

**HRL Limited:  
Burning Coal at Three Minutes to Midnight**

**A report for Friends of the Earth**



## **Contents**

**Summary...2**

**Introduction...3**

**HRL Company Structure...3**

**The Privatisation of the Herman Research Laboratory...6**

**Jeff Kennett and Amskan...7**

**Another Coal Fired Power Station...8**

**Energy Technology Innovation Strategy...9**

**HRL and Hazelwood...10**

**Harbin Power Engineering Company...11**

**References...13**

## Summary

HRL Ltd and Chinese company Harbin Power Engineering intend to commence operation of a new 400 MW brown coal fired power station in 2009 (Frew 2007, p.1). To be located in the Latrobe Valley, this power station will use Integrated Drying Gasification Combined Cycle (IDGCC) technology (HRL 2005, p.4). HRL argues that through the use of this technology, this power station will produce fewer greenhouse emissions than a standard brown coal fired power station (The Age 2007, p.1). Nevertheless, this power station will add to existing power generation, and in turn, will significantly increase the volume of greenhouse emissions produced through power generation in Victoria (Barber 2007, p.1).

The estimated cost of this power station will be \$750 million, of which Harbin is providing \$500 million (reference). Through the Low Emission Technology Demonstration Fund, the Federal Government is providing \$100 million for the station's development (Cowan 2007, p.1), while the Victorian Government is providing a further \$50 million (Frew 2007, p.2). It can therefore be ascertained that twenty per cent of the capital required for this project is being provided by tax payers.

However, HRL Ltd used to be *owned* by tax payers. HRL Ltd (previously known as the Herman Research Laboratory) was once the research arm of the State Electricity Commission of Victoria (Mayne 2007a, p.1). In the mid 1990's, the Kennett Government sold HRL to a consortium led by media mogul Kerry Stokes (Mayne 2007b, p.1). The sale of HRL was heavily criticised, as the contract was not put up for private tender (Mayne 2006, p.34)(Legislative Assembly of Victoria 1996, p.10). Critics include journalist Sally Neighbour, who claims that HRL "was effectively given away" by the then State Government of Victoria (Neighbour 1997, p.9).

Essentially, the privatisation of HRL led to tax payers losing ownership of a public asset and receiving little in return. Tax payers are now set to provide \$150 million to support the construction of a power station by this very company (Cowan 2007, p.1)(Frew 2007, p.2). The Australian Climate Justice Program argue that this power station will lead to increased greenhouse emissions (2007, p.1), while profits derived from this venture are to be shared amongst private owners such as Kerry Stokes.

Harbin Power Engineering Company, the major financier of this project, has benefited from involvement in projects such as the Merowe Dam in Sudan and the Three Gorges Dam in China (Oster 2007)(Sudan Tribune 2003)(Macartney 2007). These projects have caused the displacement of huge numbers of people (Macartney 2007)(Lacey 2005, p.55). In both Sudan and China, people protesting against their displacement have been killed (Yardley 2007, p.6)(Oster 2007, p.3). The massive Three Gorges Dam has created significant environmental problems in China (Macartney 2007, p.3).

## Introduction

The research arm of the State Electricity Commission of Victoria (SECV), the Herman Research Laboratories was privatised by the State Government of Victoria in 1994, under Jeff Kennett. As mentioned by Elias, following privatisation the business became known as HRL when it was purchased by a “consortium of business and employee investors that includes media magnate Kerry Stokes”, who now has a 20 per cent interest in the company (Elias 2005, p.3).

As stated by Elias, amongst other activities HRL “provides technical services to the coal, power, oil, gas, petrochemical and mining industries” (Elias 2005, p.3). This report provides a basic outline of the company, including information on subsidiaries, directors and associated companies. This report will then investigate the nature of the privatisation of the Herman Research Laboratories. A brief description of Harbin is provided. Analysis of the coal fired power plant which HRL plan to construct with Harbin Power Engineering will follow.

## HRL Company Structure

The wholly owned subsidiaries of HRL Ltd include:

- ACIRL Pty Ltd
- Energy Brix Australia Corporation Pty Ltd
- HRL Developments Pty Ltd
- Enviro-Mining Pty Ltd
- HRL Investments Pty Ltd
- IDGCC Investments No.1 Pty Ltd
- Industrial Energy Pty Ltd

(taken from HRL 2005, pp73-74).

The **HRL business division** operates in three areas:

- **Energy Brix**, which generates electricity from brown coal through a 170 MW power station at Morwell in the Latrobe Valley (HRL 2005, p.4).
- The Energy Brix plant provides “base-load electricity to the national electricity market” (HRL 2005, p.10). In 2005, Energy Brix exported over 1 million Mwh to the national grid (HRL 2005, p.10).

As stated in HRL Ltd's 2005 Annual Report:

“On the establishment of Energy Brix Australia Corporation Pty Ltd on 5 October 1993, an indemnity against any reinstatement costs on the Commercial Road, Morwell site was provided by the State Government of Victoria. This indemnity lapsed on the transfer of ownership of Energy Brix Australia Corporation Pty Ltd from the State Government of Victoria. However, a trust fund (the “Closure Fund”) has been established by the State Government of Victoria. Energy Brix Australia Corporation Pty Ltd is a joint beneficiary with the State Government of Victoria in the Closure Fund” (HRL 2005, p.63).

From this fund, an estimated \$20 million had been used to pay for the “cost of rehabilitation and remediation of land on which the briquette manufacturing facility and power station is located” (HRL 2005, p.63). It appears as though prior to the privatisation of HRL, the buyer(s) expressed concern at the costs they may have to bear in the rehabilitation of the site. To provide the potential buyer(s) with some assurance, the government established the indemnity, though allowed this to lapse and invested in the aforementioned fund. Approximately \$30.6 million was initially invested in the fund, which was also used to pay redundancies of the workers who lost their jobs following the privatisation (HRL 2005, p.63).

- **Industrial Energy** “markets briquettes manufactured in a co-generation plant associated with the Energy Brix power station in Morwell (HRL 2005, p.4).
- Industrial Energy manufactures and distributes brown coal briquettes, with the manufacturing plant forming “part of a co-generation facility at the Energy Brix site in Morwell” (HRL 2005, p.11). This plant is operated by contractor Mecrus Pty Ltd (HRL 2005, p.11). Myer states that the Briquette factory had been losing money in the years leading up to 2004; while at the same time, the building and the plant were not insured (Myer 2004). In 2004, the plant was damaged by fire and as a consequence, HRL sought an estimated \$5 million from the Victorian Government to help with the restoration of this plant (Myer 2004, p.1).
- **Steam-over-the-fence-plants**, which operate at Cobram and Leongatha (HRL 2005, p.4). HRL supplies steam to the food manufacturing plants of the Murray Goulburn Co-operative Company Limited in Cobram and Leongatha, and Meiji-MGC Dairy Pty Ltd in Cobram (HRL 2005, p.11).

**The HRL business division** also offers services through **ACIRL** (a “provider of testing and analysis services and coal quality management solutions to the black coal industry”)(HRL 2005, p.4).

**HRL Technology:** offers “engineering, consulting and testing services to the power, coal and manufacturing industries” (HRL 2005, p.4).

**HRL Developments:** main project areas include:

- The **Hunter Enviro-Mining Joint Venture**. HRL has a 40 per cent holding in a joint venture to “recover black coal from mine remnants and tailings in the Hunter Valley in New South Wales and to rehabilitate associated sites” (HRL 2005, p.7).

### **Directors of HRL Ltd**

**Lyn Davies** (Chairman): According to the 2005 HRL Annual Report, Mr Davies is a “company director and Business Consultant”, who is also Chairman of Service Stream Limited and Citiwide Service Solutions Pty Ltd (HRL 2005, p.26).

**Gordon Carter** (Manager Business Development): Mr Carter worked in the SECV’s Treasury Department, undertaking structuring of financing for major capital projects (HRL 2005, p.26). For a fortnight in July of 2004, he was a director of Amskan (HRL 2005, p.26).

**Peter Lamell** (Managing Director): Worked for Royal Dutch Shell Group for over 30 years (HRL 2005, p.27). Lamell was an “Executive Director and Board member of the Shell Company of Australia Pty Ltd” (HRL 2005, p.27). He also enjoyed a brief tenure as a director of Amskan in 2004 (HRL 2005, p.27).

**Peter Gammell** (Non-Executive Director): Group Managing Director of Australian Capital Equity Pty Ltd (ACE) (HRL 2005, pp26-27). ACE has a major interest in the Seven Network, of which Gammell is a director (HRL 2005, pp26-27). ACE also has interests in the Caterpillar dealerships of WesTrac Pty Ltd in Western Australia, New South Wales and the Australian Capital Territory (HRL 2005, p.27).

**Brian Donnell** (Non-Executive Director): An Executive Director of ACE and a director of WesTrac Pty Ltd (HRL 2005, pp.26-27).

### **Notes on ACE, WesTrac and Seven Network**

ACE is the private investment company of Kerry Stokes (Evans 2006, p.2)(ABC 2007, p.1). Through ACE, Stokes has a 42.9 per cent interest in the Seven Network of which he is Chairman, he wholly owns Caterpillar dealership WesTrac and has interests in West Australian newspapers (ABC 2007, p.1)(Forbes 2005, p.1). Interestingly, during the coverage of the Olympics in 2004, Stokes paid \$1 million for Channel Seven to broadcast advertisements for WesTrac during ‘prime time’ (Frew 2004, p.1). One wonders how many people tuning in to watch the Olympics would also be interested in purchasing heavy machinery.

WesTrac claims to be “one of the largest Caterpillar dealerships in the world”, supplying Caterpillar machinery to service “the construction, mining, forestry, local government, quarry, rental, on highway truck and marine markets” (WesTrac 2007, p.1).

## **Loans**

In 2005, the Commonwealth Bank provided \$2,400,000 in loans to the Hunter Enviro-Mining Joint Venture (HRL 2005, p.63). GE Commercial provided HRL with a \$732,000 loan in the same year, with Westpac also providing loans to the company (HRL 2005, p.64).

According to the HRL Financial Statement of 2005, the SECV provided a \$4 million loan, while Generation Victoria provided a \$4.5 million loan (HRL 2005, p.65). This report will examine the relationship between HRL and the SECV, however it is worth highlighting that on numerous occasions the Auditor General of Victoria has lamented the fact that at the time of privatisation, HRL owed the SECV \$8.5 million in unpaid loans, which the Auditor General considered would be unlikely to be repaid (Auditor General of Victoria 2000) (Auditor General of Victoria 1997). It is not clear if the loans referred to in the 2005 Financial Statement are the loans that the Auditor General was referring to, or if they are new loans altogether.

## **The Privatisation of the Herman Research Laboratory**

The Herman Research Laboratory was once owned by the State of Victoria as the research division of the State Electricity Commission of Victoria (Mayne 2007a, p.1). In 1994, HRL was sold by the Kennett Government to a syndicate headed by Kerry Stokes, in a deal described by Mayne as “tax effective” (Mayne 2006, p.34). As a result, Kerry Stokes became a 20 per cent shareholder in HRL Ltd (Mayne 2007b, p.1).

In an interesting coincidence, Kerry Stokes is also the Executive Chairman of Network Seven, which happens to be the employer of John Howard’s son Tim (Mayne 2007b, p.1). Essentially, the company controlled by Kerry Stokes received \$100 million from the Government lead by John Howard. Now, one of the other companies controlled by Kerry Stokes employs the son of John Howard, apparently for the purposes of working on “strategy” (Mayne 2007b, p.1).

According to Mayne, at the time of this privatisation, Jeff Kennett “was dead keen to simultaneously grovel to media moguls and privatise everything that moved” (Mayne 2007a, p.1). This led to a “particularly grubby deal” being reached between the then Premier of Victoria and Kerry Stokes (Mayne 2007a, p.1).

The ABC's 'Four Corners' program investigated the privatisation of HRL, with journalist Sally Neighbour (1997, p.8) making the following observations:

"There was no tender for the privatisation of HRL and its research. The deal was rushed through on the last day of the financial year in 1994. The details not disclosed. It was finalised by Premier Kennett who signed the documentation himself. ...As Kerry Stokes tells it, it began when the Premier rang personally inviting him to invest in Victoria. According to a glowing account by Mr Stokes in his company newsletter, the Premier said: "Just bring your money and come. If there's any red tape, we'll cut through it." It was a complicated deal. But amazingly, Mr Stokes recalled: "After what seemed like a wave from Mr Kennett's magic wand, all the complexities disappeared"...The attraction of the deal -- apart from the potentially huge profits -- was the fabulous tax benefits. Under a federal scheme to promote research and development, the money invested in the HRL research is "refundable, and tax deductible". Hence the rush to complete the deal by the end of the financial year. Even if the project fails, the investment syndicate led by Mr Stokes' company will get back all of its money, plus a guaranteed return of between 20 and 30%. This scheme has since been abolished by the Federal Treasurer, who said it had more to do with tax minimisation than genuine research".

Neighbour states that at the time of the sale, HRL had been developing technology which would be used to generate cleaner, cheaper power from low grade coal (Neighbour 1997, p.7). Graeme Pleasance, then Managing Director of HRL, told Neighbour that he hoped this technology would be worth hundreds of millions of dollars (Neighbour 1997, p.7).

Despite the potential value of the technology being developed by HRL, Neighbour argues that "HRL was effectively given away" (Neighbour 1997, p.9).

Then member for Geelong North, Peter Loney stated that when the Herman Research Laboratories was privatised in 1994, the contract was not put up for private tender, which was a contravention of Government guidelines (Legislative Assembly of Victoria 1996, p.10). This concern is mirrored by the Auditor General of Victoria, who laments the lack of a "competitive process" concerning the privatisation of HRL (Auditor General of Victoria 1997, p.45).

The Auditor General of Victoria mentions that in 1997, the SECV sold its "residual interest" in HRL Ltd (Auditor General of Victoria 2000).

An independent report, conducted by Access Economics for the State Government of Victoria into the privatisation of public assets raised similar concerns over the privatisation of HRL (Russell 2000, p.43). In particular, these concerns centred on the secrecy surrounding the privatisation at the time of the deal and, "for a considerable period afterwards", the "lack of independent valuation at the time of the sale", the "lack of probity audit", and the "uncertainty of returns to the State" (Russell 2000, p.43).

The Auditor General of Victoria reports that "the State Electricity Commission of Victoria previously provided interest free loans to HRL Ltd totalling \$8.5 million" (Auditor General of Victoria 2000). Furthermore, the Auditor General mentions that "substantial uncertainty exists concerning the recovery of these loans and, therefore, these amounts have not been recognised as an asset in the Government's Financial Statements" (Auditor General of Victoria 2000).

## **Jeff Kennett and Amskan**

The wife and sons of Jeff Kennett are believed to have invested in 80,000 shares in the technology company Amskan (Mayne 2006, p.27). Mayne states that the company went into administration before being purchased by HRL; which at the time was 40 per cent controlled by the State Government (Mayne 2006, p.27). HRL purchased Amskan in 1996 after shareholders voted to “enter into a Deed of Company Arrangements with HRL Ltd” (Legislative Assembly of Victoria 1996, p.11). Meanwhile, Kennett had failed to disclose his family’s shareholdings in this company to the Members of Parliament Register of Interests, stating in Parliament that there was no conflict of interest (Legislative Assembly of Victoria 1996, p.10).

Despite the claim from the Premier that there was no conflict of interest, HRL Ltd “bailed out” Amskan, with Loney querying the Premier as to whether or not he had discussed this matter with Kerry Stokes, who by this stage, controlled HRL Ltd (Legislative Assembly of Victoria 1996, p.10).

The Premier did not answer this question, simply stating that he had no further comment to make to Parliament (Mayne 2006, p.27). Furthermore, Mayne claims that The Herald Sun, the Daily Telegraph and Neil Mitchell all failed to press Kennett on this matter (Mayne 2006, p.27).

## **Another Coal Fired Power Station**

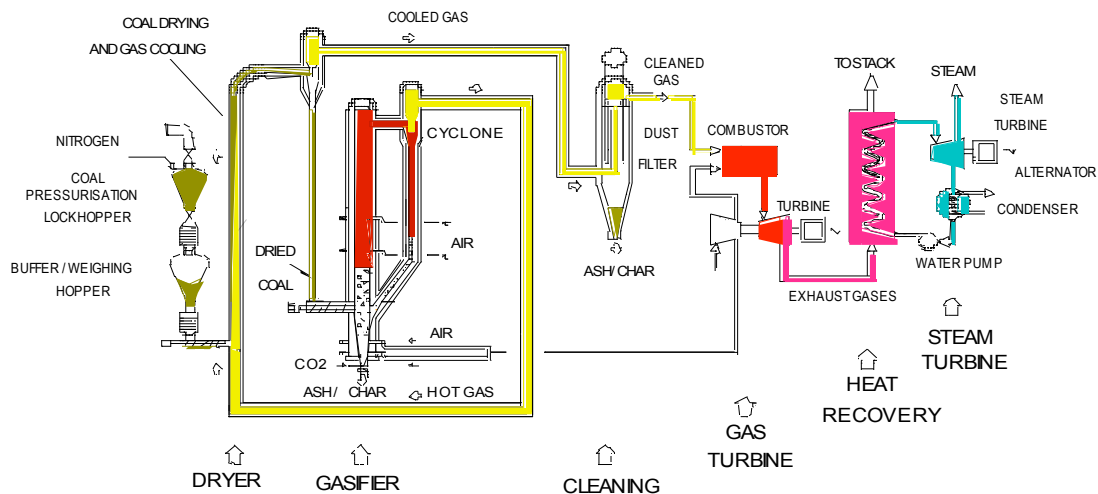
HRL Ltd and Chinese state owned enterprise Harbin Power Engineering are planning on constructing a new 400 MW coal fired power station, which will be situated in the Latrobe Valley at the Loy Yang Site (The Age 2007, p.1) (Barber 2007, p.1). The Project will be a 50/50 joint venture between the two companies (Coal 21 2006, p.). This power station will be a demonstration plant, which will be using Integrated Drying Gasification Combined Cycle technology, of which HRL claim that it will produce 30 per cent less greenhouse emissions than a standard brown coal power plant (Kenny 2007, p.5)(The Age 2007, p.1).

As stated by HRL, the project “consists of the construction, commissioning and operations of a 400MW combined cycle power generation plant with two 200 MW gasifier systems that feed the combined cycle power block with syngas to generate electricity into the Australian National Electricity Market” (HRL 2006, p.2). The demonstration plant is expected to be operational towards the end of 2009 (Frew 2007, p.1). As mentioned by Barber, this plant “will not supplant any existing generation” during the demonstration phase (Barber 2007, p.1). Energy will be sold into the energy grid which is operated by the National Electricity Market Management Company (Barber 2007, p.1).

The demonstration plant is based upon tests conducted using the IGDC technology on a 10 MW plant (Frew 2007, p.1). To support this trial plant, HRL managed to attract \$100 million in investments in 1995 (Myer 2006, p.1).

The IGDC process is described in the Hazelwood West Environmental Effects Statement (EES) Final Panel Report (Saunders, Angus and Evans 2005, p.50):

“In this process brown coal is first dried and then converted to a combustible gas in a fluidised bed gasifier. The gas is cleaned of impurities and burned in a gas turbine to produce electricity. The hot exhaust gas from the gas turbine is then used in a boiler to produce steam, and this steam is used in a steam turbine to produce additional electricity”.



However, as mentioned in the Victorian Parliament, as of mid 2007, no infrastructure exists to store carbon dioxide captured from power stations in the Latrobe Valley (Barber 2007, p.1).

Using this technology, the plant is expected to expel 0.77 tonnes of carbon dioxide into the atmosphere for every megawatt hour of electricity generated, with maximum emissions considered to be 0.83 tonnes of carbon dioxide per megawatt hour (Barber 2007, p.1). Furthermore, one tonne of water will be required to generate one megawatt hour of electricity (Barber 2007, p.1).

Critics mention that this plant will actually increase Victoria’s greenhouse emissions by an estimated 2.4 to 2.7 million tonnes each year (Australian Climate Justice Program 2007, p.1). The Australian Climate Justice Program have disputed the use of the term ‘clean coal’ in association with this project, lodging a complaint with the ACCC (Australian Climate Justice Program 2007). The technology used in this plant is considered to be an improvement in terms of greenhouse gas emissions from brown coal fired power plants; however emissions from this particular plant are not expected to be lower than emissions from conventional black coal fired power plants (Australian Climate Justice Program 2007, p.1).

The cost of the 400MW demonstration plant is expected to be \$750 million (Batchelor 2007, p.1) (The Age 2007, p.1). According to the Victorian Minister for Energy and Resources (2007, p.2), Chinese investors, including Harbin Power Engineering are set to invest \$500 million in the project.

In March of 2007, the Howard Government announced funding of \$100 million for this project, which is to come from the Commonwealth's Low Emissions Technology Demonstration Fund (Cowan 2007, p.1). The Age reports that HRL had applied for \$148 million (The Age 2007, p.1).

The funding pledged by the Howard Government is the sixth to be provided through the \$500 million Low Emissions Technology Demonstration Fund (R & D Info 2007, p.1). Of the six projects to receive funding, four are focused on clean coal (R & D Info 2007, p.1). Interestingly, the projects supported by this fund are not required to store carbon until they reach the commercialisation phase (Barber 2007, p.1).

The Victorian Government then pledged \$50 million as part of the \$103.5 million Victorian Energy Technology and Innovation Strategy (Cowan 2007, p.1) (Frew 2007, p.2). As mentioned in the Victorian Parliament in June of 2007, no contracts had been signed and no money had been received for this project (Barber 2007, p.1).

With the subsidies provided by the State and Federal Governments, it is clear that tax payers are being asked to provide 20 per cent of the capital required for this coal fired power station. Furthermore, Frew reports that HRL was subsidised to the tune of \$90 million in the mid 1990's courtesy of a 150 per cent tax break for research and development (Frew 2007, p.2). Mayne states that HRL Ltd is "the largest exploiter of Labor's tax incentive scheme for research and development" (Mayne 2007, p.1).

### **Energy Technology Innovation Strategy**

The Department of Primary Industry founded the Energy Technology Innovation Strategy, from which \$9.43 million of grants was announced in April of 2007 (Department of Primary Industry 2007, p.3). The grants were specifically intended to assist the research and development of clean coal technology, with Universities and corporations among the recipients (Department of Primary Industry 2007doc27). Ten projects are to receive support over a three year period, with a combined value of \$20 million (Department of Primary Industry 2007, pp.4-5).

HRL is a major beneficiary of these grants. The grants and associated projects involving HRL are outlined below (all information is taken from Department of Primary Industry 2007, pp.4-5):

Grant Value: \$2.06 million

Recipient: Cooperative Research Centre for Greenhouse Gas Technologies

Project: Testing "pre-combustion carbon dioxide capture technologies in power generation" (Department of Primary Industry 2007doc27). HRL Developments,

Melbourne University and Monash University are involved in the research.

Grant Value: \$1.3 million

Recipient: Melbourne University

Project: Researching “oxy fuel combustion”, which involves the capture of greenhouse emissions for storage underground (Department of Primary Industry 2007doc27).

International Power Hazelwood, Loy Yang Power and HRL are involved in the research.

Grant Value: \$390,000

Recipient: HRL Technology

Project: Involves the development of a boiler optimisation package which aims for a reduction in carbon dioxide emissions through enhanced efficiency. International Power Hazelwood, Loy Yang Power and Swinburne University are involved in the research.

Grant Value: \$525,000

Recipient: HRL Technology

Project: Intends to “improve the knowledge of advanced materials for power plants, thus avoiding risks to plant or personnel” (Department of Primary Industry 2007, p.4).

International Power Hazelwood and Monash University are among those involved in the research.

Grant Value: \$450,000

Recipient: HRL Technology

Project: Concerns research into “advanced flaw detection in welds, pitting in tubes and turbine blades in the Latrobe Valley” (Department of Primary Industry 2007, p.5).

Monash University is involved in the research.

## **HRL and Hazelwood**

The Hazelwood West EES, which describes it’s project goal as being the maintenance of an “uninterrupted supply of coal to the Hazelwood Power Station”, will have negative ramifications for HRL Ltd (Saunders et al. 2005, p.12).

This project will affect the exploration license held by HRL at the Driffield Coalfield, with the proposed fifth Morwell River diversion and relocation of the Strzlecki Highway (Saunders et al. 2005, p.2). International Power Hazelwood (IPRH), which operates the Hazelwood Power Station, propose that the location of the Strzlecki Highway deviation and the fifth Morwell River diversion should lie within the HRL Exploration License (Saunders et al. 2005, p.65). In a submission made to the Hazelwood West EES Panel, HRL expressed much concern at the economic consequences caused by this proposal (Saunders et al. 2005, p.24).

In turn, HRL receive criticism from the Department of Primary Industry, who claim that HRL knew of the IPRH proposals before seeking the exploration license, yet chose to proceed with this application (Saunders et al. 2005, p.68). The Hazelwood West EES Final Panel Report refers to a submission made by legal firm Clayton Utz on behalf of

HRL Ltd, which states that “the granting of the Exploration Licences to HRL has been specifically for the development of a new 400MW power station using the IDGCC process” (Saunders et al. 2005, p.70).

According to law firm Clayton Utz, the proposal put by IPRH will greatly affect the exploration license held by HRL, with an estimated 43 to 130 tonnes of coal resources being affected (Saunders et al. 2005, p.70). Replacement coal is estimated to cost \$1.50 more per tonne than the \$2.50 per tonne currently paid for the mining of the coal (Saunders et al. 2005, p.70). Clayton Utz estimates that this extra cost would translate into an economic loss of between \$64 million and \$195 million (Saunders et al. 2005, p.70). It is worth noting that the cost of *mining* the coal is estimated at \$2.50 per tonne, however it is unclear how much is actually being paid for the coal. It can be safely assumed that the overhead costs and the direct costs associated with the actual mining of the coal will consume the majority of that \$2.50 per tonne.

### **Harbin Power Engineering Company**

Harbin Power Engineering Company is a wholly owned subsidiary of Harbin Power Equipment Company, which is in turn 58 per cent controlled by the Harbin Power Equipment Group Corporation (HRL 2006, p.3). The Harbin Power Equipment Group Corporation is the largest power equipment and power station developer in China (HRL 2006doc11). Harbin Power Equipment Group Corporation is a state owned enterprise of China (People’s Daily 2000, p.1)(Hoovers 2007, p.1).

This company develops and builds “turbines, boilers and electric generators for power plants”, with experience gained through projects in countries such as Sudan, Bangladesh and Vietnam (HRL 2006doc11). Harbin develops thermal power equipment, clean coal combustion equipment, hydro power equipment and nuclear power main equipment (Business Week 2007, p.1).

According to Ramzy, Harbin develops new products, often with the intention of selling to overseas customers (Ramzy 2007, p.2). However, Harbin has been particularly busy in its home country, providing over one third of the “total installed capacity of all thermal power turbine sets in China” (Siemens 2007, p.1).

With China’s enormous expansion in recent years, Harbin has also flourished, averaging a revenue growth of 79 per cent since 2004 (Ramzy 2004, p.1). This is largely due to high sales of coal fired generators (Ramzy 2004, p.1).

### **Nuclear Power**

Harbin is involved in a number of nuclear power projects, including the Qishan Nuclear Power Plant (People's Daily 2000, p.1). Harbin Steam Turbine Company Ltd have developed and manufactured a 650 MW steam turbine for this power plant (People's Daily 2000, p.1).

Furthermore, the World Nuclear Association reported that "in September 2007, Sanmen Nuclear Power Co signed a \$521 million contract with Mitsubishi Heavy Industries and its partner Harbin Power Equipment Company for two steam turbine generators of 1200 MW each" (World Nuclear Association 2007, p.6). These turbines are expected to be generating electricity in 2013 (World Nuclear Association 2007, p.6).

### **Merowe Dam**

Harbin is involved in the construction of the \$2 billion Merowe Dam in Sudan, winning a contract valued at US\$400 million to build seven substations and erect 1,745 km of electricity lines (Oster 2007)(Sudan Tribune 2003). The project has received funding pledges of over \$15 million from investors located in a number of countries including Saudi Arabia and Qatar (Diamedia 2006, p.2).

Reportedly the largest hydropower project underway in Africa, the dam will have a capacity of 1,250 MW (Sudan Tribune 2003, p.1). The dam is 9.5 km long, with a height of 67 metres (Sudan Tribune 2007, p.1). However the dam is to create a lake of 160 km in length, which will submerge the homes of 50,000 people, leading to major displacements (Lacey 2005, p.55).

The Wall Street journal has reported that villagers who were protesting their forced relocation were shot and killed by police in 2006 (Oster 2007, p.3). A report published by the International Rivers Network and the Corner House expressed concerns that people who lost their land were relocated to areas of poorer soil, with services such as water, electricity and fertilizer not provided as promised (Lacey 2005, p.4). According to the International Rivers Network and the Corner House, the environmental effect of the dam has not been assessed; either prior to or throughout the dam's construction (Lacey 2005, p.4).

The submerged areas include some of Sudan's ancient sites, such as "the noted towns and cemeteries at Gebel Barkal, from the Pharaonic period and the Napato-Meroitic era, which stretched from 900 B.C. to A.D. 350, the post-Meroitic tumuli, or grave mounds, of Zuma and the Christian monastery of Ghazali" (Lacey 2005, pp.2-3).

### **Three Gorges Dam**

The Harbin Power Engineering Company won contracts for the installation of eight hydraulic turbine generators for the notorious Three Gorges Dam, which crosses the Yangtze River (China Daily 2004, p.1)(Macartney 2007). The Three Gorges dam is projected to cost at least \$13 billion, and has led to the displacement of 1.4 million people, with thousands more people expected to be displaced (Macartney 2007)(Oster 2007).

According to Yardley, “resettlement remains a volatile issue. Two years ago, more than 100,000 people protested the Pubugou Dam project in Sichuan Province, until the riot police crushed the demonstration” (Yardley 2007, p.6). According to Prime Minister Wen, dam building in China has led to the displacement of 23 million people (Yardley 2007, p.14).

Macartney refers to comments made by Wang Xiaofeng, the "director of the administrative office in charge of building the dam", who acknowledged that “We absolutely cannot relax our guard against ecological and environmental security problems sparked by the Three Gorges project” (Macartney 2007, p.2). This acknowledgment is significant, considering that in 1989 a “Vice Premier ordered a five year moratorium on any discussion about the dam” (Macartney 2007, p.2).

Landslides around the edges of the dam are becoming a major concern, as water leaking out of the reservoir creating huge pressure changes that are weakening the banks (Macartney 2007, p.3). According to Macartney, the dam has collapsed in at least 91 places, with 36 km of the dam having caved in (Macartney 2007, p.3). The landslides create massive waves up to 50 metres high (Macartney 2007, p.3). In 2007, a mountain collapsed beside the lake, killing 13 farmers and drowning 11 fishermen (Macartney 2007, p.3). Furthermore, high levels of nitrates present in the tributaries has also caused an outbreak of algal blooms, which has contaminated the drinking water for an estimated 50,000 people (Yardley 2007).

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