Spring 2020 Sponsorships

SMRI is happy to accept sponsorships and appreciates financial support of our conference activities and expenses. SMRI’s 2020 sponsorship information is available online or you may contact Dawn Langlinais for more information. No commercial advertising will be accepted, but SMRI will acknowledge contributions of all sponsors.

We thank these sponsors of the Spring Detroit 2020 SMRI Conference:

DIAMOND: Lane Power & Energy Solutions, Inc; Sonic Surveys, Inc.; WSP USA

PLATINUM: Opportunities Available

GOLD: Geostock Sandia

SILVER: Cavern Solutions; Double B Wells Services, Ltd.; RESPEC; Subterra Engineering; Eclipse E-Line Services Inc.

BRONZE: Hartmann Valves and Wellheads; Longist & Co., LLC; Ratigan Engineering & Consulting, LLC; Seal-Tite International; SOCON Sonar Well Services; Stream-Flo Industries

Additional sponsorship opportunities available. Contact Dawn Langlinais for more information.

Future Conferences

Fall 2020 20-23 September  SMRI European Conference Krakow, Poland

Spring 2021 24-28 April  SMRI Conference Rapid City, South Dakota, USA

Fall 2021 26-29 September  SMRI European Conference Chester, United Kingdom

Schedule of Events

1 February Preliminary paper list, author/co-author will be posted
18 February Registration for members starts
28 February Deadline for unsolicited research proposals for Research Committee feedback
1 March Authors final papers due
17 March Non-member registration starts
7 April Registration last day

Saturday 25 April 8:00 am–12:00 pm: Research Committee Meeting 1:00 pm–5:00 pm: Leadership/Executive Committee Meeting
Sunday 26 April 8:00 am–5:00 pm: Technical Aspects and Considerations for Cavern Abandonment (optional, same class will be repeated in Fall 2020 Krakow) 6:30 pm–8:30 pm: Icebreaker Welcome Reception, optional
Monday 27 April 8:00 am–10:00 am: SMRI Business Meeting (members only) 10:30 am–11:30 am: Oral Research Reports (2) 11:30 am–5:00 pm: Technical Papers Session, day 1 9:00 am–12:30 pm: Friends and Spouses tour - Best of Downtown Walking Tour 12:00 pm–1:30 pm: Delegates Lunch 6:30 pm–10:00 pm: Evening Dinner Event: Henry Ford Museum
Tuesday 28 April 8:00 am–5:00 pm: Technical Papers Session, day 2 9:00 am–5:00 pm: Friends and Spouses tour - Ultimate Detroit Art & Culture Experience 12:00 pm–1:30 pm: Delegates Lunch
Wednesday 29 April Technical Field Trips (3 choices, optional), each is an all day field trip. Field Trip #1—Oil Museum of Canada, Oil Springs, Canada Field Trip #2—K+S Windsor Salt’s Ojibway Mine Field Trip #3—K+S Windsor Evaporation Plant
Technical Class
“Technical Aspects and Considerations for Cavern Abandonment”

Sunday, 26 April 2020

See class instructors and topics list on last page of this announcement

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. Technical Aspects and Considerations for Cavern Abandonment has been identified by SMRI leadership and members as the topic for the Technical Class.

The life cycle of a cavern and/or cavern field has the following components: exploration, production, storage, closure or abandonment, and potentially long-term monitoring. Abandonment and long-term monitoring are concepts that should be considered during the initial planning of a project prior to leaching or storage operations commence. This stage of planning is required by many regulatory agencies and is considered a best practice for cavern operations.

The SMRI has continued to be a leader in these concepts with many research projects and technical presentations over the past 20 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:

- Physical processes in abandoned caverns such as creep closure, thermal effects, and brine permeation
- History of research activities conducted by the SMRI and the SMRI membership
- Case histories of abandonment projects
- Relevant modeling for abandoned caverns such as rock mechanics, subsidence and thermodynamic modeling
- Brief introduction to regulatory requirements across the globe

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. Each class participant will receive a USB drive (digital) of the class papers and presentations. A class book, for a fee to the delegate, maybe ordered during the registrations process.

For class questions, please contact:

**Technical Class Chair 2020**
Eric Busch
Lonquist & Co., LLC
1001 McKinney, Suite 1650
Houston, Texas 77002, USA
Phone: +1 713-559-9953
Email: eric@lonquist.com

### Technical Class Registration Fees

*Members* $400
*Member Regulator* $150
*Non-Members* $650
*Non-Member regulator* $400

*Students, if space is available: no charge (must contact John Nadeau)*

### Registration Fees

Each person attending any part of the technical conference must be in the SMRI database and must register for the conference. If you cannot login to the website and know you have a record to update, please contact John Nadeau. Online registration and payment in advance is required by all persons attending. No registrations will be held or accepted without payment. All attending non-technical spouses and friends must be registered as “guests” before completing your registration’s online payment. Space for most events is limited.

Registration fees includes $150/day for breakfast, lunch, coffee breaks, printed materials, AV, and a USB drive of tech paper files, but NOT printed class books.

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<td>Members</td>
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***University students of related subjects must contact SMRI’s Executive Director John Nadeau for discount details and applications if you wish to attend for zero registration cost. Members- if you know local professors of subjects related to SMRI, please pass this announcement on to them with your invitation.***

### Research Presentations

Depending on research project estimated completion dates, it is likely there will be two oral research reports presented Monday morning at this conference:

SOCON Sonar Well Services RR2019-2 SPR flow-induced vibration test provides the interpretation of data developed in a field test of flow-induced deformation executed in a crude oil storage well at the West Hackberry salt dome.

Ecole Polytechnique, et al, RR2020-1 presents the results of the study measuring creep at stresses between 1 MPa (σ < 1 MPa was used in the initial phase) and 5 MPa (σ > 5 MPa are used for conventional creep tests), filling in the missing gap.

### Attire

Casual attire is suggested for the meeting and all associated events. For the Monday and Tuesday spouses/friends tours and the Wednesday field trips, comfortable clothes for outdoor weather, including sturdy shoes appropriate for walking are suggested. Please check the weather forecast and be prepared for variable weather. Field trip attire will be noted for each field trip instruction sheet at the conference.
Registration and Important Dates

REGISTER EARLY if you plan to attend! About 250-275 technical delegates are expected to attend the conference.

Announcement details are subject to change, and such changes will be posted online or registered individuals will be notified.

On-line registration for members starts 18 February 2020
Non-member registration starts 17 March 2020
Registration** ends (last day) 7 April 2020

PLEASE REGISTER EARLY to ensure your space, especially for optional events such as Tech Class and field trips. No refunds or cancellations after 7 April.

If space is available, late registrants will pay a $250 late fee, starting 8 April and will not receive USB sticks or optional books. During online conference registration, participants may buy a conference book, and class participants may buy a class book.

Attendees who want books must order during registration, as no extras will be printed. This is to conserve resources, recognizing that most members prefer the USB flash drive over large, printed books.

See our website for the latest information and any changes necessary.

For future updates of this announcement, list of papers, technical class schedule, and field trip information, please see our website in “Spring 2020 Conference” menu page under “Conferences”.

SMRI nametags must be worn at every function.

Conference Executives

For SMRI Membership Issues:
John M. Nadeau
Executive Director
679 Plank Road
Clifton Park, NY 12065 USA
Phone +1 518-348-6995
Fax: +1 518-348-6966
jnadeau@solutionmining.org

For Registration Assistance:
Dawn Langlinais
Manager of Conferences and Education
20 Sullivan Ridge Way
Townsend, MT 59644 USA
Phone: +1 918-914-2499
Fax: +1 888-843-3995
dawnL@solutionmining.org

Hotel Information

Detroit Marriott at the Renaissance Center
400 Renaissance Dr W,
Detroit, MI 48243

Each SMRI participant is responsible for making their own hotel reservations. SMRI room rate is $159.00 only until our room block is sold out (does not include tax).

Right on the Detroit River, and offering stunning views, direct access to the People Mover and on-site dining, the non-smoking Detroit Marriott at the Renaissance Center is a popular choice.

Please use the pass key link to make reservations: https://book.passkey.com/go/SMRISpring2020Conference
ADDITIONAL ACTIVITIES

SPouse AND FRIENDS ATTENDANCE:
Spouses and friends are always welcome at SMRI conferences. Friends will not be technical delegates. Spouses and friends are invited and welcome to the Icebreaker Reception, the Monday Night Dinner, and the Monday and Tuesday Tours. Participation in these activities is OPTIONAL, and spouses and friends must be pre-registered and paid by 7 April. Registration depends on space available. We are sorry but do not offer the option for spouses/friends to join SMRI lunches this meeting. Please dress for the weather, and wear your name badge.

ICEBREAKER WELCOME RECEPTION:
Sunday, 26 April — 6:30 pm–8:30 pm
To open the conference, SMRI invites all participants (including spouses and friends) to this informal reception. Attendance is free for delegates and their first guest ($50 for each additional guest), so come, relax, and enjoy an evening of light appetizers and the camaraderie of friends and colleagues to officially begin the conference.

BUSINESS MEETING:
Monday Morning 27 April, 8:00–10:00 AM (SMRI Members Only)
The SMRI business meeting will be held Monday morning to transact business of the Institute. All members are welcome, including all staff of member organizations, not only voting representatives.

MONDAY NIGHT DINNER:
Monday, 27 April — 6:30 pm–10:00 pm (Optional)
The Henry Ford Museum – ($125 per participant)
Experience one of the largest collections of its kind ever assembled and learn about the breakthroughs big and small that have made our world what it is today. Fabulous displays of innovation created over many decades. Strolling cocktails and viewing from 7-8pm. Strolling dinner and viewing from 8-9:30pm

SPOUSES AND FRIENDS:
Monday and Tuesday, 27 and 28 April (Optional)
Spouses and friends are always welcome at SMRI conferences. Friends will not be technical delegates. Plans include two spouses/friends’ local tours, tentatively:

Monday – Best of Downtown Walking Tour ($50 per participant)
See all the major landmarks, new developments and some of the great historical spots from an Insider’s perspective plus explore some of the great contributions of both prolific architects and emerging artists. Highlights include: Campus Martius Park, Spirit of Detroit, Guardian Building, Capitol Park/Woodward Avenue, Developments Theater and Stadium District, The Z-Garage and Belt, Greektown

Tuesday – Ultimate Detroit Art & Culture Experience ($100 per participant)
During this one-of-a-kind experience you’ll go behind the scenes of some of Detroit’s most innovative and creative businesses, get your toes tapping at the Motown Museum, make your very own one-of-kind hand printed postcard and get to experience Detroit’s current renaissance through wonderful food, unique shops and outdoor art galleries. Highlights include: Motown Museum, North Cass Retail District and lunch, Eastern Market, and the Heidelberg Project
All field trips will be Wednesday 29 April 2020, each will be full-day plus. For each field trip, security requirements, suggested safety gear to wear/bring, physical condition necessary to tolerate environmental conditions, and any other limitations on participants will be emailed to those registered. Each participant must be in good physical shape, able to walk on rough ground and climb stairs, and understand and follow directions. SMRI reserves final right to limit participants to those passing any potential security checks and screening. We are sorry, but due to site restrictions and limited access, spouses and guests may not register in field trips 2 and 3, which are for technical delegates only until non-member registration opens on 17 March. Lunch is included with each field trip.

FIELD TRIP #1
Oil Museum of Canada, Oil Springs, Canada

$75 per participant
Explore living history of the first commercial oil well, the first oil gusher and operating oil wells with wooden casings. Museum features international history. Tour led by Charlie Fairbanks, 4th generation family still operating 100s of wells from 1800s. Trip also includes a stop by one of the salt cavern storage facilities in Sarnia petrochemical refinery area.

FIELD TRIP #2
K+S Windsor Salt’s Ojibway Mine

$125 per participant
The operation extracts rock salt by using the room and pillar method 975 ft. below the surface. Salt is mined from a 25 ft. thick unit of Salina formation from the Silurian age. The deposit is exceptionally pure, containing less than 2% impurities.

FIELD TRIP #3
K+S Windsor Evaporation Plant

$125 per participant
K+S operates the Windsor Evaporation Plant, a brine processing, packaging and distribution facility, in Windsor, Canada. The group will tour the production facility and well field followed by lunch and a visit to a car assembly factory.
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<td>F. Baasch¹, A. Glöckner¹, A. Gassner², B. Lübers²</td>
<td>(1) Untergrundspeicher- und Geotechnologie-Systeme GmbH (2) Nord-West Kavernengesellschaft mbH</td>
<td>Dealing with technical problems during the recompletion of an oil storage cavern: a case study of cavern K307, Rüstringen, North Germany</td>
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<td>Benoit Brouard¹, V. Zakharov¹, A. Frangi¹</td>
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<td>(1) AGH University of Sciences and Technology, Cracow, Poland, Faculty of Mining and Geoengineering</td>
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<td>Prud'homme Cavern No. 1 – Remediation &amp; Re Activation of a Natural Gas Storage Cavern</td>
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<td>Jean-Paul Crabeil</td>
<td>Flodim</td>
<td>Changing Leaching Phase With No or Little Work-Over Rig Assistance</td>
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<td>Roger Edgecombe¹, Julie Clarke², Ian Scotland¹, Chris Helly¹, Marissa Whittaker³, Luc Gravel¹</td>
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<td>Challenging Evaluation of Evaporite Deposits in a Thrust Fault Environment in Saltville, Virginia.</td>
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<td>Mahya Hatambeigi¹, Ishliaque Anwar¹, Kirsten Chojnicki², Mahmoud Reda Taha¹, John C. Stormont</td>
<td>(1) University of New Mexico, Albuquerque, NM (2) Sandia National Laboratories, Albuquerque, NM</td>
<td>Effect of fluid pressure on the leakage through wellbore cement fractures</td>
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<td>Stefan Hoentzsch¹,</td>
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<td>Salt Mining in a Pile of Pancakes – The Silurian Salina Evaporite Form</td>
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<td>Jonathan D. Aubertin²</td>
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<td>(2) Assiut University, Assiut, Egypt</td>
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<td>Mahmoud Reda Taha³</td>
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<td>Jonathan Aubertin³</td>
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| Alexander Raith¹,                    | (1) DEEP.KBB GmbH                                                                 | Geological 3D Modeling of Salt Structures: A Beneficial and Value-
| Max Wippich¹,                        |                                                                                   | adding Planning Tool During the Cavern Life Cycle                    |
| Jürgen Keplinger¹                    |                                                                                   |                                                                      |
| Julie Shemeta                        | MEQ Geo Inc.                                                                      | Borehole Microseismic Monitoring at Napoleonville Salt Dome,         |
|                                     |                                                                                   | Louisiana: Five Years of Microseismicity Associated with Brining and  |
|                                     |                                                                                   | Storage Facilities on a Gulf Coast Salt Dome, USA.                   |
| A. Soubeyran,                        | MINES ParisTech                                                                  | Effect of carbon dioxide dissolution into the brine on the storage   |
| A. Rouabhi,                          |                                                                                   | conditions                                                        |
| C. Coquelet                         |                                                                                   |                                                                      |
| Faruk Süülükt,                      | Kazan Soda Elektrik Co.                                                           | Improving the Ore Extraction Ratio in Solution Mining                |
| Barr Kandemir,                      |                                                                                   |                                                                      |
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| George Szasz                         | Stress Engineering Services, Inc.                                                 | Detection of flow-induced vibration from wellhead measurements       |
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| Mark Villarreal                      |                                                                                   | Expandable Tubular Technology                                       |
| Byoung Y. Park                       | Sandia National Laboratories                                                     | Geomechanical Evaluation of the Stability of Abandoned Cavern 4 in  |
| Dirk Zapf¹,                          | (1) University of Hannover-IUB                                                   | Bayou Choctaw Salt Dome                                             |
| Kurt Staudtmeister¹,                 | (2) DEEP.KBB,                                                                     | Detailing of Basic Data, Information System & Potential Estimate    |
| Sabine Donadei²,                     | (3) Federal Institute for Geosciences and Natural Resources (BGR)                 | for Site Selection of Salt Caverns for CAES and Hydrogen Storage in  |
| Peter L. Horvath²,                   |                                                                                   | Bedded Salt                                                        |
| Stephanie FLeig³,                    |                                                                                   |                                                                      |
| Gabriele von Goerne³                 |                                                                                   |                                                                      |
## INSTRUCTOR | TITLE | OBJECTIVES
--- | --- | ---
Fritz Wilke (SMRI Research Coordinator) | Class Introduction |  
**INTRO**

Pierre Bérest | History of the Abandonment Problem through In-Situ Tests | Understand history of SMRI activities since the 90ies

Benoit Brouard | Overview of the Physical Phenomena involved in Salt Cavern Abandonment | Understand the phenomena involved and how they can be measured or calculated

Joe Ratigan | SMRI History & Research Subjects related to Cavern Abandonment | Understand history of SMRI activities since the 90ies

**LEGAL**

Heike Bernhardt (DEEP.KBB) | Regulatory and Technical Requirements for salt Cavern Abandonment – latest Discussion in Europe | Status of the discussion, factors and impacts on the technical and regulatory landscape, based on the abandonment workshops in the Netherlands and Germany.

Brandon Lampe (WSP) | Legal Aspects of P&A in the US | Outline the regulatory process of a cavern P&A in various US states (TX, LA, etc.) and Canada

**FIELDTESTS, SMRI-RESEARCH**

Dirk Zapf (IUB) | The Results of the Pressure Build-Up Test in a Brine Filled Cavern in Etzel | Overview of the test conditions and the test results

Arnaud Reveillere (Geostock) | Decommissioning and Abandonment of LPG Caverns at Carresse: Removing of Trapped Propane and Abandonment Tests on Shallow Caverns in France | Review of several case studies including a couple of abandonment tests supported by SMRI, and sharing of experiences after removing of trapped product

Andreas Bannach (ESK) | SMRI, Research Project (2004-2009): “The Staßfurt Abandonment Field Test” | Demonstrate the phenomena identified in previous research at a field scale for shallow bedded salt

Joe Ratigan | SMRI, Research Project (2005-2015): Enterprise, Deep Caverns | Demonstrate the phenomena identified in previous research at a field scale for deep domal salt

**ROCK MECHANICS, MODELING**

Joel Nieland (RESPEC) | Geomechanical Modeling of Gulf Coast Salt Cavern for Abandonment Alternatives | Conventional and unconventional plugging and abandonment options

Benoit Brouard (Brouard Consulting) | Numerical Simulation of Cavern Abandonment for Shallow and Deep Caverns | Show how cavern-pressure evolution on the long term can be predicted using simple and robust hypothesis

Dieter Brückner (IFG) | Rock mechanical concept and in-situ investigations for cavern abandonment | Providing evidence for a successful and safe abandonment; Securing evidence

**TECHNICAL**

Mike Olesko (Plains Midstream Canada) | Practical Aspects of Plugging – North America | Common and leading edge plugging techn., regulatory criteria in different regions, applicable standards and comparisons, suspension prior-to-abandonment.

Allan Lennox (Atkins) | Practical considerations on cementing casing strings to surface and the consequences on well integrity & abandonment | Alternative Cement Designs for the Production Casing. Review Pros and Cons of each option from construction, operations and abandonment view.

**CASES**

Alex van El (WEP), Robert Mastaler (Frisia), Rene Schneider (DEEP.KBB) | Case: Abandonment of the brine production cavern Frisia BAS92 in Harlingen, The Netherlands | Abandonment case history of Frisia BAS2 (bedded salt, very deep) incl. history, pre-investigations, observation phase, permitting, abandonment preparation and execution, monitoring.

Marinus den Hartogh (Nouryon) | Things to consider for abandonment of shallow bedded caverns (Hengelo) and large domal caverns (Heiligerlee) | Which topics are to be considered when planning abandonment? And what are the differences between abandonment of shallow caverns in bedded salt and large caverns in domal salt?