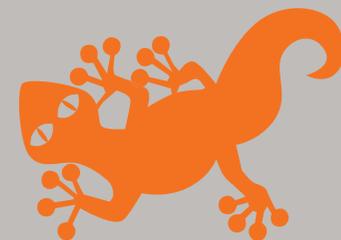




20

YEARS



GOLDEN GECKO

Awards for Environmental Excellence

*2011 Commemorative Booklet*



Government of Western Australia  
Department of Mines and Petroleum



# 20 YEARS



## GOLDEN GECKO

Awards for Environmental Excellence

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#### Abbreviations

GG – Golden Gecko Award Recipient  
CoM – Certificate of Merit Recipient  
EA – Encouragement Award Recipient

## The Minister's Address

Western Australia's resources sector, now valued at \$91.6 billion in 2010, continues to be the backbone of the State's economy. There are more than \$250 billion worth of major resource projects and associated infrastructure developments committed, or under consideration, over the next few years.

To ensure our nationally significant industry is sustainable, industry development must be balanced with the environmental and social needs of Western Australia. The Golden Gecko Awards for Environmental Excellence recognises the outstanding and innovative work being done across the State.

This 20th Anniversary Commemorative Booklet celebrates past award recipients, showcasing their innovative projects that have shaped industry practices and enriched the sector in Western Australia.

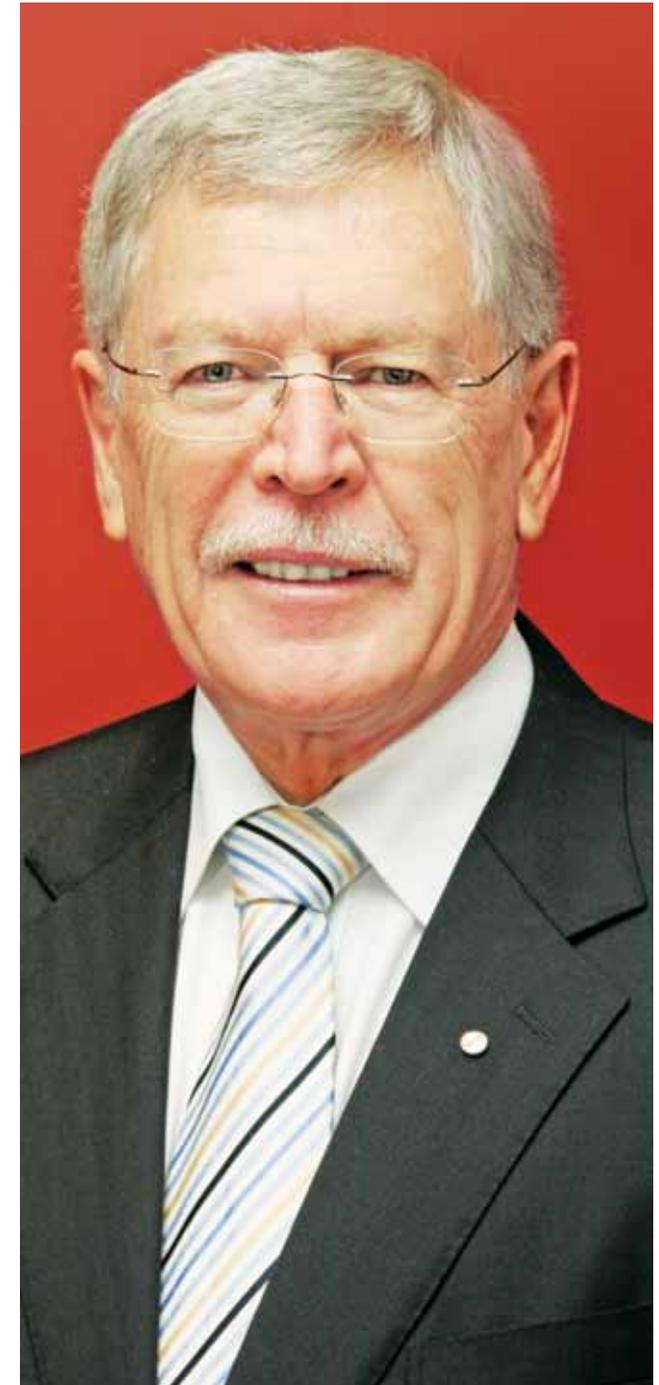
Golden Gecko Awards recipients have shown how a strong and healthy industry can be achieved without compromising biodiversity or heritage, while also meeting the expectations of the Western Australian people in regard to sustainable mining practices.

Each year entrants have continually improved environmental outcomes through innovation, techniques, commitments and attitude. These companies and individuals have led the way in changing work practice and culture, to build in better practices for the developing industry we have today.

The Western Australian Government has a rigorous regulatory approvals framework to ensure the responsible development of resources. Looking back over the history of these awards, Golden Gecko recipients have continually exceeded regulatory requirements and strived for higher industry standards.

On behalf of the Western Australian Government, I applaud the efforts of all 276 entrants over the past 20 years. I also congratulate the 53 Golden Gecko Award recipients and 44 Certificate of Merit recipients, whose achievements continue to inspire innovations to deliver improved environmental outcomes for the Western Australian community.

**The Hon. Norman Moore MLC  
Minister for Mines and Petroleum**



## History of the Golden Gecko

The Awards for Environmental Excellence began in 1992 as a way to recognise the achievements of industry. The awards aim to foster improvements in environmental management and keep Western Australia in line with world leading practice.

The gecko slowly began appearing in the background, first on the Certificate of Merit, then expanding its territory to the invitations and entry forms. By 1997, the gecko was proudly showcased front and centre and had the awards renamed in his honour – signifying the birth of the Golden Gecko Awards.

The story of our gecko reflects the story of many geckos in the wild. As industry rehabilitates mine sites, pioneer plant species recolonise the area and insects and fauna begin to re-enter the site. Geckos are seen as a bio-indicator – a species that shows the progress of rehabilitation. Geckos have specialist habitat requirements such as exfoliating tree bark and leaf litter for shelter, which take time to develop in a disturbed ecosystem. The return of the gecko species indicates the ecosystem is healthy and functioning well.

Over the past 20 years, the bronze Golden Gecko sculpture, designed and carved by local artist George Kosturkov, has taken up residence in many project locations. In total there have been 53 award recipients and 44 merit certificates, which are proudly displayed across Western Australia.

Entries are reviewed and assessed by two groups, an assessment panel and a selection committee. The assessment panel's role is to determine entry eligibility and undertake inspections to validate and verify the overall environmental performance of the project. The panel consists of representatives from the Department of Mines and Petroleum, Department of Environment and Conservation, Department of Agriculture and Food, Department of Water, the Office of the Environmental Protection Authority and previously the Conservation Council of Western Australia.

The selection committee's role is to assess the entrant's submission for demonstrated environmental excellence. The committee consists of the Director General of the Department of Mines and Petroleum and three other independent members. In this commemorative issue the Department of Mines and Petroleum would like to thank all past committee members, who are listed below.

Pat Barblett  
Marion Blackwell  
Bernard Bowen  
Denis Brooks  
Donald Burnside  
Harry Butler  
John Colwill  
Brian Easton  
Fay Gayle  
Susan Hunt  
Des Kelly  
Brian Logan  
Jim Limerick  
Pauline McLeod  
Brendon Nicholson  
Anne Nolan  
Neville Passmore  
Ken Perry  
Lee Ranford  
Beverley Ronalds  
Graeme Rundle  
Michael Schultz  
Richard Sellers  
Erica Smyth  
Ray Steedman  
Charlie Thorn  
David Wilcox



# Rehabilitation

Many Golden Gecko Awards have been won for rehabilitation efforts, demonstrating the length that industry goes to return disturbed areas to fully functioning ecosystems. In the 20 years of the awards, techniques and processes have been invented, modified and updated to improve the quality of rehabilitation to standards where many sites are assumed to be 'natural', with companies extending rehabilitation efforts to return the land to similar pre-clearing conditions.

Alcoa's (2002, 2007 GG) rehabilitation of Australia's first bauxite mine at Jarrahdale painted an amazing picture of environmental excellence. The rehabilitation of 630 hectares of disturbed land back into a functioning ecosystem, demonstrated how industry can operate and return the overwhelming majority of land back to its original condition. This rehabilitation matched the species richness of the surrounding environment.

Arimco Mining (1995 GG) trialed new techniques at its Gidgee Gold Mine to aid rehabilitation and water recovery. The aim of the project was to create a self-supporting, regenerative environment similar to that of the surrounding area. Good results were achieved by developing an attitude of ownership of the environment amongst the workforce.

Research has always played a vital role in advancing successful rehabilitation. Barrick Gold, Outback Ecology and the University of Western Australia (2003 CoM) initiated the first baseline study of arsenic uptake by native plants in the WA Rangelands. This research was conducted to assist with the rehabilitation of the Lawlers Gold Mine, which had four tailings facilities containing high levels of arsenic. The research provided valuable data on the tolerance of plants to arsenic, its uptake by grazing animals, and its importance in safe rehabilitation.

BHP (1993 GG) closed its Goldsworthy Mine in 1982, and left the town site to service a nearby mine. By

1992, the town population had shrunk and BHP decided to rehabilitate the entire town site even though there was no legislative requirement to do so. BHP used a new technique of interlocking dams on the slopes of waste dumps to aid rehabilitation efforts.

Botanic Gardens and Parks Authority and Rocla (2008 GG) undertook a 13-year research program to develop techniques for successful restoration of the biodiverse Banksia woodland. The results of the research were reflected in Rocla's rehabilitation plan. As a result of the information produced, Rocla's rehabilitation has seen the reinstatement of species from one per cent to over 70 per cent in rehabilitated sites - the highest achieved in a woodland community.

CRA Exploration (1992 GG) minimised its impact on the Rudall River National Park and developed strategies for its rehabilitation. They were commended for their instructional videos explaining their activities to the local indigenous community. Engagement with local Aboriginal communities is now very common, and they are being actively employed to help undertake successful rehabilitation.

CSR Readymix (1993 CoM) used ongoing five-year plans to manage the environment at its Gosnells Quarry. CSR was required to ensure its operations were strategically planned to minimise the impact on the encroaching Perth population. CSR was proactive in planting trees to minimise noise and dust, and bunds to harvest rainwater.

Planning also plays an important role in the success of rehabilitation works. Dominion Mining (1996 CoM) achieved its rehabilitation goals for its Meekatharra rehabilitation project by planning and maintaining a progressive rehabilitation program of its waste dumps. Since closure of operations in 1995, Dominion Mining concentrated on completing the rehabilitation of all decommissioned areas and placing the operation in care and maintenance prior to transferring the project to Plutonic Resources.

Forsayth Mining (1992 CoM) enclosed areas in vermin proof fencing to minimise the impact of grazing on rehabilitation. They also established an onsite nursery and seed orchard to provide a self-sufficient source of endemic floral species and seedlings for revegetation purposes. A waste dump with two spillways (vertical drains) was also built to channel water flow to an energy dissipater and reduce the potential of erosion.

Hamersley Iron's (1995 GG) rehabilitation of road and rail links in the Pilbara also demonstrated a connection to the surrounding environment. Hamersley's Aboriginal Training and Liaison Department (ATAL) carried out the rehabilitation work along 386 kilometres of rail and road corridors, with comments at the time stating some areas of rehabilitation had "become almost indistinguishable from the natural environment."

Homestake Gold (2001 GG) also used a systematic approach to its closure and rehabilitation work. Homestake used audits and monitoring to ensure that rehabilitation efforts were making progress. A key feature of their planning involved the use of user-friendly task registers in the reclamation phase. The company's approach enabled the industry to meet the community's high expectations of mine closure and rehabilitation of the natural environment.

Ingenuity saw Rod Mitchell's Transport and Exploration Services (1996 GG) take out an award for rehabilitating sites believed to be unworkable. The company successfully completed excellent rehabilitation on slopes up to 37 degrees steep. The outcome of this effort proved that steep slopes are no excuse for poor rehabilitation.

Lindsay Stockdale (1997 GG) showed that prospectors also need to be cognisant of environmental management. Lindsay set the standard for prospectors, with his commitment to manage small scale mining operations around Kalgoorlie. He showed how anyone can achieve excellent rehabilitation with limited resources through proactive planning.



Image courtesy of Alcoa of Australia

Minara Resources (2008 GG) had several unsuccessful attempts at rehabilitation of its Murrin Murrin Minesite, prompting a review of the process it followed in developing its rehabilitation program. The result was the development of key performance indicators (KPIs) to determine rehabilitation success. This included identifying five key stages: planning, construction, initial performance, monitored performance, and sustainability.

Normandy Poseidon (1992 GG) adopted a proactive attitude to environmental management at its Jubilee mine. Normandy Poseidon reduced the slopes on its waste dumps and planted rye to stabilise them and aid rehabilitation. Results at the time indicated healthy revegetation, and reduced slopes to minimise erosion is still used today.

Robe River Iron Associates (1997, 1992 CoM) also struggled with initial rehabilitation attempts at its Pannawonica Operations. As such, germination trials commenced in 1988 using commercially available seed, as local seed was limited. The results of a 10 hectare trial showed optimal results and the technique was adopted for the site.

Sons of Gwalia (2006 GG) involved the community in the planning and decision making process to improve the natural environment of the Greenbushes mine site post-mining. As it is the oldest continually mined deposit in WA since 1888, Sons of Gwalia worked on rehabilitation and closure efforts to reflect the past, present and future of the site. This resulted in community facilities, education programs and improved visual amenities.

Victor Dale (2001 CoM) completed rehabilitation at a mining site 30 kilometres north of Coolgardie to blend in with the surrounding environment. Mined from 1994 to 2000, Victor Dale ensured the rehabilitation was completed to a very high standard with vegetation regrowth, rubbish removed, and no signs of erosion.

Western Mining Company (1993 GG) developed new technology to enhance its rehabilitation. Its methods included the KNO plug for capping drill holes, acid treatment of seeds for germination and a rake attachment for ripping. This technology lifted the standard of rehabilitation requirements for the exploration industry at the time.





## Information Management

It's amazing just how far technology has advanced and how well it has been incorporated by industry to improve environmental outcomes. In the early years of the awards, the Global Positioning System (GPS), released in the 1980s, was in its early stages in the commercial world. In 2011, GPS is now so commonplace it's hard to believe that anyone survived without one. The recording of drill holes with GPS points allows companies to easily and efficiently rehabilitate exploration works.

With the speed at which technology is changing and being adopted, the future of information management is one that will be interesting and many future gecko awards are likely to form such endeavours.

Distributed throughout the Jarrah forest is the root pathogen *Phytophthora cinnamomi*, which causes dieback. This fungus is capable of causing mortality in the jarrah overstorey and a wide range of understorey species. Alcoa (1996 GG) introduced an environmental management system to integrate research, inventory, planning, education, training, field supervision and auditing which was all supported by Geographic Information Systems (GIS). This technology enabled known areas of dieback to be identified so that it doesn't spread throughout the forest. This instant availability of information is now being used across the entire workforce on site to prevent damage to the environment or clearing of the wrong area.

Information management has also helped with the distribution of data throughout a company. Australian Resources and Arimco's (1997 CoM) systems at its Gidgee Minesite in the Mid-West allow the companies to: minimise, monitor and record land clearance using a database; keep better and more accessible records; activate disciplinary procedures; undertake internal monthly reports summarising rehabilitation works; and send quarterly Environmental Compliance Audit results to the Australian Resources Board of Directors. This has minimised land disturbance, enabled progressive land rehabilitation, preserved surface hydrology and recognised and preserved Aboriginal and European heritage sites.

BHP Petroleum's (1995 GG) environmental management of exploration activities in WA included developing a Geographic Information System (GIS) and Environmental Resource Atlas. BHP Petroleum studied environmental effects and management measures, conducted an oil dispersibility study and consulted with public stakeholders and community. This resulted in environmental management of exploration activities, oil spill response and contingency planning in the area.

Over a decade ago, Hamersley Iron's (1998 GG) Resources Task Force developed an innovative application of GPS and GIS technology to minimise the impact of mineral exploration in the Pilbara. The team used real time GPS data, field tracking systems and digital mapping to develop a program that could identify, log and detail current and historic exploration activities including drill holes, access tracks, winzes, costeans and camps. At the time of the award more than 10,700 drill holes had been capped and more than 3000 had been rehabilitated, a 674 kilometre line of access tracks had been rehabilitated and 11 winzes filled and rehabilitated.

Newmont (2002 EA) is signatory to the Minerals Council Code for Environmental Management and is required to publish an annual Public Environmental Report. Newmont has enhanced their mandatory report for the Golden Grove mine site in the Mid-West to exceed regulatory reporting requirements. The report is also an effective tool for internal auditing of environmental performance. This approach exceeds regulatory reporting requirements and has resulted in notable improvements in environmental performance.

Larger companies require an even greater commitment to information management. Rio Tinto's (2010 GG) Iron Ore Group manages over 2.5 million hectares of land in Western Australia, including mine sites, supporting infrastructure and pastoral stations. Rio Tinto implemented information management systems and approval requests into its operations for environmental management. The project demonstrated the innovative and holistic approach Rio Tinto took to understand environmental factors and minimise environmental impacts throughout its entire group and the Pilbara region.

# Environmental Management

Industry has changed dramatically over the past 20 years, incorporating environmental management into planning, day-to-day running of operations and even boardroom decision making. Today we see good corporate citizenship as a requirement for organisations, with environmental credentials being a key performance indicator.

Environmental management can be expressed in many different ways including using technology to engineer solutions that minimise the impact of operations. Alcoa (2006 CoM) made a significant effort to operate a well-managed site using best practice techniques for the protection of the environment. Alcoa constructed its McCoy Crusher site with mine closure in mind, ensuring all infrastructure was easily removable and minimising its footprint by the use of shared services corridors. Many companies are now applying other technical innovations to leave the smallest footprint possible after exploration or operations cease.

Environmental management also extends beyond the boundary of the site. Alcoa (2000 GG) demonstrated commitment at its Pinjarra Alumina Refinery with its Quality Land Management Program. The program involved extensive communication with the local community and as a result, the land was returned to a range of useful activities in accordance with the wishes of the local community.

ATCO Gas Australia, formally known as WA Gas Networks, teamed up with KD1 (2011 CoM) to demonstrate how planning and on-the-ground commitment to environmental protection and management can result in beyond compliance practice. They cleared 40 per cent less vegetation than allowed and avoided habitat trees. This active management style will hopefully be adopted by companies in the future to ensure the best outcome for the environment is always achieved.

BHP (1997 GG) undertook extensive marine surveys of the Big Bank Shoals with assistance from the Australian Institute of Marine Sciences (AIMS). Not only did this provide helpful information for BHP's operations, it also provided substantial information for the community through the compilation of the data into an Environmental Resource Atlas. Nowadays we often see partnerships between resource companies, research bodies and government agencies to improve the environmental information available to the community.

CSR Readymix (1994 GG) faced urbanisation issues at its Jandakot Sand Quarry with residents moving closer to them. They hired an environmental consultant to advise on rehabilitation procedures and their unique solution involved a rehabilitation levy, so that a percentage of product sales from every tonne of sand sold would fund rehabilitation. Various government bodies now use levies in a similar fashion.

Hadson Energy (1992 GG) used a specifically constructed drilling rig for its Tanami-1 Well on an exposed rock headland. This virtually redesigned the drill rig, adopting innovative techniques for both recirculating mud and constructing foundations. This was specially prepared and managed so that its operations avoided interference with the nearby mutton-bird rookery. Many of the entrants recognised by the awards, particularly in recent years, have used new technology to allow activities to occur closer to plants and animals without impact.

Dr Harry Butler (1996 GG) was honoured for his major contribution to environmental management and the incorporation of environmental management into corporate policy in Western Australia's mineral and petroleum industries. Dr Butler used his public image to introduce the concept of multiple land use and environmental management at a practical level. Today, companies are actively taking pride in environmental management and maintaining their good corporate citizen status.

Homestake (2001 CoM) was recognised for its whole-of-site approach to best practice environmental management and positive culture across all levels at its Plutonic Gold Mine near Meekatharra. Major improvements were made to topsoil management, waste dump design and construction, progressive rehabilitation, priority fauna and flora management, feral animal control, waste management, exploration rehabilitation, tailings storage facility management and in-pit tailings disposal.

Mobil (1998 GG) similarly designed its Wandoo B Platform to be completely dismantled at decommissioning by using a concrete gravity structure (CGS). This was industry best practice at the time. In line with Mobil's "reduce, reuse, recycle" principle, a portion of the greenhouse gas emissions were used for power generation on the platform. This principle has been widely adopted across industry, including remote mine sites.

Mt Morgans Gold Mine (1997 CoM) inherited a difficult site that was contaminated with waste rock unhospitable to plant growth, and old mine refuse. Mt Morgans showed environmental management of operations with a comprehensive training and induction program developed for the local aboriginal community to ensure that the people of this community had sufficient skills to collect seed for sale to Mt Morgans and to distribute that seed on the rehabilitated areas. Mt Morgans managed to contain and improve these legacies whilst beginning its own operations.

As with rehabilitation, forethought into mine processes has now become standard procedure for the industry. Pancontinental (1992 CoM) implemented Pre-mining Environmental Planning at the Kundana Gold Mine to classify the existing environment and minimise the impact of future mining operations by incorporating rehabilitation requirements into the mine planning processes. This was important for successful revegetation and long-term stability of the environment.

Perilya Mines (1998 GG) engaged with Methodist Ladies College to demonstrate its approach to the environment at Fortnum Gold Mine in Meekatharra. This included waste dump, tails dam and general mining activity rehabilitation; revised exploration procedures; collection of native seed programs; and establishment of emergency response training areas. As a result, companies often proactively engage with school communities to provide environmental education gathered by the resources industry.

Placer (1999 GG) developed a Sustainability Policy at its Granny Smith Goldmine at Laverton with extensive consultation and involvement of the indigenous community and a focus beyond mine closure. The key elements of the policy incorporated corporate commitment, public responsibility, social progress, environmental stewardship and economic benefits. The policy improved cultural relations and showed a commitment to the Laverton community.

Environmental management is also about adapting to changing situations around you. WA Petroleum (1992 CoM) exercised commitment to the environment by locating its drill site away from a preferred location in order to minimise the potential of impact on Dugong Reef. Many companies now place environmental protection interests as a key consideration in planning a project, and not as an implication on costs.

WA Petroleum's project on (1994 CoM) Barrow and Thevenard Islands highlighted the value of forward planning and good communication. Their commitment to environmental protection included continual improvement of seismic acquisition methodology, especially in areas with difficult accessibilities. They also trialled "Geoflex" energy source to determine its impact on marine flora and fauna prior to commencement of operations.

Woodside (1993 GG) used innovative technology, including a Remote Operated Vehicle sediment sampler, among its efforts to avoid or minimise environmental impact on the Burrup North West Shelf



project. This was part of their baseline studies onshore and offshore, within environmentally sensitive localities. As a result aspects of the North West Shelf project avoided or minimised possible adverse effects on the environment.

Woodside (2004 CoM) also made a commitment to the environment over costs at its Goodwyn A Platform.

During its shutdown phase, its health, safety and environment issues took precedence over economic and time pressures. As a result of this process, their workforce was empowered to champion the environmental cause.

# Community Engagement

Increasingly, geckos are finding themselves having to interact with the community as the expanding population edges nearer to their habitat. With the advent of the internet and online mapping websites, it is now easier for the public to find out all about them. Similarly, the availability of information about resources companies and their local environments has also become available. This has resulted in a move from one-way communication with industry to a more interactive engagement with the community. In recent years there has been a marked increase in the community engagement of all award entries.

Beenup Consultative Group (2003 GG) implemented an interactive community consultation process while rehabilitating the Beenup Mineral Sands Mine. The group played an influential role in the mine's closure, ongoing rehabilitation, and ensured their environmental concerns were addressed. Beenup set a new standard for community consultation in the mining industry by organising participatory planning to achieve outcomes that satisfied all of its stakeholders.

Placer (Granny Smith) (2000 GG) has, with its Wallaby Project in Laverton, developed and implemented a participative planning process to deal with aspects of a project such as environment, heritage and community impact. This process has provided better environmental and social outcomes for all concerned, as well as developed effective relationships and understanding between stakeholders.

Woodside Energy (2003 CoM) committed significant resources to the consultation process for its Enfield Oil Field development due to the close proximity of the proposed development to areas of high social, economic and environmental value. The consultation process included: the early identification of stakeholders; formation of community reference groups in Exmouth and Perth; appointment of a conservation liaison officer; environment and community workshops; monthly newsletters; a '1800' toll free information line; and an extensive research program on the deep water marine environment. The results increased community confidence in Woodside's proposal.



## Planning

Effective planning is synonymous with effective results for the environment, the community and the company's success. Every resource development project needs to be properly planned from start to finish.

BHP Billiton and URS Australia (2005 CoM) worked together on the Pilbara LNG Site Selection Study to identify a suitable site for the project. This was achieved by assessing regional constraints and avoiding project cost consideration until the optimum site, in environmental and social aspects, had been identified. The project also involved extensive stakeholder consultation including an independent focus group. This resulted in community strengthening of BHP Billiton's Corporate Charter.

Epic Energy's (1999 GG) Burrup Pipeline Project involved the construction of a 24 kilometre underground gas pipeline in an area world renowned for its environmental and cultural values. Construction of the pipeline was one of the most difficult and challenging engineering and construction projects undertaken in Australia. The attention to specific details such as the handling and replacement of Red Rock, the innovative inclusion of local Indigenous residents as rangers and the preservation of the vast number of rock carvings drew praise from the judges. The planned engagement with traditional owners is now a must-have component of any resource development.

LionOre Australia's (2002 GG) mine and processing plant of the Emily Ann mine is located within the proposed Mt Day Nature Reserve. LionOre conducted detailed research and planning well before construction in order to overcome the challenge of being a relatively small company establishing its first mine in a remote and environmentally sensitive region. This has resulted in the Emily Ann mine site being planned, developed and operated to a very high standard including appropriate management systems for health, safety and environment. Although the activities occurring are not innovative, they set a new industry standard for mine site planning, construction and operation.

Simcoa Operations, Sally Robinson and Strategic Environmental Solutions (2002 CoM) operate in the Coomberdale Chert, a significant quartzite region favoured by specialised flora adapted to living in small cracks in the quartzite and supports several priority and declared rare flora. Recognising the potential conflict between resource access and conservation of biodiversity, Simcoa put forward a package of environmental measures to offset potential environmental impacts from operations and ensure long-term access to the resources would be provided. The outcomes achieved were the result of a cooperative effort between Simcoa, the consultants, WA Government Railways Commission, CALM and the EPA. Planned offset packages are now standard procedure.

Woodside Energy (2001 GG) operates an onshore gas plant in Dampier. Gas is extracted from the North West Shelf and transported via undersea pipeline near Dampier Archipelago. This region supports a diverse range of biota and has significant recognition as a recreational activities area. In order to "look after its

own backyard", Woodside entered into a four year partnership with the Western Australian Museum to document the marine biodiversity of the Dampier Archipelago and to make this information available to the public and scientific community. The research set new standards for establishing baseline knowledge.

Woodside Energy's (2009 GG) scientific research program at Scott Reef has contributed to the understanding of the effects of seismic and drilling reservoir appraisal on coral reef environments. The research will ensure these activities can be undertaken with minimal environmental disturbance. Woodside engaged marine science expertise from Australia and the United States to undertake in-situ research to understand the effects of seismic noise on coral reef communities. The study demonstrated that the seismic survey would not result in impacts on coral fish behaviour or hearing. Adequate planning for ocean bottom cable surveys at Gigas ensured low incidence of coral breakage and only mild startle effects on fish. The results of this study will help other operators plan seismic surveys in the future.



Image courtesy of Woodside



## Statue Designer George Kosturkov

Local Perth artist George Kosturkov has been crafting the Golden Gecko Award statue since it was first introduced in 1997. To make this amazing statue, George carves the gecko in polystyrene and then casts it in bronze. Many recipients of the award often ask George to make them additional replicas of the statue so they can display them around their operations in Western Australia. The perpetual trophy, with the names of all the previous recipients, is displayed in the foyer of DMP's Mineral House at 100 Plain Street, East Perth.

### Contact details

George Kosturkov  
588 Great Eastern Highway,  
Darlington, 6070  
(08) 9294 1609  
[www.kosturkov.com.au](http://www.kosturkov.com.au)



## Mine Closure

Mine closure is one of the areas that we have seen the greatest change over the last 20 years. Previously treated as a last minute tidy up of a site to relinquish bonds, mine closure is now an important part of mine feasibility studies and an ongoing component of the mine during operation.

Many of the older Golden Gecko recipients have received recognition for their efforts to rehabilitate after the mine has closed. In many of these cases the activities were undertaken even though there was no regulatory requirement. The more recent recipients are recognised for their planning of mine closure upfront in the construction and operation of the site. This can include building infrastructure which is fully removable and recyclable, minimising the operating footprint, and with progressive rehabilitation so that the area impacted at any time is minimised.

Alcoa (1992 GG) led industry in the early 1990s with its Wellard Wetlands from Excavated Eucalypts project in Kwinana which rehabilitated excavated pits back into land use with a higher conservation value. The rehabilitated wetlands were disused clay pits used to supply material for red mud impoundments. The project was a new concept in wetland rehabilitation and supports a number of bird, aquatic and fish species. The wetland is both a research and educational facility and as further wetlands are developed appropriate recreation facilities will be expanded.

Newmont (2004 GG) employed a Closure Plan specialist to drive and develop its Mt McCure Gold Project in the Goldfields, which involved benchmarking tours of other sites in the region to examine best practice, financial provisioning, assessment of incomplete and failed rehabilitation, material characterisation, feral animal and weed management,

environmental monitoring, tight quality control and careful contractor selection and management. The key to the outstanding result at Mt McClure was the genuine and dynamic partnerships developed and nurtured primarily by the Newmont-McClure management team. The standard of mine closure planning and rehabilitation demonstrated by Newmont has set a new benchmark and is a showcase for industry to emulate.

Wesfarmers Premier Coal (2003 CoM, 2005 GG) established assets of lasting social, economic and environmental value at its Sustainable Mine Lakes in Collie. Wesfarmers demonstrated its commitment to sustainability principles with three innovative rehabilitation programs which included a recreational lake; a motor sports and driver training complex; and an aquaculture precinct for research and economic development.

## Innovation & Technology

A number of companies have also demonstrated environmental excellence through the use of innovative technologies and methods of rehabilitation.

Who would've thought a cage would be a cost effective and easy way to handle putrescible and inert industrial waste issues on site. Barrick Gold of Australia (2003 GG) did when it introduced the Bellan Cage at Lawlers Minesite. The cage is safe, simple to use, low maintenance, cost effective, portable, visually acceptable and compliant with regulatory conditions. It's now widely used around the State and has improved the standards of waste management.

The Botanic Gardens and Parks Authority (1997 GG) worked with mining and extractive industries over the past decade. In 1997, the current project was 'Development of Land Reclamation, Rescue of Endangered Species, Using Leading Edge Science for Mined Land Rehabilitation'. The projects have involved a variety of research approaches and resulted in the development of new technologies for land rehabilitation practice including propagating seeds, using genetic diversity, simulating smoke germination and building resilience. Many of these techniques developed by the Botanic Gardens and Parks Authority are widely used.

HISmelt (2008 GG) helped develop the processing of iron ore without the need for coke. The HISmelt process allows flexibility in the quality of raw materials which can still be processed, enabling the production of premium iron from high phosphorous ores. As well as the ongoing development of the HISmelt technology, HISmelt Operations have undertaken a multitude of projects at the local scale to improve water and energy efficiencies and set an example for industrial product stewardship.

Rally Revegetation Services (1994 GG) used its expertise in rehabilitation with the development of its Nurally Seeder to improve seeding and fertilising



surfaces for rehabilitation. The seeder is a one-step seeding and fertilising process and can be attached to a variety of standard plant machinery. It also operates in sandy and clay soils with slope elevations of up to 30 degrees and is an efficient way of rehabilitating sites. Rally Revegetation Services revegetates around 2000 hectares a year in Western Australia and Queensland.

WorleyParsons and Port Hedland Port Authority (2011 GG) have developed a sedimentation scanner to allow real time monitoring of dredging activities on the environment. This technology has provided a new understanding of the way in which sedimentation occurs. The results will see a change in the way dredging activities occur and likely see a new requirement for measuring these impacts.

## Services

One of the most overlooked sectors of the resources industry is the services sector, including the provision of catering, work villages, waste management and transport. Increasingly, companies are being judged not only on their own mining and petroleum operations, but also how employees are treated and what happens with their products.

With commitment and cooperation of both BP Refinery and Mitchell Corporation, ARC Energy (2004 CoM) researched, developed and operates a cost effective and highly reliable Hovea Oil Field Crude Export System. A new Accuload automated crude load-out facility and associated bunded load-out pad has reduced the risk of spillage; and a new fleet of purpose-built pocket road trains are shorter and wider than standard trucks, and contain an internal bladder system enabling the transport of two different products in the same tankers without cross contamination. These initiatives have reduced total truck movement by 62 per cent leading to a reduction in fuel consumption, and have reduced risk to the community and environment from crude oil transportation.

Compass Group Australia (2011 CoM) has taken catering to a new level with its central production of meals in Perth. Prepared ingredients and fully cooked meals are prepared in Perth and distributed to remote sites. This saves waste as it can be composted and used as livestock feed in Perth; saves energy from bulk production; and reduces greenhouse emissions. Compass now provides catering to 80 sites in the WA resources industry.

St Barbara (2009 CoM) constructed a temporary mine village in Leonora demonstrating improvements in environmental performance and developing knowledge of sustainable building design for mining applications. St Barbara undertook a study with SKM into establishing a sustainable mine village. Initiatives included improved insulation, photovoltaic power units, solar hot water, waterwise landscaping, energy efficient



appliances and flyscreen windows to encourage the use of natural ventilation. Monitoring undertaken since the completion of the project has demonstrated a 30 per cent reduction in energy use and a 50 per cent reduction in water consumption.

Waste management at remote sites is a major issue for environmentally responsible companies. Sodexo Remote Sites (2009 GG) developed a Resource Recovery Program to provide a sustainable alternative to existing waste management practices for mining

villages. The program involved educating residents and clearly identifying recycling stations. Sodexo's recycling program until March 2009 avoided the need for 1275 cubic metres of landfill space. The program is continually expanding with new efforts including utilising waste canola oil for biodiesel to operate an onsite vehicle in the Goldfields; appropriate collection and disposal of incandescent globes and printer cartridges; and providing re-usable crib bags for residents. It is clear that this is being adopted by industry.

# Fauna and Flora Management

One of the most complex issues in resources development is exploring areas that have never been explored before. One of the consequences of this is we come across many species of flora and fauna that we have no or very little knowledge about. Fortunately industry is a major contributor to the scientific knowledge-bank. A glowing example of this is the discovery, through mining related research, of the Northern beak-faced gecko (*Diplodactylus galaxias*) in 2010.

Anaconda Operations (1999 CoM) re-discovered a presumed extinct plant species, *Hemigenia exilis* on its tenements. Anaconda engaged the Department of Conservation and Land Management's Threatened Flora Seed Centre to gain a better understanding of its seed biology and funded a project at Kings Park and Botanic Gardens on the overall biology of the species. Public awareness programs and workshops conducted by Anaconda resulted in the discovery of more populations. As a result *Hemigenia exilis* is now known in over 60 populations and has been re-classified as Priority Four Rare Taxa.

Botanic Gardens and Parks Authority (2000 GG), funded by WMC Resources, Novus and Apache Energy, succeeded in developing a process to remove buffel grass from Airlie Island to revegetate the area. Buffel grass, a pernicious and invasive weed, was introduced early last century to the Airlie Island Nature Reserve and eradication of the grass has been a priority objective for a number of years. The knowledge gained from the study and successful removal and replacement of buffel grass on Airlie Island can be directly applied to other parts of Australia with similar problems.

Cliffs Asia Pacific Iron Ore (2010 CoM) conducts iron ore mining in the Mount Jackson region, an area which is known to contain Malleefowl (*Leipoa ocellata*).

It formed a unique relationship with a local community group, the Malleefowl Preservation Group, for the preservation of this vulnerable species. This provided an exemplary model of how working with the community can achieve tangible results for the conservation of a threatened species, while mining operations continue to be conducted.

Last year Crosslands Resources (2010 GG) undertook research on the effects of drilling vibrations on Schedule 1 spider, *Idiosoma nigrum*. The new, non-invasive survey technique has resulted in a vast increase in spider distribution data and knowledge of biology, publication of a journal article, accurate impact assessment, transferrable monitoring technology, and reduction in the exclusion buffer.

Sometimes, where resources projects and conservation overlap, it is necessary to translocate individuals from one area to another. Hamersley Iron (1998 CoM) translocated the rare and endangered Western Pebble Mound Mouse. The results showed that the mouse can be translocated to areas where there are active 'mounds'. Follow-up monitoring suggested this approach has given good survival rates.

Cockburn Cement (2000 GG) had similar results with its seagrass transplantation project in Owen Anchorage and Success Bank. Cockburn Cement applied exceptional and detailed effort to bring its project to its present stage. The company's work has contributed significantly to the scientific understanding of seagrass ecosystems and demonstrated how industry can rehabilitate fragile environments.

Resolute and Titan Resources (1997 CoM) discovered a young male Mulgara, *Dasyercus cristicauda*, during a routine assessment survey for an extension to the Marymia Gold Project. This finding was significant as this was only the fifth specimen to be captured in Western Australia since 1959. Over 50 individuals were recorded and the population of Mulgaras at Marymia is the largest ever documented in Western Australia. This has resulted in extensive research including describing

core habitat areas, identifying movement corridors and home range sizes, monitoring population size and health, identifying and minimising mining impacts, and describing the regional distribution of Mulgaras.

WA Petroleum (1992 GG) has been operating in the oilfields on Barrow Island since 1963. WA Petroleum established a dynamic environmental management strategy to preserve endangered species and species of conservation value on Barrow Island and nearby offshore islands. It also sponsored the "Desert Dreaming" project undertaken by CALM which was aimed at re-establishing the Burrowing Bettong and Golden Bandicoot on the mainland. These discoveries offer scientists a wealth of information about all plants and animals, not just those explicitly researched. The outcome was a greater understanding of biodiversity by everyone, and better protection of the species.

As part of Westralian Sands (1999 GG) operations, it needed to reconstruct a road to ensure traffic safety. The road reserve however, contained notable remnant populations of floristic communities which link the coastal area to the scarp. Many declared rare flora were also located here. Westralian Sands' thorough and extensive planning provided protection for the native flora and fauna outside the road design during the reconstruction of the road and maintained the long-term integrity of the vegetation and its type. By demonstrating how it is possible to operate in confined areas, Westralian Sands have led the way for industry to follow and it is evident that companies have also replicated this.

Careful management of a species can allow mining and conservation to co-exist. Worsley Alumina (1995 CoM) developed a "Forest Hygiene Field Guide" and induction training (video and booklet) to direct staff and contractors on how to minimise the risk of spreading dieback. Major washdown areas were also monitored by camera. Regular inspections are made to monitor any change in dieback conditions.



## Energy and Emissions

The issue of remoteness in the mining industry can occasionally be overlooked by those not directly involved. In remote areas, even the most basic elements of infrastructure do not exist, for example power, water supply and roads. This allows an opportunity for resources projects to use renewable energy sources to provide energy for the site and that can be deconstructed and transported.

Anglogold Ashanti and Westwind (2007 CoM) collaborated to develop an innovative wind/electric water pumping solution for environmental water table management. A custom design Wind Turbine Water Pumping System was specifically developed and is the first of its kind. The system delivers an economic solution for remote site water pumping for areas that have adequate wind resources.

The management of dust is a top priority for BHP Billiton Iron Ore due to the proximity of its facilities to the community at Port Hedland and mangroves in the harbour. BHP Billiton and CSIRO (2004 GG) undertook a collaborative research project on hyperspectral remote sensing technology in the quantitative monitoring of iron ore. Used from an aircraft, this technology measures light reflected from the earth's surface to enable measurement of minerals such as iron ore dust. The project was successful in determining that iron ore dust could be detected on vegetation and were able to quantify how much dust was deposited. This enabled the identification of 'dust hot spots' and a computerised dust monitoring system has since been implemented. Despite the increase in the amount of iron ore being handled through the port, ambient dust levels have decreased, suggesting management activities have been effective.

BP Refinery (2005 GG) were the first in the world to apply a filter on a residue cracker with its Reducing Particulate Emissions project in Kwinana. Although already below regulatory limits, the initiative reduced particulate emissions by 74 per cent and set a



dramatically higher and cleaner benchmark for the global refining industry to meet.

Woodside Energy (2002 CoM) implemented a revised gas flaring policy to minimise flared gas volumes, resolve problems that led to unplanned outages, revise

the process start-up and shutdown procedure to limit gas emissions, and identified and controlled the causes of fugitive emissions. This work has significantly reduced greenhouse gas emissions and increased facility uptime and worker comfort.

## Infrastructure & Heritage

Road, rail and pipeline infrastructure can also be a menace to the environment if not well designed. Thankfully, Gecko entrants have shown that these are readily adaptable to suit the environment and minimise any harm.

Apache Energy (2003 GG) added the Victoria Oil Field Development to the Varanus Hub, requiring the installation of a mini-platform of three production wells and a 5.4 kilometre offshore subsea pipeline. The environment surrounding the development had high conservation values characterised by isolated coral bombores of high diversity and coral patch reefs. The preferred pipeline alignment was identified using remote sensing technology and field verification surveys. Procedural controls were implemented with the construction contractor to avoid impact to these features and an incentive scheme was offered to the workforce based on compliance with environmental targets. This approach was successful with only two out of 222 features affected by minor damage.

Heritage is also an emerging issue for resources companies. BHP Billiton (2004 CoM) discovered a large stone arrangement with Aboriginal heritage significance in the heart of the rich iron ore deposit at Mining Area C. The outcome from four years of native title negotiations was the stone relocation project, which involved the excavation and repositioning of over 1000 stones to a safe area where they will remain undisturbed by future mining operations. BHP Billiton Iron Ore and the native title claimants set new standards in the management of heritage sites.

Esperance Port Authority (2002 GG) undertook extensive community consultation prior to upgrading its facilities. The result considered the visual amenity of the port, as well as the world's only fully enclosed iron ore handling facility.

Environmental impact associated with pipeline construction needs to be managed and kept to a

minimum. Hadson Energy (1993 CoM) recognised the need for this with its Harriet Gas Field project. This was achieved through comprehensive planning of the pipeline route, construction and rehabilitation techniques. The project used innovative technology such as floating pipeline back to mudflat areas and "Sno-Cat". As a result environmental impact was reduced.

Railway corridors have the potential to affect local water flow regimes, which can affect surrounding vegetation. Rio Tinto Iron Ore's (2008 CoM) Lang Hancock Railway route in Newman was designed to minimise the impact on local physical and biological processes, such as surface water flow and drainage. Rio Tinto also had to consider the mulga woodland communities, which were identified and avoided. This project is an example of best practice methodology in terms of route selection, engineering design, borrow pit management and rehabilitation.

Rail projects also have the potential to impact on significant vegetation associations and priority species. Robe River Iron Associates (2003 CoM) had two rail alignments to consider for its West Angelas Southern Spur Rail Project. The shortest alignment, Coondewanna West, was not preferred by government agencies due to potential impacts on significant vegetation associations and priority species. Robe was granted approval for this route after demonstrating that these impacts could be managed. The railway was constructed by contractors with strict on site supervision, and impacts were reduced by minimising disturbance within the construction corridor; maintaining natural sheet water flows by installing numerous culverts under the line preventing drainage shadows in mulga and other communities; progressive rehabilitation; borrow pit management; and priority flora species protection. More and more companies are now being allowed to access sensitive areas as the standard of industry has increased.



## Waste Management

Material waste has always been an issue throughout civilisation. Waste is even an issue in nature – trees drop their leaves, animals leave their scats, geckos shed their skin. In nature though, there is a constant process of recycling. This is a key part of several past award and certificate recipients.

Alcoa (2006 CoM) developed technology that reduces the alkalinity of its residue from its refineries by mixing it with carbon dioxide. Alcoa established its first Residue Carbonation plant at the McCoy Crusher site in Kwinana and carbonates 25 per cent of its residue output using trucked in carbon dioxide. Alcoa ensured a well operated and managed site that uses best practice for all environmental issues.

Other companies have sought more proactive solutions to the waste issue by exploring ways to reduce the amount of waste produced. Argyle Diamond Mines (1997 CoM) employed a cross-functional team comprising employees from the workforce, middle management and an external consultant. The team spent approximately two years addressing all aspects of hydrocarbons management (oil, grease, fuel and associated cleaning agents). This work, in conjunction with improved workforce commitment, resulted in reduced quantities of hydrocarbons to manage, and the establishment of appropriate treatment and disposal facilities including zero discharge. Physical evidence that the new waste management program is working, is the acceptance of the workforce when adopting new management practices, and the collection and recycling by Argyle of 800,000 litres of used oil.

Barrick Gold of Australia (2003 GG) recognised the need for a simple and effective landfill system for minesites in remote areas. Barrick developed the Bellan cage (designed by Bob Bellingham) – a cage mounted on skids and pushed along above a trench by a front-end loader. The trench is progressively filled and then covered with soil and netting to prevent

rubbish escaping from the trench. This results in a litter free environment with fewer scavenging animals and a reduction in odours.

Resource companies and environmental groups need to work together to protect the environment. Barrow Island Coastal Care Group (2000 CoM) supported by Chevron Australia demonstrated what can be achieved by a dedicated group of volunteers for its Clean Up Barrow Island project. The group cleared up the island's beaches and BBQ areas. The island's fauna, in particular nesting turtles, have significantly benefited from the project. It is hoped that the group's results will inspire similar efforts in other environmentally sensitive areas that are subject to adverse human impact. There has been an increase in the relationship between resources companies and environmental groups in protecting the environment.

BHP Iron Ore (1992 CoM) managed its Orebody 25 operation in Newman to minimise waste production. Environmental solutions to the problem included no dump (waste) piles onsite - mobile grizzly plant; restriction of blasting using innovation of a trenching bucket; and conversion of waste to product by using it as road base and fines for mud-bricks for house construction.

Resolute (1998 CoM) constructed and operated an in-pit tailings facility on its Marymia site. This was the best solution and resulted in increased water recycling, filling of the pit void and earlier rehabilitation. The operation involved the construction of underdrainage in the pit floor and extraction of water from the pit as process water for the plant resulting in a reduction of approximately 400ML per annum from the borefield. In pit tailings have become more commonplace in the industry as they reduce the area of disturbance.

The Ruggies Minerals Industry Recycling project was initiated in 1996 at the Placer Granny Smith (1998 CoM) minesite. The program saw approximately 500 tonnes of recyclables removed from the site during the initial housekeeping exercise in 1997. It expanded

rapidly from one minesite to many throughout the State and is still expanding to encompass petroleum sites and general industry. In 2006 Jo Jo Plastics and Ruggies Recycling (2006 GG) were recognised for an expansion to this program which collected, shredded, removed and bagged black plastic pipe materials from minesites, predominately in the Goldfields. The pipe had previously been buried on site or accumulated in dumps as contaminated waste. The project provided numerous benefits including reduced landfill, support for those in need, environmental awareness at a personal level and gave minesite workers a positive feeling.



## Minimising Disturbance

Individual geckos are all for minimising disturbance. The less of their habitat we remove, the fewer issues they have to contend with (competition, shelter, predation and reduced food source) during the period of exploration and development. No matter how successful rehabilitation may be, there is still a temporal disturbance to the ecosystem. By decreasing the footprint of operations, this temporal impact is reduced.

With the improvement in technology and information management, the pre-planning of operations can significantly reduce the impact that an operation has on the environment. The most significant of this would be the planning of infrastructure such as railways, pipelines and roads. The use of satellite imagery today has revolutionised planning decisions and allows this essential infrastructure to be built whilst avoiding areas of environmental significance.

North Mining and Westralian Diamond Drillers (2000 CoM) developed the innovative Ecotruck. The trucks help avoid negative impact on the environment with the only evidence of drilling activity left being the vehicle tracks. North Mining and Westralian Diamond Drillers have shown a commendable understanding of the potential impacts of exploration on the environment and have developed equipment that efficiently removes potentially damaging drill spoil and saline water.

Furthering this, since the inception of its exploration program at Irvine Island, Pluton Resources (2010 GG) has been committed to minimising the environmental impact of its activities at Irvine Island. Among other innovations this has involved the development of a novel heli-portable drilling platform that supports commercially available heli-portable diamond core drill rigs. This significantly reduced the amount of ground that is disturbed, resulting in almost instant rehabilitation of vegetation and the preservation of the natural topography of the terrain.



Woodside Energy (2005 CoM) implemented some innovative procedures to reduce the footprint on the sensitive Burrup environment. The Trunkline System Expansion Project was a major engineering challenge for which Woodside implemented some innovative

procedures to reduce the footprint on the sensitive Burrup environment, including specially designed gravity anchors to reduce the need for quarried rock, and specialised blasting techniques to minimise sediment plumes.

# Golden Gecko Award Recipients



TM

**GOLDEN GECKO**  
Awards for Environmental Excellence

AWARD RECIPIENT

Alcoa	Lindsay Stockdale
Apache Energy	LionOre Australia
Arimco Mining	Minara Resources
Barrick Gold of Australia	Mobil Exploration
Beenup Consultative Group	Producing Australia
BHP	Newmont
Botanic Gardens & Parks	Normandy Poseidon
BP Refinery Kwinana	Perilya Mines
Cockburn Cement	Placer (Granny Smith)
CRA Exploration	Pluton Resources
Crossland Resources	Port Hedland Port Authority
CSIRO	Rally Revegetation Services
CSR Readymix	Rocla Quarry Products
Epic Energy	Rod Mitchell's Transport and Exploration Services
Esperance Port Authority	Ruggies Recycling
Hadson Energy	Sodexo Remote Sites
Hamersley Iron	Sons of Gwalia
Harry Butler	WA Museum
Hill 50 Gold Mine	WA Petroleum
HISmelt	Wesfarmers Premier Coal
Homestake Gold	Western Mining Corp
Iluka Resources	Woodside
Jo Jo Plastics	WorleyParsons

# Certificate of Merit Recipients



TM

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CERTIFICATE OF MERIT

- |                                  |                                   |
|----------------------------------|-----------------------------------|
| Alcoa of Australia               | North Mining                      |
| Anaconda Operations              | Outback Ecology                   |
| AngloGold Ashanti                | Pancontinental Mining             |
| ARC Energy                       | Placer                            |
| Argyle Diamond                   | Plutonic Gold                     |
| Arimco                           | Princess Margaret Hospital        |
| ATCO Gas Australia               | Resolute                          |
| Australian Resources             | Rio Tinto Iron Ore                |
| Barrick Gold of Australia        | Robe River Iron Associates        |
| Barrow Island Coastal Care Group | Sally Robinson                    |
| BHP Billiton                     | Simcoa Operations                 |
| BP Refinery                      | St Barbara                        |
| Cliffs Asia Pacific              | Strategic Environmental Solutions |
| Compass Group (Australia)        | Titan Resources                   |
| CSR Readymix                     | University of Western Australia   |
| Dominion Mining                  | URS Australia                     |
| Forsyth Mining Services          | Victor Dale                       |
| Hadson Energy                    | WA Petroleum                      |
| Hamersley Iron                   | Wesfarmers Premier Coal           |
| KD1                              | Westralian Diamond Drillers       |
| Mitchell Corporation             | Woodside                          |
| Mt Morgans Gold                  | Worsley Alumina                   |
| Newmont                          |                                   |

## A Bright Future

The Golden Gecko Awards have helped showcase the extent of industry's commitment to environmental management. Looking back over the last 20 years, we have seen individuals and companies in Western Australia demonstrate skilled, progressive, proactive and innovative solutions to environmental protection and enhancement. Industry continues to meet and exceed world's best practice, invent solutions to common problems and conduct preliminary planning to mitigate environmental risks. Industry continues to provide vital research, knowledge and understanding to the environmental sector, including the 2010 discovery of a new gecko species in the Pilbara.

Western Australia's resources sector will continue to grow in response to local and international demand. The mining and petroleum industries are a significant part of Western Australia's past and will continue to play a vital role in the future as we welcome innovation that supports the development of a responsible resources industry.



20 YEARS



**GOLDEN GECKO**  
Awards for Environmental Excellence

Department of Mines and Petroleum  
Mineral House, 100 Plain Street  
East Perth, Western Australia 6004

Tel: +61 8 9222 3333  
Fax: +61 8 9222 3862

Email: [dmp@dmp.wa.gov.au](mailto:dmp@dmp.wa.gov.au)  
[www.dmp.wa.gov.au](http://www.dmp.wa.gov.au)



Government of **Western Australia**  
Department of **Mines and Petroleum**