In the past decade, industry has demonstrated that the Duvernay is one of the premier liquids-rich shale plays in North America, with the potential to produce roughly 3.4 billion barrels of marketable oil, 6.3 billion barrels of natural gas liquids, and 77 Tcf of gas (NEB, 2017).

With more than 900 horizontal wells drilled to date, activity in the Duvernay has rapidly accelerated over the past 5 years, as many operators move from appraising their land blocks to commercial development.
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 SPE workshop. A permanent record of a participant's involvement and awarding of CEUs will be maintained by SPE.

Documentation
A link to an FTP site will be emailed to attendees 1-2 weeks after the workshop. A copy of the presentations that speakers have agreed to release will be made available, along with the list of workshop attendees.

Electronic Devices
As a courtesy to the speakers and your fellow registrants, please turn off all electronic devices during presentations.
Show Me the Money! Moving the Duvernay from Appraisal to Commerciality

Committee Members

WORKSHOP CHAIRPERSON
Patrick Miller
Repsol Oil & Gas Canada Inc.

WORKSHOP PROGRAM COMMITTEE

Osita Aniekwe
KUFPEC Canada

Ron Moyes
Keyera

Russell Brausse
Encana Corporation

Cris O’Brien
Shell Canada

Steven Golko
Sproule

Dave Sawyer
McDaniel & Associates Consultants

Ryan Hasell
Murphy Oil Corporation

Shahab Siddiqui
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Trevor Holding
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Lisa Song
Chevron Canada Resources

Susan Ilsley
Paramount Resources

Claudio Virues
Alberta Energy Regulator

Matt Johnston
Shell Canada

Kris Watson
NCS Multistage

David Langille
Shell Canada

Aaron White
Murphy Oil Corporation

Nick Miles
Tier 1 Energy

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

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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.
## Schedule Overview

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### Did you Know...

The SPE Canadian Educational Foundation is the successor entity of the Petroleum Society’s 50th Anniversary Educational Trust Fund, established in 1999, and of the SPE Canadian Educational Trust Fund. The SPE Canadian Educational Foundation (SPECEF) provides scholarships annually to post-secondary students who have indicated a desire to make a career in the Energy Industry. SPECEF also supports science fairs and other programs that encourage middle and high school students to consider the Energy Industry as a career choice. To date, since 1999, well over $300,000 in scholarships and funding has been granted. The governance structure of SPECEF provides the flexibility to create new programs, scholarships and energy educational initiatives that will benefit members of SPE in Canada. For more information about SPECEF or to give a tax deductible donation, please visit: [www.spe.org/canada](http://www.spe.org/canada)
DAY 1: Tuesday, 19 March 2019

0800–0805
Opening Remarks

0805–0900
Opening Keynote
Moderators: Patrick Miller, Repsol Oil & Gas Canada Inc.
Dave Sawyer, McDaniel & Associates Consultants

This opening session will set the stage for the rest of the workshop by providing an overview of the current state of the Duvernay play in terms of geology, well design, well performance, and operator activity. Next, we will see how the Duvernay compares to other unconventional plays in North America from the perspective of the investment community.

Keynote Speakers:
• Presentation 1: Duvernay: An Evaluator’s Perspective
  David Sawyer, McDaniel & Associates Consultants
• Presentation 2: Duvernay Investment Perspectives
  Cheryl Sandercock, Managing Director and Co-Head A&D Advisory Energy BMO Capital Markets

0900–1000
Session 1: Basin Mapping
Session Chairpersons: Steven Golko, Sproule
Susan Ilsley, Paramount Resources

The Duvernay is a vast play covering a large land base and contains multiple depositional Basins. Not all Duvernay is the same. This session focuses on differentiating the geology and performance of different parts of the play (East vs. West, North vs. South) and trying to understand what the potential may be in some of the untested areas.

• Presentation 1: Building the Foundations: Geological Overview of the Duvernay
  Paul Poscente, Canadian Discovery
• Presentation 2: Pushing the Limits of the Duvernay
  John Hirschmiller, GLJ Petroleum Consultants

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DAY 1: Tuesday, 19 March 2019

1030–1200
Session 2: Reservoir Rock Phase Behavior Characterization
Session Chairpersons: Ryan Hasell, Murphy Oil Company
Claudio Virues, Alberta Energy Regulator

The Duvernay formation is an emerging liquid rich formation in the western Canada sedimentary basin. This session focuses on characterizing the rock and fluid properties trying to capture insights on knowledge gained to predict and optimize performance for future developments.

• Presentation 1: Using Laboratory-Derived Stress-Dependent Unpropped and Propped Fracture Permeability and Compressibility Measurements to Constrain Rate-Transient Analysis and Modeling of Duvernay Flowback Data
  Chris Clarkson, University of Calgary

• Presentation 2: EOS Basin Modeling in the Duvernay on PVT Phase Behavior
  Curtis Whitson, whitson

• Presentation 3: Key Considerations in Estimating HIIP in the Duvernay Formation
  Linda Echikh, Sproule

1300–1430
Session 3: Development Strategy and Economics
Session Chairpersons: Russell Brausse, Encana Corporation
David Langille, Shell Canada

Understanding of the rock, pressures, and pipe must clearly link to corporate value drivers, partnering opportunities, and play differentiators in the upstream business. Join us for a discussion about development strategy and regional incentives to consider in unlocking the Duvernay.

• Presentation 1: Joint Ventures in the WCSB
  Jeremy Hus, Encana Corporation

• Presentation 2: Addressing Canada’s Oil and Gas Competitiveness
  Steve Breese, Canadian Association of Petroleum Producers (CAPP)

• Audience Participation Session
  Developing the Duvernay – Audience vs. the Data
  Facilitator: Kristian Wieclawek, Sproule

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In Lieu of Speaker and Committee Gifts...

On behalf of Invited Speakers and the Workshop Committee, SPE Canada is pleased to make a donation of $500 to support AWSN.

AWSN is an umbrella organization that supports a wide range of programs that encourage youth from underrepresented groups (girls, aboriginal youth, rural youth) to pursue their interest in STEM (science, technology, engineering and math). AWSN also supports programs for STEM graduates at any career stage by encouraging STEM trained professionals to find work in, and to stay and grow in their profession (new graduates, Alberta newcomers, women).

For more information about this non-profit, visit: www.awsn.org

SPE training programs offer professionals many options to enhance their knowledge in classrooms, online or with an in-house training session. A training course through SPE allows professionals to learn about the latest advancements and explore new solutions directly from subject matter experts. Visit www.spe.org/training/courses to check out the training schedule in your region.

Upcoming SPE Canada Training Courses

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<td>Evaluation of Canadian Oil and Gas Properties</td>
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Day 2: Wednesday, 20 March 2019

0830–0930  
**Session 5: Factors That Impact Production Performance**  
Session Chairpersons: Nick Miles, Tier 1 Energy  
Cris O’Brien, Shell Canada

Operators have expressed interest in completion intensity, flowback methods and Artificial lift performance. This session will be discussing the production challenges encountered during the full life from initial well design to full field development.

- **Presentation 1:** Flowing While Fracking Risks & Rewards  
  Arlo Sutherland, Shell Canada

- **Presentation 2:** Factors Affecting Growth of Stimulated Reservoir Volume in the Kaybob Area  
  Erfan Sarvaramini, GLJ Petroleum Consultants

1000–1200  
**Session 6: Infrastructure Planning – Wellhead to Market**  
Session Chairpersons: Ron Moyes, Keyera  
Lisa Song, Chevron Canada Resources

As part of the commerciality part of this workshop, this session will showcase some operators’ wellsite designs, challenges and current practices in infrastructure planning - commercial and pipeline status and challenges from the midstream perspective.

- **Presentation 1:** Pad Level Measurement in the Duvernay  
  Neale Beswick, Chevron Canada Resources

- **Presentation 2:** Midstream 101 - A Producers and Processors Points of View  
  Shane Moss, Encana Corporation  
  Ron Moyes, Keyera

- **Presentation 3:** Market Fundamentals – Plant Gate to Market  
  Dan Miller, Keyera

The Society of Petroleum Engineers (SPE) is a not-for-profit organization. Income from this event will be invested back into SPE to support many other Society programs. When you attend an SPE event, you help provide even more opportunities for industry professionals to enhance their technical and professional competence. Professional awards, scholarships, the Distinguished Lecturer program, OnePetro, JPT and the Competency Management Tool are just a few examples of programs that are supported by SPE.

**Upcoming SPE Canada Events**

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<td>16 April 2019</td>
<td>SPE/CHOA Slugging it Out Conference</td>
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<tr>
<td>4–5 June 2019</td>
<td>SPE Workshop: Using Instrumentation and Data to Optimize Thermal Operations</td>
<td>Calgary, Alberta</td>
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<tr>
<td>30 Sep–2 Oct 2019</td>
<td>SPE Annual Technical Conference and Exhibition</td>
<td>Calgary, Alberta</td>
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<tr>
<td>19–21 Nov 2019</td>
<td>SPE Thermal Well Integrity and Design Symposium</td>
<td>Banff, Alberta, Canada</td>
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1330–1500
Session 7: Managing the Non-Hydrocarbon Side of Duvernay Production
Session Chairpersons: Osita Aniekwe, KUFPEC Canada Inc.
Matt Johnston, Shell Canada

As the Duvernay play transitions into development, creating and executing a strategy for the non-hydrocarbon production from Duvernay wells is critical for industry. This includes understanding both i) what is causing risks to arise (e.g. H2S or high water cut production) and ii) how to manage these risks (e.g. water disposal strategy) in a safe and cost-effective way that proves commercially economic. The session will assess how industry is tackling these issues as the shift to development continues.

• Presentation 1: Duvernay H2S Production Challenges
  Sean Kleiner, Chevron Canada Resources

• Presentation 2: Disposing Produced Water in the Kaybob Duvernay Play
  Jean-Francois Gagnon, Shell Canada

• Presentation 3: Water Production, Disposal, and Midstream Synergies in the Duvernay
  Gaetan Gobeil, Catapult Environmental

1530–1700
Session 8: Panel Discussion – Appraisal to Commerciality
Moderators: Kris Watson, NCS Multistage
Aaron White, Murphy Oil Company

This panel session will focus on how different companies approach making a final investment decision in an unconventional play. Topics covered in the discussion will include risk tolerance, quantifying uncertainties, consistency in assessments across a company, and the advantages and disadvantages of the Duvernay compared to other key North American unconventional plays.

Panelists:
• Guy Grierson, Partner and Director, Outlier Resources
• Courtney Jones, Director and Vice President, Planning & Performance Management, Repsol Oil & Gas Canada Inc.
• Sean Kleiner, Execution Manager, Kaybob Duvernay Project, Chevron Canada Resources
• Sean Petersen, General Manager, Kaybob Asset, Murphy Oil Company
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