CASING ANALYSIS FOR WELL INTEGRITY INVESTIGATION

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Abstract

The U.S. Strategic Petroleum Reserve (SPR) has an increasing reliance on multi-arm caliper surveys to assess the integrity of casing for cavern access wells and to determine priorities for casing remediation. Multi-arm caliper (MAC) surveys provide a view of casing deformation by reporting radial measurements of the inner casing wall as the tool is drawn through the casing.

Over the last several years the SPR has collected a large number of modern MAC surveys. In total, these surveys account for over 100 million individual measurements. The surveys were collected using differing survey vendors and survey hardware. This has resulted in a collection of disparate data sets which confound attempts to make well-to-well or time-dependent evaluations. In addition, the vendor supplied MAC interpretations often involve variables which are not well defined or which may not be applicable to casings for cavern access wells. These factors reduce the usability of these detailed data sets.

In order to address this issue and provide an independent analysis of multi-arm caliper survey data, Sandia National Labs has developed processing techniques and analysis variables which allow for the comparison of MAC survey data regardless of the source of the survey data. These techniques use the raw radial arm information and newly developed analysis variables to assess the casing status and provide a means for well-to-well and time-dependent analyses. Time-dependent investigation of the MAC survey data can provide information on rates of casing deformation helping to prioritize well remediation activities and identify wells with integrity issues. This paper presents the challenges in using disparate MAC survey data, techniques developed to address these challenges, and some of the insights gained from these new techniques.

Key Words: Well Casing, Well Logging, Storage Cavern, DOE (US Department of Energy)