

The Successful Application of Surface 2-D Resistivity to the Exploration and Direct Detection of Quaternary Gas Reservoirs

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ABSTRACT

Since 1993, very shallow (less than 100 m depth) Quaternary gas reservoirs have been known to exist in northwestern Alberta. These reservoirs are Quaternary glacial meltwater channels with a till or lacustrine clay trap. The reservoirs have been produced only since 1998. Presently, two fields are being developed. Individual wells in the Sousa field have reached flow rates of as high as 4.4mmcf/d (5-13-112-24W5). Cumulative production in wells in the Rainbow field have exceeded 1 bcf. Due to the extremely shallow nature of the prospects, seismic reflection has been unsuccessful in exploring for these gas charged channels. Since 1999, cost-effective two-dimensional (2-D) geoelectrical imaging techniques have been applied to this prospect with spectacular results, not only in imaging the channels, but in directly detecting economic gas deposits. The product of a 2-D imaging survey is a true geoelectric section, that is, a cross-section of true resistivity versus true depth. Since 1999, over 3,000 km of this type of data collection has been carried out in northwestern Alberta. Over 1,000 km of these surveys have been carried out elsewhere in Alberta in search of a similar play concept.