Little Missouri Lateral Pipeline Project

HORIZONTAL DIRECTIONAL DRILLING INADVERTENT RELEASE CONTROL PLAN

ISSUED FOR CONSTRUCTION

Prepared by:

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Horizontal Directional Drilling Inadvertent Release Control Plan
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LIST OF ACRONYMS AND ABBREVIATIONS

EI	Environmental Inspector
ESA	Environmentally Sensitive Area
HDD	Horizontal Directional Drill
SDS	Safety Data Sheet
ONEOK	ONEOK Bakken Pipeline, L.L.C..
PCN	Preconstruction Notification
Project	Littler Missouri Lateral Pipeline Project

1.0 PURPOSE AND NEED

ONEOK Bakken Pipeline, L.L.C. (ONEOK) has developed this *Horizontal Directional Drilling Inadvertent Release Control Plan* for the Little Missouri Lateral Pipeline Project (Project). The horizontal directional drill (HDD) method will be used to install the pipeline at selected waterbody crossings and certain other features that will not be open cut/trenched and are not suitable for conducting a bore. Under optimal conditions, the HDD method involves no disturbance to the bed or bank of the waterbody being crossed or allows the highway, steep slope, or environmentally sensitive area (ESA) to be crossed without excavating between the HDD entry and exit points. However, if a natural fracture or unconsolidated area in the ground is encountered, an unexpected release of drilling fluid to the environment could occur. The objective of this *HDD Inadvertent Release Control Plan* is to provide procedures that will minimize the potential for release of drilling fluid into sensitive resource areas such as wetlands, waterbodies, and ESAs, or onto the adjacent surface soils, and should a release occur, prescribe measures to control the extent of the release and cleanup and dispose of the drilling fluid.

2.0 DRILLING BASICS

The HDD method is a technically advanced process involving specialized equipment and skilled operators. The method involves placing a drill unit on one side of the feature to be avoided (e.g., a stream) and drilling a small-diameter pilot hole under the feature along a prescribed profile. After the pilot hole has been completed, specialized reaming tools are used to enlarge the pilot hole to accommodate the desired diameter for the pipeline. Once the properly-sized hole is established, the pipe section is pulled through the hole by the drilling rig and welded to the adjoining sections of pipe on each side of the feature.

3.0 DRILLING FLUID AND DRILLING FLUID SYSTEM

The directional drilling process uses drilling fluid consisting primarily of water and bentonite, a naturally occurring clay. Drilling fluid removes the cuttings from the bore hole, stabilizes the walls of the bore hole and acts as a coolant and lubricant to the drill bit during the drilling process. The drilling fluid mixture consists of a small percentage of bentonite clay and inert solids generated during the drilling process from the bore hole cuttings with the remainder being water. Under certain conditions an additive may need to be mixed with the drilling fluids/mud for viscosity or lubricating reasons. Only non-hazardous additives will be used and a Safety Data Sheet (SDS) for all additives will be maintained on-site.

The drilling fluid is prepared in the mixing tank using both new and clean recycled drilling fluid. The fluid is pumped through the center of the drill pipe to the drilling tools. Return flow is through the annulus created between the wall of the drilled hole and the drill pipe. During pilot hole drilling the cuttings are returned to a small excavation at the entry point called the entry pit. From the entry pit, the returned fluid is pumped to the fluid processing equipment. Typically, shaker screens, desanders, desilters, and centrifuges process and remove increasingly finer cuttings from the drilling fluid. The cleaned fluid is recycled to the mixing tank for reuse in the borehole. The cuttings removed by the cleaning process are disposed of at a site approved to accept this type of material.

4.0 DRILLING FLUID RELEASE

The primary environmental risk associated with the HDD crossing method comes from the potential for inadvertent release (IR) of drilling fluid into a waterbody, wetland, or ESA. A drilling fluid release is indicated when pressure in the drill hole is not maintained and/or a loss of circulation of drilling fluids occurs. Minimal, consistent losses of drilling fluid are common during the drilling process due to the fluid filling natural voids in layers of loose sand, gravel, or fractured rock encountered along the drilling

path. Larger losses of circulating drilling fluid and a reduction in drilling pressure indicate that seepage is occurring outside of the hole.

4.1 PREVENTION

Drilling fluid releases can occur when the drilling path encounters naturally occurring fractures in bedrock or other voids in the strata that allow the pressurized drilling fluid a less resistant path to the surface. Drilling fluid releases may also be caused by blockage of the return flow path around the drill pipe where pressurization of the drilling fluid rises above the containment capability of the overburden soil material. The following will be implemented as preventive measures to reduce the potential for a release of drilling fluid.

4.1.1 Suitable Material and Adequate Overburden

Prevention of drilling fluid seepage is a major consideration in determining the profile of the HDD crossing. A minimum 15-foot depth of cover below the bottom of a waterbody is required to provide a margin of safety against drilling fluid seepage.

The areas that present the highest potential for drilling fluid seepage are the drill entry and exit points where the overburden depth is minimal. Appropriate containment materials will be staged near the entrance and exit locations for quick deployment should an inadvertent return occur within these areas.

4.1.2 Pipeline Geometry

The geometry of the pipeline profile can affect the potential for drilling fluid seepage. In a profile which forces the pipe to make compound or excessively tight radius turns, key-seating of the drill pipe may develop, blocking the return flow to surface, allowing down-hole pressures to build up, thereby increasing the potential for drilling fluid seepage. The profiles for ONEOK's pipeline crossings minimize this potential, with very smooth and gradual vertical curves in the crossing profile, therefore affording consistent cover under the waterbody. Therefore, the potential for pressure buildup caused by pipeline geometry has been minimized.

4.1.3 Pre-construction Planning

Prior to initiating the drill, IR response equipment required by this *HDD Inadvertent Release Control Plan* will be staged on site. All personnel working the drill site will be trained on the requirements of this *HDD Inadvertent Release Control Plan* and, where applicable, on-site briefings about the sensitive nature of the feature being crossed will be conducted.

4.1.4 Pre-construction Measures for Environmentally Sensitive Areas

ONEOK will avoid all streams and wetlands that would trigger a Preconstruction Notification (PCN) with the U.S. Army Corps of Engineers (USACE/Corps). ONEOK will accomplish this by either routing around features that would require a PCN or by using an HDD or conventional bore methods to avoid the features. Locations on or immediately adjacent to the right-of-way (ROW) will have specific mitigation measures on the ESA plans.

The Little Missouri Lateral Pipeline will cross ESAs using the HDD or conventional bore method. Instructions for ESA crossings are given throughout this *HDD Inadvertent Release Control Plan*. Refer to site-specific ESA plans for further information.

Prior to construction in an ESA, the following measures will be implemented:

- ESAs will be marked with signage, exclusion fencing, or both;
- Cultural and Biological surveys will be conducted of the drilling entry and exit areas, surrounding work areas, and the drilling route to ensure that there are no cultural materials present on the surface;
- Excavation of all entry and exit points will receive full-time monitoring where required by ONEOK;
- Barriers will be installed between the bore site and the sensitive resource(s) to prevent released mud from reaching the sensitive resources;
- It will be ensured that all personnel understand their responsibility for timely reporting of IRs of drilling mud by conducting on-site briefings;
- Necessary response equipment will be maintained at an accessible location; for each wetland or waterbody crossed equipment will be available on both sides of the feature outside of the ESA; and
- Mats will only be allowed at some ESAs. The contractor will need to review the ESA plans prior to construction for restrictions.

4.1.5 Responsibility of HDD Contractor and Operator

ONEOK's HDD contactor is responsible for execution of the HDD, including actions for detecting and controlling drilling fluid seepage as well as containment and cleanup of inadvertent returns.

4.2 DETECTION AND MONITORING PROCEDURES

To determine if an IR has occurred, HDD activities will be constantly monitored on this project. Monitoring procedures will include:

- Continuous inspection along the drill path during active drilling with mud circulation. Construction observers will be briefed on what to watch for and will be made aware of the importance of timely detection and response actions to any release of drilling mud.
- Construction observers will have appropriate operational communication equipment (e.g., radio and/or cell phone) available at all times during installation of the HDD crossing, with the ability to communicate directly with the HDD operations control center.
- Continuous examination of drilling mud pressure gauges and return flows to the surface pits. If the HDD operator realizes a sustained loss in fluid pressure or loss of circulation, the operator will immediately notify the construction observers of the assumed position of the drill head who will attempt to locate the potential release. The environmental and construction inspectors will be immediately notified of a release or potential release.
- If a release occurs in a wetland, containment of the drilling fluids and continued inspection to determine any potential for movement of released drilling mud within the wetland, and collection of drilling mud returns at the location for future analysis, as required.
- If a release occurs in a wetland or waterbody, monitoring of the release will be documented by ONEOK. Access to edge of waterbody will be necessary so that ONEOK will keep photographs of release events on record.

5.0 NOTIFICATION PROCEDURES

Corrective action will begin immediately when monitoring indicates a release is occurring or has occurred. The Construction Inspector or ONEOK will immediately notify ONEOK's construction management personnel and Lead Environmental Inspector (EI). In the case of an IR during the crossing of a designated ESA, wetland, or waterbody, the contactor will notify the Spill Coordinator, the Environmental Manager, Lead EI, and the designated Cultural Resources Specialist (in the case of a release within an ESA).

ONEOK will notify the appropriate agencies upon discovery of an IR to an ESA, waterbody, or wetland, detailing the location and nature of the release, corrective actions being taken, and whether the release poses any threat to public health and safety.

6.0 CORRECTIVE ACTION

In the event an IR is observed during an HDD crossing, the release will be assessed to determine the amount of drilling mud being released and potential for the release to reach sensitive resource areas (e.g., wetlands, waterbodies, or environmentally sensitive areas). Response measures will vary based on location of IR as discussed below.

As discussed above, the greatest potential for drilling fluid seepage is during drill entry and exit where the overburden is reduced for entry and exit of drilling tools at the low approach angle. In the contingency planning for the pipeline crossings, drilling fluid seepage containment will be incorporated into the drill plan. The entry or exit locations will generally be located in upland areas on a dry land segment where drilling fluid seepage can be readily detected and contained. Containment response and clean-up equipment is required to be available at both sides of the HDD crossing location prior to the commencement of the HDD to assure a timely response in the event of an IR of drilling fluid.

Containment and response equipment may include but is not limited to:

- Silt fence;
- Plastic sheeting;
- Shovels and other appropriate hand tools;
- Squeegees;
- Pails;
- Push brooms;
- Pumps and sufficient hose;
- Mud storage tanks;
- Vacuum truck on 24-hour call (arrange for this service before drilling begins);
- Pre-filled sandbags;
- Geotextile fabric;
- One small boat (for larger rivers and open water wetlands);
- Steel box or large-diameter pipe section (or the equivalent) that, under appropriate conditions, could be used to contain an IR of drilling mud; and
- Light plant/generator.

ONEOK will address an IR immediately upon discovery. The following measures will be implemented to minimize or prevent further release, contain the release, and clean up the affected area:

Upland Release:

These measures apply to upland releases unless the release occurs adjacent to a wetland, waterbody, or ESA such as a stream bank or steep slope, where drilling mud releases could quickly reach a resource. If the release occurs adjacent to a wetland, waterbody, or ESA use the measures listed below that apply:

- Any modifications to the drilling technique or composition of drilling fluid (e.g., thickening of mud by increasing bentonite content, temporary lowering of the downhole pressures) will be determined and implemented to minimize or prevent further releases of drilling mud.
- Containment structures will be placed at the accessible affected area to prevent migration of the release.
- If the amount of the release is large enough to allow collection, the drilling mud will be collected and returned to either the drilling operations or a disposal site by hose or tanker.
- If the amount of the release is not large enough to allow collection, the released drilling fluid will be swept, shoveled, or mixed with sand and temporarily left in place to dry. If the amount of the release is not large enough to allow for the practical physical collection from the affected area, it will be diluted with clean water.
- If not in a designated ESA, drilling operations will be reduced if the mud release cannot be effectively contained within accessible containment areas. Within designated an ESA, drilling operations will be suspended if drilling mud cannot be effectively contained.
- If public health and safety are threatened by an IR, drilling operations will be shut down until the threat is eliminated. This measure will be taken as a last resort because of the potential for drill hole collapse resulting from loss of down-hole pressure.

Waterbody Release:

- If a release occurs within a waterbody, the Environmental Manager will contact the appropriate agency as soon as possible to inform them if there is a potential threat to public health and safety and explain whether the release can be corrected without incurring additional environmental impact. If necessary, drilling operations will be reduced to assess the extent of the release and to implement corrective actions.
- Drill pressures and pump volume rates will be continuously reviewed and adjusted to minimize the extent of the release.
- If the release is a single-point release, accessible with a hose and truck, personnel will attempt to ‘cap’ the release, if possible, by placing a section of pipe over the release to contain the fluid within the pipe section. With a larger release, personnel will attempt to place a water-filled bladder around the release in order to isolate it from the waterbody prior to removal. After the release is contained, the fluid will be pumped into trucks and reused or disposed of at an appropriate facility.
- If public health and safety are threatened, drilling fluid circulation pumps will be turned off. This measure will be taken as a last resort because of the potential for drill hole collapse resulting from loss of down-hole pressure.
- ONEOK will assist agencies by collecting water samples, if required.

- If monitoring indicates that the intake water quality at downstream user locations is impacted to the extent that it is no longer suitable for treatment, alternative water sources (i.e., trucked or bottled water) will be provided to impacted users.

Wetland/Riparian Area Release:

- The release will be evaluated to determine if containment structures are warranted and can effectively contain the release. When making this determination, ONEOK will also consider if placement of containment structures will cause additional adverse environmental impact.
- If a release occurs within the wetland, reasonable measures, within the limitation of directional drilling technology and Contractor's capability, will be taken to re-establish drilling mud circulation.
- Any modifications to the drilling technique or composition of drilling fluid (e.g., thickening of mud by increasing bentonite content, temporary lowering of the downhole pressures) will be determined and implemented to minimize or prevent further releases of drilling mud.
- Upon completion of the drilling operations, ONEOK will consult with applicable regulatory agencies to determine any final clean-up requirements for the IR.
- If public health and safety are threatened by the IR, drilling operations will be shut down until the threat is eliminated. This measure will be taken as a last resort because of the potential for drill hole collapse resulting from loss of down-hole pressure.
- ONEOK will assist regulatory agencies with any sampling they may require.

ESA Release:

- If a release occurs within an ESA, the Lead EI will be contacted immediately so they may assess the situation. The EI will contact the Environmental manager who will notify the appropriate agency as soon as possible to inform them of a release. The Environmental Manager will communicate whether the release can be corrected without incurring additional environmental impact. If necessary, drilling operations will be reduced to assess the extent of the release and to implement corrective actions. Depending on circumstances, federal, state, and/or local agencies may require further action.
- The release will be continuously monitored.
- The release will be evaluated to determine if containment structures are warranted and can effectively contain the release. When making this determination, ONEOK will also consider if placement of containment structures will cause additional adverse environmental impact.
- Drill pressures and pump volume rates will be continuously reviewed and adjusted to minimize the extent of the release.
- If public health and safety are threatened, drilling fluid circulation pumps will be turned off. This measure will be taken as a last resort because of the potential for drill hole collapse resulting from loss of down-hole pressure.
- All mitigation measures employed for releases within ESAs will be closely documented to assist with ONEOK's agency notification process.

7.0 ABANDONMENT

If corrective actions do not prevent the threat to public health and safety, or if the pipeline installation is unsuccessful, ONEOK may opt to re-drill the hole along a different alignment after receiving appropriate

regulatory approvals. In this case, the following procedures will be implemented to abandon the previous drill hole.

- To seal the abandoned drill hole, thickened drilling mud and cuttings will be pumped into the hole as the drill assembly is extracted.
- Within approximately 10 vertical feet of the surface, drilling mud and cuttings will be removed, then the drill end points and any mud pits will be filled with soil, and the location graded to the original contour.
- In the case of an ESA crossing, no alternative crossing methods would be implemented without the proper notification and approvals from ONEOK.

8.0 FOLLOW-UP

After the drilling fluid seepage has been contained, the drilling contractor will try to determine the cause of the seepage. After the cause has been determined, measures will be implemented to control the factors causing the seepage and to minimize the chance of recurrence.

In some cases, the corrective measure may involve a determination that the existing hole encountered a void, which could be bypassed with a slight change in the profile. In other cases, it may be determined that the existing hole encountered a zone of unsatisfactory soil material and the hole may have to be abandoned. If the hole is abandoned, it will be filled with cuttings and drilling fluid, as described in Section 7.0.

9.0 CLEAN UP

Clean-up measures following mud releases in uplands, wetlands, and waterbodies will be implemented as determined by this *HDD Inadvertent Release Control Plan* and in consultation with the appropriate regulatory agencies. The following measures will be considered as appropriate:

- Drilling mud will be cleaned up by hand using hand shovels, buckets, and soft-bristled brooms as possible without causing extensive ancillary damage to existing vegetation. Clean water washes may also be employed if deemed beneficial and feasible by the Lead EI and monitor.
- Backhoes or other mechanized earth-moving equipment will not be used to clean up drilling fluid seepage within ESAs, waterbodies, or wetlands.
- Containment structures will be pumped out and the ground surface scraped to bare topsoil without causing undue loss of topsoil or ancillary damage to existing and adjacent vegetation.
- Material will be collected in containers for temporary storage prior to removal from the site.
- Potential for secondary impact from the clean-up process is to be regularly evaluated and clean-up activities terminated if physical damage to the site is deemed to exceed the benefits of removal activities in consultation with the appropriate regulatory agencies and/or field representatives.