THE PETROPORPHYRINS IN THE OIL SHALE FROM THE JULIA CREEK DEPOSIT

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BIOGRAPHIES

A. Ekstrom, B.Sc., Ph.D. (University of N.S.W.) was employed by the Australian Atomic Energy Commission during the period 1969 - 1981, and is now employed by the CSIRO Dvision of Energy Chemistry. His main interest is physical chemistry, and he is now head of the section investigating the chemical and retorting properties of Australian oil shale.

H.J. Loeh, B.Sc. (University of N.S.W.) joined the Australian Atomic Energy Commission in 1970, working on in-site chlorination of power station cooling water, and kinetic studies of solid phases associated with UO_2 production and uranium isotope enrichment. He joined CSIRO in 1982 and is now engaged in the examination of petroprophyrins in oil shale.

L.S. Dale, B.Sc. (Sydney) ARACI, was employed in the analytical chemistry section of the Australian Atomic Energy Commission over the period 1960 - 1982. His main area of interest has been analytical spectroscopy involving a wide range of spectrometric instrumentation. He joined CSIRO in 1982, and is now involved in trace element characterisation of oil shales and energy-related materials.

SUMMARY

The compounds solvent extracted from Julia Creek oil shale with chloroform have been examined by a variety of techniques including chromatography and mass spectrometry. These studies have provided the following results:-

1. The oil shale contains signigicant concentrations of elements such as iron, copper, chromium, molybdenum and zinc which are present as metal-organic complexes. However, the major metal organic species present are vanadium and nickel porphyrins.

2. The concentration of the solvent extractable froms of the nickel and vanadium porphyrins show marked variations with depth in the deposit, although these forms are generally associated with the oil shale.

3. At present it appears that the nickel and vanadium are complexed to different types of porphyrin compounds. This observation may indicate that these two species have different origins in the deposit.

4. The vanadium porphyrins are an extraordinarily complex mixture which includes compounds tentatively identified as phylloerythrin and chlorin derivatives. In addition, porphyrins of a molecular weight in the range 1000 - 1200 are present in significant amounts, as are compounds containing vinyl substituent groups.

5. The presence of these thermally and chemically quite unstable compounds in the deposit suggests that despite its age, the deposit has undergone very little maturation.