



Installing Pipe by Auger Boring

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STANDARD OPERATING PROCEDURE

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STANDARD OPERATING PROCEDURE

1. PURPOSE & SCOPE

- 1.1 This Standard Operating Procedure (SOP) describes the requirements for installing a pipeline or steel casing Auger Boring.

2. QUALIFICATION

- 2.1 Employees and contractors subject to this SOP shall be trained on its contents.
- 2.2 All employees and contractors performing the activities described within this SOP shall be qualified according to OQ requirements and shall adhere to those requirements. Refer to the appropriate Operating Company Operator Qualification (OQ) plan.
- 2.3 Inspectors and other site personnel should have appropriate training and/or qualifications as determined by the project engineer or other designated Operating Company personnel.
- 2.4 The Boring Site Supervisor or Inspector should have relevant and successful experience using boring installation techniques on projects with similar diameter, installation length, pipe material, and geologic conditions.
- 2.4.1 Other factors that may be considered could include but are not limited to the following:
- Prior construction experience in constructing transmission lines, mains, and regulated gathering lines.
 - Demonstrated knowledge of the person performing the inspection.
 - Training taken received.
 - Written examination.
 - Qualified to the operator's Operator Qualification (OQ) program, a recognized industry OQ program, or a state required OQ program.

3. REGULATORY REQUIREMENTS

- 3.1 NONE

STANDARD OPERATING PROCEDURE**4. PROCEDURE****4.1 Design & Work Plan Development**

4.1.1 Company shall review and approve all auger boring plans.

4.1.2 A geotechnical investigation will be conducted as part of the design and work plan before work begins unless otherwise authorized by appropriate management personnel. The level of investigation should be determined by, but not limited to the following inputs:

- Proposed methodology;
- Local site geology;
- Local site hydrogeology;
- Proposed bore length and depth;
- Pipe diameter.

4.1.3 Prior to commencing any work, a site-specific work plan should be developed. This plan should include the identification of site-specific hazards and appropriate steps to mitigate them. Work plans should be reviewed with appropriate contractor personnel prior to commencing any work activities. Items to be reviewed in the work plan should include, but are not limited to the following:

- a. Appropriate erosion and sediment control requirements
- b. DOT, Railroad, or other entity encroachment permit requirements
- c. List of general risks that appear on every project and how to mitigate those risks.
- d. Map or redlined Company drawing including but not limited to:
 - Utility crossings
 - Drainage features
 - Pipe specifications
 - General plan and profile of bore path
 - Entry & exit pit locations
 - Bore depth
 - Bore grade
 - Acceptable bore profiles as constructed tolerances
 - Design plans shall include specifications for allowable deviation from the planned bore path.
- e. Contingency plans for reporting to permitting agencies or local authorities and indication to pause and consult with engineer if any abnormal conditions arise. Some examples may include but are not limited to the following:
 - Shaft/pit collapse;
 - Face/bore collapse;
 - Shaft/pit flooding;
 - Auger bore flooding;
 - Major equipment mechanical failure;
 - Settlement or heave scenarios;
 - Serious safety or environment incidents;
 - Higher jacking (thrust) forces than expected.
 - Unexpected geology

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- Roadway/Railway damage
- Damage to drill/bore pipe
- f. Procedures to follow in these events:
 - Required change in bore plan or construction methods;
 - Deviation from planned bore path;
 - Surface heaving or damage to structures, roadways, etc.;
 - Subsidence or collapse of the surface;
 - Bore cannot be completed;
 - Abandonment of a drill pipe section, if needed;

4.1.4 Additional Business Unit procedures or practices that are applicable to the project should be referenced in the work plan as applicable and provided to the site supervisor and/or inspector as needed.

4.1.5 Consideration should be given to proper pipe and joint coatings suitable for this installation. Coatings with additional abrasion resistance may be necessary. Refer to appropriate Operating Company specifications.

4.2 Site Construction

4.2.1 Inspection

- a. A qualified inspector should be present at the job site during the installation and available to address immediate concerns and emergency operations.

4.2.2 Site Prep

- a. The approved design plan shall provide proposed recommendations for depth of bore, backfill, and dewatering where necessary.
- b. The Company Representative should review the work plan with the contractor prior to beginning the work.
- c. Investigate all sites for possibility of having to manage groundwater problems that may occur due to seasonal changes or natural conditions and consult with Environmental Compliance Coordinators (ECC) as required. Ground water conditions may require the location to be de-watered prior to mobilizing bore equipment and crew.
- d. Locate and determine depth of any known utilities to be crossed by the bore path, bore pits, or potentially impacted by construction activities. If there are issues in locating and/or determining the depth of known utilities to be crossed, those utilities should be potholed and verified as part of the design process and included in the design drawing.
- e. Carry out excavation for entry, exit, recovery pits, auger slurry sump pits, or any other excavation as specified in appropriate Operating Company SOP.
- f. Perform pot holing operations as required to verify location and depth of all utilities to be crossed by the bore path.
- g. Ensure that all encroachment permit conditions are followed, to include proper safety practices at roadways/railways.

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4.3 Pipe Installation**4.3.1 Installation**

- a. Work shall not proceed before the Operating Company approves the work plan and schedule.
- b. Any deviation outside of the stated tolerances from the approved engineered drawing's specified bore path and profile must be approved by the Operating Company project engineer and in consultation with the geotechnical consultant, where applicable.
 1. All deviations shall be documented on the Auger Bore As-Built Form. If there are no out of tolerance deviations during the boring process, an Auger Bore As-Built Form should be filled out at the end to document that the bore was within stated tolerances.
- c. For all installations, a plan to address the following must be established or provided:
 1. Setting of the boring machine on line and grade and a final check of the line and grade shall be done before setting the machine.
 2. Equipment is of adequate size and capability to install the product.
 3. A means for preventing voids in the bore.
 4. A means to ensure that the bore hole shall never be empty without the bore pipe or casing.
 5. If casing lubrication is required, adequate casing lubrication with a bentonite slurry or other approved technique should be used. Detailed environmental compliance procedures should be provided and followed for handling, use, and disposal of these fluids in accordance with Operating Company environmental requirements.
 6. An adequate band around the leading edge of the casing to provide extra strength in loose unstable materials when the cutting head has been retracted into the casing to reduce skin friction as well as provides a method for the slurry lubricant to coat the outside of the casing.
 7. Welding requirements for casing pipe as per specific Operating Company welding standards.

4.3.2 Testing

- a. Inspect the carrier pipe coating for any damage before installation and exposed carrier pipe after installation via holiday detector for steel pipe in accordance with the Operating Company procedures. If coating damage is observed, consult with Company representative to discuss and document possible remediation.
- b. Consider performing a 4 hour pressure test prior to pipe installation to verify integrity. This primarily applies to lengthy or more difficult bores, but could apply to other situations. Project Engineer should specify this requirement where applicable.

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- c. When there is any indication that the installed product pipe has been installed outside of specified tolerances or has sustained damage, stop the work, notify the Company project engineer and investigate damage.
- d. A post installation coating survey should be performed to verify coating integrity.

4.4 Site Restoration

- 4.4.1 Once installation of the boring product is complete, ensure that the work site is cleaned of all excess auger fluids or spoils. Removal and final disposition of excess fluids or spoils is the responsibility of the Operating Company. Coordinate with the company ECC for proper disposal plan. Ensure that the work site is restored to pre-construction conditions or as identified in the plans. Refer to applicable business unit standards and/or specifications for guidance on restoration.

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5. RECORDS

5.1 Records of auger boring activities shall be maintained for the life of the facility. These records should include but are not limited to:

- Job summary reports
- Contractor information
- Changes in materials, equipment or construction methods
- As-built plans
- Auger Bore As-Built Form

6. EXCEPTIONS

6.1 NONE

7. REFERENCES

7.1 **WORK PROCEDURES**

- Refer to applicable Operating Company standards

7.2 **SAFETY**

- Refer to applicable Operating Company standards

7.3 **CHARTS, GRAPHS & DRAWINGS, LISTS**

- NONE

7.4 **SOFTWARE APPLICATIONS**

- NONE

7.5 **FORMS**

- NONE

7.6 **REGULATIONS**

- NONE

Attachment 1 – AUGER BORE AS-BUILT FORM

AUGER BORE AS-BUILT FORM

PROJECT

PROJECT NAME:

WBS NUMBER:

BORING START DATE:

BORING COMPLETION DATE:

LOCATION OF BORE:

BORING COMPANY:

DOMINION ENERGY INSPECTOR:

AS-BUILT

ENTRY POINT LATITUDE:

ENTRY POINT LONGITUDE:

EXIT POINT LATITUDE:

EXIT POINT LONGITUDE:

HORIZONTAL BORE DISTANCE (ft):

ACTUAL DISTANCE OF BORE (ft):

CARRIER PIPE NOMINAL DIAMETER (in):

CARRIER PIPE WALL THICKNESS (in):

CARRIER PIPE GRADE:

MAX ANTICIPATED PRESSURE (psig):

CASING PIPE (IF APPLICABLE) NOMINAL DIAMETER (in):

CASING PIPE (IF APPLICABLE) WALL THICKNESS (in):

CASING PIPE (IF APPLICABLE) GRADE:

INITIAL ALLOWABLE VERTICAL DEVIATION TOLERANCE:

FINAL VERTICAL DEVIATION:

INITIAL ALLOWABLE HORIZONTAL DEVIATION TOLERANCE:

FINAL HORIZONTAL DEVIATION:

SIGNATURE: _____

DATE: _____