

## The Impact of the Quality of CO<sub>2</sub> on Transport and Storage Behaviour

### IMPACTS CCS Course

19-23 October 2015, Bucharest - Romania

## AGENDA

### Monday, the 19<sup>th</sup> of October 2015

Hour	Session/Lecture	Lecturer
09.00-09.30	<i>Participants registration</i>	
09.30-10.00	Welcome Addresses and Introductions	<b>George Darie</b> – Prorector of University Politehnica of Bucharest (UPB), Romania <b>Claudia Tomescu</b> – Institute for Studies and Power Engineering (ISPE), Romania <b>Amy Brunsvold</b> – SINTEF Energi, Norway
<b>Session S1</b>	<b><i>Models on thermodynamic properties and equilibrium</i></b>	
10.00-11.00	<b>Fluid Property Calculations in the 21<sup>st</sup> Century with Multiparameter Fundamental Equations of State (part 1)</b>	<b>Stefan Herrig</b> – Ruhr University of Bochum (RUB), Germany
11.00-11.20	<i>Coffee break</i>	
11.20-12.20	<b>Fluid Property Calculations in the 21<sup>st</sup> Century with Multiparameter Fundamental Equations of State (part 2) - exercises</b>	<b>Stefan Herrig</b> – Ruhr University of Bochum (RUB), Germany
12.20-12.30	<i>Break</i>	
12.30-13.30	<b>Fluid Property Calculations in the 21<sup>st</sup> Century with Multiparameter Fundamental Equations of State (part 3)</b>	<b>Stefan Herrig</b> – Ruhr University of Bochum (RUB), Germany
13.30-15.00	<i>Lunch break</i>	
15.00-16.00	<b>Fluid Property Calculations in the 21<sup>st</sup> Century with Multiparameter Fundamental Equations of State (part 4) - exercises</b>	<b>Stefan Herrig</b> – Ruhr University of Bochum (RUB), Germany
16.00-16.20	Discussions / Q&A	
16.20-17.30	<b>Visit to the UPB Research Facilities</b>	University Politehnica of Bucharest (UPB)

### Tuesday, the 20<sup>th</sup> of October 2015

Hour	Session/Lecture	Lecturer
<b>Session S1</b>	<b><i>Models on thermodynamic properties and equilibrium</i></b>	
9.00-9.40	<b>Measurements of Impurities and Equilibria in CO<sub>2</sub></b>	<b>Jacob Stang</b> – SINTEF Energi, Norway
9.40-10.00	Discussions / Q&A	
<b>Session S2</b>	<b><i>Typical CO<sub>2</sub> mixtures and operating conditions, transport and storage gap analysis, classification of CO<sub>2</sub> impurities</i></b>	
10.00-11.00	<b>Typical CO<sub>2</sub> Mixtures and Operating Conditions, Transport and Storage Gap Analysis, Classification of CO<sub>2</sub> Impurities</b>	<b>Filip Neele</b> – TNO, the Netherlands
11.00-11.20	Discussions / Q&A	
11.20-11.40	<i>Coffee break</i>	
<b>Session S3</b>	<b><i>Typical CCS chains</i></b>	
11.40-12.40	<b>Choice of Benchmark CCS Chains for Illustrating CO<sub>2</sub> Quality (part 1)</b>	<b>Charles Eickhoff</b> – Progressive Energy Limited (PEL), UK
12.40-14.10	<i>Lunch break</i>	
14.10-14.55	<b>Choice of Benchmark CCS Chains for Illustrating CO<sub>2</sub> Quality (part 2)</b>	<b>Charles Eickhoff</b> – Progressive Energy Limited (PEL), UK
14.55-15.05	<i>Break</i>	
15.05-15.50	<b>Choice of Benchmark CCS Chains for Illustrating CO<sub>2</sub> Quality (part 3)</b>	<b>Charles Eickhoff</b> – Progressive Energy Limited (PEL), UK
15.50-16.10	Discussions / Q&A	
<b>Session S4</b>	<b><i>Corrosion of pipeline steels caused by CO<sub>2</sub> mixtures</i></b>	
16.10-16.40	<b>Corrosion Resistance of C Steels Linepipe in Presence of CO<sub>2</sub> Mixtures: Literature Review</b>	<b>Amy Brunsvold</b> – SINTEF Energi, Norway
16.40-17.00	Discussions / Q&A	

## Wednesday, the 21<sup>st</sup> of October 2015

Hour	Session/Lecture	Lecturer
<b>Session S5</b> <i>The influence of CO<sub>2</sub> mixture composition</i>		
09.00-10.00	<b>The Effect of Impurities for Pipeline and Tanked Transport of CO<sub>2</sub></b>	<b>Geir Skaugen</b> – SINTEF Energi, Norway
10.00-10.20	Discussions / Q&A	
<b>Session S7</b> <i>Techno-economic analyses of impacts of CO<sub>2</sub> quality</i>		
10.20-11.20	<b>Techno-Economic Analysis of CO<sub>2</sub> Quality Impact on CCS Chains (part 1)</b>	<b>Charles Eickhoff</b> – Progressive Energy Limited (PEL), UK
11.20-11.40	Coffee break	
11.40-12.40	<b>Techno-Economic Analysis of CO<sub>2</sub> Quality Impact on CCS Chains (part 2)</b>	<b>Charles Eickhoff</b> – Progressive Energy Limited (PEL), UK
12.40-13.00	Discussions / Q&A	
13.00-14.30	Lunch break	
<b>Session S6</b> <i>Operational and material effects of impurities in CO<sub>2</sub> streams</i>		
14.30-15.30	<b>CO<sub>2</sub> Transport: the CO<sub>2</sub> Stream Composition depends on the Capture Process</b>	<b>Miguel Angel Delgado</b> – Fundación Ciudad de la Energía (CIUDEN), Spain
15.30-15.40	Break	
15.40-16.10	<b>CIUDEN's Transport Rig</b>	<b>Miguel Angel Delgado</b> – Fundación Ciudad de la Energía, Spain
16.10-16.40	<b>Effects of Impurities in CO<sub>2</sub> Transport: last experiences at CIUDEN</b>	<b>Miguel Angel Delgado</b> – Fundación Ciudad de la Energía, Spain
16.40-17.00	Discussions / Q&A	

## Thursday, the 22<sup>nd</sup> of October 2015

Hour	Session/Lecture	Lecturer
<b>Session S8</b> <i>Chemical and physical effects of impurities on CO<sub>2</sub> storage</i>		
09.00-10.00	<b>CO<sub>2</sub> Geological Storage: Operational Parameters during the Injection</b>	<b>Juan Andres Marin</b> – Fundación Ciudad de la Energía (CIUDEN), Spain
10.00-10.10	Break	
10.10-10.40	<b>CIUDEN's Storage Site</b>	<b>Juan Andres Marin</b> – Fundación Ciudad de la Energía, Spain
10.40-11.10	<b>Short-term Effects of Impurities on CO<sub>2</sub> Storage</b>	<b>Juan Andres Marin</b> – Fundación Ciudad de la Energía, Spain
11.10-11.30	Discussions / Q&A	
11.30-11.50	Coffee break	
<b>Session S9</b> <i>Risk assessment of CO<sub>2</sub> transport and storage infrastructure</i>		
11.50-12.50	<b>Risk Assessment of CO<sub>2</sub> Transport and Storage Infrastructure Part 1: Introduction to Quantitative Risk Assessment (QRA)</b>	<b>Ingrid Raben</b> – TNO, the Netherlands
12.50-14.20	Lunch break	
14.20-15.20	<b>Risk Assessment of CO<sub>2</sub> Transport and Storage Infrastructure Part 2: Impact of CO<sub>2</sub> Quality on QRA</b>	<b>Ingrid Raben</b> – TNO, the Netherlands
15.20-15.40	Discussions / Q&A	
<b>Session S10</b> <i>IMPACTS recommendations</i>		
15.40-16.40	<b>IMPACTS Recommendations</b>	<b>Amy Brunsvold</b> – SINTEF Energi, Norway
16.40-17.00	Discussions / Q&A	
17.00-17.20	Diploma Awarding Ceremony	

## Friday, the 23<sup>rd</sup> of October 2015

Hour	Session	Chairperson
<b>Wrapping-up the CCS course (only for the lecturers) - Meeting between lecturers and organisers</b>		
08.00-09.30	Departure to Sinaia, Romania	
09.30-13.30	<b>Round Table</b> on the outcomes of the course; discussions regarding: <ul style="list-style-type: none"> <li>- structure of the audience (academia, industry, etc.) and questions received during the course;</li> <li>- which of the debated topics were of most interest for the attendees; analysis of the attendees' knowledge evaluation questionnaires;</li> <li>- feedback received from the participants based on the training assessment questionnaires;</li> <li>- identification of follow-ups</li> </ul>	<b>Claudia Tomescu</b> – Institute for Studies and Power Engineering (ISPE), Romania
13.30-14.30	Lunch break	
14.30-16.00	Return to Bucharest – departure of lecturers	