



nafasi
water



At Nafasi Water, we believe in investing in and applying innovative technologies and responsible management to ensure that development takes place not at the cost of future generations, but in an environmentally conscious way.

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A WORD FROM THE CEO

Water security is at the heart of economic growth, environmental sustainability, and the well-being of communities.

At Nafasi Water Technologies, we take this responsibility seriously. We develop integrated, turnkey water treatment solutions that address the growing demand for alternative water sources and environmental rehabilitation. From desalination to the reuse of industrial and municipal wastewater, we deliver turnkey, fully financed solutions that ensure long-term sustainability.

Our mission is simple yet powerful:

- Transform water challenges into opportunities.
- Innovate solutions that are cost-effective and scalable.
- Empower communities through sustainable infrastructure.
- Build a circular water economy through waste beneficiation.

With our desalination expertise and value from waste solutions, we help industries reduce risk, reduce costs, and ensure a water-secure future.

By investing in local skills, supply chains, and communities, we are shaping a future where sub-Saharan Africa thrives with secure and sustainable water resources.

Welcome to Nafasi Water Technologies – your trusted partner in sustainable water security solutions.

Suzie Nkambule
Chief Executive Officer
Nafasi Water Technologies

OUR VALUE PROPOSITION

**INDUSTRIAL, MUNICIPAL
AND MINE IMPACTED WATER
TREATMENT AND SEAWATER
DESALINATION SPECIALISATION**



Project Feasibility

- Technological
- Environmental
- Financial
- Social



Engineering

- Process design
- Detail engineering
- Equipment selection and supply
- Ongoing R&D



Operations & Maintenance

- EPCM if preferred
- EPC construction through international and local construction partners
- Commissioning



Finance

- Raising of Capital for Investment
- Evaluation of investment
- Terms to suit client needs



Construction

- Long term operations services
- Training and development of local skills
- Plant process optimisation
- Asset protection

OUR PORTFOLIO

MINE IMPACTED WATER MUNICIPAL & INDUSTRIAL

At Nafasi Water, we don't just provide water solutions – we redefine the future of water security in Southern Africa and beyond. Through cutting-edge technology and strategic investment, we ensure that industries, municipalities, and communities have sustainable, reliable access to water.

As a full-service water utility, we take the complexity out of water management by offering end-to-end solutions – from financing and design to construction, operation, and maintenance. This allows our clients to focus on their core business while we handle the critical task of water security.

Our commitment extends beyond infrastructure; it's about investing in people, technology, and sustainable practices that drive long-term impact. Whether reclaiming water from industrial processes, purifying wastewater for reuse, or implementing large-scale desalination, we merge innovation with expertise to deliver world-class water and wastewater treatment solutions.

At Nafasi Water, we turn challenges into opportunities, ensuring that every drop is managed responsibly, recovered efficiently, and used sustainably.

ACID MINE DRAINAGE – AMD

What is it?

AMD is the flow of unsafe, polluted, acidic water from old or current mining areas. The level of pollutants in the water mostly depends on the area it comes from. The water contains high levels of dissolved salts, such as; calcium, magnesium, sulphate, iron, aluminium, toxic heavy metals such as cadmium and cobalt, and at times radioactive elements. This contaminated water is capable of polluting soil and water supplies as it spreads underground and flows into streams and rivers.

Why is it bad?

The flow of AMD into South Africa's surface and ground water systems is having devastating and lasting consequences that are both far reaching and long-term. These consequences include degrading the quality of the country's water systems, poisoning of food crops, destroying wildlife and eco-systems, endangering human health and infrastructure, as well as heritage sites.

Today, there are an estimated 6,000 abandoned or disused mines across South Africa, AMD from abandoned mine shafts and dumps poses a threat to clean water, as the contaminated water seeps into both surface and underground water reserves. As a leader in AMD, Nafasi is committed to remaining a strategic player by consistently investing in innovative methods geared at addressing challenges that lead to conservation and repurposing, which will benefit many Africans.





MUNICIPAL & INDUSTRIAL

As a responsible corporate organisation that aspires toward a 'triple- bottom-line' approach to business and reporting, saving water is a large aspect of that goal. Annual increases for potable water from municipalities is expected to rise at levels far above inflation, with an average of 9.3% up to 2022. This puts financial strain on industrial water users and forces an investigation around other options.

Additional concerns over national degradation of water infrastructure and looming water shortages, have the potential to cripple economic activity. Requirements to go 'off-grid' are now becoming a more crucial risk mitigation strategy.

Sectors within industrial water treatment vary, with ferrous metals, paper, petroleum, food & beverages and textiles accounting for over 90% of water use within the segment. Water treatment requirements for these industrial users are varied; from raw water treatment for internal use, to wastewater treatment for re-use or disposal.

Developing off-grid water strategies for industrial users is gaining traction – both to de-risk operational revenue through lack of reliable future supply, as well as clear business case to re-use as much water as possible.

Outside of treating water, Nafasi offers remote management of FMCG water treatment plant for internal re-use, which results in large cost saving opportunity both from water saving, as well as membrane management. We also help with recovery of CIP chemicals for FMCG customers, thus increasing efficiencies across the board.

By increasing wastewater re-use, we can reduce the reliance on municipal water intake and wastewater outfall, thus contributing to a better quality of life for the people and economy.

PROPRIETARY MINE WATER TREATMENT PROCESS

HIPRO PROCESS

Nafasi Water maintains its market leadership through continued technical innovation and investment in research and development. This strong commitment to innovation is achieved through our entrepreneurial culture and by working with external technical partners. For the treatment of mine water, Nafasi Water has developed a unique product called HiPRO™. With this we have pioneered the application of reverse osmosis to treat mine water and achieve ultra-high-water recoveries of 97% to 100%.

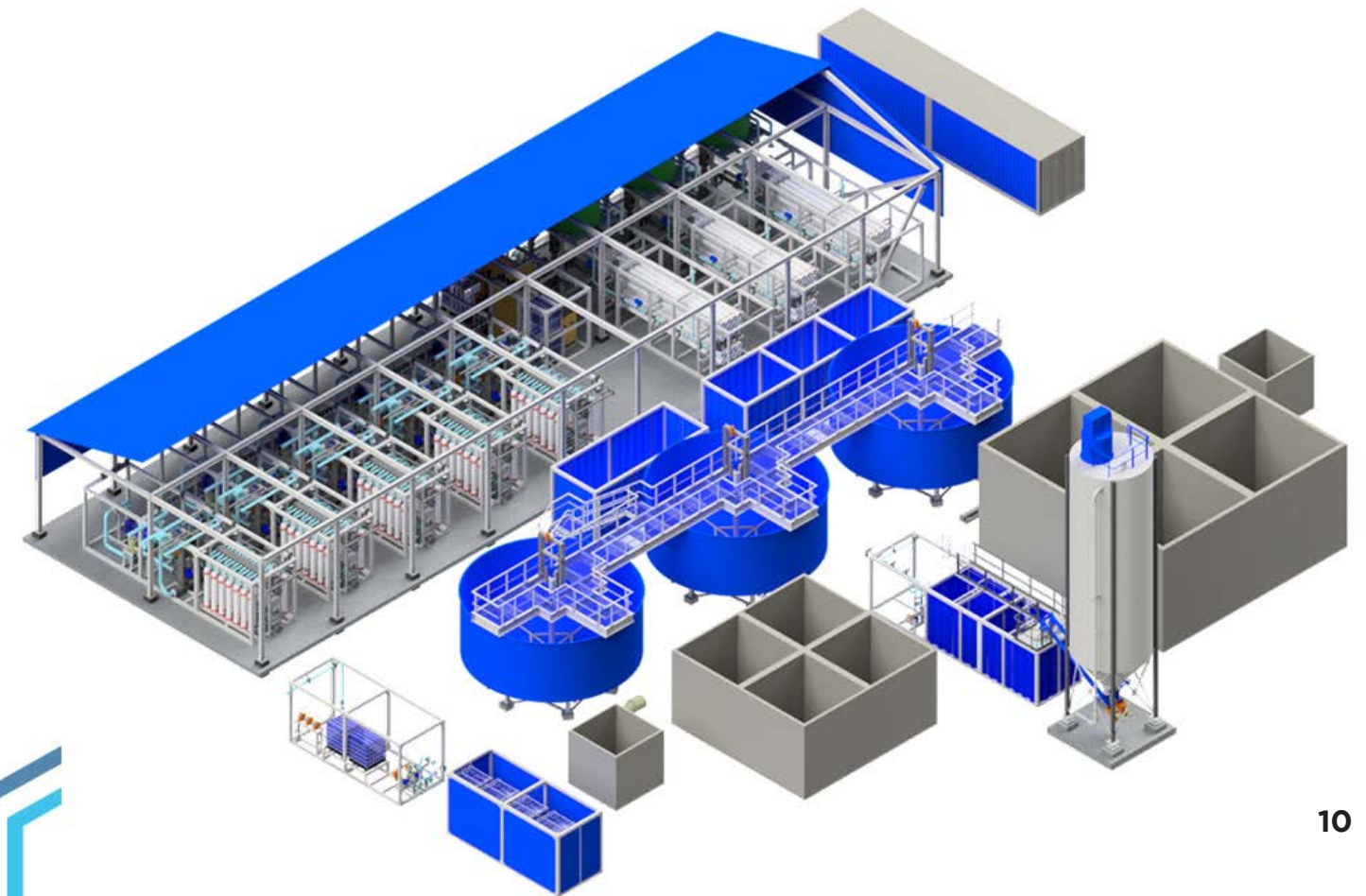
The HiPRO™ process achieves its high-water recovery through the use of multiple stages of ultrafiltration (UF) and reverse osmosis (RO) membrane systems, operating in series, and with inter-stage precipitation of low solubility salts. This is applied without the expense of evaporators and crystallisers typically used in the final concentration step.

The result is a very small brine stream that can be further treated or discharged into a lined evaporation dam.

HiPRO™ has the following unique features:

- Produces quality drinking water (SANS highest standard) Very high-water recovery, in excess of 97%.
- Lower capital and operating costs than other technologies. Minimum waste generation.
- Recovery of potentially useful by-products.

- Elimination of high-cost evaporation and crystalliser plants Nafasi Water uses various membrane technologies to treat water.
- Ultrafiltration (UF) uses membranes to achieve separation of small particles (down to bacteria and viruses) to avoid them reaching the RO membranes.
- Nanofiltration (NF) uses pressure-driven filtration through a membrane to remove larger molecules.
- Reverse Osmosis (RO) is a high pressure driven membrane process used for desalting water. Electro Dialysis Reversal (EDR) is an electrically driven ion exchange membrane process used to remove all dissolved components for ultra-high purity water requirements, such as boiler feed water.



OPERATION & MAINTENANCE



The day-to-day management of water infrastructure remains a non-core function for our mining and industrial clients. As leading providers of complete water treatment solutions, we offer a cost-effective water management service that allows our clients to focus on their core business.

In our role as managers of water treatment plants, we take the responsibility for the plants' operation, while also providing technical assistance and head office support. The services we offer include water analysis, utility management, audit and condition monitoring, routine maintenance and equipment renewal.

Our operations division is distinguished by its ability to consistently meet agreed performance criteria. We place the utmost priority on Safety, Health and Environmental standards, and offer performance guarantees to cover plant throughout, operating costs and process efficiencies.

The in-house Operations Management Tool - SIGMA OPS, enables alignment between operational goals, actual performance and asset (specifically membrane) monitoring.

This product has allowed the consistent operation of highly technical membrane plants, while offering membrane guarantees that ensure the financial exposure of the client is well defined.

Nafasi Water operates with an Intergrated Management Systems aligned with three ISO standards. ISO 9001 - Quality Management System, ISO 14001 - Environmental Management System and ISO 45001 - Safety Management System.

A great utility service and technology company, balances professional engineering, artisanal operations and maintenance skills pools. Nafasi Water is always on the lookout for talented people with a water technology obsession, particularly as we aim to capacitate the local industry to lead technology development. A core operations teams, with additional personnel sourced from local communities benefit from our consistent internal training programmes upskill employees and provide well-defined opportunities throughout the organisation.

SUSTAINABLE MINING



- eMalahleni Water Reclamation Plant
- Middleburg Water Reclamation Plant
- Optimum Water Reclamation Plant

Sustainable mining as an approach can grow the economy, create jobs, preserve and rehabilitate environmental resources, while assuring our economic and social security.

Through advanced reverse osmosis treatment, Nafasi Water provides permanent or short-term solutions to the mining industry by converting heavily polluted water into a re-usable resource, at recovery rates in excess of 97%, often achieving zero brine.

Our product range encompasses products that are rapidly deployable and have the ability to expand and adapt as the water treatment requirements change; as well as larger fixed capacity plants that are designed to handle a variety of feed waters from a range of different mining areas.

By developing high impact technology and local skills outside conventional mining to help support operations and grow the off-mining economy, it can improve the economic resilience of mining dependent communities.

EMALAHLENI WATER RECLAMATION PLANT

PHASE 1, SOUTH AFRICA

This flagship plant demonstrates Nafasi Water's expertise in treating mine water at affordable rates for re-use, thereby generating new water resources. In line with Nafasi Water's focus on zero waste, pure gypsum sludge, which is produced as a by-product, is sold to the manufacturing industry for use as gypsum board and building materials.

With various awards, this process has gained international recognition, showcasing the level of innovation that is part of the Nafasi Water DNA. These include a gold medal by the South African Institute for Engineers, a Mail & Guardian's Greening Future Award and the sustainability category of Nedbank Capital's Green Mining Awards.

The project was also recognised by the United Nations Framework Convention on Climate Change (UNFCCC) in 2011 as one their Lighthouse Projects in the Momentum for Change awards at COP17.

PHASE 2, SOUTH AFRICA

Nafasi Water has completed the upgrade project at eMalahleni to design, construct and commission a 25,000 m³/day plant to treat highly acidic mine water. The plant prioritises the processing of high acidity Acid Mine Drainage from Anglo American Thermal Coal's Navigation colliery to produce drinking quality water for the local municipality.

This plant upgrade has allowed Nafasi Water to showcase their operational expertise; by managing two large AMD water treatment plants next to each other, both of which receive vastly different feed water qualities. This translates into different complexities which need to be carefully operated and managed by a highly skilled Operations team.



OPTIMUM WATER RECLAMATION PLANT

SOUTH AFRICA

The purpose of the Optimum Coal plant near Hendrina in Mpumalanga is to treat the surplus of affected waters generated by the mine and its associated activities. The project was initiated in October 2008 and is designed to treat 15,000 m³/day with a peak capacity of 18,500 m³/day.

The plant treated water with a 99% water recovery, most of which was utilised by the local Hendrina Municipality, with the excess being discharged into the Klein Olifants River. Pure gypsum sludge from this plant was also available for sale as a building material. The design of this facility differs from the other plants in that the upfront neutralisation reactors are not included.

The plant was operated and maintained by Nafasi Water for 5 years and is anticipated to be functional beyond the life of the mine.





MIDDLEBURG WATER RECLAMATION PLANT

The MWRP was designed to be the world's first Mine Water Treatment Plant which produces zero brine, without the need for an energy intensive brine treatment technology. The project was completed in June 2015 and is designed to treat 20,000 m³/day with a peak capacity of 25,000 m³/day.

The plant treats water with a 99.7% water recovery, where the only liquid not leaving the plant as product water is the moisture in the dewatered sludges. Zero Brine is achieved through expert membrane design, and an operational team who can consistently operate a highly technical plant on the edge of current membrane capability. Pure gypsum sludge from this plant is also available for sale as building material.



NEW SOURCE OF WATER

Nafasi Water considers innovation a critical company value and has created an environment where innovation is celebrated. The outcome of this culture is that every new water treatment challenge is looked at through the lens of finding opportunity often new, creative ways to solve water treatment problems for our customers.

Discovering new ways of treating water source which was not historically part of the water balance for the region and adding it as a new resource gives us a great deal of pride, as well as moves us closer to our vision of a water secure future.

Innovation needs to be focussed with the end user in mind, understanding the customer needs, and working back to a technical solution that is fundamentally sound, as well as financially viable. This approach has allowed Nafasi Water to remain on the leading edge of technology, which results in ensuring our customer receives the required product and service – at the best price.

The availability of fresh water supplies is under great pressure with the demands of global population growth, significant industrial development and changing climatic conditions.

As a result, it is critical that cost-effective ways of providing fresh water for human consumption and business use are developed. With this in mind, sea water desalination is considered an increasingly viable water resource for industry and domestic consumption for coastal users.

Nafasi Water offers desalination treatment plant solutions which enable industrial and mining opportunities in coastal areas. Our solutions are also well suited to alleviating water shortages in environmentally sensitive areas.

Our flexible and innovative application of desalination technologies makes allowance for varying feed water quality and delivers consistent performance at optimal operating conditions.



ERONGO DESALINATION PLANT NAMIBIA

The Trekkopje Uranium Project in the Erongo desert region of Namibia is a low-grade, shallow uranium deposit that is mined by opencast methods. With the lack of groundwater and surface water resources and the abundantly rich mineral reserves in the area, as well as the associated water intensive nature of mineral extraction, desalination was the only viable solution to support the development of Orano uranium mine.

The seawater desalination plant, which was won against stiff international competition, was designed and constructed by Nafasi Water and is the first significant plant to be constructed in southern Africa. It is capable of delivering 20 million m³/year of treated water that is pumped approximately 50km in an overland pipeline to the Trekkopje mining site. The intake system draws sea water from the ocean, 1km offshore and caters for a future potential water demand of 45 million m³/per year.

Located approximately 30km north of Swakopmund, the plant began delivering water in May 2010 in preparation for mine activities and is being operated and maintained under contract by Nafasi Water until present.

The Atlantic Ocean along the Namibian coastline is nutrient rich, containing plankton, other sea life and is subject to incidence of red tide. The trend worldwide is to use advanced pre-treatment systems with difficult water in order to lower the total cost of operation. In this case, Nafasi Water uses ultrafiltration membranes to maximise the efficiency of the pre-treatment processes. Eleven parallel ultrafiltration trains are installed, followed by nine parallel reverse osmosis trains.

The Erongo Desalination Plant in Namibia is a prime example of the innovative approach that sets Nafasi Water apart from local and international players. The seawater desalination plant, which was won against stiff international competition, was designed and constructed by Nafasi Water and is the first significant plant to be constructed in southern Africa.

MUNICIPAL WATER & WASTE WATER

One of the most effective ways to unlock water and sanitation security is through effective wastewater treatment. A critical hurdle to overcome on the path to improving the state of our wastewater infrastructure is an effective finance structure which attracts various forms of investment.

Nafasi Water not only provides the innovative technological solutions but additionally has the ability to fully finance the entire project through various partners - ensuring that municipal infrastructure can be sufficiently improved and upgraded to handle the required volumes of wastewater.

The ability to meet South Africa's Millennium development goal of drastically reducing the number of people without access to safe drinking water depends on the ability to improve the maintenance of existing water infrastructure and build new water treatment facilities to meet future demand.

The mounting importance of clean drinking water is highlighted in parallel by the United Nations World Health Assembly's resolution to specifically address drinking water and sanitation needs for the first time in 20 years.

With the current deterioration of water infrastructure in South Africa, government has prioritised the spend on bulk water resource infrastructure. Water supply, as governed by the National Water Act 36 (1998), ensures that the nation's water resources are protected, used, developed, conserved and managed for the following purposes:

- To meet the basic human needs of present and future generations
- To promote equitable access to water
- To promote the efficient, sustainable and beneficial use of water in the public interest
- To provide for the growing demand for water use.

Nafasi Water provides innovative and custom developed solutions to enhance municipalities' ability to supply potable water and treat wastewater to acceptable standards. Our focus extends beyond the basic management of water resources to ensure optimal use of water.

As re-use of municipal wastewater through the utilisation of Membrane Bio Reactor (MBR) technology and membrane applications increases worldwide, Nafasi Water has honed its experience in advising and implementing effective processes for water re-use.

We can also provide skills transfer programmes within the scope of projects. Our holistic solution includes an operating and maintenance service, bolstered by the Nafasi Water's broad experience in major infrastructure development, which can be offered for both new and existing municipal infrastructure.



INDUSTRIAL EFFLUENT TREATMENT

Water is used widely for industrial purposes, and in the production of nearly every manufactured product. For each product, effective water management is essential to minimizing the discharge of wastewater into municipal wastewater systems and freshwater sources.

Sectors within industrial water treatment vary, with ferrous metals, paper, petroleum, food & beverages and textiles accounting for over 90% of water use within the segment.

Water treatment requirements for these industrial users are varied; from raw water treatment for internal use, to wastewater treatment for re-use or disposal.

The challenge for industry is to reduce the amount of water consumed per unit of valuable product produced. Nafasi Water helps clients to reduce their water consumption by designing solutions where water is recycled and waste streams are minimized, to achieve zero effluent goals.

Developing off-grid water strategies for industrial users is gaining traction - both to de-risk operational revenue through lack of reliable future supply, as well as clear business case to re-use as much water as possible. Nafasi Water has the necessary expertise in membrane and advanced treatment processes to assist industrial users in this regard.





LETHABO POWER STATION DESALINATION PLANT

SOUTH AFRICA

Eskom's Lethabo Power Station Desalination Plant was a project aimed to increase the desalination capacity at their water treatment plant. The water treatment plant is where the excess saline water from the New Vaal Colliery is treated for use in the cooling towers.

A major requirement was for our business to provide the right level of reliability, while ensuring the Eskom power station continues to operate optimally. To achieve this, construction and installation activities were carefully managed to ensure minimal disruption to the ongoing operation of the power plant.

To help the Lethabo Plant move towards being a zero liquid discharge facility, we replaced an older reverse osmosis plant with a polyamide reverse osmosis plant in a spiral-wound configuration. By doing this, the capital required and operating costs of maintaining the membranes are reduced, while having a smaller footprint and robust design which prevents membrane breakage.

A multi-membrane system is used to achieve a water recovery of 80% in a single stage. This system consists of TORAY microfiltration and reverse osmosis membranes. As a pre-treatment to the reverse osmosis plant, the existing settling tanks are used as lime water-softening units to remove water hardness through precipitation.

OUR PEOPLE

EMPLOYMENT & TRAINING



Nafasi Water stands firm in ensuring its people create consistent value for all stakeholders, by actively investing in the broader communities in SA. The company provides internal training programmes to upskill new employees, providing new prospects and well-defined opportunities for local employment.

Our investment in local communities promotes an environment of learning, breeding the next young engineering talent through training, while allowing expertise to be transferred to every new plant through the core business operations team. The SIGMA Ops monitoring and control system allows us to manage risk on maintaining and operating the plants. This social engagement adds value for the communities and stakeholders, demonstrating equitable benefits for the business and client's bottom line.

It is essential for Nafasi Water to facilitate and sponsor communities with effective water grids for long-term sustainability that brings about a better quality of life, while simultaneously assisting them in becoming self-sufficient all round.

OUR COMMUNITY

CORPORATE SOCIAL INVESTMENT

We believe that acting responsible through sustainable development is imperative. This core ethos has led to our commitment to build social and environmental awareness and bring about positive change throughout stakeholder communities with our social responsibility programme.

Our focus is on education - educating communities and stakeholders on the importance of clean water, environmental responsibility and sustainability, while striving to conduct our business in a way that is both environmentally friendly and sustainable. The goal is to expand our reach beyond just water education but to additionally offer support to children's schools and technical universities.

We aim to uplift and develop the communities impacted by the industrial and municipal projects that we are involved with by providing cleaner technologies, minimal waste and ensuring clean water wherever we leave our footprint. This will establish that the impact of all activities on communities, employees, partners and stakeholders, including the surrounding environment, is positive.



PROJECT REFERENCES

Acid Mine Drainage	<p>eMalahleni Water Reclamation Plant Phase 1 Mpumalanga, South Africa</p> <p>eMalahleni Water Reclamation Plant Phase 2 Mpumalanga, South Africa</p> <p>Optimum Coal Mine Water Reclamation Plant: Hendrina, Mpumalanga, South Africa</p> <p>Middelburg Water Reclamation Project Middelburg, Mpumalanga, South Africa</p> <p>Kromdraai Mobile Mine Water Treatment Plant Mpumalanga, South Africa</p>	<p>Client: Anglo American Thermal Coal/BHP Billiton Capacity: 25,000 m³/day Completion date: September 2007 Technology: Neutralisation, reactor/clarifiers and multi-stage UF/RO Operated by: Nafasi Water</p> <p>Client: Anglo American Thermal Coal Capacity: 25,000 m³/day Completion date: April 2018 Technology: Neutralisation, reactor/clarifiers and multi-stage UF/RO Operated by: Nafasi Water</p> <p>Client: Optimum Colliery (formerly BHP Billiton) Capacity: 15,000 m³/day Completion date: August 2010 Technology: Reactor/Clarifiers and multi-stage UF/RO Operated by: Nafasi Water to 2017</p> <p>Client: South 32 (formerly BHP Billiton) Capacity: 20,000 m³/day Completion date: June 2015 Technology: Neutralisation, reactor/clarifiers and multi-stage UF/RO Operated by: Nafasi Water</p> <p>Client: Anglo American Thermal Coal Capacity: 6,000 m³/day Completion date: October 2011 Technology: Neutralisation, reactor/clarifiers and multi-stage UF/RO Operated by: Nafasi Water to 2013</p>
	<p>Erongo Sea Water Desalination Plant Swakopmund, Namibia</p> <p>Lethabo Power Station Desalination Plant: Upgrade Vereeniging, South Africa</p>	<p>Client: Areva Resources Namibia Capacity: 54,000 m³/day Completion date: August 2010 Technology: Pre-treatment using ultrafiltration followed by RO Operated by: Nafasi Water to 2020 (under 10 year contract)</p> <p>Client: Eskom Capacity: 12,000 m³/day Completion date: 2002 (upgraded in 2010) Technology: Ultrafiltration and RO</p>
	<p>Langer Heinrich Uranium Mine Namibia</p>	<p>Client: Langer Heinrich Capacity: 5,500 m³/day Completion date: July 2011 Technology: Ultrafiltration and RO</p>



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