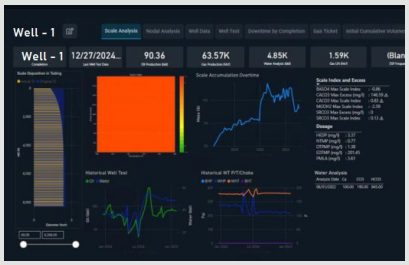
SENSIA
Rockwell Automation + SLB

+ CASE STUDY

Smart Surveillance, Seamless Operations: Avocet in Action

Leveraging Automated Workflows and Advanced Analytics



Key Highlights

+ **Proactive Scale Management:** Mitigated scale risks using daily insights delivered via Avocet™.
+ **Automated Daily Workflows:** Avocet™ orchestrated automated scale analysis and simulation integration.
+ **Centralized Data & Results:** Consolidated validated data and predictive results within the Avocet™ platform.
+ **Accurate Scale Forecasting:** Delivered reliable scale predictions through integrated advanced analytics.
+ **Actionable Dashboards:** Provided clear visualizations of risk and performance directly from Avocet™.

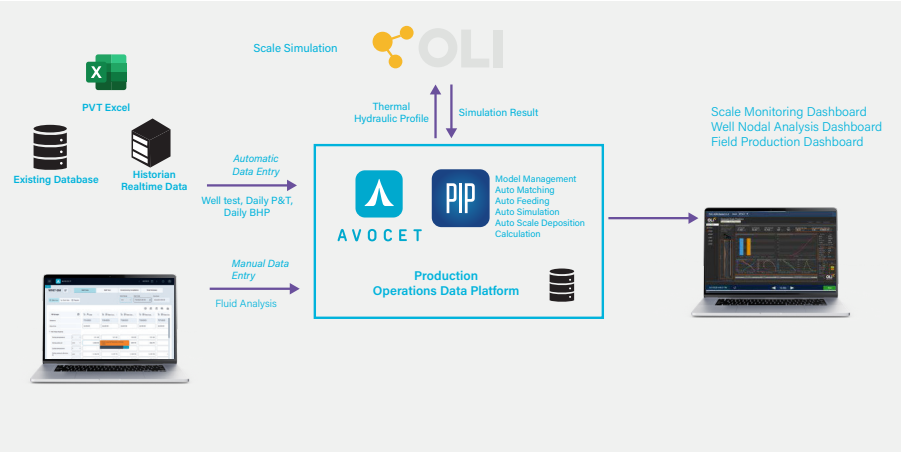
Design, Implementation, and Outcomes: Delivering Proactive Scale Management via Avocet™

An operator was facing a major production challenge due to scaling, which was disrupting operations and increasing costs. To address this, Sensia's Avocet™ platform was deployed, offering a proactive and automated solution through advanced data management, workflow orchestration, and integrated simulation engines. As a result, the operator received daily, actionable insights directly within their production environment, enabling informed, data-driven decisions that optimized uptime and reduced operational expenditures related to scale.

Challenge:

An Indonesian oil and gas operator faced significant operational challenges related to mineral scale deposition (like $CaCO^3$) in their production wells. Scale buildup can lead to reduced production, equipment damage, and costly interventions. The operator required a robust, automated system centered around their production data management platform to continuously monitor scale risk, predict deposition rates accurately, and provide actionable insights.

The Sensia solution, centred on the Avocet™ platform, successfully met the operator's need for a proactive and automated scale management system. By leveraging Avocet™'s powerful data management and workflow orchestration capabilities to integrate specialized simulation and calculation engines, the system provides daily, actionable insights directly within the operator's core production environment. This empowers informed, data-driven decisions to optimize uptime and manage operational expenditures related to scale.



Solution: An Avocet - centric surveillance & advisory system

Sensia delivered a comprehensive Scale Surveillance and Advisory System architected around the Avocet™ Production Operation Software. This platform served as the core, integrating data and triggering automated workflows:

+ **Avocet™:** Acted as the central validated data repository and workflow hub. It managed well configurations, historical production data (from historians, databases, manual entry), initiated external analysis processes, and stored all key simulation and calculation results in dedicated, structured transactions.
+ **Integrated Multiphase Flow Simulation:** The solution leveraged SLB's industry-leading PIPESIM™ simulator for multiphase flow modelling, well performance simulation, and heat transfer analysis. Automated workflows, managed via Avocet™, matched PIPESIM™ models to actual well test data to ensure model fidelity, with results fed back into Avocet™.
+ **Specialized Thermodynamic Engine & Custom Kinetics:** Scale tendency under varying conditions (P, T, GOR, water chemistry) was predicted using a specialized thermodynamic engine. A custom Python-based kinetics engine, incorporating tuned parameters, calculated the actual scale deposition rate and thickness profile. Avocet™ managed the inputs and stored the outputs from these calculations.
+ **Python Automation Layer:** A sophisticated Python toolkit, executed as an external process controlled by Avocet™, orchestrated the end-to-end analysis: collecting validated data from Avocet™, running simulations, performing thermodynamic and kinetic scale calculations, auto-matching model parameters, and writing all results back to specific Avocet™ database.
+ **Power BI Visualization:** Custom-designed dashboards connected directly to the Avocet™ database provided clear visualization of current scale thickness, risk indicators, historical trends, well performance curves, and operational parameters stored within Avocet™, enabling engineers to quickly assess conditions.