



SPE Workshop: EOR—The Obligatory Way to Optimize Mature Fields

29–30 May 2019 | Intercontinental Mendoza | Mendoza, Argentina | go.spe.org/MatureFields

Enhanced Oil Recovery (EOR) is an important if not obligatory step in the full life cycle planning and development of mature fields and heavy oil fields, in order to optimize operational economics and improve recovery. This is particularly important in the current economic environment of volatile oil prices and uncertain supply and demand. Additionally, many current Improved Oil Recovery (IOR) projects, particularly waterfloods, have reached their peak in terms of oil recovery, with their economics further diminished by high water cuts. As a result, it is imperative to propose and implement technologies that not only enable maximization of oil recovery, but also mitigate large water production and other operational costs, which can lead to an overall optimization of operational economics.

This event will cover the latest advances in chemical EOR, thermal EOR, miscible gas injection EOR, low salinity water flooding, emerging and innovative technologies, monitoring and surveillance for EOR, EOR screening studies, well design, drilling and completion challenges for EOR applications among others.

Evaluating the applicability of EOR should not be a choice, but a necessary step during the productive stage of a mature field.

PRINCIPAL SPONSOR



Committee Members

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YPF

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Gianna A. Pietrangeli
Flotek

Lirio Quintero
Baker Hughes, a GE company

Pallav Sarma
Tachyus

Isabel Vega
Y-TEC

Who We Are

SPE is the largest individual member organization serving managers, engineers, scientists and other professionals worldwide in the upstream segment of the oil and gas industry.



Society of Petroleum Engineers

Wednesday, 29 May 2019

0700–0800 **Grand Salón E Foyer**
Registration Check-In

0800–0810
Chairperson's Welcome and Introduction

0810–0840
Keynote Speaker: Jose Luis Massaferro, YPF

0840–1020 **Grand Salón E**
SESSION 1: Session 1: Why Continue Waterflooding

Session Chairs: Eric Delamaide, IFP Canada
Isabel Vega, Y-TEC

This session intends to do a revision of different strategies followed to control and monitor the excess of water in those fields under secondary recovery (Waterflood). The session will also include experiences in conformance control applied to injectors, and water blockage through producers aimed to improve oil production.

- **Injection of Thermally Activated Particles in Depth for Blocking High Permeability Zones: Pilot with Positive Results and New Treatment Cases in Cerro Dragón Field**
Alberto Iuliano, Pan American Energy
- **Lessons Learned in Water Shut-Off Treatments—Experience in Papagayos Formation, Vizcacheras Field: Business Case**
Jose Peltier, YPF; Alvaro Campomenosi, YTEC
- **New Simplified Methodology to Simulate Gel Water Shut-off Treatment in Producing Wells**
Diego Moglia, YPF
- **Water Flooding Optimization: Data Physics Provides New Insight**
Silvio Figliuolo, YTEC

1020–1050
Coffee Break

1050–1220 **Grand Salón E**
SESSION 2: EOR Screening and Its Comprehensive Incremental Value

Session Chairs: Eric Delamaide, IFP Canada
Lirio Quintero, Baker Hughes a GE company

Screening is the first step in the long road to a successful EOR project. Basic screening can range from the very simple—reviewing lists of screening criteria established by several authors—to the more complex involving dedicated software. Yet, even these methods suffer from weaknesses such as the fact that parameters are often considered in isolation, and that true geological complexity cannot be considered. This session will focus on identifying the issues for screening and the potential ways they could be improved.

- **Importance of Dynamic Reservoir Properties in Screening of EOR Technologies for Mature Reservoirs**
Sergio Cilento, CMG
- **Grimbeek Successful Polymer Pilot Books 1P, 2P, 3P Reserves in Gulf San Jorge Basin—Manantiales Behr: Four Estimation Methods**
Juri, J.E, Ruiz A.M., Serrano V., Schein F., Thill M., Guillen P., Tosi A., Pacchy M., Soto L., Therisod A., Paura M., Lauro P., Alonso P. Funes F., YPF
- **EOE Screening Methods Assisted by Digital Rock Analysis**
Claudia Lorena Delgadillo Aya, Ecopetrol-Colombian Petroleum Institute

1220–1350 **Olivas Restaurant**
Lunch

1350–1530 **Grand Salón E**
SESSION 3: Water Sourcing and Chemical Flood Design

Session Chairs: Gianna Pietrangeli, Flotek, Gonzalo Gallo, ITBA
Eleonora Erdmann, UNSA

Water quality for waterflooding and EOR is a major industry issue accounting for significant technical, economic, environmental and health impacts. The sourcing and/or treatment of the utilized water can determine the success of projects around the globe. In this session, we will be discussing the requirements, economics, technical and scientific aspects of water utilization to guarantee the realization of industry projects.

- **Optimization of EOR Formulation Using the Well Known Simple HLD Expression and the Recently Enderstood Tricks of Surfactant Nonlinear Ternary Mixtures**
Ana Forgiarini, Universidad de Los Andes
- **Waterflood Enhancement Through Successful Implementation of Microemulsion Additives in North American Field Pilots**
Jose Camilo Jimenez, Flotek
- **A Novel, Field-Prove Reservoir Triggered Polymer for Enhancing the Economics of Mobility Control Floods**
Mahdi Kazempour, NALCO
- **Polymer Selection and Gel Formulation Assessment for a High Temperature Oilfield in Argentina**
Jorge Monzon, SNF

1530–1600
Coffee Break

1600–1730 **Grand Salón E**
SESSION 4: Business Case: The Need To Do a Full Field Commercial Evaluation

Session Chairs: Carlos Glandt, Consultant
Eugenio Ferrigno, YPF; Celso Branco, Petrobras

This session will address the need to have a de-risked robust business case to embark in an EOR Pilot/Large scale project. This implies building a spectrum of production forecasts covering all project key uncertainties leading to a sound economic analysis. Typical EOR projects are mounted on mature waterfloods with abundant geological and production data that provide a fairly well calibrated simulation model.

Simulation results will be impacted by geological heterogeneities, grid dimension, relative permeability curves, fluid viscosities, and many others. Early simulated sensitivities to these variables are key to focus data acquisition and validation at both, laboratory and field level.

The session will cover simulation studies, risk analysis, economic impact posed by wells and facilities conditions, as well as the need for tax and fiscal incentives.

A well-grounded commercial business case that ranks against other production alternatives should be the starting point to embark in the multimillion-dollar investment required for field pilots. A successful production pilot will unlock the promise of EOR incremental reserves.

- **Grimbeek Successful Polymer Pilot Extends to 80 Injectors at CGSJ Basin Targeting an 18% STOOIP Incremental Oil**
Juri, J.E, Ruiz A.M., Serrano V., Schein F., Thill M., Guillen P., Tosi A., Pacchy M., Soto L., Therisod A., Paura M., Lauro P., Alonso P. Funes F., YPF
- **High-Resolution Dynamic Modeling Supports EOR Business Evaluation in Los Perales Field, Argentina**
Diego Perez, YPF
- **Derisking Strategy for High Temperature, High Salinity and High Hardness SP Flooding in Barrancas Formation: Laboratory Experiments, Single Well Tracer Tests Campaign, and Pilot Design**
Roberto Ariel Lucero, YPF

1730–1900
Welcome Reception

SPE Workshop: Enhanced Oil Recovery (EOR)—The Obligatory Way To Optimize Mature Fields

Thursday, 30 May 2019

0700–0800

Grand Salón E Foyer

Registration and Check-In

0800–0930

SESSION 5: Lower Cost Wells and Modular Facilities

Session Chairs: Francisco Francilmar Fernandes, Petrorio
Andres Lopez Gibson, YPF

In order to be selected for execution, EOR projects need to achieve better KPIs than their alternatives. Knowing that time and money are two important leverages to improve project performance, this session will focus on new technologies and methodologies involving well design & equipment, modularity and efficiency advances in facilities & operations that lower development and lifting costs along the projects, as well as on ways to improve EOR timing, bring it up front in a fields development and/or reducing its development time.

- **Lower Cost Well—Essential for Improved Oil Recovery—Polvo Case**
Valdo Rodrigues, PetroRio
- **Challenges of Optimizing Mature Field Production Facilities**
Wally Georgie, Maxoil Process Consultancy
- **Modularity Options and Cost Optimization on an EOR Project**
Enrique Leisen, YPF

0930–1000

Coffee Break

1000–1140

Grand Salón E

SESSION 6: Current and Emerging EOR Technologies, and Challenges With Existing Technologies

Session Chairs: Cesar Patiño, Ecopetrol
Pallav Sarma, Tachyus

This session will cover the emerging technologies that can help improve operational efficiency and economics of EOR projects, including applications of EOR to unconventional, new materials, methodologies and processes for EOR, and applications of surveillance, modeling, simulation and optimization. It will look at advances in surveillance techniques and IoT for better and smarter acquisition of data, and how this data can be used to the fullest extent via data science and machine learning methods and their applications to EOR projects, advances in modeling and simulations of EOR physics, and approaches that combine these seemingly disparate fields. It also aims to present insights on applications of existing modeling approaches for EOR and lessons learnt. Finally, it aims to explore new materials and processes for EOR, and emerging EOR technologies for shale, such as huff-and-puff, with emphasis on modeling, implementation and case studies.

- **Active Flood Management of Multizone Wells Using an Autonomously Remote Controlled Valve Array**
Warren MacPhail, NCS Multistage
- **Successful Industrial Scale Makedown and Field Injection of EOR Scleroglucan Polymer**
Briana Kozlowski, Cargill Bioindustrial Group
- **Creating Chemistry For Advanced Chemical EOR Solution Offering—Opportunities & Challenges**
Karin Eberius, BASF SE
- **Development of High Activity Liquid Polymers for Offshore Applications**
Dwarakanath Varadarajan, Chevron

1140–1300

Lunch

Olivas Restaurant

1300–1430

Grand Salón E

SESSION 7: Pilot Design

Session Chairs: Jose Luis Massaferro, YPF
Carlos Glandt, Independent Consultant
Gaston Fondevila, Grupo CAPSA

The proper pilot design is at the center of a well-executed commercial development plan. The discussion is driven by the clear understanding of the objectives of the pilot, i.e., the key risk factors the pilot would help us quantify. The expansion into a commercial venture requires in all cases satisfactory results of a production “oil-in-the-tank” pilot in a confined setting. This is a multipattern arrangement costly in time and company resources. This session will address a) the piloting steps needed before we design and commence the final production pilot and b) the design options of “low cost” oil-in-the-tank pilots to provide unambiguous results required for a commercial expansion decision. Field cases will be most valuable. Illustration of salient topics of this session are: a - Injectivity of the EOR fluids under matrix and fracture conditions, b- Communication and fly times between injectors and surrounding producers, c - Mechanisms for oil bank propagation and chemical consumption by adsorption and other losses, d- Polymer viscosity degradation, e - Design and execution of an Oil-in-the-tank pilot in a fully confined arrangement.

- **Combining Field Measurements and Dynamic Modeling for Pilot Design: Los Perales Case Study**
D. Perez, M. Cocco, D. Volzone, E. Fuzul, R. Katz, G. Pedersen, J.P. Ursule, J. Massaferro, YPF
- **Characterization of the Rayoso Formation: the Importance of 3D Modeling in Decision-Making for a Polymer Injection Project**
I. Weisman, A. Arguello, R. Lehu, G. Tennerini, S. Gandi, YPF
- **Polymer Flooding Pilot Design: How To Prolong Life and Increase Asset Value in a Marginal Area in the San Jorge’s Gulf Basin**
María Eugenia Peyrebonne Bispe; M. Villambrosa, M.E. Peyrebonne Bispe, M. Goldman, D. Benitez, CAPEX SA

1430–1500

Coffee Break

1500–1630

Grand Salón E

SESSION 8: Field Experiences

Session Chairs: Rodrigo Dalle Fiore, Ecopetrol
Eugenio Ferrigno, YPF

After screening for candidate fields, studying the reservoirs to select a suitable one for EOR, performing extended lab testing on their fluids and cores, and after obtaining corporate approval, field pilots and their subsequent expansions are the firsthand experiences. Unexpected situations will occur and must be documented if we want EOR to become a reality.

This session will show how EOR is done at the field. It will present common problems and lessons learned, aiming to obtain monitoring best-practices and de-risking strategies to guarantee future development.

- **Implementation and Assessment of Production Optimization in a Steamflood Using Machine-Learning Assisted Modeling**
Carlos Calad, Tachyus
- **Lessons from the Planning, Design, Execution and Results of Two ASP Pilots in Colombia: San Francisco and Caracara Sur**
Danuil Dueñas, Ecopetrol
- **Chemical EOR—Field Experience and Research**
Farouq Ali, University of Houston

General Information

Accessibility

Our events and functions are accessible to all attendees with wheelchairs. If you require special arrangements, please contact our staff at the registration desk.

Alcohol Policy

SPE recognizes the legitimate serving of alcoholic beverages in the process of conducting business and social activities. We also recognize that the use and consumption of alcohol carries with it the requirement for all attendees to consume those beverages responsibly.

Commercialism

In remaining consistent with workshop objectives and SPE guidelines, commercialism in presentations will not be permitted. Company logos should be used only to indicate the affiliation of the presenter(s).

Continuing Education Units

Attendees will receive 1.6 CEUs. One CEU equals 10 contact hours of participation. CEUs will be awarded through SPE Professional Development for participation and completion of an SPE workshop. A permanent record of a participant's involvement and awarding of CEUs will be maintained by SPE.

Documentation

Following the workshop, a URL containing released copies of the workshop presentations will be available to all attendees.

Electronic Devices

As a courtesy to the speakers and your fellow registrants, please turn off all electronic devices during presentations.

Name Badges

Please wear your badge at all times. It is a courtesy to your fellow registrants, speakers, and sponsors.

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Any person attending may be photographed or videotaped, and by your attendance, you give permission to use your image in possible future marketing publications including print, online, and video.

Workshop Format

Workshops maximize the exchange of ideas among attendees and presenters through brief technical presentations followed by extended Q&A periods. Focused topics attract an informed audience eager to discuss issues critical to advancing both technology and best practices.

Many of the presentations are in the form of case studies, highlighting engineering achievements and lessons learned. In order to stimulate frank discussion, no proceedings are published and members of the press are not invited to attend.



workshop Survey

Please take a moment and let us know your thoughts on this event!

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