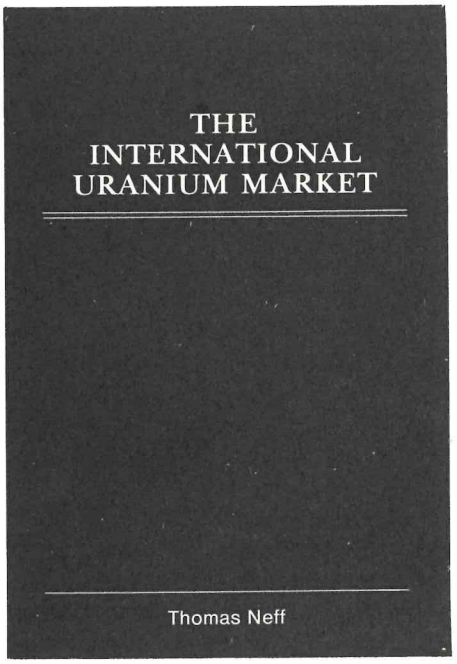
BOOK REVIEW



The International Uranium Market by Thomas L Neff. Ballinger, Cambridge, Mass, 1984. 347 pages.

"This book is concerned with the structure and evolution of the international uranium market and the economic and non-economic forces that shape it." The first part of the book seeks to provide an understanding of the "structure and origins" of a market where "radical change is almost given". Neff commences by describing the structure of the nuclear fuel market from the mining of uranium through its refining, conversion, enrichment, and finally fuel fabrication. These stages are often referred to as the "front-end" of the nuclear fuel cycle. The processing and management subsequent to reactor discharge (ie spent fuel storage, spent fuel reprocessing, and radioactive waste management) are generally referred to as the "back-end". In addition to these activities, the fuel cycle also incorporates the transportation of radioactive material and decommissioning of nuclear facilities.

All front-end and back-end activities of the nuclear fuel cycle potentially affect human health, safety, the environment, nuclear proliferation and theft. Each activity has economic implications for the final product: electricity. Yet Neff completely ignores the back-end of the cycle and the reader may emerge from this volume with the impression that it is of only minor importance. The reviewer would have liked to have seen a separate chapter containing a comprehensive outline of the nuclear fuel cycle as a prelude to this work. Fortunately, this deficiency is easily overcome, since the International Atomic Energy Agency (IAEA) has provided a thorough description of the nuclear fuel cycle which is readily accessible and comprehensible to the layman.[1]

Chapter 2 gives an historical background to the international uranium market. Over its relatively short lifetime, this market has experienced a turbulent and controversial existence. The rapid wartime development of nuclear technology generated by the Manhattan Project demonstrated an urgent need for substantial supplies of uranium during the early 1940s. Uranium requirements increased dramatically during the "Cold War" period and gold-rush style mining booms were witnessed as the United States, and to a lesser extent France and the United Kingdom, embarked on a frantic search for uranium to satisfy their growing demand for the raw material necessary for the expansion of their nuclear arsenals.

As stockpiles grew and world tension eased the demand for uranium declined rapidly and the uranium mining industry fell into a deep recession. It was not until the late 1960s that the industry's fortunes appeared certain to improve, when it became apparent that nuclear power was a viable economic proposition.

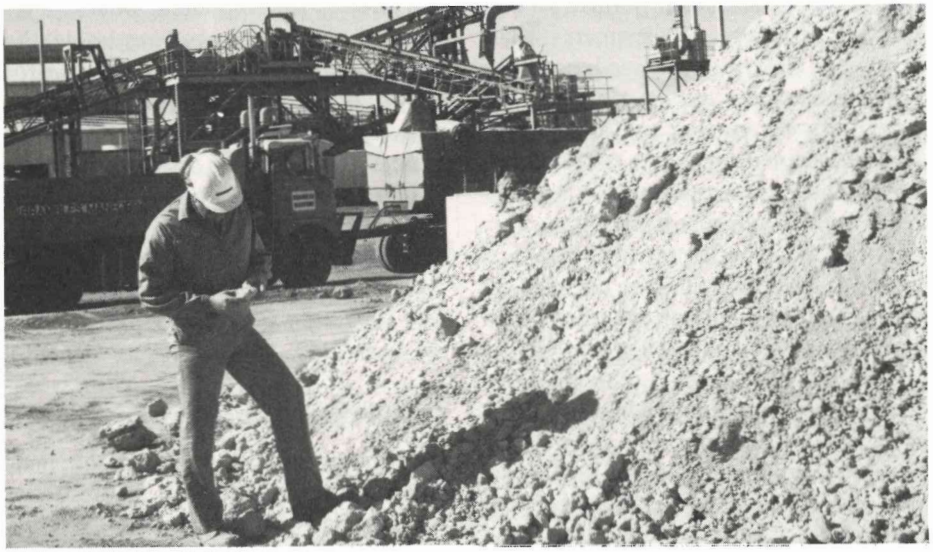
The decade of the 1970s saw the world pre-occupied with the avialability and cost of its growing energy requirements. Electricity consumption in the OECD countries had grown at an annual rate of approximately 7 per cent during the 1960s (ie it virtually doubled over the decade) and power utilities were investing heavily in additional generating capacity in the belief that this rate of growth would continue unchecked for the foreseeable future. Nuclear power was envisaged to play a central role in the electricity supply industries of many industrialized nations over the remaining years of the twentieth century. In 1970, the Organisation for Economic Co-operation and Development (OECD) estimated that installed nuclear capacity in the industrilized nations over the ensuing decade would increase from a level of just 18 GWe to reach 300 GWe by 1980. The raw materials required to fuel the projected growth in power consumption (coal, oil and uranium) were all being supplied at, what appears in retrospect to have been, bargain prices and a prosperous 1970s seemed assured.

The OPEC oil embargo of October 1973, and the fourfold increase in the posted price of Saudi Arabian light oil over the ensuing ten weeks, cast a shadow of an impending world energy shortage. The outcome was a rapid rise in the price of coal, oil and uranium as utilities scrambled to ensure the security of their future fuel requirements. The OPEC crisis, however, was just one in a succession of events which exerted a major impact on the uranium market in the early 1970s. Combined, these events generated a very spectacular and extremely controversial, but fairly short-lived, explosion of uranium prices. By comparison, the increases in oil and coal prices following the OPEC embargo were relatively minor. Neff traces the development of the uranium market through these times of political and economic uncertainty to the relatively more sedate market of the early 1980s.

Part I is completed with chapters on "uranium resources and supply" and "uranium demand". Most of the data presented by Neff are readily available from the OECD Red books.[2]

Part II of the book represents its major contribution. A very detailed survey of the uranium industry in each of the

The pilot plant at Yeelirrie, Western Australia. The plant is operated by Yeelirrie Development Co. Pty. Ltd., jointly owned by Western Mining Corp., Holdings (85%) and Urangesellschaft, BRD (15%), which are awaiting Government approval for full scale mining.



major uranium exporting nations (Australia, Canada, Gabon, Namibia, Niger and South Africa) and a description of the political environment affecting each nation's role in the international trade of nuclear fuel. "The industry analysis is conducted on a mine-by-mine basis and includes consideration of resource characteristics, ownership and foreign participation, and export commitments." The roles of France and the United States as major traders of uranium are also analysed.

The veil of secrecy which has always covered the uranium industry inevitably means that some of the information provided by Neff is incomplete, while some may be inaccurate. Nevertheless, he has succeeded in marshalling a vast number of facts (from a large array of sources) which provides the most comprehensive information base currently available for the uranium industry.

In common with the reviewer, Neff has been unable to penetrate the secrecy surrounding complete ownership details of the Rössing deposit in Namibia. The 22.88 per cent which remains a mystery undoubtedly includes a South African interest in addition to General Mining and the Industrial Development Corporation. Can somebody please fill this gap in our information?

The third section of the book integrates parts I and II with Neff presenting a long-term analysis of the supply and demand situation for the major uranium consumer nations: France, Japan, the Federal Republic of Germany, and the United States. Together these four nations dominate the nuclear power industry, accounting for a little over 80 per cent of OECD operable nuclear capacity in 1983, a figure which is likely to change very little over the ensuing decade.

Neff concludes his book by developing his ideas on how much the market will develop in the long-term, with the growing significance of secondary markets leading to greater efficiency in the allocation of surplus requirements. His long-term prognosis for the uranium industry is pessimistic. Without a resurgence of order for nuclear power plants "the world uranium industry can look forward to a prolonged depression, punctuated, perhaps, by transient disruptions arising from national and international policy shifts".

An important omission in Neff's analysis of the uranium market is, in the reviewer's opinion, his failure to recognise the link between uranium spot market prices (as reflected by NUEXCO's Exchange Value[3]) and the relative (to consumption) level of uranium inventories. In the short-term the role of inventories is central to the process of price determination, and it has been the dominant factor in keeping prices depressed throughout the first half of the 1980s. While the growth of secondary markets is allowing a greater flexibility with respect to disposing of uranium which is surplus to current requirements, it is difficult to perceive any improvement in spot market prices while inventory levels are running at the equivalent of four to five years of forward consumption. Perhaps Neff would consider such a rigorous approach to this topic to be outside the scope of his already sizeable volume. With all due modesty, however, the reviewer would like to assure the interested reader that such an analysis is provided elsewhere.[4]

This book represents the end product of a major, seven year, project undertaken by Neff and an army of researchers. It contains a wealth of statistical and qualitative information on the world uranium industry which is unmatched by any other single source. It should be the first work consulted by anybody wishing to gain an in-depth grasp of this fascinating market.

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Footnotes

[1] International Atomic Energy Agency, *Guidebook on the Introduction of Nuclear Power,* IAEA, Vienna, 1982.

[2] OECD Nuclear Energy Agency and the International Atomic Energy Agency, *Uranium: Resources, Production, and Demand,* OECD, Paris, December 1983, is the most recent edition of the "Red book" which has been published periodically since 1965.

[3] NUEXCO is a San Francisco-based uranium brokerage company.

[4] Anthony D Owen, *The Economics of Uranium,* Præger, New York, 1985 (forthcoming). ■