NAMIBIA

By Roger Murray

The mining sector continues to account for the major share of Namibia's exports by value. However, because of an expansion of fish processing and other manufacturing activities in recent years, mining's contribution to GDP had fallen to some 8% of the estimated total GDP of N$28 billion (US$3.3 billion) in 2001. Namibia recorded an estimated 2.5% real GDP growth rate in 2001, down from the previous year's 3.3%, and mining's real value-added declined by an estimated 5% owing mainly to lower volumes of diamond and uranium production caused by depressed global demand, which more than offset increased output of some minerals, notably gold, copper and fluorspar.

Preliminary figures published by the Bank of Namibia show mineral export earnings in local currency terms were a record N$6.2 billion in 2001, a 12% increase over the preceding year and equivalent to 69% of total exports by value. However, US dollar-denominated exports fell by 10% to US$718 million, reflecting the sharp fall in the value of the South African rand (to which the Namibia dollar is linked at par), during the latter part of 2001. While diamond earnings were also at a record N$4.5 billion, up by 6% on the preceding year, this reflected an increase in prices received in local currency terms which more than offset a decrease in volume exports caused by reduced overall output and the introduction of quotas on rough-diamond deliveries to De Beers' Diamond Trading Co. (DTC).

However, US dollar-denominated diamond exports fell by 15% to US$524 million, compared with US$615 million in 2000. In contrast, other mineral exports rose by 30% to N$1.7 billion, a US-dollar denominated increase of 4% to US$195 million. Income tax and royalties from diamonds were set to contribute N$1.2 billion in the 2002/03 fiscal year (April 1-March 31), equivalent to 12% of total estimated revenue.

In order to maintain its competitive edge during the weak world diamond and metal markets during 2001, the Namibian mining industry continued to pursue cost containment and innovative approaches in co-operation with its major stakeholders. The adverse global climate was partially offset for most operations by the sharp decrease during the latter part of 2001 in the foreign exchange value of the South African rand, which raised local currency-denominated profitability. Mineral output at most operations by the 18 producing members of the Chamber of Mines of Namibia (CMN) was either at around the same level or higher than in 2000. Total membership of the CMN, including firms engaged in exploration, mineral rights holders and mining services suppliers reached a record 61 in 2001.

Major highlights of the year included a 5% increase in output by the biggest diamond mining company, Namdeb Diamond Corp. (Namdeb) and establish- ment of the new Daberas mine on the north bank of the Orange River; a successful first full year of production by Ongopolo Mining and Processing (OMP) at the Tsumeb copper smelter and associated mines; the resumption of marine diamond mining by Namibian Minerals Corp. (Namco) following its refinancing and effective take-over by Israel's Leviev Group; and the commencement of offshore diamond mining by a joint venture of Canada's Diamond Fields International (DFI) and South Africa's Trans Hex. However, the most significant development was the fast-track construction of the large Skorpion zinc mine and refinery in southwest Namibia by Anglo Base Metals, which will substantially expand and diversify mineral export earnings, in addition to boosting economic and social development in the region. Initial zinc metal output is expected by the end of 2002, building up to full output of 150,000 t/y in early 2003.

Overall capital expenditure by CMN members in 2001 was N$245 million (US$28 million), mainly invested in plant refurbishments and equipment purchases, of which N$180 million was spent by Namdeb (exclusive of exploration expenditure). Full-time employment by the mining industry declined slightly to 6,026 in 2001, down from 6,248 in the preceding year, reflecting the closure of some small operations. Total remuneration was N$566 million (US$66 million) in 2001, equivalent to an average N$94,000 (US$11,000) per employee.

The mining industry has maintained its sound relationship with the Namibian Government, including involvement in revising and extending mining legislation, environmental laws and related matters. While no new legislation was promulgated during 2001, extensive work continued on revision of the existing Minerals (Mining and Prospecting) Act, with the aim of producing a final draft amendment act, including minerals licensing regulations, during 2002. In addition, the Ministry of Mines & Energy (MME) has actively involved stakeholders in the formulation of a Minerals Policy, for which South African consultants, Minerals and Energy Policy Centre (MEPC) were appointed, with a draft policy document due to be finalised early in 2002. Of major current concern to the mining industry is the capacity of relevant ministries to monitor exploration work effectively, and also compliance with legislation and/or specific conditions attached to licences issued. This is important because of the adverse impact of reported instances of non-compliance on the public's perception of mining and exploration activities.

Diamonds

Total diamond output of predominantly gem-quality stones was 1,495,245 ct in 2001, down 3.7% on the 1,552,591 ct produced in the previous year, owing to lower offshore production by De Beers Marine Namibia (DBMN) and Namibian Minerals Corp. (Namco). In consequence, the proportion of total diamond output recovered offshore fell from 58% in 2000 to 50% in the following year. Because of a sharp increase in onland recoveries, Namdeb Diamond Corp. (Namdeb), the joint venture partnership between the Namibian Government and De Beers SA, raised production by 5% to 1,384,704 ct (1,320,308 ct in 2000), despite lower than forecast recoveries by DBMN, in which Namdeb has a 30% interest. The average grade mined for all Namdeb operations was 6.3 ct/100 t in 2001, up from 5.6 ct/100 t in the previous year. The higher production was despite the depressed global diamond market and the introduction of quotas by De Beers' Diamond Trading Co. (DTC) in the second half of 2001. This was likely to have been because in 2000, when global demand was strong and no quotas were in force, Namdeb liquidated most of its diamond stockpile, so that last year production could be matched more directly to demand.

Land-based production, covering the coastal operations north of Oranjemund in Mining Area No.1 and inland along the Orange River north bank within Diamond Area 1 (Sperrgebiet), exceeded targets in 2001, with production of 742,732 ct (652,746 ct in 2000). This was due to higher average grades as ore tonnage treated was 20% below target at 21.9 Mt (23.5 Mt in 2000) because of delays in the commissioning of two wet infield screening facilities at No.3 plant and the tailings dump treatment facility at No.2 plant (where mining operations ceased at end-2001) in Mining Area No.1. The shortfall was exacerbated by problems relating to the dredging operation, while production at the Elizabeth Bay mine to the north was hampered by seawater intake and blending. But extensions to the ore resource in the No.4 plant area resulted in a two-year prolongation of the expected life-of-mine, while the two wet infield screening plants at No.3 plant were commissioned by the year-end, the first time that dry infield screening technology has been applied to a wet operation. The dredging facility introduced in 1977 was originally planned as a five-year operation, but it is now expected to continue for at least another ten years.

At Elizabeth Bay, a feasibility study on changes to the current treatment methods for cemented and wet materials continued to make progress and testwork indicated that locked-up diamonds in the gritstone could be liberated by crushing. To this end, a crushing facility was installed in August 2001, but problems with crusher throughput and wear have necessitated investigations into alternative crushing methods to prolong the mine's life. Planning work was continued in 2001 on developing mining and treatment methods for ore in pocket beach areas to the north of Mining Area No.1 and a feasibility survey has been commissioned to investigate the possible treatment of low grade overburden spoil dumps.

Inland along the Orange River, the main focus was on the development of facilities at Daberas mine, where a new treatment plant to process alluvial gravel terraces, replacing the mobile treatment and infield screening plants previously used, was commissioned during 2001. The treatment plant's performance was improved by the installation of a high-rate thickener to remove fine particles from the process water, with full-capacity output expected to be achieved early in 2002. Production is expected to last nine years and average about 43,000 ct/y, about the same as at the similar Auchas mine, where mining ceased at the end of 2000. The Daberas mine was formally inaugurated by Namibia's President Sam Nujoma in June 2002. Two new mines along the Orange River are currently planned by Namdeb, at Obib (2004) and Sendelingsdrif (2009). The former will be a small operation but Sendelingsdrif is expected to produce at around the same level as Daberas.

There was an improvement in production by Namdeb contractors engaged in beach and shallow water operations in 2001, with 99,057 ct recovered (91,091 ct in 2000); empowerment initiatives were extended via the consolidation of relations with small contractor groups. A new corporate strategic plan launched by Namdeb in early 2002 aims to expand output to some 2 Mct/y by 2010, including offshore recoveries by DBMN, cut operational costs and implement effective procedures to combat the incidence of HIV/AIDS among the workforce. It is also planned to transform Oranjemund, originally built as an exclusive diamond mining town with restricted access in the 1920s and still managed by Namdeb, into a fully-fledged municipality.

Overall offshore recoveries, including Namdeb's beach and shallow water operations, fell for the second successive year in 2001, down by 16% to 752,513 ct (899,845 ct in 2000) although the prospects for 2002 are better and capacity expansion through new equipment purchases was continued. Deep water recoveries by De Beers Marine Namibia (DBMN) in the large Atlantic 1 concession fell by 6% to 542,915 ct (576,471 ct in 2000) compared with a steady rise in production during the past eight years, owing to an extended port lay-up by one of the production vessels. Nevertheless, planned future output expansion by Namdeb will be mainly focussed on increased offshore recoveries by DBMN as the Atlantic 1 concession contains a currently estimated total resource of 8 Mct of predominantly gem-quality stones.

Diamond Production ('000 ct)

	2000	2001	% change
Namdeb	1,320	1,385	4.9
of which Onshore[a]	653	743	13.8
Offshore[b]	576	543	-5.7
Beach & marine contractors	91	99	8.8
Other offshore producers[c]	232	111	-52.2
Total	**1,553[d]**	**1,495[d]**	**-3.7**
of which:			
Offshore recoveries	900d	753	-16.3
% recovered offshore	58.0	50.4	-

[a] Mining Area No.1, Elizabeth Bay and Orange river northbank;

[b] Deep water recoveries by De Beers Marine Namibia (DBMN);

[c] Mainly Namibian Minerals Corp. (Namco);

[d] Totals do not add precisely due to rounding.

Source: De Beers SA; Chamber of Mines of Namibia; Namibian Minerals Corp. (Namco).

The year 2001 was an extremely troubled one for Namibia's second largest marine mining undertaking, the UK-based Namibian Minerals Corp. (Namco), which was almost bankrupted by the loss on the seafloor of part of its NamSSol 1 underwater mining tool in January 2001, at a time when its new and larger capacity Nam 2 seafloor mining system was still undergoing commissioning trials. The loss of cash flow and inability to meet the terms of its loans from senior creditors led to the company's subsidiaries being placed in provisional liquidation in February 2001, from which they were only discharged in August that year, following the raising of US$27 million in additional financing, including a US$15 million investment from LL Mining Corporation (LLM), a subsidiary of Israel's Leviev Group, which thereby became Namco's major shareholder. This process was completed with a rescheduling of debt with senior lenders and provision of a US$10 million loan facility by LLM.

In December 2001, Namco's founder, Alastair Holberton, resigned as chairman, chief executive and a director. He was replaced as chairman by Leviev Group director of international investment, Arye Barboy, and early in 2002, Greg Walker took over as chief executive officer. In addition, in March 2001 Namco had concluded an exclusive marketing agreement with the Leviev Group and following the termination of the existing contract with IDC (Holdings), the former took over marketing in the third quarter of 2001. LLM currently holds an effective 53% interest in Namco, rising to 70% if existing share warrents and other securities are fully exercised. Namco remains listed on the Toronto, Johannesburg and Namibian stock exchanges, but in May 2002 ceased to be listed on the US Nasdaq exchange as for 30 consecutive trading days its share price had remained below the minimum US$1 level required.

Although mining was resumed by mv Ya Toivo (Nam 2) in April 2001 and by Namco's third vessel mv Namibian Gem (with airlift technology) in August 2001, production for the year was down by almost two thirds over 2000 at 85,598 ct. In consequence, due partly to the increased mining costs, Namco incurred a US$56 million loss on revenue from diamond sales of US$12 million. The restructured company is currently implementing a recovery programme designed to restore production to around the level recorded in 2000 (221,000 ct) with the conclusion of further debt rescheduling and the raising of additional funds. It was planned to have the mv Kovambo and Namssol mining system back in production by mid-2002, following completion of repairs in May of that year.

Until now, mining has mainly been focussed on Feature 19 of Namco's offshore Luderitz mining licence and development of the overall ore reserve has been somewhat limited. In the second half of 2001, its exploration vessel equipped with an advanced sampling technology (the Nam Drill) began a dedicated exploration and sampling programme designed to expand and improve the company's ore reserve position to enable the development of an efficient mining plan. Current remaining measured resources are some 500,000 ct. Namco has acknowledged that a substantial increase in output during 2002 and improvement in its cash flow position will be essential to stabilising the business, given the continuing risks and uncertainties with regard to the company's liquidity and capital resources.

Commercial mining by Namibia's third marine operator, the joint venture of Canada's Diamond Fields International (DFI) and South Africa's Trans Hex (DFI-TSX), began successfully in the second half of 2001, with a total 16,470 ct recovered in that year, and an annual production target of 40-50,000 ct/y. The joint venture agreement, signed in March 2001 and lasting seven years initially, covers a small part of DFI's mining licence 111 offshore Luderitz, which shares the underwater Marshall Fork feature with Namco's adjoining mining licence area. Operations commenced at the end of May 2001 using the Ivan Princep vessel purchased for US$4 million from

Namco. This fast-tracked the joint venture, enabling a mixed trench sampling and test mining programme to start earlier than originally anticipated, which proved valuable in verifying the feature's geology and the distribution of high grade diamond pockets within a background of mineable grade.

Full-scale mining by the first dedicated joint venture vessel, mv Namakwa, supplied by Trans Hex, started in November 2001; the vessel has a powerful abrasive airlift system yielding up to 30% more diamonds on a second pass of mining than the Ivan Princep, with a mining head specifically designed to operate in the smaller gully and pothole features where diamonds are trapped. Onboard facilities also include an advanced sonar seabed visualisation system, primary screening equipment, a 50 t/h dense media seperation (DMS) plant and final recovery with twin X-ray machines. The Ivan Princep has been reassigned to Trans Hex concessions off South Africa and under the terms of the joint venture a second mining vessel is to be purchased, converted and made operational by Trans Hex by October 2002.

The eastern fork of Marshall Fork was mined initially but since the start of 2002 mining has been concentrated on the western fork, where average mined grades have been almost double those estimated in the original 2000 feasibility study of the area, and the current 640,000 ct resource may be increased by 45% or some 290,000 ct, according to DFI geologists. The results indicate that existing resource estimates for other parts of Marshall Fork and features with similar geology may also prove to have been too conservative. A continued increase in diamond output was recorded in the joint venture's third production quarter, January 1 - March 31, 2002, with some 10,330 ct recovered, of which DFI's share was 6,198 ct. DFI recorded a quarterly net income, US$70,000, for the first time, on a gross profit of US$851,000, with operating profit margins improved by lower production costs and better mining efficiencies since the start of full-scale mining.

Diamonds are sold on the open market in Antwerp by Diamond Tenders Belgium, in which DFI owns a 24% interest. In early 2002, DFI initiated a programme to develop its own mining operation, focussed on the known resource outside the joint venture area. Debt financing will be used to purchase an already-identified mining vessel, which it is intended to have commissioned by the end of 2002.

Diamond production on a small scale by Diaz Point Exploration continued in 2001, with 8,479 ct recovered (11,283 ct in 2000). The operation mainly involves the screening and treatment of sheetwash and deflation deposits in shallow waters. Negotiations for a restructuring of the company, via the allocation of 40% interests each to local empowerment group Omina and South Africa's Microfin, were finalised by the year-end and the re-capitalisation will enable a major exploration and delineation programme to identify and prove mineable reserves to be conducted.

During 2001, a Canadian junior exploration company, Afri-Can Minerals Corp. (Afri-Can), consolidated a number of partnerships with local empowerment and social development groups in respect of 28 exclusive prospecting licences (EPLs) covering 26,500 km^2, the largest offshore acreage in Namibia. A US$200,000 sampling programme on targets in several concessions was started at the end of 2001. The company- listed on Canada's TSX Venture Exchange (TSX)- in May 2002 carried out a private placement of C$2.5 million via the issue of 8.3 million shares and non-transferrable warrents to finance working capital for its Namibian exploration activities, notably a follow-up sampling programme for the Block J marine concession located 105 km north of Luderitz. In addition, a not-for-profit concern Ototinana Regional Marine Minerals Exploration (ORMME), owned by Namibia's four northern regional councils of Ohangwena, Omusati, Oshana, Oshikoto, is aquiring a direct interest in Afri-Can. The transaction involves the transfer to ORMME of 2.5 million of Afri-Can's 43.3 million issued shares, the appointment of one ORMME representative to the board of directors

and the right to increase its interest in Afri-Can on mutually-acceptable terms.

In return, and as counterpart to the share transfer, Afri-Can has uniquely been granted relinquishment relief in respect of all its concessions involving joint ventures with Namibians. This means that for the next five years Afri-Can's existing concession areas are guaranteed not to be reduced in size, in contrast to the standard terms application to exploration licences. The company has also agreed to invest 5% of exploration expenditure on training and empowerment plus a 'goodwill grant' equivalent to 1% of annual gross sales when commercial mining of diamonds begins.

Afri-Can holds interests in two main areas: the northern concessions (Blocks J, K, M, N and B) in shallow and mid-water areas offshore and to the north of Luderitz, and the southern concessions, a deepwater area extending from opposite the Orange river mouth along the western edge of Namdeb's Atlantic 1 concession. The northern concessions represent Afri-Can's near-term production potential, with the 995 km^2 Block J covering water depths of 70-167 m, a priority target. The company is operator and has a 40% interest, with an option to acquire up to a 70% interest. The block lies about 100 km to the north of the Marshall Fork feature mined by Namco and DFI. The empowerment consortium Woduna Mining Holding is the joint venture partner. It was formed in 1999 and has five shareholders: Namibia Diamond Consultants, Namibia Diamond House, Orange Mining Co., Ukumwe Marine Diamonds and Welwitchia Mining, each with a 20% stake.

Based on the encouraging results from interpretation of a regional geophysical survey conducted by South Africa's Marine & Coastal Geoscience at the end of 1998, Afri-Can initiated a three-phase prospecting and bulk-sampling programme on Block J, the third of which will comprise a bulk-sampling programme to delineate diamond reserves.

The recovery of a significant number of diamonds from an ongoing reconnaissance sampling programme by De Beers Marine was announced in February 2002; these were collected from 17 features on a sea-floor area covering 728 m^2 of which eight proved to be diamondiferous, yielding 23 gem stones weighing a total 4.65 ct. Fourteen samples were collected from features six and eight, the first is a classic type found on Namibia's inner shelf while the latter is situated on the middle shelf in deeper waters of the type only DBMN is mining at present. In addition, gravels found at the latter contain "the classic Orange River suite of exotic minerals" according to Afri-Can. A decision was due to be taken after the programme had been completed around mid-2002 on whether to proceed with a US$1.5 million bulk sampling programme with the aim of calculating a resource base. Afri-Can is also operator and has options to acquire a controlling position in the four adjoining blocks forming part of the northern concessions, of which the 250 km^2 shallow water Block B (Together Quando) is the most promising and where a detailed geophysical survey is to be undertaken.

The southern concessions - Namibian Gemstones - represent Afri-Can's longer-term project area with the largest potential. They comprise 23 exclusive prospecting licences (EPLs) totalling 23,000 km^2, the second-largest marine concession after Atlantic 1. Water depths range from 168 m to over 500 m, covering a large part of the northern edge of the sediment wedge built out by the Orange River during the last 100+ million years. Afri-Can has a 60% interest and is operator in a joint venture agreement with Namibian Gemstone Mining Corp., and has the option to acquire an additional 20% interest. An initial geophysical survey of the shallower eastern part of the concession (41% of the total) identified large areas of eroded bedrock and abundant features typical of areas where diamonds are concentrated elsewhere in the Namibian marine zone. An area of some 1,900 km^2 (20% of the area surveyed) indicated exposed exposed rocky areas or rock covered by a veneer of unconsolidated

sediments. Based on these results a grab sampling programme is planned, to be followed by a geophysical on several priority areas in order to estimate the size of the potential resource.

Land-based prospecting for kimberlites in the Tsumkwe area of northeastern Namibia near the border with Botswana was continued during 2001 by Australia's Mount Burgess Mining with encouraging results. The Tsumkwe project covers some 5,000 km^2 held under five exclusive prospecting licences (EPLs), and exploration work, including loam-deflation lag sampling and rotary air-blast (RAB) drilling in the Delta/Ebony area, has recovered a number of kimberlitic indicator minerals. The company has a confirmed exploration model, tracking indicator minerals by drilling using an open-hole percussion rig. Following the discovery of an unabraded macrodiamond from loam sample NN740, samples from an infill loam sampling programme of the surrounding area were found to contain several garnets, a chrome diopside and an ilmenite, all with remnant kimberlite coating. The results strongly implied close proximity to a local kimberlite source and drilling was recommenced early in 2002.

In November 2001, the Gura-1 kimberlite was also discovered, but is not believed to be the source of the macrodiamond, which was found 12 km to the south. Positive results were obtained from gravity surveys of Gura-1 during February 2002, with a mini bulk sample being analysed for diamond content. In December 2001, Mount Burgess increased its equity in the Tsumkwe project from 75% to 90% by agreeing to fund all project expenditure up to a decision to develop any kimberlite discovered in the licence areas. The remaining 10% interest is held by a local joint venture partner, Kimberlite Resources.

Namibia's first diamond-cutting plant, Namgem Diamond Manufacturing Co., a joint venture of the government and De Beers located at Okahandja north of Windhoek, produced 30,000 cut stones in 2001. Turnover at N$48 million was 57% above that of 2000 and the product has been well received by customers globally. All rough stones are purchased from the DTC, although the govern-ment hopes in future there may be the option of purchasing stones directly from Namdeb. Two more cutting plants, both in Windhoek, were opened in 2001, and a fourth, by a Russian firm, Mars Investment Holdings, was opened at Walvis Bay in May 2002.

Gold and Copper

Total gold production increased by almost a fifth during 2001, the second successive annual rise of around this level, to 2,851 kg. A new record amount of 2,694 kg (2,399 kg in 2000) were produced by the Navachab mine near Karibib, owned by Anglogold Namibia, while gold contained in blister copper increased substantially to 157 kg (18 kg in 2000), reflecting the first full year's output at the recommissioned Tsumeb smelter. The 12% increase in Navachab's output reflected better than forecast head grades of 2.3 g/t as against a planned grade of 1.9 g/t, with all production targets met. The enhanced revenue from an improved gold price during 2001 and enhanced local currency earnings improved the mine's competitive position and investigations have been recommenced on the viability of the phased open-pit expansion project.

The main problem is that marginal material needs to be processed prior to gaining access to the deeper-lying higher grade ore, meaning that price and cost predictions have to be carefully calculated to assess the financial risks of the expansion project. The phase one extension work completed in 1999 on the pit western side will enable operations to continue for another five years or so. Anglogold is continuing to explore a number of nearby prospects, although the initial results have not been that encouraging.

Ongopolo Mining & Processing (OMP), the Namibian-owned company which took over the assets of Tsumeb Corp. Ltd (TCL) during 2000, had a successful first full year of operations in 2001. OMP's shareholders

include former managers and staff, trade unions, cash investors and an environmental trust; the company defines its mission to be a globally competitive copper producer through the application of world-class practices to the benefit of all stakeholders via smart partnership, equal opportunities and share incentive schemes for employees. The Kombat mine near Tsumeb produced 18,200 t of copper concentrate (15,600 t in 2000); output has stabilised at some 30,000 t/mth of ore, slightly below the concentrator capacity of 35,000 t/mth. An extensive refurbishing programme (costing some N$20 million in OMP's financial year to end-June 2001) is continuing, with a particular focus on improving water controls by a doubling of water handling capacity to avoid a repetition of past inflow flooding. Implementation of a new shaft complex, the Asis Far West project, was started in 2001 with the aim of securing production at Kombat for the next 20 years.

An environmental assessment report on the Tschudi copper deposit in the Otavi Mountainland area was completed and a bankable feasibility study for development of a mining operation is due to be finalised by the end of 2002. Extensive refurbishment (also costing some N$20 million) at the Otjihase mine east of Windhoek, including access into a new ore compartment, was virtually completed in 2001, with 26,200 t of copper concentrate produced (5,100 t in 2000). Funding of N$12.5 million was obtained from the European Union's Sysmin facility for Namibia to part-finance development costs. Production has been optimised at some 60,000 t/mth of ore, although the concentrator has a design capacity of 110,000 t/mth Otjihase copper concentrate contains the gold recovered as a smelting by-product, and new customers in South Africa and Zambia have been found for its pyrite concentrate, supplied to the Rossing uranium mine for sulphur prior to the suspension of operations by TCL in 1998. Pyrite output more than quadrupled to 57,000 t in 2001 and negotiations are under way to secure long-term contracts with these customers.

Namibian Mineral Production

(t, except where stated)

	2000	2001
Diamonds ('000 ct)	1,552	1,495
of which marine	900	753
Uranium oxide	3,201	2,640
Gold (dore/blister) (kg)	2,417	2,851
Silver	9	18
Copper (blister 99% Cu)	5,082	27,015
Lead (conc. 30% Pb)	20,665	26,182
(contained metal)	11,114	13,025
Zinc (conc. 52% Zn)	73,535	70,610
(contained metal)	39,126	31,803
Pyrite (conc. 50% S)	11,967	56,994
Arsenic trioxide (75% As)	0	914
Fluorspar (97% conc)	6,128	81,245
Salt (coarse)	514,077	558,441
(rock)	4,585	6,400
(refined)	4,347	11,250
Value (N$ million)[a]	2000	2001
Diamonds	4,245	4,507
Gold	160	208
Silver[e]	5	12
Copper	22	120d
Zinc	117	135
Uranium and other[e]	983	1,185
Total	5,533	6,180
Value (US$ million)	**797**	**718**

[a] *Export sales revenue*

[e] *estimated.*

Source: Ministry of Mines and Energy; Bank of Namibia (central bank); Central Statistics Bureau; Chamber of Mines of Namibia; De Beers SA; Namibian Minerals Corp. (Namco); Rio Tinto.

The Tsumeb copper smelter and arsenic plant operated successfully during 2001, following a N$15 million refurbishment by OMP, with 27,000 t of blister copper, 18 t of silver and 914 t of refined arsenic trioxide produced during the year, including toll-smelted imported concentrates. Production of refined cadmium and sodium antimonate has not been resumed and the lead refinery has remained out of commission. However, production of both lead and zinc may be resumed under an 18-month joint-venture project to evaluate and retreat accumulated slag dumps at Tsumeb, which also contain substantial quantities of germanium, gallium and indium. This was formed between OMP and the UK-based ZincOx Resources at the end of 2001, with a preliminary economic appraisal due to be completed during the first half of 2002 and a full feasibility study by the year-end. The slag dumps are estimated to contain 2.9 Mt of material averaging 9.03% Zn, 2.05% Pb, 0.026% Ge, 0.02% Ga and 0.02% In.

ZincOx can earn a 50.1% interest in a development company to be formed by supplying metallurgical expertise, completing the feasibility study and paying OMP N$19 million (US$1.6 million). The latter will earn its 49.9% interest by contributing the slag dumps, infrastructure and some plant, including the existing Ausmelt-type furnace. ZincOx, which subsequently listed on the Alternative Investment Market (AIM) of the London Stock Exchange, will use technology specifically designed to treat oxide zinc ore at the Skorpion deposit. This was developed by the company's personnel when they worked for the UK-based Reunion Mining prior to its acquisition, along with Skorpion, by Anglo American in 1999. Preliminary metallurgical work at Tsumeb has established that zinc and other metals can be concentrated from the slag in an oxide dust amenable to ZincOx technology, as successfully utilised by Korea Zinc. OMP is also investigating the retreatment of tailings dam materials, provisionally estimated to contain some 0.4% Cu, 0.9% Pb and around 14 g/t Ag.

In its financial year ended June 30, 2001, OMP's total revenue was N$156 million, and net operating profit was N$32 million. Owing to setting off previous losses against future taxable income in respect of mining operations, no tax was payable for 2000/01, with net profit therefore the same as the N$26 million pre-tax profit. In any case, OMP will pay only small amounts of tax as its subsidiary Ongopolo Processing (OP), which generates 99% of total revenue, has export processing zone (EPZ) status, meaning it is not liable to income tax on profits generated, or payment of value-added tax (VAT).

Zinc

Namibia currently has one producing zinc/lead mine at Rosh Pinah in the southwest on the edge of Diamond Area No.1, but will become a significant producer of zinc metal when the Skorpion mine and refinery comes fully on stream in early 2003. The two companies are co-operating in the expansion of facilities at Rosh Pinah township which is providing accommodation for employees at both operations. Skorpion will use Luderitz harbour, rather than Walvis Bay to the north, for shipments of zinc and has built a new quay and warehousing facilities; Luderitz may also be utilised in future by Rosh Pinah for lead shipments, at present sold through trader tenders for export via Walvis Bay.

At Rosh Pinah, zinc concentrate production fell by 4% to 70,610 t in 2001 (73,535 t in 2000), with 31,803 t of metal in concentrate produced and shipped (39,100 t). Concentrate grade was maintained at just over 53%, with some N$12 million spent during 2001 on asset modernisation and replacement, although this programme had to be curtailed before the year-end due to low metal prices. In contrast, production of lead concentrate increased by 27% to 26,182 t (20,655 t); the concentrate grade was maintained at 54%, with 13,025 t (11,114 t) of metal in concentrate. Output of silver in concentrate almost trebled to 32 t (12 t). The mine is 95%-owned by Kumba Resources (formerly Iscor) with the remaining 5% held by Rosh Pinah Mine Holdings, an empowerment

vehicle for Namibian citizens whose stake is being progressively increased to 15%.

Construction of the large Skorpion zinc mine and refinery 25 km north of Rosh Pinah by Anglo Base Metals (ABM) has proceeded apace with production of the first ingot likely before the end of 2002. Skorpion is the biggest new mining development in Namibia since independence and the first non-diamond mine within the formerly restricted Diamond Area No.1 (Sperrgebiet); at full production it is expected to contribute some 4% of Namibia's GDP, with a 15 year life, and 550 employees. The mine will exploit oxidised material in a zinc silicate/carbonate ore body containing 21.4 Mt averaging 10.6% Zn and the refinery will produce some 150,000 t/y of exceptionally pure high-grade zinc metal at low cost. The refinery, like the OMP facility at Tsumeb, has been granted export-processing zone (EPZ) status by the Namibian Government, which means no income tax will be payable on earnings from zinc exports. Based on current forecasting, ABM also anticipates the project will come in just under the N$3.2 billion (US$276 million) total budget, without recourse to a US dollar contingency funding provision. Excluding capitalised working costs, final project commitment and cash flow are forecast at some R3.0 billion, about 6% below budget, with the first revenue due in April 2003.

Detailed design, basic engineering, procurement and construction manage-ment have been carried out by SPJV, a joint venture between South Africa's Bateman and SNC-Lavalin of Canada, with specialist expertise and proprietory technology supplied by LTA-Monsanto (acid plant), Belgium's Umicore Engineering ('super jumbo' cellhouse and casthouse) and Spain's Tecnicas Reunidas ('Modified ZINCEX Process' for zinc solution purification by solvent extraction). The acid plant incorporates a five-stage conversion process to ensure one of the world's lowest sulphide oxide emission rates; some 1,000 t/d of industrial grade and 100 t/d of chemically-pure (CP) grade sulphuric acid will be produced for use on the leach circuit and for production of high-grade zinc respectively.

Uranium

Production of uranium oxide from the Rossing open-pit mine inland from Swakopmund was reduced by 18% to 2,640 t in 2001 (3,201 t in 2000). This was as a result of mining limitations in the pit (given the need to make allowances for future flexibility), and the matching of output to weak global market conditions in order to rationalise inventory levels. It is anticipated production will be about 5% higher in 2002 in line with delivery requirements by existing customers. However, the operating company, Rossing Uranium Ltd, in which Rio Tinto plc holds an unchanged 69% interest, improved profitability in 2001 as a result of the beneficial impact of its cost-reduction programme initiated the preceding year. While Rossing's gross turnover fell by US$9 million to US$115 million in 2001, net earnings attributable to Rio Tinto rose by US$2 million to US$21 million, indicating after tax earnings by Rossing (on a 100% basis) of US$30 million in 2001.

Rossing achieved its targeted cost savings of N$150 million (US$17 million) by the end of 2001, with all mine employees receiving payments from the savings pool amounting to N$18 million in total. A pilot ore-sorting plant commenced in 2000 was completed early the following year. Test work and evaluation of plant performance continued throughout 2001 as construction of a full-scale plant cannot be authorised until a complete business case has been developed. Plans to place the pilot plant into full production were due to be developed in 2002. Ore currently processed at Rossing contains 20% waste material and an ore-sorting plant would enable removal of the waste rock before it enters the secondary crushing plant, with consequent savings in production costs. A detailed feasibility study is to be commissioned on the construction of a sulphuric acid plant at Walvis Bay harbour, which as a by-product might also enable the generation of large volumes of desalinated seawater for consumption in the coastal area. Some 2,000 t/y of acid are currently imported for use in the mine's solvent extraction process, as a plant at the mine site was

mothballed in early 2000 and until recently the economics of obtaining feedstock have continued to be at a disadvantage to imported acid. However, the economic case for local production for acid has improved owing to the slide in the value of the Namibia dollar/South African rand (which has increased the cost of imports), and the renewed availability of pyrite concentrate form the Otjihase copper mine.

A verification study commissioned in 1998 from international scientists to confirm or refute the findings of a Namibian researcher, Dr Zaire, on the effects on mineworkers of long-term, low-dose radiation exposure, was completed in 2001. The study's overall conclusion was that Dr Zaire's findings were not correct as 'the frequency of chromosomal damage in the miners did not exceed that in control subjects'. The results of the study were presented to the Rossing management, the government and Mineworkers Union of Namibia (MUN), and subsequently approved for publication in the relevant scientific journals.

Other Minerals

Output of fluorspar and salt, the main non-metallic minerals mined in Namibia, expanded during 2001, while quarrying of dimension stone (marble and granite) and semi-precious stones (amethyst, blue-lace agate, rose quartz and tourmaline) continued at around previous levels. Tantalite mining was resumed on a small scale, but was suspended by the end of the year.

Production of 81,245 t of acid-grade CaF_2 concentrate by the Okorusu mine northeast of Windhoek exceeded the 80,000 t target for 2001, and was almost one-quarter higher than the previous year's output. An increased volume of 222,000 t of ore, at an average head grade of 50% CaF_2, was mined. Export shipments to Europe rose by 11% to 74,857 t, providing sales revenue of N$56 million. The current life of mine is over ten years based on concentrate production of 100,000 dry t/y. Belgium's Solvay, which owns the operating company Okorusu Fluorspar, invested N$9 million in new equipment, replacements and renewals during 2001, and also commenced exploration to determine the full extent of the main A orebody. By the end of 2001, some 90% of a 6,500 m diamond-drilling programme had been completed, providing significant extensions to the west and down-dip of the orebody. Drilling was due to continue during the first quarter of 2002, with future drilling planned for the nearby B and C orebodies, while other outlying orebodies within the mining licence and surrounding exclusive prospecting licence (EPL) are to be investigated. A desk top study has also been completed of the nearby Omburu fluorspar deposit, but a planned extensive drilling programme had to be deferred to the latter part of 2002 pending agreement on surface access rights with the landowner, with a bankable feasibility study targeted for completion in early 2003.

Coarse salt output from coastal brine pans recorded a 9% increase to 558,441 t in 2001, of which Salt & Chemicals, a wholly-owned subsidiary of South Africa's Sentrachem, produced 500,441 t at its Walvis Bay facilities (482,000 t in 2000) and the locally-owned Salt Co., 58,000 t (32,077 t) at Swakopmund. An expansion programme by Salt & Chemicals, to raise annual production capacity to 600,000 t/y was completed successfully and in December 2001 an initial shipment of 40,000 t was exported to Qatar. Other bulk sales of coarse salt were better than anticipated in 2001, with some 120,000 t shipped to customers in Nigeria, while 43,000 t of bagged salt were exported to the Democratic Republic of Congo (DRC). Sales of refined and rock salt by Salt Co. enjoyed a strong recovery in 2001, with significant orders placed for both categories by South African customers, in addition to supplies to existing domestic and regional customers.

Mining of the well-known but small Tantalite Valley deposit near Karasburg in southern Namibia was resumed in mid-2001 on the back of the surge in global prices and in March 2002 the mine was offered for sale, either outright or for a partnership with an outside investor to secure additional funds for development. The mine has access to

338,000 t of proven and probable reserves located in niobium-tantalite mineralised pegmatites at an estimated average grade of 434 ppm Ta_20_5. It was planned to process 6,000 t/mth of ore, yielding 1.5 t/mth Ta_20_5 over eight years but the mine was closed as a temporary measure at the end of 2001 due to a sharp drop in the tantalite price and dissatisfaction with the mining contractor's performance. Tantalite Valley Mining (TVM), the mine owner, had by mid-2002 received 22 serious offers for the property, of which half were from overseas firms, and hoped to finalise a deal by the end of the year.

Ambitious plans for the development of a N$400 million quartz mine and high-grade silicon metal plant at Omaruru northwest of Windhoek are currently in abeyance following a dispute between the Namibian Government and the project promoter, Namibian Metals (NM). The Johannesburg-based firm planned to mine a 600,000 t quartz vein deposit at an estimated grade of 98% $Si0_2$ for production of 20,000 t/y under a joint venture partnership with Germany's SMS Demag. However, in November 2001, the Ministry of Mines and Energy (MME) announced the cancellation of Namibian Metal's mining licence on the grounds it had failed to meet a requirement to have implemented the project by mid-year; this version of events was disputed by NM which maintained it was on-track to secure the necessary funding. The MME invited other companies to apply for the mineral rights by end-2001, and the project, if it proceeds, would almost certainly be implemented by a different promoter.

Exploration

Prospecting and exploration activities were maintained at a high level in 2001, with a significant increase in most categories of mineral licences issued by the Mining Commissioner's office. A record number, 583, of non-exclusive prospecting licences were issued (510 in 2000), along with 160 exclusive prospecting licences (155), while 206 claims were registered (147). In addition, three new mining and three new exclusive reconnaissance licences were granted.

Exploration spending by CMN member companies increased by just under half in local currency terms to a record N$249 million in 2001 (N$167 million in 2000), although due to the depreciated Namibia dollar, spending in US dollar terms was up by a more modest one fifth, to US$29 million. As in recent years, prospecting for diamonds, mainly offshore and inclusive of exploration equipment, accounted for the bulk of exploration costs. In 2001, spending on diamond prospecting was N$209 million or 84% of the total, with Namdeb alone incurring expenditure of N$79 million (up from N$62 million in 2000) on exploration and sampling operations- both offshore and on land. Other substantial marine diamond exploration expenditure included equipment purchases, replacements and refurbishments by Namco and Trans Hex.

However, sizeable expenditure was also incurred on land-based exploration and sampling programmes, especially by Namdeb and other companies prospecting within the Sperrgebiet (Restricted Area), the widely-used name for Diamond Area 1, stretching north and east of Oranjemund, which was opened for prospecting in 2000. The area has significant potential for zinc and other base metals, and some N$22 million was spent during 2001 by the holders of 24 EPLs, including major mining firms such as BHP Billiton, which carried out an extensive Tempest airborne electromagnetic survey over its licence areas, in addition to spending over N$1 million on geophysical surveys and diamond drilling at its EPL north of Rosh Pinah. Other firms prospecting within the Sperrgebiet include Cominco, Westport Resources and Kumba Resources.

To ensure prospecting and, potentially, mining is carried out in a controlled manner and does not adversely impact on the area's fragile desert ecology, a Land Use Plan for the Sperrgebiet has been drafted to which various of the companies involved in prospecting have contributed. Recommendations contained in the plan, along with draft standard guidelines for environmental impact assessments, were

due to be approved during the first quarter of 2002 and a proposal recommending the drafting of similar plans for other regions as a matter of priority has been submitted to the Mineral Policy Committee. In addition, a roads/track plan for the Sperrgebiet is being drawn up in consultation with other industries, most notably tourism, with the intention of restricting access to common routes and minimising environmental degradation. Other substantial prospecting was carried on during 2001 by Ambase Exploration, with licence areas in the Karas, Kunene and Omahake regions, and by Avdale Namibia, which carried out follow-up drilling to determine the potential of a near-surface gold deposit in the Otavi project area which may prove amenable to open-pit mining.

The local mining industry remains extremely concerned at the potential negative impact on exploration investment of an adverse judgement in the still unresolved legal proceedings between Northbank Diamonds, a subsidiary of South Africa's Trans Hex Group, and Aussenkehr Grape Growers' Association regarding prospecting work on the Orange River north bank. This concerns the right of access of the mineral rights holder to a property under agreement with the landowner, which in this case has witheld access on the grounds that work would damage nearby grape production areas. The CMN states that a number of other landowner/prospector agreements are being held up pending the court's definitive ruling, which is stalling legitimate development of Namibia's mineral resources.