced to numbers to speed data entry. A separate query, "News tracking with added value names", replaces the numerical codes with written labels.

Field Name	Data Type	Description
ID	AutoNumber	
Date added	Date/Time	
Source	Text	Name of news source
Location	Number	1=Namibia, 2=South Africa, 3=Africa, 4=Europe, 5=Australia, 6=Asia, 7=North America, 8=South America, 9=Global/NA
Article Title	Text	Title of article
Date	Date/Time	News date
Link	Hyperlink	URL of news item
Critical	Number	Does article express/transmit critical voices about Namibian uranium? 0=No, 1=Yes, 99=NA
Evidence	Number	Is evidence presented of unethical etc conduct? 0=No, 1=Yes, 99=NA
Assessment	Number	0=neutral/minor mention, 1=largely negative, 2=mixed, 3=largely positive, 99=unknown/inaccessible
Summary	Text	Brief summary
Incidental	Number	Article only mentions Namibian uranium incidentally. 0=No (ie, mention is substantive), 1=Yes (mention is incidental/in passing) 99=NA
Investment	Number	Article aimed at investors. 0=No, 1=Yes 99=NA
Environment?	Number	Discusses environmental impacts. 0=No, 1=Yes 99=NA
Radiation?	Number	Discusses radiation. 0=No, 1=Yes 99=NA
Economy?	Number	Discusses economic impacts in Namibia. 0=No, 1=Yes 99=NA
Infrastructure?	Number	Discusses infrastructure (roads, energy, water, power) impacts in Namibia. 0=No, 1=Yes 99=NA
Security?	Number	Discusses security. 0=No, 1=Yes 99=NA
Governance?	Number	Discusses governance matters. 0=No, 1=Yes 99=NA
Occupational health and safety	Number	Discusses OH&S matters. 0=No, 1=Yes 99=NA
Coding	Text	Any comments on difficulties in coding
DB	Number	Article was added to database on ad hoc basis (ie not from standard search). 1=Google News, 2=Mining Journal 3=IAEA, 4=World Nuclear N

News tracker table in MS Access design view

The first two fields in the database, *ID* and *Date Added*, are automatically generated by the database.

Source is just a text (string) field in which the name of the source should be noted. In the case of AllAfrica.com, both AllAfrica.com and the original source were noted (thus a reprinted *New Era* article would be listed as AllAfrica.com (New Era)).

Article Title is another string field where the article title is reproduced. *Date* refers to the date the article was published. *Link* contains the URL of the article.

Summary is a longer text field containing a brief summary of the article. This is mainly to help analysts navigate the field, but may overlap slightly with *Coding*.

[21] Among other things, Google personalizes its results based on a user's history (although this can and should be avoided by adding "&pws=0" to the end of a search string. Even on the same computer, this researcher has seen inconsistencies in the number of reported results for a given time period on Google News. As a gauge of Google News' reliability compared to other databases, a search on 28/11/2011 for "uranium Namibia" on Google News found 210 results from 1/1/2011 onward (adding "&pws=0" changed the count to 209); on the same day the same search on Lexis-Nexis Academic, a subscriber-only database, found 369 results. It is possible that this reflects differences between Google and Lexis-Nexis in their handling of duplicate stories across publications.

Coding is another text field for notes about anything unusual about the source or coding process. This might include limitations on the source (if only a snippet view is available, for instance), or doubts that the coder had about a particular code assignment. For example, an article discussing criticisms of the government's handling of a given aspect of the uranium industry might fall between a "1" and a "0" in the *Critical* code. Doubts or reasons for the coding should be noted here.

Coding strategy

Coding is a common practice in social science, particularly in "content analysis", a method of analyzing large amounts of textual data. It involves assigning a series of "codes" to individual records (or even portions of text), marking and sometimes ranking the appearance of particular themes or subjects of interest to a researcher.

A "codebook" details the criteria by which particular codes should be assigned to a given text.[22] Some codebooks cover hundreds of potential codes; there is always a tradeoff between the level of detail required in a study and the time and effort that will be required to code. Some judgment will always be required, but codebooks help maintain consistency through time and across separate coders.

A set of fourteen codes was developed (see Table 1). Three codes, *Assessment* (discarded in the process of developing methods), *CriticalVoices*, and *Evidence*, deal directly with the indicators required for EQO 11.1.

Database fields and code for content analysis

Database field/code	***Description***
Date	Publication date
Source	Publication name
Article Title	Title
Link	URL of article
Summary	A summary of the article by the coder
CriticalVoices	Does the article contain any critical voices?
Evidence	Does the article present evidence of poor conduct?
Incidental	Does the article only mention Namibia incidentally?
InvestorReport	Is the article primarily aimed at investors?
Environment	Does the article mention environmental issues?
Radiation	Does the article mention radiation?
Economy	Does it mention economic questions?
Infrastructure	Does it mention infrastructure issues?
Governance	Is governance (state or corporate) mentioned?
Security	Is security mentioned?
OccupationalHealthAndSafety	Are occupational health and safety mentioned?
DB	Notes where information was found
Coding	Allows for notes on coding

One code, *Location*, identifies the source by geography, allowing for a quick sorting of the database by the origin of the articles.

Two codes, *Investment* and *Incidental*, allow the flagging of articles that are likely to not be relevant to the study.

[22] See, for instance, the codebook for a University of Wisconsin, USA study of coverage of students protests: http://www.ssc.wisc.edu/~oliver/PROTESTS/ArticleCopies/codebook2000.htm.

Seven more codes (*Environment?*, *Radiation?*, *Economy?*, *Infrastructure?*, *Security?*, *Governance?*, *Occupational Health and Safety?*) help narrow down what areas of concern are touched on by each article.

A final code, *DB*, deals with how the article was added to the database.

More codes could be added, but every added code increases the burden of maintaining the database in coming years. Codes should only be added if there is a clear analytical need.

Codebook

Here codes will be presented in the order they appear in the main database table. Comments on certain codes appear in italics.

Note that most codes have a "99" option: when this code is inappropriate or unable to be answered (except in the case of *DB*, where this also indicates that an article was added in an ad hoc fashion). This code may be applied when, for instance, most of an article is blocked by a subscription paywall and whatever snippet is available does not give enough information to code an answer.

Location

Allows analysis of sources broken down by their location. This can occasionally be problematic: in some cases articles are reprinted: as in the case of AllAfrica.com, where the issue is whether or not a reprinted article from *New Era* should be classed as "Africa" or "Namibia". Since the audience rather than the source of the piece is arguably more relevant, reprints will be classified by their publication location: an AllAfrica.com reprint of a *New Era* article will be classed as "3" rather than "1".

1 = Namibia

2 = South Africa

3 = Africa

4 = Europe

5 = Australia/Oceania

6 = Asia – Middle East should be coded as Asia

7 = North America

8 = South America

9 = Global/unknown – To be used in cases where the publication location of the source is unknown or where coverage appears to be global. Appropriate for regional instances of global news networks such as Reuters.

Assessment (no longer in use)

Intended to answer the question of whether there are any "critical international voices about the operations and performance of the Namib Uranium Province among any key international stakeholders". Stories are coded in one of five ways depending on the expression or transmission of an opinion about Namibian uranium: some stories may have their own "voice", some may merely transmit expressions of opinions by others.

This was the most problematic among the codes: after 28/11/2011 it was decided to replace it with three codes: CriticalVoices, Evidence, and Incidental. This one code was doing too much work, making coding ambiguous and overly subjective. The code remains here in case there is some use in reviving it later.

0 = Neutral/minor mention – Mark story with this code if Namibia is only mentioned incidentally or if the story does not express or transmit any particular approval or disapproval.

1 = Largely negative – Indicates a story that is intended to read as reflecting negatively on the industry.

2 = Mixed – Has both negative and positive assessments of the industry

3 = Largely positive – Reflects well on industry

99 = NA – It is inappropriate or irrelevant to assess the article.

Critical Voices

Codes for presence of a "critical voice" about the Namibian uranium industry, either expressed directly by the writer or in the words of someone quoted or paraphrased in the article. This code speaks directly to the first indicator in EQO 11.1. Criticism should be fairly explicit: merely mentioning a negative event should not cause an article to be coded as critical.

0 = No – No critical voice is present

1 = Yes – A critical voice is present

99 = NA – This code is inappropriate for the article at hand.

Example: A column claiming that the Namibian government has failed to properly regulate the industry should be coded as "1" for *CriticalVoices.* An article that simply discusses production figures for a given mine should be coded as "0".

Evidence

Indicates whether or not the article discusses "unreliable, unethical and/or environmentally, socially and financially irresponsible conduct by operating uranium mines or prospecting activities", addressing the second key indicator for EQO 11.1. Note that government or other parties' conduct is not addressed by this code; it refers only to industry activities. Baseless criticism (with no reference to specific cases or examples) should be coded as "0".

There was discussion in the December 2011 Steering Committee meeting that this code should include consideration of the quality of evidence, perhaps by coding as range of values from "good evidence" to "bad evidence". I suspect this would introduce more problems in terms of reliability than it would solve, as well greatly increasing the time needed to complete an annual review of news coverage. My recommendation is to leave the assessment of evidence to a narrative section presented after the numerical/quantitative analysis.

0 = No – No evidence is discussed or presented

1 = Yes – Evidence is discussed or presented

99 = NA – Code is inappropriate for this article

Examples: An article that discusses uranium theft should be coded "1" for *Evidence*—but "0" for *CriticalVoices* unless it explicitly critiques security practices. An article that rails against corporate corruption but discusses no evidence or specific practices should be coded as "0".

Investment

Helps sort articles by whether or not their primary audience appears to be investors. This code was necessary as many articles mentioning the industry did so merely to discuss details of a pending financial transaction or to discuss the quality of a particular investment opportunity. Note that some such articles still discuss substantive matters about the uranium industry, such as "political risk" implications.

In many cases, using this code involved judgment calls. Coding was often demonstrably unreliable (even with the same coder). As such, it may be more efficient and less subjective to simply class some sources as always *investment advice. This would make this code category obsolete. The code may be worth keeping, however, as it has the advantage of being one way to sort out many articles that discuss mining companies with interests in Namibia that do not discuss the substance of mining impacts on or contributions to Namibia.*

0 = No – The article is not primarily an investment information or advice piece

1 = Yes – The article is primarily an investment information or advice piece

99 = NA – Code is inappropriate for this article

Example: An article in Bloomberg Businessweek that prominently features stock prices and other investment information should be classed as "1" for *Investment*. An article that mentions stock prices but also discusses substantive matters of concern regarding a uranium mine would be coded "0" for *Investment*.

Incidental

Many articles make only incidental mention of the Namibian uranium industry: either they are primarily about uranium (or some other topic) and mention Namibia in passing, or they are focused on Namibia and mention uranium in passing. This code will allow analyses to filter such articles.

Arguably, if an article is coded as incidental, most other relevant codes should default to "99". Analysis should exclude incidental articles in any case, so there should be little difference in practice.

0 = No – The article is NOT only incidentally about the Namibian uranium industry. Use this code in cases where an article makes substantive mention of the industry. It could be a brief mention, if that mention makes a substantial point.

1 = Yes – The article only mentions Namibian uranium incidentally

99 = NA – Code is inappropriate for this article

Example: An article which is primarily about a company negotiating to buy another company that owns an interest in a Namibian mine—and which contains no details about conditions in Namibia—should generally be coded as "1" for *Incidental*. (Such an article should likely also be coded "1" for *Investment* as well.)

Environment, Radiation, Economy, Infrastructure, Security, Governance, Occupational Health and Safety

These codes mark specific areas of content: some articles will only discuss economic implications of the industry, some will discuss radiation, some will discuss governance. These codes allow a rough tracking of which issues are most prominent in articles about the Namibian uranium industry.

Coding these themes is somewhat subjective: industrial actions, for instance, could potentially be a matter of economy (the political question of how benefits from mining are to be apportioned between management and workers), governance (the technical question of how labour disputes are handled), and occupational health and safety (if workers are protesting about working conditions or health). In these cases, code by the content of the article: if governance is not mentioned, code the article as a 0. If the article discusses specific worker concerns over health, code Occupational Health and Safety?

Security should be understood as covering matters such as theft, concerns over inappropriate sales of nuclear materials, and so forth.

Note on *Governance*: this can refer to corporate or state governance over any issue. An article discussing praise for good internal management by a mining company would be coded "1" for

Governance, as would criticism of, for instance, health and safety regulatory control by the government. Labour relations are considered here to be an aspect of "governance"; articles about strikes or other labour relations matters should be coded as "1" for *Governance*.

For these codes, even brief mention of a given topic, negative or positive, is enough to enter a "1" for the given code. For instance, an article that primarily discusses the financial prospects of a mining company but which mentions recent EIA approval and trouble with labour disputes (and nothing else about conditions at the mine or in Namibia) should be scored a "1" for both *Environment* and Governance, but **"**0" for other content categories.

All codes are assigned according to the same rubric:

0 = No – No mention is made of the theme in question

1 = Yes – Mention is made of the theme in question

99 = NA – Code is inappropriate for this article

Database

Notes the site or database through which the article was found. Note that articles added in an ad hoc fashion will coded as 99. In the case of article duplicates, the earliest sighting of an article should be kept and further instances should be discarded.

This code could allow for analysis searching for differences between types of sources (although this would more properly be carried out with *Source*).

More likely, analysis might want to separate out ad hoc articles: sometimes the coder will come across an article about Namibian uranium that did not show up in the regular searches of Google News and professional journals. These can still be added to the database but should be coded as "99" for *DB*. Some of these articles will be from unusual sources, but some will simply reflect the imperfect coverage of—in particular—Google News. In these cases, when articles come from sources, such as *The Namibian*, that are ordinarily covered by Google News or other standard databases, the article should still be coded as "99" for *DB*: they were not added through the normal search-and-review process detailed in this document.

This will allow future analysts to adjust data or methods if it turns out that ad hoc articles are substantially different from articles gathered in the standard fashion. The regular search-and-review process is a sampling method of sorts; marking those items in the dataset not gathered through regular sampling is standard practice.

1 = Google News

2 = Mining Journal

3 = IAEA

4 = World Nuclear News

5 = International Mining

6 = Africa Mining Intelligence

99 = Ad hoc

Analysis

Analysis is a relatively simple matter of looking at the frequency of particular codes: especially *CriticalVoices* and *Evidence*. Using pivot tables in MS Excel or Access allows for frequencies of particular combinations of codes to be quickly extracted; likewise, charts illustrating relative percentages of articles are easy to generate.

Looking at frequencies for content codes (such *Governance* or *Radiation*) can give a quick idea of what areas were of most concern to those writing articles.

In general, articles coded as "1" for *Incidental* should be left out of analyses, as these articles do not deal with Namibian uranium in any detail. For *CriticalVoices*, since the indicator specifies "international" critical voices, domestic articles should be left out of the analysis. Note that reprints of domestic articles (i.e. AllAfrica.com reprints of articles from *New Era*) should be left in: these have been chosen as relevant to a wider audience—and likely reach a wider audience as well.

Note that when analyzing all African cases, classes 1, 2, and 3 should be included.

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Annex 9: LIST OF INDICATORS WHERE THE MEANING IS AMBIGUOUS, MAKING INTERPRETATION, AND THUS SCORING OF ITS STATUS, VERY DIFFICULT. A GENERAL RECOMMENDATION IS THAT THE WORDING OF THESE INDICATORS SHOULD BE REVISED BY THE WORKING GROUPS

Indicator no.	Indicator	Ambiguity
EQO 3	Scoring the status performance as per SEA report (MET/IN PROGRESS/NOT MET/EXCEEDED) does not seem to apply well to the road infrastructure indicators, and thus modification will be necessary. Example: if the target is to have a certain road tarred, and currently only the feasibility study to tar the road is conducted, we cannot use the scores provided, thus in such cases the term "In progress" was introduced as a more appropriate rating.	
3.2.1.5	Accidents at intersections and turn-offs decline from current trends	There is effectively no possibility of monitoring this indicator in a way that the objective can be achieved, because data on accidents are not spatially referenced (hence impossible to say whether it occurred at intersections and turn-offs), and because it is so difficult to attribute increases or decreases to the effect of the uranium rush. *It is recommended that the indicator should be reformulated according to how the police monitor these accidents.*
6.1.3.1	Measured change in the incidence rate of industrial diseases amongst uranium mine workers.	It is easy to measure such diseases among direct employees of uranium mines. To know the rates among support industries employees and how they relate to increased uranium mining will not, however, be easy to quantify
6.1.3.2	Measured change in the incidence rate of diseases scientifically attributed to radiation amongst members of the public, uranium mine workers and medical personnel	Mines might invest in detailed health research of their employees; the same does not however, apply to supporting industries. These supporting industries are also difficult to identify.
7.1.2.3	All developers commission EIAs prior to final design, and outcomes-based EMPs guide implementation and decommissioning. In all cases, visual impacts and sense of place are addressed	It is clear that this indicator should be split into three separate ones that each answer a single question
8.1.1.4	Mines have specific programmes and projects to actively avoid, mitigate, restore or offset their impacts, with impact AVOIDANCE predominating	All EIAs are following the basics of the mitigation hierarchy. However, because it is often not possible to decide whether a specific management action is directed towards avoidance or not (most management actions are defined as "mitigations", but these sometimes include avoidance measures), it is not possible to decide whether avoidance predominates. In addition, the option of offsetting cannot yet be measured, because it expects a process that does not yet occur.
8.1.1.5	Biodiversity footprints of mines are minimized	This indicator requires an assessment of whether different footprint options were considered and the smallest one, which simultaneously has the least biodiversity impacts, was chosen. The decision-making

Indicator no.	Indicator	Ambiguity
		process is however seldom documented in such detail. In addition, cases exist where footprints had to be increased in order to avoid a specific biodiversity impact.
9.2.1.2	Every mine has funds/ a skills development programme for employees (3% of wage cost).	This indicator is poorly defined and could be made more specific, e.g. Funds for skills development programme for employees exceeds 3% of wage cost for every mine.
6.1.4.1	Measured change in the number of fatal road accidents per road user over 1 year	This indicator should rather measure accidents directly attributed to uranium mining as these are recorded by mining and exploration companies. MVA or Namibia National Road Safety will most likely not ask if an accident on a public road is caused by uranium mines or associated industry unless vehicles is clearly marked as mine property.
9.1.1.1	75% of grade 1 enrolments complete grade 10.	This indicator describes a broad population of learners and can produce incorrect results given the dynamics of learner population changes that occur during the time period from enrolment in grade 1 to grade 10. There are a number of influencing factors that need to be looked at before determining the approach for assessment. Since the focus is on grade 1, is this indicator tracing the number of grade 1 pupils enrolled in the region during a specific year, and then making a comparison with the number of learners who passed grade 10, using a ten year gap (assuming that those are the same learners who will be enrolled in grade 10 in the year of assessment? Or should the number of grade 10 pupils and grade 1 learners for a specific year be compared (assuming that the same number of learners who enrolled in grade 10 is equal to the number as the grade 1 pupils enrolled for that specific year?
9.1.1.3	National examination results in Grade 10 and 12 in maths, English and science are a D or better for more than 50% of learners from public (GRN) schools.	This indicator should be modified to include learners from both public and private schools for ease of assessment.
9.1.1.4	Region improves performance in reading and mathematics.	Although maths marks can be compared, it is not clear how reading is scored and can be compared objectively.
EQO 9	A working group should convene to better define these indicators. This should include the responsible persons from the Ministry of Education who can provide the information in future.	
11.1.1.1	No critical international voices about the operations and performance of the Namib Uranium Province among	Strict adherence to the wording of the indicators (“no critical international voices”; “no evidence”) would mean that a single article could cause the indicator to

Indicator no.	Indicator	Ambiguity
	any key international stakeholders…	be scored as NOT MET. A standard of no more than 10% of relevant articles voicing criticism or showing evidence would be more reasonable and still conservative
11.1.1.2	There is no evidence of unreliable, unethical and/or environmentally, socially and financially irresponsible conduct by operating uranium mines or prospecting activities.	A clear problem with these indicators is the potential open-ended nature of any approach to measuring them; the SEMP team is asked, in effect, to prove an absence. As such, a less conservative standard of 10% negative coverage was chosen. A more fundamental problem with these two indicators is the nature of expert perception. It is possible for the indicators to score as NOT MET for no fault of industry, regulators, or others. Monitoring international (and domestic) perceptions of the industry is certainly worthwhile, but this indicator is not as amenable to direct intervention as others in the SEMP.
12.3.1.4	Number of new mines and prospecting licenses in protected areas.	This should be rephrased as currently one cannot be sure how to meet this indicator