Case study: Onshore Mexico

Baker Hughes rejuvenates a mature field, cutting operational costs, improving emissions management and reactivating 393 wells to deliver 10 MMboe in 10 years

In collaboration with a major operator, Baker Hughes developed a solution for the Soledad project, which lies in the southern part of the Tampico-Misantla Basin in the State of Veracruz, Mexico. The field reached peak production in April 1980 at 7,244 bbl/d, and over the years, production had declined at a rate of 3% per month. The operator wanted to reverse the severe rate of decline and modernize the field to address falling production, reduce operational costs, and decrease the environmental footprint.

The operator entered into a multiyear service agreement with Baker Hughes via an integrated exploration and production contract for Soledad, which covers 125 sq km area and includes 393 wells (200 active), eight production facilities, two compression plants, and approximately 450 km of pipelines. The goal was to introduce digital, well intervention, and geology and geophysics (G&G) technologies to improve sustainability by employing feasible solutions that would extend the production life of the field. The scope of work included CAPEX, OPEX, and abandonment.

Between April 2014 and December 2025, a broad range of programs was executed to increase hydrocarbon production without drilling new wells within the Soledad Contractual Area. Programs included:

- 35 major workovers (CAPEX with rig) to add production intervals/change reservoir interval. Average initial production 33.3 bbl/d
- 409 minor workovers (OPEX with rig) to replace subsurface pumps and tubing, Average initial production 29.5 bbl/d
- 33 minor workovers (OPEX with flush-by unit) to replace subsurface pumps. Average initial production 21.7 bbl/d.

Approximately 50% of well interventions in shut-in wells used Baker Hughes RESTORE™ wellbore remediation treatments to remove deposits and reestablish flow in the near wellbore area.

Site work also included improving operational efficiency to maintain production. This encompassed preventive maintenance programs for static and dynamic equipment such as separators, tanks, motor pumps, compressors and instrumentation in separation batteries and gas compression, including pipelines and flowlines. Preventive maintenance programs also targeted artificial lift systems, gas engines, wellheads and production flowlines. Wells were reactivated following minor infrastructure/mechanical work, and beam pumps were relocated to reactivate intermittent wells. In addition, corrosion inhibitors were injected in pipelines to safely extend their service life.

G&G field studies performed by GaffneyCline™ Energy Advisory informed the engineering team's understanding of the reservoir and the creation of intervention assessment processes to identify the best

Challenges

- Improve recovery in a mature, 60-year-old oil field with declining production and aging infrastructure
- Reduce manual monitoring and analysis while enabling flexible, remote, automated field surveillance and improved gas utilization and emissions management

Solutions

- Implemented a digital transformation using Leucipa™ to centralize well data and automate workflows for surveillance and optimization
- Deployed production and integrity initiatives, including Flare-to-Power, RESTORE chemical treatment, and corrosion inhibitor injection to boost productivity, reduce emissions, and protect aging assets

Results

- Extended field life by 15 years and reduced well intervention and maintenance cost by 20%
- Delivered a digitally enabled platform that improved surveillance, accelerated decision-making, and optimized well intervention planning
- Increased operational efficiency by reallocating 140 hr/month (1,680 hr/year) to higher-value optimization activities and reduced development time through flexible data loading
- Stabilized and increased production by 1,300 bbl/d of oil and 4 MMscf/d of gas, while extending asset life and preventing artificial lift failures and

candidate wells in the better pay zones of the field.

Fast-tracking Leucipa implementation

Phase 1, which began in 2024, focused on creating a structured production and well information database. The solution included well monitoring, surveillance, and opportunity tracking modules with a streamlined data flow feeding the database.

The Baker Hughes team designed and implemented a data loader management tool comprising standard templates that included a well master table and information related to operations, production, well events, and fluid delivery. The tool also included audit and log reports to ensure data loading and management were tracked correctly

The team completed Phase 1 of the data loader tool development process, including integrating all the databases and Leucipa modules, in only six weeks.

The new platform made it possible for Baker Hughes engineers to respond more quickly to irregular well behavior and key events, which not only reduced downtime, but also helped prevent damage to production equipment. The platform also simplified the process of assessing the complexity and practicality of proposed well-optimization solutions — evaluating the benefits of each solution and automating the opportunity-ranking process.

Centralized data management eliminated manual well monitoring and data analysis activities, redistributing approximately 140 working hours per month to address well issues. Streamlining optimization activities improved artificial lift operations and expedited the ranking of well intervention opportunities, which allowed field life to be extended by 15 years and saved 35% in minor workover interventions, reducing overall well intervention and maintenance cost by 20%.

Improving Performance at Soledad

To expedite the process of identifying wells that required intervention, Baker Hughes introduced Leucipa™, a SAAS-based workflow automation solution that is delivering performance improvement for mature fields around the world.

This scalable, agnostic, and easy-to-integrate solution takes in real-time production data across wells and uses that information to provide automated recommendations for improvements.

Unlike traditional software, the Leucipa solution enables predictive intervention planning, workflow automation, and adaptive strategies to extend the economic life of mature fields, enhance recovery, and provide a way to evolve for the future.

Over the long term, the team improved production rates at a stabilized level of 1,300 bbl/d of oil and 4 MMscf/d of gas, reducing field decline rates from 3% per month (recorded before Phase 1 began) to 1.5 % per month. A drilling campaign that marked the beginning of the field development phase of the project commenced in December 2025 and is expected to contribute additional production to the total output at Soledad and further extend the life of the field.

To help meet environmental stewardship goals, 12 gas tanks were removed from the pads as the field transitioned through upgrades that included installing new pipelines and bulk compressors to gather and transport the gas. Productivity in the pads was improved using the bulk compressors, which allowed the operator to manage > 98% of gas produced to comply with global environmental requirements. In addition, the conversion of 120 engines from liquid gas to natural gas fuel enabled better use of natural resources and reduced production costs.

Breathing life into declining fields

The Baker Hughes team is developing a Phase 2 plan that incorporates additional Leucipa modules, including enhanced scorecards, deferred production analysis, and advanced well surveillance functionalities that can deliver additional operational benefits.

Applying the Baker Hughes team's solution at Soledad demonstrates how digital intelligence can transform operations and decision-making in mature fields, enhancing reserve recovery, reducing operational risks, extending the field's, economic life, and evolving operations through increased sustainability.

Future work on the site includes viability assessments to determine if converting gas to power for local use can improve field economics in the years ahead and evaluating additional technologies that will help advance net-zero initiatives for a sustainable energy future.

Baker Hughes

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