DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof. Reference herein to any social initiative (including but not limited to Diversity, Equity, and Inclusion (DEI); Community Benefits Plans (CBP); Justice 40; etc.) is made by the Author independent of any current requirement by the United States Government and does not constitute or imply endorsement, recommendation, or support by the United States Government or any agency thereof.

Illinois Storage Corridor
CarbonSAFE Phase III

Pre-drilling Site Assessment: Prairie State Generating Company

Technical Report

Authors:
Curt Blakley, Zohreh Askari, Yaghoob Lasemi, Charles Monson, Jennifer Obrad, and Roland Okwen

Prairie Research Institute
University of Illinois
Urbana-Champaign, IL 61820

Report Issued: November 5, 2025
Report Number: DOE-UIUC-31892-2
U.S. DOE Cooperative Agreement Number: DE-FE0031892

Principal Investigator: Dr. Roland Okwen
Business Contact: Illinois State Geological Survey
615 E Peabody Drive
Champaign, IL 61820-7406

ILLINOIS
Illinois State Geological Survey
PRAIRIE RESEARCH INSTITUTE

DISCLAIMER

EXECUTIVE SUMMARY

The Illinois Storage Corridor project will drill a stratigraphic test well as part of the Illinois Storage Corridor CarbonSAFE Phase 3 project near the Prairie State Generating Company coal-fired power plant near Marissa, Illinois. The pre-drilling site evaluation has considered the primary target reservoirs, the Potosi Dolomite and St. Peter Sandstone, and primary seal, the Maquoketa Group. Data to be collected from the well include core, fluid samples, in situ well tests, geophysical logs intended to provide information on lithologic, geomechanical, and geophysical characteristics to determine the feasibility for the geologic sequestration of 50 million metric tons or more of injected carbon dioxide.

The planned drilling site has been evaluated using available subsurface geologic data and analyses from the Illinois Basin. These data provide lithologic and structural information, shallow groundwater resource distribution, location of known nearby wellbores, and regional drilling characteristics. The data were used to generate geologic structure and isopach maps for the target reservoir and caprock strata and for prognosing the tops of major lithologic units to aid drilling and coring procedures. The regional analyses indicate that no known structural features are expected to negatively impact the target storage reservoir or caprock. No protected and sensitive areas, groundwater resources, or existing resource development are expected to be impacted by the proposed well drilling activities.

The well is planned to be drilled to a total depth of approximately 5,600 feet (1,707 m) and terminate in the Precambrian. Cores (up to 5 intervals) will be collected from the Maquoketa Group, confining units above the St. Peter Sandstone, St. Peter Sandstone, confining units of the Potosi Dolomite and the Potosi Dolomite. Water samples will be attempted to be collected from the St. Peter Sandstone and Potosi Dolomite. Potential impact on drilling progress is a lost circulation zone in the Potosi Dolomite, which has been demonstrated to have intermittent cavernous porosity from karstification elsewhere in the Illinois Basin.

This document also presents a preliminary coring and sampling program, proposed logging suite, and well testing program, all of which will be reviewed during drilling.

Table of Contents

List of Figures

List of Tables

INTRODUCTION and SITE LOCATION

The Illinois Storage Corridor project intends to drill a stratigraphic test well near the Prairie State Generating Company (PSGC) coal-fired power plant near Marissa, Illinois, to determine the feasibility for the geologic sequestration of 50 million metric tons or more of injected carbon dioxide (CO_2). This pre-drilling report characterizes the regional and local context for the proposed LIVELY GROVE #1 stratigraphic test well and describes project and site location, geologic setting, storage complex assessment, well siting, any potential need for protection of resources, drilling concerns, preliminary formation top prognosis, and planned logging and sampling programs.

The proposed drill site is located approximately 5 miles north of the Prairie State Generating Company facility. The PSGC facility is a modern coal-fired electricity generation plant that consists of two approximately 800 MW coal- fired, supercritical steam electric generating units (1,600 MW total) operational since 2012. The Prairie State Generating Company and the adjacent Lively Grove coal mine form the Prairie State Energy Campus (PSEC) located in Washington County, Illinois, southeast of Clinton (Figure 1). The proposed well site area is located within an existing lot northeast of the interaction of Stone Church Road and Illinois Route 12 to northeast of the PSGC Training Center (formerly Johannisburg Grade School) that currently being developed for future coal mine expansion. The current location of the proposed well location has not been surveyed, and is in T2S R5W, approximately 956 feet (291 m) from the South line, and 1,150 feet (350 m) from the West line, SW quarter, Section 15. Longitude and latitude coordinates in the NAD83 datum are: 38.353028, -89.644836. A stratigraphic test well drilling permit will be submitted to the Illinois Department of Natural Resources (I-DNR).

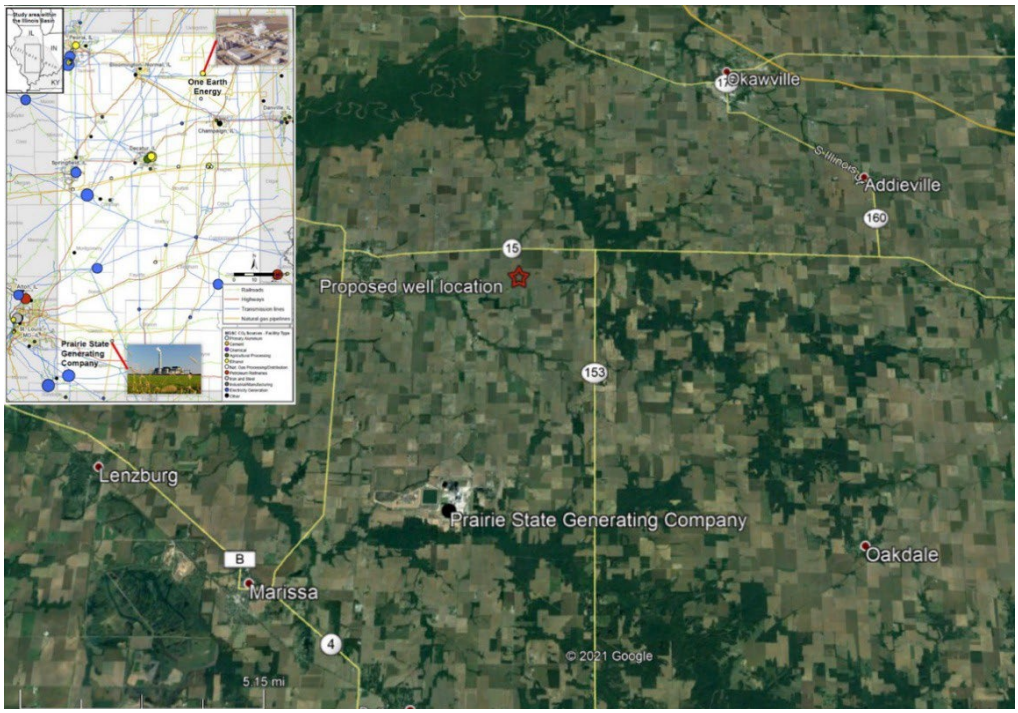

Figure 1. Site of proposed LIVELY GROVE #1 stratigraphic test well with inset map showing the Illinois Storage Corridor Project areas.

GEOLOGIC SETTING

Structural Features

The St. Peter Sandstone and the Potosi Dolomite are the target reservoirs for investigation, and the Maquoketa Shale is the primary target caprock although there are additional confining beds in the sedimentary succession. Data collected from the proposed stratigraphic test well will be used to investigate and characterize the suitability of the target reservoirs for storage and the caprock and confining beds for containment.

There are few known structural features in the region of interest with the nearest identified structural feature to the drill location is the Elkton Anticline about twenty miles east (Figure 2). Interpretation of existing regional seismic data indicates there is no structural influence on the integrity of the storage complex and that the beds appear to be laterally extensive. Acquisition of new 2D and 3D seismic data are planned to be conducted to support the regional interpretation and to better characterize regional structural features.

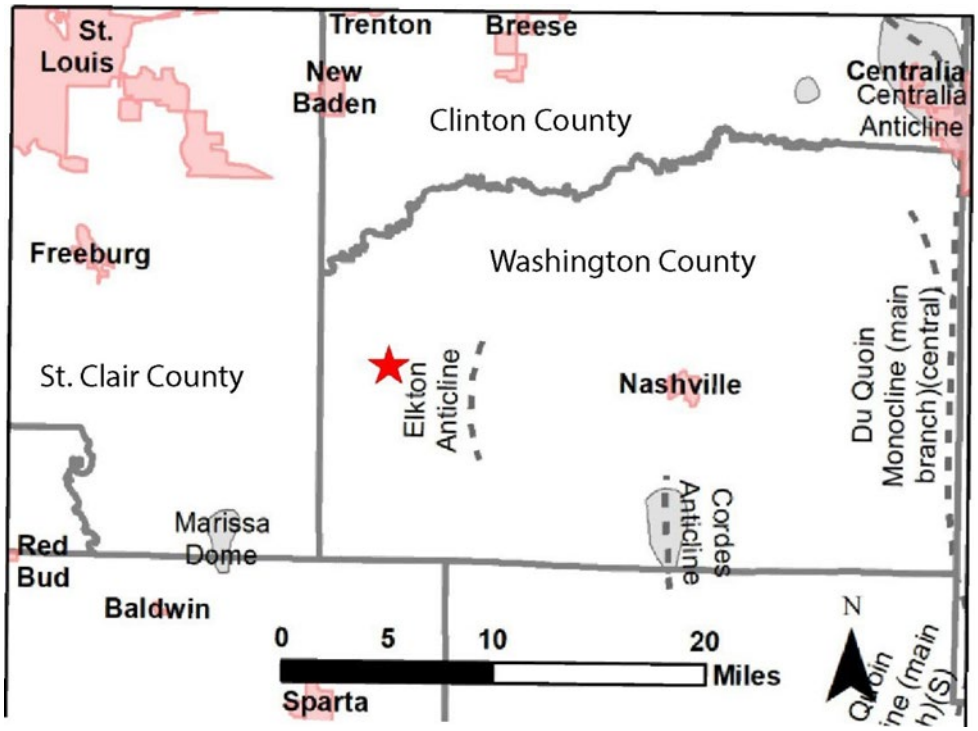

Figure 2. Regional subsurface structures in the area around proposed well site (modified from Nelson 1995).

STORAGE COMPLEX ASSESSMENT

The St. Peter-Knox Storage Complex (Figure 3) consists of potential target reservoirs (Potosi Dolomite and St. Peter Sandstone) overlain by primary and secondary seal (Maquoketa Shale and New Albany Shale). This section describes key characteristics of those potential reservoirs and seals.

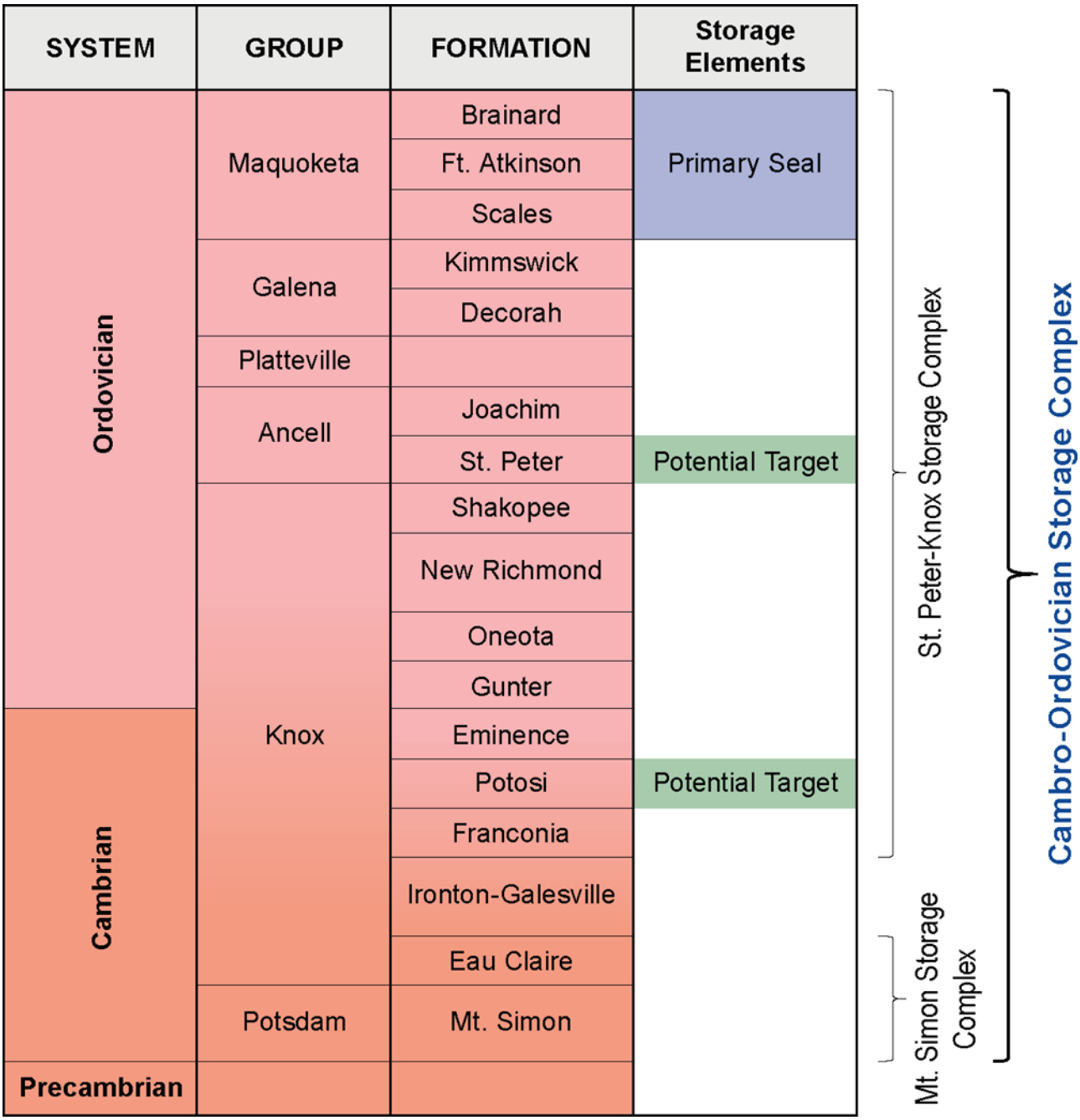

Figure 3. Stratigraphic classification showing the primary reservoirs and seals in the St. Peter-Knox Storage Complex in the Illinois Basin.

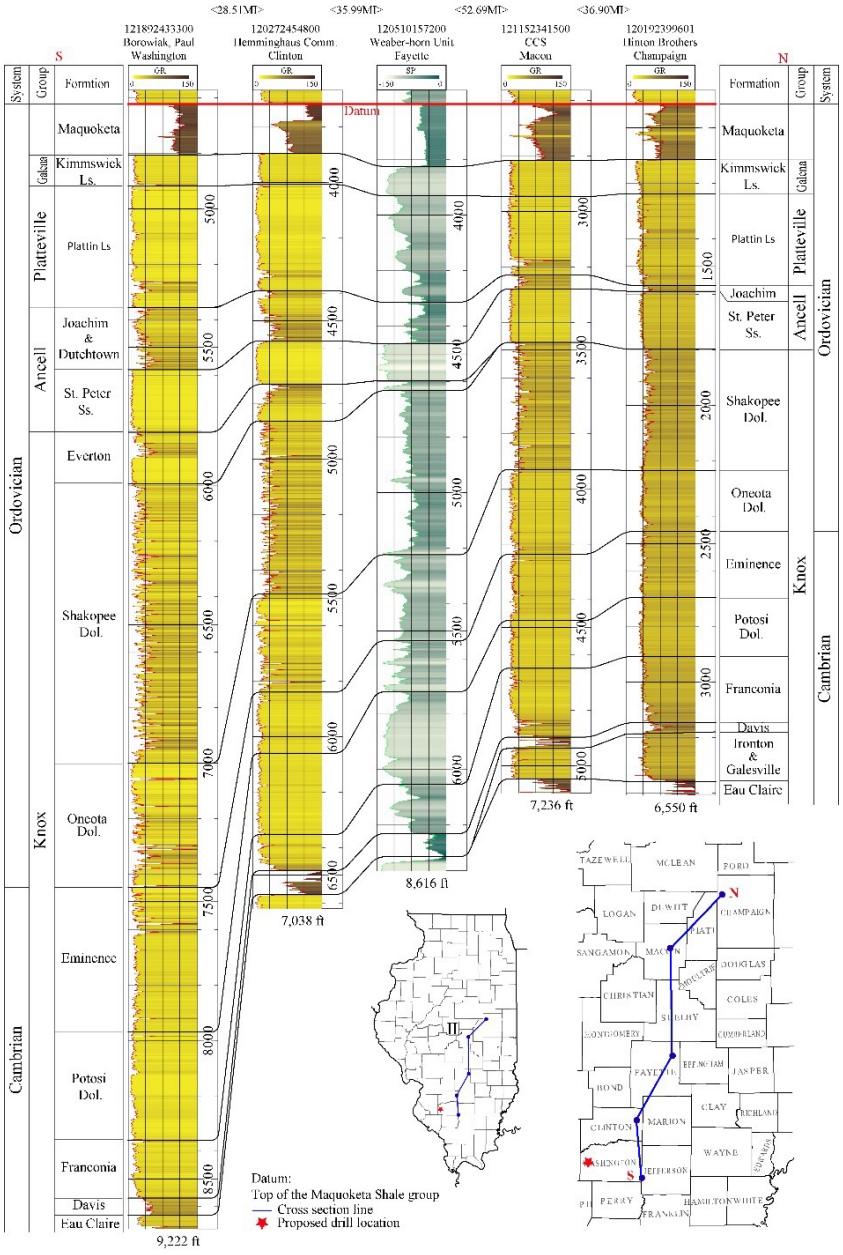

Figure 4. North-south regional stratigraphic cross section through the Cambro-Ordovician strata in central to southwest Illinois.

The north-south stratigraphic cross section (Figure 4) displays variability of the potential reservoir and overlying sealing strata in the Cambro-Ordovician Storage Complex from central Illinois (Champaign County) into southwest Illinois (Washington County) near the PSGC facility.

Reservoirs

Knox Group / Potosi Dolomite

The DOE sponsored (DE-FE0002068) study "An Evaluation of the Carbon Sequestration Potential of the Cambro-Ordovician Strata of the Illinois and Michigan Basins" produced a series of reports assessing the storage potential of the Knox Group in the Illinois and Michigan Basin.

The Knox succession comprises the Cambrian, Lower Ordovician, and lowermost Middle Ordovician rocks of the Illinois Basin which overly the Mt. Simon Sandstone (Buschbach, 1975). In southern Illinois, it is classified as the Cambro-Ordovician Knox Group. Moreover, in the northern half of Illinois, the Knox succession comprises the Cambrian Knox Group and the Lower Ordovician Prairie du Chien Group, which consists of Gunter Sandstone, Oneota Dolomite, New Richmond Sandstone, and Shakopee Dolomite (Kolata, 2005). In Washington County, the Knox is expected to be between 1,600 and 2,700 feet thick (488 and 823 m, Figure 5). The Knox Group is laterally extensive and contains beds of porous and permeable dolomites and sandstones generally confined in tight dolomite intervals. Because of high porosity and permeability intervals throughout the Knox, most notably in the Potosi Dolomite, this group may be a potential target reservoir.

In 2018 the WWDW #1 well was drilled at the Prairie State Generating Company facility to a total depth of 3,840 feet (1,170 m). The measured top of the Knox Group is 3,738 feet (1,139 m); 102 feet (31 m) of formation generally described as light tan and gray dolomite, arenaceous, microcrystalline, no visible porosity and medium tan sandstone, fine grained, dolomitic cemented with no visible porosity.

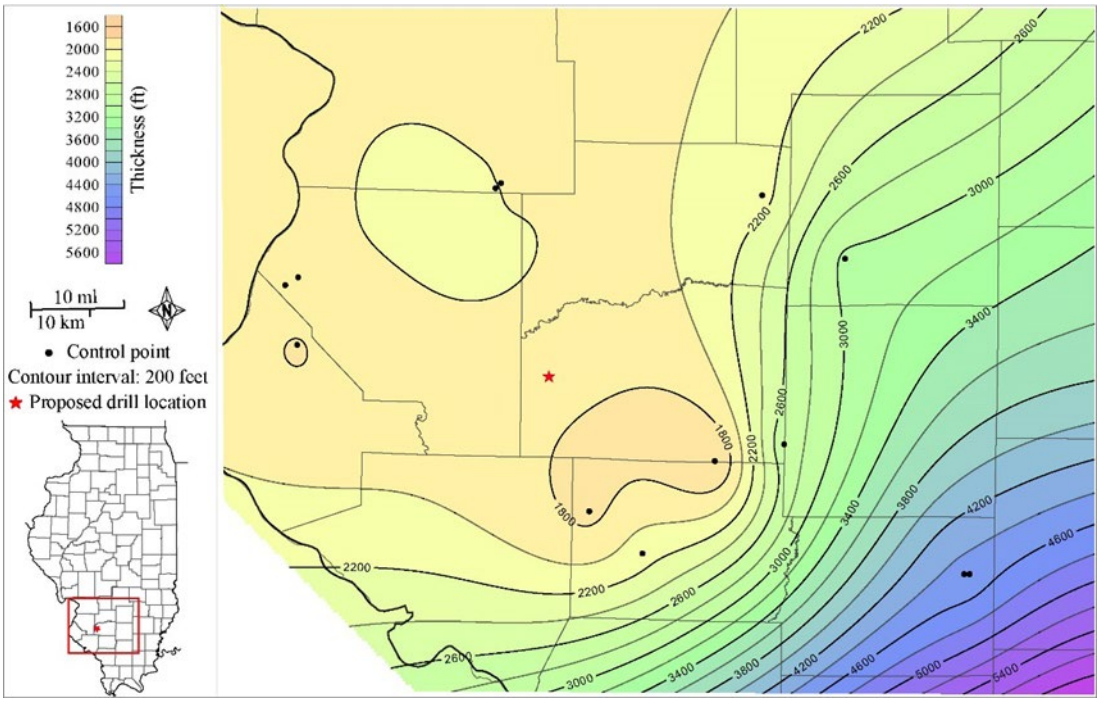

Figure 5. Thickness map (feet) of the Cambro-Ordovician Knox succession (modified from Lasemi and Askari, 2014).

The Potosi Dolomite is an extensive formation that underlies most of Illinois and Indiana, except in parts of northern Illinois. Its thickness ranges from 100 feet (30 m) in northern Illinois to more than 900 feet (274 m) in extreme southeastern Illinois (Figure 6). At the proposed well location, the Potosi is estimated to be 286 feet (87 m) thick and occur at a depth of 4,829 feet (1,472 m). A detailed regional geological characterization of the Potosi Dolomite is being prepared (Wabash CarbonSAFE DOE-FE0031626 Potosi Topical Report, in preparation) and the following summary is extracted from this topical report.

Generally, the Potosi is a fine to coarsely crystalline, commonly dense, dolomite, but contains characteristic drusy quartz and intercalations of vugular, brecciated, fractured and/or cavernous intervals. The pore spaces are generally lined with diagenetic quartz, calcite, or dolomite (Freiburg and Leetaru, 2012; Leetaru et al., 2014; Lasemi and Askari, 2020).

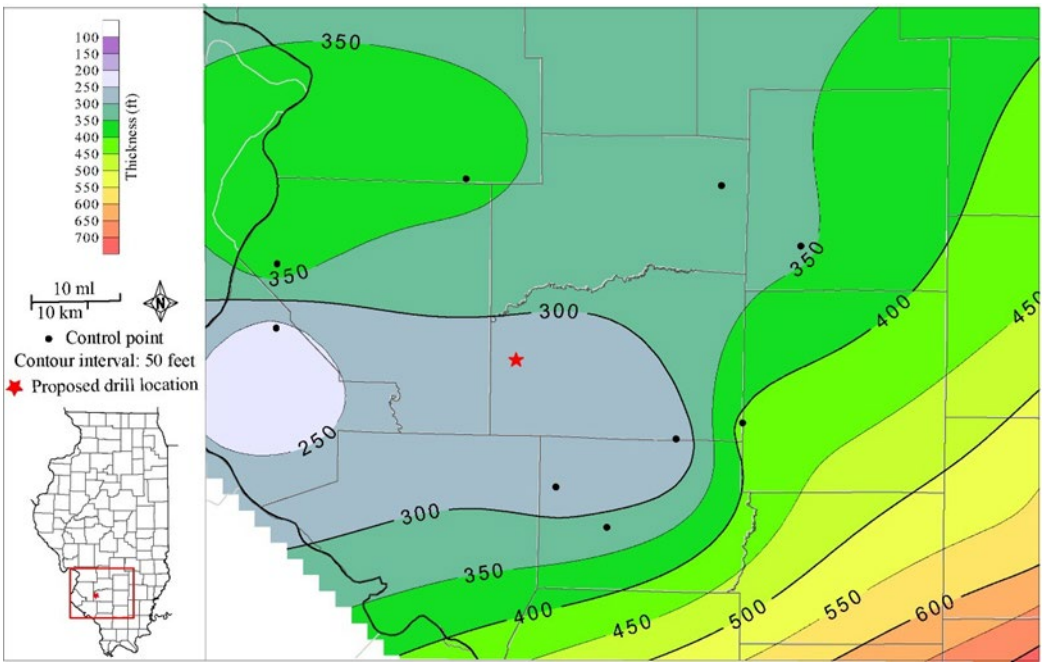

Figure 6. Isopach map (feet) of the Potosi Dolomite.

Drusy quarts and vuggy porosity is a distinctive feature of the Potosi throughout the Illinois Basin (Buschbach, 1975) suggesting a widespread diagenetic event. Throughout the Illinois Basin, lost circulation intervals are encountered when drilling the Potosi Dolomite (Bell et al., 1964). In the wells at the Illinois Basin-Decatur Project (IBDP) in Decatur, Illinois, vuggy intervals up to 7 feet (2 m) thick were recognized (Freiburg and Leetaru, 2012; Leetaru et al., 2014); well record data indicate that several hundred barrels of drilling fluid was lost during drilling in these zones. The presence of lost circulation zones in the Potosi suggests well connected voids giving rise to excellent reservoir permeability; additional details on the lost circulation zones are discussed later in this report. The Knox carbonate reservoirs are enclosed in thick dense dolomite intervals that could serve as an effective confining interval (Lasemi and Askari, 2012; Greb et al., 2012).

St. Peter Sandstone

The Middle Ordovician age St. Peter Sandstone is a widespread, lithologically distinct, typically pure quartz arenite lithostratigraphic unit found throughout the upper Midwest, USA (Barnes and Ellett 2014). In the northern part of the Illinois Basin, the St. Peter Sandstone is considered an underground source of drinking water (USDW) and important regional aquifer however, southward, and deeper into the basin the total dissolved solids (TDS) of the St.

Peter generally increase above the potable concentration (10,000 mg/L) and in the vicinity of the PSGC site, the TDS is around 53,000 mg/L (Figure 7), thus suitable for geological storage of CO_2.

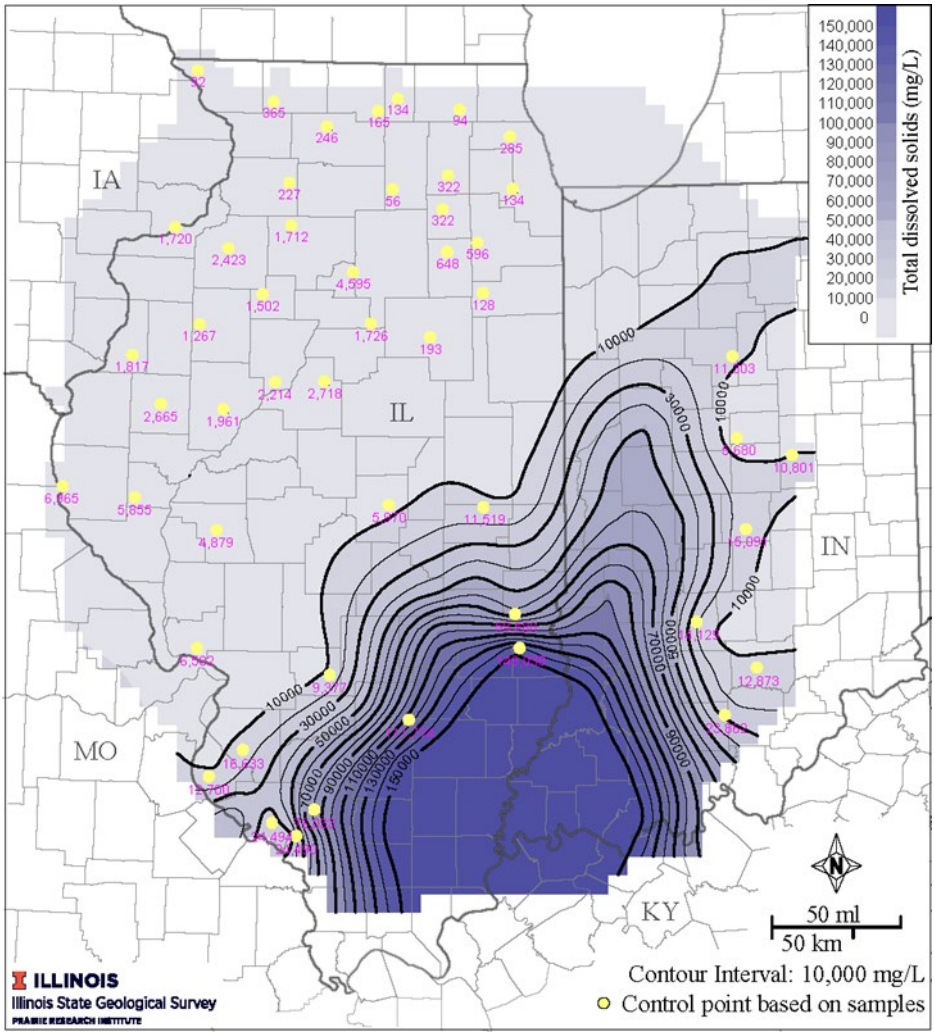

Figure 7. Contour map of the total dissolved solids content in the groundwater from St. Peter Sandstone. Preliminary map prepared by the Illinois State Geological Survey 03/01/2021.

The St. Peter Sandstone is used in Illinois for natural gas storage and in these cases has excellent reservoir quality with porosity values of 5% to over 25% (average 14-16 %) and permeability from 10 mD to over 1,000 mD (average 150 - 400 mD). The carbon sequestration potential of the St. Peter Sandstone was evaluated in several studies of the DE-FE0002068 project.

The St. Peter is generally fine to medium, well-sorted, well-rounded, frosted grains of quartz sand that, except in a few local areas, are exceptionally pure, largely free from clay, carbonates, and heavy minerals. It exhibits a homogeneous lithology (super-mature quartz arenite, often in 'sheet-like' deposits) and is generally considered a transgressive marine deposit, although aeolian components are also present. The distribution of the St. Peter Sandstone around the proposed drill site shown in the isopach and structural map (Figure 8, Figure 9).

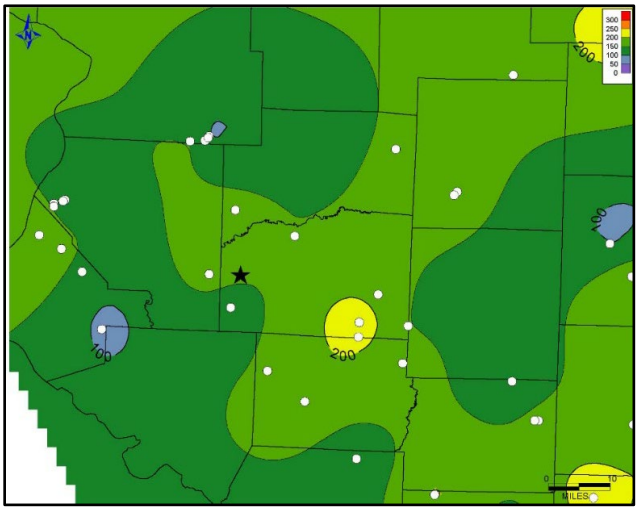

Figure 9. St. Peter Sandstone thickness (feet) in the vicinity of the proposed drill site which is identified with a black star.

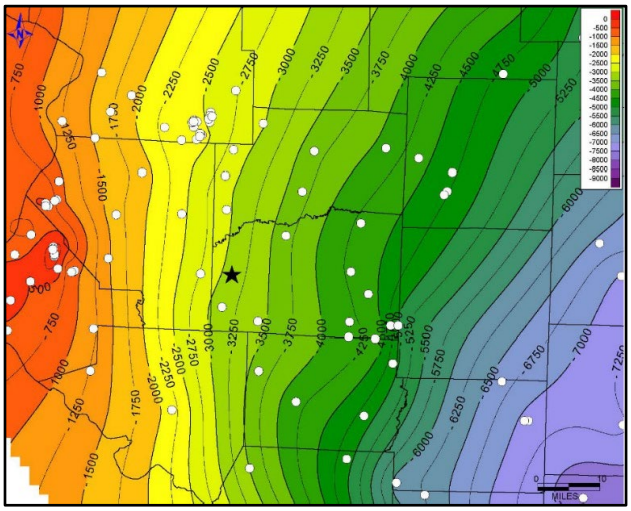

Figure 8. Structural elevation of the St. Peter Sandstone in the vicinity of the proposed drill site which is identified

In WWDW #1 the St. Peter Sandstone occurred at measured depth of 3,580 feet (1,091 m) with a thickness of about 158 feet (48 m). Approximately 30 feet (9 m) of core was recovered, interval 3,600 to 3,630 feet (1,097 to 1,106 m), in description it is white to frosted, moderately rounded, well sorted, unconsolidated to poorly cemented, excellent intergranular porosity. Core analyses indicate an average porosity of 11.9% and maximum of 15%, and an average permeability of 126 mD and maximum of 324 mD. Log analyses show an average porosity of 10.6% and maximum of approximately 19.1%. A basin-wide petrographic study (Hoholick et al. 1984) indicated that primary porosity is generally reduced with depth in the St. Peter through compaction and diagenetic cementation; log data indicates a slight decrease in reservoir quality with depth, which is consistent with regional observation.

Caprock Seals

Maquoketa Shale

The Ordovician Maquoketa Shale Group, which disconformably overlies the Galena group, is the primary seal to the St. Peter Storage Complex. The Maquoketa Shale is widespread across the Illinois Basin and is a laterally continuous impermeable confining layer composed of a heterogeneous sequence of carbonates, silt, and clay-rich rock units. Topical report DOE-FE0029445-11 (Medina et al. 2019) evaluates the regional seal capacity of the Maquoketa, using a lithofacies model to define three main units (upper, middle, and lower) consisting of five distinct lithologies.

The upper unit of the Maquoketa is dominated by dolomitic, calcareous, and silty shale, the middle unit is dominated by limestone and argillaceous limestone, and the lower unit is dominated by dolomitic and calcareous shale and occasionally contains minor amounts of argillaceous limestone and silty shale.

The Maquoketa has been found to be a widespread and an effective cap rock for CO_2 storage as it has advantageous petrophysical properties (low effective porosity and low permeability), favorable geomechanical properties, a general absence of observable fractures (Zaluski, 2014). The isopach map shown in Figure 10 shows the regional distribution and thickness of the Maquoketa Shale.

The Maquoketa Shale in the WWDW #1 well occurs at a depth of approximately 2,790 to 2,940 feet (850 to 896 m) for a thickness of 150 feet (46 m). Approximately 30 feet (9 m) of core was recovered, interval 2,759 to 2,789 feet (840 to 850 m), the lower interval of the Maquoketa was described as light gray, sparry limestone with dark gray nodular chert, coral macro fossils with irregularly bedded dark gray silicified algal mat spacing 0.25 to 1.0 inch.

Average porosity and permeability, determined from mercury injection, of core samples are 0.9% and 1.8 x 10-4 mD: thus, indicating Maquoketa Shale's effectiveness as to vertical movement of fluids.

New Albany Shale

The Upper Devonian-lowermost Mississippian New Albany Shale is impermeable and laterally continuous formation, which acts as a potential secondary seal in St. Peter-Knox Storage Complex. The top of the New Albany Shale is anticipated to be 2,194 feet (669 m) deep (measured depth, MD) with an estimated thickness of to be roughly 15 feet (4.6 m). The New Albany Shale occurs at the drill hole confirmed depth of 2,200 feet (671 m) for a thickness of approximately 20 feet (6.1 m) in WWDW #1 well.

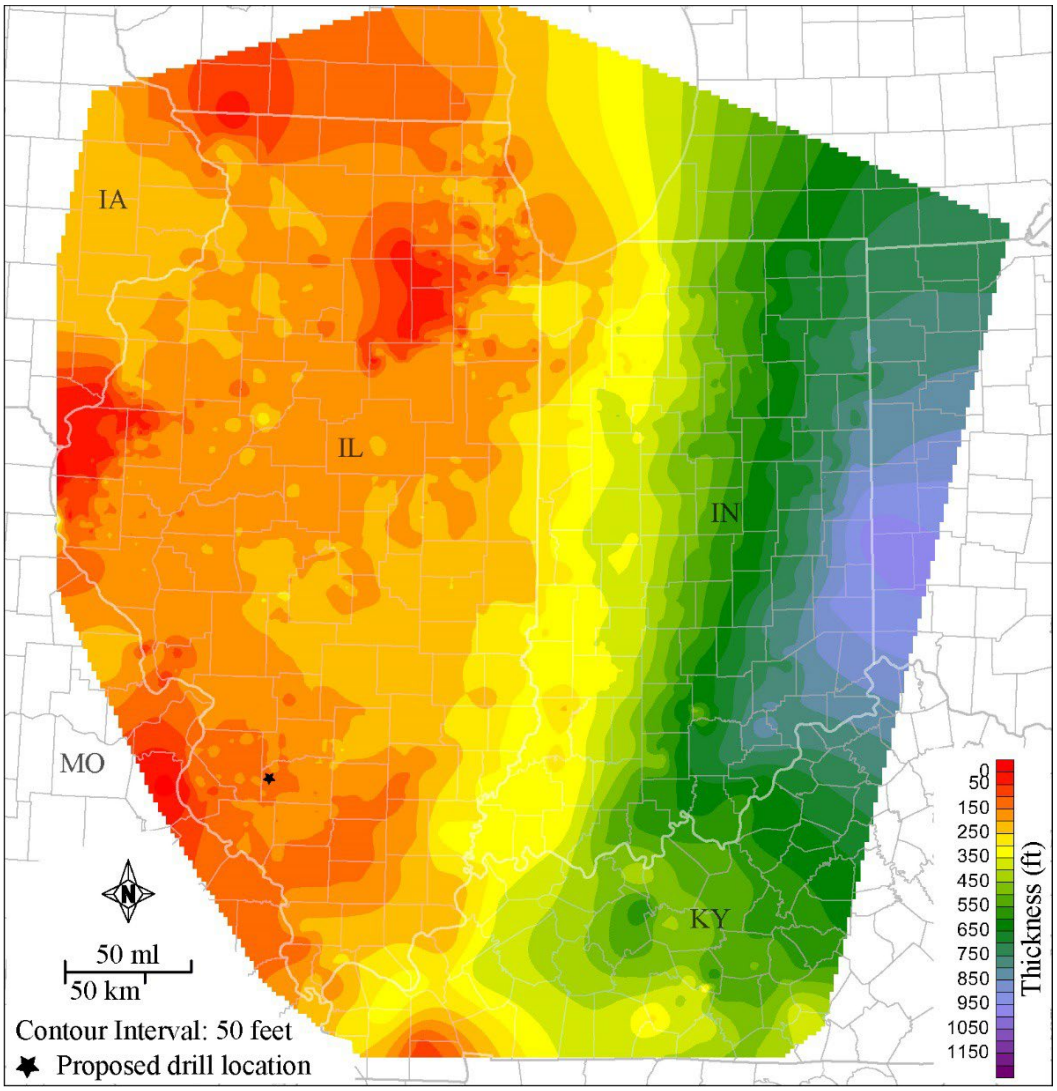

Figure 10. Regional thickness (feet) of Maquoketa Group.

WELL SITING AND PROTECTION OF RESOURCES

Protected and Sensitive Areas

The proposed drill site is in cultivated field that is undergoing modification for expansion of the underground mining operations. Electrical service and public water supply have been established at the site, parking and equipment storage area and access roads are in development. The site has shown no conflicts for State or Federal lands, threatened and endangered species, historical places, wetlands and floodplains, or high probability archaeological areas.

Groundwater

The proposed well site is approximately 4 miles east of the mapped extent of the Kaskaskia River Alluvial Aquifer in eastern St. Clair County. The site is not located in a drinking water protection area or above a sole source aquifer. Water supply wells within 5 miles of the proposed drill site produce from the shallow sand and gravel deposits and few shallow bedrock wells generally measuring up to 100 feet (30 m) deep.

Coal Resources

The Lively Grove Mine produces up to 6.5 million tons of coal annually providing feedstock for the Prairie State facility. The underground mine has been extracting coal from the Pennsylvanian Herrin Coal seam since 2009. Within eight miles of the proposed well (Figure 11), there are also nine abandoned underground coal mines, all of which produced Herrin Coal (Table 1). Coal records identify an unlocated mine, the Fauke & Gussman, producing Herrin Coal at a depth of 200 feet (61 m), registered in St. Libory in 1909-1910.

Table 1. Coal mines within eight miles of the proposed well.

Index	Company	Mine	Years of operation	Seam	Depth (feet)	Thickness (feet)
1043	Prairie State Generating LLC	Lively Grove*	2009-Current	Herrin	225-280	6.5
990	Peabody Coal Co.	Marissa	1979-1999	Herrin	150-200	6.6-7.3
856	Midland Electric Coal Corp.	Green Diamond	1948-1966	Herrin	77-100	7
637	Darmstadt Coal Co.	Darnstadt	1910-1952	Herrin	216	6.5
4337	John Beheremann	St. Libory	1883-1886	Herrin	183	6.0-7.5
4338	St. Libory Coal Co.	St. Libory	1910-1912	Herrin	200	6
699	Venedy Coal Co.	Venedy	1921-1969	Herrin	256	6.5-8
3913	Okaville Coal Co.	Okaville	1884-1906	Herrin	324	6
3914	George Andrew	Andrew	1937-1942	Herrin	315	8.3
3152	Coal worked along creek		pre-1930	unknown		

* Active mine.

The coal seams mined in the region are Pennsylvanian age occurring higher in the stratigraphic sequence than potential carbon storage reservoirs, Potosi Dolomite and St. Peter Sandstone. Additional coal mines exist to the southwest (outside of the reviewed area summarized in Table 1) far from the proposed drill site and should not be impactful to potential drilling.

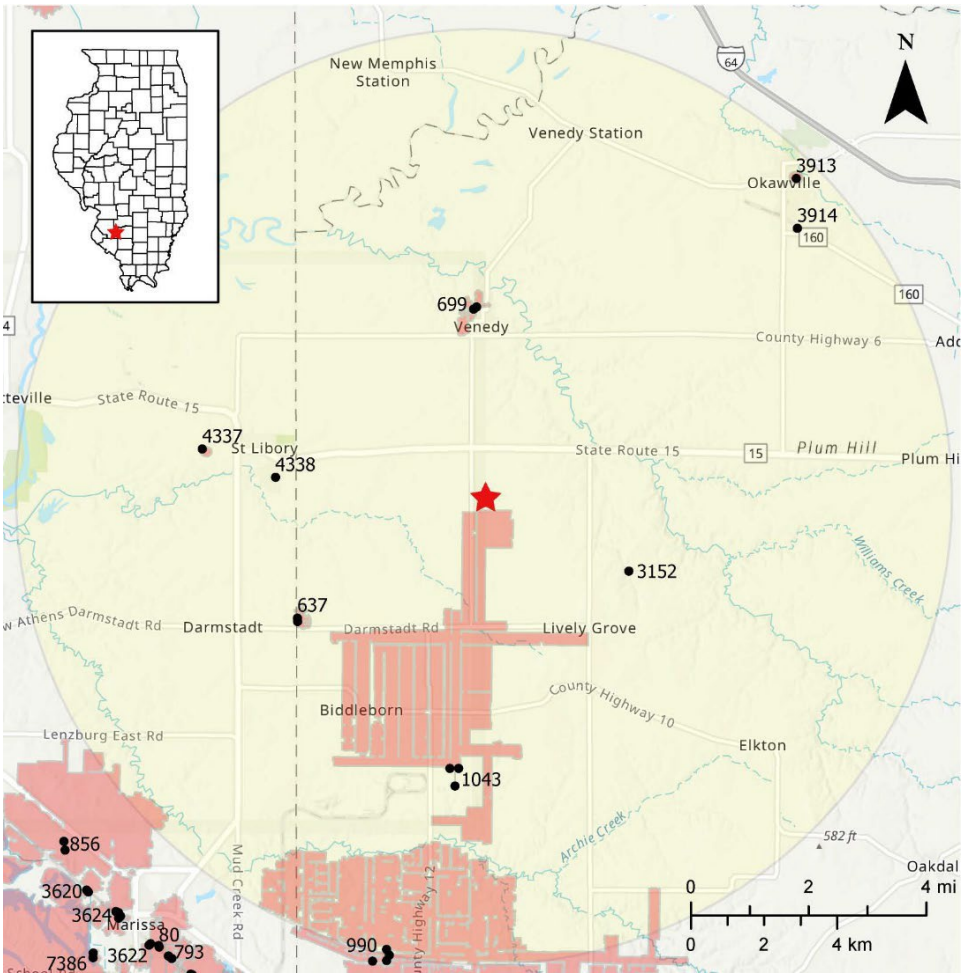

Figure 11. Map showing coal mines near the Prairie State Energy Campus identified with index numbers. Proposed drill site is identified with a red star.

Petroleum Development

Within a 20-mile area surrounding the proposed test hole there are 209 boring records showing penetrations into or through the Maquoketa Shale Group (Appendix). Well records indicate exploratory holes concentrated into the underlying Trenton/Galena Limestone, roughly 200 wells have documented with status of petroleum well. Petroleum well status records indicate 32 of these wells have produced oil, 13 wells identifying production from the Trenton, and 168 wells are dry and abandoned.

Several fields in the area have production from Siluro-Devonian rocks and the Mississippian Cypress Sandstone. A cluster of 12 wells drilled in the early 2000s to maximum depth of 2,480 feet (756 m) are currently producing from the Silurian and Devonian approximately 2 miles east

of the drill site. One of these borings reached a depth of 3,250 feet (991 m) to test the Trenton but was plugged and abandoned.

Natural Gas Storage

Tilden Gas Storage Field, discovered in 1957, is approximately 7.5 miles south of the proposed well site across the convergence of St. Clair, Randolph, and Washington Counties. The Mississippian Cypress Sandstone is the storage reservoir occurring at a depth of approximately 785 feet (239 m) below ground surface at thickness of approximately 35 feet (11 m). Freeburg Gas Storage Field, discovered in 1954, is approximately 12.5 miles to the west of the proposed well site in St Clair County. The Mississippian Cypress Sandstone is the storage reservoir occurring at a depth of approximately 310 feet (95 m) below ground surface at thickness of approximately 50 feet (15 m). The St. Peter Sandstone is used for natural gas storage approximately 22 miles northwest of the proposed drill site at St. Jacobs Field in Madison County, IL. In the St. Jacob Field, the St. Peter Sandstone is occurring at depth of approximately 2,850 feet (869 m) at a thickness of 100 feet (30 m).

Deep Well Penetrations

The nearest deep well that penetrates through the St. Peter-Knox Storage Complex and into the basement is the Shaglee Unit #1 (121452888200) well in Perry County approximately 16 miles from the proposed well. According to the ISGS records, 11 locations have been identified within 20 miles of the wellsite that penetrate or through the St. Peter Sandstone (Table 2).

Table 2. Well records within 20 miles from the PSGC drill site that penetrate the St. Peter Sandstone. TA: Temporarily Abandoned; DA: Dry and Abandoned.

API	Well Name	Latitude (DD)	Longitude (DD)	Distance (miles)	Total Depth (feet)	County	Formation	Status
1216325774	Dieker	38.351673	-89.737359	5.01	3,561	St. Clair	Knox	TA
1218924886	PSGC - WWDW	38.275490	-89.670677	5.53	3,810	Washington	Knox	ACTIVE
1218924809	Bram Vu Farms Inc	38.446740	-89.488080	10.67	5,614	Washington	Knox	OIL - PLUGGED
1216300041	Postel	38.489770	-89.798814	12.59	3,107	St. Clair	St. Peter	DA
1202725590	Gildig	38.545066	-89.683374	13.42	3,435	Clinton	St. Peter	DAP
1202727107	Davis	38.581736	-89.673699	15.87	3,428	Clinton	St. Peter	DA
1214528882	Shaglee Unit	38.130749	-89.556569	16.08	6,062	Perry	Precambrian	DA
1202702476	Schlarmann, Bernard	38.550446	-89.443407	17.45	4,213	Clinton	St. Peter	OIL – plugged to Silurian (2,408-2,475)
1218923683	Sensel	38.367175	-89.292520	19.1	5,038	Washington	St. Peter	DAP
1202727084	Kalmer	38.642127	-89.651754	19.96	3,600	Clinton	St. Peter	DAP
1216301756	Vale, Maurice E.	38.380310	-90.012243	19.98	1,959	St. Clair	St. Peter	TA

DRILLING PROGNOSIS

The proposed well will be drilled from surface to a depth of ~5,600 feet (1,707 m). A generalized stratigraphic column is shown in Figure 12, while the measured depths and subsea elevations of prognosed formation tops expected to be encountered in the LIVELY GROVE #1 well are listed in Table 3, as based on regional correlation and/or nearest well data. Figure 13 illustrates a local stratigraphic cross section from available deep well data, showing the deep stratigraphic trends below the St. Peter Sandstone.

Table 3. Formation tops for proposed drilling site, prognosed from structural correlation and nearby well data. Measured depth (MD) and subsea elevation (SS) are in feet. (See also the Lost Circulation Zone section of the report, below).

Formation	Estimated Depth, (GL), feet	Estimated Depth, SS, feet
Ground Level	0	464
New Albany	2,194	-1,730
Lingle/Base New Albany	2,209	-1,745
Maquoketa Shale	2,819	-2,355
Galena	2,934	-2,470
Platteville	3,039	-2,575
St. Peter	3,574	-3,110
Knox	3,729	-3,265
Potosi	4,829	-4,365
Franconia	5,115	-4,651
Eau Claire Formation	5,374	-4,910
Mt. Simon	Very thin or absent	Very thin or absent
Pre-Cambrian	5,609	-5,145

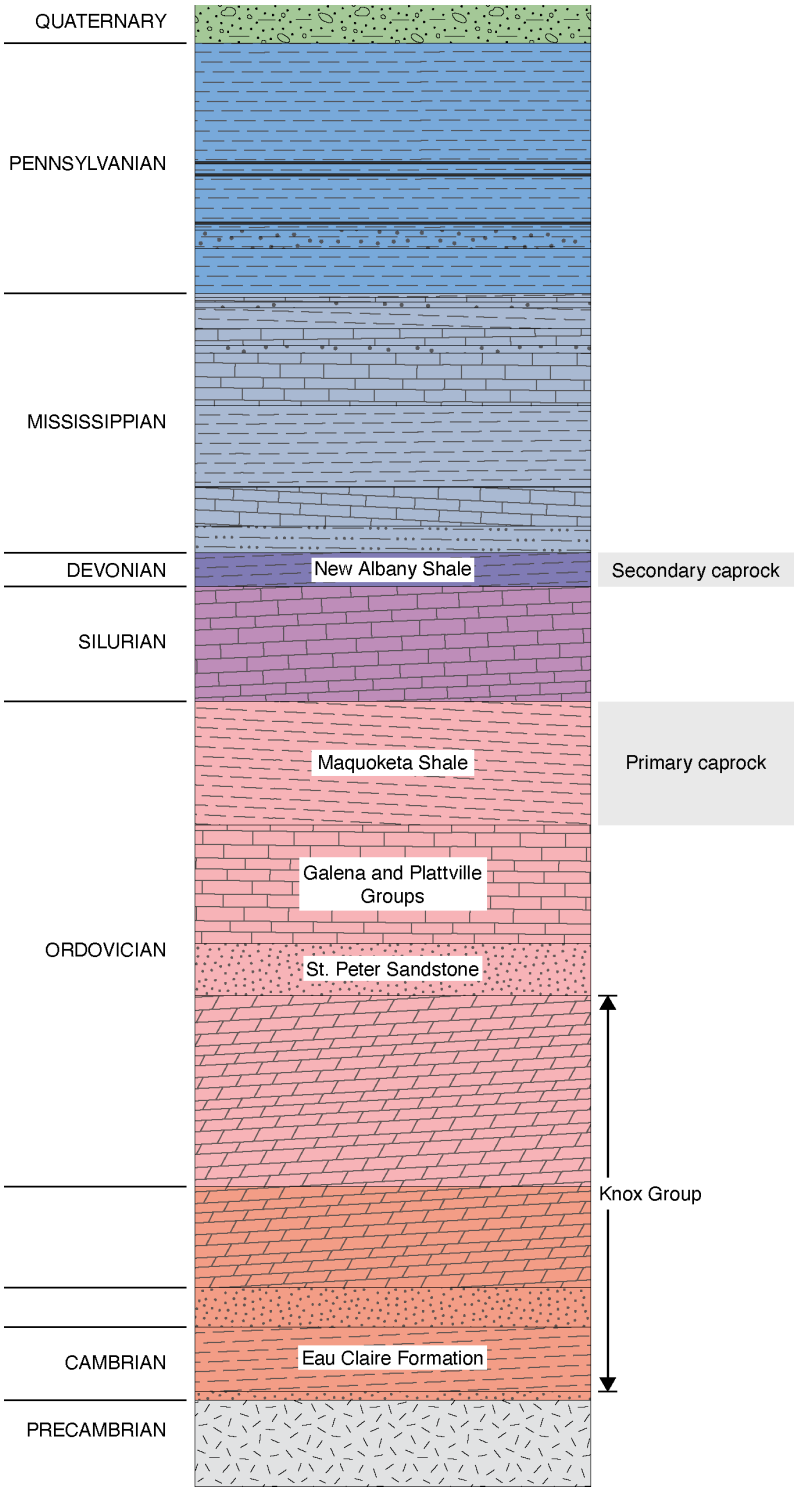

Figure 12. Generalized regional stratigraphic column.

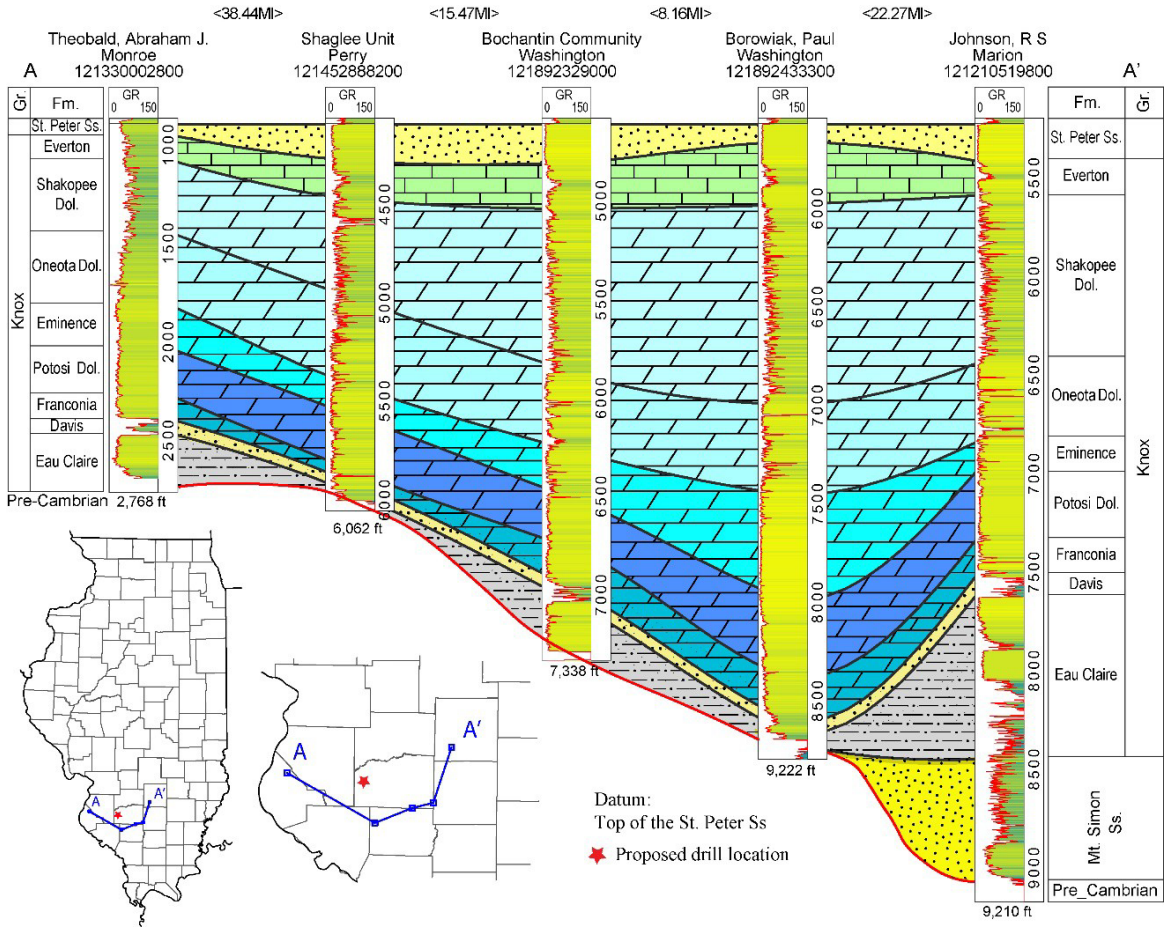

Figure 13. Stratigraphic cross section using deep wells near the proposed well site.

Primary Target Reservoir and Caprock

The characterization targets for this project are the St. Peter Sandstone and the Potosi Dolomite (Figure 12), estimated to be from approximately 3,574 to 3,729 feet (1,089 to 1,137 m) and 4,829 to 5,115 feet (1,472 to 1,559 m) deep (Table 3, Figure 13), respectively. We intend to drill completely through the St. Peter and Potosi to fully evaluate the reservoir quality of both formations. The Maquoketa Group overlies the St. Peter and is the primary sealing unit with an estimated depth of approximately 2,819 to 2,934 feet (859 to 894 m, Table 3) at thickness of 115 feet (35 m). Based on previous drilling experiences in the Illinois Basin, a significant zone of lost circulation is expected to be encountered in the Potosi Dolomite, of the Knox Group, between 4,829 and 5,115 feet (1,472 and 1,559 m) in depth (Table 3). A detailed discussion of the regional geological setting of the drilling site location is provided in the Geologic Setting section.

A zone of lost circulation is expected to be encountered in the Potosi Dolomite, a formation with the larger Knox Group. The Potosi is characterized by up to 7 feet (2.1 m) thick vuggy intervals, brecciated zones, and cavernous porosity that suggest a paleokarst environment (Freiburg and Leetaru, 2012) and make it a viable storage target. Moreover, reservoir modeling in zones of cavernous porosity suggests that it could contain approximately 90 million tonnes of CO_2 from a

single injection well (Will et al., 2014). Deep wells drilled throughout the Illinois Basin have demonstrated the Potosi's lost circulation zone and excellent reservoir properties, for example:

- The cavernous porosity of the Potosi was encountered during drilling of both the Illinois Basin – Decatur Project (IBDP) and Illinois Industrial Carbon Capture and Storage (IL-ICCS) project wells in Macon County, IL. The considerable volume of lost drilling fluid forced well engineers to plug the zone with cement and drill through the plug.
- A chemical waste disposal project at Tuscola, Douglas County, IL, has injected over 50 million tonnes of CO_2 equivalent of liquid chemical waste into the Potosi through the Cabot-Tuscola #2 well (Leetaru, 2014a).
- A deep waste disposal well (API 125110) was drilled at Newport Chemical Plant in Vermillion County, IN, in 1960, 900 feet (274 m) into the Mt. Simon. The lost circulation in the Knox and Potosi was predicted and encountered during drilling from 2,800 to 4,000 feet (853 to 1,219 m). The zone was not considered for waste storage. Lost circulation was satisfactorily controlled by the addition of circulation materials directly to the drilling mud, albeit at added cost (Hundley 1963).
- In Kentucky and Indiana, millions of gallons of liquid industrial wastes have been injected annually into the Knox vuggy to cavernous reservoirs (Greb et al., 2012).

However, the possibility of encountering a lost circulation zone at the proposed well is unknown because the Potosi is poorly constrained in this area.

DATA COLLECTION

The LIVELY GROVE #1 geologic/structure test well will allow the ISC team to evaluate reservoir potential for long- term storage of CO_2 focusing mainly on the St. Peter Sandstone, Potosi Dolomite, the confining overlying formation, and their primary and secondary sealing units. The secondary sealing units comprise of argillaceous carbonates between the base of the Maquoketa and top of the St. Peter Sandstone and argillaceous carbonates of the upper Knox Group overlying the Potosi Dolomite. Furthermore, we will investigate hydrocarbon potential throughout the stratigraphic column. Extensive data collection and testing will be performed using the well. Details of these investigations are provided below.

Coring and Sampling Program

Core will be taken from the basal Maquoketa/upper Trenton (Galena) Formation contact (primary seal/confining carbonate interval, +/-60 feet), contact with the basal Joachim Dolomite/upper St. Peter Sandstone (potential reservoir, +/-60 feet), the St. Peter Sandstone (potential reservoir, +/-60 feet), Upper Knox (confining carbonate interval, +/-60 feet), and the Potosi Dolomite (potential reservoir target, +/-60 feet). In case of unsuccessful core recovery, well cuttings will be available as contingency.

The coring and sampling program is detailed as follows:

Coring Program
One section of 4" core or larger diameter will be collected from the following intervals:

- 60' Maquoketa/Galena from ±2,884'-2,944' (unsleeved)
- 60' Joachim/St. Peter (confining) from ±3,544'-3,604'.
- 60' St. Peter from ±3,604'- 3,664'
- 60' Upper Knox confining interval, depths to be determined.
- 60' Potosi from ±4,879'-4,939'

Sidewall cores may be collected from selected formations as desired.

Proposed Logging Suite

An extensive suite of geophysical logs will be collected from the well bore immediately after drilling to evaluate CO_2 storage potential, hydrocarbon potential, and general lithological and petrophysical characteristics of the sedimentary column (Table 4).

Production Open Hole Logging Run: Surface Casing to TD

Table 4. Proposed logging suite for the proposed stratigraphic test well.

Logging Run	Logging Tools	Interval
Triple Combo	GR, Caliper, SP, Resistivity, Density, Neutron	Correlation, Porosity, Saturations, Hole Size, Resistive Anisotropy
Dipole Sonic	Sonic compressional and shear	Porosity, Mechanical Properties,
Formation Images	Formation Micro-Imager borehole images	Structure, Env. Deposition, Fractures
Magnetic Resonance	Magnetic Resonance	Porosity, free and bound fluids, Permeability
Elemental Spectroscopy	Elemental Capture Spectroscopy	Lithology
Natural Gamma Ray Spectroscopy	Spectral GR	Clay Minerals
Sidewall Cores	Sidewall Coring Tool	Porosity, Permeability
Temperature	Temperature Log	Geothermal Gradient

Well Testing Program
Following drilling the project team will analyze the drilling, coring, and logging results to identify specific zones for well testing. If the St. Peter or Potosi, do not indicate sufficient reservoir quality for CO_2 storage, testing may not be conducted.

It is anticipated that testing will take place within three months of completion of drilling. The pre-drilling well testing plan is as follows:

- Reservoir Limit Test – St. Peter Sandstone and Potosi Dolomite. This test includes pumping from one or more intervals within either the St. Peter Sandstone or the Potosi Dolomite to establish broad reservoir characteristics and determine whether vertical and horizontal limits can be detected.
- Step rate tests – Step rate tests involve injection of water into the formation to determine parting pressures of strata and establish fracture gradients needed for guidelines for injection pressures during CO_2 storage and for geomechanical measurements. The tests will be performed in the Maquoketa, St. Peter, and Potosi Formations.
- Vertical Interference Testing. The team will evaluate the potential for conducting vertical interference testing during the step rate tests in the Maquoketa, St. Peter, and Potosi formations. The performance and success of these tests depends on the vertical spacing of the intervals being tested, intervening lithologies, and wellbore integrity.

ACKNOWLEDGEMENTS

This report was prepared with contributions from Alan Myers, Damon Garner, Daniel Byers, Hannes Leetaru, Carl Carman, and Steve Whittaker at the Illinois State Geological Survey; Nick Malkewicz at Projeo Corp.; Bill Armstrong at Geostock Sandia.

REFERENCES

Barnes, D. and Ellett, K. 2014. Geological Carbon Sequestration Storage Resources Estimates for the Ordovician St. Peter Sandstone, Illinois and Michigan Basins, USA: Topical Report Number: DOE/FE0002068- 6, 63 p.

Bell, A. H., E. Atherton, T. C. Buschbach, and D. H. Swann. 1964. Deep oil possibilities of the Illinois Basin: Illinois State Geological Survey, Circular 368.

Buschbach, T.C. 1975. Cambrian System. In: Willman, H.B., Atherton, E., Buschbach, T.C., Collinson, C., Frye, J.C., Hopkins, M.E., Lineback, J.A., Simon, J.A. (eds.), Handbook of Illinois Stratigraphy, p. 34-46.

Freiburg, J. T., and Leetaru, H. E. 2012, Controls on porosity development and the potential for CO_2 sequestration or wastewater disposal in the Cambrian Potosi Dolomite (Knox Group): Illinois Basin: Presented at the 41st Annual Eastern Section AAPG Meeting, Program Abstracts.

Greb, S. F., J. R. Bowersox, M. P. Solis, D. C. Harris, R. A. Riley, J. A. Rupp, M. Kelley, and N. Gupta. 2012. Ordovician Knox carbonates and sandstones of the Eastern Mid-continent: Potential geologic carbon storage reservoirs and seals, in J. R. Derby, R. D. Fritz, S. A. Longacre, W. A. Morgan, and C. A. Sternbach, eds., The great American carbonate bank: The geology and economic resources of the Cambrian–Ordovician Sauk megasequence of Laurentia: AAPG Memoir 98, p. 1077-1101.

Hoholick, J. D., Metarko, T., Potter, P. E. 1984. Regional variations of porosity and cement: St. Peter and Mount Simon Sandstones in Illinois Basin. AAPG Bull. 68, 753-764.

Hundley, C. & Matulis, J., 1963, Deep Well Disposal. Ground Water. 1.15-33.10.1111/j.1745-6584.1963.tb01911. x.

Kolata, D. R. 2005. Bedrock geology of Illinois. Illinois State Geological Survey, Illinois Map 14, 2 sheets, scale 1:500,000.

Lasemi, Y., Z. Askari, and H. E. Leetaru, 2012. Potential of the Cambro-Ordovician Knox carbonates of

Illinois as combined reservoirs and seals for carbon sequestration. AAPG Eastern Section Meeting Abstracts, p. 42.

Lasemi, Y., Askari, Z. 2014. Stratigraphy of the Cambo-Ordovician Knox succession in Illinois. US DOE Knox Project Cooperative Agreement No. DE-FE0002068, Topical Report No. FE0002068-12, 43 p.

Lasemi, Y., Askari Z. 2020. Stratigraphic variability, secondary porosity development, and correlation of the Cambrian Potosi Dolomite across the Illinois Basin. Geological Society of America Abstracts with Programs. Vol 52, No. 6.

Leetaru, H. E. 2014. An Evaluation of the Carbon Sequestration Potential of the Cambro- Ordovician Strata of the Illinois and Michigan Basins, Final Report DE-FE0002068. *U.S. Department of Energy*

Leetaru, H. E., V. Smith, Y. Adushita, and J.T. Freiburg. 2014. An integrated approach to evaluating the suitability of the Potosi Dolomite as a carbon sequestration target: Interpretation 2, p. 125-133.

Medina, C., Rupp, J., Lahann, R., and Eldridge, J., 2019 Evaluation of Caprock Integrity of the Upper Ordovician Units within the CarbonSAFE Prefeasibility Study Region, Topical Report: DOE-FE0029445-11. U.S. Department of Energy.

Nelson, W. J. 1995. *Structural Features in Illinois*. Illinois State Geological Survey Bulletin 100, p. 144.

Will, R., Smith, V. and Leetaru, H. E. 2014. Utilization of the St. Peter Sandstone in the Illinois Basin for CO_2 Sequestration, Topical Report DOE/FE0002068-7. U.S. Department of Energy, 54.

Zaluski, W. 2014. Maquoketa Shale Caprock Integrity Evaluation, Washington, DC, U.S. Department of Energy, Topical Report DOE/FE0002068-9 89 p.

APPENDIX A

Locations and well information for wells that penetrate the Maquoketa within 20 miles of the drill site.

Well API	Well Name	Distance (miles)	Total Depth (feet)	Formation	Completed	Well Category	Well Type	Status
1218924781	Schneider 1	1.43	3,050	Maquoketa	09/07/2006	PET	DA	PLG
1218924485	Lange, Herbert W. Jr. 2	2.13	3,002	Maquoketa	06/22/1995	PET	Unknown	PLG
1218924473	Lange, Herbert Jr.1	2.14	3,250	Trenton	11/28/1994	PET	OIL	
1218901476	Koch, H 1	3.33	3,000	Galena	08/21/1953	PET	DA	PLG
1216301503	Lange, Mary 1	3.82	2,746	Galena	03/01/1943	PET	DA	PLG
1216325631	Trerveer Community 1	4.07	2,614	Maquoketa	09/14/1984	PET	DA	PLG
1218901171	Droege 1	4.15	3,239	Trenton	03/30/1954	PET	DA	PLG
1218902896	Siefeldt 1	4.34	2,648	Trenton	06/06/1973	PET	DA	PLG
1218901579	Moeller Community 1	4.52	3,276	Trenton	07/01/1949	PET	DA	PLG
1218924840	Faber 2	4.65	3,460	Trenton	01/20/2012	PET	OIL	
1218901145	Metalman, M 1	4.73	2,860	Decorah	07/18/1952	PET	DA	PLG
1218901170	Haier, Fred O 1	4.77	3,292	Trenton	12/05/1949	PET	DA	PLG
1218924870	Smith 5	4.89	3,445	Trenton	06/09/2015	PET	DA	PLG
1218924623	Luebke-phipps 1	5	3,100	Platteville	09/09/1998	PET	DA	PLG
1216325774	Dieker 1	5.01	3,561	Knox	10/08/1985	PET		
1216301394	Wagner, Frieda M 1	5.11	2,787	Galena	12/30/1952	PET	DA	PLG
1218923026	Unverfehrt, Alfred 1	5.23	3,084	Trenton	12/03/1974	PET	DA	PLG
1218923956	Steinkamp 1	5.38	3,233	Trenton	07/01/1984	PET	DA	PLG
1218924886	Prairie State Generating WWDW 1	5.53	3,810	Knox		STRAT	INJ	
1218901772	Gilbert 1	5.59	2,712	Maquoketa	10/01/1954	PET	DA	PLG
1216323788	Koeller, Casper 1	5.66	2,643	Trenton	01/09/1975	PET	DA	PLG
1218900559	Brueggemahn Comm 1	5.79	2,913	Platteville	09/01/1955	PET	DA	PLG
1216301760	Schickedanz, Henry 1	5.81	2,805	Galena	08/02/1944	PET	DA	PLG
1216300436	Koch, Mathias 1	5.84	2,688	Galena	05/06/1930	PET	DA	
1216326767	Lehr 1	5.9	2,720	Trenton	12/20/1990	PET		
1218902930	Schneidewind 1	6.06	2,900	Trenton	09/24/1973	PET	DA	PLG
1216329365	1	6.07	2,613	Galena	01/01/1939	COAL		
1216300801	Weckler 1	6.11	2,613	Galena	11/02/1939	PET	DA	PLG
1218924586	Juenger 1	6.19	3,300	Maquoketa	07/12/1996	PET	OIL	
1216300800	Petri, Henry C. 1	6.61	2,576	Galena	01/01/1939	PET	DA	
1202726562	Schulte 1	7.04	2,800	Galena	09/11/1997	PET	DA	PLG
1218924299	Forsythe 1	7.11	2,200	Moccasin	09/28/1988	PET	DA	PLG
1202701733	Friedrich 1	7.29	2,741	Galena	01/24/1943	PET	DA	PLG
1216301753	Burgard 1	7.87	2,486	Galena	04/01/1954	PET	DA	PLG

Well API	Well Name	Distance (miles)	Total Depth (feet)	Formation	Completed	Well Category	Well Type	Status
1218924624	Sinn 1-27	8	3,403	Trenton	12/15/1998	PET	DA	PLG
1202701117	Broeckling 1	8.26	2,900	Galena	02/14/1956	PET	DA	PLG
1218900822	Hunter, P 1	8.84	2,810	Decorah	01/01/1957	PET	DA	PLG
1216301446	Oneil 1	8.91	2,292	Galena	08/01/1954	PET	DA	PLG
1216330255	Postel 1-11	9.02	2,640	Trenton	11/11/2005	PET	DA	PLG
1218900918	Kockamohr 1	9.2	3,070	Trenton	12/01/1957	PET		
1218900520	Baldwin 3	9.23	3,505	Galena	08/01/1955	PET		
1216301757	Schroeder 1	9.32	2,340	Trenton	05/28/1954	PET		
1218901777	Bonnat 1	9.36	3,204	Galena	12/20/1952	PET	DA	PLG
1218923771	Mclaughlin, L 1	9.36	2,450	Trenton	10/02/1981	PET	DA	PLG
1218902866	Kolweier, Gustav 1	9.52	3,601	Maquoketa	06/30/1973	PET	DA	PLG
1218902945	Roesener 1	9.57	3,700	Champlainia n	11/19/1973	PET	DA	PLG
1215701410	Wilson, George 1	9.65	3,640	Joachim	01/01/1938	PET	DA	
1202703621	Eilering 1	9.66	3,050	Decorah	08/31/1968	PET		
1216303020	Moeller, R 1	9.72	2,415	Trenton	06/19/1969	PET	DA	PLG
1218902852	Harre 1	9.99	3,776	Trenton	04/03/1973	PET	OIL	
1218901137	Rabe, H.l. Etal 1	10.11	3,758	Decorah	06/01/1949	PET	DA	PLG
1218924803	Wilke, D 4	10.13	3,519	Platteville	12/03/2008	PET	DA	PLG
1202703315	Heimann "b" 1	10.19	3,010	Trenton	02/20/1968	PET	DA	PLG
1216325699	Reinneck 1	10.23	1,230	Trenton	07/21/1985	PET	DA	PLG
1216301260	Klingelhoefer-dickhaut Comm. 1	10.34	2,661	Platteville	05/26/1952	PET		
1216323785	Dickhaut, R l 1	10.4	2,479	Trenton	01/24/1975	PET	DA	PLG
1216302346	Linss 1	10.5	2,173	Trenton	06/26/1966	PET	DA	PLG
1215724555	Keller 2	10.61	2,145	Maquoketa	09/08/1983	PET	DA	PLG
1218924809	Bram Vu Farms Inc 1	10.67	5,614	Knox	09/08/2009	PET	OIL	
1216301378	Klingel, A S 1	10.72	2,363	Galena	03/04/1943	PET		
1202701434	Goebel, J H 1	10.78	2,916	Platteville	11/02/1956	PET		
1216300506	Winters 1	10.97	2,150	Kimmswick	10/01/1939	PET	DA	
1202702556	Billhartz H 1	11.16	3,213	Galena	07/01/1941	PET	DA	
1215724762	Anderson, E. 4	11.17	3,100	Trenton	11/21/1984	PET	OIL	
1216301382	Dahm, Adolph G. 1	11.17	2,190	Trenton	11/04/1954	PET	DA	PLG
1215701923	Stevenson, R S 1	11.32	2,832	Trenton	04/22/1952	PET	DA	PLG
1216325722	Funk, Dennis 1	11.36	1,755	Trenton	08/12/1985	PET	DA	PLG
1216301513	Mccurdy 6	11.39	2,368	Galena	01/01/1946	PET	DA	PLG
1218924806	Tepe 1	11.4	3,689	Platteville	02/01/2009	PET	DA	PLG
1215724764	Easdale, C 11	11.42	3,053	Trenton	11/21/1984	PET	OIL	
1215725686	Easdale, Carl 14	11.44	2,650	Maquoketa	08/10/1988	PET	OIL	
1215724982	Easdale, C 12	11.55	2,600	Maquoketa	12/07/1985	PET	OIL	
1215724763	Easdale, F 7	11.7	3,100	Decorah	11/03/1984	PET	OIL	

Well API	Well Name	Distance (miles)	Total Depth (feet)	Formation	Completed	Well Category	Well Type	Status
1216325808	Mueller 1	11.76	1,925	Maquoketa	05/27/1986	PET	DA	PLG
1218923839	Ruether, Cora 1	11.77	3,850	Trenton	03/29/1983	PET	OIL	
1216324113	Schaller, Edward, Dr. 1	12.17	2,026	Trenton	09/06/1976	PET	DA	PLG
1215724984	Lindsay 3	12.25	2,600	Maquoketa	12/05/1985	PET	OIL	
1216325268	Sudheimer, George 1	12.29	755	Trenton	03/11/1982	PET	DA	PLG
1216327065	Shooting Star 22-1	12.42	2,789	Trenton	07/09/1992	PET	DA	PLG
1216300041	Postel 1	12.59	3,107	St. Peter	######### #	PET	DA	
1216301484	Schaller 1	12.69	1,910	Galena	01/01/1939	PET	DA	
1216300312	Funk, A 1	12.72	1,770	Kimmswick	08/01/1928	PET	DA	
1216301253	Morris, Emma Comm. 1	12.74	2,765	Galena	12/30/1942	PET	DA	
1215702066	Rainey 1	12.8	2,704	Galena	06/01/1954	PET	DA	PLG
1216301256	Engle 1	13.05	2,452	Galena	08/01/1943	PET	DA	PLG
1214528932	Filipsic 1	13.26	3,722	Platteville	06/18/2007	PET	DA	PLG
1216301380	Grandcolas, John 1	13.3	2,233	Galena	12/05/1952	PET	DA	PLG
1202725590	Gildig 1	13.42	3,435	St. Peter	10/10/1984	PET	DA	PLG
1216323792	Patton -A- 1	13.58	1,943	Trenton	02/14/1975	PET	DA	PLG
1216301381	Behrens, Elmer 1	13.67	2,000	Galena	10/13/1954	PET	GAS	
1216301816	Dinges, H p 1	13.73	2,142	Platteville	07/20/1955	PET	DA	PLG
1216303621	Hentzel 1	13.79	1,860	Trenton	07/02/1973	PET	DA	PLG
1216302165	Goodman 2	13.9	1,804	Galena	01/01/1960	PET	DA	PLG
1216302151	Schmidt, Lena 1	13.98	1,768	Galena	05/08/1959	PET	DA	PLG
1202725356	Wildhaber 1	14.1	2,431	Trenton	10/28/1982	PET	DA	PLG
1216302122	Reinhardt, Fred 1	14.11	1,885	Trenton	12/01/1958	PET	GAS	
1218924412	Holston 13	14.12	3,820	Trenton	01/29/1993	PET	OIL	
1215702061	Guebert, Herman 1	14.18	2,225	Galena	09/05/1953	PET	DA	
1218923618	Hermanson 1	14.2	1,295	Trenton	03/26/1981	PET	DA	PLG
1216323923	Schwebel 1	14.23	1,911	Galena	10/30/1975	PET	DA	PLG
1218924454	Francis 17	14.25	3,840	Trenton	01/12/1994	PET	OIL	
1216302154	Goodman 1	14.26	1,817	Galena	08/24/1959	PET	DA	PLG
1216327951	Braswell 1	14.29	2,477	Trenton	04/23/1997	PET	DA	PLG
1216302119	Reinhardt, Walter 1	14.3	1,895	Decorah	11/01/1958	PET	DA	PLG
1216302271	Berthold, Tillie 1	14.31	1,791	Galena	11/01/1961	PET	DA	PLG
1202701374	Haukap, C 1	14.32	3,290	Trenton	03/01/1943	PET	DA	PLG
1218924455	Kurwicki 13	14.37	3,830	Trenton	06/23/1994	PET	OIL	
1216302247	Waeltz, George 1	14.42	1,770	Galena	12/08/1960	PET	DA	PLG
1218901706	Sharkowski, Fred 13-D	14.51	3,880	Galena	12/14/1945	PET		
1214502515	Schwartzkopf, E E 1	14.51	3,776	Trenton	10/01/1951	PET	DA	PLG
1214523224	Ernest 1	14.55	3,750	Trenton	08/08/1975	PET	DA	PLG
1218924472	Miller 4-A	14.56	3,820	Trenton	11/25/1995	PET	OIL	
1214502815	Ernest, Albert L. 1	14.62	3,704	Trenton	09/30/1965	PET	OIL	

Well API	Well Name	Distance (miles)	Total Depth (feet)	Formation	Completed	Well Category	Well Type	Status
1202701393	Billhartz, O W Etal 1	14.65	2,850	Galena	10/21/1952	PET	DA	PLG
1216325396	Von Bokel, F 1	14.68	2,768	Trenton	03/19/1983	PET	DA	PLG
1216324113	Schaller, Edward, Dr. 1	12.17	2,026	Trenton	09/06/1976	PET	DA	PLG
1215724984	Lindsay 3	12.25	2,600	Maquoketa	12/05/1985	PET	OIL	
1216325268	Sudheimer, George 1	12.29	755	Trenton	03/11/1982	PET	DA	PLG
1216327065	Shooting Star 22-1	12.42	2,789	Trenton	07/09/1992	PET	DA	PLG
1216300041	Postel 1	12.59	3,107	St. Peter	##########	PET	DA	
1216301484	Schaller 1	12.69	1,910	Galena	01/01/1939	PET	DA	
1216300312	Funk, A 1	12.72	1,770	Kimmswick	08/01/1928	PET	DA	
1216301253	Morris, Emma Comm. 1	12.74	2,765	Galena	12/30/1942	PET	DA	
1215702066	Rainey 1	12.8	2,704	Galena	06/01/1954	PET	DA	PLG
1216301256	Engle 1	13.05	2,452	Galena	08/01/1943	PET	DA	PLG
1214528932	Filipsic 1	13.26	3,722	Platteville	06/18/2007	PET	DA	PLG
1216301380	Grandcolas, John 1	13.3	2,233	Galena	12/05/1952	PET	DA	PLG
1202725590	Gildig 1	13.42	3,435	St. Peter	10/10/1984	PET	DA	PLG
1216323792	Patton -A- 1	13.58	1,943	Trenton	02/14/1975	PET	DA	PLG
1216301381	Behrens, Elmer 1	13.67	2,000	Galena	10/13/1954	PET	GAS	
1216301816	Dinges, H p 1	13.73	2,142	Platteville	07/20/1955	PET	DA	PLG
1216303621	Hentzel 1	13.79	1,860	Trenton	07/02/1973	PET	DA	PLG
1216302165	Goodman 2	13.9	1,804	Galena	01/01/1960	PET	DA	PLG
1216302151	Schmidt, Lena 1	13.98	1,768	Galena	05/08/1959	PET	DA	PLG
1202725356	Wildhaber 1	14.1	2,431	Trenton	10/28/1982	PET	DA	PLG
1216302122	Reinhardt, Fred 1	14.11	1,885	Trenton	12/01/1958	PET	GAS	
1218924412	Holston 13	14.12	3,820	Trenton	01/29/1993	PET	OIL	
1215702061	Guebert, Herman 1	14.18	2,225	Galena	09/05/1953	PET	DA	
1218923618	Hermanson 1	14.2	1,295	Trenton	03/26/1981	PET	DA	PLG
1216323923	Schwebel 1	14.23	1,911	Galena	10/30/1975	PET	DA	PLG
1218924454	Francis 17	14.25	3,840	Trenton	01/12/1994	PET	OIL	
1216302154	Goodman 1	14.26	1,817	Galena	08/24/1959	PET	DA	PLG
1216327951	Braswell 1	14.29	2,477	Trenton	04/23/1997	PET	DA	PLG
1216302119	Reinhardt, Walter 1	14.3	1,895	Decorah	11/01/1958	PET	DA	PLG
1216302271	Berthold, Tillie 1	14.31	1,791	Galena	11/01/1961	PET	DA	PLG
1202701374	Haukap, C 1	14.32	3,290	Trenton	03/01/1943	PET	DA	PLG
1218924455	Kurwicki 13	14.37	3,830	Trenton	06/23/1994	PET	OIL	
1216302247	Waeltz, George 1	14.42	1,770	Galena	12/08/1960	PET	DA	PLG
1218901706	Sharkowski, Fred 13-D	14.51	3,880	Galena	12/14/1945	PET		
1214502515	Schwartzkopf, E E 1	14.51	3,776	Trenton	10/01/1951	PET	DA	PLG
1214523224	Ernest 1	14.55	3,750	Trenton	08/08/1975	PET	DA	PLG
1218924472	Miller 4-A	14.56	3,820	Trenton	11/25/1995	PET	OIL	

Well API	Well Name	Distance (miles)	Total Depth (feet)	Formation	Completed	Well Category	Well Type	Status
1214502815	Ernest, Albert L. 1	14.62	3,704	Trenton	09/30/1965	PET	OIL	
1202701393	Billhartz, O W Etal 1	14.65	2,850	Galena	10/21/1952	PET	DA	PLG
1216325396	Von Bokel, F 1	14.68	2,768	Trenton	03/19/1983	PET	DA	PLG
1214502518	Ernest, J A 1	14.69	3,735	Trenton	12/14/1948	PET	OIL	
1218924605	Rueter 1	14.72	3,889	Trenton	04/26/1997	PET	DA	PLG
1218924762	Sensmeyer 2	14.83	3,965	Joachim	11/22/2004	PET	DA	PLG
1213300050	Smithton Hunting and Fishing 1	14.87	1,907	Trenton	01/20/1966	PET	DA	PLG
1216325922	Kunz 1	17.92	1,579	Trenton	11/13/1986	PET	DA	PLG
1218901656	Liszewski, Eddie 1	17.95	4,112	Trenton	06/19/1953	PET	OIL	
1218901501	Hasemeier 6	17.97	4,175	Galena	03/01/1953	PET	OIL	
1218924343	Kruski 9-A	17.97	4,090	Trenton	10/03/1989	PET	DA	PLG
1213300292	Fehr, Chas.	17.97	1,876	Galena	01/01/1930	PET	DA	
1216301354	Harms, Leroy O. 1	17.98	2,562	Galena	04/01/1953	PET	DA	PLG
1216301829	Voellinger 1	18.03	1,914	Trenton	11/01/1955	PET	DA	PLG
1216325594	Sadaf 1-A	18.03	1,563	Trenton	11/09/1983	PET	DA	PLG
1202701387	Tschudy 1	18.12	3,025	Trenton	07/11/1954	PET	DA	PLG
1218924339	Kruski 8-A	18.16	4,110	Trenton	11/02/1989	PET	OIL	
1202701417	Rakers 1	18.17	3,115	Decorah	06/16/1951	PET	DA	PLG
1218924871	Malawy 1	18.34	4,240	Galena	09/20/2015	PET	DA	PLG
1215724243	Consolidation Coal (burning Star 3) 2-A	18.38	2,610	Trenton	05/28/1982	PET	DA	PLG
1216301566	Baer, Ben D. 1	18.43	2,575	Galena	10/24/1944	PET	DA	PLG
1216301793	Harpstrite, H s 1	18.44	2,573	Galena	11/22/1956	PET	DAW	
1215725757	Birchler, James 1	18.46	3,450	Trenton	06/09/1990	PET	DA	PLG
1202701462	Breese-trenton Mng: Richter, Henry 1	18.58	3,240	Trenton	06/21/1952	PET	DA	PLG
1202726695	Kunz 1	18.64	2,700	Trenton	07/21/2003	PET	DA	PLG
1215701983	Schmoll, Louie 1	18.69	1,801	Galena	01/01/1960	PET	DA	PLG
1216324980	Harbauch 1	18.89	1,480	Trenton	04/19/1980	PET		
1218924872	Niedbalski 1	18.9	4,040	Trenton	09/10/2015	PET	DA	PLG
1218901663	Jessa Joe 1	18.91	4,061	Galena	07/12/1954	PET	DA	PLG
1215724246	Ratz 2	18.92	1,844	Galena	10/19/1982	PET	DA	PLG
1218924785	Malick Community 1	18.93	4,155	Trenton	10/10/2006	PET	DA	PLG
1216301390	Gnadt, Katherine 1	18.97	1,505	Galena	05/01/1949	PET	DA	PLG
1216301504	Harbaugh 1	18.97	1,400	Galena	09/01/1942	PET	DA	PLG
1215702073	Rehmer, Henry 1	19.01	1,800	Kimmswick	03/01/1939	PET	DA	
1218901667	Kitowski, Theodore Sr 1	19.03	3,954	Galena	11/01/1952	PET	OIL	
1202725773	Langhauser, Leo 1	19.03	3,530	Trenton	12/21/1986	PET		
1218923683	Sensel 1	19.1	5,038	St. Peter	01/24/1981	PET	DA	PLG
1218901666	Kitowski 1	19.12	3,935	Trenton	09/01/1952	PET	OIL	

Well API	Well Name	Distance (miles)	Total Depth (feet)	Formation	Completed	Well Category	Well Type	Status
1216301565	Voges, A H 1	19.16	2,995	Galena	02/01/1943	PET	DA	PLG
1202725432	Haas, Richard L and Mary G 2	19.19	2,725	Platteville	12/14/1983	PET	DA	PLG
1218901665	Gorski, John 1	19.21	3,951	Galena	06/08/1953	PET	OIL	
1218923081	Heape, Irene 1	19.22	3,994	Trenton	07/29/1975	PET	DA	PLG
1218901181	Wiese, Christian 1	19.24	4,076	Platteville	02/14/1949	PET	DA	
1216300092		19.25	1,368	Galena	01/01/1908	PET	DA	
1215724242	Consolidation Coal (burning Star3) 1-A	19.3	2,480	Trenton	05/22/1982	PET	DA	PLG
1216324313	Berberich 1	14.91	2,800	Trenton	04/15/1978	PET	DA	PLG
1218924744	Sensmeyer 1	14.92	3,550	Platteville	07/02/2004	PET	OIL	
1218924758	Reinhardt 3	15.03	3,600	Platteville	10/20/2004	PET	OIL	
1216327961	Reinneck 1	15.13	2,198	Trenton	05/19/1997	PET	DA	PLG
1216300491	Miller, J C 1	15.23	1,962	Galena	01/01/1939	PET	DA	PLG
1216302192	Rust, Ed 1	15.33	2,413	Joachim	05/01/1960	PET	GAS	
1216324673	Junk 1	15.43	1,568	Trenton	06/14/1979	PET	DA	PLG
1215701896	Temple 2	15.49	3,127	Galena	12/01/1949	PET	DA	PLG
1216301752	Schmidt, A G 1	15.57	2,066	Galena	12/01/1954	PET	DA	PLG
1202726917	Gebhart Farms 1	15.67	2,980	Platteville	10/22/2008	PET	DA	PLG
1202726611	Bayer, Earl 1	15.7	2,820	Trenton	03/04/2000	PET	DA	PLG
1202727107	Davis 1	15.87	3,428	St. Peter	03/11/2014	PET	DA	PLG
1202700556	Peters, George 1	15.92	3,305	Trenton	01/01/1940	PET	DA	
1214528882	Shaglee Unit 1	16.08	6,062	Precambrian	11/24/2001	PET	DA	PLG
1215722762	Hagene 1	16.31	3,425	Trenton	12/21/1973	PET	DA	PLG
1216302281	Echart, Adam 1	16.54	1,662	Galena	08/01/1962	PET	DA	PLG
1202701388	Bassler, William 1	16.62	2,844	Trenton	09/02/1952	PET	DAW	
1216301567	Schoene, J D 1	16.64	2,691	Galena	12/24/1942	PET	DA	PLG
1216300671	Reichert, W j 1	16.64	2,022	Galena	07/14/1937	PET	Unk	JA
1216323887	Schwaegel, E 1	16.64	1,693	Trenton	12/19/1975	PET	DA	PLG
1216302294	Range 1	16.65	1,725	Trenton	05/01/1963	PET	DA	PLG
1214528533	Shaw, Elizabeth 1	16.91	3,650	Trenton	06/22/1994	PET	DA	PLG
1214528818	Ogilvie 1	17	3,675	Trenton	11/18/1997	PET	DA	PLG
1216325590	Berberich Community 1	17.05	1,933	Trenton	11/14/1983	PET	DA	PLG
1215722775	Gass, George A. 1	17.08	2,230	Decorah	05/23/1974	PET	DA	PLG
1213300290	Schuster, Adam P 1	17.11	1,800	Galena	01/01/1940	PET	DA	
1202702828	Alberternst, H b 1	17.2	3,250	Trenton	11/01/1942	PET	DA	PLG
1202702476	Schlarmann, Bernard 1	17.45	4,213	St. Peter	04/22/1941	PET	OIL	
1202725972	Huelsmann, Edward 1	17.57	2,950	Trenton	07/18/1989	PET	DA	PLG
1215702000	Feltmeyer, Elmo 1	17.57	1,753	Galena	06/01/1961	PET	DA	PLG
1202701467	Twiss, Ina M. 1	17.63	3,044	Trenton	08/25/1942	PET		
1215722763	Yakel 1	17.65	2,008	Trenton	01/23/1974	PET	DA	PLG

Well API	Well Name	Distance (miles)	Total Depth (feet)	Formation	Completed	Well Category	Well Type	Status
1218924342	Jankowski 1-A	17.67	4,080	Trenton	12/10/1989	PET	OIL	
1216326751	Rehberger, Omar 1	17.67	2,460	Trenton	06/02/1991	PET	DA	PLG
1202701385	Twiss, J C 1	17.78	3,029	Trenton	06/07/1951	PET	DA	PLG
1218923075	Kruski A-7	17.79	4,170	Trenton	08/04/1975	PET	OIL	
1218901117	Kitowski, Rose 2	19.36	3,925	Galena	11/01/1952	PET	OIL	
1216301386	Keeser, M 1	19.37	1,450	Galena	08/28/1952	PET	DA	PLG
1202701563	Giesecke, Henry 1	19.45	2,942	Platteville	08/06/1945	PET	DA	PLG
1202724305	Rebling -A- 1	19.54	2,826	Decorah	03/28/1975	PET	DA	PLG
1216300030	Gundlach 1	19.61	1,995	Plattin	01/01/1927	PET	DA	
1218923835	Bonczyk 1	19.63	3,980	Trenton	10/20/1982	PET	OIL	
1202725429	Haas, Marcel and Bernard 1	19.65	2,765	Platteville	12/07/1983	PET	DA	PLG
1216301800	Karban, Wm. 1	19.76	1,480	Galena	02/01/1943	PET	DA	PLG
1215701984	Wilson-hartman Comm 1	19.77	1,773	Galena	01/01/1960	PET	DA	PLG
1218923927	Wisniewski 1	19.79	3,945	Trenton	09/10/1983	PET	DA	PLG
1216301990	Landauer, E 1	19.84	1,450	Trenton	11/01/1957	PET	DA	PLG
1216301988	Wolf 1	19.85	1,465	Trenton	09/01/1957	PET	DA	PLG
1216301564	Mauck-thorpe 1	19.93	2,463	Trenton	12/24/1945	PET	DA	PLG
1202727084	Kalmer 1	19.96	3,600	St. Peter	06/27/2013	PET	DA	PLG
1216325809	Stumpf 1	19.96	1,417	Trenton	01/05/1986	PET	DA	PLG
1216301756	Vale, Maurice E. 1	19.98	1,959	St. Peter		PET		

PET – Petroleum well

STRAT – Stratigraphic well

DA – Dry and Abandoned

PLG – Plugged