

Technical Requirements and Recent Developments in Well Completions and their Effects on Wellhead Design

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1 Abstract

With the progress in the requirements and derived technical developments of well completions, the complexity of components has meanwhile reached a highly sophisticated standard. Thus being state of the art, technical solutions for one completion unit directly affects the engineering and design of other completion elements.

This fact has to be considered in a special manner for the wellhead assembly since it represents the interface between surface and subsurface installations. Therefore, it can be seen as a main - maybe the most important - element of a well completion. In general, the wellhead has to enable the suspension of the casings and tubings, provide pressure control and access to the annuli.

Depending on the wellhead's purpose, e.g. solution mining, debrining or gas storage, these requirements may diversify in a wide range, and presume certain technical solutions expressing in the wellhead design and its components.

Within the last years, several additional demands concerning safety aspects, technical features and regulatory restrictions for wellheads have arisen. These have led to an amount of varieties in further technical solutions which demand high effort in engineering and planning and will at last reflect in new designs and wellhead assemblies.

Exemplarily for the new challenges in wellhead design, the increasing demand in redundancy of safety devices such as additional and activatable sealing elements can be mentioned. Furthermore, the necessity to integrate control and surveillance features has risen with the increasing application of advanced subsurface completions. Other changes in wellhead design are driven by new maintenance concepts or the attempts to reduce the wellheads overall dimensions due to public acceptance demands.

The paper will mention the general purpose of a wellhead as completion component, reflect on new requirements of recent times and describe the technical solutions based on selected examples. Finally, the advantages in planning and benefits for wellsite operators as a result of these developments in engineering and design will be shown.

Key words: Well Completion, Wellhead, Safety, Acceptance, Gas storage cavern