Conference Program

SPE Latin America and Caribbean Heavy and Extra Heavy Oil Conference

Management and Innovation in Challenging Times

19–20 October 2016 | Novotel Hotel, Lima, Peru
www.spe.org/events/laheo/2016

SPE is a not-for-profit professional association whose more than 168,000 members in 144 countries are engaged in oil and gas E&P. Income from this event will be invested back into SPE to support many other Society programs.

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Welcome Message From the Chairpersons

Dear Industry Colleagues,

Thank you for joining us at the SPE Latin American and Caribbean Heavy and Extra Heavy Oil Conference! Take advantage of this knowledge-sharing platform and the networking opportunities designed for you. We encourage you to actively participate in the technical and special sessions, as we share knowledge, practical experiences, and lessons learned from the application of technology to increase heavy oil production and recovery while reducing development costs. We will become more efficient through collaboration and innovation.

Welcome to this SPE International Conference and to Lima, the gastronomy capital of Latin America!*

Victor Huerta  
Petroperú

Jose Flores  
Consultant

Schedule of Events

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<td>EOR of Heavy and Extra-Heavy Oils—Conformance, Gas and Solvent Stimulation and Completions</td>
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### Technical Program Committee

**Victor Huerta Quiñones**, Co-chairperson  
Petroperú  

**Jose Flores**, Co-chairperson  
Consultant

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<td>Samuel Armacanqui</td>
<td>World Oil Group</td>
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<td>Carolina Artiga</td>
<td>Universidad Central del Ecuador</td>
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<td>Geragg Chourio</td>
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<td>Felix Fonseca</td>
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### RESPONSABILIDAD SOCIAL

**Nuestro compromiso contigo**

Educando para mañana

Fomentamos la educación de los niños y jóvenes, mediante programas diseñados para elevar sus capacidades intelectuales, inculcando valores y desarrollando sus habilidades con la finalidad de formar ciudadanos emprendedores y socialmente responsables.

En los últimos cinco años son más de 300,000 jóvenes de nuestra costa, sierra y selva quienes hoy pueden aspirar a un futuro más prometedor.
General Information

Registration Hours: Registration will be available at the Machu Picchu, first floor.
- Tuesday, 18 October  | 1400-1700
- Wednesday, 19 October | 0700-1700
- Thursday, 20 October  | 0700-1700

Speaker Check-In Hours: The Speaker Check-In Room is located at Caral, second floor.
- Tuesday, 18 October  | 1400-1700
- Wednesday, 19 October | 0700-1700
- Thursday, 20 October  | 0700-1700

Poster Sessions: All poster sessions will take place during the coffee breaks, at the Machu Picchu, first floor.

Luncheon: Attendee lunch will be provided on Wednesday and Thursday from 1200 to 1300 hours at Restaurante 365. Lunch is included in the full registration price. Additional tickets may be purchased on-site at the registration area for USD 50.

Networking Reception: Join us on Wednesday, 19 October to enjoy complimentary drinks and hors d’oeuvres at the networking reception.

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Attendance at or participation in SPE meetings and other activities constitutes an agreement by the registrant to SPE’s use and distribution of the registrant’s image or voice in promoting future SPE meetings in any way SPE deems appropriate.

Copyright Information: All conference sessions are protected by international copyright laws. Photography and audiovisual recording of any kind are strictly prohibited in the sessions.

Simultaneous Translation: Bring a photo ID to claim your headset before the session begins. Technical presentations will be simultaneously translated in English and Spanish.

Proceedings: One copy of the digital cards to access the proceedings is included in the full conference registration fee. Additional copies can be purchased at the registration desk for:
- SPE Members USD 100
- Nonmembers USD 150

Conference Survey: A questionnaire will be distributed online on Monday, 24 October. Please take the time to fill out the survey as your opinion helps us continue to grow and make the next event even better.

Hotel Concierge: Information on transportation, restaurants, and activities can be provided by the hotel concierge and it is available 24/7.

Safety: When traveling, as in any major city, take the necessary precautions. Notify the hotel immediately in the event of a lost or stolen room key card. Plan your itinerary with the assistance of the hotel concierge before leaving the property.

In Memoriam

EDGAR RANGEL-GERMAN, SPE, commissioner of Mexico’s regulatory agency National Hydrocarbons Commission (CNH) and one of the key members behind the implementation of Mexico’s recent energy reform for hydrocarbons, died 23 March. He was 42. He was an active volunteer and served on several SPE committees, including the 2016 SPE Latin America Heavy and Extra Heavy Oil.
Technical Program

SE01 Opening Plenary Session: How to Produce Heavy Oil Under Challenging Economic Scenarios?
Wednesday, 19 October | 0830–1000 | Choquequirao
Moderators: Jose Gonzalez Flores, Consultant; Victor Alexei Huerta Quiñones, Petroperú
Panelists: 1. Darcy Spady, 2018 SPE International President, Broadview Energy Canada
2. Anton Castillo, PDVSA
3. Rodrigo Andrés Dalle Fiore, Ecopetrol

01 - EOR of Heavy and Extra-Heavy Oils—Chemical
Wednesday, 19 October | 1030–1200 | Choquequirao
Session Chairpersons: Lirio Quintero, Baker Hughes; Eric Delamaide, IFP Technologies Canada

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<td>181210</td>
<td>Evaluation of a Polymer Injection Pilot in Argentina • A. Hryc, F. Hochenfellner, R. Ortiz Best, S. Maler, R. Puliti, Pluspetrol S.A.</td>
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<td>1100–1130</td>
<td>181149</td>
<td>Investigation of Post-Breakthrough Heavy Oil Recovery by Water and Chemical Additives Using Hele-Shaw Cell • A. Voroniak, University of Calgary; J.L. Bryan, S. Taheri, University of Calgary, Perm Inc; H. Hejazi, University of Calgary; A. Kanztas, University of Calgary, Perm Inc</td>
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<td>1130–1200</td>
<td>181166</td>
<td>Retrieval of Solvent Injected During Heavy-Oil Recovery from Water- and Oil-Wet Reservoirs: Pore Scale Analysis at Variable Temperature Conditions • J. Cui, T. Babadagli, University of Albert</td>
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02 - Heavy Oil Mature Fields
Wednesday, 19 October | 1030–1200 | Sipan
Session Chairpersons: Jesus Samuel Armacanqui World Oil Group; Jose Luis Mogollon, Halliburton

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<td>Assessment of Cold Production Strategies to Revitalize Mature Heavy Oilfields in the Peruvian Jungle V.A. Huerta Quinones, Petroperú SA</td>
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<td>1100–1130</td>
<td>181185</td>
<td>Integrated Methods for Identifying Opportunities to Efficiently Develop Heavy Oil in the Block 192 – Peru W. Zafra, Independent Consultant; A. Erazo, Universidad Nacional de Ingeniería; V.H. Soriano Arambulo, Pluspetrol Peru Corporation S.A; X. Wu, University of Oklahoma</td>
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SE02 Keynote Presentation: Basak Kurtoglu, Citi Energy A&D
Wednesday, 19 October | 1300–1350 | Choquequirao
Moderator: Victor Alexei Huerta Quinones, PetroPeru SA
Basak Kurtoglu Stookey will share economically driven strategies to maximize the value of resources.

15 - POSTER SESSION
Wednesday, 19 October | 0830–1700 | Machu Picchu

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<td>Optimization and Adaptation of Wastewater Treatment Plants (WWTP) Located in Camps of Oil and Gas Operations in Peruvian Jungle • M.M. Centurión Castro, L. Alosilla-Lazo, Repsol Exploración Perú</td>
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<td>181169</td>
<td>The Concept of the Sustainable Oil Field Development Applied to Heavy and Extra Heavy Oil Fields J.S. Armacanqui, CITEL - Centro De Innovacion Tecnologica y Empresarial Latinoamericana</td>
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<td>181167</td>
<td>Natural Generation of Acidic Water as a Cause of Dissolution of the Rock During Smart Water Injection in Heavy Oil Carbonate Reservoirs • H. Gachuz-Muro, Heriot-Watt University/Pemex E&amp;P; M. Sohrabi, Heriot-Watt University; D. Benavente, University of Alicante</td>
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<td>181144</td>
<td>Design of Autonomous Inflow Control Device Completions in Heavy Oil for Complex Reservoir Structures K.V. Thornton, Halliburton</td>
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### 03 - EOR of Heavy and Extra-Heavy Oils—Thermal
**Wednesday, 19 October | 1400–1530 | Choquequirao**  
**Session Chairpersons:** Eric Delamaide, IFP Technologies Canada; Victor Manuel Salazar, Computer Modelling Group

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| 1400–1430  | 181198  | **Strategies To Increase Production in a Colombian Heavy Oil Field With Cyclic Steam Stimulation**  
| 1430–1500  | 181148  | **Wettability Alteration during Solvent Assisted-Steam Flooding with Asphaltenes-Insoluble Solvents**  
P. Stape, B. Hascakir, Texas A&M University                                                   |
| 1500–1530  | 181155  | **A Calculation Model for Steam Properties Variation along Wellbore Trajectory in SAGD Processes**  
N. Ju, G. Zhao, University of Regina                                                            |

### 04 - Emerging Technologies
**Wednesday, 19 October | 1400–1530 | Sipan**  
**Session Chairpersons:** Carlos Marquez, PDVSA; Douglas Alexander Espin, NeOTechnology, C.A

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| 1400–1430  | 181178  | **Application of Electrochemical Treatment Technology of Produced Water of a Heavy Oil Field, via Boron Doped Diamond (BDD) Electrode**  
H. Ghanem, S. Rosiwal, M. Göltz, Friedrich Alexander Universität Erlangen-Nürnberg; D. Espin, Neotechnology |
| 1430–1500  | 181181  | **Evaluation of an Advanced Metal Bonded Coating Technology for Improved SAGD Performance**  
D. Zhu, M.N. Leitch, RGL Reservoir Management Inc; J. Wang, X. Shi, L. Gong, E. Aghaie, J. Luo, H. Zeng, University of Alberta |
| 1500–1530  | 181152  | **The Research and Application of In-Situ Combustion With Gravity Technology in Thermal Developed Heavy Oil Reservoir**  
W. Lei, D. Liu, H. Zhang, H. Long, X. Wu, R. Hao, J. Liu, F. Gao, Drilling and Production Technology Institute of Liaohe Oilfield, Petrochina |

### 05 - Flow Assurance and Artificial Lift
**Wednesday, 19 October | 1600–1730 | Choquequirao**  
**Session Chairpersons:** Victor Alexei Huerta Quinones, Petroperú SA; Jesus Samuel Armacanqui, World Oil Group

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| 1630–1700  | 181199  | **Effectiveness in Heavy Oil Wells Cleaning at Boscan Field With Cyclone Bailer and Coiled Tubing Unit**  
| 1700–1730  | 181183  | **A Practical Guideline for Selection and Application of Chemical Treatments for Production Enhancement in Heavy Oil Reservoirs**  
L.U. Castro, R.A. Morales, Baker Hughes                                                                 |

### 06 - Dynamic Processes—Heavy Oil Recovery
**Wednesday, 19 October | 1600–1730 | Sipan**  
**Session Chairpersons:** Victor Manuel Salazar, Computer Modelling Group; Jose Gonzalo Flores, Consultant

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| 1600–1630  | 181208  | **Modeling of Heat Transfer Coupled with Fluid Flow for Temperature Transient Analysis during SAGD Process**  
K. Yu, G. Zhao, University of Regina                                                             |
| 1630–1700  | 181193  | **Evaluation of Heavy Oil Recovery by Water Flooding and Polymer Flooding at Different Temperatures**  
H.L. Bento, R.Z. Moreno, University of Campinas                                                   |
| 1700–1730  | 181188  | **Pore-Level Simulation of Heavy Oil Reservoirs; Competition of Capillary, Viscous, and Gravity Forces**  
B. Goudarzi, P. Mohammadmoradi, A. Kantzas, University of Calgary                                |
## 07 - EOR of Heavy and Extra-Heavy Oils—Conformance, Gas and Solvent

**Thursday, 20 October | 0830–1000 | Choquequirao**  
**Session Chairpersons:** Berna Hascakir, Texas A&M University; Jose Gonzalo Flores, Consultant

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| 0830-0900 | 181173  | **New Method of Steam Channeling Plugging in Horizontal Wells of Heavy Oil Steam Stimulation**  
H. Yu, L. Li, J. Zheng, W. Ji, X. Qin, X. Fu, Drilling & Production technology Research Institute of Jidong oilfield; W. Gao, Nan Pu Oilfield Operation District of Jidong Oilfield Company |
| 0900-0930 | 181209  | **Selection of Proper Chemicals To Improve the Performance of Steam Based Thermal Applications in Sands and Carbonates**  
Y. Wei, T. Babadagli, University of Alberta |
| 0930-1000 | 181160  | **State of the Art Review of the Steam Foam Process**  
E. Delamaide, IFP Technologies (Canada) Inc.; A. Cuenca, M. Chabert, SOLVAY |

## 08 - Stimulation and Completions

**Thursday, 20 October | 0830–1000 | Sipan**  
**Session Chairpersons:** Francisco Alberto Porturas, ScanViz; Ramon Correa, AGIP Oil

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| 0830-0900 | 181191  | **Successful Cases Histories of the Application of Acidizing Treatments with Seawater Based Fluid in the Gulf of Mexico Heavy Oil Reservoirs**  
A.D. Gonzalez, C.R. Ramirez, C.J. Ramirez, Halliburton |
| 0900-0930 | 181204  | **Enhanced Production with ICD and AICD Completions in Oil Wells: Case Studies From Latin America**  
F.A. Porturas, ScanViz |
| 0930-1000 | 181194  | **A Low-Cost Completion Technique for Simultaneous Steam and Co2 Injection in Heavy Oil Reservoirs**  
C. Teodoriu, A. Marquez, A.C. Ichim, MPGE, The University of Oklahoma |

## 09 - Reservoir Evaluation and Reservoir Description I

**Thursday, 20 October | 1030–1200 | Choquequirao**  
**Session Chairpersons:** Ronald Egusquiza, GranTierra Energy Peru SRL; Juan Fernando Watanabe, GMP

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| 1030-1100 | 181182  | **Robust Characterization of Naturally Fractured Carbonate Reservoirs Through Sensitivity Analysis and Noise Propagation Reduction**  
C. Minutti, G. Ramos, S. Gomez, IIMAS National University of Mexico; R. Camacho Velazquez, M.A. Vasquez-Cruz, PEMEX; N. del Castillo, IIMAS National University of Mexico |
| 1100-1130 | 181170  | **Whole-Rock Elemental Data as an Aid in Log Interpretation: Low-Resistivity Reservoir Case Study**  
L.A. Lander, M. Dix, J. Kharrazi, Weatherford; L. Rendon, L.C. Matute, PDVSA |
| 1130-1200 | 181165  | **Optimization of Production in Reservoirs with Temperature-Dependent Asphaltene Precipitation and Irreversible Flocculation**  
C. Temizel, Aera Energy LLC-EBS; D.J. Betancourt Rodriguez, Halliburton; M. Zhang, University of Akron; K.V. Thornton, Halliburton; K. Balaji, R. Ranjith, University of Southern California |
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10 - Emerging Technologies II
Thursday, 20 October | 1030–1200 | Sipan
Session Chairpersons: Carlos Vinicio Anez, Delta Hydrocarbons; Douglas Alexander Espin, NeOTechnology, C.A

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<td>Flow Visualization for Performance Measurement Across Sand Control Orifices • F. Rasimarzabadi, University of Alberta; M.N. Leitch, RGL Reservoir Management Inc; S. Ansari, D. Nobes, University of Alberta</td>
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<td>1100-1130</td>
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<td>New Material Technologies Reduce PDC Drill Bit Body and Cutter Erosion in Heavy Oil Drilling Environments • A. Wong, SHEAR BITS; A. Bell, M. Williams, DiaPac; S. Isnor, J. Herman, SHEAR BITS</td>
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<td>1130-1200</td>
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<td>Compact and Highly Efficient Heat Exchanger Based on Packed Beds of Nanoparticle-Doped Spheres A. Alvarado, E. Lancon, C. Blanco, M.I. Briceno, Nano Dispersions Technology, Inc.; D.A. Espin, NeOTechnology, C.A</td>
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11 - Economics and Sustainability of Heavy and Extra-Heavy Oils
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Session Chairpersons: Victor Alexei Huerta Quinones, Petroperú SA; Carlos Vinicio Anez, Delta Hydrocarbons

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<td>Managing Oil Fields in a Low Oil Price Environment • J.S. Armacanqui, CITEL; L. Eyzaguirre, C.A. Lujan, J.A. Rodriguez, Universidad Nacional de Ingeniería</td>
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<td>Assessment of Macro-Regional Net Back Prices for Heavy Oil Monetization: From Marañon Basin to the Talara Refinery • R.J. Cervantes Bravo, N. Palacios Chun, V.A. Huerta Quinones, Universidad Nacional de Ingeniería</td>
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<td>How Accurate is Your Well Integrity? A Discussion About the Surface Casing Integrity Under Temperature Loading in Heavy Oil Fields • A.C. Ichim, A.R. Marquez, C. Teodoriu, MPGE, The University of Oklahoma</td>
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12 - Production Optimization Analyses
Thursday, 20 October | 1400–1530 | Sipan
Session Chairpersons: Carolina Artigas, Consultant; Francisco Alberto Porturas, ScanViz

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<td>Unified Model of Heat Transfer in Gas/Oil/Water Pipe Flow • W. Zheng, H. Zhang, C. Sarica, University of Tulsa</td>
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<td>1430-1500</td>
<td>181142</td>
<td>Successful Application of Root Cause Analysis on Progressive Cavity Pumps Failures in Orinoco Oil Belt S. Rangel, A. Delgado, M.J. Han, I. Gamez, S.K. Rosales, R. Morety, PDVSA Petropiar; J.A. Pereira, INTEVEP</td>
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<td>1500-1530</td>
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<td>Voidage Replacement Ratio as a Decision Variable in Closed Loop Reservoir Management Process Improving Field Production Efficiency • E.M. Nogueira, Petrogal Brasil</td>
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13 - Reservoir Evaluation and Reservoir Description II
Thursday, 20 October | 1600-1730 | Choquequirao
Session Chairpersons: Berna Hascakir, Texas A&M University; Jose Gonzalo Flores, Consultant

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<th>Paper #</th>
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<tr>
<td>1600-1630</td>
<td>181190</td>
<td>Influence and Determination of Mechanical Skin in a Reservoir with a Fractal Behavior R. Posadas-Mondragon, R. Camacho-Velazquez, PEMEX</td>
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<tr>
<td>1630-1700</td>
<td>181197</td>
<td>Influence of Confining Stress in Petrophysical Changes During Thermal Recovery in Silty Sands, Colombia J.A. Arias Buitrago, G.A. Alzate, A. Arbelaez, C. Morales Monsalve, Universidad Nacional de Colombia; R.J. Chalaturnyk, G. Zambrano, University of Alberta</td>
</tr>
<tr>
<td>1700-1730</td>
<td>181177</td>
<td>Quantification of the Distribution of Initial Water Saturation Through Leverett J Function To Calculate Hydrocarbon Reserves • J.W. Gonzalez, A.E. Perozo, F.X. Medina, Petroleos de Venezuela S.A.</td>
</tr>
</tbody>
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14 - EOR of Heavy and Extra-Heavy Oils—Combustion and the New Tech

Thursday, 20 October | 1600-1730 | Sipan
Session Chairpersons: Lirio Quintero, Baker Hughes; Eric Delamaide, IFP Technologies Canada

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<th>Time</th>
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| 1600-1630 | 181195  | Investigation on In-situ Combustion in D66, a Multilayered Heavy Oil Reservoir, Liaohe Oilfield  
L. Teng, S. Zhang, D. Lu, D. Xu, Y. Gong, Liaohe Oilfield Subcompany, CNPC; L. Zhong, H. Gao, C. Li, China University of Petroleum, Beijing |
| 1630-1700 | 181192  | Simulator Capability Extension Using a Dynamic Load Library To Enable H2S Reactions In Thermal EOR  
C.N. Donatti, E.G. Muenz, T. Aliaga, V. Girardi, J. Kabche, ESSS; G. Li, P.J. Evans, W. Shi, Chevron |
| 1700-1730 | 181207  | Experimental and Numerical Simulation of Combined Enhanced Oil Recovery with In Situ Upgrading in a Naturally Fractured Reservoir  
S.M. Chavez Morales, Pemex/University of Calgary; P. Pereira-Almao, University of Calgary |
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  - Agua de Producción
  - Water Floodings (*)

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(*) Procesos patentado GreenZyme®

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- Costo reducido de extracción
- Sin necesidad de capacitación, manejo o transporte especial
- GreenZyme® es un catalizador, trabaja en el tiempo
- Biodegradable y amigable con el medio ambiente

**Costo Beneficio IOR/EOR**
- Sin capacitación adicional
- Sin necesidad de manejo o transporte especial
- No combustible
- No peligroso
- Base de Agua

**Ventajas de Multiuso:**
- Cambios en el acceso a los productos de EOR
- Cambios en el retorno de la inversión
- Equipos de superficie viejos o fuera de servicio conectados a campos productores

**Causas de la baja recuperación en la formación:**
- Bloqueo del Wellbore
- Alta viscosidad, Acumulación de Parafinas
- Baja permeabilidad
- Alta resistencia dinámica al flujo
- Petróleo atrapado
- Disminución la presión en la formación
- Disminución de la capacidad de water flood
- Bajo rendimiento del Pozo

**Cuando GreenZyme® se espere en la formación:**
- GreenZyme® rompe la barrera interfacial
- Acción moviliza el petróleo atrapado
- Se abren nuevos canales de flujo
- El fluido dinámico levanta el petróleo movilizado
- Remueve acumulaciones de parafinas
- Incrementa la permeabilidad
- Restaura la presión en la formación
- Previene la re-adhesión del petróleo
- Petróleo es movilizado al wellbore

**Contactenos:**
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https://www.youtube.com/c/btprocessing