

CarbonSAFE Illinois – Macon County

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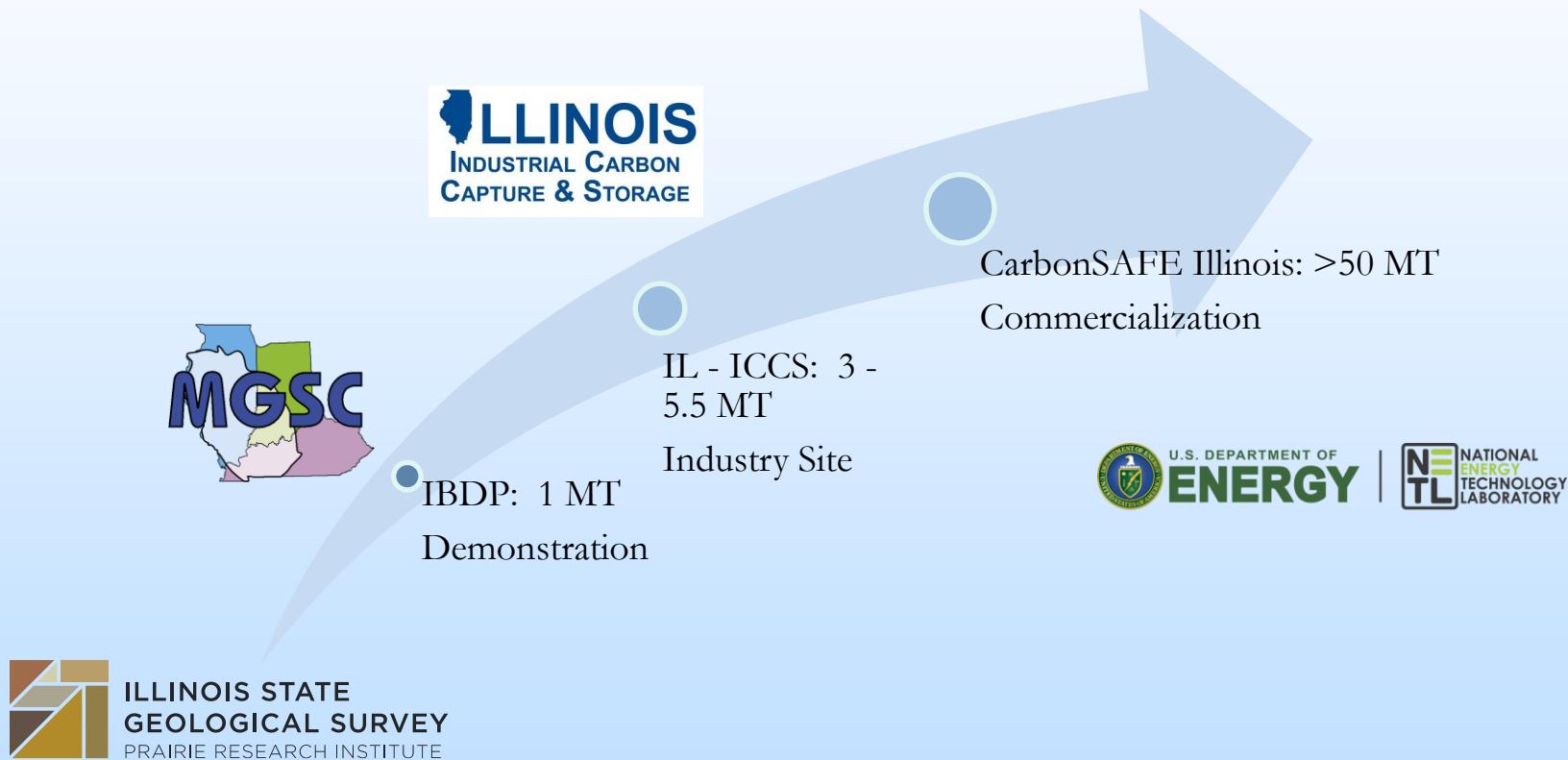
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U.S. Department of Energy
National Energy Technology Laboratory
Mastering the Subsurface Through Technology Innovation, Partnerships and Collaboration:
Carbon Storage and Oil and Natural Gas Technologies Review Meeting
August 1-3, 2017

Presentation Outline

- Project Objectives & Setting
- Technical Status
- Accomplishments
- Lessons
- Synergistic Opportunities
- Summary

CCS Progression to Commercialization in Illinois



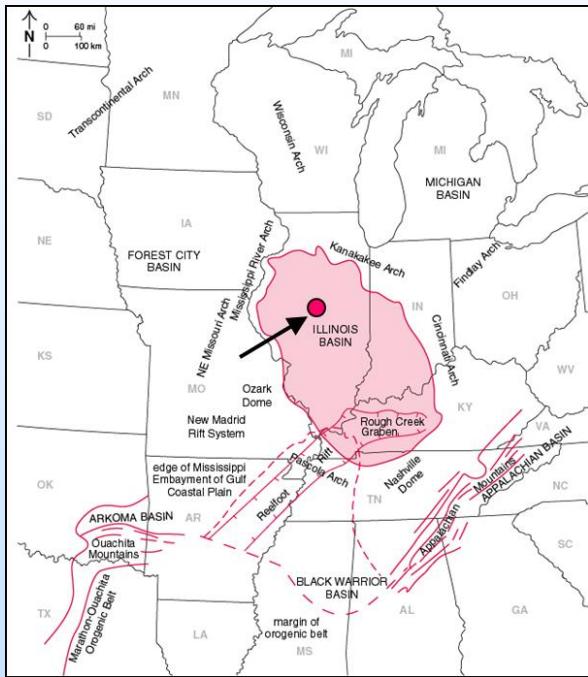
Project Aspects

Address technical and non-technical questions around developing commercial-scale storage complexes.

- Assess Public Outreach needs
- Analyze Regulatory Issues
- Analyze Business Aspects
- Characterize the Subsurface Storage Complex
- Analyze Infrastructure Needs
- Site Development Plan

Technical Status

Storage options in Macon County

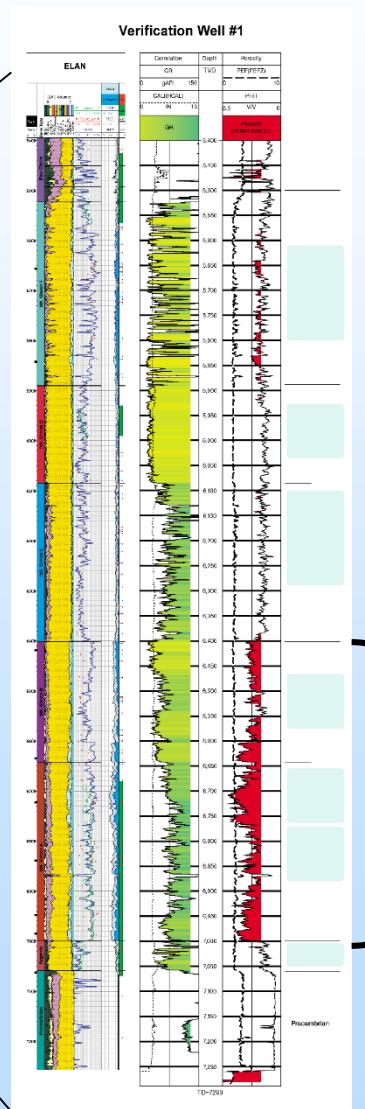
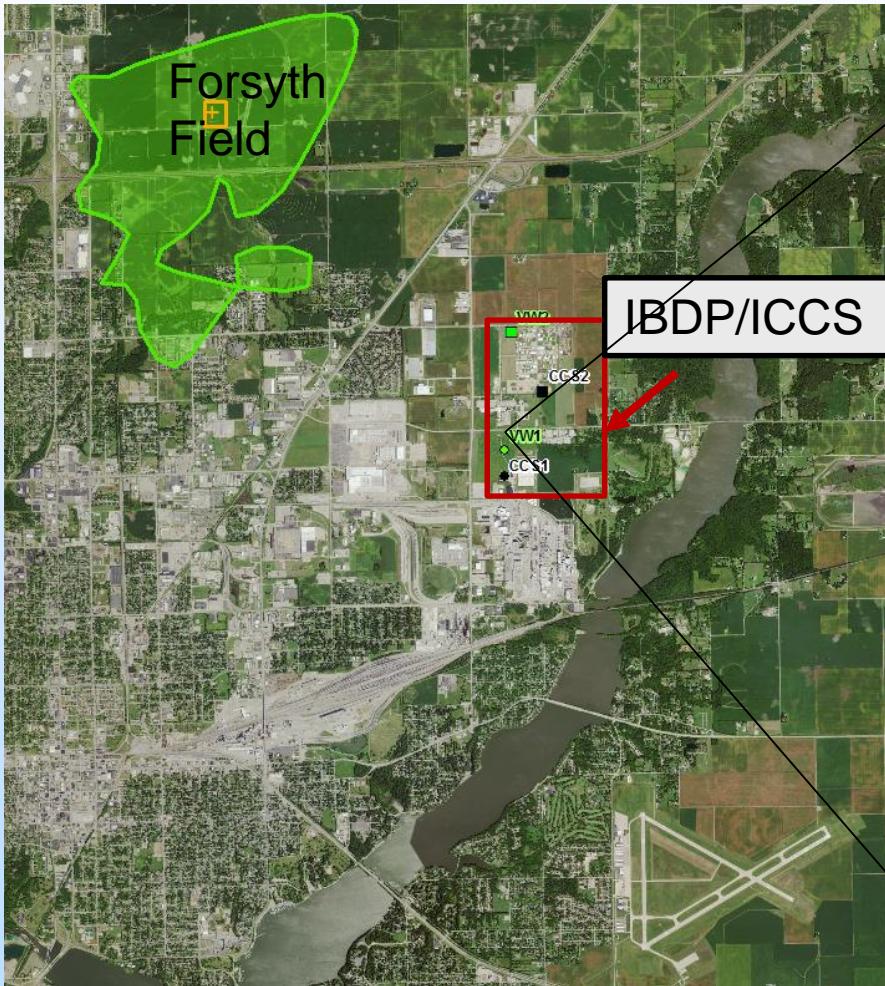


SYSTEM	GROUP	FORMATION	Storage Elements
Ordovician	Maquoketa	Brainard	Secondary Seal
		Ft. Atkinson	
		Scales	
	Galena	Kimmswick	
		Decorah	
	Plateville		
	Ancell	Joachim	
		St. Peter	Potential target
	Knox	Shakoppee	
		New Richmond	Secondary Seal/Reservoir
		Oneota	
		Gunter	
		Eminence	
		Potosi	Potential target
		Franconia	
		Ironton-Galesville	
		Eau Claire	Primary Seal
		Mt. Simon	Target reservoir
Precambrian			

St. Peter-Ordovician Storage Complex

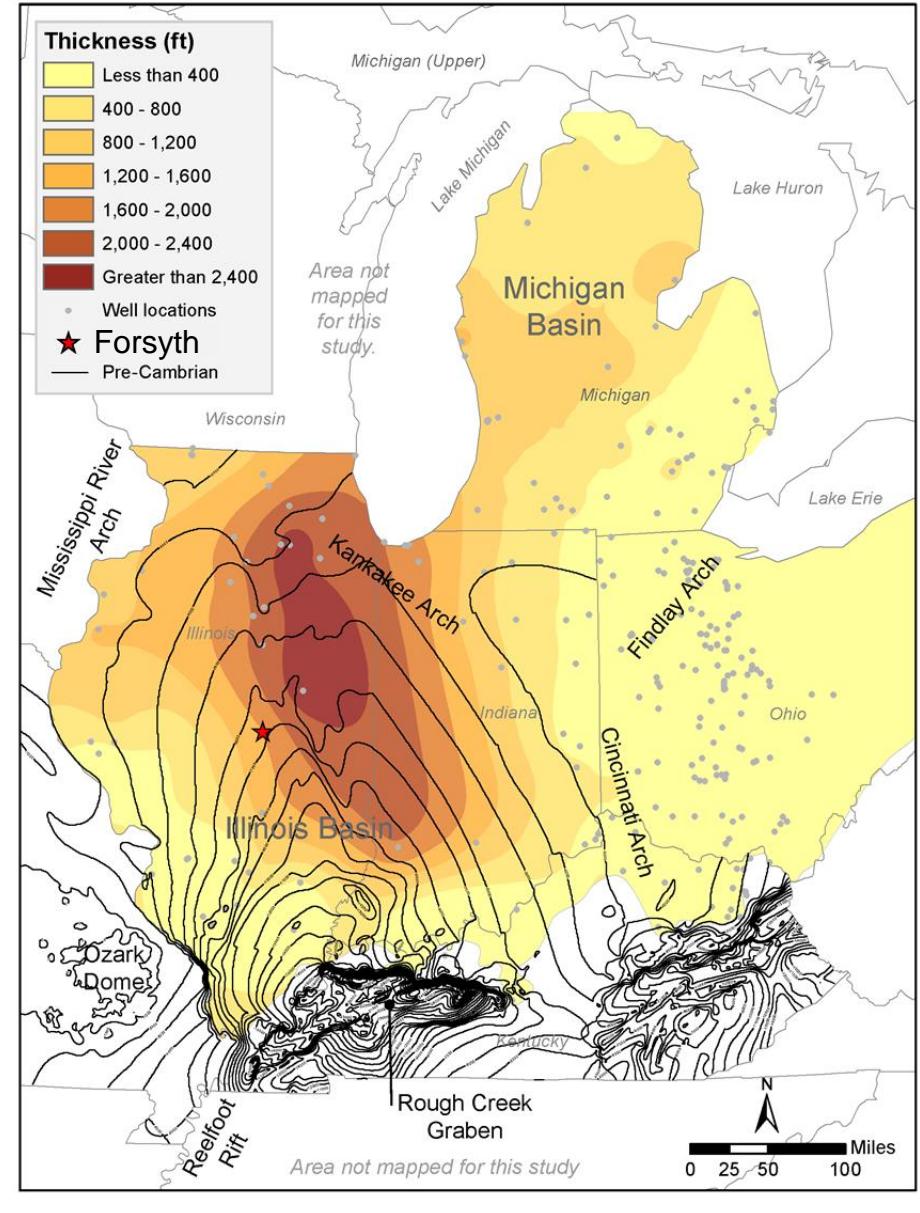
Mt. Simon Storage Complex

Subsurface Characterization



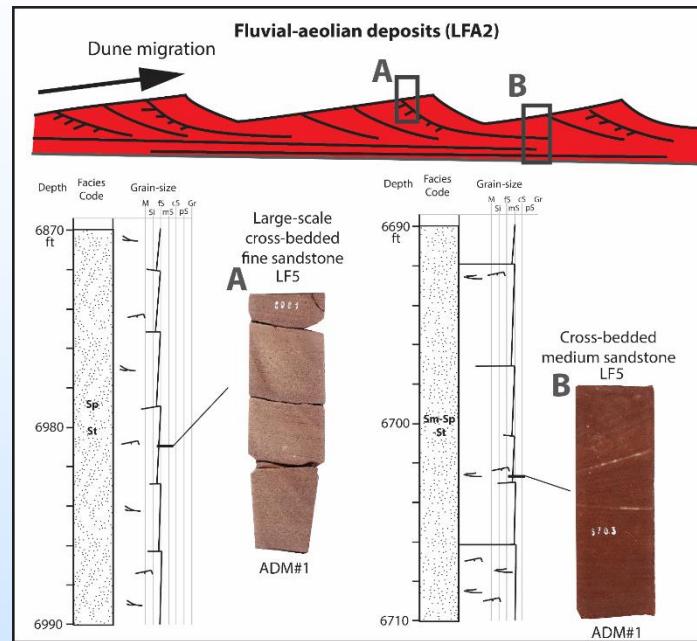
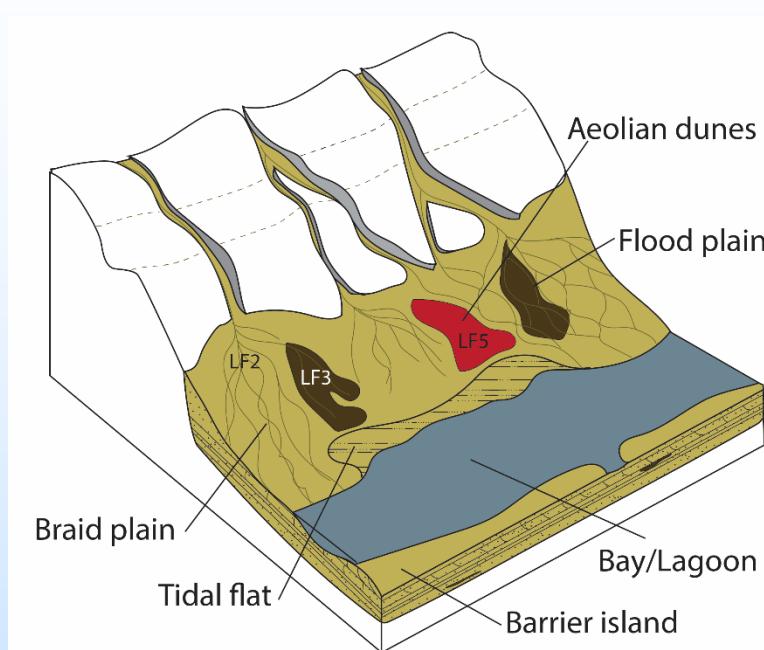
600 feet of
10-30%
Porosity
Lower Mt.
Simon

Mt Simon Sandstone



- Mt. Simon Sandstone is \sim 1500 ft thick at Forsyth Field, Macon County
- In Macon County (IBDP), the Mt. Simon can be divided into three major sections
- Underlying unit (Argenta), has highly variable thickness.
- Argenta is unconformably bound and overlies weathered Precambrian surface

Mt Simon Depositional Environment

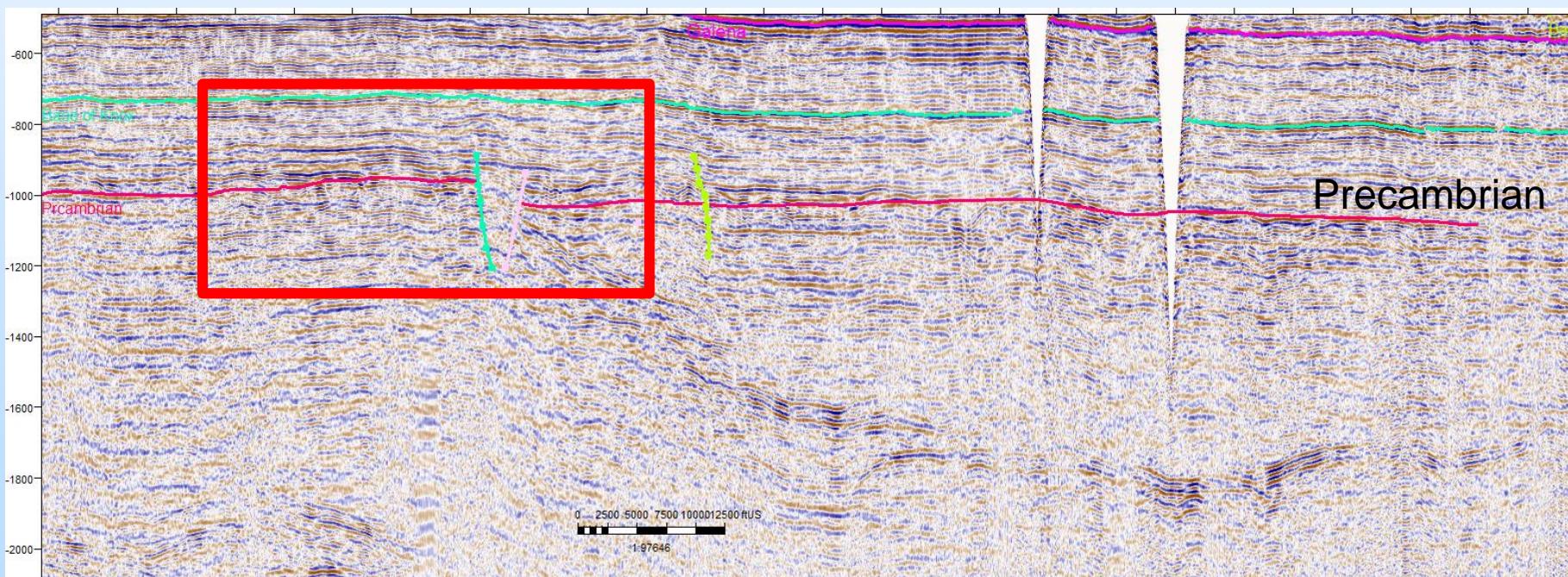


Lower Mt. Simon can have up to 30% porosity. Porosity largely secondary via feldspar dissolution.

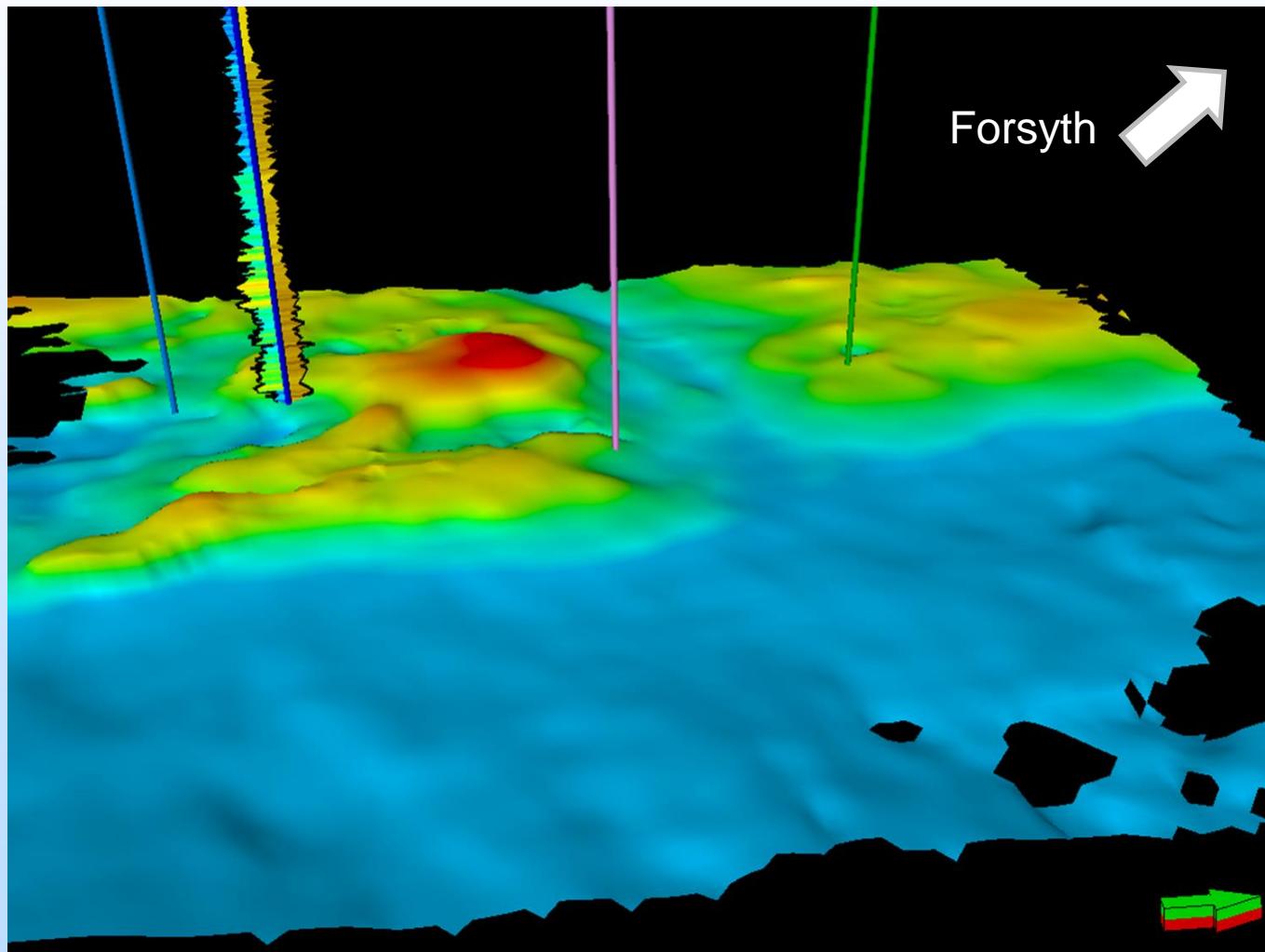
Lateral Continuity and Basement Highs



- What is the relationship of Precambrian highs and arkosic high porosity sands?
- Where is it thickest?



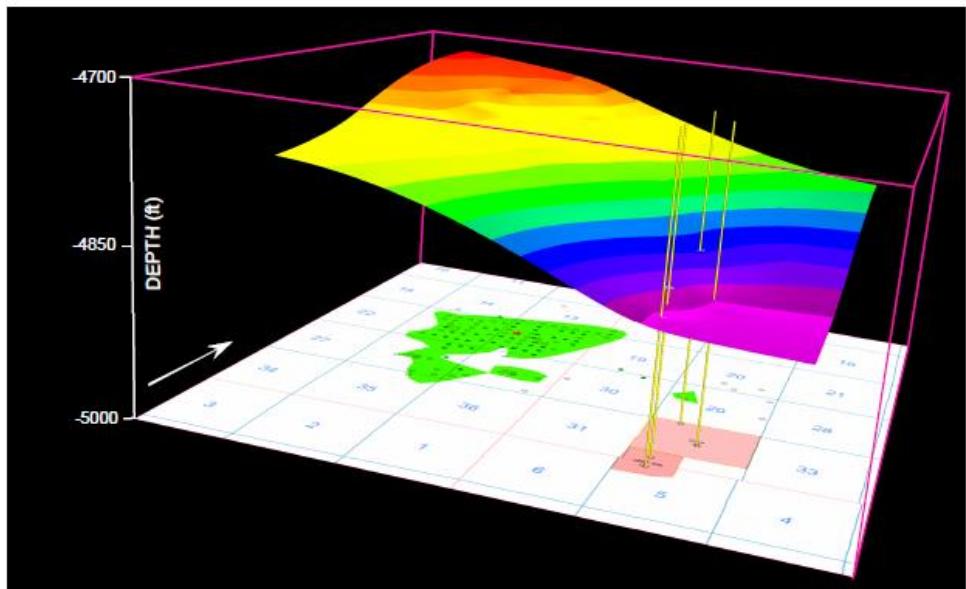
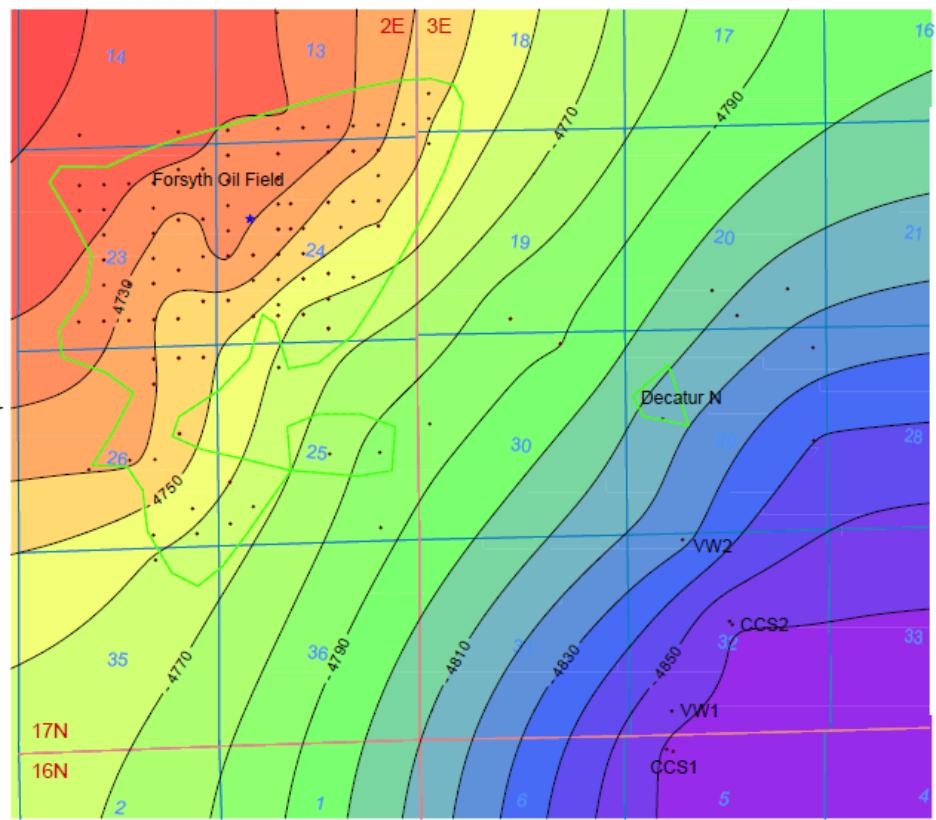
Basement Topography



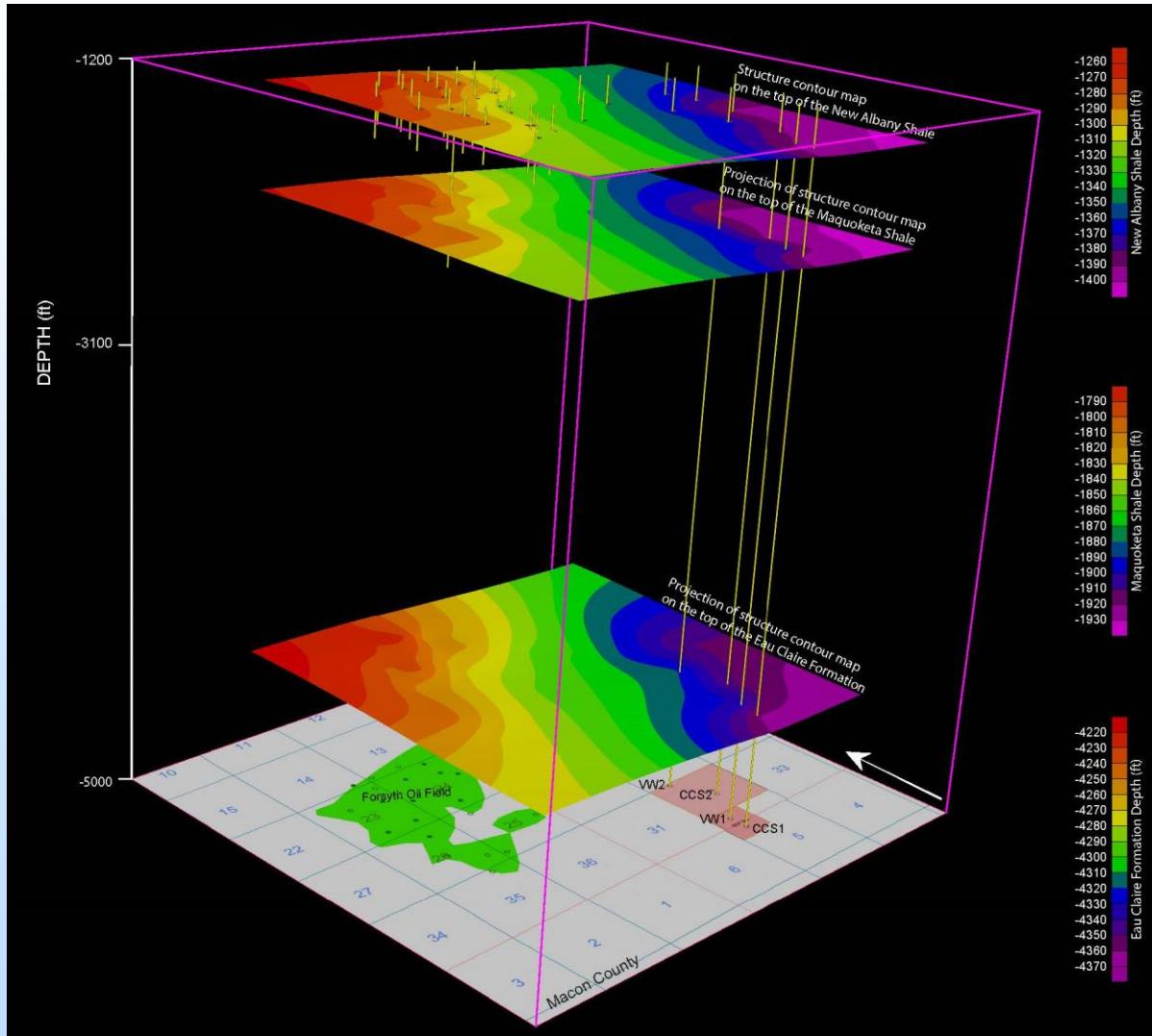
3D
Seismic
IBDP



Mt. Simon Structure at Forsyth



Structure on Seals



New Albany Shale

Maquoketa Shale

Eau Claire Fm

Stratigraphic Well

Drill ca 7500 ft depth

Core 4 to 5 intervals

Silurian;

Eau Claire – U Mt Simon;

L Mt Simon;

Argenta (pre-Mt Simon) TBD;

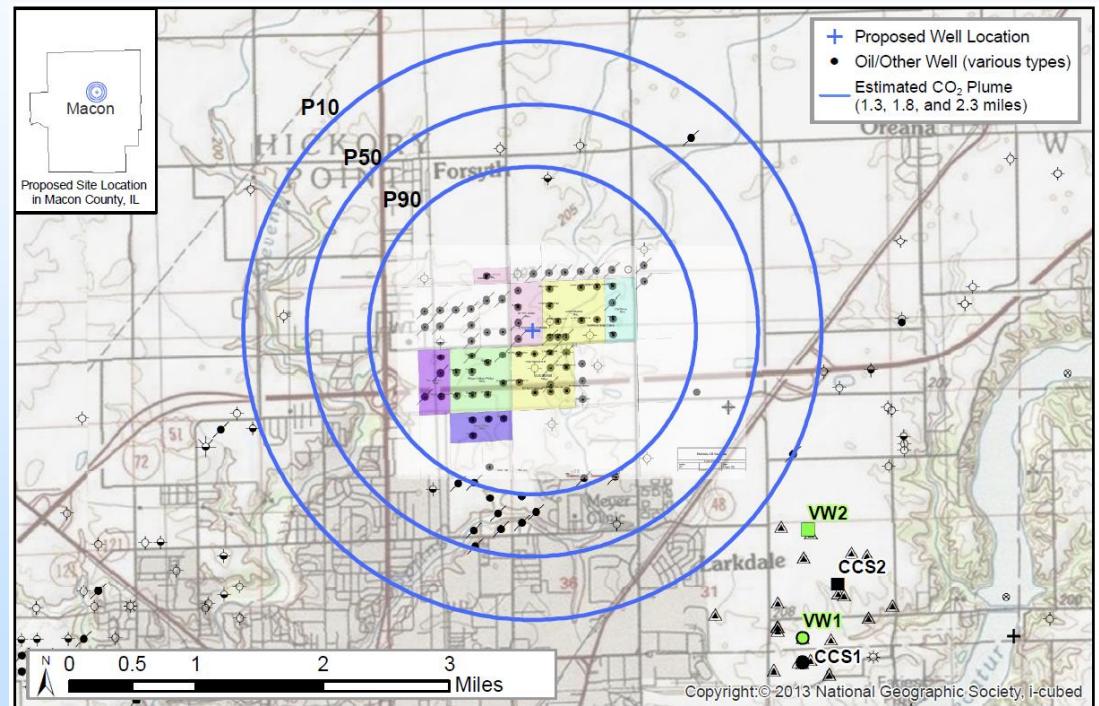
Precambrian

Sidewall core

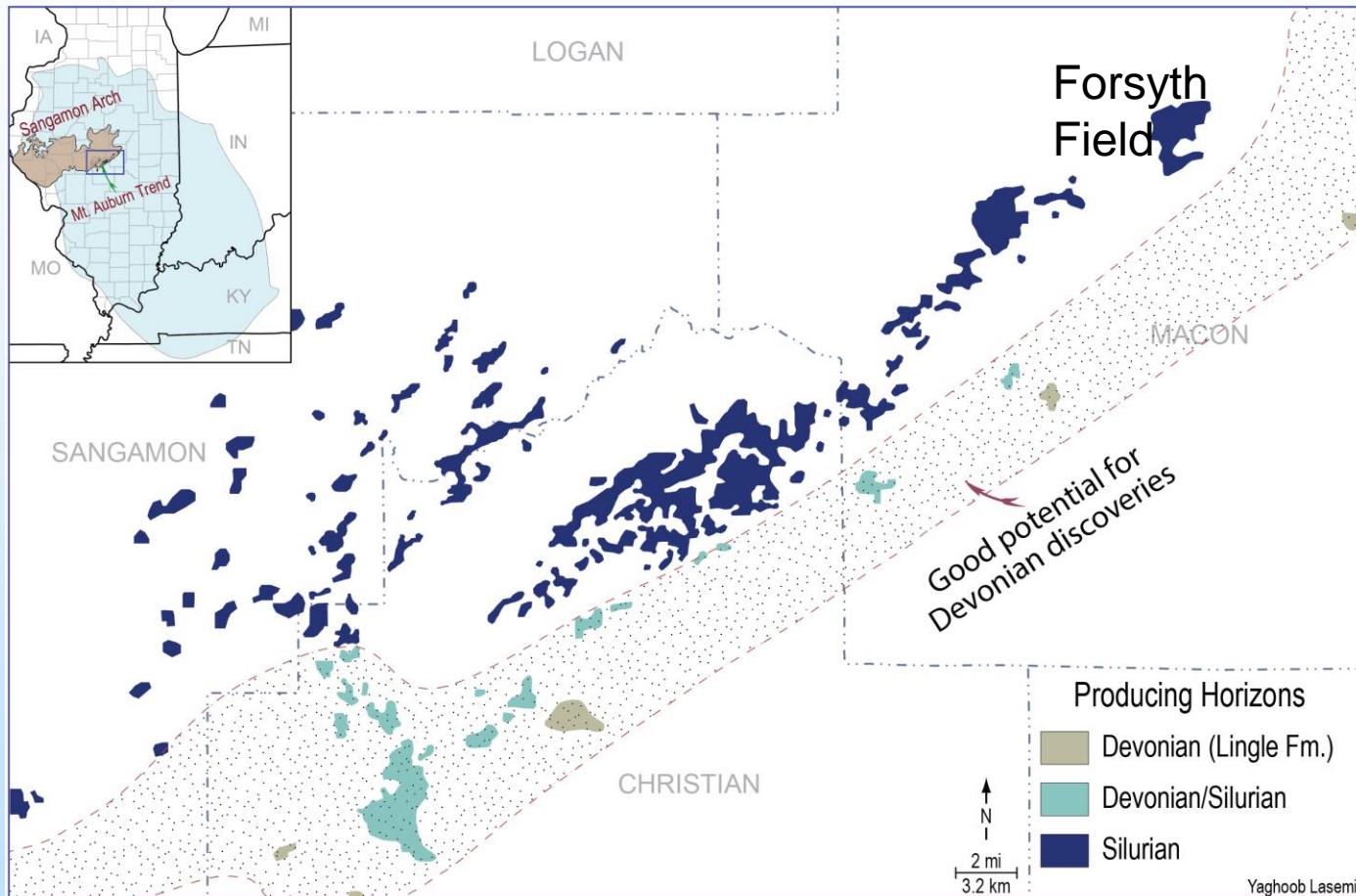
Extensive logging suite

Well tests

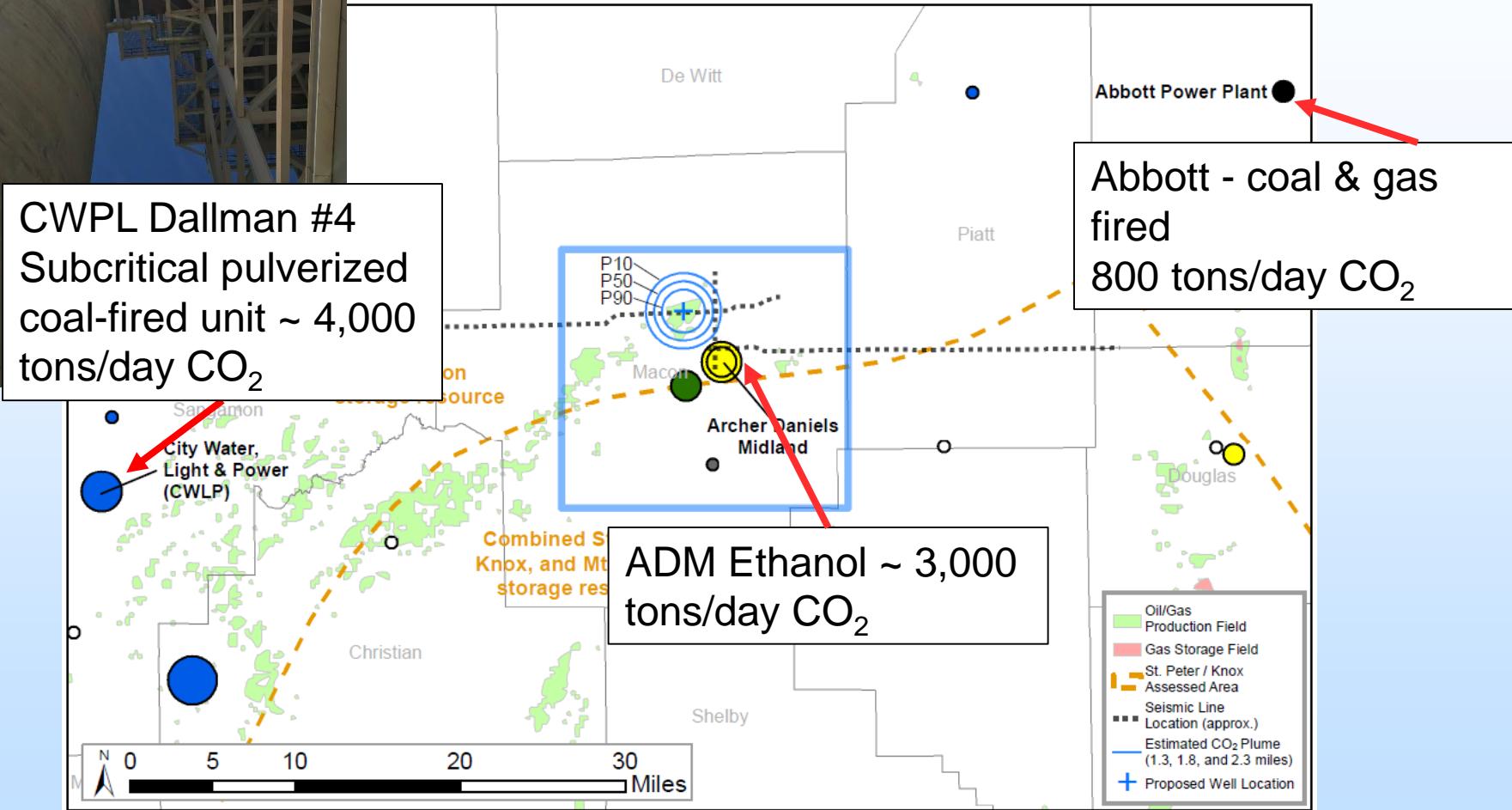
Core Studies & Measurements



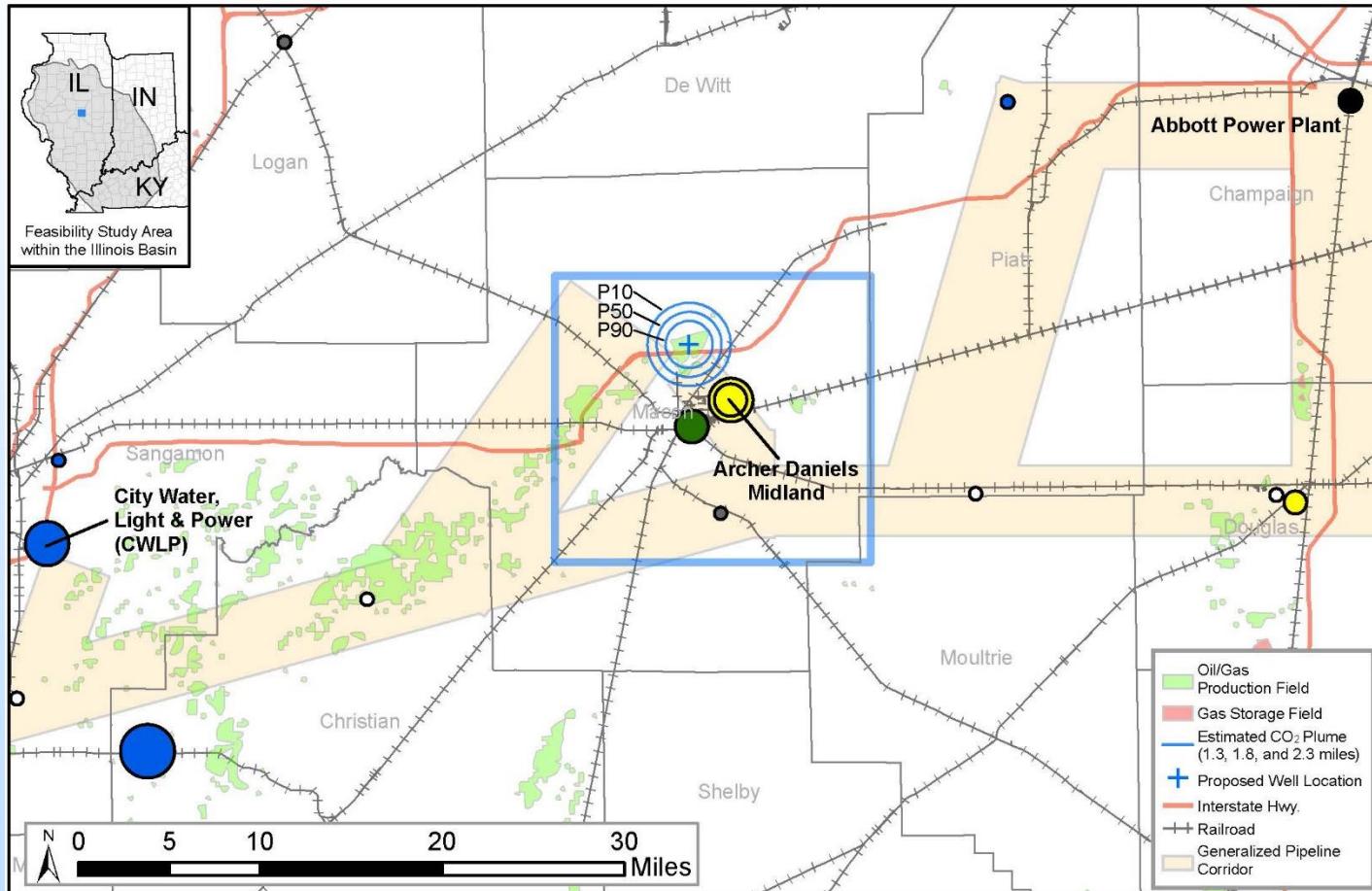
Mt Auburn Trend – EOR potential



CO₂ Sources



Potential CO₂ Transportation Corridors



Accomplishments to Date

- Conducted Project Kick-off
- Updated mapping and GIS with additional Forsyth Field data
- Constructed structure and isopach maps of Forsyth area for drilling plan
- Initiated model development of target site
- Site visit at Springfield CWPL CO₂ source
- Started data exchange for NRAP

Lessons Learned

- Challenge in understanding lateral continuity of reservoir quality in Lower Mt Simon
- Challenge in addressing economic questions from potential CO₂ sources

Synergy Opportunities

- Business case development
- Addressing permitting issues
- Addressing regulatory and policy issues
- Aspects of Stakeholder Engagement process
- Knowledge Sharing – NRAP screening
- Site development issues

Project Summary

- Drilling location identified for stratigraphic test well to evaluate feasibility of commercial-scale carbon storage in Macon County
- Geological mapping at drilling site near complete for well-drilling plan
- Next Steps
 - permitting
 - detailed well design
 - Drilling plan
 - Contracts and agreements for site access