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Development of the first internationally accepted standard for geologic storage of carbon dioxide utilizing enhanced oil recovery (EOR) under the international standards organization (ISO) technical committee TC-265

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Recommended Citation

Presentation Overview

1. ISO & Standards
2. TC-265
3. Why Do This…Next Steps
1: ISO & Standards
What are Standards?

• Consensus based
• Designed as a rule, guideline or definition
• Revisable and updateable
• Voluntary

• Standards must fit to purpose:
  • Prescriptive based
  • Objectives based
  • Performance based
  • Principles based
  • Hybrids
Why Standards?

• Because they are not laws...
  • Standards & regulations can work together
• Not Mandated
• Typically initiated by industry...
  • And therefore better received and used by industry because they are part of the process
• Demonstrate regulatory compliance
• Streamline the regulatory process
• Harmonize across jurisdictions
Must INCLUDE any and all...

- UNFCCC - IPCC
- ISO
- EU European Directives
- USDOE
- USEPA
- NGO’s (WRI, GCCSI, etc.)
- Federal, Provincial, State regulations
- **Future expected directives**
ISO = A Global System

- >600 organisations in liaison
- >19,000 existing ISO Standards
- 163 Countries 5,000 people 97% of world population
- 1208 standards produced in 2011
- >250 active TCs 3,335 technical bodies 100,000 experts
- Learning Growth
- Financial
- Vision & Strategy
- Internal Process
- Central Secretariat in Geneva 151 FTE staff
ISO Standards Development

• ISO does not write standards
• Technical Committees write standards
• P-Member countries approve standards
• Nations adopt ISO standards
• ISO does not influence the technical content
ISO Standards Process

- WG experts consensus and 2/3 P-Members votes
- Less than 1/4 total negative votes

WG members (Consensus)

WD (Preparatory)

NP (Proposal)

CD (Committee)

DIS (Enquiry)

FDIS (Approval)

ISO (Publication)

ISO / CS

- 2/3 P-Members votes
- Less than 1/4 total negative votes

NP: New Work Item Proposal
WD: Working Draft
CD: Committee Draft
DIS: Draft International Standard
FDIS: Final DIS
ISO: ISO Standard
2: ISO TC 265
Title & Designation:
Standardization of design, construction, operation, and environmental planning and management, risk management, quantification, monitoring and verification, and related activities in the field of carbon dioxide capture, transportation, and geological storage (CCS).
ISO TC 265 – CCS Organization

Twined Secretariat

Canada & China

Members

Countries

Liaisons

Participants

P-Member Nations

O-Member Nations

NGOs & Liaisons
<table>
<thead>
<tr>
<th>Participating Members</th>
<th>Voting Members</th>
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</thead>
<tbody>
<tr>
<td>Australia</td>
<td>✓ Voting Members</td>
</tr>
<tr>
<td>Canada</td>
<td>✓ Guaranteed International Expert Participation on all WGs</td>
</tr>
<tr>
<td>China</td>
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<tr>
<td>France</td>
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<td>S. Korea</td>
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<tr>
<td>Malaysia</td>
<td>✓ Voting Members</td>
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<tr>
<td>Netherlands</td>
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<td>Norway</td>
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<td>Saudi Arabia</td>
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<td>Switzerland</td>
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<td>United Kingdom</td>
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<td>United States</td>
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</table>
ISO TC 265 – O-Members (Observing)

- Argentina
- Brazil
- Czech Rep.
- Egypt
- Finland
- Iran
- New Zealand
- Serbia
- Sri Lanka

- Non-voting Members
- May request International Expert Participation on all WGs
- May upgrade to P-Member at any time
ISO TC 265 – Liaisons

- ISO TC207 Environmental Management
- ISO TC67 Petroleum and Natural Gas
- CEN/TC 234 Gas Infrastructure
- Carbon Sequestration Leadership Forum (CSLF)
- European Industrial Gases Association (EIGA)
- Global CCS Institute (GCCSI)
- International Energy Association (IEA)
- IEAGHG
- CO2 GeoNet
- World Resources Institute (WRI)

✔️ Non-voting Members
✔️ Guaranteed International Expert Participation on all WGs
TC-265 Working Groups

International
Interdisciplinary or
Transdisciplinary
Approach

WG1
Capture

WG2
Transportation

WG3
Storage

WG4
Q&V (MVA)

WG5
Cross-Cutting

WG6
CO2-EOR
Technical Report (TR):
• Pre-, post-, & oxyfuel combustion capture
• Industrial processes
• Separation, purification
• Dehydration, compression and pumping
• Liquefaction, installation, operation, maintenance
• Quality of CO$_2$ streams
• Monitoring, management systems
• Plant retrofitting

4 US Members
All have lead author roles
Proposed schedule for the first IS

ISO/TC 265/WG1 N053

2014

July: 2nd WG1 Teleconference
August: Discussion of IS by e-mails
September: Starting the discussion of the first IS
October: 3rd WG1 meeting
November: Discussion of NWIP by e-mails
December: Consensus on NWIP

2015

January: 4th WG1 meeting
February: TC265 meeting
March: Vote for the proposed NWIP (3 months)
April: Development of IS (3 years)
May – 2018

ISO/TC 265 the 2nd WG1 Teleconference, 2014-07-17
Pipeline transportation systems boundaries:

- Pipelines not currently covered by existing ISO/TC-67 standards
- Health, safety and environment (HSE) aspects specific to transport
- Monitoring of CO₂

2 US Members
WG2: Transportation

427 comments:

- Australia 34 comments
- Canada 27 comments
- China 42 comments
- France 9 comments
- Germany 5 comments
- Japan 16 comments
- Norway 19 comments
- UK 212 comments
- USA 63 comments
WG3: Storage

Geological storage of carbon dioxide; Canada (Onshore) Japan (Offshore):

• Z-741-12 as seed document
• Site selection
• Site characterization
• Risk assessment & risk management
• Well construction
• Closure
• Post-closure

✓ 8 US Members
✓ Many have lead or co-lead author roles
WG3: Storage

<table>
<thead>
<tr>
<th>Entity</th>
<th>Site screening and selection period</th>
<th>Site characterization period</th>
<th>Design and development period</th>
<th>Operational period</th>
<th>Post-injection period</th>
<th>Post closure period (not included in the Standard)</th>
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<tr>
<td>(Private) operator</td>
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<tr>
<td>Regulatory authority*</td>
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<tr>
<td>Designated authority**</td>
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• 750 comments from the Technical Committee
Quantification & Verification Methodology (TR); Led by China, with support from France:

- Project boundary & leakage
- CO$_2$ quantification
- Monitoring and reporting
- Third party verification
- Life Cycle Analysis

4 US Members
## WG4: Quantification & Verification

<table>
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<th>Country</th>
<th>Number of member (2014, last plenary)</th>
<th>Current membership</th>
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<tr>
<td>Australia</td>
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<tr>
<td>Canada</td>
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<td>4</td>
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<tr>
<td>China</td>
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<tr>
<td>France</td>
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<tr>
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<tr>
<td>Korea</td>
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<tr>
<td><strong>US</strong></td>
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<td>5</td>
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<tr>
<td>Liaison</td>
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<tr>
<td><strong>Total</strong></td>
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<td>37</td>
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</table>
Definitions & Vocabulary; Led by France, with support from China:

• Terminology
• Definitions
• System Integration
• Public Participation & Engagement
• Mixing of gas streams from different sources
Example of harmonizing cross-cutting terms among WGs: CO₂ stream

- **WG5**: *a stream consisting overwhelmingly of carbon dioxide*
- **WG2**: stream consisting overwhelmingly of carbon dioxide *with a limited fraction of other chemical substances*
- **WG3**: a stream of carbon dioxide *that has been captured from an emission source (e.g., a fossil fuel power plant) and meets applicable regulatory requirements for CO₂ storage*

*Note: It may include any incidental associated substances derived from the source materials or the capture process, added as a result of commingling for transportation, added to the stream to enable or improve the injection process and/or trace substances added to assist in CO₂ migration detection.*
**WG6: CO2-EOR**

Carbon Dioxide Storage using EOR; led by USA, with support from Norway:

- Subsurface oil field operating environments
- Reservoir & pore space management
- Manage known lateral stratigraphic traps in the target formation
- Coordination with WGs1-5

- 14 US Members
- 1 - Norway
- 5 - Canada
- 2 - Japan
- 2 - IEA
- 24 Total Members

**Expected:**
- China
- France
- UK
- Liaisons
WG6: CO2-EOR
3: Why Do This…Next Steps
“Standards, smart local and global standards, are essential to the timely advancement of the technologies and equipment that will be necessary to make safe reliable power with the capture of emissions from hydrocarbon fueled power plants.”

Mike Monea
President, Carbon Capture & Storage Initiatives - Saskatchewan Power Corporation (Boundary Dam)
Regulatory Conflict
...Regulatory Framework:
• Malaysia
• Argentina
• Iran
• Brazil
• Egypt

...Industry Experience – expands membership:
• Saudi Arabia
• Mexico
Issues Impacting CCUS in US

• Complying with Subpart RR of the GHG Reporting Program
• Categorization of CO₂ as a solid waste and maybe hazardous waste
• Potential conversion of State-based UIC Class II programs into UIC Class VI programs.
• EPA’s Prevention of Significant Deterioration (PSD)
• 45Q tax credits
Next Steps...

• 7th Plenary Meeting in May – Laramie, WY

• Expect draft standards for:
  • Post-combustion capture DIS
  • CO₂ transportation by pipeline DIS
  • Storage in saline/stacked reservoirs DIS
  • Risk Analysis & LCA TR
  • CO₂-EOR DIS
Enhanced Oil Recovery Institute

www.uwyo.edu/eori/

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