Wellbarrier Planning

Enhance operations planning and safeguard the execution of well activities

Introduction

The Wellbarrier well integrity management solution provides a digital framework to enable a holistic view of well integrity and helps identify failure modes and possible consequences. It helps to assure the safety of people, assets, and the environment. Furthermore, engineers spend less time searching for well data and know exactly where to find the latest, most accurate well information.

The Wellbarrier solution consists of the following:

→ Wellbarrier Planning supports decision-making during planning operations and safeguards the execution of well activities.

→ Wellbarrier Integrity Management provides a digital framework to manage well integrity through drilling, well testing, completion, production, intervention, workover, plug and abandonment.

Wellbarrier Planning uses the barrier definition (ensuring the necessary barriers are in place and being able to test and verify them) as the basis to ensure that all stakeholders have a clear and common understanding of risk throughout the well life cycle.

Applications

→ Wellbarrier Planning improves decision-making during planning operations and safeguards the execution of well activities by using the barrier definition to support collaboration and mitigate vulnerabilities.

→ The foundation of the solution is the well barrier schematic, it supports collaboration between stakeholders involved in well operations.

→ Risk assessments are performed objectively and systematically using failure mode effect and criticality analysis (FMECA) methodology. Remediation of anomalies are proactively managed and allow prioritization of mitigating measures.

→ Understanding of potential operational challenges is enhanced through visualization of the well inclination, knowledge of the formation strength, and provision of well control action diagrams to support response to unexpected events.

Possible leak paths through primary barrier (1) and secondary barrier (2)

By establishing two independent barrier envelopes, a primary barrier, which is backed by a secondary barrier, operators safeguard well activities and reduce risk.

Where this is not available for legacy or technical reasons, it is equally important to communicate what well barriers are in place.

The advantage of a two-barrier philosophy is that no matter where the pressure might escape, there will always be a protective second barrier in place as backup.
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Both Wellbarrier Planning and Wellbarrier Integrity Management share the following five Wellbarrier solution features.

### Well Data Integration

Defines the hole and casing configuration, completion components, reservoir sections, blowout preventer (BOP) configuration, and other well status information. Domain specialists can share, track, and augment data in real time. Built-in quality assurance continuously improves the data's richness and accuracy.

<table>
<thead>
<tr>
<th>SECTION TYPE</th>
<th>HOLE</th>
<th>CASING</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Size</td>
<td>Size</td>
</tr>
<tr>
<td></td>
<td>inch</td>
<td>inch</td>
</tr>
<tr>
<td>Conductor</td>
<td>24.00</td>
<td>18.750</td>
</tr>
<tr>
<td>Surface casing</td>
<td>17.50</td>
<td>13.375</td>
</tr>
<tr>
<td>Production casing</td>
<td>12.25</td>
<td>9.625</td>
</tr>
<tr>
<td>Production liner</td>
<td>8.50</td>
<td>5.500</td>
</tr>
</tbody>
</table>

### Illustrations

Quickly generates illustrations using intuitive drag-and-drop functionality to represent the well at any stage of its life cycle, enabling the creation of consistent and accurate illustrations in minutes.

### Well Barrier Schematic

Conveys how the well activity should be safeguarded through easy-to-read schematics and summary tables of how to qualify and monitor the defined well barrier elements. The well barrier schematic is the foundation of the solution.

![Well Barrier Schematic Diagram]

### Risk Assessment

Enables performing objective failure mode effect and criticality analysis (FMECA) risk assessments for the well or specific operations. Systematic evaluation of failure modes and consequences supports understanding the risks and specifying mitigating measures to limit them.

### Well Integrity Anomalies Tracking

Provides an overview of well integrity incidents identified during the well's construction and lifetime. This feature is used to assign actions to colleagues, set deadlines, and take corrective action.

<table>
<thead>
<tr>
<th>Date Raised</th>
<th>Observation Title</th>
<th>Component</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>05-Aug-21</td>
<td>LMV Failure</td>
<td>Lower maste valve (LMV)</td>
<td>Monitoring</td>
</tr>
<tr>
<td>01-Aug-21</td>
<td>Ran wireline and detected degraded tubing</td>
<td>4 1/2&quot; Tubing</td>
<td>Manual</td>
</tr>
<tr>
<td>29-Jul-21</td>
<td>Leak in SSSV</td>
<td>Downhole safety valve (150 ftMD)</td>
<td>Monitoring</td>
</tr>
<tr>
<td>01-Aug-20</td>
<td>Bleed down pressure</td>
<td>A Annulus</td>
<td>Manual</td>
</tr>
</tbody>
</table>
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Understanding of potential operational challenges is enhanced through visualization of the well inclination, knowledge of the formation strength, and provision of well control action diagrams to support response to unexpected event.

Interactive Well Inclination Schematic
Provides a clear illustration of the curvature of the well and includes descriptions of the well components.

Well Control Action Diagram
Displays the sequence of proposed actions in the event of an unforeseen incident. Particularly useful if the drilling or wellsite crew is using new or unfamiliar equipment.

Sequence Diagram
Displays a step-by-step visual of how the well activity is progressing. Shows the well and well equipment (without any well barrier lines) and how the well barrier definition is changing as the well activity progresses.

Pore and Fracture Pressure
Determines whether the formation strength is sufficient at critical points in the overburden where casing shoes, cement plugs, or other critical well components are placed.

Industry recognized
The Wellbarrier user community comprises more than 5,000 registered users across 51 countries worldwide. They are using the Wellbarrier solution's user-friendly and intuitive digital tool to efficiently and effectively prepare more than 95,000 barrier schematics to bring them unique, reliable insight to safeguarding their well integrity.

slb.com/wellbarrier