Division of Surface Water
August 2023

Environmental Protection Agency

Horizontal Directional Drilling (HDD) Contingency Plan Guidance

A Horizontal Directional Drilling (HDD) Contingency Plan (Plan) should be developed and implemented in the event HDD is anticipated for the construction and installation of transmission and gathering lines. A copy of the HDD Plan need be on-site and available for review at each location where drilling will occur. The Plan, at a minimum, should include the following sections with stated basic elements:

Introduction

The introduction should provide a narrative stating the Plan provides procedures and steps to effectively address an inadvertent return of a non-toxic clay and water slurry used in HDD. HDD activities do not include slick bores. The introduction should state that the Plan will be implemented and maintained on each site where HDD operations are intended. This section should state that all key personnel associated with HDD operations, including inspection and monitoring, will be trained with respect to all content of the Plan. Lastly, the introduction should clarify if any polymers or other additives will be incorporated in the HDD Slurry used in directional drilling and should be evaluated in accordance with the Drilling Fluid Additives and LCM section of the Plan.

Planned HDD Crossing

This section of the Plan should include a narrative addressing the method(s) of construction utilized to avoid features such waters of the state, manmade structures and other protected areas. The Plan should include a narrative of the drilling process including the establishment of drill pit entry and exit locations, pilot hole installation, reaming operations, pipe installation, hydrostatic testing and final reclamation.

This section should detail the content and intended use of the associated drilling fluids. All drilling fluids must be limited to a non-toxic clay, water and any drilling fluid additives used in accordance with the drilling fluid additive/LCM section of this guidance document. The Plan should include how and where the makeup water is obtained.

An inadvertent return (IR) shall be defined in this section and should include all unintended fluid returns which reach the surface. Understanding, fluid loss may result from formational fluid loss or hydraulic fracturing, the IR definition should also include:

- Losses of fluids to underground formations defined by a loss of fluids and/or annular pressure which exceed 50 percent over a 24-hour period, or
- A 25 percent loss or greater of fluids and/or annular pressure sustained over a 48-hour period, or
- A daily max (24 hours) not to exceed 50,000 gallons of drilling fluids loss.

Protocols for monitoring drilling pressures, circulation and loss of fluids to underlying formations should be included in the Plan. Continual annular pressure monitoring should be inclusive.

This section should include a narrative of conditions which could lead to a loss of drilling fluid pressure, loss of fluids and/or loss of circulation and associated corrective actions. In addition, corrective action triggers (i.e., “swab the bore hole,” “trip,” “LCM’s,” etc.) should be clearly defined in this section. At a minimum, corrective action should be initiated and completed until such time appropriate circulation/pressures are restored and until such time the IR as defined in this section is eliminated.

Site Specific Information

The Plan should address site specific evaluation and conditions including:

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1. Geology and hydrogeology: An evaluation of geology and hydrogeology should be conducted to evaluate conditions favorable to an IR. At a minimum, a bore hole should be evaluated through all formations where drilling operations will occur. The Plan should include a site-specific appendix for each HDD site. The Appendix should identify the environmentally sensitive areas that may be impacted by an IR. The Plan should identify any specific equipment or supplies needed to address an IR within that sensitive area that are not already identified in the Plan.
2. Evaluation of alternate conditions: In addition to loss of circulation, the Plan will need to include other site-specific factors that may indicate that conditions are favorable for an IR.
3. Standard Operating Procedures (SOPs): The Plan should include detailed discussion regarding the potential to encounter abnormal conditions such as: a bore hole through formation where there is no circulation of HDD slurry or a large void is detected during the bore. The Plan should include the company's response plan to these abnormal conditions. This should include all SOPs that are followed when there is no return or minimal down-hole pressure.
4. Relief well: The use of a relief well should be evaluated for all sites involving an environmentally sensitive area and be inclusive in the site-specific section of the Plan.
5. Resource evaluation: The site-specific section should identify the location of all surface water bodies within the potential area of impact from an IR. The Plan is to include each location as an inspection point in the Inspection log. A detailed list of containment measures and BMP's specific to each resource be identified in this section. Document the location of nearest public water supply.
6. Containment measures: Due to the unpredictability of an IR, in relation to location and volume, the Plan should list the equipment and supplies that will be staged in reasonable proximity to each HDD location that will adequately provide primary and secondary containment regardless of conditions. The Plan will need to identify the specific location where the material will be staged. The primary and secondary containment systems will need to be designed to ensure the IR is contained and controlled over the expected course of the IR. Secondary controls are required as a redundancy and the containment volume must support 110 percent of the primary containment volume. The Plan should address controls which can be expeditiously implemented in the event of an unexpected IR. This would include, but not limited to, pumps, storage tanks, coffer dams, steel sheet piles, sandbags and straw bales. Containment planning needs to address an IR in wetland areas, open water, and within streams.
7. Recovery equipment redundancies: The Plan should specify that IR response equipment and supplies are solely dedicated for containment and recovery actions related to an IR event. Equipment and supply levels need be maintained and replenished in the case of multiple IR events at the same HDD location.
8. Adjacent property owners: Include and maintain a list of adjacent properties owners in order to obtain access in the event of an IR outside the right of way. Attempt to acquire access prior to drilling operations in the event of an IR outside the right of way.

Monitoring Procedures

HDD activities should be continually monitored and documented by the construction inspector, contractor, environmental inspector, third party inspector, or any combination of the four.

The drill path needs be evaluated prior to commencement of drilling operations to assess any condition that impedes the ability to conduct visual observations. Modifications to inspect these areas need be documented in the site-specific section of this Plan.

Documentation logs must be filled out after every shift and, at a minimum, include the following:

- Authorized representative conducting the inspection
- Time and date of the inspection

- Evaluation of drilling fluid pressures (documenting losses per hour)
- Quantification of drilling fluid loss and return flows per hour
- Documentation of visual observations along the drill path (conducted every 4 hours)
- Documentation of visual observations of wetlands and streams on or near the drill path (conducted every 2 hours)
- Consistent recording of drill status including drill conditions, pressures, returns and progress during the course of the shift
- Evaluation of on-site recovery equipment in the event of an IR
- Documentation the HDD Plan is on-site
- Continuous, 24-hour monitoring of pumps utilized on-site

Notification Procedures

Notify Ohio EPA via a telephone call to Ohio EPA's 24-hour Emergency Spill Hotline at 1-800-282-9378 of all inadvertent returns within 60 minutes of discovery.

Provide details regarding the location and quantity of the release. Identify if the release has resulted in a discharge to waters of the state or poses a threat to public health or safety.

Immediately upon discovery of an IR, initiate corrective action pursuant to the Corrective Action Section of the Plan.

Contact the property owner affected by the IR and coordinate with them on the corrective actions necessary to contain and remediate the release within 60 minutes of discovery. Seek access agreements with the property owner where the IR occurred and for any other properties where access would assist with emergency response actions.

If Ohio EPA's Office of Emergency Response staff deploy to the incident, Ohio EPA's On Scene Coordinator (OSC) will manage the incident by following Incident Command System principles. The OSC is the permittee's point of contact throughout the duration of the incident and until the OSC makes a positive determination that no further emergency response actions are necessary.

Ohio EPA reserves the right to activate its Level of Effort Contractor as appropriate to redress an environmental emergency to protecting public health, safety and the environment. Entities may be subject to response costs as set forth in ORC Section 3745.12.

Corrective Actions

Upon discovery of a sustained loss of circulation or pressure exceeding a duration of 30 minutes, the drilling operator will begin to reduce down-hole pressure and conduct a visual inspection of the drill path and sensitive areas for evidence of an IR. If an IR is detected as defined by the Planned HDD Crossing Section, initiate the following:

If public health and safety are threatened by an inadvertent release, drilling operations will be immediately shut down until the threat is eliminated.

Upon discovery of an IR, above, within waters of the state or other sensitive area, a temporary suspension of drilling operations will take place until measures are in place to manage, control, and contain the release acceptable to Ohio EPA.

The drilling contractor needs to evaluate an IR to the surface and provide containment structures to effectively contain the release. When making this determination, the drilling contractor needs to consider if placement of containment structures will cause additional adverse environmental impact. Secondary containment, supporting 110 percent of the primary volume will also be designed and installed as practicable.

If the amount of the release is large enough to allow collection, the collected fluids must be returned directly to the drilling operations or an approved Ohio EPA disposal location.

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If a wetland or waterbody release occurs, determine the potential movement of released drilling fluids and consider remediation/mitigation options accordingly.

All releases to waters of the state need be documented in the monitoring/inspection logs and include relative information, including but not limited to; Date and Time of Release, drilling conditions leading up to the release, location coordinates in decimal degrees, photographs, estimate of quantities, location of public and private water supplies, corrective actions taken and an evaluation of effective containment and remediation equipment on-site.

Upon completion of the drilling operations, consult with applicable regulatory agencies and develop a site-specific plan to determine any final clean-up requirements for the IR.

Depending upon the type and duration of an IR, if necessary impacts to benthic and/or aquatic communities will be remediated to restore the function of the community. Additionally, site-specific plans will be developed to offset or mitigate any long-term impacts to the aquatic environment via mitigation or some other form of mitigation to replace the loss of function or value.

For any impacts to public or private water supplies, provide temporary or permanent, short or long-term replacement of the water supply until the water supply is restored to its pre-IR condition.

In the event of an IR in a stream, several contingency procedures are possible, depending on the width and flow of the stream at the time of the IR. The potential use of preferred contingency measures need be listed in the site-specific section of this Plan. All instream corrective measures must be approved by Ohio EPA and may include the following for purposes of appropriate planning:

- turbidity curtain
- straw bales (backed with impermeable layer)
- sandbags
- cofferdams
- dam and pump section
- flumed section
- stand pipe or alternate in stream containment
- relief well

Best Management Practices (BMPs)

1. Implement the following BMP's:
    - Effective sediment barriers, including the installation of silt fence and/or other equivalent erosion control devices (ECDs).
    - Installation of slope breakers in areas where ground disturbance leading to or from the HDD location may cause sedimentation downslope.
    - Installation of silt fence and other ECDs at wetland or waterbody edges near the HDD location to further protect the resources.
    - Utilization of sediment ponds or traps when design parameters of sediment barriers are exceeded.
    - Proper trench dewatering techniques for trenches leading to or from the HDD location, using a filter bag and silt fence/straw bale structure and sediment ponds or traps as dewatering structures to comply with applicable water quality standards. There will be no turbid discharges to waters of the state resulting from dewatering operations.
    - Use of secondary containment for pumps or equipment within 50 feet of a wetland or waterbody.
    - Relevant sections of Ohio EPA's Rainwater and Land Development Manual or other applicable state design specifications.

- Timely reclamation and stabilization of the areas following construction, with temporary ECDs maintained and monitored until final stabilization is achieved, at which time any necessary permanent ECDs would be installed.

2. Have on-site, prior to drilling, an appropriate supply of materials and equipment to contain an IR at both sides of the HDD. This would include, but not be limited to:
    - straw bales
    - silt fence
    - sandbags
    - Hand tools
    - pumps and hoses
    - vacuum truck(s)
    - backhoe
    - bulldozer
    - equipment mats
    - cofferdams
    - sheet piling
3. In the event of an IR, an appropriate number of pumps will be staged to volumetrically control the current release, as well as any further anticipated releases. Additional equipment and supplies will be brought into supplement and provide for redundancy of critical systems in case of mechanical failure or an increase in the severity of a situation. In addition, pumps or other active relief systems will be continuously monitored while in use.
4. Provide training to ensure that personnel associated with the HDD are knowledgeable concerning this Plan and other applicable construction plans approved for the project. All training will occur on site and the training events and attendees will be documented. In addition, records of occurrences and attendees of job safety analysis meetings will be documented.
5. Monitor annular flow and injection pressure on a continuous basis to identify any significant, rapid variances, which may be a sign of reduction or loss of circulation.

Alternative Contingency Plan

If the corrective actions described above do not correct the problem, you need to abandon the drill hole and consider alternate measures. Consult with Ohio EPA to determine if an HDD failure has occurred and evaluate alternative site-specific remedies. An HDD attempt will be considered failed if any of the following occur:

- circulation is insufficient to maintain the integrity of the borehole
- circulation losses present an imminent risk to human health or the environment
- the borehole location cannot be maintained within the required limits as defined by an IR in Part II.B of this permit.

In the event of borehole failure, the borehole will be properly abandoned and a decision will be made regarding whether to re-attempt the HDD crossing, or use another crossing method, as described below:

- grout will be pumped into the borehole to completely seal and fill 30 feet of hole entirely with grout, understanding that the top 5 may be filled with topsoil, and
- the location will be graded to the original contour.

The above abandonment procedures will be discussed with all appropriate permitting and regulatory agencies prior to implementation.

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Alternative Crossing Locations and Methods

If the HDD cannot be completed at the proposed location, the HDD will be re-attempted at an alternate location. Before a determination is made on an alternate crossing location, an effort will be made to identify and assess the reason for the drill failure. This may be critical for the selection of the alternate crossing.

Considerations of alternative locations include, but are not limited to, the following:

- horizontal relocation of the drill hole
- changing of the drill profile (depth of hole)
- changing drill procedures (slurry viscosity/pressure/flow velocity, bit rotation/velocity, etc.)
- additional soil borings and geo tech evaluation.

If the entry and exit points need to be relocated, consideration will be given to:

- Stream bank type, flow width, depth, velocity and flow volume
- Surrounding topography
- Condition of riparian areas
- Condition and extent of wetlands, if any, on each side of the alternate crossings
- Aquatic biota
- Downstream water uses
- Entry and exit angles for the HDD path
- Permitting considerations

These and other factors will be considered and discussed with Ohio EPA and all appropriate regulatory agencies to secure the appropriate approvals.

Alternate crossing methods, if determined to be necessary, may include:

- open cut
- auger boring
- pipe jacking
- microtunneling

Drilling Fluid Additives and Lost Circulation Materials (LCM's)

Drilling fluid additives and LCM's must be comprised of and consistent with materials used in the drinking water distribution industry. Acceptable materials would include products only containing nontoxic clays, cements, ash and other non-toxic substances as indicated by the corresponding safety data sheets (SDS or MSDS). Any use of drilling fluid or LCM's containing any petroleum-based products is strictly prohibited.

Disposal Considerations for Drilling Fluids and Drill Cuttings

All drilling fluids must be analyzed to ensure appropriate disposal. Representative Sampling must be done in accordance with sampling method SW-846 8260B for volatile organic compounds and SW-846 8270C for semi-volatile organic compounds. In lieu of disposal at an approved sanitary landfill, drilling fluids determined to be non-toxic, contain drilling fluids or additives consistent with drinking water standards and the analytical results indicate there is no presence of petroleum constituents may be considered for on-site disposal pursuant to the following conditions:

- For an on-location burial option, the site must be fully contained within the right-of-way of the gathering or transmission line being installed.
- The placement does not occur in surface waters of the state or result in a discharge to surface waters of the state.
- The spent drilling fluids and drill cuttings should be buried in either an excavated pit or mixed with overburden removed from the gathering right–of-way during gathering line construction/installation purposes at a ratio of one to one.

- The material must be buried in a manner to prevent ponding or transport of stormwater through the material (for example, crested in the middle and a slope to edge of disposal area).
- The burial location is not to be located in sensitive hydrogeological areas (for example, shallow ground water, shallow sand and gravel lenses or fractured bedrock, etc.).
- The burial location must be located at least 100 feet from any permanent surface water.
- The burial location must be located a minimum of 100 feet from any potable water supply well and 300 feet from any large supply public water supply well.

Contact

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