URANIUM

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Uranium producers had a difficult year in 2000, with excess supply leading to further price reductions. However, world production rose substantially, by 12% to 34,746 t U. This followed 5% and 9% falls in 1998 and 1999 respectively, owing to production plan cutbacks and the termination of production in some countries. The rebound in 2000 marked a return to the three years of production increases experienced from 1995-1997, which demonstrated a partial recovery after ten years of decline from 1985. In 2000, the rebound was concentrated in the two leading producing countries, Canada and Australia, but to a lesser extent in the former Soviet Union (FSU). Australian production has been rising sharply with the mine expansion at Olympic Dam. In Canada, production in 2000 was back to the 1998 level as 1999 was an exceptionally weak year. Production had been reduced to bring inventories under control, while production was simultaneously being transferred to new mines.

Despite the improvement in world production in 2000, primary supply filled only 56% of world reactor requirements during the year. The balance was made up by secondary supplies, including an expected further reduction in uranium inventory levels throughout the world and by the recycling of both reprocessed spent reactor fuel and other fissile materials. These included a major contribution from former military materials and also from re-enriched depleted uranium stockpiles.

Uranium spot market prices continued their downward drift throughout the whole of 2000, with few signs of any respite. This continued the trend begun in the second half of 1996, after prices had peaked in mid-year at around US$16.50/lb for non- FSU supply, a level which had not been reached since the late 1980s. Prices which started 2000 at around US$9.50/lb, drifted down to US$7/lb by the final quarter. Volume in the spot market was generally low, with the few buyers finding willing sellers. Although the vast majority of uranium is traded under longer-term contracts, the spot market provides a guide to the material traded at the margin and is also an influence on these contract terms themselves.

The major influence on the market continued to be the uncertainty surrounding the timing and magnitude of secondary supplies on the commercial market. These include the uranium component of the blended down highly enriched uranium (HEU) sold by Russia to the US. There was an agreement in early 1999 between the Russians and three Western companies concerning the prudent marketing of this, but the material continues to overhang the market. In addition, the incremental supply from the US Enrichment Corp. (USEC), having been granted high uranium inventories as part of its privatisation, kept up the notion that supply should be freely available into the medium term. It is also believed that uranium producers took advantage of the weak market conditions to prune their inventories further. The Uranium Institute's last survey of producers revealed that these had increased substantially to some 20,000 t U between 1996 and 1998.

Some restrictions on FSU supply remained in the market during 2000 but the anti-dumping import quotas for uranium from Ukraine, Kazakhstan and Uzbekistan in the US ended. The gap between spot prices quoted for supply from the FSU as opposed to the rest of the world accordingly narrowed to less than US$1/lb during the year. Quota restrictions apply in the US on Russian origin uranium, while in the European Union, the

Euratom Supply Agency has a policy of limiting FSU supply to 25% of demand. FSU producers continued to export all their production. It is believed that Russia still has significant inventories of fissile material to fuel domestic and captive customer reactors up to perhaps 2010, but it shows signs of needing to supplement this with new uranium production before then if it is to remain as a substantial exporter to the West.

Production by Country or Area

Australia

Total Australian mine production again rose sharply in 2000, in line with the strong upward trend apparent since 1994 (only temporarily reversed in 1998). Total production of 7,578 t U represented over a fifth of world production in 2000. ERA pushed up production at Ranger to 3,762 t U and announced a planned increase in capacity to 4,230 t/y U. ERA's parent company, North Ltd, was acquired by Rio Tinto during 2000 and it has been announced that plans to develop the Jabiluka orebody, 20 km from the existing Ranger mill, have been put on hold. Uranium output at WMC's Olympic Dam copper/uranium mine also increased significantly in 2000 to 3,816 t U and the company is working on plans to expand both copper and uranium production further. The Beverley in-situ leach (ISL) mine in South Australia, owned by Heathgate Resources (a General Atomics subsidiary), went into commercial production towards the end of 2000 and has a stated capacity of 850 t/y U. The Honeymoon ISL project remains at the permitting/approvals stage.

Canada

Canada's uranium output rose by 30% in 2000 to 10,682 t U, and it easily retained its place as the leading world producer. The dip in production which occurred in 1999 can now be seen as a period of transition as it moved towards the new higher grade mines. Key Lake/McArthur River output rose slightly to 4,000 t U and the mill was able to reach its rated capacity of 6,900 t/y U towards the end of the year, after it had been adapted to take the higher grade McArthur ore. Rabbit Lake production was up slightly at 2,800 t U but has been suspended in 2001, possibly until ore from Cigar Lake comes on stream. Cluff Lake continued in operation throughout 2000 and higher grade ores led to production rising to 1,450 t U. It is now likely to close by the end of 2001. McClean Lake produced at a level close to its design capacity of 2,300 t/y U, but it was closed in the final months of the year to make some improvements to the mill circuit. Development of the Cigar Lake project is now on hold, with the start-up date dependent on an improvement in market conditions.

Europe

French production continued to fall in 2000, down to 319 t U. Remaining reserves are becoming gradually exhausted, so French mainland production is likely to end in 2001. Belgian phosphate by-product production has now ended. German production was solely associated with the decommissioning and environmental clean-up of mining operations belonging to Wismut, in the former East Germany, which ceased production in the early 1990s after being a major world producer in the 1950s-1980s. Production in Spain fell slightly to 251 t U, but mining operations were terminated at the end of 2000. DIAMO in the Czech Republic is gradually phasing out uranium production, but still produced 500 t U in 2000, while Hungarian output now is solely from decommissioning work.

Africa

Overall production was down on 1999, owing to the ending of production in Gabon due to the depletion of economic reserves and a 10% reduction in South Africa. Niger's output from Akouta and Arlit was virtually unchanged at 2,895 t U, as was Rossing's in Namibia at 2,714 t U. In South Africa, production was significantly lower at AngloGold (formerly Vaal Reefs) but higher again at Palabora, owing to better uranium grades in the ore processed.

US

Production fell again in 2000 for the third year running to 1,456 t U. Each of the three major ISL mines suffered output declines, namely Cameco's Highland and Crow Butte operations and Rio Algom's Smith Ranch. Production ended at Cogema's Irigaray/Christensen ISL project. Other production came from Cotter's Canon City mill, which produced from stockpiled Schwartzwalder ore and from Rio Algom's Ambrosia Lake mine water recovery operation. In 2001, US production will be totally dependent on the three large ISL operations, with a revival of any conventional mills dependent on improved market conditions.

FSU

Overall, uranium production has continued to rise after the low point reached in 1997. This followed a long decline, apparent from the early 1990s. The poor economic conditions have continued to affect uranium mining adversely, as have the restrictions on sales outlets in the West. The restructuring in Kazakhstan bore fruit with a further increase to 1,740 t U, while Uzbekistan also continued to improve at 2,350 t U. These countries have the most successful links with Western partners. In both countries, conventional mines have closed and they are now dependent on ISL technology. Russia is investigating the practicality of applying ISL mining, but currently remains dependent on the one conventional mine at Krasnokamensk.

Other Countries

There was no production in Argentina in 2000 although output is believed to have remained constant in each of China, India and Pakistan. Each of these can be termed 'captive producers' in that they produce for domestic reactor requirements. Their reserves tend to be low grade, making widespread commercial exploitation unlikely in foreseeable market environments. Brazil recommenced production in 2000 and is hoping to increase to 250 t/y U in the near future.

Outlook

The market outlook is for a slow rise in world production, led by Canada and Australia and, to a lesser degree, by the FSU countries. Nevertheless, despite the run-down of inventories by Western utilities, secondary supply from ex-military materials is likely to prevent a strong boom. The trend for supply to become concentrated in a few large low-cost mines in a limited number of countries is likely to continue, with some of the smaller projects which have been mentioned over the past few years finding it hard to compete on cost grounds. Delays to approval for the major projects may, however, provide an opportunity for these, as would any interruption in the expected supply of blended-down HEU. There remains considerable uncertainty surrounding future FSU production levels. In terms of reserve availability, it is in a good position to expand output and production may become increasingly necessary in order to feed domestic reactors (rather than solely for export). The problem is securing sufficient funds for the significant capital investments required. Russia has announced a major push towards ISL mining in new areas, but uncertainties about likely production levels and their timing will persist.

Exploration

Programmes have remained at modest levels. With a Uranium Institute survey identifying world reserves at 3.4 Mt, equivalent to 100 years' production at the recent level, the incentive has remained poor. The focus has been directed at identifying deposits amenable to low cost production either through their high grade or through their suitability for ISL technology. The search for high grades has continued in Canada (Saskatchewan and the Northern Territories) and in Australia, where previous successes have been achieved. Sandstone deposits suitable for ISL have been sought in the US, the FSU, Mongolia, India and China.

Demand

At the end of 2000, there were 436 nuclear

reactors in operation throughout the world with a combined capacity of 350 GWe. This was five more than at the end of 1999 and represents an increase of three GWe. An increasingly important factor is the rise in generating capacity of existing reactors via upgrades, as opposed to new reactor start-ups. There were also 39 reactors throughout the world either under construction or temporarily suspended from operation at the end of 2000, with combined capacity of 32 GWe. These can be expected to come into operation over the next ten years, to be partly offset by closures of some older (and usually smaller) reactors.

Although nuclear generating capacity is an important indicator of demand for uranium, the operating characteristics of reactors are also crucial and are sometimes ignored by commentators. The almost universal recent experience has been for higher reactor load factors to be achieved, which pushes up uranium demand. This was particularly so in 2000 – despite only a slow increase in nuclear generating capacity, nuclear production has maintained its share of world electricity generation at approximately 17% throughout the 1990s. There are also other important factors to consider, including fuel burn ups and enrichment levels, plus the length of reactor operating cycles. The annual current world reactor requirement is for around 62,000 t U and this is expected to grow slowly over the longer term by up to 1% annually.

WORLD URANIUM PRODUCTION (t)			
	1998	**1999**	**2000**
Argentina	7	4	0
Australia	4,885	5,979	7,578
Belgium	15	0	0
Canada	10,924	8,214	10,682
China*	500	500	500
Czech Republic	610	612	500
France	508	439	319
Gabon	731	294	0
Germany	40	33	40
Hungary	10	10	10
India*	200	200	200
Kazakhstan	1,074	1,367	1,740
Namibia	2,762	2689	2,714
Niger	3,731	2,918	2,895
Pakistan*	23	23	23
Portugal	19	10	10
Romania*	100	100	50
Russia*	2,000	2000	2,000
South Africa	962	981	878
Spain	255	255	251
Ukraine*	500	500	500
US	1,872	1807	1,456
Uzbekistan	2,000	2,130	2,350
Total	**33,728**	**31,065**	**34,746**

* UI estimate