

AN INTEGRATED VISUALIZATION TOOL TO MANAGE THE INTEGRITY OF UNDERGROUND STORAGE SUBSURFACE INSTALLATIONS

Vincent Barrere

Geostock, Rueil Malmaison, France

Abstract

Nowadays, the vast majority of underground storage wells in the world are over 30 years old. In an increasingly competitive environment, owners have to make their storage assets profitable while ensuring safe operation and being compliant with stringent and evolving regulations. Evaluating the integrity of underground facilities is essential in achieving this objective and can be efficiently managed by setting up a clear methodology involving suitable analysis tools and operational procedures. The Asset Integrity Management System (AIMS) organizes the information and addresses the integrity of the barrier elements of underground facilities throughout their entire life span. This article exposes such a system, running on hydrocarbon underground storages, liquid or gas, for several years. It is notably based on the adaptation of existing standards from the oil and gas industry (in particular the Norsok D10 and ISO/TS 16350-1 norm) to the underground storage industry.

To provide operators a pragmatic flexible user-friendly way to apply this methodology, an in-house management tool has been developed, composed of a structured database paired with a visualization tool, with the objective to demonstrate integrity & traceability and integrate within the operator's management procedure.

The latter consolidates and computes different operational site data to dynamically evaluate the integrity status of underground facilities components. The following functionalities are displayed:

- Asset Integrity Assessment: Well barrier Schematics, Risk Matrix, Leak Paths Diagrams, with an easy access to relevant technical reports;
- Graphs, tables and chronological timeline to view the inspection and monitoring history, analyze the evolution of the different integrity parameters, and provide assistance to schedule the next inspections.
- A module to assist the user in the management of anomalies observed when evaluating the integrity of the asset;
- Data import / Export module
- Key Performance Indicators and geographical mapping of the site facilities with their corresponding integrity status.
- Management System implementation & monitoring tools

All those features comply with requirements in terms of quality control, traceability, and documentation of the displayed data, which facilitates reviews and access to relevant information.

The modular design of the application allows to fit the needs and specificities of each site (number of wells/ caverns, type of storage, integrity criteria and corresponding thresholds, etc...), and to manage the users' rights for the connection to the different features of the tool.

This digital application:

- is building up the experience and know-how that each gas storage site requires before being able to react with swift & efficient action plans
- improves the collaborative exchange of information between the different parties (technical operators, stakeholders, third party companies, administration, etc...),
- provides a tailored solution to follow-up the integrity of an underground storage site,
- is a powerful device to technically investigate, justify and communicate on the status of the asset.

Key words: Well Integrity, Asset Integrity Management System, digitalization, underground storage