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Compilation and Evaluation of Bedded Salt Deposit and Bedded Salt Cavern Characteristics Important to Successful Cavern Sealing and Abandonment

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1 Summary

Background of this research study is the **SMRI research program on Cavern Sealing & Abandonment**. After the general feasibility of abandoning sealed brine filled caverns in **homogeneous salt structures like salt domes** had been proved in earlier studies, the specific aspects of caverns located in **inhomogeneous salt structures like thin bedded salt formations** have been identified in this study.

The research study is divided into two parts: **Part I** is intended to form the basis; it is an illustrated **geoscientific documentation** on global bedded salt deposits and a compilation of publicly accessible **technical data** on cavern fields for brine production and storage in bedded salt. The subsequent **Part II** is a compilation of the issues faced at the various bedded salt sites relating to **successful cavern sealing and abandonment**, which have not been covered in the previous studies in homogeneous salt structures.

This abstract (chapter 1) is followed by chapter 2 with an **introduction** explaining SMRI's motivation to conduct the study as well as some details on the study's origin and its purpose.

The 3rd chapter describes the **scope of work** defined by SMRI and KBB UT in Part I and Part II of the research project.

Chapter 4 provides an insight into the **geographical location** and **stratigraphy** of **global buried salt deposits**.

The basic conditions required for the **formation of bedded salt deposits** is described in chapter 5 (chapter 5.1). This is followed by a pre-classification of the term bedded salt deposit as used in this study and how these deposits differ from domal salt deposits (chapter 5.2).

Chapter 6 contains **Part I**, i. e. the global **compilation of cavern fields in bedded salt deposits**. This section is arranged hierarchically according to the geographical location of the fields:

- **Continent** (e.g. Europe, North America, etc.)
- **Country** (e.g. UK, Germany, Canada, USA etc.)

- **Salt Basin** (e.g. Permian Basins, Mesozoic Salt Basins, Western Canadian Sedimentary Basin, Michigan Basin etc.)
- **Sub-Basin** (e.g. Teesside Salt Field, Subhercynian Basin, Alberta Sub-Basins, Michigan Basin Rim, etc.)
- **Cavern location** (e.g. Holford, Byley, Epe, Xanten, Fort Sasketchewan, Saskatoon, etc.) or **County** (Cochran, Reno, Rice; only in the USA)

Chapter 7 contains **Part II** of the study which starts with a detailed **classification of** those **bedded salt cavern projects** compiled in Part I. They are subdivided into **homogeneous and inhomogeneous salt structures**. Subsequently the special characteristics of caverns in homogeneous and inhomogeneous salt formations are discussed in consideration of **rock mechanical aspects, tightness of the access borehole, and integrity**. Finally open **questions** are raised and **recommendations** are given for further SMRI R&D projects dealing with sealing and abandonment of inhomogeneous salt formations.

Chapter 8 lists the approximately 200 **references** which form the basis for this study.

Chapter 9 contains the **enclosures**. These consist of **tables** (geographical position and stratigraphy; data for cavern fields in Europe, Asia, and Africa; data for counties with cavern fields in the USA), and **figures** (geological maps and sections, sonar logs etc.).