International Specialty Conference on
Ocean Brine Mining
March 21-23, 2022
Le Meridien Hotel, Al Khobar
Saudi Arabia

Preliminary Program
International Specialty Conference on Ocean Brine Mining

This conference is organized by the International Desalination Association (IDA) and the Desalination Technologies Research Institute (DTRI) of the Saline Water Conversion Corporation (SWCC) under the patronage of the Ministry of the Environment, Water and Agriculture of the Kingdom of Saudi Arabia and with the leadership of HE Abdullah Alabdulkarim, Governor of SWCC.

The Value of Brine from Desalination Plants

Brine from desalination plants contains valuable minerals and Desalination Brine mining has the potential to surpass earth mining as a source of rare-earth metals such as lithium, strontium, cesium, rubidium, barium and others. Desalination brine mining brings a new era of exploration of the vast water resources of the planet. This conference opens a venue for presenting and discussing the latest advanced technologies for extraction of minerals and rare metals from brine generated by desalination plants.

Conference Focus

The Desalination Brine Mining Conference will provide a forum for expert scientists, applied researchers, practitioners and innovators in the field of desalination brine mining to share their latest technologies and experience of mineral and metal extraction.

Emphasis will be given to membrane based ocean brine concentration and advanced extraction methods and technologies which combine low energy use and competitive production of rare metals and minerals.

The focus of the presentations will be technologies and systems that are advanced to the point of proof-of-concept and beyond, that have potential to yield minerals and rare metals at cost lower than that of earth mining and conventional methods of production. Presentations sharing case studies for demonstration or full-scale implementation of brine concentration and mineral extraction technologies are very welcome.

Conference Venue and Time

The conference venue is the Conference Auditorium of the Le Meridian Hotel in the City of Al Khobar, Saudi Arabia. The conference dates are March 21-23, 2022.

Key Themes of the Ocean Brine Mining for Desalination

The presentations of the Ocean Brine Mining for Desalination will be divided into three days. Each day will have one morning and one afternoon session and each session will include six 25-minute presentations each followed by discussions.
DAY 1 Monday, March 21st

Technical Workshop – Ocean Brine Mining for Sodium Chloride and Bromine

Transport from Le Meridien to DTRI (90mins) 7am pickup

09:00-09:10  Introductions
  ◊ Dr. Ahmed Al Amoudi, CEO, DTRI, KSA

09:10-09:30  Overview of DTRI System for Brine Mining of NaCl and Br
  Program Moderator: Eng. Nikolay Voutchkov, SWCC, KSA

09:30-10:00  Coffee Break

10:00-12:00  Scope of Work of 2 Million Tons/Year NaCl and Br Project
  Speakers: Dr. Seungwon Ihm, & Dr. Christopher Fellows, SWCC

12:00-13:00  Lunch Break

13:00-13:30  Hydranautics NF, SWRO & UHPRO Systems w/ Turbocharger
  Speakers: Dr. Craig Bartels, Hydranautics, USA & Mr. Rory Waver, FEDCO, USA

13:30-14:00  SUEZ NF System
  Speaker: Dr. Neil Moe, SUEZ, France

14:00-14:30  FTS Membrane Brine Concentration System
  Speaker: Mr. John Tracy, Fluid Technology Solutions (FTS), USA

14:30-15:00  Coffee Break

15:00-15:30  Toyobo Membrane Brine Concentration System
  Speaker: Mr. Takahito Nakao, Toyobo, Japan

15:30-16:00  Suez Brine Crystallization System
  Speaker: Mr. Karel Vratny, Suez, France

16:00 – 16:30  Project Questions & Answers Session
  ◊ Summary Overview of Brine Mining Project – Contractor Questions & Discussions
16:30-17:00  Visit to SWCC Brine Concentration System

17:00  Workshop Adjourned and Transport to the Le Meridien hotel - arrival estimated 19:00.

16:00 - 20:00  Conference Registration Open at the Le Meridien hotel

19:30 - 21:00  Welcome Reception

**Day 2 Tuesday, March 22nd**

**Morning Session**

08:30-09:00  Welcome Remarks

◇ H. E. Eng. Abdullah Al-Abdulkareim, Governor of SWCC
◇ President of DTRI, Dr. Al-Amoudi
◇ Secretary General of IDA, Ms. Shannon McCarthy

**Theme 2.1: Innovation in Desalination Brine Concentration and Mining**

**Session 2.1.1 – Advanced Technologies for Membrane Brine Concentration**

- **Chairman:** Prof. Mohammed Albeirutty, King Abdulaziz University
- **Co-Chairman:** Eng. Nikolay Voutchkov, DTRI/SWCC

08:00-08:30  Challenges and Advancements for Ultra High Brine Recovery

Author and Presenter: Dr. Craig Bartels, Hydranautics, USA

08:30-09:00  High Performance RO Membranes and Membrane System for High Concentration Seawater Desalination

Author and Presenter: Dr. Hussein Almughrabi, Toray Middle East, Japan

09:00-09:30  Dual Pretreatment-Concentration Hybrid Process of Salty Water Feed of Desalination Plants

Author and Presenter: Dr. Aiman Al-Rawajfeh, Tafila Technical University, Jordan

09:30-10:00  On the Gaps and Needs to Achieve Ultra-High Pressure Reverse Osmosis Desalination

Author and Presenter: Mr. Arian Edalat, Pacifica Water Solutions, USA
10:00-10:30 Coffee Break

Session 2.1.2 – Brine Concentration and Treatment - Challenges and Solutions

- Chairman: Dr. Hussein Almughrabi, Toray Middle East, Japan
- Co-Chair: Prof. Sangho Lee, Kookmin University

10:30-11:00 Carbon Footprint of Various Brine Concentrators In Zero Liquid Discharge Process
Author and Presenter: Eng. Youngwook Yoo, SWCC, KSA

11:00-11:30 High Recovery Reverse Osmosis Water Systems
Author and Presenter: Mr. Rory Waver, FEDCO, USA

11:30 – 13:00 Lunch Break

Afternoon Session

Theme 2.2: Innovation in Brine Concentration and Mining

Session 2.2.1 – Integrated Brine Concentration and Mining

- Chairman: Prof. Enrico Drioli, ITM-CNR
- Co-Chair: Dr. Seungwon Ihm, Saline Water Conversion Corporation

13:00-13:30 Brine Utilization from Seawater Desalination: An Integrated Concept for the Recovery of Valuable Minerals From Seawater
Author and Presenter: Mr. Sherif Elsayed, K-UTEC AG Salt Technologies, Germany

14:30-15:00 Workhorse Membrane Technologies For Ocean Brine Mining
Author and Presenter: Dr. Neil Moe, SUEZ, USA

14:30-15:00 SEArcularMINE: Feasibility study of the Integration of a Desalination Plant Upstream of Saltworks
Authors: Eng. Daniel Baaklini, A. Hannachi, D. Pastorelli, F. Vicari, R. Cucchiarra, SUEZ, France
Presenter: Eng. Daniel Baaklini, SUEZ, France
15:00-15:30  Coffee Break

Session 2.2.2 – Case Studies for Membrane Brine Concentration

15:30-16:00  Long-Term Operating Results of an Osmotically Assisted Reverse Osmosis Brine Concentration System Integrated with a Seawater Reverse Osmosis Desalination Plant
Author and Presenter: Mr. John Tracy, Fluid Technology Solutions (FTS), USA

16:00-16:30  Development of Membrane for Concentrating Brines – Innovative Solution for Valuable Mineral Recovery
Author and Presenter: Mr. Takahito Nakao, Toyobo, Japan

16:30-17:00  Energy and Exergy Analysis of the NF-RO-BC System
Author and Presenter: Dr. Seungwon Ihm, SWCC, KSA

17:00-17:30  Strategy to Resolve Operational Challenges of Nanofiltration Plants in Seawater Brine Valorization
Author: Mr. Pablo Cañada García, Dr. Neil Moe, Mr. Manel Soria Tendillo, SUEZ WTS, Italy
Presenter: Mr. Pablo Cañada García, SUEZ WTS, Italy

Day 3  Wednesday, March 23rd
Morning Session

Theme 3.1: Brine Mining for Minerals and Metals

Session 3.1.1 – Advanced Technologies for Mining of Brine for Rare Metals

- Chairman: Prof. Enrico Drioli, ITM-CNR
- Co-Chair: Dr. Seungwon Ihm, Saline Water Conversion Corporation

08:00-08:30  Characterization, Thermal Properties, Removal of Metal Cations and Metal Electrodeposition
Author: Prof Abir Abdel-Naby and Dr. Jwaheer Al-Ghamdi, Imam Abdulrahman Bin Faisal University, KSA
Presenter: Prof Abir Abdel-Naby, Imam Abdulrahman Bin Faisal University, KSA
08:30-9:00 Potential for Lithium Production in the Kingdom of Saudi Arabia  
Author and Presenter: Dr. Christopher Fellows, DTRI/SWCC, KSA

09:00-9:30 Oceans as Open Sky Mines for Minerals and Water Extraction via Advanced Integrated Membrane Systems  
Author and Presenter: Prof. Enrico Drioli, ITM-CNR, Italy

9:30-10:00 Future Mining of Valuable Metals and Minerals from Brine for Microelectronics, Pharmaceutical and Chemical Industries  
Author and Presenter: Mr. Shahram Shafie, EFD Corporation, USA

10:00-10:30 Coffee Break

Session 3.1.2 – Mining of Brine for Mineral Salts

10:30 -11:00 Economics of Brine Mining for Sodium Chloride  
Author and Presenter: Dr. Basel Abusharkh, SWCC, KSA

11:00-11:30 Challenges and Opportunities for Brine Recovery in Seawater Desalination Plants  
Author and Presenter: Dr. Naiara Hernandez Ibanez, Aqualia, Spain

11:30–13:00 Lunch Break

Afternoon Session

Theme 3.2. – The Future of Brine Mining

• Chairman: Dr. Ahmed Al Amoudi, Director General, DTRI of SWCC  
• Co-Chair: Mr. Devesh Sharma, IDA First Vice President, Managing Director of Aquatech International

13:00-13:30 Full Recovery Desalination for Sustainable Materials Production: Water and Minerals for the Future  
Author and Presenter: Mr. Paul Wallace, Enviro Water Minerals, USA

13:30-14:00 Valorization of Seawater Concentrate  
Author and Presenter: Dr. Christopher Fellows, SWCC, KSA
14:30-15:00  Research and Development of Brine Mining in Pakistan
Author and Presenter: Mr. Mubeen Fayyaz, Pakistan

15:00-15:30  Coffee Break

15:30 – 17:00  Visit to Brine Concentration Pilot Plant in Jubail – Tour 1

15:30 – 17:00  Visit to Ras Al Khair SWRO Plant – Tour 2
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