CCUS Conference

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Virtual Events

ORGANISED BY

Society of Petroleum Engineers Aberdeen Section

PESGB

Tuesday 22nd February - Wells

Conference Co-Chairs

Alex Crossland

Alex graduated from the University of Nottingham in 1998 with a BEng in Environmental Engineering before then going on to complete a Masters in Petroleum Engineering at Heriot-Watt University in 2000. He then joined Reeves Wireline, a small logging company which took him to Oklahoma, Texas, Alberta and then Aberdeen in 2002. He continued to work in the North Sea and internationally before moving to Total as an offshore Well Services Supervisor, Read Well Services developing hydraulic expanded completion products and EV cameras as Region manager for Europe and West Africa. Since 2016 Alex has consulted for a variety of small technology companies focussed on well logging and intervention but is actively following the energy transition which lead to him volunteering for the recently formed SPE Aberdeen Net Zero Committee and the Geothermal and CCUS Conference Committees.

Gavin Ward

Gavin has an economic, accounting and technical skill set from over 30 years in the oil and gas industry at major international operators and independents. He has peer-reviewed and valued assets and companies in Europe, Middle East, Far East, Africa and North America. Mr. Ward is an expert on risk and volume estimation, and is able to translate technical evaluations into meaningful economic and financial assessments as a Chartered Accountant/CPA and professional geoscientist. He has used these skills previously as a sedimentologist for Corex, geophysicist for Phillips Petroleum; corporate business advisor for Noble Energy (based in Houston); Europe & Mediterranean Portfolio Manager for Noble Energy; Reserves and Economics manager for UK utility Centrica, and Regional Subsurface Manager for Centrica Energy Upstream when he also managed a team working on a CCS feasibility study for North Morecambe gas field. He currently manages the EAME regional office, based in London, for RISC Advisory, a global technical energy consultancy. Mr Ward holds a B.Sc (Hons) degree in physics and geology from Aston University in the UK, an MBA from Cranfield School of Management in the UK, Dip M. Post Graduate Diploma in marketing, MCIM Chartered Institute of Marketing, UK; and is a fellow of the Association of Chartered Certified Accountants.

Tuesday 22 February

THEME – WELLS

Conference Co-Chairs - A. Crossland & G. Ward /// Session Chair - N. Low /// Session Co-Chairs - Y. Le Guen, K. McAllister & M. Wood

10:00	Opening statement	A.Crossland/G.Ward
10:05	Keynote #1	Nigel Jenvey, Managing Partner, New Frontiers, BakerHughes
10:25	OGUK North Sea transition deal and well decommissioning for CO_2 storage guideline	Kareem Shafi/Will Webster, OGUK
10:45	The Gorgon capture and storage system	Ishtar Barranco, Chevron
11:05	Q&A	
11:20	Coffee Break	
11:30	Application of novel downhole video technology leads to the diagnosis and successfu remediation of injectivity performance issues in deep saline CO_2 storage well	Tobben Tymons, EV/Petroleum Technology Research Centre
11:50	Testing program consisting of numerical analysis and full-scale tests on gas-tight premium connections with a dedicated focus on performances in sub-zero environment	Massimo Lanna, Tenaris
12:10	TECHBYTE - Achieving net-zero carbon emission goals by using a novel CO_2 Self-healing cement	Carl Johnson, Schlumberger
12:15	Q&A	
12:30	Lunch	
13:00	Risk-based modelling of P&A'd legacy supports decision making for a CO_2 storage project in a depleted gas field	Morteza Haghighat Sefa, Heriot Watt University
13:20	Development and application of REX-CO_2 tool for CCS well reuse assessment	Kaj van der Valk, TNO
13:40	TECHBYTE - Reservoir monitoring from the shore: long stepout, subsea well VSP acquisition using DAS	Pierre Franciois Roux, Baker Hughes
13:45	Q&A	
14:00	Coffee Break	
14:10	TECHBYTE - Integrity diagnostics for CCUS wells	Remke Ellis, TGT Oilfield Services
14:15	Cold Duty SSSV qualification JIP - status update and forward plan	Rodrigo Oropeza, Storegga
14:25	TECHBYTE - Temperature challenges and completion solutions for depleted gas CCUS projects	Adam Vasper, Schlumberger Completions
14:30	Considerations for emergency response to a CO_2 well blowout	Alistair Gill, Wild Well Control
14:50	Q&A	Q&A
15:00	Closing statement	A.Crossland/G.Ward

Session Two – Wells

Session Chair – Nick Low, Vysus Group

In addition to conventional oil and gas exploration and development projects, well decommissioning and geothermal projects, Nick acted in the role of owner's engineer for the well engineering aspects of the UK "White Rose" CCS Project; provided Well Engineering Consultancy services to the Asian Development Bank for CCS and CCUS projects in Indonesia; provided well engineering expertise to the UK HSE department for the UK onshore gas storage wells.
Nick is a chartered engineer and fellow of the Institution of Chemical Engineers and member of the SPE.

Session Co-Chairs – Yvi Le Guen, bp

Yvi has 20 years' experience in the CCUS and O&G sector. He started working on CCUS about 20 years ago during his PhD, and subsequently got involved in a number of industrial and European research programmes related to CCUS across the world with a focus on cement, well integrity modelling and risk management methodologies. More recently, Yvi has been working as a senior completions engineer for bp in the North Sea, for platform and subsea projects.

Mark Wood, Baker Hughes

Mark Wood Mark has 17 years of experience in O&G and Energy Transition including CCUS, H2, & Geothermal projects both technically and commercially in offshore, onshore, subsea, deep water and HPHT environments. Mark's background is in Well Integrity, Perforating, Plug and Abandonment and Electric Line Logging, holding roles such as Wireline Logging Engineer, Field Service Manager, Account Manager, Regional Sales Leader and currently serving as Baker Hughes CCUS Lead for Europe.

Kenny McAllister, Seal-Tite UK LLC

Kenny is Managing Director of Seal-Tite UK LLC where he leads this well integrity business' interests in Europe, The Middle East and Africa. He holds a BSc in Applied Physics from the University of Strathclyde and MSc in Information Technology from the University of York. He began his career as a Research Scientist and Product Development Project Leader with large chemical multinational. Since then he has spent over 20 years involved in the development and commercialisation of new well and near-well technology. He has been involved in new technology developments in electronic downhole gauges, fibre optic downhole measurement, intelligent completion, multi-phase metering, innovations in software based fiscal metering, completions hardware and well integrity solutions. He is passionate about the science and art of new technology adoption.

Keynote

Nigel Jenvey, Executive, Strategy and Growth Initiatives at Baker Hughes

Nigel has over 25 years of global energy industry experience in technology, project development and operations with major international energy companies. He is an industry leader in the Energy Transition, Decarbonization and Carbon Management, and an expert in Carbon Capture, Use and Storage (CCUS). Nigel has participated and lead collaborative industry technology programs, policy and regulatory development, and capability building efforts in low carbon energy. This includes roles such as the chair of the CO2 Capture Project, chair of the North American CCS Association, program chair of the Society of Petroleum Engineers CCUS Technical Section and founding member of the GAIA Sustainability program, peer-reviewer for International Energy Agency reports, and Alternate Chair to the National Petroleum Council CCUS Study Coordinating Subcommittee.

At Baker Hughes, Nigel guides the company's strategy and growth initiatives to advance new frontiers for energy that will position the company to help meet global energy demand by offering lower carbon solutions across industries.

Nigel graduated from Imperial College, London with a Master's degree in Petroleum Engineering, and from The University of Leeds, UK with a Bachelor's degree with honors in Mining Engineering. Nigel now lives in Houston, Texas with his wife and 2 children.

OEUK North Sea Transition Deal And Well Decommissioning For CO_2 Storage Guideline

Kareem Shafi & Will Webster, OEUK

The North Sea Transition Deal is a transformative partnership which will harness the expertise of the UK offshore oil and gas industry to urgently meet the country's climate ambitions of the net zero emissions by 2050.

It will unlock billions of pounds of investment and see government and industry work together to deliver a homegrown energy transition, realising innovative low carbon solutions that can be exported globally.

Furthermore, OEUK has agreed with BEIS to develop technical guidelines on repurposing oil and gas infrastructure for CCUS, as such OEUK has taken an action to coordinate the development of the Well Decommissioning for CO2 Storage Guideline.

The presentation will provide an overview of the North Sea Transition Deal and what this means for Carbon Capture and Storage, whilst providing an overview and progress update on the development of the OEUK Well Decommissioning for CO_2 Storage Guideline.

Kareem Shafi is a Business Advisor at OEUK (Offshore Energies UK), where he is responsible for the development of technical guidelines and UKCS initiatives associated with CCUS. His career started off with leading Reserves Progression and Reservoir & Well Optimisation Initiatives, whilst providing insights on key aspects across the oil and gas industry and energy transition. Kareem also holds a BEng in Petroleum Engineering from the University of Portsmouth.

The Gorgon Carbon Capture And Storage System

Ishtar Barranco, Chevron

The Gorgon Carbon Capture and Storage System is a key element of the Gorgon LNG Project on Barrow Island. Two gas fields currently supply the LNG plant including the Gorgon Field. Rather than vent the separated reservoir carbon dioxide into the atmosphere, the Gorgon JVPs undertook to develop the Carbon Capture and Storage System, which was designed and constructed to inject up to 4 million tonnes of carbon dioxide equivalent per annum into the Dupuy Formation, a Jurassic sandstone unit below Barrow Island in the Barrow Sub-basin. Chevron Australia Pty Ltd (Chevron), as operator on behalf of the Gorgon joint venture participants, has been working on the development of the project, through early concept select, appraisal, final concept selection, detailed design, construction, commissioning, and now early operations. This work commenced in 1998, with project approvals in 2009. Since then, 17 wells have been drilled, pipelines and compression facilities constructed and installed, baseline monitoring data acquired, and injection operation has commenced. It is expected that the Gorgon Carbon Capture and Storage will have a 40-plus year lifespan. The volume and rate of carbon dioxide injection makes it the largest carbon dioxide injection project for geological storage undertaken to date. Chevron and the Gorgon joint venture participants will continue to monitor performance against expectations and revise assumptions, models and forecasts over time.

Ishtar Barranco is a practicing development geologist, reservoir modeler, and digital advisor with more than 20 years of international experience in France, Mexico, Indonesia, Australia and New Zealand with Total, Pemex, Schlumberger and Chevron. She has worked in different projects such as Duri steamflood, Cantarell oilfield, Fairview Coal Seam Gas, Gorgon CO_2 sequestration, Windalia waterflood, Jansz and Northwest Shelf gas fields. She has 13 years of CCS experience and is currently managing the CCS and Earth Science Digital portfolio for Chevron Australia. Ishtar received her Bachelor of Engineering in Environmental Geosciences from the University of Toulouse in France, and her Master of Science in Petroleum Geology from the French Petroleum Institute.

Application Of Novel Downhole Video Technology Leads To The Diagnosis And Successful Remediation Of Injectivity Performance Issues In Deep Saline CO_2 Storage Well

Tobben Tymons & Aaron Adamczyk, EV; Zeinab Movahedzadeh, Petroleum Technology Research Centre

This presentation will share a case study from the Aquistore deep saline CO_2 geological storage facility that is injecting and storing emissions from SaskPower's coal fired Boundary Dam power station located in Estevan, Saskatchewan, Canada. The presentation will document the how the operation and performance of the storage facility was affected by a decline in injectivity, and the steps taken to understand and manage the issue.

The presentation will include details of initial efforts to optimise inflow using diversion technologies and the application of conventional cased hole logging technologies to understand flow behaviour.

The presentation will go on to demonstrate how the subsequent application of an innovative array camera technology revealed the cause of the issue, precipitation of halites within the perforation tunnels formed by back-flow of reservoir brines, and how a step change in computer vision techniques enabled detailed evaluation of their extent across multiple reservoir intervals.

The presentation will conclude with details of the actions that have been taken as a result of the information obtained, including modelling of brine flows in and around the well, recommendations for operational changes to mitigate the flow of brines, and the potential long-term consequences that are faced with respect to well productivity and integrity.

Tobben graduated with a BSc in Physics and Computer Science in 2000 before starting his career in the research and development engineer of specialized downhole oilfield equipment. Since then, Tobben has devoted his time to the development and commercialization of technologies and solutions within the production logging and well integrity domains.

In his current role as Product Director at EV, Tobben helps to solve the challenges faced within the upstream energy sector through the application of downhole visual analytic techniques.

Testing Program Consisting Of Numerical Analysis And Full-scale Tests On Gas-tight Premium Connections With A Dedicated Focus On Performances In Sub-zero Environment

Massimo Lanna, TENARIS

The Sustainable Development Goals adopted by all United Nations Member States aim at promoting prosperity while protecting the planet. In this context, CO2 emissions reduction is becoming a strategic goal for many Companies and Carbon Capture and Storage (CCS) activity is quickly developing.
As underground CO2 storage can be achieved through the exploitation of aquifers or depleted hydrocarbon reservoirs, all possible synergies with existing wells and facilities are scouted.
One of the main criticalities recognized during drilling and completion activities is related to the Joule-Thomson effect during the injection phase. A rapid depressurization of the string or the injection in highly depleted reservoirs can cause gas expansion and the consequent cooling of the entire system in both operational and critical conditions. In the latter case, temperatures can be as low as -70 degrees Celsius according to CO2 phase diagram. In this scenario, a thermal contraction due to the very low temperatures might lead to well integrity events.
Purpose of this experimental work is to set up a testing program consisting of numerical analysis and full-scale tests on gas-tight premium connections with a dedicated focus on performances in a sub-zero environment.
In the experiment, the sealing mechanism and structural integrity of a premium connection are investigated under mechanical and pressure loads before, during and after exposure to extreme low temperature. Effects of connection make-up torques combined with axial loads are also considered.
The low-temperature testing protocol developed in this activity is an industry first, opening to a new perspective for the well design of CO2 injector wells in terms of load conditions and OCTG selection.

Massimo is the Technical Sales Director for Europe, CIS and Sub Saharan Africa at Tenaris. He holds a Master Degree in Materials Engineering from University of Naples (Italy). He has joined Tenaris in 2016 working in manufacturing and product engineering at the start of his career. In 2010 he has joined Technical Sales team for OCTG products with growing responsibilities worldwide.

Techbyte - Achieving Net-Zero Carbon Emission Goals By Using A Novel CO_2 Self-healing Cement
Carl Johnson, Schlumberger

Operators and governments are moving towards carbon neutrality by adopting carbon capture use and storage (CCUS) as a key strategy. For CCUS projects to be successful, storage wells require safe design to retain CO_2 fluids underground indefinitely. Maintaining zonal isolation in a corrosive (acidic) environment is made very challenging by the need to select a capable annular sealant. Ordinary Portland cement (OPC) is chemically unstable in this environment.
Approximately 15 years ago, a special cement system, highly resistant to CO_2, was successfully implemented worldwide, including its use in CCUS projects. Wellbore pressure and temperature oscillations nevertheless caused annular cement sheath damage; hence, an improvement to set cement performance was needed.
Recently, additional functionality has been developed and added to the CO_2-resistant cement. The new system is CO_2-resistant and exhibits self-healing capability when exposed to CO_2-fluids. Should cement matrix damage occur, the cement interacts with in-situ CO_2 to heal and seal potential leak paths; thus, well integrity is maintained.
Finally, from a sustainability perspective, this recently developed system can reduce CO_2 emissions by nearly 90% when compared with OPC. Accordingly, this technology can bolster long-term CO_2 storage quality in supporting operators and governments achieve their sustainability goal of net-zero carbon emissions.

Carl was appointed Cementing Technical Domain Manager in 2013. In this role, he is responsible for the provision of technical leadership in well integrity (cementing), direction on technology applications, developing specific technical solutions and support to address client problems and challenges, and developing/directing the technical strategy for the Well Construction Fluids cementing business.
During his +25 years with Schlumberger, Carl has authored/co-authored 30 technical papers and has well integrity experience in the areas of offshore deep-water, HPHT, well abandonment (land and offshore), unconventional recovery, product development and sustaining, laboratory testing, and chemical/regulatory compliance. He was also co-author of the OGUK Guidelines on Qualification of Materials for the Abandonment of Wells and is currently a member of the OGUK Well Integrity workgroup responsible for Issue 5 and 6 of the well integrity guidelines. Carl has a BEng Degree in Mechanical Engineering from The University of Manchester

Risk-based Modelling of P&A'd Legacy Wells Supports Decision Making For A CO2 Storage Project In A Depleted Gas Field

Morteza H. Sefat, Saeed Ghanbari, David Davies, Heriot-Watt University
Jonathan Murray, Andrew Hood, Harbour Energy

The risk of integrity failure of legacy P&A'd wells in CO_2 storage fields is often the top item of the CO_2 project's leakage risk registry. Heriot-Watt University's (HWU) risk-based leakage model (SPE-200608) of P&A'd wells was extended to include the long-term reaction of cement with carbonic acid. The model now accounts for both degradation of the cement matrix and the self-sealing or degradation behaviour of cement defects (micro-annuli, etc.) to flow of CO_2.
Multiple uncertainty scenarios were investigated for a legacy P&A'd well in a North Sea depleted gas field. Post-storage CO_2 leakage rates to the upper Bunter Sandstone formation and to the surface were assessed and self-sealing of cement defects were observed for most scenarios. Over-pressurising the reservoir above initial virgin pressure with CO_2 increased the leakage risk, promoting self-degradation behaviour in defective scenarios with poor cement quality.
This "proof-of-concept" study confirmed the importance of risk-based, well-specific analysis of legacy P&A'd wells when repurposing a mature field as a CCS project. Comprehensive extension of the HWU well P&A framework will provide risk-based analysis for selecting between candidate fields for future CO_2 storage projects. This is in addition to guiding decommissioning campaigns in both hydrocarbon and CO_2 projects with fit-for-purpose, risk-based well P&A designs.

Morteza Sefat is an associate professor at Heriot-Watt University, where he leads the Well Decommissioning research, and directs or co-directs various other teaching, research, and consultancy activities. Morteza holds bachelor's and master's degrees in petroleum engineering, and had previously worked in the petroleum industry before joining Heriot-Watt University, where he also got his PhD.

Saeed Ghanbari is a researcher at Heriot-Watt University. His main expertise is flow modelling in porous media particularly focused on delivering CO2 storage in geological structures. Saeed has been involved in several CO2 storage projects including the ETI-funded project on the "Impact of Brine Production for Optimized CO2 Storage" and ACT-Acorn project for "CO2 injection modelling in Captain and East Mey sands"

Jonathan Murray is a Chartered Mechanical Engineer at Harbour Energy. He is responsible for the engineering and delivery of well abandonments in the Southern North Sea and recently has been focussing on containment assurance for carbon capture and storage projects. Jonathan holds a master's degree in mechanical engineering and has worked in the petroleum industry for 10 years.

Development And Application Of The REX-CO2 Tool For CCS Well Reuse Assessment

Kaj van der Valka, TNO Applied Geosciences

Existing oil and gas fields are one of the potential options for geologic CO_2 storage as part of the reduction of CO_2 emissions. Conversion of existing oil and gas wells to CO_2 storage wells can potentially result in cost savings. Prior to converting the existing oil and gas wells, feasibility of their use as part of a CO_2 storage operation will have to be evaluated while taking into consideration operational and safety requirements. Currently there are no standard approaches or public tools available to aid this evaluation.

This talk will provide details of our work on a well reuse assessment process and its application to national case studies as part of the REX-CO_2 (Reusing Existing wells for CO_2 storage operations) project funded by the ACT (Accelerating CCS Technologies) program. Based on state of the art practices, international standards and guidelines and reference projects we have developed an assessment framework which is translated to a stand- alone well reuse screening tool. This tool is able to qualitatively screen the reusability of wells in a consistent manner aiding concept selection and decision making processes. The tool is applied to the national case studies of which the first two have been finished. At the time of the presentation we will have finished at least two more. The preliminary findings and their implications will be included in the presentation.

Kaj van der Valk is a senior system engineer at the Dutch applied scientific research organization TNO. He has a degree in Hydraulic engineering from Delft University of Technology and has previously worked at Shell as Completion and Well Intervention engineer for non-routine operations. His work aims at unlocking the subsurface for the energy transition via safe, reliable and affordable wells. He focuses on well engineering and well integrity topics for renewable applications like CCS, Geothermal Energy and Subsurface Energy Storage. Currently, he coordinates the Well technology domain in TNO and works as a lead scientist on the ERA-ACT REX-CO_2 project, amongst others.

Techbyte - Reservoir Monitoring From The Shore: Long Stepout, Subsea Well VSP Acquisition Using DAS

Pierre-François Roux, Baker Hughes

Whether for regulatory compliance or better storage control, monitoring is an essential requirement of any CCUS project. Among the various existing techniques – each with its objective and corresponding spatial and temporal scale, 4D VSP has been identified as a key component of any proper monitoring strategy. Acquisition geometry (i.e., placing both source and receivers at the same location from one vintage to another) is of critical importance because it defines the sensitivity of the repeat surveys to the 4D signal. One way to reduce geometry errors is to use permanently installed receivers, and fiber optic is a practical and versatile solution, offering instantaneous full well coverage and access to other measurements (temperature, strain). It is however incompatible with offshore, subsea well located tens of kilometers away from any useable platform or the shore. In this contribution, we demonstrate how a combination of equipment and processing allow for the acquisition of a VSP in a well located 69 km away from the interrogating unit, simulating a long stepout subsea well condition. Data was simultaneously acquired on a conventional wireline seismic tool for comparison. This is, to the best of our knowledge, the first time a VSP is acquired with such a long step-out, opening opportunities of monitoring reservoir from subsea well with completions that previously prevented it.

Pierre-François Roux is a subject matter expert in reservoir monitoring with Baker Hughes. He currently focuses on the application of wellbore-based instrumentation (fibre optic and gauges) to multi-scale reservoir monitoring in the oil & gas and energy transition. He previously served as Baker Hughes' global microseismic advisor for hydraulic fracturing monitoring, participating in the processing, interpretation and research activities on multiple projects worldwide.

He is a seismologist by background and holds a Master of Engineering in Geotechnical & Geophysical Engineering from Paris Université Pierre et Marie Curie, and a Ph.D. in seismology from ISTerre – Université Savoie Mont-Blanc in France. He has worked on the characterization of brittle deformation using seismicity for more than 15 years, starting in the early 2000s on fracturing processes in Alpine glaciers and sea ice, and then as a seismologist as part of the CTBTO (Comprehensive Test Ban Treaty Organization). He moved to the O&G industry in 2010 as a research geophysicist with CGG on active & passive monitoring of reservoirs (4D seismic and microseismic). In 2014 he joined Baker Hughes to focus on the evaluation of completions in unconventional resources using microseismic monitoring. He's the author and co-author of 20+ articles and conference papers.

Techbyte - Integrity Diagnostics For CCUS Wells

Remke Ellis, TGT Oilfield Services

Carbon Capture Utilisation and Storage can be facilitated by using exiting production or injection wells to target certain reservoirs that meet the criteria for CO2 storage. Candidate wells are chosen based on their ability to effectively connect the injected fluid with target reservoir zone, and to properly isolate reservoir from overburden units and surface. Plugged perforations and / or reservoir damage impedes ability to inject fluid into a target zone. Leaking completion components such as cement, packers and pipe can cause communication between reservoir, overburden units and surface resulting in out of zone injection and many hazards to HSE.
Evaluating a wells ability to effectively deliver and contain fluid in these respects requires technologies to provide measurements relating to fluid movement occurring behind one or more barrier (i.e. within formation or annuli behind casing). This presentation focuses on technologies that have been developed to ascertain how effectively a target zone is in communication with the wellbore, and to verify the sealing potential of completion components such as cement, packers and pipes. Several different published cases are introduced relating to out of zone injection, cross flow between overburden units and determining source and route of sustained annulus pressure fluids.

Remke Ellis is from Aberdeen and has academic background in Geoscience and Petroleum Engineering. In 2012 he began working in oil industry with principle roles in Reservoir and Production engineering. In early 2016 he joined TGT UK as Reservoir Engineering Domain Champion. He is now based permanently in Stavanger as Domain Champion supporting all Norway operations; primarily for well integrity diagnostics and evaluation of completion and reservoir performance in facilitating flow.

Cold Duty SSSV Qualification Joint Industry Project Status Update And Way Forward

Rodrigo Oropeza, Storegga

Safety Legislation for offshore CO_2 injection requires use of a qualified well barrier such as a surface controlled subsurface safety valve (SCSSSV), or equivalent, to prevent the backflow of CO_2 from the store to the atmosphere (or seabed if subsea) in the event of a loss of control of the well.

During such a loss control event any liquid CO_2 column within the wellbore will boil off most likely down to the SCSSSV with temperature reaching as low as -78°C for a platform well which would vent to atmospheric pressure.

Vendor specifications for SCSSSVs are seldom qualified for duty much below -5°C and as such the current supply of safety critical SCSSSVs are not certified for the desired CCS cold duty service.

To resolve this supply chain shortcoming a number of major oil companies, Storegga and a number of major SSSV manufacturers have combined their resources through a Joint Industry Project initiative to develop an API14A compliant qualification programme each SCSSSV should meet in order to become qualified for cold duty service.

The JIP is being managed by the NZTC in Aberdeen and aims to commence in late 2021 with the majority of testing complete within a 12-month period enabling projects to procure qualified SCSSSV during 1H2023.

Rodrigo is a Petroleum Engineer with an MSc in Oil and Gas Enterprise Management with great ambition to fight against climate change and boost clean growth by implementing new innovative technologies and solutions. After concluding a national winning research about water consumption in fracking processes and its implications on the exploitation of shale gas/oil plays in Mexico, he had the opportunity to collaborate with Carbon Capture Machine (CCM UK) Ltd. in the development of a breakthrough CAPCON technology. Eventually, he realized that the UK is one of the leading countries fighting against climate change, and Storegga had already been positioned as one of the main catalysts and drivers of the energy transition. He now works for Storegga as a Wells Engineer, helping the Subsurface and Wells team in the development of the most complex and ambitious project he has ever been involved in: the Acorn CCS project.

Techbyte - Temperature Challenges & Completion Solutions For Depleted Gas CCUS Projects
Adam Vasper, Schlumberger Completions

Depleted gas reservoirs will not support a column of liquid or dense phase CO_2 to surface at initial reservoir pressure conditions. In these cases, significant cooling of the upper parts of the well will occur if the pressure is not kept above the vapor-liquid equilibrium curve during injection. Many completion types have been proposed to maintain wellbore pressure, including tapered or narrow completions, concentric, velocity or dual string completions with varying flow areas, and completions equipped with downhole flow control equipment. Because the reservoir pressure will ultimately increase and because the CO_2 supply rates may change, a completion with variable levels of backpressure is desirable. It should be remembered, of course, that transient effects, such as shutting in the well cause an abrupt and significant change in supply rate to the well and can cause very significant cooling.
This presentation shows the steady-state and transient thermal effects that can occur in depleted gas CCUS reservoirs using results from a commercial multiphase flow simulator. Results for wells with multiple flow paths and downhole flow control valves are also presented to highlight their operational flexibility which must be balanced against the increased well complexity and cost.

Adam has worked for Schlumberger for 28 years. Following field and office jobs in cementing and hydraulic fracturing he has worked in technical, managerial and product development roles in production enhancement, field development planning and operations, downhole flow control and lower completion optimization. For the last 2 years he has focused mainly on Carbon Capture and Storage projects.

Considerations for Emergency Response To A CO_2 Well Blowout

Alistair Gill, Wild Well Control

Wild Well Control has decades of experience of planning for and responding to well control events, but the majority has been in the hydrocarbon based arena. With the drive to develop means of storing CO_2, response plans for CO_2 wells are becoming more common place a CO_2 storage well blowout or accident at some time in the future is all but inevitable. While the response to a CO_2 well control event will follow a similar 6 step response timeline to its oil and gas counterpart there are a number of significant differences that must be accounted for in both the operational and the response planning stages. Predicting the behavior of the well flow and its surface expression requires similar but different physics to account for idiosyncrasies of the CO_2 phase behavior and its interaction with well control crews, fluids and equipment must be accounted for. Wild Well Control will discuss some of the changes needed to ensure that a CO_2 well control event can be managed successfully, through a combination of adjustments to well control engineering and field operations.

Alistair Gill serves as General Manager of Engineering Services at Wild Well Control. In this capacity, he oversees the company's advanced engineering and simulation activities. Alistair has 30+ years of industry experience, 20+ of which has been in the energy sector. He has a BEng degree in Mechanical Engineering from the University of Glasgow, Scotland and holds and professional engineering license in Texas, where he is based. He is a SME in both finite element analysis and computational fluid dynamics.

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