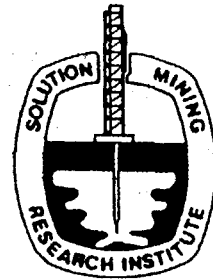


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**MEETING
PAPER**



**Surface Seismics as a Method of
Monitoring Underground Gas
Storage in Salt Domes.**

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ABSTRACT

In the paper a possibility of detecting gas leakage from gas storage through fractures in the dome's cap is presented. It is proved that the observed seismic wave field anomalies (Andrew et al. 1991, Van den Bark et al. 1980, Eliason et al. 1983) above gas deposits are caused by continuous diffusion of hydrocarbons into the rockmass. These anomalies have good correlation with geochemical anomalies. The identification of „hydrocarbon diffusion chimneys” and their correlation with the surface geochemical anomalies are deposit indicators (England et al. 1987).

The same situation is observed above underground gas storage when gas is escaping from the salt dome. To determine a relationship between velocity changes and gas saturation ratio theoretical modelling (Bała 1989, Kuster and Toksoz 1974) was conducted for the Mogilno salt dome. Also the theoretical seismic field was constructed for models „with” and „without” gas to determine the criteria for identifying seismic anomalies due to gas diffusion (Pietsch et al. 1996). The model was based on the geometry of the most important lithological boundaries. The migration paths were assumed as the faulted zones in the clay-gypsum cap.

The zones of gas migration can be seen as zones of uncontinuous seismic boundaries and incoherent strong events. Very distinct seismic anomaly point to a possibility of identifying zones with vertical gas diffusion in seismic records.

The seismic profiles should go along the geochemical profiles. The mentioned criteria will be applied to the interpretation of the seismic wave field.

The monitoring of the area above gas storage will be made with the high resolution seismic method before and during exploitation of the gas storage.

The Department of Geophysics proposes the following means for investigations:

- the TERRALOC Mk6 seismic measurement system with 48 channels,
- the Elastic Wave Generator as an environmentally safe, fast and economical seismic wave source,
- the PROMAX system for seismic data processing,
- the CHARISMA workstation for graphical presentation of results.

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