Enhanced Recovery Techniques Could Double the Yield of Known Oil Reserves

Enhanced recovery techniques for conventional and non-conventional forms of energy constitute a significant option for any energy policy that aims at satisfying long-term energy demand and careful exploitation of finite resources. This potential is large for every primary form of energy; however, it appears to have particular relevance to oil, as enhanced recovery techniques could double the yield of known conventional oil reserves and significantly raise that of any future discoveries.*

These were among the conclusions of a Seminar on Improved Techniques for the Extraction of Primary Forms of Energy. Sponsored by the United Nations Economic Commission for Europe (ECE), and held upon invitation of the Government of Austria, the Seminar took place in Vienna, at the new International Centre, from 10 to 14 November 1980.

The Seminar brought together, for the first time within the ECE framework, experts from the coal, oil, and gas, industries. Participants assessed the technological, economic, and environmental, difficulties experienced in the development and application of conventional and advanced extractive technologies. They determined the contribution which could be made by these technologies towards the alleviation of energy-supply problems in the years to come. In addition, they identified areas where international cooperation could achieve widespread application of these improved technologies for more efficient exploitation of conventional and new fossil-fuel resources in the ECE region.

The Seminar, which was attended by 89 participants from 16 countries, undertook a study-tour to oil- and gas-fields in the North-of-Vienna Basin, including steam- and water-injection facilities, and to the international gas despatching centre of Baumgarten (Austria).

Main Energy-losses Occur during Extraction

At present, the efficiency of extraction techniques of fossil fuel is rather low—more than half of the energy contained in currently-worked coal-, gas-, and oil-fields remains in the ground. Losses during extraction are bigger than losses in the other stages of the energy-flow: 59% of the energy-losses in the energy systems of the ECE area occur at the extraction stage, as compared with 27% during terminal use, 13% in transformation, and 1% in transport. However, the technological potential for raising recovery efficiencies is huge: in the case of conventional oil, recoveries could be doubled, while about 90 thousand million tons could be additionally recovered worldwide.

Compared with this technological promise, the rational utilization of deposits was regarded as an economic problem, in view of the fact that an improvement in this respect automatically led to an increase in production costs. There is also some divergence of interests in this connection, as on one hand enterprises wish to maximize profits and, on the other, the state endeavours to exploit reserves as fully as possible. Modern exploitation technologies, in particular for coal, do not meet the requirements of good deposit-utilization. Those technologies had been developed at a time when energy had been abundant and cheap, and their main purpose had been to reduce production costs.

In the near future, the reserves of non-conventional primary energy, in the form of oil-sands and -shales, could not play an important part in replacing conventional fossil fuels owing to the lack of a technology whose use would be economically justified. None the less, it could be assumed in long-term forecasts, that the contribution of those 'alternative' sources of energy would be important. With regard to the environment, it was stated that problems relating to environmental protection would increasingly favour the promotion of *in situ* extraction techniques instead of the conventional methods of exploitation.

Need for International Cooperation

All primary energy-producing countries of the ECE region and elsewhere could be beneficiaires of enhanced recovery techniques, which can be adjusted to the particular conditions of the various deposits, the Seminar concluded. However, a number of conditions would have to be met, including: adaptation of legal, regulatory, and fiscal, provisions; solution of land-use and environmental problems; training of skilled labour; and a sustained commitment to continued and costly research and development.

The Seminar stressed the need for international cooperation as a means of reducing costs and risks, and of speeding up the application of enhanced recovery techniques. It suggested that the Senior Advisers to ECE Governments on Energy: keep the subject of enhanced recovery on its work programme; call for an informal meeting of experts with the mandate to prepare a consolidated report on the finding of the Seminar and also make proposals as to the contents, work methods, priorities, and calendar, of future work in this domain; and undertake a study on the comparative merits of enhanced recovery techniques and of other options to supply energy in the longer term.

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*See also the paper by Dr Douglas A. Campbell entitled 'Enhanced Oil-recovery and Its Environmental and Economic Implications in the United States', published on pages 5–18 of this issue.—Ed.

New Moves to Help Save East Africa's Wildlife

New impetus has been given to the campaign to save East Africa's and Madagascar's threatened wildlife with the announcement by the International Union for Conservation of Nature and Natural Resources and the World Wildlife Fund that they are to spend more than $600,000 on a wide-ranging programme of conservation measures.

A new national park in Sudan, anti-poaching equipment for Tanzania, assistance for Uganda's beleaguered wildlife, and help to African governments to wipe out

the illegal wildlife trade, are among the activities that IUCN and WWF have agreed to finance over the coming months.

Approximately half of the money will go to help the Sudanese authorities to set up a 'White Rhino protected-area' in southern Sudan—*see* the accompanying sketch-map (Fig. 1, top left). This 800 km^2 area, proposed as a new national park, will be some five times the size of the present Shambe Game Reserve and provide sanctuary for Sudan's 1,000 or so remaining specimens of Northern White Rhinoceros (*Ceratotherium simus*)—the only significant population of this race to have survived anywhere in Africa outside of Zaire.

After the recent concentration on Zambia, the focus of the IUCN/WWF anti-poaching drive has now switched to Tanzania. Following a recent visit to Tanzania by two consultants—one financed by the Frankfurt Zoological Society and the other by WWF—IUCN, in close cooperation with the country's Livestock Development and

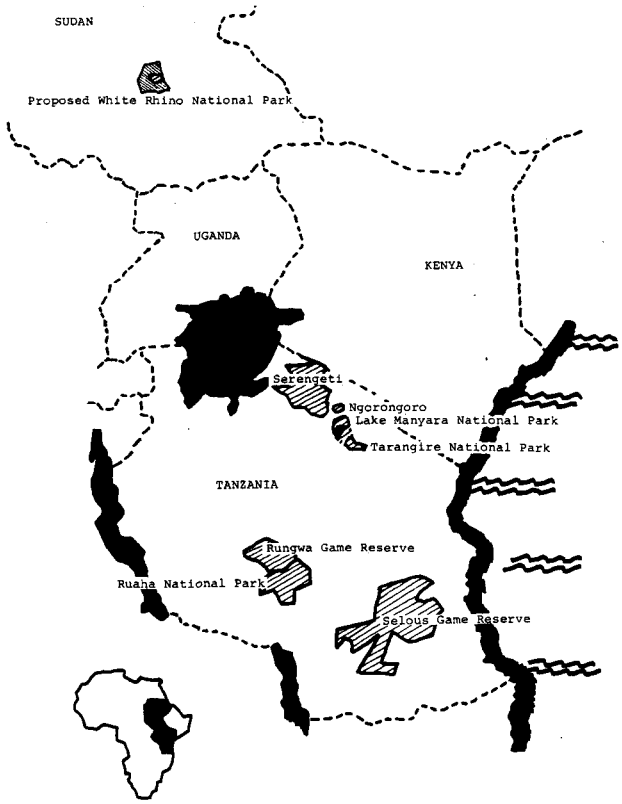

Fig. 1. *Sketch-map of parts of East Africa indicating most of the features mentioned. Scale indicated by Lake Victoria, the large dark area near the centre, which is about 300 km in dimensions.*

Natural Resources Ministry, drew up a $250,000 package of emergency measures.

In Tanzania, highly-organized poaching has reduced the Black Rhinoceros (*Diceros bicornis*) population to around 1,000 in the Ruaha National Park and, what is far more serious, fewer than 100 in the Serengeti (Fig. 1). Ivory poachers are also taking a heavy toll of the African Elephant (*Loxodonta africana*) population in northern Tanzania. IUCN/WWF—on the advice of the Union's rhinoceros and elephant specialist groups in Africa—will be supplying both these parks with anti-poaching equipment, such as vehicles and radio communications equipment.

A disturbing trend in recent months has been the spread of big-time poaching to the southern part of Tanzania which, until now, had been relatively unaffected. About half of the $250,000 has been allocated to help stamp out poaching before it gets a firm hold in the Selous and Rungwa Game Reserves (Fig. 1). The pickings are potentially rich: with about 9,000 Black Rhinos and up to 100,000 Elephants, the two Reserves share one of Africa's finest remaining populations of both species. Extra funds have also been made available to carry out a detailed survey of the rhino population in the Selous Game Reserve.

Other anti-poaching measures announced include the establishment of a field camp at Lake Eyasi in the Ngorongoro Conservation Area, and a $30,000 grant to help the National Parks Authority extend the southern boundary of Lake Manyara National Park to link it with Tarangire National Park. In adjoining Kenya, funds have been earmarked to help the authorities to train rangers in anti-poaching duties.

The IUCN/WWF aim is two-pronged: defeat the poachers on the ground and frustrate the urban-based middlemen by helping African countries to control the international trade in rhino horn and elephant ivory. A grant of $34,000 has been made to CITES—the Convention on International Trade in Endangered Species of Fauna and Flora—to provide expert assistance to ivory-producing countries to control the trade.

A major barrier to the implementation of trade controls is the lack of a universal marking and tagging system to denote legal ivory shipments. IUCN/WWF are providing additional funds to pay for one of their experts to devise such a system. The new marking procedure is being demonstrated to signatory countries of CITES attending its third meeting (in New Delhi, India, early in 1981).

Top priority has also been given to reconstruction work in Uganda. During the eight-year rule of Idi Amin and the anarchy following the Ugandan War of Liberation, the country's wildlife resources were devastated. A grant of $30,000 has been made to support an adviser to the Ugandan authorities on how to go about rehabilitating the country's wildlife conservation areas. Here, IUCN/WWF will work closely with the New York Zoological Society and the African Wildlife Leadership Foundation.

The final element in this comprehensive regional package of conservational measures is help for the rescue of a small lemur in Madagascar called the Aye-aye (*Chiromys madagascariensis*). Restricted to a remote corner of the island, only a handful of Aye-ayes are left. The grant is relatively small—just $10,000—but it is significant because it signals the beginning of a new drive by the two organizations to save Madagascar's unique but in many cases highly-endangered range of endemic animal and plant species and even higher taxa. The new programme will have the full support of the Malagasy Government.

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