

#### **1.7.4. ACOUSTIC EMISSION TESTING OF BURIED PRESSURE VESSELS. IMPLEMENTATION ON A 16,000 m<sup>3</sup> GAS STORAGE UNIT, COMPOSED OF 4 SPHERICAL VESSELS OF 4000 m<sup>3</sup> EACH**

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Acoustic emission testing of pressure vessels has been applied for decades in France, Europe and worldwide. It allows overall and rapid monitoring of large structures, greatly minimizing the time of maintenance and shutdown of plants.

In order to reduce the impact of the presence of large gas storage tanks on the environment, projects of this type are subject to new constraints for several years. These gas storage vessels, cylindrical or spherical, are then covered by either an embankment slope or placed in a sarcophagus filled with sand. The question of periodic control arises fully, since the surface of the pressure equipment is no longer available for inspection. As a compensatory measure to the problem of accessibility, acoustic emission is then possible.

The study reported in this article illustrates all stages of implementation of acoustic emission on a large industrial project of this type: the building of 4 spherical gas storage vessels of 4,000 m<sup>3</sup> each, located in Tunisia. From design, pressure equipments have taken into account the constraints related to the integration of acoustic emission. Indeed, the solution was to use waveguides, allowing monitoring of inaccessible areas due to the presence of the embankment. From laboratory experimentation until final tests after burying, this technology has been validated. The Monitoring of Hydraulic pressure test by acoustic emission provided a first acoustic signature of each vessel, which will serve as reference for the future. This successful project is one of the largest industrial projects in the world if we consider that nearly 400 acoustic emission sensors were needed to control these 4 pressure storage vessels.