WENCK File #B2579-0036
JULY 2019

Little Missouri Lateral NGL Pipeline Topsoil Removal Inspection Report PU-19-85




Prepared for:

North Dakota
Public Service Commission

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Executive Summary

The North Dakota Public Service Commission (PSC) retained Wenck Associates, Inc. (Wenck) to complete topsoil inspections during construction of the ONEOK Little Missouri Lateral Pipeline (i.e., the Project). The project is a 12-inch Natural Gas Liquids (NGL) pipeline in McKenzie County, North Dakota, constructed by ONEOK Bakken Pipeline L.L.C. (ONEOK). The purpose of the inspection(s) was to ensure the project is constructed in compliance with the siting laws and rules and the applicable PSC Orders for the Project, which includes a requirement that topsoil must be segregated from subsoil during installation of the pipeline.

A pre-construction conference call was held for the Project on 5 June 2019; Wenck attended the call. Wenck reviewed Project documents to become familiar with the Project and PSC Orders for the Project. Initial soil stripping along the Project right-of-way began 18 June 2019. Wenck visually inspected the Project area on 18 and 19 May 2019 and observed topsoil and subsoil removal and segregation conducted by Jomax Construction Company Inc. (Jomax). Overall soil removal and storage processes were satisfactory and completed properly. Some minor issues were observed where subsoil stockpiles slightly came in contact with topsoil stockpiles, however, after discussions with Jomax foreman, a plan for resolving this issue was achieved.

1.0 Background and Scope

1.1 INTRODUCTION

The Little Missouri Lateral 12-inch mixed natural gas liquids (NGLs) will be a single pipeline segment located in McKenzie County and will transport NGLs, or Y-Grade product, approximately 10.8 miles originating from the Little Missouri Gas Processing Plant at the southeast quarter of T149N, R98W, Section 30 and terminate at an interconnection with ONEOK's Demicks Lake Pipeline (PU-18-399) at the southwest quarter of T149N R100W Section 1.

The pipe for the Little Missouri Lateral Pipeline is a 12.75-inch outside diameter steel pipe with 0.25 inches wall thickness for line pipe and 0.281-inches for road crossings. The maximum operating pressure will be 1,480 pounds per square inch and the maximum flow rate of each pipe will be 20,000 barrels per day. The Project is under the jurisdiction of the North Dakota Public Service Commission (PSC), which issued its Findings of Fact, Conclusions of Law, and Order in Case No. PU-19-85 on 31 May 2019, granting Certificates of Corridor Compatibility No. 211 and Route Permits No. 221 for the Project.

1.2 REGULATORY PURPOSE AND SCOPE OF WORK

The North Dakota Energy Conversion and Transmission Facility Act (North Dakota Century Code Chapter 49-22) authorizes the Public Service Commission to determine that the location, construction, and operation of jurisdictional energy conversion and transmission facilities will produce minimal adverse effects on the environment and the welfare of citizens of North Dakota. Construction inspections ensure that such projects are constructed in compliance with the siting laws (North Dakota Century Code Chapter 49-22) and rules (North Dakota Administrative Code Article 69-06) and the applicable Commission Orders.

The ND PSC retained Wenck to complete construction inspections for the project, the first of which was the "Topsoil" inspection. The inspection process included a review of the Application for Corridor Compatibility and Route Permit, the Project's Order, and other applicable documents. PSC Order #12 for the Project states: "*Company understands and agrees that all topsoil, up to 12 inches, or topsoil to the depth of cultivation, whichever is greater, over and along trench areas where cuts will be made, must be stripped and segregated from the subsoil. Any area on which excavated subsoil will be placed must also be stripped of topsoil. The stripped topsoil must not be stockpiled in natural drainages, and must be protected from water erosion. Care must be taken to protect topsoil from unnecessary compaction by heavy machinery. Unless otherwise approved by the Commission, topsoil must be removed before topsoil freezes in the late fall/early winter to the point that frost inhibits proper soil segregation. After backfilling is completed, any excess subsoil must be placed over the excavation area, blending the grade into existing topography. Topsoil must be replaced over areas from which it was stripped only after the subsoil is replaced.*"

Wenck's scope of work was to perform and document on-site inspections during the initial topsoil removal phase of the Project to verify that topsoil was properly removed and kept segregated from subsoil. The number of on-site Topsoil inspections was to be based on

Wenck's determination that equipment operators demonstrated proficiency concerning topsoil and subsoil removal and segregation in compliance with the Commission's Order. This report includes documentation of the site visit observations, a summary of findings and recommendations for resolution of any issue for the Project to be considered complete and in compliance.

1.3 BACKGROUND

During pipeline installation preparation and excavation work in general, it is important to separate topsoil and subsoil. Topsoil has biological, physical and chemical properties that are critical to reclamation of a site. Topsoil, typically considered the A horizon, should be stripped to the correct depth according to natural variations in the depth of this top layer of organic matter rich soil. Distinguishing the horizon boundaries can sometimes be difficult as they vary in *distinctiveness* and *topography*. Most boundaries are zones of transition rather than sharp lines of division. Boundary distinctiveness is the vertical distance over which one horizon transitions into another which can be abrupt, clear, gradual or diffuse. The boundary topography is the cross-sectional shape of the contact between the horizons which can be smooth, wavy, irregular or broken (Soil Survey, 1993).

Mixing subsoil in with the topsoil can be detrimental to the re-vegetation of a site. Subsoil material generally has lower organic matter content than topsoil, making it typically lighter in color. It may also have a different chemical and physical properties (i.e., texture) than the topsoil. The most unfavorable characteristic of subsoil horizons is often the accumulations salts. Salts, such as sodium, can severely restrict plant growth.

2.0 Findings of Site Inspection

2.1 METHODS

Jeremy Hackley, Wenck Field Inspector, visited the Project site on June 18 & 19, 2019. Representatives from Onshore Quality Control Specialists, LLC. (QCS), Dub Jeffrey, and Jomax Construction Company Inc., David Burrow, met with Mr. Hackley at Jomax yard, 12274 25th F St. NW. Watford City ND. Mr. Burrow escorted Mr. Hackley to the Project site. QCS, under management by Dub Jeffrey, oversee the daily actions of the construction contractors to ensure work is being conducted according to approved plans and procedures.

The site was inspected visually by driving to access points and walking or driving within the Project right-of-way (ROW). Topsoil removal began on the day of the first inspection, 18 June 2019. Jomax is the pipeline contractor company working on the project. Jomax began topsoil removal at the ROW located west of Watford City and south of highway ND-85 and continued working southward. Contractors/equipment operators were observed during the topsoil removal phase of the Project to check that topsoil has been properly removed, piled, and kept segregated from subsoil. Digital photographs were taken showing Project inspections and documenting any observed problem areas (**Appendix A**). Geographic coordinates were recorded at observation points or potential problem areas using a handheld Global Positioning System (GPS) (Garmin GPSMAP 60CSx; <10m accuracy; NAD83 datum) (see Table 1).

2.2 ON-SITE INSPECTION OBSERVATIONS

Construction for the Project began 18 June 2019. Wenck staff was accompanied by Jomax Superintendent, David Burrow at the construction location. Jomax contractors did not conduct any ground disturbing work until Wenck's Field Inspector was on-site. The Project ROW had been mowed prior to arrival. Two bulldozers began the topsoil disturbance by stripping topsoil off the ROW and creating stockpiles on the far east side. A motor grader than proceeded along the ROW cutting the boundaries to mark the extent of the work area. Dozer operators continued to move topsoil to the east edge with spotters observing the work to ensure nothing occurred outside the ROW. The dozer performed several passes over each area of ground removing a couple inches of soil with each pass until the subsoil was reached. Given the topography of the location, measurements of topsoil depth ranged from approximately 5 to 10 inches. Gaps in the topsoil stockpiles were made to mitigate water erosion. Jomax contractors sometimes employed a combination of equipment (i.e., dozers and motor grader) depending on topsoil depth and other factors.

A follow-up topsoil inspection was conducted the next day on 19 June 2019. This inspection focused on the work that has progressed in the last 24 hours. Wenck staff arrived at the same location as the day before. The prior day's work had been graded. Lumber was being placed to support the pipe for assembly and Storm Water Pollution Prevention Plan (SWPPP) controls were being installed.

Completed topsoil removal looked adequate. However, Wenck's Field Inspector observed that topsoil and subsoil stockpiles were touching at one location. (**Appendix A, Observation Point 76**). This was brought to the attention of Jomax ROW clean-up foreman, Jared Walters. This issue was resolved with Mr. Walters acknowledging the problem and offering to vigilantly watch to keep the stockpiles segregated. Equipment

operators will need to re-spread the excavated soil by pulling from the pile starting with the subsoil during subsequent backfilling activities. After all the subsoil is graded, another pass with the grader will be completed to spread the slightly mixed soil where topsoil and subsoil had contacted each other. Lastly, the topsoil will be placed over the disturbed subsoils. This proposed soil handling procedure will help ensure that any subsoil/topsoil mix is located above the subsoil layer, while still being buried beneath the unmixed topsoil.

Topsoil Inspections included a hilltop area with limited topsoil thickness. Topsoil was pushed to the south side of the ROW and then another pass was made into the subsoil to create a level surface for installing the pipe along the hill. The subsoil stockpile was stored to the northeast of the topsoil. Both stockpiles revealed an effervescence reaction with hydrochloric acid (HCl) (**Appendix A, Observation Point 80**). Extra workspace was created in conjunction with this hilltop so that subsoil could be manipulated in the leveling of the ROW. The far northeast corner and area close to the topsoil stockpile had not been completely stripped of topsoil. Mr. Burrow was made aware of this and understands that if the workspace were to be utilized for further stripping or stockpiling, topsoil would have to be fully stripped and kept segregated from subsoil(**Appendix A, Observation Point 84**).

In general, the contractors did a good job with the stripping of topsoil. Contractors paid close attention to topsoil stripping depths which tended to vary several inches depending upon the topography of the location. Stripping and stockpiling of topsoil only was conducted along flatter areas of the ROW. More sloping terrain and hilltops required separate stockpiles of subsoil in order to create a level workspace for equipment and pipe installation.

3.0 Recommendations and Issue Resolutions

3.1 MINOR ISSUES OBSERVED

During site inspections, there were a few locations where the subsoil stockpile was observed touching the topsoil stockpile or was mixed slightly within the topsoil stockpile. Isolated instances of soil mixing is to be expected when working with large, heavy machinery. On hilltops, subsoil was removed and manipulated in order to create a level surface to operate and install pipe. Some of these subsoil stockpiles were observed in contact with the adjacent topsoil stockpiles. This will result in slight mixing of the subsoil and topsoil at the points of contact. Also, the final pass taken by graders during topsoil stripping inevitably disturbed a small amount of subsoil along some areas of the ROW. Both of these types of observed mixing were minimal and were recognized by the contractors. The mixed soils are located on the surface and front side of the stockpile facing the ROW. Thus, the mixed soil will be re-spread prior to topsoil during replacement. As a result, the mixed soils will be covered with the stockpiled topsoil, which should not adversely affect reclamation.

4.0 References

North Dakota Public Service Commission (ND PSC). 2018. Online Case Search. Available from: http://www.psc.nd.gov/database/company_case_list.php. Accessed June 2019.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook. Energy Information Administration, www.eia.doe.gov/oiaf/1605/coefficients.html

5.0 Signature

The services performed by Wenck staff for this project have been conducted in a manner consistent with the degree of care and technical skill appropriately exercised by professionals currently practicing in this area under similar time and budget constraints. Recommendations and findings contained in this report represent our professional judgment and are based upon available information and technically accepted practices at the present time and location. Other than this, no warranty is implied or expressed.

Matt Retka, Project Manager

7/02/2019
Date

1. Observation Point Coordinates

Observation Point	Date Taken	Latitude	Longitude
54	18-Jun-19	47.7440284840001	-103.432359835
55	18-Jun-19	47.7456163520001	-103.432341479
56	18-Jun-19	47.749957507	-103.431969825
57	18-Jun-19	47.750336621	-103.432638533
58	18-Jun-19	47.74985902	-103.432337623
59	18-Jun-19	47.748894095	-103.432699889
60	18-Jun-19	47.7483291550001	-103.432613472
61	18-Jun-19	47.744755195	-103.432584722
62	18-Jun-19	47.7497922160001	-103.43261431
63	18-Jun-19	47.7502355350001	-103.432632247
64	18-Jun-19	47.7505630160001	-103.432575837
75	19-Jun-19	47.743461197	-103.432584554
76	19-Jun-19	47.7434290950001	-103.432433764
77	19-Jun-19	47.7439775220001	-103.43238716
78	19-Jun-19	47.7442066840001	-103.432483384
79	19-Jun-19	47.7446155530001	-103.432530658
80	19-Jun-19	47.7423930910001	-103.43244466
81	19-Jun-19	47.742141969	-103.432613891
82	19-Jun-19	47.741282992	-103.430576334
83	19-Jun-19	47.7410233210001	-103.430346418
84	19-Jun-19	47.7428490670001	-103.43236696

Figure

North Dakota Public Service Commission

Little Missouri Lateral (OneOK)

Legend

Photo Points

OneOK PU-19-85 Centerline

500 250 0 500 Feet

N

Path: U:\GIS\2579\0036\MyProject1\PhotoPoints.aprx
Date: 7/2/2019 Time: 12:01 PM User: RetMH0505

PU-19-85 CONSTRUCTION INSPECTION

Topsoil Construction Observation Locations

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Figure 1

Appendix A

On-Site Photographs

Appendix A- On-Site Photographs

	**Observation Point: 54** Date Taken: 18-June-2019 Direction Photo is Taken: North Station 546+00 Photo Description: Beginning of topsoil removal and Jomax crew inspection. Latitude: 47.7440284840001 Longitude: -103.432359835
	**Observation Point: 55** Date Taken: 18-June-2019 Direction Photo is Taken: North Station 552+00 Photo Description: ROW boundary cut in a cultivated field. Latitude: 47.7456163520001 Longitude: -103.432341479
	**Observation Point: 56** Date Taken: 18-June-2019 Direction Photo is Taken: North Station 568+00 Photo Description: Spotters guiding heavy machine operators to keep topsoil stockpile within ROW boundary. Latitude: 47.749957507 Longitude: -103.431969825

Appendix A- On-Site Photographs

	**Observation Point: 57** Date Taken: 18-June-2019 Direction Photo is Taken: Southeast Station 569+00 Photo Description: Topsoil stripped approximately 5 inches on backslope. Latitude: 47.750336621 Longitude: -103.432638533
	**Observation Point: 58** Date Taken: 18-June-2019 Direction Photo is Taken: West Station 567+00 Photo Description: Topsoil stripping too shallow within a swale. Discussed with Jared Walters, Jomax ROW Clean-up Foreman. Issue resolved on-site. Latitude: 47.74985902 Longitude: -103.432337623
	**Observation Point: 59** Date Taken: 18-June-2019 Direction Photo is Taken: West Station 564+00 Photo Description: Approximately 8-9 inches of topsoil removed from back/shoulder slope. Latitude: 47.748894095 Longitude: -103.432699889

Appendix A- On-Site Photographs

	**Observation Point: 60** Date Taken: 18-June-2019 Direction Photo is Taken: West Station 562+00 Photo Description: Approximately 7-8 inches of topsoil removed from hill summit. Latitude: 47.7483291550001 Longitude: -103.432613472
	**Observation Point: 61** Date Taken: 18-June-2019 Direction Photo is Taken: North Station 549+00 Photo Description: Calcareous subsoil under approximately 7 inches of topsoil on backslope. Stripping terminated at location. Latitude: 47.744755195 Longitude: -103.432584722
	**Observation Point: 62** Date Taken: 18-June-2019 Direction Photo is Taken: West Station 567+33 Photo Description: Gap in topsoil stockpile for water erosion control placed properly within a swale. Latitude: 47.7497922160001 Longitude: -103.43261431

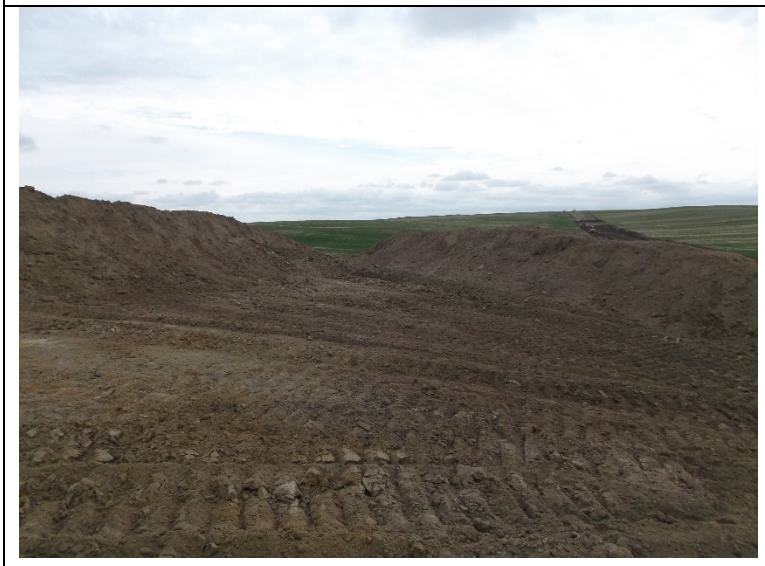
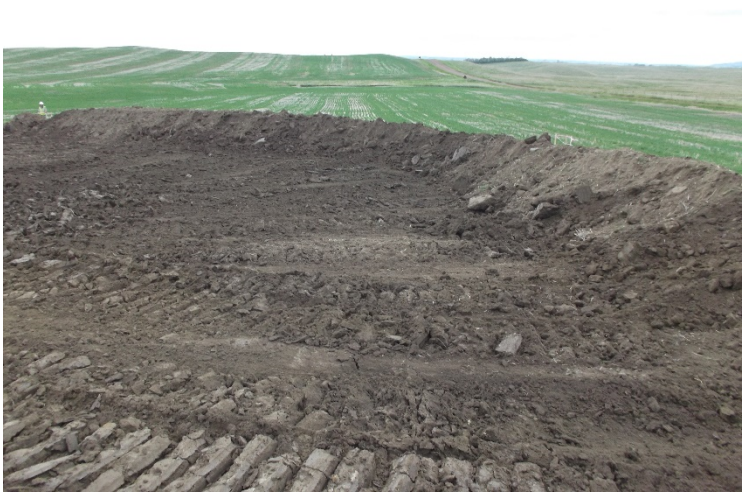
Appendix A- On-Site Photographs

	**Observation Point: 63** Date Taken: 18-June-2019 Direction Photo is Taken: East Station 569+00 Photo Description: Approximately 9-10 inches removed from backslope. Latitude: 47.7502355350001 Longitude: -103.432632247
	**Observation Point: 64** Date Taken: 18-June-2019 Direction Photo is Taken: South Station 570+00 Photo Description: ROW at the southwest quarter of T149N, R100W, Section 1. The Little Missouri Pipeline will interconnection with ONEOK's Demicks Lake Pipeline (PU-18-399) approximately 100 feet north from this point. Latitude: 47.7505630160001 Longitude: -103.432575837
	**Observation Point: 75** Date Taken: 19-June-2019 Direction Photo is Taken: South Station 544+00 Photo Description: Grading of ROW to mitigate for topography. Latitude: 47.743461197 Longitude: -103.432584554

Appendix A- On-Site Photographs

	**Observation Point: 76** Date Taken: 19-June-2019 Direction Photo is Taken: North Station 544+00 Photo Description: Lack of topsoil and subsoil segregation. Discussed with Jared Walters, Jomax ROW clean-up Foreman that subsoil and topsoil stockpiles should not be touching. Issue resolved on-site. Latitude: 47.7434290950001 Longitude: -103.432433764
	**Observation Point: 77** Date Taken: 19-June-2019 Direction Photo is Taken: North Station 546+00 Photo Description: Soil segregation. SWPPP installation for water erosion mitigation. Latitude: 47.7439775220001 Longitude: -103.43238716
	**Observation Point: 78** Date Taken: 19-June-2019 Direction Photo is Taken: East Station 546+00 Photo Description: SWPPP erosion control installation. Latitude: 47.7442066840001 Longitude: -103.432483384

Appendix A- On-Site Photographs

	**Observation Point: 79** Date Taken: 19-June-2019 Direction Photo is Taken: North Station 548+00 Photo Description: ROW stripped and graded. Latitude: 47.7446155530001 Longitude: -103.432530658
	**Observation Point: 80** Date Taken: 19-June-2019 Direction Photo is Taken: East Station 539+71 Photo Description: Topsoil stockpile on the right. Subsoil stockpile on the left. Topsoil from hill summit and of poor quality, slight effervescence on topsoil stockpile and moderate effervescence on subsoil stockpile. Latitude: 47.7423930910001 Longitude: -103.43244466
	**Observation Point: 81** Date Taken: 19-June-2019 Direction Photo is Taken: South Station 539+46 Photo Description: Topsoil stripped to color change. Latitude: 47.742141969 Longitude: -103.432613891

Appendix A- On-Site Photographs

	**Observation Point: 82a** Date Taken: 19-June-2019 Direction Photo is Taken: North Station 534+00 Photo Description: Naturally calcareous topsoil and of poor quality. Latitude: 47.741282992 Longitude: -103.430576334
	**Observation Point: 82b** Date Taken: 19-June-2019 Direction Photo is Taken: South Station 534+00 Photo Description: Topsoil stockpile reflects the limited topsoil supply and poor quality. Latitude: 47.741282992 Longitude: -103.430576334
	**Observation Point: 83** Date Taken: 19-June-2019 Direction Photo is Taken: West Station 532+79 Photo Description: Topsoil and subsoil stockpiles. Subsoil stockpile was clayey. Latitude: 47.7410233210001 Longitude: -103.430346418

Appendix A- On-Site Photographs

Observation Point: 84
Date Taken: 19-June-2019
Direction Photo is Taken: Northeast
Station 543+31

Photo Description: Extra ROW workspace at bottom of slope. Workspace not fully stripped of topsoil. Discussed with David Burrow, Jomax Superintendent, that if workspace was to be utilized that additional approximately 1-2 inches would need to be stripped.

Latitude: 47.7428490670001
Longitude: -103.43236696

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