



Inadvertent Returns Plan

Case 18-T-0604

April 2021

Prepared for:

South Fork Wind, LLC

Prepared by:

Mott MacDonald

**South Fork
Wind**

Powered by
Ørsted &
Eversource

Table of Contents

ABBREVIATIONS	iii
1.0 INTRODUCTION.....	1
1.1 PURPOSE AND OBJECTIVES	2
2.0 DRILLING FLUIDS.....	3
2.1 DRILLING FLUID COMPOSITION AND PROCESSING	3
2.2 DRILLING FUNCTIONS	6
2.3 CONTROLLING AND MAINTAINING DRILLING FLUID CIRCULATION/FLOW	6
2.4 MINIMIZATION OF ENVIRONMENTAL IMPACTS ASSOCIATED WITH DRILLING FLUID FLOW	7
2.5 SPILL PREVENTION AND CONTAINMENT MEASURES	9
2.6 INADVERTENT RETURN PREVENTION MEASURES.....	9
3.0 HYDRAULIC FRACTURE/HYDROFRACTURE EVALUATION.....	12
4.0 HDD CONTRACTOR RESPONSIBILITIES.....	16
5.0 INSPECTION AND TRAINING.....	17
6.0 INADVERTENT RETURN MONITORING AND RESPONSE PROTOCOLS.....	19
6.1 CONDITION 1 – FULL DRILLING FLUID CIRCULATION	19
6.2 CONDITION 2 – PARTIAL LOSS OF DRILLING FLUID CIRCULATION	20
6.3 CONDITION 3 – INADVERTENT RETURNS OF DRILLING FLUID	21
6.3.1 Inadvertent Return Response for Event within Onshore Area.....	21
6.4 INADVERTENT RETURN RESPONSE FOR EVENT WITHIN OCEAN.....	22
6.5 INADVERTENT RETURN RESPONSE FOR EVENT WITHIN OCEAN IN VICINITY OF EXIT LOCATION	23
6.6 CONTAINMENT AND CLEAN-UP MATERIALS AND EQUIPMENT	23
6.7 RESPONSE CLOSE-OUT PROCEDURES.....	24
6.8 CONSTRUCTION RE-START	24
7.0 NOTIFICATIONS	25
7.1 INADVERTENT RETURN EVENT NOTIFICATIONS	25
8.0 FAILED HDD CONTINGENCY.....	27
9.0 COMPLETION AND CLEAN-UP.....	29

INADVERTENT RETURNS PLAN

April 2021

LIST OF TABLES

Table 1. List of Common Drilling Fluid Materials	4
Table 2. List of Common Conditioning Agents	5
Table 3. List of Common Filtration Control Additives	5
Table 4. Inadvertent Return Risk Factors and Mitigations	11
Table 5. Agency/Stakeholder Notifications	26

LIST OF FIGURES

Figure 1. Preliminary, Theoretical, Recommended Allowable, and Required Drilling Fluid Pressures	14
--	----

LIST OF ATTACHMENTS

ATTACHMENT A	TYPICAL DRILLING FLUID SAFETY DATA SHEETS.....	A.1
ATTACHMENT B	HYDRAULIC FRACTURE / HYDROFRACTURE EVALUATION	B.1
ATTACHMENT C	INADVERTENT RETURN REPORT FORM	C.1

INADVERTENT RETURNS PLAN

April 2021

Abbreviations

ANSI/NSF	American National Standards Institute/National Science Foundation International
Certificate	Certificate of Environmental Compatibility and Public Need
DPS Staff	Department of Public Service Staff
EM&CP	Environmental Management and Construction Plan
ft	feet
HDD	horizontal directional drill
HDPE	High-density polyethylene
kV	kilovolts
m	meter
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
SFEC	South Fork Export Cable
SFW	South Fork Wind, LLC
SPCC	Spill Prevention, Control, and Countermeasure

INADVERTENT RETURNS PLAN

April 2021

1.0 INTRODUCTION

South Fork Wind, LLC (SFW) will construct, operate, and maintain the South Fork Export Cable (SFEC) in support of the South Fork Wind Farm, which will be constructed 35 miles (30 nautical miles, 56 kilometers) east of Montauk Point. The SFEC will be an alternating current electric cable (138 kilovolts [kV]) that will extend from the South Fork Wind Farm in federal offshore waters to coastal New York State (NYS) waters and inland to the existing mainland electric grid located in the Town of East Hampton, New York. This Inadvertent Returns Plan is part of the Environmental Management and Construction Plan (EM&CP) for the SFEC components subject to Article VII of the New York Public Service Law, including the following, hereafter referred to as “the Project”:

- SFEC-NYS: the submarine segment of the export cable buried beneath the seabed from the boundary of NYS waters (3 nautical miles offshore) to a sea-to-shore transition vault located in the Town of East Hampton on Long Island, Suffolk County, New York. The SFEC-NYS includes the sea-to-shore transition via horizontal directional drilling (HDD).
- SFEC-Onshore: the terrestrial underground segment of the export cable from the sea-to-shore transition vault to the SFEC-Interconnection Facility where the SFEC will interconnect with the Long Island Power Authority electric transmission and distribution system in the Town of East Hampton, New York.
- SFEC-Interconnection Facility: a new onshore facility, primarily consisting of a transformer and a 69-kV interconnection cable that will connect to the 69-kV bus in the existing Long Island Power Authority East Hampton Substation in the Town of East Hampton, New York.

As part of this Project, a high-density polyethylene (HDPE) conduit is to be installed using HDD methods for a landfall crossing at Beach Lane in East Hampton, New York. The proposed HDD entry location is situated onshore within the road right-of-way, which is 49.5 feet (ft; 15.1 meters [m]) wide. The proposed HDD exit location is situated offshore in the Atlantic Ocean. The outer diameter of the HDPE conduit will be approximately 26 to 28 inches (660 to 711 millimeters). The HDPE conduit pipe string will be fabricated at a location offsite of the drilling operations and will require towing to the offshore exit location prior to installation.

The HDD Landfall Installation Plan and Profile Drawings are included the HDD Work Plan included as Appendix C to the EM&CP. The HDD installation length considered in this evaluation is approximately 2,550 ft (777 m). The proposed HDD entry and exit locations are approximately 750 ft (229 m) onshore and 1,800 ft (549 m) offshore from the location of the mean high water elevation. The elevations of the proposed HDD entry and exit locations are approximately 11.3 and -26.8 ft (3.4 and -8.2 m), respectively. An elevation difference of approximately 49 ft (15 m) exists between the HDD entry and exit locations, with the entry location at the higher elevation. The minimum depth of cover of the HDD installation beneath the seabed is approximately 80 ft (24.4 m) with the exception of the exit curve where the HDD bore profile begins to ascend towards the ocean floor. A jack-up barge will be used to support drilling operations offshore at the

INADVERTENT RETURNS PLAN

April 2021

HDD exit location. Marine operations will include dredging an exit pit to accommodate burial of the HDPE conduit upon completion of pullback operations.

Temporary casing pipes are anticipated at both the HDD entry and exit locations. The onshore casing pipe is anticipated to be approximately 125 ft (38 m) in length. The offshore casing pipe is anticipated to be approximately 320 ft (98 m) in length. The actual length of the offshore casing pipe will be dependent on the HDD exit angle and exit location. This casing pipe will be seated into the ocean floor from the jack-up barge at the exit location upon completion of the pilot bore drilling operation and will be used to maintain an open pathway for drilling fluid flow, to remove and capture drilling fluid and for the passage of tooling. Due to its length, goalposts will be installed to support the casing pipe. All goalposts and casing pipes will be removed following completion of the HDPE conduit installation.

1.1 PURPOSE AND OBJECTIVES

The purpose of this Inadvertent Returns Plan is to identify operational procedures and responsibilities for the prevention, containment, and clean-up of drilling fluids that could potentially pond on the ground surface or within a waterbody during HDD operations. This Inadvertent Returns Plan defines methodologies to control and minimize the impacts to sensitive resources from inadvertent returns of drilling fluids associated with the proposed HDD. The objectives of this Inadvertent Returns Plan are to:

- Minimize the potential for an inadvertent return event;
- Enable the timely detection of an inadvertent return event;
- Provide for environmental protection of waterbodies and other sensitive resources, in the event an inadvertent return occurs;
- Establish response procedures to address containment and clean-up of an inadvertent return event; and
- Establish notification protocols with the applicable parties and regulatory agencies, in the event an inadvertent return occurs.

This Inadvertent Returns Plan has been prepared to outline the responsibilities, protocols, and required notifications in the event of an inadvertent drilling fluid return during HDD operations. Prior to providing this information, a background discussion on drilling fluids and the crossing-specific hydrofracture evaluation is presented.

INADVERTENT RETURNS PLAN

April 2021

2.0 DRILLING FLUIDS

2.1 DRILLING FLUID COMPOSITION AND PROCESSING

Drilling fluids consist of a mixture of water, bentonite, and special additives. The mixture typically contains up to five percent bentonite by mass and has a mud weight between 8.6 to 8.8 pounds per gallon. Fresh water has a mud weight of 8.34 pounds per gallon. The bentonite that is added to the water is a naturally occurring, non-toxic, inert substance that meets American National Standards Institute/National Science Foundation International (ANSI/NSF) Standard 60 Drinking Water Additive Standards and is frequently used for drilling potable water wells. Additives are mixed into the drilling fluid mixture to enhance specific fluid properties that the bentonite products cannot provide alone. Drilling products certified as meeting ANSI/NSF Standard 60 Drinking Water Additive Standards are capable of being used to drill and complete drinking water wells when used in accordance with manufacturer recommendations.

The exact composition of the drilling fluids will be determined prior to construction. During construction, the formulation of the drilling fluids will be adjusted to optimize the properties for the anticipated and encountered geotechnical conditions through the HDD installation process. A complete list of drilling fluid components (including Safety Data Sheets and eco-toxicity information) for all anticipated products that could be used in the course of drilling will be made available for review. If polymer-based additives are proposed to be used, an approved NYS Department of Environmental Conservation (NYSDEC) Water Treatment Chemical Form will be provided in addition to the Safety Data Sheets and eco-toxicity information to NYS Department of Public Service Staff (DPS Staff) for approval. Petroleum-based additives will not be used. Example Safety Data Sheets are included in Attachment A.

Drilling fluids are typically composed of the following materials:

- Bentonite – a naturally occurring, non-toxic inert sodium montmorillonite clay. When mixed in water, the bentonite provides lubricating, supporting, and swelling properties. The individual clay platelets within the bentonite provide a seal between the encountered soils and the annular space created by the drilling assembly to prevent drilling fluid losses. Pure bentonite is not typically used in the HDD industry as additional fluid properties are required to support proper drilling operations.
- Soda ash – a natural sodium carbonate that is used as a drilling fluid conditioning agent. Soda ash is added to fresh water to raise the pH to values between 8 and 9 prior to adding bentonite to the fluid. The raised pH maximizes the performance of the bentonite and speeds up hydration of the bentonite to reduce mixing times.
- Additives – most are naturally occurring, such as xanthan gum, guar gum, and starch. Other additives are modified natural polymers or synthetic polymers. Additives can be used as viscosifiers, fluid-loss control measures, or for multifunctional purposes. It is common for drilling fluid manufacturers to add additives to high-yielding bentonite products for use as a drilling fluid system for their brand name products. It is important to note that drilling fluid components with specialized formulations of drilling fluids meet American National Standards Institute/National

INADVERTENT RETURNS PLAN

April 2021

Science Foundation International (ANSI/NSF) Standard 60 Drinking Water Additive Standards when used at concentrations in accordance with manufacturer recommendations.

- Lost circulation materials – materials that are added to drilling fluids when required and pumped downhole to aid in sealing areas of the HDD bore. These products are often naturally occurring and are used to restore drilling fluid flow within the drilled bore.

While the exact mixture has yet to be confirmed, it is anticipated that the mixture will be selected from the following products listed in Table 1. These products are specifically designed for use in the HDD industry and are not all-inclusive of all available products. Other manufacturers may have similar products to those listed in the tables. Further, other additives, such as lost circulation materials, clay inhibitors, suspension agents, dispersants, and foaming agents not listed in Table 1, Table 2, and Table 3, may be required depending on the encountered conditions during drilling operations. Concentrations will be in accordance with manufacturer recommendations. Safety Data Sheets and eco-toxicity information for all materials will be provided to DPS Staff for review prior to use.

Table 1. List of Common Drilling Fluid Materials

Trade Designation/Product Name	NSF Certification (As of March 16, 2021)	Typical Concentration Range used in Drilling Operations	Reported Ecotoxicity (As of March 16, 2021)
AquaGel Gold Seal (Baroid)	Yes	10–50 lb/100 gal	EC50 algae 440 mg/L LC50 invertebrates >10,000 mg/L
Bore-Gel (Baroid)	Yes	25–60 lb/100 gal	EC50 algae 440 mg/L LC50 invertebrates >10,000 mg/L
Quik-Gel Gold (Baroid)	Yes	12–40 lb/100 gal	Not classified as environmentally hazardous
Puregold Gel (Cetco)	Yes	30–80 lb/100 gal	Not classified as environmentally hazardous
Hydraul-EZ (Cetco)	Yes	20–60 lb/100 gal	Not classified as environmentally hazardous
Super Gel-X (Cetco)	Yes	15–40 lb/100 gal	Not classified as environmentally hazardous
Natural Gel (Wyo-Ben)	Yes	20–50 lb/100 gal	Not determined
Tru-bore (Wyo-Ben)	Yes	15–25 lb/100 gal	Not determined

Key:

EC50 = half maximal effective concentration that induces a response halfway between baseline and maximum

gal = gallon

lb = pound

LC50 = lethal concentration at 50 percent concentration

mg/L = milligram per liter

NSF = National Science Foundation

INADVERTENT RETURNS PLAN

April 2021

Table 2. List of Common Conditioning Agents

Trade Designation/Product Name	NSF Certification (As of March 16, 2021)	Typical Concentration Range used in Drilling Operations	Reported Ecotoxicity (As of March 16, 2021)
Soda Ash (Baroid)	Yes	0.1–0.5 lb/100 gal	EC50 algae 242 mg/L LC50 pimephales promelas 310–1,220 mg/L LC50 lepomis machrochirus 300 mg/L EC50 daphnia magna 265 mg/L EC50 ceriodaphnia sp. 200–227 mg/L
Soda Ash (Cetco)	Yes	0.33–0.5 lb/100 gal	Not determined
Soda Ash (AMC)	Yes	0.25–0.5 lb/100 gal	Not determined

Key:

EC50 = half maximal effective concentration that induces a response halfway between baseline and maximum

gal = gallon

lb = pound

LC50 = lethal concentration at 50 percent concentration

mg/L = milligram per liter

NSF = National Science Foundation

Table 3. List of Common Filtration Control Additives

Trade Designation/Product Name	NSF Certification (As of March 16, 2021)	Typical Concentration Range used in Drilling Operations	Reported Ecotoxicity (As of March 16, 2021)
Quik-Trol (Baroid)	Yes	0.5–5 lb/100 gal	LC50 fish 20,000 mg/L EC50 crangon 1000-3300 mg/L
Quik-Trol LV (Baroid)	Yes	0.5–7 lb/100 gal	LC50 fish 20,000 mg/L EC50 crangon 1000-3300 mg/L
Dril-Trol QD (Wyo-Ben)	Yes	2–8 lb/100 gal	LC50 fish >100 mg/L

Key:

EC50 = half maximal effective concentration that induces a response halfway between baseline and maximum

gal = gallon

lb = pound

LC50 = lethal concentration at 50 percent concentration

mg/L = milligram per liter

NSF = National Science Foundation

When needed, drilling fluid components are mixed in a specific order and maintained within a holding tank. These fluids are then pumped into the HDD bore through the drill pipe. As the drilling fluid exits the downhole tooling within the bore, it mixes with the soil and/or rock cuttings generated by the downhole tooling to

INADVERTENT RETURNS PLAN

April 2021

create a slurry and travels through the borehole to return to the ground surface as additional drilling fluids are injected. The drilling fluid/slurry mixture flows toward either the HDD entry or exit locations depending on which stage of the installation process is being completed and the location of the drilling assembly in question within the bore.

When the fluids return to the ground surface, they are transferred to a separation plant for processing. The drilling fluid is sent through the separation plant to remove the entrained cuttings. The processed water is then recycled into storage tanks to be combined with additional bentonite and additives for reuse. Recycling of the drilling fluids is very important in large diameter installations, like this Project, where large volumes of drilling fluids are required to facilitate the installation process.

The separated soil and rock cuttings are referred to as “spoil” and will be removed from the site for disposal. The equipment incorporated into the separation plant must be matched to the anticipated geotechnical materials and production rates to avoid delays associated with the drilling process.

2.2 DRILLING FUNCTIONS

Drilling fluids serve several functions to support an HDD installation. The primary functions include:

- Cooling and lubrication of drilling tools, drill pipe, and the conduit;
- Suspension of cuttings within the drilling fluid/slurry mixture;
- Removal of soil cuttings from the bore during the installation process;
- Counterbalance of natural ground water formation pressures; and
- Stabilization of the bore and prevention of raveling of surrounding soil/bedrock materials. Stabilization of the bore is provided from the combination of developing a low-permeability bentonite filter cake along the bore walls and applying a positive fluid pressure to the surrounding bore walls.

Drilling solely with fresh water is not ideal for an HDD installation, as water is not capable of suspending and transporting the cuttings produced from the bore and provides little to no capacity to stabilize the bore. If the generated cuttings cannot be removed, then a fluid-filled bore cannot be properly developed and maintained, and the conduit cannot be installed.

2.3 CONTROLLING AND MAINTAINING DRILLING FLUID CIRCULATION/FLOW

A drilling fluid loss refers to the condition where the drilling fluids/slurry mixture leaves the bore and migrates outwards away from the bore and into the surrounding geotechnical materials. The term inadvertent return is used to describe a drilling fluid loss event that results in migration of the drilling fluids up through the overlying geotechnical materials with ponding of the drilling fluids at the ground surface or within a water body at a location away from the HDD rig or exit locations.

INADVERTENT RETURNS PLAN

April 2021

The introduction of drilling fluids into the HDD bore under pressure causes the drilling fluid/slurry mixture to flow. The magnitude of the required drilling fluid pressure necessary to induce flow is a function of several factors including:

- Encountered geotechnical materials and their properties;
- Volume of drilling fluids pumped downhole during the installation process;
- Density and viscosity of the drilling fluids injected into the bore and of the returning slurry;
- Annular space between the drilling equipment and the excavated bore that is available for fluid flow;
- Length of the HDD installation; and
- Elevation difference between the HDD entry/exit ground surface and the particular point in question along the bore path.

The highest risk of an inadvertent return occurs during the pilot bore, where a complete flow path has yet to be constructed. The areas of greatest probability of occurrence include areas near the HDD entry and exit locations due to the shallow depth of cover while the drill bit is initially advanced into the subsurface or approaching exit from the subsurface. At the entry location, the risk of drilling fluid inadvertent returns will be mitigated with the use of a starter conductor casing.

There is also a risk of drilling fluid returns near the exit location during the pilot bore operation, as the drill bit is steered upwards and the installation is completed. This risk is associated with the long flow path for drilling fluid flow back to the drill rig/entry location and the ever-decreasing depth of cover (and strength/resistance offered by the overlying geotechnical materials) above the HDD installation in the immediate vicinity of the exit location.

To mitigate these risks for the proposed HDD installation, the mud pump rate will be reduced as much as possible to decrease the amount of drilling fluids that could be lost into the ocean. An exit pit will be excavated to support burial of the HDPE conduit. Installation of a conductor casing at the exit location upon completion of the pilot bore will provide a pathway to collect drilling fluid to the work barges at the exit location during reaming, swabbing, and conduit installation. Uncontaminated drill cuttings and drilling muds from drilling processes which utilize only air, water, or water-based drilling fluids will be disposed of at either construction and demolition debris landfills or municipal solid waste landfills. In addition, the HDD Contractor will use a forward reaming pass from shore towards offshore to maximize drilling fluid returns to the onshore HDD entry location.

2.4 MINIMIZATION OF ENVIRONMENTAL IMPACTS ASSOCIATED WITH DRILLING FLUID FLOW

During construction, potential environmental impacts will be further minimized by controlling downhole annular pressures, reacting to occurrences of higher than anticipated pressures, conducting visual

INADVERTENT RETURNS PLAN

April 2021

observations of the volume of returning fluids, and maintaining drilling fluid flow/circulation within the HDD bore while drilling.

The following construction requirements will apply with respect to drilling fluid control:

- Instrumentation – Instrumentation that accurately locates the pilot hole, measures drill string axial and torsional loads, and measures drilling fluid discharge rate and downhole annular drilling fluid pressures will be utilized. Downhole annular pressures will be monitored as close to the drill bit as practical during the pilot bore phase of the installation process. Actual observed downhole annular drilling fluid pressures will be compared with anticipated values to determine if optimal drilling conditions are being maintained during the pilot bore installation process.
- Observation – Observations of drilling fluid returns at the HDD entry location will be continuously conducted for signs of reduced drilling fluid flow during the drilling process. Reduced drilling fluid flow observations are often a first sign that drilling fluid losses may be occurring.
- Reaming operations – All reaming operations will be completed to maximize drilling fluid returns towards the onshore drill rig. This will involve a forward reaming direction from shore towards the exit location offshore.
- Composition – Only approved, non-petrochemical-based, non-hazardous additives that comply with applicable permit requirements and environmental regulations will be utilized.
- Recirculation – Recirculation of drilling fluid between downhole tooling and the returns pit located at the entry and exit locations will be maximized; the pilot tool will be adequately sized to provide annulus spacing around drilling pipe exits for good return flows during pilot drilling; containment, solids control and fluid cleaning equipment of a configuration and capacity that can process the returning drilling fluid volumes and clean the mud to an extent that allows for reuse will be utilized and solids control, cleaning equipment performance, and treatment of excess drilling fluid and drilled spoil will be monitored daily.
- Loss of Circulation – Best efforts will be used to maintain full annular circulation of drilling fluids within the HDD bore. Drilling fluid returns at locations other than the entry and exit points will be minimized. If annular circulation is lost, one or more of the following steps will be performed:
 - Size the hole frequently by advancing and retracting the drill string to keep the annulus clean and unobstructed (known as short-tripping);
 - Establish circulation slowly prior to further advancement when drilling fluid flow has diminished or stopped; and/or
 - Minimize annular pressures by pumping sufficient quantities of drilling fluids downhole to clean the bore and minimize the density of the returning fluid. Viscosity should be minimal, consistent with bore cleaning and stabilization requirements.

INADVERTENT RETURNS PLAN

April 2021

- Control the balling of material on bits, reaming tools, and pipe to prevent a plunger effect from occurring. This task typically requires the introduction of special additives to the drilling fluids. Only approved, non-petrochemical-based, non-hazardous additives that comply with applicable permit requirements and environmental regulations will be utilized.
 - Control penetration rates and travel speeds to prevent a plunger effect from occurring.
- Seal a zone of lost circulation using a high viscosity bentonite plug or lost circulation materials. Only approved, non-petrochemical-based, non-hazardous additives that comply with applicable permit requirements and environmental regulations will be utilized.
 - Potential suspension of drilling activities for a period of time, anticipated to be between 2 and 8 hours.

2.5 SPILL PREVENTION AND CONTAINMENT MEASURES

SFW's Onshore Spill Prevention Control and Countermeasure (SPCC) Plan and Offshore SPCC Plan can be found in Sections 3.2.6 and 3.2.9 of the EM&CP, respectively. The SPCC plans require inspecting, establishing containment measures, and repairing equipment components to prevent release of any hazardous materials (hydraulic hoses, fuel tanks, etc.) prior to and upon arrival at the drill site. This equipment will also be inspected and maintained daily during all drilling operations to minimize the potential release of any materials.

Prior to initiating HDD operations, a containment plan will be utilized to prevent the migration of any fluids away from the site. At the drill rig entry location, a pit will be excavated to contain and allow for processing of the drilling fluid returns. At the exit side, temporary casing pipe will be used to provide a pathway for collecting drilling fluid returns during reaming, swabbing and pullback operations. Work barges will be used to collect, contain, process, and store these fluids.

Equipment-specific containment measures will be established around key equipment to capture and contain any potential fluids (including drilling fluids) during the installation process.

2.6 INADVERTENT RETURN PREVENTION MEASURES

To minimize the possibility of inadvertent return events, the HDD bore will utilize HDD construction practices during completion of the entire drilling process that include monitoring the drilling fluid/slurry returns at the HDD rig location. If the drilling fluid/slurry mixture is circulating through the bore and returning to this location, the possibility of an inadvertent return is minimized.

As previously stated, proactive monitoring and quick reaction to observations will aid in preventing a drilling fluid inadvertent return. This monitoring will consist of continuously monitoring the circulation of drilling fluid/slurry returns at the HDD rig or exit locations, monitoring of the fluid properties of both the raw drilling fluids and the returning fluids, and monitoring of the downhole annular pressure during pilot bore drilling. A drilling fluid mud technician will sample, test, and record the fluid properties of the raw and returning drilling fluid during drilling operations. Typical monitored drilling fluid properties include viscosity, fluid density (or

INADVERTENT RETURNS PLAN

April 2021

mud weight), and sand content. Viscosity and fluid density are the easiest and most important properties to monitor during the drilling process. The monitoring frequency of the drilling fluid properties varies depending on the conditions of the work and the encountered geotechnical materials.

The properties of the returning fluids provide an indication of what is occurring within the HDD bore. If monitoring indicates that one of the fluid properties of the returning fluids is not ideal for the encountered geotechnical materials, the drilling fluid mud technician can modify or adjust the fluid properties of the raw drilling fluids injected into the bore to then adjust the fluid properties of the returning slurry mixture. The drilling fluid mud technician may also inform the HDD rig operator to slow their advance rate to accomplish lower returns with lower mud weights and hence, lower required fluid pressures within the bore as a result.

A slow down or sudden loss of drilling fluids/slurry circulation at the HDD rig or exit locations can provide an early indication that the downhole fluid pressures within the bore are increasing and that a hydraulic fracture event may be about to occur. A slow down or loss of circulation may also indicate that the drilling equipment has encountered a coarse granular soil with open pore spaces between soil particles that are filling with the injected drilling fluid or highly fractured bedrock conditions. If circulation slows, the HDD rig operator may swab back to clean the bore and/or remove/pullback several drill pipes to re-establish full slurry returns at the HDD rig entry or exit locations. If returns are re-established, the drilling process can continue. In the event returns are not re-established, additional drill pipes may be removed to clean out any blockage within the bore. This could mean tripping completely out of the bore, retooling, and/or recommencing drilling/reaming operations. Loss circulation material could also be mixed into the drilling fluid and injected into the bore. This material is designed to help plug or pack off an open flow channel, thereby increasing the ability to re-establish slurry flow within the HDD bore.

The cuttings produced by the drilling equipment in combination with the bentonite particles within the drilling fluid are capable of naturally sealing fractures or voids as the drilling process advances. Often the time required to stop and document or clean-up an inadvertent return is sufficient for the sealing of the preferential flow path and further flow does not occur.

The drill rig operator can also monitor the potential for inadvertent return events by monitoring the drilling fluid pressures within the drill pipe. Any presence of back pressure within the drill pipe when the drill pipe is disconnected (to remove or add the next drill pipe) can be a warning of a plugged annulus, which could lead to a bore pressure build-up event and eventually an inadvertent return. Annular pressures and drilling fluid returns will be monitored to minimize the potential for an inadvertent return to the extent possible.

Special downhole monitoring equipment will be used to monitor the downhole annular fluid pressure within the HDD bore as close as practical to the drill bit. This equipment provides real time monitoring of fluid pressures allowing for quicker reaction times to make adjustments (such as those described above) when increased fluid pressures are observed.

Identified inadvertent return risk factors and mitigation measures presented in this Inadvertent Returns Plan are summarized in Table 4.

INADVERTENT RETURNS PLAN

April 2021

Table 4. Inadvertent Return Risk Factors and Mitigations

Inadvertent Return Risk Factor	Mitigation
Elevation difference between entry and exit location	Install conductor casing once pilot bore has been completed to provide a means to collect and process drilling fluid returns during reaming, swabbing, and pull back operations
Loose sands along ocean floor	Adequate depth of cover along HDD alignment to minimize risk of an inadvertent return. Selected installation depth based on modelling of various installation depths and electrical cable requirements
Changing lithology	Develop grouting plans and loss of circulation plans prior to commencement of drill. Maintain drilling fluid properties to target values.
Potential loss of drilling fluids during initial pilot bore drilling at HDD entry location where pilot bore is shallow	Install conductor casing to bridge and support the shallow soils in the vicinity of the entry location. Casing pipe will provide an open and supported flow pathway for drilling fluid flow to the HDD entry location.
Potential loss of drilling fluids during punchout of pilot bore	Perform a hydrofracture evaluation to determine risk. Develop pump rate requirements as part of the workplan to minimize pump rate and excess volume of drilling fluids during exit of pilot bore assembly. Excavation of exit pit offshore to contain fluid loss during punchout. Fluid losses are anticipated to be minimal.
Potential loss of drilling fluids during subsequent reaming, swabbing, and pullback operations	Installation of conductor casing at the exit location following completion of pilot bore. Casing to be seated at least 15 feet (4.6 meters) vertically into the ocean floor sediments. Casing pipe will allow for collection, processing, and storage during drilling operations. Maintain drilling fluid properties to target values.
Unknown downhole annular drilling fluid pressures during pilot bore operations	Monitor downhole annular pressures during pilot bore and react to higher than anticipated values quickly. Provide a sufficient pilot bore diameter to minimize drilling fluid pressures to the extent possible.

Key:

HDD = horizontal directional drill

INADVERTENT RETURNS PLAN

April 2021

3.0 HYDRAULIC FRACTURE/HYDROFRACTURE EVALUATION

A hydraulic fracture evaluation has been completed for this crossing in general conformance with the Delft Geotechnics Method outlined in Attachment B of the United States Army Corps of Engineers 1998 Report CPAR-GL-98 (*Guidelines for Installation of Utilities Beneath Corp of Engineers Levees Using Horizontal Directional Drilling*). General conformance refers to the more conservative approach where the plastic zone is limited to distance of only three pilot bore diameters away from the HDD bore as opposed to two-thirds of the depth of cover for HDD installations in sand. This conservative approach lowers the maximum allowable/theoretical effective pressure for the installation.

The Delft Geotechnics Method can be used to estimate the maximum allowable/theoretical effective pressure (i.e., drilling fluid pressure) that can be induced during an HDD operation within a particular soil horizon prior to a hydrofracture/inadvertent return event. The maximum allowable/theoretical effective pressure is a function of the soil properties of the overlying soils and the depth of cover for the given HDD simulation. This pressure is often referred to as the maximum theoretical formation pressure and is used to compare with the required drilling fluid pressure to determine where a high hydrofracture/inadvertent return risk exists along the HDD profile. The required fluid pressure for an HDD installation is governed by the drilling fluid weight (commonly referred to as the mud weight), installation length and depth, and drilling fluid flow properties (plastic viscosity, yield point, etc.). Typically, the highest hydrofracture/inadvertent return risk exists in the vicinity of the HDD entry and exit locations where the depth of cover is low, as further discussed in Section 2.3. Where an increased risk of hydraulic fracture is identified, it does not necessarily mean that a hydraulic fracture will occur. Similarly, drilling fluid circulation losses can occur into preferential flow pathways within the surrounding geotechnical materials at pressures much less than those predicted using the Delft Geotechnics Method.

Hydrostatic and frictional flow components comprise the required drilling fluid pressure necessary for an HDD installation. The hydrostatic pressure component is associated with the column or height of drilling fluid above the specific point in question. This pressure is derived from the drilling fluid weight (commonly referred to as the mud weight) of the drilling fluid and the height of the drilling fluid column above. The frictional pressure component is associated with the fluid pressure necessary to induce drilling fluid flow through the HDD bore. This component is a function of several variables, including flow path length back to the HDD entry location, annular space available for drilling fluid flow, drilling fluid pump rate, and drilling fluid flow properties (plastic viscosity, yield point, etc.). A Bingham Plastic rheological model is typically used in the HDD industry to model the frictional loss component associated with the required drilling fluid pressure. This model replicates the behavior of the drilling fluid based on yield stress and plastic viscosity of the drilling fluids.

The calculated required drilling fluid pressure is based on the assumption that an open flow pathway equivalent to the annular space (minus the cross-sectional area of the drill pipe) exists between the drill bit and the drill rig location. During drilling, it is common for the drill bit to create a heavier or thicker slurry of cuttings that results in higher required downhole annular pressures than the calculated values and are observed as drilling fluid pressure spikes. These spikes more commonly occur in cohesive (clay) soils and clay-rich bedrock materials (such as shale or mudstone). Care is required during construction to react to

INADVERTENT RETURNS PLAN

April 2021

higher than anticipated required drilling fluid pressures to minimize the risk for drilling fluid loss and inadvertent returns.

Hydraulic fracture evaluations are typically completed on the pilot bore stage of the installation process, as the required drilling fluid pressures are highest during this stage, due to the smaller annulus and a completing bore path to only one side of the installation. The larger diameter of the subsequent reaming pass coupled with the open flow pathway through the bore to both ends of the HDD installation typically results in much lower required drilling fluid pressures than the pilot bore.

The Delft Geotechnics Method assumes a uniform column of soil above any point of interest along the alignment. The calculated maximum allowable drilling fluid pressure is a function of the strength of the overlying materials and the total overburden and groundwater stresses. Weak soils typically cannot resist drilling fluid pressures greater than the total overburden soil and groundwater pressures. In layered soils, the strength of each individual layer will dictate whether drilling fluids are lost into each soil layer. Drilling fluids lost to low strength soil layers may not migrate to the ground surface if a stronger soil layer of sufficient thickness overlies the low strength soil layer. Soils with little to no strength include very soft and soft cohesive silts and clays and very loose cohesionless silts and sands. Higher maximum allowable drilling fluid pressures are attainable with higher density cohesionless soils or higher consistency cohesive soils.

The results of the preliminary hydraulic fracture evaluation for the preferred HDD alignment for the pilot bore phase of the installation process are provided in Figure 1. An exit excavation has been incorporated into this evaluation (hence, a sharp drop in the ocean floor elevation is shown in the vicinity of the exit location). More detailed results are provided in Attachment B. The theoretical formation pressures are based on the Delft Geotechnics Method as described previously. The recommended maximum allowable drilling fluid pressures shown in Figure 1 were determined by applying a factor of safety of 2.0 to the strength component that contributes to the theoretical formation pressure.

INADVERTENT RETURNS PLAN

April 2021

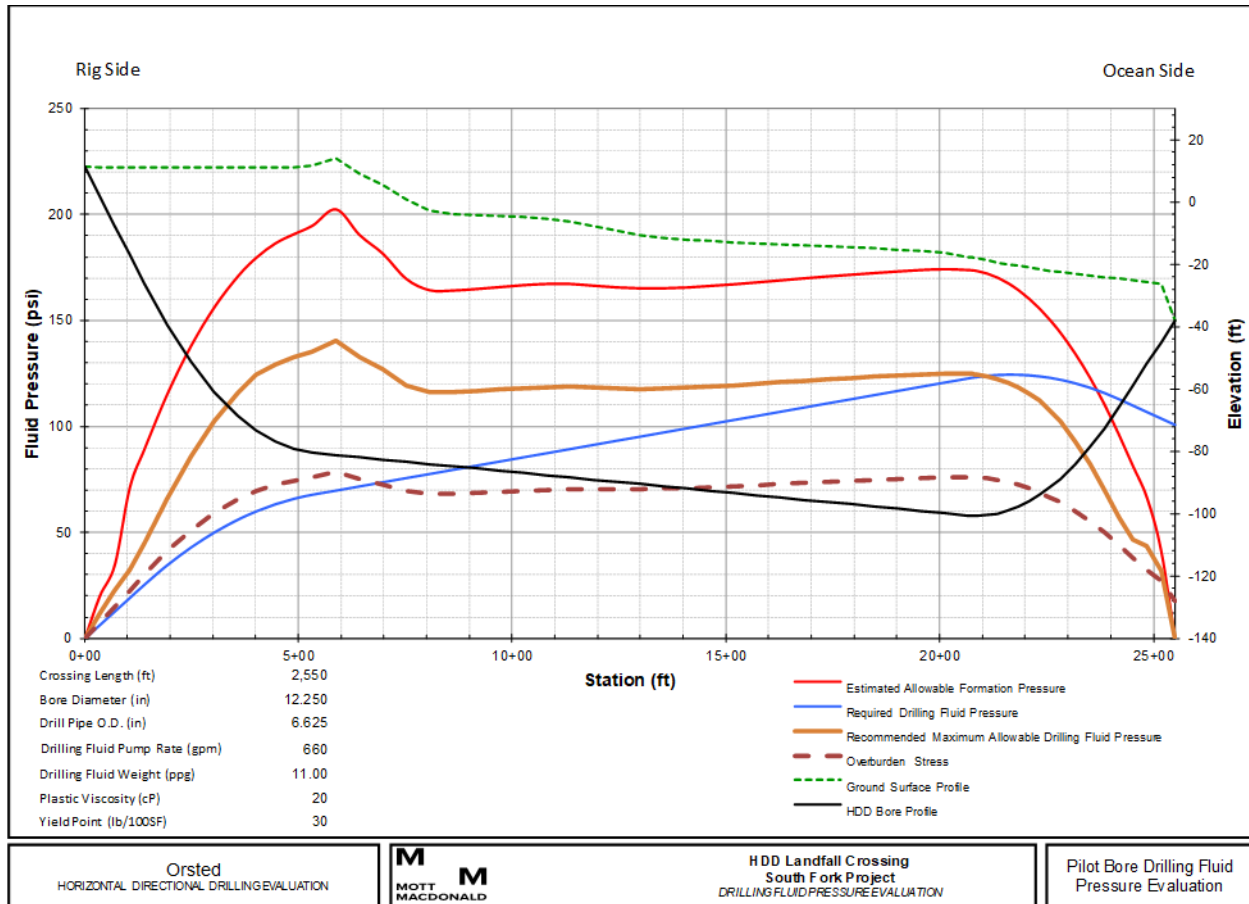


Figure 1. Preliminary, Theoretical, Recommended Allowable, and Required Drilling Fluid Pressures

The various lines shown on Figure 1 represent the following:

- Dashed green line – the ground surface and ocean floor
- Solid black line – the HDD bore profile
- Solid red line – the estimated or theoretical allowable formation drilling fluid pressure based on the Delft Geotechnics Method approach (maximum formation pressure)
- Solid light brown line – the recommended maximum allowable drilling fluid pressure, as defined earlier
- Solid blue line – the estimated required drilling fluid pressure for the HDD installation based on a Bingham rheological model
- Dashed brown line – the total overburden stress related to the depth of cover above the HDD bore

INADVERTENT RETURNS PLAN

April 2021

The fluctuations with the theoretical drilling fluid pressure (and factored theoretical drilling fluid pressure) represents changes in the depth of cover and the various strength properties assigned to the overlying geotechnical materials along the HDD alignment. Increased reliance on the overburden strength increases the likelihood of a drilling fluid inadvertent return.

Once the pilot bore is completed and the offshore conductor casing is installed, the risk of an inadvertent return diminishes. The HDD Contractor will be responsible for monitoring downhole drilling fluid pressures during all pilot bore operations. Cleaning runs may be required where downhole pressures significantly differ from the predicted required drilling fluid pressure values provided within the hydraulic fracture evaluation. In addition, the HDD Contractor will be required to visually monitor drilling fluid returns during the entire drilling operation. If preferential drilling fluid flow pathways are encountered during the course of drilling, the HDD Contractor will implement a loss circulation recovery plan that will include one or a combination of actions (e.g., pumping of loss-circulation materials, swabbing the bore, and/or grouting of the flow pathway) to apply dependent on the specific condition encountered.

INADVERTENT RETURNS PLAN

April 2021

4.0 HDD CONTRACTOR RESPONSIBILITIES

SFW will require the HDD Contractor to:

- Verify that all workers are properly trained and familiar with the necessary procedures for response to an inadvertent return prior to commencement of drilling operations;
- Maintain constant communication with construction personnel when a suspected inadvertent return occurs;
- Verify that all drilling equipment is in working order, including annular pressure monitoring equipment;
- Ensure that the proper site personnel are informed of an inadvertent return. Coordinate personnel response to clean-up and provide timely notifications in accordance with this Inadvertent Returns Plan;
- Verify all waste materials are properly containerized, labelled, and removed from the site to an approved disposal facility by personnel experienced in the removal, transport and disposal of drilling mud;
- Stop operations if contaminated soils are suspected and conduct testing to assess the potential for contamination. If contamination is discovered, the HDD Contractor will confirm that drilling mud/spoils/cuttings associated with the crossings will be managed and disposed of at an approved facility;
- Be familiar with all aspects of the drilling activity, the contents of this Inadvertent Returns Plan, and the conditions of approval under which the activity is permitted to take place;
- Have the authority to stop work and commit the resources (personnel and equipment) necessary to implement this Inadvertent Returns Plan; and
- Verify that a copy of this Inadvertent Returns Plan is available (onsite) and accessible to all construction personnel.

INADVERTENT RETURNS PLAN

April 2021

5.0 INSPECTION AND TRAINING

At least one third-party HDD Monitor will be assigned full-time to each of the onshore and offshore HDD locations for the duration of the HDD operations. SFW will provide full-time inspection for HDD construction. The HDD Monitor will monitor the drilling process, assess trends, and verify that the HDD operations are completed in accordance with Project specifications, approved workplans, permit requirements, and the Certificate. SFW will verify that the proper equipment and materials are available on-site and that Inadvertent Returns Plan procedures are followed.

At least one third-party Environmental Monitor will be assigned full-time to the Project. Additionally, at least one additional Environmental Monitor will be assigned for the duration of in-water work if such work is undertaken simultaneously with SFEC-Onshore and/or SFEC-Interconnection Facility construction activities ("Aquatic Environmental Monitor"). Each Environmental Monitor will verify the environmental aspects associated with the Project, approved workplans, permit requirements, and the Certificate.

Prior to the start of construction, SFW will verify that a training session is conducted with contractor personnel and applicable inspectors. Such personnel will be thoroughly trained in the applicable inadvertent return contingency items in this Inadvertent Returns Plan. On-site safety and environmental protection meetings will provide ongoing communications and awareness measures regarding prevention, mitigation, and response associated with potential inadvertent return events. Additional training may be required at the SFW's discretion in response to HDD Contractor non-compliance. The initial training session will cover the following:

- Inadvertent Returns Plan provisions, equipment maintenance, and site-specific permit and monitoring requirements
- Inspection procedures for release prevention and containment equipment and materials
- HDD Contractor/crew obligation to stop the drilling operation upon identifying an inadvertent return and to report any release
- Operation of release prevention and control equipment and the location of release control materials, as necessary and appropriate
- Protocols for communication with agency representatives who might be on-site during any clean-up effort

Visual surface inspections along the drill path onshore will be performed by the HDD Contractor; however, all construction crew members will be trained during the pre-construction environmental training program to recognize inadvertent returns and report them to the Environmental Monitor(s) and HDD Monitor(s). During normal drilling operations, these inspections will occur a minimum of once every 3 hours. During the course of drilling, the drilling fluid returns at either rig location will be monitored continuously by the HDD Contractor and HDD Monitor. Should a reduction in drilling fluid returns occur or a spike in pressure be

INADVERTENT RETURNS PLAN

April 2021

registered by the HDD rig operator, visual inspections along the drill path onshore will occur continuously until pressure and drilling fluid returns are within normal operating ranges.

The HDD Monitor and Environmental Monitor will document visual inspections on their daily reports, which will be submitted daily to SFW. SFW, or its designee, will maintain the inspection record.

INADVERTENT RETURNS PLAN

April 2021

6.0 INADVERTENT RETURN MONITORING AND RESPONSE PROTOCOLS

Monitoring of the HDD alignment for an inadvertent return is an integral component of this Inadvertent Returns Plan. Monitoring frequency will vary depending upon the following drilling fluid operational conditions:

- Condition 1: Full drilling fluid circulation
- Condition 2: Partial loss of drilling fluid circulation
- Condition 3: Inadvertent return of drilling fluid

6.1 CONDITION 1 – FULL DRILLING FLUID CIRCULATION

When HDD operations are in progress and full drilling fluid circulation is being maintained at one or both of the HDD endpoints, the following monitoring and drilling protocols will be implemented:

- The presence of drilling fluid returns at the HDD entry/exit points will be documented on the HDD Contractor's daily inspection report.
- Land-based portions of the drilled alignment will be walked and visually inspected for signs of inadvertent drilling fluid returns as well as surface heaving and settlement as deemed necessary.
- Ocean-based portions of the alignment will be monitored visually from the beach in the event of suspected loss of fluid.
- In the event an inadvertent return is detected, the monitoring protocol associated with Condition 3 will be implemented.
- Drilling fluid products and quantities used will be documented.
- Drilling will proceed in accordance with the approved HDD workplan.
- During pilot bore drilling, the downhole annular drilling fluid pressures will be monitored and compared to anticipated values. If pressures trend significantly higher from anticipated values, several drill pipes may be extracted to swab the HDD bore, clear any blockage behind the downhole tooling, and lower the observed downhole drilling fluid pressures.

INADVERTENT RETURNS PLAN

April 2021

6.2 CONDITION 2 – PARTIAL LOSS OF DRILLING FLUID CIRCULATION

If circulation slows and partial losses of drilling fluids are noted, the following drilling procedures will be followed. These procedures apply to the pilot bore, reaming and swab processes as detailed in the HDD workplan. Losses during pullback operations will be documented but pullback operations will continue.

- Land-based portions of the drilled alignment will be walked and visually inspected for signs of inadvertent drilling fluid returns.
- Ocean-based portions of the alignment will be monitored visually from the beach.
- In the event an inadvertent return is detected, the monitoring protocol associated with Condition 3 will be implemented.
- Forward drilling progress with the drilling assembly will be halted.
- The drill rig operator will reduce their drilling fluid pumping rate and swab back and forth with the current drill pipe on the drill rig to work and clean the bore. If drilling fluid circulation is fully restored, the drilling process can continue in accordance with the HDD workplan with monitoring protocols as required with Condition 1. The HDD Monitor will document the steps taken by the HDD Contractor to restore drilling fluid circulation.
- The HDD Contractor will notify SFW, or their designee, immediately.
- In the event drilling fluid circulating is not restored, the drill rig operator will remove additional drill pipes to swab and clean the bore. This could involve tripping completely out of the bore, retooling and/or recommencing drilling/reaming operations. Pre-approved loss circulation material could also be mixed into the drilling fluid and injected into the bore. This material is designed to help plug or pack off an open flow channel, thereby increasing the ability to re-establish slurry flow within the HDD bore. Once drilling fluid circulation is restored, the drilling process can continue in accordance with the HDD workplan with monitoring protocols as required with Condition 1. The steps taken by the HDD Contractor to restore drilling fluid circulation will be recorded.
- Drilling fluid products and quantities used will be documented.
- During pilot bore drilling, the downhole annular drilling fluid pressures will be monitored and compared to anticipated values. If pressures trend significantly higher from anticipated values, several drill pipes may be extracted to swab the HDD bore, clear any blockage behind the downhole tooling, and lower the observed downhole drilling fluid pressures.
- If circulation is not re-established, the HDD Contractor will increase the frequency of visual inspection along the drilled path alignment as appropriate. Additionally, the HDD Contractor downtime (during which no drilling fluid is pumped) and the drilling fluid pumping rate will be recorded in case it should become necessary to estimate lost circulation volumes.

INADVERTENT RETURNS PLAN

April 2021

6.3 CONDITION 3 – INADVERTENT RETURNS OF DRILLING FLUID

If an inadvertent return is observed, the HDD Contractor will immediately take measures to eliminate, reduce, or control the inadvertent return. The actions to be taken will depend on the location of the inadvertent return, site specific geologic conditions, and the volume of the inadvertent return. Clean-up activities inside of approved construction workspace will proceed immediately. Permission to access the beach area, in the unlikely event an inadvertent return were to occur, will be pre-arranged. Clean-up activities outside of the approved construction workspace and beach area will not proceed prior to completion of any requisite agency notifications. All visible inadvertent returns, regardless of location, will be reported in accordance with notification measures outlined below in Section 7.

If an inadvertent return of drilling fluids is detected, the following will be implemented based on the location of where the inadvertent return has occurred. Upon discovery, the following will apply:

- Immediately upon discovery, drilling operations will be halted.
- The HDD Contractor will notify SFW, or their designee, immediately.
- Containment measures will be implemented by the HDD Contractor where returns are noted onshore. The HDD Monitor will document any containment measures employed. Containment of an inadvertent return offshore is not practical as the water-based drilling fluids are anticipated to dissipate quickly in the ocean.
- Upon notification, SFW will perform external notifications per Section 7 of this Inadvertent Returns Plan.
- The HDD Contractor will document the location, approximate area impacted, approximate volume, and potential for aquatic resource to be impacted by the return, as well as any containment measures employed by the HDD Contractor.

6.3.1 Inadvertent Return Response for Event within Onshore Area

If an inadvertent return is identified onshore, the HDD Contractor will notify SFW of the event. If the event is located within the Project area or publicly accessible land, the HDD Contractor will contain and clean the area as necessary. Typical responses to an event will include foot-traffic to setup pumps with small hoses to transfer the returns from the location of the inadvertent return back to an accessible location. Construction of new access roads outside of certificated workspaces are not anticipated as containment and clean-up equipment can generally be hand carried. All parties including SFW and the HDD Contractor, will work closely to determine the best course of action for inadvertent returns occurring onshore. Applicable agencies and affected landowners (private or public) will be notified. The HDD Contractor will take appropriate actions to reduce, eliminate, or control the return, which may include:

- Constructing a small pit or sandbag coffer around the return point, installing a section of silt fence and/or straw bales to trap as much drilling fluids as possible, and placing a pump hose in the pit to pump the drilling fluid back to the bore site or temporary holding area or vessels (i.e., vacuum truck);

INADVERTENT RETURNS PLAN

April 2021

- Only resuming drilling fluid operations with SFW's permission. The HDD Contractor will be directed to pump minimal drilling fluids while retracting the drill string and bottom hole assembly. Pre-approved loss circulation material may be mixed into the drilling fluid and injected into the bore. This material is designed to help plug or pack off an open flow channel, thereby increasing the ability to re-establish slurry flow within the HDD bore following a waiting period for the loss circulation material to hydrate/yield. The drill rig operator will remove additional drill pipes to swab and clean the bore. This could involve tripping completely out of the bore, retooling and/or recommencing drilling/reaming operations;
- Documenting drilling fluid circulation during any trip out or into the bore;
- Reducing downhole annular drilling fluid pressures; and
- Monitoring and documenting the effectiveness of the containment measures.

Information about the return will be recorded and updated as necessary as a running report on the Inadvertent Return Report (IR Report) form provided in Attachment C. The HDD Contractor is responsible for completion of the IR Report form. Each IR Report form will be updated with the assistance of the HDD Monitor and Environmental Monitor as new information is learned about the return. The general reporting will be "Initial", "Interim", and then "Final". The initial, interim, and final reports will comprehensively document the return from initial discovery/notification through final restoration.

6.4 INADVERTENT RETURN RESPONSE FOR EVENT WITHIN OCEAN

If an inadvertent return is identified offshore, the HDD Contractor will notify SFW of the event. The environmental impacts of a return of drilling fluid into the ocean include a temporary increase in local turbidity until drilling fluid dissipates with the current and/or settles to the bottom. Applicable agencies will be notified. Appropriate actions will be taken to reduce further volume of drilling fluids lost to the inadvertent return. Depending on the condition to be resolved, the actions will include one or a combination of:

- Resuming drilling fluid operations. The HDD Contractor will be directed to pump minimal drilling fluids while retracting the drill string and bottom hole assembly. Pre-approved loss circulation material may be mixed into the drilling fluid and injected into the bore. This material is designed to help plug or pack off an open flow channel, thereby increasing the ability to re-establish slurry flow within the HDD bore following a waiting period for the loss circulation material to hydrate/yield. The drill rig operator will remove additional drill pipes to swab and clean the bore. This could involve tripping completely out of the bore, retooling, and/or recommencing drilling/reaming operations;
- Reducing downhole annular drilling fluid pressures; and
- Documenting drilling fluid circulation during any trip out or into the bore.

Information about the return will be recorded and updated as necessary as a running report on the IR Report Form provided in Attachment C. Each IR Report form will be updated as new information is learned about the return. The general reporting will be "Initial", "Interim", and then "Final". The initial, interim, and final reports will comprehensively document the return.

INADVERTENT RETURNS PLAN

April 2021

6.5 INADVERTENT RETURN RESPONSE FOR EVENT WITHIN OCEAN IN VICINITY OF EXIT LOCATION

During punch out of the drill bit, some drilling fluids may be lost to the ocean environment. These fluids would likely enter the pit excavated over the exit location for later HDPE conduit burial. The extent of fluid losses will be minimized by pumping minimal to no excess fluids downhole during pilot bore operations over the last 400 ft (121 m) of the installation.

6.6 CONTAINMENT AND CLEAN-UP MATERIALS AND EQUIPMENT

The necessary containment and clean-up equipment will be available at the site and readily available for use. All or a subset of the following material and equipment will be on site and in ample supply depending on the site conditions and extent of sensitive areas traversed by the HDD:

- Spill sorbent pads and booms
- Compost filter socks
- Weighted filter socks
- Straw bales (certified weed-free)
- Wood stakes
- Sledgehammers
- Sandbags
- Silt fence
- Plastic sheeting
- Corrugated plastic pipe
- Shovels, push brooms, and squeegees
- Leak-free hoses
- Five-gallon buckets
- Centrifugal, trash and sump pumps
- Vacuum truck (on emergency response agreement)
- Rubber tired or wide track backhoe
- Timber mats

INADVERTENT RETURNS PLAN

April 2021

- Bobcat (if needed on a site-specific basis)
- Storage tanks (if needed on a site-specific basis)

6.7 RESPONSE CLOSE-OUT PROCEDURES

When the release has been contained and cleaned up, response closeout activities will be reviewed by SFW. Implementation of the clean-up is to be conducted by the HDD Contractor, with oversight by the HDD Monitor(s) and Environment Monitor(s) and will include the following:

- The recovered drilling fluid will either be recycled or hauled to an approved facility or disposal site. No recovered drilling fluids will be discharged into streams, storm drains or any other water source.
- All inadvertent return excavation and clean-up sites will be returned to pre-project contours using clean fill as necessary.
- All containment measures will be removed from the inadvertent return site after containment and clean-up, unless it would be beneficial to keep the containment measures in place for the remainder of HDD operations.

6.8 CONSTRUCTION RE-START

Following an inadvertent release of drilling fluid, and after containment is achieved, drilling operations may continue if the root cause of the return is determined and a plan is developed to reduce or eliminate the risk of reoccurrence.

INADVERTENT RETURNS PLAN

April 2021

7.0 NOTIFICATIONS

7.1 INADVERTENT RETURN EVENT NOTIFICATIONS

In the event of an inadvertent return of any volume, and regardless of the spiller, SFW will report all spills encountered to the NYSDEC Spill Hotline (1-800-457-7362) within 2 hours in accordance with the NYSDEC Spill Reporting and Initial Notification Requirements Technical Field Guidance, as outlined in the Certificate. Furthermore, SFW will report all spills encountered to DPS Staff, in accordance with all federal and state regulations and the Certificate. A copy of such notification will be provided to the affected property owner as well. Other agency notifications, if required, will occur within 24 hours and proper documentation will be submitted in a timely and complete manner. The notifications will initially be via phone to the Emergency Response numbers listed below in Table 5, and then to the appropriate agency personnel via submittal of an initial IR Report form located in Attachment C.

This notification process is intended to provide SFW the flexibility to notify agencies with regulatory jurisdiction in a given inadvertent return. If all the following conditions apply to any inadvertent return, SFW will notify required regulatory agencies of the inadvertent return and its resolution within the weekly environmental inspection report:

- Occurs in a non-environmentally sensitive location such that no other agencies require notification.
- Is within the approved workspace.
- There is no danger to public safety.
- No landowner complaints are received.
- Handling of the inadvertent return complies with the approved HDD Inadvertent Return and Contingency Plan.

For situations that deviate from these parameters, the required regulatory notifications will be provided within 24 hours of an inadvertent return.

For the initial phone notification, the following information will be provided:

- Name and telephone number of person reporting
- Location of the release
- Date and time of release
- Estimated size of release
- Description of any sensitive areas and their location in relation to the inadvertent return
- Description of the methods used to clean-up or secure the site

INADVERTENT RETURNS PLAN

April 2021

Following the initial phone notification to appropriate emergency/regulatory staff, SFW personnel will notify the following individuals via e-mail to include submittal of the IR Report form located in Attachment C. This email notification will document the initial phone reporting of the return and any open consultations with applicable agencies. Additional consultations may be required regarding remediation approval, restoration approval, and the need for appropriate approval/permits. The IR Report form will be used to document the consultations and approvals and report final remediation/restoration.

Table 5 provides a listing of agencies/stakeholders, contact information, regulatory oversight and/or roles, and the applicable crossing(s).

Table 5. Agency/Stakeholder Notifications

Agency/Stakeholder	Contact Information	Regulatory Oversight/Role

This list will be modified pending further discussions and consultation with agencies and stakeholders and permit requirements.

INADVERTENT RETURNS PLAN

April 2021

8.0 FAILED HDD CONTINGENCY

If the attempted HDD installation is unsuccessful, the proposed HDD alignment may be modified using the same HDD entry/exit locations to accommodate an additional HDD attempt, depending on the condition that resulted in the HDD failure. Prior to attempting a second HDD crossing, a risk mitigation workshop will be held with SFW, the HDD design consultant, and the HDD Contractor to determine the cause of the initial failure and any mitigation measures that could be adopted to reduce the risk(s) during the second HDD attempt. Based on the risk workshop, the participants will determine whether a second HDD can be attempted.

Subsurface information obtained during the pilot hole phase is important to SFW's decision-making framework. Natural variations in stratigraphy encountered by the pilot hole could interfere with steering accuracy. Depending on the cause and severity of the HDD failure, and its potential consequences to the environment, the following contingency measures will be employed:

- Designating a new drill path
- Adjusting the depth of the borehole path so that the drill could avoid the problematic stratum
- Pulling out the drill pipe, moving the drill rig over (offset the alignment) and re-drilling the pilot hole
- Abandoning the pilot hole and employing an alternative crossing method such as trenching with isolation
- Fluid loss, including inadvertent returns, is addressed in the previous sections of this Inadvertent Returns Plan in the context of monitoring and clean-up. The following content addresses fluid loss in the context of remedial response leading to abandonment. Loss of circulation can occur during any of the phases of an HDD. If loss of circulation is encountered during any crossing installation phase, then SFW's HDD Contractor, construction manager, and the engineering consultant will assess the extent of fluid loss, determine its likely cause and take the appropriate remedial action. These actions could include:
 - Deeming the fluid loss acceptable and continuing to drill/ream/pull.
 - Stopping the operation, re-establishing circulation, and restarting the operation.
 - Abandoning the hole, moving over, and boring a new crossing path (re-drill).
 - Abandoning the hole and employing an alternative crossing method, such as trenching with isolation as applicable.
 - Drilling a relief well.
- If severe pipe damage or collapse is experienced during the pullback phase, then SFW, the HDD Contractor, construction manager, and engineering consultant will take the appropriate action to

INADVERTENT RETURNS PLAN

April 2021

complete the crossing within specifications. After assessing the damage, determining its likely cause and appropriate remedial action, these actions could include:

- Deeming the pipe section acceptable.
 - Removing the pipe from the bore, repairing or replacing the pipe, re-reaming the bore to the same or larger diameter and re-installing the pipe.
 - Abandoning the pipe, moving over, and boring a new crossing path (re-drill).
 - Abandoning the pipe and employing an alternative crossing method, such as trenching with isolation.
- If for any reason the HDD hole must be abandoned, the accessible abandoned hole will be filled with grout. The upper 5 feet of the abandoned hole will be filled with compacted soil to allow vegetation to re-establish. If deemed necessary by SFW, more extensive grouting may be used to reduce the risk of ground subsidence and/or returns of inadvertent drilling fluid from adjacent HDD alignments, or to comply with applicable regulatory requirements or other Project conditions.
 - The grout mixture utilized to abandon a borehole will consist of either a cement grout or cement/bentonite grout mixture that can be pumped downhole through the drill pipe used to drill/ream the hole.
 - The grout mix design (e.g., water/cement/bentonite ratios) will be suited for the HDD location based on the geologic formation(s) along the abandoned portion of the hole. Admixtures such as those used in structural concrete may be used to modify the flowability and/or set time of the grout. To grout the abandoned hole (including pipe section if the pipe cannot be pulled out), all cutting tools (e.g., reamer, cutting heads) will be extracted from the hole, the drill pipe will be advanced into the hole to the required grout depth and the grout mixture will be pumped while the drill pipe is being extracted from the hole. The rate at which the drill pipe is extracted during grouting operations will be regulated to match the rate of grout placement.
 - Once the partially completed hole has been properly abandoned, new entry and exit locations will be evaluated. If the new entry and exit points are viable, following receipt of any requisite environmental permits and regulatory approvals, a new drilling process will proceed. The new entry and exit locations will be offset from the original to avoid the point of release. Should the shifted alignment also fail, alternate methods, such as open-cut crossing, will be evaluated.

INADVERTENT RETURNS PLAN

April 2021

9.0 COMPLETION AND CLEAN-UP

Proper site clean-up will be conducted and will include the following:

- All materials and any rubbish/construction debris will be removed from the construction zone at the end of each workday.
- Sump pits at the bore entry will be filled and returned to natural grade.
- All protective measures (fiber rolls, straw bale, silt fence, etc.) will be removed.

INADVERTENT RETURNS PLAN

April 2021

ATTACHMENTS

INADVERTENT RETURNS PLAN

April 2021

Attachment A TYPICAL DRILLING FLUID SAFETY DATA SHEETS



The Public Health and Safety Organization

NSF Product and Service Listings

These NSF Official Listings are current as of **Monday, January 13, 2020** at 12:15 a.m. Eastern Time. Please [contact NSF](#) to confirm the status of any Listing, report errors, or make suggestions.

Alert: NSF is concerned about fraudulent downloading and manipulation of website text. Always confirm this information by clicking on the below link for the most accurate information:

<http://info.nsf.org/Certified/PwsChemicals/Listings.asp?TradeName=max+gel&>

NSF/ANSI/CAN 60 Drinking Water Treatment Chemicals - Health Effects

M-I L.L.C.

A Schlumberger Company
5950 North Course Drive
Houston, TX 77072
United States
281-561-1322

Facility : Houston, TX

Miscellaneous Water Supply Products[WL]

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Max Gel	Well Drilling Aid	NA

[WL] These products are designed to be flushed out prior to using the system for drinking water. The well shall be properly flushed and drained before being placed in service.

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

Facility : Greybull, WY

Bentonite[1]***Trade Designation***

Max Gel

Product Function

Well Drilling Aid

Max Use

NA

[1] This product is designed to be used off-line following manufacturer's use instructions.
The well is to be flushed until the turbidity of the water is < 1 NTU before the system may be used for drinking water.

Number of matching Manufacturers is 1

Number of matching Products is 2

Processing time was 0 seconds



The Public Health and Safety Organization

NSF Product and Service Listings

These NSF Official Listings are current as of **Monday, January 13, 2020** at 12:15 a.m. Eastern Time. Please [contact NSF](#) to confirm the status of any Listing, report errors, or make suggestions.

Alert: NSF is concerned about fraudulent downloading and manipulation of website text. Always confirm this information by clicking on the below link for the most accurate information:

<http://info.nsf.org/Certified/PwsChemicals/Listings.asp?TradeName=M%2DI+gel&>

NSF/ANSI/CAN 60 Drinking Water Treatment Chemicals - Health Effects

M-I L.L.C.

A Schlumberger Company
5950 North Course Drive
Houston, TX 77072
United States
281-561-1322

Facility : Houston, TX

Miscellaneous Water Supply Products[WL]

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
M-I Gel	Well Drilling Aid Drilling Fluid	NA
M-I Gel Supreme	Well Drilling Aid Drilling Fluid	NA

[WL] These products are designed to be flushed out prior to using the system for drinking water. The well shall be properly flushed and drained before being placed in service.

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

Facility : Greybull, WY

Bentonite[1]

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
M-I Gel	Drilling Fluid	NA
	Well Cleaning Aid	

[1] This product is designed to be used off-line following manufacturer's use instructions.
The well is to be flushed until the turbidity of the water is < 1 NTU before the system may be used for drinking water.

Miscellaneous Water Supply Products[2]

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
M-I Gel Supreme	Well Drilling Aid	NA
	Drilling Fluid	

[2] The well is to be properly flushed until the turbidity of the water is <1 NTU.

Number of matching Manufacturers is 1

Number of matching Products is 4

Processing time was 0 seconds



The Public Health and Safety Organization

NSF Product and Service Listings

These NSF Official Listings are current as of **Monday, January 13, 2020** at 12:15 a.m. Eastern Time. Please [contact NSF](#) to confirm the status of any Listing, report errors, or make suggestions.

Alert: NSF is concerned about fraudulent downloading and manipulation of website text. Always confirm this information by clicking on the below link for the most accurate information:

<http://info.nsf.org/Certified/PwsChemicals/Listings.asp?TradeName=soda+ash&>

NSF/ANSI/CAN 60 Drinking Water Treatment Chemicals - Health Effects

AMC USA LLC

1220 North 2200 West

Suite # 600

Salt Lake City, UT 84116

United States

801-364-0233

Visit this company's website (<http://www.amcmud.com>)

Facility : Salt Lake City, UT

Sodium Carbonate

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
SODA ASH	pH Adjustment	100mg/L

Bentonite Performance Minerals, LLC

3000 North Houston Parkway East

Houston, TX 77032

United States

281-871-5900

Facility : # 1 USA

Sodium Carbonate

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Polysselect Power Soda Ash	pH Adjustment	100mg/L

Brenntag Canada Inc.

43 Jutland Road

Etobicoke, ON M8Z 2G6

Canada

905-459-1232

[Visit this company's website](#)

<http://www.canadacolors.com>

Facility : Brampton, Ontario, Canada

Sodium Carbonate[1]

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Soda Ash 100	Corrosion & Scale Control pH Adjustment	200mg/L
Soda Ash Dense	Corrosion & Scale Control pH Adjustment	200mg/L
Soda Ash High Purity	Corrosion & Scale Control pH Adjustment	200mg/L
Soda Ash Light	Corrosion & Scale Control pH Adjustment	200mg/L
Soda Ash Natural Light H.A.	Corrosion & Scale Control pH Adjustment	200mg/L

[1] Only products that bear the NSF Mark are Certified.

Brenntag Mid-South, Inc.

1405 Highway 136 West

P.O. Box 20

Henderson, KY 42420-0020

United States

800-950-7267

270-827-3545

Visit this company's website

(<http://www.brenntag.com/north-america/en/about-brenntag/regional-capabilities/brenntag-mid-south/index.jsp>)

Facility : Henderson, KY

Sodium Carbonate

Trade Designation

Soda Ash 15%

Product Function

Corrosion & Scale Control
pH Adjustment

Max Use

667mg/L

[CP] The finished drinking water shall be monitored to ensure that levels of copper do not exceed 1.3 mg/L.

Brenntag Pacific, Inc.

10747 Patterson Place

Santa Fe Springs, CA 90670

United States

323-562-9500

Visit this company's website

(<http://www.brenntag.com/north-america/en/about-brenntag/regional-capabilities/brenntag-pacific/index.jsp>)

Facility : South Gate, CA

Sodium Carbonate

Trade Designation

Soda Ash 20%

Product Function

Precipitation Agent

Max Use

150mg/L

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

CETCO

Colloid Environmental Technologies Co.

2870 Forbs Avenue

(<http://www.cetco.com>)

Hoffman Estates, IL 60192
United States
800-527-9948
847-851-1824
Visit this company's website (<http://www.cetco.com>)

Facility : # 1 USA

Sodium Carbonate[4]

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
SODA ASH	Well Drilling Aid	NA
SODA ASH DENSE	Well Drilling Aid	NA

[4] These products are designed to be flushed out prior to using the system for drinking water. Before being placed into service, the well is to be properly flushed according to the manufacturer's use instructions. Certification of these products is based on the well drilling model with the following assumptions:

- The amount of well drilling fluid used is 3780 L (1000 U.S. gallons) to which the drilling fluid has been added at the manufacturer's recommended level.
- The aquifer contains 3.1 million liters of water (815,000 gallons) based on 0.5 acre aquifer of 6.1 meter depth (20 ft.) and 25% porosity.
- The bore hole is 61 meters in total depth (200 ft.), the screen is 6.1 meters in length (20 ft.), and the bore hole is 25.4 cm. in diameter (10 in.).
- The amount of well drilling fluid removed from the well during construction is equal to the combined volumes of the casing and the screen, plus an additional amount removed through the well disinfection and development (90% removed).
- This product should not be used in constructing wells in highly porous formations, such as cavernous limestone.

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

Facility : # 16 USA

Sodium Carbonate[1]

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
SODA ASH	Well Drilling Aid	NA

[1] These products are designed to be flushed out prior to using the system for drinking water. Before being placed into service, the well is to be properly flushed according to the manufacturer's use instructions. Certification of these products is based on the well drilling model with the following assumptions:

- The amount of well drilling fluid used is 3780 L (1000 U.S. gallons) to which the drilling fluid has been added at the manufacturer's recommended level.
- The aquifer contains 3.1 million liters of water (815,000 gallons) based on 0.5 acre aquifer of 6.1 meter depth (20 ft.) and 25% porosity.
- The bore hole is 61 meters in total depth (200 ft.), the screen is 6.1 meters in length (20 ft.), and the bore hole is 25.4 cm. in diameter (10 in.).
- The amount of well drilling fluid removed from the well during construction is equal to the combined volumes of the casing and the screen, plus an additional amount removed through the well disinfection and development (90% removed).
- This product should not be used in constructing wells in highly porous formations, such as cavernous limestone.

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

Ciner Wyoming LLC

254 County Road 4-6
P.O. Box 513
Green River, WY 82935
United States
307-872-7207

Facility : Walbridge, OH

Sodium Carbonate

Trade Designation

Soda Ash - Dense

Soda Ash - High Purity Dense

Soda Ash - High Purity Grade

Product Function

Corrosion & Scale Control
pH Adjustment

Corrosion & Scale Control
pH Adjustment

Max Use

100mg/L

100mg/L

100mg/L

Soda Ash - Technical Grade	Corrosion & Scale Control	100mg/L
	pH Adjustment	
	Corrosion & Scale Control	
	pH Adjustment	

NOTE: Only products bearing the "NSF 60" designation are Certified by NSF International.

Facility : Green River, WY

Sodium Carbonate

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Soda Ash - Dense	Corrosion & Scale Control pH Adjustment	100 mg/L
Soda Ash - High Purity Dense	Corrosion & Scale Control pH Adjustment	100 mg/L
Soda Ash - High Purity Grade	Corrosion & Scale Control pH Adjustment	100mg/L
Soda Ash - Technical Grade	Corrosion & Scale Control pH Adjustment	100mg/L

**DuBois Chemicals, Inc. formerly
known as BHS Marketing LLC**

3630 East Kemper Road

Sharonville, OH 45241

United States

800-438-2647

[Visit this company's website](http://www.duboischemicals.com)

(<http://www.duboischemicals.com>)

Facility : Salt Lake City, UT

Sodium Carbonate

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Soda Ash Briquettes	pH Adjustment	100mg/L
Soda Ash Dense	pH Adjustment	100mg/L
Soda Ash Lite	pH Adjustment	100mg/L

Genesis Alkali, LLC

1735 Market Street
Philadelphia, PA 19103
United States
215-299-6000

Facility : Wilmington, DE

Sodium Carbonate

Trade Designation

Product Function

Max Use

Soda Ash 100	Corrosion & Scale Control pH Adjustment	150mg/L
Soda Ash 260	Corrosion & Scale Control pH Adjustment	150mg/L
Soda Ash Dense	Corrosion & Scale Control pH Adjustment	150mg/L
Soda Ash Light	Corrosion & Scale Control pH Adjustment	150mg/L

Facility : Ogden, UT

Sodium Carbonate

Trade Designation

Product Function

Max Use

Soda Ash 100	Corrosion & Scale Control pH Adjustment	150mg/L
Soda Ash 260	Corrosion & Scale Control pH Adjustment	150mg/L
Soda Ash Dense	Corrosion & Scale Control pH Adjustment	150mg/L
Soda Ash Light	Corrosion & Scale Control pH Adjustment	150mg/L

Facility : Green River, WY

Sodium Carbonate

Trade Designation

Product Function

Max Use

Soda Ash 100	Corrosion & Scale Control pH Adjustment	150mg/L
Soda Ash 160	Corrosion & Scale Control pH Adjustment	150mg/L
Soda Ash 260	Corrosion & Scale Control pH Adjustment	150mg/L

Soda Ash 50	Corrosion & Scale Control pH Adjustment	150mg/L
Soda Ash Dense	Corrosion & Scale Control pH Adjustment	150mg/L
Soda Ash Light	Corrosion & Scale Control pH Adjustment	150mg/L

George S. Coyne Chemical Co., Inc.

3015 State Road

Croydon, PA 19021

United States

800-523-1230

215-785-3000

[Visit this company's website](http://www.coynechemical.com)

(<http://www.coynechemical.com>)

Facility : Croydon, PA

Sodium Carbonate

Trade Designation

Soda Ash Solution 10%

Soda Ash Solution 15%

Product Function

Corrosion & Scale Control
pH Adjustment

Corrosion & Scale Control
pH Adjustment

Max Use

1000mg/L

667mg/L

Halliburton

3000 North Sam Houston Parkway East

Houston, TX 77032

United States

800-735-6075

281-871-4612

[Visit this company's website \(http://www.baroididp.com\)](http://www.baroididp.com)

Facility : Rosenberg, TX

Sodium Carbonate

Trade Designation

SODA ASH

Product Function

pH Adjustment

Max Use

100mg/L

Hawkins, Inc.

2381 Rosegate

Roseville, MN 55113

United States

800-328-5460

612-331-6910

Visit this company's website (<http://www.hawkinsinc.com>)

Facility : Minneapolis, MN

Sodium Carbonate

Trade Designation

Soda Ash 16%

Soda Ash 16% FCC

Product Function

Corrosion & Scale Control

pH Adjustment

Corrosion & Scale Control

pH Adjustment

Max Use

769mg/L

769mg/L

Ideal Chemical and Supply Company

4025 Air Park Street

P.O. Box 18698

Memphis, TN 38181-0698

United States

901-363-7720

Facility : # 1 Memphis, TN

Sodium Carbonate

Trade Designation

Soda Ash

Product Function

Corrosion & Scale Control

pH Adjustment

Max Use

100mg/L

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

International Suppliers & Contractors Inc. (DBU Intersac)

19400 Cruickshank Avenue

Baie-d'Urfé, QC H9X 3P1

Canada

800-810-1833

514-457-5362

Visit this company's website (<http://www.intersac.com>)

Facility : Baie-d'Urfé, Québec, Canada

Sodium Carbonate

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Soda Ash Dense	pH Adjustment	100mg/L

Natrium Products, Inc.

58 Pendleton Street

P.O. Box 5465

Cortland, NY 13045

United States

607-753-9829

Visit this company's website (<http://www.natrium.com>)

Facility : Cortland, NY

Sodium Carbonate

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Soda Ash-Dense[1]	pH Adjustment	100 mg/L

[1] Only packages or pallets of Sodium Bicarbonate/Sodium Carbonate (Soda Ash) bearing the NSF Mark are Certified.

Premier Chemicals & Services

4856 Revere Avenue

Baton Rouge, LA 70808

United States

225-926-0059

Visit this company's website
(<http://www.premierchemicals.net>)

Facility : South Manchac, LA

Sodium Carbonate

Trade Designation

Soda Ash 10 - 20%

Product Function

pH Adjustment

Corrosion & Scale Control

Max Use

20mg/L

Reliable Industrial Supply Ltd.

50 Mumford Road
Lively, ON P3Y 1L2
Canada
705-692-2959

Facility : Lively, Ontario, Canada

Sodium Carbonate

Trade Designation

Soda Ash Dense

Product Function

Corrosion & Scale Control

pH Adjustment

Max Use

100mg/L

Soda Ash Light

Corrosion & Scale Control

pH Adjustment

100mg/L

SAL Chemical Company, Inc.

Half Moon Industrial Park
3036 Birch Drive
Weirton, WV 26062
United States
800-879-1725
304-748-8200

Visit this company's website (<http://www.salchem.com>)

Facility : # 1 USA

Sodium Carbonate

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Soda Ash - Dense	Corrosion & Scale Control	100 mg/L
Soda Ash - Light	Corrosion & Scale Control	100 mg/L

Searles Valley Minerals

13200 Main Street
P.O. Box 367
Trona, CA 93592-0367
United States
760-372-2243

Facility : Trona, CA

Sodium Carbonate

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Dense Soda Ash	pH Adjustment	100 mg/L

Solvay Chemicals, Inc.

3737 Buffalo Speedway
Suite 800
Houston, TX 77098
United States
713-525-6500

Facility : Distribution Center - Sandersville, GA

Sodium Carbonate

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Soda Ash	pH Adjustment	200mg/L

Facility : Distribution Center - Chicago Heights, IL

Sodium Carbonate

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Soda Ash	pH Adjustment	200mg/L

Facility : Distribution Center - Council Bluffs, IA

Sodium Carbonate

Trade Designation

Soda Ash

Product Function

pH Adjustment

Max Use

200mg/L

Facility : Distribution Center - Memphis, TN

Sodium Carbonate

Trade Designation

Soda Ash

Product Function

pH Adjustment

Max Use

200mg/L

Facility : Green River, WY

Sodium Carbonate

Trade Designation

Soda Ash

Product Function

pH Adjustment

Max Use

200 mg/L

Southern Ionics Incorporated

579 Commerce Street

P.O. Box 1217

West Point, MS 39773

United States

866-204-2850

662-494-3055

[Visit this company's website](http://www.southernionics.com)

<http://www.southernionics.com>

Facility : Pasadena, TX

Sodium Carbonate

Trade Designation

Soda Ash Solution

Product Function

Corrosion & Scale Control

pH Adjustment

Max Use

286mg/L

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

Tata Chemicals North America

20 Miles West of Green River, WY

P.O. Box 551

Green River, WY 82935

United States

800-819-8568

800-819-8568

[Visit this company's website](#)

<http://www.tatachemicals.com>

Facility : # 1 Green River, WY

Sodium Carbonate

Trade Designation

Soda Ash - Dense

Product Function

Corrosion & Scale Control

pH Adjustment

Max Use

200mg/L

Soda Ash Dense Food Grade

Corrosion & Scale Control

pH Adjustment

200mg/L

Facility : # 2 Green River, WY

Sodium Carbonate

Trade Designation

Soda Ash - Dense

Product Function

Corrosion & Scale Control

pH Adjustment

Max Use

200mg/L

Soda Ash Natural Light

Corrosion & Scale Control

pH Adjustment

150mg/L

Soda Ash Natural Light HA

Corrosion & Scale Control

pH Adjustment

150mg/L

Facility : Distribution Center - Mansfield, MA

Sodium Carbonate

Trade Designation

Soda Ash-Dense

Product Function

Corrosion & Scale Control

pH Adjustment

Max Use

200mg/L

Facility : Distribution Center - Columbus, OH

Sodium Carbonate

Trade Designation

Soda Ash - Dense

Product Function

Corrosion & Scale Control
pH Adjustment

Max Use

200mg/L

Tata Chemicals North America

20 Miles West of Green River

P.O. Box 551

Green River, WY 82935

United States

800-819-8568

905-459-1232

Facility : # 1 Canada

Sodium Carbonate

Trade Designation

TATA Soda Ash Dense

Product Function

Corrosion & Scale Control
pH Adjustment

Max Use

200mg/L

TATA Soda Ash Dense, Food Grade

Corrosion & Scale Control
pH Adjustment

200mg/L

TATA Soda Ash Natural Light

Corrosion & Scale Control
pH Adjustment

200mg/L

TATA Soda Ash Natural Light H.A.

Corrosion & Scale Control
pH Adjustment

200mg/L

The Phoenix Products Company

55 Container Drive

Terryville, CT 06786

United States

860-589-7502

Facility : Terryville, CT

Sodium Carbonate**Trade Designation**

Dense Soda Ash

Product FunctionCorrosion & Scale Control
pH Adjustment**Max Use**

200mg/L

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

Univar Canada Ltd.

9800 Van Horne Way
Richmond, BC V6X 1W5
Canada
604-273-1441

Facility : Valleyfield, Québec, Canada

Sodium Carbonate**Trade Designation**

Soda Ash 58% Dense

Product FunctionCorrosion & Scale Control
pH Adjustment**Max Use**

100mg/L

Soda Ash 58% Light Natural

Corrosion & Scale Control
pH Adjustment

100mg/L

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

**Univar Solutions USA Inc. DBA
Univar USA Inc.**

17411 Northeast Union Hill Road
Redmond, WA 98052
United States
425-889-3400

Facility : Franklin, MN

Sodium Carbonate**Trade Designation****Product Function****Max Use**

Soda Ash Dense	pH Adjustment	150mg/L
Soda Ash Light	pH Adjustment	150mg/L

NOTE: Only products bearing the "NSF 60" designation are Certified by NSF International.

Facility : Cincinnati Dues Drive, OH

Sodium Carbonate

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Soda Ash 15% Solution	Corrosion & Scale Control pH Adjustment	100mg/L
Soda Ash 8%	Corrosion & Scale Control pH Adjustment	1250mg/L
Soda Ash 8% Solution	Corrosion & Scale Control pH Adjustment	1250mg/L

NOTE: Only products bearing the "NSF 60" designation are Certified by NSF International.

Facility : Houston Brisbane, TX

Sodium Carbonate

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Soda Ash Dense	pH Adjustment	100mg/L
Soda Ash Light	pH Adjustment	100mg/L

NOTE: Only products bearing the "NSF 60" designation are Certified by NSF International.

Univar USA Inc.

17425 Northeast Union Hill Road
Redmond, WA 98052
United States
425-889-3400

Facility : # 2 USA

Sodium Carbonate

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
--------------------------	-------------------------	----------------

Soda Ash-Dense	Corrosion & Scale Control pH Adjustment	100 mg/L
----------------	--	----------

Univar USA Inc.

17425 Northeast Union Hill Road
Redmond, WA 98052
United States
425-889-3496

Facility : Genesis Alkali, Green River, WY

Sodium Carbonate

Trade Designation

Univar Dense Soda Ash

Univar Light Soda Ash

Product Function

Corrosion & Scale Control
pH Adjustment

Corrosion & Scale Control
pH Adjustment

Max Use

150mg/L

150mg/L

Number of matching Manufacturers is 28

Number of matching Products is 82

Processing time was 0 seconds



The Public Health and Safety Organization

NSF Product and Service Listings

These NSF Official Listings are current as of **Monday, January 13, 2020** at 12:15 a.m. Eastern Time. Please [contact NSF](#) to confirm the status of any Listing, report errors, or make suggestions.

Alert: NSF is concerned about fraudulent downloading and manipulation of website text. Always confirm this information by clicking on the below link for the most accurate information: <http://info.nsf.org/Certified/PwsChemicals/Listings.asp?TradeName=sodium+bicarbonate&>

NSF/ANSI/CAN 60 Drinking Water Treatment Chemicals - Health Effects

Church & Dwight Co., Inc.

469 North Harrison Street

Princeton, NJ 08543-5297

United States

609-497-7282

[Visit this company's website](#)

<http://www.ahperformance.com>

Facility : Old Fort, OH

Sodium Bicarbonate

Trade Designation

Product Function

Max Use

200mg/L

Arm & Hammer™ Sodium Bicarbonate Treated No. 1 Powdered	Corrosion & Scale Control pH Adjustment	
Sodium Bicarbonate CB Grade	Corrosion & Scale Control pH Adjustment	200mg/L
Sodium Bicarbonate USP Grade 1	Corrosion & Scale Control pH Adjustment	200mg/L
Sodium Bicarbonate USP Grade 2	Corrosion & Scale Control pH Adjustment	200mg/L
Sodium Bicarbonate USP Grade 5	Corrosion & Scale Control pH Adjustment	200mg/L

Facility : Green River, WY

Sodium Bicarbonate

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Arm & Hammer™ Sodium Bicarbonate Treated No. 1 Powdered	Corrosion & Scale Control pH Adjustment	200mg/L
Sodium Bicarbonate USP Grade 1	Corrosion & Scale Control pH Adjustment	200mg/L
Sodium Bicarbonate USP Grade 2	Corrosion & Scale Control pH Adjustment	200mg/L
Sodium Bicarbonate USP Grade 5	Corrosion & Scale Control pH Adjustment	200mg/L

Genesis Alkali, LLC

1735 Market Street

Philadelphia, PA 19103

United States

215-299-6000

Facility : Wilmington, DE

Sodium Bicarbonate

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Sodium Bicarbonate - Industrial Grade	Corrosion & Scale Control pH Adjustment	100mg/L
Sodium Bicarbonate - Pool Grade	Corrosion & Scale Control pH Adjustment	100mg/L

Facility : Green River, WY**Sodium Bicarbonate**

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Sodium Bicarbonate #6 Grade	Corrosion & Scale Control pH Adjustment	100mg/L
Sodium Bicarbonate - Industrial Grade	Corrosion & Scale Control pH Adjustment	100mg/L
Sodium Bicarbonate - Pool Grade	Corrosion & Scale Control pH Adjustment	100mg/L
Sodium Bicarbonate - USP-FCC #1 Grade	Corrosion & Scale Control pH Adjustment	100mg/L
Sodium Bicarbonate - USP-FCC #1 TFF Grade	Corrosion & Scale Control pH Adjustment	100mg/L
Sodium Bicarbonate - USP-FCC #2 Grade	Corrosion & Scale Control pH Adjustment	100mg/L
Sodium Bicarbonate - USP-FCC #5 Grade	Corrosion & Scale Control pH Adjustment	100mg/L
Sodium Bicarbonate Feed Grade	pH Adjustment Corrosion & Scale Control	100mg/L

Natural Soda, LLC

3200 R. B. C. Road #31

Rifle, CO 81650

United States

970-878-3674

Facility : Rifle, CO

Sodium Bicarbonate

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Sodium Bicarbonate	pH Adjustment	100mg/L
TFF Sodium Bicarbonate	pH Adjustment	100mg/L

Vitusa Products, Inc.

343 Snyder Avenue

Berkeley, NJ 07922

United States

908-665-2900

Facility : # 2 USA

Sodium Bicarbonate

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Sodium Bicarbonate	pH Adjustment	100mg/L
TFF Sodium Bicarbonate	pH Adjustment	100mg/L

Vitusa Products, Inc.

343 Snyder Avenue

Berkeley Heights, NJ 07922

United States

908-665-2900

Facility : # 3 USA

Sodium Bicarbonate

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Sodium Bicarbonate Industrial	Corrosion & Scale Control pH Adjustment	200mg/L
Sodium Bicarbonate Treated Free Flowing No. 1	Corrosion & Scale Control pH Adjustment	200mg/L
Sodium Bicarbonate U.S.P. Fine Granular No. 2	Corrosion & Scale Control pH Adjustment	200mg/L
Sodium Bicarbonate U.S.P. Powdered No. 1	Corrosion & Scale Control Pipe Cleaning Aid	200mg/L

Facility : # 4 USA**Sodium Bicarbonate**

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Sodium Bicarbonate Industrial	Corrosion & Scale Control pH Adjustment	200mg/L
Sodium Bicarbonate Treated Free Flowing No. 1	Corrosion & Scale Control pH Adjustment	200mg/L
Sodium Bicarbonate U.S.P. Fine Granular No. 2	Corrosion & Scale Control pH Adjustment	200mg/L
Sodium Bicarbonate U.S.P. Powdered No. 1	Corrosion & Scale Control pH Adjustment	200mg/L

Number of matching Manufacturers is 5

Number of matching Products is 31

Processing time was 0 seconds



The Public Health and Safety Organization

NSF Product and Service Listings

These NSF Official Listings are current as of **Monday, January 13, 2020** at 12:15 a.m. Eastern Time. Please [contact NSF](#) to confirm the status of any Listing, report errors, or make suggestions.

Alert: NSF is concerned about fraudulent downloading and manipulation of website text. Always confirm this information by clicking on the below link for the most accurate information:

<http://info.nsf.org/Certified/PwsChemicals/Listings.asp?TradeName=citric+acid&>

NSF/ANSI/CAN 60 Drinking Water Treatment Chemicals - Health Effects

American Development Corporation

821 William D. Jones Boulevard

P.O. Box 620

Fayetteville, TN 37334

United States

888-542-8561

931-438-0653

Visit this company's website (<http://www.adc-chem.com>)

Facility : Fayetteville, TN

Citric Acid[2] [3]

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Citric Acid 50% Solution	Membrane Cleaner	NA

[2] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions.

[3] The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.

Anco Chemicals Inc.

85 Malmo Court

Maple, ON L6A 1R4
Canada
905-832-2276
[Visit this company's website](http://www.ancochemicals.com/)
(<http://www.ancochemicals.com/>)

Facility : Maple, Ontario, Canada

Citric Acid[1] [2]

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Citric Acid	Membrane Cleaner	NA
Citric Acid 50%	Membrane Cleaner	NA
Citric Acid 50% Solution	Membrane Cleaner	NA
Citric Acid Solution	Membrane Cleaner	NA

[1] The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.

[2] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following the manufacturer's use instructions.

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

Brainerd Chemical Company, Inc.

1200 North Peoria
Tulsa, OK 74106
United States
800-551-5128
918-622-1214
[Visit this company's website](http://www.brainerdchemical.com/)
(http://www.brainerdchemical.com)

Facility : Dunn, NC

Citric Acid[1] [2]

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Citric Acid 50% Solution	Well Cleaning Aid	NA
	Membrane Cleaner	
Citric Acid Solution	Well Cleaning Aid	NA
	Membrane Cleaner	

- [1] The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.
- [2] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions.

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

Facility : Tulsa, OK

Citric Acid[1]

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Citric Acid 50% Solution	Well Cleaning Aid	NA
	Membrane Cleaner	
Citric Acid Solution	Well Cleaning Aid	NA
	Membrane Cleaner	

- [1] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following the manufacturer's use instructions. The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.

NOTE: Only Listed products bearing the NSF Mark are considered NSF Certified.

Brenntag Canada Inc.

43 Jutland Road
Etobicoke, ON M8Z 2G6
Canada
905-459-1232

Visit this company's website (<http://www.canadacolors.com>)

Facility : Brampton, Ontario, Canada

Citric Acid[1] [2] [3]

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
CITRIC ACID 50% SOLUTION (PWTG)	Membrane Cleaner	NA
	Well Cleaning Aid	

- [1] Only products that bear the NSF Mark are Certified.
- [2] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions.
- [3] The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.

Facility : Leduc, Alberta, Canada

Citric Acid[1] [2]

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
CITRIC ACID 50% SOLUTION (PWTG)	Well Cleaning Aid Membrane Cleaner	NA

- [1] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions.
- [2] The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.

Brenntag Great Lakes LLC

4420 North Harley Davidson Avenue

Wauwatosa, WI 53225

United States

262-252-3550

Visit this company's website (<http://www.brenntag.com>)

Facility : Menomonee Falls, WI

Citric Acid[1] [2]

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Citric Acid 50% Liquid	Membrane Cleaner	NA
	Well Cleaning Aid	
Citric Acid 50% Solution	Membrane Cleaner	NA
	Well Cleaning Aid	
Citric Acid Solution	Membrane Cleaner	NA
	Well Cleaning Aid	

- [1] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions.

[2] The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.

Brenntag Mid-South, Inc.

1405 Highway 136 West

P.O. Box 20

Henderson, KY 42420-0020

United States

800-950-7267

270-827-3545

Visit this company's website

([http://www.brenntag.com/north-america/en/about-](http://www.brenntag.com/north-america/en/about-brenntag/regional-capabilities/brenntag-mid-south/index.jsp)

[brenntag/regional-capabilities/brenntag-mid-south/index.jsp](http://www.brenntag.com/north-america/en/about-brenntag/regional-capabilities/brenntag-mid-south/index.jsp))

Facility : Tampa, FL

Citric Acid[1]

Trade Designation	Product Function	Max Use
Citric Acid 50%	Membrane Cleaner	NA
Citric Acid Solution	Membrane Cleaner	NA

[1] These products are designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions. The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

Facility : Indianapolis, IN

Citric Acid[1] [2]

Trade Designation	Product Function	Max Use
Citric Acid Solution	Membrane Cleaner	NA
Citric Acid, Anhydrous	Membrane Cleaner	NA

[1] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following the manufacturer's use instructions.

[2] The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.

NOTE: Only products bearing the NSF Mark on the product, packing, and/or documentation shipped with the product are Certified.

Facility : Henderson, KY

Citric Acid[1]

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Citric Acid 50%	Membrane Cleaner	NA
Citric Acid Solution	Membrane Cleaner	NA

[1] These products are designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions. The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.

[CP] The finished drinking water shall be monitored to ensure that levels of copper do not exceed 1.3 mg/L.

Facility : Chattanooga, TN

Citric Acid[4]

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Citric Acid 50%	Membrane Cleaner	NA
Citric Acid Solution	Membrane Cleaner	NA

[4] This product is designed to be used off-line and flushed prior to using the system for drinking water, following manufacturer's use instructions. The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.

Facility : St. Louis, MO - Chouteau

Miscellaneous Water Supply Products

Trade Designation	Product Function	Max Use
Citric Acid 30-50%[1] [2]	Membrane Cleaner	NA

[1] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions.

[2] The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.

Brenntag Pacific, Inc.

10747 Patterson Place

Santa Fe Springs, CA 90670

United States

323-562-9500

[Visit this company's website](http://www.brenntag.com/north-america/en/about-brenntag/regional-capabilities/brenntag-pacific/index.jsp)

<http://www.brenntag.com/north-america/en/about-brenntag/regional-capabilities/brenntag-pacific/index.jsp>

Facility : Chandler, AZ

Citric Acid

Trade Designation	Product Function	Max Use
Citric Acid 50%[1] [2]	Membrane Cleaner	NA
Citric Acid 50%	pH Adjustment	250mg/L
Citric Acid Solution[1] [2]	Membrane Cleaner	NA
Citric Acid Solution	pH Adjustment	250mg/L

[1] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions.

[2] The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

Facility : Fresno, CA

Citric Acid

Trade Designation	Product Function	Max Use
--------------------------	-------------------------	----------------

Citric Acid	pH Adjustment	250mg/L
Citric Acid[1] [2]	Membrane Cleaner	NA
Citric Acid Solution	pH Adjustment	250mg/L
Citric Acid Solution[1] [2]	Membrane Cleaner	NA

[1] These products are designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions.

[2] The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

Facility : Richmond, CA

Citric Acid

Trade Designation	Product Function	Max Use
Citric Acid 50%	pH Adjustment	250mg/L
Citric Acid 50%[1] [2]	Membrane Cleaner	NA
Citric Acid Solution	pH Adjustment	250mg/L
Citric Acid Solution[1] [2]	Membrane Cleaner	NA

[1] This product is designed to be used off-line and flushed prior to using the system for drinking water, following manufacturer's use instructions.

[2] The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

Facility : South Gate, CA

Citric Acid

Trade Designation	Product Function	Max Use
Citric Acid[4] [5]	Membrane Cleaner	NA
Citric Acid	pH Adjustment	250mg/L
Citric Acid 50%	pH Adjustment	250mg/L
Citric Acid 50%[4] [5]	Membrane Cleaner	NA
Citric Acid Solution[4] [5]	Membrane Cleaner	NA
Citric Acid Solution	pH Adjustment	250mg/L

- [4] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions.
- [5] The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

Facility : Portland, OR

Citric Acid

Trade Designation	Product Function	Max Use
Citric Acid 50%	pH Adjustment	250mg/L
Citric Acid 50%[1] [2]	Membrane Cleaner	NA
Citric Acid Solution	pH Adjustment	250mg/L
Citric Acid Solution[1] [2]	Membrane Cleaner	NA

- [1] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions.
- [2] The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

Brenntag Southwest

Route 2, Box 352-200

Nowata, OK 74048

United States

800-722-3145

918-273-2265

Visit this company's website (<http://www.brenntag.com>)

Facility : Catoosa, OK

Citric Acid[1] [2]

Trade Designation	Product Function	Max Use
--------------------------	-------------------------	----------------

Citric Acid 50% Solution

Membrane Cleaner

NA

- [1] The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.
- [2] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions

Facility : Houston, TX

Citric Acid[4] [5]

Trade Designation

Product Function

Max Use

Citric Acid 50% Solution

Membrane Cleaner

NA

- [4] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions.
- [5] The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.

Chemstream, Inc.

166 Commerce Drive

Stoystown, PA 15563

United States

866-629-7118

814-629-7118

Visit this company's website (<http://www.chemstream.com>)

Facility : Stoystown, PA

Citric Acid

Trade Designation

Product Function

Max Use

50% Citric Acid

pH Adjustment

250mg/L

Chemtrade Solutions LLC (formerly General Chemical LLC)

1421 Willis Avenue

Syracuse, NY 13204

United States
315-478-2323
[Visit this company's website](http://www.chemtradelogistics.com/main/)
(<http://www.chemtradelogistics.com/main/>)

Facility : Odem, TX

Citric Acid[1]

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Citric Acid Solution	Membrane Cleaner	NA
Liquid Citric Acid	Membrane Cleaner	NA

[1] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions.

ClearTech Industries Inc.

1500 Quebec Avenue
Saskatoon, SK S7K 1V7
Canada
306-664-2522

Facility : # 3 Edmonton, Alberta, Canada

Citric Acid

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Aqueous Citric Acid 50%[2]	Membrane Cleaner	NA
Aqueous Citric Acid 50%	pH Adjustment	250mg/L
CITRIC ACID ANHYDROUS[2] [3]	Other	NA
CITRIC ACID ANHYDROUS	pH Adjustment	125mg/L
CITRIC ACID GRANULAR	pH Adjustment	125mg/L
CITRIC ACID GRANULAR[2] [3]	Other	NA
Citric Acid[2]	Membrane Cleaner	NA
Citric Acid	pH Adjustment	250mg/L
Citric Acid 50% Solution[2]	Membrane Cleaner	NA
Citric Acid 50% Solution	pH Adjustment	250mg/L

[2] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions.

[3] CITRIC ACID ANHYDROUS and CITRIC ACID GRANULAR are Certified for use as filter media cleaners.

ClearTech Industries Inc.

1500 Quebec Avenue
Saskatoon, SK S7K 1V7
Canada
306-933-0214

Facility : # 5 Canada

Citric Acid[1]

Trade Designation

Citric Acid 50% Solution

Product Function

Membrane Cleaner

Max Use

NA

[1] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions.

COFCO Biochemical (Thailand) Co., Ltd.

184/8, 11th Floor, Building Forum Tower
Ratchadaphisek Road, HuaiKhwan
Bangkok 10310
Thailand
66 26 454 051

Facility : Rayong, Thailand

Citric Acid

Trade Designation

Citric Acid Anhydrous Fine Granular

Product Function

pH Adjustment

Max Use

125mg/L

Sequestering

Citric Acid Anhydrous Fine Granular[1]

Membrane Cleaner

NA

Well Cleaning Aid

Citric Acid Anhydrous Granular

pH Adjustment

125mg/L

Sequestering

Citric Acid Anhydrous Granular[1]

Membrane Cleaner

NA

Well Cleaning Aid

[1] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions.

Fanchem Ltd.

207-3228 South Service Road
Burlington, ON L7N 3H8
Canada
905-637-7034

Facility : # 1 Canada

Citric Acid[1] [2]

Trade Designation

CITRIC ACID 50% SOLUTION (PWTG)

Product Function

Membrane Cleaner
Well Cleaning Aid

Max Use

NA

[1] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions.

[2] Based on an evaluation of health effects data, the level of aluminum in the finished drinking water shall not exceed 2 mg/L.

Flochem Ltd.

6986 Wellington Road 124
Guelph, ON N1H 6J4
Canada
519-763-5441

Visit this company's website (<http://www.flochem.com>)

Facility : Guelph, Ontario, Canada

Citric Acid[2]

Trade Designation

Citric Acid 50%

Product Function

Membrane Cleaner

Max Use

NA

[2] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions.

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

FSTI, Inc.

6300 Bridgepoint Parkway

Suite 2-110

Austin, TX 78730

United States

888-290-7548

512-278-8800

Visit this company's website (<http://www.fstichem.com>)

Facility : Greenville, TX

Citric Acid

Trade Designation

Citric Acid[1] [2]

Product Function

Membrane Cleaner

Max Use

NA

[1] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions.

[2] The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.

George S. Coyne Chemical Co., Inc.

3015 State Road

Croydon, PA 19021

United States

800-523-1230

215-785-3000

Visit this company's website

(<http://www.coynechemical.com>)

Facility : Croydon, PA

Citric Acid

Trade Designation

Citric Acid Anhydrous

Product Function

Membrane Cleaner

Max Use

NA

- [2] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions.
- [3] The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.
-

Harcros Chemicals Inc.

5200 Speaker Road

Kansas City, KS 66106

United States

913-321-3131

Visit this company's website (<http://www.harcroschem.com>)

Facility : Tampa, FL

Citric Acid[1] [2]

Trade Designation

Citric Acid 50%

Product Function

Membrane Cleaner

Max Use

NA

- [1] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions.
- [2] The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

Facility : Vicksburg, MS

Citric Acid[1] [2]

Trade Designation

Citric Acid 50%

Product Function

Membrane Cleaner

Max Use

N/A

- [1] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following the manufacturer's use instructions.
- [2] The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

Hawkins, Inc.

2381 Rosegate

Roseville, MN 55113

United States

800-328-5460

612-331-6910

Visit this company's website (<http://www.hawkinsinc.com>)

Facility : # 2 Centralia, IL

Citric Acid[2] [3]

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Citric Acid 15% Solution FCC	Membrane Cleaner	NA
Citric Acid 50%	Membrane Cleaner	NA
Citric Acid 50% Liquid FCC	Membrane Cleaner	NA
Citric Acid 50% Solution	Membrane Cleaner	NA

[2] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions.

[3] The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.

Facility : Apopka, FL

Citric Acid[1] [2]

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Citric Acid 50% Solution	Membrane Cleaner	NA

[1] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions.

[2] The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.

Facility : Minneapolis, MN

Citric Acid[2] [3]

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Citric Acid 15% Solution FCC	Membrane Cleaner	NA
Citric Acid 50%	Membrane Cleaner	NA
Citric Acid 50% Liquid FCC	Membrane Cleaner	NA
Citric Acid 50% Solution	Membrane Cleaner	NA

[2] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions.

[3] The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.

Jutzi Water Technologies

525 Wright Boulevard
Stratford, ON N4A 6T1
Canada

519-814-9283

Visit this company's website (<http://www.jutzi.com>)

Facility : Stratford, Ontario, Canada

Citric Acid[1]

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Citric Acid 50%	Membrane Cleaner	N/A

[1] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions.

NAPCO Chemical Company, Inc.

P.O. Box 1239
Spring, TX 77383-1239
United States
800-929-5976
281-651-6800

Facility : Spring, TX

Citric Acid[1] [2]

Trade Designation	Product Function	Max Use
Citric Acid	Membrane Cleaner	NA
Citric Acid 50%	Membrane Cleaner	NA
NAPCO Citric Acid	Membrane Cleaner	NA

[1] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions.

[2] The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.

[ZN] Based on an evaluation of health effects data, the level of zinc in the finished drinking water shall not exceed 2.0 mg/L.

Northstar Chemical

14200 Southwest Tualatin Sherwood Road

Sherwood, OR 97140

United States

888-793-9476

503-625-3770

Visit this company's website

(<http://www.northstarchemical.com>)

Facility : Modesto, CA

Citric Acid

Trade Designation	Product Function	Max Use
Citric Acid	pH Adjustment	100mg/L

Facility : Santa Fe Springs, CA

Citric Acid

Trade Designation	Product Function	Max Use
Citric Acid	pH Adjustment	100mg/L

Facility : Sherwood, OR

Citric Acid

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Citric Acid	pH Adjustment	100mg/L

Posy Pharmachem Pvt. Ltd.

708, "Aakruti", Opp. Sardar Patel Stadium

Ahmedabad 380009

India

91 79 26449966

Visit this company's website

(<http://www.daffodilpharma.com>)

Facility : # 1 India

Citric Acid[1] [2]

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Citric Acid Anhydrous	Membrane Cleaner	NA
Citric Acid Monohydrate	Membrane Cleaner	NA

[1] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following the manufacturer's use instructions.

[2] The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.

SAL Chemical Company, Inc.

Half Moon Industrial Park

3036 Birch Drive

Weirton, WV 26062

United States

800-879-1725

304-748-8200

Visit this company's website (<http://www.salchem.com>)

Facility : # 1 USA

Citric Acid[1]**Trade Designation**

Citric Acid 50%

Product Function

Membrane Cleaner

Max Use

NA

[1] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions.

Scale Free Company, Inc.

16420 West Hardy Road

Suite #100

Houston, TX 77060

United States

218-873-5555

Facility : Houston, TX**Miscellaneous Water Supply Products****Trade Designation**

Citric Acid 50% Solution

Product Function

Membrane Cleaner

Max Use

NA

[1] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions.

Sterling Water Technologies, LLC

P.O. Box 602

Columbia, TN 38402-0602

United States

800-426-2428

931-540-1334

[Visit this company's website](http://www.sterlingwatertech.com)<http://www.sterlingwatertech.com>**Facility :** # 14 USA**Citric Acid[1] [2]****Trade Designation****Product Function****Max Use**

Citric Acid Anhydrous

Membrane Cleaner

NA

[1] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following the manufacturer's use instructions.

[2] The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.

Thatcher Group

1905 Fortune Road

Salt Lake City, UT 84104

United States

800-777-8965

775-358-0888

Facility : Stockton, CA

Citric Acid[1] [2]

Trade Designation

Citric Acid, 50% Solution

Product Function

Well Cleaning Aid

Max Use

NA

Membrane Cleaner

Citric Acid, Anhydrous

Well Cleaning Aid

NA

Membrane Cleaner

Citric Acid, Liquid

Well Cleaning Aid

NA

Membrane Cleaner

Citric Acid, Solution

Well Cleaning Aid

NA

Membrane Cleaner

[1] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions.

[2] The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

Facility : Sparks, NV

Citric Acid[1] [2]

Trade Designation	Product Function	Max Use
Citric Acid, 50% Solution	Well Cleaning Aid	NA
	Membrane Cleaner	
Citric Acid, Anhydrous	Well Cleaning Aid	NA
	Membrane Cleaner	
Citric Acid, Liquid	Well Cleaning Aid	NA
	Membrane Cleaner	
Citric Acid, Solution	Well Cleaning Aid	NA
	Membrane Cleaner	

[1] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions.

[2] The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or, documentation shipped with the product are Certified.

Univar Canada Ltd.

9800 Van Horne Way
Richmond, BC V6X 1W5
Canada
604-273-1441

Facility : Richmond, British Columbia, Canada

Citric Acid

Trade Designation	Product Function	Max Use
Citric Acid 50%	Well Cleaning Aid	NA
	Membrane Cleaner	
Citric Acid 50%	pH Adjustment	100mg/L
Citric Acid 50% Solution	pH Adjustment	100mg/L
Citric Acid 50% Solution	Well Cleaning Aid	NA
	Membrane Cleaner	

Facility : Valleyfield, Québec, Canada

Citric Acid

Trade Designation	Product Function	Max Use
CITRIC ACID 50%	pH Adjustment	100mg/L

CITRIC ACID 50%	Well Cleaning Aid	NA
	Membrane Cleaner	
CITRIC ACID 50% SOLUTION	Well Cleaning Aid	NA
	Membrane Cleaner	
CITRIC ACID 50% SOLUTION	pH Adjustment	100mg/L

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

Univar Solutions USA Inc. DBA Univar USA Inc.

17411 Northeast Union Hill Road
Redmond, WA 98052
United States
425-889-3400

Facility : Distribution Center - Santa Fe Springs, CA

Citric Acid

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Citric Acid, 50%	pH Adjustment	100mg/L

NOTE: Only products bearing the "NSF 60" designation are Certified by NSF International.

Facility : Fresno, CA

Citric Acid

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Citric Acid 50%	pH Adjustment	100mg/L

NOTE: Only products bearing the "NSF 60" designation are Certified by NSF International.

Facility : Redwood City, CA

Citric Acid

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Citric Acid, 50%	pH Adjustment	100mg/L

NOTE: Only products bearing the "NSF 60" designation are Certified by NSF International.

Facility : Visalia, CA

Citric Acid

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Citric Acid, 50%	pH Adjustment	100mg/L

Miscellaneous Treatment Chemical

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Hydrochloric / Citric Acid Blend	pH Adjustment	40mg/L

NOTE: Only products bearing the "NSF 60" designation are Certified by NSF International.

Facility : Distribution Center - Dallas, GA

Citric Acid

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Citric Acid 50%	Membrane Cleaner	NA

NOTE: Only products bearing the "NSF 60" designation are Certified by NSF International.

Facility : Geneva, NY

Citric Acid[1] [2]

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Citric Acid 50%	Membrane Cleaner	NA

[1] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following the manufacturer's use instructions.

[2] The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.

NOTE: Only products bearing the "NSF 60" designation are Certified by NSF International.

Facility : Altoona, PA

Citric Acid[1] [2]**Trade Designation**

Citric Acid 50%

Product Function

Membrane Cleaner

Max Use

NA

[1] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following the manufacturer's use instructions.

[2] The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.

NOTE: Only products bearing the "NSF 60" designation are Certified by NSF International.

Facility : Spartanburg, SC**Citric Acid[1] [2]****Trade Designation**

Citric Acid, 50% Solution

Product Function

Membrane Cleaner

Max Use

NA

[1] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following the manufacturer's use instructions.

[2] The pH of the influent and effluent water should be monitored to ensure that all traces of the product have been removed before placing into service.

NOTE: Only products bearing the "NSF 60" designation are Certified by NSF International.

Number of matching Manufacturers is 29

Number of matching Products is 117

Processing time was 0 seconds



The Public Health and Safety Organization

NSF Product and Service Listings

These NSF Official Listings are current as of **Monday, January 13, 2020** at 12:15 a.m. Eastern Time. Please [contact NSF](#) to confirm the status of any Listing, report errors, or make suggestions.

Alert: NSF is concerned about fraudulent downloading and manipulation of website text. Always confirm this information by clicking on the below link for the most accurate information:

<http://info.nsf.org/Certified/PwsChemicals/Listings.asp?Company=51120&Standard=060&>

NSF/ANSI/CAN 60 Drinking Water Treatment Chemicals - Health Effects

Wyo-Ben, Inc.

<http://www.wyoben.com>

1345 Discovery Drive

Billings, MT 59102

United States

800-548-7055

406-652-6351

Visit this company's website (<http://www.wyoben.com>)

Facility : Houston, TX

Bentonite

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Hydrogel®[1]	Well Drilling Aid	NA
	Drilling Fluid	
Naturalgel®[2]	Well Drilling Aid	NA
	Drilling Fluid	

[1] These products are designed to be flushed out prior to using the system for drinking water. The well is to be properly flushed and drained until the turbidity of the water is < 1 NTU.

[2] These products are designed to be flushed out prior to using the system for drinking water. The well is to be properly flushed and drained before being placed in service.

Facility : Greybull, WY

Bentonite

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
CEMENTGEL™[1]	Well Sealant	NA
Cleartrat® 1000	Coagulation & Flocculation	250mg/L
Cleartrat® 1040	Coagulation & Flocculation	250mg/L
Cleartrat® 1200	Coagulation & Flocculation	250mg/L
EXTRA HIGH YIELD™ BENTONITE[1]	Well Drilling Aid	NA
	Drilling Fluid	
HYDROGEL®[1]	Well Drilling Aid	NA
	Drilling Fluid	
HYDROGEL® 125[1]	Well Drilling Aid	NA
	Drilling Fluid	
HYDROGEL® PLUS[1]	Well Drilling Aid	NA
	Drilling Fluid	
MICRO-GEL™[1]	Well Drilling Aid	NA
	Drilling Fluid	
Naturalgel®[WS]	Well Drilling Aid	NA
	Drilling Fluid	
SW-101™[1]	Well Drilling Aid	NA
	Drilling Fluid	
TRU-BORE®[1]	Well Drilling Aid	NA
	Drilling Fluid	

[1] This product is designed to be flushed out until the turbidity of the water is < 1 NTU.
Flushing is required before the system may be used for drinking water.

[WS] The well shall be properly flushed and drained before being placed in service.

Miscellaneous Water Supply Products

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
AIR FOAM®[1] [2]	Foaming Agent	12,500mg/L
Dril-Trol™ LV[1] [3]	Well Drilling Aid	NA
	Drilling Fluid	
Dril-Trol™ QD[1] [3]	Well Drilling Aid	NA
	Drilling Fluid	

[1] This product is designed to be flushed out until the turbidity of the water is < 1 NTU.
Flushing is required before the system may be used for drinking water.

[2] Certification of this product is based on a well drilling model using assumptions stated in NSF/ANSI/CAN 60, Section 8 for well drilling foamers.

- [3] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following the manufacturer's use instructions.
- [4] These products should not be used in constructing wells in highly porous formations such as cavernous limestone.
- [5] Certification of these products is based on a well drilling model with the following assumptions:
- The amount of well drilling fluid used is 3780 L (1000 U.S. gallons) to which the drilling fluid has been added at the manufacturer's recommended level.
 - The aquifer contains 3.1 million liters of water (815,000 gallons) based on a 0.5 acre aquifer of 6.1 meter depth (20 ft.) and 25% porosity.
 - The bore hole is 61 meters in total depth (200 ft.), the screen is 6.1 meters in length (20 ft.), and the bore hole is 25.4 cm in diameter (10 in.).
 - The amount of well drilling fluid removed from the well during construction is equal to the combined volumes of the casing, the screen, and bore hole annulars around the bore hole annulars around the casing and the screen, plus an additional amount removed through the well disinfection and development (90% removed).
- [PC] Polyacrylamide Products Certified by NSF International comply with 40 CFR 141.111 requirements for percent monomer and dose.
- [WS] The well shall be properly flushed and drained before being placed in service.

Miscellaneous Water Supply Products [WS]

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Enviroplug® Coarse	Well Sealant	NA
Enviroplug® Grout[1]	Well Sealant	NA
Enviroplug® Medium	Well Sealant	NA
Enviroplug® No. 16	Well Sealant	NA
Enviroplug® No. 8	Well Sealant	NA
Grout-Well®[1]	Well Sealant	NA

- [1] This product is designed to be flushed out until the turbidity of the water is < 1 NTU. Flushing is required before the system may be used for drinking water.
- [WS] The well shall be properly flushed and drained before being placed in service.

Miscellaneous Water Supply Products

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
MTA-1™[1]	Well Drilling Aid	NA
	Drilling Fluid	
THINZ-IT[1]	Well Drilling Aid	NA
	Drilling Fluid	

- [1] This product is designed to be flushed out until the turbidity of the water is < 1 NTU. Flushing is required before the system may be used for drinking water.
- [2] Certification of this product is based on a well drilling model using assumptions stated in NSF/ANSI/CAN 60, Section 8 for well drilling foamers.
- [3] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following the manufacturer's use instructions.
- [4] These products should not be used in constructing wells in highly porous formations such as cavernous limestone.
- [5] Certification of these products is based on a well drilling model with the following assumptions:
- The amount of well drilling fluid used is 3780 L (1000 U.S. gallons) to which the drilling fluid has been added at the manufacturer's recommended level.
 - The aquifer contains 3.1 million liters of water (815,000 gallons) based on a 0.5 acre aquifer of 6.1 meter depth (20 ft.) and 25% porosity.
 - The bore hole is 61 meters in total depth (200 ft.), the screen is 6.1 meters in length (20 ft.), and the bore hole is 25.4 cm in diameter (10 in.).
 - The amount of well drilling fluid removed from the well during construction is equal to the combined volumes of the casing, the screen, and bore hole annulars around the bore hole annulars around the casing and the screen, plus an additional amount removed through the well disinfection and development (90% removed).
- [PC] Polyacrylamide Products Certified by NSF International comply with 40 CFR 141.111 requirements for percent monomer and dose.
- [WS] The well shall be properly flushed and drained before being placed in service.

Miscellaneous Water Supply Products [WS]

Trade Designation	Product Function	Max Use
Therm-Ex Grout Plus™[1]	Well Sealant	NA
Therm-Ex Grout™[1]	Well Sealant	NA

- [1] This product is designed to be flushed out until the turbidity of the water is < 1 NTU. Flushing is required before the system may be used for drinking water.
- [WS] The well shall be properly flushed and drained before being placed in service.

Miscellaneous Water Supply Products

Trade Designation	Product Function	Max Use
VC-55™[4] [5] [PC] [WS]	Well Drilling Aid	NA
	Drilling Fluid	
WYO-FOAMER®[1] [2]	Foaming Agent	12,500mg/L

- [1] This product is designed to be flushed out until the turbidity of the water is < 1 NTU. Flushing is required before the system may be used for drinking water.

- [2] Certification of this product is based on a well drilling model using assumptions stated in NSF/ANSI/CAN 60, Section 8 for well drilling foamers.
- [3] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following the manufacturer's use instructions.
- [4] These products should not be used in constructing wells in highly porous formations such as cavernous limestone.
- [5] Certification of these products is based on a well drilling model with the following assumptions:
- The amount of well drilling fluid used is 3780 L (1000 U.S. gallons) to which the drilling fluid has been added at the manufacturer's recommended level.
 - The aquifer contains 3.1 million liters of water (815,000 gallons) based on a 0.5 acre aquifer of 6.1 meter depth (20 ft.) and 25% porosity.
 - The bore hole is 61 meters in total depth (200 ft.), the screen is 6.1 meters in length (20 ft.), and the bore hole is 25.4 cm in diameter (10 in.).
 - The amount of well drilling fluid removed from the well during construction is equal to the combined volumes of the casing, the screen, and bore hole annulars around the bore hole annulars around the casing and the screen, plus an additional amount removed through the well disinfection and development (90% removed).
- [PC] Polyacrylamide Products Certified by NSF International comply with 40 CFR 141.111 requirements for percent monomer and dose.
- [WS] The well shall be properly flushed and drained before being placed in service.

Miscellaneous Water Supply Products [WS]

Trade Designation	Product Function	Max Use
e-Grout	Well Sealant	NA

- [1] This product is designed to be flushed out until the turbidity of the water is < 1 NTU. Flushing is required before the system may be used for drinking water.
- [WS] The well shall be properly flushed and drained before being placed in service.

Polyacrylamide [PC]

Trade Designation	Product Function	Max Use
KWIK-VIS™ "D"[4] [5] [6]	Well Drilling Aid Drilling Fluid	NA
WYO-VIS[4] [5] [6]	Well Drilling Aid Drilling Fluid	NA
WYO-VIS HP[4] [5] [6]	Well Drilling Aid Drilling Fluid	NA
WYO-VIS LVP[4] [5] [6]	Well Drilling Aid Drilling Fluid	NA

- [4] These products should not be used in constructing wells in highly porous formations such as cavernous limestone.
- [5] Certification of these products is based on a well drilling model with the following assumptions:
- The amount of well drilling fluid used is 3780 L (1000 U.S. gallons) to which the drilling fluid has been added at the manufacturer's recommended level.
 - The aquifer contains 3.1 million liters of water (815,000 gallons) based on a 0.5 acre aquifer of 6.1 meter depth (20 ft.) and 25% porosity.
 - The bore hole is 61 meters in total depth (200 ft.), the screen is 6.1 meters in length (20 ft.), and the bore hole is 25.4 cm in diameter (10 in.).
 - The amount of well drilling fluid removed from the well during construction is equal to the combined volumes of the casing, the screen, and bore hole annulars around the bore hole annulars around the casing and the screen, plus an additional amount removed through the well disinfection and development (90% removed).
- [6] These products are designed to be flushed out prior to using the system for drinking water. Before being placed into service, the well is to be properly flushed according to the manufacturer's use instructions.
- [PC] Polyacrylamide Products Certified by NSF International comply with 40 CFR 141.111 requirements for percent monomer and dose.

Facility : Lovell, WY

Bentonite [WS]

Trade Designation	Product Function	Max Use
CEMENTGEL™[1]	Well Sealant	NA
EXTRA HIGH YIELD™ BENTONITE[1]	Well Drilling Aid	NA
	Drilling Fluid	
Enviroplug® Coarse	Well Sealant	NA
Enviroplug® Medium	Well Sealant	NA
Enviroplug® No. 16	Well Sealant	NA
Enviroplug® No. 20	Well Sealant	NA
Enviroplug® No. 8	Well Sealant	NA
HYDROGEL®[1]	Well Drilling Aid	NA
	Drilling Fluid	
HYDROGEL® 125[1]	Well Drilling Aid	NA
	Drilling Fluid	
HYDROGEL® PLUS[1]	Well Drilling Aid	NA
	Drilling Fluid	
MICRO-GEL™[1]	Well Drilling Aid	NA
	Drilling Fluid	
SW-101™[1]		NA

TRU-BORE®[1]	Well Drilling Aid	
	Drilling Fluid	
	Well Drilling Aid	NA
	Drilling Fluid	

[1] This product is designed to be flushed out until the turbidity of the water is < 1 NTU.
Flushing is required before the system may be used for drinking water.
[WS] The well shall be properly flushed and drained before being placed in service.

Miscellaneous Treatment Chemical[AL] [PC]

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
CLEARTREAT® 4100 PWG	Coagulation & Flocculation	250mg/L
CLEARTREAT® 4100G PWG	Coagulation & Flocculation	250mg/L
CLEARTREAT® 5100G	Coagulation & Flocculation	250mg/L

[AL] Based on an evaluation of health effects data, the level of aluminum in the finished drinking water shall not exceed 2 mg/L.
[PC] Polyacrylamide Products Certified by NSF International comply with 40 CFR 141.111 requirements for percent monomer and dose.

Miscellaneous Water Supply Products [WS]

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Grout-Well DF[1]	Well Sealant	NA
Plugz-It	Well Sealant	NA
Plugz-It Max	Well Sealant	NA
TD-16	Well Sealant	NA

[1] This product is designed to be flushed out until the turbidity of the water is < 1 NTU.
Flushing is required before the system may be used for drinking water.
[WS] The well shall be properly flushed and drained before being placed in service.

Number of matching Manufacturers is 1
Number of matching Products is 54
Processing time was 0 seconds



The Public Health and Safety Organization

NSF Product and Service Listings

These NSF Official Listings are current as of **Monday, January 13, 2020** at 12:15 a.m. Eastern Time. Please [contact NSF](#) to confirm the status of any Listing, report errors, or make suggestions.

Alert: NSF is concerned about fraudulent downloading and manipulation of website text. Always confirm this information by clicking on the below link for the most accurate information:
<http://info.nsf.org/Certified/PwsChemicals/Listings.asp?TradeName=platinum+PAC&>

NSF/ANSI/CAN 60 Drinking Water Treatment Chemicals - Health Effects

M-I L.L.C.
5950 North Course Drive
Houston, TX 77072
United States
281-561-1322

Facility : # 1 China

Miscellaneous Water Supply Products[WS]

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Platinum PAC	Well Drilling Aid	NA
Platinum PAC UL	Well Drilling Aid	NA

[WS] The well shall be properly flushed and drained before being placed in service.

Number of matching Manufacturers is 1

Number of matching Products is 2

Processing time was 0 seconds



The Public Health and Safety Organization

NSF Product and Service Listings

These NSF Official Listings are current as of **Monday, January 13, 2020** at 12:15 a.m. Eastern Time. Please [contact NSF](#) to confirm the status of any Listing, report errors, or make suggestions.

Alert: NSF is concerned about fraudulent downloading and manipulation of website text. Always confirm this information by clicking on the below link for the most accurate information:

<http://info.nsf.org/Certified/PwsChemicals/Listings.asp?TradeName=magma+fiber&>

NSF/ANSI/CAN 60 Drinking Water Treatment Chemicals - Health Effects

Lost Circulation Specialists, Inc.

16202 Surrey Lane

Stagecoach, TX 77355

United States

281-252-4243

[Visit this company's website](#)

<http://www.lostcirculation.com>

Facility : # 1 USA

Miscellaneous Water Supply Products[1]

<i>Trade Designation</i>	<i>Product Function</i>	<i>Max Use</i>
Magma Fiber Coarse	Well Drilling Aid	NA
Magma Fiber Fine	Well Drilling Aid	NA

[1] These products are designed to be flushed out prior to using the system for drinking water. Before being placed in service, the well is to be properly flushed and drained according to the manufacturer's use instructions.

Number of matching Manufacturers is 1

Number of matching Products is 2

April 2021

Attachment B HYDRAULIC FRACTURE / HYDROFRACTURE EVALUATION

PROJECT: South Fork HDD Landfill

CROSSING LOCATION: Beach Lane, Wainscott, NY

Reference: 1. Latoore, C.A., Wakeley, L.D., and Conroy, P.J., Guidelines for Installation of Utilities Beneath Corps of Engineers Levees using Horizontal Directional Drilling, June 2002, ERDC/GRSL TR-02-9
2. HDD Consortium, Horizontal Directional Drilling Good Practices Guidelines, Fourth Edition, North American Society of Trenchless Technology, 2017.

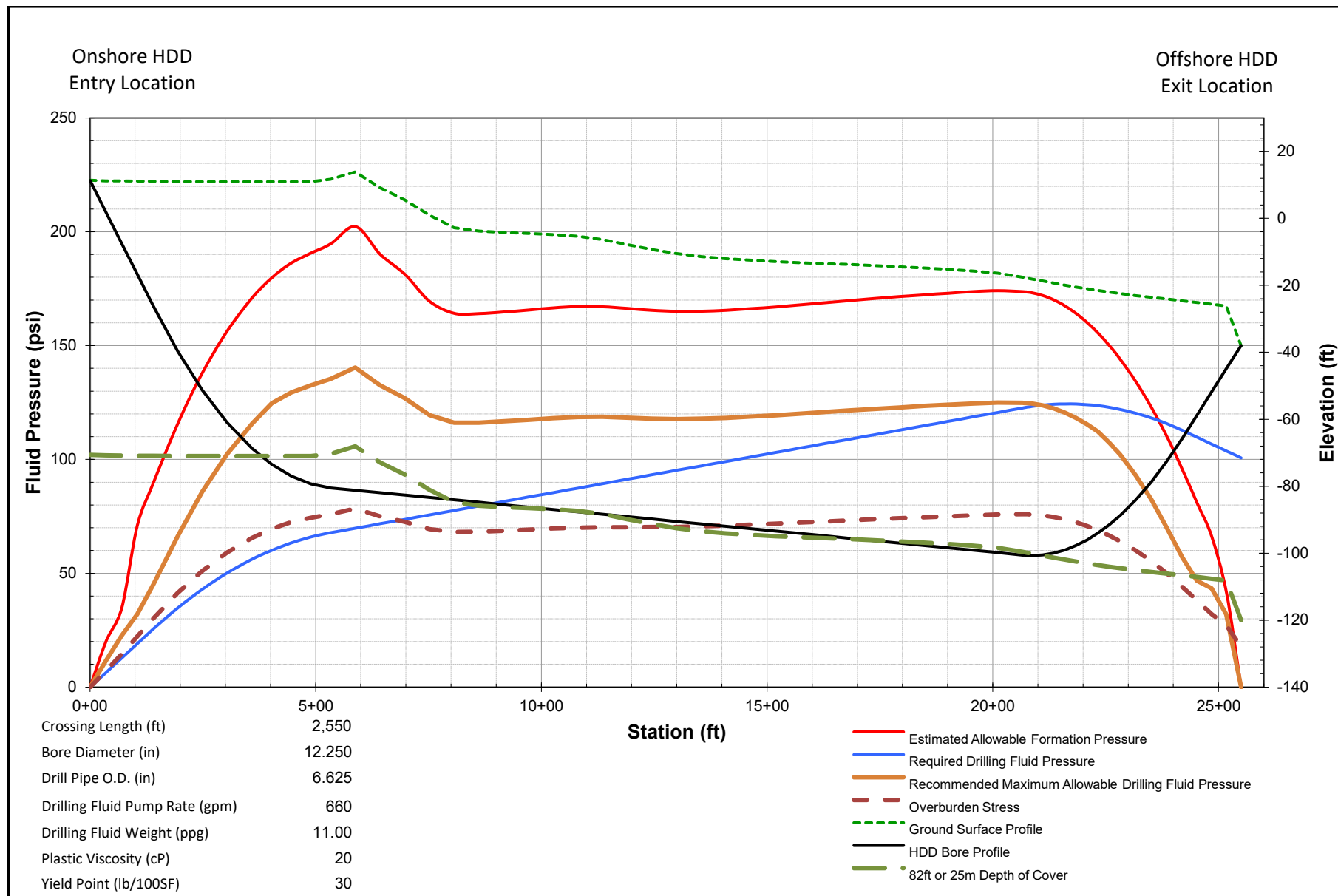
Geotechnical Inputs

Soil Properties	Upper Soil		Lower Soil		Soil Type 3	Soil Type 4	Soil Type 5
	Soil Type 1	Soil Type 2	Soil Type 3	Soil Type 4			
c, soil cohesion (psf)	0	0					
c, soil cohesion (N/m ² or Pa)	0	0	0	0	0	0	0
φ, soil internal friction angle (deg)	17.0	26.0					
φ, soil internal friction angle (rad)	0.30	0.45					
Equivalent SPT Blow Count N60 (blows per 12 inch)	10	20			0.00	0.0	0.0
E, Young's Modulus based on blow count (blf/ft)	300,000	600,000	0	0	0	0	0
E, Young's Modulus (kPa)	14,364	28,728					
E, Young's Modulus (blf/ft)	300,000	600,000	0	0	0	0	0
v, Poisson's ratio	0.35	0.35					
G, soil shear modulus (blf)	111	222	0	0	0	0	0
G, soil shear modulus (kPa)	5,320	10,640	0	0	0	0	0
G, soil shear modulus (Pa)	5,320,030	10,640,060	0	0	0	0	0
γ, soil total unit weight (pcf) below water table	115	120					
γ, soil total unit weight (kN/m ³) below water table	18.1	18.9	0.0	0.0	0.0	0.0	0.0
γ, soil total unit weight (pcf) above water table	110	115					
γ, soil total unit weight (kN/m ³) above water table	17.3	18.1	0.0	0.0	0.0	0.0	0.0
Top Elevation Soil Type encountered (feet)	0	0					
Top Elevation Soil Type encountered (metre)	0.0	0.0					
Bottom Elevation Soil Type encountered (feet)	0	0					
Bottom Elevation Soil Type encountered (metre)	0.0	0.0	0.0	0.0	0.0	0.0	0.0

HDD Installation Inputs

Drill and Intersect Used	no
Target Drill and Intersect Location	53+00
For Drill and Intersect, this must be "no"	1+615
Drill Rig setup on Pipe Side (Single Rig Option Only)	no
Drill Rig #1 Elevation	11.4 feet
Drill Rig #2 Elevation (Pipe Entry Location)	3.5 metre
Recommended Allowable Pressure Factor	N/A
Constrain Plastic Radius to 3 X Pilot Bore Diameter	2.00
Apply Allowable Pressure Factor to Strength only	yes
Total Horizontal Installation Length	2,560 metre
True Installation Length	2,565.2 feet
Pilot Bore Diameter	781.9 inch
Drill Pipe Diameter	12,250 mm
Yield Point	31,115 psi
Plastic Viscosity	660 cP
Drilling Fluid Pumping Rate	660 gal/min
Calculated Drilling Fluid Velocity	2.50 m/min
Pressure Required for Bore Slurry Flow	0.773 N/sec
Drilling Fluid Mud Weight	0.028 psi per ft of bore
	0.195 kPa per metre of bore
	0.848 psi per 30 ft drill pipe
	0.030 ppg
	82.3 lb/ft ³
	1.32 specific gravity

Location	Bore Stationing	Drilled Length with Drill Rig(s) and Locations (True Bore Length)		Bore Elevation		Ground Surface Elevation		Water Table Elevation		Depth of Cover	Soil Type	Theoretical Unfactored Drilling Fluid Pressure		Estimated Bore Fluid Pressure for Drilling Fluid Flow		Factor of Safety	Estimated Hydrostatic Fluid Pressure Within Bore		Factor of Safety	Estimated Bore Fluid Pressure for Drilling Fluid Flow and Hydrostatic Columns		Factor of Safety	Recommended Upper Drilling Fluid Pressure Limit		Factor of Safety	Total Stress Evaluation				
		feet	metre	feet	metre	feet	metre	feet	metre			feet	metre	psi	kPa		psi	kPa		psi	kPa		psi	kPa		Factor	psi	kPa	psi	kPa
Pipe Exit Side		0+00	0+000	0.0	0.0	11.40	3.5	11.40	3.5	0.0	0.0	Type 1	0.0	0.0	0.00	0.0	--	0.00	0.0	--	0.00	0.0	--	0.00	0.0	--	0.00	0.0		
		0+35	0+011	36.2	11.0	2.0	0.6	11.21	3.4	0.0	0.0	Type 1	0.0	0.0	1.0	7.1	19.52	5.4	36.9	3.73	6.4	44.0	3.13	3.00	11.3	78.2	1.78	7.0	48.4	
		0+70	0+021	72.5	22.1	-7.4	-2.2	11.16	3.4	0.0	0.0	Type 1	34.8	239.7	2.0	14.1	16.97	10.7	73.9	3.24	12.8	88.0	2.73	2.50	22.5	165.2	1.77	14.4	99.3	
		1+05	0+032	108.7	33.1	-17.7	-5.1	11.02	3.4	0.0	0.0	Type 1	71.1	490.1	3.1	21.2	23.13	16.1	110.8	4.42	19.1	132.0	3.71	4.00	32.1	221.3	1.68	22.3	154.1	
		1+40	0+043	144.9	44.2	-26.1	-8.0	11.07	3.4	0.0	0.0	Type 2	89.6	617.1	4.1	28.3	21.86	21.4	147.8	4.18	25.5	176.0	3.51	4.00	45.0	310.2	1.76	30.1	207.7	
		1+84	0+059	200.8	61.2	-39.6	-12.1	11.00	3.4	0.0	0.0	Type 2	115.8	798.4	5.7	39.1	20.40	29.2	201.0	3.97	34.8	240.1	3.32	3.00	66.1	456.1	1.90	41.3	284.9	
		2+49	0+076	296.6	88.2	-51.2	-15.6	11.00	3.4	0.0	0.0	Type 2	138.1	952.7	7.3	50.0	19.04	35.8	246.8	3.80	43.0	296.8	3.21	2.50	85.8	591.8	1.99	51.0	351.6	
		3+04	0+093	312.5	95.2	-40.9	-12.6	11.00	3.4	0.0	0.0	Type 2	156.5	1078.8	8.8	60.9	17.71	41.3	285.0	3.79	50.2	345.9	3.12	2.25	100.2	705.8	2.04	98.1	687.3	
		3+59	0+109	368.3	112.3	-48.7	-14.9	11.00	3.4	0.0	0.0	Type 2	171.0	1179.1	10.4	71.8	16.42	45.8	315.6	3.74	56.2	387.4	3.04	2.10	115.8	798.2	2.06	65.6	452.0	
		4+02	0+123	410.2	125.6	-73.4	-22.4	11.00	3.4	0.0	0.0	Type 2	179.8	1239.6	11.6	80.3	15.47	48.5	334.2	3.71	60.1	414.5	2.99	2.00	124.6	859.4	2.04	69.5	479.1	
		4+46	0+138	455.8	138.9	-77.0	-23.5	11.00	3.4	0.0	0.0	Type 2	186.3	1284.7	12.9	88.5	14.47	50.5	358.0	3.69	63.4	437.0	2.94	2.00	139.4	892.1	2.04	72.4	499.5	
		4+90	0+149	499.2	152.2	-79.3	-24.2	11.00	3.4	0.0	0.0	Type 2	190.7	1314.8	14.1	97.3	13.51	51.8	357.3	3.68	66.0	454.7	2.89	2.00	144.3	913.8	2.01	74.4	513.0	
		5+33	0+163	542.9	155.5	-80.5	-24.5	11.08	3.6	0.0	0.0	Type 2	194.7	1342.4	15.3	105.8	12.69	52.5	362.0	3.71	67.9	467.8	2.87	2.00	135.3	933.0	1.99	75.9	523.6	
		5+88	0+179	597.6	182.2	-81.2	-24.6	13.93	4.2	0.0	0.0	Type 2	202.3	1394.9	16.9	116.5	11.98	52.9	364.9	3.82	69.8	481.3	2.80	2.00	140.4	987.8	2.01	78.4	540.7	
		6+43	0+196	652.4	198.8	-81.9	-25.0	91.3	2.8	0.0	0.0	Type 1	190.2	1311.4	18.4	127.2	10.31	53.3	367.3	3.57	71.8	494.8	2.85	2.00	132.6	914.3	1.85	75.0	517.2	
		6+97	0+213	707.1	215.5	-82.6	-25.2	55.3	1.7	0.0	0.0	Type 2	181.4	1250.5	20.0	137.8	9.07	53.7	370.5	3.38	73.7	508.3	2.46	2.00	127.0	875.6	1.72	72.6	500.7	
		7+52	0+229	761.9	232.2	-83.4	-25.4	0.92	0.3	0.0	0.0	Type 2	189.5	1188.8	21.5	148.5	7.87	54.1	373.3	3.13	75.1	521.8	2.24	2.00	119.4	823.6	1.58	69.4	478.3	
		8+07	0+246	816.6	249.8	-84.1	-25.6	-2.77	-0.8	0.0	0.0	Type 2	184.2	1132.1	23.1	159.2	7.11	54.6	376.1	3.01	77.6	535.3	2.11	2.00	116.1	800.8	1.50	68.1	469.5	
		8+62	0+263	871.3	265.6	-84.8	-25.8	-3.78	-1.2	0.0	0.0	Type 2	184.1	1131.3	24.6	169.8	6.66	55.0	379.0	2.99	79.6	548.8	2.06	2.00	116.2	801.1	1.46	68.3	470.8	
		9+18	0+279	926.1	282.3	-85.5	-26.1	-4.23	-1.3	0.0	0.0	Type 2	184.8	1136.1	26.2	180.5	6.29	55.4	381.8	2.98	81.6	562.3	2.02	2.00	116.7	804.9	1.43	68.7	473.7	
		9+71	0+296	980.8	299.0	-86.2	-26.3	-4.53	-1.4	0.0	0.0	Type 2	185.7	1142.4	27.7	191.2	5.98	55.8	384.6	2.97	83.5	575.8	1.98	2.00	117.4	809.7	1.41	69.2	477.0	
		10+26	0+313	1,035.6	315.7	-86.9	-26.5	-4.83	-1.5	0.0	0.0	Type 2	186.6	1148.7	29.3	201.8	5.69	56.2	387.4	2.96	85.5	589.3	1.95	2.00	118.1	814.5	1.38	69.7	480.3	
		10+81	0+329	1,090.3	332.3	-87.7	-26.7	-5.36	-1.6	0.0	0.0	Type 2	187.2	1152.7	30.8	212.5	5.42	56.6	390.3	2.95	87.4	602.8	1.91	2.00	118.6	817.8	1.36	70.0	482.9	
		11+35	0+346	1,145.1	348.0	-88.4	-26.9	-6.31	-1.9	0.0	0.0	Type 2	187.2	1152.5	32.4	223.2	5.16	57.0	393.1	2.93	89.4	616.3	1.87	2.00	118.7	818.5	1.33	70.3	484.4	
		11+90	0+363	1,199.8	365.7	-89.1	-27.2	-7.80	-2.4	0.0	0.0	Type 2	186.3	1146.9	33.9	233.9	4.80	57.4	395.9	2.90	91.3	629.8	1.82	2.00	118.3	815.6	1.30	70.3	484.4	
		12+45	0+379	1,254.6	382.4	-89.8	-27.4	-8.27	-2.8	0.0	0.0	Type 2	185.6	1141.5	35.5	244.5	4.67	57.8	398.7	2.86	93.3	643.3	1.77	2.00	117.9	813.0	1.26	70.3	484.5	
		13+00	0+396	1,309.3	399.1	-90.5	-27.6	-10.52	-3.2	0.0	0.0	Type 2	185.1	1138.3	37.0	255.2	4.46	58.2	401.5	2.83	95.3	656.8	1.73	2.00	117.7	811.7	1.24	70.4	485.2	
		13+54	0+413	1,364.1	419.8	-91.2	-27.8	-11.42	-3.5	0.0	0.0	Type 2	185.1	1138.6	38.6	265.9	4.28	58.6	404.4	2.82	97.2	670.2	1.70	2.00	117.6	812.7	1.21	70.6	486.8	
		14+09	0+429	1,418.8	432.5	-92.0	-28.0	-12.09	-3.7	0.0	0.0	Type 2	185.5	1141.2	40.1	276.5	4.13	59.1	407.2	2.80	99.2	683.7	1.67	2.00	118.2	815.1	1.19	70.9	488.1	
		14+64	0+446	1,473.5	449.1	-92.7	-28.2	-12.51	-3.8	0.0	0.0	Type 2	186.3	1146.4	41.7	287.2	3.99	59.5	410.0	2.80	101.1	697.2	1.64	2.00	118.8	819.2	1.17	71.4	492.0	
		15+19	0+463	1,528.3	465.8	-93.4	-28.5	-12.92	-3.9	0.0	0.0	Type 2	187.0	1151.5	43.2	297.9	3.87	59.9	412.8	2.79	103.1	710.7	1.62	2.00	119.4	823.3	1.16	71.5	493.0	
		15+73	0+480	1,583.0	482.5	-94.1	-28.7	-13.23	-4.0	0.0	0.0	Type 2	187.9	1157.8	44.8	308.6	3.75	60.3	415.7	2.79	105.0	724.2	1.60	2.00	120.1	828.0	1.14	72.3	498.3	
		16+28	0+496	1,637.9	499.2	-94.8	-28.9	-13.51	-4.1	0.0	0.0	Type 2	188.9	1163.4	46.3	319.2	3.65	60.7	418.5	2.78	107.0	737.7	1.58	2.00	120.8	833.0	1.13	72.8	503.6	
		16+83	0+513	1,693.3	510.9	-95.3	-29.1	-13.80	-4.2	0.0	0.0	Type 2	189.8	1169.7	47.8	329.8	3.58	61.0	421.5	2.78	108.1	750.9	1.57	2.00	121.5	838.2	1.12	73.5	510.1	
		17+37	0+530	1,747.3	532.6	-96.3	-29.3	-14.09	-4.3	0.0	0.0	Type 2	190.7	1177.1	49.4	340.6	3.46	61.5	424.1	2.78	110.9	764.7	1.54	2.00	122.2	842.7	1.10	73.7	508.2	
		17+92	0+548	1,802.0	549.3	-97.0	-29.6	-14.47	-4.4	0.0	0.0	Type 2	191.5	1182.6	50.9	351.2	3.37	61.9	427.0	2.77	112.9	778.2	1.52	2.00	122.8	847.8	1.09	74.2	511.3	
		18+47	0+563	1,856.9	568.7	-97.9	-29.8	-14.85	-4.5	0.0	0.0	Type 2	192.3	1188.1	52.0	361.9	3.29	62.3	429.5	2.76	114.9	791.4	1.49	2.00	123.5	852.9	1.07	74.7	514.4	
		19+02	0+580	1,911.5	582.6	-98.4	-30.0	-15.26	-4.7	0.0	0.0	Type 2	193.1	1193.2	54.0	372.6	3.20	62.7	432.8	2.76	116.8	805.2	1.48	2.00	124.1	855.3	1.06	75.0	517.4	
		19+56	0+596	1,966.3	593.3	-99.1	-30.2	-15.71	-4.8	0.0	0.0	Type 2	193.8	1198.0	55.6	383.3	3.13	63.2	435.4	2.75	118.7	818.7	1.46	2.00	124.8	859.1	1.05	75.5	520.2	
		20+11	0+613	2,021.1	608.3	-99.9	-30.4	-16.17	-4.9	0.0	0.0	Type 2	194.5	1203.1	56.9	393.8	3.05	63.5	438.1	2.74	120.6	831.3	1.44	2.00	125.5	863.2	1.04	75.9	523.2	
		20+66	0+630	2,075.8	632.7	-100.6	-30.7	-17.58	-5.4	0.0	0.0	Type 2	193.8	1198.0	58.7	404.6	2.96	64.0	441.1	2.72	122.7	845.7	1.42	2.00	124.8	860.7	1.02	75.9	523.3	
		20+71	0+631	2,081.0	633.3	-100.6	-30.7	-17.71	-5.4	0.0	0.0	Type 2	193.7	1197.5	58.8	405.6	2.95	64.0	441.3	2.71	122.8	846.9	1.41	2.00	124.8	860.4	1.02	75.9	523.3	
		20+76	0+633	2,086.2	635.9	-100.7	-30.7	-17.84	-5.4	0.0	0.0	Type 2	193.6	1196.8	59.0	406.6	2.94	64.1	441.5	2.71	123.0	848.1	1.41	2.00	124.7	860.1	1.01	75.9	523.3	
		20+82	0+636	2,092.4	638.7	-100.8	-30.7	-17.97	-5.4	0.0	0.0	Type 2	193.5	1195.9	59.1	407.6	2.93	64.1	441.7	2.71	123.1	849.3	1.41	2.00</						



INADVERTENT RETURNS PLAN

April 2021

Attachment C INADVERTENT RETURN REPORT FORM

Project:

HDD Crossing:

HDD Contractor:

Report Stage:

Inadvertent Return Report Form

This report must be filled out and sent in to Enable by close of business the day the inadvertent return is found.

1. Name and telephone number of person making this report

2. Location of the inadvertent return (approximate MP, nearby landmarks, etc.)

3. Date and time of inadvertent return

4. Estimated quantity (gallons) and size (LxW) of the inadvertent return

5. Type of activity that was occurring during inadvertent return (drilling, reaming, etc.)

6. Description of any sensitive areas and the proximity to the location of the inadvertent return

- a. If necessary, has turbidity curtain been deployed?

7. Description of the methods used to clean up and secure the site

8. Has the area been cleaned for restoration purposes?

9. This was reported at what time and to whom?
