

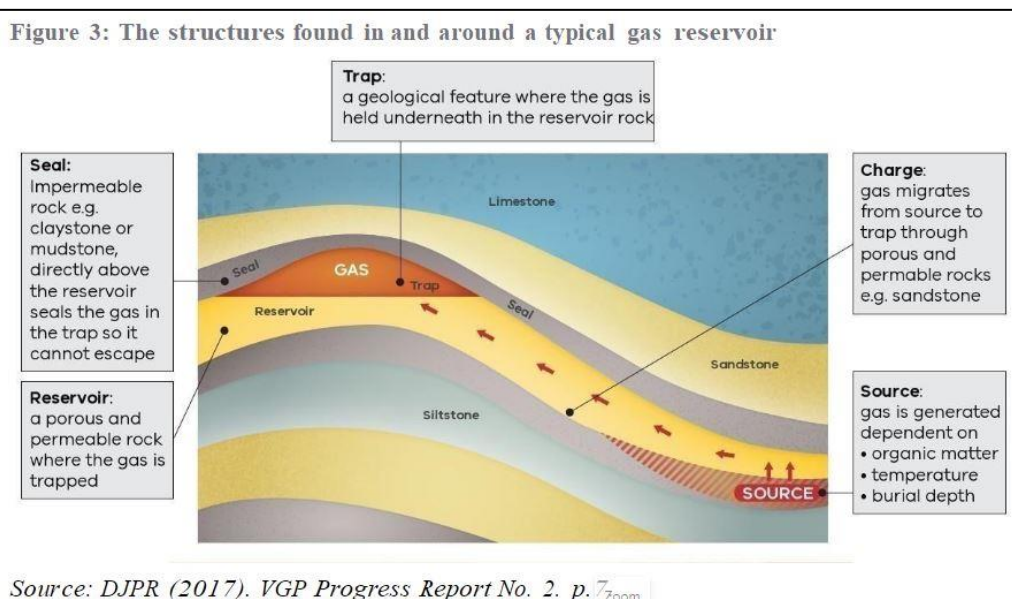
SEISMIC SURVEYS IN GAS EXPLORATION



Victoria's gas supply has been safely sourced for over forty years through the use of geophysical seismic surveys to locate gas reservoirs. Virtually all gas exploration wells, onshore and offshore, are drilled on locations that have been identified by seismic survey data. Scientifically based seismic surveys are undertaken by contractors using equipment designed specifically for these operations.

How are gas fields formed?

Gas fields are located deep underground where a reservoir rock layer has been squeezed by geological forces to form a 'dome' structure. Gas floating through the reservoir layer from where it was generated is trapped in the structure and accumulates over geological time to form a gas field. The layer of rock immediately above the reservoir rock must also have the right characteristics to act as a seal, to lock the gas in place in the reservoir.



How do seismic surveys indicate new gas fields?

These deep geological structures have no associated topographic features on the surface above. Their locations can only be found by producing detailed depth maps of the upper 'surfaces' of rock layers known to contain gas.

The scientific data required for producing these depth maps is provided by seismic surveys. Sound waves generated on the surface are reflected back as they cross the boundaries between rock layers during their descent through the subsurface. Sensors on the ground measure the time taken for the two-way travel of these reflected waves. The depth to a reflecting boundary can be calculated from the two-way travel time of the sound wave it has reflected.

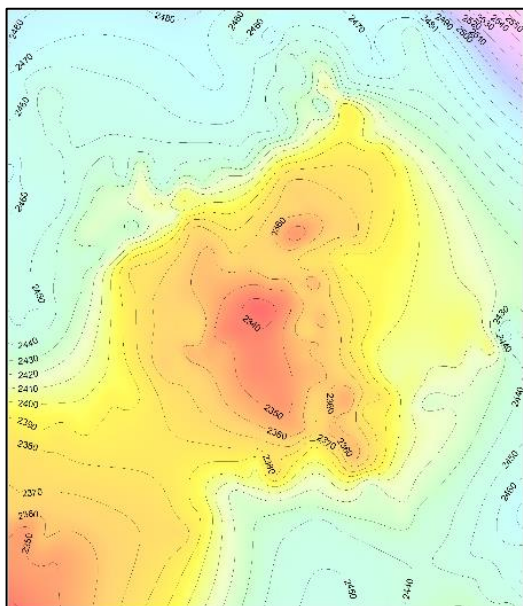
Soundings taken at close spacing across the survey area provide a grid of the depth to the top of the gas-bearing rock layers and can identify possible traps and give an indication of the chance of them containing commercial quantities of migrated gas.

Factors taken into account in the assessment of the traps are their shape, size, location, and the time the structure was formed.

A structure that is assessed as having sufficient potential for containing economic reserves of gas is then tested by drilling an exploration well.

The drilling operations provide indications as to whether the target rock layer has the right composition at that location for storing commercial volumes of gas, and how much migrating gas may have been trapped.

If the indications are positive for a commercial resource, the well is completed as a production well.



Further background information on the role that seismic surveys play in exploring for new gas fields and on the obligations on exploration companies undertaking exploration has been prepared by the Earth Resources Division of the Department of Jobs Precincts and Regions. This information can be found on their website:

<https://earthresources.vic.gov.au/community-and-land-use/landholder-information/oil-and-gas-exploration-on-private-land>