

VISSION

Husab now has a

20-YEAR LIFE!

THAT young child grappling with his times tables in primary school right now, could well be an engineer working for Swakop Uranium's proposed Husab Mine in 20 years' time. The proposed mine near Swakopmund now has a potential mine life of more than 20 years and uranium reserves of at least 280 million tonnes.

This was the good news from the latest reserve estimate. Not only is there more uranium: the ore grade in Husab Zones 1 and 2 shows a 4% increase in forecast grade from 497 parts per million (ppm) to 518 ppm uranium oxide. It furthermore shows a 15% reduction in life-of-mine strip ratio. Total ore tonnes within the reserve have increased by 37% to 280 million tonnes.

In short, we will be getting a better grade than originally thought, have to remove less waste rock to get to it, and have much more ore to process.

The strip ratio now stands at 6,2:1 (previously 7,3:1), which means that just over six tonnes of waste rock have to be removed to obtain one tonne of ore. The reduction in strip ratio is expected to have a positive effect on project economics.

The 20-year mine life, which includes pre-strip and ramp-up, is based on the definitive feasibility study (DFS) processing target of 15 million tonnes of ore and 15 million pounds (6 800t) of U_3O_8 per year. Once this production is reached, Husab will become the world's third-largest uranium-only mine.

There's MORE to Husab

According to Jonathan Leslie, CEO of Extract Resources (Swakop Uranium's 100% shareholder), the updated reserve estimate marks the

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Dean Esau, Swakop Uranium's office administrator in Swakopmund (left), and PR officer Nomvula Kambinda are not only basking in the sun; they're basking in the glory of being part of the editorial team that was responsible for VISSION being judged the best External Newsletter in Southern Africa.

The glorious details are on page 12

WHAT'S IN OUR NAME?

Vision (intelligent foresight) and *fission* (nuclear reaction) met the day that Swakop Uranium was established. The result? Our own *Vission* newsletter.

DO YOU HAVE ANY NEWS OR VIEWS TO SUPPORT OUR VISSION?

Please email your comments to:
info@swakopuranium.com.na

AN ICON TELLS THE STORY

Key financial, social and environmental issues around the Husab Project are identified by simple icons as follows:



Burning issue

We'll cover any topic that fuels debate.



In the marketplace

The need, demand and pricing of uranium will feature prominently.



Green notes

Environmental considerations grab the headlines in this section.



Room for a view

This is an opportunity for individuals to air their views – however controversial – on any subject surrounding the Husab Project.



People are talking about ...

These articles will address community-related or social issues.



Project pipeline

Key milestones will be tracked.

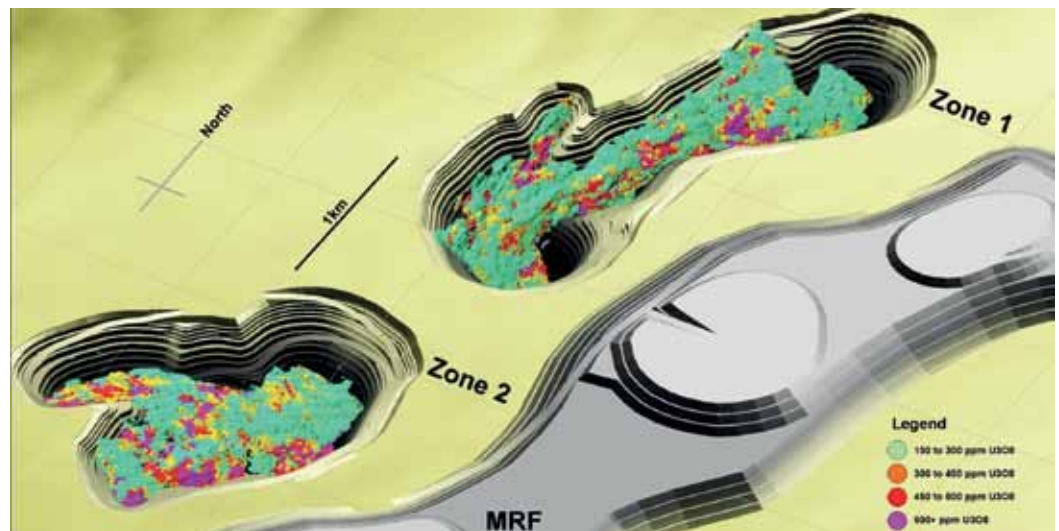


Did you know?

These bite-sized items of interest will whet your appetite for news.

CONTINUED FROM PAGE 1

Husab now has a 20-YEAR LIFE!



latest phase of the company's Mine Optimisation and Resource Extension (MORE) programme, which is aimed at substantially increasing project value. He points out that the increase in reserves arises from identifying new resources and upgrading resources previously classified as "inferred" to "indicated" (inferred resources cannot be included as reserves).

He is confident that Husab will become a nationally and globally significant long-life mine, with opportunities to increase the reserve base further by adding the defined resources at Zones 3 to 5, and through building on promising exploration results from Middle Dome, Pizzaro and Salem.

"A review of life-of-mine pit sequencing and scheduling is now under way to further refine the overall mine plan and financial model for Husab. The MORE programme continues to

evaluate further opportunities to increase mine life, and to optimise the process plant and mining operations to add significant additional value to the Husab project."

Important steps in bringing the US\$1,66 billion (N\$12 billion) Husab Uranium Project into production will be taken during the next six months. "We are eagerly waiting for the Namibian government to grant a mining licence, the application for which was lodged in December 2010. The Ministry of Mines and Energy has confirmed that our licence it is under active consideration."

According to Norman Green, CEO of Swakop Uranium, potential process enhancements are being evaluated in Australia and South Africa. This includes the use of elevated temperature, fine grind and simplifying the solid liquid separation circuit.

RESOURCE CLASSIFICATION

	Classification	Tonnes (million)	Grade (ppm)	Contained uranium (Mlb)
Zone 1	Proven	25,3	482	26,9
	Probable	123,4	460	125,1
Zone 2	Proven	37,4	628	51,8
	Probable	93,9	561	116,1
TOTAL		280,0	518	319,9

Welwitschia's fluid hide-and-seek game

HERE'S a question that has puzzled scientists for decades: In a desert that generally receives an average of just 35 mm rainfall each year, how is the Welwitschia able to survive? The Welwitschia uses water just like a normal plant, yet in the Namib Desert the source of the plant's water remains unclear.

As Swakop Uranium fine-tunes its designs for the proposed Husab Mine and associated infrastructure, it has become clear that we need a greater understanding of how water reaches the Welwitschia field south of Zones 1 and 2. We want to ensure that our operations do not negatively impact on any potential sources of this water.

Swakop Uranium's Environmental Manager, Michele Kilbourn Louw, explains: "In keeping with our commitment to take care of the Welwitschia field and the rich environmental heritage that it represents, we have commissioned three geophysical studies to give us more information on what type of sub-strata we have between the desert surface and the bedrock under the mine residue facility and north of the Welwitschia field.

"We know from the detailed groundwater modelling study done for the Environmental Impact Assessment (EIA) that there will be a natural gravitational drawdown, or flow, of groundwater in the later years of the mine. There will also be possible seepage from the mine residue facility toward, and into, the pit.

"Our concern is in the early years of the mine. If any seepage is generated beneath the mine residue facility, we want to establish where it may go to avoid near-surface impact on the Welwitschias."

Two cost-effective methods

"We have contracted two Namibian firms of geophysical consultants to help us get this important near-surface geological information".

Klaus Knupp of Earthmaps Consulting uses two high-frequency methods called ground-penetrating radar (GPR) and horizontal loop electromagnetics (HLEM) to



Klaus Knupp of Earthmaps Consulting in Swakopmund shows how he will use electromagnetic waves to map groundwater distribution. This information will help ensure that if there is any seepage from the proposed mine, it will not affect the Welwitschia field.

obtain information. "While GPR records show radiowave pulses which bounce back from water-bearing layers in the ground, the HLEM method records induction currents generated in these layers when sending down electromagnetic waves from the surface," he says.

"This geophysical orientation study will help us decide which of the methods is most effective in mapping the groundwater distribution under the mine residue facility, the ephemeral channels and, ultimately, the Welwitschia field."

Gregory Symons of Gregory Symons Geophysics uses a different method to determine where the water tables may be. "Our method is at the other end of the electromagnetic spectrum and uses direct current (DC) electricity to penetrate the ground," he explains. "By measuring the current we pump into the ground and voltage drop at specific points, we are able to determine the resistivity

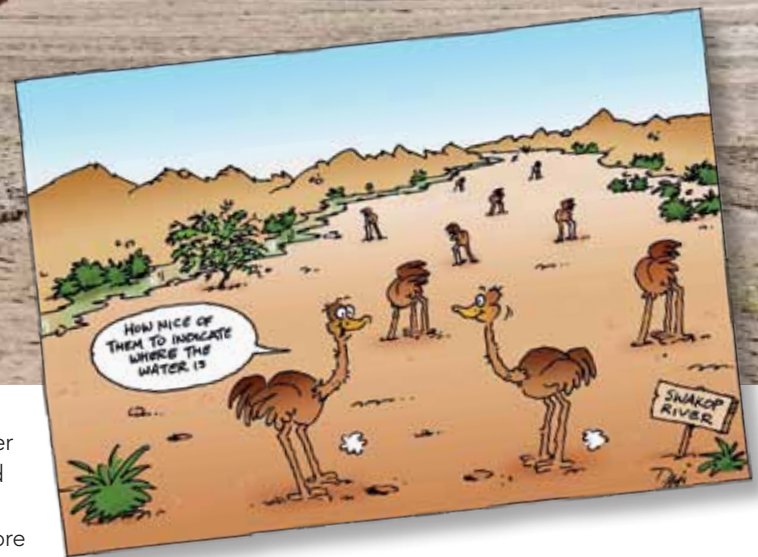
of the ground beneath us. Where the resistivity is lower, we can indicate portions of the subsurface that are more saturated with water than in other places."

Test pits have been dug along each of the two survey lines as a control measure to the findings obtained through geophysical measuring.

"From what we learn about the near-surface geology, and the possible direction that early draw-down water is likely to want to go, we will be able to design measures to prevent possible seepage from reaching the channels," says Michele. "This information will help us design the channel needed to divert water around the mine residue facility and back into a diversion pond that redistributes water back into the lower end of the ephemeral channels affected by the mine," she adds. "We need to increase our knowledge to ensure we minimise any potential impact on the Welwitschia field."



It's water, but can



AFTER the recent heavy rains, many rivers in the Erongo District came down in spate. But abundance does not always mean quality, as our testing results might prove.

Water in the Namib Naukluft National Park is a rare sight and a precious commodity. Recent heavy rains have helped shore up the water table in the northern part of Park, which has helped Swakop Uranium's monitoring efforts to assess its impact on this scarce resource.

Monitoring is done by means of a variety of numbered boreholes sunk at strategic places, including in the Swakop and Khan Rivers. This responsibility has been entrusted to groundwater consultant Arnold Bittner of BIWAC cc. Arnold is a hydrologist, which means that he specialised in the study of groundwater after first qualifying as a geologist.

Fifteen boreholes currently cover the proposed Husab Mine site and the Swakop River, and these are monitored every quarter. Three more boreholes are planned for the Khan River and several more on the actual proposed mining site and in the Welwitschia fields.

"Water in the Swakop River is traditionally brackish, but we'll have to check whether that has changed after the unusually high rainfall," Arnold says. "The water in this part of the Namib Naukluft National Park is usually unsuitable for human consumption as it is very salty."

Monitoring measures

The monitoring of the boreholes includes measuring the depth of the water table, as well as testing the water quality. Tests are done to determine whether the major ions – such as sulfates, chlorides and fluorides –

are present as well as the general salt content. The presence of naturally occurring radionuclides, which include radium and polonium that are decay products of uranium, also needs to be determined.

Testing of a set of 25 metals, such as uranium and cadmium, is also carried out on the water samples to provide baseline study information for the proposed mine.

"Any changes in the levels of these metals could be an indicator of potential pollution," informs Arnold.

According to Arnold, the high content of some of the minerals found in the groundwater, makes it not drinkable by standards set by the World Health Organization.

you drink it?

Swakop River's importance

"Swakop Uranium has identified the Swakop River as an important temporary back-up water resource should problems occur with its temporary water supply for construction from the Rössing reservoir," Arnold adds. "For us to fully understand how the Swakop River works, BIWAC created a flow model of the river and sub-divided the river into compartments, each roughly 25 km long."

Three production boreholes with larger diameters than the monitoring holes, have been drilled in the Swakop River's Ida Dome compartment. This compartment stretches from the Khan/Swakop confluence, under the main Welwitschia road crossing of the Swakop River, to about 5 km upstream from proposed production hole SW4.

Arnold says the upper reaches of the Ida Dome Compartment have been earmarked to provide 0.5M cubic meters of water per annum for two years for the construction

phase of the mine. The Namibian Department of Water Affairs has already issued a permit allowing Swakop Uranium to extract this water.

Global testing standards

The water quality is tested in laboratories in South Africa and in Germany. Water samples are stabilised at a laboratory in Windhoek, which manages the customs duties and arranges transport. Samples sent to South Africa for analysis are scrutinised for metals, while German laboratories analyse the water samples for radium, polonium and uranium and thorium isotopes. This can take up to three months.

"I'm proud to say that as a result of the thorough testing we do, and the model of the Swakop River that BIWAC has created, we provide benefits to the wider community. We have assisted Swakop Uranium in obtaining the all-important permit to have a back-up plan for construction water in this desert environment," Arnold says.

BOREHOLE NUMBERS

15 boreholes currently cover the Husab Mine site and the Swakop River.

3 more boreholes are planned for the Khan River.

7 more will be sunk on the actual proposed mining site and in the Welwitschia fields.



Arnold Bittner, a hydrologist, opens the lock on one of the 15 boreholes that currently cover the proposed Husab Mine site and the Swakop River.



Numbered boreholes have been drilled and equipped for monitoring throughout the project area.



Following the recent flooding of the Swakop River, Arnold shows how high the water table is... a mere 20cm below surface!

Explorer covers its tracks on site




EXPLORING is very much like driving a car. You need a licence and you have to stick to the rules of the “road”.

An Exploration Prospecting Licence (EPL) has certain conditions attached to it. One of these is that an Environmental Management Plan (EMP) is developed and audited twice a year. The audit report is sent to the Ministry of Environment and Tourism (MET). Swakop Uranium has done this each year since exploration began in 2007.

“Initially, when there were just a few drilling rigs on site, the audit was quick because of the small area of activity,” says Alex Speiser of ASEC, the independent environmental specialist who has performed the bi-annual audit over the years. “Following the discovery of the uranium prospect at Zones 1 and 2, the number of drill rigs increased rapidly, and managing environmental compliance became a lot more complex.”

Alex Speiser (right), the independent environmental specialist who has performed Swakop Uranium’s bi-annual audits since 2008, discusses environmental compliance with drilling crews.



Our bi-annual audits show we’re taking the right road to ameliorate our footprints and sticking to the rules of the exploration highway

For the bi-annual audit, the exploration geologists provide Alex with statistical information – for example, the number of rigs, people staying in the camps and kilometres of track that have been rehabilitated. She arranges a site visit and looks for signs of non-compliance with the EMP.

“A common problem on most exploration sites is the track management,” says Alex. “At the Husab site it was not as good as it ought to have been during 2010 when there were up to 17 drill rigs and their associated crews on site.”

Barry Parker, Swakop Uranium supervising geologist, agrees: “Managing all the drivers and the neighbouring exploration crews that traversed the area, was a bit of a headache.”

The latest bi-annual audit for July 2011 saw a considerable improvement in track management. Alex was heartened by the efforts of Namib Hydrosearch who supply the track rehabilitation crews for the site. “The recent good rains in the area have also helped with vegetation growth on the old drill tracks and test pit sites,” she says.

Namib Hydrosearch was appointed in 2008 to conduct and apply rehabilitation measures following Husab’s exploration activities. “There is no mystique and no short-cuts around rehabilitation work,” says Glynis Humphrey, rehabilitation practitioner at Namib Hydrosearch. “It involves manual labour, using tools such as rakes, spades and hand picks. Active rehabilitation measures involve removing the evidence of disturbance from the surface substrate of the exploration area by raking and redistributing the surface sediments,” she informs.

Further measures involve maintaining the roads by eliminating corrugated ruts and pot-holes. Water is routinely sprayed over the surface of the roads by a tractor pulling a water tank to reduce dust and improve safety.

Glynis agrees that the unusual rainfall received in the area in 2011 has made a visible difference. “The gravel plains at the Husab site are still covered in grass, which suggests that the sub-surface soil layers were housing a dormant seed bank that has sprouted after the good rains.”

Says Norman Green, CEO of Swakop Uranium: “Some people may ask why we rehabilitate, especially in the Zone 1 and 2 pit areas that we anticipate will eventually become a huge mining area. However, we recognise that good environmental management begins with compliance to the recommendations of the EMP. After all, much of it is just good housekeeping!”



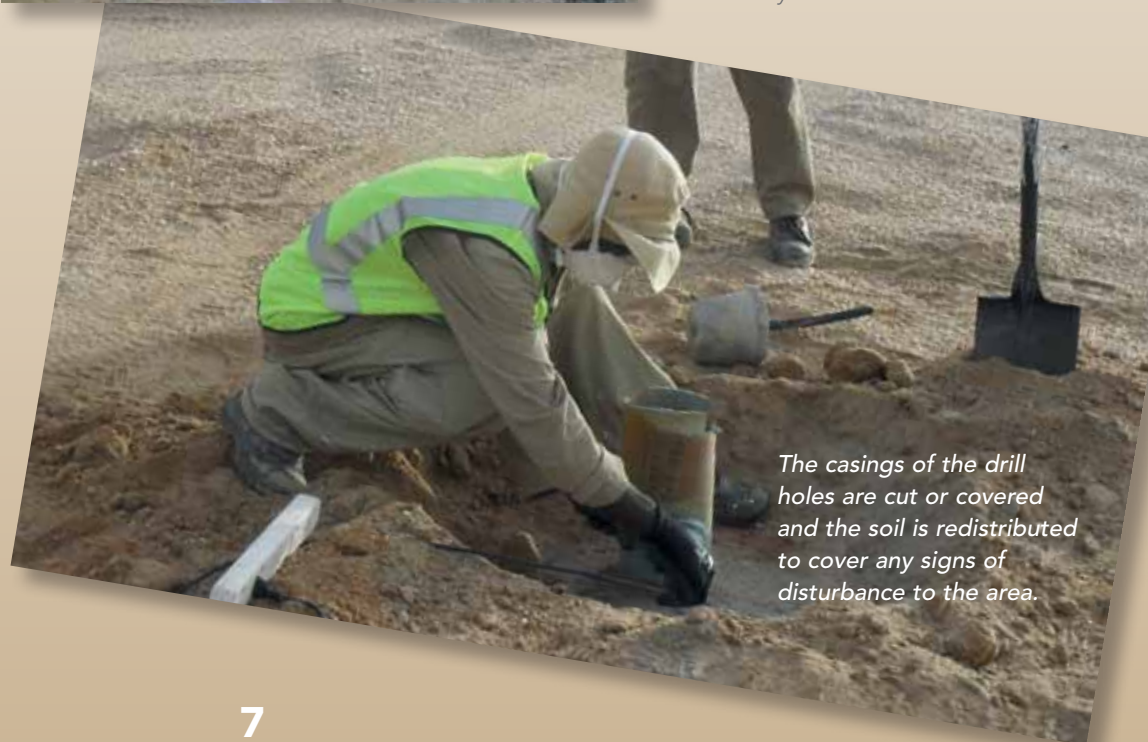
There's nothing scientific about rehabilitation work: it involves manual labour, using tools such as rakes, spades and hand picks to remove the evidence of disturbance from the surface substrate of the exploration areas.



Even the waste bins at the Welwitschia and Swakop River Camp sites are cleaned up as Swakop Uranium's contribution to assisting the NNNP management.



Soil polluted with oil is placed in plastic bags and removed to the skip on site for disposal at the Walvis Bay hazardous landfill.



The casings of the drill holes are cut or covered and the soil is redistributed to cover any signs of disturbance to the area.

New additions to the team

GRANT MARAIS



Manager: Corporate Strategy and Business Development, Swakop Uranium

Having lived in Namibia for most of his life, Grant is passionate about the development of Namibia and its people. "I am hoping that in a small way I can contribute to people's lives in a positive way during my stay at Swakop Uranium," he says.

His approach in his new position at the company is to "care about the well-being of people and genuinely try to understand their opinions" and he believes that "if you treat people with respect and dignity all the time they will always surprise you with what they deliver".

The Husab project has excited Grant since he first heard about it in 2006 and he has wanted to be involved ever since. "The project has the potential to be a benchmark for the mining industry in Namibia and beyond. I do not mean benchmarking by the highest safety standards, the best grades possible, contribution to the economy through taxes and royalties, value of exports or GDP

contribution. While these are extremely important, I am referring to the equally important contribution such as community development, caring for the Namibian environment, development of projects that support fauna and flora, people development and education," he adds passionately.

Having been in the financial services environment for the past 30 years, Grant has immersed himself in business development and customer relationships at all levels. Swakop Uranium, and Namibia in general, can only benefit from this experience.

Along the way he has made time to cultivate a healthy body, which is a very important part of his work/life balancing act. Long-distance cycling is a particular passion of his and he has completed a few ultra-distance races, including the Cape Argus and the Namibian desert dash, as well as a cycling fund-raiser from Johannesburg to Durban to raise funds for children in Botswana.

Grant is married to Esmé and they have two daughters.

RODNEY VOIGT



Engineering Manager for Husab Uranium Project

With 33 years of experience as a Structural Engineer, specialising in the static and dynamic design of heavy structures, Rodney Voigt is a welcome addition to the Husab Uranium Project.

Apart from a relatively short sojourn as a bridge design engineer, Rodney has spent more than 25 years as a design and project management professional providing surface and underground infrastructure for a broad base of clients in the South African hard rock mining industry, including gold, platinum, copper and manganese projects.

Rodney joined Gencor in 1983 as a Project Engineer. In 1991, Rodney, with two colleagues from the Gencor Engineering Department, formed Read, Swatman and Voigt (Pty) Ltd, RSV, which is today a pre-eminent South

African Consulting Engineering and Project Management business.

Rodney is a past secretary to the STANSA Sub-Committee SC 5120.09E-Mining Structures Committee that produced the SANS 10208 Part 1–Part 4 Codes of Practice, having been a committee member from 1987 to 2006.

In 2006 Rodney joined Transnet Limited, the South African port and rail parastatal, as Projects Director responsible for the R1,5 billion upgrade of the Container Terminal in the Port of Durban.

His mining roots prevailed and in 2008 Rodney accepted the position as Projects Director with Borneo Mining SA, a wholly owned subsidiary of AMCI Capital, before joining the Husab Uranium Project Owner's Team. He and his wife, Elizabeth, have two grown-up children.



*José Kaumba, new warden for the northern section of the Namib Naukluft Park, explains to Michele Kilbourn Louw, environmental manager for the Husab Uranium Project, the difference between the two types of *stipaegrostis* sp grasses found on site.*



The position of the proposed 6 km-long mine residue facility for the Husab Mine is indicated to the park visitors.

The proposed Husab Uranium Project will lie within the confines of an internationally famous conservation area, the Namib Naukluft National Park. Two special visitors came to see if uranium mining and the park could be good neighbours.

Africa's largest game park could soon host the world's third-largest uranium mine. Namib Naukluft National Park (NNNP) encompasses part of the Namib Desert – considered to be the oldest desert in the world – and the Naukluft mountain range. With an overall area of 49 768 square kilometres, the NNNP is regarded as the fourth-largest park in the world. The proposed Husab Uranium Project will lie just inside the park's northernmost section.

Josè Kaumba, the new warden for the northern section of the Park, visited the site to gain first-hand knowledge of the proposed uranium mining project and how it may impact the park and its fauna and flora. Arnold Uwu-Khaeb, Senior Ranger for the northern section of the NNNP, joined Josè on this fact-finding mission.

Together, Josè and Arnold obtained information regarding the proposed mine's projected impacts on the park's infrastructure and fauna and flora from two of the project team members, Michele Kilbourn Louw, environmental manager for the Husab Uranium Project, and Riaan Kazondunge, Swakop Uranium's Senior Project Geologist.

Standing on a koppie that overlooks the entire area of the Exclusive Prospecting Licence (EPL) area, Michele told them where water and powerlines would be, where access routes would run and where the plant and mining areas would lie. "We fully realise that this proposed mine will impact this environment, but our mission is to minimise that impact," she emphasised.

Michele also touched on the Namibian uranium industry's "clean energy from Namibia", a concept widely promoted by all the uranium mines and exploration companies in the Erongo area, working in conjunction with the Uranium Institute.

Riaan supplied information on the ore bodies, environmental monitoring and benchmarks for health and safety.

"We're very impressed with the lengths to which the Husab Uranium Project team has gone to count the *Welwitschia* plants," Josè said. "This gives us food for thought to possibly motivate for a similar census, counting game and studying migration patterns in the area when considering that the proposed mine fence



Michele Kilbourn Louw indicates the position of the proposed 6 km-long mine residue facility for the Husab Mine.

may affect movement of wildlife in this area. It would be useful to know what possible pathways to access water in the Khan River will be affected.

"From what we've seen, it is clear that the Husab Uranium Project team has the interests of the environment at heart," he added. "Minimising the impact of the mine on the environment is clearly a major objective and we appreciate that."

Both parties agreed that transparency was the key to the way forward for this exciting project that will bring additional infrastructure and economic growth into the Erongo region, while keeping in mind the very special location of the proposed mine.



SCIENCE dictates that dust rises with increasing wind speeds, which helps us determine what possible pollutants can be found in the air. Swakop Uranium's dust monitoring team will help ensure that it settles with the least possible impact on human, animal and plant life.

As part of the baseline study to fully understand as much of the environmental factors that could influence the proposed Husab Uranium Mine and its people, as well as the fauna and flora surrounding it, Swakop Uranium has engaged a number of environmental consultants. They are observing, measuring and monitoring a host of variables that will add invaluable information to its baseline studies.

"In this region specifically, we want to understand what the current levels of air pollution are so as to form a baseline study," says Hanlie Liebenberg-Enslin. Her company, Airshed Planning Professionals, has been tasked with monitoring the dust in the air, on the site as well as around it. "We also want to see what levels of concentration the mining activity will add, if any."

Particular about particulates

"Our main concern will be for particulates in the air," she continues. "Particulates is the name given to dust in the air. Dust comes in different sizes and shapes and contains different materials."

According to Hanlie, particulates are normally defined as coarse particulates, which includes the whole range from 1 mm and smaller in size. Finer particulates are classed as PM₁₀ and these are especially worrisome as they can be inhaled. These are normally generated by mechanical means as would be found in typical open pit-mining activity.

Even smaller particulates – called PM_{2,5} fractions – are generated by combustion sources such as tailpipe emissions.

"In the Erongo region, our concern is mostly about the dust that we can inhale. Due to the radioactive nature of some of the dust, however, we want to have a clearer picture of what we should be monitoring," Hanlie adds.

Hanlie Liebenberg-Enslin from Airshed Planning Professionals has been tasked with monitoring the dust in the air, on the site as well as around it. Here she is calibrating the PM₁₀ monitor on site.

Dust-busters TEST if dust settles in the RIGHT PLACES



“Accurate measuring by means of sampling therefore becomes crucial to us.”

Collection methods

Basic methods are currently used to collect the dust samples as there is not yet enough infrastructure – such as electrical power and reliable cellphone coverage – on or near the Husab Uranium Project site.

Dust buckets are used to measure the dust fall-out of coarser particulates, mainly associated with a nuisance impact. This comprises a bucket on top of a 2 m-high stand. A metal windscreen, which is designed to slow down the flow of the particulates and cause them to drop into the bucket, surrounds the bucket. The dust sample is collected during routine monthly monitoring and sent to a laboratory for analysis.

Monitoring finer particulates such as those classed as PM_{10} and $PM_{2.5}$, is done mechanically using a Minivol sampler. Samples are drawn over a 24-hour period and calculations are made as to how much of the particulates can be inhaled by volume.

While there is no real concern as to the effect of gaseous pollutants on the immediate

area where the proposed Husab Mine will be, these will be monitored in time. Gaseous pollutants include sulphur dioxide, oxides of nitrogen and volatile organic compounds, which are usually caused by high traffic volumes and industrial operations.

“Airshed Planning Professionals is proud to be associated with Swakop Uranium’s monitoring project in an effort to get a better understanding of the baseline air quality. Although we manage the monitoring project, the actual monthly exchanges of the dust buckets and the Minivol sampler are being conducted by Swakop Uranium personnel whom we have helped train,” Hanlie says. “We believe we are further adding value by having the dust fallout analysis done by the SGS laboratory in Swakopmund, using local personnel. In this way, there is a continuous knock-on effect of skills transfer.”

A dust bucket is erected on top of a 2 m-high stand to collect the dust fall-out of coarser particles in the air. A metal windscreen, which is designed to slow down the flow of the particulates and cause them to drop into the bucket, surrounds the bucket.



Vission hits bull's-eye

In its first year of existence, Swakop uranium's newsletter, VISSION, has sparked a whole lot of interest.

Along the way it has ignited respect and accolades usually reserved for much more established publications.

It has recently been named the best External Newsletter in a Southern African-based corporate publication competition in which 150 corporate publications were entered.

This is the first time in the 10-year history of the competition that a publication produced from outside of South Africa has walked off with the top prize.

VISSION also won the prize for Best Writing, and was in the top three for design, photography, communication and Best Cover.

Of the writing, the judges said: "VISSION is a shining star in a firmament that has no shortage of stars, but none as bright as this one!"

The fun that the editorial team has in putting together this publication was also evident in this judge's comment: "The headlines are textbook examples of what a headline should be. The

introductions are original, novel, cheeky and, at times, funny. They certainly compel the reader to read on and on and on ..."

Another one stated: "Clearly the editor knows his/her job and has the know-how to present company information in an interesting and enjoyable manner to readers. It was really enjoyable to judge this publication. Excellent in every way!"

Page layout and design also went down well, with the judges noting that: "The design definitely enhances the message.

A very well-designed masthead that makes this publication easily recognisable, with an expertly designed cover that creates a feeling of expectation for the rest of the publication."

Photography received a near-perfect score, with judges recognising that "you clearly put in a lot of effort with the photographs".

In closing, one of the judges wrote: "This publication is an outstanding initiative and shows that close cooperation with local communities is essential. Well done."



Uranium fast facts



Where uranium is found

Uranium occurs in sea water, at about 0,003 parts per million (ppm); in rocks of the Earth's crust at up to 4 ppm; in ore as uraninite (UO_2) or pitchblende (U_3O_8); or as secondary minerals (complex oxides, silicates, phosphates, vanadates).

Uranium mines

Uranium mines operate in some 20 countries, though 58% of world production comes from just 10 mines in six countries, these six providing 85% of the world's mined uranium.

Uranium from warheads

A major secondary supply of uranium is provided by the decommissioning of nuclear warheads by the USA and Russia.

Leading producers

Kazakhstan is now the world's leading uranium producer, followed by Canada (which long held the lead), Australia and Namibia.

Namibia is expected to overtake Canada and Australia in 2015.

Birth of nuclear power

The first power station to produce electricity by using heat from the splitting of uranium atoms began operating in the 1950s.

Enrichment levels

Before it can be used in a reactor, uranium oxide concentrate (U_{235}) has to be enriched so that the proportion of U_{235} is increased to between 3% and 5%. After enrichment it has to be further processed to make fuel pellets that are fabricated into fuel rods. To be used in a nuclear weapon, uranium has to be enriched to at least 80% uranium U_{235} , which can't be done in civil enrichment facilities.

Reactor fuel

Uranium is used in nuclear reactors to generate heat and create steam that drives turbines and electricity generators.

Carbon dioxide levels

Nuclear reactors produce no carbon dioxide. While other parts of the nuclear fuel cycle do produce carbon, nuclear energy generation on a life-cycle basis is comparable to wind, hydro-electricity and biomass. Lifecycle emissions of coal generation are 30 times greater than nuclear.

Nuclear waste

If a nuclear power station was used to supply a family living in a four-bedroom house for 70 years, it would leave about one teacup of high-level waste.