



CONFERENCE SCHEDULE

All times in Mountain Daylight Time (MDT)

Saturday, September 21

8:00 AM – 12:30 PM RESEARCH COMMITTEE MEETING
1:00 – 4:30 PM LEADERSHIP MEETING

Sunday, September 22

8:00 AM – 5:00 PM **SMRI TECHNICAL CLASS**
Class #1: Solution Mining
Optional with additional charge; to be repeated Spring 2025 Conference
Class #2: Canadian Standards Association
Z341 Storage of Hydrocarbons in Underground Formations *Optional with additional charge*

Monday, September 23

8:00 – 10:00 AM **BUSINESS MEETING**
Members Only
10:30 AM – 5:00 PM **TECHNICAL PAPER PRESENTATION**
8:30 AM – 4:15 PM **FRIENDS AND SPOUSES FUN**
6:30 PM – 9:30 PM **MONDAY CONFERENCE EVENING EVENT**
Optional; additional charge

Tuesday, September 24

8:00 AM – 5:00 PM **TECHNICAL PAPER PRESENTATION**
9:30 AM – 3:30 PM **FRIENDS AND SPOUSES FUN**

Wednesday, September 25

7:30 AM – 5:00 PM **FIELD TRIP 1:** *Stream-Flo Group and Keyera Fort Saskatchewan*
FIELD TRIP 2: *C-Fer Technologies and ATCO Fort Saskatchewan*

CONTACT

CONFERENCE ASSISTANCE

SMRI Membership Issues

John Nadeau Executive Director
+1 518-579-6587
jnadeau@solutionmining.org

Registration Assistance

Dawn Langlais
Conferences and Education
+1 918-914-2499
dawnL@solutionmining.org

PROGRAM QUESTIONS CONTACT

Program Chair 2024

Dirk Zapf University of Hannover
+49 511 762 2590
dirk.zapf@igth.uni-hannover.de

Assistant Program Chair

Nils Skaug WSP USA
+1 281 589 5846
nils.skaug@wsp.com

CLASS QUESTIONS CONTACT

Technical Class Chair 2024

Eric Busch Agapito Associates
+1 832 216 0785
ebusch@agapito.com

Research Coordinator

Tim Bauer Solution Mining
+1 281 435 9753
tbauer@solutionmining.org



REGISTRATION INFORMATION

IN-PERSON ATTENDEES

All conference attendees must be in the SMRI database and register online in advance, with payment required for confirmation. Non-technical guests must be registered as "guests" before finalizing the online payment. Event space is limited. The delegate registration fee includes access to Sunday Icebreaker, breakfast, AM/PM breaks, and Monday and Tuesday lunches. Registering after September 6 incurs a \$250 additional charge, subject to space availability.

REMOTE ATTENDEES

SMRI plans to broadcast the Edmonton meeting in a hybrid format. Technical Presentations will be live-streamed, with on-demand access later. The same platform as the Krakow event will be used, and details will be shared closer to the conference date. Virtual attendees must register separately with a link on the registration page. The remote delegate registration fee is the same as in-person rates, covering live feed broadcast, on-demand videos, and a file of all presented papers. Register before September 6 to avoid additional \$250 charge. *The Technical Class will be live-streamed only and not available on-demand afterward.*

conference pricing

MEMBER COST: \$725
(\$600 w/o Monday Night Event)

NON-MEMBER COST: \$1,225
(\$1,100 w/o Monday Night Event)

Discounts available for Class Instructors and one Speaker per paper. University students contact John Nadeau to apply for discounted registration (jnadeau@solutionmining.org).

registration dates

17 JULY
Member registration begins

15 AUGUST
Non-member registration begins

6 SEPTEMBER
Registration ends;
no refunds after this date

HOTEL & TRAVEL DETAILS

CONFERENCE HOTEL

The Westin Edmonton

10135 100 St NW, Edmonton, AB T5J 0N7, Canada

[Click to Book Hotel](#)

SMRI RATE **RESERVATIONS**
\$165 CAD +1 780-426-3636

TRANSPORTATION

There are several ways to get to The Westin Edmonton:

1. By car/rental car, the airport is accessible from Alberta Highway 2 south of Edmonton.
2. Bus, train, tram, or Uber

OVERFLOW HOTEL

The Chateau Rogue

10111 Bellamy Hill, Edmonton, AB T5J 1N7, Canada

7-10 min. walk to the Westin

[Click to Book Hotel](#)

SMRI RATE
\$124 CAD Standard King
\$144 CAD Concierge King

RESERVATIONS
+1 800-661-8801

AIRPORT

Edmonton Airport (YEG) is 30 km south of downtown Edmonton along Alberta Provincial Highway 2; 30-min drive to downtown.



CONFERENCE ANNOUNCEMENT



SMRI FALL 2024

EDMONTON | CANADA
SEPTEMBER 21-25

FALL 2024 SPONSORS

Sponsorships help defray costs of hosting conferences, keep conference fees affordable, and allow more of member dues to be directed towards active research. Members or non-members may be sponsors. Current sponsorship information is available online or contact Dawn Langlais for more information. No commercial advertising is accepted, but SMRI will acknowledge contributions of all sponsors.

Thank you to our sponsors of the Fall 2024 Edmonton, Alberta, Canada Conference!

ICEBREAKER BAR HOST



HOMETOWN HERO SPONSOR



WHILE REGISTERING, DON'T FORGET TO ORDER YOUR SMRI LOGO GARMENTS!

SS POLOS STARTING AT JUST \$32 & LS FLEECE AVAILABLE

DIAMOND



PLATINUM



GOLD



SILVER



BRONZE



CONFERENCE APP SPONSOR





TECHNICAL CLASS INFORMATION

TECHNICAL CLASS #1 Solution Mining

SUNDAY, SEPTEMBER 22 | 8 AM – 5 PM

The Technical Class, typically held on Sunday prior to the Technical Session, is designed to be an introductory course or refresher course for the variety of disciplines and management levels that work in the solution mining environment and with solution mined caverns. Solution Mining was chosen as the topic for the Technical Class for Fall 2024 and Spring 2025 based on a survey by SMRI leadership to members.

The SMRI has continued to be a leader in solution mining concepts with many research projects and technical presentations over the past 50 years. To outline this

historical knowledge and provide further insight into these concepts, the SMRI has proposed a tentative list of topics for the Technical Class including:

- Theories regarding leaching and modeling
- Geological impacts on control of mining/developing a leaching concept
- Mining of non-halite materials
- Well hydraulics, hanging string design, and flow rates
- Overview of simulation software (SALGAS, SANSMIC, UBRO4, & others)
- Various case studies

technical class registration fees

MEMBERS

\$400

MEMBER REGULATOR

\$200

NON-MEMBERS

\$650

NON-MEMBER REGULATORS*

\$400

STUDENTS

(SUBJECT TO SPACE)

*No Charge

The SMRI does include in the schedule of the Technical Class sufficient time for questions and open discussion during the sessions. Additionally, the structure of the session breaks and lunch breaks are great opportunities to continue the discussion with cavern peers.

FUTURE CONFERENCES

Spring 2025 | 27-30 April
Wilhelmshaven, Germany

Fall 2025 | 28 Sept -1 Oct
Wichita, Kansas, USA

Spring 2026 | TBD

RESEARCH PRESENTATIONS

Depending on research project estimated completion dates, it is possible there could be one oral research reports presented Monday morning at this conference. More information will be provided on the Conference Schedule in early-September.



TECHNICAL CLASS INFORMATION

TECHNICAL CLASS #2

Canadian Standards Association Z341 Storage of Hydrocarbons in Underground Formations

SUNDAY, SEPTEMBER 22 | 8 AM – 5 PM

SMRI is hosting this one-day course that provides an overview of the CSA Z341 - 2022 Storage of Hydrocarbons in Underground Formations series of standards. It will summarize the standards' development, structure, and safety and environmental objectives. The course provides an understanding of hydrocarbon storage and oilfield waste disposal in salt caverns and reservoir storage systems. Covered in detail are the requirements from geological evaluation, drilling, completion, conversion, operation, maintenance, and testing to final abandonment of storage/disposal facilities. An overview of CSA Supplement Z341S1 Application to Hydrogen and Hydrogen Blends released in September 2023 will be included.

The participants will receive a booklet containing the training

materials and will be sent their electronic individual personalized electronic copy of the Z341 standard in advance. Participants may print a copy of the standard or bring their laptop to follow along in the course. A test will be provided to ensure participants are familiar with where to find information in the standard. Some speakers may present the local geology, overview of storage and disposal operations and operational experiences. Participants will be provided with a Certificate of Attendance.

The SMRI includes sufficient time in the schedule of the Technical Class for questions and open discussion. Additionally, the structure of the session and lunch breaks are great opportunities to continue the discussion with instructors and other attendees.

technical class registration fees

MEMBERS

\$450

MEMBER REGULATOR

\$250

NON-MEMBERS

\$700

NON-MEMBER REGULATORS*

\$450





ICE BREAKER

Sunday, September 22 | 6:30 - 8:30 pm

Join SMRI friends for appetizers, wine, beer, coffee, tea, and soft drinks. It's a great way to kick off the Fall 2024 Edmonton Conference. No charge for delegates. \$50 fee for guests.

MONDAY NIGHT EVENT

Monday, September 23 | 6:30 - 9:30 pm
(optional)

\$125/person | Max. 300 guests

The Monday Night Event participants and guests will walk 6 blocks to Rogers Place, home of the Edmonton Oilers (Stanley Cup Division Champions) for the Monday Evening Event.

Registrants arrive Rogers Place for 6:30 pm cocktails and appetizers. A casual buffet "sports arena" dinner will follow. The Rogers Place event ends at 9:30pm, when all participants will need to exit the building. From the venue, feel free to walk back to the hotel or nearby restaurants and bars.



FRIENDS & SPOUSES

Monday: Fort Edmonton Park/Indigenous Peoples Experience/West Edmonton Mall

Monday, September 23 - 8:30 AM-4:15 PM | \$120/person
15 persons minimum or tour will be canceled; 25 max

The bus will depart the Westin Edmonton at 8:30am. Be in the lobby by 8:20 am. The group will begin the day at **Fort Edmonton Park**. Participants will explore life through the diversity of First Nations' and Métis peoples' histories, cultures, experiences, and perspective. **The Indigenous Peoples Experience** is an immersive and comprehensive exhibit. The exhibit explores the rich and beautiful cultures of First Nations and Métis Peoples while encouraging visitors to seek out the truths as lived by Indigenous Peoples before and after Canada became a country. (3 hour duration) After the experience, the bus will take participants to the well-known **West Edmonton Mall** for an afternoon of shopping, dining, or just walking around enjoying all the Mall has to offer. The bus will load at 4:15 for travel back to the hotel. (3 hour duration)

Tuesday: Sorrento's Cooking School & Muttart Conservatory

Monday, September 24 - 9:30 AM-3:30 PM | \$120/person
15 persons minimum or tour will be canceled; 25 max

The bus will leave the hotel at 9:30 am for a drop off at Sorrento's Cooking School. Here, enjoy a "Chat, Chop, and Chill" class. Eating your creations and imbibing in some bubbly will end the morning. Includes: Souvenir Apron, Recipe Cards, Cooking Class Instruction with a professional chef, Full serving staff, Meal at the end for everyone to enjoy their culinary creations. After the cooking class, load the bus for travel to the Muttart Conservatory. The Muttart Conservatory, one of Canada's largest indoor botanical collections, is nestled in the river valley. Discover the Pyramids and learn about more than 700 species of plants in 3 climate-regulated biomes. After time to explore, the bus will take tour participants back to the hotel (around 3:30pm).



WEDNESDAY TECHNICAL FIELD TRIPS

FIELD TRIP 1

Stream-Flo Group and Keyera Fort Saskatchewan

MAX CAPACITY: 50

COST: \$100 (all inclusive of transportation, breakfast, and lunch)

ANTICIPATED TIME: 7:30 am – 5:00 pm

This field trip will partner a half-day visiting the Stream-Flo Group facilities in the morning with and afternoon at the Keyera Fort Saskatchewan natural gas liquids processing plant. The morning portion will take you to the heart of wellhead, surface safety system, choke valve, check valve, ball valve, and data acquisition innovation. Spread across 1.5 million square feet and home to Stream-Flo, Master Flo, and Dycor, the Stream-Flo Group Edmonton campus contains bleeding edge technology and the brilliant minds behind it.

For the emergency shutdown enthusiast, part of the tour will focus on Stream-Flo's suite of SmartESD safety valves – the PwrESD and ESD-EHX – with visitors getting the chance to learn about this industry-proven, zero emission, surface safety valve that is coupled with Dycor's IIoT technology to provide an unmatched safety system for onshore well monitoring and emergency control, and which allows users to access their safety system in real time from anywhere in the world.

For the choke and control valve connoisseur, Master Flo's subsea, high pressure/high temp, 20K psi, and drilling choke expertise will be on full display with a chance to check out their Cv and erosion flow loops, and environmental chamber for low temperature testing.

Last but not least, the opportunity to dive into Dycor's leading data acquisition and monitoring solutions and unparalleled integration capabilities will also be available as part of this tour.

The Keyera Fort Saskatchewan natural gas liquids processing plant receives NGL feedstock from across Alberta and splits it into ethane, propane, butane and condensate. The facility includes eighteen storage caverns in the Lotsberg formation at 1870 m depth, the first of which was drilled in 1970. The tour will include the fractionation plant and the facilities that support cavern operations.

FIELD TRIP 2

C-Fer Technologies and ATCO Fort Saskatchewan

MAX CAPACITY: 50

COST: \$100 (all inclusive of transportation, breakfast, and lunch)

ANTICIPATED TIME: 7:30 am – 5:00 pm

This field trip will partner a half-day visiting the C-Fer Technologies facilities in the morning with and afternoon at ATCO's Fort Saskatchewan salt cavern storage operations. C-FER is a fee-for-service research subsidiary of Alberta Innovates that works in partnership with the global energy industry to advance safety, environmental performance and efficiency by providing full-scale testing services using a variety of large-scale testing systems that can combine load, pressure, temperature and fluid environments to simulate upstream and midstream operating conditions, as well as specialized engineering consulting services. The morning will consist of two parts: (i) a tour of the facilities, including an oil country tubular goods testing system that utilizes 100% hydrogen gas, thermal flow loops, and dynamic load frames; and (ii) a presentation summarizing C-FER's salt cavern storage research to-date (some of which was conducted for SMRI), including: Finite Element Analyses regarding salt creep and cavern stability, well deformation analyses using Multi-finger caliper data, risk assessments for cavern release events, corrosion logging tool and fiber optic monitoring evaluation studies, and commentary on technical gaps in the industry.

The afternoon will be spent in Fort Saskatchewan at the Salt Cavern Storage Operations of ATCO Energy Systems and ATCO EnPower. The tour will include a walking tour of Energy Systems facility with a presentation. Attendees will see the EnPower facilities by bus with presentations at multiple sites.





TECHNICAL PAPER LIST WITH ALL AUTHORS Page 1 of 2

Author(s)	Organization(s)	Title
Mejda Azabou, Yvan Charnavel, Grégoire Hévin, Paule Labaune	Storengy	Maximum Hydrogen Velocity in Salt Caverns Wells
Benoit Brouard ¹ , Tobias Baumann ² , Joey Bruinsma ² , Richard R. Bakker ³	Brouard Consulting ¹ , SmartTectonics GmbH ² , Nobian Industrial Chemicals B.V. ³	A Field-Based Method to Determine Pressure Solution Creep In-Situ at Cavern Scale
Dan Carson	Alberta Energy Regulator	Regulations & History of Salt Caverns in Alberta
Jesper Culmsee, Jørgen Mads Clausen, Lars Storm Pedersen	SaltPower	Osmotic Energy for Solution Mining – Operating Data and Experience
Hippolyte Djizanne ¹ , Franck Prats ¹ , Pique Sylvaine ¹ , Carlos Murillo ¹ , Grégoire Hévin ²	Ineris ¹ , Storengy ²	Risk Assessment for a Hydrogen Storage in Salt Cavern
Clemens Eichler ¹ , Torben Mortensen ²	DEEP.KBB ¹ , GSD ²	Challenges for ReCompleting Old Cavern Wells – Insights on a Practical Project Example
Sergio Mendes ¹ , Patrick Seymour ¹ , Latasha McMullen ¹ , R. Coleman Hale ¹ , Jack Neil ²	Lonquist & Co. ¹ , Compass Minerals ²	Specialized Cavern Well and Mining Design within Bedded Salt
Mahya Hatambeigi ¹ , Greg Lackey ²	WSP USA ¹ , National Energy Technology Laboratory ²	Diagnosis of Leakage from Underground Storage Wells
Hossam Gharib ¹ , Hugh Flesher ¹ , Men-Fun Chin ¹ , Alex Mitrovic ¹ , Gilberto Garcia ²	Stream-Flo ¹ , Dycor Technologies Inc. ²	Real-time Monitoring and Analytics of Cavern Surface Safety Systems
Alan S. Kornacki	Stratum Reservoir	Origin of Two Kinds of Thermogenic Natural Gas Released When a Salt Solution Cavern Collapsed Near Bayou Corne, Louisiana
Chandler Ridler ¹ , Biao Qiu ² , Brandon Lampe ²	Intrepid Potash ¹ , Agapito Associates, Inc. ²	Case Study of Solution Mining Potash in the Paradox Basin, Utah
Kurt M. Loeff ¹ , Merouane Foudi ² , Carolyn J. Bienvenu ¹ , Eduardo Cazeneuve ² , Nora Alarcon ² , Mort Houston ²	United Brine Service Company ¹ , Baker Hughes ²	A Novel 3D Reservoir Characterization Between Two Closely Spaced Wells to Evaluate a Complex, Highly Deformed Bedded Salt Structure with Limited Subsurface Data at Saltville, Virginia
Anna S. Lord	Sandia National Laboratories	Salt Site Selection Criteria for Hydrogen Cavern Storage
Dallas Longshore, Dustin Kinch	SubTerra Engineering	Understanding the Regional Stress Impacts of Cavern Development Combined with Brine Disposal in the Fort Saskatchewan Region



TECHNICAL PAPER LIST WITH ALL AUTHORS Page 2 of 2

Author(s)	Organization(s)	Title
David B. Hart, Hannah Maurer, Todd Zeitler	Sandia National Laboratories	SANSMIC C++/Python Open Release
Adel Najafimarghmaleki, Amin Alinejad, Lin Yuan, Hassan Dehghanpour	University of Alberta	Measuring and Modelling Hydrogen Permeability of Salt and Cemented Salt Plugs Under Cavern Operating Conditions
Joseph Nealy, Steven Heath, Matthew Mickelson	Tiberius Energy Services	Workover of Domal Cavern Wells Under Gas Pressure Without Snubbing
Alex Reed	Keyera Corporation	Confirming Integrity of Close-Proximity Caverns in Bedded Salt
Arnaud Réveillère ¹ , Ceri Vincent ² , Yann Le Gallo ¹ , Martin Wagner ³ , Gregor Mori ⁴ , Cyriane Fournier ¹ , Christopher Kutz ⁵ , Hubert Jannel ¹ , Gemma Raluy ⁶ , Gianluca Greco ⁶	Geostock SAS ¹ , BGS, UK; and CO2Geonet ² , Micropro GmbH ³ , MU Leoben ⁴ , LBST5, FH ⁶	Hystories Project – Hydrogen Storage in European Subsurface : Main Project Outcomes and Applications for the Salt Cavern Industry
Christopher J. Thompson	4C Exploration Ltd	Non-Seismic Geophysics for Cavern Imaging
Ryan Edgar, Leah Villanueva	Plains Midstream Canada ULC	Product Conversions in Brine Displacement Caverns in Fort Saskatchewan, Alberta, Canada – Challenges and Successes
Samuel Voegeli ¹ , Dalila Caparroz ² , Brady Mills ¹ , Jordan Costley ²	RESPEC ¹ , Federation Group ²	Maximizing Salt Cavern Opportunities in Alberta: The Marguerite Lake CAES and Hydrogen Project
Jinchao Wang, Zhiming Wang, Quanshu Zeng, Jun Wang, Binwang Li	China University of Petroleum	Experiments study on dynamic dissolution of salt rock and dissolution equation



TECHNICAL CLASS SCHEDULE

Time	Instructor	Title	Objectives
8:00 Class Introduction: Tim Bauer, SMRI Research Coordinator			
8:10	Olaf Kruk Socon	Overview Hydrogen Gas	Understanding Hydrogen, properties, safety considerations and detection, similarities to and differentiation from Natural Gas for Storage
8:35	Don Conley Sandia	Hydrogen Industry/governmental drivers/regulatory issues (North America Perspective)	Understand the drivers for the hydrogen push and specific business drivers and regulatory environment. (Gov. incentives, hydrogen hubs, overview/outlook for current/future projects)
9:00	Yvan Charnavel Storengy	Hydrogen Industry/governmental drivers/regulatory issues (European/other Perspective)	Understand the drivers for the hydrogen push and specific business drivers and regulatory environment. (Gov. incentives, hydrogen hubs, overview/outlook for current/future projects)
9:25	Sophie Minas WSP	ACES Project	Overview of Hydrogen Project in progress in UTAH
9:45	Patrick J.P. Roordink Gasunie Gregoire Hevin Storengy	Projects A8 HyStock and HyPSTER: Two pilot experiments of Hydrogen Storage in Salt Caverns	Overview of pilot of hydrogen storage in a salt cavern
10:05 BREAK: Coffee/Tea, Refreshments (30 Mins)			
10:25	Paul Munsterman LINDE	LINDE Mass Bluff H2 Cavern	Overview of and lessons from Existing Cavern
10:45	Kurt Loof Texas Brine Anna Lord Sandia	Geological Considerations for Hydrogen Caverns	Potential geological influences for hydrogen vs nat gas service
11:05	Sam Voegeli (S.A.) RESPEC Dirk Zapf (Kr) IUB	Geomechanical Considerations for Hydrogen Service	Potential geomechanical considerations for hydrogen vs nat gas service
11:25	Joel Nieland RESPEC Benoit Brouard Brouard	Cavern Operations/ Thermodynamics	Modeling of cavern thermodynamics, gas nominations (Differentiation from Natural Gas) Software examples
12:00 LUNCH BREAK: Included with Class Registration (1 Hour)			
13:15	Hippolyte Djzanna INERIS	Blowout Modeling	The modeling of the subterranean and aerial parts of a blowout from a hydrogen storage cavern.
13:50	Brennan Domec Expro	Casing and welding concerns	Considerations for casing specifications, material, welding for hydrogen service.
14:20	Barry Roberts Sandia	Sealing (Cement, Elastomers, Threaded connections)	Overview of current status of cementing technologies, elastomer concerns and suitable material selections, threaded connections.
14:50 BREAK: Coffee/Tea, Refreshments (30 Mins)			
15:15	Brandon Lampe Agapito Rene Schneider DEEP.KBB GmbH	Regulations (North America/Europe)	Overview of regulations for Hydrogen caverns, including safety requirements
15:35	Joel Warneke CSI Amaud Revellere Geostock	Completions/conversions/MIT (North American /European Perspective)	North American/European typical completions, MIT considerations, regulatory considerations (Plus microbial considerations[CSI]).
16:25	Heike Bernhardt DEEP.KBB GmbH	Repurpose of Existing Caverns	Evaluation of deciding factors for repurposing existing caverns for hydrogen service.
16:50 Questions/Discussion			
17:05 Concluding Remarks: Tim Bauer, SMRI Research Coordinator			