

THE GEOLOGIC DATA BASE AS IT RELATES TO UNDERGROUND STORAGE PROJECTS

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Abstract

All underground storage projects whether involving domal or bedded salt, depleted gas reservoirs, aquifer storage, or hard rock caverns occur within a geologic framework. This framework consists of three basic aspects: geologic structure, stratigraphy, and associated geologic processes. For storage in salt, the geologic structure includes the geometry and internal stratigraphy or fabric of the salt. Individually or in various combinations these aspects of the geologic framework can influence and affect storage projects during its design, construction, or operational phases. An incomplete evaluation of the geologic framework can lead to cost overruns and abandoned projects.

To adequately understand the interaction between a storage project and its surrounding environment, knowledge of the geologic framework is mandatory. This requires the assembly and use of a suitable geologic database. Because suitable site-specific geologic data are critical to establishing a proper geologic framework and to addressing impending geotechnical issues, a modest properly designed acquisition and retention program generated as the project develops should be an integral element of any active or ongoing storage project. This paper discusses the types of data to be included in a geologic database as well as data acquisition, organization, handling and the use of the database.

Introduction

All underground storage projects whether involving domal or bedded salt, depleted gas reservoirs, aquifer storage, or hard rock caverns occur within a geologic framework. This framework has three basic parts. These are geologic structure, stratigraphy, and geologic processes (Figure 1). For storage operations in various types of salt masses, the geologic structure includes the geometry and internal fabric of the salt mass as well as the depth relationships of the enclosing formations. Stratigraphy includes the lateral and vertical changes in lithology among and within these formations. Geologic processes are those currently affecting the geologic framework and are commonly associated with ground water, salt movement, or regional tectonics. Individually or in combination, each of these three parts of the framework can influence or affect storage projects during the design, construction, or operational phases. Likewise, long-term storage operations can also induce changes to the geologic framework. To understand the interaction between a storage operation and its surrounding environment a knowledge of the geologic framework is required. This requires the assembly of a suitable geologic database.

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