

The Effects of Interbedded Salt & Potash on Cemented Casing at Dewdney Field

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Abstract

The Dewdney Field is composed of eight salt caverns currently operated by Spectra Energy at their liquid hydrocarbon transfer terminal near Regina, Saskatchewan. Four of the caverns are active hydrocarbon storage caverns and the remaining four are inactive. The caverns are completed in the Prairie Evaporate salt, which is an extensive bedded salt formation that runs from northwestern Alberta through southeastern Saskatchewan in Canada. The Prairie Evaporate salt interval at Dewdney Field is approximately 115 meters thick with top of salt at 1,575 meters and base of salt at 1,690 meters, generally. The upper 65 meters of the salt interval is composed of interbedded salt and potash. Throughout the operational history of the cavern field, this interbedded interval has proven to increase strain on the cemented production casing of each cavern well. All of the wells have experienced some degree of cemented casing damage, and four of the eight wells have experienced severe casing separations within the interbedded interval. The casing strain and subsequent wellbore complications are occurring at a higher rate than normally expected or observed in other cavern fields. The casing damage has forced the operator to complete complex well remediations, which in some instances leads to the drilling of a second cavern entry wellbore to maintain the required hydrocarbon throughput rates. These remediation operations in combination with the unique effects of the interbedded interval, also lead to completing complex mechanical integrity tests. Geotechnical analysis of formation cores, wireline logging, and other investigative operations have been completed to gain a better understanding of this interbedded interval. The knowledge gained from these analytical and investigative studies have proven to maintain the safe functionality of the hydrocarbon terminal, and have established possible solutions for constructing new cavern wells in the field. The intent of this technical paper is to summarize the geological analysis and engineering solutions applied at the Dewdney Field.

Keywords: Casing Damage, Casing Strain, Casing Separation, Potash, Interbedded, Void, Communication, Bedded Salt, Clay