Uranium — the world situation

The annual symposium of the Uranium Institute in 1980 examined the position of uranium in global energy needs. In this article Herwig Rudolph reviews the findings of the symposium and looks at the position of Africa — and in particular that of South Africa and SWA/Namibia — in the international uranium trade.

The fifth annual symposium of the Uranium Institute held in London in mid-September 1980 was particularly significant. It brought together representatives of most major producers and consumers as well as official representatives from producer countries and provided an in-depth exposition of global energy needs up to the turn of the century, the required production volume and the available reserves.

In most of the keynote speeches a world shortage of uranium was anticipated for the late 1980s and a general energy crisis by the end of the century. According to figures released by the International Energy Agency (IEA), there will be an energy shortfall equal to 28-million barrels of oil a day by the year 2000. This is equivalent to the present combined oil production of all OPEC nations.

The reasons for this were spelt out in some detail. According to a low estimate by the American Hugh Douglas Corporation, world demand for uranium metal, presently standing at around 40 000 tons, will rise to about 60 000 tons annually in 1995 and to about 67 000 tons in the year 2000. Mr Douglas told the delegates: “While these estimates are considerably lower than those published by the International Atomic Energy Agency (IAEA), further requirements will nevertheless outstrip currently available uranium supplies after the late 1980s.”

In a study carried out by the OECD the world’s reasonably assured resources (RAR), which can be produced at less than 130 dollars per kg, are estimated at 2 590 000 tons. Total Western resources recoverable at less than 130 dollars per kg amount to approximately five million tons.

Aggravating the growing demand situation is the fact that a considerable number of known uranium deposits are located in politically unstable areas. Certain producer countries also impose stringent constraints on the export of uranium while in many other countries the mining of the metal remains socially unacceptable.

According to IEA estimates, economic growth in the OECD countries until the year 2000 will average 3.4 percent. Consequently oil production of the OPEC states will rise to 38-million barrels a day and that of non-OPEC developing countries to 13-million. During the same period coal production, natural gas output, hydro-electricity and geothermal energy are all expected to double.

In addition to these increases in conventional energy supply and consumption, nuclear power is expected to increase tenfold to around 800 megawatts installed capacity. Should oil production of the OPEC states fall short of the estimated 38-million barrels per day, “the gap will have to be filled in some other way,” according to Atshuhiko Yatake, Director-General for scientific and technological affairs of Japan’s Ministry of Foreign Affairs.

This would mean that the estimated energy shortfall given as 28-million barrels a day by the turn of the century would be exceeded.

Mr Yatake called on OECD countries as a group “irrespective of their individual positions with regard to indigenous energy resources” to try collectively to expand their nuclear capabilities. The Japanese expert lamented the fact that for environmental, siting and public acceptance reasons, nuclear power programmes in Western industrialised nations had suffered a considerable slow-down in recent years. There was in fact an excess of uranium supply capacity and consequently a lack of incentive for producers to expand their exploration. He reminded delegates that if insufficient effort is made now, in the year 2000 producers would not be able to satisfy demand because of the long lead time required for uranium production. (It takes an average of eight to twelve years to bring a mine into full production.) While the present relatively low demand for uranium in the industrialised countries made it appear as though production capability would be sufficient until 1985 at least, producers would have to gear themselves now for the rapidly increasing demand expected for the second half of the present decade.

The conference also discussed the controversy surrounding the supply of uranium and the use of nuclear power. Anthony Gray, Chairman of the Institute’s committee on international trade in uranium, pointed to the lack of international consensus on acceptable standards for nuclear non-proliferation. He reviewed the situation since a 66-nation study began last February to consider whether nuclear materials or technology might be misused to build atomic weapons. He made a firm call for a standardisation of rules by supplier countries, particularly as regards the transfer and exchange of nuclear...
materials among consuming nations. Mr Gray said that major producer nations insisted on a provision for prior consent, meaning that permission was required from the supplier for the reprocessing of spent nuclear fuels, its enrichment beyond 20 percent, and the retransfer of uranium from the consumer to another nation. He pointed to the fact that consumers, many of them Third World countries with a growing nuclear potential, were becoming "increasingly resistant" to such clauses and that this continued to be a major stumbling-block to agreements now under consideration.

An additional factor of uncertainty lay in the pursuit of national economic objectives by African governments who were likely to reserve adequate uranium resources for future domestic needs while assuring a fair price by controlling production and limiting the level of foreign ownership in their uranium industry.

How well the concern of Western producers is justified was sketched by Stanford Anderson, Vice-President of the American Nuclear Exchange Corporation, who spoke of "unconventional uranium transactions" where the "parties want to record or report different prices for the transactions for their own individual reasons, where the parties do not want to name each other in their contracts, and where they have substantially different cash-flow priorities and cost of funds and where the parties have special financial accounting and tax accounting needs."

Even the most careful wording could not detract from the unsatisfactory state of affairs in the international uranium market, particularly where prestige-conscious Third World countries, who have come to regard a nuclear capacity as a political necessity, are concerned.

"Increased assurance of continuity of their supplies and the existence of a more predictable market are prerequisites for the orderly development of an international uranium trading environment," said Pierre Wyat, Managing Director of the Organisation of Nuclear Energy Producers (OPEN). He went on to offer guidelines on political issues such as non-proliferation, government approval and waste material transfer, as well as commercial issues involving prices, guarantee of supply, disputes and conditions governing fuel processing. The symposium went a long way towards the identification of present-day ills in the uranium trade. Remedies and their application will be the urgent task of future gatherings of the Uranium Institute.

Africa's role in world uranium trade

The generally expected rapid rise in the demand for uranium will have an important bearing on present and future uranium-producing nations. The projected production figures for 1979 indicate that a little under 35 percent of total world production outside the Communist Bloc will have been produced on the African continent. The free world's leading producers are the United States with a projected production for 1979 of 14 800 tons followed by Canada with 6 900 tons, South Africa with an actual production of 4 797 tons and SWA/Namibia with 4 220 tons (actual) followed by Niger, France, Gabon, Australia, Spain and Mexico with projected productions of 3 300 tons, 2 200 tons, 1 000 tons, 600 tons, 340 tons and 100 tons respectively.

According to figures released by the Uranium Institute, the free world's production reached 41 000 tons in 1979.
AFRICA: URANIUM RESOURCES

Uranium producers
- South Africa (actual production 4,797 tons)
- SWA/Namibia (actual production 6,200 tons)
- Niger (projected production 3,300 tons)
- Gabon (projected production 1,000 tons)

Possible producers
- Mauritania
- Botswana
- Central African Republic
- Zambia
- Togo

The Arcozu strip in northern Chad is said to contain rich deposits — no reliable estimates are available.
By the year 1990 this picture is expected to have undergone considerable change. According to estimates of the Uranium Institute, South Africa’s production capability will increase to around 12 000 tons and could possibly reach 16 000 tons by 1990.

In a recent press statement the South African Atomic Energy Board said that South Africa is in a position to produce 10 000 tons a year well into the next century. Should the demand arise, SWA/Namibia’s production could also be stepped up considerably, possibly doubling its present annual production of 4 200 tons.

For the USA the low estimate for 1990 is 24 000 tons and the high estimate 35 000 tons. Most other uranium-producing states will more than double their production over the next decade, except Australia where a twentyfold increase from the present 500 tons to over 12 000 tons is expected. It is likely that Niger’s production will more than double from 3 300 tons last year to as much as 11 000 tons in 1990.

In 1979 Africa’s four main producers, South Africa, SWA/Namibia, Niger and Gabon, planned to produce 13 800 tons. This figure is expected to rise to 28 500 tons by 1990, but not all will come from the four present-day producers. Possibly viable deposits have been discovered in Mauritania, Botswana, the Central African Republic, Zambia and Togo. Furthermore the Aozou strip in northern Chad, which was occupied by Libya in the early 1970s, is said to contain rich uranium deposits although reliable estimates for the region are not available.

**Southern Africa**

By far the richest uranium province in Africa is presently situated in southern Africa. In 1979 South Africa produced 4 797 tons as against 3 961 tons in the previous year. Total resources recoverable at less than 130 dollars per kg stand at 530 000 tons, of which 391 000 tons are reasonably assured resources. A further 76 000 tons of RAR and 139 000 tons of estimated additional resources (EAR) are recoverable at a production cost of over 130 dollars per kg. In 1979 a total of 21 mines sent their ore to 18 uranium treatment plants.

The Rossing uranium mine in SWA/Namibia, which produces some 4 220 tons of uranium per year. The rated capacity of the mine is 5 000 tons per year.
The production of just under 4 800 tons represented an increase of 21 percent over 1978 and amounted to 11.4 percent of the free world's uranium production. According to the annual report of the South African Atomic Energy Board, "total receipts for 1979 amounted to R493-million as compared with the 1978 figure of R335-million. Planned production is expected to reach 8 200 tons per annum by 1984." In 1978 alone no fewer than 19 major mining companies were prospecting for uranium in the Republic at a total outlay of R21-million.

**SWA/Namibia**

SWA/Namibia's recoverable resources at less than 130 dollars per kg are estimated at 133 000 tons in the RAR category and a further 53 000 tons in the EAR category, giving a total of 186 000 tons. To this may be added a further 24 000 tons recoverable at above 130 dollars per kg.

SWA/Namibia's entire uranium production of 4 220 tons came from the Rössing mine which, with a rated maximum capacity of 5 000 tons per year, is by far the world's largest single uranium producer. Its uranium energy potential is said to equal that of the entire oil-energy potential of Saudi Arabia. According to Agence France-Presse, the shareholders of Rössing Uranium Limited include Rio Tinto Zinc (Britain) 41.3 percent, the Industrial Development Corporation (South Africa) 13.5 percent, Rio Algom Mines (Canada) 10 percent, Minatome (France) 10 percent, General Mining and Finance Corporation (South Africa) 2.3 percent, while 13.88 percent of the shares are in the hands of anonymous holders. Of the approximately 3 000 employees about 900 are whites, 600 Coloureds and the rest consist of 800 Ovambo, 470 Damara and 200 Herero.

In 1978 a total of 26 companies held prospecting rights for SWA/Namibian source material. These include a number of multinational corporations. Serious attention is being given to potentially viable deposits, among them those at Langer Heinrich.

As indicated above, within a few years SWA/Namibia's production could be double that of Rössing's present production, while South Africa's production, too, could be stepped up considerably should international demands so require. This means that even if Niger reaches its full attainable production capability of 10 500 tons in 1985 and 12 000 tons in 1988, southern Africa could still produce more than the combined output of all African states. There is little doubt that, despite the increases in production in such countries as Niger, South Africa is likely to remain Africa's largest single producer for some time to come.

Niger has produced uranium since 1971 at its first mine at Arlit. The country's largest deposits are at Akouta which have been worked since 1978 and the next largest deposit at Imouraren will come on stream this year. Together they are expected to boost Niger's production to at least 8 000 tons (and possibly as high as 11 000 tons) by 1990. The state holding company Onarem has holdings of between 25 and 50 percent in the foreign exploration consortia which include such giants as Cogema (France), Agip (Italy), Urangesellschaft (Germany), Exxon (USA), Somair (France), Ourd (Japan), and several others. The country's total uranium resources are currently estimated at 215 000 tons.

Cogema is also involved in Gabon together with the French Compagnie des Mines d'Uranium de Franceville (Comul). The two main deposits at Mounana and Oklo both fall within the concession area of Comul. The company expects to boost present output of just over 1 000 tons to 1 500 tons in 1982. Cogema is prospecting in the Booué Lastoursville region, at Kaya-Kaya and in the N'Djole area. Cogema is presently also investigating uranium deposits in the Ghalaman region of northern Mauritania in conjunction with PUK, the Japanese Uranium Development Corporation. The West German company Uranerzbau is exploring deposits at Naimtougou in Togo and these too are expected to be viable. In Botswana the Falconbridge Co of Canada is exploring in the Kgalagadi region. Uranerzbau is prospecting in south-eastern Botswana and the American Union Carbide Corporation at Ghanzi.

As in the case of Botswana developments in Zambia have so far not progressed beyond the drilling and exploration stage. In Zambia a number of companies have joined in the search for the important mineral, among them Agip, Uranerzbau and several Japanese companies. Even where viable quantities are in evidence, production in Botswana and Zambia is not likely to commence in the foreseeable future.

The Soviet Union and certain other European countries are showing an increasing interest in Africa's mineral wealth and it is rumoured that advance geological parties are in a number of African states, as for instance in Angola and Mozambique. There can be little doubt that the Communist Bloc's political interest, particularly with regard to SWA/Namibia and South Africa, is motivated by the mineral wealth of the region.

The London uranium symposium heard that, having become an important if not vital link in the total energy chain, the uranium supply must be assured if the nuclear industry of the industrialised nations is to remain viable. In view of the unsettled political situation in countries such as the Central African Republic and Mauritania they remain high-risk areas where sudden changes of government can disrupt the supply of raw materials, including uranium, to the expanding and increasingly uranium-dependent energy sector of the Western industrialised nations.

Both high and low production estimates reveal that by the year 1990 Africa's contribution to the free world's uranium market will decrease somewhat from the present 35 percent to around 30 percent. However, South Africa and SWA/Namibia will continue to maintain a dominant role in the free world's energy needs and it should be remembered that South Africa is a potential exporter of enriched uranium. In fact, the predicted global shortfall of energy needs by the year 2000 could to a large extent be met by southern Africa alone.

The need for safe supply sources will be significantly more critical in a decade from now in view of the industrialised world's greater energy requirements and the subsequent dependence on uranium. As South Africa and SWA/Namibia together will continue to make up more than half of Africa's total uranium production, the loss of uranium from these two countries to the West would bear disastrous consequences for the delicately balanced supply and procurement situation.