

2017 AML PROJECT SUMMARY

March 2018

Exploratory Drilling

Project Type

Drilling to identify and characterize abandoned underground coal mines.

Locations

- Williston: 5132 & 5140 134th Street NW near Williams County Road 9
- Noonan: Section 9, T162N, R95W, County Road 21 Right-of-way
- Foxholm: Farmstead in SE 1/4, Section 2, T156N, R85W
- Section 11, T156N, R85W, Highway 52 Right-of-way
- Burlington: Residential areas along 29th Ave NW and 27th Ave NW
- Roseglen: Sections 17&20, T149, R87W, 21st Street NW Right-of-way
- Shell Lake: Wally Lee Farmstead in SE1/4, Section 17, T154N, R89W

Contract AM 777-17

Project Cost

\$158,047

Contractor

S & S Drilling, Inc., Williston, ND



Drilling in the ditch of US Highway 52 about 2 miles south of Foxholm.

Contents

- ND PSC AML Mission & Funding
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2017 AML Project Statistics

Project Dates	May 15—November 15, 2017
Project Length	184
Holes Drilled	456
Holes Cased	90
Feet Drilled	24,174
Feet Cased	3,316
Cost—Total	\$158,047
Noonan	\$25,043.26
Foxholm	\$8,727.10
Burlington	\$37,805.39
Shell Lake	\$22,313.11
Roseglen	\$34,198.14
Williston	\$29,960.01

North Dakota Public Service Commission and Abandoned Mine Lands

North Dakota has records for about 1,700 abandoned coal mines which are mostly in the western half of the state. The Surface Mining Control and Reclamation Act of 1977 (SMCRA) provides for the reclamation of abandoned mine lands with fees collected on coal mined since that time. In 1981, the North Dakota Legislature approved an Abandoned Mine Lands (AML) Program to be administered by the Public Service Commission (PSC) on behalf of the State of North Dakota.

ND PSC AML Mission

The AML Program is charged with eliminating existing and potential public hazards resulting from abandoned surface and underground coal mines. Thus the AML Program is a service (not regulatory) program aimed at protecting North Dakotans while reclaiming hazardous abandoned mines. Reclamation eligible mines can be on our inventory, found by exploratory drilling or reported to us. The PSC's selection of reclamation projects also requires federal approval. Emergency projects are conducted when AML problems are an immediate and serious danger to the public.

Program Funding

Reclamation costs are covered through a federal fee on actively mined coal. The current rate for lignite coal is 8¢ per ton. The federal government, through the Office of Surface Mining Reclamation and Enforcement (OSMRE), reallocates the money to each state or tribe with an AML program. North Dakota's allocation is about \$3 million per year. Federal fee collection is scheduled to end in 2021 unless reauthorized by the United States Congress.

Drilling and Grouting

In exploratory drilling, holes are drilled through the overburden into the coal to locate areas where the coal was removed. When drilling indicates a need for reclamation, a drilling and grouting project is planned. Additional drilling is conducted and a cement-like grout mixture is pumped into any voids to fill the space left when the coal was removed. The goal is to stabilize the mine and reduce the likelihood of the mine collapsing. This will reduce the chances of sinkholes forming at the surface. Drilling and grouting projects are expensive and are reserved for use around public roads or residential and commercial areas.



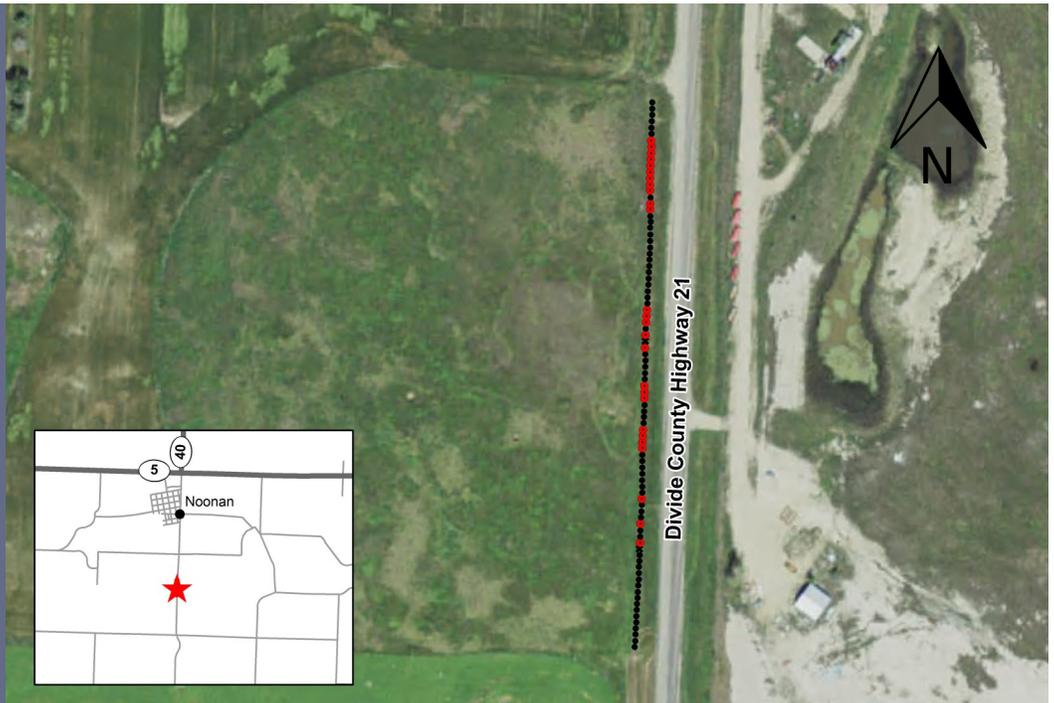
Drilling at the farmstead home near Foxholm.

Noonan: Kimball Coal Company

The Kimball Coal Mine was an underground shaft mine that operated about a mile south of Noonan between about 1919-1927. About 800 tons were produced in 1919. In 5 of the next 6 years between 7,000 and 11,000 tons were produced annually. Most of this coal was shipped out of the area. A 1926 inspection of the mine reported "this mine is being finished up, main entry pillars being pulled back at the time of inspection." The mine was officially abandoned in 1927.

Over the years, this area has been susceptible to hazardous sinkholes, some occurring near Divide County Highway 21. Exploratory drilling was conducted in 2017 to assess the extent and condition of the mine, and how the abandoned mine may impact the highway.

The top of the coal at the south end is 37 feet below the

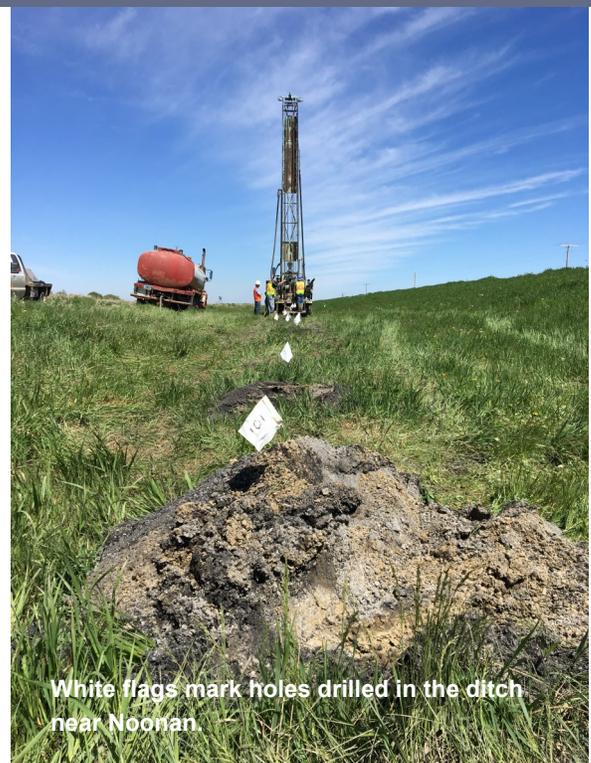


Divide County Highway 21 runs north and south. Each **black dot** represents one drill hole that encountered solid coal. **Red dots** are holes that intercepted mine workings and were cased for future grouting.

surface and extends 7 feet to 44 feet below the surface (see Map). The top of the coal at the north end of the site is 27 feet below the surface and remains 7 feet thick. A total of 88 holes were drilled 10 feet apart. Twenty-six boreholes encountered heavily rubblized areas suggesting the mine roof has collapsed. These holes were cased for future reclamation work.

2017 Noonan Statistics

Project Dates	May 22-31
Holes Drilled	88
Holes Cased	26
Feet Drilled	3,750
Feet Cased	594
Cost	\$25,043.26



White flags mark holes drilled in the ditch near Noonan.



Top: Casing being prepared for installation into a “void” hole at Sunland Services. Right: Drilling at the Shift Services building.

Williston: Williston Coal & Ice Co.

In the spring of 2017, the ND PSC AML Division was notified of a sinkhole on the Shift Services property (northern building on the Map) along Williams County Road 9. Upon investigation, another sinkhole was discovered at Sunland Services (southern buildings) as well as a potential sinkhole in the ship building. The site was immediately added to the Exploratory Drilling Project.

Of the 59 holes drilled, 33 encountered mine workings and were cased for future work (Red dots on Map). The Sunland shop building appears to be undermined. The Shift Services building may be undermined. Reclamation for this site is slated for the summer of 2018.

This is the site of the abandoned Williston Coal & Ice Co. which operated between 1913 and 1936. An upper and lower seam were mined with an average of 14,000 tons mined annually.



Williams County Road 9 runs north and south. Shift Services occupies the building to the north. The building to the south was formerly occupied by Sunland Services. Each **black dot** represents one drill hole that encountered solid coal. **Red dots** are holes that intercepted mine workings and were cased for future work. Sinkholes are represented by **pink dots**.

2017 Williston Statistics

Project Dates	May 18-June 1/ November 10-18
Holes Drilled	59
Holes Cased	33
Feet Drilled	4,027
Feet Cased	1,460
Cost	\$29,960.01

Roseglen: Roseglen City Mine

The Roseglen City Mine likely began operation in 1923. The underground coal mine had a slope double entry which is still visible in the side of the coulee near the farmstead. The room and pillar mine operated until about 1937. The mine employed 4 to 6 people and produced 2,500 to 3,000 tons annually for local trade. The price of coal started at \$2.50/ton in 1925 and fell to \$1.25/ton by 1937.

Currently the Giffey farmstead is located over the Roseglen City Mine. Over the years, the landowner has filled sinkholes in the driveway, road right of way and tree rows. In 2017 two sinkholes opened in a field to the east of the house. Another sinkhole near the road right of way on the southwest side of the tree rows was fenced.

Drilling was conducted along the road and road right of way (see map above). The top of coal in this area is about 56 feet below the surface, and the seam is about 7 feet thick. Eight of the bore-



The east—west road is 21st Street NW. Each **black dot** represents one drill hole that encountered solid coal. **Red dots** are holes that intercepted mine workings and were cased for future work. A **black x** indicates a hole that was abandoned before reaching the coal.

holes encountered mine workings and were cased. At four of these holes, the mine showed evidence of collapse and migration of the collapse toward the surface. Given time, the collapse may reach the surface and produce a sinkhole.

Additional drilling will be necessary to further identify the extent and condition of the mine and how it may influence the homestead and the county road.



2017 Roseglen Statistics

Project Dates	September 21-October 10
Holes Drilled	92
Holes Cased	8
Feet Drilled	5,671
Feet Cased	364
Cost	\$34,198.14



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2



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3



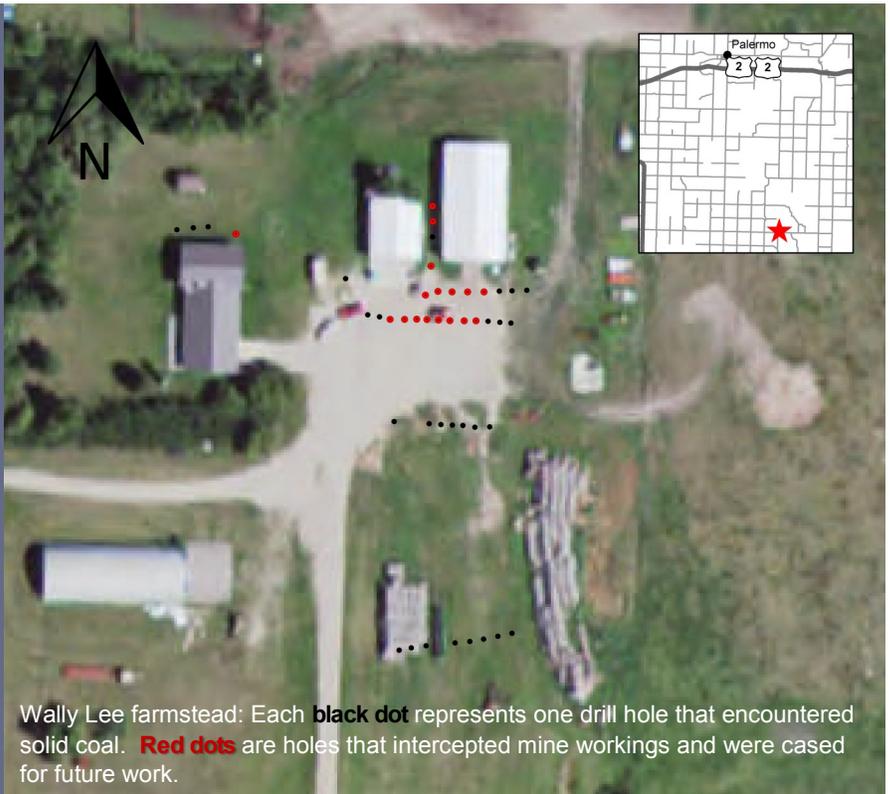
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1. Exploratory drilling near a water filled sinkhole in Williston.
2. Using a "mud pit" while drilling with water.
3. White flags show bore hole locations at Margie Zietz's home in Burlington.
4. Angle drilling near the Shift Services Building in Williston.
5. White flags showing bore hole locations along the road shoulder and ditch near Roseglen.

Shell Lake: Spiegel Coal Mine

Very little is known about the Spiegel Coal Mine (formerly called the Smith Coal Mine). It appears to have begun operation around 1932 and ceased operation in 1940. No more than a few hundred tons were mined in any given year. The mine employed 4 people and charged \$1.50/ton of coal. The entry was by a vertical shaft unlike the typical slope or drift entries of most North Dakota underground coal mines of that era.

Wally Lee currently occupies the farmstead where the Spiegel Coal Mine is located (see map). With no available mine map, the location of the mine is based on drilling and reports from Wally. An air shaft may be near one of the shop buildings. The entry shaft



Wally Lee farmstead: Each **black dot** represents one drill hole that encountered solid coal. **Red dots** are holes that intercepted mine workings and were cased for future work.



2017 Shell Lake Statistics

Project Dates	October 12-31
Holes Drilled	49
Holes Cased	17
Feet Drilled	3,083
Feet Cased	786
Cost	\$22,313.11

was thought to be near an area used for hay storage; however, no entry or mine workings were discovered in this area.

The top of coal lies about 62 feet below the surface and the seam is 7-8 feet thick. Drilling near the shop buildings and house encountered mine workings. Of the 49 bore holes, 17 encountered rubble from collapse of the mine. About one-half of these holes showed upward migration of the collapsed area to within 35 feet of the surface. Given time, the collapsed portion may reach the surface, causing a sinkhole to form.

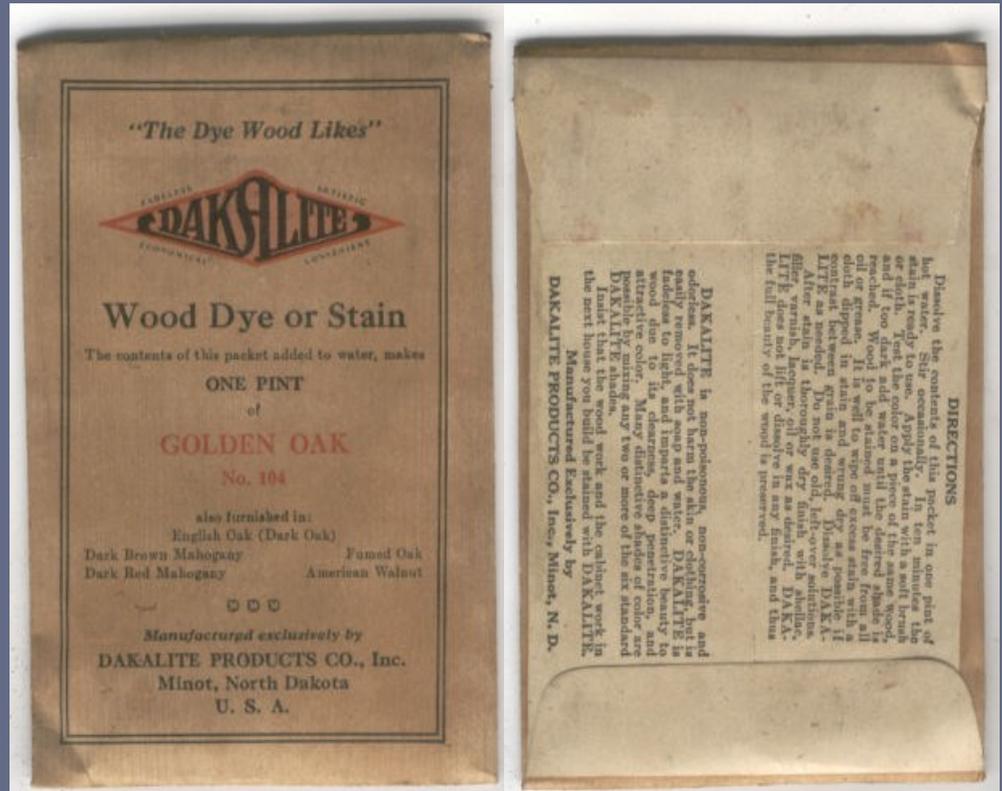
Since sinkhole formation is often sudden, this presents a threat to people and property at the farmstead. To reduce the threat of sinkhole formation, a drilling and grouting project is planned for this site in 2018.

Coal Mining in Burlington

The people of Burlington are proud of Burlington being the “first town in Ward County.” Much of its early success was based on the mining of lignite coal which was plentiful and easily accessible at the time. The Davis mine was noted as being the first in the area. The Davis Mine also boasted briquetting and brick plants for a time.

The Burlington Centennial (1883-1983) book includes an article by Blanche Lynch on Dakalite. Dakalite was a water soluble wood stain and filler product developed from lignite coal slack by Professor L.P. Dove from “North Dakota University”. While the article is undated, it appears that the Dakalite plant in Burlington started in the mid-1920s. By all accounts, the product was shipped to countries all around the world and primarily used in the furni-

ture industry. Only in Germany was a similar product manufactured. Dakalite was still in production in 1942 as indicated by a listing in the North Dakota Blue Book. To the right is an image of a packet of the dye. The Public Service Commission AML Division would be interested in any further information on history or manufacture of Dakalite.



Left: Drilling on 29th Avenue NW in Burlington.



Right: Drilling on 29th Avenue NW in Burlington. Groundwater is being pushed to the surface by drilling 40 feet away. This suggests there may be an opening linking the two holes. Three holes in this area encountered mine workings and were cased for future work.

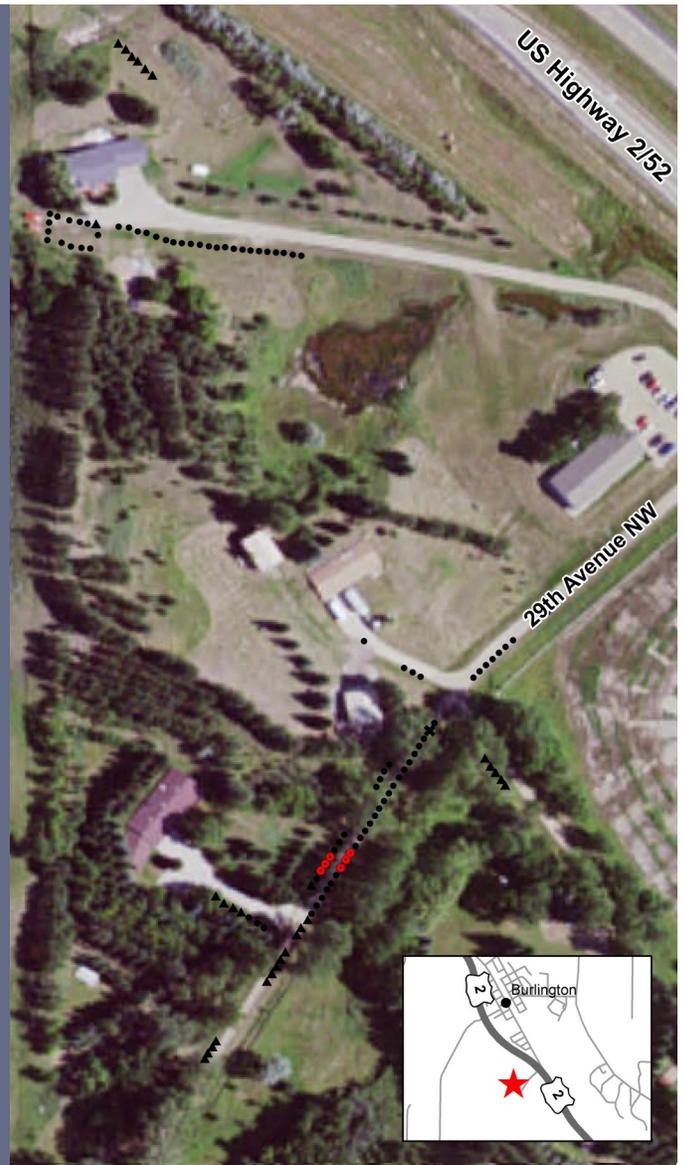
Burlington: Miller and HH Mines

The Burlington area is surrounded by more than 25 abandoned underground coal mines. In 1994 and 1995, the AML Division reclaimed areas under the US Highway 2/52 bypass and Burlington Heights Subdivision by pumping over 18,500 cubic yards of grout into the mine workings. In 2004 an additional 2,172 cubic yards of grout were pumped along Snake Road (County 10A) now known as Colton Avenue.

In the fall of 2016, several areas around Burlington were identified as potentially affected by abandoned underground coal mines. Sinkholes were observed within 50 to 250 feet of each home along 29th Avenue NW in Burlington. These sinkholes are likely associated with the Miller Coal Company Mine which operated between 1926-1941. No map of this mine is known to exist. Generally the coal seam is 9-10 feet thick. Along 29th Ave. NW the top of coal is between 22 and 29 feet from the surface. Of the 116 holes drilled at this site, six boreholes encountered mine workings and were cased for later work (top map). Some questions remain as to the location, extent and condition of this mine.

The second site (bottom map) is undermined by the HH Mine. A map of the mine shows workings very near both houses. Sixteen holes were drilled on 27th Avenue NW. The coal seam is about 9-10 feet thick and about 105 feet from the surface. No drill log noted mine workings and the site geology made distinguishing the condition of the mine difficult. Five holes encountered two feet of coal followed by 8 feet of sand. This is very unusual. Normally a clay layer is directly under the coal.

While drilling did provide some information on the condition of both mines and their associated geology, additional drilling will be necessary to fully understand the potential risk of the abandoned mines to homeowners.



Top Map: 29th Avenue NW, Burlington. **Bottom Map:** 27th Avenue NW, Burlington. Each **black dot** represents one drill hole that encountered solid coal. **Red dots** are holes that intercepted mine workings and were cased for future work. Drill holes represented by **black triangles** did not encounter coal.

2017 Burlington Statistics

Project Dates	June 19—July 13
Holes Drilled	132
Holes Cased	6
Feet Drilled	6,551
Feet Cased	112
Cost	\$37,805.39



Foxholm: Unknown Mines

A preliminary site investigation in the fall of 2016 found evidence of historic mining including sinkholes and collapsed mine entries in the Foxholm, ND area. Exploratory drilling was conducted at 2 sites to investigate the possible impact of historic mining on the area. One site was a farmstead about 1 mile south of Foxholm (see top map). Evidence of mining at this site included a collapsed entry about 500 west of the house and a sinkhole about 200 feet east of the house. Six holes were drilled near the house. The top of 7 to 9 foot thick coal seam ranged from 47 to 52 feet below the surface. No mine workings were encountered near the home.

The second site (bottom map) was in the right of way of US Highway 52 near where a gas pipe line transects the highway. Several sinkholes can be found in the pasture near the high-

way right-of-way. Also, in the pasture near the right-of-way fence a portion of the gas pipeline appears to run under a sinkhole. Drilling was done to verify that the pipeline was not undermined in the right-of-way. The 8 foot thick coal seam in this area is very shallow, with the top of coal only 14 feet below the surface. Though drilling in the right-of-way did not encounter any mine workings, the pipeline may be undermined in the adjacent pasture.

No additional work is currently planned for these sites; however, caution is always advised in areas with abandoned underground mines.



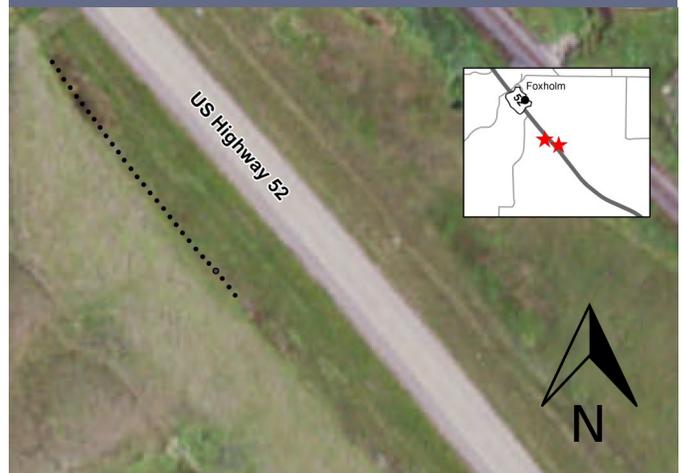
Drilling near the farmhouse south of Foxholm.



Above: A farmstead about 1 mile south of Foxholm. **Below:** US Highway 52 runs diagonally through the map. Each **black dot** represents one drill hole where drilling encountered solid coal. No mine workings were encountered at either Foxholm sites. No additional work is planned for the Foxholm sites.

2017 Foxholm Statistics

Project Dates	June 5-16
Holes Drilled	36
Holes Cased	0
Feet Drilled	1,091
Feet Cased	0
Cost	\$8,727.10





Glossary of Terms

Backfill— Material used to fill an opening, void or depression. Material placed in the mine void to support the mine roof.

Casing—A tubular structure installed in a drill hole to prevent the wall of the hole from caving and to provide a conduit for grout.

Core—A cylindrical sample taken from a formation for analysis. Usually a core barrel is substituted for the drilling bit and it procures a sample as it penetrates the formation.

Cribbing— Timbers laid at right angles to each other, sometimes filled with earth, as a roof support or as a support for machinery.

Drift mine— An underground coal mine that enters a coal seam horizontally usually from a coal outcrop.

Haul Tunnel— Any underground entry or passageway designed for transport of coal, other material, personnel, or equipment.

Highwall— The unexcavated face of exposed overburden and coal in a surface mine.

Mine Workings— The entire system of openings in a mine.

Overburden— Layers of soil and rock covering a coal seam.

Pillar—The part of coal left between individual rooms and entries to support the overlying strata.

Rob— To mine or remove coal pillars left for support.

Roof —The stratum of rock or other material above a coal seam; the overhead surface of a coal working place.

Roof Fall— A coal mine cave-in.

Room and Pillar Mining— A method of underground mining in which a portion of the coal is left in place to support the roof of the active mining area. Large "pillars" are left while "rooms" of coal are extracted.

Rubble— Debris encountered when drilling into mine workings that may indicate mine collapse or roof fall.

Seam— A stratum or bed of coal.

Shaft— A vertical opening from the mine to the surface that may be used for ventilation, drainage or transportation.

Slope— An inclined connection to the surface from underground workings used for transportation, drainage and ventilation.

Slump—In material testing it is a measure of consistency of concrete or grout on a scale from 0-12. The higher the number the more liquid or flowable the mixture.

Void— A general term for openings in rock. In mine reclamation-the open space remaining after coal was removed by underground mining.



Left: Drilling in the ditch near Noonan.

Right: A hazardous sink-hole near Sunland Services in Williston.



PLACE
STAMP
HERE

North Dakota Public Service Commission
Abandoned Mine Lands Division
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Bismarck, ND 58505-0480

When a Hole Is Not Just a Hole

Underground coal mining was common in Western North Dakota in the early part of the twentieth century. After WWII, surface mining became more economical, and many underground mines ceased operation and became abandoned. The legacy of abandoned underground mining is the potential for surface collapse.

If you live or work near an abandoned underground coal mine, please use caution. The ground can give way without warning. In this photo, a coyote became trapped after falling into a sinkhole. A similar event could happen to you at an abandoned underground mine site.



Contact Us

To report a sinkhole or request more information about our program

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