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NORDIC-IFRF COURSE IN ESTONIA: SOLID FUELS UTILIZATION AND ENVIRONMENT

From the 25th to the 27th of August, 1992, in a neighbourhood of Tallinn, Estonia, at Lohusalu a Nordic-IFRF intensive course "Solid Fuels Utilization and Environment" was organized. The course was carried through by the Nordic Energy Research Co-operation, the International Flame Research Foundation (IFRF) and the Helsinki University of Technology.

The IFRF is a non-profit organization founded in 1948. The foundation is devoted to researching into the combustion of fuels fired in industrial processes. At present there are national committees of IFRF in the following ten countries: Australia, The Netherlands, Great Britain, France, Italy, The United States, Japan, Germany, Finland and Sweden.

The Nordic Energy Research Co-operation is devoted to supporting the different areas of research in the technical universities in the Nordic countries: Finland, Sweden, Norway, Denmark and Iceland. The programme was initiated in 1986 and the current plans extend to 1994. The programme including six main areas of research activity, among these the Solid Fuels, is financed by the council of Nordic Energy Ministers.

At the course at Lohusalu among 19 lectures two lectures concerning oil shale utilization were presented.

Arvo Ots (Tallinn Technical University, Estonia) presented a lecture on oil shale utilization in Estonia. Since the subject-matter of this lecture was published in some "Oil Shale" papers, there is no need to give its digest.

Henrik Wallman from the Lawrence Livermore National Laboratory (LLNL, University of California, U.S.A.) in his lecture "Oil shale in the U.S.A., properties and application" described a new project of a 12,000 tons (11,000 tonnes) per day oil shale throughput coproduction plant, producing per day 8,000 bbl (1,270 m³) shale oil and 1,560 MWh net electric power.

The annual production of the plant by 330 operating days is planned to be 0.42 million m³ of shale oil and 0.51 TWh of commercial electricity derived from approx. 4 million tons of 28 GPT (103 kg oil per tonne) Colorado oil shale.

The scheme of the 12,000 tons per day oil shale coproduction plant is depicted on the present figure (see p. 278). The pyrolyser of the plant is similar to the Chevron STB retort with 700 °C recycle oil shale ash as heat carrier.

It was calculated that the operating costs after reducing of the sold electric power credit for the US\$ 0.05 a kWh are about US\$ 9 per barrel of shale oil.

The calculated capital cost of the installed plant (US\$ 370 million) is US\$ 21 per barrel of oil.

It was concluded that shale oil and electric power can be co-produced in a relative simple plant at moderate cost, but there must be developed a hot vapour filtration for the dedusting process of the shale oil, as well as sulfur capture by shale carbonates and NO_x reduction by ammonia in retort water (the Colorado and Utah oil shales are rich in nitrogen).

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Plant Costs = \$21/BBU
 Operating Cost = \$9/BBU

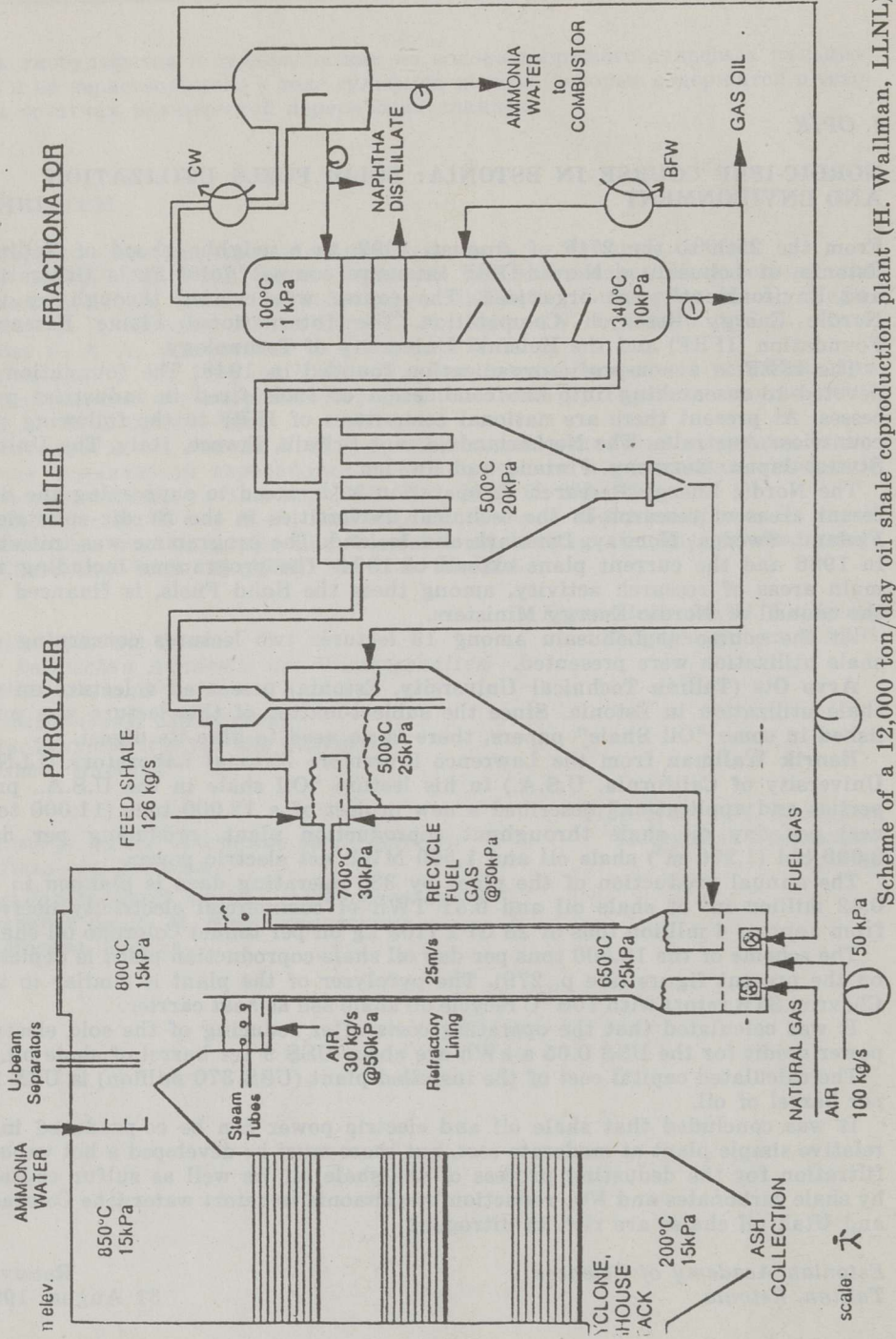
HEAT RECOVERY

COMBUSTOR

PYROLYZER

FILTER

FRACTIONATOR



Scheme of a 12,000 ton/day oil shale coproduction plant (H. Wallman, LLNL)