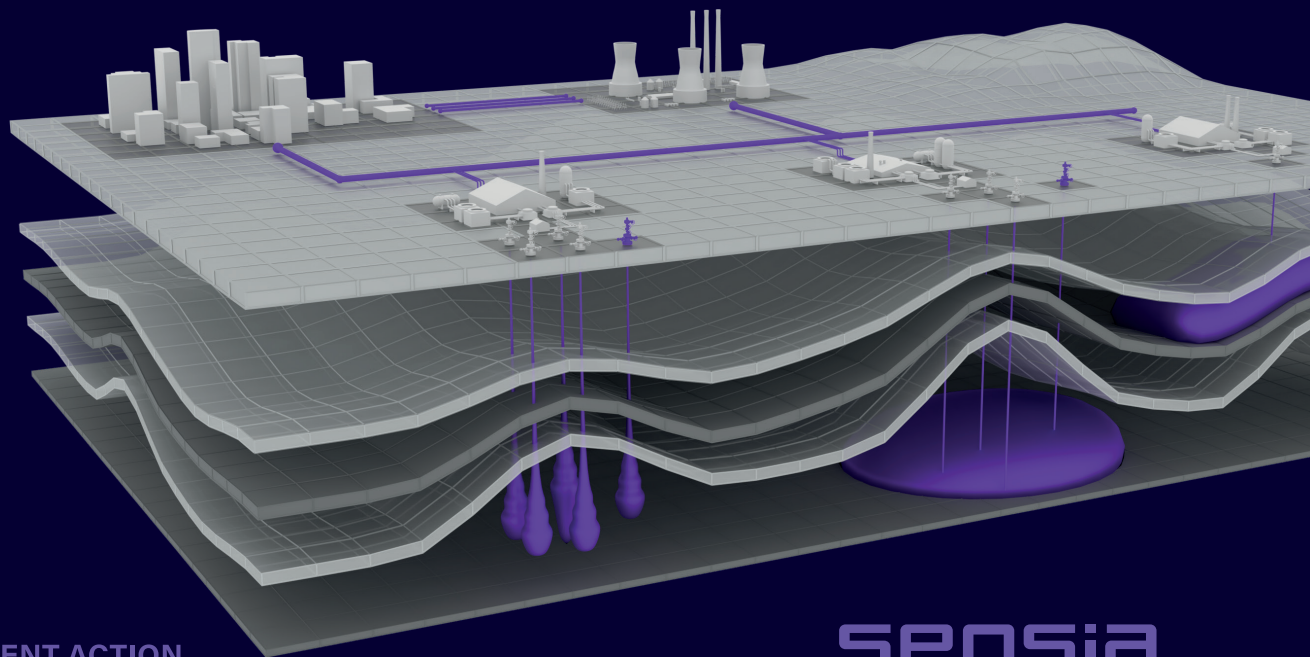


+ Underground Gas Storage

DISCOVER YOUR ONE-STOP SHOP FOR SMARTER GAS STORAGE SOLUTIONS



INTELLIGENT ACTION

sensia
Rockwell Automation + Schlumberger

UNDERGROUND GAS STORAGE

+ Revolutionize your Underground Gas Storage strategy with Intelligent Action

The operation of complex systems – under both contractual and physical constraints – poses a real challenge to the safety and profitability of many underground gas storage operations.

We are proud to offer the widest solution set to the underground natural gas storage and carbon sequestration industries. By uniting the control, process safety and electrical expertise of Rockwell Automation and Schlumberger's accurate well monitoring solutions with our own intelligent action philosophy – Sensia is uniquely positioned to bring you a one-stop shop for underground storage and carbon sequestration initiatives.

Enabling seamless online integrity management, increasing asset performance and empowering your workforce to maintain a healthy reservoir, more efficiently than ever before.

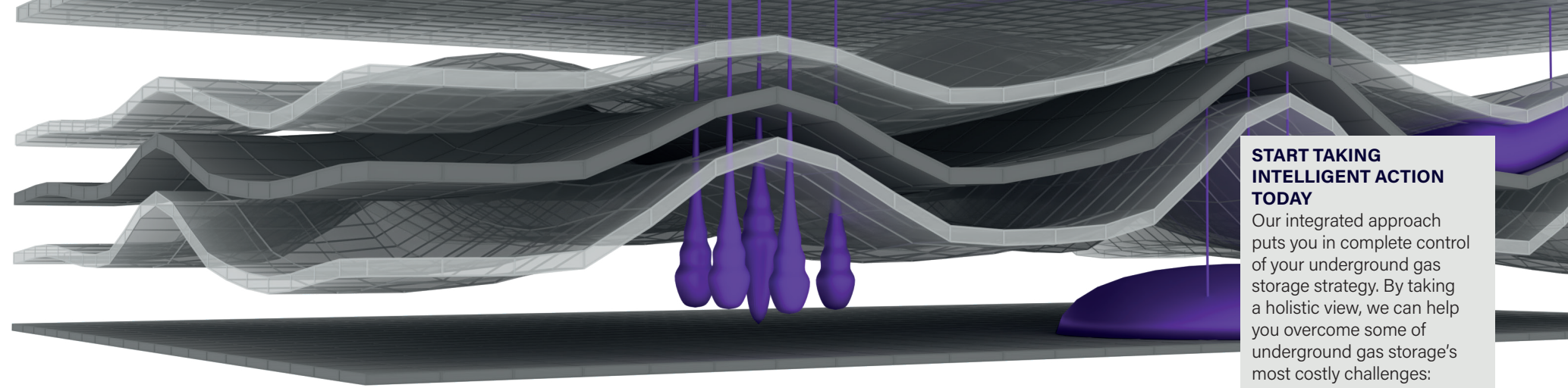
DIGITAL TRANSFORMATION BUILT FOR A SUSTAINABLE FUTURE

From digital transformation and integrated project delivery to intelligent Throughput Optimization, reservoir management and measurement capabilities – we can provide everything your operation needs to start making the move towards leaner, greener, natural gas storage strategies in one convenient place.

START TAKING INTELLIGENT ACTION TODAY

Our integrated approach puts you in complete control of your underground gas storage strategy. By taking a holistic view, we can help you overcome some of underground gas storage's most costly challenges:

- + Reducing the number of geotechnical experts needed to ensure an effective reservoir management
- + Streamlining all the operations across your organization to make the injection and extraction cycles more efficient
- + Optimizing the overall operation by turning insight into action
- + Mitigating operational risks to protect your people and processes



UNDERGROUND GAS STORAGE SOLUTIONS

+ Your one-stop shop for seamless underground gas storage

When we say we have the widest solution set to the underground natural gas storage and carbon sequestration industries – we mean it. Our range of innovative, reliable and field-proven solutions have your underground gas storage needs covered from end-to-end.

1. Well monitoring

- + Injection, withdrawal and observation wells
- + Christmas trees and ESD valves
- + Passive seismic sensing
- + Low power RTUs with wireless communications
- + Solar power packages
- + Permanent down hole measurement systems
- + Well Integrity
- + Real-time well integrity service
- + Full characterization of cased hole environment and casing condition
- + Mechanical integrity testing
- + Nitrogen/brine interface detection
- + Caliper log
- + Magnetic flux leakage log
- + Ultrasonic noise log
- + Temperature log
- + Cement bond log
- + Down Hole Camera

2. Surface equipment monitoring and control

- + Dehydration units monitoring, control and optimization
- + Hydrate monitoring and control
- + Compressor monitoring and control
- + After-cooler monitoring and control
- + Separators, Filters, Sludge
- + Water & Waste Treatment Facility
- + Custody Transfer Station
- + Power Systems, Power Sub Station and MCCs
- + Industrial HVAC control
- + Predictive maintenance

3. Reservoir Visualization & Optimization

- + Integrity management system
- + Shortfall management
- + Reservoir hysteresis and forecasting
- + Operational targets
- + Leak detection

4. Flow Measurement & Control

- + Industry leading Ultrasonic flow meters
- + Cone meters
- + Positive displacement meters
- + Turbine meters
- + Flow computers
- + Metering skids
- + Sampling system
- + Chokes
- + Valves

5. SCADA, RTU, Historian, Data Management

- + Station control system – PLC & remote I/O
- + Control network
- + Station HMI/SCADA
- + Historian
- + Integrated operations IoT platform
- + E-house
- + Low & medium voltage variable frequency drives
- + Unit compressor control with vibration monitoring
- + Industrial HVAC control
- + Communications with remote Gas Control Center
- + Fire, Gas and Safety system

6. Safety Compliance (API, PHMSA)

- + Process safety
- + Fire & gas
- + Wellbore integrity
- + Unaccounted for losses

7. Corrosion Control

- + Corrosion protection systems for wellbore casing and pipeline
- + Acid gas liquid management systems

8. Carbon Sequestration and Storage (CCS)

- + Specialized measurement options for Carbon Dioxide and Hydrogen
- + Liquid prediction and avoidance (Throughput Optimization)
- + Thermodynamic model tuned for CCS applications including contaminants

UNDERGROUND GAS STORAGE DIGITAL INTEGRATION

+ Join the dots with smarter monitoring, measurement and management

There's more to Sensia than an impressively diverse solution set. Our irreducibly simple digital technologies have been specially designed to get the best out of our underground gas storage product portfolio – helping you take intelligent action every step along the way.

ONE SUPPLIER. THREE IRREDUCIBLY SIMPLE SOLUTIONS.

+ SENSE

Avalon

Our Avalon core IT/OT platform brings you complete access to the operational condition of your underground gas storage equipment and facilities. In real-time.



+ THINK

Avocet

This single, integrated production data management system connects your underground gas storage operations to a broad range of disciplines from field staff, production and reservoir engineers to production accountants and administrators; keeping your data safe, traceable and auditable.



+ ACT

OFM

Transform data into decisions with a powerful toolbox that enables your engineers to build customized dashboards, implement engineering workflows, develop new analysis methods and improve reservoir management.



AVALON

+ Connect everything to everything

Our Avalon™ platform underpins Sensia's new breed of autonomic, automated and connected solutions. Enabling Intelligent Action to solve the challenges of the oil & gas industry from the wellhead to the refinery. Including in your underground gas storage operations.

Moving your underground gas storage operations to a digitalized and automated environment isn't a single, major event. It can be broken down into steps, each of which adds value in its own right, but leads in a clear direction towards a more productive, efficient destination.

Avalon™ is an open platform, so you won't need to completely overhaul your infrastructure, and you'll still be able to use your current investments.

But, once in place, the Avalon™ will allow you to visualize and control all aspects of your underground gas storage operation by collecting the right data and contextualizing it into real-time diagnostics, production trends and KPIs.

Helping people and functions across the organization make more informed and timely decisions.

+ SENSE

- + Visualization
- + Asset Control
- + Reasoning & Analytics
- + Mobility
- + Open Architecture

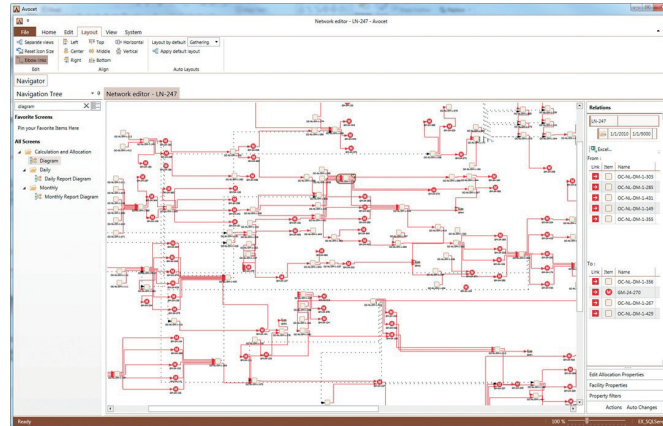


AVOCET

+ Optimize gas storage decisions at your desktop, in the field and on the cloud

+THINK

- + Historical Data
- + Data Auditing
- + Traceability
- + Information Distribution
- + Integration
- + Back allocation
- + Shortfall Management



Avocet is a key information management element for the entire UGS operation, by allowing you to store all the well, facilities and assets information, characteristics, and configuration into one single and secure repository with changes tracking and easy visualization.

All the current and historical operational data accrued by Avocet can be automatically collected from multiple sources, Avalon™, SCADA/DCS systems, data historians, third party systems as well as manual data capture by desktop, web or mobile.

Capabilities to verify the validity of collected information and management of processing to generate computed results for allocations, production processes and operational surveillance; with changes tracking features that allow the customer to be completely in control over the sources, trends, and data updates over the time, allowing efficient traceability and easy auditability as required.

Distribution of processed production information to company personnel, partners, and government bodies in form of reports and graphs; and utilization within monitoring, surveillance, engineering design, facilities, and reservoir optimization applications.

Within Avocet is a best-in-class allocation engine that allows for production allocation based on one of four properties: volume, mass, energy, and composition. Allowing to create a dynamic model of an existing production environment, that once configured, production allocation and shortfall management becomes a near completely automated task, where assets can be divided based on their field location and grouped, as necessary.

Avocet offers a flexible data security solution to restrict access to components or the entire platform and its data. Additionally, this system can be used for role-based authorization by geographic location or clearance level, which can be developed within Avocet, or they can be integrated with existing cloud or domain Active Directories.



OFM

+ Transform gas storage insight into Intelligent Action

OFM well and reservoir analysis software is a powerful application designed to support daily surveillance and management of oil and gas reservoirs. OFM software provides a user-friendly interface and efficient analysis tools for viewing and analyzing production, completion, and – crucially – underground gas storage reservoir data.

OFM software provides flexibility, with industry-standard and user-defined workflows enabling analysis of a single completion, wellbore, field or reservoir or an entire basin. Offering quick and easy access to important information for managers, petroleum engineers, and geoscientists.

It also provides a cost-effective, integrated environment to visualize individual well- or field data, design and manage domain-specific workflows, and perform production analysis; evaluation and analysis of detailed differential pressure, based on historical behaviour, to determine the maximum MMBtu, avoiding reservoir damage, increasing your ability to learn about reservoir constraints and operate within them, to extend the reservoir life.

OFM software enables early detection of any anomalies, failures, leakages &/or loss of containment, providing opportunities for timely follow-up and enhancing gas delivery capacity for each cycle.

+ACT

- + Analysis Dashboards
- + Filtering & Reporting
- + Plotting & Mapping
- + Workflow Extensibility
- + Hysteresis Analysis

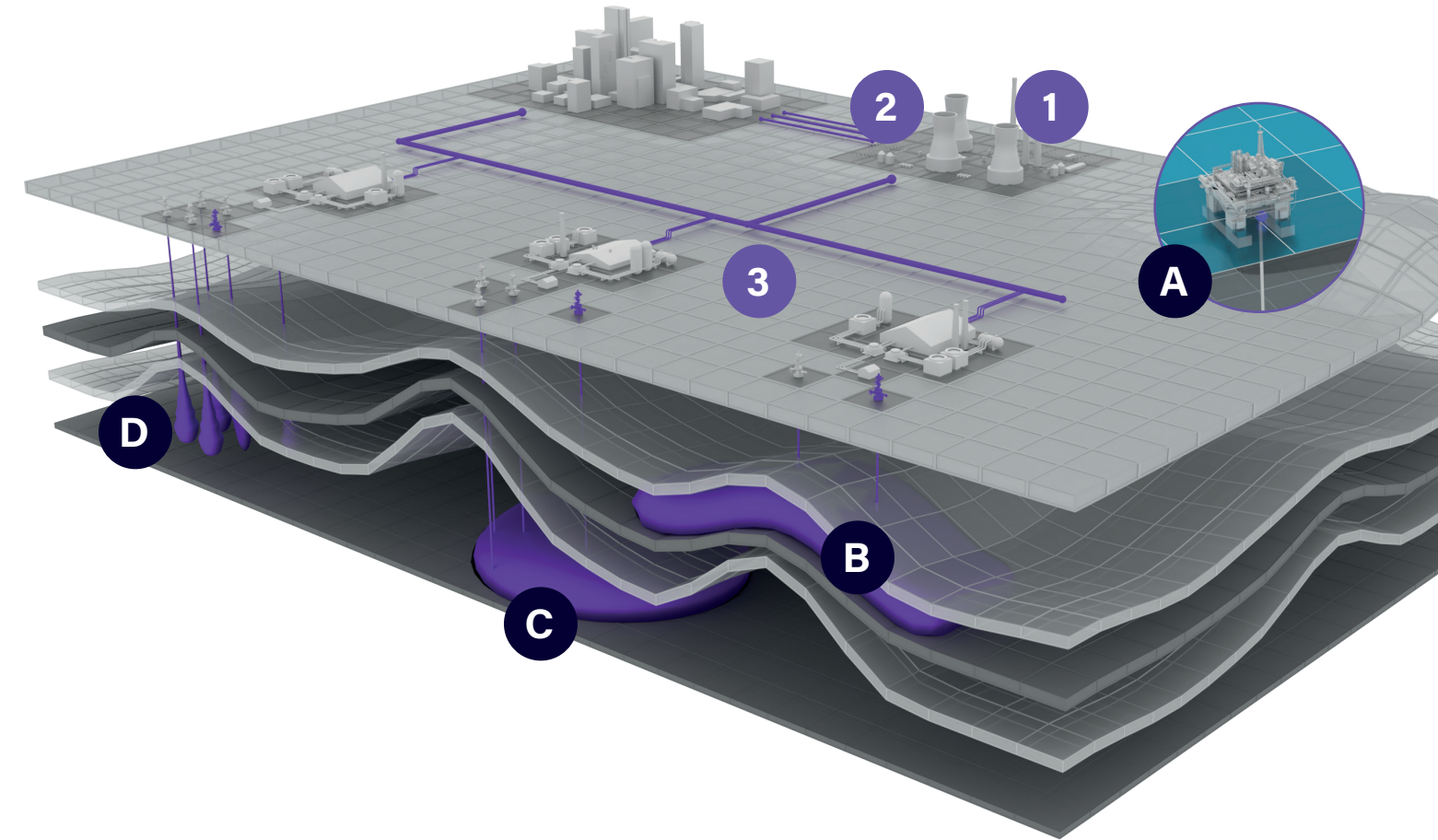


CARBON STORAGE

+ Understanding the carbon capture and storage cycle

HOW WE ARE PREVENTING THE RELEASE OF HARMFUL CO₂ EMISSIONS INTO THE ATMOSPHERE

- 1** When fossil fuels are used in power plants and industrial processes, they generate CO₂.
 - 2** By capturing the CO₂ emissions we can then convert them into a liquid.
 - 3** This liquid is then transported by pipeline, truck or ship to injection wells where it can be safely stored deep underground.
- A** Captured CO₂ from offshore platforms can be injected directly under the seabed to be absorbed in the porous rock.
 - B** Captured CO₂ can enhance oil & gas recovery, when injected into depleted reservoirs – with minimum potential risk for leakage.
 - C** Captured CO₂ can be stored in large-capacity deep saline aquifers – but there is potential for leakage.
 - D** Captured CO₂ could be injected into salt caverns, but exist risk of undesirable chemical interactions and potential risk for leakage as well.



Solving challenges from the reservoir to refinery. One challenge at a time.

We collaborate with all stakeholders to make the production, transportation and processing of oil & gas simpler, safer, more secure, more productive and better understood from end-to-end. Sensia is making the advantages of industrial-scale digitalization and seamless automation available to every oil & gas company. Now every asset can operate more productively and more profitably.

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