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Howard Ranch: Hunting For Overpressured Plumbed Structures In The Wind River Basin, Wyoming

Major natural gas accumulations can occur when a shallower structural closure is plumbed into deeper overpressured, usually basin-centered gas accumulations and mature source rocks. In these cases, deeper overpressured gas may leak upward along faults and fractures charging the shallower stratigraphic intervals. In those cases where the shallower stratigraphic sections are characterized by thick intervals of stacked lenticular sands, these Overpressured Plumbed Structures have developed into giant natural gas discoveries, as in the case of Jonah and Pinedale Fields. Madden Field, and the Howard Ranch discovery, both located in the Wind River Basin, appear to be other classic examples of Overpressured Plumbed Structures.

The Howard Ranch Structure is located in Township 39 North, Ranges 92 and 93 West, just west of Madden Field. The structure is partially concealed and truncated by the Owl Creek Thrust and is separated from Madden field by a structural saddle. The targeted stratigraphic intervals are the Lower Fort Union, Lance and Mesaverde Formations. Howard Ranch Field displays pressure gradients ranging from 0.53 psi/ft for gas-charged sands directly below the Waltman Shale, and increasing to over 0.67 psi/ft gradient for the lower Lance and Mesaverde sand intervals. Currently, over 12,000 feet of gas column has been discovered in the Lower Fort Union, Lance and Mesaverde Formations. Permeabilities average 20 microdarcies in porous sands shallower than 14,000', approximately 4 times greater than average Pinedale permeabilities. Generally, water saturations appear to increase downdip, and some wells do produce free water from some intervals.

Staged-frac technology has been used with mixed results. Currently several studies are being conducted to find the optimum frac techniques and frac fluid for artificial stimulation. Gas-in-place calculations for both the Madden and Howard Ranch Structures are huge, estimated to be in the 10's of TCFs combined.