Geologically Storing Carbon. Learning from the Otway Project Experience

Description: Carbon capture and geological storage (CCS) is presently the only way that we can make deep cuts in emissions from fossil fuel–based, large-scale sources of CO2 such as power stations and industrial plants. But if this technology is to be acceptable to the community, it is essential that it is credibly demonstrated by world-class scientists and engineers in an open and transparent manner at a commercially significant scale. The aim of the Australian Otway Project was to do just this.

Geologically Storing Carbon provides a detailed account of the CO2CRC Otway Project, one of the most comprehensive demonstrations of the deep geological storage or geosequestration of carbon dioxide undertaken anywhere. This book of 18 comprehensive chapters, written by leading experts in the field, is more than a record of outstanding science— it is about “learning by doing”. For example, it explains how the project was organised, managed, funded and constructed, as well as the approach taken to community issues, regulations and approvals. It also describes how to understand the site: Are the rocks mechanically suitable? Will the CO2 leak? Is there enough storage capacity? Is monitoring effective?

This is the book for geologists, engineers, regulators, project developers, industry, communities, indeed anyone who wants to better understand how a carbon storage project really works. It is also for people concerned with obtaining an in-depth appreciation of one of the key technology options for decreasing greenhouse emissions to the atmosphere.

Contents:

Foreword 1 xi
Foreword 2 xii
Preface xiii
Authors xvii
Acknowledgements xx

1. Developing the Project 1
Peter Cook, Mal Lees, Sandeep Sharma
1.1 Introduction 1
1.2 Developing an Australian project 2
1.3 Developing a suitable corporate structure 10
1.4 Formation of CO2CRC Pilot Project LTD 13
1.5 Funding the project 17
1.6 Designing the Otway Project 22
1.7 Project liability and risk 30
1.8 Conclusions 33
1.9 References 34

2. Communications and the Otway Project 35
Tony Steeper
2.1 Introduction 35
12.1 Introduction 217
12.2 Sampling the Buttress–1 well 217
12.3 Sampling the CRC–1 injection well 218
12.4 Sampling the Naylor–1 monitoring well 220
12.5 Injecting tracers at the CRC–1 injection well 224
12.6 Analytical methods 228
12.7 Composition of hydrocarbons 232
12.8 Formation water composition and behaviour 240
12.9 Constraining CO2 breakthrough 241
12.10 In–reservoir behaviour of tracers 244
12.11 Liquid hydrocarbons 245
12.12 Solid hydrocarbons 245
12.13 Conclusions 247
12.14 References 248

13. Monitoring groundwaters 251
13.1 Introduction 251
13.2 Monitoring groundwater level 252
13.3 Monitoring groundwater composition 253
13.4 Interpreting groundwater results 257
13.5 Groundwater composition 260
13.6 Operational issues relating to groundwater monitoring 261
13.7 Quality control 264
13.8 Conclusions 270
13.9 References 270

14. Soil gas monitoring 273
14.1 Introduction 273
14.2 Surficial geology 274
14.3 Soil gas sampling at Otway 274
14.4 Analysis of soil gas 275
14.5 Soil gas results 276
14.6 Interpretation of soil gas results 277
14.7 Conclusions 279
14.8 References 279

15. Atmospheric monitoring 281
David Etheridge, Ray Leuning, Ashok Luhar, Zoe Loh, Darren Spencer, Colin Allison, Paul Steele, Steve Zegelin, Charles Jenkins, Paul Krummel, Paul Fraser

15.1 Introduction 281
15.2 Sensitivity 282
15.3 Simulated emissions and monitoring design 282
15.4 Background CO2 283
15.5 Data filtering 288
15.6 Bayesian inverse modelling 289
15.7 Conclusions 290
15.8 References 291

16. Reservoir engineering for Stage 1 293
Jonathan Ennis-King, Lincoln Paterson

16.1 Introduction 293
16.2 Description of field data 293
16.3 Well history 297
16.4 Well locations 297
16.5 Well completions 297
16.6 Initial pre-production conditions 297
16.7 Initial fluid compositions 299
16.8 Production data 299
16.9 Post-production conditions 299
16.10 Composition of injected gas 300
16.11 Downhole pressure and temperature during injection 300
16.12 Tracer injection 301
16.13 Gas and tracer sampling 301
16.14 Post-injection conditions 302
16.15 Simulation approach 303
16.16 Dynamic modelling process 308
16.17 Pre-injection modelling results 310
16.18 Injection and post-injection modelling results 312
16.19 Dynamic storage capacity of a depleted gas field 322
16.20 Conclusions 323
16.21 References 324

17. CO2CRC Otway Stage 2B residual saturation and dissolution test 329

17.1 Introduction 329
17.2 Test concept 330
17.3 Injection target 332
17.4 Test sequence 334
17.5 Downhole completion 339
17.6 Measurements 342
17.7 Surface data 342
17.8 Thermal logging 345
17.9 Noble gas tracer tests 345
17.10 Testing phases 345
17.11 Downhole data (memory gauges) 347
17.12 Downhole data (permanent gauges) 347
17.13 Pulsed neutron logging 351
17.14 The organic tracer test 353
17.15 The dissolution test 357
17.16 Conclusions 358
17.17 References 360

18. What was learned from the Otway Project? 361
Peter Cook

18.1 Introduction 361
18.2 Organising a project 363
18.3 Managing a project 364
18.4 Funding a project 365
18.5 Project communications and collaboration 366
18.6 Regulating a project 366
18.7 Identifying a suitable project site 367
Fax Order Form
To place an order via fax simply print this form, fill in the information below and fax the completed form to 646-607-1907 (from USA) or +353-1-481-1716 (from Rest of World). If you have any questions please visit
http://www.researchandmarkets.com/contact/

Order Information
Please verify that the product information is correct.

Product Name: Geologically Storing Carbon. Learning from the Otway Project Experience
Web Address: http://www.researchandmarkets.com/reports/2935950/
Office Code: SCDK15JL

Product Format
Please select the product format and quantity you require:

<table>
<thead>
<tr>
<th>Quantity</th>
<th>USD 125 + USD 29 Shipping/Handling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard Copy (Hard Back):</td>
<td></td>
</tr>
</tbody>
</table>

* Shipping/Handling is only charged once per order.

Contact Information
Please enter all the information below in BLOCK CAPITALS

<table>
<thead>
<tr>
<th>Title:</th>
<th>Mr ☐</th>
<th>Mrs ☐</th>
<th>Dr ☐</th>
<th>Miss ☐</th>
<th>Ms ☐</th>
<th>Prof ☐</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Name:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Email Address: *</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Job Title:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organisation:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Address:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>City:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Postal / Zip Code:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Country:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phone Number:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fax Number:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Please refrain from using free email accounts when ordering (e.g. Yahoo, Hotmail, AOL)
Payment Information

Please indicate the payment method you would like to use by selecting the appropriate box.

☐ Pay by credit card: You will receive an email with a link to a secure webpage to enter your credit card details.

☐ Pay by check: Please post the check, accompanied by this form, to:
Research and Markets,
Guinness Center,
Taylors Lane,
Dublin 8,
Ireland.

☐ Pay by wire transfer: Please transfer funds to:
Account number 833 130 83
Sort code 98-53-30
Swift code ULSBIE2D
IBAN number IE78ULSB9853308331083
Bank Address Ulster Bank,
27-35 Main Street,
Blackrock,
Co. Dublin,
Ireland.

If you have a Marketing Code please enter it below:

Marketing Code: ........................................................

Please note that by ordering from Research and Markets you are agreeing to our Terms and Conditions at http://www.researchandmarkets.com/info/terms.asp

Please fax this form to:
(646) 607-1907 or (646) 964-6609 - From USA
+353-1-481-1716 or +353-1-653-1571 - From Rest of World