STANDARDIZED ENVIRONMENTAL ASSESSMENT

2017-2021 Sinkhole Filling Abandoned Mine Lands Projects
Various Problem Areas and Locations in North Dakota

Prepared by
North Dakota Public Service Commission
In Cooperation with
United States Department of the Interior
Office of Surface Mining Reclamation and Enforcement
Casper Field Office

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A. Need for the Action

The principal objective of the Abandoned Mine Lands (AML) Division of the Public Service Commission (PSC) is to reclaim hazardous abandoned surface and underground coal mines.

Some of the most hazardous, widespread and frequent mine-related problems in North Dakota are deep sinkholes caused by underground mine collapse. The AML Division has received reports of personal injury, loss of livestock and property damage caused by underground mine collapse sinkholes. Since 2005, nearly 2000 dangerous sinkholes have been filled in western North Dakota. Most of these were reported by property owners and renters, state and local government agents and the public. Sinkholes are a serious hazard to landowners and the public. This environmental assessment is for sinkhole filling projects that are expected to be conducted in the five year period between 2017 and 2021.

B. Background

Most of western North Dakota is underlain by lignite coal and it has been estimated that North Dakota contains 25 billion tons of strippable lignite reserves. At the current rate of mining, it would take more than 800 years to exhaust North Dakota’s supply of economically recoverable lignite. (from: Strippable Lignite Deposits of North Dakota, Murphy, E. 2001, North Dakota Geological Survey, Miscellaneous Map #34)

Lignite mining was an important part of the settlement of western North Dakota. The earliest documented commercial underground lignite mine opened near Sims, about 30 miles west of Bismarck, in 1873. By 1910, more than 80 commercial mines were in operation producing over 400,000 tons annually. Production from North Dakota underground coal mines peaked in the 1930s, as the steam shovel made strip mines more efficient and cheaper. The last commercial underground coal mine in North Dakota closed in the 1960s. The AML Division estimates there are at least 500 abandoned underground coal mines in twenty-three counties in western North Dakota.

Mined lignite seams in North Dakota are thick, from 6-40 feet, usually overlain with less than 100 feet of soft overburden soils. Underground mining leaves large subsurface voids. As these mine voids collapse, they create large and deep sinkholes that often may occur suddenly and can be a serious hazard to landowners and the public.

The AML Division has been conducting projects to fill sinkholes since the AML program began. One of the earliest projects was conducted near Scranton, ND, from 1982-87 (see Photo 1).
Since the early 1990s, the AML Division has used a two-pronged approach for underground mine reclamation. On high-use areas that are undermined, such as residential and commercial developments and public roads, drilling and grouting projects are conducted in order to prevent mine subsidence. Holes are drilled into the underground mine voids and cementitious grout is pumped to fill them and prevent collapse.

Sinkhole filling projects are conducted on areas where mine collapse has already occurred and dangerous sinkholes are present. In these projects, topsoil is removed and saved from within and around the sinkholes. Then the sinkholes are excavated and filled, usually with compacted soil materials. Topsoil is replaced and the areas are tilled and seeded. In 2015, approximately 207 dangerous sinkholes were filled at locations near Beulah, Zap, New Leipzig, Scranton, Dickinson and Wilton. Table 1 is a summary of sinkhole filling projects conducted between 2011 and 2015.

Occasionally, as needed, emergency and maintenance AML work is included with sinkhole filling projects. In 2015, emergency coal refuse fires were extinguished near Haynes and Williston. Also in 2015, minor maintenance work was conducted at the Richter Mine near Glen Ullin. This surface coal mine was reclaimed in a 2013 AML project, but there were a few barren spots where vegetation was not successful. Maintenance included salvaging and respraying topsoil and seeding eight barren spots comprising about 1 acre of this 55-acre mine site.

Photo 1: Sinkholes near Scranton, ND, circa 1980
Table 1: North Dakota Sinkhole Filling Projects 2011-2015

<table>
<thead>
<tr>
<th>Year</th>
<th>Locations (Nearest Cities)</th>
<th>Sinkholes</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>Haynes Dickinson, Wilton, Velva, Baldwin</td>
<td>45</td>
<td>$61,772.50</td>
</tr>
<tr>
<td>2014</td>
<td>Haynes, Dickinson, Richardton, New Salem, Beulah, Garrison, Wilton</td>
<td>174</td>
<td>$81,487.00</td>
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<tr>
<td>2015</td>
<td>Beulah, Zap, Glen Ullin (Surface), New Leipzig, Scranton, Dickinson, Wilton</td>
<td>207</td>
<td>$77,224.00</td>
</tr>
<tr>
<td></td>
<td>Totals</td>
<td>778</td>
<td>$502,443.00</td>
</tr>
</tbody>
</table>

Section II
Description of the Proposed Project and Alternatives

The current standard requirements for sinkhole filling projects are as follows.

1. Remove and stockpile topsoil or other suitable plant growth material from around/within sinkhole and borrow areas.
2. Excavate the sinkhole (as directed) with a backhoe or excavator.
3. Backfill sinkhole with approved fill material; if trucks are used, compaction with backhoe bucket and wheels is required between dumps. If a scraper is used, holes shall be ramped into and filled in such a way to get maximum compaction.
4. Grade area to blend with adjacent topography and re-establish drainage.
5. Respread topsoil evenly over disturbed areas and finish-grade.
6. Seed disturbed areas with required mixture of locally adapted native grasses.

Sinkhole filling projects have been conducted annually since the early 1990s. These projects are usually conducted in the fall, after harvest, at locations where dangerous sinkholes have been observed or reported. The sinkholes are usually filled with soil materials taken from nearby borrow areas. In special cases where the sinkhole extends underneath a building foundation or road, flowable grout may be used.

Borrow areas, where fill dirt is taken, must be approved in advance by the Commission’s project manager. These borrow areas will be located as near as possible to the sinkholes. Usually, these borrow areas are spoil piles from a nearby abandoned surface mine or come from “over-excavating” a large sinkhole(s) on a hillside and grading it into a shallow swale consistent with surrounding topography.
It is impossible to predict exactly where sinkholes will occur during the period from 2017-2021. However, it is expected that nearly all of them will occur in areas where sinkhole filling has been conducted previously. Maps of areas where sinkhole filling projects have been conducted between 2005 and 2015 are included as an appendix to this document.

The total areas of disturbance for sinkhole filling projects vary, but are restricted to the immediate area of the sinkholes and borrow area(s). The total area disturbed by the 2015 Sinkhole Filling AML Project was approximately 6 acres. Considering that 207 sinkholes were filled, the average area disturbed for each sinkhole was less than 0.03 acres.

Sinkhole filling projects are a relatively low cost means of eliminating immediate hazards of abandoned underground mines that directly affect the public. These projects are a benefit to farmers, ranchers, property owners and the public. The main drawback is that sinkhole filling only addresses the immediate problem of existing sinkholes and does not prevent subsequent occurrences. Other reclamation options may include complete excavation (daylighting), drilling and grouting, blasting, fencing, property buy-out, condemnation, or taking no action. These last options are impractical and do not solve the AML problems at these sites.

Section III
Existing Environmental Documents

OSM-EIS-11. Approval of State and Indian Reclamation Program Grants under Title IV of the Surface Mining Control and Reclamation Act of 1977 was published by the Office of Surface Mining in November 1983. This EIS describes and analyzes the environmental impacts that were expected to result from approval of State or Tribal Grants. It focuses on the adverse and/or beneficial impacts and standard reclamation activities associated with eight major categories of abandoned coal mine problems in the United States.

The environmental concerns of the proposed project are addressed in an environmental impact statement (EIS) prepared by the Office of Surface Mining Reclamation and Enforcement entitled "Approval of State and Indian Reclamation Program Grants Under Title IV of the Surface Mining Control and Reclamation Act of 1977": (OSM-EIS-11, November 1983). Please reference the following documents for further information.

Chapter III, Affected Environmental Rocky Mountain/Northern Great Plains Region

Section 3.5.3.2, Adverse impacts related to subsidence, PP III-29, Subsections 3.5.3.2.1, 3.5.3.2.2, 3.5.3.2.4, 3.5.3.3.3

Chapter IV, Environmental Consequences Rocky Mountain/Northern Great Plains Region

Section 4.3.3.3, Impacts of deep subsurface reinforcement treatment
Section IV
Site Specific Review

A. Cultural or historic resource values (the Archaeological Resources Protection Act of 1979; the Archaeological and Historic Preservation Act of 1974; the National Historic Preservation Act of 1986, as amended; the Antiquities Act of 1906, Executive Order 11593, concerning the protection and enhancement of the cultural environment; the American Indian Religious Freedom Act of 1978; the Historic Sites Act of 1935; and OMB Circular A-102).

Reclamation activities will be conducted in a manner that should have no significant effect on cultural or historic resources. This will include minimizing disturbances and restricting them to the immediate area of the sinkholes and borrow area(s).

A letter requesting concurrence for the 2017-2021 Sinkhole Filling Projects was sent to the State Historical Society of North Dakota December 7, 2016.

B. Water quality values (Clean Water Act, as amended)

Reclamation activities will be conducted in a manner that should have no significant effect on surface or ground water quality or quantity. This will include minimizing disturbances and restricting them to the immediate area of the sinkholes and borrow area(s). If necessary, erosion may be controlled with best management practices including mulching, installation of wattles, rip-rap, flexamat, and others.

A letter requesting concurrence for the 2017-2021 Sinkhole Filling Projects was sent to the North Dakota Department of Health December 7, 2016.

C. Wetlands values (Clean Water Act, Executive Order 11990, and Army/EPA Memorandum of Agreement (MOA) Concerning the Determination of Mitigation under the Section 404(b) (1) Guidelines)

Reclamation activities will be designed in a way that will not diminish the size or function of any wetlands. Reclamation activities should not affect any wetland areas.

D. Floor values (Executive Order 11988)

No planned activities will adversely affect an identified floodplain.

E. Wildlife (Endangered Species Act and Fish and Wildlife Coordination Act)

Reclamation activities will be designed in a way that will not diminish fish or wildlife habitat but likely may enhance it.

A letter requesting concurrence for the 2017-2021 Sinkhole Filling Projects was sent to the U. S. Fish and Wildlife Service December 7, 2016.
F. Prime and unique farmland values (Farmland Protection Policy Act)

Reclamation activities will be designed in a way that will not diminish the integrity or utility of prime farmland.

G. Recreational resource values (Wild and Scenic Rivers Act, Clean Air Act)

There are no lands in this area classified as wilderness areas or lands being studied for wilderness designation.

There are no lands in this area identified as areas of critical environmental concern.

There are no lands in this area included in the Wild and Scenic Rivers category.

There are no parks or areas of critical ecological or aesthetic concern in this area.

H. Air quality (Clean Air Act)

These areas are not in or near a Class I Air Quality Region. Watering of construction areas could be required if needed to control fugitive dust, but most sites will be so small that it will not be necessary.

I. Socioeconomic factors

Sinkhole filling is expected to be conducted mainly on undeveloped agricultural lands and impacts to minority or low-income populations are expected to be minimal.

It is possible that work contracted for sinkhole filling could result in slightly higher local employment and revenues. Sinkhole filling should also make the lands safer and more useful, and this will be a benefit to the property owners and the public.

J. Political factors

Zoning jurisdictions for these areas are generally held by County and local township authorities. Property is privately and publicly owned and used mainly for agricultural activities and wildlife habitat. Consent for right-of-entry is obtained prior to any reclamation activities and property owners or managers are usually notified before work begins.

K. Existing Vegetative Cover

Existing vegetation varies with land use on areas affected by sinkholes. This may include cropland, tame grass and legume pastures, native grasslands, wildlife habitat, road ditches, shelterbelts and farmstead areas. Topsoil will be saved to the extent possible on all affected areas and respread evenly after the sinkholes are filled. All affected hay land and grassland areas will be reseeded with locally adapted grass species native to western North Dakota.
L. **Threatened and Endangered Plant Species**

Reclamation activities will be conducted in a manner that should have no significant effect on threatened or endangered plant species, species of concern or significant ecological communities. This will include minimizing disturbances and restricting them to the immediate area of the sinkholes and borrow area(s).

A letter requesting concurrence for the 2017-2021 Sinkhole Filling Projects was sent to the Natural Heritage Program of the North Dakota Parks and Recreation Department December 7, 2016.

M. **Anticipated dates of Reclamation**

Sinkhole filling activities are expected to be conducted every year in the period from 2017-2021. Recently, the AML Division has been entering two-year unit price contracts for this work where a single contractor will fill all dangerous sinkholes identified for that period. It is expected that most of the non-emergency sinkhole filling work will be conducted in the fall, after harvest.

N. **Estimated Construction Cost**

The AML Division estimates construction costs for sinkhole filling projects will average about $100,000 per year. Therefore, the estimated total cost for all sinkhole filling projects from 2017-2021 is $500,000.

O. **Off-site Borrow and Disposal Areas**

Borrow areas, where fill dirt is taken, must be approved in advance by the Commission’s project manager. These borrow areas will be located as near as possible to the sinkholes. Usually, these borrow areas are spoil piles from a nearby abandoned surface mine or come from “over-excavating” a large sinkhole and grading it into a shallow swale consistent with surrounding topography. If off-site borrow or disposal issues arise, they will be addressed through consultation with the North Dakota Department of Health and Consolidated Laboratories.

P. **Noise Pollution**

Noise pollution problems are not anticipated; however, if problems arise, remedial action measures could be addressed in consultation with the North Dakota Department of Health and Consolidated Laboratories.
Section V
Consultations

A letter requesting concurrence for the 2017-2021 Sinkhole Filling Projects was sent to the State Historical Society of North Dakota December 7, 2016.

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Section VI
Preparers

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