SOLUTION MINING RESEARCH INSTITUTE

812 MURIEL STREET
WOODSTOCK, ILLINOIS 60098
815-338-8579

MEETING PAPER

TITLE:

Natural Gas Storage Project at Ll. Torup, Denmark

RESPONDING AUTHOR:

Ole Bernt Frydenberg
DANSK OLIE & NATURGAS A/S
Agern Allé 24-26
DK - 2970 Hoersholm, Denmark

Manchester, UK
October 1982

0. SUMMARY

The salt diapir at Ll. Torup was investigated by D.O.N.G. in 1978 to 1981 for the possible use as base rock for development of caverns. The geological and geophysical investigations consisted of a 12-fold reconnaissance seismic survey, to supplement previous seismic surveys, a densely spaced surface - gravity survey and the drilling of 8 boreholes of which the 6 were prepared for a subsequent leaching. A geological model has been developed based on the oriented drill cores taken in each drill hole. The inclination (dip and strike) of the salt structure was measured to $70^{o}C$ - $90^{o}C$ leading to reduced compression yield stress, when loading the cores uniaxial and made further triaxial test necessary.

The Danish Authorities (DEA) participated in the interpretation of the initial results and a set of guidelines were issued as a frame of regulations for the design of caverns. Based on extensive laboratory test programmes the caverns were designed, using Finite Element Calculation Programmes and a set of material laws, (S. Krenk, Menzel/ Schreiner, Burger's modified). Presentation of the major findings are that no stability rupture will occur but substantial creep is to be suspected if internal pressure falls to around 8 MPa.

The layout of the gas plant includes intake pump station and dilution station at Virksund, leaching water and brine discharge pipelines, high pressure leaching facilities and blanket gas installations. A thorough design procedure has been followed through basic design, technical notes on detail investigations and latest detailed design.