



SaskCO₂USER

Saskatchewan CO₂ Oilfield Use for Storage and EOR Research

Saskatchewan CO₂ Oilfield Use for Storage and EOR Research (SaskCO₂USER)

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Saskatchewan
Ministry of the
Economy



BUREAU OF
ECONOMIC
GEOLOGY



EERC
Energy & Environmental Research Center
Putting Research into Practice



Saskatchewan

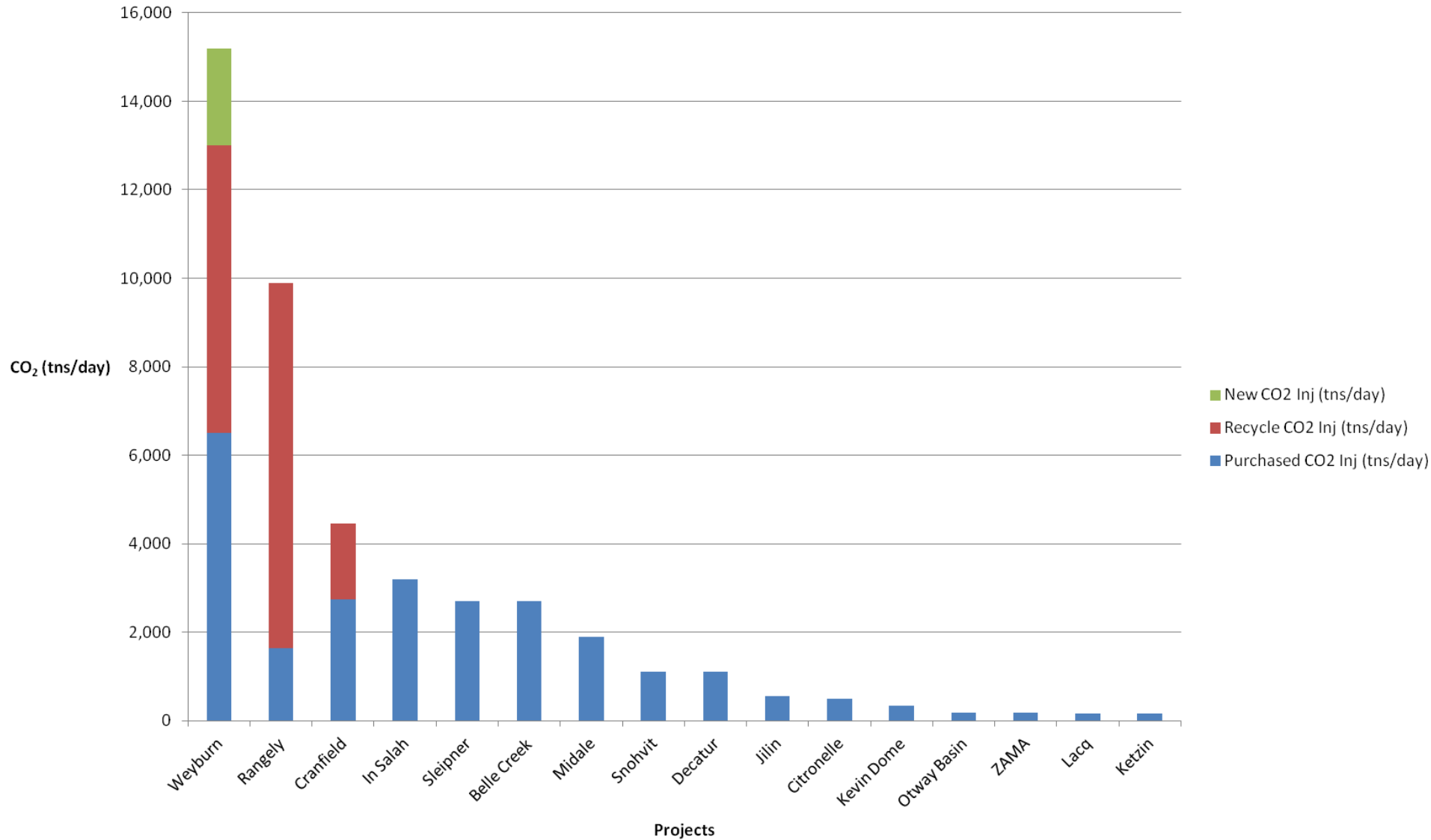


TNO innovation
for life



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SASKATCHEWAN

Monitored CO₂ EOR Storage Projects



Petroleum Technology Research Centre

- Non-Profit Research & Development
- Collaborative partnerships with Industry, Government and Research Organizations
- Committed to improving oil recovery
- Research projects associated with CO₂ management
 - IEAGHG Weyburn –Midale CO₂ Monitoring & Storage Project
 - SaskCO₂User
 - Aquistore



Benefit to the Program

- New 2014 -2015 Research Program
- Applied research for commercial applications of CO₂-EOR operations and CO₂ storage.
- Focus on commercialization, SaskCO₂User will address:
 - CO₂ conformance
 - Wellbore Integrity
 - Monitoring

SaskCO₂USER Program

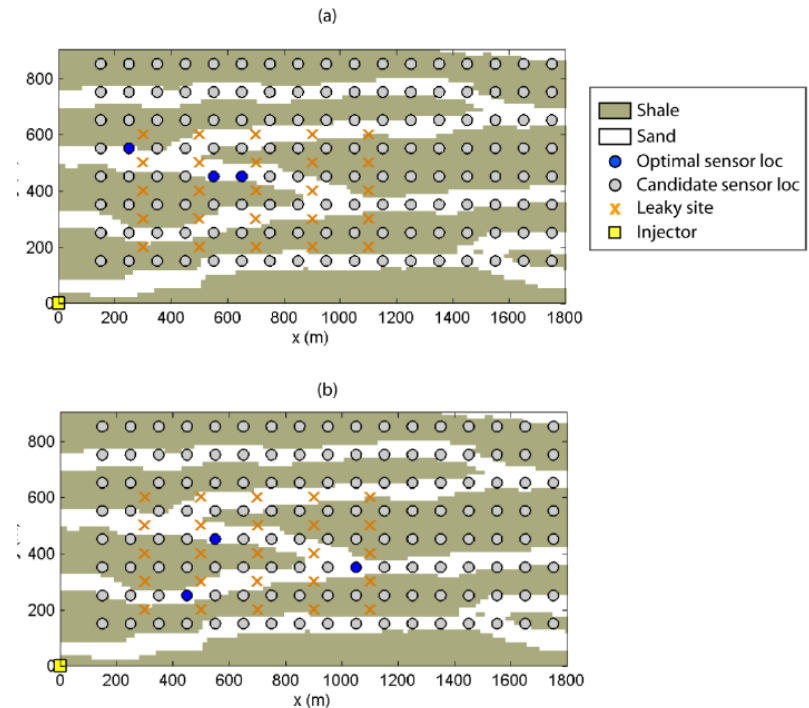


1. Evaluating minimum data sets
2. Storage integrity
3. Passive seismic monitoring
4. History-matched modelling
5. Wellbore design
6. Casing corrosion
7. Core assessment



Evaluating Minimum Data Sets

- Abundance of information unlikely for future geological storage projects
- Need to determine minimum amount of data necessary to identify migration pathways in order to strike a balance between resolution and risk assessment needs .
- Data that are useful for EOR phase may not be necessary for post-EOR phase because of different initial conditions and plume extents.



Monitoring of CO₂-EOR Sites for Storage Integrity

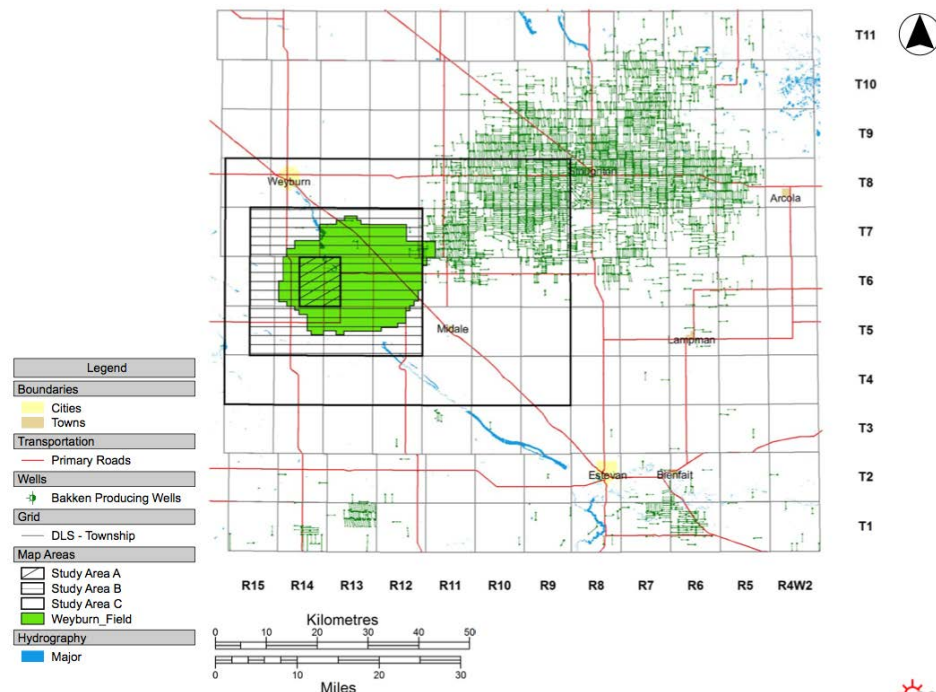
- Recommend an MMV strategy appropriate for monitoring CO₂ overlying the storage reservoir
- Examine most likely pathways for migration
- A review of existing and emerging regulatory regimes





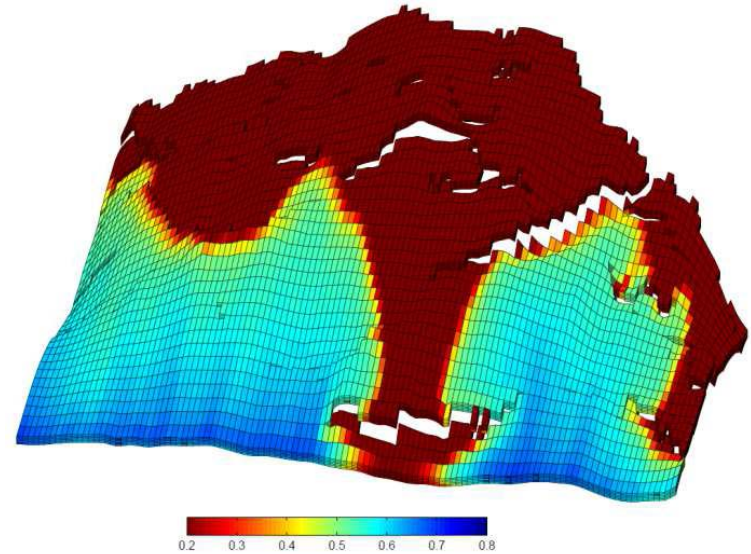
Passive Seismic Monitoring

- Deployment of 3 broadband stations.
- Correlation between industrial activity and induced seismic events.
- Integrate with geomechanics.



History-Matched Modelling

- Develop automated seismic-constrained history matching workflow to verify CO₂ distributions predicted by dynamic simulations.
- Stochastic inversion of time lapse seismic coupled with flow simulations to identify porosity/permeability in order to improve the predictive accuracy of the model.



Wellbore Design

- Optimized well design for production, CO₂ flood operations, disposal and long-term abandonment.
- Define a general completion procedure and recommend completion tools configuration and material requirements to convert producing wells into long term CO₂ injection wells.
- Identify any well construction or estimated cost differences for wells that may or may not require conversion to CO₂ EOR injection.



Casing Corrosion

- Estimate in situ corrosion rates and locations for wellbore casing/cement in an operational field.
- Three case studies from collected data.
- Determine corrosion rates and locations, as well as contributing factors.



Core Assessment

- Investigate the affect of injected CO₂ on the rock properties
- Two recently drilled observation wells with core and DSTs from the Weyburn field post CO₂ flood initiation
- Compare these cores to equivalent cores in the area and determine if the CO₂ flood has changed the reservoir mineralogically and/or geochemically over the course of the past 15 years





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Summary of Accomplishments to Date

- Project launch
- RFPs, contracts awarded, executed
- Phase I Kick-Off Meeting held
- Equipment installation currently underway
- Projects to be completed by September 2015



QUESTIONS?

Thank you.

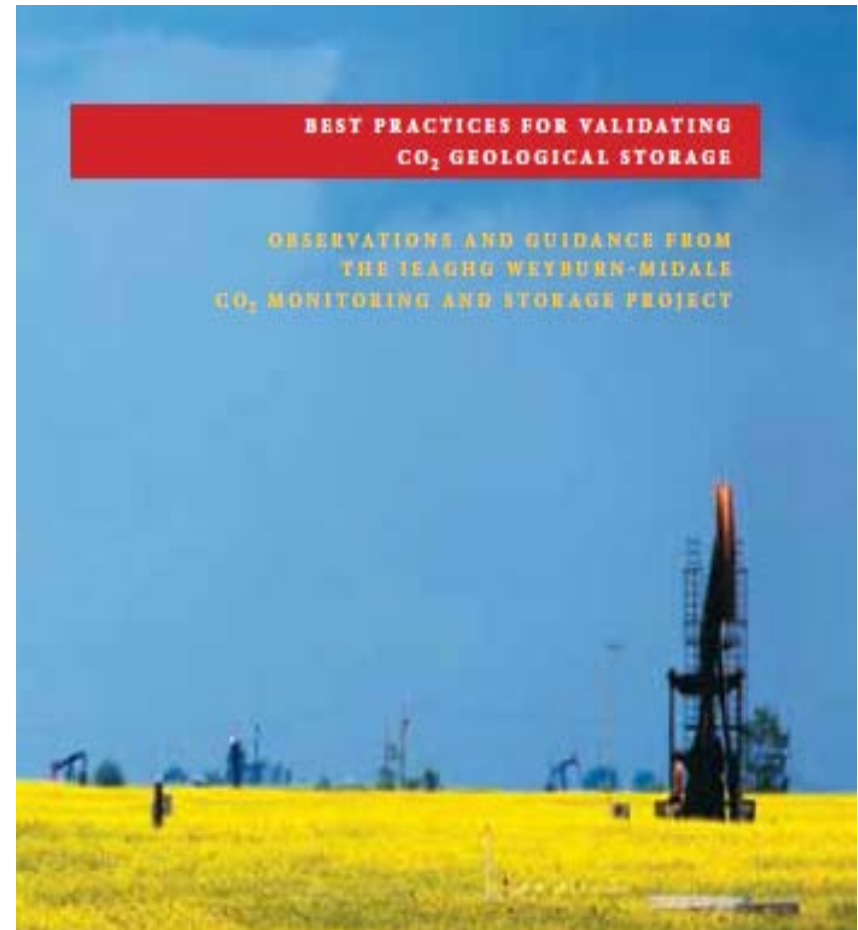
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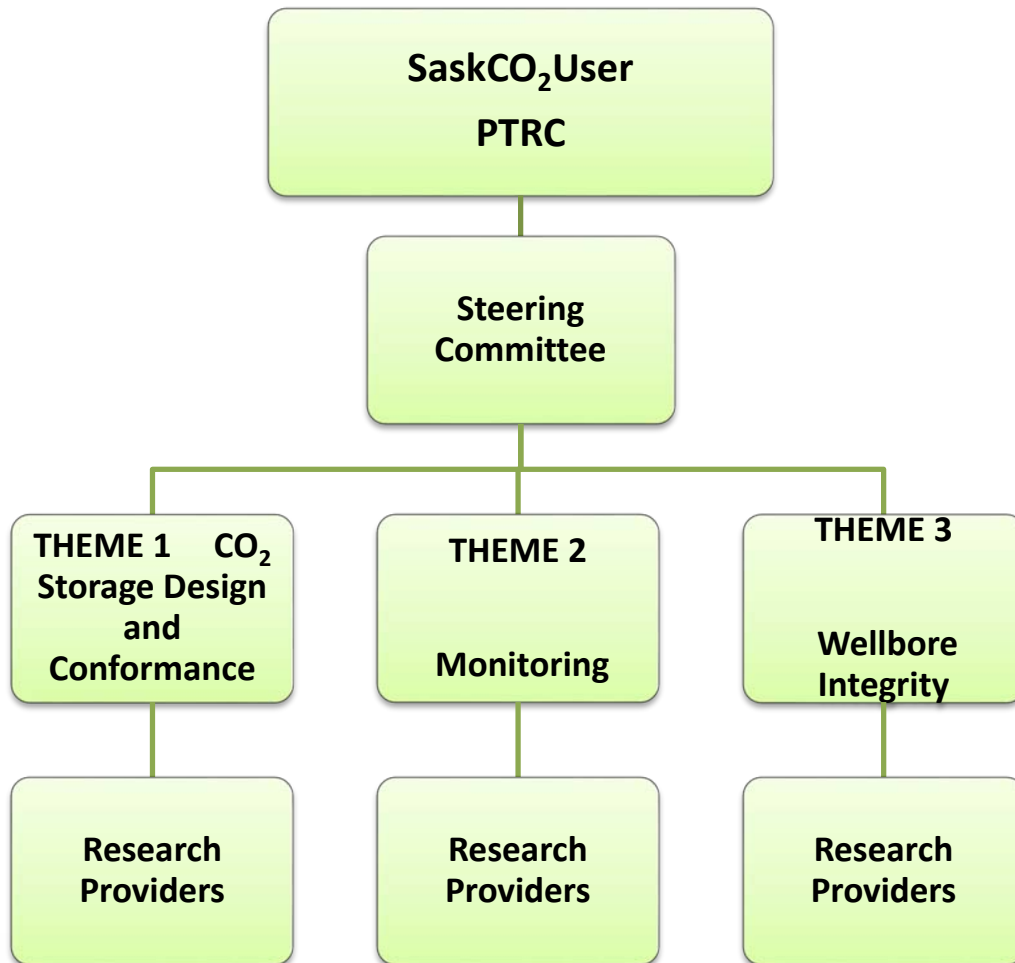
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Best Practice Manual

- Characterisation
- Performance Predictions
- Geochemical Monitoring
- Geophysical Monitoring
- Performance Validation
- Well Integrity
- Risk Assessment
- Community Outreach



Organization Chart



Theme Leads:

Dr. Chris Hawkes;
Theresa Watson;
Dr. Don White.

Research Providers:

Texas BEG; Schlumberger Carbon Services;
University of Bristol; TNO;
Bisset Resource Consultants;
EERC;
Saskatchewan Geological Survey

Gantt Chart

