

DEGRÉMONT'S EXPERTISE APPLIED TO INDUSTRIAL WATER

OUR PROPOSITION

- EXPERTISE IN EXISTING PROCESSES
- TECHNICAL ASSISTANCE
- TRAINING
- CONSTRUCTION WORK SERVICES
- CUSTOMER SERVICE
- OPERATION

INDUSTRIAL QUALITY SERVICE: AN INTEGRAL PART OF THE PRODUCTION FACILITIES

*Degrémont accompany you to reduce the environmental footprint of industrial activities- a major facet of the **environmental responsibility of industries**. We manage industrial water production and operate increasingly complex industrial **wastewater treatment plants** as a result of tighter liquid effluent disposal regulations.*

CUSTOMER BENEFITS

- **Controlled management** of industrial water enables the industrials to **focus on their core business** and, in this way, plays a key role in **enhancing their competitiveness**.
- **Safe and reliable solutions** at reasonable cost to guarantee the **continuity of the industrial production**.
- **A network of experts** specialised in industrial issues and the support provided by Ondeo Industrial Solutions, a subsidiary of SUEZ ENVIRONNEMENT, which specialises in industrial water.
- Degrémont's innovative **capabilities**.
- **Optimisation of cutting edge equipment** functions used in situations where effluents fluctuate greatly in quantity and quality depending on production.
- **Builder-operator dual expertise** enables the operating personnel to be involved at the project design stage to promote the plant's **ergonomics** and to ensure it will operate properly in the future.
- Safety lies at the heart of all of Degrémont's operations.
- **Preventive maintenance plans** ensure the plant's longevity and **optimal asset preservation**.



DEGRÉMONT ACCOMPANIES YOU TO REDUCE THE ENVIRONMENTAL FOOTPRINT OF INDUSTRIAL ACTIVITIES

TREATING MINING WATER IN CHILE

Codelco is one of the giants of the global mining sector and is the world's biggest copper producer. Conscious of the environmental impact of its business, Codelco has selected Degrémont's expertise in order to operate and maintain the molybdenum treatment plant located at the South of Santiago in Chile. The operational challenge lies in managing the very polluted effluents whilst ensuring safety and reliability.



CIA VAL DO DOCE (BRAZIL), SUPPORTING THE MINING INDUSTRY'S PROFITABILITY

Degrémont operates a wastewater treatment plant for the mining industry at Vale in Brazil. Aim: adapt operation in case the mining market fluctuates whilst ensuring treatment reliability and service quality. Degrémont's staff constantly optimise the facility in order to maintain the industrial profitability thanks to the support from the company's technical network, which has been very responsive. Specific maintenance works have been endeavoured to ensure the longevity of the plants.



MAIN CONTRACTS

COUNTRY

CAPACITY (M³/D)

Cia Val do Rio Doce

Brazil

1,600

Salina Cruz

Mexico

8,640

Codelco

Chile

129,600

DEGRÉMONT'S EXPERTISE APPLIED TO DESALINATION BY REVERSE OSMOSIS

OUR PROPOSITION

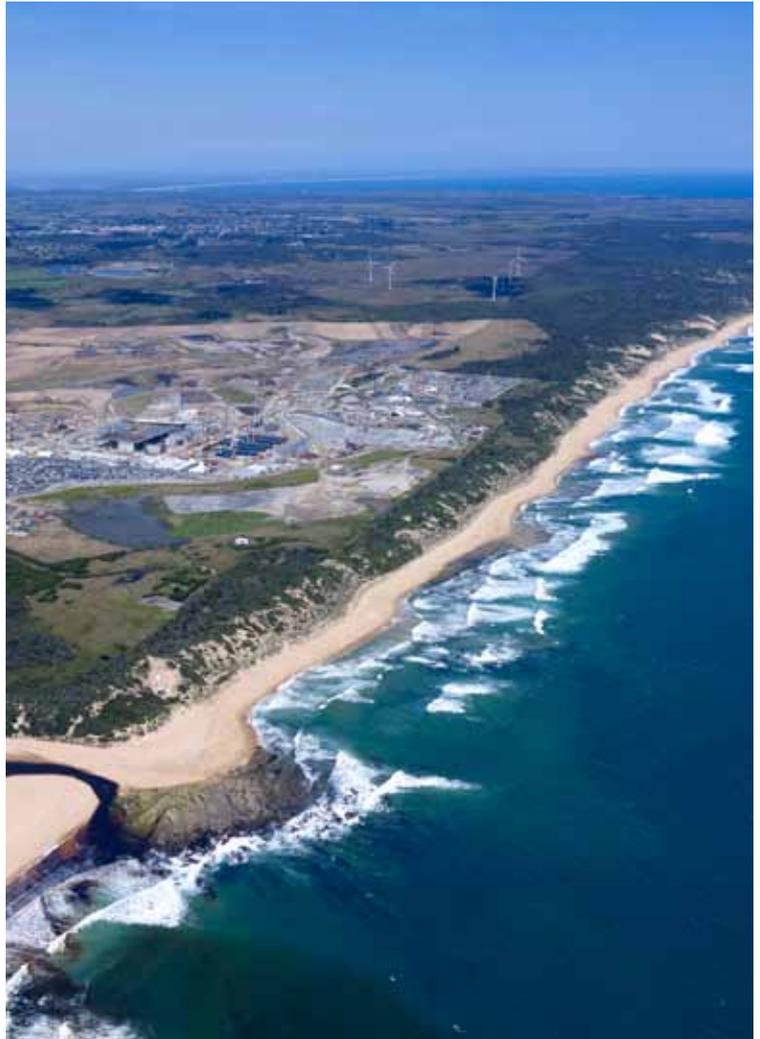
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DEGRÉMONT, THE PIONEER IN DESALINATION BY REVERSE OSMOSIS

10 million people currently consume water coming from a desalination plant built by Degrémont. The major issues in operating desalination by reverse osmosis plants have to do with **pre-treatment quality to preserve the membranes' integrity and life span** as well as **energy consumption optimisation**, which represents 2/3 of the operating costs. Environmental issues are also a priority for Degrémont, particularly with regard to brine disposal and fossil fuel consumption.

CUSTOMER BENEFITS

- **Over 25 years of experience** and know-how in operating desalination plants.
- **Experts in:**
 - **optimising energy consumption**,
 - **pre-treatment**, thereby ensuring that optimal water quality flows into the osmosis membranes,
 - **maximising the lifespan of membranes**,
 - **minimising water losses** during treatment and membrane replacement while ensuring the plant's continuous production.
- Working **partnerships** with the principal suppliers of membranes and energy recovery solutions.
- **Builder-operator dual expertise** enables the operating personnel to be involved at the project design stage to promote the plant's **ergonomics** and to ensure it will operate properly in the future.
- Safety lies at the heart of all of Degrémont's operations.



DEGRÉMONT, EXPERT IN OPTIMISING ENERGY CONSUMPTION AND MAXIMISING THE LIFESPAN OF MEMBRANES



PERTH (AUSTRALIA), AN ALLIANCE THAT LASTS

The Perth plant was built by Degrémont and inaugurated in April 2007. It produces 140,000 m³ of drinking water every day and is currently the southern hemisphere's largest operating sea water desalination plant by reverse osmosis. The plant provides water to 17% of Perth's inhabitants, or about 250,000 people.

The Perth plant is the first plant of its size to be entirely powered by wind energy, thereby preventing the emission of 200,000 tons of greenhouse gases per year. Moreover, in order to optimise the plant's overall energy consumption, Degrémont installed the ERI (Energy Recovery Inc.) on the first reverse osmosis system pass-through, allowing it to recover over 95% of the energy needed for its operation. Degrémont's operating staff were involved in commissioning the plant and starting it up, and have since then ensured its operation as part of an Alliance, a contractual scheme that brings the customer and operator together so that they share all gains and losses transparently. To reduce equipment corrosion, the staff increased preventive maintenance efforts and hired a specialised corrosion technician.

The Australian authorities appreciate Degrémont's builder-operator dual expertise and the guarantees of quality service. The Degrémont team, working closely with the customer, has been optimising the plant's operation for several years and has adapted its operations to suit new constraints and modifications requested by the municipality. The staff made operational changes in response to the municipality's request to boost the plant's productivity. By fine-tuning the adjustments and by carrying out numerous tests, Degrémont's operations staff were able to reduce energy consumption by 10% below the original design.



MAIN CONTRACTS	COUNTRY	CAPACITY (M ³ /D)
Calvia	Spain	5,000
Salina Cruz	Mexico	13,500
San Pedro del Pinatar	Spain	65,000
Bahia de Palma	Spain	68,000
Wadi Ma'In	Jordan	135,000
Perth	Australia	140,000
Barcelona	Spain	200,000
Melbourne	Australia	450,000

DEGRÉMONT'S EXPERTISE APPLIED TO REUSING WASTEWATER

OUR PROPOSITION

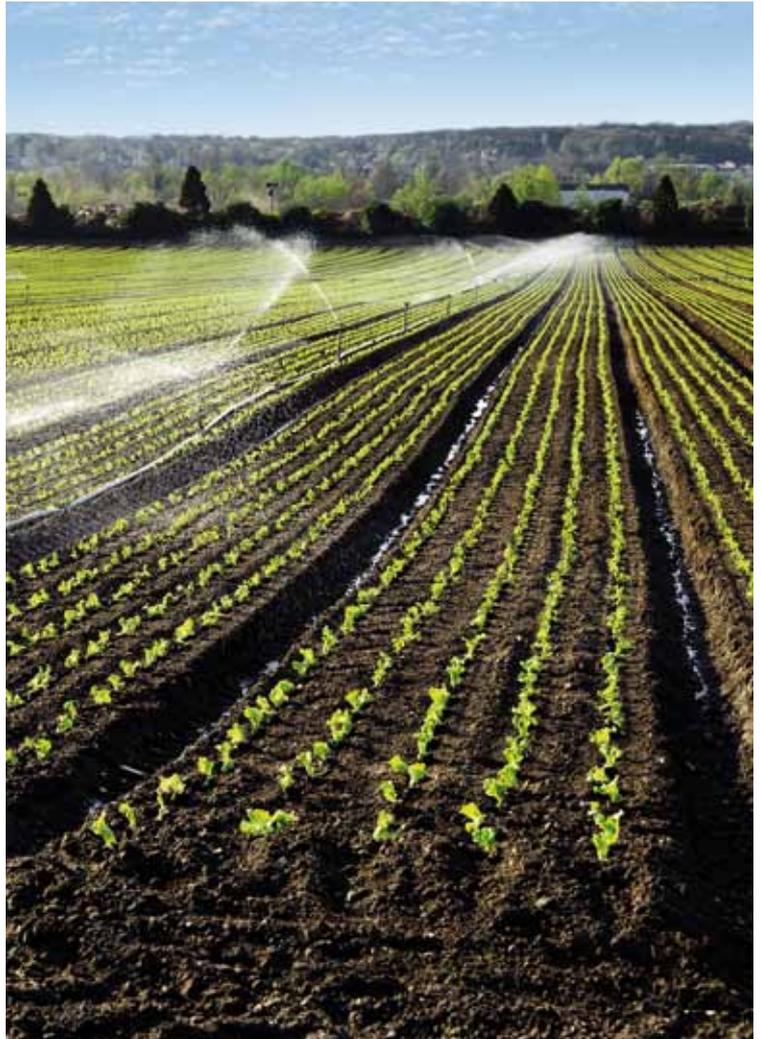
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REUSING WASTEWATER: A SKILL ALREADY MASTERED BY DEGRÉMONT

*Certain regions are affected by worrisome water stress situations, and are rethinking their water resource management by focusing on reusing their wastewater. This choice entails a high **level of technical know-how on the part of the treatment lines** since wastewater must be brought up to a **quality level similar to that of drinking water**. The entire process must, of course, remain **economically viable** with a **reduced environmental foot print**.*

CUSTOMER BENEFITS

- **Proven skills** in producing drinking water and treating wastewater, command of existing technical solutions (membranes, physical and chemical).
- The benefit of our **innovations** and **partnerships**.
- Experts in **optimising energy consumption** of such plants thanks to our know-how in **sludge recovery** and by using biogas as an energy source.
- **Improved energy performance** makes the operation of the plant even more complex and requires special monitoring.
- **Builder-operator dual expertise** enables the operating personnel to be involved at the project design stage to promote the plant's **ergonomics** and to ensure it will operate properly in the future.
- Safety lies at the heart of all of Degrémont's operations.
- **Preventive maintenance plans** ensure the plant's longevity and **optimal asset preservation**.



DEGRÉMONT WAS ONE OF THE FIRST COMPANIES TO OFFER ITS CLIENTS WASTEWATER RECLAMATION PLANTS

MAXIMUM WATER AND ENERGY RE-USE IN JORDAN

Designed to treat the wastewater of 2.2 million inhabitants in Amman Jordan, the As Samra plant is almost self-sufficient energy wise- a world-wide first. Inaugurated in August 2008 with a capacity of 267,000 m³/day, the plant allows 100 million m³ of water to be reused per year. The plant's staff operate, among others, hydraulic turbines installed upstream and downstream of the plant. The gas engines fuelled with biogas produced by sludge digestion accounts for 95% of the electricity needed for the plant's operation.

Reusing wastewater is key to the Jordanian water management to protect the environment. 100% of the water treated at As Samra is reused in the agricultural sectors located around the treatment plant and in the Jordan Valley with its 17,000 hectares of crops. The thoroughness of the monitoring process enables the production of water of much higher quality than that which is required by local regulations. Degrémont's teams were able to modify the plant's operations in order to maintain the treatment quality despite the plant overload of suspended solids. The United States Agency for International Development (USAID) helped fund this project because of its exemplary and strategic nature.



SAN LUIS POTOSI (MEXICO) - DUAL-PURPOSE WATER

Since 2006, Degrémont has had a 20-year contract to operate the Tanque Tenorio plant located in San Luis Potosi, Mexico. This modern plant enables the production of two types of recycled water for different uses. 90,000 m³ of wastewater is recycled every day for farm irrigation, an unexpected resource that is crucial for this drought-affected region.

A tertiary treatment enables the production of higher-quality recycled water used to feed the cooling system of the nearby electrical generating plant-Villa Reyes. The technologies employed and the industrial manufacturing constraints make Degrémont's expertise crucial to operate and maintain this plant under the best conditions.

MAIN CONTRACTS	COUNTRY	CAPACITY (M ³ /D)
Cubbon Park-Bangalore	India	1,500
Noosa	Australia	12,000
San Luis Potosi	Mexico	90,720
Doha West	Qatar	135,000
As Samra	Jordan	267,000
Milan San Rocco	Italy	345,000

DEGRÉMONT'S EXPERTISE APPLIED TO URBAN WASTEWATER

OUR PROPOSITION

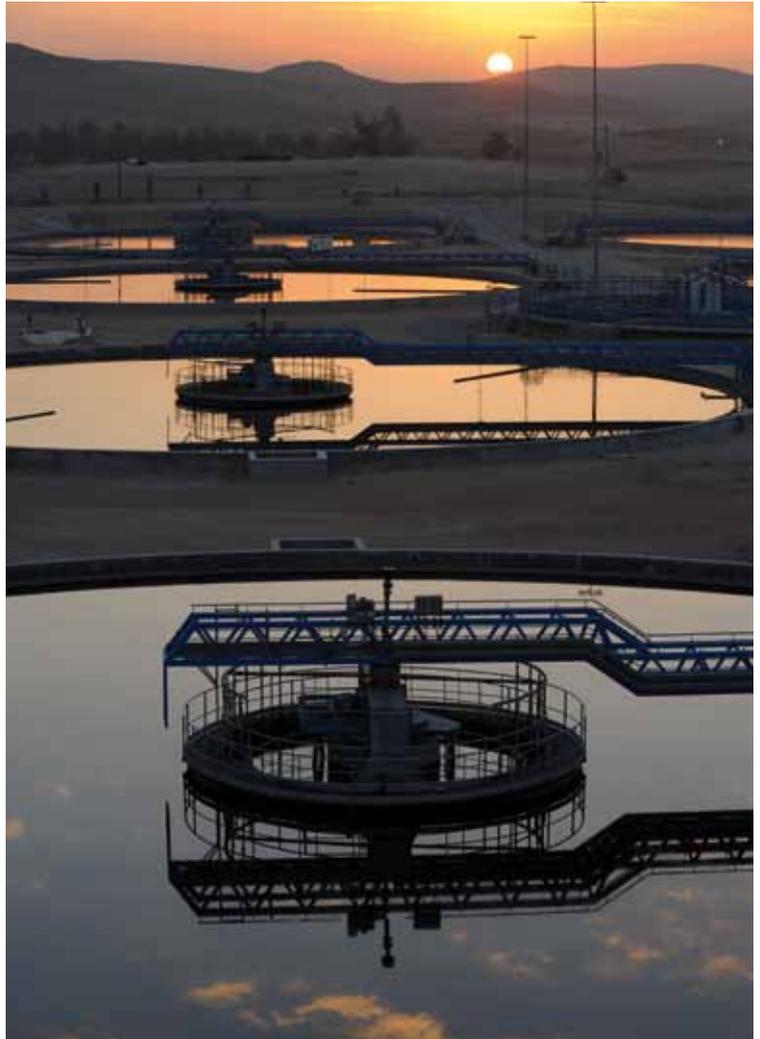
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WASTEWATER TREATMENT ON A SMALL OR LARGE SCALE: A BROAD RANGE OF SERVICES

The complexity of wastewater treatment together with growing regulatory requirements pose business challenges and increasingly complex technological issues for the operators. Degrémont is committed to working closely with you to ensure **perfect control of the treatment at all times**. **Urban integration goals** have been added to these quality issues, (efficient use of space, architecture, noises and odours nuisance) and **reducing energy consumption**.

CUSTOMER BENEFITS

- **Complete control of numerous technical facilities** to treat effluents, odours and sludge to generate electricity and reuse wastewater.
- Know-how with regards to managing a **wide range of effluents** collected, compact **facilities** as well as our ability to control **odours** to reduce their propagation, represents various skills that sign our difference.
- We also provide services for **sludge recovery** and **produce energy** from waste.
- **Builder-operator dual expertise** enables the operating personnel to be involved at the project design stage to promote the plant's **ergonomics** and to ensure it will operate properly in the future.
- Safety lies at the heart of all of Degrémont's operations.
- Numerous operating experience **feedbacks** help us to implement operating processes **to optimise daily operations**.
- **Preventive maintenance plans** ensure the plant's longevity and **optimal asset preservation**.



DEGRÉMONT IS COMMITTED TO WORKING CLOSELY WITH YOU TO ENSURE PERFECT CONTROL OF THE TREATMENT AT ALL TIMES

OPERATING PERFORMANCES GUARANTEE HIGH QUALITY WATER DISPOSAL IN QUEENSLAND (AUSTRALIA)

The city of Noosa is situated in one of Australia's most touristy regions that attaches much importance to environmental protection. The constraints for water disposal are therefore extremely demanding and require continuous operation vigilance in order to perform as expected. The wastewater treatment plant, with a capacity of 12,000 m³/day, meets high quality environmental standards. The plant is equipped with an ultraviolet disinfection line and advanced solutions to manage sludge. But after 12 years of operation, upkeep and maintenance are crucial factors in the environmental performance of this facility. Degrémont operates the plant with the greatest of care in order to guarantee results day after day at a reasonable cost while ensuring the longevity of the facility.



GABAL AL ASFAR (EGYPT): INCREASING CAPACITY THROUGH OPTIMIZATION

The contract for operating the Gabal El Asfar wastewater treatment plant in Cairo, that was awarded to Degrémont in 2005, was recently renewed for the second time. The facility has a capacity of 650,000 m³/day and treats urban wastewater for over 4 million inhabitants. By renewing the contract, the Egyptian authorities underscored their satisfaction with Degrémont's builder-operator dual expertise that raised the facility's treatment capacity by 25% while minimising energy consumption. The plant produces 65% of the energy needed for its operations thanks to sludge treatment and the adjacent electrical generating plant. The authorities also appreciated Degrémont's ability to recruit, train and share its expertise with the local staff since the plant's construction in 1999. To date, nearly 220 people have taken part in a training program.

MAIN CONTRACTS	COUNTRY	CAPACITY (M ³ /D)
Barwa Housing	Qatar	3,000
Noosa	Australia	12,000
Villeneuve d'Asq	France	21,600
Adeje Arona	Spain	35,000
Marrakech	Morocco	118,000
Delhi- Rithala	India	180,000
Valenton	France	600,000
Strasbourg	France	170,000
Pillar Point	Hong Kong	550,000
Gabal Al Asfar 2A	Egypt	650,000
La Farfana	Chile	800,000

DEGRÉMONT'S EXPERTISE APPLIED TO DRINKING WATER PRODUCTION

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SERVICES: EXCELLENCE AND DEDICATION TO ACHIEVE 100% COMPLIANCE

*Operating plants to produce drinking water is a huge responsibility that we constantly undertake to ensure the continuity of the supply service. **We guarantee the production of drinking water** regardless of the type of source or quality of the source, be it springs, creeks or rivers, **while ensuring that sanitation standards and regulatory requirements are met.***

CUSTOMER BENEFITS

- **Over 25 years** of experience operating plants that produce drinking water.
- **Command of increasingly complex treatment lines** that trap micro-pollutants, nitrates and other molecules responsible for tastes and odours.
- **Builder-operator dual expertise** enables the operating personnel to be involved at the project design stage to promote the plant's **ergonomics** and to ensure it will operate properly in the future.
- Safety lies at the heart of all of Degrémont's operations.
- **Feedback** from the operator's experiences improves processes and treatment technologies while deriving the most from them.
- **Maximum operating performance** to ensure universal access to drinking water.
- **Preventive maintenance plans** ensure the plant's longevity and **optimal asset preservation**.



DEGRÉMONT ENSURES THE CONTINUITY OF THE SUPPLY SERVICE OF DRINKING WATER



SONIA VIHAR (INDIA): CHANGE THE STATUS QUO IN NEW DELHI

Facing significant pressures on its water supply, New Delhi decided to acquire a drinking water plant adapted to cater to its important needs. New Delhi awarded Degrémont the design, construction and operation of the Sonia Vihar plant with a capacity of 635,000 m³/day from 2005 to 2015. The raw water comes from both the Yamuna River, which crosses Delhi, and from the Ganges River. Although the quality of the raw water proved to be higher in turbidity compared to the project's initial data, Degrémont's expertise enabled operation adjustments without a significant increase in chemical costs. By modifying the settling process, the staff obtained a more effective treatment and a reduction in operating costs. The water is treated by three Turbocirculator pre-settlers, which are used during the monsoon, and then 8 Pulsator™ settlers and 22 Aquazur V™ sand filters. The extracted sludge is thickened and then centrifuged. Operating advanced technologies on such a grand scale requires a specific skill set. New Delhi's decision to choose Degrémont to operate the new plant for 10 years proves the operator's concern to obtain the best operating conditions and the best service quality.

SEMARANG (INDONESIA): SUCCESSFUL SERVICE CONTINUITY AT A TIME OF REHABILITATION

Built by Degrémont between 1959 and 1963, the drinking water production plant for the city of Semarang, located on the island of Java in Indonesia, rendered good and loyal services for 42 years. In 2005, the local authorities decided to award Degrémont a contract for the plant's rehabilitation and operation to ensure that the community would continue to have access to quality drinking water. The construction work began at the same time that the existing facility was operating under a Rehabilitate Own Transfer contract. The challenge was to maintain continuous production and service quality during the rehabilitation. Completed in 2009, the facility is now modernised and will be operated by Degrémont for a period of 15 years. The plant now produces over 600 litres of water per second compared to the plant's previous production capacity of 500 litres of water per second.

CHEN CHIN LAKE (TAIWAN): CONTINUING TO OPERATE UNDER EXTREME CONDITIONS

Chen Chin Lake in Taiwan is the only water treatment plant which operates in Kaohsiung during the typhoon season. During the extreme weather conditions specific to the typhoon season, Degrémont's operators control the facility and adapt its operations to maintain water quality while increasing production capacity. Our expertise has also resulted in the price reduction of granular activated carbon thanks to process optimisation.

MAIN CONTRACTS	COUNTRY	CAPACITY (M ³ /D)
Almoguera	Spain	33,000
Medan	Indonesia	43,200
Semarang	Indonesia	51,840
Perak	Malaysia	126,000
Athmania	Algeria	262,500
Bangalore TK Halli	India	400,000
Chen Chin Lake	Taiwan	450,000
Sonia Vihar - New Delhi	India	635,000
Prospect	Australia	3,000,000