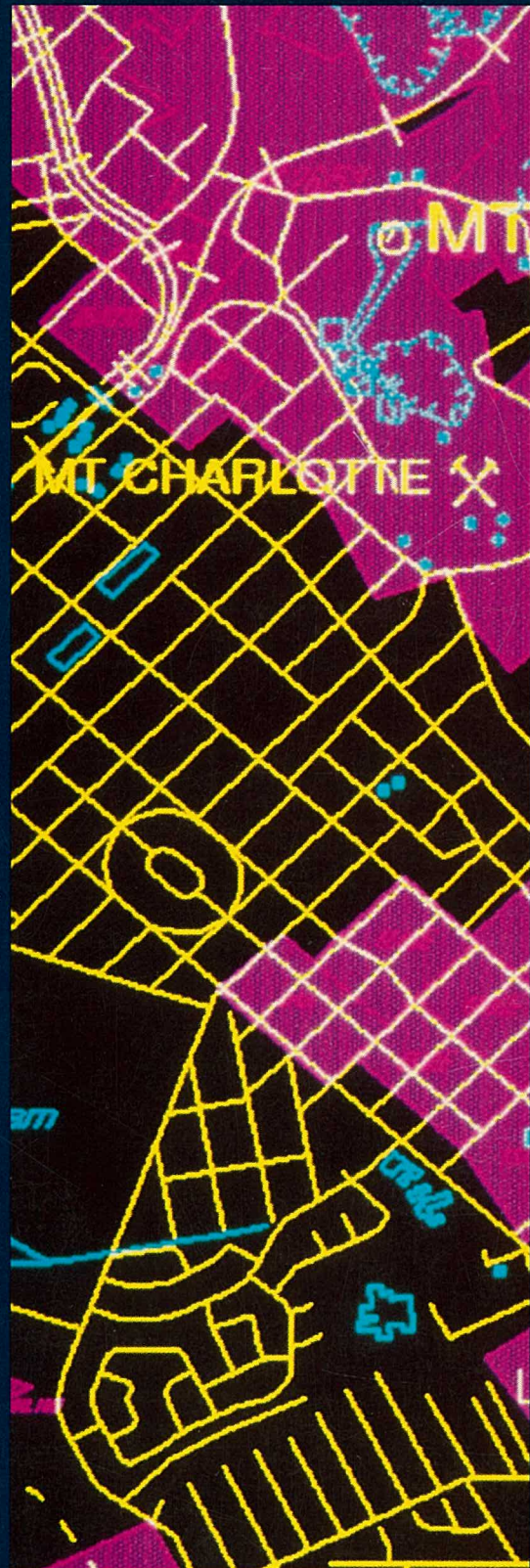


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ANNUAL REPORT 1992 - 93



DEPARTMENT OF MINERALS AND ENERGY



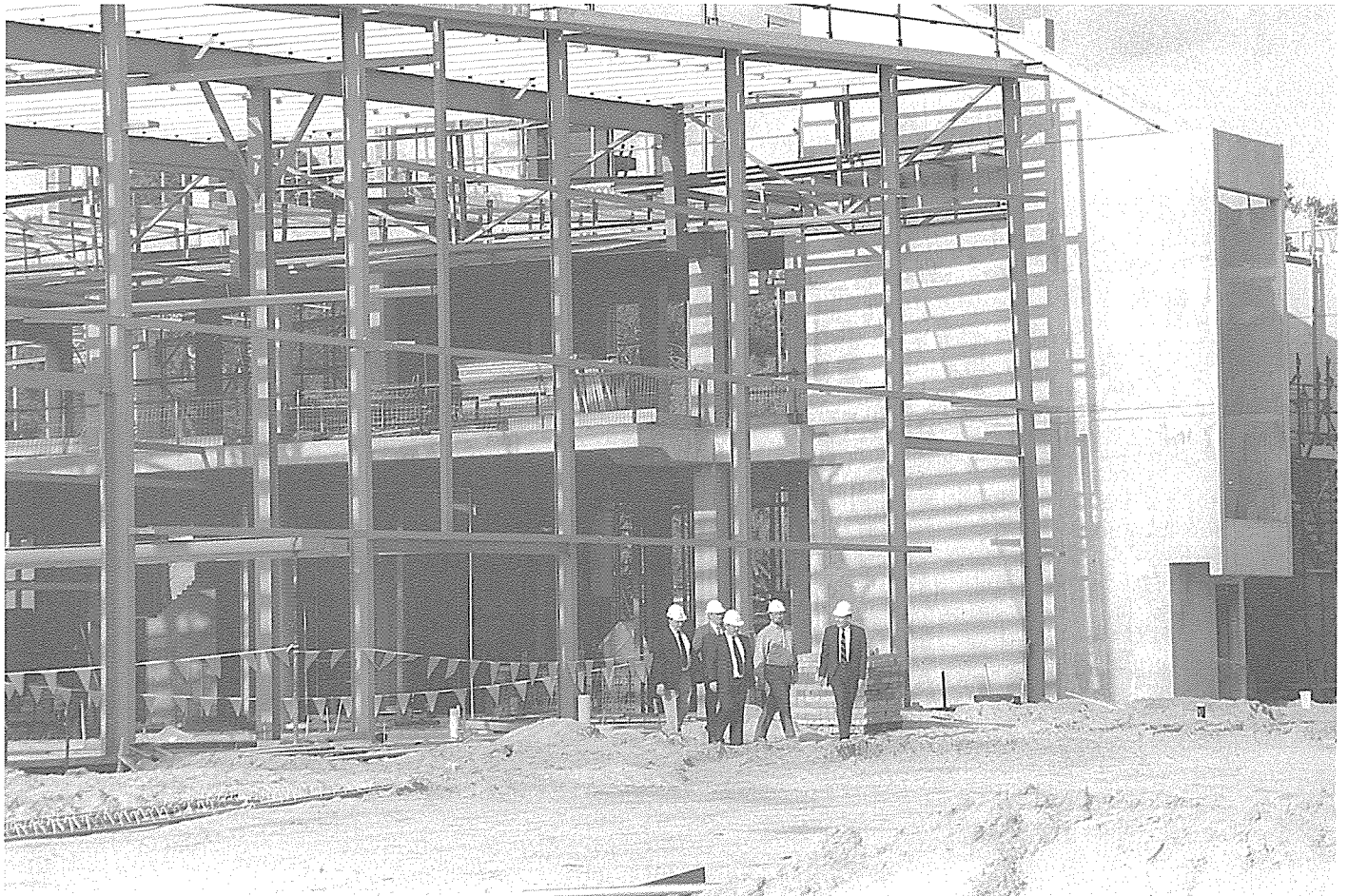
Cover:

Gold was first found at Kalgoorlie 100 years ago in 1893. Our cover photograph shows a segment of Kalgoorlie as it appears on the Department of Minerals and Energy's TENGRAPH database which rapidly identifies areas available for mineral exploration in relation to other land tenure and topography. By 1997, TENGRAPH will have replaced the 9 000 paper plans of the Public Plan System. Hard copy and digital data is available for sale. For details, contact Surveys and Mapping on Floor 2 at Mineral House or telephone 222 3111.

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Construction of Stage One of the new Chemistry Centre Complex at Bentley is well under way. Inspecting the site are Arthur Mistilis of our Corporate Development Division, project coordinator Martyn Piercey of PDC Project Management, project manager Chris Bagley of the Building Management Authority, Dennis Chaloner, project manager for Fletcher Construction Australia, and Dr John Hosking of the Chemistry Centre.





Foreword by the Minister for Mines



Hon George Cash JP MLC
Minister for Mines

I am pleased to present Parliament with this 1993 Annual Report recording the activities and achievements of the Department of Minerals and Energy during the 1992-93 financial year.

My Department continued its important role in facilitating development, and managing the mining and petroleum industries, both of which have a significant impact on the Australian and world economies.

Our 270 mines produced 22% by value of Australia's minerals; and in quantity terms, world-wide provided 35% per cent of all mineral sands, 30% of the world's diamonds, 20% of alumina, 12% of all iron ore, 9% of all gold, 8% of the world's nickel, and 2.5% of all salt. Petroleum production came from 26 oil and gas fields including Australia's largest natural resource project, the North West Shelf.

With production valued at more than \$12 000 million, our resource industries produced 70 per cent of the State's exports. Mining and petroleum directly employed about 34,000 people and indirectly employed approximately a further 100,000 Western Australians.

Royalties, rents and other charges collected by my Department contributed \$413 million to State consolidated revenue, and additional revenue was collected on behalf of the Federal Government. This money was channelled back into the community as schools, hospitals, roads, water and other amenities for the benefit of all.

There are good reasons for optimism in the 1990s. The Government aims to double the value of mineral production before the turn of the century by

My Department continued its important role in facilitating development, and managing the mining and petroleum industries, both of which have a significant impact on the Australian and world economies.

developing a legislative and administrative framework that will encourage the industry to move ahead with exploration and development. Cabinet has approved amendments to petroleum legislation, and legislation to amend the Mining Act and outdated Mines Regulation Act has been introduced to Parliament.

Western Australia will be the nation's largest petroleum producer within the next four years, and liquified natural gas is expected to overtake iron ore as the State's primary export by the end of the decade. Gold exports should increase next year with expanding gold markets in the developing Asian nations, particularly China.

The mining industry has kept pace with the change in community expectations relating to sound environmental management practices during mining development, operation and abandonment. Environmental protection and rehabilitation are no longer an afterthought, but now an intrinsic part of the mining process. This is reinforced by the Government's commitment to maximise protection of the natural environment.

My Department is also at the leading edge of technological research and development in this State. Examples include the world-first development of gold finger-printing which can unerringly identify the source of gold, thereby helping reduce gold stealing and falsification of test-drill results. Another development is a computerised tenement graphics and database system which rapidly identifies areas available for mineral exploration in relation to topography and other land tenure.

The Explosives and Dangerous Goods Division continues to make a vital contribution to public safety by reviewing and administering laws guiding the safe manufacture, storage, handling and transport of explosives and dangerous goods. Inspectors regularly visit chemical and petroleum storage sites. Working closely with the police and fire brigade, Departmental specialists provide advice on major chemical hazards and carry out reviews of emergency response plans.

The Chemistry Centre at the Department of Minerals and Energy provides the largest range of scientific services of any State Government organisation in Australia. Services to Government, industry and the public include chemical, mineralogical and metallurgical analysis, testing and consultancy. The 150 professional, technical and support staff in eight laboratories are expert in areas as diverse as agricultural and mineral resource development, environmental chemistry, consumer assistance, material, forensic and racing science and occupational health. The Chemistry Centre also assists our State's consumers by providing recycling and waste management advice, evaluating building materials, identifying contaminants in food, and testing water quality.

I commend this Annual Report to you as a summary of my Department's activities during the year.

George Cash JP MLC
Minister for Mines



Statement of Compliance

The Honourable George Cash JP MLC
Minister for Mines
Parliament House
PERTH WA 6000

Dear Minister

In accordance with Section 62 of the Financial Administration and Audit Act 1985, I submit for your information and presentation to Parliament, the Annual Report of the Department of Minerals and Energy of the State of Western Australia, for the year ending June, 1993.

The Annual Report has been prepared in accordance with the provisions of the Financial Administration and Audit Act 1985.

It uses the format established in previous years, with the Department's activities described under Corporate Programs. These are set against a background of the mining and petroleum industry in 1992-93.

I commend to you the loyal and responsible contribution of officers from all sections of the Department towards the implementation of Government policies.

Yours sincerely



Lee Ranford
Acting Director General

August 1993



Highlights for the Year

- Change of name from Department of Mines to Department of Minerals and Energy
- Major review of Departmental programs
- Director-General, Dr Des Kelly, appointed a member of the general division of the Order of Australia for services to the mining industry
- Work begins on Stage One of the new Chemistry Centre at Bentley
- New duty-of-care provisions introduced and Petroleum Safety Branch established to manage occupational health and safety in the petroleum industry
- Lost time injury rate continues to fall in mining industry
- New version of Dangerous Goods Regulations proclaimed and special body established to advise Government
- New computer-based tenement database developed to serve the needs of industry
- New computer-based exploration database launched
- Record 27.4 million hectares of land now held under granted title
- Inaugural Awards for Environmental Excellence presented to industry
- Release of Golden Mile Mining Development Conceptual Plan
- Thirty five accident prevention courses run for the mining industry
- Total collection of royalties and rentals from mining and petroleum companies sets a new record at \$433 million
- New hybrid royalty system developed for offshore minerals



Report of the Director General



Lee Ranford
Acting Director General

The year in review was marked by a number of major developments and notable accomplishments by the Department of Minerals and Energy in Western Australia.

It saw the Department complete a major review of its corporate programs aimed at ensuring a better customer focus for all its activities. This overhaul had also become essential in the light of reduced financial and staff resources and increased demands for products and services.

It also saw the Department's Director General, Dr Des Kelly, honoured with appointment as a member of the general division of the Order of Australia for his services to the mining industry.

After 13 years as Director General, Dr Kelly left in early 1993 to head the newly-formed Department of Resource Development.

On 1 July 1992, the Department changed its title from the Department of Mines to the Department of Minerals and Energy. This change recognised both the growing importance of the energy sector to the economy of Western Australia and the breadth of the Department's responsibilities. The State's 26 producing oil and gas fields currently provide over 20% of the total value of Western Australia's mineral and petroleum production and make a substantial contribution to the economy of the State.

Indeed, it was continued expansion of gas and petroleum activity that prompted Government during the year to make

“ I believe that the dedicated professionalism of our staff has been instrumental in the achievements of the Department over the year and will continue to be our major asset. ”

changes to occupational health and safety arrangements for the State's 1 800 petroleum workers. From 1 May 1993, petroleum companies were required to observe new duty-of-care responsibilities for their employees and a new Petroleum Safety Branch was established within the Department to administer the new provisions.

In late 1992, responsibility for occupational health and safety in the mining industry was transferred from the Minister for Mines to the Minister for Productivity and Labour Relations, and for a few months the Director General was in the challenging position of having to report to three separate Ministers; one for general mining issues, one for energy matters and one for occupational health and safety.

However, immediately following a change of Government in February 1993, responsibility for occupational health and safety was returned to the Minister for Mines, the Energy Policy Planning Bureau was transferred to the new Department of Resources Development, and the Department of Minerals and Energy returned to having a single Minister responsible for its programs.

There were a number of important developments related to public safety during the year. One was the proclamation in October 1992 of new Dangerous Goods Regulations covering emergency response planning and fire protection, the placarding of premises and containers, and the licensing of premises as the basis of an

emergency response database. The new regulations draw heavily on Australian Standards to ensure that Western Australia's requirements are in line with the best national and international practices.

The year also saw the establishment of a Dangerous Goods Liaison Committee, comprised of company, union, industry body and government representatives, to advise the Department and the Minister on a range of matters related to the storage, handling, and transportation of dangerous goods in Western Australia.

In recent years, considerable Departmental resources have been directed to the development of a new computer-based system to store and graphically display mining tenement information. Called TENGRAPH, the system involves the digital storage of the State's 9 000 tenement maps and other topographic and land tenure data to present a total land use picture.

The system is expected to give a significant boost to mineral exploration in Western Australia as it enables swift identification of land available for exploration. Currently, it is planned that access to TENGRAPH will be extended to the Department's Coolgardie, Norseman and Leonora offices in 1994-95 after its implementation in Kalgoorlie in 1994.

Computers have had a significant impact within the Department of Minerals and Energy, not only to provide sophisticated database services but also in the field of map-making. Currently, over



Report of the Director General

70% of the maps produced by the Department are computer-generated.

The provision of up-to-date maps, tenement and land use data became all the more important in a year which saw a new record established with 27 434 574 hectares of land (nearly 11% of the State) held under granted mineral titles.

Ensuring appropriate environmental protection and rehabilitation of mining areas continued to be a major focus of Departmental activity during the year. In order to publicly recognise companies which have done outstanding work in this field, the Department presented Awards for Environmental Excellence to a number of operators. These awards are to be presented annually to promote the good work of certain mining and petroleum companies and to encourage other companies to emulate the example of award winners.

A further initiative of considerable importance to the environment and development of Kalgoorlie, was the release during the year of the Golden Mile Mining Development Conceptual Plan. Produced by the Golden Mile Mining Development Planning Committee, chaired by the State Mining Engineer, the plan will assist the community, government and industry in planning for the impact of large scale mining development along Kalgoorlie's Golden Mile.

Also of considerable importance to industry, government and the broader community was the Government's decision to proceed with a new world-class headquarters for the Department's Chemistry Centre. Stage One commenced during the year and will house a new mineral research centre. It will function as a test facility for new or improved mineral processes and should play an important role in maintaining the competitive edge for Western Australia's mining industry.

The Chemistry Centre has already established an international reputation for its work in many areas. Few of these developments have generated such popular

interest as its world-first breakthrough in gold fingerprinting - a process which is already bringing gold thieves to justice. Announcement of this development during the year generated considerable media coverage both within Australia, and around the globe.

Much work has been undertaken in recent years within the Department of Minerals and Energy to assist the Government develop and implement policies related to the complex issues associated with land access for exploration and mining.

The Mabo decision by the High Court of Australia generated considerable work for parts of the Department in 1992-93 because of the need for detailed assessment of the implications for government, industry and the public. The decision is one with far-reaching implications for the mining and petroleum industries and it presents major challenges for governments across Australia.

I believe that the dedicated professionalism of our staff has been instrumental in the achievements of the Department over the year and will continue to be our major asset. With the new program structure in place and the support of Government for new initiatives currently being considered, I am sure that in 1994 we shall again be able to report on a year of significant achievement and progress.



Lee Ranford
Acting Director General



The Mining and Petroleum Industry in 1992-93

Despite uncertainty over the commencement of a worldwide economic recovery, the resources sector remains fundamentally sound and will again underpin gains in the broader economy.

In contrast to the main industrialised nations where the economies have stalled, East and North Asian economic growth was solid. The area was buoyed by infrastructure and capital investment, and a strong level of intra-regional trade. As a result of this activity, the demand for some mineral and energy products was strong.

Asian regional growth was not, however, enough to offset weak demand elsewhere and international mineral and energy prices remained broadly depressed. The build-up of inventories by end users will reduce the chance of a quick recovery for some key minerals.

While most of the indicators of Australia's economic recovery were positive, the rate of growth was slow. Poor business investment opportunities, low levels of consumer confidence and a tight fiscal environment ensured that unemployment remained high. Minerals developers did, however, welcome the associated low inflation, sustained downward pressure on interest rates and exchange rates and the renewed focus on improving aspects of Australia's export culture.

The Western Australian resources industry

The State's producers of minerals and petroleum were shielded from some of the effects of a further contraction in world market prices through an overall increase

in output, and by the December 1992 depreciation of the Australian dollar. Total value of production of minerals and petroleum was \$12 343 million, a solid increase on the 1991-92 result (Figure 1).

The alumina, iron ore, nickel and heavy mineral sands sectors all recorded slight increases in the quantities sold. Petroleum sector products (except LNG), gold, diamonds and most of the base metals all had small falls in output during the year (Figure 2). Where possible, producers sought efficiency gains through capacity utilisation, innovation and the application of new technology.

The outlook for 1993-94 is for a nominal increase in total receipts. This result is predicated on the exchange rate

stabilising below US70 cents, and the overall volume and mix of exports remaining roughly constant. Despite uncertainty over the commencement of a worldwide economic recovery, the resources sector remains fundamentally sound and will again underpin gains in the broader economy.

Iron ore

Iron ore sector performance was strong during the trading period with a marginal increase in production, to 110 million tonnes (Mt), and receipts steady at just over \$3 000 million. With 24% of the total value, iron ore was the largest single commodity (Figure 3). A 10% reduction in

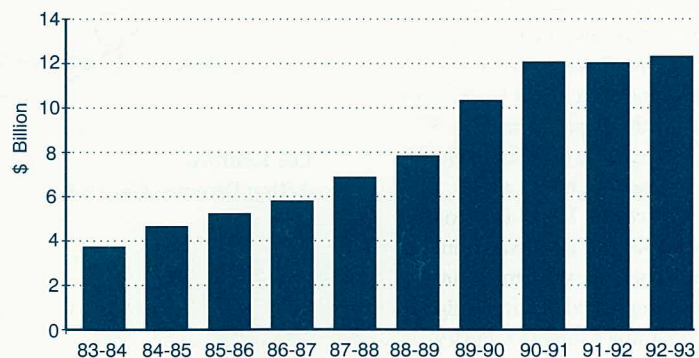


Figure 1. Value of mineral and petroleum production in Western Australia



The Mining and Petroleum Industry in 1992-93

average contract prices was offset by a fall in the exchange rate. The currency fall against the US dollar occurred at the end of 1992 and was largely sustained over the trading period. A further 11% price cut was forced on producers for the 1993-94 financial year.

Producers steadily expanded the State's production capacity during the year, confident that prices have bottomed out and that a moderate growth in export tonnages can be sustained. Much of this investment was to enable the efficient blending of different ores, thus extending the mine life of higher grade deposits. The

commencement of the \$300 million Marandoo project, which will complement Mount Tom Price upon its completion in 1994, was a good indicator of the industry's future investment strategy. The \$80 million Mesa J development, the Yarrie mine and the \$200 million loading facility upgrade at Port Hedland were all well advanced. On a relatively smaller scale, a feasibility study was undertaken for the Koolyanobbing mine. It is planned that ore from the deposit will be blended with beneficiated product from Cockatoo Island for sales to China's Anshan Steelworks. The HISMELT research and development facility at Kwinana

progressed steadily and commissioning is scheduled for early September 1993.

Although receipts are expected to fall slightly in 1993-94, export tonnages will rise. As approximately 80% of exports will continue to flow to Japan and other North Asian destinations producers are expected to benefit from steady levels of regional demand growth, and be cushioned from the severe contraction which is developing in European markets. Total exports should be in the region of 115 million tonnes in 1993-94.

Gold

While production eased slightly to approximately 180 tonnes, the calculated value of production from the State's mines rose marginally to just over \$2 800 million. The value increase was partly attributable to the May 1993 price rise, which was in turn caused by a range of political and economic factors.

The rally came after a sustained period of decline, which reached its lowest point at the beginning of 1993 when the market valued the metal at \$US330/oz. A price surge to near \$US400 provided a fillip to existing producers, exploration activity and mining industry investors. The late 1992 devaluation of the \$A also increased returns to producers. Many of the small mineral explorers received a boost from the steady advances recorded by the share market. Growth in the traded value of mining stocks preceded the leap in gold bullion prices by about 6 months.

While development activity was relatively subdued, there were some substantial projects commenced and brought on stream during the year. Marymia, Mount McClure, Yilgarn Star and Mount Monger were the major new operations commissioned, with Butcher Well and Kanowna Belle due to start production before the end of 1993. The \$78 million first stage of the Kanowna Belle opencut development should come into production by September 1993, and be followed by the \$130 million second and third stages. A range of significant

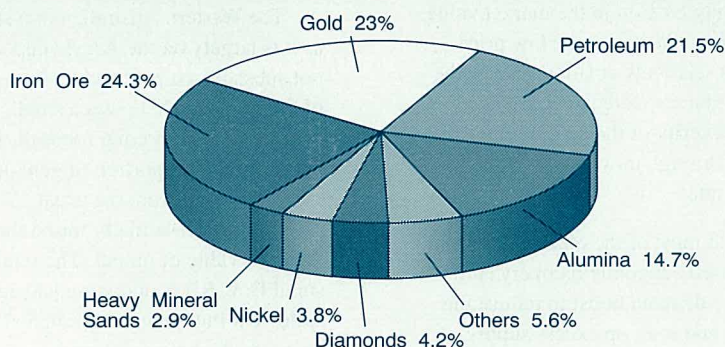


Figure 2. 1992-93 value of mineral and petroleum production
Total \$12 343 million

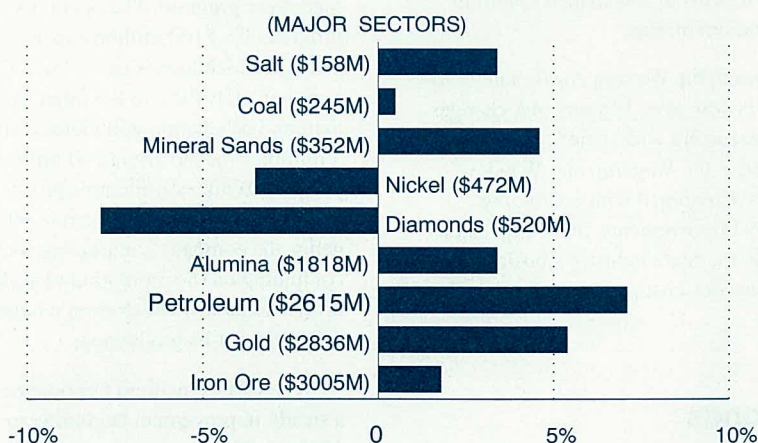


Figure 3. Percentage change in value of production from previous year. Actual production value 1992-93 shown in brackets



The Mining and Petroleum Industry in 1992-93

mine expansions and feasibility studies were announced and, given the buoyancy of the market, will probably progress quickly.

Petroleum

While petroleum markets were again constrained by the recessed world economy, the Western Australian sector enjoyed an overall increase in the value of output, exploration activity and investment. The 7% increase in total receipts, to over \$2600 million, was due to another strong rise in LNG sales to approximately \$1000 million.

Crude oil receipts contracted slightly to \$850 million, on the back of weak demand and a stagnating average price of US\$18 per barrel. Condensate production remained steady while receipts rose to just over \$360 million. Natural gas sales improved moderately to around \$400 million.

In Western Australia, new offshore field developments and plant upgrades progressed steadily during the year, with a further \$1 500 million of committed investment. The development phases of the Griffin, Roller/Skate and Wandoo projects advanced strongly. All three fields will be commissioned in early to mid 1994.

The third LNG train was largely completed and the debottlenecking of trains one and two substantially progressed. The joint venturers did, however, suffer a set back on the offshore production platform component of Phase 3 of the development. Pile damage which occurred during the primary insillation pushed out the scheduled start up until late 1994. The delay will defer revenue flows to the project by about a year. The steadily growing level of LNG exports was not affected by the holdup. The construction phase of the \$700 million Wanaea/Cossack project, and \$350 million LPG plant, is expected to commence before the end of 1993.

The medium and long term outlook for the local industry is for a steady increase

in investment and output. A slight fall in output is expected for 1993/94. The growth scenario assumes only a very small rise in the crude oil price over the rest of the decade. A significant increase in price would lift profitability and result in more high-risk, high-cost projects being brought into production than would otherwise be the case.

Alumina

Small increases were recorded in both total tonnage, up to 7.5 Mt, and value of production, to over \$1 800 million.

The alumina price averaged around A\$180 per tonne during the year, in line with a steady erosion in the market value of aluminium. Although the low price resulted in relatively smaller returns, the State's producers were partly shielded from the severity of the continuing downturn through movements in the exchange rate.

As with most of the other metals, only a broad based economic recovery can provide the demand boost to reduce the stockpiles and soak up excess supply. Despite immediate structural problems, there are tentative indications that aluminium prices might be struggling off a 6 year low. It is reasonable to assume that the alumina price will begin to recover within 6 months of a sustained upturn in the aluminium market.

Although the Western Australian industry is now over 30 years old, changes are still occurring with major expansions completed at the Wagerup and Worsley refineries. Combined with continuing efficiency improvements, these expansions will retain the State industry's position as a world class low cost producer through the 1990s.

Diamonds

In a tough trading environment State production fell significantly to just under 25 million carats. Reported receipts from all categories of diamonds marketed were

approximately \$520 million. There was a noticeable shift in sales focus to quality stones.

The world diamond market remained depressed. Low demand in the principal consuming regions of North America and Europe, and little growth in the relatively new Japanese market, was exacerbated by supply problems. An excessive amount of smuggled diamonds from strife torn Angola and Zaire threatened to disrupt the well controlled market.

As a result of these points of crisis the Central Selling Organisation (CSO) was forced to cut back on purchases, reduce purchases by 25% and reduce prices in real terms.

The Western Australian industry, based as it is largely on the Argyle deposits, was not substantially affected by the vagaries of the market. There was a small difference in marketing focus during the period as the proportion of gem quality sales increased from the usual 5% level. This factor substantially raised the reported value of output. The relatively small Bow River operation had another solid year but, given its limited alluvial reserves, the project life remains short.

The Argyle joint venturers expressed confidence in their Kimberley operations with an ambitious mine capacity investment, exploration and longer term marketing program. The operators progressed a \$100 million expansion through which tonnes treated will rise by approximately 30% to 8.5 mtpa and diamond production will increase by 5 million carats to around 40 million carats per year. While considerable profits were generated by the sale of the rare pink gems, the company's marketing focus is continuing on the promotion of yellow and brown diamonds which form a large proportion of its production.

The CSO's medium term outlook is for a steady improvement beginning in 1993-94. The organisation maintains that the flood of smuggled product has been absorbed and supply is once more consistent with the requirements of an orderly market. This will ensure that any



The Mining and Petroleum Industry in 1992-93

emerging economic upturn will quickly translate into a rebound in demand and prices.

The Western Australian industry is confident and the general level of activity remains high. Exploration programmes are currently proceeding in the Kimberley, Eastern goldfields and over large areas of the Murchison.

Nickel

Total tonnages of contained nickel produced and gross receipts both contracted during the year. Value of production was just over \$470 million, a 4% fall, and output eased by 6% to 53 000 tonnes. The local industry was hard hit by a continuing weakness of market prices and a general worsening of global oversupply.

After a small rally in mid to late 1992, the nickel metal price fell in real terms to the June 1993 level of around \$7.70 per kilogram.

Given the prevailing poor market conditions, it is very encouraging that the Western Australian industry is again looking to increase capacity for a mid to late 1990s recovery in prices. During the past 12 months there have been some dramatic announcements on investments and development.

The \$100 million Forrestania mine came on stream in January, and firm plans were announced for the \$450 million Mt Keith project to be at the production stage by early 1995. Although some detailed evaluation is progressing on the massive Yakabindie deposits, the project is not expected to proceed until there is a sustained price improvement.

Plans for significant expansions and upgrades of existing operations are well advanced. Production will be increased at both Leinster and Kambalda, as will the capacity of the Kalgoorlie smelter and the Kwinana refinery. The extra smelter and refinery capacity is scheduled to be operational by 1994.

Western Australia is set to maintain, and possibly increase, its 75% share of total national export tonnages over the next few years.

Heavy mineral sands

The heavy mineral sands industry experienced another year of weak product demand and softening prices. World-wide overcapacity exacerbated an already tough operational environment.

While the value of production increased marginally to just over \$350 million, most of the minerals suffered falls in sales volumes. There was generally little movement in prices during the year. Receipts from rutile and upgraded ilmenite did edge up, but only as a result of substantial tonnage increases. Despite a 33% increase in marketed product, receipts from zircon sales again fell by nearly 20% to \$50 million. There was only a small decrease in ilmenite sales to \$80 million.

While the market value of most of the heavy mineral sands products is stabilising, and possibly beginning a medium term recovery, the zircon price is coming under more pressure. It is forecast that the price could fall by another 15% in 1993-94, after a 30% fall in 1992-93, due to strong competition from South African

producers and from production associated with increased rutile/ilmenite mine output.

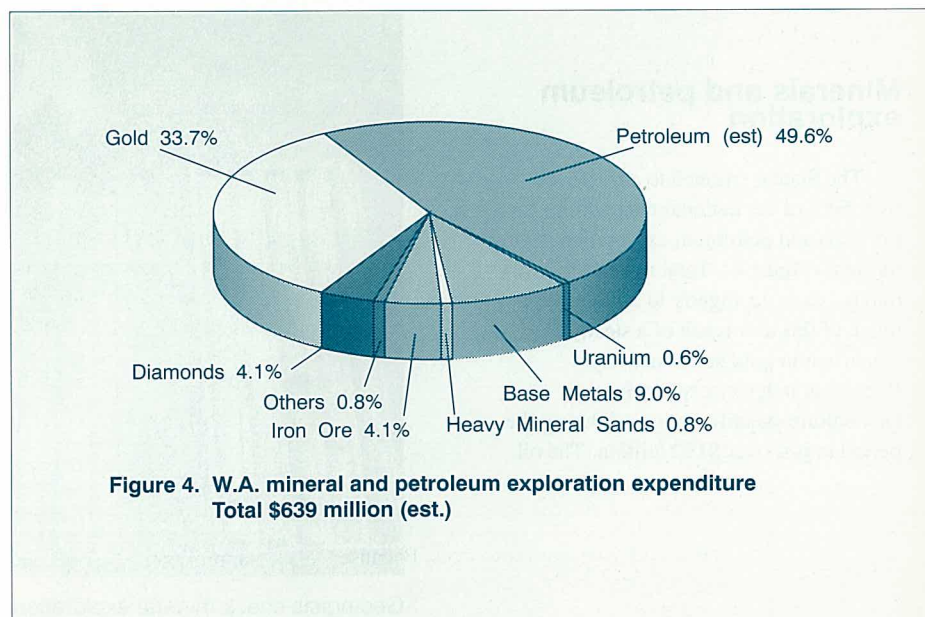
Western Australian production of zircon, rutile, synthetic rutile and ilmenite is forecast to again increase during 1993-94. Small tonnage increases will push total export earnings for the sector, including value added products, up by about 4% in 1993-94.

Although partial shutdowns of capacity have occurred, and some developments put on hold, there are signs that the State's industry is planning for a steady recovery. Bulk sampling has been completed for the proposed Beenup project and construction has progressed at Jangardup. The start up date for the latter operation is scheduled for late 1994. Westralian Sands \$100 million synthetic rutile capacity expansion is still under active consideration.

Existing plant and infrastructure, plus planned expansions, will ensure Western Australia's position as a major global titanium minerals producing region.

Other minerals

Coal tonnages and sales increased marginally as the State government moved closer to finalising arrangements which will expand electricity generation capacity.



The Mining and Petroleum Industry in 1992-93

Significant mine development work is being planned by both Collie operators. Gross investment of up to \$200 million is contingent on market conditions and the commissioning of a new power station.

The State's salt industry had another relatively strong year as receipts increased slightly to approximately \$160 million. Producers have undertaken, or are actively considering, expansions in capacity which are predicated on a strengthening, though competitive, market through the 1990s.

Base metals producers had another tough trading year as lead, copper and zinc prices continued to fall. The short term outlook is for a period of stabilisation before prices begin a recovery in 1994. The State's relatively small industry is steadily building capacity with Stage 1 of the Nifty copper project due to be commissioned late in the year and a zinc smelter study progressing for the Port Hedland region.

Manganese sales were again strong as the sector continued to be driven by short term market conditions.

Potential developments which are attracting considerable interest are the Windimurra vanadium pentoxide project and the Mount Weld rare earths operation. It is proposed that product from Mount Weld will be extensively processed at Meenaar near Northam.

Minerals and petroleum exploration

The State continued to attract well over 50% of the national expenditure for minerals and petroleum exploration during the year (Figure 4). Total mineral industry outlays were up slightly to \$340 million, much of this as a result of a steady expansion in gold sector activity. Petroleum industry exploration expenditure steadily improved during the period to just over \$190 million. The oil

search increase came as prices stagnated in an over-supplied market.

Many gold exploration companies anticipated the surge in bullion prices and expanded their activities considerably during the year. Estimated outlays were over \$210 million, or 63% of all the funds committed by the minerals industry. Given the cyclical and structural factors currently pushing the gold price the pace of, mainly technically advanced, exploration activity should be sustained.

The iron ore industry maintained a relatively high level of exploration and evaluation activity during the year. Approximately \$27 million was committed by the principal companies, mainly to a closer examination and feasibility work on known deposits. The industry's longer term strategy is to prove up economic reserves in order to supply demand growth in the East and North Asian region.

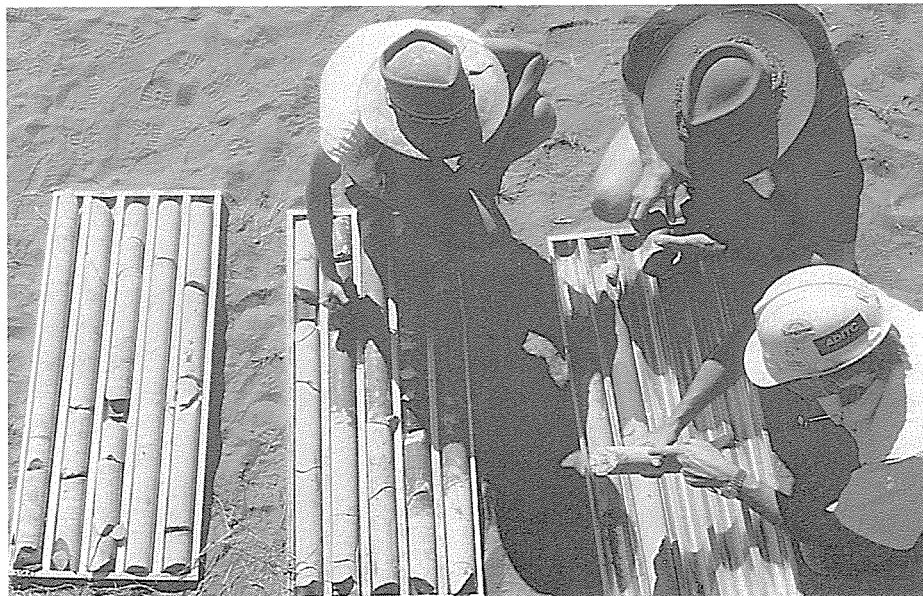
While the base metals mining sector remained a relatively minor portion of the State's minerals inventory, exploration efforts were again strong during the year. Steady application by the major players yielded a range of small prospects which could become economic as prices improve. Despite the uncertainty associated with a prolonged market downturn, nickel exploration and evaluation activity was

again strong. Apart from the high profile feasibility work being undertaken at Yakabindie and Mount Keith, a considerable range of smaller prospects are also under examination.

Diamond exploration activity was buoyant despite the depressed market. The Kimberley, Murchison, Eastern Goldfields and remote desert regions are all the subjects of vigorous exploration programs.

Increasingly, mineral exploration success in Western Australia is being driven by technological advances. The industry's use of remote sensing equipment, computer modelling and satellite imagery is crucial to its competitiveness and environmental profile.

The offshore Carnarvon Basin was once again the focus of most petroleum exploration activity, as onshore work decreased. A range of producing and exploration companies drilled over 20 wells. At least 20 wildcat wells are scheduled for 1993-94. This drilling will be completed as a direct result of the area's known prospectivity and the intense seismic survey work which has been undertaken over the past few years. With exploration techniques improving and geological knowledge rising it is likely that there will be more viable discoveries in the near future.



Geologists check mineral exploration drill cores.



The Department of Minerals and Energy

Enabling legislation

The Department is established by the Governor of Western Australia under Section 11 of the Mining Act 1978 which requires that there be a Department of the Public Service to assist the Minister in the administration of the Mining Act.

Background

The Department was established on January 1, 1894 as the regulatory body to ensure the safe and orderly development of mineral resources in this State, and to allow the Government and the community to benefit from these activities. This is still the major role of the Department.

The Geological Survey, which had been founded six years earlier, was incorporated with the Department of Mines. This was closely followed by the establishment of a system of State gold batteries. In 1902 the Government Analyst's Laboratory was transferred to the Department and signified the start of another role — the provision of services to the mining industry.

These services have evolved with the technological growth of modern mining. As the industry became prominent and complex, regulatory functions demanded a wide range and depth of internal services and expertise. Consequently, many of the sections of the Department traditionally involved in regulation were able to provide further services in the form of technical advice, tenement maps, and safety recommendations. Progressively, this role has been extended and now the Department is called upon to provide services to the community beyond those exclusively related to the mining and petroleum industries, particularly in relation to chemistry and public safety.

Government policy aims to encourage responsible investment in exploration, extraction and utilisation of the State's mineral and petroleum resources. Because of their major contribution to the economy, mining activities have ramifications that

reach directly or indirectly into the whole economic and social fabric of Western Australia. This is reflected in the wide range of activities currently administered by the Department.

Operating environment

Western Australia is fortunate in being endowed with abundant mineral and petroleum resources, held in trust by the Government on behalf of the community.

Recognising that the community requires mineral and petroleum products to sustain its standard of living, the Department of Minerals and Energy has been given the responsibility to ensure that the exploration for and development of these resources is carried out equitably, with due care for the environment and worker safety, in the best interests of the community, and in accordance with the principles of integrated catchment management.

The mineral and petroleum resources of the State are owned by the Crown, but are almost entirely explored for, and developed by, private enterprise.

Exploration and development are undertaken in an organisational framework controlled and directed by Government with appropriate recompense (benefit) to the wider community.

The mineral and petroleum industries play a major role in the economy of the State and a high level of exploration is essential to identify the mineral, petroleum and groundwater resources which will be required to sustain our economy and maintain our living standards.

Mineral and petroleum deposits are finite, and non-renewable. They are almost always difficult and expensive to find and small in size relative to the total land mass.

Mineral and petroleum deposits are assets only after they have been discovered and delineated, and the potential for an appropriate financial return provides the incentive to engage in high-risk exploration necessary to find them.

Mineral and petroleum developments are a temporary land-use and should be a key element in a strategy of multiple land-use.

Changes in the economy, technology, and geological understanding will lead to the re-appraisal of previously tested ground; therefore the mineral potential of any area can never be totally written off and there is a need to ensure that information is not lost and as much land as possible is made available for exploration.

Geoscientific data is essential for land-use planning covering urban areas, dams, roads, ports and harbours.

Independent chemical and metallurgical research and services at a high level of confidence and integrity are needed to ensure that standardised information is available to the community.

Public safety is of major concern in relation to the transportation, storage and use of explosives and dangerous goods.

Resources allocated to the Department are to be administered efficiently according to the prevailing principles and standards expected of the Public Service.

The Department must respond quickly and effectively to changes required by the community through Government.

It is against this background and in this environment that the Department must operate.

Mission

- To manage and support the sustainable development of the State's mineral, petroleum and ground water resources in the best interests of the community of Western Australia; and
- To ensure that the community is:
 - protected from hazards associated with dangerous goods
 - provided with high quality independent chemical research, consultancy and analytical services.



The Department of Minerals and Energy

Role

The role of the Department is to ensure that the community of Western Australia:

- receives maximum benefit from the responsible exploration and development of minerals and petroleum with proper regard to the protection of the environment;
- is protected from hazards associated with mineral and petroleum activities, explosives and dangerous goods;
- has access to independent geotechnical, chemical and engineering advice relevant to land-use planning, and the mineral and petroleum industries;
- is provided with information about the geoscientific environment including the distribution of mineral, petroleum and groundwater resources; and
- is provided with independent chemical research, consultancy and analytical services.

Programs

In its defined role the Department of Minerals and Energy carries out certain programs, as follow:

Program 1: Minerals and petroleum titles

The objective of this program is to ensure that exploration and development titles for minerals and petroleum are issued fairly and without delay.

1.1 Titles System Sub-Program

Provides an equitable system for granting secure exploration and development titles as a basis for petroleum and mineral assessment and production.

1.2 Dispute Management Sub-Program

Minimises potential for disputes over exploration and development titles and facilitates the prompt settlement of disputes when they do arise.

Program 2: Exploration and development of natural resources

The objective of this program is to foster and assist responsible mineral and petroleum exploration and development, groundwater assessment, and land-use planning by providing high-quality scientific and technical services and advice to industry, Government and the public.

2.1 Geological Data Collection Sub-Program

Meets the need for geoscientific mapping, research, and resources assessment required to produce up-to-date maps, reports, and advice on the geology of the State and its mineral, petroleum and groundwater resources.

2.2 Metallurgical and Analytical Services Sub-Program

Provides mineral and metallurgical analytical and research services.

2.3 Geoscientific Data Dissemination Sub-Program

Provides timely dissemination of scientific and technical data from company exploration activities and Departmental studies.

2.4 Geotechnical and Mining Engineering Advice Sub-Program

Meets the need for geotechnical, geoenvironmental, hydrogeological, and mining engineering advice and services.

2.5 Community Relations Sub-Program

Fosters a favourable climate in the community for mineral and petroleum exploration and development.

Program 3: Environmental protection and rehabilitation

The objective of this program is to ensure that proper attention is given to the protection and rehabilitation of the natural environment as it may be affected by mineral and petroleum exploration and development, and to facilitate the protection of groundwater resources.

The program also provides chemical services for environmental management plus geological and mineral resource information and advice for planning and management of National Parks and Conservation Reserves.

Program 4: Community benefits

The objective of this program is to ensure that the community receives a fair return from the extraction of the State's mineral and petroleum resources.

It ensures that royalty collection is carried out in an economically and administratively efficient manner.

Program 5: Worker and public safety

The objective of this program is to ensure that all operations in the mining and petroleum industry, and activities involving explosives and dangerous goods, are conducted in a manner that is safe for workers and the public.

5.1 Worker Safety and Health Sub-Program

Maximises the safety and health of workers in the mining and petroleum industry.

5.2 Management of Dangerous Goods Sub-Program

Minimises hazards to the public from activities involving explosives and dangerous goods.

Program 6: Chemical services

The objective of this program is to enhance agricultural and industrial development, and the protection of community, consumer, environment and health standards by providing high-quality independent chemical services to Government, industry and the public.

Program 7: Corporate services

The objective of this program is to ensure that the human, financial and other resources of the Department are used efficiently and effectively to provide a service responsive to the needs of the community, industry and Government.

The Organisation

Minister



The Honourable George Cash JP, MLC.
Minister for Mines

Principal Officers



Lee Ranford BSc(Hons), FAusIMM
**Acting Director General
Minerals and Energy
And Accountable Officer**



Murray Meaton
BSc(Agric)(Hons) BEc
**Director
Royalties and Policy
Development Division**



Colin Branch BSc(Hons) PhD FAusIMM
**Assistant Director General
Minerals and Energy**



Kerry O'Neil MBA CPA
Dip Pub Admin
**Director
Corporate Development Division**



Pietro Guj BSc PhD MBA MAusIMM
**Director
Geological Survey Division**



Jim Torlach BE(Min) MAusIMM
**Director
Mining Engineering Division**



Ian Fraser BSc(Hons)
**Director
Petroleum Division**



Ken Price BSc(Hons) ARACI
Grad Dip Admin
**Director
Explosives and Dangerous Goods Division**



John Hosking MSc PhD
FAusIMM FRACI
**Director
Chemistry Centre (WA)**



Bill Phillips Dip Pub Admin
**Director
Mining Registration Division**



Les Annison LS
**Director
Surveys and Mapping Division**



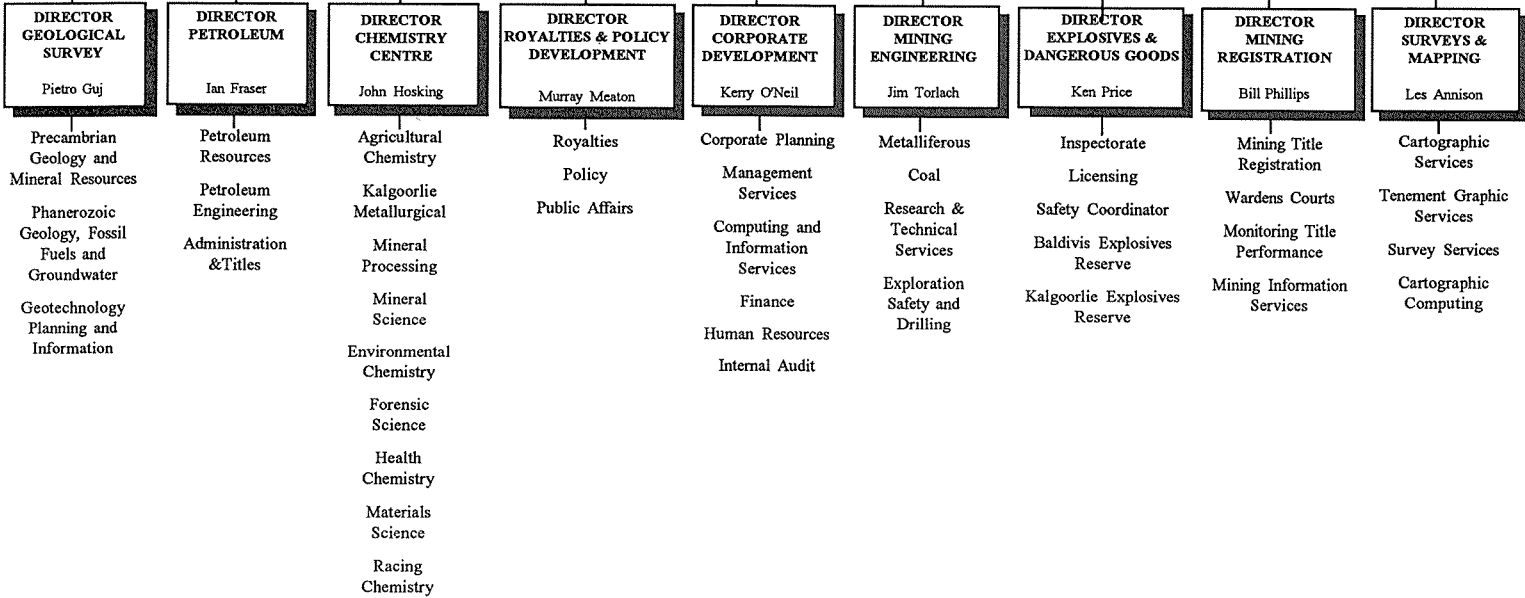
MINISTER FOR MINES
Hon George Cash JP MLC

Department of Minerals and Energy

ACTING
DIRECTOR GENERAL
Lee Ranford

ASSISTANT
DIRECTOR GENERAL
Colin Branch

ASSISTANT
DIRECTOR GENERAL
(Vacant)



The Organisation

DMB2

The Organisation

Divisions of the Department

The Department of Minerals and Energy is structured into nine divisions representing centres of professional excellence in a diverse organisation.

Activities of the Divisions are targeted at achieving the objectives of seven corporate programs. The matrix at pages 18-19 shows the Divisions and the programs into which they have input.

The officers of the Department are mostly located in Perth, although five divisions — Geological Survey, Mining Engineering, Chemistry Centre, Explosives and Dangerous Goods, and Mining Registration — have staff situated in regional centres. Most of these people work in areas that are large and remote by world standards (Figure 5).

In addition to providing services for land-based operations, the Department is also required to administer State and Commonwealth legislation covering offshore oil and gas exploration, exploitation, pipeline transportation and royalty payments.

A Department directory listing the principal offices is included at Appendix A.

The Geological Survey Division Systematically records and interprets the geology of the State and provides this information to Government, industry and the general public in order to assist the exploration, development and conservation of the State's mineral, petroleum and groundwater resources.

It evaluates mineral and petroleum resources as a basis for decision-making by Government and assists and advises on a variety of community needs, including urban planning, land-use matters and engineering developments.

The Petroleum Division facilitates the undertaking by industry of geophysical and drilling programs for the identification and exploitation of oil and gas accumulations. It ensures that sound engineering principles and standards are applied to the design and construction of exploration and production facilities and that safety management systems are in place to secure the occupational health,

safety and welfare of the workforce. It also maintains an effective title allocation and registration system, and monitors, advises and interprets State and Commonwealth petroleum legislation.

The Chemistry Centre (WA) provides chemical, mineralogical, metallurgical and associated analytical, investigative and advisory services to Government, industry and the public in the following areas: the development of the State's mineral, water and agricultural resources; monitoring and improving public and occupational health, environmental and material standards within the community; and scientific support to law enforcement and racing agencies.

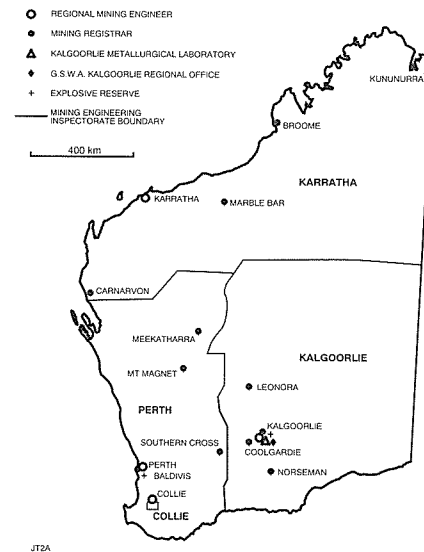


Figure 5 Regional Operations

The Royalties and Policy Development Division develops mineral and petroleum royalty systems which are fair and equitable and administers the collection and audit of royalties paid on behalf of the State and Commonwealth. It also provides economic advice on mining and petroleum industry issues, collects and disseminates statistics and assists in the development and coordination of general Departmental policies. The division informs staff, industry and the public about the role of the Department and the

importance of the mining and petroleum industry.

The Corporate Development Division provides corporate services for the Corporate Executive and the divisions of the Department while responding to the requirements of Government and central agencies. These services include corporate planning, building and purchasing services, computing, typing, records, telecommunications, finance, human resource and auditing activities.

The Mining Engineering Division administers mine safety legislation to safeguard and promote the health and safety of those working in the industry. It provides advice to the Government and to industry on mining engineering matters including deep mining, open-cut mining, quarrying, drilling, the environment and rehabilitation. It monitors exploration safety and administers contract drilling for the Department.

The Explosives and Dangerous Goods Division reviews, formulates and administers laws, regulations and policies aimed at the safe manufacture, storage, handling and transport of explosives and dangerous goods. It provides safety advice on these matters and major hazard control.

The Mining Registration Division receives applications and allocates titles that give legal rights for exploration and mining of minerals in Western Australia pursuant to the Mining Act. It maintains a mining tenement registry which records tenement holders, conditions and term of the grant and expenditure details from which the division monitors compliance with the provisions of the Mining Act.

The Surveys and Mapping Division determines, documents and validates the boundaries of tenements and produces and updates all maps and plans necessary for the operations of the Department. All functions from primary field surveys to final map production are embraced. The range of cartographic activities includes charting, field surveying, computations, mapping reprographics, and maintenance of archival materials as an integral part of the tenement management process.



The Organisation

DIVISIONAL ACTIVITIES TO MEET CORPORATE PROGRAMS 1992-93

PROGRAM	SUB-PROGRAM	GEOLOGICAL SURVEY	MINING ENGINEERING	PETROLEUM
MINERALS & PETROLEUM TITLES 1 To ensure that exploration and development titles for minerals and petroleum are issued fairly and without delay.	1.1 Provide an equitable system for granting exploration and development titles as a basis for petroleum and mineral assessment and production.	Provide technical advice in relation to administration of Petroleum and Mining Acts.		Award, maintain and monitor rights to explore and develop petroleum onshore and offshore.
	1.2 Minimise potential for disputes over exploration and development titles and facilitate the prompt settlement of disputes when they do arise.	Technical advice or tenement matters.	Technical advice on tenement matters.	Process dealings, assess fees and advise on legislation.
EXPLORATION & DEVELOPMENT OF NATURAL RESOURCES 2 To foster and assist responsible mineral and petroleum exploration and development, groundwater assessment, and landuse planning, by providing high-quality scientific and technical services and advice to industry, Government and the public.	2.1 Meet the need for geoscientific mapping, research, and resource assessment required to produce up-to-date maps, reports and advice on the geology of the State and its mineral, petroleum, and groundwater resources.	Obtain, interpret and evaluate data on all aspects of geoscience and earth-based resources (mapping, data, collation, evaluation).	Administer contract drilling to support resource assessment.	Provide technical and advisory services to ensure efficient and effective oil-field practice in exploratory and development drilling, testing and production.
	2.2 Provide mineral and metallurgical analytical and research services.			
	2.3 Provide timely dissemination of scientific and technical data from company exploration activities and Departmental studies.	Publish information and maintain geoscientific databases.	Publish reports and guidelines.	Provide information and statistics on petroleum exploration and development.
	2.4 Meet the need for geotechnical, geoenvironmental, hydrogeological, and mining engineering advice and services.	Provide advice and prepare special maps.	Ensure that effective mining engineering advice is available as required.	Advise on oil and gas volumes, field behaviour and production techniques to ensure optimum production and conservation of resources.
	2.5 Foster a favourable climate in the community for mineral and petroleum exploration and development.	Inform and advise Minister, and liaise with industry, Aboriginal and other community groups.	Ensure mineral exploration and mining operations meet community standards.	Develop strategies to encourage a strong and active oil and gas industry.
ENVIRONMENTAL PROTECTION & REHABILITATION 3 To ensure that proper attention is given to the protection and rehabilitation of the natural environment as it may be affected by mineral and petroleum exploration and development, and to facilitate the protection of groundwater resources.	<ul style="list-style-type: none"> Ensure protection and rehabilitation of the natural environment as it may be affected by mineral and petroleum exploration and development. 	Review and advise on environmental and/or rehabilitation aspects of exploration and mining proposals.	Ensure protection and rehabilitation of the environment as it may be affected by mineral exploration and development.	Implement audit procedures to ensure industry commitment and compliance with environmental requirements.
	<ul style="list-style-type: none"> Facilitate the protection and rehabilitation of groundwater resources. 	Provide hydrogeological advice on groundwater contamination.	Ensure drilling and tailings dams are managed to minimise groundwater contamination.	Ensure oil drilling operations do not pollute underground water resources.
	<ul style="list-style-type: none"> Provide chemical services for environmental management. 			
	<ul style="list-style-type: none"> Provide geology and mineral resource information and advice for planning and management of National Parks and conservation reserves. 	Provide geoscientific advice for landuse planning.		Advise on petroleum prospectivity and possible development methods for environmentally sensitive areas.
COMMUNITY BENEFITS 4 To ensure that the community receives a fair return from the extraction of the State's mineral and petroleum resources.	<ul style="list-style-type: none"> Ensure that royalty collection is carried out in an economically and administratively efficient manner. 	Provide geological advice to assist royalty determination.	Inspect mineral projects to assist with royalty determination and collection.	Ensure standards are met for oil and gas metering systems, and for the measurement of petroleum quantity and composition.
WORKERS & PUBLIC SAFETY 5 To ensure that all operations in the mining and petroleum industries, and activities involving explosives and dangerous goods, are conducted in a manner that is safe for workers and the public.	5.1 Maximise the safety and health of workers in the mineral and petroleum industries.	Provide geotechnical advice relating to mine safety.	Ensure compliance with the Act and Regulations by regular inspections, training and advice in mineral exploration and metalliferous and coal mines.	Carry out audits and safety inspections of petroleum operations; provide technical advice on exploration and development proposals and plant modifications.
	5.2 Minimise hazards to the public from activities involving explosives and dangerous goods.		Ensure public safety at abandoned mines.	Ensure the design, installation and operations of licenced petroleum pipelines comply with approved safety standards.
CHEMICAL SERVICES 6 To enhance agricultural and industrial development, and the protection of community, consumer, environmental and health standards, by providing high-quality independent chemical services to Government, industry and the public.	<ul style="list-style-type: none"> Agricultural chemistry services; Forensic science services; Environmental chemistry services; Public and occupational health chemistry services; Materials and consumer protection scientific services; Racing chemistry services. 			



The Organisation

CHEMISTRY CENTRE W.A.	EXPLOSIVES & DANGEROUS GOODS	MINING REGISTRATION	SURVEYS & MAPPING	ROYALTIES & POLICY DEVELOPMENT
		Award, maintain and monitor rights to explore and mine minerals onshore and offshore.	Provide and maintain maps depicting all mining and petroleum tenure and other land tenure; provide public searching facilities; record and certify position and other land tenure status of tenements; and manage surveying operations to establish tenement boundaries.	
		Operate Warden's Court and process Ministerial Appeals, Monitor effectiveness of legislation.	Provide a means of resolving conflict arising in respect to tenement boundaries, positions or markings.	
Provide chemical, mineralogical, analytical and advisory services on minerals and water.		Monitor performance of tenement holders in the submission of geoscientific reports.	Provide supporting geographical information systems.	
Provide chemical, extractive metallurgical and mineral processing advisory services and undertake investigations to enhance the processing of minerals.				
		Record and publish tenement data for industry.	Provide a cartographic and map preparation facility.	
Provide analytical and advisory services on groundwater, ores, mining and mineral processing.			Provide a cartographic and map preparation facility.	
Develop and monitor new technology appropriate to further processing of minerals.		Liaise with industry.		Inform Government and community.
Inspect, investigate and advise on environmentally sensitive areas, including mine wastes.		Issue and monitor titles with due regard to protection and rehabilitation of the environment.	Provide a graphical index and record of environmental themes.	
Provide chemical advice on the protection and rehabilitation of groundwater.	Ensure that dangerous goods are transported in a manner that provides maximum protection to the environment.			
Analyse and identify contaminants and natural constituents in air and water. Provide soil testing services for soil conservation projects.				
Provide chemical and mineralogical analytical services on geological materials.			Monitor changes to Environmental Reserve boundaries and maintain graphical systems.	
			Support the site location data base.	Collection of royalties and statistics.
Inspect, test, investigate and advise on occupational health matters.			Provide a repository for information concerning plans of mines and minesites.	
Inspect, test, investigate and advise on chemical aspects of dangerous goods, handling, storage and transport.	Provide a high level of assurance of public safety at places where explosives and dangerous goods are manufactured, stored or transported.			
Undertake investigations, solve problems and provide scientific support, for agricultural research and regulatory programs; for law enforcement and drug free racing; for protection of community health, consumer and environment standards, and for the support of chemical industry.				CORPORATE SERVICES
				7 To ensure that the human, financial and other resources of the Department are used efficiently and effectively to provide a service responsive to the needs of the community, industry and Government. (Affects all programs.)



Program 1: Minerals and petroleum titles

To ensure exploration and development titles for minerals and petroleum are issued fairly and without delay.

This program aims to facilitate responsible mineral and petroleum exploration and development by providing legislation and administrative systems which are efficient, equitable and responsive to the needs of those engaged in the mineral and petroleum industries.

The capital-intensive nature of the mining and petroleum industries makes security of title imperative for those engaged in the exploration and development of mineral and petroleum resources. The rules for access to land and security of tenure are embodied in the State's mining and petroleum legislation and, in the case of some offshore areas, in Commonwealth legislation. This not only protects the rights of the title holder but also the rights of the community.

Large exploration titles are provided under both legislative codes to enable wide-ranging assessment of the State's mineral and petroleum resources, utilising modern techniques that involve minimal ground disturbance.

Mineral and petroleum development titles are much smaller in area and issued subject to stringent environmental and rehabilitation conditions.

Mineral title is awarded on the basis of first in time, either by pegging in the case of prospecting licences and mining leases, or the time of lodgement with an exploration licence.

Vacant petroleum exploration areas are advertised nationally and, in some cases, internationally, with details of previously-acquired data and special conditions that may apply. Applications are assessed and awarded on the basis of the exploration work programs submitted and the capacity of the applicant to undertake the proposed program.

In all cases, the holders of exploration and development titles are required to meet expenditure or work commitments and comply with the conditions of approval to retain the rights to explore and develop.

The framework under which the Department operates is aimed at protecting the rights of all parties (from the large corporation to the individual), as well as providing a fair and reasonable return to the community for the rights given to carry out exploration and development operations, and to see that such operations are carried out in harmony with other land-use activities.

An on-going review of legislation, procedures and policies is undertaken to ensure that registration of titles and related dealings are dealt with efficiently and within acceptable time frames.

Resources allocated to program

Human Resources: 175 FTEs*

Expenditure: \$7.54 M

* Includes 6.5 Full Time Equivalents (FTEs) based in regional outstations servicing court systems and associated procedures for the Crown Law Department.

Divisional roles

Six divisions are involved in the program with prime responsibility resting with the Mining Registration and Petroleum Divisions which issue mineral and petroleum titles, both onshore and offshore, and handle title registration, transfer and other dealings.

Surveys and Mapping Division determines and documents the boundaries of mineral and petroleum titles on a State-wide plan system and co-ordinates

the survey of mineral titles to determine exact boundary positions.

Geological Survey and Mining Engineering Divisions provide technical advice needed to formulate conditions for mining tenements. They also assist in the monitoring of titles for compliance with statutory obligations and undertake field inspections when required.

Geological Survey Division provides ongoing advice on geoscientific and geotechnical matters relevant to the administration and regulation of proposed exploration programs and mining projects.



Geological Survey's Chris Swindells checks a map in the North Dandalup area.

Program 1: Minerals and Petroleum Titles

Corporate Development Division provides corporate services and computing support. A full description of that Division's activities are set out under Program 7.

In addition to the Head Office in Perth, Mining Registrars' offices are located at 11 regional centres throughout the State. These offices accept applications and dealings and provide access to public plans and other Departmental services.

A Warden's Court system operates to deal with disputes, complemented by both legal and administrative appeal rights. As well as the Warden's Court in Perth, Wardens sit on a regular basis in courts located throughout the State in the regional Mining Registrars' offices ensuring that customers located in these areas have ready access to Warden's Court services.

An overview of departmental activities within this program is given below under the two sub-program headings.

Title systems

The objective of this sub-program is to provide an equitable system for granting secure exploration and development titles as a basis for petroleum and mineral assessment and production.

Mineral titles

Record levels of the area held under granted title were reached during the year with 27 434 574 hectares being held as at 30 June 1993. These figures were supported with a sustained level of activity in the number of applications received (Table 1) and granted throughout the year.

The Department's measure of performance for this activity is the proportion of applications which have been determined within a three, five or seven month period from the date of application, depending on whether these are prospecting licences, mining leases or exploration licences respectively. With a 1.7% increase in the overall number of applications the outcome against an objective of 75% was that 82% of

prospecting licences, 62% of mining leases and 62% of exploration licences applications were determined within their respective target timeframes.

Table 1 Mineral Title Applications

	1990-91	1991-92	1992-93
Prospecting licences	2 720	3 284	3 171
Exploration licences	1 285	1 445	1 632
Mining leases	695	689	759
Other	289	195	140
Total:	4 989	5 613	5 702

	1990-91	1991-92	1992-93
Area applied for (hectares)	15 046 424	17 371 776	21 062 893

Applications Granted

	1990-91	1991-92	1992-93
Prospecting licences	1 996	2 746	2 870
Exploration licences	830	955	1 104
Mining leases	679	694	641
Other	218	177	105
Total:	3 723	4 572	4 720

	1990-91	1991-92	1992-93
Area granted (hectares)	9 344 478	11 126 345	12 335 075

Tenements in force (1978 Mining Act)

	1990-91	1991-92	1992-93
Prospecting licences	5 517	5 992	7 142
Exploration licences	2 183	2 376	2 787
Mining leases and others	6 728	6 531	6 320

(1904 Mining Act)

	1990-91	1991-92	1992-93
Mineral Claims & Others	419	419	419
Total	14 847	15 318	16 668

	1990-91	1991-92	1992-93
Areas in force (hectares)	20 472 186	23 219 571	27 434 574

Changes to Public Plans

	1990-91	1991-92	1992-93
Additions	4 949	5 610	5 704
Removals	8 065	5 144	4 425

Registration of mineral dealings

Dealings such as transfers and caveats involving changes to the title register totalled 13 948 for the year. This was a 17% increase over the 11 584 dealings received in the previous year.

The objective of registering 70% of dealings received within one month of lodgement was exceeded throughout the

year with an annual average of 88% registered within the time frame.

Mineral title monitoring

Statewide availability of the rental and expenditure monitoring system (TRAXS) was achieved in June 1993.

Implementation of this system has eliminated the duplication of entries into the hard copy registers held in Perth and by the respective Mining Registrars. All rental, expenditure and exemption information is now entered into the TRAXS system which has inbuilt checks and balances to reduce the risk of error.

The system is also capable of issuing rental advice notices in advance of the rent due date and intention to forfeit notices when expenditure and reporting commitments are not complied with. Both of these features will be utilised in the forthcoming year.

Over the year there was a slight increase in the number of operational reports and applications for exemptions received.

Table 2 Tenement Surveillance

	1990-91	1991-92	1992-93
Operation reports received	9 580	9 350	9 877
Applications for exemption	2 744	2 338	2 780
Tenements forfeited	962	468	511

Land access issues

The processing of title applications affecting the conservation estate has been streamlined and the standard conditions under which exploration can be carried out have been further refined to reflect the new Government's policy on exploration and mining on this category of land.

Discussions throughout the year with prospectors, the Amalgamated Prospectors and Leaseholders Association (APLA) and CALM officers resulted in agreement being reached over the acceptance of personal sureties in lieu of bonds where limited disturbance to land was involved.

A joint conference with APLA addressing land access issues, environmental impact and rehabilitation, Mining Act amendments and prospecting



Program 1: Minerals and petroleum titles

techniques is to be held in Kalgoorlie during October 1993 as a follow-up to a similar conference held in 1991.

Regional Registrar's office in Kalgoorlie

The first phase of regionalising the functions of the Registration Division was implemented in February 1993 with the transfer of responsibility for the overall management of the Coolgardie, Leonora and Norseman offices to the Regional Mining Registrar Kalgoorlie.

The grant of title for these districts and registration of dealings lodged in Kalgoorlie will now be undertaken in the Kalgoorlie office under delegated authority.

The progressive extension of an electronic tenement graphic system (TENGRAPH) to the Coolgardie, Norseman and Leonora offices in 1994-95, after its implementation in Kalgoorlie in April 1994, will complete this phase.

Mining Registrars' conferences

A Goldfields Mining Registrars' Conference was held in Kalgoorlie in March 1993 to address issues relating to the transfer of responsibility to the Kalgoorlie office.

A conference for all Mining Registrars was held in Perth in April 1993 to discuss proposed amendments to the Mining Act, management issues and demonstrate enhancements to the computerised tenement register system.

Petroleum titles

Following the trend established in the 1991-92 year there was again a significant increase in the number of onshore and offshore exploration titles with 25 new titles granted taking the total number of in-force petroleum titles to 192 at 30 June 1993.

Two releases comprising 13 offshore areas and four quarterly releases of all onshore vacant areas were advertised during the year.

The first two drilling reservations were granted in the 1992-93 year. Drilling Reservations are short term titles allowing

explorers to drill individual prospects by providing a 12 month tenure to a small prospective area with a minimum one well work obligation.

During the year a total of 1 147 registration of petroleum tenement matters were dealt with of which 1 033 or 90% were determined within the target period of three months.

Draft guidelines on offshore insurance were prepared for presentation to the November meeting of Commonwealth and State Ministers.

Administrative arrangements to streamline the process of approval and determination of fees on dealings were introduced via the combined processing and referral to the Minister of dealings and transfers for approval and determination of fees.

Table 3 Petroleum titles

	1990-91	1991-92	1992-93
Exploration Permits			
Granted	16	25	25
In-Force	96	114	131
Drilling Reservations			
Granted	-	-	2
In-Force	-	-	2
Production Licences			
Granted	1	3	1
In-Force	22	25	26
Pipeline Licences			
Granted	1	4	2
In-Force	22	25	27
Retention Leases			
Granted	-	4	0
In-Force	1	5	5
Petroleum Lease			
Granted	-	-	-
In-Force	1	1	1
Total	142	170	192

The new offshore exploration permits were spread over two basins including four in the Browse and nine in the Carnarvon Basin. The onshore exploration permits were mainly in the Canning Basin with two in the Carnarvon and one in the Savory Basin. The first two drilling reservations were granted in the Canning Basin.

Ten exploration permits were renewed, four were surrendered and four expired. Two new pipeline licences and one production licence were granted. Other titles issued included two production access authorities, forty one access authorities, four scientific investigations and eight special prospecting authorities.

A review of the onshore petroleum legislation was completed by the end of the year and various improvements were approved by Cabinet. Instructions have been referred to the Parliamentary Counsel for drafting of an appropriate Amendment Bill.

The petroleum tenement database has been expanded and work has commenced on a feasibility study and users requirements for the next stage of the petroleum titles management system.

Mining customer and information services

The Information Centre in Mineral House dealt with an average of 70 customers and answered an average of 115 telephone calls per day. A pronounced increase in activity during the latter quarter of the year was evident when customer levels exceeded 100 daily.

In response to a customer survey undertaken in the previous year, more senior and experienced staff have been transferred to the Information Centre to ensure that a high standard of customer satisfaction is maintained.

Staff have been able to respond to the increased level of customer enquiries by:

- on line access for staff to title and other data systems;
- public access via terminals to limited information; and
- the introduction of an automatic title numbering system and Miner's Right Index.

Industry Liaison Committees

Regular meetings of the Mining, Petroleum, and Surveys and Mapping Industry Liaison Committees continued throughout the year and the key issues



Program 1: Minerals and Petroleum Titles

dealt with during the year are summarised below.

Mining Industry Liaison Committee

- review of the operation of the graticular exploration licence system;
- a change to the Mining Act relating to the extension of the term of an exploration licence;
- review of the activities that should be allowed under a Miner's Right;
- review of the ballot system for competing mining tenement applications; and
- revision of Departmental Notice of Intent guidelines for mining operations.

Petroleum Industry Liaison Committee

- guidelines for project development applications;
- work program remissions;
- open file status of reprocessed data;
- amendments to Schedule of Requirements for Petroleum Operations.

Surveys and Mapping Industry Liaison Committee

- review of guidelines, regulations and legislation from an industry viewpoint;
- purchase and use of digital data; and
- pitwall deformation monitoring.

Public plans and title maps

A total of 3 078 public plans and working transparencies were maintained to chart all mineral titles throughout the State.

A total of 5 704 mineral title applications were recorded, plotted and appraised for land tenure status and 4 425 titles cancelled from public plans.

Petroleum title maps and plans were maintained and quarterly editions of the State Petroleum maps and booklets produced and released on schedule.

The Department aims to have new mineral title applications and cancellations charted on the public plan within 10 days of the information being received in Perth.

This objective was met in 90% of cases in a year which saw an increase in new applications and a decrease in the number of cancellations.

The number of applications and cancellations processed per full-time employee is a measure of efficiency. In 1992-93 the level was similar to previous years (Table 4) with a general increase in charting.

Table 4 Title Charting

	Quantity (number)	Staff (FTE)	Number (per FTE)
Title Charting (Other than Exploration Licences)			
1990-91	3 673	3.5	1 050
1991-92	4 168	4.0	1 042
1992-93	4 070	4.0	1 018

Title Charting (Exploration Licences)

1990-91	1 276	3.0	425
1991-92	1 445	3.0	462
1992-93	1 632	3.0	544

Exploration Licence Releases

1990-91	492	3.3	149
1991-92	428	3.0	143
1992-93	723	3.0	241

Title Cancellations

1990-91	8 065	3.3	2 444
1991-92	5 144	2.0	2 572
1992-93	4 396	3.0	1 475

Tenement graphics

Development of a computer-based system which rapidly identifies areas available for mineral exploration in relation to other land uses, tenure and topography (TENGRAPH) continues with the software modules for the capture of unsurveyed tenements finalised. The capture of all surveyed tenement and topographic information for the Kalgoorlie Mining Registrar's region is now complete. Input of cadastral data is 80% complete.

The TENGRAPH system has successfully been demonstrated in a number of forums including conferences, seminars interstate and overseas and to the mining industry in general.

Introduction of TENGRAPH to Kalgoorlie is planned for April 1994. During the first stage, the system will only be available for mineral titles in the Kalgoorlie Mining Registrar's administrative region. Seminars and workshops will be provided to the mining industry on the use and application of the system once it is in place.

Microfilm program

Microfilming of original maps and documents continued with all the survey diagrams having now been microfilmed in black and white and colour. The microfilming of survey field books has been completed.

Dispute management

The objective of this sub-program is to minimise potential for disputes over exploration and development titles and facilitate the prompt settlement of disputes when they do arise.

The majority of objections and formal disputes (plaints) were heard or had an initial hearing in the Warden's Court within three months of lodgement. A total of 574 objections against applications for mineral titles and 132 complaints for forfeiture of granted titles were received.

A low level of administrative appeals to the Minister against conditions imposed at the time of grant or the refusal of title applications was maintained.

Title surveys

A total of 112 mineral titles were surveyed during the year leaving the number of unsurveyed titles outstanding at 3 331. Of the total number surveyed, 86 were surveyed under the user pays system, while 26 were surveyed from the departmental survey vote which was fully committed.

Survey data received has been incorporated into the State Cadastral Database through the Survey Data Input (SDI) programme. All current and archived survey data within the Kalgoorlie Mining Registrar's district, has been captured and included in the TENGRAPH spatial database.



Program 1: Minerals and petroleum titles

Planned achievements for 1992-93

Outcomes

Introduce administrative and legislative changes to increase the opportunity for prospectors to access land that is held under Mining Act title but is not currently being worked.

Amendments for prospectors to obtain a Special Prospecting Licence on a Mining Lease with the Lessee's consent have been approved and will be introduced into Parliament in the second half of 1993.

Continue development of a computer-based graphical mineral title information system (TENGRAPH) in the Kalgoorlie Mining Registrar's administrative district to improve the quality and timeliness of information required by the industry.

The development of TENGRAPH is on schedule with the release of the system in the Kalgoorlie Mining Registrar's administrative district programmed for April 1994. The system has been publicised through demonstrations and expositions, the delivery of technical papers at international and national seminars and conferences, and the distribution of brochures and information pamphlets.

Plan an effective training and education program for the public and the mining industry to support the introduction of the TENGRAPH system in Kalgoorlie.

Courses have been designed for public and mining industry training and a video is currently being developed to supplement the training and education in regional offices.

Improve the availability of information to the public on mineral title application and assessment procedures by introducing changed title advertisement requirements, and making title reference plans available in CALM regional offices in the South West Land District.

Amendments to the Mining Act Regulations providing for improved information in advertisements of mineral title applications will take effect from 2 July 1993. Copies of title reference plans have now been distributed to all CALM regional offices.

Introduce administrative arrangements to streamline the process of approval and determination of fees on dealings affecting petroleum titles.

Improved arrangements were introduced.

Introduce amendments to State petroleum legislation in keeping with provisions of Commonwealth petroleum legislation so as to maintain a common petroleum code.

Amendments were prepared and submitted to Parliamentary Counsel to ensure that a common petroleum code is maintained.

Develop, in consultation with industry and third parties, guidelines for insurance on offshore petroleum titles that cover liabilities arising from adverse environmental impacts over petroleum activities.

Draft guidelines were prepared for consideration by the Commonwealth and the States.

Make increased use of technological advances in surveying techniques, such as GPS, to facilitate the prompt resolution of disputes over the location of mineral title boundaries.

Increased use of technology has been used to facilitate the prompt resolution of disputes over the location of mineral title boundaries. In particular, Global Position System (GPS) techniques have been used to accurately determine geographic locations in a range of situations including: mining operations within approved title area; tenement corners previously located by photogrammetric methods; and to 'check survey' incongruous tenement boundaries.



Program 2: Exploration and development of natural resources

To foster and assist responsible mineral and petroleum exploration and development, groundwater assessment and land-use planning, by providing high-quality scientific and technical services and advice to Government, industry and the public.

The discovery and development of WA's mineral, fossil fuel and groundwater resources is intrinsic to the State's development. This principle is the corner-stone of the Department's second Program. Its specific activities are designed to disseminate scientific advice and services to industry, Government and the public, providing a basis for medium and long-term planning and decision-making, principally in relation to the mining and petroleum industries, but also in regard to the State's civil engineering activities for infrastructure development.

With the provision of timely and high-quality scientific information which improves the chances of success in exploration and development projects, the Program strives to stimulate mineral and petroleum companies to invest in Western Australia. The same information is used to provide sound advice to the Government on land-use issues.

Decisions regarding the management of the State's mineral, fossil fuel and groundwater resources and the development of its road, rail and urban infrastructure need to be made on the best scientific information and advice available. The Department provides a central location for geoscientific information which is provided by mining and petroleum companies, various research organisations and institutions, as well as that generated in field and office studies conducted by the Department's own specialists. In conjunction with facilities for a broad range of mineral and metallurgical analytical services, the Department is able to provide a comprehensive scientific base for the successful exploration and development of the State's natural resources.

Resources allocated to program

Human Resources: 217 FTEs

Expenditure: \$11.33 M

Divisional roles

The Program is supported by seven divisions of the Department:

The Geological Survey Division carries out regional geoscientific mapping and research, conducts groundwater exploration and assessment, maintains extensive databases of mineral and petroleum exploration and development information, and provides advice relating to mineral, fossil fuel and groundwater resources within the State.

The Surveys and Mapping Division provides the spatial information base required for geoscientific mapping and is responsible for the graphical integrity of Departmental databases.

The Petroleum Division is responsible for fostering onshore and offshore petroleum exploration, drilling, engineering, oil and gas production and pipeline transportation.

The Chemistry Centre provides expert services and advice with activities ranging from the analysis and characterisation of minerals and mineral products through metallurgical and mineralogical services to comprehensive process development for new ore deposits.

The Royalties and Policy Development Division coordinates the preparation of departmental policies, and also provides economic and general advice and information to government and the public.

The Mining Engineering Division is responsible for the inspection of mineral exploration and drilling operations, organises and supervises contract drilling

operations, and provides information about mining developments throughout the State.

The Corporate Development Division provides corporate services and computing support. That Division's contribution is described in full under Program 7.

A number of liaison committees bring together the interests of industry and research institutions to ensure that the Department's activities meet their most appropriate requirements. Where necessary, sub-committees have been established to meet special or area-specific needs.

An overview of Departmental activities within this Program is given below under Sub-Program headings. Specific outcomes against planned achievements have been summarised in tabular form at the end of this section.

Geological data collection

Geoscience mapping, field and office studies

Progress achieved in documenting geoscientific information about the State is shown in Appendix 7 which displays the areas where data from Departmental studies have been integrated with information from mineral and petroleum exploration companies and transformed into printed maps available to the public. Regional geological mapping projects continued in the Eastern Goldfields, the Pilbara, Kimberley, and the Savory and northern Perth Basins, some of which was carried out with the Australian Geological Survey Organisation (AGSO) under the National Geoscience Mapping Accord (NGMA).

The intensity of information aggregated in these reports and maps

Program 2: Exploration and development of natural resources

ranges from various degrees of regional synthesis (1:000 000, 1:500 000, 1:250 000 scales) to detailed analysis (1:100 000, 1:50 000, 1:25 000 scales) and results from an appreciation by the Department of industry's and Government's needs for the necessary degree of detail.

Mapping projects were supported and enhanced by various specialist studies and technical support services.

Table 5: Geological Analysis

	1988-89	1989-90	1990-91	1991-92	1992-93
Petrological Examinations					
Samples examined	1360	539	365	347	566
Reports compiled	23	29	28	24	25
Palaeontological Reports	16	19	49	9	26
Geophysical Logging					
Number of boreholes	49	38	32	27	45
Aggregate metres logged	19163	20638	7832	5100	3856

Mineral resources

Activities continued towards the production of a series of 1:1 million scale maps of mineral deposits to complement the 1:2 500 000 scale State map published in 1988. Details of all the mineral deposits and occurrences on the Albany sheet area are now held in a computer database, and a map of the deposits has been compiled and is undergoing editing prior to publication. A report on gold deposits between Menzies and Kambalda was finalised for publication, and a report on a similar study in the Leonora area is being undertaken.

Petroleum resources

The Department continued with its assessments of the State's oil and gas reserves and the evaluation of the petroleum potential of the State by reviewing the geological models of the Griffin and related fields, and by recording and reviewing the data provided by petroleum companies in their development plans and proposals. Specific assessment reviews included the development plans for the Griffin, Wanaea and revised Cossack fields, and preliminary Reservoir Management Policy documents for the

Roller and Skate fields. In carrying out these assessments, the Department maintained close liaison with industry, and conducted numerous technical discussions as part of the assessment process.

Groundwater resources

Contracts were awarded for the Leeman Stage II drilling project and for exploratory drilling near Manjimup and near Dumbleyung. To date 52 bores have been drilled at 36 sites with an aggregate depth of 2 587 m. To assist in defining recharge areas and rates of groundwater movement of the large groundwater resources occurring in the southern Perth Basin, field investigations to investigate the age of the groundwater were completed and a report is nearing completion. The work is being partly supported by the Water Authority of Western Australia. The numbers of boreholes logged increased significantly but the aggregate metres logged continued to decline reflecting an increased focus on relatively shallow investigations since the deep drilling program funding was reduced two years ago.

Metallurgical and analytical services

The Chemistry Centre provides efficient and effective chemical and mineralogical information and advice, together with mineral processing and metallurgical laboratory facilities and expertise to Government departments and to the mining and mineral processing industries.

Analytical and mineralogical data and advice was provided by the Mineral Science Laboratory to industry and to support Departmental projects and occupational hygiene issues impacting on the mining sector. The range of analytical data supplied is the most comprehensive available from any similar laboratory in Australia. Significant effort was put into developing the concept of gold fingerprinting, using the full capabilities of the inductively coupled plasma mass spectrometer (ICP-MS), which was formally launched by the Minister for

Mines in November. Updated equipment was installed to cover the analysis of several non-metals, which cannot otherwise be determined easily, and a new asbestos identification method was developed which involves minimum sample preparation and provides reliable, easily interpreted results.

The Mineral Processing Laboratory continued to provide consulting services and testwork facilities to industry. Major pilot rotary kiln runs were conducted with the benefit of a new gas scrubbing system which will meet all necessary requirements at the new site. Two senior officers were involved in managing projects within the A J Parker Cooperative Research Centre for Hydrometallurgy, which commenced operation at the start of the year. A MERIWA-funded project on the electrowinning of gold in the presence of copper was successfully concluded. Following a detailed evaluation program, a locally produced device for introducing gases into liquids and slurries was installed in a goldmine and produced dramatically favourable results.

The Kalgoorlie Metallurgical Laboratory maintained its involvement with rapid bullion analysis for industry clients. Experimental work on the MERIWA sponsored project for four industry clients on column flotation of gold and base metal ores was completed with modelling and scale-up tests conducted in parallel with the full-scale production column at an operating gold plant. Laboratory staff were involved in organising and contributing to an International Conference on the Extractive Metallurgy of Gold and Base Metals which attracted over 300 delegates when held in Kalgoorlie last October.

Geoscientific data dissemination

Bulletins on the geology of the Savory Basin and the Permian palaeontology of the State were released during the year. The latter was a significant work representing the culmination of several years research.

Program 2: Exploration and development of natural resources

A report on the bauxite resources of the Darling Range was released and, at year end, five reports were in press covering the following subjects:

- coal resources of the Collie Basin;
- gold mineralisation in the Menzies-Kambalda region;
- Eastern Goldfields volcanic rocks that host significant gold mineralisation;
- a structural study of the southern Perth Basin;
- a compilation of 10 short geological and hydrogeological papers on the Pilbara, Eastern Goldfields, Perth and Collie Basins, and the South West.

During the year, eight full colour geological and two hydrogeological maps were completed, as well as five detailed cross-sections and 13 geophysical maps.

Table 6: Geological publications

	1989-90	1990-91	1991-92	1992-93
Major coloured maps	11	11	11	10
Other maps	7	40	60	18
Bulletins, reports, records, notes	7	19	23	16

A shift in emphasis towards increased production of the major coloured maps series reduced the number of other maps produced. Of a publication program of 20 full colour maps (of which ten were released and five are in press), all but four were prepared by computer-assisted technology as traditional manual cartographic techniques are being phased out. Maps and explanatory notes published in 1992-93 are shown at Appendix 7.

The Department continued to maintain specialised databases with geochemical, geophysical and hydrogeological information. The former are compiled from mineral and petroleum exploration reports submitted by companies.

Table 7: Exploration Reports

	1988-89	1989-90	1990-91	1991-92	1992-93
Received from Industry					
Petroleum	383	496	675	368	596
Minerals (volumes)	3 035	3 165	2 766	2 731	2 950
Minerals (reports)	n/a	n/a	n/a	n/a	2 174
Released					
Petroleum (reports)	560	407	487	1318	688
Minerals (volumes)	819	846	1 411	3 353	2 312

The WAMEX database on mineral exploration reports now includes about 38 000 volumes, representing 10 500 projects, about half of which relate to exploration for gold. The reduction in the number of minerals volumes released is the result of the elimination in the last financial year of the large backlog of reports awaiting processing. The current rate of processing is enabling reports to be made available at the end of the statutory moratorium period.

The increase in the number of petroleum reports received is partly due to a change in recording procedures. The number of reports released to industry represents a normal rate of release compared to the anomalous situation which prevailed in 1991-92 when changes regarding the availability of data in Federal areas were introduced and implemented.

Library

During the year, there were 5 647 external visitors to the library. This represents a 10% decrease from the previous year although the general trend over the past five years is upwards.

Table 8: Library use (visitors)

	1988-89	1989-90	1990-91	1991-92	1992-93
Visitors	4 087	4 369	5 132	6 298	5 647
Microfiche/film users	1 025	1 203	1 590	1 885	1 703

The majority of WAMEX searches are now conducted directly by users via two terminals installed in the library. As a result, the library staff conducted only ten online searches of the WAMEX database in response to public requests, as opposed to 37 searches of the WAMEX database.

Conferences and excursions

As a small but important aspect of information dissemination activities under this Program, the Department encourages participation of its officers in professional conferences and the presentation of papers at such gatherings. During the year, officers made presentations at a number of venues including a Geological Society Field Conference in Alice Springs, an

Exploration and Mining Geology Conference hosted by the School of Mines in Kalgoorlie, the Aquifers at Risk Conference in Canberra, a Seminar on Municipal Waste Disposal held in Perth, and an international cartographic conference in Cologne, Germany.

Geotechnical and mining engineering advice

Geotechnical advice

Advice was provided principally to the Water Authority and Main Roads but also to a number of State and local government agencies.

Geotechnical advice and services provided to the Water Authority included technical advice and engineering geology supervision during the construction of the North Dandalup Dam and the Ten Mile Brook Dam at Margaret River. Geological investigations were also undertaken at the Lower South Dandalup Dam site.

For Main Roads, advice has been given on proposed rock cuttings at Tom Price, Norseman, Madura and Eucla, and assessments made of quarries and quarry sites at McPhee's Creek, Nillibubabca, Oscar Range and Pyramid Hill.

Groundwater and hydrogeological advice.

The Department continued to explore for groundwater and provide groundwater and hydrogeological advice to the Water Authority on matters relating to management and licensing. Four hydrogeologists have been on secondment to the Water Authority and a further three hydrogeologists have worked on Water Authority matters including the supervision and assessment of drilling projects for Perth, Exmouth, Carnarvon, Leonora, Nullagine, Horrocks Beach, Mount Magnet and Gibson town water supplies. Water bore sites were successfully located for the Nullagine and Halls Creek townships, and about 28 Aboriginal communities, while groundwater investigations were carried out at Jandakot, Laverton, Mount Hampton, Dunsborough, Kalbarri,



Program 2: Exploration and development of natural resources

Carnarvon and Esperance. Frequent advice has also been provided to the EPA, Health Department and other Government agencies.

Mining engineering advice

Mining engineering advice and services were sought by a number of private companies in regard to developing new mines and planning mine extensions. With several new underground mines being evaluated by industry, the mining engineering advice given was primarily in the areas of ventilation, ground support techniques, emergency preparedness, and the use of developing technology with respect to safety and duty of care.

Community relations

To foster a favourable climate in the community for mineral and petroleum exploration and development, the Department strives to keep its staff and the general public well-informed as to the importance to the State of the mineral and petroleum industry sectors, and the role and operations of the Department.

Media and public relations

Regular contact was maintained with key people in more than 50 newspapers, television and radio stations, and mining journals and 150 media releases were distributed on a wide variety of topics.

In addition, the Department responded to wide-ranging public and media enquiries across a broad spectrum of subjects including occupational health and safety, environmental protection, land access, and a variety of technical matters.

A special media visit was arranged to the Maersk Venturer offshore drilling rig and a number of media conferences organised at the Department's Perth offices.

Considerable background material on the mining and petroleum industries was provided to schools and the Department worked with industry in organising a colouring-in competition for primary school children.

The Department also mounted its third annual public photographic competition on the subject of the mining and petroleum industries. This attracted over 100 entries and generated considerable publicity throughout the State. Entries were displayed at a number of metropolitan and regional venues.

A wide range of publications were produced for dissemination to a range of specialist and general audiences. These included a new Fact Sheet series on major minerals mined in Western Australia, a booklet on the history of mining in the Northampton region, and a 280-page Annual Review of industry and Departmental operations which was produced in association with a commercial publishing house.

For the sixth successive year the Department won a W S Lonnie Award, presented by the Royal Australian Institute of Public Administration, for the excellence of its Annual Report.

Displays

In addition to technical displays at industry conferences such as the international Minesafe conference in Perth, a number of other displays were mounted in a range of venues. More prominent among these were: the annual Mining and Petroleum Industry in WA photographic competition in conjunction with the WA Photographic Federation; displays mounted for the Kalgoorlie and Marble Bar centenary celebrations; and a TENGRAPH display at an international conference in Cologne.

Specific community relations

Advice relating to Aboriginal issues continues to be an important Departmental function. On-going working relationships have been maintained with the Aboriginal Affairs Planning Authority, Aboriginal sites Department and the Department of Land Administration to address land access, use and cultural heritage matters in relation to mineral exploration and development.

The Department maintained its contributions to the education of our

State's youth. The Departmental museum was visited by various classes of geology students during the year, and treated to one hour lectures from geoscientists. Twenty three geology resource kits were prepared and distributed to schools.

Policy liaison

This encompasses the Department's responsibilities in preparing briefing notes, speeches and economic information for the Corporate Executive and Minister. Economic advice is also provided for Government policy formulation in regard to the development and management of the resources sector.

The global downturn, with its associated effects on the State's export-driven minerals and petroleum industry, and the post election change of government, resulted in a sharp increase in the demand for briefings and speeches with a substantial economic content.

The main resources sector issues addressed during the year concerned Commonwealth/State relations and the local industry's adjustments to difficult conditions. Consultations with the Commonwealth focused on royalties structures, areas of jurisdiction and methodology changes in Grants Commission calculations. Substantial progress was made in developing alternative efficient and equitable rent-based royalties systems for onshore and offshore production. This required extensive computer modelling, as well as liaison with other States, Commonwealth and industry representatives. The efficacy of using royalty flexibility as a policy instrument to support major projects and encourage investment in frontier areas was also closely examined. Submissions were prepared on the future structure of natural gas markets, changes to the Mining Act and a review of specific rate royalties.

Given the protracted nature of the current downturn in commodity markets, the very tentative signs of recovery and the competitive global investment environment, the Department will increasingly be called upon to provide medium term economic advice.

Program 2: Exploration and development of natural resources

Planned achievements for 1992-93

Publish a report on Eastern Goldfields volcanic rocks that host major mineralisation in the area as part of the Department's continuing studies of mineralised regions.

Release reports on specific commodities within the Department's continuing program of acquisition of information on mineral reserves in Western Australia; in particular, publication of a report on mineral deposits on the Albany 1:1 000 000 map sheet area.

Publish twelve full-colour map sheets as part of the Department's systematic base-map coverage of the State. It is expected that by June 1993, 70% of full-colour maps and other graphic publication material will be produced using computer-assisted or automated techniques.

Define the geological structure in the Browse and Bonaparte Basins with the release of fifteen seismic horizon maps as part of the Department's activities to provide specialist maps as an aid to petroleum exploration.

Commission a Sensitive High Resolution Ion Micro-Probe (SHRIMP) for geochronological dating of rocks and minerals, and commence a geochronological study in the Eastern Goldfields to provide geoscientific data necessary for mapping and in support of mineral exploration.

Initiate the first projects involving the Cooperative Research Centre in Australian Mineral Exploration Technologies, in conjunction with CSIRO, AMIRA, Curtin and Macquarie Universities, and World Geoscience Corporation as part of the Commonwealth/State efforts to stimulate applied research.

Make releases each quarter inviting applications for petroleum exploration permits in the offshore area to ensure a steady stream of new areas are made available to explorers.

Assess development plans for new offshore petroleum proposals.

Formulate a draft policy on gas flaring in response to Government's desire to conserve resources wherever possible.

Refine estimates of groundwater resources of the Perth Basin and determine a more accurate estimate of flow and recharge rates for renewable resources to facilitate long term planning of groundwater usage.

Commence involvement with the A J Parker Cooperative Research Centre for Hydrometallurgy, in association with Curtin and Murdoch Universities, and the CSIRO Division of Mineral Products as part of the Commonwealth/State efforts to stimulate applied research for the benefit of industry.

Transfer new techniques developed for the beneficiation of gold and base metal ores from laboratory to pilot scale and conduct testwork in direct comparison to plant scale systems.

Outcomes for 1992-93

This report is being printed.

A publication on bauxite mineralisation in the Darling Range area was released during the year and reports were compiled on the gypsum and base metal resources of the State, and the mineral deposits of the Albany 1:1 000 000 Sheet.

Ten full-colour maps were released. Over 70% of maps and other graphic publication material are now being produced using computer-assisted or automated techniques.

A reallocation of priorities resulted in the production and release of six of the programmed 15 seismic horizon maps of the Browse Basin.

Commissioning is now unlikely to occur before 1994 because of problems experienced with a similar machine at the Australian National University in Canberra, and the geochronological study has therefore been delayed.

A geologist has been seconded to work on a regolith mapping research project with the Cooperative Research Centre.

Onshore areas were released each quarter.

The Griffin, Wanaea, Cossack and Wandoo oil field development plans were assessed, as was the design of the Goodwyn pipeline.

A draft policy was formulated.

The major groundwater sources in the Perth basin capable of a sustainable yield of 10 gegalitres/year were identified and mapped, and a report of the results published.

Chemistry Centre involvement commenced with projects being initiated in mineral sands beneficiation and nickel ore refining.

Column flotation facilities were expanded to pilot scale and testwork conducted in direct comparison to a plant-scale system.

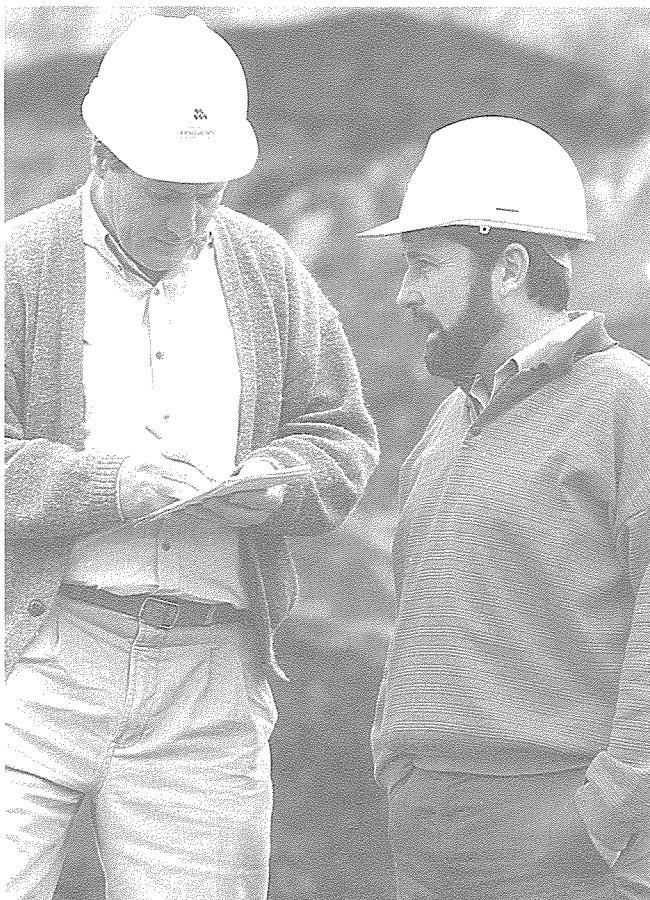


Program 2: Exploration and development of natural resources

Planned achievements for 1992-93

Continue management of the Department's exploration and mineral resources databases including the following specific activities: classify and make available for public access all open file mineral and petroleum exploration reports; develop further the mineral resources database and introduce a system for the publication of an annual resource inventory; and complete a Departmental user-requirement study for Geographic Information Systems (GIS) and introduce an end-user system for the dissemination of GIS databases.

Create an awareness of the role and responsibilities of the new Department of Minerals and Energy, and increase educational activities designed to improve community understanding of the resources sector. Specific tasks will be to develop a new publication providing an annual profile of the mineral and energy sectors, and to publish "Petroleum in Western Australia" magazine biannually.

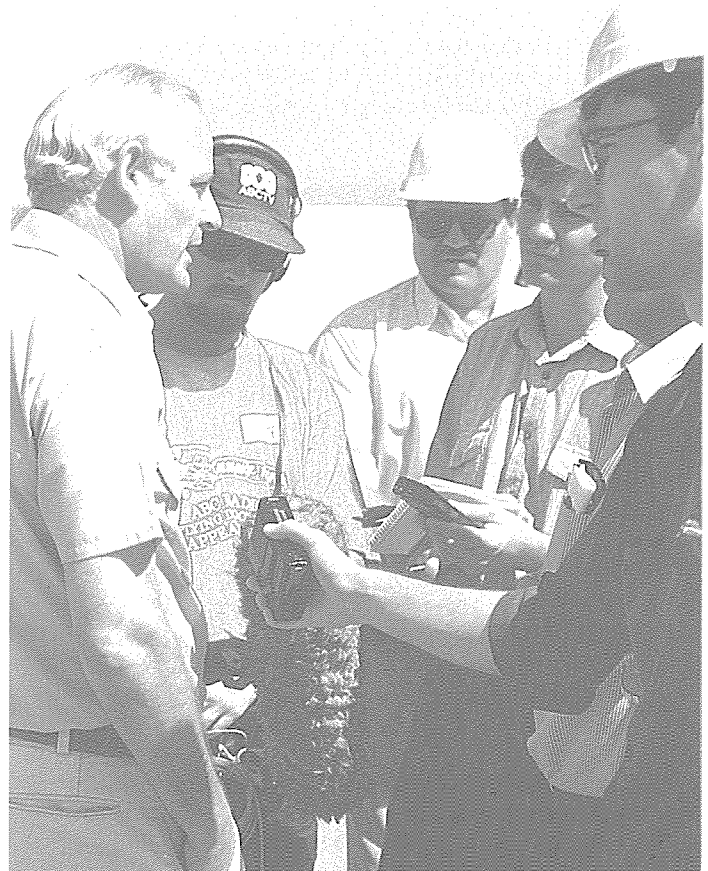


Telling the minerals and energy story to the people of Western Australia is an important function carried out by Communications Branch. Publications officer John Terrell gathers information from production manager Tom Bailey during a visit to Western Collieries' open cut mine.

Outcomes for 1992-93

Mineral exploration reports have been released to Open File within three months of their availability date; during the year 722 items (2 350 volumes) were released. An integrated version of the MINEDEX mineral resources system, which now holds data on around 3 100 deposits or mine sites on 1 600 integrated mineral projects, was brought into production. The user-requirement study for GIS was completed, and an end-user system for the dissemination of GIS databases developed and a departmental standard adopted.

An extensive media and publications process was undertaken to introduce the new Department. Education fact sheets have been prepared on 18 subjects and the outline of a new publication about the industry agreed. Two issues of Petroleum in Western Australia magazine were published.



A large media contingent joined Minister for Mines George Cash when he visited the offshore oil drilling rig Maersk Venturer exploring for oil and gas about 50 kilometres north west of Fremantle.



Program 3: Environmental protection and rehabilitation

To ensure that proper attention is given to the protection and rehabilitation of the natural environment as it may be affected by mineral and petroleum exploration and development, and to facilitate the protection of groundwater resources.

The Department is involved in a diverse range of management, monitoring and consultancy roles concerned with the protection and management of the environment. In addition to activities which specifically relate to the mining and petroleum sectors, the Chemistry Centre provides a range of analytical and advisory services covering all aspects of the environment.

This program aims to maximise protection and rehabilitation of the environment as it might be affected by petroleum and mineral exploration and production. It also aims to provide regulatory agencies with information on groundwater quality.

The strategies adopted to achieve these objectives include the employment of technically-qualified officers who liaise with other Government agencies, industry and the community. These officers monitor the adequacy of systems and practices used to achieve required environmental standards and participate in environmental training, education and research programs. Site visits are conducted to monitor and audit compliance with legislation and conditions of title. A security-bond system is also maintained to facilitate administration and emergency response plans in the event of a mishap.

The quality of the State's groundwater resources is the subject of ongoing investigations and monitoring in order to provide advice to regulatory authorities and to provide information which is published to increase community awareness.

Resources allocated to program

Human Resources: 31 FTEs
Expenditure: \$1.86 M

Divisional roles

Seven divisions of the Department of Minerals and Energy play an active role in supporting this program.

The Mining Registration Division places conditions on titles to ensure environmental protection and rehabilitation of land held under Mining Act titles.

Conditions for mining projects are developed by the Mining Engineering Division in consultation with the Environmental Protection Authority (EPA). All new development proposals are assessed and appropriate conditions recommended to ensure adequate environmental management and protection in accordance with Government policies. The Mining Engineering Division coordinates the Department's response to the EPA for resource projects that are the subject of formal environmental assessments. Monitoring of these projects is undertaken by the Mining Registration and Mining Engineering Divisions. Where illegal mining or breaches of conditions have taken place, these divisions, in concert, may initiate prosecutions.

The Petroleum Division provides advice on environmental matters related to petroleum exploration and development and monitors the environmental performance of petroleum companies in this State.

The Surveys and Mapping Division monitors changes to conservation reserve boundaries and maintains graphical and digital systems to support agencies involved in environmental protection and rehabilitation associated with the mineral and petroleum sectors.

The Chemistry Centre reviews environmental assessments with regard to

the impact of mining and industrial development on the environment. Key areas which the Chemistry Centre evaluates include; stack gas or other process chemical emissions, disposals of waste chemicals or by-products, the use of local water resources, and the effect on the quality of these resources.

The Geological Survey Division advises on rehabilitation aspects of exploration tenements and mining projects. It plays a major role in developing appropriate environmental conditions for exploration tenements. Negotiations are conducted with both CALM and the EPA to ensure that environmentally sensitive areas are protected during exploration. Groundwater contamination and pollution studies are another important element of the Geological Survey Division's program.

The Corporate Development Division provides corporate services and computing support. A full description of the Division's activities are found in Program 7.

An overview of departmental activities within this program is given below. Specific outcomes against planned achievements have been summarized in tabular form at the end of this section.

Mineral exploration and mining activities

During the year, 293 new mining proposals and 17 environmental management programs (for operating mines) were received and reviewed by the Department for their environmental impact. This resulted in a total of 310 Notices of Intent (NOI) being received. Eighty-seven of these were referred to the EPA resulting in eight formal EPA assessments. Overall, this was a major



Program 3: Environmental protection and rehabilitation

increase in submissions from the previous year when 213 were received.

The procedures established for the preparation of Notices of Intent and annual environmental reports have resulted in improvements in site environmental management. This assignment of greater responsibility by the EPA to the Department for environmental review and approval of mining projects is indicative of the success of the NOI assessment process.

From 1 October 1992, specified plants, tailings dams, heap and vat leaches and mine dewatering were exempted from EPA Works Approval Applications and pollution licences. These operations are now subject to pollution control by the Department.

All the Department's country offices and its public counter in Mineral House now receive a weekly list of NOIs received the previous week. The EPA receives a copy by facsimile.

To enable improved access by the general public to information in NOIs, a program is being developed for electronic access to NOI summaries.

There continues to be a substantial improvement in rehabilitation performance at minesites. This has been achieved through attitudinal change, and a higher commitment to environmental management by industry management. Progressive rehabilitation at minesites is now the norm rather than a rarity.

A review of the Regional Mining Development Planning Committees established in the Yilgarn, Leonora and Laverton areas resulted in agreement to meet on an 'as required' basis. The aim of improved liaison between local authorities and industry has been achieved.

Environmental Performance Bonds are now required for all new mining operations and at 30 June 1993 there were 408 bonds in place with a total value of \$10 741 million. No Performance Bonds had to be called in due to poor performance while six were retired due to satisfactory completion of rehabilitation work.

A total of 87 Notifications of Intention to Clear Land were reviewed by the State Mining Engineer through delegation from the Commissioner of Soil and Conservation under the Soil and Land Conservation Act.

Liaison and involvement of Departmental officers continued with the Goldfields and Pilbara Land Rehabilitation Groups. These groups are proving very successful in the fostering of new rehabilitation techniques and activities.

Following inspections and field visits by Environmental Officers, there was one prosecution for mining without authority.

A 12 month exchange of environmental staff between the Department and the US Bureau of Land Management was completed in November 1992. Mr Mark Cannon from the Kalgoorlie office exchanged locations with Mr Ahmed Mohsen from Battle Mountain, Nevada.

Resource assessments were completed for a range of programs including the Ellen Brook sub-division, the Mungari industrial site, the Kennedy Range National Park, extensions to Purnululu National Park and mining tenement applications in Fitzgerald River National Park. CALM's Draft Management Plan for the Goldfields Region was reviewed in the light of detailed industry submissions.

A database of significant geological features was compiled. Areas are being reviewed for specific management requirements. Two sites (the Veevers and Dalgwonga mexemite craters) have been vested in the Minister for Mines.

Continued support was provided to the mining industry in the form of analytical advisory services on the environmental effects of mining operations. Two major gold mining companies are investigating rehabilitation techniques for tailings disposal areas and the Department is involved in monitoring the stability of the tailings during revegetation and soil conditioning trials.

The first Awards for Environmental Excellence in the mineral and petroleum

industries were presented in July 1992. Awardees included WAPET, CRA Exploration, Hadson, BHP Iron Ore, Normandy Poseidon, Alcoa, Forsyth Mining and Pancontinental Mining. The awards will be made annually to give recognition to those operators who have conducted their activities in an environmentally-sensitive manner. The awards were decided by a selection committee comprising Professor Fay Gale AO, Mr Harry Butler CBE, and Mr Brendan Nicholson of The West Australian newspaper.

Standard procedures have been developed in consultation with and agreed to by CALM for the processing of mineral exploration tenements to ensure that standard and appropriate conditions are applied on conservation reserves.

Petroleum operations

Continued improvement occurred in coordination and liaison between Government, the petroleum industry, interest groups and the community with respect to environmental impact assessment and approvals. Several requests were received from the petroleum industry and other governments in Australia and overseas for copies of the *Petroleum Information for Petroleum Operations in Western Australia* manual which is currently being updated.

Agreement was reached with the EPA concerning the setting of work licence conditions under of the Environmental Protection Act.

An environmental database was set up to monitor companies' compliance with rehabilitation requirements for their onshore operations, and a number of field inspections were conducted to verify their environmental performance.

The Division's Senior Environment Officer was appointed to the Curtin University of Technology Ecotoxicology Management Board, and participated in the assessment of proposals submitted to the Department for its annual Award for Environmental Excellence.



Program 3: Environmental protection and rehabilitation

During the year, the Petroleum Division was involved in devising various strategies to assist the Government in developing a workable policy for petroleum exploration and development in marine areas.

Mapping support

A digital Conservation Reserve Map of Western Australia was developed. It is in strong demand for use in the assessment of environmentally sensitive or restricted lands. A State Map of Aboriginal Lands is in preparation.

Mapping activities were undertaken to show any encroachment of mining tenements into Aboriginal Lands and Conservation Reserves while proposed Conservation Reserves were plotted on Public Plans.

The constraints of the EPA's Environmental Protection Policy Coastal Plains Lakes, Declared Rare Flora, the Gngara Waste Mound and State Heritage are being plotted on the Public Plans. A list of valid constraints have been produced and necessary enhancements made to the electronic database to incorporate them.

The Conservation Estate

The Department chaired groups that developed draft policies for marine conservation reserve access for petroleum operation and access for mining tenement activities in environmentally protected areas.

Groundwater

Information was compiled on the Perth Basin to enable preparation of a groundwater contamination susceptibility map. This will allow land-use decisions to take into account the protection of groundwater quality.

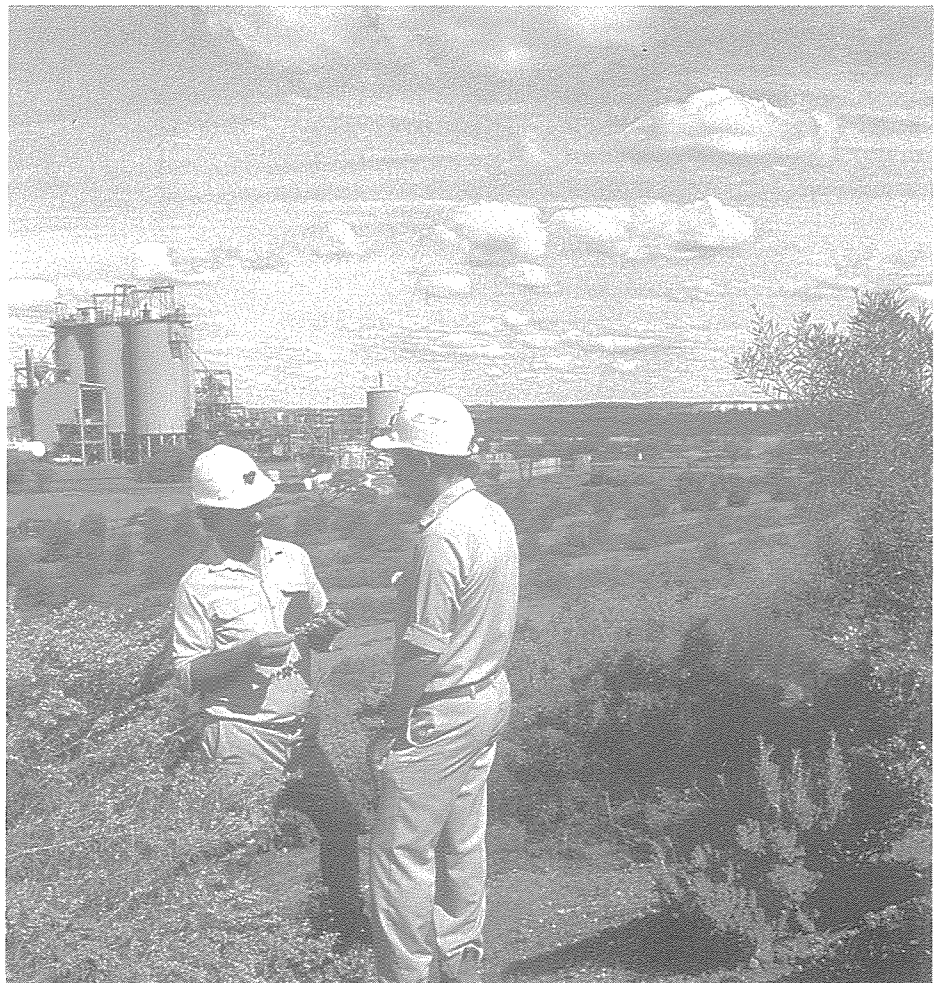
Frequent advice relating to the location and management of landfill sites was provided to the Health Department. Advice on groundwater contamination (notably pollution at Jolimont and Dianella) was also provided to the Health Department and EPA. Numerous bore sites for road construction have been selected for the

Main Roads Department in the Kimberley, Pilbara, Goldfields and Southwest.

A computer database of WA tailings dams was established. Data sheets have been returned for approximately 70% of the tailings dams.

Community consultations

The Minerals Environment Liaison Committee (MELC) and the Petroleum Environment Liaison Committee (PELC) met on a regular basis to review the Departmental policies and activities relevant to this program. They made contributions to improving the Department's overall performance by reviewing guidelines prior to release and suggesting areas that require special attention.



Western Mining Corporation received an Award for Environmental Excellence from the Department for its rehabilitation work at Hill 50 Gold Mine near Mount Magnet.

Program 3: Environmental protection and rehabilitation

Planned achievements for 1992-93

Conduct an environmental audit of seismic operations in the Perth and Canning Basins to ensure compliance with government standards and conditions.

Ensure that all mining operations on mining tenements provide annual reports on environmental rehabilitation activities and have bonds in place to reflect their liability for site rehabilitation.

Review and amend the Department's guidelines on mining development in arid lands and develop guidelines on pollution control for mining operations to ensure awareness of expected environmental performance.

Develop and implement a compliance audit system to facilitate the retirement of environmental bonds on mining operations where appropriate

Review, in consultation with the Mineral Environmental Liaison Committee, the progress made by the mineral sands mining industry since the 1987 Report on Conservation and Rehabilitation on the Mineral Sands Mining Industry.

Complete a pilot project aimed at developing the approach necessary to establish a comprehensive database of information on the environmental status of abandoned minesites in Western Australia.

Establish a database of information about tailings dams in Western Australia and assess the potential for surface and groundwater pollution at each site.

Complete and publish a groundwater contamination susceptibility map and explanatory notes for the Perth Basin.

Develop and publish guidelines in the hydrogeological aspects of landfill and liquid waste disposal sites at the request of, and in conjunction with, the Health Department.

Produce a State map of conservation reserves and environmentally sensitive areas as a guide to mineral and petroleum explorers.

Publish guidelines in collaboration with the EPA dealing with the storage and handling of dangerous goods to ensure co-ordination of public safety and environmental protection measures.

Outcomes

Seismic survey lines in Exmouth Gulf and Carnarvon were examined and the results presented to PELC. In general, there was no significant environmental impact. A report was prepared reviewing the outcome of seismic survey reports in the Perth Basin between 1986 and 1990.

Progress is being achieved to ensure that all mining operations that are anticipated to operate for more than two years submit annual reports and all operators have bonds. Mine Operating Systems has been modified to improve tracking of annual reports and bonds.

The guidelines were reviewed and amended.

A draft system of compliance auditing is in place and guidelines are being prepared.

A review of both the mineral sands and gold mining industries environmental management and rehabilitation has commenced and is due for completion in 1994.

A cost estimate to undertake an environment survey of all abandoned minesites in WA was prepared and it is proposed that the pilot project will be undertaken in 1993-94.

A computer database of WA tailings dams has been established. Data sheets have been returned for approximately 70% of the tailing dams.

The sampling program for the groundwater pollution map is proceeding well and nearing completion.

The guidelines are under development.

A digital map of the WA groundwater state and environmentally sensitive areas was completed and is being validated.

The preparation of guidelines dealing with the storage and handling of dangerous goods to ensure coordination of public safety and environmental protection measures has been deferred pending proclamation and implementation of the Dangerous Goods Regulations but is expected to be completed in 1993.



Program 4: Community Benefits

To ensure the community receives a fair return from the extraction of the State's mineral and petroleum resources.

In Western Australia, with only a few exceptions, mineral and petroleum resources belong to the community. However, under our economic system their extraction is undertaken by private sector developers.

The extraction and sale of mineral and petroleum resources provides benefits to the community. These benefits include employment, establishment of new towns and the provision of infrastructure as well as the direct financial payments made to the Government through various charges, rates and taxes. One of the charges is a royalty which represents a direct payment to the community for the loss of its non-renewable resource. As such it is a purchase price, not a tax which is a general revenue raising instrument.

The Department of Minerals and Energy is responsible for the collection of mineral and petroleum royalties. This is undertaken on behalf of the State Government and where projects lie in Commonwealth areas, the Commonwealth Government.

Royalty systems

The method used to calculate royalty payments depends upon the value of the resource, the method of sale and company accounting and financial structures. In 1981, the State Government adopted as a benchmark, a royalty level of 10% of the minehead value of production. The policy required royalties to be applied to the form in which the mineral was sold with uniform rates set for each mineral.

Since 1981, the WA Government has adopted a pragmatic approach to the actual collection process with Government and developers negotiating arrangements which achieve the overall objectives but are tailored to the individual project. For this reason, a range of administrative

systems and rates prevail designed to achieve the overall objectives. They can be categorised into three broad types:

- **specific rates:** Generally levied on low value products. Rates range from 30 cents to 50 cents per tonne with unique arrangements for some minerals.
- **ad valorem:** Based on the value of the mineral produced with rates varying from 1.65% to 7.5% of the sales value depending on the degree to which processing of the mineral takes place before sale. For petroleum, a rate of between 5% and 12.5% of the value of production at the well-head is applied.
- **profit-based:** Based on net profit or economic rent with allowance for all production costs. Rates of 22.5% and 40% apply depending on the way in which the royalty base is calculated and the extent of cost deductions allowed.

For petroleum, a royalty schedule is negotiated which defines the well-head value on which royalty is levied. While well-head value is a commercial concept, the agreements are complex and take a considerable amount of time to negotiate. Royalty is collected on an interim basis until these agreements are finalised.

Resources allocated to program

Human Resources: 13 FTEs
Expenditure: \$0.74M

Divisional roles

While the Royalties and Policy Development Division is primarily responsible for royalty collection, assistance is provided by six other divisions.

The Petroleum Division ensures that technical standards are met for oil and gas metering systems and that accurate

measurements are taken of petroleum quantity and composition. It also assists in the negotiation of well-head value schedules.

The Geological Survey and Mining Engineering Divisions provide geological advice and mineral project inspections to assist in royalty determination and collection.

This work is complemented by the Surveys and Mapping Division which provides maps and site location details while the Mining Registration Division provides title information and ownership details.

The Corporate Development Division provides corporate services and computing support to this program. A full report on the activity of that Division is contained in Program 7.

The activities of the Department under this program are summarised below. Specific outcomes against planned achievements have been summarised in tabular form at the end of this section

Royalty policy

Three petroleum royalty agreements were negotiated and finalised with negotiations in varying stages for six other projects. Discussions continued with petroleum and mineral companies concerning requests for royalty relief and disputed royalty payments. One mining lease was forfeited for failure to pay royalties.

The Department was involved in extensive discussions with the Commonwealth regarding the calculation of petroleum well-head value in Commonwealth areas and also has the responsibility for chairing a State inquiry into onshore petroleum royalties. The Department also participated in a



Program 4: Community benefits

Commonwealth/State enquiry into mineral royalties. A two part royalty system for offshore minerals was developed in response to the request from Commonwealth/State Mining Ministers.

An internal review of specific royalty rates applying under the Mining Act was completed during the year and further work to examine this issue is planned during 1993-94.

The need for amendment to certain royalty provisions under the Mining Act was discussed with the Crown Law Department and amendments drafted covering penalty provisions for unpaid and late payment of royalty, and the payment of royalty on the receipt of provisional sales amounts.

Royalties Collected

Total royalty payments to Government by mineral and petroleum producers was \$376 million, of which \$349.1 million passed through the State Consolidated Revenue Fund (CRF) (Table 9). Over 99% of the value of royalties was collected on time.

Table 9: Royalty Collection (\$M)

Legislation	Revenue share State	Revenue share C'wth	Total	Paid CRF
Minerals State	269.4	-	269.4	269.4
Petroleum State				
Barrow Island	6.5	19.4	25.9	6.5
Other Petroleum	36.0	21.5	57.5	57.5
Commonwealth	15.7	7.5	23.2	15.7
Total Petroleum	58.2	48.4	106.6	79.7
Total 1992-93	327.6	48.4	376.0	349.1
Total 1991-92	319.7	55.6	375.3	344.9
Total 1990-91	297.5	60.5	358.0	324.4

Total royalty collections were marginally higher than the previous year. The State share of total collections was \$327.6 million while the Commonwealth received \$48.4 million which represents its share of royalty collected from offshore petroleum projects. In addition to royalty

payments, the Department collected \$24.8 million through iron ore additional lease rentals which are a form of royalty levied on iron ore producers under State Agreement Acts.

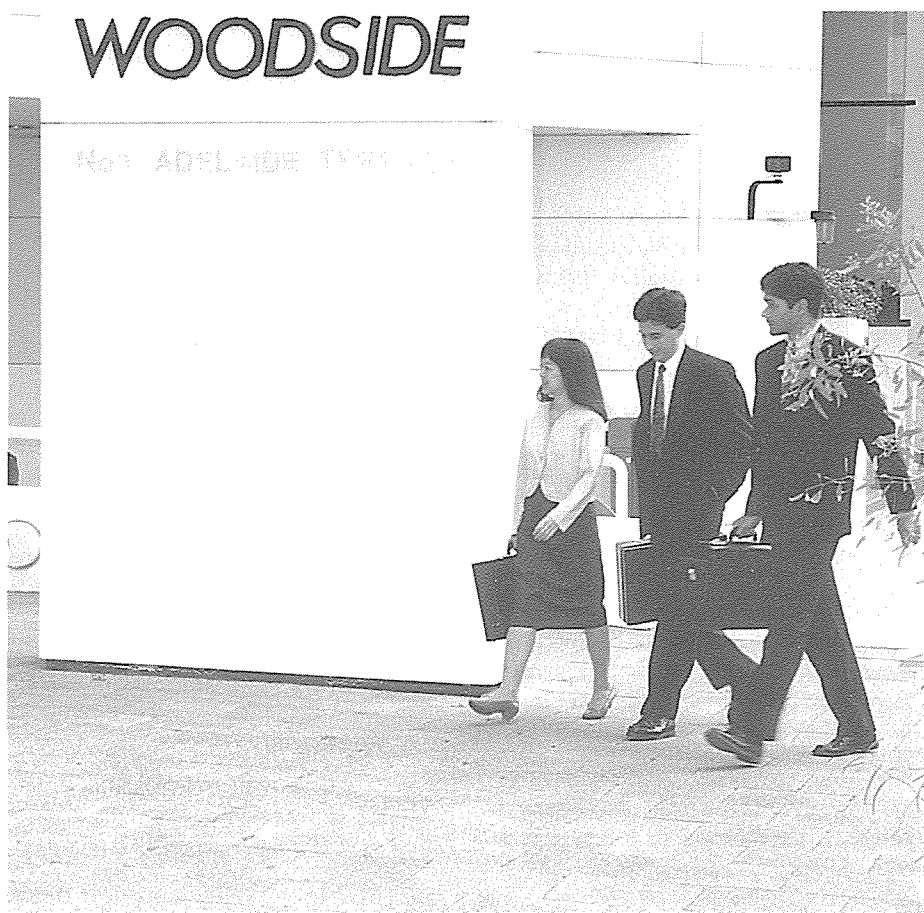
Royalty Audits

Royalties were paid by more than 160 companies/individuals operating under 27 Acts including 23 project specific State Agreement Acts.

More than 900 royalty returns were received and checked at the Department's offices while over 1 100 returns were examined at company offices. Most royalty audits were completed in accordance with the audit plan. An audit manual for all mineral sands operations was completed during the year. Manuals for the North West Shelf Project, Barrow Island and the Argyle Diamond Mine were updated.

The proportion of royalty audited increased due to an effort to maintain company office audits throughout the year. Of the total royalty collected over the past two financial years, 89% has been fully audited and finalised. The remainder represents royalty payments which have not been audited due primarily to the returns being received late in the financial year.

An integrated version of another major Departmental database, the MINEDEX system which now holds data on around 3 100 deposits or mine sites on 1 600 integrated mineral projects, was brought into production. The integrated system includes: core data, locality information, resources inventory, notices of intent for development, and mine inspections. Preliminary design of the production statistics part of the system has commenced.



Royalties officers Peggy Kho, Angelo Duca and Michel Crouche regularly visit petroleum companies to carry out royalty audits.

Program 4: Community benefits

Planned achievements for 1992-93

- Complete the negotiation of four petroleum royalty schedules.
- Review Australian and overseas petroleum royalty systems and develop options.
- Develop a two-part royalty system for minerals as requested by Commonwealth/State Mining Ministers.
- Draft penalty provisions for Mining Act royalties.
- Resolve 80% of requests for variations to royalty arrangements as a production target.
- Complete a review of the Mining Act specific rate royalties which have not been reviewed since 1981.
- Complete the mining information database and develop the production recording sub-system.

Outcomes for 1992-93

- Three schedules were completed; negotiations are in varying stages for six other projects.
- The review of Australian petroleum royalty systems continued and options for onshore petroleum projects are under consideration for application to future production.
- A model two-part royalty system for offshore minerals was developed.
- Discussions were held with Crown Law and other States regarding the drafting of penalty provisions for Mining Act royalties; however drafting of the provisions has not been completed.
- Eightytwo per cent of requests for royalty variations received during the year were resolved; work is continuing with those received late in the year.
- An internal review was completed and further work to examine this issue is planned during 1993-94.
- The planned mining information database has been largely completed but work on the production recording sub-system has been deferred until design considerations have been finalised.



Ensuring the public is safe from the manufacture, storage and transport of explosives and dangerous goods is an important function carried out by our Explosives and Dangerous Goods Division. Inspector Laurie Lim examines an autogas storage cylinder at a suburban garage to ensure it complies with safety regulations.

Program 5: Worker and public safety

To ensure all operations in the mining and petroleum industries, and activities involving explosives and dangerous goods, are conducted in a manner that is safe for workers and the public.

This program aims to achieve a low and decreasing incidence of serious bodily injury, occupational disease and fatalities among those employed in the petroleum and mineral industries; and an acceptably low level of risk to the public from the storage and handling of explosives and dangerous goods.

To achieve these objectives, the Department employs scientifically and technically-qualified staff who develop suitable legislation, issue guidelines, audit and enforce compliance with regulations, promote and participate in safety education, training and research, monitor and audit industry safety systems and practice, and provide technical advice to Government, industry and the public.

Resources allocated to program

Human Resources: 122 FTEs

Expenditure: \$7.89M

Divisional roles

Six divisions of the Department are involved in this program with specialised technical personnel from Mining Engineering, Petroleum and Explosives and Dangerous Goods Divisions taking the lead roles.

The Mining Engineering Division has inspectors based in four centres with responsibility for ensuring safe working practices in mining operations across the State. They ensure that provisions of the Mines Regulation Act are complied with and that the occupational health of the industry's workforce is not jeopardised or compromised. This is achieved by inspections which monitor and enforce compliance with regulations and the assessment of safety practices and procedures. In addition, the inspectorate provides technical advice on legislated and duty of care issues, and in less formal site

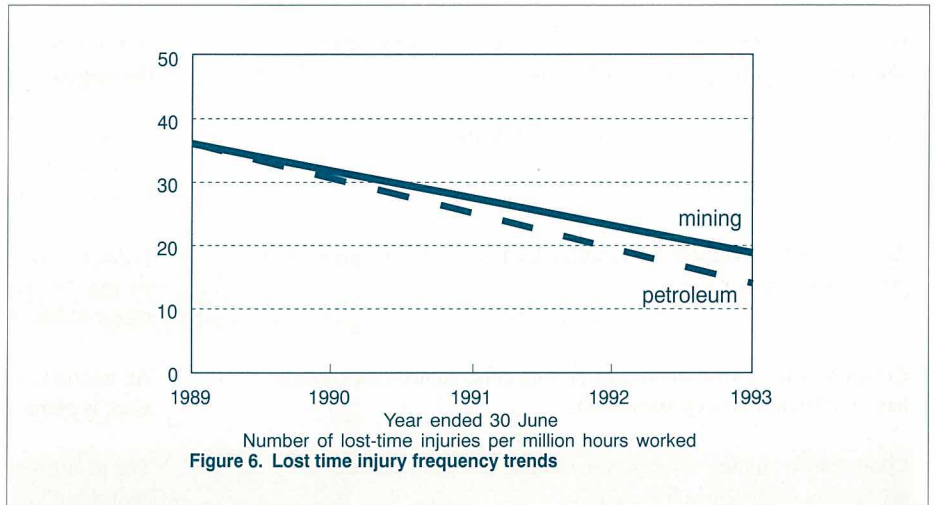


Figure 6. Lost time injury frequency trends

Table 10: Lost Time Injuries (LTI - Mining)

Mines	1991-92		1992-93		%Change	
	Incidence	Frequency	Incidence	Frequency	Incidence	Frequency
Metalliferous surface	4.1	19	3.3	16	-20	-16
Metalliferous underground	7.8	41	5.3	29	-32	-29
Total	4.4	21	3.5	17	-20	-19
Coal surface	13.0	85	14.2	88	+9	+4
Coal underground	31.3	220	45.1	300	+44	+36
Total	16.8	112	20.6	130	+23	+16
Total mining	4.8	23	4.1	20	-15	-13

Table 11: Lost Time Injuries (LTI) - Petroleum

Operation	1991-92		1992-93		%Change	
	Incidence	Frequency	Incidence	Frequency	Incidence	Frequency
Petroleum onshore	4.5	20.7	4.9	21.0	+9	+1
Petroleum offshore	3.4	15.5	3.7	15.9	+9	+3
Total Petroleum	3.7	16.9	4.1	17.4	+11	+3

Note:

Under Australian Standard AS1885.1-1990, Incidence is the number of occurrences of injury/disease for each 100 workers employed. Frequency is the number of occurrences of injury/disease for each one million hours worked.



Program 5: Worker and public safety

visits, health and safety education and training.

The Geological Survey Division, through the provision of geotechnical and rock mechanics advice, and in conjunction with industry and other research organisations, carries out studies and research on aspects of rock mechanics that affect mine safety.

The Petroleum Division acts to ensure public and worker safety in all petroleum exploration, construction and production activity, through a professional inspectorate service.

The Explosives and Dangerous Goods Division acts to ensure public safety at places where explosives and dangerous goods are manufactured, stored or transported.

The Surveys and Mapping Division records and preserves plans of mines and minesites to ensure that this information is readily available to inspectors and the mining industry.

The Corporate Development Division provides corporate services and computing support. A full description of that Division's activities is contained in Program 7.

An overview of Departmental activities is given below under the two sub-program headings. Specific outcomes against planned achievements are summarised in tabular form at the end of this section.

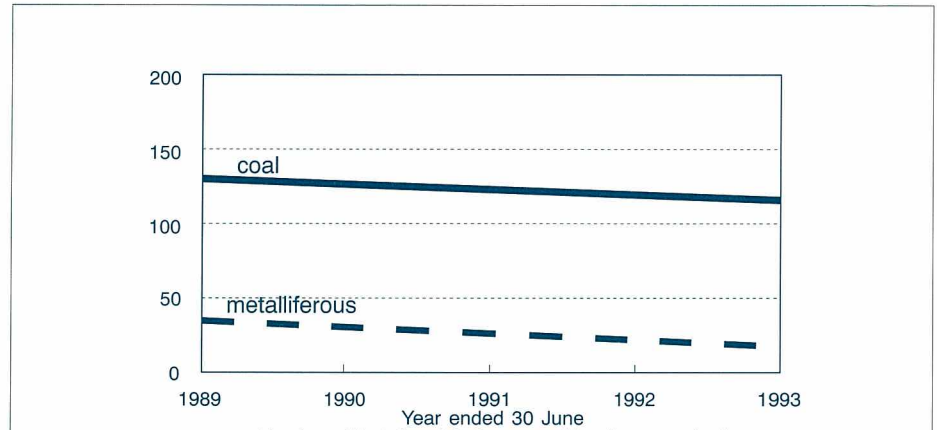
Worker safety and health

This sub program covers activities on exploration, mining and petroleum sites

Lost-time injuries

The overall performance of the mining sector during the year was sound with an overall decrease in lost time injury frequency of 13% (18% decrease in 1991-92). The petroleum sector had an increase of 3% (22% decrease in 1991-92) but still maintains a downward trend (Figure 6).

In the mining sector, the underground coal mining industry recorded a very



**Figure 7. Western Australian mines
Lost time injury frequency rate trends**

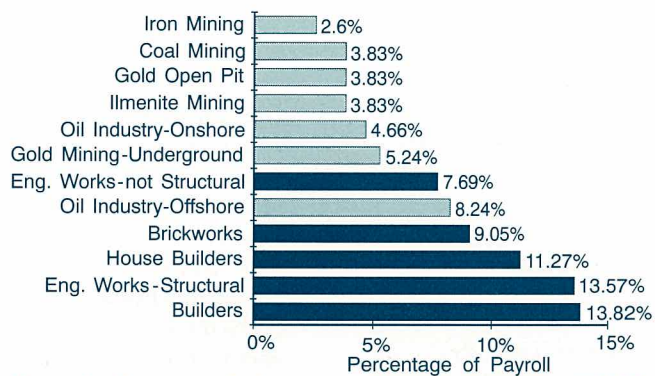


Figure 8. Recommended compensation premium rates 1992-93

unsatisfactory lost time injury frequency with an increase of 36% (Table 10). This was accompanied by an increase of 44% in the incident rate. It is believed that the frequency rate for underground coal miners of 300 (220 in 1991-92), compared with the rate for underground metalliferous mines, 29 (41 in 1991-92) is influenced by factors other than safety.

The non-coal (metalliferous) industry continued a steep downward trend by improving by 19% (16% in 1991-92) in the frequency rate, and by 20%, the same as last year, in the incidence rate. The notable improvement in the underground non-coal mines by 29% and 32% respectively in frequency and incidence, reflects the emphasis on safety in this

sector from both industry and the inspectorate.

Despite increased surveillance by the Petroleum Division, the lost-time incidence and frequency rates for petroleum operations have increased by 11% and 3%, respectively, from 1991-92 to 1992-93. This apparent deterioration in the rates may be due to greater industry compliance in submitting statistical data rather than an actual increase in the incidence of accidents. Further details are included in Appendix 6.

The workers compensation premium rates for 1993-94 reflect the continuing improvement in safety standards of the mining and petroleum industries. The industry compares very favourably with other major industry sectors (Figure 8).

Program 5: Worker and public safety

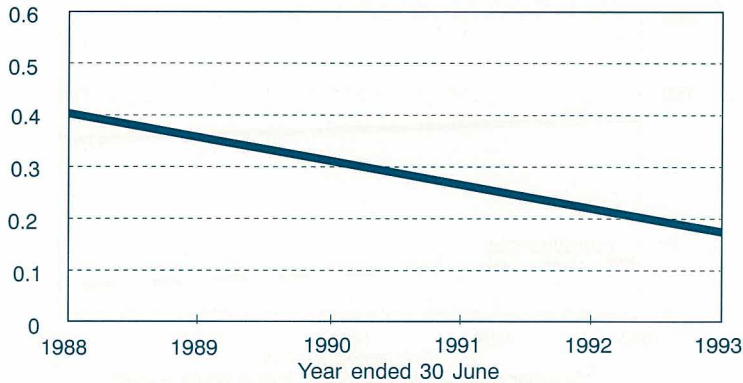


Figure 9. Fatalities per thousand employees

Fatalities

Six fatalities occurred in the mining industry of which three were underground, with five occurring in the nickel/gold sector. The fatality incidence rate is 0.18 per 1 000 employees, (0.15 in 1991-92) and is still of serious concern to the Department. While the overall trend continues to decline, there is still a year-by-year scatter of incidence rates which is typical for fatalities.

Full details of mining industry accident statistics were published during the year in the tenth and eleventh reports entitled Fatal and Lost Time Injuries in Western Australian Mines. These reports are available from the Department. Summary details included in Appendix 5.

Petroleum engineering and operations

The draft schedule of Specific Requirements as to Design, Construction and Operation of Petroleum Pipelines has undergone further revision and is expected to be released to industry for final comment in the third quarter of 1993.

Amendments to the Schedule of Special Requirements as to Offshore Petroleum Exploration and Production 1990 were issued in October 1992 covering mandatory helicopter escape training, pipeline emergency shutdown valves and the requirement to submit Safety Cases for option installations for

which design or construction commenced after 1 July 1992.

An interim direction to comply with a Schedule of General Requirements for Occupational Health and Safety 1993 was issued to petroleum title holders in May, following extensive discussions with the industry and unions, to implement one of the major recommendations arising from the Consultative Committee on Safety in the Offshore Petroleum Industry (COSOP). This Schedule will be reviewed after 12 months with a view to replanning it with objective setting legislation in line with the new Safety Case regime.

Following approval for additional Government funding, a Safety Branch was established within the Petroleum Division

to assess Safety Case submissions initially required for new developments but which will later be extended to cover existing installations. Six Safety Cases for new and existing projects are currently being prepared and recruitment of safety specialists has commenced to assist in the assessment of submissions.

The Petroleum Division has provided advice on safety related issues associated with the development of a prototype ultra slim hole drilling rig based on modified mineral drilling technology for drilling small diameter petroleum exploration wells. The project, if successful, could result in considerable cost savings in drilling wells on land and in shallow water.

The dynamic factors for fixed offshore cranes used for petroleum operations were reviewed and recommendations made which will provide greater flexibility in the application of load factors for mild sea state conditions while ensuring operational safety in more severe conditions.

As part of a general upgrade of safe operating practices in the oil industry, operators have been encouraged to update their operating safety, emergency response and statutory inspection manuals in line with current good oil field practice.

During the year, 49 inspections of petroleum sites were carried out to ensure compliance with industry occupational health and safety standards (up from 45 last year). With only a few exceptions, all

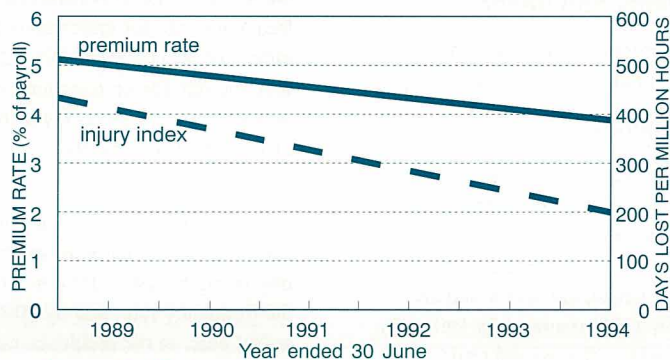


Figure 10. Western Australian mines Comparison of injury index and compensation premium rate

Program 5: Worker and public safety

petroleum sites were visited at least once during the year.

Mining safety

The enforcement of the Mines Regulation Act and Regulations through site inspections was maintained at a high level. Inspectors report that of note on such visits is the increased accompaniment and discussions with health and safety representatives, and this is seen to have a positive effect on communications and safety issues.

The mining industry injury index (days lost per million hours) continues to demonstrate a close correlation with the declining trend of workers compensation premiums for the industry (Figure 10). The injury index for all mines in 1992-93 was 242, compared with 291 in 1991-92, a reduction of 17%.

The auditing of emergency preparedness and response facilities and procedures was repeated this year by the District Inspectors. Results show that improvements and new initiatives are still being implemented by the industry including the provision of stench gas, personal emergency device (PED) communications or two-way radios as emergency warning methods for persons underground.

Following the audit, specialist visits have been made to most underground mines to review the dovetailing of emergency procedures with induction training and the emergency facilities available. A guideline has been prepared detailing the minimum requirements of the inspectorate on emergency preparedness for underground fires. During the year, a total of 125 fires were reported, 32 of these originating underground. In most cases, the fires were easily extinguished. Three lost time injuries from burns resulted from the fires. Engineering investigations by the Inspectorate aim to reduce the incidence of fires and include the involvement of mining companies and equipment suppliers.

As the most immediate and effective action to prevent injury or harm to health,

sections of mines were closed on 69 occasions and 470 items of defective equipment were taken out of service by the Inspectorate.

Four prosecutions were successfully conducted for breaches of the Mines Regulation Act, and associated Regulations. Details are included in Appendix 5.

Safety education was enhanced by the regular publication of a newsletter, by the expansion of the Nugget series of safety pamphlets and the Work Practices series of pamphlets.

During the year, the Mining Engineering Division continued to conduct accident prevention presentations on minesites. The presentations concentrated on making mine employees aware of common accidents, incidents, work practices and systems across the State, and looked at ways of preventing injury and improving work practices. All regional Inspectorates were involved in this educational role as well as the Divisional Executive. During 1992-93, presentations have been given at 35 minesites to some 1 800 mine employees. All Inspectorates conduct these presentations on a regular basis.

The Division is an active participant in seminars, briefings and training courses around the State, providing both speakers and topics and where necessary, organisational assistance on a wide range of subjects including Health and Safety Representative training, hazardous chemicals and alcohol and other drugs in the workplace.

The Mines Inspectorate provided increasing encouragement to mines rescue by attending and adjudicating at all competitions, for both surface and underground mines. Promotion of mines rescue and local area competitions by inspectors has been rewarded with another competition being introduced in the Yilgarn area. The presence of new teams participating in the competitions has led to a notable improvement in the skills of mines rescue members.

During the year, all inspectors received training in investigative techniques to be used for accident and incident investigations. These formalised methods include change analysis, hazard-barrier-target analysis, fault tree analysis, events and causal factors analysis and management oversight and risk tree (MORT). An update was included in the training on protocol and information recording for inquests and prosecutions.

Safety inspections covering mining exploration activity totalled 331 for the year (Table 12). There were 381 drill rigs on record in Western Australia in June 1993 (257 in 1992).

Table 12: Exploration drilling

	1991-92	1992-93
Drill rig inspections	283	331
Safety defects recorded	1531	1484
Average defects per inspection	5.41	4.48
Drill rigs shut down	4	1
Environmental matters referred to rig owners	27	9

On the Collie coalfield, the inspectorate has been concerned with the slope stability of WO5 and Muja pits and strata control in two of the underground collieries. The deteriorating roof conditions in the WD2 Wyvern mine is the major contributing factor to its recent closure. Another underground mine WD6 is close to being worked out and is due to close in the next 12 months. Part of the production shortfall is being taken up by the expanding WD2 - Collie Burn mine.

A comprehensive review of the existing legislation and practices relating to the submission and storage of mine plans was carried out. Action taken by the State Mining Engineer resulted in a 44% increase in plan submissions and a major improvement in the standard of submissions.

Geotechnical advice

Involvement continued with the geotechnical aspects of open pit and underground mines during the year, with approximately 80 individual geotechnical



Program 5: Worker and public safety

assessments being completed. The bulk of these assessments were for proposed or existing open pit operations. As a result of site visits and office studies, significant changes have been made to a number of mine plans and operating procedures.

Research continued into methods of mine design and ground control with preparation of documentation on ground control practices in underground mines. Preparation of a general booklet on safe work practices commenced. Work was undertaken on the preparation of a set of introductory course notes on ground control in the workplace for underground mines.

Collaborative research continued with the Chemistry Centre and several mining companies on the assessment of the corrosion behaviour of friction rock stabilisers. Current investigations are assessing the correlation between the mass loss and strength of the friction bolts.

There was a significant increase in the Departmental input to the technical assessment of the design and management of new and pre-existing tailings storages. Some 47 individual geotechnical assessments or reviews were completed. Several of these assessments included site inspections of specific problems in addition to the scrutiny of consultants' reports.

In general, field inspections have received positive response from industry representatives, and been viewed as a valuable means of explaining the requirements of the Interim Guidelines for the Safe Management and Storage of Tailings.

Management of hazardous chemicals

The Mines inspectorate now undertakes all technical inspections relating to chemical management on minesites. This includes implementation on minesites of the Dangerous Goods Regulations which came into effect in 1992.

There was a significant increase in site inspections in the area of hazardous

chemicals. Apart from the handling and use of chemicals, there was an emphasis on storage requirements under the Dangerous Goods Regulations 1992. Areas of activity included placarding, bunding, the separation of incompatible dangerous goods, fire protection and the development of emergency plans.

Occupational noise

During the year, alternative work practices were investigated for the reduction of equipment noise emissions within minesites.

Assistance was given to industry on control of noise and vibration from blasting.

Radiation

Radiation inspections continued at mineral sands mining and processing sites, again concentrating on dry separation plants to improve dust and spillage control. An increased auditing role is being developed commencing with site radiation monitoring systems.

A computerised recording and reporting system covering dose assessment has been installed at all industry sites where radioactive ore is mined and processed.

A \$40,000 research project titled Retention and Excretion of Thorium by Mineral Sands Industry Employees was undertaken during the reporting period.

The project was funded by the Minerals and Energy Research Institute of Western Australia with 50% sponsorship by the Chamber of Mines and Energy.

The primary purpose of the research was to develop a measurement system that will determine the amount of the radioactive element thorium that is retained in the lungs following inhalation of mineral sands dust. A device was successfully commissioned and measurements were made of the lung burden of thorium of 62 volunteers from five mineral sands processing plants. Fifty one workers (82% of test group) were assessed as receiving an average annual radiation dose over their employment period below the proposed 20 millisieverts per year (mSv/y) limit. Two workers (3%) were assessed as receiving in excess of the present standard of 50 mSv/y, however both workers had been employed for greater than 15 years.

An important finding to emerge from the study is that most long term workers have not been exposed to excessive levels of airborne thorium. The success of the research offers a unique opportunity to extend the testing to other long term dry plant workers and this will improve our knowledge of past exposures. Detailed information on the research project is available in MERIWA Project Report M211 and summary information is available from the Department in the form of an information leaflet.

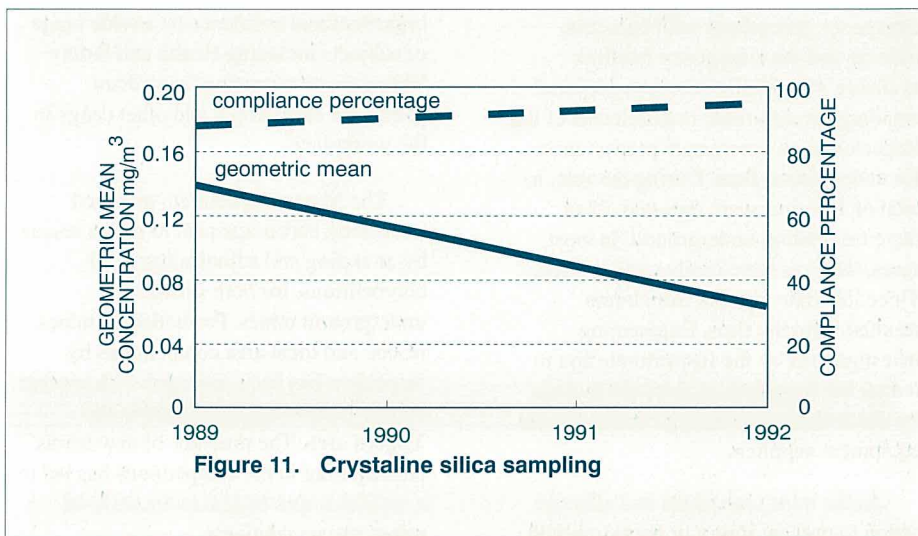


Figure 11. Crystalline silica sampling

Program 5: Worker and public safety

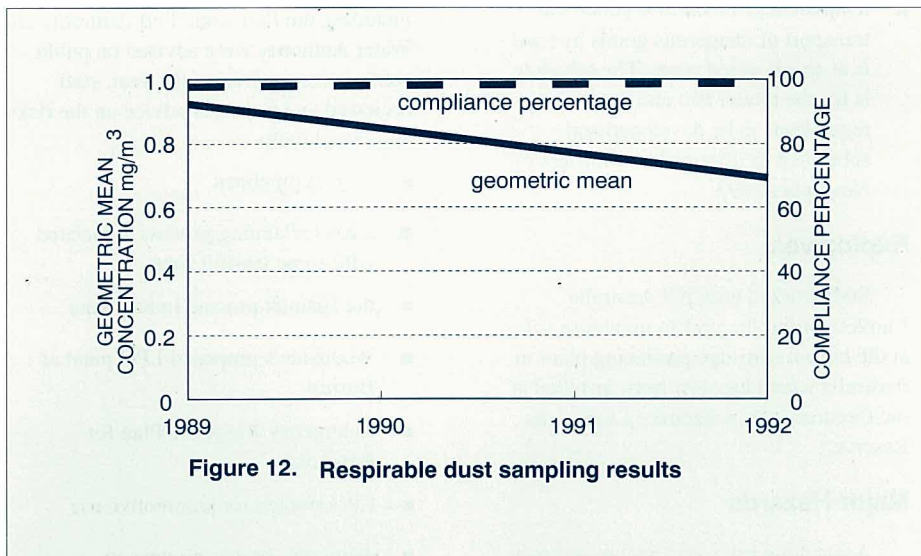


Figure 12. Respirable dust sampling results

Safety at mineral processing plants

Investigations were held into possible worker exposure to a variety of materials during mineral processing. As a result, interim guidelines have been developed on the management of exposure to arsenic and inorganic mercury.

Both regional and minesite seminars were held on cyanide management in the mining industry. Guidelines have been published and widely distributed.

Dust and ventilation

A guideline on the management of asbestos in mining operations was published. The guidelines are to be applied where asbestiform minerals occur and include detailed procedures designed to minimise the generation of airborne asbestos fibres.

An industry survey was completed into the use of heavy media separation. This resulted in a series of recommendations concerning safety procedures when handling bromoform and tetrabromoethane in laboratories.

The system for recording the results of atmospheric contaminants in the workplace (CONTAM) continues to guide the Inspectorate in setting sampling quotas for industry. Samples are taken in accordance with Australian Standards and

the results for silica and respirable dust are shown in figures 11 and 12. Compliance with the exposure standards remains at a very high (+95%) level.

Health and safety legislation

Effective 1 January 1993, the Mines Regulation Amendment Act 1990 was proclaimed. This was accompanied by the Mines Regulation Amendment Regulations 1992. The effect of this legislation was to formally introduce the consultative mechanisms involving health and safety representatives and committees and invoked duty of care responsibilities on employers and employees.

Also on 1 January 1993, the Government transferred responsibility for administration of the Mines Regulation Act 1946, the principal Act dealing with occupational health and safety in the mining industry, to the Minister to whom the Occupational Health, Safety and Welfare Act 1984 is committed. With the change of Government in February, a revocation was made on 5 March, returning the responsibilities to the Minister for Mines.

During the latter part of the year, the Government decided on further amendments to the Mines Regulation Act, specifically Divisions 2A, 5 and 6. The Bill submitted to Parliament repeals Division 2A and the tripartite Ventilation

Board and Mines Radiation Safety Board. Divisions 5 and 6 are therefore also repealed and will result in specific legislative control on working hours and Sunday labour being removed but work practices will still be subject to the duty of care provisions.

To ensure continuing safety advice, an interim Mines Occupational Health and Safety Advisory Board (MOHSAB) is being established to advise the Minister on occupational health and safety matters in the mining industry.

The Minister has also directed that a new Mine Safety and Inspection Act is to be drafted that will incorporate both the Mines Regulation Act and the Coal Mines Regulation Act and the associated Regulations.

Management of dangerous goods

The Dangerous Goods Regulations were proclaimed and came into effect by stages through 1992-93. A series of seminars was held in conjunction with the Chamber of Commerce and Industry and the Western Australian Chamber of Mines and Energy to explain the effect of the regulations. Numerous publications were produced explaining various aspects of the regulations in plain English; and an inspector worked with Agsafe to facilitate that organisation's implementation of aspects of the Dangerous Goods Regulations in the agricultural chemicals industry.

Risk prevention officers were accredited in selected industries to facilitate the preparation and assessment of plans and streamline the introduction of the regulations, and several inspectors received training in quality assurance standards. Development work continued during the year on a computerised management system to maximise effectiveness in administering the Regulations.

A Dangerous Goods Liaison Committee was established and held its



Program 5: Worker and public safety

first meeting towards the end of the year. Several working parties have been set up to investigate and report on some key aspects of explosives and dangerous goods safety.

The first phase of the three phase program to attain national uniformity in the area of dangerous goods by the end of 1993 was achieved. This included:

- draft model Major Hazards Regulations were developed to a stage where they can be presented to the national Standards Development Standing Committee (SDSC) before being distributed for public review
- the draft national model Dangerous Goods Regulations should be ready for presentation to SDSC by the end of 1993

- template legislation to regulate the transport of dangerous goods by road is at an advanced stage. The schedule is for the model Bill and draft regulations to be developed and submitted to responsible Ministers by November 1993.

Explosives

Staff worked with ICI Australia Limited during the year to maximise safety at the largest cartridge producing plant in Australia which has now been installed at the Department's Kalgoorlie Explosives Reserve.

Major Hazards

A watching brief was maintained over the eight major hazards sites in Western Australia. In addition, various groups,

including the Fremantle Port Authority and Water Authority were advised on public safety systems. During the year, staff reviewed and provided advice on the risks associated with:

- several pipelines
- a gas reclaiming process associated with some landfill sites
- the Hismelt process in Kwinana
- Woodside's proposed LPG plant at Burrup
- Emergency Response Plan for Kemerton
- LPG storage for automotive use
- dangerous goods storages in Welshpool, Mandurah, Kwinana and Meenaar



Mining Engineering Division's inspectors are involved in accident investigation and safety inspections at mine sites throughout the State.

Program 5: Worker and public safety

Planned achievements for 1992-93

Conduct a minimum two inspections of each of the 28 petroleum sites in Western Australia to ensure compliance with industry occupational health and safety standards.

Conduct an audit of the preparedness of all underground mines to deal with a major emergency.

Complete the current research program on methods of mine design and ground control, establish a database of geotechnical information and commence an evaluation of alternative methods of scaling loose rock in underground mines.

Conduct a minimum of ten safety seminars or courses on topical issues such as mining geomechanics, handling cyanide, radiation safety, and ventilation and laboratory practices.

Compile and publish comprehensive up-to-date reports on accident statistics for Western Australian mines in September 1992 and March 1993.

Develop and introduce guidelines for the construction and safe operation of onshore petroleum pipelines, and publish final guidelines for the design, operation and rehabilitation of tailings dams.

Complete the current MERIWA research project investigating the use of photogrammetry in geotechnical studies for open pit mines.

Compile and publish an information booklet dealing with the occurrence of asbestiform minerals and a map showing the known natural distribution of asbestiform minerals in Western Australia.

Complete the first phase of a three phase program to comply with the Premier's directive to attain national uniformity by the end of 1993 in the areas of dangerous goods storage and handling, and dangerous goods transport.

Establish a liaison committee with representatives from community groups and the explosives and dangerous goods industries, to provide advice on explosives and dangerous goods legislation and its administration in Western Australia.

Introduce the new Dangerous Goods Regulations in conjunction with an accreditation scheme to utilise competent third party auditors to complement the activities of Departmental inspectors.

Outcomes

Forty nine inspections were carried out. Due to the constraints of time and staff availability, the target of a minimum of two inspections per 28 sites was not met.

All 49 underground mines have been audited to ascertain fire emergency preparedness. The results have been compiled, reviewed and guidelines prepared.

The research program was completed and a database of geotechnical information established.

Twelve courses/seminars have been conducted on a range of issues including cyanide handling, radiation safety, ventilation practices and five information sessions dealing with alcohol and other drugs.

Reports on accident statistics for the 12 month periods ending 30 June 1992 and 31 December 1992 were compiled and published on schedule.

Guidelines for the construction and operation of onshore petroleum pipelines have been drafted and will be circulated for industry comment prior to their release. Guidelines for tailings dams were issued.

The research project was completed.

The information booklet was prepared for publication and the work completed.

The drafting of the model code for major hazards facilities has been completed and the document is with the National Standards Development Committee.

The drafting of the model code for dangerous goods is slightly behind schedule and should be released for public comment by December 1993, six months after the original expected date.

Template legislation for the transport of dangerous goods has been prepared and work is proceeding on subsidiary regulations.

This phase of national uniformity for dangerous goods is on target.

The Dangerous Goods Liaison Committee was established and met towards the end of the year.

Regulations were introduced by stages through the year and are now fully operational.

Some third party auditors have been accredited, though not as many as originally planned. This program will continue through 1993-94.



Program 6: Chemical services

To enhance mineral, agricultural and industrial development, and the protection of community, consumer, environment and health standards by providing high quality, independent chemical services to Government, industry and the public.

This program encompasses the main role of the Chemistry Centre which is to provide a range of highly specialised services to Government, industry and the Western Australian public as distinct from the investigative and consultancy services undertaken in Programs 2, 3 and 5.

Chemical, metallurgical and mineralogical information and advice are provided to Government agencies, industry and the public. This enhances agricultural, mineral and industrial development and the protection of community, consumer, environmental and health standards in Western Australia.

The Chemistry Centre supports Government programs through some 30 government agencies. These agencies are involved in many Government policy sectors including Court Services (Coroner), Consumer Assistance, Police and Emergency Services, Prisoner Detention and Corrective Services, Occupational and Public Safety, Disease Prevention and Health Promotion, Alcohol and Drug Services, Water, Agriculture, Minerals and Energy Resources, Environmental Protection, Conservation, Economic Development and Trade and Construction and Property Services. The Chemistry Centre also has statutory and advisory responsibilities dealing with certification of analysts and analytical procedures. Support is also given to a wide range of Western Australian industries, to the racing agencies and to the public.

The Chemistry Centre generally does not compete with private industry and where possible, diverts routine analytical work to private laboratories. It exists principally to solve chemical problems which arise in Government instrumentalities and industry.

The comprehensive range of chemical, metallurgical and mineralogical capabilities and associated quality systems were upgraded during the year to allow government agency clients to respond to community needs and to an increasing range of diverse and often one-off specialist investigations. The increased capabilities have been achieved by undertaking complex investigations, developing and validating new testing procedures and by commissioning new equipment.

Scientific advice provided to government and its agencies generally deals with use of chemicals, associated occupational or environment issues and material failure. The advice provided was not readily available from other sources. Assistance was also provided to establish new standard test procedures and to assess laboratories for quality accreditation.

Resources allocated to program

Human Resources: 115 FTEs

Expenditure: \$6.64M

* includes 10 FTEs funded from external sources.

Agricultural Chemistry Laboratory

The Agricultural Chemistry Laboratory supplied comprehensive chemical support to its major client, the Department of Agriculture as well as to the Department of Conservation and Land Management (CALM), Environmental Protection Authority (EPA), Health Department and other Government clients. Advice was also given to local land conservation groups and a range of commercial clients.

The Laboratory is funded mainly through the Consolidated Revenue Fund

but has been increasingly successful in attracting funds for a range of projects geared towards more efficient farming in Western Australia and the development of new products for export and home consumption.

The Soil Chemistry Section contributed to studies in the areas of soil conservation, rangeland management, resource inventory and land capability and working closely with the Department of Agriculture's scientific officers to achieve these ends. Soil problems peculiar to Western Australia present particular challenges to the application of science to agriculture. Studies included, for example, the influence of wind on soil erosion, investigations to determine the viability of applying treated red mud (the waste product from bauxite refining) to ameliorate the poor Western Australian soils to enable them to better retain moisture and phosphorus, to the management of nutrients in turf applications.

The Plant Chemistry Section concentrated its efforts in supporting projects aimed at improving the efficiency of fertiliser application in cereal, pasture, horticulture and grape production. Work was also directed at minimising nutrient runoff and associated water pollution of the coastal plain in support of initiatives by the EPA. The Section was also involved in investigating toxic problems in plants, such as the relatively high concentrations of cadmium in Western Australian cereals, by studying the relationship between cadmium uptake with plant species, varieties and environmental effects.

A major contribution of the Special Projects Section has been research into the development of lupins for human consumption. Lupins are the State's second largest agricultural export earning

Program 6: Chemical services



Graffiti vandalism spoils public facilities and generates significant clean-up costs. The Chemistry Centre's Mark Hood tests chemicals developed to help clean up the mess.

in excess of \$200 million annually and expanding rapidly. Activities in this area have included the isolation of pure lupin alkaloids for a human feeding study, support for the lupin breeding program designed to ensure that lupin seed does not contain unacceptably high levels of alkaloids and the development of tests to enable alkaloid levels to be quickly determined in the field. The Agricultural Chemistry Laboratory is a world authority on lupin chemistry and is frequently

consulted for advice. The Section is also involved in the development of improved legume cultivars with low toxin levels and on identifying the organic compounds which cause the formation of non-wetting soils and lead to soil erosion and poor water infiltration.

The Food Science Section, in addition to its involvement with the Department of Agriculture, played a key role in supporting the Food Monitoring Program

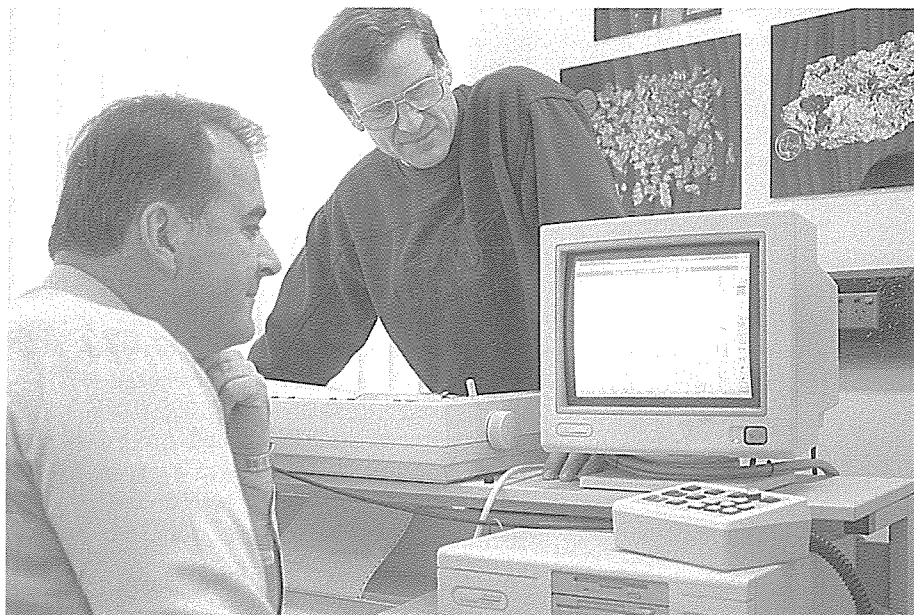
conducted by the Health Department. The Section investigated food products for compliance with Health regulations and provided support for the State's food processing industries. The Section also carried out investigations into factors which influence the production of glycoalkaloids, in particular solanine in potatoes. Studies of heavy metal residues in fish and crustacea for the Fisheries Department, the development of techniques for determining the toxicity of algal blooms and the accumulation of toxins by shellfish in the Peel Harvey Estuary are examples of the work of the Section which has played an important role in protecting the health of the community.

Environmental Chemistry Laboratory

The Environmental Chemistry Laboratory continued to carry out chemical monitoring and evaluation of the Western Australian environment. Particular emphasis was directed towards the monitoring of air, waters, soils, sediments and biota for nutrients, pollutants, pesticides and trace organic contaminants. The Laboratory also assessed occupational exposure to chemicals and investigates odour and air pollution problems. It has provided scientific assistance to government regulatory agencies such as the Health Department, Waterways Commission, Department of Occupational Health, Safety and Welfare and the EPA. It also supported the investigational work of the Geological Survey and Mining Engineering Divisions. The Laboratory provided specialised services to the mining industry and private water consumers.

Significant support was given to the Health Department in a range of areas, including investigation of waste disposal problems and research and advice on technologies available for the destruction of hazardous wastes. The Laboratory also assisted with monitoring of the pest control industry and carried out pesticide residue surveys on fruit and vegetables to determine suitability for human consumption. Further services have included analysis and advice on tip site

Program 6: Chemical services



By precisely identifying the origins of samples provided for testing, the gold fingerprinting technique developed at the Chemistry Centre by John Watling and Hugh Herbert is helping the fight against gold stealing and gold fraud.

leachates, and the inspection of hospitals to monitor the safety of operating theatres with respect to anaesthetic gases.

The Laboratory provided a scientific inspection and analytical service to investigate safety problems in occupational environments. Examples included studies on atmospheric levels of solvents and hazardous fumes resulting from spray painting and welding, the investigation of indoor air quality in multi-storey buildings following complaints of respiratory problems, and the health hazards incurred by dusts associated with the training of bricklayers, plasterers and tilers. The Department of Occupational Health, Safety and Welfare has been an important client for this type of work which requires not only field inspections and analysis but also extensive laboratory investigations using sophisticated equipment to detect extremely low levels of chemicals.

The Laboratory provided investigative and analytical expertise to assist the EPA in its air and water pollution investigations. The Laboratory also contributed to Environmental Impact Assessments where advice was given on proposed new industrial developments.

Baseline surveys of ecosystems with respect to man-made chemical pollutants was another area of involvement.

Within the Department of Minerals and Energy, the Laboratory provided chemical support to the Geological Survey Division in its program of surveying and mapping the State's water resources. It also assisted the Mining Engineering Division in monitoring the health and safety of workers in the mining industry with respect to materials such as mercury, arsenic and toxic gases. This involved on-site and laboratory investigations.

Industry, particularly the mining industry, and the general public sought the assistance of the Laboratory because of the high level of expertise, the ability to handle difficult analyses and solve problems and because of the interpretative advice given to clients. The Laboratory became heavily involved in studies of mining sites where there are special problems associated with cyanide in tailings. The Laboratory also provided analysis and advice on the use of water for a range of applications including human consumption, suitability for stock, plants and marine life and also for use in swimming pools. Although analytical

services were available in private laboratories, interpretation of the results was often unavailable from these sources.

Forensic Science Laboratory

The Forensic Science Laboratory assisted the State's law enforcement program by providing scientific support to Government agencies involved in justice administration. This support was provided for toxicology, illicit drugs, the examination of physical evidence and a drug analytical and advisory service to the Corrective Services authorities.

The Forensic Toxicology Section absorbed the major portion of the Laboratory's resources and worked in close cooperation with forensic pathologists from the State Health Laboratories in providing information to the State's Coroners to enable them to establish the causes of sudden and unexplained deaths where drug or poison overdoses were involved. This Section was involved in the examination of post mortem exhibits for the presence of drugs and poisons and the subsequent quantitative analysis of the levels of the drugs or poisons detected. Reports were provided on the significance of the levels found. It was involved in the investigation of most sudden and suspicious deaths throughout the State including fatal traffic cases. This Section worked closely with the Police Traffic Branch, providing an analytical and advisory service as well as expert evidence to the courts, in relation to traffic offences involving alcohol and drugs. It also assessed evidential breath alcohol testing equipment and the competency of the Police operations of breath analysing equipment.

The Illicit Drugs Unit provided the scientific needs of the Police Drug Squad in their efforts to control illicit drugs in Western Australia. Drugs were identified and where required, additional assistance provided in establishing the source. Where clandestine drug laboratories are suspected, a chemist from the Laboratory has accompanied the police to identify the drugs and chemicals found and provide information on the chemical process being

Program 6: Chemical services

used to manufacture the drugs. Chemists have been frequently called to provide expert evidence to the courts.

The Physical Evidence Section provided scientific support to the Police Forensic Branch and the CIB in the investigation of evidence at scenes of crime and in providing expert evidence in court. This is generally done through physical evidence submitted to the Laboratory but where it is considered necessary, a chemist has attended the scene. Some of the more common types of material examined include glass, a smear or chip of paint in connection with a hit-and-run incident, or the identification of chemicals in a wilful damage charge. Generally, the Laboratory has dealt with trace evidence perhaps no bigger than a pinhead. Identification of natural or made-made fibres, from assault or murder cases also form an important part of the Section's work as does the examination of gunshot residues to assist Police and Coroners in establishing the type of firearm used in a fatal shooting or to establish whether the death was the result of homicide or suicide. Laboratory, and less frequently on-site investigations, were carried out to determine if and what accelerants were used in cases of suspected arson. The Section has been a valuable contributor to the Police in terms of lectures to detective training schools. The chemists involved in this Section were also frequently called on to appear as expert witnesses in the courts.

The Laboratory continued to provide an analytical and advisory service to assist Prison authorities control drug use through the analysis of urine samples or solid drugs.

Material Technology Laboratory

The Materials Technology Laboratory provided scientific advice and testing to the Building Management Authority, Ministry of Consumer Affairs, Small Claims Tribunal, Tender Board, other Government agencies and local industries on corrosion and building problems, consumer products, materials usage,

specification compliance and causes of failures.

The Building Management Authority has been a major client and was advised on the suitability of materials such as surface coatings, metals and construction materials for use in buildings. The Laboratory has given advice on reasons for material failures such as defects in cement, mortars, renders, other building products and on the compatibility of new cement products with various types of bricks. The Laboratory also provided technical assistance for the restoration of historical buildings. In addition, graffiti removers and anti-graffiti coatings were areas where the Materials Technology Laboratory provided state-of-the-art technical assistance, not only in relation to removal of the graffiti itself and advice on the safety of the solvents used for its removal but also suitability of the many anti-graffiti coatings for the WA climate.

The Ministry of Consumer Affairs and Small Claims Tribunal were provided with frequent advice by the Laboratory on a range of topics. This took the form of oral advice or comprehensive written reports followed by personal attendance at hearings to submit expert evidence when needed. Such cases included the fretting of brickwork, problems with the painting of swimming pools, stains on floor coverings, and whether ceramic tiles are manufactured and laid correctly.

Corrosion problems present an enormous cost to the State and the Materials Technology Laboratory has been frequently consulted on various failures due to corrosion. Examples of this work included exudate from concrete attacking surrounding aluminium windows, pipe lagging corroding of copper piping, corrosion of surgical instruments and the premature corrosion of mining equipment.

The Laboratory worked in close cooperation with the Department's Mining Engineering Division in relation to corrosion in mines. Research was carried out on the reasons for corrosion of friction rock stabilisers in mines and attempts were

made to predict the longevity of the stabilisers in the interest of mine safety.

The State Tender Board called on the Laboratory for assistance in writing tenders for a number of products. The Laboratory provided technical input and assessed Material Safety Data Sheets to ensure that the manufacturers supply technologically advanced and environmentally friendly products while the Tender Board gets the best value for Government.

Apart from advice to Government, the Laboratory assisted industry with telephone enquiries and a range of technical investigations. Examples included the evaluation of industrial grade detergents, assessment of the cause of paint failure on commercial buildings, assessing the failure of aluminium clad polystyrene foam ceiling panels at a major building site and investigating the safety of a concrete sealing compound used in the central city.

Another function of the Materials Technology Laboratory has been the collection of *Scaevola Spinescens* from east of Kalgoorlie and the preparation of an extract from the bush on a fortnightly basis for cancer sufferers. The supply of this extract is limited to those who were receiving the product as at 1 July 1991. The Government has decided that this product is to be phased out over five years and no new requests are being accommodated.

Racing Chemistry Laboratory

The Racing Chemistry Laboratory continued to provide drug monitoring and advisory and research service for the Western Australian Turf Club, the Western Australian Trotting Association and the Western Australian Greyhound Racing Association. This service allowed the racing codes to maintain their drug free stance which requires animals to compete on their own merits. The Laboratory also conducts drug testing for the Equestrian Federation.

Stipendiary stewards requested blood and urine samples from designated horses,



Program 6: Chemical services

generally winners but not necessarily so. The samples were taken under the supervision of a veterinary officer and delivered under tight security to the Laboratory. After carefully checking the seals and contents, the staff carried out a wide range of screening tests which included non-steroidal anti-inflammatory drugs, corticosteroid, anabolic steroids, narcotic analgesics, benzodiazepines, barbiturates, β -blockers, amphetamines and other miscellaneous drugs and substances.

At city trotting meetings, an on-course service was provided which enabled blood carbon dioxide levels to be determined prior to racing. This was to detect the use of oral drenches of sodium bicarbonate or other alkalinising agents administered prior to racing.

The detection of a drug is reported only when its presence is determined unequivocally using the most up-to-date scientific equipment available for the purpose. It must also be clearly established that a control sample, consisting of prior washings from the receptacle in which the urine is collected, is free from drugs clearly eliminating the possibility that the drug detected was present by way of contamination. A second sample is available to confirm the analysis. This can be done in the Racing Chemistry Laboratory, with or without a trainer's representative analyst, or in an Eastern States racing laboratory, with or without a trainer's representative analyst. The choice is determined by either the club or the trainer.

On confirmation of a positive detection, the Laboratory has undertaken to supply a chemist to the hearing to provide any explanation of the results obtained or to advise the hearing on such matters as the excretion rate of the drug in question.

Because the drugs used in racing tend to change as new drugs become available, it is important that ongoing research be carried out in an attempt to keep up with, or ahead of those illicitly using drugs in racing. The Laboratory conducted research

into new procedures for detecting highly potent low-dose drugs as well as investigations into the rates at which drugs are excreted by the animals, and in what form. This information is vital to the Laboratory in terms of knowing what to look for and also to the stipendiary stewards in being able to interpret when a detected drug was administered to the animal.

The Laboratory conducted testing of blood and urine samples in relation to the pre-purchase of horses and also some elective testing for a limited range of drugs to establish, for example, that a horse was drug-free prior to racing. Jockeys and reinspersons are also subject to drug testing and during the year, the Laboratory began to undertake employee drug checks.

The Chief of the Laboratory provided advice to the various racing codes on the rules of racing as they relate to drugs. This required regular meetings with his counterparts in other States to provide recommendations on rule changes and advice relating to the excretion rates of drugs. This advice was provided to the trainers and racing veterinarians to assist them to comply with the rule requiring trainers to present horses for racing free from drugs and prohibited substances.

New building

Construction of Stage One of the new Chemistry Centre complex at a site adjacent to Curtin University of Technology began early in 1993 and is scheduled to be completed in the 1993-94 financial year.

The first stage will provide facilities for the Mineral Processing Laboratory which is currently housed in buildings at Catherine Street Bentley, the Perth sections of the CSIRO Division of Mineral Products and the School of Chemical Engineering of the Curtin University of Technology.

Accountability

The Chemistry Centre's financial systems have been further upgraded with the implementation of debtors and

inventory systems. The debtors system has provided an improved service to clients and enabled the Chemistry Centre to significantly reduce outstanding debts. The inventory system and other improvements to the Chemistry Centre's financial systems have allowed more costs to be directly distributed to the Laboratories which are the Chemistry Centre's business units.

Laboratory information management systems (LIMS)

Funding was made available to progress year two of the Centre's three-year Information Technology Plan, with the goal of having all required information systems in place to handle inter-agency charging should this be introduced on 1 July 1994. Two METRIX Laboratory Information Management Systems (LIMS) were installed in the Environmental Chemistry and Mineral Science Laboratories and a third system was ordered for the Agricultural Chemistry Laboratory. These three Laboratories are the largest in the Centre in terms of sample throughput and volume of data to manage, and the METRIX system has distinct advantages which assist in this regard.

A suitable LIMS for the smaller Laboratories, where variety of client work is the norm, could not be found and Winthrop Technology was contracted to develop one, initially for the Materials Technology Laboratory. This was delivered late in the year and will undergo minor modifications before installation in the Mineral Processing and Kalgoorlie Metallurgical Laboratories.



Program 6: Chemical services

Planned achievements for 1992-93

Upgrade the Chemistry Centre's laboratory and financial management information systems to meet its commitment to inter-agency charging as from 1 July 1994. Government agencies are currently notified of the full cost of all Chemistry Centre work.

Facilitate, in cooperation with various government agencies, the construction of Stage 1 and planning for the final stage of the new Chemistry Centre Bentley Complex.

Streamline the provision of soil and plant analytical services in the Agricultural Chemistry Laboratory. Collaborative programs will be developed with the Department of Agriculture and other interested organisations in support of new Government initiatives, particularly in the areas of agricultural and food processing, post-harvest technology and horticulture.

Respond to community health concerns by conducting major surveys through the Agricultural Chemistry Laboratory in conjunction with the Health Department to determine levels of additives in food.

Develop analytical techniques which enable the assessment of water quality against national and international standards and ensure efficient and integrated analytical services are available for monitoring water bodies.

Cooperate with the Health and Agriculture Departments to ensure adequate and efficient monitoring of foodstuffs for pesticide contamination. Collate and publish Statewide monitoring data from the pesticide monitoring database being established jointly with the Pesticide Advisory Committee.

Maintain an emergency response capability for chemical crises such as spillages and accidents and provide advisory support on disposal options.

Upgrade methods and instrumentation and reallocate resources to ensure police case work is handled in agreed times.

Extend the range of nationally accredited tests. In particular, the Forensic Science Laboratory will further develop quality programs to meet the accreditation requirements.

Develop proposals and obtain funds from the National Institute of Forensic Science for research projects which will assist Police case work.

Outcomes

Computerised systems have been established in two laboratories and are being commissioned in other laboratories. A computerised debtors system has also been commissioned.

Stage One of the new Chemistry Centre Bentley Complex is under construction. Further progress of future stages is dependent on finance.

Procedures were streamlined and collaborative programs developed.

Major surveys were conducted.

Methods have been developed for nutrient analysis at trace levels in saline matrices such as seawater. Collaboration with the Environmental Protection Authority in monitoring trace nitrate and ammonia levels near ocean outfalls of sewerage is now continuing.

Fruit and vegetable surveys have continued and indicate general compliance by growers with withholding periods. Isolated problems with seasonal fruits such as strawberries have occurred but at no identified human health risk.

In maintaining an emergency response capability, three urgent groundwater contamination problems required detailed investigation, with one resulting in the issue of a pollution abatement notice at the source.

As part of the upgrade to ensure client deadlines were met, a micro-spectrophotometer and a diode-array high performance liquid chromatograph were commissioned and significant improvements in methodology implemented.

The range of nationally accredited tests was extended, with the Kalgoorlie Metallurgical Laboratory being registered for bullion analysis. Quality programs were further developed in the Forensic Science Laboratory to meet the requirements of the appropriate accrediting body.

A research project to investigate the identification of synthetic fibres was funded by the Institute and work commenced.



Program 6: Chemical services

Planned achievements for 1992-93

Test the effectiveness of commercially available graffiti removers to be supplied through the Building Management Authority and comment on their toxicity and safety for use in public areas.

Produce a report to the Department of Minerals and Energy on friction rock stabilisers corrosion and longevity. Seek funding for longer term work on general corrosion of mine supports.

Increase liaison with the building industry trades people, in particular TAFE, to assist in solving building materials failures.

Continue to develop and improve drug detection methods to increase the range of drugs which can be investigated in each sample submitted by the racing bodies.

Outcomes

Many commercially available graffiti removers were assessed for effectiveness, toxicity and safety for use in public areas. This enabled the BMA to generate an approved list of materials.

A major report to the Department of Minerals and Energy on the corrosion and longevity of friction rock stabilisers was produced.

A significant investigation of the use and failures associated with mortars, renders and plasters is underway with TAFE.

Detection methods for a range of anabolic steroids have been developed for use in programs to assist the horse and greyhound racing agencies.



Henry Zuidersma of our Explosives and Dangerous Goods Division inspects the site of a deliberate explosion at the Baldivis Explosives Reserve which destroyed a magazine and was heard up to 25 kilometres away.

Program 7: Corporate services

To ensure that the human, financial and other resources of the Department are used efficiently and effectively to provide a service responsive to the needs of Government, industry and the community.

The Corporate Services Division provides administrative support services to the Department's Corporate Executive and operating Divisions to assist in optimising the resources provided by Government.

The nature of these services is affected by the requirements of the operating Divisions, and influenced by Government policy and the requirements of agencies such as the Department of Premier and Cabinet, Public Service Commission, Treasury, Department of Infrastructure and Government Accommodation, State Services and Building Management Authority.

The continuing trend towards greater Departmental accountability has seen a growing number of central agency functions devolved to the Department, putting pressure on resources within this Program. This has necessitated a continuous review of systems and procedures to make the best use of staff and other resources.

Resources allocated to program

Human Resources: 77 FTEs
Expenditure: \$7.69 M

Corporate planning

At the beginning of the financial year, following the change of name and anticipated focus of the Department from Mines to Minerals and Energy, the Department commenced a comprehensive review of how to meet the needs of the various client groups which it serves, in an accountable and effective manner.

A modification to the existing program structure was made to improve focus on clients and outcomes through better alignment of program-directed activities with functional divisional responsibilities.

A new structure was developed comprising five major programs: Mineral Resources Management, Petroleum Resources Management, Geology and Resource Information, Dangerous Goods Management and Scientific Support. The new structure received Ministerial and Treasury approval and takes effect on 1 July 1993.

Management services

In addition to coordinating the Department's capital and minor works projects, carrying out reviews into operations and providing a supply service, the Management Services Branch deals with all services of an administrative nature not covered by the other functional branches.

Significant achievements for 1992-93 were:

Capital works

The Department was allocated \$4 406 million for Capital Works in the 1992-93 financial year of which \$901 000 was to complete works in progress. \$3 133 million was provided to commence construction of the Mineral Research Centre being Stage one of the Chemistry Centre Complex at Bentley. The remaining \$372 000 was utilised to begin the development and installation of the computerised Laboratory Information Management System.

Supply services

As part of a randomly selected group of government agencies, the Department was reviewed, by Office of the Auditor General (OAG) for compliance with State Supply Commission (SSC) policies and purchasing practices. From this review, OAG was able to establish benchmarks for best practices which could be applied across the public sector. In addition, the

Department's supply practices compared favourably to those observed in the better managed government trading enterprises.

In 1989, the Department was the first CRF agency to obtain approval for Stage One Devolved Purchasing. This enabled the Department to carry out its own purchasing up to the line value of \$20 000. Items above this value require approval by the State Supply Commission. An application has been made to the Commission seeking progression to Stage Two Devolution which will raise this limit to \$50 000.

Building services

Expansion in operational areas has led to urgent demands for more accommodation. An accommodation usage survey conducted within the Mineral House Complex is being analysed.

To more effectively manage its properties, the Department is also seeking approval to acquire a computerised Building Management System which will provide a record and report all capital works and ongoing costs.

Computing

During the year, steady progress was achieved in developing a number of key computer-based projects.

The development of the Tenement Graphics System (TENGRAPH) is continuing but at a slower pace than that sought by industry. During the year, programming was completed to enable the collection and validation of data relating to surveyed mining tenements, topography and land ownership. These data sets form the base against which to show the unsurveyed tenements, and to plot new applications. An early version of the TENGRAPH system which will be used at public counters to display the electronic

Program 7: Corporate services

public plan was also completed. Demonstrations to mining company representatives confirmed a keen interest in the way TENGRAPH will be able to show more clearly the ground that is available for exploration and mining. The initial implementation of the system, now planned for March 1994, will cover the districts administered by the Kalgoorlie Mining Registrar.

A consolidation of three departmental systems into a single Mining Information Index system (MINEDEX) was completed. This consolidation encompassed all functions from the existing MINEDEX enquiry system, the Mineral Resources Information System (MINIFORM) and the Mining Operations System (MINEOPS). A facility to capture electronically and store Notice of Intent (NOI) summaries was also included in the upgraded system. The new consolidated system provides Departmental users and the public with a single entry point to a broader range of site-based data.

An industry sub-system of the Mineral Exploration Database (WAMEX 2) was implemented. This system provides improved query facilities to industry and the ability to extract and download data onto computer floppy disk for sale to exploration companies.

Work commenced on the development of a Petroleum Titles Management System (PETMAN). This system, when implemented, will replace the current manual Petroleum Title sub-register and provide facilities for improvements in the administration of Petroleum Titles and associated field operations.

Enhancements were made to the Tenement Index System (TENDEX) to replace manual procedures and to streamline the processing of Unconditional Bonds and Miner's Rights. In addition, the system was modified to cater for the inclusion of pre-1978 Mining Act tenements - thereby achieving the long standing requirement of a comprehensive electronic register of Statewide tenements.

The development of a new Dangerous Goods and Explosives Information System

(DEXIS) was commenced. The system, to be developed in a microcomputer work station environment, will replace the existing Dangerous Goods and Explosives System (DANEX). In addition to the existing DANEX functions, it will provide a wider range of licensing functions, improved audit trails, the recording of inspection details and improved management information and reporting facilities.

Use of the Department's centralised computer-based information systems has continued to increase at around 20% per annum in line with the capacity plan forecast. The replacement of the existing central mainframe computer with an IBM Model 3090 occurred mid-way through the year. This upgrade allowed absorption of growth in centralised computer system usage at an acceptable cost and without any adverse effect on user services.

An audit of personal computing hardware and software was completed at the end of the fiscal period. A review is now under way to reconcile the audit results with the official asset register.

The utilisation of Local Area Networking (LAN) technology continued to grow with a resulting increase in availability of services to users of networked work stations. As well as providing a standard platform for the development of down-sized corporate computer applications, the adoption of a LAN infrastructure has allowed the Department to achieve cost savings through the sharing of resources such as software and high quality printers.

A Wide Area Network router to link the Chemistry Centre and Surveys and Mapping Division Ethernet networks to the Department's Token Ring Local Area Network was implemented. This key development provides access to applications for virtually any work station attached to the local and Statewide network.

Word processing

The replacement plan for the ageing Wordplex equipment was completed

during the year. The replacement equipment is based on Local Area Network (LAN) and microcomputer technology and utilises standardised word processing software.

Records management

The level of growth experienced in 1991-92 continued.

	1991-92	1992-93
Correspondence	77 870	81 950
Files	7 950	8 150
Mail	828 500	200

New initiatives were undertaken to improve records management and their implementation has generated significant administrative improvements.

One of the key initiatives was a review of divisional filing systems operated by the Geological Survey Division, Explosives and Dangerous Goods Division, Mining Engineering Division and the Chemistry Centre. The review aims to eliminate duplication and to identify and separate each Division's functional files.

The year saw a large increase in the microfilming program with 87 000 files being filmed and destroyed (43 000 in 1991-92) to optimise the use of available physical storage areas. Storage and space for files in the Mineral House Complex continues to be at a premium.

Information technology continued to play a significant role in providing timely and effective services to the Department and industry. During the year, further use of the computerised Records Management System (RMS) was made to improve information management by:

- implementing an RMS facility to print file covers automatically using laser printers.
- researching a pilot program for imaging Ministerial correspondence onto RMS.

Mr Peter Hewitt returned as Manager Records Services after completing his 26 month secondment to the Royal Commission as Manager, Document Registry.



Program 7: Corporate services

Telecommunications services

The Fujitsu 9600L PABX system commissioned in January 1990 continues to perform well and provides effective communications for the Department and its clientele.

The telephone facilities at the Bentley Mineral Processing Laboratory were upgraded. An Ericsson 150 PABX telephone system was installed in December 1992 and the laboratory is now able to handle direct dialling.

The Department has negotiated significant discounts for telephone call charges under Telecom's Flexiplan and CustomNet Horizon packages.

With the creation of the Telecommunications Services Section, telecommunication services functions have been transferred to the Computer Services Branch.

Photocopying services

Continued demand for photocopying services saw a 14% increase to 1 030 000 copies provided during 1992-93.

Financial management

A major review of the Department's charging and pricing practices was undertaken to ensure that where appropriate, services provided to clients are charged on the basis of full cost recovery. This review required a series of major cost accounting exercises to be undertaken in order to determine the cost of each service. The Department now has a new framework on which to determine fees and charges in future years. Fees and charges for 1993-94 were determined in accordance with this framework.

A centralised sundry debtors system was implemented in 1992-93 and was ready for use at the commencement of the 1993-94 financial year as planned. This computerised system will improve control of sundry debtors and allow credit to be provided for regular clients.

A new accounting structure was developed to reflect the new corporate management program structure for

1993-94, and to rationalise and standardise the chart of accounts format for the whole Department.

Financial Services Branch continued to provide accounting education throughout the organisation for all staff having financial responsibilities under the Financial Administration and Audit Act, and maintained a high level of liaison with staff in all divisions to ensure that accounting and reporting structures meet their needs, while also meeting the needs of the Director General and the State Treasury.

The program of installing electronic receipting machines in Departmental offices throughout the State was completed in 1992-93.

Human resource management

Public Sector Mobility, permanent part-time employment, enterprise bargaining, youth traineeship and language services strategies have been devolved and implemented during the year to maintain efficient service.

The majority of these initiatives have helped to offset some of the difficulties associated with the requirement to operate with further reductions (from 743 to 728 full time equivalents) in staffing levels.

Staffing levels

In 1992-93 the Department's Approved Average Staffing Level (AASL) was reduced by 15.3 to 727.7 Full Time Equivalents (FTEs). An additional 15 FTEs were utilised in special activities with funding being provided from external sources.

The rate of turnover fell by approximately 6.3% on the previous year with 104 staff resigning or retiring (13.87% of staffing level). Consistent recruitment efforts have enabled the Department to maintain stability with 105 new staff being recruited.

Training and development

Training initiatives continued with 398 staff (45%) attending a variety of

management, development and technical seminars, workshops and courses.

Enterprise bargaining

During the early part of the year, the Department participated in enterprise bargaining discussions with the Primary Industry Enterprise Bargaining Unit but later in the year commenced developing its own program for implementing enterprise bargaining. While an enterprise agreement has yet to be achieved, significant progress was made during the latter part of the year.

Employee working groups were established to identify initiatives and issues which would increase productivity and improve efficiency. These initiatives will be considered by the Department's Joint Consultative Committee and it is envisaged an agreement will be struck during 1993-94.

Equal Employment Opportunity

The Department has again shown its commitment to Equal Employment Opportunities in the workplace through strict adherence to its Equal Employment Opportunity policies and practices. In addition, the Equal Employment Opportunity yearly report was submitted to the Directorate for Equal Employment Opportunities in Public Employment in August 1992 and received a favourable response.

Occupational health

There is a continuing emphasis placed on occupational health and safety education, awareness and case management. Although the number of worker's compensation claims lodged did not decrease again this year, the actual cost of claims was significantly reduced. This should result in premium reductions next year.

During the year, there were 32 worker's compensation claims, of which 28 were accepted, three rejected, with one still pending decision.

A total of 101 person days were lost through claims lodged during the year. A further 1 057.5 person days were lost due



Program 7: Corporate services

to long-term ongoing claims previously lodged.

Continued engagement of a part-time occupational therapist/counsellor ensured ongoing claims/case management, workplace assessments, confidential counselling, safety awareness and education contributed greatly to the reduction of claim costs and the avoidance of many potential worker's compensation claims.

Internal audit

During the year, twelve Systems Based Audits were carried out in accordance with the Strategic Audit Plan with a further three audits in progress. This included a final audit of the Energy Policy and Planning Bureau whose corporate functions were transferred to the Department of Resources Development as at July 1, 1993. Audits were also conducted at four of the Department's regional offices including Broome, Kununurra and Carnarvon which operate under the general control of the Crown Law Department. This coverage, together with the programmed Transaction Based Audits, represented a significant cross-section of the Strategic Audit Plan for the year. As part of the planned Strategic Audit Plan for the 1993-94 financial year, the Branch will be conducting three Value for Money Audits.



Mining Engineering's Jim Torlach and Hugh Jones serve on the committee which developed the Golden Mile mining development conceptual plan that is assisting Government, industry and the community to manage environmental impacts in the Kalgoorlie area.

Financial Report



Financial Report

Accounting

The financial statements for the year ended 30 June 1993 have been prepared in accordance with the provisions of the Financial Administration and Audit Act, 1985 and the relevant Treasurer's Instructions. To assist in comparisons with other Government agencies, they follow the format suggested in the appendices to the Treasurer's Instructions.

The Statements are prepared on a cash basis in that only collections received and payments made are included, with the exception of salaries where an accrual is made to accommodate salaries for one day payable in the next financial year.

The Statement of Consolidated Revenue Fund Receipts (Table 1) provides details of actual revenue received and credited to the fund. This is compared with the Consolidated Revenue Fund estimates under the headings Territorial and Departmental Revenue where Territorial Revenue is revenue which has not been generated from fees and charges levied for services provided by the Department. Details of actual revenue for the previous financial year have also been provided to enable comparisons to be made.

Revenue

Consolidated Revenue Fund

During the financial year, the Department was responsible for the collection of \$413 million through the Consolidated Revenue Fund (CRF), this being \$8 million more than in 1991-92 (Figure 14). Mineral and petroleum royalties collected from companies operating under State legislation comprised 85% of this amount. Part of the revenue was also payments collected by the State on behalf of the Commonwealth for petroleum produced within Commonwealth waters. These receipts subsequently were paid to the Commonwealth by way of special purpose payments after payment into CRF.

In addition to royalties, the Department collected lease and other rental charges and Departmental revenue. The latter, while considerably less as a proportion (1.7%), was still significant (\$7.2 million) and represented charges for goods and services provided by the Department (Figure 13) The Departmental revenue largely originated from charges associated with the Registration, Explosives and Chemistry Centre Divisions.

Expenditure

Consolidated Revenue Fund

Funds are appropriated by the Parliament through the Consolidated Revenue Fund to provide for the operating costs of the Department. This appropriation includes provision for equipment replacement as well as refunds of revenue collected in previous financial years. It also includes some minor expenditure which relates to activities of the mining and petroleum industries which are not operating costs of the Department. The payments, financed through the Consolidated Revenue Fund (Figure 15), are related to the programs of the Department.

During the financial year, the Department's CRF expenditure budget of \$48.709 million was underspent by \$2.619 million (5.4%) as a result of lower

than anticipated refunds of revenue collected in previous financial years.

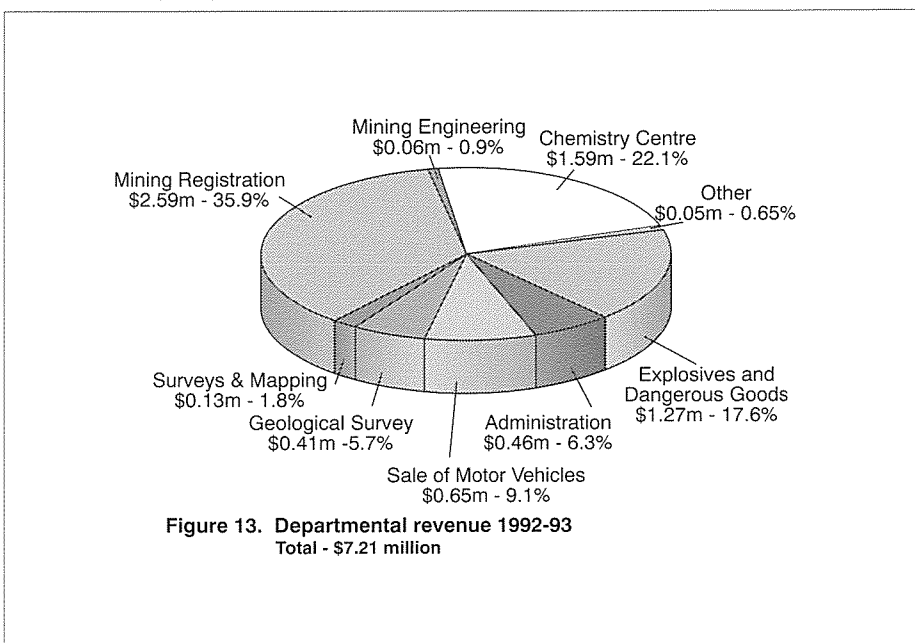
Special Acts

An appropriation is made under the provisions of the Petroleum (Submerged Lands) Act 1982 for the Commonwealth's share of royalties received from offshore operations. The Commonwealth revenue has been collected by the State into the Consolidated Revenue Fund. Payments to the Commonwealth totalled \$21.537 million in the year, compared with the \$25.228 million paid in the previous year (Table 2).

General Loan and Capital Works Fund

Major capital works projects are financed under the State's Capital Works Program from the General Loan and Capital Works Fund.

During the year, \$2.255 million was expended on capital works funded from this source (Table 3) of which \$1.280 million related to Stage One of the new Chemistry Centre complex at Bentley.



Financial Report

Financial management

The Department has continued to operate a financial management information system which provides the Accountable Officer and Corporate Executive with timely and comprehensive financial management reports to assist in resource allocation and management decisions. Research was undertaken throughout 1992-93 to

determine the availability of new generation financial management information systems which meet the future needs of the Department and provide both accrual and cash accounting data. It is anticipated that a new system will be implemented during 1993-94 for use in 1994-95.

Pricing policy

The Department generally adopts a cost-recovery user-pays approach in determining fees and charges for services provided to the public and industry. With some services, where there is considered to be an element of service to the general public, a nominal fee has been determined. However, this represents only a small fraction of services provided and has minimal impact on revenue. In other cases the data collected is considered to be a freely available resource for the public and for industry, but a charge is levied to cover the cost of supplying this data in user friendly formats.

To further refine and enhance the full cost-recovery user-pays policy, the Department undertook a comprehensive cost accounting exercise to establish an up-to-date basis for fees and charges for implementation in 1993-94, based on generally accepted accounting principles.

A review of the fees and charges levied by the Chemistry Centre was conducted during the year in accordance with the cost accounting framework originally developed in 1990-91. In addition to charging for services provided to non-Government clients and Government trading concerns, the system of notional charging developed last year for services provided to other Government agencies is continuing. This initiative is a precursor to charging for services provided to these agencies by the Chemistry Centre.

Royalty policy

The Department has a corporate objective of ensuring that the community receives a fair return for the extraction of non-renewable resources owned by the people of the State. The Department aims to ensure that these royalties are collected on time and in an economically and administratively efficient manner.

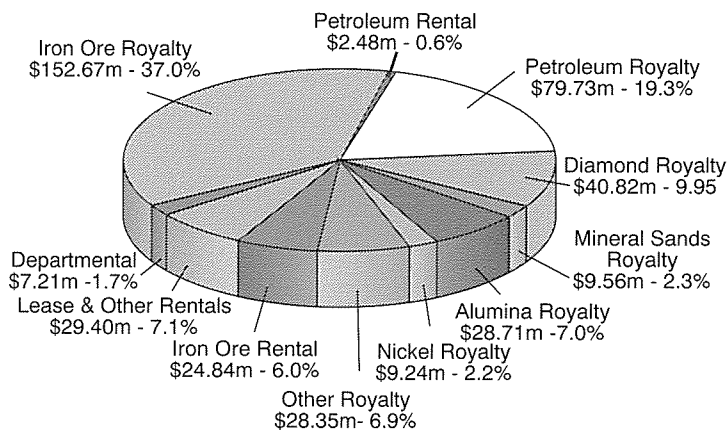


Figure 14. Revenue 1992 - 93
Total - \$413.01 million

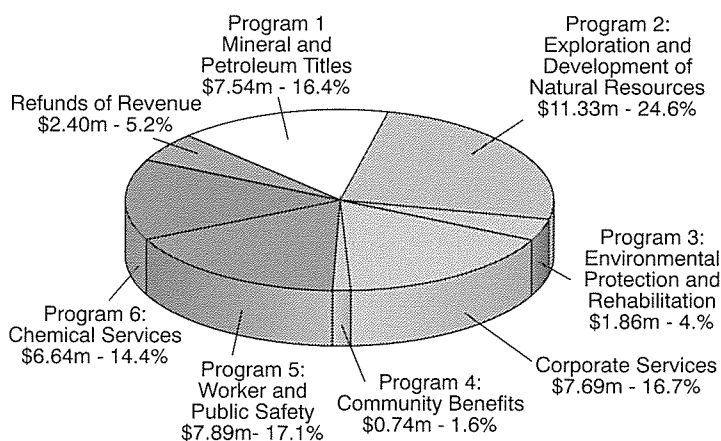


Figure 15. Department expenditure 1992 - 93
Total - \$46.09 million



Financial Report

Table 1: Statement of Consolidated Revenue Fund Receipts

<u>1991-92</u>		<u>1992-93</u>		
Actual		Estimate	Actual	Variation
\$		\$	\$	\$
Territorial				
Royalties				
152 880 228	Iron ore	154 500 000	152 674 073	(1 825 927)
86 520 780	Petroleum	71 000 000	79 728 050	8 728 050
30 985 306	Diamonds	29 000 000	40 819 425	11 819 425
29 315 958	Alumina	28 500 000	28 715 040	215 040
10 184 303	Mineral sands	10 500 000	9 557 398	(942 602)
10 589 461	Nickel	11 000 000	9 242 491	(1 757 509)
24 404 569	Other	28 000 000	28 348 218	348 218
<u>53 551 441</u>	Lease and other rental	<u>53 000 000</u>	<u>56 715 702</u>	<u>3 715 702</u>
<u>398 432 046</u>		<u>385 500 000</u>	<u>405 800 397</u>	<u>20 300 397</u>
Departmental				
2 301 756	Registration	2 002 000	2 589 342	587 342
1 259 500	Chemistry Centre	1 234 000	1 593 375	359 375
1 231 514	Explosives	1 224 000	1 268 248	44 248
627 800	Sale of motor vehicles	637 000	652 963	15 963
681 059	Adminstration	206 000	455 937	249 937
285 419	Geological Survey	358 000	412 890	54 890
123 862	Surveys and Mapping	147 000	130 514	(16 486)
61 219	Engineering	19 000	64 340	45 340
<u>25 562</u>	Other	<u>21 000</u>	<u>45 324</u>	<u>24 324</u>
<u>6 597 691</u>		<u>5 848 000</u>	<u>7 212 933</u>	<u>1 364 933</u>
<u>405 029 737</u>	Total Receipts	<u>391 348 000</u>	<u>413 013 330</u>	<u>21 665 330</u>

Explanations of variations between the current year estimates and actual results, and the actual results compared with the preceding year, are set out in Note 2.



Financial Report

Table 2: Statement of Consolidated Revenue Fund Payments

1991-92		1992-93		
Actual		Estimate	Actual	Variation
\$		\$	\$	\$
<u>45 048 987</u>	Division 64 - Minerals and Energy Item 151 Amount provided for services for the year	<u>48 709 000</u>	<u>46 089 552</u>	<u>(2 619 448)</u>
<u>7 811 227</u>	Description Corporate Services	<u>7 575 000</u>	<u>7 693 879</u>	<u>118 879</u>
<u>2 088 995</u>	Refunds of Revenue	<u>5 319 000</u>	<u>2 396 006</u>	<u>(2 922 994)</u>
<u>6 891 164</u>	Program 1: Mineral and Petroleum Titles	<u>7 654 000</u>	<u>7 539 827</u>	<u>(114 173)</u>
	Sub Programs			
5 680 371	Title Systems	6 414 000	6 300 785	(113 215)
1 210 793	Dispute Management	1 240 000	1 239 042	(958)
<u>12 789 973</u>	Program 2: Exploration and Development of Natural Resources	<u>12 302 000</u>	<u>11 332 290</u>	<u>(969 710)</u>
	Sub Programs			
3 347 401	Geological Data Collection	3 270 000	3 222 185	(47 815)
2 931 564	Metallurgical and Analytical Services	3 047 000	2 733 302	(313 698)
4 091 498	Geoscientific Data Dissemination	3 171 000	3 011 458	(159 542)
1 202 135	Geotechnical and Mining Engineering			
	Advice	1 257 000	816 516	(440 484)
1 217 375	Community Relations	1 557 000	1 548 829	(8 171)
<u>1 854 772</u>	Program 3: Environmental Protection and Rehabilitation	<u>1 897 000</u>	<u>1 856 668</u>	<u>(40 332)</u>
<u>666 302</u>	Program 4: Community Benefits	<u>804 000</u>	<u>739 028</u>	<u>(64 972)</u>
<u>7 193 556</u>	Program 5: Worker and Public Safety	<u>6 979 000</u>	<u>7 889 311</u>	<u>910 311</u>
	Sub Programs			
5 822 989	Worker Safety and Health	5 603 000	6 199 767	596 767
1 370 567	Management of Dangerous Goods	1 376 000	1 689 544	313 544
<u>5 752 998</u>	Program 6: Chemical Services	<u>6 179 000</u>	<u>6 642 543</u>	<u>463 543</u>
<u>45 048 987</u>		<u>48 709 000</u>	<u>46 089 552</u>	<u>(2 619 448)</u>
<u>25 228 063</u>	Special Acts Expenditure Petroleum (Submerged Lands) Act 1982	<u>15 500 000</u>	<u>21 536 625</u>	<u>6 036 625</u>

Explanations of variations between the current year estimates and actual results, and the actual results compared with the preceding year, are set out in Note 2.



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Table 3: Statement of Capital Works Payments and Source of Funds

<u>1991-92</u> Actual \$	Activity	<u>Estimate</u> \$	<u>1992-93</u> Actual \$	Variation \$
	Completed works and works in progress			
114 000	Chemistry Centre (WA) Material Science Laboratory upgrade	-	-	-
55 000	Mineral House Computer suite air conditioning upgrade	-	-	-
543 971	New Chemistry Centre Complex Bentley Planning fees	901 000	594 212	(306 788)
	New works			
-	Chemistry Centre (WA) Complex Bentley Stage 1 Mineral Research Centre construction	3 133 000	1 279 647	(1 853 353)
-	Chemistry Centre (WA) Computerised Laboratory Information Management System	372 000	381 542	9 542
<u>712 971</u>	Total	<u>4 406 000</u>	<u>2 255 401</u>	<u>(2 150 599)</u>
	Source of funds			
<u>712 971</u>	General Loan and Capital Works Fund	<u>4 406 000</u>	<u>2 255 401</u>	<u>(2 150 599)</u>

Explanations of variations between current years estimates and actual results are set out in Note 2.



Financial Report

ACCOUNTS OF THE TRUST FUND

Survey of leases under the Mining Act Account

Survey fees collected under the Mining Act are paid into this account. The actual cost of surveys is charged to the Consolidated Revenue Fund, and fees previously collected are then transferred to Consolidated Revenue. If the applicant decides not to proceed with the survey, the fee collected is refunded. The balance of the account is held at Treasury.

	1991-92 \$		1992-93 \$
Opening Balance			
July 1	6 119 498 CR		4 987 416 CR
<u>Add Receipts</u>			
Survey fees	<u>13 983</u>		<u>504</u>
	6 133 481		4 987 920
<u>Less Payments</u>			
Transferred to			
Revenue	255 668		5 306
Refunds	<u>890 397</u>		<u>952 284</u>
Total Payments	<u>1 146 065</u>		<u>957 590</u>
Closing Balance			
June 30	<u>4 987 416 CR</u>		<u>4 030 330 CR</u>

Chemistry Centre Trust Account

The account was created to hold monies received from industry and other organisations for the purpose of conducting specific projects. The balance of the account is held at Treasury.

	1991-92 \$		1992-93 \$
Opening Balance			
July 1	156 421 CR		208 682 CR
<u>Add Receipts</u>			
Contributions from:			
Industry	301 520		214 790
Government	<u>158 528</u>		<u>380 035</u>
Total Receipts	<u>460 048</u>		<u>594 825</u>
	616 469		803 507
<u>Less Payments</u>			
Salaries	264 684		296 495
Travel	1 872		5 056
Equipment, misc	<u>141 231</u>		<u>226 861</u>
Total Payments	<u>407 787</u>		<u>528 412</u>
Closing Balance			
June 30	<u>208 682 CR</u>		<u>275 095 CR</u>

Barrow Island Royalty Trust Account

The account was created under the Barrow Island Royalty Trust Account Act 1985 which provides for royalty payments received under the Barrow Island lease to be credited to the account and subsequently apportioned between the Commonwealth and the State. The balance of the account is held at Treasury.

	1991-92 \$		1992-93 \$
Opening Balance			
July 1	8 086 561 CR		7 942 123 CR
<u>Add Receipts</u>			
Royalties received	<u>32 584 265</u>		<u>25 930 203</u>
Total Receipts	<u>32 584 265</u>		<u>25 930 203</u>
	40 670 826		33 872 326
<u>Less Payments</u>			
Transferred to			
Revenue	8 130 258		6 447 940
Remitted to			
Commonwealth	24 514 134		19 572 535
Royalty Refunds (i)	<u>84 311</u>		<u>-</u>
Total Payments	<u>32 728 703</u>		<u>26 020 475</u>
Closing Balance			
June 30	<u>7 942 123 CR</u>		<u>7 851 851 CR</u>

- (i) Refunds of royalty due to quarterly provisional receipts exceeding assessed royalty due.

Note: Commonwealth share of royalty payment payable in July 1993 \$7 817 240 and State's share of refund of royalty payable in July 1993 \$34 611 due to quarterly provisional receipts exceeding assessed royalty due.



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Deposits: Mines Department Account

Funds held are received for the issue of temporary reserves and exploration permits pending finalisation of certain legal requirements. The balance of the account is held at Treasury.

	1991-92 \$	1992-93 \$
Opening Balance		
July 1	301 954 CR	346 165 CR
<u>Add Receipts</u>		
Bonds, securities	590 000	460 000
Interest	<u>32 117</u>	<u>23 713</u>
	<u>924 071</u>	<u>829 878</u>
<u>Less Payments</u>		
Refund of Bonds, Securities	539 000	89 650
Refund of Interest	-	-
Transfers to Revenue		
Interest	38 906	16 982
Bonds, Securities	-	-
Other	<u>-</u>	<u>-</u>
Total Payments	<u>577 906</u>	<u>106 632</u>
Closing Balance		
June 30	<u>346 165</u> CR	<u>723 246</u> CR

Transfers to Suspense Account

The account is maintained to hold funds to meet any relevant end of year commitment in respect of plant and equipment or land.

	1991-92 \$	1992-93 \$
Opening Balance		
July 1	29 000 CR	-
<u>Add Receipts</u>		
Transfers ex CRF - Plant & Equipment	<u>-</u>	<u>-</u>
	<u>29 000</u>	<u>-</u>
<u>Less Payments</u>		
Purchase of Plant & Equipment or Land	<u>29 000</u>	<u>-</u>
Closing Balance		
June 30	<u>-</u>	<u>-</u>

Special Projects Trust Fund Account

The account was created to hold funds for the purpose of participating in significant projects with other countries and the private sector to the mutual benefit of the other participants and the State of Western Australia. No monies were received or expended for the year ending 30 June 1993. Trust Statement No. 11 is shown at the end of this section.

Treasurer's Advance

Drilling

Recoverable drilling expenditure is initially charged to a Treasurer's Advance Account. The cost of work performed, together with overhead charges, are recovered and credited to this account. The amount of the advance outstanding as at 30 June 1993 was \$338 816.

Chemistry Centre

The purpose of the advance was to enable the Chemistry Centre to operate a stores function for purchasing stock items which may relate to unbudgeted contract analytical activities. Recoupment of the advance was the stores' portion of the service charged to and collected from clients.

The advance was not required for the full year and was closed, and outstanding moneys were recouped to Treasury in June 1993.

Departmental Receipts in Suspense

This amount is used to hold moneys temporarily pending identification of the purpose for which the funds were received. The balance of the account as at 30 June 1993 was \$372.

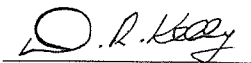


Financial Report

Department of Minerals & Energy Trust Statement No. 11

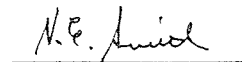
Name	An account called Special Projects Trust Fund Account shall be maintained as a Private Trust Account at Treasury.
Purpose	To hold funds for the purpose of participating in significant projects with other countries and the private sector to the mutual benefit of the other participants and the State of Western Australia.
Receipts	Such monies as are received for the purpose of the account shall be paid to and placed to the credit of the account.
Payments	The funds standing to the credit of the account shall be transferred to the Consolidated Revenue Fund to recoup expenditure met from that fund.
Administration of the account	The account shall be maintained by the Director General, Department of Minerals and Energy in accordance with the Financial Administration and Audit Act, Financial Administration Regulations and the Treasurer's Instructions
Accounting Records	There shall be maintained by the Director General, the Department of Minerals and Energy, a detailed record of transactions processed through the account, together with such other accounting records and procedures as are prescribed in the accounting manual.
Financial statements	The Director General, Department of Minerals and Energy shall cause to be prepared a statement of cash receipts and payments and such other supplementary information in accordance with the requirements of Treasurer's Instructions.
Investment of funds	Moneys standing to the credit of the account may be invested in accordance with section 40(a) of the Financial Administration and Audit Act.
Disposal of funds on cessation	Any balance standing to the credit of an individual project account shall, upon cessation of operations and after completion of all research for which the project was approved, be refunded to the contributors in the same proportions as the contributions made.

I have examined and agreed to the provisions of this Trust Statement.



Director General

Date 9.11.92



**Assistant Under Treasurer
(Accounting)**

Date 24.11.93



Financial Report

Notes to and forming part of the Financial Statements for the year ended 30 June, 1993

1. Accounting Policy

- (a) The Financial Statements are prepared on a cash basis in that only collections received and payments made are reflected therein. The disbursements include a net payment of \$113 800 to the Treasury Departmental Receipts in Suspense Account for accrued salaries.
- (b) The financial statements included in this report have been prepared in accordance with the provisions of the Financial Administration and Audit Act, 1985.
- (c) All expenditures incurred by the Department of Minerals and Energy in the provision of services are not appropriated to the Department. The employer's share of superannuation pensions is met by Treasury. The servicing of the Department's General Loan and Capital Works Fund debt also is met by Treasury.
- (d) Property disposals are effected through the State Tender Board and proceeds credited to Revenue Government Property Sales. Exceptions are:
- (i) when the original acquisition was met from General Loan and Capital Works Fund, the proceeds are credited to Loan Repayments.
- (ii) when proceeds received from the disposal of Departmental vehicles originally purchased from Consolidated Revenue were credited to general Departmental revenue within the Consolidated Revenue Fund.

2. Explanatory Statement

- (a) Details of expenditure in advance of appropriation approved in accordance with Section 28 of the Financial Administration and Audit Act, 1985.

NIL

- (b) Significant variations (greater than 10%) between actual revenues and budget estimates for the financial year.

Territorial Revenue

- (i) Petroleum (+ \$8 728 050)

Higher petroleum royalty collections resulted mainly from higher than expected output.

- (ii) Diamonds (+ \$11 819 425)

This increase is attributable to royalty payments by the Argyle Joint Venturers moving to a profit based system as opposed to the minimum ad valorem paid in previous years. This change was not budgeted for.

- (iii) Nickel (- \$1 757 509)

The shortfall in nickel royalty collections resulted from reduced world prices for this commodity.

Departmental Revenue

- (i) Registration (+\$587 342)

Increased revenue resulted from an increase in the level of applications for mining tenements, particularly exploration licenses.

- (ii) Chemistry Centre (+\$359 375)

Additional revenue collections resulted from a number of externally funded projects, and a higher level of revenue from the Mineral Processing Laboratory. Therefore, expenditure in the Chemistry Centre exceeded budget by a similar amount.

- (iii) Administration (+\$249 937)

Revenue relating to a number of externally funded special projects has resulted in collections being more than double the budget estimate. This situation occurs each year, as no budget provision is made for special projects on either the revenue or expenditure side of the estimates. Therefore, supplementary funding is provided, if necessary, to cover the additional expenditure on the basis that a like amount of

unbudgeted revenue has been collected to accommodate it.

- (iv) Geological Survey (+\$54 890)

The Geological Survey had several externally funded special projects which resulted in collections being above the budgeted figure. The principle is the same for these projects as described at (iii) above.

- (v) Surveys and Mapping (-\$16 486)

The lower than expected collections resulted from a lower level of demand for in-house printing.

- (vi) Engineering (+\$45 340)

The majority of this increased revenue occurred as a result of funds received for a special project relating to the health of workers in the mineral sands industry.

- (vii) Other (+\$24 324)

This additional revenue was mainly due to the unanticipated receipt of a forfeited cash security (\$15 000) following the cancellation of a petroleum permit.

- (c) Significant variations (greater than 10%) between actual expenditure and budget estimates for the financial year.

Departmental Appropriation

- (i) Refunds of revenue (-\$2 922 994)

Refunds of revenue collected in previous years was well below expectation as a one off royalty refund for which provision was made, did not occur. \$3.45 million will be provided in the Department's 1993-94 Budget allocation to accommodate this refund should it eventuate.

- (ii) Worker and public safety (+\$910 311)

Salary costs associated with staff working in this program were higher than expected resulting in total expenditure being slightly more than 10% above the allocation.



Financial Report

Special Acts Expenditure

- (i) Petroleum (Submerged Lands) Act 1982 (+\$6 036 625)

This higher than expected level of payments to the Commonwealth resulted from sustained high production levels from the Saladin field instead of the anticipated major decline.

Capital Works Expenditure

- (i) New Chemistry Centre Complex Bentley

Stage One Mineral Research Centre - Planning Fees (-\$306 788)

Planning continued throughout 1992-93 but will not be completed until 1993-94 due to the complexities being experienced in planning the whole project.

- (ii) Chemistry Centre Bentley

Stage One Mineral Research Centre - Construction (-\$1 853 353)

Awarding of the contract for construction occurred later than anticipated resulting in a lower level of expenditure in 1992-93 than expected.

- (d) Significant variations (greater than 10%) between actual results for the financial year (1992-93) and results for the immediately preceding financial year (1991-92).

Consolidated Revenue Fund Receipts

Territorial Diamonds

1991-92\$	1992-93\$	Variance\$
30 985 306	40 819 425	9 834 119

This increase is attributable to royalty payments by the Argyle Joint Venturers moving to a profit based system as opposed to the minimum ad valorem applied in previous years.

Nickel

1991-92\$	1992-93\$	Variance\$
10 589 461	9 242 491	(1 346 970)

This decrease in nickel royalty was due to a decrease in world prices for this commodity.

Other

1991-92\$	1992-93\$	Variance\$
24 404 569	28 348 218	3 943 649

This increase was due to an increase in the rate of royalty applicable to coal sold to SECWA. 1992-93 is the final year of a three year phased increase designed to bring about a single rate for all coal.

Departmental

Registration

1991-92\$	1992-93\$	Variance\$
2 301 756	2 589 342	287 586

Increased revenue resulted from an increase in the level of applications for mining tenements, particularly exploration licenses.

Chemistry Centre

1991-92\$	1992-93\$	Variance\$
1 259 500	1 593 375	333 875

Additional revenue collections resulted from a number of externally funded projects, and a higher level of revenue from the Mineral Processing Laboratory.

Administration

1991-92\$	1992-93\$	Variance\$
681 059	455 937	(225 122)

Funding received for externally funded special projects was higher in 1991-92 than 1992-93 and a decrease in the transfer of survey deposits from Trust.

Geological Survey

1991-92\$	1992-93\$	Variance\$
285 419	412 890	127 471

The Geological Survey had several externally funded projects in 1992-93, resulting in additional revenue collections.

Other

1991-92\$	1992-93\$	Variance\$
25 562	45 324	19 762

This additional revenue was mainly due to the unanticipated receipt of a forfeited cash security (\$15 000) following cancellation of a petroleum permit.

Consolidated Revenue Fund Payments

Departmental

Refunds of Revenue

1991-92\$	1992-93\$	Variance\$
2 088 995	2 396 006	307 011

Refunds were above last year's level as a result of a one-off payment of a royalty refund.

Exploration and Development of Natural Resources

1991-92\$	1992-93\$	Variance\$
12 789 973	11 332 290	(1 457 683)

Expenditure on this program was lower as a result of a lower level of geoscientific data dissemination and geotechnical and mining engineering advice.

Chemical Services

1991-92\$	1992-93\$	Variance\$
5 752 998	6 642 543	889 545

A greater level of expenditure resulted from externally funded projects and a higher level of activity from the Mineral Processing Laboratory and Environmental Chemistry Laboratory.



Financial Report

Special Acts

Petroleum (Submerged Lands) Act 1982
 1991-92\$ 1992-93\$ Variance\$
 25 228 063 21 536 625 3 691 438
 Payments to the Commonwealth were less than last year as a result of Federal excise being deducted in the calculations of interim wellhead values for royalty purposes.

3. Supplementary financial information

	1991-92	1992-93
	\$	\$
Losses of public monies and public or other property through theft or default	2 934	160
Amount recovered	<u>434</u>	<u>-</u>
Losses for write off	<u>2 500</u>	<u>160</u>

Public and other property, revenue and debts due to the State, written off in accordance with Section 45 of the Financial Administration and Audit Act by the:

	1991-92	1992-93
	\$	\$
Accountable Officer	14 812	10 287
Minister	<u>23 804</u>	<u>-</u>
	<u>38 616</u>	<u>10 287</u>

Analysis of losses written off		
· Stock shortages	2 880	-
· Bad debts	<u>35 736</u>	<u>10 287</u>
	<u>38 616</u>	<u>10 287</u>

	1991-92	1992-93
	\$	\$
Consolidated Revenue Fund revenues due and uncollected	267 899	538 253
Less irrecoverable	<u>3 715</u>	<u>6 890</u>

Amount considered to be recoverable	<u>264 184</u>	<u>531 363</u>
Unpaid expenditure claims at 30 June - CRF	<u>73 170</u>	<u>39 888</u>

Gifts of public property	<u>-</u>	<u>2 823</u>
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4. Events occurring after balance date

No known event or events occurred after year end which materially affect the results reflected in this financial report.

5. Related bodies

The Department had no related bodies as defined in the Financial Administration and Audit Act 1985 and Treasurer's Instruction 951.

6. Affiliated bodies

The Department had no affiliated bodies as defined in Financial Administration and Audit Act 1985 and Treasurer's Instruction 951.

7. Expenditure by standard groups

	1991-92 Actual \$	Estimate \$	1992-93 Actual \$	Variation \$
29 817 134 Salaries, wages, allowances		29 236 000	29 484 456	248 456
1 762 762 Other staffing costs		1 837 000	1 949 599	112 599
635 709 Communications		730 000	708 169	(21 831)
3 609 744 Services and contracts		4 162 000	3 601 125	(560 875)
2 647 679 Consumable supplies		2 645 000	2 891 071	246 071
1 520 994 Maintenance of assets		1 611 000	1 857 479	246 479
2 679 086 Purchase of assets		3 124 000	3 158 681	34 681
2,375,879 Grants, subsidies & transfer payments		5,364,000	2,438,972	(2,925,028)
45 048 987		48 709 000	46 089 552	(2 619 448)



Financial Report

8. Remuneration of Senior Officers

Total of salaries and other benefits received, or due and receivable, for the financial year by Senior Officers of the Department.

1992-93
\$
914 856

The number of Senior Officers whose total salaries and other benefits received, or due and receivable, for the financial year, falls within the following bands:

	1992-93
\$50 000 to \$60 000	1
\$60 000 to \$70 000	2
\$70 000 to \$80 000	5
\$80 000 to \$90 000	3
\$90 000 to \$100 000	1

9. Retirement Benefits

In respect of Senior Officers the following amounts became payable for the financial year.

1992-93
\$

Notional contributions to the Government Employees Superannuation Act Scheme	99,994
Redundancy payments	-
	<u>99,994</u>

The number of Senior Officers employed at 30 June who are members of the Superannuation and Family Benefits Act Scheme:

1992-93

Senior Officers of the Department's Corporate Executive	<u>2</u>
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10. Remuneration of auditor

As the Department is a Budget Sector Agency, it does not pay fees for the annual audit, or for other services, carried out by the Office of the Auditor General.



Financial Report

CERTIFICATION OF FINANCIAL STATEMENTS

The accompanying financial statements of the Department of Minerals and Energy have been prepared in compliance with the provisions of the Financial Administration and Audit Act 1985 from proper accounts and records to present fairly the financial transactions for the year ending 30 June 1993 and the state of affairs as at 30 June 1993.

At the date of signing we are not aware of any circumstances which would render the particulars included in the financial statements misleading or inaccurate.



L C Ranford
ACCOUNTABLE OFFICER



P H Palmer
PRINCIPAL ACCOUNTING OFFICER

12 August 1993



OPINION OF THE AUDITOR GENERAL

I have audited the accounts and financial statements of the Department of Minerals and Energy for the year ended June 30, 1993 under the provisions of the Financial Administration and Audit Act 1985.

The Director General is responsible for keeping proper accounts and maintaining adequate systems of internal control, preparing and presenting the financial statements, and complying with the Act, and other relevant written law. The primary responsibility for the detection, investigation and prevention of irregularities rests with the Director General.

My audit was performed in accordance with section 79 of the Act to form an opinion based on a reasonable level of assurance. The audit procedures included examining, on a test basis, evidence to provide reasonable assurance that the amounts and other disclosures in the financial statements are free of material misstatements and that the controls exercised are in accordance with legislative provisions. Significant accounting estimates were evaluated and the accounting policies and principles used were assessed to determine that they are consistent with the Treasurer's Instructions and applicable accounting concepts and standards.

The audit opinion expressed below has been formed on the above basis.

In my opinion,

- i) The controls exercised by the Department of Minerals and Energy provide reasonable assurance that the receipt and expenditure of moneys and the acquisition and disposal of property and the incurring of liabilities have been in accordance with legislative provisions; and
- ii) the Statements of Receipts and Payments and the notes thereto are based on proper accounts and present fairly the transactions for the year ended June 30, 1993.



D D R Pearson
AUDITOR GENERAL

September 13, 1993



Key Performance Indicators

PROGRAM 1: Minerals and petroleum titles

To ensure exploration and development titles for minerals and petroleum are issued fairly and without delay.

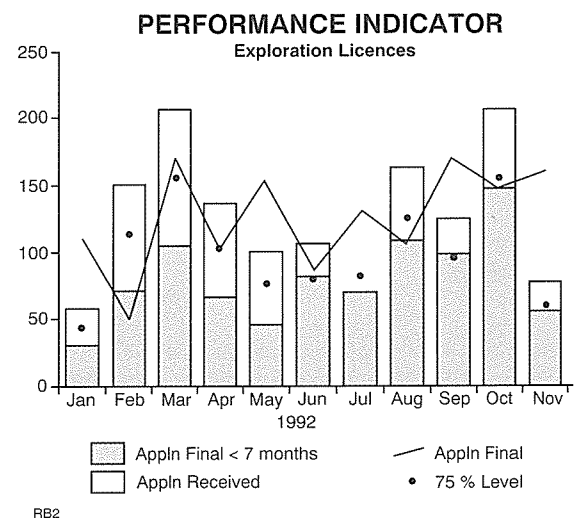
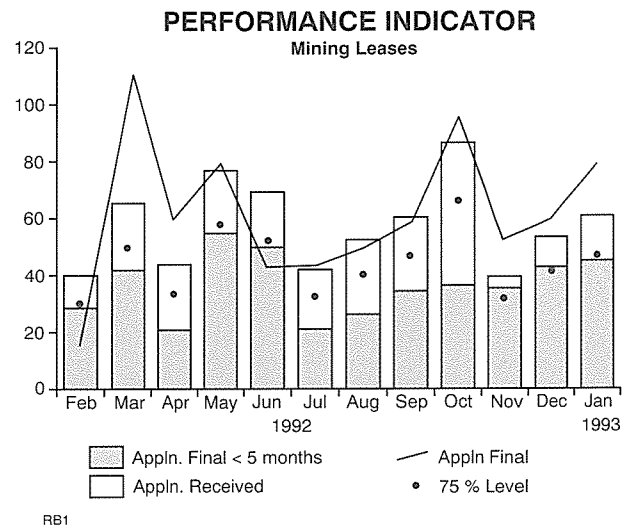
Indicator	Result		
	1990-91 %	1991-92 %	1992-93 %
Effectiveness			
The proportion of prospecting licence, mining lease and exploration licence applications which are finalised within three, five and seven months of receipt respectively.	Average for all Titles 60	Average for all Titles 60	Prospecting Licences 82 Mining Leases 62 Exploration Licences 62

This indicator reflects the Department's ability to process title applications in a timely manner. The respective periods have been chosen as a realistic duration given the processes involved with each title category including the public objection period. A target of 75% achievement has been set because approximately 25% of applications are subject to delays beyond the control of the Department, such as where the application involves private land or Aboriginal and Conservation Reserves or is delayed through legal disputation.

The 75% target was exceeded for prospecting licences in 1992-93 but not achieved for mining leases or exploration licences where, in both cases, 62% of applications were determined within the target periods. (graphs opposite)

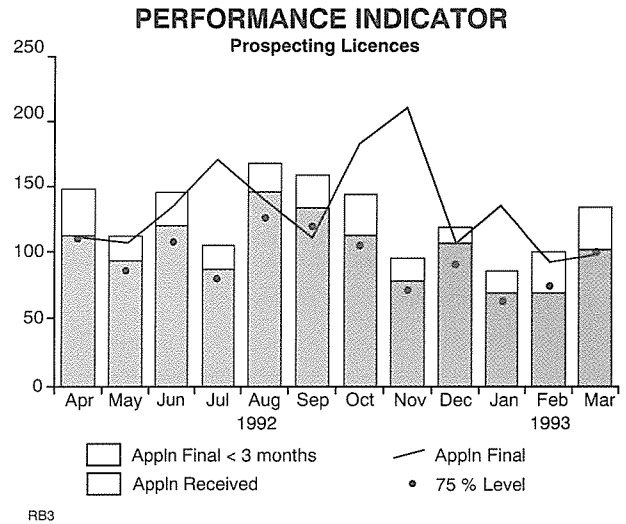
Explanatory Notes

- Exploration for and development of mineral resources cannot commence until title authorising exploration/development has been granted subject to appropriate conditions.
- The 75% target figure properly reflects applications not subject to delays due to land categories such as private, Aboriginal, and environmentally sensitive, or delay through legal disputation.
- The criteria used to determine the processing timeframes takes into account:
 - the 30 day public objection period for all title applications
 - the need for a Wardens Court hearing/recommendation
 - Warden determines and imposes conditions on prospecting and miscellaneous licences
 - additional processing is required for exploration licences, mining leases and general purpose leases which are determined by the Minister
 - 30 day letter to the applicant for exploration licences to consider proposed conditions of grant
- The average time taken to determine each title category over the last three years has been:
 - prospecting/miscellaneous licences 2.3 months
 - exploration licences 7.4 months
 - mining/general purpose leases 5.8 months



Key Performance Indicators

Indicator	Result
-----------	--------



The average time taken to determine each major title category during the year

This indicator also gives a general indication of the timeframes of the processing of all applications.

	1991-92 (months)	1992-93 (months)
Prospecting Licences	2.0	2.6
Mining Leases	4.4	5.5
Exploration Licences	6.3	7.3

The proportion of clients satisfied with the petroleum title process

Petroleum title issue effectiveness is to be measured by client survey to be conducted for the first time in 1993-94.

Efficiency

The administration cost for mineral and petroleum titles.

This indicator reflects the departmental cost of issuing and maintaining titles.

The costs are calculated using average salary levels and allowances for overheads with all costs in 1992-93 dollars.

	1990-91	1991-92	1992-93
Mining Titles (cents/ha)	37c	32c	29c
Petroleum Titles (cents/sq km)	N/A	88c	71c

Key Performance Indicators

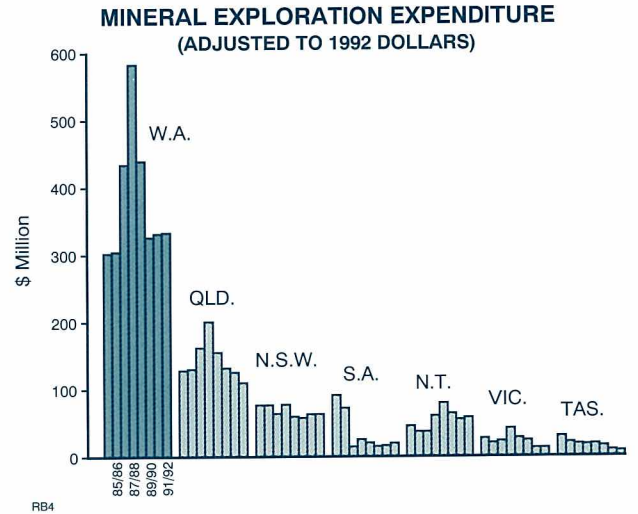
PROGRAM 2 Exploration and development of natural resources

To foster and assist responsible mineral and petroleum exploration and development groundwater assessment and land-use planning, by providing high-quality scientific and technical services and advice to Government, industry and the public.

Indicator	Result
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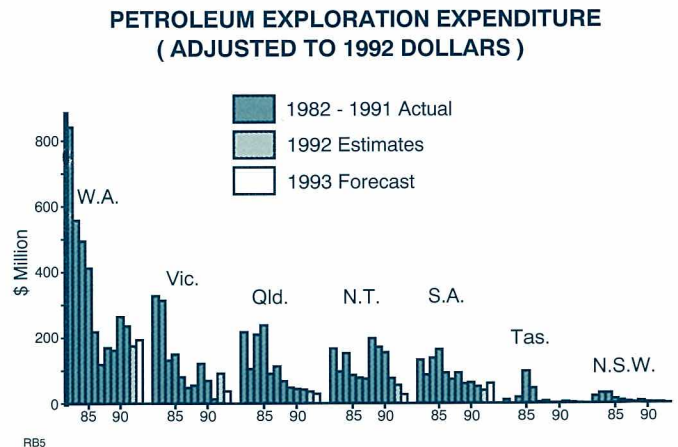
Influencing Factors

The level of mineral and petroleum exploration and development activity in the State is dependent on a number of factors, including world commodity prices and Federal and State fiscal and land access policies, which significantly outweigh the impact of any Departmental initiatives. It is not appropriate, therefore, to use the level of these activities as a measure of the Department's effectiveness. However, they do provide an important indication of the context in which the Department operates, showing that the State cannot be complacent if it is to retain its pre-eminent position in terms of attracting mineral and petroleum exploration and development investment.



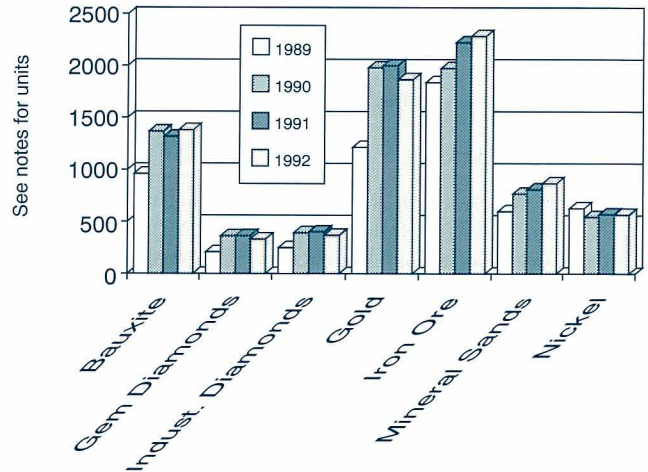
Level of exploration activity and resource inventories

The rate of resource discoveries and the corresponding changes in the State's resource inventory are related to the level of exploration activity. The figures indicate the current and immediate past exploration and development activity in the State in terms of aggregate expenditure relative to other States, and the changes in resource inventories for selected commodities.



Key Performance Indicators

Indicator	Result
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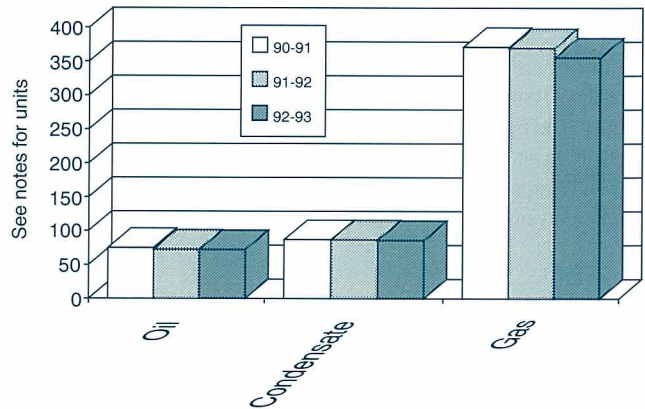


Major mineral resource inventory

Measured and indicated resources at 31 December 1992

Note: Units of commodities shown are:
 bauxite - million tonnes; diamonds - million carats; gold - tonnes; iron ore (high grade) - ten million tonnes; mineral sands - 100 tonnes; nickel - ten thousand tonnes

The graph shows total reserves from proved developed, proved undeveloped and probable fields at the 50% probability level. Reserves are currently defined according to the SPE standard, which essentially defines reserves as the identified, unproduced volume that is technically and economically recoverable from the reservoir. Therefore, for reserves to remain static while fields are on production, the rate of discovery must keep pace with the annual rate of production.



Petroleum reserves inventory

Note: Units of commodities shown are: oil and condensate - million kilolitres; gas 1 000 million cubic metres.

Appendix 5: Mining accidents and prosecutions

Mining accidents 1992-93

Mineral	Employees	Fatal	Serious	Minor	Total
Gold and nickel	13 275	5	210	324	539
Iron ore	8 351	1	74	205	280
Coal	1 090		40	185	225
Bauxite and alumina	5 372		17	60	77
Mineral sands	1 743		13	38	51
Diamonds	1 075		22	19	41
Base metals	558		19	18	37
Salt	478		3	19	22
Construction materials	260		4	15	19
Other	782		17	35	52
All mining	32 984	6	419	918	1 343

Fatal accidents 1992-93

Six persons were killed in work-related mining accidents at work on mines in 1992 -93. Two of the fatalities happened underground and four on the surface.

A fitter was run over by a dump truck in an open-cut gold mine. He had been working on the truck's air conditioning system. The truck driver thought the fitter had completed the job and had left the area.

A supervisor was run over by a truck underground. His presence near the truck was unknown to the driver.

A fitter was working on the brakes underneath a service truck in the workshop. The front wheels were raised off the floor and the vehicle was supported by a trolley jack. He asked for the vehicle to be started and was crushed by the rear dual wheels when the truck lurched forward.

A water truck driver was reversing his truck to refill a drill. The vehicle went over an embankment and rolled down 30 metres crushing the driver in the cab.

A jumbo operator was killed when a rock fell from the face and struck him. He

had left his control cab to change the drill bits.

A delivery truck driver was helping to unload a ventilation fan at a mine store compound. He was standing close to the fan on the tray of his truck. The fan was being lifted by a forklift when it came off the forks and rolled over the edge of the tray. The truck driver was struck by the fan and was found on the ground with massive head injuries.

Prosecutions

A senior foreman was fined \$250 with costs of \$42 after pleading guilty to an offence relating to the damage to, misuse or failure to use ventilating equipment.

A company was charged with breaches of Sections 30, 54 and 55 of the Act and Regulations 8.11(3) and was found not guilty. Costs of \$2 100 were awarded against the complainant.

A registered manager was charged with breaches of Sections 30, 54 and 55 of the Act and Regulations 8.11(3) and was found guilty. He was fined \$250 with costs of \$1 100. This was later appealed and charges were withdrawn.

Five prospectors were charged with illegal mining under the Mining Act. Three were acquitted with the remaining two being fined \$2 000 each with costs of \$1 400. They were also ordered to pay rehabilitation costs of \$1 136.

A registered manager was charged with a breach of Regulation 6.9(2)(c) but the charge was rejected by the Magistrate as the subpoena was issued outside the six months statute of limitations.

A company and three employees were charged with breaches of Sections 39(1)(b) and 40(3) of the Act. The charges against the company and the three employees were dismissed. The complainant was ordered to pay costs of \$1 180.

A registered manager was charged with a breach of Section 31(5)(c) of the Act. He pleaded guilty and was fined \$1 000 with costs of \$103.

An engineering employee was charged with a breach of Regulations 6A .1 and was fined \$300 with costs of \$50.

A quarry manager was prosecuted and fined \$800 with \$91 costs for breaching Section 155 of the Mining Act and by commencing mining before approval was given.

Appendix 4: Departmental directory

Head Office

Department of Minerals and Energy
Mineral House Complex
100 Plain Street (cnr Adelaide Terrace)
EAST PERTH Western Australia 6004
Telephone (09) 222 3333
Fax (09) 222 3430

Metropolitan Offices

Chemistry Centre WA
125 Hay Street
EAST PERTH Western Australia 6104
Telephone (09) 325 5544
Fax (09) 325 7767

Baldivis Explosives Reserve
Stakehill Road
BALDIVIS Western Australia 6171
Telephone (09) 524 1301
Fax (09) 524 1792

Exploration Safety and Drilling
91 Briggs Street
WELSHPOOL Western Australia 6106
Telephone (09) 470 0300
Fax (09) 362 5694

Mineral Processing Laboratory
19 Catherine Street
BENTLEY Western Australia 6102
Telephone (09) 351 5777
Fax (09) 351 8197

Regional Offices

Broome

Mining Registrar
Court House (Box 28)
BROOME Western Australia 6725
Telephone (091) 921 137
Fax (091) 921 878

Carnarvon

Mining Registrar
Court House (Box 35)
CARNARVON Western Australia 6701
Telephone (099) 411 082
Fax (099) 412779

Collie

Coal Industries Council
Unit 5, Centrepont Princep Street
COLLIE Western Australia 6225
Telephone (097) 344599
Fax (097) 344142

Regional Mining Engineer
66 Wittenoom Street
COLLIE Western Australia 6225
Telephone (097) 341222
Fax (097) 341606

Coolgardie

Mining Registrar
40 Bayley Street (Box 41)
COOLGARDIE Western Australia 6429
Telephone (090) 266 066
Fax (090) 266204

Kalgoorlie

Regional Mining Engineer
Brookman Street (Box 671)
KALGOORLIE Western Australia 6430
Telephone (090) 219419
Fax (090) 213612

Kalgoorlie Metallurgical Laboratory
95 Egan Street (Box 881)
KALGOORLIE Western Australia 6430
Telephone (090) 805120
Fax (090) 912762

Regional Mining Registrar
Brookman Street (Box 364)
KALGOORLIE Western Australia 6430
Telephone (090) 213066
Fax (090) 912428

Kalgoorlie Explosives Reserve
Piccadilly Street West
KALGOORLIE Western Australia 6430
Telephone (090) 218 246
Fax (090) 913222

Geological Survey of WA Regional Office
Egan Street
KALGOORLIE Western Australia 6430
Telephone (090) 219425
Fax (090) 914499

Karratha

Regional Mining Engineer
Hedland Place (Box 518)
KARRATHA Western Australia 6714
Telephone (091) 868 243
Fax (091) 868251

Kununurra

Mining Registrar
Court House (Box 917)
KUNUNURRA Western Australia 6743
Telephone (091) 681 011
Fax (091) 681103

Leonora

Mining Registrar
Rochester Street (Box 4)
LEONORA Western Australia 6438
Telephone (090) 376 106
Fax (090) 376248

Marble Bar

Mining Registrar
Bohemia Road (Box 7)
MARBLE BAR Western Australia 6760
telephone (091) 761044
Fax (091) 761048

Meekathara

Mining Registrar
Main Street (Box 7)
MEEKATHARRA Western Australia 6642
Telephone (099) 811 008
Fax (099) 811482

Mt Magnet

Mining Registrar
Richardson Street (Box 13)
MT MAGNET Western Australia 6638
Telephone (099) 634 040
Fax (099) 634488

Norseman

Mining Registrar
Princep Street
NORSEMAN Western Australia 6443
Telephone (090) 391 082
Fax (090) 391657

Southern Cross

Mining Registrar
Great Eastern Highway
SOUTHERN CROSS Western Australia
6426
Telephone (090) 491 107
Fax (090) 491431



Appendix 3: Publications

Appendix 2: Research and technical investigations (Continued)

Mining Engineering

Projects commenced and continuing include:

- blast and environmental noise monitoring program in Kalgoorlie
- study on the retention and excretion of thorium by mineral sands industry employees
- emergency preparedness and response audits for underground mines
- guidelines for preparation of a Safety Management Plan (SMP) document for underground mines
- investigation into underground diesel equipment fires
- investigation into the benefits and availability of low emission diesel fuel for underground diesel engines
- investigation into methods of reducing particulates and hydrocarbons in diesel emissions for diesel engines underground
- review of medical procedures following carbon monoxide poisoning
- review of atmospheric contaminant levels for extended workshifts
- radon in underground coal mines
- Long Distance Commute - health, safety and lifestyle survey

Projects completed include:

- survey of tetrabromoethane and bromoform usage in laboratories
- interim guidelines for mercury vapour exposure in gold plants
- survey of asbestos fibres in underground nickel operations
- interim guidelines for noise control in mines
- asbestos management in mining
- evaluation of electric trucking methods for underground

The Department compiled or revised publications covering a variety of topics during the year. They included:

- Mining Act and Regulations
- Fact Sheet series on the mining of various commodities and general aspects of the mining industry.
- mineral exploration and land access
- geological publications and maps
- mineral tenement maps and various thematic maps relating to mining and other land-use applications in Western Australia
- petroleum exploration, safety and environmental considerations
- explosives and dangerous goods
- accident reports and safety pamphlets
- chemical investigations covering the fields of agriculture, forensic science, environment, public health, the racing industry, materials science, metallurgy and mineral processing
- environmental responsibilities of mining and petroleum companies
- guidelines on mine work practices and radiation

More details on Departmental publications can be obtained through the Head Office Library (09 222 3165), the public counter at Mineral House, 100 Plain Street, East Perth, or regional offices in the State.

Further information on the services provided by the Department, and the mining and petroleum industries in general, can be obtained from the Public Affairs Branch (09 222 3589).

Appendix 2: Research and technical investigations

Geological Survey

A large part of the work of the Geological Survey Division involves research and development projects to investigate, interpret, and record the geology of Western Australia by relating mineral, petroleum, and groundwater occurrences and potential to that geology. This research provides a platform for the further exploration and development of the State.

Some highlights of the program are:

- geological mapping in the Pilbara, Kimberley, Rudall River and Ravensthorpe areas
- regolith mapping in the Eastern Goldfields region
- geoscientific investigations in the Eastern Goldfields with particular emphasis on regional controls of gold mineralisation
- geochemical study of mineralisation in the Glengarry Basin
- geotechnical studies related to open-pit and underground mining
- hydrogeological mapping in the South Coastal District, Eastern Goldfields and the Murchison
- hydrogeological studies related to groundwater contamination
- investigation of the geology and petroleum potential of the northern Perth Basin
- the development of computer-based Geographic Information Systems (GIS) to assist in land-use planning in mineralised areas

Petroleum Division

The following investigations were completed during the year:

- reservoir engineering studies on the Wanaea, Cossack and Woodada fields
- reassessment of dynamic load factors for offshore cranes
- assessment of the impact of the introduction of Safety Case legislation in Western Australia
- review of options and recommendations for the introduction

- of Occupational Health and Safety legislation covering the Western Australian petroleum industry
- technical input and recommendations to the Working Party on Petroleum Exploration and Production in Marine Conservation Areas
- technical input and recommendations for the Departmental Awards for Environmental Excellence.
- technical evaluation of the Griffin and Wanaea field development plants

Explosives and Dangerous Goods

Investigations were undertaken in the following areas:

- BP Petroleum refinery, Kwinana
- Hazards Control Plan reviewed at CSBP chlorine plant, Kwinana
- finalised boundary and scope of Hazards Control Plan at Western Mining Corporation nickel refinery, Kwinana
- first audit being investigated at Nufarm chlorine plant, Kwinana
- investigated first major audit of plant at Tiwest titanium dioxide plant, Kwinana
- investigated automotive LPG locational guidelines in conjunction with Standards Australia
- worked on the development of Safety Management System guidelines as part of the National Planning Ministers' Taskforce

Chemistry Centre

The Chemistry Centre provides professional consultancy and analytical facilities for Government instrumentalities, industry and the general public. During the year, it undertook projects in the following key areas:

- evaluation of chemical parameters influencing silicon metal production
- mineralogical assessment of reference soils from WA and of samples from the Goldfields seismic profile
- investigation of the upgrading of ilmenite as a commencing project in

the AJ Parker Cooperative Research Centre for Hydrometallurgy

- pilot scale column flotation studies of sulfide ores
- development and protection of the WA legume industry
- minimisation of land degradation, and of nutrient export and contamination of ground and surface waters, through the development of sustainable agricultural production systems and of improved fertiliser application strategies
- evaluation of hazardous waste treatment technologies
- determination of arsenic species in occupationally exposed workers
- identification of trace quantities of synthetic fibres found as contact evidence
- evaluation of graffiti removers and anti-graffiti coatings
- improvement and validation of drug detection methods for the racing industry

Surveys and Mapping Division

Projects commenced and continuing include:

- the use of Geographic Information System (GIS) techniques on a number of projects including the production of 14 maps for the Hamersley Range project, the production of a geological map of the Cowaramup/Margaret River area, the Kwinana Pipeline Project (pipeline safety) and the Collie Basin Project (landplanning, Collie townsite)
- investigation of Global Positioning System (GPS) data capture in the field
- investigation into the scanning of analog map data for Computer Assisted Map Publishing (CAMP)
- investigation to determine Low Tide Elevation (LTE) of Scott Reef
- ongoing developments in the use of CADSCRIPT software to transfer and overlap images used in mapping



Appendix 1: Legislation

Appendix 1: Legislation

The Department is responsible to the Minister for Mines for administering 14 Acts of Parliament.

- Mining Act
- Petroleum Act
- Explosives and Dangerous Goods Act
- Mines Regulation Act
- Coal Mines Regulation Act
- Coal Miners' Welfare Act
- Miners' Phthisis Act
- Mining on Private Property Act
- Mining (Validation and Amendment) Act
- Petroleum Pipelines Act
- Petroleum (Registration Fees) Act
- Petroleum (Submerged Lands) Act
- Petroleum (Submerged lands) Registration Fees Act
- Western Australian Coal Industry Tribunal Act

The following Commonwealth legislation is administered in the Western Australian adjacent area by the State and through the Commonwealth/Western Australian Offshore Petroleum/Minerals Joint Authorities:

- Petroleum (Submerged Lands) Act
- Petroleum (Submerged Lands) (Registration Fees) Act
- Petroleum (Submerged Lands) (Royalty) Act
- Petroleum (Submerged Lands) (Retention Lease Fees) Act
- Petroleum (Submerged Lands) (Exploration permit Fees) Act
- Petroleum (Submerged Lands) (Production Licence Fees) Act
- Petroleum (Submerged Lands) (Pipeline Licence Fees) Act
- Minerals (Submerged Lands) Act
- Minerals (Submerged Lands) (Registration Fees) Act
- Minerals (Submerged Lands) (Works Authority Fees) Act
- Minerals (Submerged lands) (Production Licence Fees)

- Minerals (Submerged Lands) Exploration Permit Fees) Act
- Minerals (Submerged lands) (Royalty) Act

In addition to its responsibilities under the above Acts, the Department undertakes various functions in relation to a number of special Agreements Acts:

- Barrow Island Royalty Trust Account Act
- Barrow Island Royalty Variation Agreement Act

Changes to legislation

Mining Act 1978

Mining Amendment Regulations 1992

Gazetted 31 July 1992, these regulations changed several provisions. In particular they provided that expenditure incurred during the month in which the anniversary date of the commencement occurred may be treated as expenditure either in the current year or the next year.

The Mining Amendment Regulations (No2) 1992

Gazetted 3 July 1992, these regulations provided that no royalty is payable on rock by Central Norseman Gold Corporation Ltd where it is used to upgrade the Norseman section of the Eyre Highway.

The Mining Amendment Regulations (No4) 1992

Gazetted 18 December 1992, this made a minor amendment to the rates of royalty table.

Mines Regulation Act 1946

The Mines Regulation Amendment Act 1990 (No 85 of 1990) was proclaimed on 31 December 1992 and became operative on 1 January 1993. The amendment includes occupational health, safety and welfare matters and establishes health and safety representatives and mine site committees providing of general duty of care covering employers and employees.

Supporting Regulations also became operative on 1 January 1993 by notice on the Government Gazette dated 31 December 1992.

Coal Industry Tribunal Act 1992

The Coal Industry Tribunal Act was re-written and proclaimed in the Government Gazette on 31 December 1992, becoming operative on the same day.

Regulations were also published in support of the new Act which was re-written to modernise legislation affecting industrial relations in the coal industry in Western Australia and to give the Tribunal similar powers to the Industrial Relations Commission in dealing with matters before it.

Explosives and Dangerous Goods Act 1961

Flammable Liquids Regulations 1967 - repealed 1 October 1992

Dangerous Goods (Road Transport) Regulations 1983 - repealed 1 October 1992

Dangerous Goods Regulations 1992 - effective from 1 October 1992

CERTIFICATE OF PERFORMANCE INDICATORS

I hereby certify that these performance indicators are based on proper records and fairly represent the performance of the Department of Minerals and Energy for the year ending 30 June 1993



Lee Ranford
ACCOUNTABLE OFFICER

12 August 1993



OPINION OF THE AUDITOR GENERAL

PERFORMANCE INDICATORS

The Financial Administration and Audit Act 1985 requires the accountable officer to prepare and submit performance indicators. Treasurer's Instruction 904 requires that key indicators of effectiveness and efficiency be reported for each program. I am required to audit these indicators and state whether in my opinion, they are relevant and appropriate having regard to their purpose and fairly represent the indicated performance.

As stated in my First General Report for 1993, when certain conditions are met, I will issue an opinion on performance indicators as required by the Act. I have reviewed the performance indicators reported by the Department of Minerals and Energy for the year ended June 30, 1993 in accordance with the approach outlined in my First General Report for 1993.

During my review, I have assessed the relevance of the reported indicators to the objectives submitted by the Department based on my knowledge of the Department and have assessed the appropriateness of the indicators for the purpose of assisting users external to the Department to assess performance. I have also assessed whether the Department is reporting on all key objectives required by the program statements. Where I have formed the view that indicators are relevant and appropriate, I have also examined, on a test basis, the relevant information systems to determine whether the information reported in the indicators is verifiable and free from significant bias.

Audit Assessment

It is my view that the performance indicators reported are relevant to the stated objectives of the Department of Minerals and Energy. The indicators are appropriate for assisting users external to the Department to assess its performance.

However, as the information systems upon which the following indicators have been based are still under development I am unable to determine if the information reported fairly represents the indicated performance.

- Program 1: - The administrative cost for mineral and petroleum titles.
- Program 2: - Major minerals resource inventory.
 - The rate of geoscientific map production.
- Program 3: - The cost per environmental impact reported on projects.
- Program 4: - Royalties as a percentage of minehead value.
 - The administration cost per company/individual paying royalty.
- Program 5: - The frequency of lost time injuries for mining and petroleum operations.
 - The effectiveness of dangerous goods transport inspection as reflected by the proportion of vehicles complying with safety standards.
 - The total cost of salaries and support services for the Department's engineering inspectors per employee in the mineral and petroleum sectors.
 - The number of dangerous good vehicles inspected per dangerous goods inspector in the metropolitan area.

In my view, except for those listed above, the indicators reported by the Department fairly represent the indicated performance.

I am aware that the Department is developing additional effectiveness indicators which are intended to illustrate the Department's achievements in relation to meeting its objectives and efficiency indicators which will show the relationship between the resources used and the outputs produced which contributed to the desired outcomes.



D D R Pearson
AUDITOR GENERAL
September 13, 1993



Key Performance Indicators

PROGRAM 6: Chemical services

To enhance mineral, agricultural and industrial development, and the protection of community, consumer, environmental and health standards, by providing high-quality independent chemical services to Government, industry and the public.

Indicator	Result			
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Effectiveness

	1989-90	1990-91	1991-92	1992-93
The proportion of the Chemistry Centre's scientific areas covered by accreditation procedures which have achieved comprehensive external accreditation.	45%	54%	64%	82%

A key element in determining the Chemistry Centre's effectiveness is the quality of its services. The quality of Chemistry Centre data and advice can be assessed by the effectiveness of its quality assurance programs.

External accreditation and the results obtained in proficiency programs are relevant performance indicators.

However, although quality assurance programs are in place in all areas, not all have been accredited by an external body. To date, nine of the possible 15 scientific areas have comprehensive National Association of Testing Authorities (NATA) accreditation. Four areas are not yet covered by national accreditation procedures.

Efficiency

Cost of services

Over the past year, there have been significant reductions in the analysis costs of agricultural and mineral samples. However, simple comparisons cannot be made in all areas due to changing client demands as they seek solutions to more complex problems and require either more components and/or lower detection limits.

A 'market basket' of tests is being developed for 1993-94.

Timeliness of services

Clients are asked to prioritise their work. Turnaround times are also negotiated with clients as a compromise is required between batching for efficiency and cost purposes and far more expensive rapid response. The sample turnaround time has been significantly reduced for agricultural and mineral samples. Computerised laboratory information management systems have been partly introduced into four laboratories. It is planned that systems will be operating in all laboratories by the end of 1993-94 financial year. This will allow the collection and collation of appropriate data.

A 'market basket' of tests is being developed and computerised systems are being established to enable the percentage of work reported within target times to be ascertained.



Key Performance Indicators

Indicator	Result	
The effectiveness of dangerous goods transport inspection as reflected by the proportion of vehicles complying with safety standards.	1991-92	1992-93
	%	%
	44	58
The general trend in all these performance figures is encouraging though only the figures for full vehicle compliance are statistically significant.	Documentation	81
	84	81
	Safety equipment	74
	73	74
Similar indicators are being developed for operations involving the storage of dangerous goods and explosives. These should be sufficiently developed to report in 1994.	Emergency equipment	84
	78	84
	Vehicle load	96
	93	96

Efficiency

The total cost of salaries plus support services for the Department's engineering inspectorates per employee in the mineral and petroleum sectors.	1991-92	1992-93
	\$	\$

The costs have been estimated using average salary levels and a factor for all Departmental overheads.

Mining	185	188
Petroleum	359	296

The number of dangerous goods vehicles inspected per dangerous goods inspector in the metropolitan area.	1991-92	1992-93
---	----------------	----------------

The efficiency gains in this area were achieved by scheduling inspections in cooperation with vehicle operators.

Vehicles/inspector	252	345
--------------------	-----	-----

The number of tankers inspected per inspector per day.	1991-92	1992-93
---	----------------	----------------

The efficiency gains in this area were achieved by accrediting third party auditors thereby minimising inspector involvement in the supervision of tank tests.

Tankers/inspector/day	16	31
-----------------------	----	----

Other efficiency measures

The Explosives and Dangerous Goods Division is developing procedures to report on efficiency in terms of cost per unit of improvement in compliance. It is expected that full year figures will be available for the 1993-4 Annual Report.



Key Performance Indicators

PROGRAM 5: Worker and public safety

To ensure all operations in the mining and petroleum industries, and activities involving explosives and dangerous goods, are conducted in a manner that is safe for workers and the public.

Indicator	Result
-----------	--------

Effectiveness

The frequency of lost time injuries for mining and petroleum operations.

The frequency is the number of occurrences of injury or disease for each one million hours worked as defined in Australian Standard AS1885.1 - 1990.

The rate for metalliferous (non-coal) mining is the only one that recorded an improvement (19%).

The rates for the coal sector are much higher than for metalliferous mining, but are comparable with rates recorded in other States. Factors, other than safety, are believed to be influencing this poor result.

The frequency rate for petroleum activities increased by 1% and 3% respectively in the onshore and offshore sectors. This apparent deterioration in the rates is considered due to greater industry compliance in submitting statistical data as a result of the heavier emphasis on occupational safety matters and increased inspectorate surveillance.

	1991-92	1992-93
Coal	112.0	130.0
Metalliferous	21.0	17.0
Onshore petroleum	20.7	21.0
Offshore petroleum	15.5	15.9

Workers' compensation premium rates for the mining and petroleum industries as a proportion of the employer's payroll.

These rates are published in the Government Gazette and are determined by the Premium Rates Committee on the basis of past performance.

The rates generally reflect an improved safety performance, bearing in mind that they are set on 1 July, based on the previous year's compensation data.

	1991-92 %	1992-93 %
Coal	3.33	3.0
Gold underground	7.51	6.76
Gold open-cut	3.93	3.54
Mineral sands	3.93	3.54
Iron ore	3.20	2.88
Onshore petroleum	8.08	4.85
Offshore petroleum	7.99	6.32



Key Performance Indicators

PROGRAM 4: Community benefits

To ensure the community receives a fair return from the extraction of the State's mineral and petroleum resources

Indicator	Result	
-----------	--------	--

Effectiveness

Royalties as a percentage of mine-head value.	1991-92	1992-93
As a general policy, a royalty of 10% of the mine-head value is considered to provide a fair return to the community. This indicator has been calculated for the first time in 1992-93.		%
	-	7.0

The proportion of royalties due, paid by the required date:	1991-92	1992-93
	%	%
	99.9	99.9

The proportion of royalty which has been audited at company offices.	1991-92	1992-93
The remainder represents royalty payments which have not been audited, mainly due to returns being received late in the financial year.	%	%
	84.3	89.3

Efficiency

The administration cost per company/individual paying royalty.	1991-92	1992-93
Costs have been calculated using average salary costs and an allowance for overheads.	%	%
	\$5 865	\$5 955



Key Performance Indicators

PROGRAM 3: Environmental protection and rehabilitation

To ensure that proper attention is given to the protection and rehabilitation of the natural environment as it may be affected by mineral and petroleum exploration and development, and to facilitate the protection of groundwater resources.

Indicator	Result
-----------	--------

Effectiveness

The extent to which mineral operations comply with Departmental environmental completion criteria.

For mining, this is measured by the proportion of companies completing their rehabilitation to the Department's standards.

The performance of this indicator is assessed by field inspections and completed reports maintained in the Mining Engineering Division.

The five mining projects completed during the year met the set environmental criteria. It was not necessary to call upon any company's unconditional performance bond to rectify unsatisfactory environmental performance.

The extent to which there is acceptance by the community of the Department's role in the environmental management of the mining and petroleum industries.

Implementation of community and user surveys was deferred while the new program structure was being developed. Appropriate indicators are being used for the new Departmental programs.

Efficiency

Cost per environmental impact report on projects assessed.

1991-92	1992-93
\$1 900 per report	\$1 587 per report



Key Performance Indicators

Indicator	Result
-----------	--------

Effectiveness

The rate of geoscientific map production

See table below

Geoscientific maps are widely used by mineral and petroleum explorers and developers and by groundwater and land-use planners as a basic source of information on which to make resource allocation decisions. The indicator reflects the extent to which the Department is maintaining an adequate coverage of this information over the State.

Note: There is already 100% coverage of the State by 1:250 000 geological maps (each of which covers an area approximately 100km x 150km). The Department aims to ensure that these maps are updated as required. In recent years, there has been an increased demand for a greater degree of information in geologically complex areas, and this is being addressed by the issue of maps at 1:100 000 scale (covering an area approximately 50km x 50km).

Customer satisfaction

It had been planned to undertake a client satisfaction survey during 1992-93 but this was deferred while the new program structure was being developed and implemented. Work towards an appropriate client survey has started and results will be reported in the 1993-94 Annual Report.

Map coverage of Western Australia (1:100,000)

Regional Area	Programmed sheets(1)	Maps compiled(2)	Maps issued	Cumulative coverage(3)	Maps compiled	Maps issued(2)	Cumulative coverage(3)
Eastern Goldfields	43	1	2 (4)	9 (11)	4	1 (4)	10 (15)
East Kimberley	8				2		
East Pilbara	10	1		1 (1)		1 (1)	2 (2)
North Perth Basin	5				1		
TOTAL	66	2	2 (4)	10 (12)	7	2 (5)	12 (17)

(1) Total number of sheets for which mapping at this scale is considered necessary by the Geological Survey Liaison Committee.

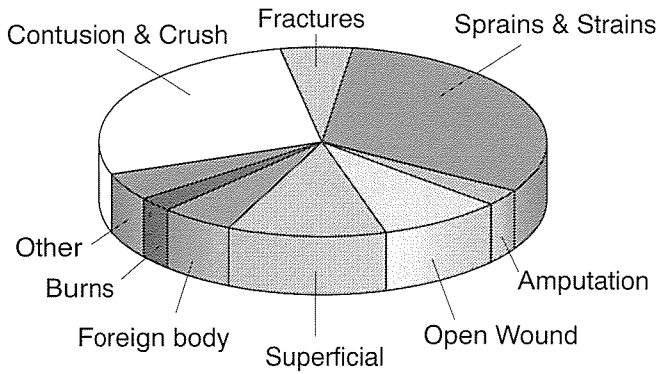
(2) Map compilation completed during the year

(3) Figures in brackets are numbers including those maps published by the Australian Geological Survey Organisation as part of the National Geoscience Mapping Accord.

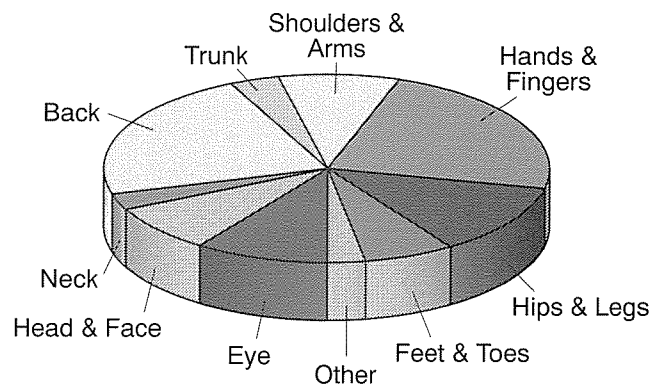


Appendix 6: Petroleum industry accidents

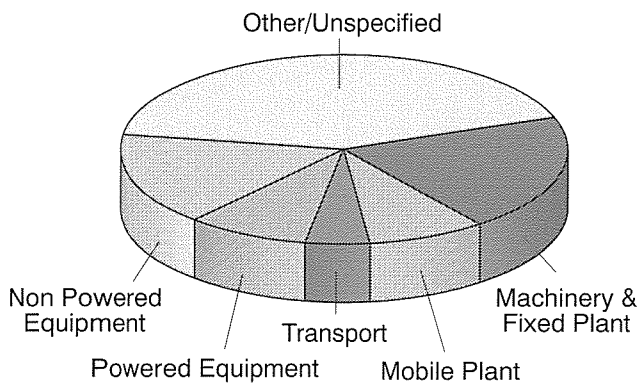
NATURE OF INJURY



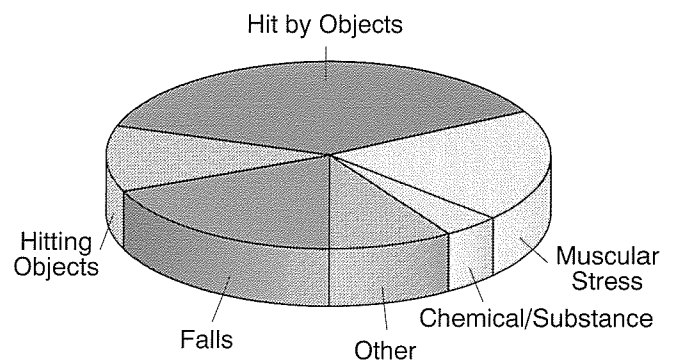
PART OF BODY



BREAKDOWN AGENCY



TYPE OF ACCIDENT



Appendix 7: Maps and explanatory notes published in 1992-93

