CONTINGENCY PLAN FOR HDD PIPELINE INSTALLATIONS

New York State Electric and Gas
Seneca West Pipeline Interconnect Project
Chemung County, New York

May 2013

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1.0 INTRODUCTION

New York State Electric and Gas (NYSEG or Company) plans to construct approximately 5.0 miles of 8-inch outside diameter (OD) natural gas pipeline in the Towns of Big Flats and Horseheads and the Village of Horseheads, Chemung County, New York (Project Site) that will cross multiple streams, wetlands, and a residential area with existing infrastructure. This document serves as reference for the handling, containment and clean-up of any inadvertent releases of drilling fluids and an alternative plan in case of process failure during pipe installation through the use of the HDD method.

The purpose of this contingency plan is to:

- Minimize the potential for inadvertent releases of drilling fluids into any wetlands waterbodies, or other sensitive areas.;
- Provide for the timely detection of and response to inadvertent releases;
- Protect areas that are considered environmentally sensitive (streams, wetlands, other biological resources, cultural resources) while responding to an inadvertent release;
- Ensure the implementation of an organized, timely, and “minimum-impact” response in the event an inadvertent release of drilling fluid occurs; and,
- Ensure that all appropriate notifications are made in a timely manner to NYSDEC, USACE, NYPSC, and other resource management agencies;
- Provide for an alternative plan in case of drill failure.

2.0 CONTINGENCY PLANNING FOR INADVERTENT RELEASES

Prior to construction, the selected drilling contractor will prepare and submit a detailed drilling plan for NYSEG's review and approval. Major elements of the contractor's drilling plan will include:

- Work plan and detailed description of the drilling program (specifications for executing pilot hole, reaming, pull-back operations, and schedule or timeline of events);
- Description of the proposed drilling equipment and drill site layout (a typical HDD site layout is shown in Figure 1);
- Material Safety Data Sheet (MSDS) information for all drilling fluid products proposed for use;
- Procedures for drilling fluid management (*i.e.,* metering of makeup water, recording of drilling fluid product quantities utilized, fluid return volumes, fluid and cuttings disposal quantities, *etc.*)*;*
- Contingency plan for inadvertent returns, and
- Mud disposal procedures

2.1 GENERAL OBSERVATIONS REGARDING INADVERTENT RELEASES

Subsurface conditions that could be conducive to inadvertent returns or drill failure include:

- Highly permeable soil such as gravel;
- Presence of rock joints or other subsurface fractures;
- Considerable differences in the elevations of HDD entry and exit points; and,
- Disturbed soil, such as piling and fill.

2.2 BASIC HDD CONTINGENCY PLAN ELEMENTS

The following section presents the basic strategy for contractor management of the overall HDD program as well as responses to inadvertent releases. It is expected that the selected drilling contractor will adopt and amplify this basic plan during the development of their site-specific HDD contingency plan. The basic plan outlines the following activities:

- Steps contractor will take to identify sensitive resources and potential release sites;

- How contractor will respond to any inadvertent release of drilling fluid into wetlands, waterbodies or other sensitive areas; ;

- How contractor will seal the drill hole if abandoned; and,

- The procedures that will be used to contain and clean up any inadvertent releases, including providing immediate notification to BGCNY and, including but not limited to, the company on-site Environmental Monitor, HDD inspector, the chief project inspector, the project construction manager, and any applicable permitting agency.

2.3 PRE-CONSTRUCTION CHARACTERIZATION OF SENSITIVE AREAS WITHIN WORK SPACE AND CROSSING ALIGNMENT

At each drill location, NYSEG and its contractor will identify and clearly delineate any sensitive habitats, communities, or cultural resource or municipal storm control features within the proposed workspace limits or adjacent to the proposed drilled alignment. These are resources that could be adversely impacted through drilling fluid deposition or remedial actions to contain and clean up an inadvertent release.

The contractor will also survey the drilling alignment for signs of previously disturbed ground where inadvertent returns may be likely to occur. At each drill location, NYSEG and its contractor will attempt to identify potential areas susceptible to frac-outs, as inadvertent returns frequently occur within the first and final 200 feet of the drill path (GRI, 2002). In addition, NYSEG and its contractor will determine if any sensitive areas are located within the first 200 feet of the drill path (150 feet to either side of the drill path). Areas identified by NYSEG and/or contractor as being either sensitive to drilling fluid deposition or more susceptible to inadvertent returns will be monitored more closely during construction.

2.4 MUD CONTINGENCY PLAN

NYSEG and its contractor will work with the drilling contractor prior to construction to design the crossing and plan the construction phase of the HDD crossings. This planning will include the mud contingency plans. NYSEG will also work with the drilling contractor to determine the best method of disposing of the drilling mud. Currently, the method of mud disposal being evaluated is r disposal at an approved off-site disposal location.

The purpose of this section is to aid NYSEG in developing a program designed to eliminate or minimize adverse effects from HDD fluid seepage. Included is a description of the typical drilling fluid and drilling fluid system, a description of the drilling fluid disposal plan, and a description of contingency plans for inadvertent seepage of drilling fluid and mitigation measures at the entry and exit points.

2.4.1 Drilling Fluid and Drilling Fluid System

The inadvertent release of drilling fluids is a potential concern where HDD methods will be used to install pipeline crossings under stream or other sensitive areas as well as any

associated cultural resource sites or riparian habitats. All stages of HDD involve circulating drilling fluid from equipment on the surface through a drill pipe to a downhole bit or reamer and back to the surface through the annular space between the pipe and the wall of the hole.

Drilling fluid performs several key functions during the HDD installation process including hydraulic excavation of soils, transmission of hydraulic power, transportation of drilled spoil, hole stabilization, cooling and cleaning of cutters, and reduction of friction. Under ideal circumstances, drilling fluid exhausted at the bit or reamer will flow back to the entry or exit point through the drilled annulus. Under actual conditions, this happens inconsistently. Drilling fluid expended downhole will flow in the path of least resistance. In the drilled annulus, this path may be an existing fracture or fissure in the soil. This can result in dispersal of drilling fluid into the surrounding soils, known as lost circulation, or discharge to the surface at some random location, known as inadvertent returns. Lost circulation and inadvertent returns are possible occurrences in pipeline installation by HDD and do not prevent completion. However, the environment may be impacted if drilling fluid inadvertently returns to the surface at an environmentally sensitive location. Drilling parameters may be adjusted to maximize circulation and minimize the risk of inadvertent returns. However, the possibility of lost circulation and inadvertent returns cannot be eliminated.

The major component of drilling fluid used in HDD pipeline installation is fresh water. In order for water to perform the required functions, it is generally necessary to modify its properties by adding a viscosifier. The viscosifier used almost exclusively in HDD drilling fluids is naturally occurring bentonite clay mined by open pit methods from locations in Wyoming and South Dakota. Bentonite is not a hazardous material as defined by the Environmental Protection Agency's characteristics of ignitability, corrosivity, reactivity, or commercial chemicals. It is also used to seal earth structures such as ponds or dams and as a suspending component in livestock feeds. "High-yield" bentonite, which contains benign polymers to improve drilling fluid properties and reduce viscosifier requirements, is typically used in the HDD industry.

Although high-yield bentonite is non-toxic, benthic habitats and aquatic organisms (benthic invertebrates, aquatic plants, and fish-spawning habitat) can be impacted by deposition and accumulation of clay material if an inadvertent drilling fluid release occurs within a waterbody or adjacent riparian area.

2.4.2 Biodegradable Drilling Fluid

NYSEG's Seneca-West Pipeline Interconnect Project will not be utilizing biodegradable (BD) drilling fluids. All drilling fluids, BD based or water based, are designed to meet the anticipated requirements of the hole to be drilled. Their purpose is to both lubricate the cutting head and suspend in solution the cuttings that are produced during the drilling process.

Both BD based and water based fluids have advantages and disadvantages. BD based fluids provide excellent lubricating properties and because of their BD nature, if inadvertently leaked out of the drilled hole (via fissures in the soil/rock) during the drilling operation will biodegrade over time and are therefore considered by the environmental community to be an advantage. Water based drilling fluids on the other hand, which contain bentonite (an inert

type of clay) as the lubricating agent, if leaked out of the drilled hole (via fissures in the soil/rock) during the drilling operation will lose the bentonite as the water in the solution dissipates. This can cause the environmental community concerns, not because of the toxicity of bentonite, but rather because of the possible silting of streams if the release occurs within a stream.

One of the disadvantages of BD fluids is that they are more time critical than water based fluids. As noted above, one of the base purposes of drilling fluids is to suspend in solution the cuttings that are produced during the drilling process. The ability of BD fluids to do this is a function of the design of the BD fluid mix, but in general their ability to suspend solids is more time sensitive than water based fluids – in other words, they are designed to hold solids in suspension for a period of time and once that time is reached, the solids begin to drop out of solution at a much more rapid rate than a similarly timed water based fluid mix.

This solid dropout rate is not normally an issue if all goes as planned during the drilling and pipe pull back process as the mix is designed to not degrade until after the pull back is anticipated to be complete. However, if issues arise that affect the plan (such as mechanical breakdown of a drilling rig component, requirement to change out drilling head, additional need to clean the hole before pull back, weld cutout on the pullback pipe, etc.) solids that begin to rapidly drop out of a BD fluid will begin to fill the drilled hole, causing additional friction on the pipe, increasing the amount of pull back effort required by the drilling rig potentially to the point of exceeding the rig pull back capability, causing the pipe to become stuck and ultimately the failure to complete the drilled crossing at the planned location.

At this point either a new drilled crossing must be attempted if the right-of-way and surrounding land allows for it, or an open cut crossing must be made, the avoidance of which (and the associated environmental impact) was likely the reason for attempting the drilled crossing in the first place.

The potential for getting the pipe “stuck” in the hole goes up as the pipe size, and corresponding surface area exposed to the solids that deposited increases. In discussing the use of BD fluids with drilled crossing contractors, they have confirmed that the use of BD fluids is more suitable for pipe sizes 6” and less.

NYSEG believes that for the installation of the proposed 8” diameter pipeline, the use of BD drilling fluids would increase the risk of failure of a drilled crossing and would potentially cause more environmental impact if the HDD fails and an alternate open cut crossing had to be made.

2.4.3 Drilling Fluid Seepage

2.4.3.1 Prevention

HDD is an increasingly popular method of installation whereby surface features, such as riverbed, disturbance is minimized. HDD installation does however present a remote potential for riverbed disturbance through a drilling fluid seepage. Drilling fluid seepage can be caused by pressurization of the drill hole beyond the containment capability of the overburden soil material. Providing adequate depth of cover for the installation can

substantially reduce this potential. In some cases, a drilling fluid seepage can also be caused by preexisting conditions in the geotechnical strata even if the downhole pressures are low.

2.4.3.2 Suitable Material and Adequate Overburden

In the contingency planning for the proposed crossings, prevention of a drilling fluid seepage has been a major consideration in determining the profile of the crossings. The primary factors in selecting the pipeline crossing profile are the type of soil and the depth of cover material. Cohesive soils, such as clays, dense sands and competent rock are considered ideal materials for horizontal drilling. The second factor to be considered in developing a profile is adequate overburden material. A minimum depth of cover of approximately 25-feet in competent soils should be maintained to provide a margin of safety against drilling fluid seepage. The depth of cover proposed should ensure adequate overburden throughout the crossing.

As the drill and hole opening assembly enters the ground and nears the ground surface at the exit location , there is the potential for drilling fluid seepage outside of the construction work areas. Since prevention is the best and most effective contingency plan, steps can be taken to reduce the potential for seepage in these areas. At the exit point, an exit pit can be constructed. If seepage does occur, detection will be enhanced as the seepage is contained in the exit pit.. Subsequent containment of the mud can therefore be planned and managed. Containment dikes in the form of berms and hay bales will contain any seepage and minimize any migration of the mud from the work area.

2.4.3.3 Pipeline Geometry

The geometry of the pipeline profile can also affect the potential for drilling fluid seepage. In a profile which forces the pipe to make compound or excessively tight radii turns, downhole pressures can build up, thereby, increasing the potential for drilling fluid seepage. The profiles for the proposed crossings minimize this potential, with very smooth and gradual vertical curves. In addition, all horizontal curves have been eliminated. Therefore, the potential for pressure buildup caused by pipeline geometry has been minimized.

2.5 INADVERTENT RELEASE MONITORING PROTOCOL

Monitoring of the drilling operation to detect a potential inadvertent release will be achieved by contractor by observing and documenting the flow characteristics of drilling fluid returns to the HDD endpoints and by visual inspection along the drill path.

The following will be implemented by contractor if drilling fluid circulation to the HDD endpoints is lost:

- The drilling operator will record pertinent drilling conditions and observe and monitor the drill path for evidence of an inadvertent release;

- The drilling operator will take a sample of drilling fluid and hold for future analysis if required;
- NYSEG's company onsite inspection personnel will immediately advise NYSEG's Project Manager of any significant loss of drilling fluid returns at the rig;
- The drilling operator will take steps to restore drilling fluid circulation in accordance with the requirements of the HDD technical specifications.
- If drilling fluid circulation is not regained, drilling may continue while NYSEG's inspection personnel continue to monitor for inadvertent returns.

2.6 CONTAINMENT AND CLEAN UP OF INADVERTENT RELEASES

2.6.1 Entry and Exit Locations

There is a greater potential for drilling fluid seepage at the entry and exit locations than other areas along the HDD. In the contingency planning for the pipeline crossing, drilling fluid seepage at the entry and exit locations has been considered, and preventative actions have been developed. The entry and exit locations on all directionally drilled crossings have dry land segments where drilling fluid seepage can be easily detected and contained. To isolate and contain potential drilling fluid seepage at each of the drill sites, there can be a berm around the entire drilling site area. To contain and control drilling fluid seepage on the land area, there will be earth-moving equipment such as backhoes or small bulldozers, portable pumps, sandbags, and straw bales available at each of the drilling sites. Any drilling fluid seepage will first be contained and isolated using sandbag berms, straw bales, silt screens or other suitable structures. For larger releases, a sump may need to be excavated for containment purposes. Once the release is effectively contained, pumps or vacuum trucks will be used to remove accumulated drilling fluid and, if practical, return it to the active drilling fluid system.

2.6.2 Wetland and Waterbody Locations

Straw bales and silt fences will also be on site and readily available for containment situations. Sufficient spill-absorbent material will be on-site in the event of an inadvertent release. All inadvertent releases will be immediately contained and reported as required.

Should an inadvertent release occur within a waterway, contractor will notify appropriate parties and evaluate the potential impact of the release on a site-specific basis in order to determine an appropriate course of action. In general, NYSEG does not believe that it is environmentally beneficial to try to contain and collect drilling fluid returns in a waterway. HDD drilling fluids are nontoxic, and discharge of the amounts normally associated with inadvertent returns does not pose a threat to public health and safety. Placement of containment structures and attempting to collect drilling fluid within a waterway often result in greater environmental impact than allowing the drilling fluid returns to dissipate naturally.

2.6.3 Follow-up/Corrective Action

If drilling fluid seepage should occur, the drilling operation will be adjusted by lowering mud pressures, slowing drilling rates, and/or stopped, temporarily. Once the clean-up response has started, the drilling activities will immediately resume. After the drilling fluid seepage has been contained, the drilling contractor and NYSEG will make every effort to determine why the seepage occurred. Once the Company has determined the cause of the seepage, measures will be developed to control the factors causing the seepage and to minimize the chance of recurrence. Developing the corrective measure will be a joint effort of NYSEG, its contractor and the drilling contractor and will be site and problem specific.

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. The first alternative to a failed drill is to offset the existing abandoned hole, and attempt another drill. If this alternative were not effective then NYSEG would pursue an open cut method of installation.

2.7 DRILLING FLUID DISPOSAL

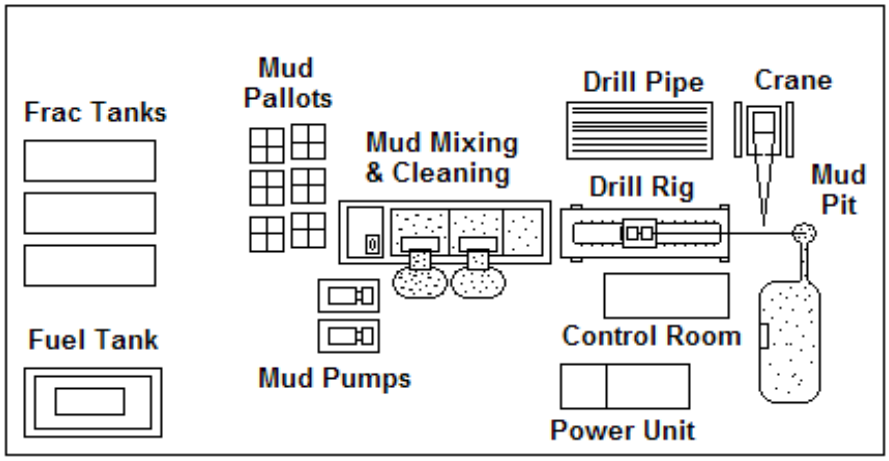
Drilling fluids will be hauled offsite for disposal at an approved disposal site.

2.8 RESTORATION OF RELEASE SITES

Following cleanup of an inadvertent release, the affected location will be regraded by contractor as close as practical to the original contours. All areas affected by the release will be restored in accordance with the specifications contained in NYSEG's Environmental Management & Construction Standards & Practices (EM&CS&P).

Figure 1

HDD Equipment Layout



2.9 DRILL HOLE SEALING AND ABANDONMENT CONTINGENCY PLAN

In the event the contractor must abandon the drilled hole, a plan to fill the abandoned hole must be in place and an alternative plan for crossing must be planned. If it becomes necessary to abandon a partially completed hole, the abandoned hole will be filled with a mixture of high-yield bentonite, water, and drilled spoil. The first five feet will be compacted and filled with soil to prevent any settlement. The procedure used by the contractor will be a documented site specific plan and approved by NYSEG prior to the abandonment of the hole.

After the abandoned hole has been filled, an alternative entry and exit hole will be determined. This new location for the directional drill will be offset from the abandoned hole to ensure a successful drill. This determination will again be a joint effort between NYSEG, the contractor, and the environmental inspector. The only other alternative method for installation would be by open cut.

3.0 PIPELINE CROSSING CONTINGENCY PLAN

During the Design phase of the project, , NYSEG had a geotechnical study completed along the proposed alignment of the HDD crossing in order to minimize the risks inherent in the HDD crossing. Additionally, prior to construction NYSEG will work closely with the contractor and drilling contractor to design the crossing and plan the construction phase of the HDD installation .

Should the HDD technology fail during construction, NYSEG will consider shifting the alignment and attempt to redrill the crossing. The alternatives to redrilling are construction using conventional open cut techniques and construction using the HDD technique of revised configuration and location.

4.0 REFERENCES

GRI, 2002. Horizontal Directional Drilling Best Management Practices Manual. Topical Report prepared by ENSR and Trenchless Engineering Corporation for the Gas Research Institute. GRI 02/0092. May.