Jordan International Oil Shale Symposium 2012

Economic And Environmentally Responsible Oil Shale Development

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Dear Guests,

The Hashemite Kingdom of Jordan represented by the Natural Resources Authority (NRA) along with Colorado School of Mines and the Oil Shale Companies investing in Jordan, are pleased to announce the opening of the 1st International Jordan Oil Shale Symposium, today the 7th May 2012 at the Dead Sea, Jordan.

The NRA for and on behalf of the Symposium co-organisers encourage you to learn more about Jordan and use this opportunity to interact with the various professionals in the field. The Symposium will lay the seeds, establish a ground for discussing and exploring technologies in the oil shale industry and get the benefit of experience of countries in the commercialization of Oil Shale as fuel and for other investment opportunities.

We extend our warm welcome to the distinguished guests and hope you have a fruitful meeting at the Symposium and also enjoy the hospitalities of the “Hashemite Kingdom of Jordan”.

Best Regards,

Director General

Dr. Mousa Alzyoud
Main Symposium Day 1
Monday, 7 May 2012

08.30  Registration & morning refreshments
09.30  National anthem and reading from the Quran
09.40  Opening remarks from the conference chairman
       H.E. Dr. Hisham Khatib, Honorary Vice Chairman, World Energy Council, Ex-Minister of Energy, Water and Planning, Government of Jordan
09.45  Official Opening of the JIOSS 2012: welcome speech
       HE. Dr. Mousa Ali Alzyoud, Director General, Natural Resources Authority, Jordan
09.55  Speech of guest of honor
10.00  Opening Keynote:
       Future Energy Outlook - Oil Shale In The Energy Mix: State Of Play, Expectations And Constraints
       Christoph Frei, Secretary General, World Energy Council, UK
10.30  PANEL DISCUSSION: Exploring The Viability And Future Role Of Oil Shale
       Moderator:
       Jim Schmidt, Principle, PROCOM Consultants P/L, USA
       Discussion Leaders Include:
       Khosrow Biglarbigi, President, INTEK Inc., USA
       Ziad Jebril Sabra, Director Of Alternative Energy And Energy Efficiency Department, Ministry Of Energy And Mineral Resources, Jordan
       Hazim M. Al-Ramini, Acting Director of Petroleum & Oil Shale Directorate and Head of Policies & Contracts Division, Natural Resources Authority, Jordan
11.10  Morning networking break & refreshments
11.45  Facilitating Competitive Oil Shale Utilisation Around The World: Successful Legal And Regulatory Frameworks
       Chris Nurse, Managing Director, Hart Group, UK
12.10  PANEL DISCUSSION: Enabling Oil Shale: Schedule For Commercialisation
       Moderator:
       Jeremy Boak, Director, Centre for Oil Shale Technology and Research, Colorado School Of Mines, USA
       Discussion Leaders Include:
       Chris Nurse, Managing Director, Hart Group, UK
       Jamal Alali, General Manager, Aqaba Petroleum for Oil Shale Co, Jordan
       Senior Representative, Ministry Of Planning, Jordan (invited)
       Thomas Meijssen, General Manager, Jordan Oil Shale Company B.V. (JOSCO), Country Chair for Shell, Jordan
       Martin Amison, Partner, Trowers & Hamlins LLP, UK
       Harri Mikk, Member Of The Management Board, Enefit, Estonia
13.00  Advance Drilling Technologies For Oil Shale Exploration And Exploitation
       Reiner Homrighausen, Chairman, Site Group for Services & Well Drilling, Jordan
13.15  Lunch & networking
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<th>TIME</th>
<th>TRACK A</th>
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</table>
| 14.15 | Opening Remarks Track Chairman: Ruslan Salikhov  
Deputy Chief Engineer Designer, OJSC  
ATOMENERGOPROEKT, Russia                                   | Opening Remarks Track Chairman: Harri Mikk, Member  
Of The Management Board, Enefit, Estonia |
| 14.20 | 1. Resource Assessment  
Well Logging Methods for Oil Shale Assessment  
Jeremy Boak, Director, Centre for Oil Shale T & R,  
Colorado School Of Mines, USA                               | 2. Oil Shale Resources And Opportunities  
Potential Oil Shale Deposit in Wadi An-Nadiya-Jordan  
Jamal M Alali, General Manager, Aqaba Petroleum for  
Oil Shale Co, Jordan                                        |
|       | Characterisation of Jordan’s In Situ Oil Shale Resource  
Richard Terres, Development Manager, JOSCo, Jordan                                                          | Lithological Nature of the Maastrichtian Oil Shale in  
Central Jordan  
Väino Puura, Professor, University of Tartu, Estonia                                                            |
|       | Containment Testing and Hydrology Evaluation for Shell’s ICP Oil Shale Projects  
Erik Hansen, Senior Hydrogeologist, Shell  
International Exploration & Production Inc, USA                                                                 | Opportunities and Challenges for the  
Commercialisation of Oil Shale in the United States  
Delivered by Thomas A. Sladek, Director, Ockham  
Energy Services, USA on behalf of  
Glenn Vawter, Executive Director, National Oil Shale Association, UAE |
| 15.20 | Afternoon networking break                                                                                                              |                                                                        |
| 15.40 | 3. Environment  
Effect Of Oil Shale Composition On Its Calorific Value And Oil Yield  
Jamal O. Jaber, Associate Professor, Dept. of  
Mechanical Engineering, Al-Balqa' Applied University, Jordan                                            | 4. Strategies and policies  
Oil-Shale Power Generation Developments In Estonia  
Raine Pajo, Member Of The Management Board, Enefit AS, Estonia |
| 16.00 | Dry Disposal Of Jordanian Oil Shale Ash As A Reasonable Option To Prevent Impacts To Groundwater: Experiments And Modelling  
Erik Puura, Director, Institute of Technology, University of Tartu, Estonia                                | ExxonMobil’s In Situ Oil Shale Technology: A Progress Report  
Michael W. Lin, Senior Research Engineer, Unconventional Resources-Oil Shale, ExxonMobil  
Upstream Research Company, USA                                    |
|       | Evaluation Of Energy And Water Requirements And CO2 Production For Commercial In-Situ Conversion Process (ICP) Shale Oil Production In The Piceance Basin Of Western Colorado  
James Killen, Unconventional Fuels Program Manager, U.S. Department of Energy, USA (delivered by video) | Assessment Of Plans And Progress On US BLM Oil Shale RD&D Leases In The United States  
Peter M. Crawford, Director, INTEK, Inc., USA  
(delivered by video)                                                                                           |
| 16.40 | CO2 Sequestration Within Spent Oil Shale From The Al-Lajjun Deposit, Jordan  
Helen Foster, PhD Student, University of Durham, UK                                                               | Can Oil Shale Development be so Hard?  
Jim Schmidt, Principle, PROCOM Consultants P/L, USA                                                               |
| 17.00 | Technical poster gallery opening and networking session                                                                                   |                                                                        |
| 18.30 | Close of symposium day 1                                                                                                                  |                                                                        |
Main Symposium Day 2, Workshop A & B  
Tuesday, 8 May 2012

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<tr>
<td>8.30</td>
<td>Registration &amp; Morning Refreshments</td>
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<td>9.30</td>
<td>Chairman Opening Remarks:</td>
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<td>Chris Nurse, Managing Director, Hart Group, UK</td>
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<td>Chairman Opening Remarks:</td>
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<td>John Gordon, Manager, Upgrading Dev, Ceramatec,</td>
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<td>9.35</td>
<td>A Comparison Of The Reactivity Of Different</td>
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<td>Jordanian Oil Shales</td>
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<td>Roy Jackson, Distinguished Professor, Sir John Monash</td>
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<td>University, Australia</td>
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<td>09.55</td>
<td>Water Use And EROI Of Production Of Upgraded</td>
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<td>Shale Oil Products Using The Enefit280 Technology</td>
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<td>Indrek Aarna, Head of R&amp;D, Enefit, Estonia</td>
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<td>10.15</td>
<td>Downstream Treatment Of Hydrocarbons Produced</td>
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<td>From Oil Shale Pyrolysis</td>
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<td>Pierre Allix, Unconventional Resources R&amp;D, Program Manager, TOTAL SA,</td>
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<td>10.35</td>
<td>The Alberta Tacikov Process (ATP) Technology For</td>
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<td>Jordan: Comprehensive Feasibility And Scale Up Factors</td>
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<td>Steven Odut, Senior Process Engineer, UMATAc</td>
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<td>Industrial Processes, Canada</td>
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<td>10.55</td>
<td>Closing Remarks From The Track Chairman:</td>
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<td>Chris Nurse, Managing Director, Hart Group, UK</td>
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<td>11.00</td>
<td>Morning networking break &amp; refreshments</td>
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<td>11.30</td>
<td>PANEL DISCUSSION: Oil Shale Economics, Investment And Financing Challenges</td>
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<td>Thomas A. Sladek, Director, Ockham Energy Services, USA</td>
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<td>Discussion Leaders Include:</td>
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<td>Emad Dabbass, Ministry Of Finance, Jordan</td>
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<td>Chris Morgan, CEO, Jordan Energy and Mining, Jordan</td>
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<td>David Argyle, Chairman, Global Oil Shale Holdings, UK</td>
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<td>Andres Anijalga, Project Director, Jordan Oil Shale Energy (JOSE), Jordan</td>
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<td>12.10</td>
<td>Successfully Managing Environmental &amp; Social Issues In The Oil Shale</td>
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<td>Industry: Expectations Of The International Community</td>
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<td>Nicky Spooner, Partner, Citrus Partners LLC, UK</td>
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<td>Mark Mackintosh, Partner, Citrus Partners LLC, UK</td>
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</tbody>
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12.50 PANEL DISCUSSION: Environmental And Social Dialogue: Aligning Stakeholders From The Off-Set
Moderator:
Rikki Hrenko, CEO, Enefit American Oil, USA
Discussion Leaders Include:
Khosrow Biglarbigi, President, INTEK, Inc., USA
Tamim Suyyagh, Corporate Affairs Manager, Jordan Oil Shale Company B.V. (JOSCO), Jordan
Izzat Ahmad Salman Abu Humra, Director, Licensing and Guidance Directorate, Ministry of Environment, Jordan
Ali Sobh, Ministry of Water and Irrigation, Jordan
HH Ms. Al Shareefa Zain Bint Al Naser, Jordan
Nicky Spooner, Partner, Citrus Partners LLC, UK
13.50 Closing Remarks From The Conference Chairman:
HE. Hisham Khatib, Honorary Vice Chairman, World Energy Council, Ex-Minister of Energy, Water and Planning, Government of Jordan
13.50 Lunch & networking
14.50 Workshop registration
14.50

**WORKSHOP A**
Financial Institutions And Oil Shale Development
Workshop Leader:
Khosrow Biglarbigi, President, INTEK, Inc., USA
Participants:
David Argyle, Chairman, Global Oil Shale Holdings, UK
Hazim Ramini, Head of Policies & Contracts Division and Petroleum & Oil Shale Directorate, Natural Resources Authority, Jordan
Munther Akroug, Managing Director, Jordan Energy and Mining, Jordan

**WORKSHOP B**
Recent R & D Achievements In Oil Shale, Commercial Petrochemicals And Chemicals Production
Workshop Leader:
Thomas A. Sladek, Director, PhD, Ockham Energy Services, USA
Participants:
Ruslan Salikhov Deputy Chief Engineer Designer, ATOMENERGOPROEKT, Russia
Jeremy Boak, Director, Center for Oil Shale Technology and Research, Colorado School Of Mines, USA
Nicky Spooner, Partner, Citrus Partners LLC, UK
Sergei Sabanov, Consultant, SRK Consulting (UK) Ltd, UK
Omar Al-Ayed, Associate Professor of Chemical Engineering & Oil Shale Department of Chemical Engineering Faculty of Engineering, Al-Balqa Applied University, Jordan
Tõnis Meriste, Environmental Dev Manager, Eesti Energia AS, Estonia
Rikki Hrenko, CEO, Enefit American Oil, USA
Jaan Habicht, Academic Mentor, University of Tartu, Estonia
Tom Fowler, Oil Shale Commercial & Integration Lead, Shell International Exploration & Production, Inc, USA

16.15 Close of workshop A
Afternoon refreshment and networking
17.30
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<td>Professor</td>
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<td>First Name</td>
<td>Miroslav</td>
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<td>Job Title</td>
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<td>Company</td>
<td>Faculty of Chemistry of the University of Belgrade</td>
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**Abstract of presentation rationale:**

BENEFICIATION OIL SHALE BY BACTERIAL DEPYRITIZATION AS POSSIBLE GREEN TECHNOLOGY: BIOPROCESSING ON LABORATORY SCALE M.M. Vrvice1-2, J.S. Milic2, V.P. Beskoski2, V. Dragutinovic3, S. Spacic2, D. Vitorovic4 1Faculty of Chemistry, University Belgrade, 2Department of Chemistry IchTM, Belgrade, 3School of Medicine, University of Belgrade, 4SASA, Belgrade-Serbia Amount of reserves of oil shale in Serbia are up to about 6 billion tons (estimated), while the largest deposit (approx. 1/3 of total quantity) for open-pit and underground exploitation is situated in the locality of Aleksinac in East Serbia (not exploited at the moment). Shale from Aleksinac is an immature Oligocene-Miocene lacustrine sediment. The average content of the organic substance in Aleksinac shale is about 20 %, with a dominant share of kerogen (the content of bitumen is less than 5 %). The mineral part comprises about 20 % carbonates, approximately 10 % pyrite and the rest are aluminosilicates. In our lab researches relating to the “quality improvement” of raw shale from Aleksinac that have been made for near 30 years, for depyriritization as “non-destructive reagents” we use strains of chemolithoautotrophic thionic bacteria Acidithiobacillus ferrooxidans. In a large number of experimental variations of the “shake flask test technique” the best results have been obtained for depyriritization (more than 95%). Combining AFM surface imaging and leaching analysis following bacterial colonisation of oil shale layers demonstrates that an initial attachment to the surface is necessary for the leaching and that later on, once a sufficient concentration of Fe2+ ions in the solution is achieved, cells detach to become free cells, and leaching occurs primarily by the Fe3+. Benefits of the bacterial depyriritization are primarily in order to reduce aero pollution and corrosivity, and also this green process must be low cost green bio/technology for biodefinication of oil shale.

**A short professional biography:**

Born in 1952. Graduated Chemistry from the Faculty of Sciences/Chemistry (University of Belgrade, Serbia), in 1975, and received a Doctorate in Chemistry, in 1991, at the same Faculty. In 1977, he was appointed Assistant, Assistant Professor in 1992, Associate Professor in 1997, and Full Professor in 2003, all at the Faculty of Chemistry in Belgrade. Sphere of scientific-research work are biochemical and chemical activity of microorganisms on different substrates, which generated the greatest number of fundamental and applied results.
BENEFICIATION OIL SHALE BY BACTERIAL DEPYRITIZATION AS POSSIBLE GREEN TECHNOLOGY: BIOPROCESSING ON LABORATORY SCALE

Miroslav M. VRVIĆ1,2, Jelena S. MILIĆ2, Vladimir P. BEŠKOSKI1, Vesna DRAGUTINOVIC2, Snežana SPASIĆ3, Dragomir VITOROVIĆ4

1Faculty of Chemistry, University of Belgrade, 2Department of Chemistry ICHTM, University of Belgrade, 3School of Medicine, University of Belgrade, 4Serbian Academy of Science, Belgrade, Serbia
E-mail: mmvchem@sezampro.rs

INTRODUCTION

Amount of reserves of oil shale in Serbia is up to about 6 billion tons (estimated), while the largest deposit (approx. 1/3 of total quantity) for open-pit and underground exploitation is situated in the vicinity of Aleksinac in East Serbia (not exploited at the moment). Shale from Aleksinac is an immature Oligocene-Miocene lacustrine sediment. The average content of the organic substance in Aleksinac shale is about 23%, with a dominant share of kerogen (the content of bitumen is less than 6%). The mineral part comprises about 20% carbonates, approximately 10% pyrite and the rest are amorphous silicates.

RESULTS AND DISCUSSION

In our lab researches relating to the "quality improvement" of raw shale from Aleksinac that have been made for nearly 30 years, for depyrification as "non-destructive reagents" we use strains of chemolithoautotrophic thioacids Acidithiobacillus ferrooxidans. In a large number of experimental variations of the "shake flask test technique" the best results have been obtained for depyrification (more than 90%). Combining AFM surface imaging and teaching analysis, following bacterial colonization of oil shale layers demonstrates that an initial attachment to the surface is necessary for the teaching, and that later on, once a sufficient concentration of Fe²⁺ ions in the solution is achieved, cells detach to become free cells, and leaching occurs primarily by the Fe³⁺."[1-8].

CONCLUSION

Benefits of the bacterial depyrification are primarily in order to reduce aero pollution and corrosivity, and also this green process must be low cost green bio/technology for biobeneficiation of oil shale.

REFERENCES