

Asset integrity management is a key requirement for all operators, not least because shareholders like to know that their investments are in safe hands

WELL INTEGRITY – WHAT YOU CAN MEASURE, YOU CAN MANAGE

While surface facilities, and especially pipelines, have received a great deal of attention in this respect, well integrity has tended to come further down the agenda. To begin with, "well integrity" is difficult to define: every operator has their own definition – or even several of them. Part of the problem is that the integrity of a well depends on the condition of a wide variety of elements, from the top to the bottom of the hole, from the inside to the outside. Consequently, coming up with an overall assessment of well integrity is not a trivial matter.

The most common definitions of well integrity are based on the concept of retaining two intact barriers between the well and the external environment, as normally dictated by the original design. This is clearly reasonable, but only so long as we not only

consider the status of the barriers today – derived from data monitoring – but also seek to anticipate the status of well barriers in the future – which can only be done by predictive analysis of current measurements.

Monitoring tubing string and casing pressures, production data, wellhead movement, wellhead seals and so forth will generate information about well integrity status on the day the information is gathered. However, by adopting a more analytical approach that data becomes very much more valuable. By breaking down the well integrity evaluation into a condition analysis of key components, and then predicting their rate of deterioration, it is possible to obtain advance warning of an integrity problem. This is the essential step if well integrity is to be managed,

rather than dealt with reactively.

The Intertech Well Integrity Toolkit was developed in response to demands from operators for a practical tool that does more than just monitor data – that gives a true insight into the integrity of their wells. The Toolkit provides operators with a complete overview of their operating units, with the integrity status of each well highlighted. This makes it very easy to see where there may be problems and how extensive they are. By reviewing the statistics for the full field, the percentage of wells with integrity failures of key components can be seen instantly and the economic impact of those integrity failures assessed. This provides a way to manage production so that workover activities can be focused on safety-critical as well

as production-critical wells.

Engineers using the software can readily establish the reasons for a loss of integrity of individual components in each well. An estimate can be made of when a failure may be expected, based on an analysis of current and historical operating data, and component reliability analyses can be carried out to identify frequently failing items. Going one step further, analysis of well annular pressure diagnostic test data can be used to identify leakage points within a well and define optimum well remediation measures.

The aim of the Toolkit is to provide the well integrity engineer with the ability to make an across-the-board evaluation of all the threats to individual wells in order to make the best remediation decisions. Streamlined and consistent data collection enables efficient technical well evaluations to be made, which is crucial when there are large numbers of wells to be monitored, and especially when the range of well designs and operating conditions varies widely.

The Toolkit is an on-line system that uses continuously updated field data and automatically evaluates the information. This enables rapid and systematic identification of threats to a field's production and the integrity of its wells. As a result, remedial action can be established before well integrity becomes critical, leading to improved safety and increased confidence in the robustness of wells in operation. There is also an audit system to demonstrate that wells are operated and maintained in a safe fashion, and to track the identification, and solution, of integrity problems.

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