

ECONOMIC, PETROLEUM, AND GROUNDWATER GEOLOGY

The Structure of the Salt Deposit at Pugwash, Nova Scotia

by ROBERT EVANS

Department of Geology, University of Kansas,  
Lawrence, Kansas

Provincial and Federal interest in research into the salt deposits of Nova Scotia has increased of late. The most recent expression of that interest is the \$150,000 research grant awarded by the ATLANTIC DEVELOPMENT BOARD to the NOVA SCOTIA RESEARCH FOUNDATION for Potash exploration at Pugwash, Nova Scotia. The Research Foundation previously had instituted a number of investigations into the Pugwash salt deposit, and also supported a structural study, the conclusions drawn from which form the basis of this report.

The study of the internal structure of the salt deposits of North America is new. Balk published the first complete report in 1949, and Kupfer (1963) presents an excellent summary of the work done to 1962.

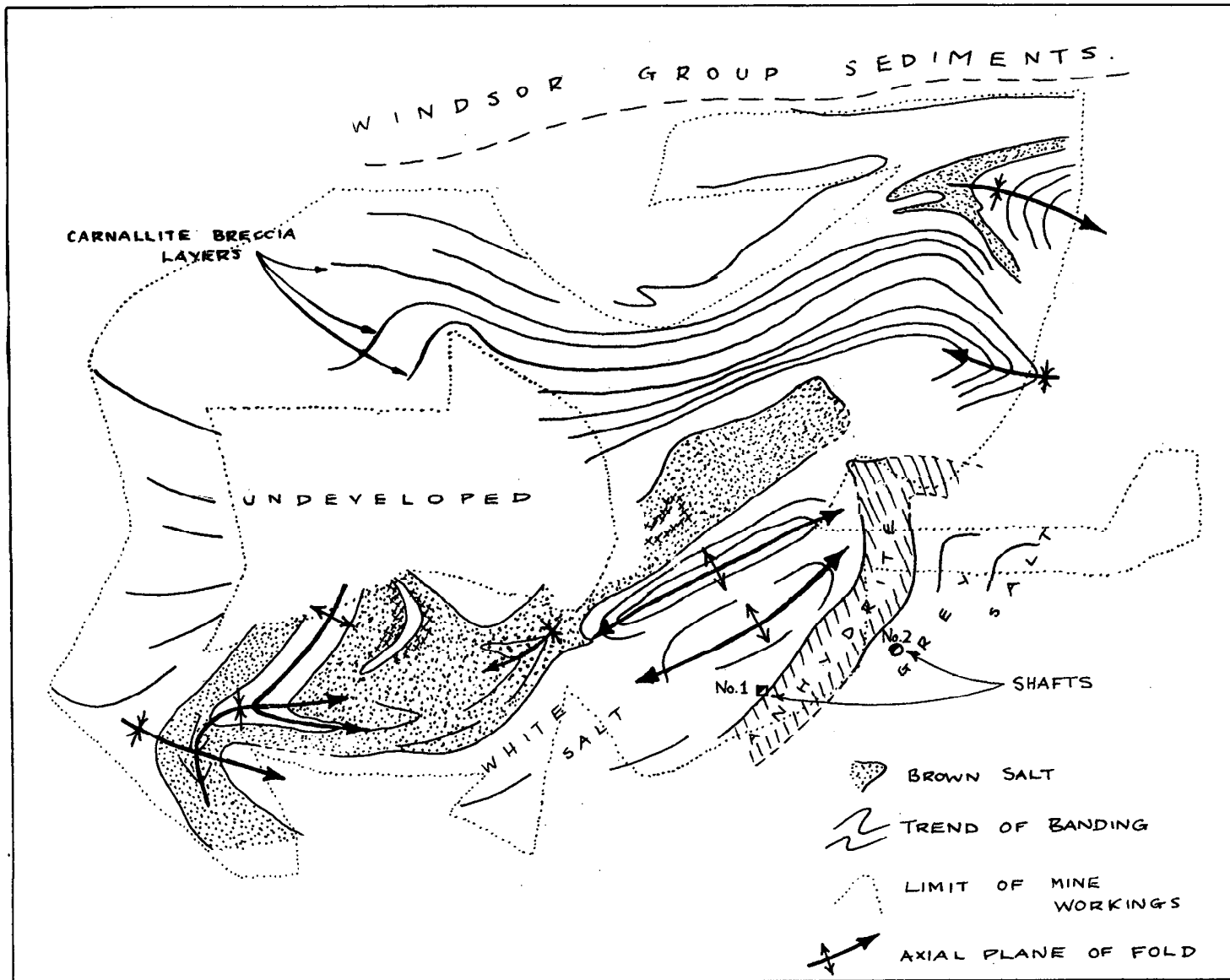
The deposit exposed in the mine at Pugwash consists of white, grey and brown halite. The principal contaminating agent is anhydrite, and it occurs poikilitically within halite grains, as fragments of once continuous layers and as a single 100 ft. thick layer (see map). Interbedded with the halite are three brecciated clastic layers. In the north-western part of the mine, three distinct carnallite breccia units can be traced over a considerable distance, and one layer of sylvite-carnallite-halite rock occurs within the deposit.

The halite is colour-banded, and both fine and coarse banding are present. The anhydrite is generally massive, but the main layer of the mineral contains two clastic layers and a zone of fine banding.

The salt body has been severely deformed, and over 50 folds have been identified within the deposit. Plunging and non-plunging synforms and antiforms are common structures. Two domes have been traced out completely and several refolded folds are clearly exposed. The traces of the axial planes of the folds within the salt body are orientated within  $40^\circ$  of the trace of the axial plane of a major fold in the overlying Pictou group sediments.

The north-western boundary of the salt deposit was determined by horizontal drilling on the mining level, and the salt exposed in the mine forms part of a large plunging anticline. The main anhydrite layer lies near the bottom of the exposed sequence, and five distinct salt zones lie above it.

Little mineralogical work has been done in the deposit, and it is only recently that any chemical work has been attempted. The staff of



SIMPLIFIED GEOLOGICAL MAP OF THE SALT DEPOSIT  
 AT  
 PUGWASH, NOVA SCOTIA

the mine have expressed great interest in further research, and it is hoped that in the near future more extensive work will be undertaken in this very interesting salt body.

References Cited:

BALK, R., 1949, Structure of the Grand Saline Salt Dome, Van Zandt county, Texas: Amer. Assoc. Petroleum Geologists, Bull. vol. 33, p. 1791-1829

EVANS, R., 1965, The structure of the Salt Deposit at Pugwash, Nova Scotia: unpublished M.Sc. Thesis, Dalhousie University

KUPFER, D.H., 1963, The structure of salt in Gulf Coast Domes: in Symposium on Salt, Northern Ohio Geol. Soc., p. 104-123

Nominees of SHELL CANADA LIMITED and other petroleum corporations have applied to the Nova Scotia Department of Mines of petroleum licenses (see map). Shell's application dates from April, 1965. Its area is 23,500,000 acres, about twice the size of mainland Nova Scotia, and includes more than 70% of the Scotian shelf.

The ATLANTIC DEVELOPMENT BOARD Canadian Government has approved an intensive foundation study of a tidal power dam at the entrance to the Minas Basin, Bay of Fundy. Chairman IAN M. McKEIGAN states that the study may show that the Minas Basin can produce more power, more cheaply than either Passamaquoddy or Hamilton Falls.

Tidal range at the site of the study is in the vicinity of 10 meters. The highest tides in the world are said to occur off Burntcont Head within the basin, where tides over 17 meters have been reocrded.

The proposed study is the last in a series of surveys which began at the beginning of the century. The study supplements a similar study recently conducted in the nearby Cumberland and Shepody Basins.

The contract for the study has been given to HUNTEC LIMITED of Ottawa.

