



August 8, 2022

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, D.C. 20426

Docket No. CP17-40

RE: **CLC and Landowners' Comments to FERC Staff's Draft Environmental Impact Statement Issued on the Spire STL Pipeline Project**

Dear Secretary Bose,

On June 22, 2022, staff of the Federal Energy Regulatory Commission (FERC or Commission) issued a draft environmental impact statement (EIS) that purports to assess the impacts associated with the continued operation of the Spire Pipeline under a reissued certificate.

CLC has developed an extensive record regarding the Spire STL Pipeline project before and after the Draft EIS was issued. The Commission should seriously consider all comments and recommendations provided herein. This information is **not** based on the outdated 2017 Environmental Assessment and does **not** assume construction has not taken place but provides actual data and analysis with legitimate criteria that substantiates our determinations of the project and its fate.

Please see attached, CLC's and Landowners' Comments to FERC Staff's Draft Environmental Impact Statement Issued on the Spire STL Pipeline Project

Please feel free to contact the undersigned at (330) 312-1060 with any questions or for further assistance.

Respectfully Submitted,

/s/ Nate Laps

Nate Laps,
President of Operations
Central Land Consulting, LLC

cc: Chairman Richard Glick (FERC)
Rich McGuire (FERC)
David Swearingen (FERC)
Keith Rodgers (FERC)
Brian Rennecker (Illinois Department of Agriculture)
John Teefe (Illinois Department of Agriculture)
Congressman Jamie Raskin (MD), Chairman of the House Subcommittee on Civil Rights and Civil Liberties
Congressman Rodney Davis (IL)
IL Rep. C.D. Davidsmeyer (Illinois State Representative, 100th District)
IL Rep. Jerry Costello (Illinois State Representative, 116th District)

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Congressman Rodney Davis (IL)
IL Rep. C.D. Davidsmeyer (Illinois State Representative, 100th District)
IL Rep. Jerry Costello (Illinois State Representative, 116th District)

List of Exhibits

- Exhibit A. Compliance Level System and Report for the Spire STL Pipeline Project**
- Exhibit B. Documents That Highlight the Importance of Removing Construction Debris and Rock from the Pipeline Workspace**
- Exhibit C. Spire's Status Report No. 64 Accession No. 20191206-5025**
- Exhibit D. Scott Turman and Jay Gettings Crop Loss and Yields**
- Exhibit E. Combine Repair Estimate from Sloan Tractor Equipment, Inc.**
- Exhibit F. IEPA's Report findings and IEPA's Violation Notices**
- Exhibit G. Kenny Davis Declaration of Spire Violating AIMA Timber Requirements**
- Exhibit H. Landowner Complaints to U.S. Senator Tammy Duckworth Regarding FERC Staff's Lack of Oversight**
- Exhibit I. March 18, 2021 Compliance Order**
- Exhibit J. Agricultural Impact Mitigation Agreement**
- Exhibit K. FERC Plan**
- Exhibit L. FERC Strategic Plan Fiscal Years 2022 - 2026**

Central Land Consulting and Impacted Landowners'
Comments on the Draft Environmental Impact Statement
for the
Spire STL Pipeline Project

Spire STL Pipeline
Docket No. CP17-40-006
August 8, 2022



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**BEFORE THE UNITED STATES
FEDERAL ENERGY REGULATORY COMMISSION**

Spire STL Pipeline Project

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Docket No. CP17-40-006

**CENTRAL LAND CONSULTING AND IMPACTED LANDOWNERS' RECOMMENDATIONS &
COMMENTS FOR THE PREPARATION OF THE FINAL ENVIRONMENTAL IMPACT
STATEMENT OF THE SPIRE STL PIPELINE PROJECT**

PART I: OVERVIEW

1.1 EXPLANATION OF COMMENTS

Following the invalidation and remand of the certificate for the Spire STL Pipeline in *Env'tl. Defense Fund v. Fed. Energy Regulatory Comm'n*, 2 F.4th 953 (D.C. Cir. 2021), Spire has asked the Commission to reissue a new certificate that would authorize continued operation of the project which is currently operating under a temporary certificate. On June 22, 2022 staff of the Federal Energy Regulatory Commission (FERC or Commission) issued a draft environmental impact statement (DEIS) that purports to assess the impacts associated with the continued operation of the Spire Pipeline under a reissued certificate.

Central Land Consulting and a group of impacted landowners have intervened in the temporary certificate docket and separately filed a motion to intervene in this proceeding for a new certificate for the project.¹ CLC and these landowners have signed on to, and fully join and incorporate the set of DEIS comments prepared and filed by the Niskanen Center contemporaneously with these comments. The Niskanen Center's comments describe many of the procedural and legal infirmities with the Commission's inadequate process in preparing, noticing and releasing the draft EIS, and highlight the adverse impacts of the Spire Pipeline as if no certificate had been issued, and the project had just been proposed. And indeed, this is the appropriate approach given that the certificate was vacated, and the D.C. Circuit faulted the Commission for failing to balance the benefits of the project with impacts to the environment and landowners.

The DEIS released by the Commission did not take this approach. The DEIS does not analyze the project as if it had never been constructed, but instead, erroneously assumes that the project will continue to operate and is in compliance with existing FERC requirements. Therefore, these comments will (1) demonstrate that this assumption that Spire is in compliance is erroneous by presenting facts showing that the Spire pipeline is not in compliance and (2) will show that allowing Spire to continue to operate without corrective action will have long term adverse consequences. Furthermore, these comments will also provide additional details on adverse impacts of the project on specific landowners. For the reasons stated in the Niskanen Center comments (incorporated by reference) and this set of comments, CLC and the impacted landowners ask the Commission to

¹ See Motion to Intervene (August 5, 2022), Access No. 20220805-50002 (Motion to Intervene of CLC and Betty and Keith Jefferson, William and Alice Ballard, Anne and Matthew Clayton, Hart Farms, Jo Ann Mansfield, Larry Meyer, Dianne malone, Greg and Connie Stout and Sheila Seagraves).

rescind the Draft EIS which is woefully inadequate, fatally flawed and will result in significant environmental impacts.

The comments are organized as follows. First, the comments discuss the legal requirements that govern preparation of a DEIS under the Natural Environmental Policy Statement and the Natural Gas Act. Second, the comments discuss the adverse impacts of the project including the existing non-compliance and adverse impacts of continued operation.

1.2 NEPA COMPLIANCE REQUIREMENTS

The National Environmental Policy Act requires the Commission to evaluate whether a project has significant environmental impacts that would adversely affect the quality of the human environment. In deciding whether to issue a pipeline certificate under the current Certificate Policy Statement, the Commission must weigh the adverse environmental impacts identified in an EIS with the project's other impacts and benefits. Below are some of the applicable legal standards that govern the preparation of an EIS.

Balancing adverse impacts and compliance with state requirements under NEPA and CEQ Guidelines

First, in considering the degree of the effects, agencies should consider the following, as appropriate to the specific action: (i) Both short and long-term effects. (ii) Both beneficial and adverse effects. (iii) Effects on public health and safety. (iv) Effects that would violate Federal, State, Tribal, or local law protecting the environment. See CEQ Regulation, 42 CFR §1501.3(b)(2). Here, as will be discussed, the Spire pipeline has long-term effects on farming, deleterious impacts on public health and also violates AIMA, a state requirement designed to guard against the loss of topsoil. In addition, under Section 1502.16(a)(5), the NEPA must also consider whether a proposed action conflicts with a state program - which is true for the Spire pipeline which does not conform to AIMA's requirements and was also subject to sanctions by the Illinois EPA. The Commission must take seriously a company's failure to comply with applicable state and local law.

The EIS also does not distinguish between long term and short term impacts. The initial Environmental Assessment for the project (incorporated by reference into DEIS) says that "temporary impacts are defined as occurring only during the construction phase. Short-term impacts are defined as lasting up to 3 years. Long-term impacts would eventually recover, but require more than 3 years. Permanent impacts are defined as lasting throughout the life of the Project " (Spire 2017 EA incorporated by reference at 28). Here, Spire's failure to comply with the original obligations in the EA has transformed ordinarily short term impacts (e.g., minimal topsoil displacement) into long term damage - permanent erosion and subsidence, safety concerns etc.... The wholesale transformation of temporary impacts to permanent is by definition a significant impact and absent mitigation, the impacts are too substantial to allow project approval.

Balancing effects under the Natural Gas Act and Certificate Policy Statement

Under the Natural Gas and Certificate Policy Statement, the Commission must balance the need for the project against the impacts to landowners and the environment. In fact, one of the reasons that the D.C. Circuit vacated the certificate for the pipeline to begin with is because "the Commission failed to adequately balance public benefits and adverse impacts. *Env'tl. Defense Fund v. Fed. Energy Regulatory Comm'n*, 2 F.4th 953, 973 (D.C. Cir. 2021). The DEIS is no help in that regard because it ignores or minimizes most of the project's adverse impacts discussed in these comments.

Establish baseline conditions

A draft EIS must appropriately establish baseline conditions for evaluating project impacts. "Without establishing the baseline conditions which exist ... before [a project] begins, there is simply no way to determine what effect the [project] will have on the environment and, consequently, no way to comply with NEPA." *Great Basin Res. Watch v. Bureau of Land Mgmt.*, 844 F.3d 1095, 1101 (9th Cir. 2016) *citing Half Moon Bay Fishermans' Mktg. Ass'n v. Carlucci*, 857 F.2d 505, 510 (9th Cir. 1988). Where a project is already in operation and seeks a continued authorization (such as relicensing of an existing hydroelectric project), the Commission is not required to use the conditions that predated operation as a baseline but may use existing conditions at the project. *American Rivers v. F.E.R.C.*, 201 F.3d 1186 (9th Cir. 1999)(affirming FERC's use of existing conditions at a 50 year old site as baseline). But what the Commission or any other federal agency may not do in establishing baseline is to ignore the actual "conditions on the ground.: *Natural Desert Ass'n v. Rose*, 921 F.3d 1185, 1190 (9th Cir. 2019) (reversing BLM EIS when agency failed to assess baseline conditions."

Here, EIS did not establish an appropriate baseline. Instead, it assumes that the project will continue to operate and that the project is in compliance with FERC requirements. This is an error. As will be described, the current baseline conditions include damaged, broken property caused by Spire's non-compliance with FERC requirements and the Illinois Agricultural Impact Mitigation Agreement (AIMA). The Commission cannot ignore or wish the non-compliance away. Rather, the appropriate inquiry is whether the current baseline condition of the property will worsen if Spire continues to flout the law, and the answer is unequivocally yes.

Lack of full record and disclosure of impacts

"NEPA's mandate to agencies is "essentially procedural.... It is to ensure a fully informed and well-considered decision...." *Vt. Yankee Nuclear Power Corp. v. Nat. Res. Def. Council, Inc.*, 435 U.S. 519, 558, 98 S.Ct. 1197, 55 L.Ed.2d 460 (1978). " *Black Warrior Riverkeeper, Inc. v. U.S. Army Corps of Eng'rs*, 833 F.3d 1274, 1278 (11th Cir. 2016) The draft EIS is devoid of details and fails to inform the public and the agency of the project impacts. The draft EIS does not include any discussion of climate change impacts of massive topsoil and crop loss, or reference recent literature on long term impacts of pipelines on farmland.

No discussion of mitigation or monitoring

Under NEPA, significant impacts may be reduced to acceptable levels through mitigation. The Draft EIS does not discuss mitigation at all. For example, many of the compliance related impacts may be mitigated by compensating landowners to undertake repairs. The Draft EIS does not consider this option.

Section 1505.3 provides that Agencies may provide monitoring to assure that their decisions are carried out and should do so in important cases. (a) Mitigation (§ 1505.2(a)(3)) and other conditions established in the environmental impact statement or during its review and committed as part of the decision shall be implemented by the lead agency or other appropriate consenting agency....(b) Condition funding of actions on mitigation. (c) Upon request, inform cooperating or participating agencies on progress in carrying out mitigation measures that they have proposed and were adopted by the agency making the decision. (d) Upon request, publish the results of relevant monitoring.

We also note that the Commission has the authority to take whatever steps are necessary to ensure the protection of environmental resources during construction and operation of the project, including authority to impose any additional measures deemed necessary to ensure continued compliance with the intent of the conditions of the

order, as well as the avoidance or mitigation of unforeseen adverse environmental impacts resulting from project construction and operation.

1.3 BACKGROUND OF THE PROJECT

Project Submissions

On January 26, 2017, as amended on April 21, 2017, Spire filed an application with the Commission in Docket No. CP17-40-000 for the Spire STL. The Spire STL includes: approximately 59.2 miles of 24-inch-diameter pipeline in Scott, Greene, and Jersey Counties, Illinois and St. Charles and St. Louis Counties, Missouri; approximately 6.0 miles of 24-inch diameter pipeline (the North County Extension) in St. Louis County, Missouri; and three new meter stations—the Rockies Express Pipeline LLC (REX) Receipt Station in Scott County, Illinois and the Laclede/Lange Delivery Station and Chain of Rocks Station in St. Louis County, Missouri. The Spire STL extends from an interconnection with REX in Scott County, Illinois, to interconnections with both Spire Missouri Inc. (Spire Missouri) and Enable Mississippi River Transmission, LLC (MRT) in St. Louis County, Missouri.

On March 15, 2017, Spire STL Pipeline LLC and the Illinois Department of Agriculture entered into an Agricultural Impact Mitigation Agreement which established that “the Illinois Department of Agriculture and Spire STL Pipeline LLC concur that this AIMA is the complete instrument governing the mitigation of agricultural impacts that may result from the construction of the natural gas pipeline in Scott, Greene, and Jersey Counties within the State of Illinois.”

On September 29, 2017, FERC staff issued an Environmental Assessment (2017 EA or EA) to assess the potential environmental impacts that could result from the construction and operation of the Spire STL. On August 3, 2018, the Commission issued an Order Issuing Certificates (2018 Certificate Order) that approved the Spire STL. Spire’s request to begin construction was approved on November 5, 2018 and construction finished in 2019. The majority of the project was placed into service on November 18, 2019.

On August 3, 2018 the Federal Energy Regulatory Commission (FERC or Commission) authorized an *Order Issuing Certificate* to Spire STL Pipeline, LLC (Spire) for the Spire STL Project (Project). The Project includes the construction, restoration, and operation of a new 65-mile-long interstate natural gas pipeline system in Scott, Greene, and Jersey Counties, Illinois and St. Charles and St. Louis Counties, Missouri. The Project also includes three new aboveground meter and regulation stations, the installation of pig launchers and receivers, and the installation of three mainline valve assemblies and other appurtenant facilities.

On November 5, 2018, FERC issued a notice to proceed with construction for the Spire STL project. Spire began construction shortly thereafter.

On May 31, 2019, the Illinois Environmental Protection Agency (IEPA) Formally Issued Violations Against Spire and Michels Following Investigation. Violations include Failure to Obtain NPDES Stormwater Permit, Discharge of Contaminants, Offensive Water Conditions, Offensive Discharge, Water Quality Violations, and Effluent Violations.

On November 11, 2019 Carolyn Elefant and CLC filed a letter to FERC stating that Spire’s in-service request should be denied on the basis of the ongoing compliance and environmental issues.

On November 14, 2019, FERC staff granted Spire's request to place the project into service. In the Order, Rich McGuire states: "Staff has confirmed, based on our November 12-14, 2019 field inspection and Spire's most recent construction status report filed November 7, 2019, that Spire has adequately stabilized the construction workspaces and that restoration is proceeding satisfactorily." The Order also states: "We will continue to monitor and inspect the project right-of-way to ensure that Spire follows through with its obligation and to ensure that restoration and revegetation is successful."

On August 14, 2020, the Illinois Department of Agriculture (IDOA) filed their report summarizing damages, compliance issues, and AIMA violations that were documented during the June 19, 2020 field inspections with Spire and CLC. Issues are generally consistent with previous CLC filings and allegations and include loss of topsoil mixing of topsoil and subsoil, soil compaction, drainage issues, and rocks mixed into soils. IDOA outlines the mitigative measures that Spire needs to follow in order to become compliant with the AIMA.

On January 19, 2021 The Commission issued an order dismissing the landowners and CLC complaints from 23 different landowners. These complaints claimed that Spire had violated certain environmental conditions of the Commission's August 3, 2018 order issuing a Certificate. **All complaints were dismissed by the Commission without substantiating their dismissals or providing any legitimate criteria. However, the March 18th Compliance Order, among other compliance deficiencies, contradict the Commission's January 19th dismissal of complaints.**

On March 18, 2021, the Commission issued an Order on Environmental Compliance (Compliance Order) in response to the findings of the Illinois Department of Agriculture (IDOA) concerning Spire's compliance with the Agricultural Impact Mitigation Agreement (AIMA) executed between IDOA and Spire. In this Order, the Commission addressed the IDOA's findings and directed Spire to take corrective actions on seven specific properties.

On June 28 - July 1, 2021, a representative from FERC's OEP conducted joint site inspections with CLC, Spire, and the landowners. During these inspections, various issues were identified on nearly every property that was visited. On July 20, 2021, FERC OEP issued a report, in which it directed Spire to conduct the necessary repairs no later than Fall 2021. Another deadline that was utterly ignored by Spire. In fact, of the 32 properties that were inspected Spire only reached out to 5 of the landowners to even obtain access to conduct the repairs. Of those 5, Spire refused to take the landowners' concerns into account in their restoration plans.

On June 22, 2021, the U.S. Court of Appeals for the District of Columbia Circuit issued an opinion vacating and remanding the Commission's 2018 Certificate Order that approved the Spire STL.

On September 14, 2021, and December 3, 2021, the Commission issued temporary Certificates of Public Convenience and Necessity (Certificates) to Spire to continue to operate the facilities constructed under the earlier terms, conditions, and authorizations (September and December Orders) and to continue restoration activities along the project right-of-way.

On November 12, 2021, Spire requested the Commission reissue the Certificates authorizing construction and operation of the Spire STL. On remand, the Commission will evaluate Spire's pending certificate application and consider whether to grant a Certificate under the Natural Gas Act (NGA) to Spire to continue operation of the Spire STL in Illinois and Missouri.

On December 15, 2021, FERC issued a Notice of Intent to Prepare a Supplemental Environmental Impact Statement for the Spire STL Pipeline Project, Request for Comments on Environmental Issues, and Schedule for Environmental Review. The notice explained the NEPA process and opened a formal public scoping period to gather input on the project. The notice was sent to approximately 1,200 parties and was published in the Federal Register on December 23, 2021.^{10 11} Issuance of the notice opened a 30-day scoping period for filing written comments on Spire STL; however, all in-scope environmental comments received prior to issuance of the draft EIS were considered and addressed. In total, the Commission received approximately 45 correspondences generating more than 170 comments during the scoping period and prior to issuance of the draft EIS.

On May 24th, 2022 FERC Office of Energy Projects, Keith Rodgers, Environmental Project Manager, filed FERC's Restoration Inspection Report. Mr. Rodgers conducted a restoration inspection of the Project on April 26-27, 2022. The purpose of the inspection was to assess current conditions on lands affected by the Project, assess the field conditions of the seven properties addressed in the March 18 Order, and document these conditions in the Commission's administrative record. Additionally, Mr. Rodgers was instructed to consider landowner concerns, communicate to landowners and other concerned parties that may be present of the purpose of the inspection, and inform them that other Commission staff would be reviewing the inspection's findings and considering them while addressing previously raised landowner concerns.

On June 1, 2022, Rich McGuire, Director, Division of Gas-Environment & Engineering Office of Energy Projects, filed FERC's Restoration Inspection Report for certain compliance and restoration inspections for the week of May 23rd 2022. Based on the current conditions of the Spire right-of-way of the inspected properties, the inspection confirmed that there are many lingering restoration problem areas across these tracts that require additional restoration repairs.

On June 22, 2022 The staff of the Federal Energy Regulatory Commission (FERC or Commission) prepared a draft environmental impact statement (EIS). Only intervenors have the right to seek rehearing or judicial review of the Commission's decision.

On June 23, 2022 landowners Scott Gerald Turman and Betty Ann Jefferson filed to the Commission a Request for Clarification, or in the Alternative Rehearing of the FERC Restoration Report Dated May 24, 2022

On July 21, 2022 the Commission dismissed the June 23 Rehearing Requests. CLC notified FERC that there were issues in reporting at OEP and provided evidence of the issues and then the Commissioners responded by stating the complaint rehearing is dismissed and that OEP (the subject of the complaint) is handling the issues.

PART II: DISCUSSION OF SPECIFIC PROJECT IMPACTS

2.1 SUMMARY OF COMPLIANCE NOTICES AND CONCERNS

CLC, on behalf of the impacted landowners, have submitted 175 filings to FERC docket CP17-40 such as site inspections, compliance concerns, compliance rehearings, and Rule 206 complaints. These filings are generally related to Spire's environmental noncompliance. The Commission should seriously consider how to address the intentional and predetermined pattern of decision making within the Office of Energy Projects (OEP) and their repeated failure to report accurate compliance deficiencies. CLC and the landowners have provided legitimate criteria and evidence of non-compliant actions, but OEP has misled the Commission time and time again away from the truth. The Commission must take swift action to uphold its Certificate requirements and reckon with the fact that Spire is out of compliance with the previous certificate requirements and environmental conditions that require immediate corrective actions. Due to OEP's failure to properly regulate and mitigate Spire's actions, the project has had and will continue to have direct and unavoidable impacts that will continue until the Commission addresses these issues within the scope of this EIS under the NEPA requirements. (See Table 1. Timeline of Significant Events on the Spire STL Pipeline Project).

Table 1. Timeline of Significant Events on the Spire STL Pipeline Project

Date	FERC Accession Number	Description
May 31, 2019		IL EPA Formally Issues Violations Against Spire and Michels Following Investigation. Violations include Failure to Obtain NPDES Stormwater Permit, Discharge of Contaminants, Offensive Water Conditions, Offensive Discharge, Water Quality Violations, and Effluent Violations.
November 11, 2019	20191112-5102	Carolyn Elefant and CLC file a letter to FERC stating that Spire's in-service request should be denied on the basis of the ongoing compliance and environmental issues.
November 14, 2019	20191114-3058	FERC OEP grants Spire's request to place the project into service.
December 5, 2019	20191206-5025	Spire Files That Restoration is Complete Project-Wide.
August 14, 2020	20200814-5017	IL Dept. of Agriculture files a report summarizing damages, compliance issues, and AIMA violations that were documented during the June 19, 2020 field inspections with Spire and CLC. Issues are generally consistent with previous CLC filings and allegations and include loss of topsoil mixing of topsoil and subsoil, soil compaction, drainage issues, and rocks mixed into soils. IDOA outlines the mitigative measures that Spire needs to follow in order to become compliant with the AIMA.
January 19, 2021	20210119-3048	The Commission issued an order dismissing the landowners and CLC complaints from 23 different landowners. All complaints were dismissed by the Commission without substantiating their dismissal of complaints or providing any legitimate criteria. However, the March 18th Compliance Order, among other compliance deficiencies, contradict the Commission's January 19th dismissal of complaints.
March 18, 2021	20210318-3074	The Commission Files its Order on Environmental Compliance.
June 22, 2021		U.S. Court of Appeals for the District of Columbia Circuit issued an opinion vacating and remanding the Commission's 2018 Certificate Order
July 20, 2021	20210720-3070	FERC OEP Report on Spire's Restoration.
June 28 - July 1, 2021	20210720-3070	FERC Staff Compliance and Restoration Inspections Identifying Several Areas That Require Remediation
December 15, 2021	20211215-3059	FERC issued a Notice of Intent to Prepare a Supplemental Environmental Impact Statement for the Spire STL Pipeline Project

Table 1. Timeline of Significant Events on the Spire STL Pipeline Project

Date	FERC Accession Number	Description
January 13, 2022	20220114-5244	Notice of Comments and Concerns Regarding the Notice of Intent to Prepare a Supplemental EIS for the Spire Pipeline Project. (CLC Notified FERC Staff of FERCs Deficiencies on Regulatory Compliance Oversight)
May 24, 2022	20220524-3055	FERC Office of Energy Projects, Keith Rodgers, Environmental Project Manager, filed FERCs Restoration Inspection Report. Mr. Rodgers conducted a restoration inspection of the Project on April 26-27, 2022.
June 1, 2022	20220601-3035	Rich McGuire, Director, Division of Gas-Environment & Engineering Office of Energy Projects, filed FERCs Restoration Inspection Report for certain compliance and restoration inspections for the week of May 23rd 2022.
June 23, 2022	20220621-5208	Landowners Scott Gerald Turman filed to the Commission a Request for Clarification, or in the Alternative Rehearing of the FERC Restoration Report Dated May 24, 2022
June 21, 2022	20220621-5207	Betty Ann Jefferson filed to the Commission a Request for Clarification, or in the Alternative Rehearing of the FERC Restoration Report Dated May 24, 2022
July 21, 2022	20220721-3038	The Commission Dismissed Landowners Scott Turman's and Betty Jefferson's Rehearing Requests and States That DG2E Staff Will Address Compliance Issues, Even Though the Rehearing Request Was About DG2E Not Addressing the Issues
July 7, 2022	20220707-5031	CLC Submits their Outstanding Issues List Identifying Numerous Compliance and Restoration Issues FERC staff has not Addressed
August 1, 2022	20220801-5099	Illinois State Senator Steve McClure 50th Senate District Congressional Inquiry Regarding Compliance and Restoration Issues That Landowners Impacted Have Raised
August 4, 2022	20220804-5049	Notice to FERC of Climate Change Impacts (Soil Loss)
August 4, 2022	20220804-5093	Notice to FERC on Concerns of FERC Staff's Compliance Oversight and Failure to Address Serious Compliance and Restoration Issues

For example, on May 24th, 2022, the FERC Staff submitted their restoration inspection report. Keith Rogers, Environmental Project Manager - Commission Environmental Staff, conducted the restoration inspections. Mr. Rodgers visited and has photo documentation for approximately 16 properties out of around 291 total properties impacted by the project. This means Mr. Rodgers inspected **approximately 5.5% of the project** and was somehow able to determine that the project restoration as a whole is proceeding satisfactorily. More importantly Mr. Rogers alludes to many of the properties having been successfully restored. This means that, within the last year, FERC Staff has not inspected, addressed, or provided any regulatory oversight on approximately 94.5% of the project. This is not acceptable. See Table 2. Status of FERC Inspection by Tract for CLC Properties.

On June 21, 2022 landowners Scott Gerald Turman and Betty Ann Jefferson filed to the Commission a Request for Clarification, or in the Alternative Rehearing of the FERC Restoration Report Dated May 24, 2022. (*See Accession Nos. 20220621-5208 and 20220621-5207*). On July 21, 2022 the Commission dismissed the June 23 Rehearing Requests. CLC notified FERC that there were issues in reporting at OEP and provided evidence of the issues and then the Commissioners responded by stating the complaint rehearing is dismissed and that OEP (the subject of the complaint) is handling the issues.

Table 2. Status of FERC Inspection by Tract for CLC Properties.

Landowner Name	Tract Number	Tract Inspected or Addressed in Past 12 Months?
Betty and Keith Jefferson	IL-SC-003.000	Tract Inspected in April 2022 by Keith Rodgers, but Issues Have Not Been Addressed.
Betty and Keith Jefferson	IL-SC-008.000	No
Kenneth Davis	IL-SC-018.000	Tract Inspected in May 2022 by Rich McGuire, but Issues Have Not Been Addressed.
William and Alice Ballard	IL-SC-019.000	No
Anne and Matthew Clayton	IL-GC-022.000	No
Hart Farms, LLC	IL-GC-041.001	No
Jo Ann Mansfield	IL-GC-068.000	No
Bernard H Meyer Trust #9-11, Mary Lois Meyer trust #9-11	IL-GC-093.000	Tract Inspected in May 2022 by Rich McGuire, but Issues Have Not Been Addressed.
Bernard H Meyer Trust #9-11, Mary Lois Meyer trust #9-11	IL-GC-094.000	Tract Inspected in May 2022 by Rich McGuire, but Issues Have Not Been Addressed.
Gerald Scott Turman	IL-GC-117.000	No
S.T. Turman Contracting LLC	IL-GC-120.000	No
Gerald Scott Turman	IL-GC-121.000	Tract Inspected in April 2022 by Keith Rodgers, but Issues Have Not Been Addressed.
S.T. Turman Contracting LLC	IL-JC-148.000	No
Jacob D. Gettings, Mildred L. Gettings, Jacob "Jay" Gettings TTE Land Trust	IL-JC-149.000	Tract Inspected in May 2022 by Rich McGuire, but Issues Have Not Been Addressed.
Dannie Malone	IL-JC-179.000	No
Sinclair Family Farm, LLC	IL-JC-183.000	No
4850 Longhorn, LLC	IL-JC-200.000	No
Greg and Connie Stout	IL-JC-223.000	No
Sheila Segraves	IL-JC-220.000	No
Cletus Kampmann Jr.	MO-SC-319.000	No

Table 2. Status of FERC Inspection by Tract for CLC Properties.

Landowner Name	Tract Number	Tract Inspected or Addressed in Past 12 Months?
Eugene and Joyce Weidner	880L-011.00	No
Corgaf LLC: Cori Patricia Christiansen, Barry Michael Corona, Kathleen Ann Corona-Bittick, and Karin Gaut	880L-014.00	No
Alan & Barbara Schlemmer	880L-023.00	No
Margaret G. Bell	880L-024.01	No

2.2 COMPLIANCE LEVEL REPORT

In the last several months, CLC has evaluated and prepared a Compliance Level Summary identifying certain levels of compliance concerns ranging from Level 1 identified as minimal impacts to Level 5 being the most extreme adverse impacts. The legitimate criteria CLC is currently providing and has previously provided shows the tangible impacts that occurred during construction with significant effects due to Spire's non-compliant actions that can still be observed today. (See Exhibit A. Compliance Level System Executive Summary and Compliance Level Report).

2.3 IMPACTS AND HAZARDS FROM CONTINUED OPERATION OF THE PIPELINE

The draft EIS assesses the potential environmental effects of the continued operation of the Spire STL in accordance with the requirements of the National Environmental Policy Act (NEPA). FERC staff concludes that impacts from the continued operation of the Spire STL would be less than significant, with the exception of climate change impacts resulting from GHG emissions that are not characterized as significant or insignificant. We find FERC staff's conclusion that impacts from the continued operation of the pipeline "would be less than significant" to be erroneous, shortsighted, and possibly negligent when all the facts of the records have been considered as discussed below.

We find FERC staff's conclusion that impacts from the continued operation of the pipeline "would be less than significant" to be erroneous, shortsighted, and possibly negligent when all the facts of the records have been considered as discussed below. FERC staff relies heavily on the assumption that impacts remain unchanged from the 2017 EA. This is a dangerous conclusion with potentially catastrophic consequences. For example, in the 2017 EA on page 17, FERC staff notes the dangers to the pipeline and protective coating by leaving debris and rocks buried around the pipeline. **PHMSA also notes the severity of danger when pipelines are scratched, gouged, or corroded.** These impacts can affect the pipe wall thickness and lead to deformations, anomalies, and cracks in the pipeline. Since construction has concluded, it has become clear that Spire did not comply with this requirement or enact adequate mitigation measures. This is one example of many indicating that FERC staff cannot reasonably conclude that impacts remain unchanged in light of Spire's repeated and ongoing mitigation noncompliance. We find that continued operation of the pipeline without immediate

remediation of the affected lands, will lead to compounding risk to the impacted communities and risks to the integrity of the pipeline itself.

Regarding pipeline impacts, FERC staff concludes, *“During operations, the impacts of the Spire STL on all resources when added to previously identified past, present, and reasonably foreseeable projects also remains unchanged from the 2017 EA.”* This statement is misleading at best and makes an unreasonable conclusion. FERC staff relies heavily on this assumption which is a dangerous conclusion with potentially catastrophic consequences for the reasons discussed below.

2.3.1 Buried Debris Around the Operating Pipeline

At Page 63 of the 2017 EA, Spire and FERC staff state *“removal of all construction debris would be done after backfilling and in accordance with the Plan”* Now that the pipeline has been installed, we can assess whether the expected impacts were properly mitigated. In this case, it is well documented that Spire has left high volumes of excavated trench rock, construction debris, and other obstruction in the ground – a clear violation of what was stated in the 2017 EA. To make matters worse, in the 2017 EA, FERC staff notes the importance of ensuring the pipeline trench ***“is free of rocks and other debris that could damage the pipe or its protective coating”*** (Page 17). Additionally, Pipeline and Hazardous Materials Safety Administration (PHMSA) notes the dangers of allowing rocks and other obstructions to come into contact with the pipe which could scratch, dent, gouge, or cause other deformation to the pipeline. They state *“Dents can also be caused by rocks that come in contact with the pipe wall . . . any deformation of the pipeline wall results in the pressure profile being altered at the location of the deformation, leading to the possibility of pipe failure.”*

In addition to FERC’s long standing requirement to remove construction debris and rock from the pipeline workspace, many organizations also stress the importance of this mitigative action such as The INGAA Foundation Guide for Pipeline Construction Inspectors; The Nature Conservancy Report Produced Through Collaboration Between Dominion Energy, Kinder Morgan, UGI Energy Services, Enbridge, NiSource, EQT Midstream Partners, South Company Gas, and Williams; and the Natural Resource Conservation Services Pipeline Construction Specifications. [See Exhibit B for these supporting documents.](#)

It is clear that the dangers presented by the introduction of rocks or other debris on the integrity of the pipeline is well known. FERC staff cannot avoid reckoning with this potentially catastrophic consequence by simply stating that the potential impacts remain unchanged from the 2017 EA. In order to ensure compliance with the Commission’s regulations as well as to ensure safe operation of the pipeline, FERC staff must conclude that immediate corrective action is required as part of the Final EIS.

2.3.2 Severe Erosion and Unstable Slopes Around the Operating Pipeline

Another blindly dismissed, yet ongoing impact that will affect Spire’s ability to continue safe operation of the pipeline is severe erosion and unstable slopes. In September 2018, with numerous ongoing restoration issues such as severe erosion and unstable slopes, the Revolution Pipeline, a 24-inch owned by Energy Transfer in Pennsylvania, experienced a large slip on an unstable slope (a situation not unlike conditions on Spire). This landslide caused a large explosion in which residents had to evacuate their homes as their barns, vehicles, and homes burned. Over two acres of mature trees burned into piles of ash, and six high-voltage transmission towers collapsed. As of 2022, Energy Transfer has been fined over \$30,000,000 and is facing 11 environmental crimes which are being prosecuted by Pennsylvania’s attorney general.

"ETC's lack of oversight during construction of the Revolution Pipeline and their failure to comply with DEP's October 2018 compliance order demanded serious accountability. Their inaction led directly to this unprecedented civil penalty," Please see the WTAE news article [here](#).

– Pennsylvania Department of Environmental Protection

The photos below show the fire and aftermath from the Revolution Pipeline explosion that resulted from a landslide on unstable slopes.

Photo 1: Aftermath of Revolution Explosion



Photo 2: Fireball from Revolution Explosion



The unstable conditions and reluctance to admit the severity of problems are not new to Spire landowners as discussed below.

2.3.3 Kenny Davis

Mr. Davis, a landowner in Scott County, Illinois, owns hilly property crossed by the Spire pipeline. Mr. Davis has complained about continually unstable slopes and multiple slips on the slope on the east side of the easement for multiple years. These slips are less than 30 feet away from the operating pipeline and are creeping closer and closer to the pipe with every rain event. Spire's failure to restore pre-construction contours have led to the perpetual ground instability on Mr. Davis' property. (See YouTube link [here](#) of the significant ongoing slip on Kenny Davis's property.)

2.3.4 Scott Turman

While Mr. Turman does not have the steep slopes that characterize Mr. Davis' property, he does have numerous deep erosion gullies throughout his property inside Spire workspace. In March 2022, some of these gullies were as deep as 4 to 5 feet (See Photo Below). Additionally, a number of these gullies are situated directly over the pipeline which is causing a variety of dangers since the pipeline is in operation. First, the 2017 EA notes that *"Spire would install the pipeline with a minimum depth of cover of 36 inches."* While this is acceptable in non-eroded areas, situations such as those on Mr. Turman's property create an extreme danger with the operational pipeline.

Photo 3. 3 - 4 Feet Deep Erosion Gully Over Operating Pipeline



Second, FERC staff has failed to consider the impacts that perpetual uncovering and exposure to natural elements will have on the safe operation of the pipeline. In Mr. Turman's case, these erosion ditches grow in width, depth, and length throughout the growing season and winter only to be mostly smoothed out during the Spring planting season. This constant flux of environmental variables and stressors can have a detrimental impact on the pipeline coating and the integrity of the pipe itself. PHMSA notes "as pipelines age and environmental conditions change, a pipeline can become susceptible to corrosion . . . Over time, corrosion and outside forces can degrade a pipeline to the point that a spill or release might occur."

While Spire's pipeline was installed in recent years, the lack of compliance that is allowing rocks to impact the coating and excessive erosion are creating an unsafe environment that will undoubtedly speed up pipeline degradation and increase the likelihood of pipeline failure and catastrophic consequences.

For these reasons, FERC staff cannot conclude in the Final EIS that impacts from the Spire STL Pipeline remain unchanged with the exception of climate change and environmental justice. Worse yet, FERC staff is relying on this unreasonable assumption while the potential adverse outcome is one that would be categorized as catastrophic. This is not only harmful to Spire and the environment but there are at least 435 residences, businesses, or other structures within the 628.4' PIR.

FERC staff has clearly made a predetermined decision to approve the project no matter how significant or dangerous the consequences are, but this misconduct does not outweigh the importance of safety and security for the impacted communities and landowners.

We find that continued operation of the pipeline without immediate remediation of the affected lands, will lead to compounding risk to the impacted communities and risks to the integrity of the pipeline itself. If FERC staff issues a Final EIS without requiring Spire to mitigate these issues *before* the Commission can re-certify the

Spire project, the Commission and FERC staff will be negligently risking the communities and landowner's safety.

2.4 IMPACTS TO ENVIRONMENTAL AND WATER RESOURCES

CLC and the impacted landowners have previously communicated concerns regarding the temporary and permanent impacts to sensitive environmental resources such as creeks, streams, and water resources. CLC and FERC Staff Project Manager, John Peconom, have previously identified problem areas that are impacting these sensitive environmental resources. CLC has recently found that there are multiple water quality violations, including high levels of sediment that had entered waterbodies. Increased runoff in the affected areas has created severe bank erosion contributing to sedimentation in the creeks and streams, among other problems. Our June and August 2022 environmental inspections identify serious compliance concerns that need to be corrected immediately. Some of these environmental impacts have been well documented by John Peconom during his June 28th - July 1, 2021 site inspections, but Spire has not attempted to address nor correct the issues. We strongly believe this is due to FERC staff's reluctance to press the issue or make it a priority by including this in the DEIS. CLC intends to file their environmental inspection reports to the Commission in a future filing.

2.5 PRIME FARMLAND IMPACTS

Prime Farmland and Farmland of Statewide Importance The USDA-NRCS defines prime farmland as land that has the best combination of physical and chemical characteristics for growing food, feed, forage, fiber, and oilseed crops (USDA-NRCS 2015a and b). This designation includes cultivated land, pasture, woodland, or other land that is either used for food or fiber crops, or is available for these uses. Urbanized land, built-up land, and open water cannot be designated as prime farmland. Prime farmland typically contains few or no rocks, is permeable to water and air, is not excessively erodible or saturated with water for long periods, and is not subject to frequent, prolonged flooding during the growing season. If the tracts aren't properly remediated, there will continue to be significant impacts to the Prime Farmland designation with issues such as decreased land values, reversal of drainage improvements, decreased crop yields, and potential loss of this coveted designation. See Table 3 below of Landowner Tracts Designated as Prime Farmland. The legitimate criteria provided in this section shows the tangible impacts that occurred during construction with significant effects due to Spire's non-compliant actions that can still be observed today.

<u>Table 3. Tracts Designated as Prime Farmland</u>		
Landowner Name	Tract Number	Prime Farmland Status
Betty and Keith Jefferson	IL-SC-003.000	All areas crossed by the Spire pipeline are considered "Prime Farmland" by the USDA NRCS.
Betty and Keith Jefferson	IL-SC-008.000	All areas crossed by the Spire pipeline are considered "Prime Farmland" by the USDA NRCS.
Kenneth Davis	IL-SC-018.000	The agricultural area south of Gourley Road is considered "Prime Farmland" by the USDA NRCS.
William and Alice	IL-SC-019.000	All agricultural areas are considered "Prime Farmland" by the USDA NRCS.

<u>Table 3. Tracts Designated as Prime Farmland</u>		
Landowner Name	Tract Number	Prime Farmland Status
Ballard		
Anne and Matthew Clayton	IL-GC-022.000	Approximately 75% of the agricultural areas on this tract are considered "Prime Farmland."
Hart Farms, LLC	IL-GC-041.001	Approximately 95% of all agricultural areas are considered "Prime Farmland" by the USDA NRCS.
Jo Ann Mansfield	IL-GC-068.000	The entire property is considered "Prime Farmland" by the USDA NRCS.
Bernard H Meyer Trust #9-11, Mary Lois Meyer trust #9-11	IL-GC-093.000	The entire property is considered "Prime Farmland" by the USDA NRCS.
Bernard H Meyer Trust #9-11, Mary Lois Meyer trust #9-11	IL-GC-094.000	The entire property is considered "Prime Farmland" by the USDA NRCS.
Gerald Scott Turman	IL-GC-117.000	The entire property is considered "Prime Farmland" if drained by the USDA NRCS.
S.T. Turman Contracting LLC	IL-GC-120.000	Approximately 30% of this tract is considered "Farmland of Statewide Importance. Approximately 50% of this tract is considered "Prime Farmland" by the USDA NRCS.
Gerald Scott Turman	IL-GC-121.000	The entire property is considered "Prime Farmland" by the USDA NRCS.
S.T. Turman Contracting LLC	IL-JC-148.000	The entire property is considered "Prime Farmland" by the USDA NRCS.
Jacob D. Gettings, Mildred L. Gettings, Jacob "Jay" Gettings TTE Land Trust	IL-JC-149.000	The entire property is considered "Prime Farmland" by the USDA NRCS.
Dannie Malone	IL-JC-179.000	Approximately 50% of the property is considered "Prime Farmland" by the USDA NRCS. Approximately 25% of the property is considered "Farmland of Statewide Importance" by the USDA NRCS.
Sinclair Family Farm, LLC	IL-JC-183.000	Approximately 65% of the property is considered "Prime Farmland" by the USDA NRCS. Approximately 30% of the property is considered "Farmland of Statewide Importance" by the USDA NRCS.
4850 Longhorn, LLC	IL-JC-200.000	Approximately 15% of the property is considered "Prime Farmland" by the USDA NRCS. Approximately 80% of the property is considered "Farmland of Statewide Importance" by the USDA NRCS.
Greg and Connie Stout	IL-JC-223.000	Approximately 85% of the ROW area is considered "Prime Farmland" by the USDA NRCS. Approximately 15% of the ROW area is considered "Farmland of Statewide Importance" by the USDA NRCS.
Sheila Segraves	IL-JC-220.000	100% of the ROW area is considered "Prime Farmland" by the USDA NRCS.

2.6 MATTING, CONSTRUCTION DEBRIS, AND ROCK IMPACTS

CLC has previously communicated concerns of subsurface rock and construction debris within the Spire easement. During our March and June 2022 investigation we have identified numerous tracts where matting, construction debris, and in some cases excavated rock have been found. **This does not comply with sections V.A.3, V.A.4, and V.A.6 of the Commission's Upland Erosion Plan**, which provide that rock and construction debris in construction work areas, especially surficial soils in cultivated or rotated cropland, managed pasture, and hayfields, is not permitted without landowner approval. CLC has identified buried construction debris on 14 landowners' properties. These findings have been filed to docket CP17-40 previously. The legitimate criteria referenced in this section shows the tangible impacts that occurred during construction with significant effects due to Spire's non-compliant actions that can still be observed today.

2.7 CRP COMPLIANCE IMPACTS

The Conservation Reserve Program (CRP) is managed and administered by the USDA's Farm Service Agency and provides eligible farmers and ranchers with technical and financial assistance to conserve and protect water, soil, and related natural resources on their land. Through consultation with Farm Service Agency (in both Illinois and Missouri) and landowners, Spire identified four parcels enrolled in the CRP that would be crossed at MPs 3.1, 10.4, 27.3, and 42.4. **However, Spire failed to conduct their due diligence on two CRP parcels owned by Matthew Clayton (IL-GC-022.000 at MP 3.5) and Gregory Stout (IL-JC-223.000 at MP 43.5).** These tracts are currently out of compliance with their CRP requirements and the landowners are facing possible penalties including termination of enrollment in the CRP program and reimbursement of previous compensation if immediate corrective action is not taken.

Per correspondence with the Farm Service Agency, parcels enrolled in this program are typically agricultural land which would need to be restored to pre-construction conditions following construction and would have specific reseeding requirements. **While FERC has previously found that impacts on agricultural land would be temporary and minor, and cropland would be restored and returned to production within 1 year**, this statement has proven to be inaccurate and will need to be addressed in the final EIS. See Table 4. Tracts Enrolled in Conservation Reserve Programs. Both Gregory Stout and Matt Clayton have communicated these concerns to Spire and have sent the specific CRP and the required reclamation seeding requirements to Spire. To date, Spire has not complied with the CRP-required mitigation and seeding guidelines. The information provided in this section shows the tangible impacts that occurred during construction with significant continuing effects due to Spire's non-compliant actions.

Table 4. Tracts Enrolled in Conservation Reserve Programs.

Landowner Name	Tract Number	CRP ID	Outstanding Issues
Anne and Matthew Clayton	IL-GC-022.000	CP4D	<ul style="list-style-type: none"> • Prior to construction, the agricultural portion of the property was enrolled in USDA Conservation Reserve Program CRP-CP4D. • During March 2022, high volumes of matting and construction debris were found near MP 3.6 putting the landowner in violation of the CP4D contract. • The drainage swale that drains east to west has not been re-established properly. • Approximately 1,594 CY (132 Truckloads) of soil will be needed to restore the pre-construction

Table 4. Tracts Enrolled in Conservation Reserve Programs.

Landowner Name	Tract Number	CRP ID	Outstanding Issues
			<p>contours.</p> <ul style="list-style-type: none"> • Compaction is most evident in the middle of the tract within Spire's work area. • In fall 2021, Spire mobilized to repair a creek bank slip near MP 3.46 and installed curlex. As of March 2022, erosion has formed beneath the curlex and is discharging downhill into the adjacent stream. • Slope breakers on various slopes in the wooded area are positioned incorrectly with low spots in the center of the slope breaker that hold water. • South of the agricultural field the slope contours on the west side were not properly remediated causing drainage and erosion discharging off-ROW.
Greg and Connie Stout	IL-JC-223.000	CP42	<ul style="list-style-type: none"> • Prior to construction and since 2015, 18.9 acres of the cleared land on the eastern portion of the property has been enrolled in a CP42 Pollinator Habitat Conservation Reserve Program through the US Department of Agriculture. This program requires seeding of native grasses and native wildflower mixes throughout the conservation easement. The easement spans the entire Spire construction area with the exception of a 70-foot wide corridor that follows the Stout's driveway. This contract expires on September 30, 2025. • The Stout property has been enrolled in the US Department of Agriculture's Conservation Reserve Program (CRP) CP42 Pollinator Habitat program. The CRP contract is for a 10-year term beginning October 11, 2015 to September 30, 2025. The CP42 Pollinator program requires control and management of noxious weeds, native grass and wildflower seeding mixes, and to abstain from harvesting and grazing. • Construction debris identified both north and south of the landowners asphalt driveway. • IL-JC-223.000 Will Need Approximately 2,044 CY (170 Truckloads) of Soil to Restore Contours. • High levels of road approach rock found on the surface near the far north and far south ends of the property. • 8 Tulip trees have been cut down along the asphalt driveway, some outside the permanent easement. • Soils are severely compacted as deep as 36" below the surface impacting compliance with the CP42 Conservation Program. Landowner is concerned that if this deep compaction is not remediated, it will affect the growth of the prairie plants and he will not be able to regain compliance with the CRP contract. • Landowner has put over 300 hours of work into the prairie restoration. Work conducted so far includes, ripping, grading, leveling, planting, weed suppression, and mowing.

2.8 DRAIN TILE IMPACTS

As stated in the 2017 Environmental Assessment (EA) and June 2022 Draft Environmental Impact Statement (DEIS), Agricultural Impact Mitigation Agreement (AIMA), and sections II.B.3, IV.A.1, IV.C.3, and IV.C.4 of

the FERC Upland Erosion Control, and Revegetation Plan, Spire committed to work with the landowner to replace and repair damaged drain tiles or irrigation systems. Since Spire began building their pipeline, this requirement has become an afterthought.

CLC has filed continued concerns about damaged drain tiles and irrigation systems. In several locations impacted by Spire's pipeline construction, CLC has identified drain tiles that have either not been repaired or Spire's contractors have not attempted to perform temporary connections of drain tiles that were impacted by pipeline construction.

For example, on December 5, 2019 Spire filed their weekly status report and reported to FERC that "Restoration is complete project wide". (See Exhibit C of Spire's Status Report No. 64 Accession No. 20191206-5025). Spire has alleged the completion of all drain tile repairs and has provided CLC with GPS point data of the location of drain tile repair with additional repair information at each point. CLC has gone to several of the locations where Spire claimed that drain tiles were repaired and excavated test holes to verify the drain tile repairs. Surprisingly, almost all locations we excavated had drain tiles that were not even reinstalled across the pipeline or severely damaged from settlement.. CLC had communicated this to the FERC staff and Rich McGuire in March of 2022 and again in May 2022, but these significant impacts were not addressed in the Draft EIS. (See Table 5. Illinois Properties with Damaged Drain Tiles). The legitimate criteria provided in this section shows the tangible impacts that occurred during construction with significant effects due to Spire's non-compliant actions that can still be observed today.

Table 5. Illinois Properties with Damaged Drain Tiles.

Landowner Name	Tract Number	Damaged Drain Tile Count
Betty and Keith Jefferson	IL-SC-003.000	5
Betty and Keith Jefferson	IL-SC-008.000	6
Kenneth Davis	IL-SC-018.000	0
William and Alice Ballard	IL-SC-019.000	2
Jo Ann Mansfield	IL-GC-068.000	6
Bernard H Meyer Trust #9-11, Mary Lois Meyer trust #9-11	IL-GC-093.000	12
Bernard H Meyer Trust #9-11, Mary Lois Meyer trust #9-11	IL-GC-094.000	10
Gerald Scott Turman	IL-GC-117.000	2
S.T. Turman Contracting LLC	IL-GC-120.000	1
Gerald Scott Turman	IL-GC-121.000	5
S.T. Turman Contracting LLC	IL-JC-148.000	24
Jacob D. Gettings, Mildred L. Gettings, Jacob "Jay" Gettings TTE Land Trust	IL-JC-149.000	40
Sinclair Family Farm, LLC	IL-JC-183.000	4
4850 Longhorn, LLC	IL-JC-200.000	6

2.9 CROP PRODUCTION IMPACTS

Spire and FERC staff anticipated *“that one growing season would be lost due to construction...”* and landowners would be compensated for these production losses. **(Page 82 of 2017 EA)**. Additionally, *“Impacts on agricultural land would largely be temporary and minor, as cropland would be restored and returned to production within 1 year.”* **(Page 91 of the 2017 EA)**.

In the 998 days since Spire’s request to place the project into service was granted, the affected landowners have lost several crop seasons from both direct and indirect impacts caused by the way Spire has left their construction workspace. Though the EA and Spire boldly anticipated that only one growing season would be affected, many landowners are facing their fourth year of crop loss, with impacts on and off the right-of-way. This will need to be addressed to reflect the ongoing impacts to the farmers growing season and loss of crops as we approach the 2022 growing season. These impacts are a direct result of Spire’s continued operation of the pipeline since they continue to fail to adhere to the rules that FERC imposes. (See Exhibit D. Scott Turman and Jay Gettings Crop Loss and Yields) The legitimate criteria provided in this section shows the significant impacts to crop production within the easement, but also outside the easement boundaries. This will be the fourth year of unnecessary crop production impacts.

2.10 FARM EQUIPMENT IMPACTS

The landowners are aggrieved by FERC staff and the Commission’s failure to impose the required immediate corrective action of their compliance requirements that precedes the normal revegetation and monitoring phase. This harms the landowners farming operations, crop production, causes serious damage to their equipment, risks the safety of their well being, and harms their overall livelihood.

For example, in October 2021 Mr. Bob Hart damaged his combine when harvesting soybeans due to Spire’s construction debris and matting materials lodged in the combine causing severe damage and down time. Mr. Hart ran over large pieces of construction debris damaging his equipment and ricocheted off-ROW. Luckily no one was injured. This could have seriously injured his grandkids if not hospitalized them if they were assisting him at that time. (See Exhibit E of the Combine Repair Estimate From Sloan Tractor Equipment, Inc.)

Many landowners will not be able to harvest their planted crops due to the excessive buried and surficial bedrock material and construction debris. Typically, at harvest, soybeans should be cut at approximately 0.5” from the surface to maximize soybean uptake into the combine. If the Landowners attempted to harvest their soybeans in the easement, this unwanted material can encroach into the combine’s cutter bar and be carried through the conveyors into the feeder drum. Within seconds, the rotor and the main elements of the thrashing area, which run at approximately 1,000 RPM, will be severely damaged. Additionally, the gear drive could be damaged, which runs at appropriately 2150 rpm. This would be extremely costly to repair if the machine itself was not totaled.

All excavated rock, matting, and construction debris must be excavated and removed from the soils entirely. Until FERC staff addresses, inspects, and takes corrective action on this serious matter, the landowner will continue to be significantly impacted by Spire’s embarrassing restoration work.

2.11 EROSION

Erosion is often caused by forces of water and wind and appears in the form of rill erosion, gully erosion, or sheet erosion. The impacts of erosion can lead to loss of crop productivity, loss of topsoil, and silt and sediment discharging in sensitive environmental resources. These impacts also include the reduced ability of the soil to store water and nutrients, exposure of subsoil, higher rates of runoff, and potential access issues. Ongoing erosion requires immediate corrective action and if neglected is in violation of sections II.B.12, II.B.13, II.B.14, IV.F, V.A.1, V.A.2, V.B.2, and V.D.3. of the FERC Plan. In addition, the 2017 EA and AIMA have specific guidelines to ensure that erosion is mitigated and controlled.

Spire has neglected these requirements and has allowed uncontrolled erosion to occur throughout the project. Additionally Spire has failed to take appropriate corrective action or report the full extent of erosion in their status reports. These impacts and lack of corrective action harm the landowner while the agricultural properties continue to lose invaluable topsoil that the landowners will never recover. Most importantly, these impacts are ongoing and will continue to worsen if the FERC staff does not require immediate corrective action. CLC has evaluated the ongoing impact of erosion across CLC tracts and has determined there is approximately 10,928 feet of active erosion. It's anticipated that erosion impacts will double by the end of the year if not corrected as we approach the wet fall season.

10,928 feet of erosion x 1' deep x 1' wide equals 404.74 cubic yards of topsoil lost. This is soil that has been lost since the landowners planted it in Spring 2022. The impacted landowners are aggrieved by this continuing impact and will continue to be harmed by this negligent inaction. (See Table 6. Erosion Occurrences Across CLC Tracts in Illinois).

Table 6. Erosion Occurrences Across CLC Tracts in Illinois			
Landowner Name	Tract Number	Approximate Areas of Active Erosion	Approximate Feet of Active Erosion
Kenneth Davis	IL-SC-018.000	15	671
William and Alice Ballard	IL-SC-019.000	10	773
Anne and Matthew Clayton	IL-GC-022.000	2	110
Gerald Scott Turman	IL-GC-117.000	4	546
S.T. Turman Contracting LLC	IL-GC-120.000	39	2,472
Gerald Scott Turman	IL-GC-121.000	4	423
Dannie Malone	IL-JC-179.000	2	52
Sinclair Family Farm, LLC	IL-JC-183.000	11	1,280
4850 Longhorn, LLC	IL-JC-200.000	92	4,525
Sheila Segraves	IL-JC-220.000	1	76
	Total:	180	10,928

2.12 CLIMATE CHANGE IMPACTS

Throughout the duration of the project the landowners have communicated their concerns regarding soil loss due to reckless construction practices. The conservation of soil is incredibly important to the livelihood of all farmers impacted by the Spire project, this is evident by their widespread no-till farming practices.

CLC has evaluated numerous tracts focusing on the contours to ensure Spire has appropriately restored the pre-construction elevations. The importance of restoring the contours isn't just because the FERC compliance requirements and AIMA require it. It is because the altered contours can impact large portions of the farms runoff and crop production, increased runoff velocity and can jeopardize an entire drain tile system or drainage of the property. It is important for the Commission to understand why and how the landowners have lost so much soil from Spire's pipeline construction.

2.12.1 Illinois EPA Report

On May 31, 2019 IL EPA Formally Issues Violations Against Spire and Michels Following Investigation. Violations include Failure to Obtain NPDES Stormwater Permit, Discharge of Contaminants, Offensive Water Conditions, Offensive Discharge, Water Quality Violations, and Effluent Violations. Several of the identified IEPA findings and violations, still remain without the appropriate corrective actions taken.

Paul Kennedy's findings regarding the discharge of contaminants provides the Commission with legitimate information that Spire has lost topsoil causing climate change impacts. Specific examples of these impacts are highlighted in greater detail below. This will provide the Commission with legitimate criteria that Spire has caused a significant loss in topsoil.

2.12.2 Examples of Typical Questions (and Answers) Relating to the Loss of Soil

Where did the soil go?

- Erosion
- The soil berms were not stabilized and properly vegetated leading to the discharge of silt, sediments, and other contaminants downslope into creeks, streams, or other low lying areas.
- Wind erosion
- Unstable slopes and creek slips
- Improper erosion control practices

Can't we just go retrieve the lost soil from wherever it is discharged to in the field?

- As IEPA has documented (discussed in further detail below), soil has eroded to low lying areas including creeks and streams. Furthermore, eroded soil has been stripped of its nutrients and structure and no longer resembles its original state.
 - In some areas, more than likely rocky areas or with shallow bedrock, Spire removed rocks, debris, and any unwanted material away from the pipe then used clean soil to pad the pipe.
 - Severe and deep soil compaction

What evidence proves that there was a loss of soil?

- On April 23, 2019 and May 2, 2019, the Illinois Environmental Protection Agency conducted site visits in response to US EPA complaints that were filed earlier that April. IEPA focused on sites that have

experienced runoff issues from the pipeline's easement onto the landowners' private land and into surface waters. (See Exhibit F of the IEPA's Report findings and IEPA's Violation Notices).

- Page 10 - Image File Name PF230002.JPG Kenny Davis (Tract # IL-SC-018.000)
 - *"Note the color difference between the washed out subsoil and darker topsoil outside the construction work area. There were multiple instances of the same scenario along the construction work area at this site."*
- Page 11 - Image File Name P4230003.JPG Kenny Davis (Tract # IL-SC-018.000)
 - *"silt laden water had washed away under the silt fence and flooded the area in the recent past. The subsoil color is present both inside and outside of the silt fence. This expanded for an area about 15 yards outside the silt fence."*
- Page 15 - Image File Name P4230011.JPG. Betty Ann Jefferson (Tract # IL-SC-003.000) "
 - *Clearly shows the different colored soil that washed away from the construction site onto the darker colored topsoil off the row crop field. The photo shows no runoff controls in place around the construction site."*
- Page 23 - Image File Name P4230027.JPG. Phil Brown (Tract # IL-GC-080.100)
 - *"A trail of water can be seen running from a weak point in the silt fence to the crop ground between the pipeline and the ditch inside the wetland."*
- Page 30 - Image File Name P4230042.JPG Phil Brown (Tract # ILGC-080.100)
 - *"This clearly shows how the filter bags were used to dewater the construction site and discharge contaminated water through/under the silt fence."*
- Page 33 - Image File Name P4230048. JPG Marc Steckel (Tract # IL-GC-111.000)
 - *"A failed section of the silt fence on the east silt fence on the East side of the pipeline. The darker colored soil shows where the stormwater has spilled out of the construction work area."*
- Page 44 - Image File Name P50200009.JPG.
 - *"The visible water along the edge shows the same "chocolate milk" type water that has run off from the construction site to pollute the two ponds."*
- Page 54 - Image File Name P5020029.JPG Phil Brown (Tract # IL-GC-091.000)
 - *"Sample 7 was collected from the water running off from the construction site underneath the silt fence. This water was flowing into the large puddle surrounding the tile riser and would eventually drain into the pond. The high turbidity and "chocolate milk" color is consistent with other sites where subsoil contaminated stormwater was running off from the construction area."*
- Page 56 - Image File Name P5020033.JPG. Phil Brown (Tract # IL-GC-091.000)
 - *"This was the silt fence and the channel cut by the contaminated stormwater running off from the site that led to the tile riser."*

More recently, topsoil loss is still being observed in a similar manner to what the IEPA observed 3 years ago. See below Youtube video links of Landowner Kenny Davis Summarizing Erosion and Loss of Topsoil.

Video 1: <https://youtube.com/shorts/5NR-kiDshJM>

Video 2: <https://youtube.com/shorts/tSiMwHKOXqg>

Video 3: <https://youtu.be/3YZjImSAGow>

Video 4: <https://youtube.com/shorts/KLDrms3AJWw>

Video 5: <https://youtube.com/shorts/-nmejw5Z2sE>

The above legitimate criteria noted by the IEPA violates section II.B.1, II.B.2, II.B.5, II.B.7, II.B.12, II.B.14, II.B.16, IV.F.2, and IV.F.3. of the Commission's Upland Erosion Control Plan and continues to have environmental impacts. It is clear from the laboratory results contained on pages 67 - 80 clearly indicate that high levels of soil were being washed away from the construction workspace and into adjacent water bodies, streams, and wetlands. In one case, the total suspended solids was nearly 200 times the normal levels found in surface water.

The Illinois Department of Agriculture's August 14, 2020 report clearly states that the Department found significant differences between the depths of topsoil on the impacted land and the non-impacted land, it does not appear that topsoil replacement was conducted consistently with the provisions of the AIMA. The topsoil in the impacted area has not been restored to its original depth and contour. CLC evaluated its tracts and determined there is approximately 47,167 cubic yards missing to restore the pre-construction contours, with the exception of the Ballard, Turman, 4850 Longhorn, and Segraves tracts that are pending further investigation. (See Table 7. Summary of Contour Evaluations on CLC Tracts in Illinois.)

Table 7. Summary of Contour Evaluations on CLC Tracts in Illinois.

Landowner Name	Tract Number	Max Grade Missing from ROW (Inches)	Approx. Topsoil Needed to Correct Contours (Cubic Yards)
Betty and Keith Jefferson	IL-SC-003.000	15	6,757
Betty and Keith Jefferson	IL-SC-008.000	10.8	2,006
Kenneth Davis	IL-SC-018.000	67	1,040
William and Alice Ballard	IL-SC-019.000	10.3	523*
Anne and Matthew Clayton	IL-GC-022.000	3.3	1,594
Hart Farms, LLC	IL-GC-041.001	17.5	3,746
Jo Ann Mansfield	IL-GC-068.000	13.6	5,968
Bernard H Meyer Trust #9-11, Mary Lois Meyer trust #9-11	IL-GC-093.000	15.6	896
Bernard H Meyer Trust #9-11, Mary Lois Meyer trust #9-11	IL-GC-094.000	11.96	1,023
Gerald Scott Turman	IL-GC-117.000	11.25	1,082*
S.T. Turman Contracting LLC	IL-GC-120.000	15.7	953*
Gerald Scott Turman	IL-GC-121.000	16.71	838*
S.T. Turman Contracting LLC	IL-JC-148.000	8.6	3,381

Table 7. Summary of Contour Evaluations on CLC Tracts in Illinois.

Landowner Name	Tract Number	Max Grade Missing from ROW (Inches)	Approx. Topsoil Needed to Correct Contours (Cubic Yards)
Jacob D. Gettings, Mildred L. Gettings, Jacob "Jay" Gettings TTE Land Trust	IL-JC-149.000	10.53	4,634.91
Dannie Malone	IL-JC-179.000	21.8	2,425
Sinclair Family Farm, LLC	IL-JC-183.000	20.8	5,592
4850 Longhorn, LLC	IL-JC-200.000	21	356*
Greg and Connie Stout	IL-JC-223.000	12.7	2,044
Sheila Segraves	IL-JC-220.000	22.1	2,308*
Total:			47.467.91 Cubic Yards
*Indicates That Contour Evaluation is Only Partially Completed and Additional Information is Forthcoming.			

2.13 TREE VALUATION AND NON MARKETABLE TIMBER

Throughout the AIMA Spire is required to work with landowners and if trees are to be removed from the right-of-way. Spire would also be required to determine if there are trees of commercial or other value to the landowner. If there are trees of commercial or other value to the landowner, Spire will allow the landowner the right to retain ownership of the trees with the disposition of the trees to be negotiated prior to the commencement of land clearing. Unless otherwise restricted by federal, state, or local regulations, Spire will follow the Landowner's desires regarding the removal and disposal of trees, brush, and stumps of no value to the landowner by burning, burial, etc., or complete removal from any affected property. A forester with local expertise shall be hired by Spire to appraise the merchantable value of any timber to be cut for construction of the pipeline. The Landowners shall be compensated 100% of the value.

Spire has not, in any way, consulted with the landowners to determine if there were trees of commercial or other value to the landowner. Spire was required to allow the landowner to retain ownership of the trees with the disposition of the trees to be negotiated prior to the commencement of land clearing. Spire has not hired an expert or forester to appraise the merchantable value of timber that was cut during pipeline construction. The Landowners have not been compensated 100% of the value and in most cases have not been compensated at all.

For example, landowner Kenny Davis was knowledgeable of this requirement and voiced his desire to retain his timber. After doing so, Spire intentionally hauled away and sold Mr. Davis' merchantable timber and violated his right to retain ownership of the timber that was cut on his own property. Mr. Davis takes pride in hunting on his property, but this enjoyment of his property is now hindered. (See Exhibit G. Kenny Davis Declaration of Spire Violating AIMA Timber Requirements).

In fact, Spire has reported that there is no merchantable timber as an excuse for not appraising the value of timber cut. Spire has no expertise or authority to determine what is merchantable or not. The legitimate criteria

provided in this section shows the tangible impacts that occurred during construction with significant effects due to Spire's non-compliant actions that can still be observed today.

PART III: FERC STAFF'S DEFICIENCIES IN ENSURING COMPLIANCE

3.1 FERC STAFF'S FAILURE TO ENFORCE COMPLIANCE

The FERC staff has previously committed to ensuring compliance and restoration of the project and should be held accountable if the FERC staff or the project sponsor fails to meet their commitments. If the FERC staff can not commit to this request, the Commission should specify what actions will be taken to ensure compliance with the certificate requirements.

The 2017 EA Commitments by FERC Staff state: *"FERC staff would inspect the Project throughout construction to independently verify compliance with the Commission's order. The FERC staff would continue to monitor and inspect the vegetation along the Project route until restoration and revegetation are deemed successful."*

Throughout the duration of construction and restoration of the project, it appears that the FERC staff has inspected a handful of tracts while numerous landowners and CLC have submitted serious compliance and restoration issues. At the least, prior to the Final EIS being submitted, the Commission should direct FERC staff to verify and inspect each tract across the project or specific tracts that have been submitted to the FERC with concerning issues. If tracts require corrective action, Spire must submit remediation plans and FERC staff will be required to approve the appropriate plans that will address the restoration deficiencies. (See Table 8. Spring 2022 Compliance And Restoration Report Filing Dates and Accession Numbers).

<u>Table 8. Spring 2022 Compliance And Restoration Report Filing Dates and Accession Numbers.</u>			
Landowner Name	Tract	Date of Compliance Report Filed	FERC Accession No.
Betty & Keith Jefferson	IL-SC-003.000	7/20/2022	20220720-5017
Betty & Keith Jefferson	IL-SC-008.000		
Kenneth Davis	IL-SC-018.000	5/20/2022	20220520-5179
William Ballard and Mark Ryan	IL-SC-019.000	7/19/2022	20220719-5040
Anne M. & Matthew J. Clayton	IL-GC-022.000	7/19/2022	20220719-5039
Hart Farms LLC	IL-GC-041.001	7/18/2022	20220718-5045
Darrell Mansfield, deceased Jo Ann Mansfield	IL-GC-068.000	7/20/2022	20220720-5016
Bernard H Meyer Trust #9-11, Mary Lois Meyer trust #9-11	IL-GC-093.000	5/20/2022	20220520-5168

Table 8. Spring 2022 Compliance And Restoration Report Filing Dates and Accession Numbers.

Landowner Name	Tract	Date of Compliance Report Filed	FERC Accession No.
Bernard H Meyer Trust #9-11, Mary Lois Meyer Trust #9-11	IL-GC-094.000		
Gerald Scott Turman	IL-GC-117.000	7/25/2022	20220725-5148
S.T. Turman Contracting LLC	IL-GC-120.000	7/25/2022	20220725-5148
Gerald Scott Turman	IL-GC-121.000	7/25/2022	20220725-5148
S.T. Turman Contracting LLC	IL-JC-148.000	7/25/2022	20220725-5146
Jacob D. Gettings, Mildred L. Gettings, Jacob "Jay" Gettings TTE Land Trust	IL-JC-149.000	5/20/2022	20220520-5173
Dannie Malone	IL-JC-179.000	5/27/2022	20220527-5131
Sinclair Family Farm, Brandon Sinclair and Brent Sinclair	IL-JC-183.000	7/18/2022	20220718-5049
4850 Longhorn LLC	IL-JC-200.000	7/18/2022	20220718-5046
Greg and Connie Stout	IL-JC-223.000	7/15/2022	20220715-5004
Sheila Segraves	IL-JC-220.000	7/14/2022	20220714-5064

On March 18, 2021, the Commissioners issued an Order that identified a wide array of restoration issues on several tracts and ordered Spire to immediately address and correct these issues. On July 20, 2022, FERC staff filed a restoration inspection report that identified project-wide restoration issues beyond what was identified in the March 18th Order. While FERC themselves identifies widespread restoration issues and directs Spire to correct these problems, FERC has not followed through with their regulatory obligations to ensure compliance. It is clear that Spire is out of compliance and FERC has repeatedly failed to fulfill their regulatory duties. This pattern of inaction has enabled Spire to harm the landowners and avoid any repercussions for their noncompliance. This pattern is well documented. (See Exhibit H of Landowner Complaints to U.S. Senator Tammy Duckworth Regarding FERC Staff's Lack of Oversight).

Example 1: Every time FERC staff leans towards only addressing the March 18th Compliance Order or compliance requirements, this enables and emboldens Spire to pursue shortcuts and a cheap way out. Accordingly, Spire submitted their Corrective Action Status Report No. 68 – for period of July 1 to July 8, 2022 report and has stated:

“Spire STL has also clarified for landowners that it is willing to undertake only the corrective actions identified in the March 18 Order at this time.”

This kind of statement by Spire is the direct result of FERC staff's failure to ensure compliance and exercise their regulatory obligations. If FERC was actively ensuring compliance, no

company would ever make such a brazen remark and state that they will only correct *some* of the issues. (See Exhibit I of the March 18, 2021 Compliance Order).

Example 2: However, this dynamic between FERC staff and project sponsors comes as no surprise when you are deeply involved in the project. For example, on July 8, 2022, FERC staff wrote to CLC:

“You and I can talk until the sun goes down, but I can’t direct Spire to actually implement the plans and address the identified ROW restoration issues”

and

“To reiterate this point, the Commission’s March 18, 2021 Order notes that the need for the return of the impacted land to agricultural land use practices ultimately leads to successful restoration, and where landowners opt not to replant crops or cover crops on exposed soil on agricultural land disturbed by project construction, both the restoration of soil’s function and the ability to assess the success of restoration may be impeded.” Rodgers also states: *“Furthermore, it appeared that cover crops were not planted on some fields, this may contribute to exacerbate erosion and compaction on- and off-right-of-way.”*

FERC staff (Mr. Rogers in this case) has no knowledge or understanding of the tracts across the project. To disrespect the landowners by making accusations about the landowner’s own farming operations without verifying the facts or having any communications is just as egregious as Spire’s damages and treatment of the landowners.

Moreover, FERC staff’s failure to ensure compliance has not gone unnoticed in the U.S. Federal Courts. In The United States Court of Appeals for the DC Circuit, a panel of judges questioned FERC regarding its failure to properly identify and ensure corrective action is taken on a variety of issues during the construction of a pipeline. Please listen to the hearing [here](#) and note the hearing regarding Sierra Club v FERC begins at 1:16:35.

The Final EIS must have clarification on any current remaining compliance issues and any required corrective action that precedes post construction monitoring and maintenance. There must be recommendations for removal of excavated rock to match undisturbed areas, removal of matting and construction debris, restoration of pre-construction contours, stabilization of creek banks, mitigation of trench subsidence, decompaction of impacted lands all of which naturally precede the post construction monitoring and maintenance phase.

Since Spire has failed to address the March 18th Order and other compliance correspondence. FERC staff cannot rely on the assumption that Spire is in compliance. FERC staff must determine if Spire is out of compliance with their previous certificate order, temporary certificate order, and any pending certificate orders.

3.2 CLC RESPONSES TO THE DEFICIENCIES WITHIN THE DRAFT EIS

Section 4.1 Baseline Environmental Conditions

“During scoping we received comments stating that baseline conditions should include Spire’s lack of compliance, and that the environmental analysis in this EIS should consider additional mitigation or restoration activities. As noted in section 1.3, restoration of the project right-of-way and compliance

with the 2018 Certificate Order are matters being addressed through FERC's compliance program and ongoing compliance monitoring and oversight."

CLC Response

The FERC staff avoids discussing Spire's compliance requirements and claims that restoration of the project is being addressed through FERC's compliance program and ongoing compliance monitoring and oversight. In general, the legitimate criteria previously provided to FERC staff, and filed on the docket, indicate issues that **precede** the ongoing compliance and monitoring oversight and require immediate corrective action. **FERC must ensure compliance with all Certificate requirements through a vigorous compliance oversight and the necessary corrective actions for deficiencies in compliance or restoration.**

The Commission's 2022 Strategic Plan states...

"FERC's authority, along with its surveillance, information gathering, and analytic capabilities, enable it to exercise vigilance and detect emerging compliance issues and make sure that its policies, procedures, and guidance are sufficient to inform industry action"

The Commission should remind FERC staff of their congressionally delegated regulatory duties and instruct them to stop shortcutting their obligations. The FERC staff must faithfully determine if Spire is in compliance with all restoration requirements, if violations are warranted, implement the appropriate corrective actions

Section 8.1 General Pipeline Construction Procedures

"Final cleanup would begin after backfilling and as soon as weather and site conditions permit. In accordance with the Plan, weather and season permitting, Spire would complete final cleanup (including removal of construction debris, replacement of topsoil where applicable, final grading, and installation of permanent erosion control devices) within 20 days after the trench is backfilled. In residential areas, cleanup and restoration would occur within 10 days of backfilling. If final cleanup is prevented by winter snowfall, Spire would implement its Winter Construction Plan, which includes measures to temporarily stabilize the right-of-way and avoid erosion until spring thaw conditions (see section A.8.2). Spire would complete restoration in accordance with the Plan and Procedures and applicable permit requirements. Areas disturbed by construction would be graded to match original contours and surrounding drainage patterns, except at those locations where permanent changes in drainage would be required to prevent scour, erosion, or potential exposure of the pipeline. A slight crown on top of the trench may be left to allow for settling of soil air pockets. Temporary and permanent erosion and sediment control measures, including silt fencing, water bars, and vegetation would be installed. Fences, gates, driveways, and roads disturbed by pipeline construction would be restored."

CLC Response

The FERC staff statements are irrelevant because Spire is currently in violation with the 8.1 General Pipeline Construction Procedures. In general, FERC staff has not inspected, made determinations, or suggested any corrective action regarding these construction procedures. FERC staff must implement a determination and plan of action to ensure Spire complies with these requirements.

Section 3. Construction Procedures

“Spire would comply with FERC’s Upland Erosion Control, Revegetation, and Maintenance Plan³ (Plan) and FERC’s Procedures in conjunction with the Agricultural Impact Mitigation Agreement (AIMA) for Illinois as a minimum standard during construction. Some ATWS for topsoil segregation in agricultural lands are located within 50 feet of wetlands where the adjacent upland consists of cultivated or rotated cropland as permitted in FERC Procedures. As noted in the EA and described in appendix C, Spire has requested and adequately justified deviations from our Procedures which are necessary for site-specific reasons. Additional construction, restoration, and mitigation plans developed by Spire for the Project are available for review on our website (eLibrary under Docket Nos. CP17-40-000 and CP17-40-001).”

CLC Response

CLC has proven that Spire is out of compliance with the FERC Plan, Procedures, and AIMA. How is it possible for FERC staff to insist that Spire *will comply* with the above mentioned documents when they did not comply in the first place? Furthermore, how can FERC staff make this assertion when Spire has failed to comply with multiple orders imposed on Spire by the Commissioners and FERC staff? FERC staff must be required to clarify the current condition of the properties and state if they violate the certificate requirements. If Spire is out of compliance, what does FERC propose in order to regain compliance? What is an acceptable duration that FERC would allow Spire to correct these compliance issues?

Section 1.4. Public Review and Comment

This EIS describes the affected environment as it currently exists with an operational pipeline, discusses the potential environmental consequences of the continued operations of the Spire STL, and compares the potential impact of continuing operations to that of identified alternatives. Concerns and issues related to impacts related to construction of the project, the ongoing restoration of the project right-of-way, and compliance inspections and monitoring are also not included in the scope of this EIS. This EIS also presents our conclusions and recommended mitigation measures.

CLC Response:

CLC believes that the FERC staff has made an effort to ensure that restoration compliance defects are not included in the scope of this EIS in order to avoid addressing this serious concern. However, buried debris, rock, and excessive erosion could impact the integrity of the pipeline. Therefore these issues are directly related to the continued operation of the pipeline. Moreover, FERC’s failure to ensure compliance with these issues allows Spire to continue to continue to harm the landowners since the pipeline is in operation without penalty.

Concerns and issues related to the construction of the Spire STL that already occurred include impacts on karst features, sinkholes, underground drainage, and waterbodies and riparian habitats, all of which were found to be not significant in the 2017 EA. Currently, these are significant ongoing concerns. FERC staff’s track record for citing issues as insignificant is troubling when these issues remain years later. FERC staff must provide adequate responses and legitimate analysis that will need to be addressed in detail. FERC staff must not issue a Final EIS until FERC staff can ensure Spire will meet their original obligations

The Commission should seriously consider adopting CLCs continuing verification process as a condition of the Final EIS. In this system, all compliance reporting or statements in general filed to the Commission are

substantiated by a verification procedure. Providing legitimate criteria for all statements, reports, allegations, etc. will address any doubt, misconduct, or misleading statements that only escalate and hinder the compliance and restoration of the project.

PART IV: CONCLUSION AND RECOMMENDATIONS

4.1 CONCLUSION

The landowners are aggrieved due to the Commission not taking the required immediate corrective action of their compliance requirements that precedes the normal revegetation and monitoring phase. This harms the landowners farming operations, crop production, causes serious damage to their equipment, and risks the safety of their well being that could lead to tipping their tractors or harming their families.

The Commission should seriously consider how to address the intentional and predetermined pattern of decision making within the Office of Energy Projects (OEP) and their repeated failure to report accurate compliance deficiencies. CLC and the landowners have provided legitimate criteria and evidence of non-compliant actions, but OEP has misled the Commission time and time again away from the truth. The Commission must take swift action to uphold its regulatory requirements and reckon with the fact that Spire is out of compliance with the previous certificate requirements and environmental conditions. Due to OEP's failure to properly regulate and mitigate Spire's actions, the project has had and will continue to have direct and unavoidable adverse impacts that will continue until the Commission addresses these issues within the scope of this EIS under the NEPA requirements.

Exhibit A

Compliance Level System and Report for the Spire STL Pipeline Project

COMPLIANCE LEVEL SYSTEM

EXECUTIVE SUMMARY

Why the Compliance Level System Needed

Throughout the last several years Central Land Consulting (CLC) has worked closely with hundreds of landowners impacted by FERC regulated pipeline projects. CLC has monitored and inspected these projects from pre-construction to post construction documenting, reporting, and performing a wide range of environmental inspections. CLC has also engaged in continual communications with the FERC's Office of Energy Projects regarding project issues, providing inspections and documentation of various projects along the way. Throughout this process, we have found FERC's compliance program is broken because it lacks a systematic process for identifying, assessing and addressing infractions. The lack of an objective guided system creates a culture of noncompliance under FERC's watch.

The current compliance program fails to create structure or accountability in ensuring factual and unbiased information that is being reported by the project sponsor. This system also fails to prioritize, organize, or verify compliance issues at any level of the project. This creates a stream of potentially neglected and uncredible information funneled to decision makers at FERC. On numerous occasions, the Commission has had to backtrack from initial determinations that relied on bad information from the project sponsor or the Office of Energy Projects itself. FERC staff's current compliance program falls short of ensuring FERC's regulatory responsibility creating significant impacts on landowners, the environment, the project sponsor, stakeholders, consumers, investors, and even exhausting FERC staff's time and resources.

If FERC staff had a standard process and guide for all related compliance concerns, a vast majority of landowner concerns and destructive impacts could be avoided or resolved early on. Clear and systematic procedures benefit all of the stakeholders in the FERC pipeline project process. Currently, reliance on company self-reporting and vague standards emboldens companies to ignore compliance obligations and silence those in the company who seek to do the right thing. Clear procedures and objective requirements gives those responsible for compliance within a company the tools to ensure rules are followed. Our Compliance Level System also empowers landowners by making clear what factors matter to FERC so that landowners can report violations, and remove the burden from FERC staff. In short, the standard process that we propose for handling compliance matters would benefit FERC, the project sponsors, and their stakeholders from any unnecessary costs or an extended restoration process. Ultimately, the stakeholders and consumers' increased cost would be significantly reduced.

This proposed compliance system should not be viewed in a vacuum. This process is consistent with (1) the goals of FERC's ongoing rulemaking on the Certificate Policy Statement which aims to make the certificate process more transparent; (2) FERC's recent creation of an Office of Public Policy designed to make FERC a more 'user friendly' agency for stakeholders, in particular, those who are unrepresented and (3) FERC's recent proposed rulemaking on the Duty of Candor which imposes heightened obligations on parties before the Commission to full disclose all relevant information in support of filings. Like these initiatives, the proposed Compliance Level System advances accountability, transparency and certainty for all players in the regulatory process.

What It Does and Why FERC Needs It

The proposed Compliance Level System below will create accountability and structure to identify and prioritize levels of compliance at the tract level. This standardized system will assist FERC staff in

ensuring the highest level of compliance oversight, conducting thorough and fair investigations, and making determinations about what appropriate actions will be implemented. Additionally, the Compliance Level System will create a standard investigatory process that will be used across all FERC-regulated pipeline projects since it is based directly on requirements set forth in the FERC Plan. As the Compliance Level System matures, changes may be made to improve efficacy and environmental oversight. Together, this will address any doubt or misconduct by creating requirements for providing legitimate criteria and preventing misleading statements that only escalate and hinder the compliance of the project.

The implementation of this process will create clarity and a defined process for project sponsors to follow so they do not become out of compliance in the first place. By standardizing remediation and investigation processes, the Compliance Level System will create predictability for FERC, project sponsors, and landowners throughout the construction and restoration process. The Compliance Level System will resolve disputes before they even happen.

PART I: SPIRE STL COMPLIANCE OVERVIEW

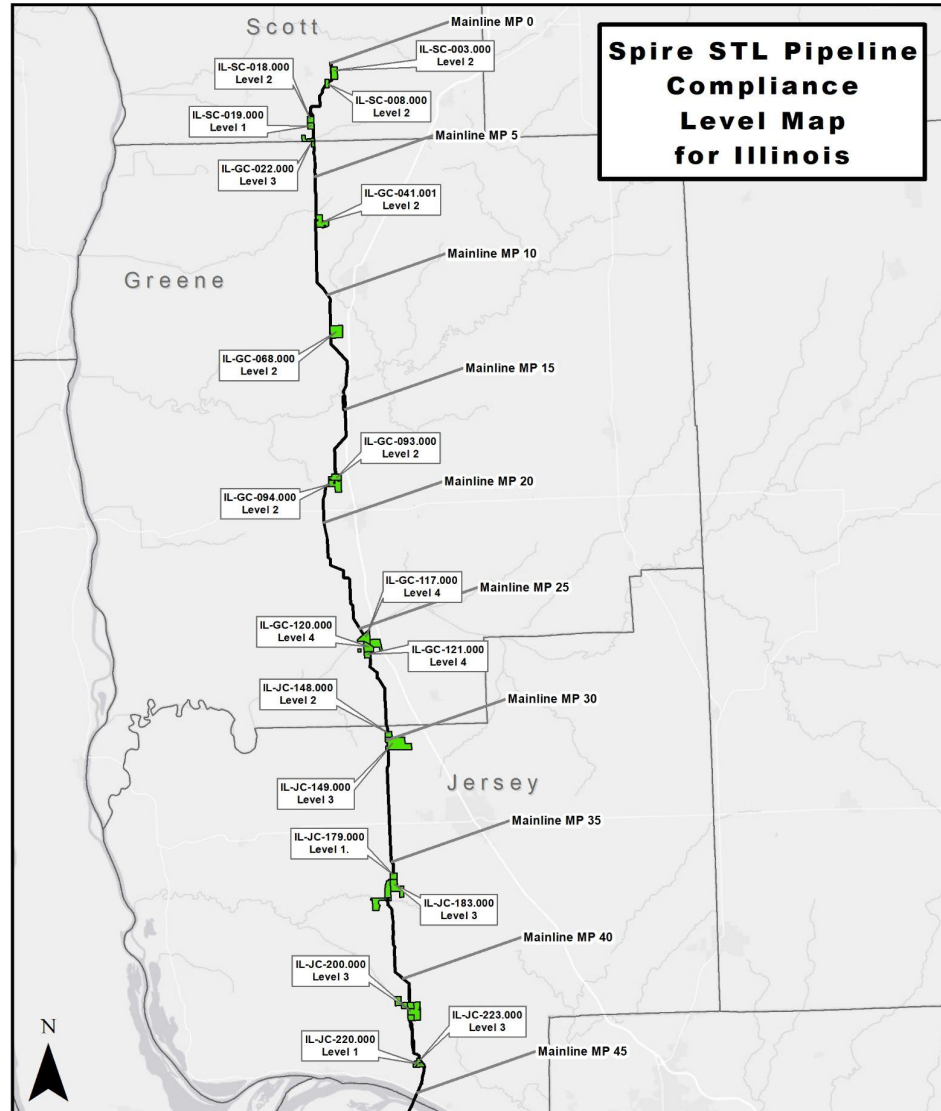
1.1 BACKGROUND OF THE PROJECT

On August 3, 2018 the Federal Energy Regulatory Commission (FERC or Commission) authorized an *Order Issuing Certificates* to Spire STL Pipeline.

On November 14, 2020, FERC staff granted Spire's request to place the project into service. In the Order, Rich McGuire states: "Staff has confirmed, based on our November 12-14, 2019, field inspection and Spire's most recent construction status report filed November 7, 2019, that Spire has adequately stabilized the construction workspaces and that restoration is proceeding satisfactorily."

1.2 CENTRAL LAND CONSULTING SUMMARY OF THE PROJECT

Central Land Consulting, LLC (CLC) has been working with numerous landowners to monitor the pipeline construction on their properties. CLC began monitoring and inspecting the Spire pipeline project as far back as April 2018 and continues to do so. Since the commencement of construction, CLC has provided the FERC staff with comprehensive site inspections and legitimate criteria across several tracts impacted by the project.



1.3 SUMMARY OF SPIRE STL COMPLIANCE EVENTS

Since the commencement of Spire's pipeline construction there have been serious concerns related to the FERC's construction and restoration compliance program. CLC and numerous landowners have communicated their concerns as well as the IEPA, IDOA, and the Commission. Below is a list of the pertinent compliance events of the Spire pipeline project:

- On May 31, 2019, IL EPA Formally Issued Violations Against Spire and Michels.
- On August 14, 2020, Illinois Dept. of Agriculture filed their report summarizing damages, compliance issues, and AIMA violations
- On January 19, 2021, The Commission issued an order dismissing the landowners and CLC complaints from 23 different landowners. These complaints claimed that Spire had violated certain environmental conditions of the Commission's August 3, 2018, order issuing a Certificate.

- On March 18, 2021, the Commission issued an Order on Environmental Compliance (Order) in response to the findings of the Illinois Department of Agriculture (IDOA)
- On June 28 - July 1, 2021, a representative from FERC's OEP conducted joint site inspections
- On May 24th, 2022, FERC Office of Energy Projects, Keith Rodgers, Environmental Project Manager, filed FERC's Restoration Inspection Report.
- On June 1, 2022, Rich McGuire, Director, Division of Gas-Environment & Engineering Office of Energy Projects, filed FERC's Restoration Inspection Report for certain compliance and restoration inspections for the week of May 23rd, 2022.
- On June 23, 2022, landowners Scott Gerald Turman and Betty Ann Jefferson filed to the Commission a Request for Clarification, or in the Alternative Rehearing of the FERC Restoration Report Dated May 24, 2022.

1.4 FERC COMPLIANCE AND RESTORATION OVERSIGHT

Throughout the construction and restoration of the project CLC and the landowners have submitted approximately 175 filings to FERC regarding compliance and restoration issues. After the August 14, 2020, Illinois Department of Agriculture restoration report, the Commission submitted their March 18, 2021, Order on Environmental Compliance regarding outstanding restoration issues on properties owned by 7 landowners. These properties are identified as IL-SC-018.000, IL-GC-078.000, IL-GC-080.000, IL-GC-080.100, IL-GC-081.000, IL-GC-091.000, IL-GC-092.000, IL-GC-093.00, IL-GC-094.000, IL-GC-110.000, IL-GC-111.000, IL-GC-116.000, and IL-JC-149.000. CLC has previously notified the Commission of many additional tracts that were not specifically addressed in the March 18th Compliance Order nor have currently been inspected and addressed by the FERC staff.

In 2022, FERC staff performed two separate inspections covering approximately 5.5% of the entire project. This means that 94.5% of the project has not been inspected nor addressed by the FERC staff. There are many tracts that have serious compliance concerns that are included in the Compliance Level List below for FERC staff review.

1.5 CURRENT OVERVIEW OF RESTORATION

Overall restoration has not proceeded satisfactorily. Satisfactorily is defined as something **done to an acceptable level**. There has been clear undeniable evidence of topsoil loss affecting pre-construction contours, excavated rock, matting and construction debris, drain tile damage, and compacted soils among other issues. The Commission should not find these compliance and restoration issues **done to an acceptable level**.

Active Restoration Issues Overview:

- Topsoil Loss Related To Contour Issues: 47.467.91 Cubic Yards (3,955.66 Truck Loads)
- 19 Tracts With Construction Debris And Excessive Rocks Buried in the Work Area
- 123 Drain Tiles Damaged
- 10,928' Of Active Erosion x 1' Deep x 1' Wide = 404.74 Cubic Yards of Lost Soil
- 19 Tracts Exceeding 300 PSI Inside the Work Area

1.6 PENDING REQUESTS FOR THE COMMISSION

- CLC and the landowners have previously requested for the FERC's technical experts to engage in determining the appropriate scopes of work and direct Spire to implement corrective actions.
- CLC and the landowners requested the Commission to direct FERC staff to verify and inspect each tract across the project or specific tracts that have been submitted to the FERC with concerning issues. If tracts require corrective action, Spire must submit remediation plans to FERC staff for approval of the plans that will address the restoration deficiencies.

PART II: COMPLIANCE LEVEL SYSTEM

2.1 DEFINING COMPLIANCE LEVELS

The goal of implementing this compliance system is to identify levels of compliance at the tract level. Compliance Levels range from Level 1 to Level 5 with 1 encompassing minimal impacts and 5 being characterized by the most extreme violations of the Commission's environmental compliance requirements. The Compliance Levels are determined by the number of compliance issues, how significant the compliance issues are, and the impacts affecting sensitive environmental resources, drainage, soils, contours, and farming practices.

<u>Compliance Category</u>	<u>Compliance Level</u>	<u>Examples Warranting Compliance Level</u>
Minor Impacts	Level 1	Vegetation Issues, Minor Erosion, Sparse Surface Debris
Elevated Impacts / Potential Compliance Issues	Level 2	Moderate Erosion, Contours, Drainage Issues, Buried Obstructions Impacting Farming Operations
Serious Compliance Issues	Level 3	Severe Erosion, Contours, Drainage Issues, Buried Obstructions Impacting Farming Operations
Out of Compliance Requiring Commission Investigation	Level 4	Buried Matting and Excavated Bedrock, Severe Erosion, Contours, Failure to Address Issues in a Timely Manner
Neglected Non-Compliance Warranting Commission Order	Level 5	Extreme Circumstances That Have Already Led To Adverse Impacts and Will Require Action by the Commission. Extreme Levels of Buried Construction Debris and Excavated Bedrock, Repeated Failure to Address Issues in a Timely Manner

2.2 INVESTIGATIVE REQUIREMENTS

The below Compliance Level Report and investigative requirements will assist FERC staff in tracking their compliance program and what action will need to be taken on each instance of compliance deficiencies of the project. The investigative requirements are generally based on the current FERC Plan and Procedures and what would most efficiently identify restoration issues. As the Compliance Level System matures, changes may be made to improve efficacy and environmental oversight. This will ensure all landowner and compliance concerns are taken seriously and addressed appropriately by the FERC staff.

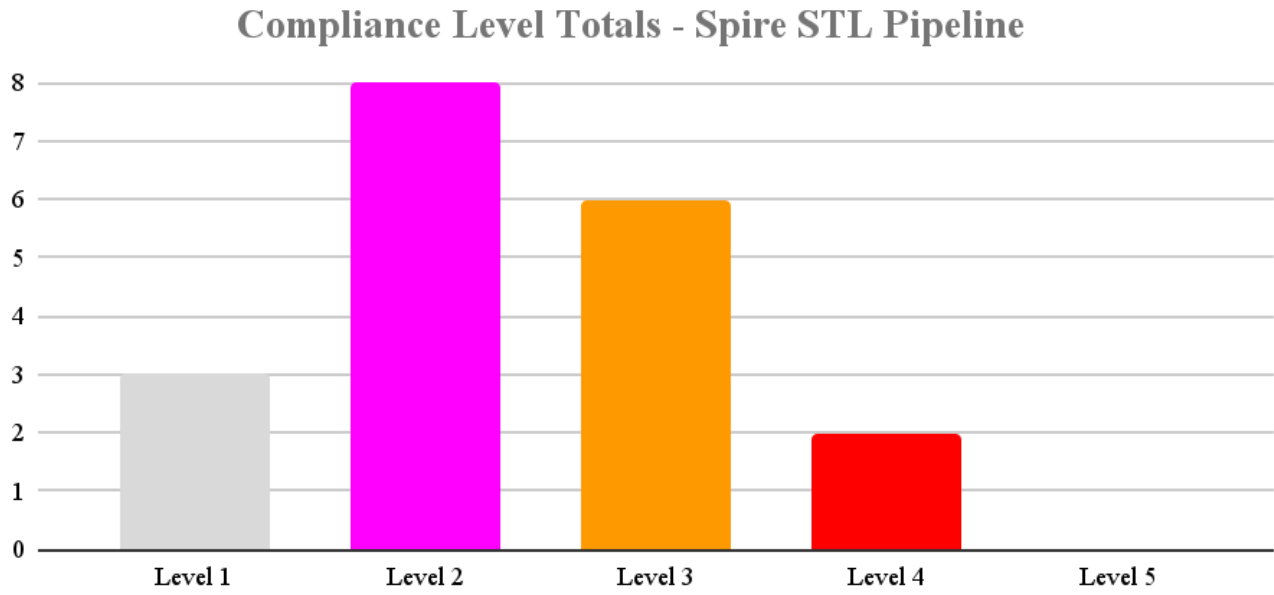
Types of Investigative Requirements

- **Soil Compaction**
 - FERC staff or the project sponsor must conduct or provide compaction testing with a cone penetrometer across the ROW (and immediately off-ROW with landowner approval) in 150 ft intervals.

- **Surface Drainage**
 - FERC staff or the project sponsor must collect or provide evidence that drainage patterns have been properly restored to pre-construction condition. Acceptable evidence may include LiDAR or other elevation data and should be compared to pre-construction drainage data or information. If pre-construction and post-construction drainage patterns are not comparable, the project sponsor now has the necessary information to properly restore surface drainage.
- **Drain Tiles**
 - FERC staff or the project sponsor must collect or provide evidence that drain tiles are functioning as designed. The project sponsor should first provide photographic evidence of areas with drain tiles within 1 day after 1 inch of rainfall in a 24-hour period. This will ensure the drain tile system is functioning properly and ponding is not occurring. If ponding is observed, the project sponsor should probe and locate all drain tiles to determine that the system is set to the proper elevations and to determine if the drain tile has subsided above the trench. If probing is unable to identify drain tiles, the tile should be excavated (with landowner approval) and visually inspected.
- **Contours**
 - FERC staff or the project sponsor must collect or provide elevation survey data that was collected either by a GNSS Rover or by aerial LiDAR instrument.
- **Construction Debris**
 - FERC staff or the project sponsor must perform an assessment that is to be approved by FERC staff (if being conducted by the project sponsor). The assessment should include either exploratory excavations or deep ripping in areas identified by the landowner's evidence. All investigative methods approved by the landowner, including excavation and ripping, should be considered.
- **Rock and Excavated Bedrock**
 - FERC staff or the project sponsor must perform an assessment that is to be approved by FERC staff (if being conducted by the project sponsor). The assessment should identify the natural depth of bedrock and natural rock content of the adjacent undisturbed soils by either excavation or borehole (with landowner approval). The project sponsor should also conduct exploratory excavations or deep ripping (with landowner approval) in areas identified by the landowner's evidence, the results of which will be compared to the off-ROW information collected. All investigative methods approved by the landowner, including excavation and ripping, should be considered.
- **Erosion**
 - FERC staff and the project sponsor must physically walk the impacted site with the landowner or landowner representative to verify the extent and severity of erosion. Videographic evidence of the entire walkthrough must be submitted to the Commission's record and provided to the applicable landowner.

2.3 COMPLIANCE LEVEL TOTALS ON PER TRACT BASIS

The chart below identifies how many instances of each compliance level have been noted. The chart below and the table in section 3.1 are color coordinated as follows: Level 1: Gray, Level 2: Pink, Level 3: Orange, Level 4: Red, Level 5: Purple.



PART III: LIST OF OUTSTANDING ISSUES AND COMPLIANCE LEVELS PER TRACT

3.1 COMPLIANCE LEVEL LIST

The list below identifies (1) the impacted tract, (2) the landowner, (3) the assigned compliance level for that tract, and (4) the outstanding restoration issues that have been identified for that tract. Compliance levels are color coordinated as identified in section 2.3 above.

Tract	Landowner Name	Compliance Level	Outstanding Restoration Issues
IL-SC-003.000	Betty and Keith Jefferson	Level 2	Severe contour issues. Will need to import approximately 6,757 cubic yards of soil to restore contours.
			Drain tile issues. Drain tiles are clogged or damaged at the easement causing saturation in the easement and to the west of the easement.
			There are approximately 5 drain tiles that will need repaired.
			Construction debris and unnatural rock has been identified near the road crossing extending north approximately 200 feet as well as the far north portion of the tract.
			Trenchline subsidence is present through the center of the tract.
			Soils are compacted compared to off-ROW testing.
			Persistent soil saturation and prolonged ponding after rain events.
IL-SC-008.000	Betty and Keith Jefferson	Level 2	Severe contour issues. Will need to import approximately 2,006 cubic yards of soil to restore contours.
			Drain tile issues. Drain tiles are clogged or damaged at the easement causing saturation in the easement and to the west of the easement.
			There are approximately 6 drain tiles that will need repaired.
			High volumes of construction debris and unnatural rock has been identified on the western half of the easement.
			Trenchline subsidence is present through most of the tract.
			Soils are compacted compared to off-ROW testing.
			Persistent soil saturation and prolonged ponding after rain events.
IL-SC-018.000	Kenny Davis	Level 3	Soil compaction is widespread in both topsoil and subsoil inside the ROW. (See Compaction Map)
			March 2022 GNSS Rover elevation survey indicates that areas north of stream SIL-CDK-033 will require approximately 1,040 cubic yards of soil to restore pre-construction contours. (See Elevation Section).
			Drainage patterns north of stream SIL-CDK-033 have not been restored and cause water to pond in this area. (See Drainage Map)
			South of Stream SIL-CDK-033, Spire STL Pipeline has failed to “grade the construction right-of-way to restore pre-construction contours . . .” (FERC Plan V.A.5.). The altered contours are causing drainage pattern changes, increased runoff velocity, and slope instability on the east side of the easement. (See Elevation Packet)

Tract	Landowner Name	Compliance Level	Outstanding Restoration Issues
			<p>It appears that Spire has taken significant amounts of soil from some areas and replaced it in other areas which is why we see such great elevation differences inside the easement.</p> <p>Spire's failure to restore these slopes as well as the clear cutting of trees and brush has caused a large slip to form on the eastern boundary of the easement. This slip is becoming larger and has already led to soil loss and the loss of multiple trees.</p> <p>On the north side of Stream SIL-CDK-033, slopes are unstable and are slipping in towards Stream SIL-CDK-033.</p> <p>Landowners stream crossing access area was not restored to pre-construction condition and is now inaccessible.</p> <p>South of Stream SIL-CDK-033, erosion is present on the north facing slope near the signage marker.</p> <p>On the far south end of the tract, a slope breaker was incorrectly installed and is causing new drainage issues.</p> <p>Large boulders and excavated rock were identified up to 23" throughout ag area on the northern portion of the tract.</p> <p>Wooden construction debris was identified up to 40" deep near the center of the property, in the bottom area north of the stream.</p> <p>Wooden construction debris was identified up to 40" deep throughout the southern end of the property at top of slope.</p>
IL-SC-019.000	William and Alice Ballard	Level 1	<p>Two drain tiles have not been properly repaired, Spire's contractors attempted repairs on May 12th-13th, but did not make the proper repairs and did not follow the AIMA drain tile mitigation requirements. Spire failed to install the required PVC bridge over the pipeline crossing and also failed to install the required sandbag supports.</p> <p>Buried construction debris was found throughout the southern 200 feet of the tract near Bluffs Springs Road.</p> <p>The southern 200 feet of IL-SC-019.000 Will Need Approximately 523 CY (44 Truckloads) of Soil to Restore Contours. Other Areas on This Tract are Still Being Assessed.</p> <p>Trench line subsidence is most evident on the southern half of the tract.</p> <p>The soils continue to be compacted compared to off-ROW compaction readings.</p> <p>Erosion continues to be an issue near the road crossing discharging from the east to the west.</p> <p>Erosion is also present near the center of the property where another drain tile was crossed by Spire which is a good indication that this drain tile was also not properly repaired by Spire.</p>
IL-GC-022.000	Anne and Matthew Clayton	Level 3	<p>Prior to construction, the agricultural portion of the property was enrolled in USDA Conservation Reserve Program CRP-CP4D.</p> <p>During March 2022, high volumes of matting and construction debris were found near MP 3.6 putting the landowner in violation of the CP4D contract.</p> <p>The drainage swale that drains east to west has not been re-established properly.</p> <p>Approximately 1,594 CY (132 Truckloads) of soil will be needed to restore the pre-construction contours.</p> <p>Compaction is most evident in the middle of the tract within Spire's work area.</p> <p>In fall 2021, Spire mobilized to repair a creek bank slip near MP 3.46 and installed curlex. As of March 2022, erosion has formed beneath the curlex and is discharging downhill into the adjacent stream.</p>

Tract	Landowner Name	Compliance Level	Outstanding Restoration Issues
			Slope breakers on various slopes in the wooded area are positioned incorrectly with low spots in the center of the slope breaker that hold water. South of the agricultural field the slope contours on the west side were not properly remediated causing drainage and erosion discharging off-ROW.
IL-GC-041.001	Hart Farms, LLC	Level 2	Drainage issues due to altered grade and the pre-construction drainage contours not re-established. Most evident within the center of the tract where the drainage swale discharges to the western portion of the property. Trench line subsidence, most evident throughout the south half of the easement area. The large drainage swale located near the center of the tract has not been returned to its pre-construction conditions. This has altered the natural flow diverting the natural drainage. Soil compaction is present throughout the Spire workspace when compared to adjacent off-ROW readings. Large and obvious low spot that perpetually holds water near road crossing. Landowner states that he has removed high volumes of matting and construction debris during his farming activities. High volumes of wood construction debris found throughout the southern half of the easement (MP 6.65 to 6.75). Approximately 3,746 cubic yards of soil will be needed to restore contours from off-ROW to off-ROW. As of June 2022, the farmer planted corn throughout the property. Many areas throughout the easement are completely bare with no bare areas outside the ROW. The farmer was unable to plant the area near the road crossing and the far north portion of the tract due to continual drainage and flooding issues. The farmer experienced this issue as well in 2021 when he planted soybeans.
IL-GC-068.000	Jo Ann Mansfield	Level 2	Approximately 5,968 cubic yards of soil will need to be imported to restore pre-construction contours in this area. ROW remains extremely wet, even through dry conditions. Damage to approximately 6 clay drain tiles inside the easement. Will require repairs and system hydroflush. Two drainage patterns need recontouring. Excessive rock found within the first 250 feet from the road crossing going south. Trenchline subsidence. Soil compaction. Severe topsoil / subsoil mixing where a layer of excavated yellow subsoil has been backfilled between two layers of dark topsoil.
IL-GC-093.000	Bernard H Meyer Trust #9-11, Mary Lois Meyer trust #9-11	Level 2	Drain Tile system is supposed to drain to the east. Excavated 4 inch drain tile that parallels County Road. Drain tile is not connected once it enters the pipeline trench. Drain tile is 4 inches in diameter, red, and is approximately 36 inches deep when it reaches the trench. It is approximately 28 inches deep further away from the trench. 6 inch drain tile main has a PVC crossing. PVC Pipe Installed by Spire is Sloped to Drain to the West. The trench extending out into the workspace west of the trench drain tile is 6 inch perforated pipe drain tile. Drain tile is supposed to drain from west to east then cross the county road and drain south to the tree line behind Larry's house.

Tract	Landowner Name	Compliance Level	Outstanding Restoration Issues
			We Only Excavated 14 Feet of the PVC Pipe. Full Length of Pipe is Likely Around 40 Feet.
			At the Opposite End of PVC that was not Excavated, the Pipe is Likely Off by 16.2 Inches.
			High volumes of large rocks or found around the drain tile north of the road.
			Soil is saturated north of the road north of where drain tiles and areas saturated inside the easement indicating non-functioning drain tiles.
			Contour issues. (See Elevation Section).
			Soil Compaction. (See Soil Compaction Map).
			Construction debris and excess rock identified north of NW 200 St. crossing for approximately 385 feet up to 38 inches deep.
IL-GC-094.000	Bernard H Meyer Trust #9-11, Mary Lois Meyer trust #9-11	Level 2	Rocks and debris found south of County Road inside the easement.
			Outside the easement, soil is black down to 23 inches.
			Contour issues. (See Elevation Section).
			Soil Compaction. (See Soil Compaction Map).
			Drain tile issues.
			Easement is currently dry. However, after rainfall, water is visually impounded on the west side of the ROW which indicates drain tile issues because the drain tiles in this area are supposed to convey water from west to east across the ROW which it currently does not.
			Low spots throughout the ROW.
			Approximately 6 inches of topsoil was found inside the ROW.
			Landowner stated that soybean yields were dramatically reduced inside the easement compared to outside the easement in harvesting 2021.
			Construction debris and excess rock have been identified south of the NW 200 St. crossing for approximately 275 feet 38 inches deep.
IL-GC-117.000	Gerald Scott Turman	Level 4	Large erosion gullies are present near the farm road crossing and originate in the Spire ROW and discharge off-ROW due to contour issues and soil compaction.
			Trenchline subsidence.
			Severe drainage and ponding issues near the bore site.
			High volumes of excavated rock found within 150 feet north of the farm access road (TAR-013). High levels of rock were encountered at the surface extending to at least 4 feet deep. Off-ROW holes were dug on each side of the ROW to a depth of 7 feet and no rock was found whatsoever. No bedrock was identified.
			Matting and construction debris found near the Macoupin Creek bore site (MP 25.4).
			Soil compaction present throughout ROW.
			Extremely saturated soils during dry conditions.
			Deep erosion gullies and rills are present throughout the tract.

Tract	Landowner Name	Compliance Level	Outstanding Restoration Issues
IL-GC-120.000	S.T. Turman Contracting LLC	Level 4	Stream crossing south of private road crossing is impacted and does not drain correctly causing an expanded ponding area that extends into adjacent field after rain events.
			8' to 10' mats found on the surface south of private road crossing (TAR-013) in meadow area.
			High volumes of buried matting and construction debris found in the meadow area near MP 25.84.
			Large erosion gullies originating in the Spire ROW and discharging off-ROW due to contour issues and soil compaction.
			Extreme erosion on north facing slope south of private road crossing exposing buried rock and construction debris.
			Slope breakers improperly installed causing high runoff velocity and severe erosion.
			High levels of excavated rock found in the easement near MP 25.92 beginning in the upper 4". An adjacent off-ROW hole was dug and no rock was found until the bedrock was reached at approximately 54" deep.
			Severe erosion on southern end of tract exposing buried rock and construction debris (near MP 26.1).
			Extremely high levels of excavated rock and matting/debris/skids found near MP 26.1. Adjacent off-ROW holes were dug to a depth of 7 feet on each side of the ROW and no rock was found. No bedrock was found either.
			High levels of construction debris, excavated rock, and other unnatural rock throughout the surface.
			Contours are visibly off-grade throughout much of the easement.
			Trenchline subsidence present throughout the entire tract.
			Soil compaction present throughout ROW.
			Contour information will be provided at a later date.
IL-GC-121.000	Gerald Scott Turman	Level 2	Large erosion gullies originating in the Spire ROW and discharging off-ROW across farm road (TAR-014) and washing out road.
			Extremely saturated soils during dry conditions. Especially throughout the southern half of the tract.
			Severe drainage and ponding issues throughout the southern half of the property.
			Trenchline subsidence throughout much of the tract.
			High volumes of construction debris, excavated rock, and unnatural rock throughout the surface.
			Buried construction debris and excavated rock found south of TAR-014.
			Soil compaction.
IL-JC-148.000	S.T. Turman Contracting LLC	Level 2	Landowner recently conducted drain tile repairs across the entire system crossed by Spire. Landowner has not been compensated for these repairs and was forced to make these repairs from his own pocket since Spire was unwilling to admit there were issues.
			Contours are significantly off.
			Approximately 3,381 cubic yards of soil will be required to restore grade.
			High volumes of construction debris found near road crossing extending south approximately 470 feet.
			Large pipe wrench was found buried in the Spire easement approximately 325 feet south of the road crossing.

Tract	Landowner Name	Compliance Level	Outstanding Restoration Issues
			Systematic drain tile damage.
			Soil compaction.
IL-JC-149.000	Jacob D. Gettings, Mildred L. Gettings, Jacob "Jay" Gettings TTE Land Trust	Level 3	<p>Spire pipeline construction impacted approximately 40 drain tiles, several drain tiles within the easement needed to be replaced and stabilized due to the settling and trenchline subsidence. GPS yield map indicates the problem area location is both east and west of the easement and the southern portion of the easement. The low spots and drainage along the easement indicate the drain tiles need inspected and appropriate mitigation The riser is backed up and appears to be clogged with silt, rocks, debris</p> <p>Contours across the ROW are significantly off and will require approximately 4,635 cubic yards to restore pre-construction contours. (See Elevation Section).</p> <p>In 4 of the 5 Excavated Drain Tile Locations (As Depicted on Spire's Data), No Drain Tile Was Located. At the single drain tile that was found, from Clay Drain Tile to Clay Drain Tile, Elevation Difference is 0.019 Feet (0.228 Inches). Where Spire Installed a Plastic Drain Tile, Elevations Vary by Up To 0.6 Feet (7.2 Inches). (See Drain Tile Maps)</p> <p>Drain tile insufficiency is evident from surface ponding and excessive soil saturation.</p> <p>Excessive rock and construction debris was found in the upper 36".</p> <p>Soil compaction is widespread inside the ROW. (See Compaction Map)</p> <p>ROW is extremely wet and saturated with several areas of ponding throughout the ROW.</p> <p>Subsoil is buried between topsoil layers inside the ROW.</p> <p>6 to 10 inch layer of subsoil is located approximately 6 to 8 inches deep. Further below is more black topsoil. Undisturbed soils show approximately 21 inches of black topsoil then a light brown subsoil layer below.</p>
IL-JC-179.000	Dannie Malone	Level 1	<p>Construction debris has been found in the areas where the drainage patterns intersect the easement and the southern portion of the easement that will need construction debris removed from the surface and as deep as 12" below the surface.</p> <p>Grade is off by up to 21.8" in certain areas.</p> <p>Approximately 2,425 CY of soil will be needed to restore contours.</p> <p>Extreme soil compaction throughout ROW.</p> <p>Two drainage patterns, located near the center of the property that flow from the northeast to the southwest, were not restored to pre-construction condition.</p> <p>Drainage ditch is backed up with excessive silt and sediment. Drainage ditch and pond will need to be cleaned out.</p> <p>Hog watering line is damaged at easement crossing and will need repaired.</p>
	Sinclair Family Farm, LLC	Level 3	<p>Contours across the ROW are significantly off and will require approximately 4,635 cubic yards to restore pre-construction contours.</p> <p>Soil compaction is present in various areas throughout the ROW.</p>

Tract	Landowner Name	Compliance Level	Outstanding Restoration Issues
IL-JC-183.000			<p>Southeast creek bank at MP 35.72 has continued to erode and slip. Much of the rip rap that Spire installed has slipped towards the creek. The condition of this bank has worsened significantly since March 2022.</p> <p>Severe trenchline subsidence at north end of tract near MP 35.75.</p> <p>Near MP 35.75, there is a large low area on the east side of the pipe that holds water and was unplatable this spring.</p> <p>Trenchline subsidence has formed erosion gullies that flow above the trench in various areas between MP 35.8 to 36.04. Some areas of erosion have branched off and flow from north and south into trenchline erosion gullies.</p> <p>Excessive erosion present flowing into wetland from the north near MP 36.15. This wetland is surrounded by damaged and ineffective silt fencing that has been in this condition for over 18 months.</p> <p>Near MP 36.45, high volumes of rock have been identified as buried inside the ROW beginning at around 6 inches. When an adjacent off-ROW hole was dug, no rock was found to a depth of 55 inches.</p> <p>From MP 36.54 to 36.61, soils remain extremely saturated far after the rest of the field has dried up. There are 4 drain tiles that were crossed in this area. According to drain tile repair data provided by Spire, all 4 drain tiles were repaired. It is unlikely that all drain tiles were functioning properly due to the extreme drainage issues in this area.</p> <p>High levels of construction debris and matting found north of Otter Creek between MP 36.54 to 36.61.</p> <p>Creek banks of Otter Creek, at MP 36.63, are unstable and are slipping into the creek. North bank has bare areas with rip rap sliding into the creek. A large gouge has been taken out of both the north and south banks.</p> <p>High volumes of buried construction debris found south of Otter Creek between MP 36.64 and 36.68.</p> <p>South of Otter Creek, contours are off by an average of approximately 9 inches. This area appears to hold water indefinitely and will not grow anything.</p>
IL-JC-200.000	4850 Longhorn, LLC (Pat & Rob Parker)	Level 3	<p>Between MP 41.14 to 41.21, high levels of partially buried matting, skids, silt fencing, and other construction debris has been identified.</p> <p>Severe erosion present in grassy waterways where they cross the Spire workspace between MP 41.14 to 41.21.</p> <p>Near MP 41.2, large erosion gullies originating in the Spire ROW and discharging off-ROW across private road and washing out road.</p> <p>In this area, there is severe erosion discharging north of the farm road crossing. This erosion has uncovered buried construction debris.</p> <p>Extremely saturated soils long after the rest of the field has dried.</p> <p>Extremely unstable creek banks at MPs 41.51, 41.53, and 41.64. The northern bank at each stream crossing has a large and active slip and each has significantly worsened since March 2022.</p> <p>Severe contour and ponding issues throughout the pasture area near the center of the property.</p> <p>Trenchline subsidence present throughout various areas of the ROW.</p> <p>High volumes of construction debris, rock, and unnatural rock throughout the surface. The northern portion of the tract has several areas where matting, skids, and construction debris have risen to the surface damaging the landowners farming equipment and ability to return to normal farming conditions.</p>

Tract	Landowner Name	Compliance Level	Outstanding Restoration Issues
			High levels of buried construction debris and excavated rock have been identified in areas where excavations have taken place between MP 41.5 to 41.83.
			Soil compaction as deep as 36" due to the lack of subsoiling and decompaction mitigation.
			At farm road crossing at MP 41.21, prior to construction there was a slight berm on the south side of the farm road that channeled water to the west towards a grassed waterway. Spire did not reinstall the berm which is now causing runoff to cross the road in various areas leading to severe erosion north of the road inside the Spire ROW.
IL-JC-223.000	Greg and Connie Stout	Level 3	Prior to construction and since 2015, 18.9 acres of the cleared land on the eastern portion of the property has been enrolled in a CP42 Pollinator Habitat Conservation Reserve Program through the US Department of Agriculture. This program requires seeding of native grasses and native wildflower mixes throughout the conservation easement. The easement spans the entire Spire construction area with the exception of a 70-foot wide corridor that follows the Stout's driveway. This contract expires on September 30, 2025.
			The Stout property has been enrolled in the US Department of Agriculture's Conservation Reserve Program (CRP) CP42 Pollinator Habitat program. The CRP contract is for a 10-year term beginning October 11, 2015 to September 30, 2025. The CP42 Pollinator program requires control and management of noxious weeds, native grass and wildflower seeding mixes, and to abstain from harvesting and grazing.
			Construction debris identified both north and south of the landowners asphalt driveway.
			IL-JC-223.000 Will Need Approximately 2,044 CY (170 Truckloads) of Soil to Restore Contours.
			High levels of road approach rock found on the surface near the far north and far south ends of the property.
			8 Tulip trees have been cut down along the asphalt driveway, some outside the permanent easement.
			Soils are severely compacted as deep as 36" below the surface impacting compliance with the CP42 Conservation Program. Landowner is concerned that if this deep compaction is not remediated, it will affect the growth of the prairie plants and he will not be able to regain compliance with the CRP contract.
			Landowner has put over 300 hours of work into the prairie restoration. Work conducted so far includes, ripping, grading, leveling, planting, weed suppression, and mowing.
IL-JC-220.000	Sheila Segraves	Level 1	Contour issues along with trench line subsidence. The most evident trench line subsidence is between the waterbody and the landowner's driveway.
			The landowner's driveway, where Spire constructed, continues to settle as deep as 24" causing access issues to the landowner's residence.
			The northern portion of the easement contours and drainage has deficiencies blocking the natural flow of stormwater.
			Soil compaction is present throughout the easement and will need to be subsoiled and deep ripped.
			Between MP 43.64 to 43.74 (1.27 Acres) IL-JC-220.000 Will Need Approximately 2,308 CY (192 Truckloads) of Soil to Restore Contours.

PART IV: COMPLIANCE REPORTING VERIFICATION

4.1 LEGITIMATE CRITERIA

Providing legitimate criteria will address any doubt or misconduct by creating requirements for providing legitimate criteria and preventing misleading statements that only escalate and hinder the compliance of the project. Under this Compliance Level System, it is a mandatory requirement to provide verification of all statements and determinations related to environmental compliance and landowner reporting. Any statement or determination made without such verification will not be considered facts of the record.

The legitimate criteria used to generate the determinations above, as well as statements and approvals by the landowner, have been previously filed to the Commission under docket no. CP17-40. These documents are listed below in Table 1.

Table 1. Spring 2022 Compliance And Restoration Report Filing Dates and Accession Numbers.			
Landowner Name	Tract	Date of Compliance Report Filed	FERC Accession No.
Betty & Keith Jefferson	IL-SC-003.000	7/20/2022	20220720-5017
Betty & Keith Jefferson	IL-SC-008.000		
Kenneth Davis	IL-SC-018.000	5/20/2022	20220520-5179
William Ballard and Mark Ryan	IL-SC-019.000	7/19/2022	20220719-5040
Anne M. & Matthew J. Clayton	IL-GC-022.000	7/19/2022	20220719-5039
Hart Farms LLC	IL-GC-041.001	7/18/2022	20220718-5045
Darrell Mansfield, deceased Jo Ann Mansfield	IL-GC-068.000	7/20/2022	20220720-5016
Bernard H Meyer Trust #9-11, Mary Lois Meyer trust #9-11	IL-GC-093.000	5/20/2022	20220520-5168
Bernard H Meyer Trust #9-11, Mary Lois Meyer Trust #9-11	IL-GC-094.000		
Gerald Scott Turman	IL-GC-117.000	7/25/2022	20220725-5148
S.T. Turman Contracting LLC	IL-GC-120.000	7/25/2022	20220725-5148
Gerald Scott Turman	IL-GC-121.000	7/25/2022	20220725-5148
S.T. Turman Contracting LLC	IL-JC-148.000	7/25/2022	20220725-5146
Jacob D. Gettings, Mildred L. Gettings, Jacob "Jay" Gettings TTE Land Trust	IL-JC-149.000	5/20/2022	20220520-5173
Dannie Malone	IL-JC-179.000	5/27/2022	20220527-5131
Sinclair Family Farm, Brandon	IL-JC-183.000	7/18/2022	20220718-5049

Table 1. Spring 2022 Compliance And Restoration Report Filing Dates and Accession Numbers.

Landowner Name	Tract	Date of Compliance Report Filed	FERC Accession No.
Sinclair and Brent Sinclair			
4850 Longhorn LLC	IL-JC-200.000	7/18/2022	20220718-5046
Greg and Connie Stout	IL-JC-223.000	7/15/2022	20220715-5004
Sheila Segraves	IL-JC-220.000	7/14/2022	20220714-5064

Exhibit B

Documents That Highlight the Importance of Removing Construction Debris and Rock from the Pipeline Workspace



A Practical Guide for Pipeline Construction Inspectors

Published March 2016



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Kim McCaig, MBA (CEPA Foundation)

CEPA Foundation Body of Knowledge Subcommittee:

David Montemurro (TransCanada Corp.)

CEPA Foundation Pipeline Inspector Certification Committee Chair:

Jason Landa (JSG Professional Services ULC, a Johnson Service Group Company)

CEPA Foundation Certification Subcommittee:

Andy Duncan, P.Eng. (Enbridge Inc.)

INGAA Foundation Executive Director:

Richard Hoffmann, MSCE (INGAA Foundation)

INGAA Foundation Sponsor & Subcommittee Chair for Pipeline Inspector Certification:

David Montemurro (TransCanada Corp.)

INGAA Foundation Certification Subcommittee Chair:

Andy Duncan, P.Eng. (Enbridge Inc.)

INGAA Foundation Subcommittee Chair for Development of A Practical Guide for Pipeline Construction Inspectors:

Pierre Bigras, P.Eng. (Pacific Gas and Electric Company)

Working Group Members:

Thomas Anderson (Henkels & McCoy, Inc.)

Pierre Bigras, P.Eng. (Pacific Gas and Electric Company)

Scott Culley (CDI Corp.)

Victor R. Flores Jr., P.E. (Enable Midstream Partners, LP)

Bryon D. Gaskin (Spectra Energy Corp.)

Jason Landa (JSG Professional Services ULC, a Johnson Service Group Company)

Roger Lemieux (TransCanada Corp.)

Kirk Peterman (Energy Transfer Partners, LP)

Joseph Prine (The Williams Companies, Inc.)

Andy Purves, P.Eng. (Stantec Inc.)

Ritch Rappel, MBA (Enbridge Inc.)

Bill Watts, P.Eng. (Alliance Pipeline Ltd.)

In collaboration with PBoK Technical Training Ltd.:

Simon van Leeuwen

Reena Sahney, P.Eng.

Annie Sio

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1.0 INTRODUCTION

This guide provides the details related to the role of the Owner Company's Pipeline Construction Inspector ("Inspector"), in terms of monitoring and inspection requirements throughout the lifecycle of the pipeline construction process. This document is written to address general inspection duties. Areas of specialty inspection are noted and are beyond the scope of this document.

This document represents best practices based on the accumulated experience and consensus amongst the majority of member companies in terms of technical requirements, both in Canada and the U.S., for pipeline construction inspection competencies and related tasks beyond those captured in regulation and current certification.

With the anticipated increase in upcoming pipeline construction activity, the CEPA (Canadian Energy Pipeline Association) and INGAA Foundations have established a Pipeline Inspector Certification Working Group as part of meeting a number of key objectives that include:

- Introducing a fundamental step change in the training and qualification of Pipeline Construction Inspectors as a means of improving the construction quality of projects
- Improving the overall quality of work performed by Pipeline Construction Inspectors within the industry

This document, in particular, is intended to support some of these broader objectives by establishing a meaningful reference tool to enhance learning for the Pipeline Construction Inspector as a complement to the existing industry knowledge base and documentation (such as recognition and alignment with the American Petroleum Institute Recommended Practice for Basic Inspection Requirements — New Pipeline Construction (API 1169), Canadian Welding Bureau (CWB), American Welding Society (AWS), and NACE International).

2.0 PURPOSE

The purpose of this document is to provide Pipeline Construction Inspectors with background and context, beyond existing regulation, regarding best practices in the industry. As such, this document is not intended to replace formal training, regulation, or Company specific practices (which may vary based on individual circumstances); rather, it is intended as a complementary guide to information from those sources.

3.0 SCOPE

The scope of this document is limited to gas and liquid pipeline construction. Specifically, content is focused on those items that are relevant to the role of a Pipeline Construction Inspector as it relates to best practices within the industry.

4.0 REVISIONS TO THIS DOCUMENT

This document will be reviewed periodically (as per existing CEPA and INGAA Foundation practices) to ensure the content within remains relevant and accurate.

However, it remains the responsibility of the user to ensure that the most current revision of documents (e.g., codes and standards) are referenced, where appropriate.

5.0 HOW TO USE THIS DOCUMENT

With an eye to practicality and ease of use, this document is organized to reflect the typical construction process for transmission pipelines. Foundational information common to all aspects of construction is presented first, followed by chapters specific to each phase of construction. Within each chapter, five main headings are used consistently:

- Overview – a brief description of the specific activities in the construction phase
- Inputs – detailed information regarding typical information the Inspector will require
- Execution – detailed information regarding items the Inspector should typically watch for; for ease of use, items are typically formulated as actions using verbs such as: ensure, monitor, confirm, check, etc.
- Outputs – detailed information listing typical information the Inspector will be required to produce for the Owner Company
- References – list of key relevant reference documents for those seeking additional information for each phase of construction

The “Inputs” section within each chapter is intended to clearly identify the types of documents, specifications, and other information the Inspector would likely need to reference in that phase of construction. The “Execution” section within each chapter provides detailed checklists, often grouped by major topic, identifying critical items that Inspectors should monitor in that construction phase. Finally, the “Output” section within each chapter then articulates items that the Inspector is expected to produce or report on as it relates to that particular phase of the construction project.

The use of the word “ensure” throughout this document is intended to convey that Inspectors “ensure” that the contractor has performed the inspected work properly through observing, monitoring, assessing, evaluating, verifying, deciding, resolving, reporting, and documenting to ensure that the project requirements are met.

6.0 PIPELINE CONSTRUCTION INSPECTOR – FOUNDATIONAL INFORMATION

The items covered in this chapter are those that are relevant through all phases of the pipeline construction process (see Figure 1). As such, any specific content in other chapters of this publication is intended to be used in conjunction with the information provided within this section. Additional information regarding the pipeline construction process can be found in the INGAA Foundation publication “Building Interstate Natural Gas Transmission Pipelines: A Primer”.

The Inspector acts as the Owner Company’s authorized representative for non-financial matters, continuously observes the Contractor’s progress and monitors all activities in their assigned areas in accordance with codes and standards; regulatory requirements; Owner Company safety and environmental requirements, drawings, plans, and specifications; as well as the terms of the construction contract or agreement. The Inspector may also be asked to assist other specialized Inspectors (e.g., Welding Inspector), as directed.

In addition to executing specific responsibilities in the following chapters, the Inspector has key responsibilities in the main areas identified in Table 1 with additional detail provided in the corresponding section.

Table 1: Main Areas of Inspector Roles and Responsibilities

Topic Area	Section Number
Authority	Section 6.1
Code of Conduct	Section 6.2
Worker, Site, and Construction Safety	Section 6.3
Quality, Deficiencies, and Non-conformance Procedures	Section 6.4
Environmental Considerations	Section 6.5
Execution of Work	Section 6.6
Administration of Contractual Obligations	Section 6.7
Records Management	Section 6.8
Personnel Qualifications and Certifications	Section 6.9
Equipment Calibration	Section 6.10
Incident Reporting	Section 6.11

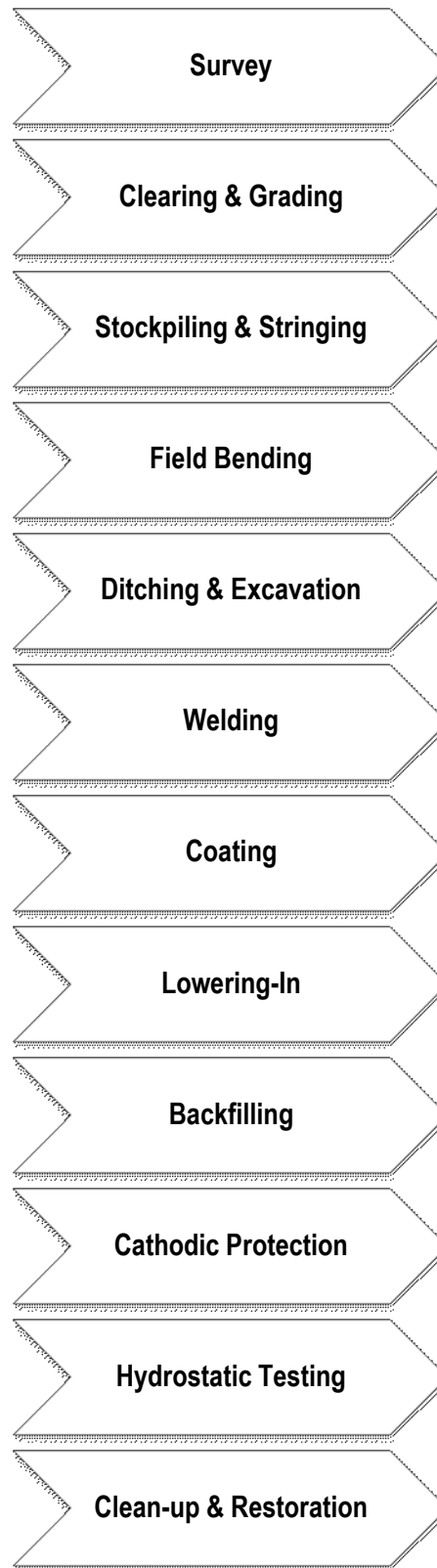


Figure 1: Typical Pipeline Construction Phases

6.1 Authority

The Inspector on-site is part of a larger Project Team; as such, the Inspector should understand their role within the established chain of command and recognize situations that may need to be escalated in the best interests of the Owner Company. This is important not only for day-to-day operations, but becomes particularly important in the handling of deficiencies / non-conformances discussed later in this chapter. In particular:

- Roles of the Contractor and Inspector will be established before performing the tests or measurements to determine whether the work or an item complies with specifications and permit requirements
- If the Contractor performs tests or measurements unassisted, the Inspector should be clear about the level of witnessing required, and make sure that the equipment and instruments used by the Contractor are correct and properly calibrated
- The Contractor should be aware of the Inspector's duties and authority (as defined in Section 6.4) outlining quality, deficiencies, and non-conformance procedures
- The Inspector has "stop work" authority when there is imminent danger to people or the environment

6.2 Code of Conduct

As the Inspector represents the Owner Company, they should always act ethically, professionally, objectively, consistently, and honestly when performing the required roles and responsibilities.

More specifically, the actual ethical conduct required from Inspectors is governed by the Owner Company's Code of Conduct, which typically includes (but is not limited to) the items identified in Table 2.

Table 2: Typical Code of Conduct Considerations

✓	Description
Behaving in an Ethical Manner	
	<ul style="list-style-type: none"> • Abide by confidentiality agreements
	<ul style="list-style-type: none"> • Not accepting gratuities of any kind that may be perceived to affect judgment in the work being performed as an Inspector; if gratuities are offered, this information should be reported to the Owner Company
	<ul style="list-style-type: none"> • Endeavor to be fair, reasonable, and objective towards performing work requirements at all times
	<ul style="list-style-type: none"> • Do not make assumptions; consult with the Construction Manager / Chief Inspector (or designate) if there are uncertainties in the requirements
	<ul style="list-style-type: none"> • Accept or reject the work performed by the Contractor based on the quality of the work
	<ul style="list-style-type: none"> • Comply with all relevant codes, standards, systems, permits, contracts, agreements, specifications, procedures, approved drawings, line lists
	<ul style="list-style-type: none"> • Document all deviations and when required, escalate in an appropriate manner for approval
Professional Approach to Work	
	<ul style="list-style-type: none"> • Be knowledgeable of and understand the relevant parts of the construction process

✓	Description
	<ul style="list-style-type: none"> Be knowledgeable of and understand Owner Company's standards and specifications
	<ul style="list-style-type: none"> Be knowledgeable of and understand relevant industry and government standards
	<ul style="list-style-type: none"> Ensure all applicable permits required to execute the work are in place and on-site prior to commencing the work
	<ul style="list-style-type: none"> Uphold Owner Company's industry practices to ensure safety, minimize risk, and avoid hazards in the workplace
	<ul style="list-style-type: none"> Comply with Owner Company's construction timelines and understand Owner Company's construction schedule, costs, and components of the work
	<ul style="list-style-type: none"> Understand the role relative to other Stakeholders in the construction process and engage other expertise accordingly
	<ul style="list-style-type: none"> Make accurate decisions by being well informed and familiar with all contract documents and design requirements
	<ul style="list-style-type: none"> Arrive on site before the Contractor's crew and remain until after the crew leaves the site for the day
	<ul style="list-style-type: none"> Take breaks when the Contractor's crew takes breaks and remain on site during construction activities that require inspection
	<ul style="list-style-type: none"> Obtain all applicable documents before the start of inspection
	<ul style="list-style-type: none"> If questions arise that cannot be answered, seek those that have the authority to resolve
	<ul style="list-style-type: none"> Be proactive in problem solving and raise issues/concerns to the attention of the Construction Manager / Chief Inspector (or designate)
Positive Image in Representation of Owner Company	
	<ul style="list-style-type: none"> Behave in a courteous manner
	<ul style="list-style-type: none"> Conduct oneself in a respectable manner during off-time hours
	<ul style="list-style-type: none"> Show respect through good driving habits on the right of way (ROW) or public roads
	<ul style="list-style-type: none"> Check the work area for good housekeeping and tidiness (e.g., equipment and consumables should be correctly handled, stored, and maintained)

6.3 Worker, Site, and Construction Safety

One of the key roles of the Inspector is to assist the Owner Company in ensuring a safe work environment both for its workers as well as the public. As such, all on-site Inspectors have "stop work" authority should a safety situation arise.

In addition to safety items detailed in the following chapters, the Inspector should keep in mind the items identified in Table 3.

Table 3: Typical Safety Considerations

✓	Description
General	
	Ensure each member of the activity crew understands their role and responsibility with respect to safety in the execution of the work
	Plan, schedule, and administer tailgate meetings prior to commencing safety sensitive work (e.g., tie-ins, excavations requiring shoring, line evacuation, hot cuts)
	Be aware of changes in work activities or site conditions that were not identified in the daily tailgate meeting along with any changes to precautions that need to be taken as a result of these changes
	Manage a proactive approach to participating in the morning Contractor safety meetings

✓	Description
	Promote a safe working environment of continuous improvement through communications of project issues and solutions
	Ensure any required emergency medical services are in place
	Continuously inspect and monitor the Contractor's workmanship and ensure conformance to Owner Company's Health and Safety specifications and Site Specific Safety Plans
	Monitor for compliance to safety regulations
	Ensure emergency / after-hours contact information is posted in site offices and provided to active Contractors
	Continuously monitor for compliance to personal protective equipment (PPE) requirements
	Ensure "safety zones" are in place and maintained at powerline locations
Safety Audits	
	Participate in weekly Project Site Specific Safety Audits and provide a constructive Corrective Action Plan to communicate safety issues to the Contractor
	Track and communicate project Safety Site Audit results to all Project Team Members

In support of a safe work environment, the Owner Company's safety policies typically include (but are not limited to) those identified in Table 4.

Table 4: List of Typical Owner Company Safety Policies / Practices / Procedures

✓	Description
	H2S Safety
	Working Alone Policy
	Fall Protection Practice
	Restricted Work Areas Policy
	Confined Space Entry Practice
	Hearing Conservation Practice
	Manual Lifting and Carrying Practice
	Lockout / Tag-out Procedure
	Vehicle and Equipment Safety Practice
	Drug and Alcohol Policy
	Job Safety Analysis (JSA)
	Other Owner Company or project specific requirements, as applicable

6.4 Quality, Deficiencies, and Non-conformance Procedures

The Pipeline Construction Inspector plays a critical role in managing the quality of work performed during pipeline construction. As such, the Inspector should recognize that inspection requires monitoring to regulation as well as the critical elements of the Owner Company's quality management system (QMS). Those items that are specifically relevant to the Inspector typically include the items listed in Table 5.

Table 5: List of Typical Owner Company Quality Documentation

✓	Description
	QMS Manual
	Quality Plan
	Inspection and Test Plan (ITP)
	Orientation with approved and current Owner Company specific requirements, processes, procedures, contact documents, and drawings relevant to their role

As the Inspector identifies any deviations, Owner Company specific escalation processes will need to be followed.

6.4.1 Escalation Processes

Since the Inspector monitors all pipeline construction activities and operations for safety, stewardship of the environment, as well as compliance to project specifications and pertinent regulations, the Owner Company will have an escalation process in place to deal with any identified deficiencies (an isolated deviation from requirements that does not impact safety, environment, structural integrity, cost, or schedule) that may require elevation to a non-conformance (a recurring deficiency or major deviation from regulation or Owner Company specification such that safety, environment, structural integrity, cost, or schedule could be impacted). Any identified non-conformance(s) need to be addressed through corrective action(s).

Specific processes vary from Company to Company and Inspectors will familiarize themselves accordingly; however, all escalation processes will typically be structured as follows:

1. Verbal discussion with Third Party Representative
2. Verbal warning with notification
3. Written warning including signed documentation
4. Stop work that can potentially impact the health, safety and environment of people working on the worksites, the community, and the land where the work is being conducted

6.4.2 Personal Violations

The Inspector should continuously observe and report individuals for personal violations. The typical examples of personal violations are included in (but not limited to) the items identified in Table 6.

Table 6: Examples of Personal Site Violations

Type	Description	Potential Consequence / Outcome
Conduct	Not wearing proper personal protective equipment (PPE)	Removal of worker from worksite
	Wearing incorrect attire (e.g., muscle shirts, shorts, or clothes made of synthetic fibres)	
	Using headphones for radio / MP3 devices while on duty	
	Roughhousing on the worksite	
	Not wearing seatbelts	
	Not respecting environment or historical resources	
	Being under the influence of drugs or alcohol	Permanent removal of worker from worksite
	Harassment in the workplace	
	Disregard for health, safety and environmental procedures	
	Insubordination	
	Behaving in a manner that can cause serious harm or injury	
Worksite	Not having proper guards or shrouds	Stopping use of or removing the vehicle or equipment from the worksite
	Not maintaining “safety zones” at powerline or overhead hazard locations	
	Non-functional backup alarms on tracked equipment and rubber tired vehicles	
	Not having canopies for clear Operator vision on machinery	
	Not having fire extinguishers or if required absorbent on welding units, vehicles and heavy equipment	
	Using defective tools	
	Equipment leaking fluids	
	Any unsafe condition or practice, as determined by Owner Company Construction Manager / Chief Inspector (or designate) or Inspection Resources	Construction Shutdown
	Construction activities not compliant with applicable safety, contract, and regulatory requirements	

6.5 Environmental Considerations

The Owner Company views compliance with applicable environmental regulations as a priority, and is committed to constructing project facilities in compliance with environmental permit requirements. Environmental compliance is a shared responsibility, and all members of the Project Team are responsible for ensuring that construction activities are conducted in compliance with environmental permits and requirements at all times.

Typically, at least one individual will be assigned the role of Environmental Inspector (EI); however, all Inspectors share a responsibility for stewardship of the environment as detailed in Table 7.

Table 7: List of Typical Environmental Activities

✓	Description
	Inform and instruct all Employees/Contractors of environmental concerns, special conditions, regulations, and specific permit conditions applicable to the construction area and the work itself
	Maintain contact with the Environmental Inspector (EI)
	Ensure that disturbance or damage to the environment is minimized, especially the following: <ul style="list-style-type: none"> • Uncontrolled fires • Soil and water erosion • Habitat damage or loss • Air, noise, and water pollution
	Ensure construction entrances are maintained to prevent tracking mud and debris onto public roadways
	In case of unanticipated disturbance or damage caused by construction activities, contact the Environmental Inspector and mitigate as soon as possible to restore affected areas to their original condition (to the extent possible) in a manner satisfactory to the Owner Company, Land Owners, Land Holder, and regulatory authorities
	Ensure equipment is not fueled or serviced within specified distances of water bodies
	Ensure that hazardous materials are stored away from specified distances of water bodies
	Ensure that all construction debris (e.g., rags, oil cans) and garbage is collected and disposed of to an approved facility off the right of way (ROW)
	Observe for persons feeding or harassing livestock or wildlife; if observed, report incident immediately to the Construction Manager / Chief Inspector (or designate)
	Report all wildlife deaths and nuisance animals to the Environmental Inspector
	Observe for firearm possession while on or off the ROW (e.g., at camp); if observed, report incident immediately to the Construction Manager / Chief Inspector (or designate)
	Observe for possession of pets while on or off the ROW (e.g., at camp); if observed, report incident immediately to the Construction Manager / Chief Inspector (or designate)
	Ensure all specified vehicles have a minimum specified amount of commercial sorbent material to address spills on both water and land
	Ensure construction activities avoid interference with the normal flow of water in any natural or man-made watercourse
	Ensure Contractor's personnel have read and understand the environmental specifications and commitments
	Ensure all environmentally sensitive material is properly disposed of
	Ensure Fire Prevention and Firefighting Plans are updated, including details of monitoring, prevention, and response concerning: <ul style="list-style-type: none"> • ROW preparation • Manpower and equipment • Training of personnel • Emergency procedures

6.6 Execution of Work

As the Inspector acts as the Owner Company's authorized representative, monitoring the work for conformance to Owner Company specifications is critical for not only meeting site safety and environmental expectations. It is critical for ensuring quality of construction which is necessary for long term safety, environmental, and cost effectiveness of the pipeline asset.

Best practices relevant for each phase of construction are identified in the following chapters in significant detail; however, additional activities that the Inspector will undertake include:

- Disseminate and explain Owner Company specifications and project specific documentation to other Inspectors (where required); it is key that the latest construction drawings and specifications are utilized
- Advance planning and organization of all construction activities, including: inspection, survey, and radiographic duties; materials availability; tie-ins and service disruptions; and commissioning and start-up
- Maintain lines of communication with key Stakeholders as appropriate (including but not limited to):
 - Construction Manager / Chief Inspector (or designate)
 - Contractors and Subcontractors
 - Land Agents
 - Third Party Owner Representative (where applicable)
 - Pipeline System Operations Personnel
 - Project Engineers
- Follow site-specific communications protocol as defined in the project

6.7 Administration of Contractual Obligations

It is part of the Inspector's role to understand contractual obligations and ensure that the Contractor is carrying out construction activities / operations accordingly. The Inspector's role in the administration of contractual obligations is summarized in Table 8, and may include the need to understand the types of agreements and contracts issued or applied for by the Owner Company as detailed in Table 9.

Table 8: Inspector Role in Administration of Contractual Agreements

✓	Description
	Maintain, coordinate, and communicate progress and schedule updates per Owner Company requirements
	Ensure Owner Company agreements (e.g., Crossing agreements, Third Party utilities agreements, Land Owner agreements), based on the line list, are executed
	Verify, approve, and forward Contractor work items and materials on a daily basis to the Construction Manager / Chief Inspector (or designate)
	Perform material take-off (MTO) and ascertain status of all materials
	Obtain approval from Construction Manager / Chief Inspector (or designate) prior to commencing any extra work activities
	Ensure only most current revision of Issued for Construction (IFC) drawings, approved contract documents, and specifications are referenced for construction
	Ensure that all proposed deviations from specifications, design changes, or material substitutions are discussed and approved by the Construction Manager / Chief Inspector (or designate) prior to proceeding with the work
	Communicate lessons learned and foster an environment of continuous improvement, including participating in post-job review meetings

Table 9: Typical Approvals/Contracts Issued or Applied For by Owner Company

Type	Description
Agreements	<ul style="list-style-type: none"> Railroad Crossing Agreements – these agreements are needed to cross any operating or abandoned railroad tracks along the proposed pipeline route
	<ul style="list-style-type: none"> Pipeline Crossing Agreements – these agreements are needed to cross any existing operating or abandoned underground and aboveground pipelines along the proposed pipeline route
	<ul style="list-style-type: none"> Utility Crossing Agreements – needed to cross any operating or abandoned underground utilities (e.g., fibre-optics, telephone, or other electrical) along the proposed pipeline route
	<ul style="list-style-type: none"> Power Line Crossing Agreements – needed to cross any overhead power lines along the proposed pipeline route
	<ul style="list-style-type: none"> Road Use Agreements; needed to use applicable public roads during construction to access pipeline construction sites
	<ul style="list-style-type: none"> Road Crossing Agreements – required to construct pipeline under public or private roads during construction along the proposed pipeline route
	<ul style="list-style-type: none"> Land Use Agreement – land use type of agreements, which may include provisions for: <ul style="list-style-type: none"> Pipeline Lease Agreement (PLA) Pipeline Installation Lease Agreement Pipe Stockpile Site Camp Site Approved Working Hours
Permits	<ul style="list-style-type: none"> Regulatory and jurisdictional permits (in some cases some of these would be obtained by the Contractor), which may include: <ul style="list-style-type: none"> Work Permits on Crown / Public land Work Permits on Private land Fenced Enclosure Permits Encroachment Permits
Contracts	<ul style="list-style-type: none"> Pipe Stockpiling
	<ul style="list-style-type: none"> Construction Survey
	<ul style="list-style-type: none"> Emergency Medical Service (EMS)
	<ul style="list-style-type: none"> Clearing / Grading
	<ul style="list-style-type: none"> Pipeline, Facility, or Integrity construction activities
	<ul style="list-style-type: none"> Non-destructive Examination (NDE)
	<ul style="list-style-type: none"> Caliper Pigging
	<ul style="list-style-type: none"> Fabrication
	<ul style="list-style-type: none"> Compaction Testing
	<ul style="list-style-type: none"> Trenchless Crossings
	<ul style="list-style-type: none"> Contracts associated with (small) miscellaneous reclamation activities

6.8 Records Management

A critical element of the Inspector's role is to support Owner Company record keeping, which is critical to the long term management of the pipeline. For example, details captured during the construction phase can be one of the critical pieces of information when maintaining the structural integrity of the pipeline in the future. While specific record keeping requirements are identified within each chapter, general requirements are listed in Table 10. Where record keeping is incomplete, poor or lacking entirely, construction inspector duties are deemed to be incomplete.

Table 10: Typical Activities Associated with Supporting Records Management

✓	Description
General	
	Ensure the timely completion and submission of all required documentation
	Ensure all forms, reports, and submitted data are as complete and accurate as possible
	Record all as-built information pertaining to the construction progress
	Provide information on an ongoing basis that will assist in closing Contractor claims
	When Contractor deficiencies and/or non-conformances have been identified, ensure continuous monitoring, documentation, and follow-up of Owner Company agreed-to actions until closed
	Continually coordinate project data collection and provide reports to Construction Manager / Chief Inspector (or designate) as per specific timelines
	Continually gather data to support a post-construction evaluation and lessons learned document
	Continually review base estimates and schedules to actual work performed and provide feedback
	Complete production-related information on inspection forms and reports, and note: <ul style="list-style-type: none"> • Equipment and consumables used by the Contractor • Contractor personnel present on-site
	Confirm that Near Miss Reports are completed and submitted to the Construction Manager / Chief Inspector (or designate)
	Confirm that Incident Reports are completed and submitted to the Construction Manager / Chief Inspector (or designate)
	Obtain formal approval and written agreement from the Construction Manager / Chief Inspector (or designate) prior to commencing any extra work activities
Daily	
	Complete Inspection reports (e.g., materials, workmanship, areas, survey stations inspected)
	Complete Construction Progress reports (e.g., materials, workmanship, and areas inspected)
	Record lengths and locations of work completed on a daily basis
Weekly	
	Confirm that Weekly Progress reports include identification of potential cost and schedule issues as well as safety, environmental, progress, and quality control issues
	Maintain, coordinate, and communicate weekly progress and schedule on survey activities to Construction Manager / Chief Inspector (or designate)
Project End	
	Prepare an end of project report (if required by Owner Company)
	Identify lessons learned and/or participate in sessions in support of lessons learned

6.9 Personnel Qualifications and Certifications

Confirming the qualifications of individuals allowed on site is an important element of ensuring a safe construction operation as well ensuring that the work meets an acceptable level of quality. For example, welding operations have very specific requirements for the qualification of Welders and the work they undertake. These personnel qualifications / certifications are identified in the following chapters where relevant and completed prior to construction unless there are on-site changes. Qualifications and certifications should also comply with applicable regulatory requirements (e.g., Owner Company Operator Qualification (OQ) Plans).

6.10 Equipment Calibration

Often activities during pipeline construction require specialized equipment for measurement. For example, jeeping / holidaying equipment (used to detect coating film discontinuities that may compromise pipe integrity) is a critical part of ensuring long term safety of the pipeline. In these situations, the Inspector will ensure that only properly calibrated test equipment is used on-site and supporting calibration records are available.

When required, the Inspector will also confirm that the Contractor's Operators are properly trained and knowledgeable with application and operation techniques, their equipment, and materials as per Section 6.9.

6.11 Incident Reporting

Should an incident occur, the Inspector is expected to assist the Owner Company (and where necessary, the local authorities) in conducting a formal and objective Incident Report. In particular, the Inspector should keep in mind the items identified in Table 11.

Table 11: Typical Incident Considerations

✓	Description
	Take immediate action to ensure injuries are attended to and/or emergency services are contacted
	Freeze the work site if required, based on Construction Manager / Chief Inspector (or designate) authority (see Section 6.1)
	Immediately report all injuries, vehicle incidents, near misses, and any unsafe conditions to the Construction Manager / Chief Inspector (or designate)
	Ensure that site evidence is preserved, pictures are taken, and documentation and witness statements are gathered and retained as soon as practical
	Participate in incident investigations (as required)
	If site shutdown occurs, obtain authorization from Owner Company when site can be returned to services

References – Foundational Information

Note to user: The reference information provided in Table 12 is intended as a guide only (i.e., the list is not exhaustive); documents of this nature are updated frequently and it remains the responsibility of the user to ensure that the correct, and most current, documents are referenced as appropriate.

Table 12: List of References – Foundational

Document No.	Type	Title
American Petroleum Institute (API)		
API RP 1169	Recommended Practice	Recommended Practice for Basic Inspection Requirements – New Pipeline Construction
API Specification Q1	Specification	Specification for Quality Management System Requirements for Manufacturing Organizations for the Petroleum and Natural Gas Industry
N/A	Effectivity Sheet	API 1169 Exam Publication Effectivity Sheet
American Society of Mechanical Engineers (ASME)		
ASME B31.4	Standard	Pipeline Transportation Systems for Liquids and Slurries
ASME B31.8	Standard	Gas Transmission and Distribution Piping Systems
Canadian Federal Regulations		
N/A	Regulation	Canadian Environmental Protection Act
N/A	Regulation	Fisheries and Oceans – Land Development Guidelines for the Protection of Aquatic Habitat
N/A	Regulation	Canada Water Act
N/A	Regulation	Migratory Bird Convention Act
N/A	Regulation	Canadian Occupational Health and Safety Regulations (COHS)
N/A	Regulation	Transport Canada – Transportation of Dangerous Goods Regulations
N/A	Regulation	Navigation Protection Act
N/A	Regulation	Species at Risk Act
Canadian Standards Association (CSA)		
CSA Z662	Standard	Oil and Gas Pipeline Systems
Code of Federal Regulations (CFR)		
29 CFR Part 172	Regulation	Hazardous Materials Table
29 CFR Part 1910	Regulation	Occupational Safety and Health Standards
29 CFR Part 1926	Regulation	Safety and Health Regulations for Construction
33 CFR Part 321	Regulation	Permits for Dams and Dikes in Navigable Waters of the United States
40 CFR Part 300	Regulation	National Oil and Hazardous Substances Pollution Contingency Plan
49 CFR Part 192	Regulation	Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards
49 CFR Part 195	Regulation	Transportation of Hazardous Liquids by Pipeline

Document No.	Type	Title
50 CFR Part 21	Regulation	Migratory Bird Permits
Federal Energy Regulatory Commission (FERC)		
18 CFR380.12 (i)	Regulation	Upland Erosion Control, Revegetation, and Maintenance Plan
18 CFR380.12(d)	Regulation	Wetland and Waterbody Construction and Mitigation Procedures
Interstate Natural Gas Association of America (INGAA)		
N/A	Report	Safety Every Step of the Way
INGAA Foundation		
Report 2013.01	Report	Building Interstate Natural Gas Transmission Pipelines: A Primer
N/A	Report	Overview of Quality Management Systems – Principles and Practices for Pipeline Construction
N/A	Report	Construction Safety Consensus Guidelines – Basic Personal Protective Equipment
National Energy Board (NEB)		
OPR-99	Regulation	Canadian Onshore Pipeline Regulations ¹
United States Code (USC)		
16 USC Chapter 35	Regulation	Endangered Species
33 USC Chapter 9	Regulation	Protection of Navigable Waters and of Harbor and River Improvements Generally
Note(s): 1) OPR-99 is the overarching Canadian regulation, but does not include specific instructions for the typical Pipeline Inspector; rather, it incorporates through reference of other documents that are directly relevant		

7.0 SURVEY

7.1 Overview

Surveying is an integral part of pipeline construction, and refers to the installation of visual reference points and markers (e.g., stakes, pins, lath, and hubs) that will define the right of way (ROW) limits and guide the construction of the pipeline and necessary appurtenances according to the Issued for Construction (IFC) drawings. The references also mark the safe limits of ROW work areas.

If the area for the approved pipeline route is forested, Construction Surveyors are commonly the first to arrive to flag trees so Clearing Contractors can cut them down and establish the ROW for pipeline construction. The Inspector is the technical liaison for survey information between the Construction Manager / Chief Inspector (or designate), Survey Contractor, and other on-site Contractors.

7.2 Inputs

As part of preparing for inspection during the surveying process, the Inspector will continually familiarize themselves with relevant aspects of key documents, drawings, and Owner Company technical specifications as identified in Table 14.

7.3 Execution

While the work is being executed, the Inspector is required to monitor workmanship and report on progress on a periodic basis. Typical items that the Inspector will monitor for during the surveying process are identified in a series of checklists as detailed in Table 13.

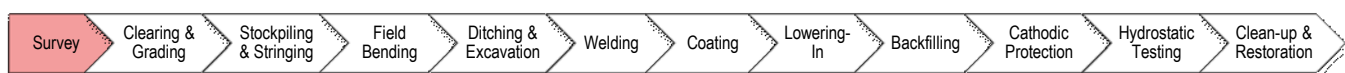
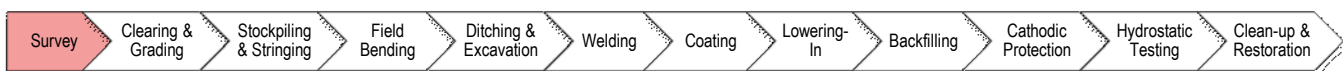


Table 13: Monitoring Requirements for Survey Inspection

Item	Description	Reference
Prior to Commencing Work	<ul style="list-style-type: none"> On a daily basis, ensure key issues that have been identified are detailed and addressed 	Table 15
Safety	<ul style="list-style-type: none"> Monitor the operations for adherence to relevant Owner Company and project specific safety requirements 	Table 16
Environmental Considerations	<ul style="list-style-type: none"> Identifies specific items that should be monitored throughout surveying operations that relate specifically to the Owner Company and/or project specific Environmental Protection Plan (EPP) 	Table 17
General	<ul style="list-style-type: none"> Identifies general items that should be monitored throughout the construction surveying process 	Table 18
Buried Facilities Location	<ul style="list-style-type: none"> Identifies specific survey items that should be monitored at buried facilities locations 	Table 19
Right of Way (ROW)	<ul style="list-style-type: none"> Identifies specific survey items that should be monitored for at ROW boundaries 	Table 20
Ditch Line	<ul style="list-style-type: none"> Identifies specific survey items that should be monitored along the ditch line 	Table 21
Crossings	<ul style="list-style-type: none"> Identifies specific survey items that should be monitored at crossing locations (e.g., roads, powerlines) 	Table 22
Appurtenances	<ul style="list-style-type: none"> Identifies specific survey items that should be monitored at appurtenance locations 	Table 23
As-Builts	<ul style="list-style-type: none"> Identifies specific information that should be monitored for collection in support of completing as-builts 	Table 24
Pilings	<ul style="list-style-type: none"> Identifies specific survey items that should be monitored for piling locations 	Table 25
Caliper Pigging	<ul style="list-style-type: none"> Identifies specific survey items that should be monitored in support of caliper pig runs 	Table 26

7.4 Outputs

The Inspector is required to report on workmanship and progress on a periodic basis (e.g., daily or weekly) by completing various reports on each work day and end of week. Report requirements and reporting processes are Owner Company and project specific; however, best practices for reporting requirements for survey inspection appear in Table 27.

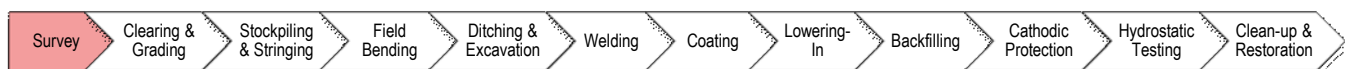


Detailed Checklists – Surveying

7.5 Typical Input Requirements for Survey Inspection

Table 14: Information Requirements for Survey Inspection

✓	Description
	<p>All designs, drawings, and specifications developed by the Owner Company and Contractors related to surveying, such as:</p> <ul style="list-style-type: none"> • Access Road Drawings • Line List (e.g., special concerns for each Land Owner) • Issued for Construction (IFC) Drawings
	<p>Contracts and agreements related to:</p> <ul style="list-style-type: none"> • Road Use • Crossing for Buried Facilities • Construction Survey • Land Owner Agreements • Third Party Crossing Agreements
	<p>Permits related to:</p> <ul style="list-style-type: none"> • Environmental • Road Use • Third Party Crossing Permits
	<p>Owner Company specific Safety Plan, including (but not limited to):</p> <ul style="list-style-type: none"> • Traffic Control Plan • Requirements for Personal Protective Equipment (PPE) • Emergency Medical Services (EMS)
	<p>Project specific Environmental Protection Plan (EPP) detailing surveying requirements for the following (but not limited to):</p> <ul style="list-style-type: none"> • Watercourses • Wetlands, muskeg, and swamp areas • Wildlife habitats • Migratory routes
	<p>Other project specific Plans, which may include:</p> <ul style="list-style-type: none"> • Fire Prevention / Firefighting Plan • Survey Plans



7.6 Best Practice Items for Inspecting Typical Surveying Operations

Table 15: Prior to Commencing Work

✓	Description
	Participate in daily meetings to address: <ul style="list-style-type: none"> • Job safety and/or hazard identification issues • Environmental concerns • Duties of Inspector(s) • Pipeline Contractor's tailgate meetings (as required) • Ad-hoc meetings with Contractors to discuss and clarify questions or concerns
	Confirm Survey crew credentials / qualifications per Owner Company requirements
	Review all available drawings with Surveyors to ensure no facilities or features (e.g., including previously existing facilities such as sales taps and abandoned pipelines) are overlooked in the current project drawings
	Ensure that the Survey Contractor has searched all legal plans and titles for registered encumbrances such as ROWs, easements, and restrictions on patented (under management of the Crown or government) and in some instances non-patented land along the ROW
	Ensure the Survey Contractor has contacted One Call / 811 Call and the Land Owners of all buried and overhead facilities prior to executing survey activities
	Verify that the Survey Party Chiefs possess a copy of the survey requirements, and have the proper materials and equipment to perform the work as per survey contract
	Ensure Surveyor's equipment is calibrated (i.e., calibrations are current)
	Ensure that Surveyors have set up their equipment to use the Owner Company's naming convention

Table 16: Safety Concerns for Surveying

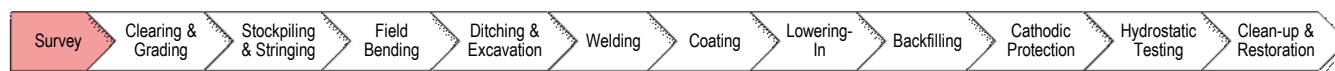
✓	Description
	Ensure that Contractors are not encroaching with construction equipment into the survey work area
	Review and accept the Working Alone Policy for the Survey Contractor
	Ensure all personnel are trained in hand tree-felling activities, including chainsaw usage
	Ensure all personnel have certification for use of all-terrain vehicles (ATVs) and/or skidoos

Table 17: Typical Monitoring Requirements for Environmental Considerations

✓	Description
	Advise the Environmental Inspector and Construction Manager / Chief Inspector (or designate) before Construction Surveyors staking (marking of proposed pipelines, equipment, or features required for construction operations in a consistent manner) environmental and archaeological sites

Table 18: Typical Monitoring Requirements – General

✓	Description
	Ensure survey monuments are not impeding construction flow
	Ensure survey proceeds in accordance with the contract requirements and Owner Company provided Work Plans
	Confirm that Construction Surveyors are continually updating all construction drawings with red pens (redline drawings)



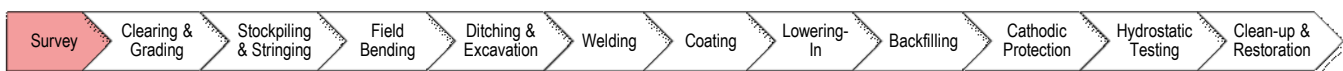
✓	Description
	Ensure compliance and operation solely within ROW and on approved access roads as outlined within the ROW line list and/or as directed by an authorized Land Agent
	Ensure all legal survey monuments are not disturbed, defaced, altered, destroyed, or removed
	Ensure that damage or obliteration of any survey references are reported per Owner Company processes and treated as a safety concern
	Ensure Contracted Surveyors are the only personnel re-establishing obliterated, missing, or damaged survey stakes, markings, and flagging
	Confirm all stakes and flags remain visible for the duration or intended use
	Confirm that Construction Surveyors have clearly staked all underground facilities
	Ensure Construction Surveyors collect all data (e.g., mill test reports (MTRs)) from pipe as well as valves / fittings nameplates
	Ensure Construction Surveyors have created the final survey drawings for the hydrostatic testing process
	Check that Construction Surveyors have signed and dated the final survey drawings

Table 19: Typical Monitoring Requirements for Buried Facilities Location

✓	Description
	Consult Owner Company's Site Representatives and/or Operators with specific knowledge of a facility being excavated to help Construction Surveyors locate facilities (existing or abandoned) with incomplete or unavailable documentation
	Consult Land Owners (if applicable) with Surveyors to determine if Land Owners are aware of any additional buried facilities (e.g., water lines, electrical cables, private gas lines)
	Ensure personnel locating buried facilities are trained in a recognized line locating program and are using accepted procedures and techniques
	Confirm that all line locating equipment have current calibration certificates
	Ensure Construction Surveyors identify and document any facility that is shown on drawings but cannot be located
	Confirm all buried facilities (e.g., Third Party pipeline or cable) have been located, identified by type (e.g., pipe diameter, pipe coating, year installed), have adequate depth of cover, and are staked accurately (showing all angular deflections) to ensure there is no chance of disturbing the facility during pipeline construction
	Confirm all Third Party pipeline, utility crossings, and centerlines of new and Third Party pipelines are staked by Surveyors as specified in alignment sheets
	Ensure that the point of crossing between the proposed centerline of the new pipeline and the existing facility is marked with a cross lath of stakes with Owner Company specific color codes showing the name of the Owner Company and the facility size
	Ensure all offset requirements from engineering or crossing agreements are staked and clearly labeled
	Confirm that buffer stakes are placed at all Third Party facilities and expected new facilities

Table 20: Typical Monitoring Requirements for Right of Way (ROW)

✓	Description
	Ensure that the Surveying Contractor will advise when stakes and marks need to be re-established
	Ensure that Surveyors are staking as per Owner Company specific color codes and obtaining approval from the Construction Manager / Chief Inspector (or designate) if any additional color codes are required
	Monitor on an ongoing basis that all stakes/markers are collected by the Contractor after that section of work has been completed



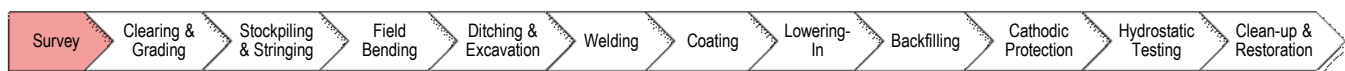
✓	Description
	Ensure that Surveyors are staking the pipeline route, valves, and other appurtenances as shown on the drawings
	Ensure that Surveyors have correctly labeled all the stakes and these are visible from the work side or within the work area of the ROW
	Confirm that the boundaries of the ROW or temporary work space (TWS) are staked as per survey specifications
	Ensure that Surveyors are using frost pins or similar tools in hard or frozen ground when securing survey markers
	Ensure that taller stakes are installed in high crop areas or snow to ensure visibility, and hub staking (a means of staking that is resistant to being knocked down) is used in livestock pastures
	Ensure watercourse crossings have the appropriate riparian zone (interface between land and a river or stream) buffers starting from the top of the bank, unless otherwise shown on drawings
	Ensure that progress stakes are placed along the edge of the ROW or TWS at specified intervals so they are visible on the work side or within the work area
	Ensure that flagging is placed more frequently in heavier vegetated and treed areas to provide better visibility for Clearing Equipment Operators

Table 21: Typical Monitoring Requirements for Ditch Line

✓	Description
	Ensure the centerline of the proposed pipeline ditch is staked at specified intervals, except at bends and crossings where the intervals will be more frequent
	Ensure Surveyors are breaking down large angle bends at points of intersection (PI) into a series of smaller bends when the PI angle exceeds bending specifications (done to ensure that the bends fit the right of way)
	Ensure angles (degrees, minutes, and seconds) of deflection are recorded at all pipeline deflection points
	Ensure Surveyors are using chainages / station numbers (an imaginary line used to measure distance that corresponds to the centerline of for example a pipeline or a fence), for example: <ul style="list-style-type: none"> In Canada, use metric chainages with 3 digits and 1 decimal point (e.g., 2+145.1 = 2145.1 m) In U.S., use imperial station numbers (e.g., 10,000 ft would be 100+00)
	Document and inform the Construction Manager / Chief Inspector (or designate) of any major deviations or necessary changes in chainage / station equations

Table 22: Typical Monitoring Requirements for Crossings

✓	Description
	Ensure activities are coordinated with the Owner Company as well as Third Party Facility Owners through One Call / 811 Call
	Ensure Surveyors are measuring contour changes along the ditch line, accounting for the terrain (including crossings) to be bored or horizontally directionally drilled (HDD)
	Ensure all features and offsets of design crossings are staked according to the construction drawings
	Confirm the staking of entry and exit points of any drill or bore, to ensure the locations and respective workspaces are marked and consistent with drawings
	Ensure temporary bench marks are placed on the work side of the right of way (ROW) in a location of minimal disturbance, showing an elevation referenced to the crossing drawings (temporary bench marks could be set on each side of the ROW in case of disturbance)
	Confirm that for typical crossings, all cadastral boundaries (i.e., legal land ownership limits) crossed are staked to show the relative disposition and are labeled with name of the Owner Company as well as pipeline type and size
	Ensure all offset requirements from engineering or crossing agreements are staked and clearly labeled



✓	Description
	<p>Confirm that Construction Surveyors for all crossing locations have completed Field Stakeout Reports containing:</p> <ul style="list-style-type: none"> • Field sketches showing all buried facilities in relation to new and existing ROW boundaries • List of line locating equipment used • Names of Surveyors, date, local area conditions, and all correspondence • All visual inspection notes • All drawings referenced • Signature of Construction Survey Contractor and date on all reports

Table 23: Typical Monitoring Requirements for Appurtenances

✓	Description
	Ensure all appurtenances are staked showing the stop, start, and end locations
	Report any change in location, spacing, and quantity to the Construction Manager / Chief Inspector (or designate)

Table 24: Typical Monitoring Requirements for As-Builts

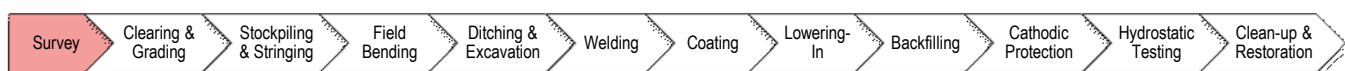
✓	Description
	Meet with the Surveyors daily to identify areas requiring as-built data
	Ensure Construction Surveyors are collecting as-built data continually during construction and are not impeding the progress of the Contractor
	Ensure that once belowground as-built data has been collected, the Construction Surveyors have staked the location
	Note the start and end chainages / stations of as-built data collection

Table 25: Typical Monitoring Requirements for Pilings

✓	Description
	Ensure the Construction Surveyors, in conjunction with the Contractor, have identified all pilings
	Ensure the Construction Surveyors, in conjunction with the Contractor, have marked all piles using iron spikes and wooden laths labeled with the pile numbers
	Ensure the Construction Surveyors, in conjunction with the Contractor, are collecting elevation data at the pile cut-off, grade, and bottom of day-lighted (the act of uncovering and exposing buried utilities) holes referenced to the site data as shown on the Construction Plan

Table 26: Typical Monitoring Requirements for Caliper Pigging

✓	Description
	Ensure Construction Surveyors have produced a complete data set containing all weld and bend information before any caliper runs
	Ask the Construction Surveyors to locate and stake any indications along the pipeline based on the caliper run results



7.7 Typical Outputs for Survey Inspection

Table 27: Typical Reporting Requirements

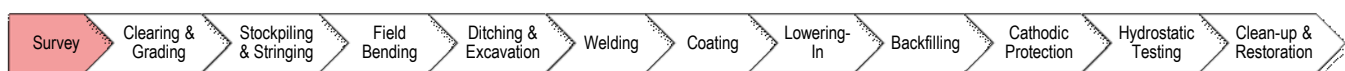
✓	Description
General	
	Ensure redline drawings are complete, checked, and forwarded to the Construction Manager / Chief Inspector (or designate), and Others (as directed) in accordance with Survey Plan
Daily	
	Complete survey progress reports, including: <ul style="list-style-type: none"> • Work completed to date, including: <ul style="list-style-type: none"> ○ Start and end chainage / station number ○ A complete set of redlined drawings identifying the as-built records for the pipeline (detailed requirements should be included in the Survey Contractor's scope) ○ Survey support sketches and data to explain as-built records (where required) ○ Survey support documentation to field RFIs (Requests for Information)

References – Survey

Note to user: The reference information provided in Table 28 is intended as a guide only (i.e., the list is not exhaustive); documents of this nature are updated frequently and it remains the responsibility of the user to ensure that the correct, and most current, documents are referenced as appropriate.

Table 28: List of References – Survey

Document No.	Type	Title
American Petroleum Institute (API)		
API RP 1102	Recommended Practice	Steel Pipeline Crossing Railroad and Highways
Common Ground Alliance (CGA)		
N/A	Recommended Practice	Best Practices
INGAA Foundation		
N/A	Guideline	Guidance Documents for Construction – Natural Gas Pipeline Crossing Guidelines
CS-S-8	Guideline	Construction Safety Consensus Guidelines – Overhead Utilities Safety



8.0 CLEARING AND GRADING

8.1 Overview

Clearing and grading is the next phase of pipeline construction after surveying, where the pipeline right of way (ROW) is prepared for the upcoming pipeline installation activities. Key steps of the clearing and grading process typically include:

- Cutting, removal, or burning of trees, brush, and debris from the pipeline ROW
- Timber salvage; the recovery and temporary storage of useful, merchantable timber from the ROW
- Unsalvageable timber disposal; the removal or elimination on-site of non-merchantable timber and brush by chipping, mulching, or burning
- Grubbing; the removal of tree stumps and large roots from specific areas of the ROW
- Use of non-merchantable timber (often called rip-rap, corduroy, and rollback) to build roads or pathways for vehicles and equipment or to create barriers for erosion control
- Preparation and maintenance of ROW access
- Frost packing (for winter activities)
- Line location of buried utilities
- Fencing (for agricultural lands)
- Stripping and storage of topsoil for later redistribution after the pipe has been backfilled
- In some cases, grade rock blasting, excavation, and removal may be required

8.2 Inputs

As part of preparing for inspection during the clearing and grading process, the Inspector will continually familiarize themselves with relevant aspects of key documents, drawings, and Owner Company technical specifications as identified in Table 30.

8.3 Execution

While the work is being executed, the Inspector is required to monitor workmanship and report on progress on a periodic basis. Typical items that the Inspector will monitor for during the clearing and grading process are identified in a series of checklists as detailed in Table 29.

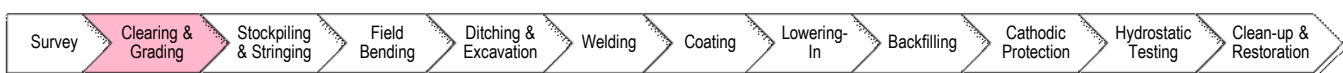
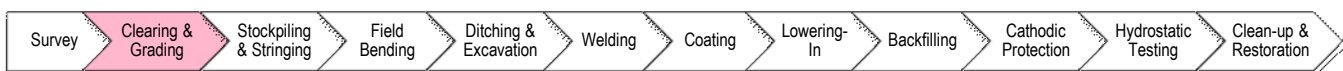


Table 29: Monitoring Requirements for Clearing and Grading

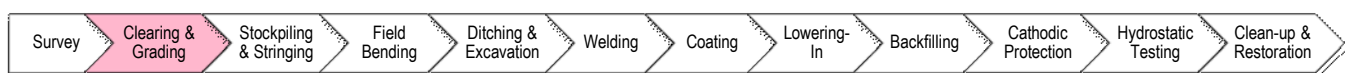
Item	Description	Reference
Prior to Commencing Work	<ul style="list-style-type: none"> On a daily basis, ensure key issues that have been identified are detailed and addressed 	Table 31
Safety	<ul style="list-style-type: none"> Monitor the operations for adherence to relevant Owner Company and project specific safety requirements 	Table 32
Environmental Considerations	<ul style="list-style-type: none"> Identifies specific items that should be monitored throughout Clearing and Grading Operations that relate specifically to the Owner Company and/or project specific Environmental Protection Plan (EPP) 	Table 33
Clearing	<ul style="list-style-type: none"> Monitor the operations for adherence to relevant Owner Company and project specific requirements for Clearing (i.e., cutting of brush and trees) 	Table 34
Temporary Work Spaces (TWS)	<ul style="list-style-type: none"> Temporary work spaces, also known as push outs, allow for maneuvering of equipment as turn-arounds or possibly temporary decking (i.e., storage) areas for salvaged timber 	Table 35
Access Road Preparation	<ul style="list-style-type: none"> Existing roads are used to transport equipment and supplies to the ROW. Where no roads exist, temporary access roads are constructed and are removed after construction has been completed It is imperative that all access roads are capable of withstanding the loads being transported and the frequency of intended use. When access roads need to be constructed and have been approved, the Inspector will ensure they are constructed as detailed by Owner Company and project specific requirements 	Table 36
Gates and Fences	<ul style="list-style-type: none"> Existing structures (e.g., fencing) should be altered to accommodate construction operations, and where possible, returned to its original state after construction is completed New fencing and structures are immediately erected to contain livestock, and where possible, returned to its original state after construction is completed Gates will be installed to allow, in most cases, permanent access to pipeline facilities 	Table 37
Buried Facilities	<ul style="list-style-type: none"> In most cases, existing buried facilities on a ROW (e.g., an existing pipeline) will require temporary aboveground mechanical support <ul style="list-style-type: none"> Typically, earthen ramps or mats are installed before construction equipment can cross the surface to prevent undue stress / potential damage to underground facilities 	Table 38
Timber	<ul style="list-style-type: none"> Incorporates items for removal, salvage, and disposal of timber and brush including considerations specific to watercourses Land Owner's crop removal requirements (e.g., Contractor may cut and remove crops from the ROW and store per conditions established between the Owner Company and the Land Owner's requirements) Discuss Crossing Plan with Environmental Inspector to identify specific requirements when clearing occurs at or near a watercourse 	Table 39
Grubbing	<ul style="list-style-type: none"> Grubbing ensures subsoil is free of stumps, roots, and debris to eliminate the possibility of damaging the pipe when the soil is placed back into the pipeline trench during backfilling 	Table 40
Snow Berms	<ul style="list-style-type: none"> Address specific considerations related to creating snow piles, primarily to prevent freezing of the pipeline trench 	Table 41



Item	Description	Reference
Grade Rock Blasting and Removal	<ul style="list-style-type: none"> Grade rock blasting with explosives by a Third Party Contractor may be required in cases where the rock is too hard to break by ripping; blasting operations require extra caution and awareness due to associated safety risks All requirements as listed in the approved Blasting Plan should be monitored for 	Table 42
Swamps and Muskegs	<ul style="list-style-type: none"> Specific considerations relating to land that is particularly sensitive to construction activity 	Table 43
Topsoil Stripping	<ul style="list-style-type: none"> Topsoil stripping is where the topsoil is segregated to the depth and width as defined by Owner Company specifications, then the segregated amount is salvaged and stockpiled on the side of the ROW, to be spread back over the area after final grading is complete 	Table 44
Grading	<ul style="list-style-type: none"> Grading refers to leveling the pipeline ROW so that construction can proceed smoothly and safely along the ROW Grading includes topsoil stripping and piling as well as the installation of flumes (ditches that run next to existing pipe trench) and bridges 	Table 45

8.4 Outputs

The Inspector is required to report on workmanship and progress on a periodic basis (e.g., daily or weekly) by completing various reports on each work day and end of week. Report requirements and reporting processes are Owner Company and project specific; however, best practices for reporting requirements for clearing and grading appear in Table 46.

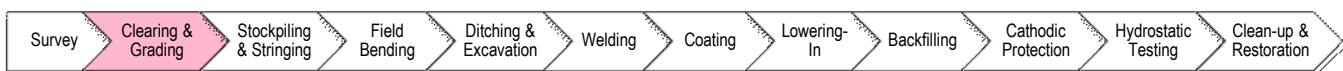


Detailed Checklists – Clearing and Grading

8.5 Typical Input Requirements for Clearing and Grading Inspection

Table 30: Information Requirements for Clearing and Grading

✓	Description
	<p>All designs, drawings, and specifications developed by the Owner Company and Contractors related to clearing and grading, such as:</p> <ul style="list-style-type: none"> • Access Road Drawings • Grading Drawings • Line List (e.g., special concerns for each Land Owner)
	<p>Contracts and agreements related to:</p> <ul style="list-style-type: none"> • Clearing • Grading (if required) • Road Use • Crossing for Buried Facilities • Timber Salvage (Land Owner, Forestry Management, Public Land Holder) • Construction Survey
	<p>Permits related to:</p> <ul style="list-style-type: none"> • Environmental • Road Use • Burning • Blasting
	<p>Owner Company specific Safety Plan, including (but not limited to):</p> <ul style="list-style-type: none"> • Traffic Control Plan • Requirements for Personal Protective Equipment (PPE) • Procedures for working near overhead powerlines • Emergency Medical Services (EMS) • Blasting Safety
	<p>Project specific Environmental Protection Plan (EPP) detailing clearing and grading requirements for the following (but not limited to):</p> <ul style="list-style-type: none"> • Watercourses • Wetlands, muskeg, and swamp areas • Wildlife habitats • Migratory routes
	<p>Other project specific Plans, which may include:</p> <ul style="list-style-type: none"> • Access Road Plans • Blasting Plan • Grading Plan • Burn Plan • Timber Salvage Plan • Fire Prevention / Firefighting Plan • Heritage Sites



8.6 Best Practice Items for Inspecting Typical Clearing and Grading Operations

Table 31: Prior to Commencing Work

✓	Description
	Participate in daily meetings to address: <ul style="list-style-type: none"> • Job safety and/or hazard identification issues • Environmental concerns • Duties of Inspector(s) • Pipeline Contractor's tailgate meetings (as required) • Ad-hoc meetings with Contractors to discuss and clarify questions or concerns
	Ensure Pre-Blast Survey is conducted and documented
	Ensure well water monitoring system is installed and functional

Table 32: Safety Concerns for Clearing and Grading

✓	Description
	Ensure that risks associated with blasting operations (e.g., fly-rock, vibration, use of explosives, undetonated explosives) are identified and sufficient safety precautions are put in place

Table 33: Typical Monitoring Requirements for Environmental Considerations

✓	Description
	Ensure topsoil stripping is conducted in accordance with the environmental specifications

Table 34: Typical Monitoring Requirements for Clearing

✓	Description
	Monitor for adherence to conditions noted in all approvals and permits issued
	Clearing is limited to vegetation within the approved ROW and approved work areas
	Monitor for proper placement of all removed trees and brush from and adjacent to the ROW
	Identify any areas where additional clearing (previously out of scope work) may be required
	Ensure the Contractor will strip, salvage, and store the topsoil before grading the ROW and store it along the ROW
	Ensure topsoil and subsoil is kept in separate stockpiles
	Identify potential for delays to planned work

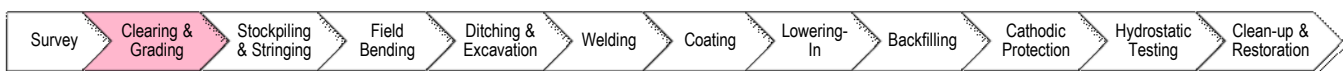


Table 35: Typical Monitoring Requirements for Temporary Work Spaces

✓	Description
	Ensure Construction Manager / Chief Inspector (or designate) approvals for push outs are in place prior to construction
	Ensure push outs along the outer edge of the pipeline ROW are constructed in approved areas only
	Ensure any temporary work space (TWS) (area usually adjacent to the permanent Right-Of-Way to be used for construction purposes) for storage of excavated material, grubbing, or salvageable timber has been approved by the Construction Manager / Chief Inspector (or designate), if required

Table 36: Typical Monitoring Requirements for Access Road Preparation

✓	Description
	Monitor for adherence to all requirements identified in project road use agreement(s)
	Ensure Contractor uses only subsoil (no topsoil) for building road approaches
	Ensure Clearing and Grading Contractors operate on only designated or permitted access roads and work areas
	Monitor Contractors for compliance with load limits on roads and bridges established by road use agreement(s) and respective authorities
	Ensure use of mats or clear span bridges for water crossings where culverts and fill material cannot be constructed
	During winter, ensure frost is driven into the ground (frost packing) on the work side of the ROW
	During winter, ensure use of mats or clear span bridges for water crossings where snow fills and ice bridges cannot be constructed

Table 37: Typical Monitoring Requirements for Gates and Fences

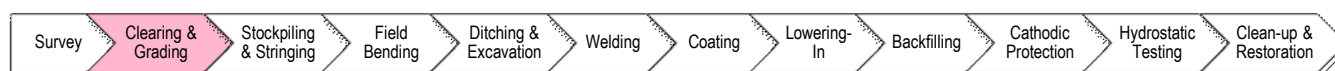
✓	Description
	Ensure Contractor builds and/or replaces fences and installs gates that cross the pipeline route per Land Owner agreement(s) and Owner Company specifications
	Check that fences are properly braced and that gates will close and can be properly secured
	Ensure a watchperson is present at open gates to control livestock (if required)

Table 38: Typical Monitoring Requirements for Buried Facilities

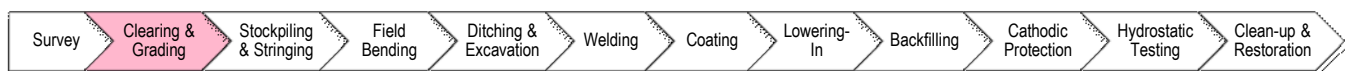
✓	Description
	Ensure only subsoil (no topsoil) is used to construct earthen ramps
	Ensure earthen ramps are constructed to the minimum height and width above natural ground surface at the point of crossing specified by crossing agreement(s)
	Ensure line list is reviewed on an ongoing basis to address all Land Owner and Third Party Utility Owner concerns
	Confirm all construction activities cease the specified distance away from any unprepared crossings

Table 39: Typical Monitoring Requirements for Timber Processing

✓	Description
Timber Removal	
	Ensure that only approved equipment is used (e.g., cut-off type saw equipment to cut trees by hand)
	Ensure that specimen trees and shrubs identified in the Environmental Protection Plan (EPP) are marked and protected both along and marginally off the ROW or work spaces by an approved method (e.g., rubber tires or safety fences)



✓	Description
	Record exact species and locations of specimen trees and shrubs to assist in re-planting / replacement during clean-up and restoration phase
	Ensure Clearing Contractor has obtained approvals from the Construction Manager / Chief Inspector (or designate) before pushing any timber outside the ROW and/or cutting any trees off the ROW
	Ensure Contractor fells trees to minimize butt shatter and breakage towards and within the ROW
	Confirm the Contractor brings the cut trees back within the ROW for processing for trees felled outside the ROW
	Ensure cuts are treated per contract requirements where branches are removed from a standing tree outside the ROW (if required)
	Confirm the Contractor cuts, de-limbs, skids, and stockpiles merchantable timber to designated areas
	Monitor for adherence to specific requirements for salvage, storage, and removal associated that may be specific to the type of Land Owner (e.g., Freehold, Aboriginal, Crown, National/State)
	Confirm need for, and monitor operations of timber scaler (to calculate the volume and weight of the timber stockpiles to facilitate contractual payments)
	Confirm segregation of merchantable timber according to project specifications
	Ensure Contractor refrains from skidding timber through partially thawed and/or muddy ground, watercourses, water bodies, or wetlands
	Ensure that on land with a significant slope (per criteria defined by Owner Company in contract documents) in any direction, removal of brush and trees is minimized and root systems are left intact to prevent slope erosion
	Monitor for adherence to special conditions for disposal of trees on hillsides
	Ensure the ROW is cleared of all trees, brush, and debris to prevent mixing with excavated soils that will be returned to ditch during backfill
	Ensure salvaged topsoil is cleared of roots and debris
Timber Removal – Watercourses	
	Ensure timely notice is given to all agreed-to parties before starting work near a creek, river, or watercourse
	Ensure adherence to any specific requirements associated with timber removal near watercourses
	Ensure Contractor plans and prepares in advance for moving equipment across watercourses
	Ensure that existing water crossings are used, where possible
	Ensure trees, shrubs, and riparian vegetation is preserved as much as practicable near all watercourses to address operational and safety concerns
	Ensure proper approvals are in place prior to installing temporary crossings across ditches and drainages
	Ensure that only approved types of temporary crossings are installed over watercourses if no bridge exists. Approved temporary crossing types may include: <ul style="list-style-type: none"> • Clear span bridge • Ice bridge • Snow bridges (built with clean snow) • Flumes • Rock fill
	Ensure that topsoil is never used to fill stream crossings
	Ensure all trees are felled away from watercourses
	Ensure any felled trees are removed from watercourses immediately
	Ensure that no debris falls/deposits into watercourses



✓	Description
	Ensure riparian zones on either side of watercourses are cleared by hand, unless approval from the Construction Manager / Chief Inspector (or designate) has been attained for machine clearing (dependent on soil condition)
	Ensure timber stockpile sites are located on top of slopes and/or away from watercourses to provide adequate working space for piling and loading logs
Timber Salvaging	
	Ensure Clearing Contractor cuts, de-limbs, and stockpiles merchantable timber per Owner Company specifications, or conditions outlined by the Land Owner, Forest Management, or Public Land Holder agreements
	Consult with the Environmental Inspector and the Timber Salvage Plan regarding any merchantable timber that appears to not meet specifications, then notify the Construction Manager / Chief Inspector (or designate) and Clearing Contractor for a decision on how to proceed
	Ensure timber stockpile sites are cleared before pipeline construction ends
	Confirm timber is stacked along the outer edge of the work side of the ROW for easier loading onto logging trucks
	Ensure stacked timber is not located in reforested areas, grade areas, muskeg areas, or wetlands
	Ensure log decks are sized adequately to accommodate loading equipment and will be located in (order of preference): <ul style="list-style-type: none"> Existing cleared areas Approved temporary work spaces (TWS) Areas with non-merchantable timber Areas with merchantable timber
	Ensure that decked logs are stacked with butt ends square, facing the same direction and with proper orientation for pickup
Timber and Brush Disposal	
	Ensure proper burn permits are in place
	Ensure burning activities comply with the Burn Plan, permit stipulations, Land Owner requirements, and Environmental Protection Plan (EPP)
	Ensure continuous (24/7) monitoring during any controlled burn
	Ensure fires are completely extinguished once burn pile is consumed
	Ensure burn locations are only on top of mineral soils and not in peat, muskeg, or wetland areas (Contractor may have to strip surface organics and replace after burning)
	Confirm stumps, roots, and debris are broken down into smaller pieces before burning
	During winter, ensure burn piles are placed on the ditch line to avoid thawing the frost-packed traffic lane on the work side of the ROW
	Ensure the burn pile is out of sight of fire detection equipment (fire eyes)
	Ensure every burn pile is marked using a global positioning system (GPS) and provide the Environmental Inspector and Construction Manager / Chief Inspector (or designate) with locations of all burn piles
	Ensure that all residual materials from burning are disposed as per contract documents and/or Owner Company or project specifications
	Ensure no unburned timber or brush, which can mix with spoil materials, is in the disposal residue
	Ensure burn piles are located on the ditch and away from an existing aboveground facility to allow for sufficient space for stacking and working
	Ensure burning is never undertaken near a body of water or watercourse unless authorized by the Environmental Inspector
	If burning is not permitted, confirm chipping or mulching is conducted as per contract specifications
	Ensure Clearing Contractor hauls away all timber and brush from the ROW that cannot be processed by the above means

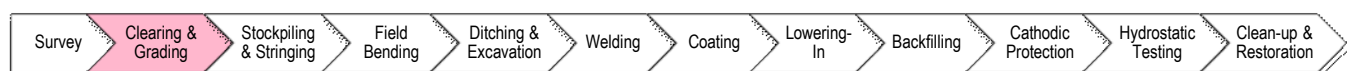


Table 40: Typical Monitoring Requirements for Grubbing

✓	Description
	Ensure stumps are grubbed and other debris is cleared from the ditch line but stored within the ROW
	Ensure leftover tree stumps are chipped to a specified height in locations where grubbing is not necessary
	On the work side of the ROW, ensure Contractor leaves as many stumps as possible to maintain soil cohesion, compaction, and to provide a stable surface for construction equipment and vehicles
	On Crown / Public land, ensure Contractor removes all stumps from the spoil side of the ROW including the ditch line
	On Freehold (including unimproved Freehold) and Aboriginal land which could be agriculturally productive, ensure Contractor grubs and disposes of all stumps, roots, and surface rocks from the entire ROW

Table 41: Typical Monitoring Requirements for Snow Berms

✓	Description
	Ensure snow berms are built to Owner Company specifications over the ditch line immediately after clearing to prevent frost penetration into the pipeline trench
	Ensure that gaps are left in snow berms at specified intervals to allow for passage of livestock and wildlife

Table 42: Typical Monitoring Requirements for Grade Rock Blasting and Removal

✓	Description
	Confirm pre-blast survey has been completed
	Confirm an approved Blasting Plan is in place
	Ensure that the Contractor has obtained permits for the use and storage of explosives
	Check that only qualified drilling and blasting personnel are employed in the blasting operations
	Ensure the Contractor has seismic monitoring equipment for blasting in place to monitor Peak Particle Velocity (PPV) limits
	Ensure blasting notifications are in place and are being clearly communicated
	Monitor for loose rock scattering onto the ROW, adjacent land, or causing damage to equipment / property
	Verify that the Contractor picks up and properly disposes of any fly-rock from blasting activities

Table 43: Typical Monitoring Requirements for Swamps and Muskegs

✓	Description
	Ensure the Clearing Contractor clears wetland and muskeg areas using approved Owner Company procedures and per the Environmental Protection Plan (EPP)
	Ensure trees are cut flush to the terrain surface
	Ensure stumps are cut flush to the terrain surface and are not grubbed to avoid unnecessary vegetation disturbance

Table 44: Typical Monitoring Requirements for Topsoil Stripping

✓	Description
	Monitor and record start and end of stripping segments and the width (full ROW, ditch and spoil, or ditch only)
	Monitor and record stripping depths throughout stripped segments and the length of each depth
	Ensure all stripping equipment is prepared for stripping in accordance with Owner Company specific procedures

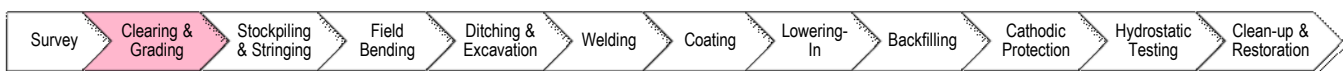
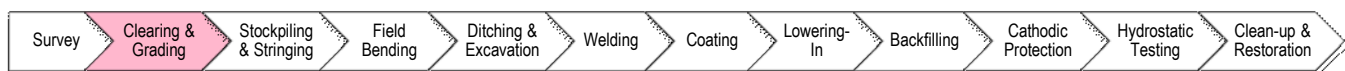


Table 45: Typical Monitoring Requirements for Grading

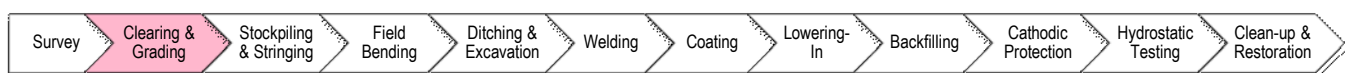
✓	Description
	Ensure that all overhead power lines are marked
	Monitor grading operations for compliance to Owner Company or project specifications and procedures
	Ensure resulting grading meets alignment and widths specified on drawings
	Check line list for special requirements of Land Owners
	Confirm that additional temporary work space (TWS) has been approved prior to its use
	Monitor temporary fencing requirements
	Ensure buried facilities have been properly located and ramped to Owner Company or project specifications
	Ensure grading in the vicinity of watercourses is per Owner Company specifications and Environmental Protection Plan (EPP) requirements
	Ensure equipment crossings at water courses are implemented correctly and in compliance with regulatory approvals
	Ensure survey markers are not damaged or destroyed throughout operations



8.7 Typical Outputs for Clearing and Grading Inspection

Table 46: Typical Reporting Requirements

✓	Description
General	
	There are no incremental specific reporting requirements beyond those identified in chapter 6.0 Pipeline Construction Inspector – Foundational Information
Daily	
	<p>Complete clearing and grading progress reports, including:</p> <ul style="list-style-type: none"> • Work completed to date, including: <ul style="list-style-type: none"> ○ Record lengths and locations of temporary fencing ○ Record start and stop chainages / station numbers of grubbing, topsoil stripping, grading, and rock grade activities ○ Record stripping depths, including start-stop chainages / stations of each segment ○ Detailed records (per Owner Company forms) of blasting activity

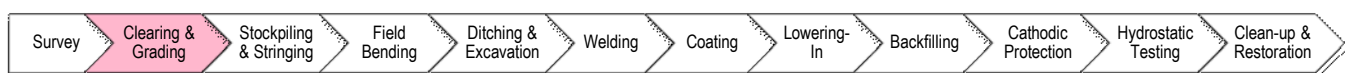


References – Clearing and Grading

Note to user: The reference information provided in Table 47 is intended as a guide only (i.e., the list is not exhaustive); documents of this nature are updated frequently and it remains the responsibility of the user to ensure that the correct, and most current, documents are referenced as appropriate.

Table 47: List of References – Clearing and Grading

Document No.	Type	Title
American Petroleum Institute (API)		
API RP 1172	Recommended Practice	Recommended Practice for Construction Parallel to Existing Underground Transmission Pipelines
Canadian Energy Pipeline Association (CEPA)		
N/A	Report	Pipeline Associated Watercourse Crossings



9.0 STOCKPILING AND STRINGING

9.1 Overview

For projects of significant size, Owner Company-provided materials are received at a marshalling yard or stockpiling site, typically located away from the right of way (ROW), for temporary storage. The Inspector is typically responsible for:

- Inspection of all received materials and log into Material Receiving Reports (MRRs) as required by Owner Company
- Quarantine and return of any materials that are damaged or do not meet specifications according to the Owner Company's processes

At the point of receipt of materials on site, both the Inspector and a Contractor Representative will inspect, verify, and receive every shipment. The Contractor immediately takes possession and responsibility for the received materials. Depending on project size and scope, the Inspector may also be assigned to assist a designated Materials Coordinator.

More specifically, the inspector will understand and comply with the Owner Company's Inspection and Materials Traceability Standards as well as Quality Control processes and forms.

Stringing involves placing pipe joints end to end along the pipeline ROW, including:

- Strategically placing pipe section supports (e.g., wooden skids or plastic tubs) next to the proposed pipeline ditch (in some cases trench may already be dug)
- Transporting the coated pipe from stockpile sites and placing the pipe on top of the skids; this includes laying out material for specific crossings (e.g., water, road, railroad, HDD), sidebends, etc.

9.2 Inputs

As part of preparing for inspection during the stockpiling and stringing process, the Inspector will be familiar with relevant aspects of key Owner Company documents, drawings, and materials technical specifications as identified in Table 49.

9.3 Execution

While the work is being executed, Inspectors are required to monitor workmanship and report on progress on a periodic basis. Typical items that Inspectors will monitor for during the stockpiling and stringing process are identified in Table 48.

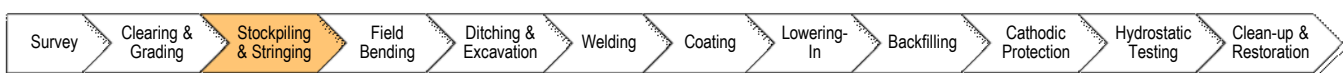
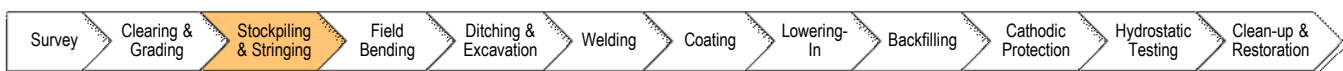


Table 48: Typical Monitoring Requirements for Executing Stockpiling and Stringing Operations

Item	Description	Reference
Prior to Commencing Work	<ul style="list-style-type: none"> On a daily basis, ensure key issues that have been identified are detailed and addressed 	Table 50
Safety	<ul style="list-style-type: none"> Monitor the operations for adherence to relevant Owner Company and project specific safety requirements 	Table 51
Environmental Considerations	<ul style="list-style-type: none"> Identifies specific items that should be monitored throughout Stockpiling and Stringing operations that relate specifically to the Owner Company and/or project specific Environmental Protection Plan (EPP) 	Table 52
Receiving / Custody Transfer	<ul style="list-style-type: none"> Involves confirmation that appropriate pipe has been shipped and received in good condition and with required documentation (i.e., MTRs) prior to the Contractor taking responsibility 	Table 53
Transport and Handling	<ul style="list-style-type: none"> Use of cranes, rigging and lifting, load handling, and signaling procedures to ensure safety and preserve material integrity 	Table 54
Storage / Stockpiling	<ul style="list-style-type: none"> Proper storage of pipe (e.g., strategic stacking based on part number) 	Table 55
Identifying and Addressing Pipe Damage	<ul style="list-style-type: none"> Inspection and repair of any damage pipe and/or coating 	Table 56
Stringing	<ul style="list-style-type: none"> Ensure that the correct pipe sections in the proper sequence are transported and placed on the ROW with appropriate supports in place in preparation for welding 	Table 57

9.4 Outputs

The Inspector is required to report on workmanship and progress on a periodic basis (e.g., daily or weekly) by completing various reports on each work day and end of week. Report requirements and reporting processes are Owner Company and project specific; however, best practices for reporting requirements for stockpiling and stringing appear in Table 58.

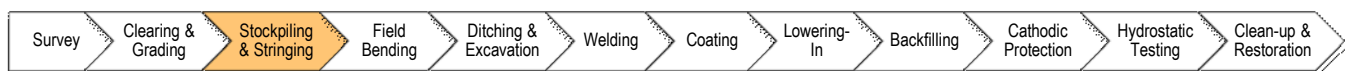


Detailed Checklists – Stockpiling and Stringing

9.5 Typical Inputs for Stringing and Stockpiling Inspection

Table 49: Information Requirements for Stringing and Stockpiling

✓	Description
	<p>All designs, drawings, and technical specifications developed by the Owner Company and Contractors related to stockpiling and stringing, such as:</p> <ul style="list-style-type: none"> • Bill of Materials (BOM) • Alignment Sheets • Pipe Tallies • Pipe Stocking Specifications • Pipe Stringing Specifications • Specifications detailing acceptable size and nature of pipe and coating defects • Specifications detailing acceptable repair methods and practices for pipe and coating defects • Owner Company specific Materials Transfer Form
	<p>Contracts and agreements related to:</p> <ul style="list-style-type: none"> • Transport and Handling of Materials • Inspection of Materials • Materials Storage
	<p>Permits related to:</p> <ul style="list-style-type: none"> • Road Transport
	<p>Owner Company specific Safety Plan, including (but not limited to):</p> <ul style="list-style-type: none"> • Pipe Transport • Pipe Loading / Unloading • Pipe Storage • Handling of Materials
	Project specific Environmental Protection Plan (EPP), detailing stockpiling and stringing requirements
	<p>Other project specific Plans, which may include:</p> <ul style="list-style-type: none"> • Traffic Control Plan



9.6 Best Practices for Typical Stringing and Stockpiling Inspection

Table 50: Prior to Commencing Work

✓	Description
	Participate in daily meetings to address: <ul style="list-style-type: none"> • Job safety and/or hazard identification issues • Environmental concerns • Duties of Inspector(s) • Pipeline Contractor's tailgate meetings (as required) • Ad-hoc meetings with Contractors to discuss and clarify questions or concerns • Confirm next day's stringing requirements for line pipe and heavy wall
	Equipment: <ul style="list-style-type: none"> • Confirm all Equipment Operators have appropriate certification / ticket(s) • Confirm Contractor possesses Manufacturer information / manual of the machinery operated • Ensure that all lifting equipment is inspected (e.g., slings and cables) for damage and all findings documented before use
	Ensure changes in wall thickness and bend locations are staked prior to stringing and correct pipe sections are placed incrementally along the right of way (ROW)

Table 51: Safety Concerns for Stringing and Stockpiling

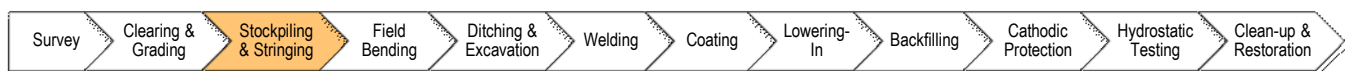
✓	Description
	Use caution while inspecting pipe unloading as each joint is extremely heavy
	Monitor for individuals standing between a suspended load and equipment or pipe
	Ensure all pipes are properly chocked
	Ensure individuals stand clear when metal banding is cut loose or other tie down means are loosened from the load
	Stand clear of lifting slings or vacuum lifters while the Equipment Operator is lifting and placing pipe joints
	Ensure eye contact is made with the Equipment Operator to establish an understanding of intentions when inspecting pipe and wait for Operator's signal before proceeding
	Monitor and be aware of other vehicles moving in the stockpile yard or right of way (ROW)
	Understand equipment limitations related to weather, such as vac-lifts and frost

Table 52: Typical Monitoring Requirements for Environmental Considerations

✓	Description
	There are no incremental specific Environmental Considerations beyond those identified in chapter 6.0 Pipeline Construction Inspector – Foundational Information

Table 53: Monitoring Requirements for Receiving / Custody Transfer

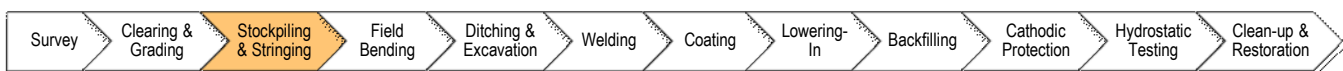
✓	Description
	Check that the pipe received at the stockpile location against the pipe tally sheet (number and length of each pipe joint the pipe mill has sent)
	Check that all the pipe joints have end caps



✓	Description
	<p>Ensure all pipe is clearly marked on the outside; if numbers are to be copied from the inside of the pipe to the outside, confirm the numbers have been transferred correctly. Markings should include:</p> <ul style="list-style-type: none"> • Size • Wall Thickness • Nominal Outside Diameter (OD) • Grade • Manufacturer • Coating Vendor • Thickness of the Coating at Mills • Heat Number • Applicable specification (e.g., API 5L) • Customer's Purchase Order (PO) (if mill purchased) • Date of manufacture • Date of Coating • Ensure QR code or barcode is present (if required by Owner Company)
	Confirm that required markings have been placed on both ends of the pipe and that these markings are consistent with the applicable mill test report (MTR)
	Ensure banding from carriers and any other refuse items are hauled away to acceptable disposal sites. Burial at railway sidings or stockpile sites is not permitted

Table 54: Monitoring Requirements for Transport and Handling

✓	Description
Transport	
	Confirm pipe is loaded, transported, and unloaded as per Owner Company procedures and specifications
	Monitor trucking safety and routing
	Ensure no chains or metal straps are used to secure loads
	Ensure pipe loads are properly secured and tarped in accordance with Owner Company specifications and local ordinances
	Conduct visual inspections for any damage to pipe, pipe coating, and end bevels prior to and during offloading / stacking / placement
	Make sure pipe joints have the correct number of nylon donuts
	Ensuring correct stacking of pipe by size, wall thickness, and coating
Cranes, Rigging, and Lifting	
	<p>Ensure Contractor uses equipment properly and according to what it was designed for, in particular:</p> <ul style="list-style-type: none"> • Check that the center of balance of the machine and the center of weight of the load are balanced • Understand the rated capacity of equipment used (i.e., do not perform critical lifts of loads that exceed capacity or lift a load with under-sized machinery or equipment)
	Ensure that Operators operate where there are no overhead power lines
	Confirm maximum lifting angles between lifting cables and pipe are not exceeded
Loading / Unloading / Handling	
	Ensure that slings, hooks, cables, and tag lines are constantly checked before use and replaced if defective
	Check that metal end hooks are used to hook both ends of a pipe joint to lift it from transports



✓	Description
	Check that metal lifting hooks attached to the sideboom cables are used to hook the pipe ends for lifting
	Confirm that no brass-lined hooks are used (copper in the brass may contaminate the pipe ends causing cracking of the field-produced girth welds)
	Check that spreader bars are used for unloading double jointed pipe lengths
	Ensure that workers are not standing under a suspended load
	Ensure that lifting equipment or chockers used comply with Owner Company specifications and do not damage the component coatings
	Ensure that equipment controls are never left unattended for a suspended load
	Ensure that there are no vehicles in the vicinity of pipe joints during lifting / placement operations
	Ensure that boom and cable brakes are used at all times if a load is suspended for an extended period of time
	Confirm that equipment is shut down before cleaning or making adjustments/repairs
	Ensure that offloading and stockpiling operations are restricted to approved work areas
Signal Persons and Operators	
	Ensure that the Signal Person is wearing a reflective vest and has verbal communication with the Operator or is in full view using standard hand signals
	Ensure that the Operator stops immediately if there is a loss of communication or misunderstanding and restarts only after communication is restored or understood

Table 55: Monitoring Requirements for Storage and Stockpiling

✓	Description
	Inspect the individual joints of pipe for pipe bevel and coating damages during offload at the allocated stockpile site from the mill
	Check and confirm all pipe joints, fittings, manufactured bends, and other tubular materials have correct markings
	Confirm pipe stacks are properly supported (i.e., placement of timber pipe supports and chocking is in compliance with Owner Company specifications)
	Confirm pipe piling height is in accordance with construction specifications
	Ensuring correct stacking of pipe by size, wall thickness, and coating
	Ensure pipe is stored with end caps (as required by Owner Company specifications)
	Ensure any pipe with confirmed damage is marked accordingly and stored in separate piles

Table 56: Monitoring Requirements for Identifying and Addressing Pipe Damage

✓	Description
	Ensure pipe is inspected for damage per Owner Company specifications prior to unloading, including (but not limited to): <ul style="list-style-type: none"> • Beveled ends • External pipe body for ovality, dents, gouges, and scratches • Internal pipe body for ovality, dents, gouges, scratches, and debris • Damage due to objects falling between joints
	Confirm that all damaged pipe is either: <ul style="list-style-type: none"> • Repaired per Owner Company specifications using Owner Company approved techniques, or • Marked as damaged goods and stored separately in the marshalling area for disposition

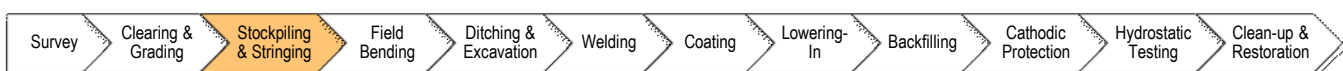
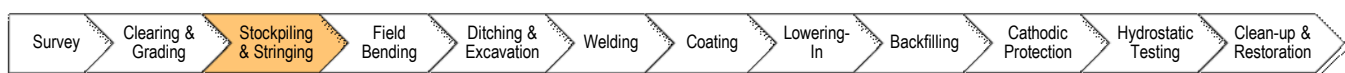


Table 57: Monitoring Requirements for Stringing

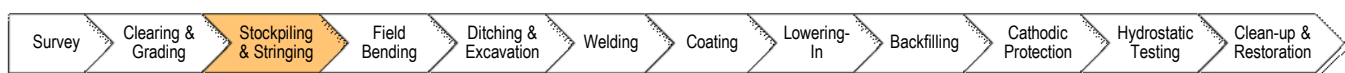
✓	Description
	Monitor for compliance to Owner Company's pipe stringing procedures
	Check for overhead power lines near unloading area
	Confirm that work areas are marked and identified in accordance with construction specifications
	Ensure that pipe is placed on padded skids, supported adequately off the ground, and blocked in a safe fashion to prevent movement
	Ensure there is no damage when using padded supports to string coated pipe
	Confirm that the wall thickness, grade, and coating type of pipe is located correctly along the ROW as indicated on the construction drawings
	Check that pipe bends are positioned and installed according to the marking on the bend
	Verify required pipe transitions are at the correct locations
	Monitor site activities to ensure any work occurring on topsoil complies with rutting policies within Owner Company specifications
	Ensure Land Owner access and livestock crossings are maintained in accordance with Owner Company specifications
	Ensure triple jointed pipes are only placed in locations where bending is not required
	Inspect the individual joints of pipe for pipe bevel and coating damages after pipe is offloaded and placed on the ROW
	Inform the Construction Manager / Chief Inspector (or designate) of all damaged pipe and reasons for damage, and ensure the damaged pipe is quarantined



9.7 Typical Outputs for Stockpiling and Stringing Inspection

Table 58: Typical Reporting Requirements

✓	Description
General	
	There are no incremental specific reporting requirements beyond those identified in chapter 6.0 Pipeline Construction Inspector – Foundational Information
Daily	
	<p>Complete stockpiling and stringing progress reports, including:</p> <ul style="list-style-type: none"> • Work completed to date, including: <ul style="list-style-type: none"> ○ Start and end chainages / station numbers of strung pipe and the pipe wall thickness ○ Start and end chainages / station numbers of locations where pipe was not strung and reasons for skipping ○ Station numbers, joint numbers, wall thickness, coating types, and heat numbers when offloading on the right of way (ROW) ○ Damage occurred to the pipe during stringing and mark the damaged locations on the pipe ○ Actual hours of work utilized for labor and equipment ○ Number of transport loads transported ○ Conditions that enhanced or delayed the planned progress of the day ○ Completed and signed Pipe Tally Sheets ○ Custody Transfer Forms ○ Any ROW weather / logistical conditions that caused either an increase or decrease in expected progress

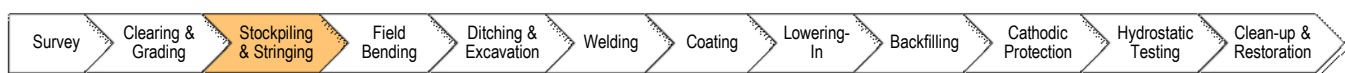


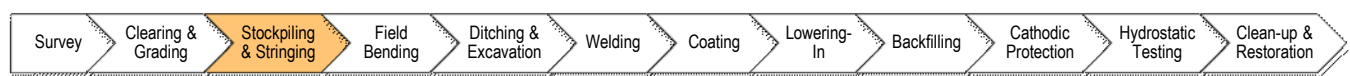
References – Stockpiling and Stringing

Note to user: The reference information provided in Table 59 is intended as a guide only (i.e., the list is not exhaustive); documents of this nature are updated frequently and it remains the responsibility of the user to ensure that the correct, and most current, documents are referenced as appropriate.

Table 59: List of References – Stockpiling and Stringing

Document No.	Type	Title
American Petroleum Institute (API)		
API 5L1	Recommended Practice	Recommended Practice for Railway Transportation of Line Pipe
API 5LT	Recommended Practice	Recommended Practice for Truck Transportation of Line Pipe
API 5LW	Recommended Practice	Recommended Practice for Transportation of Line Pipe on Barges and Marine Vessels
Canadian Standards Association (CSA)		
C22.3 No. 6	Recommended Practice	Principles and Practices of Electrical Coordination Between Pipelines and Electric Supply Lines
ENFORM		
N/A	Report	Sideboom Operator Training Standard (Entry Level)





10.0 FIELD BENDING

10.1 Overview

Field bending is an integral part of pipeline construction, and refers to the set of activities associated with bending the pipe in the field so that it fits the shape of the ROW and trench. Field bending is also known as “cold” bending since the pipe is not heated before the operation; because of this, there are strict limits on how much the pipe can be shaped. In cases where it is anticipated that the pipe will need a bend greater than technical specifications for field bends allow, the Owner Company will specify hot bends or fittings which it will purchase separately.

10.2 Inputs

As part of preparing for inspection during the field bending process, the Inspector will continually familiarize themselves with relevant aspects of key documents, drawings, and Owner Company technical specifications as identified in Table 61.

10.3 Execution

While the work is being executed, the Inspector is required to monitor workmanship and report on progress on a periodic basis. Typical items that the Inspector will monitor for during the field bending process are identified in a series of checklists as detailed in Table 60.

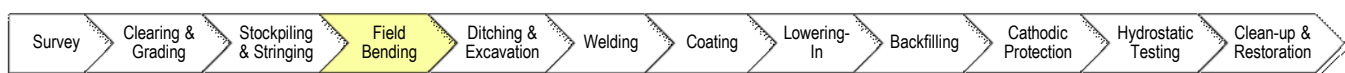
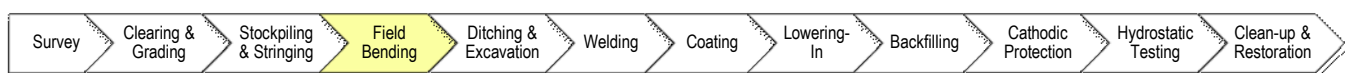


Table 60: Monitoring Requirements for Field Bending

Item	Description	Reference
Prior to Commencing Work	<ul style="list-style-type: none"> On a daily basis, ensure key issues that have been identified are detailed and addressed 	Table 62
Safety	<ul style="list-style-type: none"> Monitor the operations for adherence to relevant Owner Company and project specific safety requirements 	Table 63
Environmental Considerations	<ul style="list-style-type: none"> Identifies specific items that should be monitored throughout Field Bending operations that relate specifically to the Owner Company and/or project specific Environmental Protection Plan (EPP) 	Table 64
Field Bending	<ul style="list-style-type: none"> Monitoring requirements associated with field ("cold") bending 	Table 65

10.4 Outputs

The Inspector is required to report on workmanship and progress on a periodic basis (e.g., daily or weekly) by completing various reports on each work day and end of week. Report requirements and reporting processes are Owner Company and project specific; however, best practices for reporting requirements for field bending appear in Table 66.

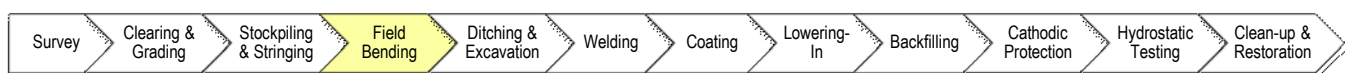


Detailed Checklists – Field Bending

10.5 Typical Input Requirements for Field Bending Inspection

Table 61: Information Requirements for Field Bending

✓	Description
	<p>All designs, drawings, and specifications developed by the Owner Company and Contractors related to field bending, such as:</p> <ul style="list-style-type: none"> • Bill of Materials (BOM) • Alignment Sheets • Pipe Tallies • Specifications detailing acceptable size and nature of pipe and coating defects • Specifications detailing acceptable repair methods and practices for pipe and coating defects
	<p>Contracts and agreements related to:</p> <ul style="list-style-type: none"> • Transport and Handling of Materials • Inspection of Materials • Materials Storage
	<p>Permits related to:</p> <ul style="list-style-type: none"> • Road Transport
	<p>Owner Company specific Safety Plan, including (but not limited to):</p> <ul style="list-style-type: none"> • Handling of Materials
	Project specific Environmental Protection Plan (EPP) detailing field bending requirements
	<p>Other project specific Plans, which may include:</p> <ul style="list-style-type: none"> • Traffic Control Plan



10.6 Best Practice Items for Inspecting Typical Field Bending Operations

Table 62: Prior to Commencing Work

✓	Description
	Ensure limitations and requirements for field bending operations defined by codes /standards and Owner Company specifications (i.e., whichever is most restrictive) are understood and clearly communicated based on the relevant jurisdiction, pipe material, and diameter
	Identify any Owner Company requirements for completing test bends
	During winter, confirm if Owner Company has identified ambient temperature limits for pipe bending operations (i.e., extreme cold weather may compromise structural integrity of pipe or coating during field bending operations)
	Confirm that the appropriate instruments are available for inspecting bends (e.g., protractor, measuring tape, centre finder, caliper, and straight edge)

Table 63: Safety Concerns for Field Bending

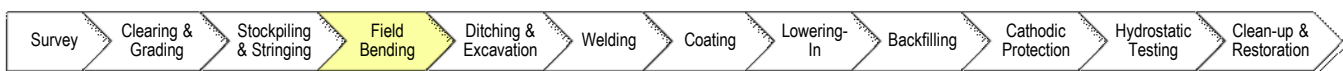
✓	Description
	There are no incremental specific Safety Concerns beyond those identified in chapter 6.0 Pipeline Construction Inspector – Foundational Information

Table 64: Typical Monitoring Requirements for Environmental Considerations

✓	Description
	There are no incremental specific Environmental Considerations beyond those identified in chapter 6.0 Pipeline Construction Inspector – Foundational Information

Table 65: Typical Monitoring Requirements for Field Bending

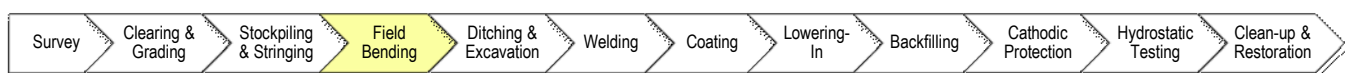
✓	Description
	Confirm that all field bends adhere to limitations and requirements for field bending operations based on the relevant jurisdiction, pipe material, and diameter
	During winter, ensure any relevant Owner Company restrictions on bending operations based on ambient temperature are adhered to (i.e., extreme cold weather may compromise structural integrity of pipe or coating during field bending operations)
	Confirm that field bends do not introduce compressive or tensile stresses (i.e., neutral axis of pipe does not deviate beyond values specified in code), excluding spiral welded pipe
	Witness and confirm the success of any test bends required by Owner Company specifications
	Ensure that field bends are the minimum specified distance from circumferential welds or open end of the pipe as specified by the Owner Company
	Ensure that bending increments are distributed along the length of the bend
	Ensure size and location of bends is established such that the pipe conforms to the centerline of the trench within limits prescribed by Owner Company
	Confirm bends and elbows are strung in the correct sequence and orientation
	Confirm that pipe (including pipe coating) was not damaged during field bending operations
	Ensure that any pipe that does not meet Owner Company specifications (i.e., has gouges, buckles or unacceptable wrinkles, ripples, or ovality) is rejected, clearly marked, and removed from the right of way (ROW)



10.7 Typical Outputs for Field Bending Inspection

Table 66: Typical Reporting Requirements

✓	Description
General	
	There are no incremental specific reporting requirements beyond those identified in chapter 6.0 Pipeline Construction Inspector – Foundational Information
Daily	
	<p>Complete field bending progress reports, including:</p> <ul style="list-style-type: none"> • Work completed to date, including: <ul style="list-style-type: none"> ○ Start and end chainages / station numbers of completed bending and set-up activities ○ Start and end chainages / station numbers of locations where pipe was not bent and reasons for skipping ○ Number and types of bends made ○ For each bend: joint numbers, wall thickness, coating types, and heat numbers ○ Damage occurred to the pipe during bending and mark the damaged locations on the pipe ○ Actual hours of work utilized for labor and equipment ○ Conditions that enhanced or delayed the planned progress of the day ○ As-built information of the bends ○ Locations, quantities of unit price pay items, and extra work installed or utilized during bending including locations of field bends made to replace 3D (radius) and 5D (radius) fittings and vice-versa

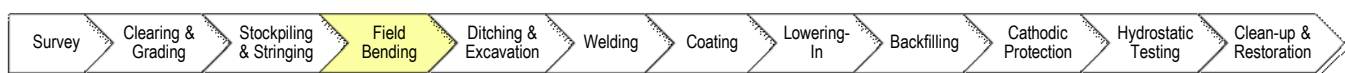


References – Field Bending

Note to user: The reference information provided in Table 67 is intended as a guide only (i.e., the list is not exhaustive); documents of this nature are updated frequently and it remains the responsibility of the user to ensure that the correct, and most current, documents are referenced as appropriate.

Table 67: List of References – Field Bending

Document No.	Type	Title
There are no incremental specific reference documents beyond those identified in chapter 6.0 Pipeline Construction Inspector – Foundational Information		



11.0 DITCHING AND EXCAVATION

11.1 Overview

Ditching and excavation is the next phase of pipeline construction, and typically involves excavation of a trench in the right of way (ROW) for pipe installation. Typically, the ditching operations are after stringing, bending, welding, non-destructive examination (NDE), and coating due to the risk of having an open trench; however, there are a number of exceptions, including:

- Where rock is encountered, the trench may be blasted and excavated prior to stringing
- In urban areas or other areas where numerous underground utilities and obstructions may exist

It should be noted that ditching and excavation is still required for entry and exit pits for trenchless crossings.

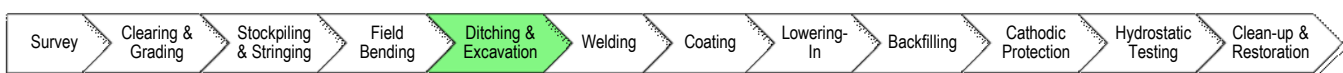
A mechanical wheel ditcher / trencher or backhoe with a trencher is generally used to create a trench of uniform depth and width; however, more specialized techniques and equipment may be required based on the type of soil and pipe. For example:

- Backhoes or traditional excavators may be used for points of intersection
- Wet areas where buoyancy control of the pipe requires an extra wide trench (to accommodate placing weights over the pipe)
- Road, highway, railroad, Third Party pipelines, and river crossings
- At all tie-in locations where extra width and depth are required for Welders to work in the trench
- Areas with unsuitable / unstable soil conditions where trench sides need to be sloped (e.g., sandy soil)
- Mountainous / steep slope and rocky soil / rock conditions
- Short sections of pipe and/or areas where moving equipment around is not practical

Depending on the nature of buoyancy control requirements, trench work may be required and be undertaken within this phase of construction.

11.2 Inputs

As part of preparing for inspection during the ditching and excavation process, the Inspector will continually familiarize themselves with relevant aspects of key documents, drawings, and Owner Company technical specifications as identified in Table 69.

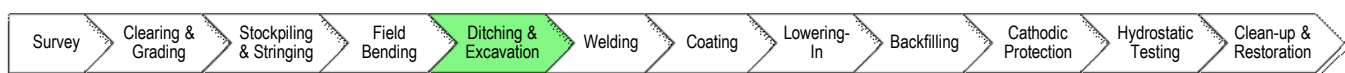


11.3 Execution

While the work is being executed, the Inspector is required to monitor workmanship and report on progress on a periodic basis. Typical items that the Inspector will monitor for during the ditching and excavation process are identified in a series of checklists as detailed in Table 68.

Table 68: Monitoring Requirements for Ditching and Excavation

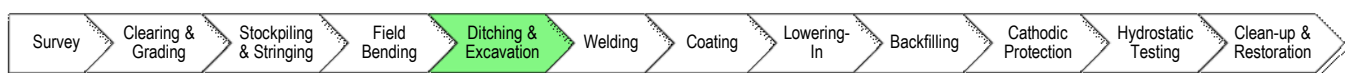
Item	Description	Reference
Prior to Commencing Work	<ul style="list-style-type: none"> On a daily basis, ensure key issues that have been identified are detailed and addressed 	Table 70
Safety	<ul style="list-style-type: none"> Monitor the operations for adherence to relevant Owner Company and project specific safety requirements 	Table 71
Environmental Considerations	<ul style="list-style-type: none"> Identifies specific items that should be monitored throughout Ditching and Excavation operations that relate specifically to the Owner Company and/or project specific Environmental Protection Plan (EPP) 	Table 72
Excavation Equipment	<ul style="list-style-type: none"> Monitor the operations for adherence to relevant Owner Company and project specific requirements; in particular, ensure that equipment does not damage pipe, buried facilities, or roadways in any way 	Table 73
Trench Excavation	<ul style="list-style-type: none"> Ensure that the trench is excavated to project requirements, including: <ul style="list-style-type: none"> Specifications for alignment of centerline and dimensions of slope of sides, width, and depth Installation of gaps / plugs for Land Owner for livestock and wildlife crossings Installation of padding and buoyancy controls in preparation for lowering-in 	Table 74
Trenching through Rock	<ul style="list-style-type: none"> In rocky areas, blasting is required to break and loosen the rock to create a trench in areas where a trench cannot be excavated with backhoes, ditchers, or rippers. This is a particularly dangerous aspect of the operation due to the use of explosives; Inspectors will ensure that the Blasting Plan is followed without exception 	Table 75
Crossing Underground Facilities (Encroachment)	<ul style="list-style-type: none"> A new pipeline will be constructed either under or over existing facilities (depending on their depths of cover), so the Inspector needs to ensure that crossing / encroachment agreements are followed and appropriate (i.e., hand trenching or hydrovac) near buried facilities 	Table 76
Ditch Plugs and Sub-drains / Drain Tiles	<ul style="list-style-type: none"> Ensure that drainage and erosion control devices or measures, such as ditch plugs and sub-drains (drainage systems that divert water away from the trench bottom) / drain tiles (perforated tubing that allows water to enter and be drained away from the pipeline) to prevent erosion of the right of way (ROW) / trench due to ground and surface water, are used as per Owner Company specifications 	Table 77
Seasonal (Winter) Considerations	<ul style="list-style-type: none"> Itemizes considerations that are specific to the construction season 	Table 78
Addressing Additional Work	<ul style="list-style-type: none"> Identifies items of particular note during this phase of the operation that can result in additional costs and therefore require close monitoring for contractual / cost reasons 	Table 79



Item	Description	Reference
Historic Sites	<ul style="list-style-type: none">In a conscious effort to preserve history, ditching and excavating operations will be suspended upon discovery of historic sites or resources until formal notice is received from Owner Company to recommence construction	Table 80

11.4 Outputs

The Inspector is required to report on workmanship and progress on a periodic basis (e.g., daily or weekly) by completing various reports on each work day and end of week. Report requirements and reporting processes are Owner Company and project specific; however, best practices for reporting requirements for ditching and excavation appear in Table 81.

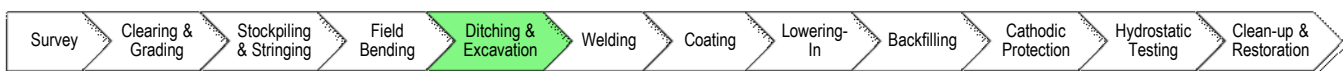


Detailed Checklists – Ditching and Excavation

11.5 Typical Input Requirements for Ditching and Excavation Inspection

Table 69: Information Requirements for Ditching and Excavation

✓	Description
	<p>All designs, drawings, and specifications developed by the Owner Company and Contractors related to ditching and excavation, such as:</p> <ul style="list-style-type: none"> • Access Road Drawings • Line List (e.g., special concerns for each Land Owner) • Trenching Specifications and Procedures • Buoyancy Control Requirements • Topsoil Segregation Requirements • Pipeline Depth of Cover Requirements • Blasting Specification (if required)
	<p>Contracts and agreements related to:</p> <ul style="list-style-type: none"> • Road Use • Crossings for Buried Facilities • Construction Survey
	<p>Permits related to:</p> <ul style="list-style-type: none"> • Environmental • Road Use
	<p>Owner Company specific Safety Plan, including (but not limited to):</p> <ul style="list-style-type: none"> • Excavation Plan • Traffic Control Plan • Requirements for Personal Protective Equipment (PPE) • Emergency Medical Services (EMS)
	<p>Project specific Environmental Protection Plan (EPP) detailing ditching and excavation requirements for the following (but not limited to):</p> <ul style="list-style-type: none"> • Watercourses • Wetlands, muskeg, and swamp areas • Wildlife habitats • Migratory routes
	<p>Other project specific Plans, which may include:</p> <ul style="list-style-type: none"> • Blasting Plan • Fire Prevention / Firefighting Plan • Heritage Sites • Engineered Shoring and Dewatering plans (as required)



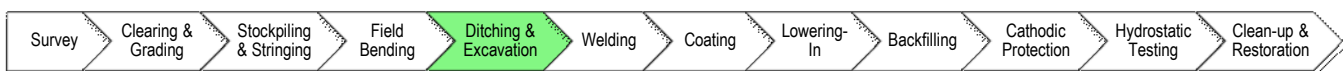
11.6 Best Practice Items for Inspecting Typical Ditching and Excavation Operations

Table 70: Prior to Commencing Work

✓	Description
	Participate in daily meetings to address: <ul style="list-style-type: none"> • Job safety and/or hazard identification issues • Environmental concerns • Duties of Inspector(s) • Pipeline Contractor's tailgate meetings (as required) • Ad-hoc meetings with Contractors to discuss and clarify questions or concerns
	Confirm everyone understands start and stop orders and signaling for equipment operation
	Ensure exclusion zones are established and site personnel are aware of the boundaries
	Crossing underground facilities including Third Party pipelines, power cables, communications cables, cables for cathodic protection purposes, and all public works will be identified, surveyed, and staked prior to any ground disturbance
	The Owner Company of a Third Party facility may locate, expose and excavate the facility themselves or allow the Contractor to do so (according to the Owner Company's procedures, specifications, and the crossing agreement). However, before the crossing construction begins, the existing buried utilities should be positively located
	Equipment: <ul style="list-style-type: none"> • Confirm all Equipment Operators have appropriate certification(s) / ticket(s) • Confirm Contractor possesses Manufacturer information / manual of the machinery operated
	Work area: <ul style="list-style-type: none"> • Check that Third Party pipeline crossing ramps have been built • Check that warning signs and temporary fencing is installed on open excavations close to public accesses • Ensure that all necessary hand or hydrovac excavations of buried facilities and Third Party pipelines have been carried out in advance of trenching activities

Table 71: Safety Concerns for Ditching and Excavation

✓	Description
	Ensure One Calls / 811 Calls for underground facilities are made by the Contractor and ensure that a valid One Call / 811 Call ticket is in place in advance of commencing work
	Ensure Equipment Operators use spotters while traversing under powerlines and overhead hazards
	Ensure Equipment Operators make eye contact with other Equipment Operators before approaching
	Monitor, where applicable, that the Contractor follows the excavation checklist (i.e., are aware of the hazards, roles, and responsibilities associated with excavation equipment and operation)
	Confirm that Equipment Operators follow start and stop orders and proper signaling for equipment operation
	Be aware of boot leg holes and their impact (undetonated dynamite which can explode) when excavating rock ditch
	Confirm that Equipment Operators are working only in the exclusion zone and know the boundaries
	Shut down work immediately if any unauthorized personnel enters the exclusion zone
	Ensure that all lifting equipment (e.g., slings and cables) is inspected for damage, issues, and wear, and all findings are documented before use
	Observe any specific requirements related to the jurisdiction (e.g., Occupational Safety and Health Administration (OSHA))



✓	Description
Blasting	
	Confirm pre-blast survey has been completed
	Confirm an approved Blasting Plan is in place
	Ensure that the Contractor has obtained permits for the use and storage of explosives
	Check that only qualified drilling and blasting personnel are employed in the blasting operations
	Ensure the Contractor has seismic monitoring equipment for blasting in place to monitor Peak Particle Velocity (PPV) limits
	Ensure blasting notifications are in place and are being clearly communicated
	Monitor for loose rock scattering onto the ROW, adjacent land, or causing damage to equipment / property
	Verify that the Contractor picks up and properly disposes of any fly-rock from blasting activities
	Ensure that segments being prepared for blasting have matting to protect the impact of fly-rock during the blast
	Establish and maintain adequate set-back distances for all blasting personnel and non-essential personnel

Table 72: Typical Monitoring Requirements for Environmental Considerations

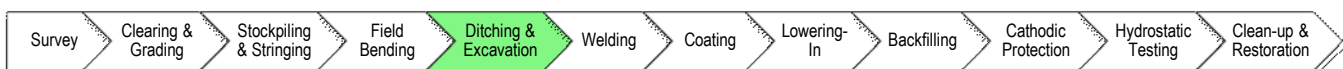
✓	Description
	Monitor and record trenching and spoil pile segregation for subsoils with variable horizons

Table 73: Typical Monitoring Requirements for Excavation Equipment

✓	Description
	Ensure that if a machine strikes, contacts, is bogged down, slides into, or rests on top of a pipeline facility, work is stopped immediately and the Construction Manager / Chief Inspector (or designate) is notified; the machine is not to be moved or extricated without Owner Company approval
	Ensure that the Contractor never passes the bucket over an exposed, loaded pipeline during excavation
	Inspect backfill areas for soft spots, rock, and adequate depth of cover before heavy equipment crosses a loaded line
	Confirm the use of timber mats for equipment support in areas of weak and saturated soils
	Ensure roadways are protected from tracked equipment at road crossings

Table 74: Typical Monitoring Requirements for Trench Excavating

✓	Description
Trench Dimensions	
	Periodically measure minimum trench dimensions to conform with specifications as defined in construction alignment sheets
	Confirm that the specified depth of cover will be measured from the top of pipe to the graded ROW profile; in the event that grading was not required, confirm that the depth will be measured to the original stripped ground. Note: Topsoil cuts are not considered in the cover depth measurement
	Where buoyancy control (e.g., continuous concrete coating, saddle weights, bolt-on weights, or screw anchors) are to be used, confirm that the depth of cover will be from the top of the buoyancy control measure
	Confirm that farm, lot-line and midfield, seasonal, or other drains not shown on project drawings will be installed to a minimum cover depth specified
	Confirm that depths of cover at the trench and drains will be measured from the top of the pipe to the invert of the ditch or drain



✓	Description
	Confirm that the trench will be deep enough to provide minimum cover in all conditions, including sand padding and sandbag or foam pillow supports (where necessary)
	Confirm that the trench will be graded to the specified clearance at all crossings (i.e., road, ditch, culvert, cable, water main, and sewer) or any other obstruction as directed by Owner Company specifications
	Monitor for locations where available work space is insufficient to allow compliance with safety and environmental requirements; escalate to Construction Manager / Chief Inspector (or designate) when identified
Open Trench Considerations	
	In cultivated fields or where livestock is present, ensure that safe, temporary bridges or backfilled sections along the trench are provided for livestock and farm machinery to cross as specified in construction drawings
	Confirm the length of the trench left open during pipeline construction is approved by the Construction Manager / Chief Inspector (or designate) based on the stability of the trench and weather conditions
	Ensure that the Contractor will not leave a trench open for extended periods; in particular, monitor for: <ul style="list-style-type: none"> • Safety concerns for workers and wildlife (confirm gaps are left in adjacent spoil and slash windrows at wildlife crossings, recreational trails, etc.) • Large accumulations of water • Excavated soil becoming frozen in winter • Snow and ice accumulation
Buoyancy Control	
	Ensure trench keys (wider trench locations to accommodate buoyancy control weights) are excavated to specified dimensions and at appropriate locations based on the construction drawings
	If screw anchors (steel helical anchors, installed in pairs on either side of the pipe through the trench bottom into the soil after the pipe section is lowered into the trench) are to be installed, ensure trench is adequately sloped per Owner Company specifications with access / egress ladders installed

Table 75: Typical Monitoring Requirements for Trenching through Rock

✓	Description
	Check that mats or other safeguards are placed over the ditch line to prevent loose rocks from scattering onto and off the right of way (ROW)
	Confirm that scattered rocks are disposed of by the Contractor to an authorized site off the right of way (ROW) or piled neatly in rows along the side of the right of way (ROW) as per line list
	Confirm that the trench will be dug for an additional depth based on Owner Company specifications (i.e., greater than the minimum ditch depth shown on the drawings) to allow for trench bottom padding

Table 76: Typical Monitoring Requirements for Crossing Underground Facilities (Encroachment)

✓	Description
	Ensure that the Contractor will excavate the trench at crossing locations with a gap between the underground facility and the proposed pipeline as specified in the contract documents / crossing agreements
	Validate the locations of buried facilities after the Contractor exposes these by hand or the use of hydrovac tools prior to mechanical excavation
	Observe the Contractor during the exposure of an operating pipeline and ensure compliance to project requirements (in case of potential inconsistency between the Owner Company's specification, the construction contract, or the crossing agreement, the most stringent requirements will apply)

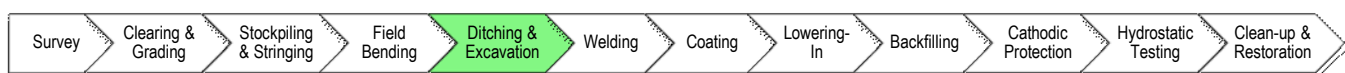


Table 77: Typical Monitoring Requirements for Ditch Plugs and Sub-drains / Drain Tiles

✓	Description
	Ditch plugs and sub-drains may be constructed based on construction drawings; however, in some cases the quantity and their location are best determined in the field after the trench is excavated. Monitor for: <ul style="list-style-type: none"> Specific terrain features / drainage patterns <ul style="list-style-type: none"> Groundwater flowing or seeping from the bottom or sides of the trench, then a sub-drain (drain tile) may be required immediately downhill of the discharge point to collect the water and divert it off the ROW Locations where water can enter the trench and flow downhill through the backfill Ditch water encountered on slopes and hills
	Ensure Owner Company specifications are met or exceeded for erosion control (e.g., a sack breaker may be installed as an alternative to ditch plugs if a ditch plug is difficult to install)
	Confirm silt fence and straw bale sediment control measures are installed
	On slopes, confirm that Contractor has installed and keyed in trench breakers (physical dams built across the inside of a trench around the pipeline to prevent backfill migration and/or erosion) and sub-drains in the trench per Owner Company drawings and specifications or as required
Sub-drains / Drain Tiles	
	If drain tiles are cut: <ul style="list-style-type: none"> Ensure location is marked Confirm ends are capped to prevent clogging from dirt or debris Ensure temporary flumes are installed to maintain drainage
	If unmarked utilities are discovered or damaged, ensure the Contractor contacts the Facility Owner for approval and requirements for the repair
	Ensure that the locations of all drain tiles, irrigation pipes, etc., not on drawings, but crossed by the trench line, are documented on the daily progress report and alignment sheets for the as-built drawings

Table 78: Typical Monitoring Requirements for Seasonal (Winter) Considerations

✓	Description
	Ensure Contractor blades (using the blade on a grader) a berm of loose material or snow (e.g., snow roach) to Owner Company specification over the centerline of the trench immediately after grading the ROW to prevent frost penetration into the ground along the ditch line. Note: A berm may not be required in muskeg areas or if ditching commences by end of the following day of grading
	Ensure frozen lumps resulting from ripping the ditch line are removed by the Contractor and stored separately from the trench subsoil pile
	Monitor for subsoil freezing into lumps in sub-zero temperatures (as it can damage pipe coating during lowering-in and result in non-uniform compaction over the pipe)
	Confirm the Contractor lowers and backfills within a specified window following ditching so the backfill does not freeze; any exceptions are to be approved by the Construction Manager / Chief Inspector (or designate)
	Ensure that snow and ice in ditch is removed before lowering-in commences

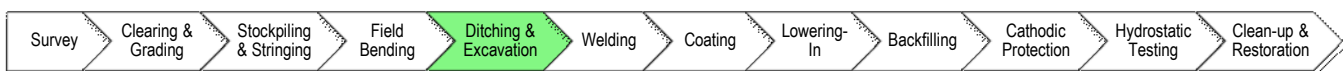
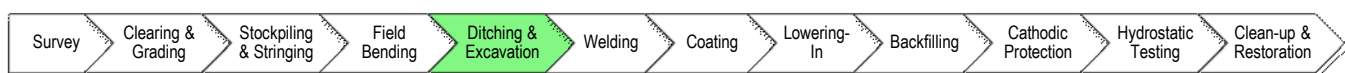


Table 79: Typical Monitoring Requirements for Additional Work Items

✓	Description
	<p>Monitor and record the following additional work items, which have potential cost implications:</p> <ul style="list-style-type: none"> • Extra-depth ditch • Locations where available work space is insufficient for compliance with safety and environmental requirements • Pre-ripping attempts where subsurface rock is encountered that may require specialized mechanical excavation • Rock-ditch excavation by specialized mechanical excavation techniques • Rock-ditch excavation by blasting techniques • Quantity of rock excavation (in accordance with the method of payment in the contract documents) • Fabricated blasting mats used to contain fly-rock (where required by permit) • Use of timber mats for equipment support in areas of weak and saturated soils • Third Party utility crossings • Sub-drain (drain tile) station locations and temporary / permanent repairs (if required)

Table 80: Typical Monitoring Requirements for Historic Sites

✓	Description
	Immediately suspend ditching activity and notify the Construction Manager / Chief Inspector (or designate) if any historic sites or resources are discovered
	Ensure ditching will not resume until formal notification provided by Construction Manager / Chief Inspector (or designate)



11.7 Typical Outputs for Ditching and Excavation Inspection

Table 81: Typical Reporting Requirements

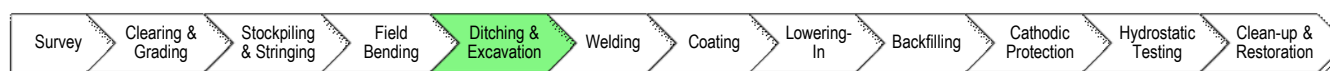
✓	Description
General	
	Record any weather or other logistical conditions that caused either an increase or decrease in expected progress
Daily	
	Complete ditching and excavation progress reports, including: <ul style="list-style-type: none"> • Work completed to date, including: <ul style="list-style-type: none"> ○ Record the quantities of any rock excavation ○ Record the ditch depths and widths ○ Start and end chainages / station numbers of dug trench ○ Record soil horizons ○ Locations of all drain tiles, irrigation pipes, etc., not on drawings, but crossed by the trench line

References – Ditching and Excavation

Note to user: The reference information provided in Table 82 is intended as a guide only (i.e., the list is not exhaustive); documents of this nature are updated frequently and it remains the responsibility of the user to ensure that the correct, and most current, documents are referenced as appropriate.

Table 82: List of References – Ditching and Excavation

Document No.	Type	Title
INGAA Foundation		
CS-S-12	Guideline	Construction Safety Consensus Guidelines – Trenching and Excavation Safety



12.0 WELDING

12.1 Overview

Welding during pipeline construction is performed to join lengths of pipe together as the Construction crew moves along the pipeline right of way (ROW). Welding is a process that uses fusion to join two or more materials together to become a manufactured or fabricated item. In the pipeline industry, the arc welding process is used to join pipe to pipe, and pipe to components together to form a pipeline.

While welding requires specialized expertise, not just for the execution of the work, but also inspection of the work, there are a number of items that the Inspector should be aware of as part of undertaking their role effectively (i.e., working alongside Welding Inspectors). Welding inspection should only be performed by a Welding Inspector who has been qualified and has been specifically assigned this task. As such, the information presented within this section deviates somewhat from the majority of chapters in this document and focuses on providing the Inspector with sufficient knowledge to understand the limitations of their role in the context of welding inspection.

12.2 Inputs

While the Inspector is not expected to undertake significant welding inspection activities, some indication of typical inputs is provided as orientation (i.e., background information). This information is detailed in Table 84.

12.3 Execution

While the work is being executed, the Inspector is required to monitor workmanship and report on progress on a periodic basis. Since welding inspection is a specialized role, the listing provided in this section is focused on items that would typically require specialized welding expertise (i.e., indication of items that would prompt the Inspector to escalate identified issues).

Typical items that the Inspector will monitor for during the welding process are identified in a series of checklists as detailed in Table 83.



Table 83: Monitoring Requirements for Welding

Item	Description	Reference
Prior to Commencing Work	<ul style="list-style-type: none"> On a daily basis, ensure key issues that have been identified are detailed and addressed 	Table 85
Safety	<ul style="list-style-type: none"> Monitor the operations for adherence to relevant Owner Company and project specific safety requirements 	Table 86
Environmental Considerations	<ul style="list-style-type: none"> Identifies specific items that should be monitored throughout Welding Operations that relate specifically to the Owner Company and/or project specific Environmental Protection Plan (EPP) 	Table 87
General Welding Operations	<ul style="list-style-type: none"> Typical monitoring requirements for a non-specialized Inspector. Note that it is important to identify those situations that require a specialized Welding Inspector 	Table 88

12.4 Outputs

While general Inspectors may be asked to assist a Welding Inspector, they are not to perform welding inspection activities on their own. Some indication of typical outputs is provided as background information as detailed in Table 89.



Detailed Checklists – Welding

12.5 Typical Input Requirements for Welding Inspection

Table 84: Information Requirements for Welding

✓	Description
	<p>All designs, drawings, and specifications developed by the Owner Company and Contractors related to welding, such as:</p> <ul style="list-style-type: none"> • All applicable Welding Procedure Specifications (WPS) • All applicable Owner Company's Welding Standards • Alignment Sheets
	<p>Contracts and agreements related to:</p> <ul style="list-style-type: none"> • Welding <ul style="list-style-type: none"> ◦ All Welders' qualifications records to specific applicable processes and WPS • Non-Destructive Examination (NDE) • Construction Survey
	<p>Permits related to:</p> <ul style="list-style-type: none"> • Environmental • Road Use
	<p>Owner Company specific Safety Plan, including (but not limited to):</p> <ul style="list-style-type: none"> • Requirements for Personal Protective Equipment (PPE) • Emergency Medical Services (EMS)
	Project specific Environmental Protection Plan (EPP) detailing welding requirements
	<p>Other project specific Plans, which may include:</p> <ul style="list-style-type: none"> • Welding Plan



12.6 Best Practice Items for Inspecting Typical Welding Operations

Table 85: Prior to Commencing Work

✓	Description
	<p>Participate in daily meetings to address:</p> <ul style="list-style-type: none"> • Ensure all Welders have welding qualifications on hand for the process and specified WPS • Job safety and/or hazard identification issues • Environmental concerns • Duties of Inspector(s) • Pipeline Contractor's tailgate meetings (as required) • Ad-hoc meetings with Contractors to discuss and clarify questions or concerns • Conduct and record tailgate meetings with Welders to ensure they clearly understand the Owner Company Quality, Safety, Welding Standards and Welding Procedure Specifications (WPS) • Communicate and monitor all hold points prior to start of welding operations • Ensure every new welder to site is briefed on the above points during onboarding

Table 86: Safety Concerns for Welding

✓	Description
	There are hazards unique to the welding phase that all Inspectors should be aware of. These include, but are not restricted to: hot surfaces (pre-heat or post weld), sharp edges (beveling), pinch points between pipe ends or line up clamps, weld flash, pressurized containers of flammable gas requiring special transportation and storage, and working in proximity to moving equipment
	Additional safety requirements require the input of a specialized Welding Inspector

Table 87: Typical Monitoring Requirements for Environmental Considerations

✓	Description
	There are no incremental specific Environmental Considerations beyond those identified in chapter 6.0 Pipeline Construction Inspector – Foundational Information; additional environmental requirements require the input of a specialized Welding Inspector

Table 88: Typical Monitoring Requirements for Welding Operations

✓	Description
	Ensure all materials are inspected for compliance with Owner Company specifications
	Check joint preparation and fit up for compliance with WPS requirements and specified drawings
	Ensure all required quality inspections and NDE are performed as per Owner Company specifications
	General housekeeping related to clean-up of welding related debris (e.g., bevel shavings, weld rod ends)
	<p>Ensure specialized welding expertise is engaged for any items associated with the following:</p> <ul style="list-style-type: none"> • Confirmation of appropriate welding equipment • Confirmation of appropriate handling and storage of welding materials • Confirming qualifications of Tackers, Welders, and Welding Operators • Identification of substandard quality of work • Examination of finished work for compliance of code, standards, specifications, and drawings • Confirmation of any issues related to weld repair



12.7 Typical Outputs for Welding Inspection

Table 89: Typical Reporting Requirements

✓	Description
General	
	Safety Hazard Observation Report
	Job Safety Analysis (JSA) / Hazard Identification Report
Non-Destructive Examination (NDE)	
	Radiographic Records
	Visual Inspection Report(s)
	NDE Results (e.g., radiographic film) and Supporting Records
	NDE Personnel Qualification Reports
Welding	
	Welding Parameter Form
	Mainline Welding Report
	List of Qualified Welders' Reports
	Welding Coupon Test Reports
	Tie-in and Poorboy (i.e., short section) Welding Report(s)
	Fabrication Welding Report(s)
	Weld Mapping
Other	
	Damaged Pipe Report
	Non-pipe Material / Equipment Damage Report
Daily	
	Complete welding progress reports, including: <ul style="list-style-type: none"> • Work completed to date, including: <ul style="list-style-type: none"> ○ Number of front end / back end welds completed and the number of welds rejected on a daily basis ○ Start and end locations for the Welding crews ○ Owner Company specific Welding Inspection Forms
	Any and all specific daily reports required by the Owner Company



References – Welding

Note to user: The reference information provided in Table 90 is intended as a guide only (i.e., the list is not exhaustive); documents of this nature are updated frequently and it remains the responsibility of the user to ensure that the correct, and most current, documents are referenced as appropriate.

Table 90: List of References – Welding

Document No.	Type	Title
American National Standards Institute (ANSI)		
ANSI Z49.1	Standard	Safety in Welding, Cutting, and Allied Processes
American Petroleum Institute (API)		
API Standard 1104	Standard	Welding of Pipelines and Related Facilities
American Welding Society (AWS)		
AWS QC1	Standard	Standard for AWS Certification of Welding Inspectors
Canadian Standards Association (CSA)		
CAN/CSA-W117.2	Standard	Safety in Welding, Cutting, and Allied Processes
CSA W178.2	Standard	Certification of Welding Inspectors
INGAA Foundation		
N/A	Action Plan / Best Practice	Training Guidance for Welding & Coating Workers & Inspectors
N/A	Action Plan / Best Practice	Best Practices in Applying API 1104 Appendix A



13.0 COATING

13.1 Overview

Coating of the pipeline provides a protective barrier against damage to the pipe (e.g., corrosion, scrapes). The majority of the coating operation occurs in a centralized plant; however, since individual pipe joints are welded together during the construction process, the (girth) weld area requires coating in the field.

While coating requires specialized expertise, not just for the execution of the work, but also Inspection of the work, there are a number of items that the Inspector should be aware of as part of undertaking their role effectively (i.e., working alongside Coating Inspectors). As such, the information presented within this section deviates somewhat from the majority of chapters in this document and focuses on providing the Inspector with sufficient knowledge to understand the limitations of their role in the context of coating inspection.

13.2 Inputs

While the Inspector is not expected to undertake significant coating inspection activities, some indication of typical inputs is provided as orientation (i.e., background information). This information is detailed in Table 92.

13.3 Execution

While the work is being executed, the Inspector is required to monitor workmanship and report on progress on a periodic basis. Since coating inspection is a specialized role, the listing provided in this section is focused on items that would typically require specialized coating expertise (i.e., indication of items that would prompt the Inspector to escalate identified issues).

Typical items that the Inspector will monitor for during the coating process are identified in a series of checklists as detailed in Table 91.



Table 91: Monitoring Requirements for Coating

Item	Description	Reference
Prior to Commencing Work	<ul style="list-style-type: none"> On a daily basis, ensure key issues that have been identified are detailed and addressed 	Table 93
Safety	<ul style="list-style-type: none"> Monitor the operations for adherence to relevant Owner Company and project specific safety requirements 	Table 94
Environmental Considerations	<ul style="list-style-type: none"> Identifies specific items that should be monitored throughout Coating Operations that relate specifically to the Owner Company and/or project specific Environmental Protection Plan (EPP) 	Table 95
General Pipe Surface Preparation and Coating Operations	<ul style="list-style-type: none"> Typical monitoring requirements for a non-specialized Inspector. Note that it is important to identify those situations that require a specialized Coating Inspector Ensure that all pipe coating damage has been identified and repaired prior to the physical lowering-in of pipe 	Table 96

13.4 Outputs

While general Inspectors may be asked to assist a Coating Inspector, they are not to perform coating inspection activities on their own. Some indication of typical outputs is provided as background information as detailed in Table 97.



Detailed Checklists – Coating

13.5 Typical Input Requirements for Coating Inspection

Table 92: Information Requirements for Coating

✓	Description
	<p>All designs, drawings, and specifications developed by the Owner Company and Contractors related to coating, such as:</p> <ul style="list-style-type: none"> • Coating Procedures • Coating Specifications • Alignment Sheets • Manufacturer supplied information (e.g., storage and handling requirements) • Material Safety Data Sheet (MSDS) for coating material
	<p>Contracts and agreements related to:</p> <ul style="list-style-type: none"> • Coating • Non-Destructive Examination (NDE) • Construction Survey
	<p>Permits related to:</p> <ul style="list-style-type: none"> • Environmental • Road Use • Safe Work
	<p>Owner Company specific Safety Plan, including (but not limited to):</p> <ul style="list-style-type: none"> • Requirements for Personal Protective Equipment (PPE) • Emergency Medical Services (EMS)
	<p>Project specific Environmental Protection Plan (EPP) detailing coating requirements for the following (but not limited to):</p> <ul style="list-style-type: none"> • Watercourses • Wetlands, muskeg, and swamp areas • Wildlife habitats • Migratory routes
	<p>Other project specific Plans, which may include:</p> <ul style="list-style-type: none"> • Coating Plan



13.6 Best Practice Items for Inspecting Typical Coating Operations

Table 93: Prior to Commencing Work

✓	Description
	Participate in daily meetings to address: <ul style="list-style-type: none"> • Job safety and/or hazard identification issues • Environmental concerns • Duties of Inspector(s) • Pipeline Contractor's tailgate meetings (as required) • Ad-hoc meetings with Contractors to discuss and clarify questions or concerns
	Verify that blasting medium and coating materials are approved

Table 94: Safety Concerns for Coating

✓	Description
	Ensure whip checks are installed on hoses
	Ensure protection is in place to prevent blast media from entering valves, pipe, fittings and appurtenances
	Ensure specialized Coating Inspector is engaged to identify additional safety requirements

Table 95: Typical Monitoring Requirements for Environmental Considerations

✓	Description
	Review site specific requirements for blast media. Silica based media may require specialized disposal methods
	Ensure specialized Coating Inspector is engaged to identify additional environmental requirements

Table 96: Typical Monitoring Requirements for General Pipe Surface Preparation and Coating Operations

✓	Description
	Ensure all materials are handled and stored as per Manufacturer and Owner Company specifications
	Ensure all materials being used match Owner Company specifications
	Ensure materials are not expired per Manufacturer expiry date(s)
	Ensure all containers for coating material are in good condition and not damaged in any way
	Ensure that all required x-rays are completed before applying protective coatings
	Ensure all jeep equipment settings are appropriate for different thicknesses of coating
	Monitor holiday detection activities for compliance to Owner Company requirements
	Monitor continually Construction Contractor supplied jeeping / holiday detectors (instruments that use electricity to locate coating discontinuities) to ensure that detectors are set at correct voltage and have proper grounding
	Check all weld joints for holidays after being coated
	Confirm that all coating defects are marked, repaired, and pipe sections re-jeeped before lowering-in pipe
	Confirm that holidaying/jeeping is conducted immediately behind the rear lowering-in cradle (sling assemblies with rollers that a sideboom uses to lift the pipe section) for coating damage from rollers
	Ensure that coating repairs are completed in accordance with the project coating standards
	General housekeeping of coating related debris (e.g., gloves, brushes, rollers, containers, overspray)



✓	Description
	<p>Identify situations that require specialized coating expertise is required for any items associated with the following:</p> <ul style="list-style-type: none">• Confirming qualifications of Coating Applicators• Confirming appropriate pre heat temperatures around circumference of pipe• Confirmation that coatings are only applied within the surface, weather and atmospheric requirements of Owner Company Specifications and the Manufacturer's specifications• Ensure that surface profile is checked for compliance with Owner Specifications and recorded (i.e., anchor profile specifications (pipe surface roughness / pattern that achieves maximum coating adhesion)• Identification of substandard quality of work• Examination of finished work for compliance of code, standards, specifications and drawings• Interpretation of specifications and codes• Confirmation of any issues related to coating repair



13.7 Typical Outputs for Coating Inspection

Table 97: Typical Reporting Requirements

✓	Description
General	
	Record any weather or other logistical conditions that caused either an increase or decrease in expected progress
	Record holiday detector settings and calibration results per Owner Company Forms
	Ensure completion of as-built red-lined drawings
Daily	
	<p>Complete coating progress reports, including:</p> <ul style="list-style-type: none"> • Work completed to date, including: <ul style="list-style-type: none"> ○ Conditions of the coating product containers ○ Number and types of coating products ○ Names of the Manufacturers of coating products ○ Color of coating products ○ Batch and/or lot numbers of coating products ○ Shelf life of coating products in use ○ Holiday test results ○ Anchor profiles ○ Dry film thickness of all layers in the coating system ○ Quality of workmanship ○ Owner Company specific Coating Inspection Forms ○ Start and end points for completed coating distances ○ Start and end points for skipped locations and why they were not completed



References – Coating

Note to user: The reference information provided in Table 98 is intended as a guide only (i.e., the list is not exhaustive); documents of this nature are updated frequently and it remains the responsibility of the user to ensure that the correct, and most current, documents are referenced as appropriate.

Table 98: List of References – Coating

Document No.	Type	Title
Canadian Standards Association (CSA)		
CSA Z245.20	Standard	Fusion Bond Epoxy (FBE) Coatings
CSA Z245.21	Standard	Polyethylene Coatings
CSA Z245.22	Standard	Polyethylene Foam Insulation Coatings
INGAA Foundation		
N/A	Action Plan / Best Practice	Field Applied Coatings Best Practices
NACE International		
SP0185	Standard	Extruded Polyolefin Resin Coating Systems with Soft Adhesives for Underground or Submerged Pipe
SP0188	Standard	Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates
SP0490	Standard	Holiday Detection of Fusion-Bonded Epoxy External Coatings of 250 to 760µm (10 to 30mil)





14.0 LOWERING-IN

14.1 Overview

Lowering-in refers to preparing the trench base (if required, due to presence of rock or stones), picking the pipe up from its temporary supports off the right of way (ROW) and placing it into an excavated trench after welding, non-destructive examination (NDE - a group of analysis techniques used in industry to evaluate the properties of a weld without causing damage), coating of pipe joints, and completing any associated coating repairs. The main focus is to monitor pipe and coating integrity during the lowering-in operation.

A considerable amount of planning and skill is required to lift the pipe using sidebooms (a bulldozer wheel or crawler tractor that incorporates a crane attachment off the left side, allowing for lifting a continuous length of pipe and placing it in the trench) and other machinery. The size, number, and spacing of sidebooms have to be calculated to ensure the pipe is not under excessive stress and equipment stability is maintained under the lowering-in process.

14.2 Inputs

As part of preparing for inspection during the lowering-in process, the Inspector will continually familiarize themselves with relevant aspects of key documents, drawings, and Owner Company technical specifications as identified in Table 100.

14.3 Execution

While the work is being executed, the Inspector is required to monitor workmanship and report on progress on a periodic basis. Typical items that the Inspector will monitor for during the lowering-in process are identified in a series of checklists as detailed in Table 99.

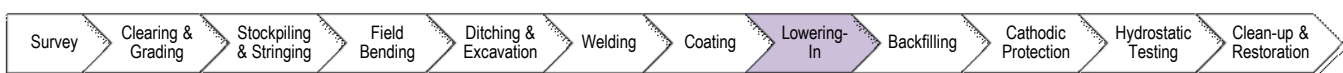
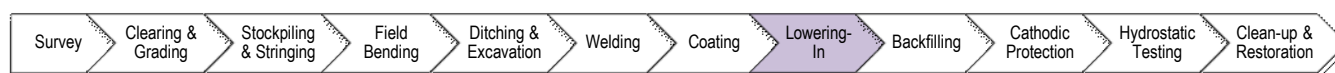


Table 99: Monitoring Requirements for Lowering-In

Item	Description	Reference
Prior to Commencing Work	<ul style="list-style-type: none"> On a daily basis, ensure key issues that have been identified are detailed and addressed 	Table 101
Safety	<ul style="list-style-type: none"> Monitor the operations for adherence to relevant Owner Company and project specific safety requirements 	Table 102
Environmental Considerations	<ul style="list-style-type: none"> Identifies specific items that should be monitored throughout Lowering-in operations that relate specifically to the Owner Company and/or project specific Environmental Protection Plan (EPP) 	Table 103
Trench Base Preparation	<ul style="list-style-type: none"> Prepare trench base to ensure pipe is not damage when it is placed in the ditch due to rock, construction related debris, and other hazards on the trench bottom 	Table 104
Pipe Handling for Lowering-In	<ul style="list-style-type: none"> Monitor lifting operations for safety and ensure that no damage occurs to the pipe or coating 	Table 105
Crossings	<ul style="list-style-type: none"> Given the specialized nature of crossings within lowering-in operations, ensure that work is undertaken as per Owner Company requirements for the following: <ul style="list-style-type: none"> Horizontal Directional Drilling (HDD) Drilling of Trenchless Crossings Boring of Trenchless Crossings 	Table 106
Buoyancy Control	<ul style="list-style-type: none"> Buoyancy control is any mechanism used to ensure that the pipe does not float (exerting undue stresses / strain in the pipe) where ground conditions are such that there is a lot of water present 	Table 107

14.4 Outputs

The Inspector is required to report on workmanship and progress on a periodic basis (e.g., daily or weekly) by completing various reports on each work day and end of week. Report requirements and reporting processes are Owner Company and project specific; however, best practices for reporting requirements for lowering-in appear in Table 108.

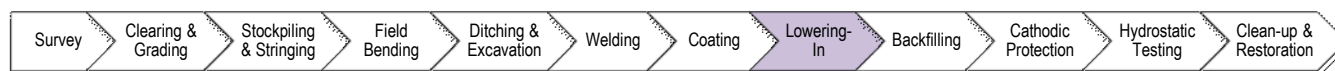


Detailed Checklists – Lowering-In

14.5 Typical Inputs for Lowering-In Inspection

Table 100: Information Requirements for Lowering-In

✓	Description
	<p>All designs, drawings, and specifications developed by the Owner Company and Contractors related to lowering-in, such as:</p> <ul style="list-style-type: none"> • Access Road Drawings • Line List (e.g., special concerns for each Land Owner) • Verify that the directional drills are installed as outlined by the directional drill profile • Buoyancy control requirements
	<p>Contracts and agreements related to:</p> <ul style="list-style-type: none"> • Road Use • Crossing for Buried Facilities • Construction Survey
	<p>Permits related to:</p> <ul style="list-style-type: none"> • Environmental • Road Use
	<p>Owner Company specific Safety Plan, including (but not limited to):</p> <ul style="list-style-type: none"> • Traffic Control Plan • Requirements for Personal Protective Equipment (PPE) • Emergency Medical Services (EMS)
	<p>Project specific Environmental Protection Plan (EPP) detailing lowering-in requirements for the following (but not limited to):</p> <ul style="list-style-type: none"> • Watercourses • Wetlands, muskeg, and swamp areas • Wildlife habitats • Migratory routes
	<p>Other project specific Plans, which may include:</p> <ul style="list-style-type: none"> • Fire Prevention / Firefighting Plan • Lowering-In Plan (identify the type and number of lifting / hoisting equipment (e.g., sidebooms) required and the number of and specific roles of workers to be on-site to lower and set the pipe in the trench) • Lift Plan • Relevant Contingency Plans (e.g., inadvertent return during HDD operations)



14.6 Best Practice Items for Inspecting Typical Lowering-In Operations

Table 101: Prior to Commencing Work

✓	Description
	Participate in daily meetings to address: <ul style="list-style-type: none"> • Job safety analysis (JSA) and hazard identification issues • Environmental concerns • Duties of Inspector(s) • Pipeline Contractor's tailgate meetings (as required) • Ad-hoc meetings with Contractors to discuss and clarify questions or concerns
	Conduct planning and tailgate meetings before the start of lowering-in to make sure all personnel involved are aware of: <ul style="list-style-type: none"> • Lifting sequence • Critical lift circumstances • Equipment size and numbers • Individual roles and responsibilities during the lowering-in phase
	Ensure that Contractor is using only calibrated holiday detectors with current calibration certificates
	Check training certificates of all Crane Operators and Riggers to ensure they are competent and trained
	Confirm slings, belts, and cradles have labels clearly indicating lift capacities (the rated maximum tensile strength of straps used for lifting purposes) and ensure their suitability for lifting the pipe sections

Table 102: Safety Concerns for Lowering-In

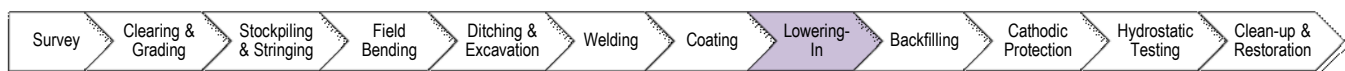
✓	Description
	Ensure a job safety analysis (JSA) is conducted and strictly adhered to throughout lowering-in operations
	Ensure that the JSA is updated as required
	Ensure Side Boom Operators use spotters while traversing under powerlines and overhead hazards
	Ensure that at no time should personnel be allowed between the pipe and the trench wall, which could result in a pinch point safety hazard
	Ensure bell holes (an excavation that allows access for tie-ins, installation, inspection, maintenance, repair or replacement of a piping section or appurtenance) are excavated in a manner that will allow for safe entry. The Contractor is responsible for determining the type of soil, benching requirements, etc. for safe entry

Table 103: Typical Monitoring Requirements for Environmental Considerations

✓	Description
	There are no incremental specific Environmental Considerations beyond those identified in chapter 6.0 Pipeline Construction Inspector – Foundational Information

Table 104: Typical Monitoring Requirements for Trench Base Preparation

✓	Description
	Ensure removal of construction related debris (e.g., rocks, skids, welding rods, tree roots, branches, hard frozen soil, trash items) from the trench base
	Check ditch bottom for rocks, clods, or high spots which could damage coating or pipe
	Ensure proper positioning of padding material for hard bottom trenches



✓	Description
	Ensure Contractor refers to the contract documents for the appropriate drawings, specifications, and procedures for paddings (support material used to shore up the underside and sides of pipe to properly distribute loading, typically sand and/or foam pillows)
	Ensure adequate spacing between the paddings so that they do not split or overly compress and maintain the specified padding thickness
	Ensure that foam boxes are installed in accordance with design documents and rests on undisturbed soil
	Ensure rock shield coating or sand padding has been installed if there is hard/rocky matter in the backfill material
	Ensure drain tiles are pre-located per alignment drawings
	Check buoyancy control requirements and monitor weight placement (if required)

Table 105: Typical Monitoring Requirements for Pipe Handling for Lowering-In

✓	Description
	Ensure that sidebooms are positioned to conform to the pre-approved Lowering-in Plan / Procedure
	Check condition of lowering-in cradles, rollers, belts, and slings
	Check that end caps are installed on section ends
	Check that the pipe trench has been dewatered (drained) where warranted before lowering-in the pipe to ensure the pipe will not float off the trench base
	Check connection of cathodic protection test lead cables where installed
	Ensure that at no time will a pipeline be lowered that has not had all weld repairs made and girth weld protection applied and tested
	Ensure that the pipe is not overstressed during lowering-in operations by limiting sideboom spacings to less than or equal to that specified in the Lowering-in Plan
	Ensure no workers at any time are in the trench, on the pipe, between pipe and trench or pipe and equipment during lowering-in operations
	Monitor for trench wall failure while pipe is suspended over or in the trench
	Ensure the coated pipe is never dragged or pulled on the trench base
	Ensure lowered pipe never swings or rubs against trench walls or sidebooms
	Ensure the pipe is in the center of the trench and conforms to all side, over, and sag bends without adding any external stress to the pipe
	Ensure drain tiles are not damaged during lowering-in operations
	Confirm that pipe bends are fitted in the trench properly, per the following: <ul style="list-style-type: none"> • Sag bends – the legs should be firmly supported • Over bends – the crutch should be firmly supported (this is important to avoid back fill load to open the bend) • Side bends – side bends should be kept away from the trench wall
	Ensure the ditching, lowering, and backfilling activities occur in close proximity to one another
	Ensure specified gaps between lowered pipe and buried Third Party utilities (e.g., pipelines and cables) are maintained
	Review and amend the job safety analysis, tailgate documents, and Lowering-in Plan if there has been any deviation

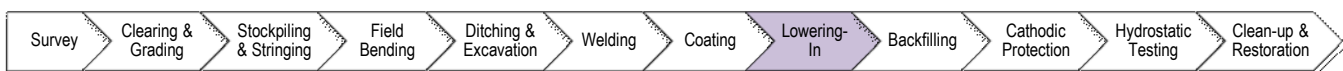
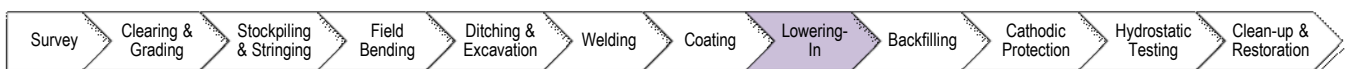


Table 106: Typical Monitoring Requirements for Crossings

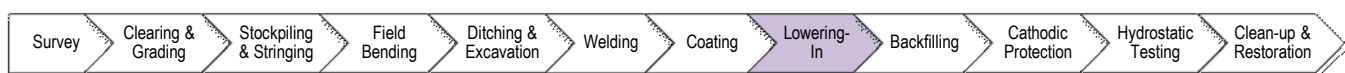
✓	Description
Horizontally Directional Drilling (HDD)	
	Confirm that a Third Party Contractor will develop the preliminary lifting requirements based on the entry / exit angle of the HDD bore, length, wall thickness, and weight of the pipe section
	Confirm Owner Company's engineering department will assist and approve the HDD design before any lifting commences
	Ensure the Lift Plan includes equipment and manpower requirements, as well as anticipated risks and their mitigation
	Ensure that upon reviewing and acknowledging the Lift Plan, the Owner Company will forward it to the Contractor
	Ensure the Contractor has an approved Lifting Plan in place and there are no deviations. In cases where the Lifting Plan cannot be used, contact the Design Engineer and obtain Owner Company approval in advance of commencing work
	Confirm that only qualified and certified Operators are used to operate the lifting equipment
	Ensure the Contractor limits the lifting forces to the lesser of the safe working capacity as detailed in the Manufacturer's specifications or limit specified by Owner Company
	Ensure cranes using an outrigger (hydraulically operated supports that increase the footprint of the crane, thereby offering more lateral stability) are supplied with a factory steel float (the large circular pad on the bottom of the outriggers that distribute load over a larger area) supplemented by a larger wooden or composite float to reduce high bearing loads on soil created by the cranes
	Ensure the Contractor has a rigging control in place and removes and destroys all defective rigging
	Check that the Contractor only uses hardware / tools that is recommended / approved by the Owner Company
	Ensure the Contractor has secured all belts, slings, and boom lines to the boom before moving the sideboom
Drilling of Trenchless Crossings	
	Ensure that the design has satisfied by both the drilling company and Owner Company
	Ensure that the directional profile has been confirmed by an Engineer or other trained and competent person
	Verify that the directional drills are installed as outlined by the directional drill profile
Boring of Trenchless Crossings	
	Ensure the carrier pipe is of the correct wall thickness and is coated with the specified abrasion-resistant coating
	Ensure bore holes are placed in a safe location in order to perform the work
	Since exact bell hole locations are determined by the Contractor on-site, ensure selected locations are safe and meet any constraints within crossing agreements and Owner Company specifications
	Ensure entry and exit trenches are located and excavated in a manner that will not disturb the road or railroad
	Ensure trench faces are sloped or timbered / shored as necessary to prevent soil collapse
	Ensure the bore diameter is larger than the diameter of the pipe by the specified value
	Ensure all soil is removed from inside of the pilot pipe before attaching it to the carrier pipe
	Ensure the bored hole is never left unlined
	Ensure punching and / or reaming are not used to advance the carrier pipe
	Ensure carrier pipe joints are properly positioned in the trench and the trench is safe for welding, coating and inspection
	For voids detected before pipe installation, ensure the Contractor is filling the voids as per the methods pre-identified and approved by the Owner Company
	Ensure depths of cover are validated with the Contractor before crossing activities start
	Ensure all pilot pipe has been removed from the section and the carrier pipe is properly aligned on the entry and exit sides of the crossing



✓	Description
	Ensure the direction or angle of the bore has not deviated from the limits of the borehole by looking through one end and seeing at least part of the borehole at the other end

Table 107: Typical Monitoring Requirements for Buoyancy Control

✓	Description
	Monitor and record the start and stop locations as well as type of all buoyancy control (e.g., set-on weights, bolt-on weights, continuous concrete)
	Monitor and record the spacing between set-on or bolt-on weights
	Ensure trench depth provides the specified cover to the top of the weight
	Ensure that lowering-in of a continuous concrete coating section has sideboom support at the specified intervals defined in the stress analysis
	Ensure bolt-on weights have wood lagging between weights to avoid movement during installation



14.7 Typical Outputs for Lowering-In Inspection

Table 108: Typical Reporting Requirements

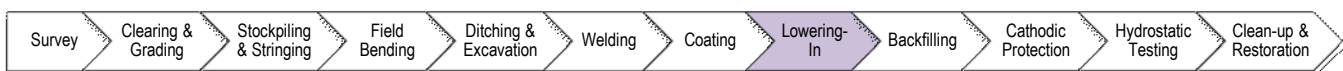
✓	Description
General	
	There are no incremental specific reporting requirements beyond those identified in chapter 6.0 Pipeline Construction Inspector – Foundational Information
Daily	
	Complete lowering-in progress reports, including: <ul style="list-style-type: none"> • Work completed to date, including: <ul style="list-style-type: none"> ○ Coating repairs ○ Bedding and padding lengths and depths ○ Field applied rock shield length, and start and end locations ○ General trench materials/conditions ○ Buoyancy control types, locations, and start and stop locations ○ Lowering-in operations carried out per lowering-in specifications, procedures, and drawings

References – Lowering-In

Note to user: The reference information provided in Table 109 is intended as a guide only (i.e., the list is not exhaustive); documents of this nature are updated frequently and it remains the responsibility of the user to ensure that the correct, and most current, documents are referenced as appropriate.

Table 109: List of References – Lowering-In

Document No.	Type	Title
American Society of Mechanical Engineers (ASME)		
ASME B30.05	Standard	Mobile Cranes
ASME B30.14	Standard	Sideboom Cranes
Canadian Association of Petroleum Producers (CAPP)		
CAPP 2004-0022	Guideline	Planning Horizontal Directional Drilling for Pipeline Construction



15.0 BACKFILLING

15.1 Overview

Backfilling refers to refilling the trench with the previously excavated or new fill subsoil once the pipe section has been lowered into the trench. As backfilling operations begin, the soil is returned to the trench in reverse order, with the subsoil put back first, followed by the topsoil. This ensures that the topsoil is returned to its original position. The Inspector should continuously monitor for the following:

- Backfill material is suitable and placed in the trench in such a way that ensures the pipe and coating are not damaged
- Coating damage is repaired per Owner Company specifications prior to backfilling
- All buoyancy controls are in place (if required)

15.2 Inputs

As part of preparing for inspection during the backfilling process, the Inspector will continually familiarize themselves with relevant aspects of key documents, drawings, and Owner Company technical specifications as identified in Table 111.

15.3 Execution

While the work is being executed, the Inspector is required to monitor workmanship and report on progress on a periodic basis. Typical items that the Inspector will monitor during the backfilling process are identified in a series of checklists as detailed in Table 110.

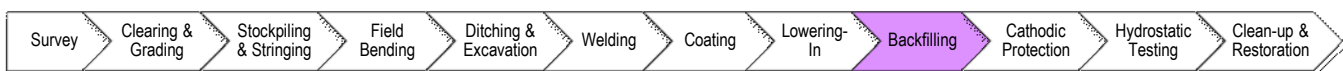
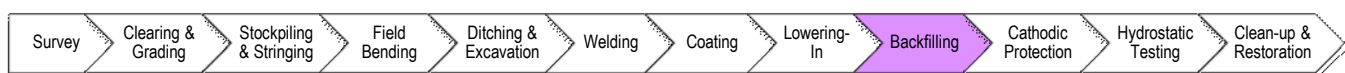


Table 110: Monitoring Requirements for Backfilling

Item	Description	Reference
Prior to Commencing Work	<ul style="list-style-type: none"> On a daily basis, ensure key issues that have been identified are detailed and addressed 	Table 112
Safety	<ul style="list-style-type: none"> Monitor the operations for adherence to relevant Owner Company and project specific safety requirements 	Table 113
Environmental Considerations	<ul style="list-style-type: none"> Identifies specific items that should be monitored throughout Backfilling operations that relate specifically to the Owner Company and/or project specific Environmental Protection Plan (EPP) 	Table 114
General Operations	<ul style="list-style-type: none"> Identifies overall items that Inspectors should monitor during backfilling operations 	Table 115
Materials	<ul style="list-style-type: none"> Padding (e.g., sand) refers to the material placed around the pipe for uniform support and protection against pipe and coating damage; this operation should be monitored for adherence to Owner Company specifications in order to prevent damage to the pipe 	Table 116
Pre-Heating Operations (when required)	<ul style="list-style-type: none"> When the ambient temperature is lower than the installation temperature in specifications and drawings, pre-heating operations will be required before backfilling and monitored for compliance to Owner Company specifications 	Table 117
Special Locations	<ul style="list-style-type: none"> Inspectors should monitor for additional items when backfilling at special locations including (but not limited to) open-cut streams, high water table, wetlands, bends, facilities sites, fenced locations and slopes 	Table 118
Primary and Secondary Roads – Bored	<ul style="list-style-type: none"> Primary roads refer to highways and major roads, which are paved main roads with large traffic volumes, well-marked traffic lanes, shoulders, and ditches Secondary roads refer to roads with moderate traffic volumes, well-marked traffic lanes and with / without shoulders or ditches. These roads are surfaced with granular materials, soil or both. These roads also include private driveways, roadways, access roads, etc. Inspectors will monitor for additional requirements for bored road crossings 	Table 119
Open-Cut Roads	<ul style="list-style-type: none"> In special cases where approval has been obtained for a pipeline to be installed by cutting the road open, inspect and ensure that the Contractor is abiding additional requirements by the Owner Company 	Table 120
Horizontal Directional Drilling (HDD)	<ul style="list-style-type: none"> For horizontal directionally bored crossings, Inspectors will monitor Contractor activities for additional items 	Table 121

15.4 Outputs

The Inspector is required to report on workmanship and progress on a periodic basis (e.g., daily or weekly) by completing various reports on each work day and end of week. Report requirements and reporting processes are Owner Company and project specific; however, best practices for reporting requirements for backfilling appear in Table 122.

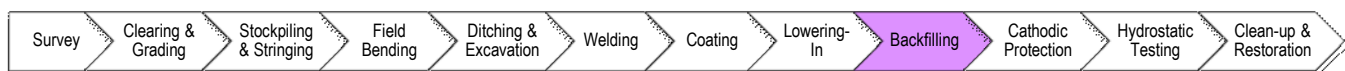


Detailed Checklists – Backfilling

15.5 Typical Inputs for Backfilling Inspection

Table 111: Information Requirements for Backfilling

✓	Description
	<p>All designs, drawings, and specifications developed by the Owner Company and Contractors related to backfilling, such as:</p> <ul style="list-style-type: none"> • Access Road Drawings • Line List (e.g., special concerns for each Land Owner) • Backfill Specifications
	<p>Contracts and agreements related to:</p> <ul style="list-style-type: none"> • Road Use • Crossing for Buried Facilities • Construction Survey
	<p>Permits related to:</p> <ul style="list-style-type: none"> • Environmental • Road Use
	<p>Owner Company specific Safety Plan, including (but not limited to):</p> <ul style="list-style-type: none"> • Traffic Control Plan • Requirements for Personal Protective Equipment (PPE) • Procedures for working around overhead powerlines • Emergency Medical Services (EMS)
	<p>Project specific Environmental Protection Plan (EPP) detailing backfilling requirements for the following (but not limited to):</p> <ul style="list-style-type: none"> • Watercourses • Wetlands, muskeg, and swamp areas • Wildlife habitats • Migratory routes
	<p>Other project specific Plans, which may include:</p> <ul style="list-style-type: none"> • Refer to project documentation for incremental specific requirements



15.6 Best Practice Items for Inspecting Typical Backfilling Operations

Table 112: Prior to Commencing Work

✓	Description
	Participate in daily meetings to address: <ul style="list-style-type: none"> • Job safety and/or hazard identification issues • Environmental concerns • Duties of Inspector(s) • Pipeline Contractor's tailgate meetings (as required) • Ad-hoc meetings with Contractors to discuss and clarify questions or concerns
	Ensure that the Owner Company witnesses and acquires approval before commencing the backfilling operation
	Prior to backfilling, ensure the trench has been re-inspected to make sure it is free of debris
	Prior to backfilling, ensure that cover, sandbags, rock shield, and Third Party lines have been inspected and documented per Owner Company specifications
	Ensure that Contractor repairs all coating damage per Owner Company specifications and repair procedures

Table 113: Safety Concerns for Backfilling

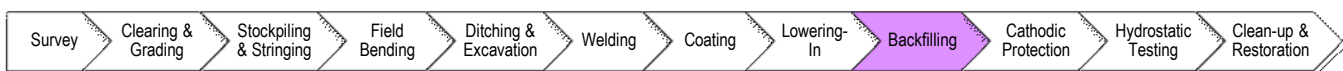
✓	Description
	There are no incremental specific Safety Concerns beyond those identified in chapter 6.0 Pipeline Construction Inspector – Foundational Information

Table 114: Typical Monitoring Requirements for Environmental Considerations

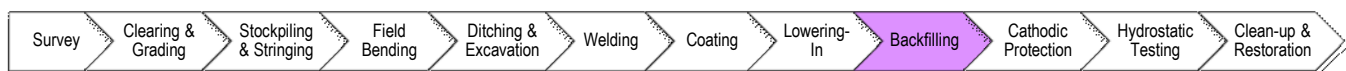
✓	Description
	There are no incremental specific Environmental Considerations beyond those identified in chapter 6.0 Pipeline Construction Inspector – Foundational Information

Table 115: Typical Monitoring Requirements for General Operations

✓	Description
	Ensure the Construction Survey crew collects as-built data before backfilling commences
	Ensure backfilling commences as soon as practical after lowering-in the pipe; otherwise, contact the Construction Manager / Chief Inspector (or designate)
	On slopes, confirm that Contractor has installed and keyed in trench breakers (physical dams built across the inside of a trench around the pipeline to prevent backfill migration and/or erosion) and sub-drains in the trench per Owner Company drawings and specifications or as required
	Ensure cathodic protection test leads are installed as per construction drawings and Owner Company cathodic protection construction specifications
	Check that the open ends of pipe are protected by appropriate plugs
	Ensure bedding materials do not act as an electrical barrier between pipe and cathodic protection equipment
	Confirm that the Contractor uses only Owner Company approved select / imported backfill.
	Ensure that Proctor density tests (which will help determine the compaction characteristics of the soil) are conducted as required per the Owner Company specifications
	Ensure trench is filled with approved padding, packing it around the pipe where warranted



✓	Description
	Ensure trench is filled with excavated material to provide firm support for the pipe
	Ensure padding or select backfill is used to provide a minimum cushion between the top of the pipe and the start of rocky backfill, as specifications and drawings stipulate and Contractor does not place rocky backfill directly on the lowered pipe
	Ensure rock shield or wood lagging is used through areas of coarse gravel and small cobble stone, instead of support bags or pillows and padding (if warranted)
	Ensure larger rocks with sizes too large for backfill are hauled away or stacked neatly along the ROW as specified in Owner Company specifications and drawings
	Check that marker tape is installed in the ditch above the pipe, where required by Owner Company
	Continuously monitor that pipes sharing a common ditch maintain the minimum distance as specified in the design documents
	Continuously monitor that soil is backfilled in the same sequence, or in the same geotechnical layers, as when it was removed during trenching operations
	Confirm that the spoil will be placed directly on top of the pipeline with an auger type (a tool with a horizontal helical bit that physically moves backfill off the ROW surface directly into the trench) backfill technique wherever possible; otherwise, confirm that an excavator (back hoe or track hoe) will initially place spoil before a bulldozer is used for backfill
	Ensure there is minimum cover over the installed pipe (or top of concrete weights) as specified in Owner Company or project specifications
	Ensure final backfilled surface is level across the trench
	Ensure soil compacting of agricultural (cultivated, pasture, and native range) land is carried out if specified in Owner Company or project specifications, drawings, and line lists
	Ensure that overall drainage control measures are undertaken as advised by the line list
	Check that watercourses or land drain reinstatement are correct and are functioning properly
	Check that ditch plugs and sack breakers are installed at the locations defined by the terrain and project specifications
	Continually observe for sinkholes along the ditch line and stop work for consultation with the Construction Manager / Chief Inspector (or designate) when identified or suspected
	Ensure that the Contractor compacts the spoil in the trench so that the trench crown (berm) is no higher than specified by Owner Company
	Confirm that the top-most specified depth of the backfilled trench and crown for cultivated land are rock-free
	Ensure that Contractor leaves openings in the trench crown (berm) as required to allow for natural drainage of surface water
	Ensure that the right of way (ROW) is left in as close to original condition as possible
	Confirm that the Contractor will conduct final clean-up when soils are dry and unfrozen. Final clean-up should be delayed until spring when spoil can be adequately compacted in the trench and spoil and topsoil can be removed from the sod surface more accurately
	Confirm that the Contractor removes spoil and stored topsoil to eliminate scalping of native sod, in a manner approved by the Owner Company
	Confirm that the Contractor replaces soils with adverse chemical properties within the area from which they were removed, to eliminate spread outside of the excavated site
	Confirm that the Contractor re-contours graded portions of the ROW to match the surrounding landforms and drainage patterns
	Confirm that the Contractor provides adequate erosion protection (installing suitable geotextiles) where surface drainage crosses the trench line and to prevent surface drainage from flowing down trench line



✓	Description
	Confirm that the Contractor re-distributes salvaged topsoil carefully over the stripped area (e.g., the size and type of equipment used and the number of passes that are needed to replace topsoil is key to reclamation success as overworking some soils can result in increased pulverization, loss of organic matter, and increased erosion potential)
	Confirm that Contractor picks surface rock to match the stoniness level of the surrounding landscape
	If required, ensure that the Contractor uses track hoes equipped with clean-up buckets to shade the pipe berm (per initial backfill procedure) and replaces the bulk of the spoil
Winter Construction	
	Confirm that during winter construction trench excavation, pipe lowering-in and backfilling is completed by the Contractor within 24 hours or as agreed with the Owner Company
	Ensure solidified or frozen backfill is broken up with a screw auger, power dozer, or other approved equipment
	Ensure that any snow or ice is removed from the compacted layer prior to placement of subsequent layers
	Ensure that during winter construction, the Contractor leaves a trench crown (berm) over the trench to compensate for settlement upon thawing of frozen soils as indicated in Owner Company specifications, construction drawings, and agreements

Table 116: Typical Monitoring Requirements for Materials

✓	Description
	Ensure that top soil is never used as padding material or fill
	Ensure that the back fill material is soft, free from large rocks, stumps, frozen material, or any other foreign material that can dent the pipe or scratch the external coating as per Owner Company specifications
	Ensure that when excavated material is not suitable for backfill, Owner Company approved imported material is used for padding above and below the pipe
	Ensure that when gravel or gravel / sand mixture is used as backfilling material for buoyancy control purposes where trench walls provide firm support, the material is free-draining and exhibits sufficient shear strength when thawed and mixed with water
	Confirm that earth filled sacks or rock riprap (rock or other support material used to armor drainage ditches and trench walls) are used for erosion control
Sand Padding	
	Confirm that if the excavated material is not suitable for padding, either a mechanical separator will be brought in or approved padding material will be hauled in and placed around the pipeline
	Ensure that where sand is used for padding, it is dry, unfrozen, and free from any rocks larger than specification or having sharp edges
	Ensure Contractor applies sand padding after sandbags and foam support pillows are placed in the trench
	Ensure Contractor uses only sandbags or foam pillows to support the pipe
	Ensure Contractor places the minimum thickness specified of sand-padding on top of the lowered pipe as indicated in Owner Company or project specifications, construction drawings, and agreements
	Confirm that Contractor is using auger equipment for backfill where coarse fragments are encountered in trench materials

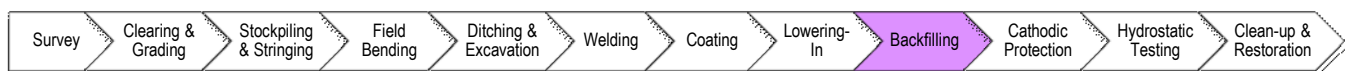


Table 117: Typical Monitoring Requirements for Pre-Heating Operations (if required)

✓	Description
	Ensure pipeline is preheated by blowing hot air through the pipeline
	Ensure temperatures at the inlet and outlet of the pipeline are being constantly monitored
	Ensure inlet temperature does not exceed the pipe coating design temperature
	Ensure outlet temperature is never less than the specified installation temperature
	Ensure backfilling and compaction is completed while pipeline temperature is maintained above specified installation temperature
	Ensure the length of pre-heated section is as per Owner Company specifications
	Ensure all wet areas on the right of way (ROW) are red lined for future reference

Table 118: Typical Monitoring Requirements for Special Locations

✓	Description
	Confirm that gravel and/or sand filled bags are used on solidly compacted backfill at open-cut water crossings that may be subject to erosion
	Confirm that concrete weights or backfilling are used as specified in Owner Company or project specifications to overcome the upward buoyancy force on the pipe due to a high water table or use sand bags in wetlands
	Ensure that for bends where no foam boxes are specified by engineering design, a minimum of sand padding will be provided based on specifications. The padding should extend beyond the tangent on both sides of the bend
	Ensure the Contractor is backfilling and finishing the grade at compressor and pump stations, mainline valves, temporary tie-overs, meter stations and other sites with fenced enclosures, as per Owner Company specifications
	Ensure that cathodic protection test leads remain intact and accessible above ground

Table 119: Typical Monitoring Requirements for Primary and Secondary Roads – Bored

✓	Description
	Ensure Contractor supports both ends of the bored crossing according to project specifications, construction drawings, and agreements
	Ensure Contractor backfills excavated trench outside the road edges with granular materials according to Owner Company specifications, construction drawings, and agreements
	Ensure Contractor backfills and compacts outside the bore edges, below the pipe, and/or places sandbags below the pipe to minimize the risk of pipe settlement and potential buckling

Table 120: Typical Monitoring Requirements for Open-Cut Roads

✓	Description
	Confirm that for secondary roads, the Contractor uses excavated trench materials up to a specified distance below the road surface if material is free of moisture and rocks. Remaining backfill will be with select, imported, granular materials according to project specifications, construction drawings, and agreements
	Ensure that backfilling is accomplished in layers, with each layer thoroughly compacted to the specified requirements with Owner Company approved vibration type tamping machines to produce a smooth and even surface
	Ensure that for repaving road surfaces, the Contractor cleans the adjacent roadway outside the open-cut trench and shoulders of all mud and debris, then pave the road to leave a smooth and even surface
	Confirm that the final topping is of granular material to match with existing road surface

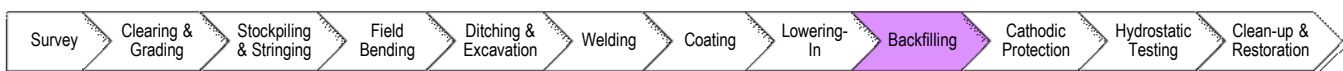
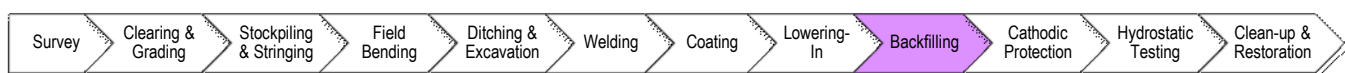


Table 121: Typical Monitoring Requirements for Horizontal Directional Drilling

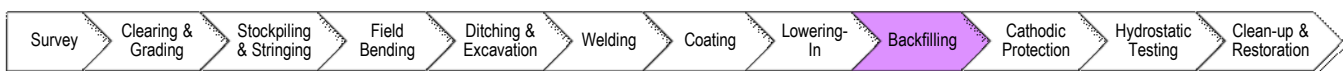
✓	Description
	Confirm that the Construction Team consults with the Horizontal Directional Drilling (HDD) Contractor to determine backfill and compaction requirements for both ends of any HDD crossing
	Check that both ends of the bored crossings will be adequately supported before backfilling
	Check that supports are not placed in disturbed or un-compacted soil
	Ensure that once the crossing pipe is in place, both ends of the bored crossings are immediately backfilled as per Owner Company specifications



15.7 Typical Outputs for Backfilling Inspection

Table 122: Typical Reporting Requirements

✓	Description
General	
	There are no incremental specific reporting requirements beyond those identified in chapter 6.0 Pipeline Construction Inspector – Foundational Information
Daily	
	<p>Complete backfilling progress reports, including:</p> <ul style="list-style-type: none"> • Work completed to date, including: <ul style="list-style-type: none"> ○ Cover dimensions ○ Ditch crown height above grade ○ Land drain locations and depths ○ Start and end points for completed backfilling distances ○ Start and end points for skipped locations and why they were skipped ○ Number of rock hits on pipe ○ Number repairs due to rock hits ○ Schedule changes including any delay or acceleration and reasons ○ As-built alignment and profile of installed pipe ○ Holiday detector settings and calibration ○ Locations of damaged drain tiles for repair ○ Start, stop, and types of buoyancy control installed ○ Start, stop, and type of pipe protection materials installed ○ Any ROW weather or other logistical conditions that caused either an increase or decrease in expected progress



References – Backfilling

Note to user: The reference information provided in Table 123 is intended as a guide only (i.e., the list is not exhaustive); documents of this nature are updated frequently and it remains the responsibility of the user to ensure that the correct, and most current, documents are referenced as appropriate.

Table 123: List of References – Backfilling

Document No.	Type	Title
There are no incremental specific reference documents beyond those identified in chapter 6.0 Pipeline Construction Inspector – Foundational Information		



16.0 CATHODIC PROTECTION

16.1 Overview

Cathodic protection (CP) is a technique used to control corrosion of a pipeline's metal surface by making the pipeline the cathode of an electrochemical cell. In other words, CP is a simple method of protection where the pipeline is connected to a more easily corroded (sacrificial) metal (e.g., magnesium) which acts as the anode. The sacrificial metal then corrodes instead of the pipeline. However, for long pipelines, this passive galvanic cathodic protection is not adequate, and an external direct current (DC) electrical power source (rectifier) can be used to provide additional electrical current to protect the pipe.

As part of the CP system, test stations are required to take readings on a periodic basis. Typically, these test stations are installed at intervals of two to three kilometers (1.2 – 1.9 miles), not to exceed five kilometers (3.1 miles). Cathodic test leads, sacrificial anodes, negative drain leads, and ground bed cables are some of the major components that are installed at these stations to complete a cathodic protection system.

The Inspector's concern should be directed not only toward new installations but to existing Third Party buried facilities and their cathodic protection systems where there is potential for damage during excavation.

16.2 Inputs

As part of preparing for inspection during the cathodic protection process, the Inspector will continually familiarize themselves with relevant aspects of key documents, drawings, and Owner Company technical specifications as identified in Table 125.

16.3 Execution

While the work is being executed, the Inspector is required to monitor workmanship and report on progress on a periodic basis. Typical items that the Inspector will monitor for during the cathodic protection process are identified in a series of checklists as detailed in Table 124.

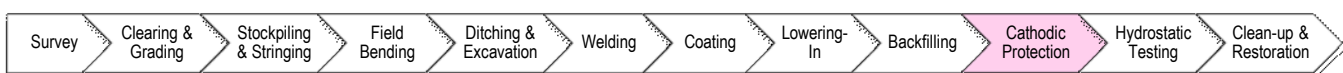
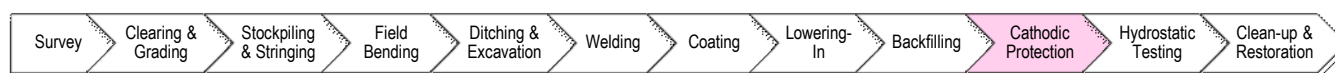


Table 124: Monitoring Requirements for Cathodic Protection

Item	Description	Reference
Prior to Commencing Work	<ul style="list-style-type: none"> On a daily basis, ensure key issues that have been identified are detailed and addressed 	Table 126
Safety	<ul style="list-style-type: none"> Monitor the operations for adherence to relevant Owner Company and project specific safety requirements 	Table 127
Environmental Considerations	<ul style="list-style-type: none"> Identifies specific items that should be monitored throughout Cathodic Protection operations that relate specifically to the Owner Company and/or project specific Environmental Protection Plan (EPP) 	Table 128
CP Installation	<ul style="list-style-type: none"> Monitor the installation of cathodic protection systems for safety as well as adherence to Owner Company specifications. In particular, incorporate considerations for locating cathodic protection test stations such as: <ul style="list-style-type: none"> Ease of accessibility of proposed installation location (e.g., on existing fence lines) Use of existing facilities (e.g., valve or scraper trap locations) Land Owner restrictions 	Table 129
CP at Third Party Pipeline Crossings	<ul style="list-style-type: none"> Ensure sufficient communication with Third Party Pipeline Owners to facilitate that requirements of the crossing agreement are met in a safe and efficient manner 	Table 130

16.4 Outputs

The Inspector is required to report on workmanship and progress on a periodic basis (e.g., daily or weekly) by completing various reports on each work day and end of week. Report requirements and reporting processes are Owner Company and project specific; however, best practices for reporting requirements for cathodic protection appear in Table 131.

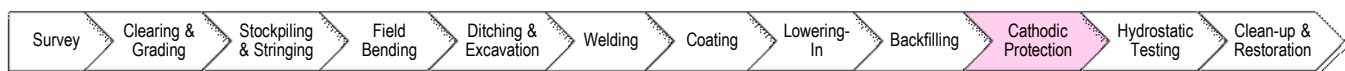


Detailed Checklists – Cathodic Protection

16.5 Typical Input Requirements for Cathodic Protection Inspection

Table 125: Information Requirements for Cathodic Protection

✓	Description
	<p>All designs, drawings, and specifications developed by the Owner Company and Contractors related to cathodic protection, such as:</p> <ul style="list-style-type: none"> • Access Road Drawings • Line List (e.g., special concerns for each Land Owner) • Cathodic Protection Installation Specifications • Cathodic Protection Testing Specifications • Third Party utility locations where CP connections are required • Locations and Types of Ground Beds and Anodes
	<p>Contracts and agreements related to:</p> <ul style="list-style-type: none"> • Road Use • Crossing for Buried Facilities • Crossing Agreements • Cathodic Protection Installation • Construction Survey
	<p>Permits related to:</p> <ul style="list-style-type: none"> • Environmental • Road Use
	<p>Owner Company specific Safety Plan, including (but not limited to):</p> <ul style="list-style-type: none"> • Traffic Control Plan • Requirements for Personal Protective Equipment (PPE) • Emergency Medical Services (EMS)
	Project specific Environmental Protection Plan (EPP) detailing cathodic protection requirements
	<p>Other project specific Plans, which may include:</p> <ul style="list-style-type: none"> • Cathodic Protection and Installation • Fire Prevention / Firefighting Plan



16.6 Best Practice Items for Inspecting Typical Cathodic Protection Operations

Table 126: Prior to Commencing Work

✓	Description
	<p>Participate in daily meetings to address:</p> <ul style="list-style-type: none"> • Cathodic protection requirements as per Owner Company specifications • Job safety and/or hazard identification issues • Environmental concerns • Duties of Inspector(s) • Pipeline Contractor's tailgate meetings (as required) • Ad-hoc meetings with Contractors to discuss and clarify questions or concerns

Table 127: Safety Concerns for Cathodic Protection

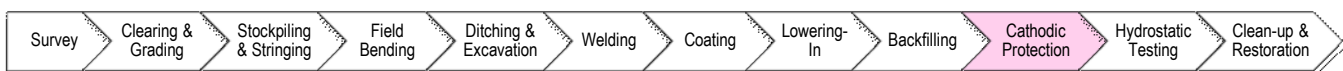
✓	Description
	Confirm that Manufacturer's instructions are followed in the use of thermite devices

Table 128: Typical Monitoring Requirements for Environmental Considerations

✓	Description
	There are no incremental specific Environmental Considerations beyond those identified in chapter 6.0 Pipeline Construction Inspector – Foundational Information

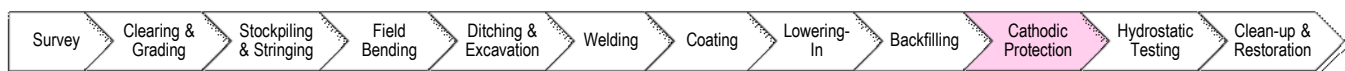
Table 129: Typical Monitoring Requirements for Cathodic Protection Installation

✓	Description
	If possible, ensure installation of cathodic test stations near existing roads for ease of accessibility during subsequent periodic testing in locations specified on project drawings
	Confirm if existing rectifiers are to be shut down in areas where existing pipe maintenance programs are under way
	Ensure test leads are backfilled carefully to avoid breaking wire-to-pipe connections and to avoid burying the lead wires before connections to the junction boxes are completed
	Confirm that both ends of the conduit leading up to the junction box are reamed out to remove any burrs that may cause a short in test lead wires
	Ensure test leads are tested electrically after backfill to confirm that wire-to-pipe connections have not been broken
	Confirm that test lead conduits are installed at locations and in a manner per the Owner Company specification (e.g., typically to the right of the centerline of pipe when facing downstream in the direction of gas flow)



**Table 130: Typical Monitoring Requirements for
Cathodic Protection at Third Party Pipeline Crossings**

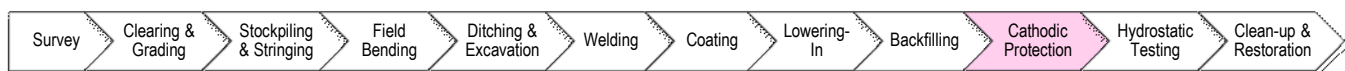
✓	Description
	Ensure the Third Party pipeline company is notified prior to any work on or near their pipeline. Typically, a representative from the Third Party pipeline company is present to observe or they themselves conduct the work
	Ensure that work undertaken in the vicinity of a Third Party Pipeline Company's cathodic protection system adheres to requirements identified for crossings in Third Party Owner Company and Owner Company specifications
	Confirm that existing ground cables connected to Third Party buried facilities are disconnected and moved out of harm's way during construction; however, ensure that any alternating current (A/C) interference mitigation concerns are addressed
	After daylighting the Third Party pipeline, ensure coating is examined to determine type, condition, and possible damage; notify the Third Party Pipeline Owner if damage is found
	At the Third Party pipeline crossing, ensure CP readings are taken by: <ul style="list-style-type: none"> • Using existing test leads on the Third Party pipeline • Take a pipe-to-soil reading if the coating has been damaged • Take a reading at the nearest Third Party pipeline's test station
	Ensure the Third Party pipeline coating is never punctured to take a pipe-to-soil reading
	Ensure if a test lead is to be attached to the Third Party pipeline, a Third Party Pipeline Company Representative will be present to perform the work themselves, unless otherwise agreed upon
	Confirm that at Third Party pipeline crossings, test leads are installed at all line crossings
	Confirm that test stations are installed as close to pipeline crossings as possible



16.7 Typical Outputs for Cathodic Protection Inspection

Table 131: Typical Reporting Requirements

✓	Description
General	
	<p>Complete cathodic protection (CP) installation / test station report, including:</p> <ul style="list-style-type: none"> • Number of Test Station Installations • Test Station Survey Numbers • Continuity Test Results (i.e., upon backfilling to ensure test leads have not broken)
	<p>Complete Third Party pipeline crossing report, including:</p> <ul style="list-style-type: none"> • Survey Station Numbers at Crossings • Name of Third Party Pipeline Companies • Pipeline Size and Use • Type and Condition of Coating • Clearance Above or Below Pipeline • Distance from Nearest Third Party Rectifier • Output from Third Party Rectifier • Pipe to Soil Readings at Crossing • If test leads are installed, Size and Color of Wire • Description of Location; Township, Range, Section, and Land Owner (tract number from alignment sheet) • Sketch of the Pipeline Crossing Showing Available Landmarks
Daily	
	There are no incremental specific reporting requirements beyond those identified in chapter 6.0 Pipeline Construction Inspector – Foundational Information

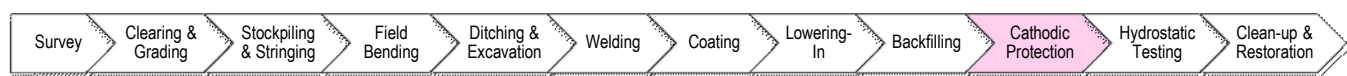


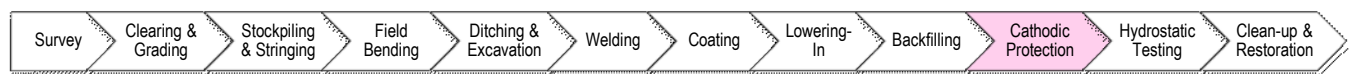
References – Cathodic Protection

Note to user: The reference information provided in Table 132 is intended as a guide only (i.e., the list is not exhaustive); documents of this nature are updated frequently and it remains the responsibility of the user to ensure that the correct, and most current, documents are referenced as appropriate.

Table 132: List of References – Cathodic Protection

Document No.	Type	Title
Canadian Gas Association (CGA)		
OCC-1	Standard	Recommended Practices for Control of External Corrosion on Buried or Submerged Metallic Piping Systems
NACE International		
SP0169	Standard	Standard Practice for Control of External Corrosion on Underground or Submerged Metallic Piping Systems
SP0177	Standard	Standard Practice for Mitigation of Alternating Current and Lightning Effects on Metallic Structures and Corrosion Control Systems
SP0188	Standard	Standard Practice for Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates





17.0 HYDROSTATIC TESTING

17.1 Overview

A hydrostatic test is a form of pressure testing used to confirm that the pipeline has acceptable strength and will not leak under operating conditions. Hydrostatic testing uses water (as opposed to air) to perform the test. Owner Companies pressure test a new pipeline after it is installed but before it is put into service for the following reasons:

- Prove the integrity of the fabricated assemblies, including all welds, to ensure the safety of the public, environment, and surrounding property
- Confirm the quality of fabricated assemblies, line pipe materials supplied by Vendors, and field welds performed on the ROW to ensure the pipeline system can safely operate within the specified maximum operating pressure (MOP)
- Prove the workmanship of Fabricators
- Comply with industry and governing body regulations

Caution: Air contains significantly more stored energy compared to water and poses increased risk during the test; as a result, it is only used for pressure testing under situations where the elevation differences result in an impractical number of test sections or if there is a shortage of water. For this reason, the scope of this document is limited to hydrostatic testing.

17.2 Inputs

As part of preparing for inspection during the hydrostatic testing process, the Inspector will continually familiarize themselves with relevant aspects of key documents, drawings, and Owner Company technical specifications as identified in Table 134.

17.3 Execution

While the work is being executed, the Inspector is required to monitor workmanship and report on progress on a periodic basis. Typical items that the Inspector will monitor for during the hydrostatic testing process are identified in a series of checklists, organized around the typical sequence of events during hydrostatic testing, as detailed in Table 133.

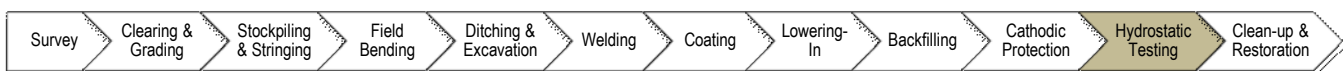
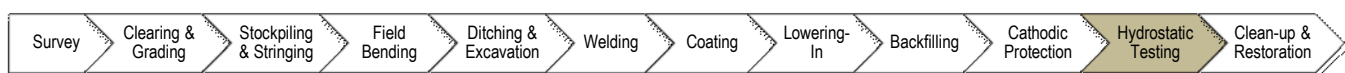


Table 133: Monitoring Requirements for Hydrostatic Testing

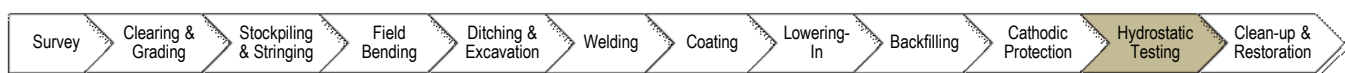
Item		Description	Reference
Prior to Commencing Work		<ul style="list-style-type: none"> On a daily basis, ensure key issues that have been identified are detailed and addressed Review and confirm all testing equipment has been certified as fully functional in advance of the testing operations 	Table 135
Safety		<ul style="list-style-type: none"> Monitor the operations for adherence to relevant Owner Company and project specific safety requirements 	Table 136
Environmental Considerations		<ul style="list-style-type: none"> Identifies specific items that should be monitored throughout Hydrostatic Testing operations that relate specifically to the Owner Company and/or project specific Environmental Protection Plan (EPP) 	Table 137
Preparing Test Sections		<ul style="list-style-type: none"> Monitor Contractor work to ensure that the test section is prepared (e.g., installation of test heads, cleaning, test water removal, and equipment use) to Owner Company specifications 	Table 138
Preparing for Pressure Test		<ul style="list-style-type: none"> Ensure all required permits, plans, and calculations are approved and in place prior to commencing hydrostatic test operation 	Table 139
Filling the Pipe		<ul style="list-style-type: none"> Confirm pipe is filled as per Hydrostatic Test Plan 	Table 140
Preparing for Pressurization		<ul style="list-style-type: none"> Ensure all instrumentation and equipment is in place prior to pressuring the test section, including setting up a "Test Bus" 	Table 141
Pressurization	Establishing Pressure-Volume Curve	<ul style="list-style-type: none"> Determine slope of pressure-volume curve (the relationship between the volume of water injected into the test section and the corresponding pressure rise) 	Table 142
	Leak Check (if required)	<ul style="list-style-type: none"> If there is need for a yield plot, then while the fill pump is shut off, the test heads should be checked for leaks and pressures compared at two test head pressure gauges and validated against elevation differences 	Table 143
	Strength Test	<ul style="list-style-type: none"> Proof of strength of installed pipe as per Hydrostatic Test Plan 	Table 144
	Leak Test	<ul style="list-style-type: none"> Follow controlled depressurization process from strength test to leak test 	Table 145
Leak or Failure Investigation (if required)		<ul style="list-style-type: none"> In the case of a pipe leak or failure during hydrostatic testing, the Contractor will visually inspect the test section route for water ponding or wet soils, locate the leak or determine the cause of the failure, and advise the Inspector. If visual inspection does not reveal the leak location, advise the Owner Company of further action The Inspector will notify the Construction Manager / Chief Inspector (or designate) and work with the Contractor to develop a Leak Detection Plan and have it approved. When a leak is discovered, the Contractor will repair the pipe section and the hydrostatic test will be conducted again 	Table 146
Depressurizing		<ul style="list-style-type: none"> Ensure depressurizing happens safely in preparation for dewatering and drying 	Table 147
Dewatering		<ul style="list-style-type: none"> Confirm dewatering happens in a manner consistent with environmental permits and approvals 	Table 148



Item	Description	Reference
Test Head Removal / Replacement	<ul style="list-style-type: none"> The Contractor will supply all materials, equipment, and personnel to remove test heads and replace with a pig launcher and receiver or tie into other facilities as specified by Owner Company 	Table 149
Drying	<ul style="list-style-type: none"> In order to prevent internal corrosion, one of three methods of drying should be undertaken to the Owner Company's specifications (i.e., use of drying pigs, air drying, or methanol) 	Table 150

17.4 Outputs

The Inspector is required to report on workmanship and progress on a periodic basis (e.g., daily or weekly) by completing various reports on each work day and end of week. Report requirements and reporting processes are Owner Company and project specific; however, best practices for reporting requirements for hydrostatic testing appear in Table 151.

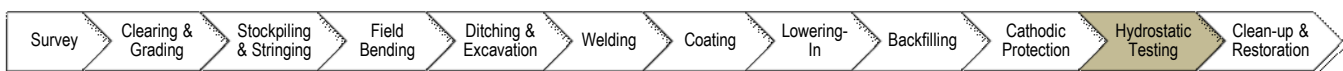


Detailed Checklists – Hydrostatic Testing

17.5 Typical Input Requirements for Hydrostatic Testing Inspection

Table 134: Information Requirements for Hydrostatic Testing

✓	Description
	<p>All designs, drawings, and specifications developed by the Owner Company and Contractors related to hydrostatic testing, such as:</p> <ul style="list-style-type: none"> • Alignment Sheets • Pipeline Facility Drawings • Line List (e.g., special concerns for each Land Owner) • Drawings specific to hydrostatic test (including but not limited to): <ul style="list-style-type: none"> ○ Temporary Launchers and Receivers ○ Elevation Profiles
	<p>Contracts and agreements related to:</p> <ul style="list-style-type: none"> • Road Use • Crossing for Buried Facilities • Construction Survey
	<p>Permits related to:</p> <ul style="list-style-type: none"> • Road Use • Water Withdrawal and Discharge for Hydrostatic Test
	<p>Owner Company specific Safety Plan, including (but not limited to):</p> <ul style="list-style-type: none"> • Traffic Control Plan • Requirements for Personal Protective Equipment (PPE) • Emergency Medical Services (EMS) • Emergency Contact List
	Project specific Environmental Protection Plan (EPP) detailing hydrostatic testing requirements



✓	Description
	<p>Other project specific Plans, which may include:</p> <ul style="list-style-type: none"> • Hydrostatic Test Plan addressing (but not limited to) the following items: <ul style="list-style-type: none"> ○ Site specific safety / hazards and appropriate analysis ○ Emergency Response Plan in the event of a rupture during the test ○ Testing personnel emergency contact list ○ Test section design process ○ Determination of class locations ○ Elevation profiles ○ Test section lengths ○ Test water sourcing, filling, pressurizing, depressurizing, and dewatering ○ Accessibility to test sections ○ Road crossings and signage ○ Possible reduction of the number of sections with heavy wall pipe ○ The sequencing of hydrostatic tests ○ Test pressure calculations ○ Minimum test head rating ○ Testing crew credentials ○ Test equipment list and capacities ○ Test schedule and sequence of tests ○ Instrumentation and their certification ○ Provision of protective berms around fuel storage used to supply fuel-driven line fill pumps (as required) ○ Leak Detection Mechanism / Plan (if required)



17.6 Best Practice Items for Inspecting Typical Hydrostatic Testing Operations

Table 135: Prior to Commencing Work

✓	Description
	Participate in daily meetings to address: <ul style="list-style-type: none"> • Job safety and/or hazard identification issues • Environmental concerns • Duties of Inspector(s) • Pipeline Contractor's tailgate meetings (as required) • Ad-hoc meetings with Contractors to discuss and clarify questions or concerns
	Confirm that the Hydrostatic Test Plan is approved
	Check that signage and contact information at public access points to the right of way (ROW), and if required, temporarily restrict access points
	Check for signage and contact information at all exposed pipe locations
	Communicate with the rest of the Construction Management / Inspection resources regarding test schedules and locations
	Check that test water withdrawal and disposal notifications, registrations, and/or permits are in place
	Confirm that the schedule will allow for the full length of strength and leak tests from start to completion
	Ensure water source volumes and flow rates are sufficient for the test sections and meet regulatory conditions
	Prior to and upon completion of a hydrostatic test, ensure that the local authorities are alerted
	Check all testing equipment certification (e.g., pressure recorders, test weights) and ensure a copy of the certification documents are on site

Table 136: Safety Concerns for Hydrostatic Testing

✓	Description
	Confirm comprehensive safety / hazard requirements are covered in detail within the Hydrostatic Test Plan

Table 137: Typical Monitoring Requirements for Environmental Considerations

✓	Description
	Ensure all stationary equipment (e.g., pumps, generators, fuel containers) within specified distances from a watercourse or water body are in secondary containment
	Ensure all equipment to be used within specified distances from a watercourse or water body is clean and free of leaks and are equipped with approved spill kits
	Ensure that appropriate testing (and associated disposal) is conducted for disposal of test water and debris from cleaning operations (i.e., if cleaning runs are completed)
	Ensure that appropriate containment is installed for receipt of any cleaning / drying pigs

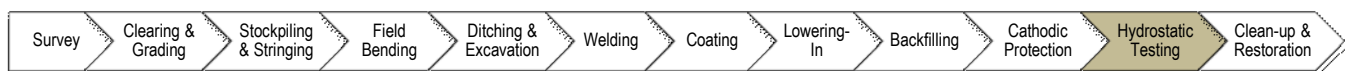
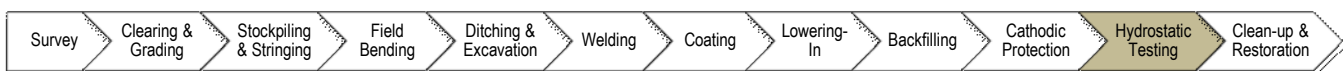


Table 138: Typical Monitoring Requirements for Preparing Test Sections

✓	Description
	Check that the lengths of exposed pipe (at the ends where test heads are connected) are kept to a minimum
	Ensure that any required bell holes (small excavated areas) are monitored for air quality
	Ensure that during winter construction, hoarding (plastic insulation over a wood frame used to maintain temperature around an exposed section of pipe) and heating is installed for exposed test section ends where test heads are to be welded
	Inspect the test heads and isolation valves and ensure that they are refurbished as required
	Ensure that the test heads are welded per Owner Company specifications; ensure that specialized welding inspection expertise is engaged for welding process (as per Section 12.0)
	Ensure good access to isolation valves (either through orientation of installation and/or scaffolding)
	Ensure that safety zones around test heads / pigging launchers and receivers are established and maintained throughout the operation
	Confirm that the Environmental Inspector is collecting and sending fill water for laboratory testing so that results are available before filling

Table 139: Typical Monitoring Requirements for Preparing for Pressure Test

✓	Description
Test Section	
	Ensure that the final test pressure calculation sheet is signed and dated by the Owner Company designate and available
	Check that water tanks have sufficient capacity to complete the test section before running out of water
	Check that pumps have the correct capacities (pressure delivery and volumetric flow rate)
	Check that water hoses for fill and squeeze activities have the correct ratings
	Check that water heating boilers (for hydrostatic testing in winter season) are in working order
	Confirm that recorders for pipe skin and ground temperature measurements are installed at the correct locations as specified per Hydrostatic Test Plan
	Check that the temperature recorders to measure the fill water temperature are installed and working properly
	Check that there are pressure gauges installed on test heads
	Check that a flow turbine meter is installed on the fill water line connected to a test head
	Check that all hoses connecting to the instruments in the test bus are installed
	Ensure that supply and discharge lines are adequately anchored and supported as per installed per Hydrostatic test plan
	Ensure that all other hoses are correctly installed and secure; monitor on an ongoing basis
	Check that lights / generators are in working order
	Confirm that a portable laboratory for testing the water quality is available (if required)



✓	Description
Test Bus	
	<p>Ensure that the test bus is supplied with the following:</p> <ul style="list-style-type: none"> • Tables, chairs, lights, and heaters • Drinking water, snacks, and paper napkins • Pressure charts and temperature charts • Pressure recorder (either hydraulic dead weights and/or electronic recorders) • Flow totalizer (shows the total volume of water injected into the test section) • Thermometers (ambient and/or alternate) • Test instrument certificates • Test system spare parts
	Ensure the Contractor will install a thermometer outside the test bus in the shade to measure the ambient temperatures during pressure testing

Table 140: Typical Monitoring Requirements for Filling the Pipe

✓	Description
	Ensure accuracy of the flow turbine and flow totalizer are confirmed and any discrepancies are resolved prior to proceeding
	For winter testing of buried pipe, ensure any preheating requirements as identified in the Hydrostatic Test Plan are executed
	<p>Ensure that the test section is filled using pigs based on the specified procedure, in particular:</p> <ul style="list-style-type: none"> • To avoid trapping of air from the water source • To maintain control of the pig • Confirm that the starting position of all valves and equipment is as specified in the filling procedure per the Hydrostatic Test Plan • Additional specific seasonal considerations may also apply
	Check and record continually the total injected volume on the flow totalizer
	Ensure that filling is continuous until the lead filling pig is seated in the downstream test head
	Monitor to ensure that the filling procedure, as specified in the Hydrostatic Test Plan, is followed

Table 141: Typical Monitoring Requirements for Preparing for Pressurization

✓	Description
	<p>Come prepared with the following items to the test site / test bus for pressurizing the test section and yield plotting:</p> <ul style="list-style-type: none"> • Final validated calculation sheets that are stamped, signed, and dated by Owner Company Designate • Mechanical pencil, pen, eraser, ruler, and calculator • Writing pad, graph paper, and envelopes • Owner Company hydrostatic test forms and logs • Unit conversion table • Watch, cell phone, cell phone charger, and water/food

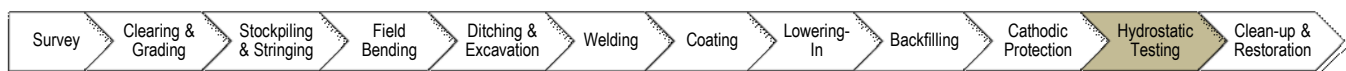


Table 142: Typical Monitoring Requirements for Establishing Pressure-Volume Curve

✓	Description
	Examine the test calculations to determine ahead of time whether or not a yield plot is required; prepare accordingly
	Establish pressure increase rate as per Owner Company Hydrostatic Test Plan using the pressure recorder
	Clearly note and establish the start and stop pressures for this portion of the hydrostatic test per the calculation sheet
	Ensure all instrument and equipment settings are as per Owner Company Hydrostatic Test Plan
	Ensure that the Contractor has unhooked the fill pump and hooked up and started the squeeze pump as specified by the Owner Company to pressurize the test section
	Log the time, test section pressure (using dead-weight pressure recorder), and water volume (using flow totalizer) on log sheet
	Minimize changes to pump settings before completing yield plot (results in pressure waves and unreliable yield plots)

Table 143: Typical Monitoring Requirements for Leak Check

✓	Description
	Yield Plot (if required)
	Check the test heads for leaks and pressures (while the fill pump is shut off), compared at two test head pressure gauges and validate against elevation differences
	Ensure a pressure versus volume plot is produced and the values verified against the hydrostatic test calculation sheet; any discrepancies should be resolved before proceeding further
	Confirm that established yield plot start and stop pressures are used
	Ensure limits for identifying yielding of pipe are established and monitored per Hydrostatic Test Plan; pressurization should be stopped if limits are exceeded
	Record results on the yield plot log sheet

Table 144: Typical Monitoring Requirements for Strength Test

✓	Description
	Ensure all instrument and equipment is installed and set as per Owner Company Hydrostatic Test Plan
	Confirm that established yield plot start and stop pressures are used
	Ensure that the pre-established pressure increase rate is maintained
	Ensure limits for identifying yielding of pipe are established and monitored per Hydrostatic Test Plan; pressurization should be stopped if limits are exceeded
	Record results on the yield plot log sheet
	At the appropriate time, ensure the Contractor is advised to lock the test section, install a bull plug at the inlet point, and the test section is declared to be on strength test
	Fill out the strength test data log as required by Owner Company
	Accept the strength test by signing and dating the log if the pressure remains above the minimum value as specified by the Hydrostatic Test Plan
	If the pressure drops below the minimum test pressure, proceed to investigate and resolve as per the Hydrostatic Test Plan

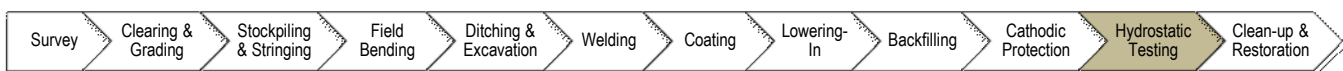


Table 145: Typical Monitoring Requirements for Leak Test

✓	Description
	Ensure pressure reduction from strength test value to leak test value is completed in a manner consistent with Hydrostatic Test Plan
	All other monitoring requirements are similar to Strength Test per Table 144

Table 146: Typical Monitoring Requirements for Leak or Failure Investigation

✓	Description
	Advise the Owner Company of further action in the event that the Contractor cannot locate a pipe leak or determine the cause of failure during hydrostatic testing through visual inspection
	Notify the Construction Manager / Chief Inspector (or designate) and work with the Contractor to develop a Leak Detection Plan and have it approved
	When a leak is discovered, ensure the Contractor repairs the leak per Owner Company specifications and other portions of this document are referenced prior to conducting the hydrostatic test again

Table 147: Typical Monitoring Requirements for Depressurizing

✓	Description
	Ensure that the Contractor does not start depressurizing until all required personnel are on site
	Confirm that the Contractor has taken all safety precautions before starting to depressurize the test section
	Check that the Contractor has secured the depressurizing hose to prevent vibration during pressure release
	Ensure that the Contractor is opening the test head slowly to protect it from shock-loading the pipeline
	Ensure that the Contractor or other personnel does not, under any circumstance, open the bleed-off assembly fully

Table 148: Typical Monitoring Requirements for Dewatering

✓	Description
	Ensure that the Contractor does not start dewatering until all required personnel are on site
	Ensure that the Contractor dewater to locations approved in the water permit or the Environmental Protection Plan (EPP)
	Ensure that the Contractor does not dewater until proper fill-water sampling is completed and filtration unit is in place (if required)
	Check that the Contractor securely supports and ties down the dewatering line at the discharge end to prevent whipping
	Confirm that the Contractor does not use mechanical connections on dewatering line
	Ensure that the Contractor installs an energy absorbing diffuser at the discharge end of the dewatering line to prevent erosion, bottom scour, or damage to vegetation
	Check that the Contractor uses a bi-directional pig propelled by compressed air to push water out of the test section
	Check that the Contractor probes the dewatering pigs to verify their proper position before and after dewatering runs
	Ensure that the test section is dewatered based on the specified procedure, in particular: <ul style="list-style-type: none"> • Appropriate pressure set points and pig speed are maintained • A test section with a downhill slope is dewatered with the appropriate precautions as identified per the Hydrostatic Test Plan (e.g., the discharge end valve should not be opened before receiving the pig) • Additional specific seasonal considerations may also apply

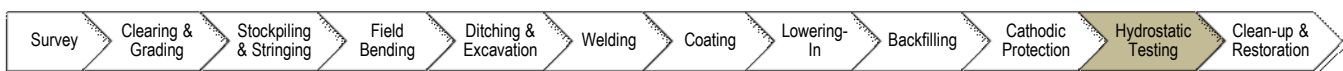
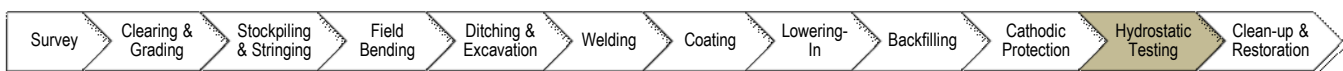


Table 149: Typical Monitoring Requirements for Test Head Removal / Replacement

✓	Description
	Inspect for damage and unfit fittings once test head is removed
	Check that sacrificial pup is removed and nuts, studs, and valves are properly secured for transport
	Complete test head inspection documentation
	Ensure heavy wall pipe end is prepared for welding during final tie-ins

Table 150: Typical Monitoring Requirements for Drying

✓	Description
General	
	Confirm that drying method used by Contractor is consistent with Hydrostatic Test Plan requirements
	Ensure that Owner Company criteria for a "dry line" are met
	If the pipeline will not be commissioned soon after drying, ensure the pipeline is purged with dry nitrogen to meet Owner Company specifications
Drying Pig Runs	
	Ensure pigs used for drying runs are as specified by the Owner Company
	Confirm that number of pig runs is per Owner Company requirements (each pig should be numbered)
	Ensure that all drying pigs are counted upon receipt (i.e., ensure no pigs remain in the line)
Air Drying	
	Ensure injected dried air relative humidity readings meet specifications
Methanol Wash	
	If Owner Company has specified methanol wash as the acceptable drying method, ensure specifications for injection and recovery are followed



17.7 Typical Outputs for Hydrostatic Testing Inspection

Table 151: Typical Reporting Requirements

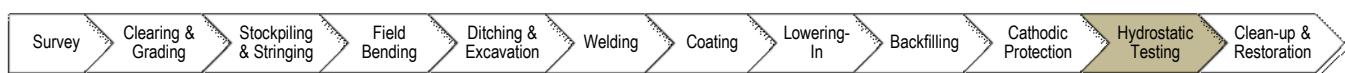
✓	Description
General	
	Record all hydrostatic test calculations and results
	Complete Safety Hazard Observation Report
	Complete test head inspection documentation
	Establishing Pressure-Volume Curve – Log the time, test section pressure (using dead-weight pressure recorder), and water volume (using flow totalizer) on log sheet
	Leak Check – Record results on the yield plot log sheet
	Strength Test – Fill out the strength test data log as required by Owner Company
Daily	
	Complete hydrostatic testing progress reports, including: <ul style="list-style-type: none"> Any and all of the monitoring and inspection items as defined in previous tables within Section 17.0

References – Hydrostatic Testing

Note to user: The reference information provided in Table 152 is intended as a guide only (i.e., the list is not exhaustive); documents of this nature are updated frequently and it remains the responsibility of the user to ensure that the correct, and most current, documents are referenced as appropriate.

Table 152: List of References – Hydrostatic Testing

Document No.	Type	Title
American Petroleum Institute (API)		
API RP 1110	Recommended Practice	Pressure Testing of Steel Pipelines for the Transportation of Gas, Petroleum Gas, Hazardous Liquids, Highly Volatile Liquids, or Carbon Dioxide
INGAA Foundation		
CS-S-9	Guideline	Construction Safety Consensus Guidelines – Pressure Testing (Hydrostatic /Pneumatic) Safety Guidelines



18.0 CLEAN-UP AND RESTORATION

18.1 Overview

Construction site clean-up is the final cleaning and removal of construction materials left over from the pipeline right of way (ROW) and surrounding area. All materials not native to the site are removed. Construction site clean-up is important to the Owner Company as it:

- Provides tangible examples of Owner Company's attention to detail during construction
- Helps to ensure regulatory agencies and Land Owners are satisfied
- Sets the stage for Land Owner acquiescence, agreement, and support when approached for future projects

Clean-up work can be performed in phases depending on the location and season of construction. For example, during winter construction, the Contractor will perform the machine or initial clean-up immediately after the end of construction and before the spring breakup, then return to the site the following winter to do the final clean-up.

However, during summer construction, the Contractor will do both machine and final clean-up immediately after the end of construction and return to the site at a later date for additional restoration work (e.g., repairing a sunken ditch).

18.2 Inputs

As part of preparing for inspection during the clean-up and restoration process, the Inspector will continually familiarize themselves with relevant aspects of key documents, drawings, and Owner Company technical specifications as identified in Table 154.

18.3 Execution

While the work is being executed, the Inspector is required to monitor workmanship and report on progress on a periodic basis. Typical items that the Inspector will monitor for during the clean-up and restoration process are identified in a series of checklists as detailed in Table 153.

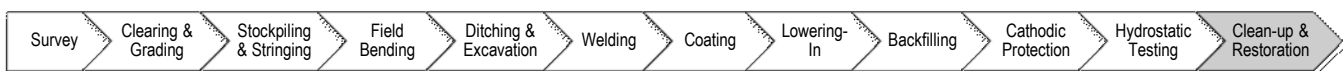
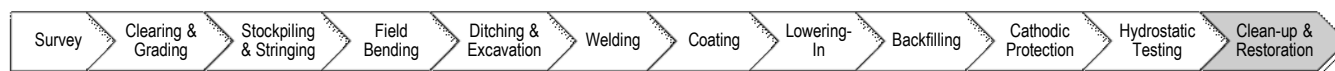


Table 153: Monitoring Requirements for Clean-up and Restoration

Item	Description	Reference
Prior to Commencing Work	<ul style="list-style-type: none"> On a daily basis, ensure key issues that have been identified are detailed and addressed 	Table 155
Safety	<ul style="list-style-type: none"> Monitor the operations for adherence to relevant Owner Company and project specific safety requirements 	Table 156
Environmental Considerations	<ul style="list-style-type: none"> Identifies specific items that should be monitored throughout Clean-up and Restoration operations that relate specifically to the Owner Company and/or project specific Environmental Protection Plan (EPP) 	Table 157
General Clean-up and Restoration	<ul style="list-style-type: none"> Monitor to ensure that condition of the ROW and construction area is returned as close to the original state as possible, also taking into consideration Land Owner concerns 	Table 158
Topsoil Replacement	<ul style="list-style-type: none"> Ensure that topsoil quality is per Owner Company specification and Land Owner agreements as part of ROW rehabilitation 	Table 159
Terraces, Drainage, and Slope Protection	<ul style="list-style-type: none"> Confirm that appropriate drainage and slope protection mechanisms have been installed as required by Owner Company specifications 	Table 160
Diversion Berms	<ul style="list-style-type: none"> Ensure Diversion Berms (shallow earthen dykes that collect and redirect surface water on right of way) are constructed as required following Owner Company specifications 	Table 161
Watercourses and Crossings	<ul style="list-style-type: none"> Confirm that watercourses and crossings are treated as per requirements of any permits as well as required by Owner Company specifications 	Table 162
Roads	<ul style="list-style-type: none"> Confirm that roads have been returned to a state as per Owner Company specifications, road crossing, and Land Owner agreements 	Table 163
Replanting and Reseeding	<ul style="list-style-type: none"> Confirm that replanting and reseeding is completed as per requirements of any permits as well as required by Owner Company specifications 	Table 164
Fencing	<ul style="list-style-type: none"> Confirm that fencing has been installed as per Owner Company specifications and Land Owner agreements 	Table 165

18.4 Outputs

The Inspector is required to report on workmanship and progress on a periodic basis (e.g., daily or weekly) by completing various reports on each work day and end of week. Report requirements and reporting processes are Owner Company and project specific; however, best practices for reporting requirements for clean-up and restoration appear in Table 166.

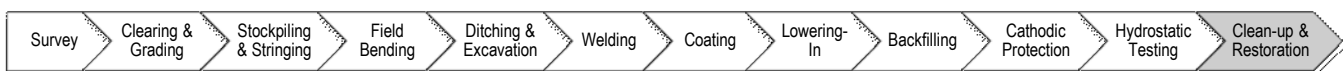


Detailed Checklists – Clean-up and Restoration

18.5 Typical Input Requirements for Clean-up and Restoration Inspection

Table 154: Information Requirements for Clean-up and Restoration

✓	Description
	<p>All designs, drawings, and specifications developed by the Owner Company and Contractors related to clean-up and restoration, such as:</p> <ul style="list-style-type: none"> • Access Road Drawings • Grading Drawings • Line List (e.g., special concerns for each Land Owner)
	<p>Contracts and agreements related to:</p> <ul style="list-style-type: none"> • Road Use • Crossing for Buried Facilities • Construction Survey
	<p>Permits related to:</p> <ul style="list-style-type: none"> • Environmental • Road Use
	<p>Owner Company specific Safety Plan, including (but not limited to):</p> <ul style="list-style-type: none"> • Traffic Control Plan • Requirements for Personal Protective Equipment (PPE) • Procedures for working around overhead powerlines • Emergency Medical Services (EMS)
	<p>Project specific Environmental Protection Plan (EPP) detailing clean-up and restoration requirements for the following (but not limited to):</p> <ul style="list-style-type: none"> • Watercourses • Wetlands, muskeg, and swamp areas • Wildlife habitats • Migratory routes
	<p>Other project specific Plans, which may include:</p> <ul style="list-style-type: none"> • Approved Grading Plan • Clean-up and ROW Restoration Plan • Heritage Sites



18.6 Best Practice Items for Inspecting Typical Clean-up and Restoration Operations

Table 155: Prior to Commencing Work

✓	Description
	<p>Participate in daily meetings to address:</p> <ul style="list-style-type: none"> • Job safety and/or hazard identification issues • Environmental concerns • Duties of Inspector(s) • Pipeline Contractor's tailgate meetings (as required) • Ad-hoc meetings with Contractors to discuss and clarify questions or concerns

Table 156: Safety Concerns for Clean-up and Restoration

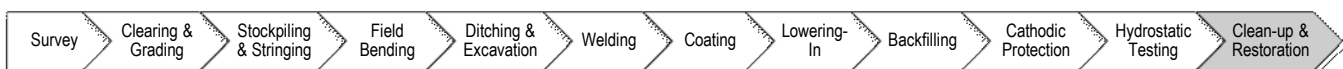
✓	Description
	There are no incremental specific Safety Concerns beyond those identified in chapter 6.0 Pipeline Construction Inspector – Foundational Information

Table 157: Typical Monitoring Requirements for Environmental Considerations

✓	Description
	There are no incremental specific Environmental Considerations beyond those identified in chapter 6.0 Pipeline Construction Inspector – Foundational Information

Table 158: Typical Monitoring Requirements for General Clean-up and Restoration

✓	Description
	Liaise with Land Agent on any special restoration requirements of Land Owners
	Ensure complete removal of debris (e.g., general construction debris, rocks, boulders)
	Ensure that previously existing contours in landscape are recreated
	Check placement of erosion control measures for compliance with Owner Company specifications
	Ensure that ROW preparation is suitable for the application of fertilizers and seeds per Owner Company specifications as well as Land Owner agreements
	Ensure that appropriate equipment is used to remove compaction
	Ensure no surplus construction or pipeline materials are left on the ROW (refer to contract documents to determine which materials will be stored and which will be scrapped)
	Confirm that reusable materials (e.g., pipe sections, valves, coating material) were returned to Owner Company after being prepared for return
	Confirm the backfill roach is not blocking any drainage, access roads, recreational trails, or wildlife/livestock trails across the ROW and that sufficient gaps have been included to allow cross-drainage
	Ensure that for winter construction, the ROW is stabilized after construction and during machine clean-up to prevent erosion during the spring thaw. Final clean-up may be completed during the following construction season, either fall or winter, depending on ground conditions
	Confirm that the Contractor will conduct final clean-up when soils are dry and unfrozen
	Check that all required diversion berms have been built
	Ensure cathodic protection test leads at all test stations are installed at specified heights on supporting poles



✓	Description
	Ensure final continuity check of cathodic protection test leads is completed
	Ensure rock material from construction or excavated that was not reused is removed from the ROW and hauled to an Owner Company approved dump site or distributed within a specific portion of the ROW
	Ensure all damage to properties such as buildings, fences, hedges, survey monuments, roads, railways, bridges, culverts, drainage ditches, and terraces occupied or crossed during construction are restored to their original condition
	Ensure all required pipeline warning signs are installed at fence lines and on each side of all road, railway, utility, and water crossings

Table 159: Typical Monitoring Requirements for Topsoil Replacement

✓	Description
	Ensure stones are removed and the subsoil surface is lump-free and leveled for topsoil replacement
	Ensure topsoil is only handled when weather conditions permit (e.g., heavy rain may disrupt operations) and in accordance with Owner Company specifications / procedures and Land Owner agreements
	Confirm that clean-up equipment heavier than allowed in the construction specifications do not operate over top the pipeline
	Ensure that all pipelines on the ROW are only crossed in accordance with the construction specifications
	Ensure all holes, ruts, and depressions are filled with subsoil
	Ensure soil tests on the ROW are completed to determine the level of compaction caused by construction
	Ensure ROW locations occupied during construction are de-compacted to loosen subsoil before replacing topsoil
	Ensure topsoil has been replaced evenly throughout work area to a depth comparable to pre-construction and off-ROW conditions
	Ensure restored topsoil has been prepared, groomed, and stones removed
	Check ROW locations where topsoil was not stripped but was compacted, it may require de-compaction, soil preparation, and/or grooming

Table 160: Typical Monitoring Requirements for Terraces, Drainage, and Slope Protection

✓	Description
	Check that the construction of terraces, berms or cross ditches on the ROW divert surface runoff to adjacent vegetated areas or existing drainage systems have been completed
	Check cross-drainage or watercourses for depth and operability
	Confirm all erosion prone slopes are re-vegetated by seeding with approved mixes, erosion control matting, hydro-seeding and/or hydro-mulching as per Owner Company specifications and Land Owner agreements
	Ensure all seepages are provided with drainage
	Ensure drainage ditches are constructed to convey overland flows off the ROW and prevents flooding (if required)
	Verify that land drains are operational and that no wet spots or pooling is evident

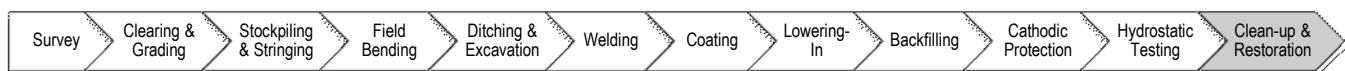


Table 161: Typical Monitoring Requirements for Diversion Berms

✓	Description
	Ensure construction of terraces, berms or cross ditches on the ROW to divert surface runoff to adjacent vegetated areas or existing drainage systems are completed
	Ensure all seepages are provided with drainage
	If required, ensure drainage ditches are constructed to convey overland water flows off the right of way to prevent flooding
	Ensure berms are prepared for seeding

Table 162: Typical Monitoring Requirements for Watercourses and Crossings

✓	Description
	Ensure water crossings are restored to pre-construction conditions and erosion and sediment control measures are installed per Owner Company specifications, Land Owner agreements, or as required
	Ensure riparian zones at major creek and river crossings are stabilized by supplying and installing site specific reclamation
	Ensure water quality is maintained while applying erosion control at a watercourse

Table 163: Typical Monitoring Requirements for Roads

✓	Description
	Confirm that all temporary access roads built during construction are removed and reclaimed per contract requirements
	Ensure road surfaces, fences and gates, signs, etc. are replaced or restored per contract requirements
	Ensure road system drainage tile systems are repaired, modified and/or replaced per contract requirements
	Ensure side-cuts are sloped and filled to stable angles to prevent incidents to persons, livestock, wildlife, or the environment

Table 164: Typical Monitoring Requirements for Replanting and Reseeding

✓	Description
	Confirm that the final soil surface is prepared adequately for seeding, taking soil conditions, weather conditions, ROW requirements, and surrounding land use into consideration
	Confirm all seed mixes, fertilizers, and rates of application have been approved by Owner Company and Land Owner agreements
	Confirm all seed and fertilizer application equipment and techniques have been approved by Owner Company using an approved technique such as seed drills or mechanical / hand broadcasters
	Ensure areas where soil stabilization is required (e.g., slopes, stream banks) have been seeded, fertilized, hydro-seeded, or sprayed with a tackifier (a soil adhesive) / mulch mixture
	Ensure trees and shrubs have been replanted or transplanted to meet Owner Company specifications and Land Owner agreements
	Ensure all original vegetation, including seeds, sod, grass, shrubs, and trees are restored or replaced, including fertilizing per Owner Company specifications and Land Owner agreements

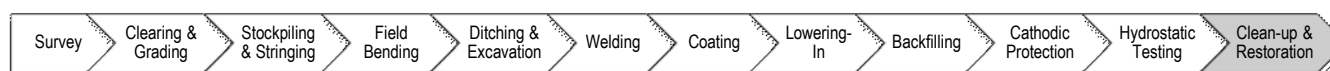
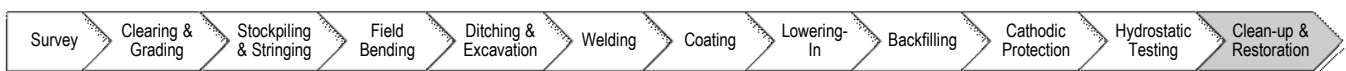


Table 165: Typical Monitoring Requirements for Fencing

✓	Description
	Ensure all temporary fences and barricades that were erected to stop unauthorized access by people or livestock (e.g., at the worksite, road crossings, access roads, or to identify sensitive locations like water crossing approaches and heritage resource sites) have been removed per Owner Company specifications
	Ensure that all fencing at compressor, sales / receipt meter stations, and valve locations that has been dismantled for convenience of work has been restored or replaced
	Ensure that sections of existing fence and gates that were removed have been supplied and replaced with new fence materials and new gates



18.7 Typical Outputs for Clean-up and Restoration Inspection Reporting

Table 166: Typical Reporting Requirements

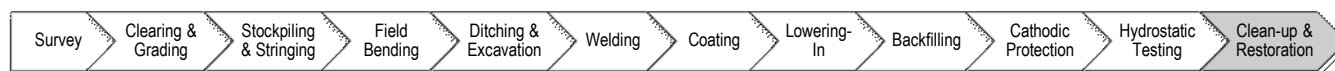
✓	Description
General	
	There are no incremental specific reporting requirements beyond those identified in chapter 6.0 Pipeline Construction Inspector – Foundational Information
Daily	
	<p>Complete clean-up and restoration progress reports, including the following details:</p> <ul style="list-style-type: none"> • Daily progress of the Contractor's clean-up activities with starts and end chainages / station numbers of daily progress • Daily updates on start and end chainages / station numbers of locations where the Contractor did no clean-up with a detailed explanation for omission • Any ROW, weather, or other logistical conditions that caused either an increase or decrease in expected progress • Depth of replaced topsoil • Compaction depths • Start / stops on tackifier applications • Start / stops on any specialized compaction removal • Drain tile station locations • Temporary / permanent repairs performed (e.g., fence damage) • Location and type of sediment control measures installed • Installation of additional warning signs

References – Clean-up and Restoration

Note to user: The reference information provided in Table 167 is intended as a guide only (i.e., the list is not exhaustive); documents of this nature are updated frequently and it remains the responsibility of the user to ensure that the correct, and most current, documents are referenced as appropriate.

Table 167: List of References – Clean-up and Restoration

Document No.	Type	Title
There are no incremental specific reference documents beyond those identified in chapter 6.0 Pipeline Construction Inspector – Foundational Information		



ENDNOTE

This Guide was developed by the INGAA Foundation and CEPA Foundation for the use of Pipeline Construction Inspectors in North America. This is the original version and is subject to future revision.

If you have any suggestions on additional content or revision to the material included in this Guide, please contact:

Executive Director
The CEPA Foundation
Suite 200, 505-3rd St. SW
Calgary, AB T2P 3E6
1 (403) 221 - 8779

or

Executive Director
The INGAA Foundation
20 F St.; Suite 450
Washington, DC 20001
1 (202) 216 - 5909

IMPROVING STEEP-SLOPE PIPELINE CONSTRUCTION TO REDUCE IMPACTS TO NATURAL RESOURCES

A REPORT PRODUCED THROUGH A COLLABORATION BETWEEN

Dominion Energy

Enbridge

EQT Midstream Partners

Kinder Morgan

NiSource

Southern Company Gas

UGI Energy Services

Williams

FACILITATED BY

The Nature Conservancy

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1 INTRODUCTION AND EXECUTIVE SUMMARY

1.1 Background

Projected energy demands over the next 15 years will lead to thousands of miles of new pipeline infrastructure and tens of billions of dollars in capital expenditures, according to analyses published by the [U.S. Department of Energy](#) [5], the [Interstate Natural Gas Association of America \(INGAA\) Foundation](#) [3], and the [Pipeline & Gas Journal](#) [4]. Increased activity is already evident across the United States and Canada, including expansions, modifications, replacements, and proposed new construction.

Steep slopes and landslide risks occur throughout the U.S., its territories, [6] and Canada [1]. The US Geological Survey (USGS) has documented landslide problems in regions known to support high levels of biological diversity, including the Appalachian Mountains, Rocky Mountains, Pacific Coast Ranges, and parts of Alaska and Hawaii [7,2]. According to the INGAA Foundation's analysis [3], the buildout of gas, oil, and natural gas liquids (NGL) infrastructure is expected to continue, with much of the pipeline capacity potentially originating in the Marcellus and Utica formations of the U.S. Northeast. Grading and excavating trenches on steep slopes increases the potential for slips, landslides, and erosion, which can threaten pipelines safety and increase the risk of environmental impacts.

1.2 Formation of a Collaborative Project Team

The Nature Conservancy (TNC or Conservancy)—a nonprofit organization dedicated to conserving the lands and waters on which all life depends, while also enabling the world to meet its food, water, wood fiber, and energy needs—facilitated a new collaboration to engage pipeline companies, regulators, academia, and other environmental non-governmental organizations (ENGOS). The participants share a commitment to developing new energy infrastructure in ways that are safe and avoid and minimize environmental impacts and effectively mitigate those impacts that cannot be avoided.

In spring 2017, the Conservancy began engaging with pipeline developers and other key stakeholders to garner interest in collaborative action. A project steering committee (project team) was formed, with representatives from the Conservancy and the following pipeline companies: Dominion Energy, Enbridge, EQT Midstream Partners, Kinder Morgan, NiSource, Southern Company Gas, TransCanada Corporation, UGI Energy Services, and Williams. Based in the U.S. and Canada, these companies committed to work collaboratively with the Conservancy to achieve the project objectives.

1.3 Project Objectives

This collaboration is intended to provide guidance for the industry in setting the highest practicable standards. Specifically, the collaboration sought to achieve three goals:

1. Identify the most prevalent challenges involved with pipeline construction in areas with a high risk of landslide, slip, and erosion potential.
2. Identify and communicate best practices for addressing these challenges.
3. Identify and communicate the additional needs or opportunities for further research, technological advancement, and new or modified engineering specifications to advance the understanding and use of potential new best practices for pipeline construction in steep slope areas.

This report is intended to serve as an industry-wide catalyst for reducing the risk of landslides, slips, and erosion that may occur during steep-slope pipeline construction, operation, and maintenance, as well as impacts from these events on habitat health and water quality. Moreover, it aims to highlight and promote a model of environmental stewardship and continuous improvement as an industry standard.

Pipeline route selection and planning is beyond the scope of this project. While recognizing that avoidance of steep slopes or other areas of concern is a route selection consideration, the project team focused on best practices that mitigate the risks of landslides on pipeline projects for which the routing process has been completed and the route will include segments with steep slopes.

The practices described in this report do not supplant any federal, state/provincial, or local regulations. The report intentionally uses language such as “recommend,” “encourage,” and “may” to describe the non-compulsory nature of these best practices, which are intended to apply to all pipeline projects in steep slope areas with a high potential for slope failure. Because each project will have unique challenges, it is not feasible to provide guidance for all possible scenarios nor is it expected that every suggested best practice will be utilized on a given project. Project sponsors should evaluate the specific issues, impacts, and stakeholder input relevant to their individual projects and adjust their analyses and consideration of best practices accordingly, while also meeting all regulatory requirements.

Figure 1-1: Recommended and Potential Best Practices.



1.4 Project Process

The collaborative project team convened in summer 2017 to develop consensus on the group’s work plan and deliverables, including this report. From fall 2017 through spring 2018, a series of technical workshops brought together key stakeholders and experts to further explore and refine the top challenges previously identified by the project team, and then to identify and articulate best practices and issues requiring further research or engineering guidance. Participants in these meetings included representatives from the Federal Energy Regulatory Commission (FERC), the American Gas Association (AGA), the Environmental Council of States (ECOS), the US Forest Service (USFS), and Trout Unlimited (TU), as well as several subject matter experts.

1.5 Report Structure & Organization of Best Practices

The Best Practices (BP) and potential Best Practices (PBP) are sequenced to correspond with the three characteristic phases in the life of a pipeline project: 1) pre-construction, 2) active construction and restoration,

and 3) operation and maintenance. For each phase, best practices were identified and organized using a similar structure as follows:

- **Definition and Purpose:** The BP is briefly defined and its purpose stated.
- **Planning Considerations:** The key issues that should be raised and resolved to promote effective implementation are identified.
- **Design Criteria:** The key design elements that should be included when utilizing the BP are outlined.
- **References:** Publicly available technical references used to formulate the BP are provided. The list highlights key sources of information and is not intended to be comprehensive.

Potential Best Practices (PBP) are actions that have the potential to become BPs but additional work is needed to fully develop these recommendations:

- **Definition and Purpose:** The PBP is briefly defined and its purpose stated.
- **Initial Considerations:** Initial key design elements that should be considered are identified.
- **Interim Recommendations:** Some initial key issues that should be raised and resolved to promote effective implementation are identified.
- **Questions:** Steps or options needed to formulate the BPs are discussed.

In all, this report contains 10 recommended BPs, along with four PBPs that hold promise but need further work and analysis to become recommended practices (Figure 1-1).

1.6 Limitations

It is understood that each project is unique and project sponsors are encouraged to consult with their pipeline construction contractors regarding the installation and maintenance of preventive measures.

2 PRE-CONSTRUCTION PHASE

2.1 BEST PRACTICES

2.1.1 Perform a Geohazard Assessment to Identify High-Hazard Landslide/Erosion Areas

Definition: Create an accurate indication of the presence of high landslide/erosion potential and erosion-prone slopes/areas utilizing desktop and site-survey methods.

Purpose: To reduce the probability of landslides or severe erosion through early and accurate discovery of high hazard areas and incorporation of findings into construction and restoration planning.

Planning Considerations:

1. Initiate this assessment as early in the process as possible to inform pre-construction planning.
2. Engage a qualified individual or team, such as a Professional Engineer, Professional Geologist, or equivalent qualification with relevant experience in geo-hazard assessments.
3. Solicit information from applicable state and federal resources (e.g. state or provincial geologists, U.S. or Canadian Geological Survey, land management agency experts) regarding historical landslide areas and unstable slopes.
4. Include in the assessment risk features outside of the Limits of Disturbance (LOD) that may contribute to landslide/erosion activity.

Design Criteria:

1. Evaluate landslide/erosion potential through a desktop review of state, provincial, and national resources, as well as project-specific LiDAR-generated topography or other high-resolution terrain data including, but not limited to, a review of the following:
 - a. previous and existing landslide-prone areas within the study corridor identified through state, provincial, and national landslide-mapping resources
 - b. topography, including hill-shading or digital terrain modeling
 - c. geology, including mapped faults, state of stress, and area seismicity
 - d. soils
 - e. surface hydrography and groundwater discharge (seeps and springs)
2. Field-verify high-hazard landslide/erosion potential areas via site visits and surveys, and inspect for potential landslide triggers (e.g., coal seam outcrops, bedrock outcrops, and attitude (strike and dip) relative to slope orientation, bedrock jointing and faults, steep slopes, soils/bedrock interface susceptible to landslides, colluvial soils, natural drainage channels, erosion rills, seeps, wetlands).
3. Utilize the geohazard assessment to assign aggregated landslide/erosion-potential categories (e.g., low, medium, high) within the study corridor. Tailor these categories to reflect the pipeline operator's assessment of landslide risk and associated environmental and pipeline integrity issues.
4. Determine aggregated landslide/erosion potential categories (typically medium and high) that require additional assessment (e.g., subsurface investigations, monitoring, software-driven slope stability assessment) to decide if civil/geotechnical measures are needed to stabilize the slope (as outlined in Best Practice 2.1.4 Identify Where Civil or Geotechnical Measures are Needed to Mitigate Slope Movement).
5. Incorporate findings into pre-construction planning.

- a. See BPs 2.1.2, Develop Site-Specific Plans for High Landslide Potential and Erosion-Prone Slopes; 2.1.3, Accurately Identify Water Features Prior to Construction; and 2.1.4, Identify Locations Where Civil or Geotechnical Mitigation Measures are Needed to Minimize Slope Movement for dependent actions.

References:

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10. Spiker, E.C., and Gori, P., 2003. "National Landslide Hazards Mitigation Strategy: a framework for loss reduction." Reston, VA. U.S. Geological Survey (USGS) Circular 1244.

2.1.2 Develop Site-Specific Plans for High Landslide Potential and Erosion-Prone Slopes

Definition: Conduct pre-construction planning for hazard avoidance, risk control measures, and specification of resources needed to implement controls as planned and to respond effectively to contingencies during construction.

Purpose: To identify effective control measures; ensure that appropriate resources are on site to implement control measures as designed; monitor efficacy of measures implemented; and address contingencies encountered during construction.

Planning Considerations:

1. Compose multidisciplinary teams of experienced technical experts – including regulatory agencies where appropriate – as a key part of ensuring well-developed plans.
2. Ensure that personnel responsible for documenting and amending risk control measures are familiar with the details and purpose of the site-specific plan for each high landslide hazard area.
3. Have construction crews with relevant experience execute (or manage) construction activities within a high-hazard area, whenever practicable.
4. Optimize operational safety, constructability, and environmental performance measures.
5. Maximize strategic timing of construction and final restoration activities:
 - a. Require excavation, installation, and restoration to be conducted as time-efficiently as possible to reduce the period during which the site is exposed to weather events.
 - b. Consider scheduling construction in high-hazard areas to avoid seasons when landslide hazard is highest.
 - c. Coordinate construction timing with the overall project schedule to minimize post-stabilization disturbance.

Design Criteria:

1. Identify water features that can contribute to landslide potential (see 2.1.3, Accurately Identify Water Features Prior to Construction).
2. Identify control measures to reduce landslide hazard potential:
 - a. Determine appropriate structural stabilization and erosion control measures (see 2.1.4, Identify Where Civil or Geotechnical Measures are Needed to Minimize Slope Movement).
 - b. Determine appropriate construction work areas (see 2.2.1, Potential Best Practice: Optimize Extent of Disturbed Area on High Landslide Potential Areas).
 - c. Determine appropriate vegetative control measures (see 2.1.5, Develop Site-Specific Reclamation and Revegetation Plans).
3. If post-construction geohazard monitoring will be needed, determine the monitoring method to be employed, and specify what equipment should be installed on or near the pipe during construction to record post-construction monitoring data. (see 4.1.2, Conduct Post-Construction Geohazard Monitoring).
4. Specify resources needed on site:
 - a. Select qualified contractors with relevant experience (“hill crews” or “slope crews”) to implement site-specific construction plans (i.e. (see 2.2.2, Potential Best Practice: Evaluate Environmental Performance of Contractors).

- b. Ensure that qualified personnel with relevant expertise are dedicated to each high-hazard construction area to document that control measures are being implemented as designed, and to make judgements regarding modifications needed to accomplish desired outcomes.
- c. Specify a chain of command assigning responsibility and authority for determining when additional expertise or resources are needed to respond to contingencies encountered during construction.

References:

1. Atlantic Coast Pipeline and Dominion Energy. 2017. Implementation Plan. FERC Docket Nos. CP15-554-000, CP15-554-001, & CP15-555-000. Environmental Condition 51 Part B. pp 68-74. Accession Number: [20171018-5002](#).
2. Federal Energy Regulatory Commission (FERC). 2017. "Guidance Manual for Environmental Report Preparation for Applications Filed Under the Natural Gas Act."

2.1.3 Accurately Identify Water Features Prior to Construction

Definition: Identify surface and subsurface hydrologic features and drainage routes during the project pre-construction phase through qualified technical personnel via on-site inspections, LiDAR-obtained topographic review, and/or other high-resolution methods.

Purpose: To avoid and minimize slope failures and slips caused by water features or soil saturation.

Planning Considerations:

1. Recognize that water features are a primary cause for landslide and erosion in high-hazard landslide/erosion areas.
2. Engage a qualified individual or team with relevant experience in hydrologic assessment.
3. Solicit information from all applicable state/provincial and national resources.

Design Criteria:

1. Gather and analyze preliminary information necessary to identify hydrologic resources, including, but not limited to, vegetation, topography, soils, geology, and surface hydrography and subsurface hydrology such as groundwater seeps and springs.
2. Verify preliminary assessment through field surveys and identify hydrologic features contributing to high landslide or erosion potential, including microtopography, and incorporate high landslide or erosion potential areas into a preliminary site-specific construction plan.
3. Incorporate findings into pre-construction planning (see 2.1.2, Develop Site-Specific Plans for High Landslide Potential and Erosion Prone Slopes).
4. Prior to construction, validate assessment and finalize site-specific construction plan through on-site inspection.
5. Create a structure to ensure consistency of institutional knowledge between design and construction phases of the project.

References:

1. Federal Energy Regulatory Commission (FERC). 2017. "Guidance Manual for Environmental Report Preparation for Applications Filed Under the Natural Gas Act." Section 4.2.2 Surface Water Resources.
2. James A.L., Watson, D.G. and Hansen, W.F., 2007, "Using LiDAR data to map gullies and headwater streams under forest canopy: South Carolina, USA" CATENA, **71**(1), pp. 132-144. doi.org/10.1016/j.catena.2006.10.010. Viewed May 18, 2018.
3. US Geologic Survey (USGS). National Hydrography Dataset. Available at nhd.usgs.gov/.
4. U.S. Fish & Wildlife Service (USFWS). National Wetlands Inventory. Available at www.fws.gov/wetlands/nwi/Overview.html.

2.1.4 Identify Locations Where Civil or Geotechnical Mitigation Measures are Needed to Minimize Slope Movement

Definition: Determine where mitigation or site-restoration measures above and beyond general standard construction and restoration practices (e.g., slope breaker installation, erosion control measures, seeding/vegetation, trench breakers) are necessary to stabilize disturbed slopes.

Purpose: Utilize civil/geotechnical measures to reduce the probability and mitigate the effects of landslides on pipeline ROW.

Planning Considerations:

1. Weigh options for geotechnical measures, which include (but are not limited to) ground armoring, special drainage measures, terracing, buttressing, rock fill, piling, and nailing.
2. Ensure that qualified personnel with relevant expertise (see Practice 2.1.1) conduct analyses and planning.

Design Criteria:

1. Evaluate whether the slope will remain unstable over the long term and/or if potential landslide-failure surfaces will be below the depth of any natural vegetation root reinforcement.
2. If so, implement civil/geotechnical measures. Consider the full suite of potential tools and techniques when determining appropriate mitigation measures (e.g., ground armoring, special drainage measures, terracing, buttressing, rock fill, piling, nailing) to stabilize the slope.

References:

1. Wang, Y.Y., West, D., Dewar, D., Hart, J., McKenzie-Johnson, A. and Sen, M., 2016, "Integrity Management of Ground Movement Hazards" *Proceedings of the 11th International Pipeline Conference*. Vol 1 2016 Paper No. IPC2016-64513, pp. V001T03A087. doi:10.1115/IPC2016-64513.
2. Bobrowsky, P.T. and Dominguez, M.J., 2012, "Landslide Susceptibility Map of Canada." Geological Survey of Canada (GSC) Open File Report 7228. [//doi.org/10.4095/291902](https://doi.org/10.4095/291902)
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5. Golder Associates, Inc. 2016. "Mitigation of Land Movement in Steep and Rugged Terrain for Pipeline Projects: Lessons Learned from Constructing Pipelines in West Virginia." Final Report No. 2015-03. Interstate National Gas Association of America (INGAA) Foundation. www.ingaa.org/File.aspx?id=28629
6. Halchak, B.E., Bell, J. and Dharmapuri, S., 2017. "Landslide Analysis Using Multi-Temporal LiDAR Data" *LiDAR Magazine*, 7 (3). www.lidarmag.com/content/view/12244/
7. D.G. Honegger Consulting. 2009. "Guidelines for Constructing Natural Gas and Liquid Hydrocarbon Pipelines through Areas Prone to Landslide and Subsidence Hazards." Pipeline Research Council International (PRCI). trid.trb.org/view/1477554

8. US Geological Survey (USGS). n.d. Seismic Hazard Maps and Site-Specific Data. Available at earthquake.usgs.gov/hazards/hazmaps/

2.1.5 Develop Site-Specific Reclamation and Revegetation Strategies

Definition: Include reclamation strategies to stabilize high landslide potential and erosion-prone slopes, for both short and long terms, in site-specific plans.

Purpose: To reestablish soil health and promote immediate vegetative cover, root growth, and long-term reclamation success.

Planning Considerations:

1. Engage an agronomist, range scientist, or soil scientist to develop the reclamation plan and, if possible, to oversee restoration performance.
2. Use a qualified pipeline restoration specialist or contractor with relevant experience to implement or manage reclamation plans.
3. Minimize the permanently maintained ROW width where possible.
4. Utilize soil amendments to achieve successful vegetative establishment if topsoil is not segregated.
5. Recognize that time of year will affect establishment success (e.g., seed establishment may be reduced during hot, dry seasons, so tree and shrub planting should be performed during spring and fall).
6. Understand that successful revegetation is likely to extend beyond project construction.
7. Budget to include construction and longer-term post-construction operations to manage the restored vegetation in high landslide potential and erosion-prone areas.
8. Follow up after short-term restoration to ensure that the long-term maintenance plan will be implemented as designed once the project is transferred from the construction division to the operations division.

Design Criteria:

1. Develop individual draft reclamation strategies for each high landslide potential and erosion-prone area prior to construction.
2. Specify both short-term and long-term restoration performance measures within relevant contracts, and identify the parties responsible for compliance with these measures.
3. Obtain soil samples during construction to validate reclamation plan prior to implementation.
4. Evaluate soil health and enact restoration measures as needed for successful long-term revegetation, such as application of appropriate soil amendments and utilization of cover crops to replenish soil biota and nutrients.
5. Plan to replant with appropriate vegetation/seed mixture in accordance with any regulatory requirements:
 - a. Utilize native species that will match or complement the adjacent habitat.
 - b. Choose deep-rooted species over shallow-rooted species, when possible, to improve environmental performance and reduce the risk of slips over the long term.

- c. Plant deeper-rooting shrub or small tree species in outer portions of LOD where they will not conflict with operational uses or regulatory requirements.
- d. Encourage revegetation of pioneer species by installing bird wire, living slope breakers, etc.

References:

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3. Natural Resource Conservation Service (NRCS) and Ducks Unlimited. n.d. "Vegetating with Native Grasses in Northeastern North America", U.S. Department of Agriculture, Washington, D.C. www.nrcs.usda.gov/Internet/FSE_PLANTMATERIALS/publications/nypmsbk10321.pdf
4. Sedivec, K., Piper, C., Printz, J., Wick, A., Daigh, A. and Limb, R., 2014. "Successful Reclamation of Lands Disturbed by Oil and Gas Development and Infrastructure Construction", North Dakota State University Extension Service. Fargo, ND
5. U.S. Bureau of Land Management (BLM), 2007, "Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (Gold Book)", BLM National Science and Technology Center Branch of Publishing Services. <https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/operations-and-production/the-gold-book>

2.2 POTENTIAL BEST PRACTICES

2.2.1 Potential Best Practice: Optimize Extent of Disturbed Area on High Landslide Potential and Erosion-Prone Slopes

Definition: Design Limits of Disturbance (LOD) that balance operational safety, constructability, and environmental performance.

Purpose: To encourage thorough evaluation of the cleared area actually needed for efficient pipeline installation, safety, and preservation of vegetation to reduce landslide and erosion potential during and after pipeline construction.

Initial Considerations:

1. Determine LOD based on factors such as pipe diameter, contractor equipment, and proposed construction methods.
2. Be aware that segregating topsoil requires additional disturbed area.
3. Recognize that the type of landslide risk may dictate the extent to which LOD modification is feasible.
4. Consult with contractors who have steep slope construction experience during the design phase to help determine the most efficient work space width to meet safety, environmental, and cost constraints and to help develop an execution plan.

Interim Recommendations:

1. Design the LOD to optimize operational safety, constructability, environmental performance, and other measures.

Questions to Inform Development of Guidance for Optimizing LOD:

1. What are the cost, safety, and environmental tradeoffs of narrowing an LOD versus operating, restoring, and maintaining a wider LOD?
2. What technical guidance can be developed for reducing disturbed areas on steep slopes given safety and operational constraints?

2.2.2 Potential Best Practice: Evaluate Environmental Performance of Contractors

Definition: Follow a process for collecting and reporting successful environmental performance in high landslide hazard areas.

Purpose: To improve the ability of pipeline companies to select contractors with proven environmental performance to implement construction in high landslide hazard areas.

Initial Considerations:

1. Consult the Federal Energy Regulatory Commission (FERC) docket for a record of environmental performance.
2. Check for records of environmental performance maintained by state agencies.
3. Be aware that no standardized record of environmental performance currently exists.
4. Recognize that successful prevention/minimization of landslides requires special expertise.

Interim Recommendations:

1. Obtain a list of relevant projects from contractors and seek records indicating environmental performance.
2. Consider developing your own company process for measuring and tracking environmental performance based on FERC's compliance definitions and those of other relevant oversight agencies until an effective industry-wide tracking system or program is implemented. (Afterwards, companies could select the best tracking system for their situations.)
3. Initiate further discussions with contractors to develop mechanisms for assessing their environmental performance.

Questions to Inform Future Development of Industry-Wide Tracking System

1. How can industry extend the management systems that have been successful in creating a culture of safety to create a culture of environmental stewardship?
2. What are the best environmental performance metrics that can be applied routinely and consistently?
3. What mechanism can industry use to track and facilitate evaluation of contractors' environmental performance?

3 CONSTRUCTION AND RESTORATION PHASES

3.1 BEST PRACTICES

3.1.1 Ensure Optimal Placement and Installation of Slope Breakers

Definition: Design and install permanent slope breakers and drainage points as needed throughout the LOD, in addition to those directed by relevant regulating authority.

Purpose: To ensure that slope breakers are optimally spaced, placed, and installed to minimize erosion potential of surface water runoff, along with soil saturation that can contribute to landslides.

Planning Considerations:

1. Be aware that this practice does not supplant any federal, state/provincial, or local regulations.
2. Engage personnel with extensive field experience in the installation of slope breakers to oversee their location and construction.
3. Account for probable rain events in the project area and, in accordance with safety considerations, decrease spacing of slope breakers and other structural drainage solutions to accommodate longer return interval storm events where appropriate.
4. Consider the discharge location, along with the potential flow path.
5. Minimize potential for discharges from upslope slope breakers to concentrate flow.
6. Apply this practice to temporary slope breakers where practicable.
7. Review the FERC Docket for similar projects on which slope breakers were utilized successfully.

Design Criteria:

1. Spacing:
 - a. Evaluate site-specific slope conditions to ensure that slope breakers are installed at optimal points in the ROW to control surface water drainage (i.e., breaks in the slope).
 - b. Increase number of slope breakers above minimum requirements in response to site-specific conditions.
 - c. Consider best placement based on topography and location of discharge first, and then consider spacing requirements.
2. Placement:
 - a. Avoid positioning slope breakers where adjacent conditions will cause problems (e.g., where slope conditions at the discharge point will redirect water back toward the project area, or adversely impact property owners along the flow path).
 - b. Align slope breakers with sub-surface trench breakers to manage increased water flows within the trench; install drainage measures such as bleeder drains to mitigate the accumulation of water at these locations.
3. Construction:
 - a. Grade slope breakers to avoid low points, moderate runoff velocity, and minimize potential erosion.

- b. Ensure that inspectors are appropriately trained and competent to evaluate proper placement and sloping of slope breakers.
 - c. Use technical measures to evaluate proper grading of slope breakers, including surveying, string lines, etc.
 - d. Disperse energy of water that is discharged off the slope breakers, using structures such as J-hook compost filter sock, rock channels along the side of ROW, or level spreaders.
4. Educate landowners on the need to keep water control measures in place, and consider including language to that effect in landowner agreements.

References:

1. Golder Associates, Inc. 2016. "Mitigation of Land Movement in Steep and Rugged Terrain for Pipeline Projects: Lessons Learned from Constructing Pipelines in West Virginia." Final Report No. 2015-03. Interstate National Gas Association of America (INGAA) Foundation. www.ingaa.org/File.aspx?id=28629
2. Massachusetts Department of Environmental Protection (MassDEP), 2003, "Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas, Water Bar". prj.geosyntec.com/npsmanual/waterbar.aspx. Viewed 9 May 2018
3. Washington State Department of Ecology, in press, "2019 Stormwater Management Manual for Western Washington BMP C203: Water Bars". Digital resource. fortress.wa.gov/ecy/madcap/wq/2019SWMMWWPrelimDraft/Content/Topics/Volumell/ConstructionStormwaterBMPs/ConstructionRunoffBMPs/BMPc203.htm. Viewed 9 May 2018.

3.1.2 Optimize Groundwater Management During Construction and Restoration

Definition: Design and install measures to manage the exposure of groundwater (e.g., seeps, springs, water table) to disturbed areas during pipeline construction activities within the LOD.

Purpose: To ensure successful management of exposed groundwater and minimize seepage-related flow interference during construction and restoration, as well as potential for post-construction landslides.

Planning Considerations:

1. Be aware that mitigation measures may require water to be conveyed to an off-ROW location.
2. Consider in advance all discharge locations and downslope impacts.
3. Obtain landowner and agency approvals as needed for off-ROW disturbance, discharge outlets, etc.
4. Keep potentially necessary materials/supplies on or near site during construction for rapid deployment as needed.
5. Involve personnel with prior relevant experience in slope water management during implementation.
6. Consider probable rain events and/or wetter times of year, when elevated water tables and/or increased seepage would occur, and design mitigation measures for maximum flows rather than levels observed during construction.
7. Be aware that these measures are not intended to supplant any federal, state/provincial, or local regulations.
8. Develop a system for maintaining accurate records of season, soil character, site conditions, and weather for any groundwater encounters to inform future issue avoidance and adaptive management/avoidance.
9. Tailor actions to meet the site-specific requirements for each situation.

Design Criteria:

1. Implement rapid-response measures to clear the slope of groundwater seepage during construction.
 - a. If seepage is entering the disturbed ROW from off-ROW:
 - i. excavate a shallow trench along the LOD edge, line the trench with plastic sheeting to prevent sedimentation and erosion, and direct the flow back to an off-ROW vegetated stable area and/or through an energy-dissipating device.
 - ii. install a flume pipe at the source to convey the flow across LOD to an off-ROW vegetated stable area and/or through an energy-dissipating device. Remove and replace the flume pipe as needed.
 - b. If the source of seepage is clearly identified within LOD, use sandbags and plastic sheeting to pond the clean water at its source and funnel the water via a corrugated high-density polyethylene pipe to an off-ROW vegetated stable area and/or through an energy-dissipating device.
2. Implement permanent civil engineering measures during restoration:
 - a. Install subsurface drainage in trench and across ROW, including but not limited to French drains, curtain drains, bored or driven horizontal drains, and multi-flow and/or other geosynthetic products.
 - b. Replace surficial soils with stable, permeable erosion granular material and/or rip-rap rock products where needed.
 - c. Reinforce soil above drainage locations through geosynthetics, geogrids, and/or soil mesh/soil nailing.

- d. Incorporate sufficiently sized drainage into trench breakers using granular fill or other means to handle maximum foreseeable flows.

References:

1. Federal Energy Regulatory Commission (FERC). 2017. "Guidance Manual for Environmental Report Preparation for Applications Filed Under the Natural Gas Act." Section 4.2.1 Groundwater Resources.
2. US Geologic Survey (USGS). USGS Groundwater Data. Available at water.usgs.gov/ogw/data.html.
3. U.S. Fish & Wildlife Service (USFWS). National Wetlands Inventory. Available at www.fws.gov/wetlands/nwi/Overview.html.

3.1.3 Utilize Hydroseeding and Hydromulching for Vegetative Restoration

Definition: Apply a liquid mixture of seed, mulch, and soil amendments to a disturbed area to aid in erosion control and provide a seedbed conducive for revegetation success. Hydroseeding typically involves applying seed and mulch in a single slurry application, while hydromulching typically involves broadcasting seeds, followed by applying a liquid mulch slurry. The terms *hydroseeding* and *Hydromulching* are sometimes used interchangeably.

Purpose: To ensure appropriate seed-to-soil contact and provide soil surface protection against erosion.

Planning Considerations:

1. Conduct hydroseeding and hydromulching either through ground-based or aerial application methods; consider accessibility and terrain when determining the best application method.
2. Recognize that hydroseeding is best applied in humid climates with clay or clay-loam soils. The single application is easier and safer in difficult to access areas and provides a more even distribution over the width of the ROW.
3. Adjust hydromulch application rates in arid climates to meet site-specific soil and rainfall conditions.
4. Consider the following before applying hydroseed and/or hydromulch:
 - a. Highly Erodible Soils – soil conditions that are unsafe for standard construction equipment should be considered for aerial application of hydroseed and/or hydromulch.
 - b. Proximity to Sensitive Areas (e.g., cultural resources, bodies of water) – disturbance from standard construction equipment in areas that could lead to erosion and sedimentation that could impact these sensitive resources.
 - c. Rainfall Intensity – areas that receive high amounts of rainfall throughout the year need a stronger surface medium that can withstand rainfall impact better than standard crimped straw.
 - d. Water Flow Patterns – preferential flow patterns and channels can easily wash away standard crimped straw and sometimes hydromulched surfaces.
5. Conduct soil tests prior to applications to ensure proper types of hydromulch and soil amendments are used for that particular location.

Design Criteria:

1. Choose hydroseeds and hydromulches appropriate for the environment and slopes being considered, as there are numerous products available on the market geared toward different scenarios and conditions. Apply all hydroseed and hydromulch products according to manufacturers' suggested rates.
2. Be aware that dry applied mulches can be used in place of hydromulches based on manufacturer labeled recommendations.
3. Apply seeds prior to the mulch slurry to ensure proper seed-to-soil contact. Seed placement can be performed by drilling, broadcasting, or hydroseeding prior to the hydromulch application.
4. Add soil amendments (fertilizer, lime, biostimulants, etc.) either prior to or during hydromulch application at prescribed rates based on prior soil tests. Note that all lime applications should be performed on calcium carbonate equivalents (CCE) to raise soil pH to proper levels.

References:

1. California Department of Transportation (Caltrans), 2017, "Hydroseed and Hydromulch", Erosion Control Toolbox. www.dot.ca.gov/design/lap/landscape-design/erosion-control/hydroseed/hydroseed_hydromulch.html
2. US Department of Agriculture (USDA). Hydroseeding and Hydromulching fact sheet www.nrcs.usda.gov/wps/portal/nrcs/detail/wy/technical/?cid=nrcs142p2_027264

3.2 POTENTIAL BEST PRACTICE

3.2.1 Potential Best Practice: Optimize Vegetative Preservation

Definition: Protect existing vegetation, root systems, and biologically active zones during construction.

Purposes:

1. To reduce short- and long-term impacts of construction activities on work areas outside of the immediate trench area.
2. To minimize the accumulation of water caused by removal of vegetation in unstable soils.
3. To speed the recovery/stabilization of the existing forest after construction.
4. To maintain soil and bedrock shearing resistance through preservation of deep-reaching roots for plant species that will coppice sprout, or in situations where root decay will not create additional soil instabilities given the implemented reclamation plan.

Initial Considerations:

1. Be aware that this practice may not be feasible on extremely steep and/or extremely long slopes.
2. Consider constraints such as pipe diameter and safety concerns in evaluating the extent to which LOD can be reduced.

Interim Recommendations:

1. Where feasible, minimize root disturbance:
 - a. Flush-cut trees within LOD where grubbing is not required or an alternative to grubbing is practicable.
 - b. Root prune along edges of trench/grading area.
 - c. Protect flush-cut areas with geotextile fabric and cover with topsoil from over the trench and minimized work area.
 - d. Run equipment on top of protected flush-cut area during trenching, stringing, and pipe installation activities.
2. Restore topsoil from flush-cut area during final grading.

Questions to Inform Future Development:

1. What slope geometry conditions are preferable for this practice?
2. How can concerns regarding equipment stability from non-graded areas be addressed?

4 OPERATIONS AND MAINTENANCE PHASE

4.1 BEST PRACTICES

4.1.1 Ensure an Effective Transition from Construction to Operation and Maintenance

Definition: Provide for effective communication and implementation of post-construction goals and requirements for ongoing operation and maintenance (O&M).

Purpose: To ensure implementation of long-term restoration; integrate planned O&M actions; reduce landslide and sedimentation potential; and promote continuous improvement.

Planning Considerations:

1. Promote effective communication of institutional knowledge regarding environmental permitting, regulatory review, and post-construction plan implementation – or attempt to have consistent personnel responsible across project phases. Ideally, this practice would occur within both pipeline companies and permitting agencies.
2. Engage operations personnel at the appropriate project phase to plan for long-term restoration activities.
3. Ensure that contingency planning provides adequate resources for operations personnel to address unanticipated issues.

Design Criteria:

1. Ensure that operations personnel have a thorough understanding of what occurred on high landslide or erosion prone areas during construction:
 - a. Clearly delineate high-hazard areas in project records prior to the end of construction.
 - b. Communicate measures taken to mitigate high-hazard areas and anticipated maintenance of those measures.
 - c. Conduct on-site reviews of high-hazard areas with construction and operations personnel during project hand-off as practicable.
2. Implement post-construction restoration and project-specific compliance measures:
 - a. Ensure company and contractor post-construction measures are clearly specified and completed as scheduled.
 - b. Clarify needs and ensure adequate resources for activities to be undertaken by operations personnel.

References:

1. Association for Project Management, 2017, “How can we hand over projects better?”, APM Research Fund Series. www.apm.org.uk/resources/find-a-resource/project-handover/ Viewed 18 May 2018.
2. Federal Energy Regulatory Commission Office of Energy Project (FERC-OEP), 2013, “Upland Erosion Control, Revegetation, and Maintenance Plan, Chapter VII. Post-Construction Activities and Reporting”. www.ferc.gov/industries/gas/enviro/plan.pdf

4.1.2 Conduct Post-Construction Geohazard Monitoring

Definition: Monitor ground movements and potential impacts to pipeline integrity (i.e., Geohazard Monitoring). Ground movements may include landslides, seismic events and/or settlement/subsidence (caused by karst sinkholes, mining subsidence, or groundwater withdrawal).

Purpose: To monitor ground movement within the pipeline ROW to reduce hazard/threat to the pipeline and surrounding resources.

Planning Considerations:

1. Consider the main options for geohazard monitoring and inspection:
 - a. **Aerial Methods:** Perform aerial patrol monitoring (frequency can be adjusted to site conditions), aerial photo review and interpretation (aerial photographs can be used to review historical landslides over large areas), and LiDAR surveys (a repeatable aerial laser-based measurement system).
 - b. **Satellite-Based Methods:** Use InSAR (Interferometry Using Radar Imagery) to measure subsidence and, in some cases, landslides. Note that InSAR may be affected by vegetation growth in some regions.
 - c. **Ground/Geotechnical Instrumentation:** Consider options for using geotechnical monitoring instruments within the ROW: slope inclinometers, extensometers, piezometers (measures pore water pressure in the subsurface), seismographs (detects seismic waves generated by earthquakes and other sources, including induced seismicity), and ground-based InSAR systems.
 - d. **GPS/Conventional Survey Methods:** Engage geotechnical specialist to visit site and determine appropriate geodetic monitoring point locations and frequency. Have surveyor install geodetic monitoring points (rebar, pipe stakes, etc.) at selected locations, obtain baseline survey readings, and perform continuous survey readings at frequency established by geotechnical specialist. Surveyor routinely processes the survey data, and the geotechnical specialist reviews the data to determine appropriate response measures.
 - e. **ROW Survey:** Travel the pipeline ROW by foot to inspect for evidence of landslides or slips in addition to potential hazards already being monitored.
 - f. **Pipe Monitoring Options:**
 - i. Conduct depth-of-cover surveys to monitor ground movement from the ground surface.
 - ii. Apply strain gages/fiber-optic cables directly to the pipeline to monitor interactions between the pipeline and moving ground; conduct in-line inspection IMU surveys to monitor bending strain deformations across welds and run-to-run movement analysis.
 - iii. In-line inspection of axial strain to assess the accumulation of absolute longitudinal strains within a pipeline.

Design Criteria:

1. Ensure that an effective monitoring program is in place as early as possible to detect potential landslide or slip hazards.
2. Verify desktop remote-sensed observations subsequent to performing aerial, LiDAR, or InSAR surveys as needed.

3. If ground movement is confirmed, consider further geological and/or geotechnical investigation prior to mitigation.

References:

1. BGC Engineering Inc. (BGC), 2015, "Trans Mountain Pipeline ULC, Trans Mountain Expansion Project Seismic Hazard Update"
www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=0ahUKEwik26fTzpfbAhUM71MKHdWfCswQFgggMAE&url=https%3A%2F%2Fapps.nibone.gc.ca%2FREGDOCS%2FFile%2FDownload%2F2748440&usg=AOvVaw3VVcCbE9LI_mQkfTyfD1DB.
 Viewed 18 May 2018
2. BGC Engineering Inc (BGC) 2017, Characterizing the Root Cause of Pipeline Failures from Geohazards. Letter report of November 17 to the Canadian Energy Pipeline Association. Transmountain Expansion Project, 2016. Seismic Program. www.transmountain.com/seismic-safety-measures.
3. Dewar, D., Tong, A. and McClarty, E. 2017. Assessing and Monitoring the Impacts of Very Slow Moving Deep-Seated Landslides on Pipelines. *70th Canadian Geotechnical Conference and the 12th Joint CGS/IAH-CNC Groundwater Conference*.
www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwj90tXh0ZfbAhXL21MKHYLwBNMQFgggMAA&url=http%3A%2F%2Fwww.geoottawa2017.ca%2Fabstracts%2Fgeo2017160.docx&usg=AOvVaw2fhwMz9YRiSDNOXJzpZKV2
4. Nyman, D.J., Lee, E.M. and Audibert, J.M.E., 2008, "Mitigating Geohazards for International Pipeline Projects: Challenges and Lessons Learned" *Proceedings of the 7th International Pipeline Conference*. Vol 3, Paper No. IPC2008-64405, pp. 639-648. doi:10.1115/IPC2008-64405
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6. Wang, Y.Y., West, D., Dewar, D., Hart, J., McKenzie-Johnson, A. and Sen, M., 2016, "Integrity Management of Ground Movement Hazards" *Proceedings of the 11th International Pipeline Conference*, Vol 1, Paper No. IPC2016-64513, pp. V001T03A087. doi:10.1115/IPC2016-64513.
7. Young, A. and Lockey A., 2013, "The Assessment of Pipeline Integrity in Geohazard Areas Using ILI Data", *Proceedings of the ASME 2013 International Pipeline Geotechnical Conference*, Paper No. IPG2013-1971, pp. V001T02A008. doi:10.1115/IPG2013-1971

4.2 POTENTIAL BEST PRACTICE

4.2.1 Potential Best Practice: Create a Culture of Environmental Stewardship and Shared Learning

Definition: Encourage processes for promoting environmental stewardship and sharing lessons learned regarding the effectiveness of landslide hazard reduction efforts.

Purpose: To advance the ability of pipeline companies to improve environmental performance in high landslide hazard landslide/erosion areas.

Initial Considerations:

1. Incorporate environmental messages similar to “safety minutes” into routine meetings and communications.
2. Establish authority and appropriate triggers to stop work for environmental hazards.
3. Collaborate with academics, NGOs, regulatory agencies, and other industry partners to evaluate and improve best practices and to analyze cost-benefit of employing best practices.
4. Establish research and development programs that leverage industry, academia, and other independent experts to develop better understandings of slope failures and techniques for prevention/mitigation.

Interim Recommendations:

1. Capture and share lessons learned internally.
2. Create opportunities for industry-wide dialogue and collaboration.

Questions to Inform Future Development

1. How can the industry measure the extent to which investments in enhanced environmental protection during the planning and construction phase reduce costs during the operations and maintenance phase?
2. How can industry create ongoing outlets for sharing lessons learned across multiple pipeline companies and industries?
3. How can industry and stakeholders create a “no-blame zone” where successes and failures can be examined to promulgate cost-effective and environmentally protective practices?
4. What mechanisms can facilitate investment in R&D to develop new best practices for ROW management on steep slopes?

5 GLOSSARY OF KEY TERMS

Hydrography - the science of the measurement, description, and mapping of the surface waters of the earth, with special reference to their use for navigation.

Hydrology - the science concerned with the properties of the earth's water, especially its movement in relation to land.

Interferometric Synthetic Aperture Radar (InSAR) – a high-precision remote sensing technique that uses two or more synthetic aperture radar (SAR) images to generate maps of surface deformation or digital elevation, using differences in the phase of the waves returning to the satellite or aircraft.

Light Detection and Ranging (LiDAR) - A distance sensing technology that measures distance to a target by illuminating the target with pulsed laser light and measuring the reflected pulses with a sensor. Differences in laser return times and wavelengths are used to make digital 3-D representations of the target that identify surface contours.

Limits of Disturbance (LOD) or Limits of Clearance (LOC) - The area which may be disturbed as work is performed. No work may occur outside the limits of disturbance shown on an approved plan.

Microtopography - The surface features of an area on a small scale that can affect runoff generation, surface/subsurface flow interactions, or subsurface flow patterns in hydrological systems.

Right-of-Way (ROW) - A strip of land acquired for the construction and operation of a pipeline or some other facility; it may be owned outright or an easement taken for a specific purpose.

Significant Landslide Potential and Erosion Prone Slopes - Areas that have a landslide susceptibility or incidence rating greater than “low” on the [Landslide Overview Map of the Conterminous United States](#) and/or a landslide susceptibility rating greater than “cold (dark green)” on the [Landslide Susceptibility Map of Canada](#).

6 ENDNOTES

- [1] Bobrowsky, P.T. and Dominguez, M.J. 2012. “Landslide Susceptibility Map of Canada.” Geological Survey of Canada (GSC) Open File Report 7228. [//doi.org/10.4095/291902](https://doi.org/10.4095/291902).
- [2] Chaplin, S.J., Gerrard, R.A., Watson, J.M., Master, L.L. and Flack, S.R. 2000. “The Geography of Imperilment” in Stein, B.A., Kutner, L.S. and Adams, J.S.; eds. *Precious Heritage, the Status of Biodiversity in the United States*. Oxford University Press. New York.
- [3] ICF International. 2016. “North American Midstream Infrastructure Through 2035: Leaning into the Headwinds.” Prepared for the Interstate Natural Gas Association of America (INGAA). www.ingaa.org/Foundation/Foundation-Reports/27958.aspx. Viewed 18 May 2018
- [4] Pipeline and Gas Journal. 2017. “2017 Worldwide Pipeline Construction Report.” Pipeline and Gas Journal, vol. 244, No. 1. pgjonline.com/magazine/2017/january-2017-vol-244-no-1/features/pgj-s-2017-worldwide-pipeline-construction-report. Viewed 18 May 2018.
- [5] US Department of Energy (DOE). 2015. “Natural Gas Infrastructure Implications of Increased Demand from the Electric Power Sector.” www.energy.gov/sites/prod/files/2015/04/f22/QER%20Analysis%20-%20Natural%20Gas%20Infrastructure%20Implications%20of%20Increased%20Demand%20from%20the%20Electric%20Sector.pdf. Viewed 18 May 2018.
- [6] US Geological Survey (USGS). n.d. “Can major landslides and debris flows happen in all areas of the U.S.?” Viewed 18 May 2018.
- [7] US Geological Survey (USGS). n.d. “Landslides 101” landslides.usgs.gov/learn/l101.php. Viewed 18 May 2018. USGS Landslide Hazards Program. landslides.usgs.gov/

**NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION****PIPELINE****1. SCOPE**

The work shall consist of furnishing and installing pipeline and the necessary fittings as shown on the drawings.

2. GENERAL

The design, construction, and operation of the pumping plant for water control shall comply with all federal, state, and local law, rules and regulations.

Construction operations shall be carried out in a manner and sequence so that erosion and air and water pollution are minimized and held within legal limits.

The completed job shall present a workmanlike appearance and shall conform to the line, grades, and elevations shown on the drawings or as staked in the field.

All operations shall be carried out in a safe and skillful manner. Safety and health regulations shall be observed and appropriate safety measures used. Contractor shall be assured that all state laws concerning buried utilities have been met.

If water from the pumping plant has the potential to be used for human consumption, applicable federal, state and local laws and regulations shall be met.

3. MATERIALS

Unless otherwise indicated, all pipes shall be PVC (polyvinyl chloride) schedule 40 conforming to ASTM D1785. Alternative materials must be preapproved by NRCS, and could include Polyethylene (PE) meeting a minimum pressure rating for this application. The ASTM or AWWA designation shall be stamped on the pipe. Storage tanks of concrete shall have a minimum wall and bottom thickness of 6 inches and 16 gauge if made of steel.

4. LAYING AND BEDDING

Pipe shall be laid to the line and grade shown on the drawings. The pipe shall be firmly and uniformly bedded throughout its entire length to the depth and in the manner shown on the drawings or as specified by the NRCS Engineer or designated representative.

5. PLACEMENT

Placement storage tank and appurtenances shall be as shown on the plans or as staked. Other parts of the water system shall be installed and connected to the pipeline as specified.

All pipes shall be protected from hazards presented by traffic, farm operations, freezing temperatures, fire, thermal expansion, and contraction. Reasonable measures should be taken to protect the system from potential vandalism.

All associated pipeline will be buried below the frost line or otherwise protected from freezing.

Pumps shall be located as indicated in the plans minimizing the need for maintenance and low sediment load.

All PVC pipe connections designed to be glued will use PVC solvent cement. Allow glue cure according to manufacturer's guidelines prior to moving pipe and pressure testing. Gluing shall not be done at temperatures below freezing. Watertight joints that have strength equal to that of the pipe shall be used. Couplings must be of material compatible with that of the pipe.

6. PUMP REQUIREMENTS

The pump shall be capable of meeting the planned capacities and range of operating lifts. The size of the pump will be as indicated in the plan at minimum or larger. The pump is designed to take in account for total head for the critical operating conditions. Automatic controls will be used as planned.

7. SUCTION AND DISCHARGE PIPES

Suction and discharge pipe shall be installed as indicated in the plans as a minimum. Gates, valves, pipe connections, and other protective works shall be installed as needed and indicated for satisfactory plant operation.

8. BUILDING AND ACCESSORIES

The design of the plant and associated housing, if required, shall consider the need for protecting equipment from the elements, malicious damage, and fire, and the need for equipment maintenance and repairs. The appearance of the plant shall be in keeping with its surrounding environment and its importance or value.

9. TESTING

All pipelines, junctions, and joints shall be pressure tested at the designed working pressure for 2 hours.

10. VEGETATION

Disturbed areas shall be established with vegetation or otherwise stabilized as soon as practical after construction.

Topsoil shall be added, if needed, to establish vegetation. Disturbed areas shall be seeded to 35 pounds of Tall Fescue or 8 pounds of Orchardgrass and 2 pounds of Redtop unless indicated differently in conservation plan. Temporary seeding or mulching may be necessary. When a temporary seeding is needed, seed 60 pounds of wheat or spring oats. Temporary seeded areas shall be seeded to permanent vegetation as soon as conditions allow.

11. ADDITIONAL ITEMS WHICH APPLY TO THIS JOB

Exhibit C

Spire's Status Report No. 64
Accession No. 20191206-5025



Spire STL Pipeline LLC
700 Market Street
St. Louis, Missouri 63101

December 5, 2019

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington DC 20426

Re: Docket Nos. CP17-40-000 and -001
Spire STL Pipeline LLC
Weekly Status Report No. 64 – for the week ending November 16, 2019

Dear Ms. Bose:

On August 3, 2018, the Federal Energy Regulatory Commission (“Commission” or “FERC”) issued an order granting Certificates of Public Convenience and Necessity to Spire STL Pipeline, LLC (“Spire”) in the above-referenced dockets (“Order”). On August 13, 2018 Spire filed its Implementation Plan for the Project. In compliance with Environmental Condition 8, Spire files its status report for the prior calendar week.

If you have any questions, please do not hesitate to contact me (314-342-3303; Russ.English@SpireEnergy.com) or Lori Ferry (630-605-5255; lmferry@burnsmcd.com) regarding this matter. Thank you.

Sincerely,

Russ A. English

Russ A. English
Director of Pipelines
Spire STL Pipeline LLC

cc: All Parties on Service List
Christine Crumpton, Office of Energy Projects, FERC
Jennifer Ward, Edge Engineering and Science

CERTIFICATE OF SERVICE

I hereby certify that on this, the 5th day of December 2019, I have caused a copy of the foregoing document to be served, by electronic mail, upon all parties listed on the service list compiled by the Office of the Secretary, Federal Energy Regulatory Commission, for the above-referenced proceeding.

/s/ Russ English

Russ English

FEDERAL AUTHORIZATIONS AND NOTIFICATIONS

Below is an update of Spire's outstanding environmental permits, approvals, and consultations. All other project permits have been received.

Environmental Permits, Approvals, and Consultations

Agency or Organization	Permit/Approval	Submittal Date (Anticipated)	Receipt Date (Anticipated)
State-Missouri			
St. Louis County	Building and Zoning Permits and Land Use Permit – Meter Stations	February 2018	(November 2019)

Red text indicates updates from Spire's last reporting period.

CONSTRUCTION STATUS

Pipeline Construction

24-inch Mainline Construction Activities

Ditch, lowering in, backfill and tie in activities have been completed. Rough-in and cleanup activities have been completed Project wide. The Project continues to complete punch list items and monitor restoration.

Construction Status-24-inch Mainline		
Activity	Total to Date this Reporting Period (feet)	Total % Complete to Date
Clearing	312,360'	100%
Environmental	312,360'	100%
Grading	312,360'	100%
Ditching	312,360'	100%
Stringing	312,360'	100%
Welding	312,360'	100%
Lowering-in	312,360'	100%
Backfilling	312,360'	100%
Rough-in Cleanup	312,360'	100%
Final Restoration	312,360'	100%
Testing	312,360'	100%

North County Extension Construction Activities

North County Extension ("NCE") portion of project has been purged and packed from Rex Receipt Station to Chain of Rocks Station. Winterization activities finished from NCE milepost ("MP") 1.08 to 1.59 and MP 5.22 to 5.75.

Construction Status-North County Extension		
Activity	Total to Date this Reporting Period (feet)	Total % Complete to Date
Clearing	31,786'	100%
Environmental	31,786'	100%
Grading	31,786'	100%
Ditching	31,786'	100%
Stringing	31,786'	100%
Welding	31,786'	100%
Lowering-in	31,786'	100%
Backfilling	31,786'	100%
Rough-in Cleanup	31,786'	100%
Final Restoration	31,786'	100%
Testing	31,786'	100%

Stream and Wetland Crossing Schedule

All stream and wetland crossings are complete for the project.

Horizontal Directional Drills - HDDs:

All horizontal direction drills have been completed for the project.

Meter Station Construction

REX Receipt Station

Station is purged and packed.

Laclede/Lange Delivery Station

Station is purged and packed. Contractor worked on final punch list items

Chain of Rocks Station

Station is purged and packed. Contractor worked on final punch list items.

Construction Status- Total % Complete to Date			
Activity	REX Meter Station	Laclede Lange Meter Station	Chain of Rocks Meter Station (West)
Clearing	100%	100%	100%
Environmental	100%	100%	100%
Grading	100%	100%	100%
Delivery	100%	100%	100%
Welding Fabrication	100%	100%	100%
Civil	100%	100%	100%
Backfilling	100%	100%	100%
Rough-in Cleanup	100%	100%	100%
Final Restoration	100%	100%	100%
Testing	100%	100%	100%

Note: Construction status for the Chain of Rocks Meter Station (West) does not include the section of 24-inch-diameter pipeline to the Mississippi River Transmission interconnect. Spire will construct this section of pipeline in the spring of 2020.

GENERAL PROJECT UPDATES

The contractor continues to work on the Project punch list project wide. Materials and equipment continue to be removed from the Project and are being temporarily stored at the Wood River Yard. The Alton Yard was decommissioned.

WORK PLANNED FOR NEXT REPORTING PERIOD

Environmental crews will continue to maintain erosion control devices ("ECDs") in areas that need to be repaired/refreshed. Post-construction noise survey will commence during the week of December 2, 2019. New-hire personnel continue to go through the Environmental Compliance & Safety Training as needed. The contractor will finish work on FERC PAR #54 and PAR #55.

ENVIRONMENTAL ISSUES

Problems/Instances of Non-Compliance

Zero problem areas or instances of non-compliance occurred during this reporting period.

Compliance Tracking Summary		
	This Period	To Date
Non-Compliance Reports	0	46
Problem Area Reports	0	18

Incident ID	Incident Type	Incident Date	Follow Up Date	Station Start	Station End	Incident Description	Corrective Action Performed
FERC Inspection PAR #54	Problem Area	10/24/2019	Ongoing	NCE MP 1.2-1.7	NCE MP 1.2-1.7	Repair erosion, repair ECDs and winterize bare portions of the right-of-way.	Spire commenced fixing the erosion, repairing the ECDs, and winterizing the bare portions of the right-of-way. This PAR is considered closed but will be monitored through the winter.
PAR #55	Problem Area	11/04/2019	11/05/2019	MP 44.94	MP 44.94	The restored stream bank (stream SIL-WJW-011) slipped.	Spire remediated the stream bank and stabilized the bank. The PAR is considered closed but will be monitored through the winter.
PAR #56	Problem Area	11/04/2019	11/13/2019	MP 39.43	MP 39.43	The restored stream bank (stream SIL-JJP-130) slipped.	Right-of-way soil conditions are inhibiting access currently. The PAR is considered closed but will be monitored through the winter.
PAR #57	Problem Area	11/04/2019	11/05/2019	MP NCE 5.51	MP NCE 5.51	The restored stream bank (streamSMO-JJP-012) slipped.	Right-of-way soil conditions are inhibiting access currently. The PAR is considered closed but will be monitored through the winter.

Red text illustrates new information since the last reporting period.

LANDOWNER RESOLUTIONS

Spire didn't receive any landowner complaints during this reporting period.

AGENCY CORRESPONDENCE

FERC conducted its in-service inspection from November 12-14, 2019. Spire received its Authorization to Commence Service letter on November 14, 2019 from FERC.

Unanticipated Discoveries

Construction is complete, zero unanticipated discoveries should be identified during restoration.

RESTORATION PROGRESS

Restoration progress as of the date of this reporting period is detailed in the table below.

Weekly Progress Report (by nearest milepost (MP))																																																					
	MP	1			5				10				15				20				25				30				35				40				45				50				55				60				65
Rough-in Sub Grade																																																					
Decompaction																																																					
Topsoil Replacement																																																					
Final Seeding																																																					
Final ECDs																																																					
Indicates activities are complete																																																					

CONSTRUCTION PHOTOGRAPHS



PAR #57 at SMO-JJP-012. The photo is captured facing downstream from within the stream, facing east.



PAR #56 where Spire recontoured the slipped stream bank of stream SIL-JJP-130. The disturbed area was seeded and curlex was added for stabilization. Photo was captured facing south.



PAR #56 continued where Spire stabilized the impacted stream bank to the north of the slipped stream bank.
Photo is captured facing north.



PAR #56 continued with an overview picture where the disturbed soils were stabilized after stream bank remediation of the slip. Photo is captured facing south from 2080+00.



Tract IL-GC-o80.100 from MP 15.1 where the photo captures annual cover crop seeding facing north.



Road work repairs located at Saale Road #1 located in St Charles County, Missouri from MP 53.0.



Road work repairs completed located at Saale Road #1 located in St Charles County, Missouri from MP 53.0.



Alton Yard decommissioned and the office trailers prepared for removal from the site.



Corsa Lane located at MP 11.4 in Greene County, IL where an inspection confirmed no residual rock was evident, displaced from the former rock construction entrance ("RCE").



S Centennial Road located at MP 35.5 in Jersey County, Illinois where an inspection confirmed no residual rock was evident, displaced from the former RCE.



MP 45.0 capturing final ECDs and final hydro mulching. The photo was captured facing north.

Public_64_Spire Weekly Status Report_120519.PDF.....1-12

Exhibit D

Scott Turman and Jay Gettings Crop Loss and Yields

Scott Turman Crop Yields

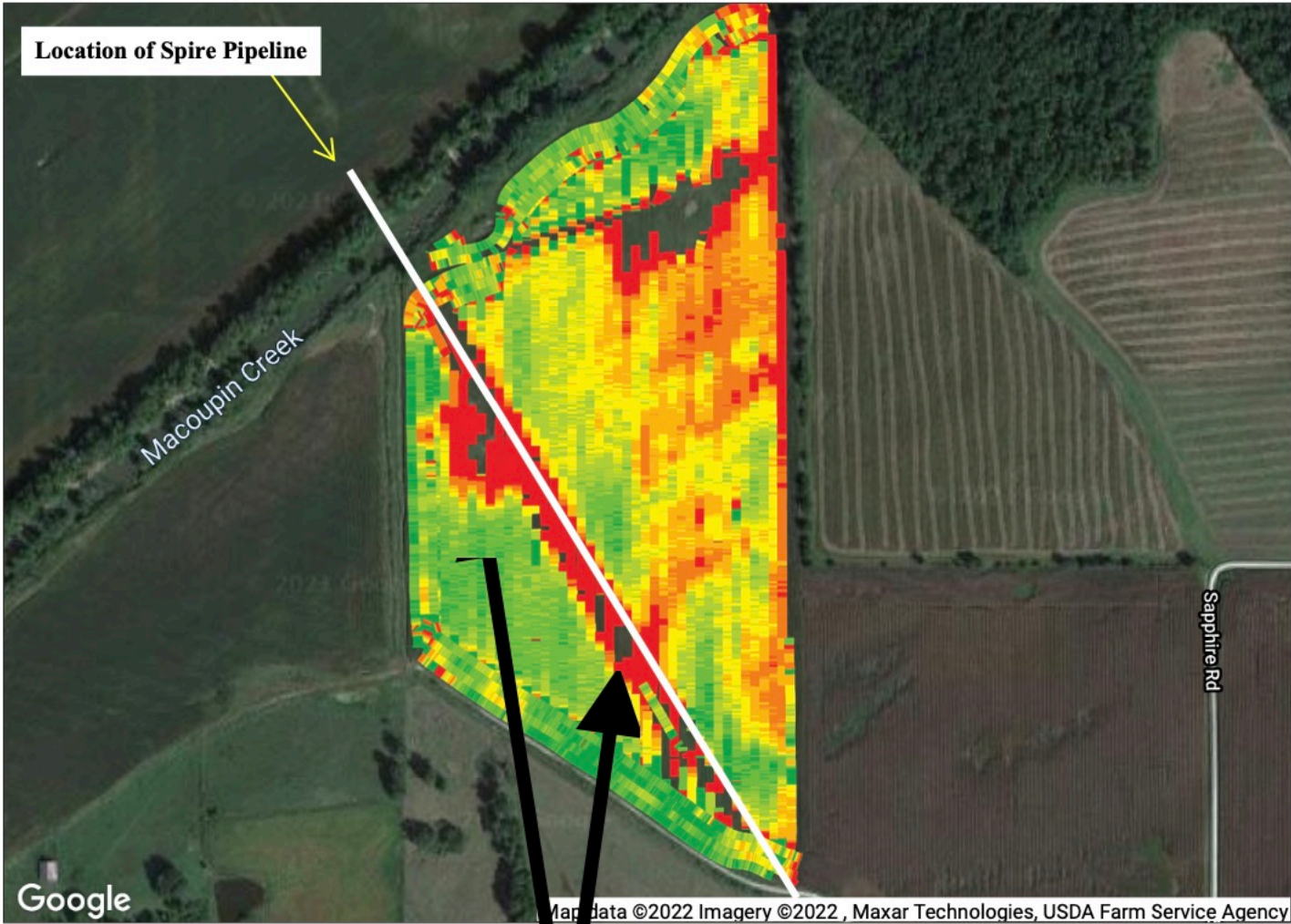


2020 Corn: Harvest

Layer: Dry Yield

north bottom 60

s turman | hill hound



Operation Dates: 10/24/2020 - 10/24/2020

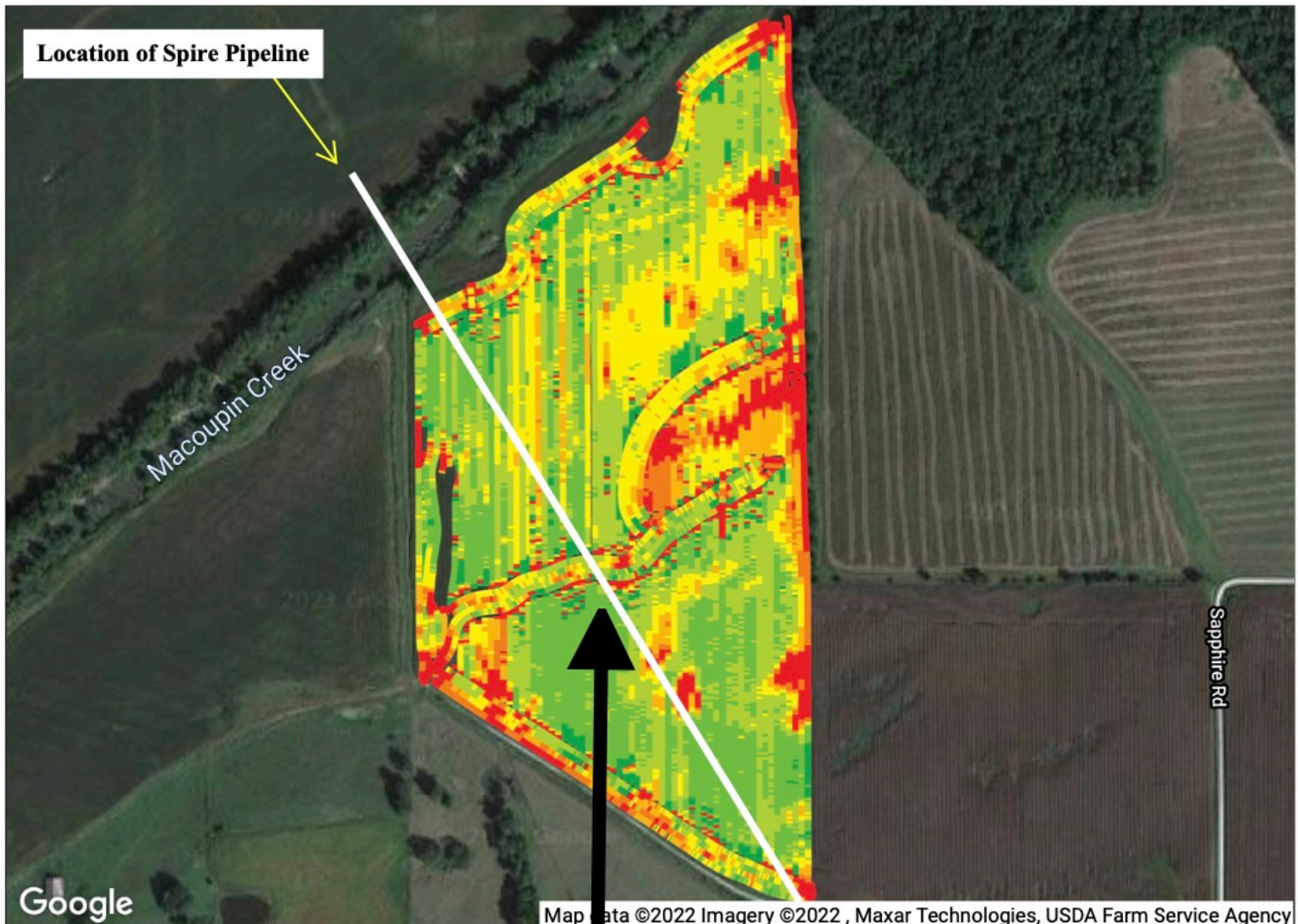
2020 Crop yield map identifying the crop yields after Spire completes construction and restoration. The areas in red show concerning or loss in yields. The farmer did plant the easement in spring of 2020 on and off the row. The Spire easement boundaries and portions off-row near the Spire easement show a significant loss in yields

**2017 Corn: Harvest**

Layer: Dry Yield

north bottom 60

s turman | hill hound

**Operation Dates:** 10/09/2017 - 10/31/2017

2017 Crop yield map identifying crop yields prior to Spire commencing construction. This yield map indicates normal yields prior to any impacts by Spire and its contractors.



JOHN DEERE

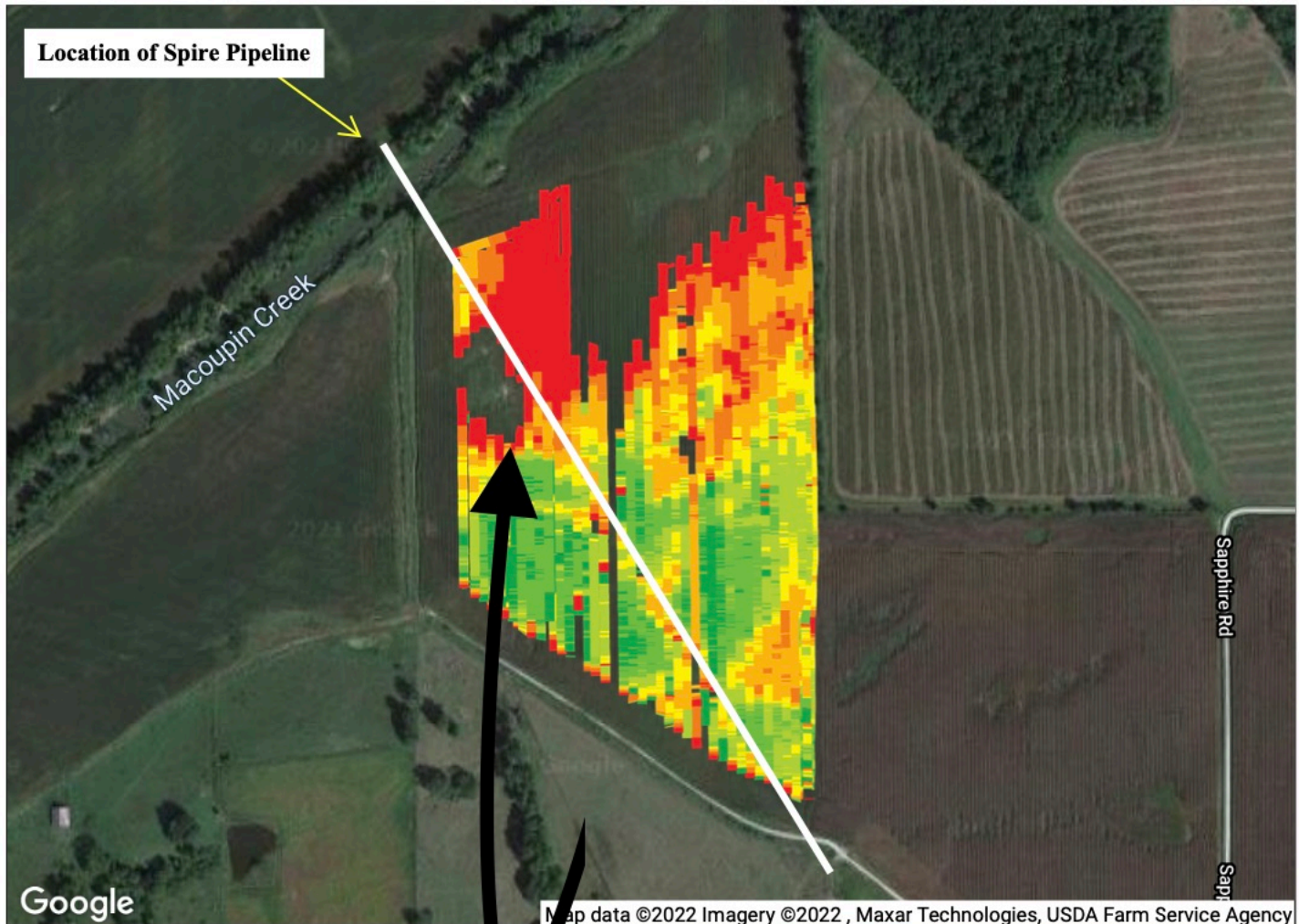
Operations Center

2021 Corn: Harvest

Layer: Dry Yield

north bottom 60

s turman | hill hound

**Operation Dates:** 10/31/2021 - 10/31/2021

2021 Crop yield map identifying the crop yields with far less crop production within the Spire easement boundaries and an increase in crop yield loss compared to the 2020 crop yield map. The farmer did plant in the spring of 2021 on and off-row, but had lost several acres both on-row, off-row, and certain areas where the farmer could not harvest entirely due to the altered drainage and soil impacts.

Jacob Gettings Crop Yields



2017 Corn: Harvest

Layer: Dry Yield

jays house

Guilander Farms | Rons House



Operation Dates: 10/01/2017 - 10/07/2017

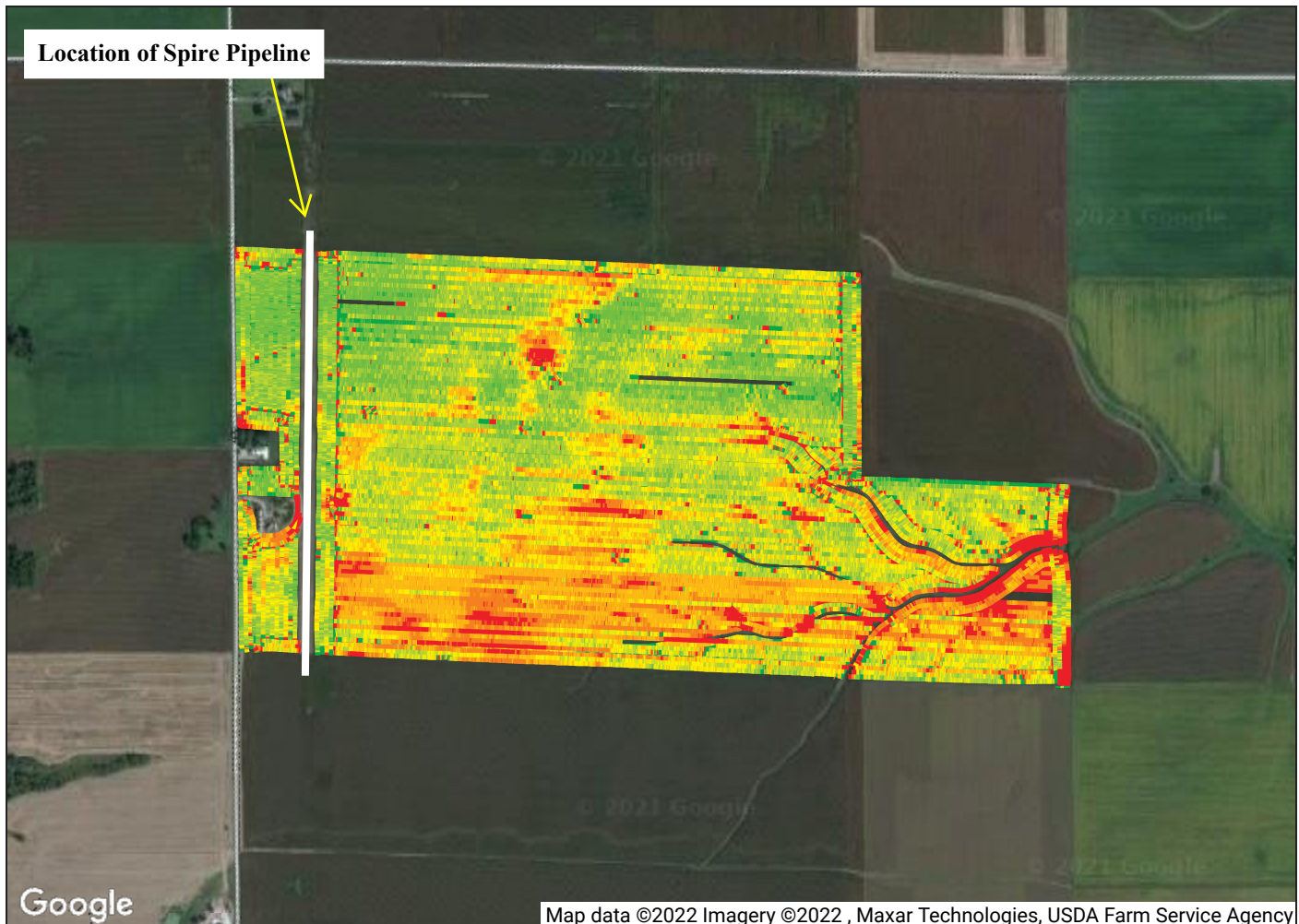
2017 crop yield map identifying crop yields prior to Spire commencing construction

**2019 Corn: Harvest**

Layer: Dry Yield

jays house

Guilander Farms | Rons House



Operation Dates: 09/21/2019 - 10/04/2019

2019 crop yield map identifying crop yields during construction. The southern portion of the yield map indicates a significant decrease in crop yields on and off the right-of-way

**2020 Corn: Harvest**

Layer: Dry Yield

jays house

Guilander Farms | Rons House



Operation Dates: 09/14/2020 - 10/06/2020

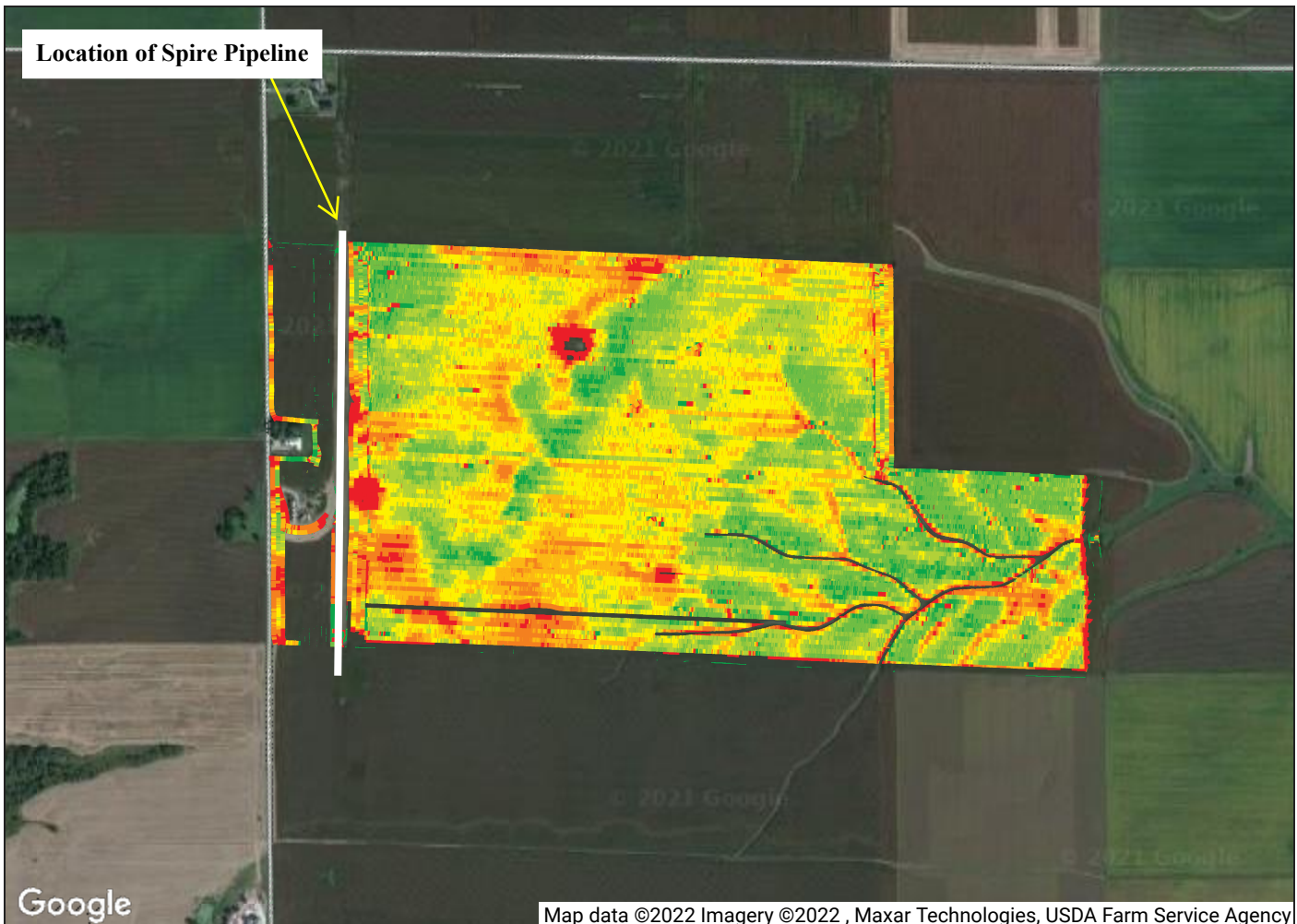
2020 crop yield map after Spire communicated 100% of restoration completed. The southwest corner of the property outside the right-of-way indicates loss of yields. This is a good indication the drain tiles have not been properly repaired.

**2021 Corn: Harvest**

Layer: Dry Yield

jays house

Guilander Farms | Rons House



Operation Dates: 09/08/2021 - 09/20/2021

2021 crop yield map identifying even more loss of yields than 2020. If you compare the 2017 pre-construction yield data from 2019, 2020, and 2021, the crop yield loss worsens each year. It has been confirmed that the farmer planted in the beginning of 2021 west of the Spire easement, but due to the ongoing issues, the farmer was unable to receive positive yields.

This yield map comparison indicates that there are serious concerns of restoration, contour issues, drainage, and the systematic drain tile system has been compromised.

Exhibit E

Combine Repair Estimate from Sloan Tractor Equipment, Inc.



425 South Main Street
White Hall, IL 62092
Phone: 217-374-2138 • 800-644-2138
Fax: 217-374-6329



JOHN DEERE

Invoice To Account No.: 69656



Deliver To Account No.: 69656

PARTS INVOICE

ROBERT HART
RT 1 BOX 128
ROODHOUSE IL 62082
US

Bus Ph: (217)473-6975
Mob Ph: (217)473-6975 Prv Ph:

ROBERT HART
RT 1 BOX 128
ROODHOUSE IL 62082
US

Bus Ph: (217)473-6975
Mob Ph: (217)473-6975 Prv Ph:

Invoice No: 2564647
Date: 11/6/21 11:44
Page: 1 of 1
Payment Type: Finance

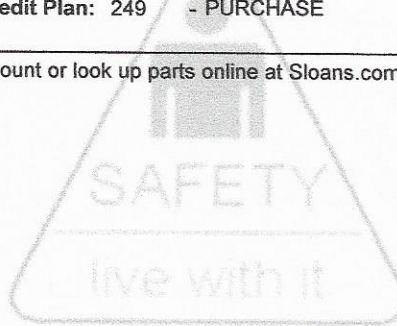
Supplied Quantity	Back Order Quantity	Part Number	Part Description	Bin Loc	List Price	Net Price	Extended Price	Tax Ind
10.00	0.00	H212374	SCREW	H0074	1.48	1.43	\$14.30	N
1.00	0.00	AH214214	PLATE	N3	336.16	327.66	\$327.66	N
1.00	0.00	AH214216	PLATE	N3	349.36	340.51	\$340.51	N

INVOICE CONTAINS \$17.85 DISCOUNT

Customer Information			Finance Information		Parts Summary	
Customer PO No:			Type: Multi-use Acct US	Auth. No: 558440	Parts:	\$682.47
Tax Exempt No:	ON FILE		Merchant No: 34000067		Misc:	\$0.00
Salesperson:	JAY JONES		Card No: xxxxxxxxxxxx1671		Sales Tax:	\$0.00
			Bill Code: 120 - PARTS		Deposit:	\$0.00
			Credit Plan: 249 - PURCHASE		Total:	\$682.47

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**TERMS AND CONDITIONS**

Repayment Terms:

This purchase(s) is subject to the terms of the Multi-Use Account, a service of John Deere Financial, f.s.b. I grant the issuer a purchase money security interest, except as limited in that agreement, in the goods described.

Received by: Date:



1 John Deere Drive
Perry, IL 62362
Phone: 217-236-5011 • 800-404-3138
Fax: 217-236-4411



JOHN DEERE

Invoice To Account No.: 69656



Deliver To Account No.: 69656

PARTS INVOICE

ROBERT HART
RT 1 BOX 128
ROODHOUSE IL 62082
US

Bus Ph: (217)473-6975
Mob Ph: (217)473-6975 Prv Ph:

ROBERT HART
RT 1 BOX 128
ROODHOUSE IL 62082
US

Bus Ph: (217)473-6975
Mob Ph: (217)473-6975 Prv Ph:

Invoice No: **2564613**
Date: 11/6/21 11:30
Page: 1 of 1
Payment Type: Finance

Supplied Quantity	Back Order Quantity	Part Number	Part Description	Bin Loc	List Price	Net Price	Extended Price	Tax Ind
1.00	0.00	AH214217	PLATE	UPEAST	445.99	385.94	\$385.94	N

INVOICE CONTAINS \$60.05 DISCOUNT

Finance Information

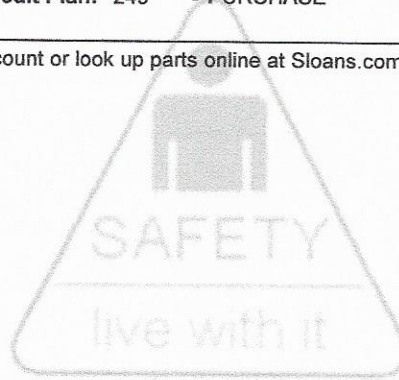
Customer PO No:
Tax Exempt No: ON FILE
Salesperson: JEFF HUBER

Type: Multi-use Acct US Auth. No: 558068
Merchant No: 34000533
Card No: xxxxxxxxxxxx1671
Bill Code: 120 - PARTS
Credit Plan: 249 - PURCHASE

Parts: \$385.94
Misc: \$0.00
Sales Tax: \$0.00
Deposit: \$0.00
Total: \$385.94

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**TERMS AND CONDITIONS****Repayment Terms:**

This purchase(s) is subject to the terms of the Multi-Use Account, a service of John Deere Financial, f.s.b. I grant the issuer a purchase money security interest, except as limited in that agreement, in the goods described.

Received by: Date:



1285 Old Route 36
Winchester, IL 62694
Phone: 217-742-3138 • 800-494-3138
Fax: 217-742-3340



JOHN DEERE

Invoice To Account No.: 69656

Deliver To Account No.: 69656

PARTS INVOICE

ROBERT HART
RT 1 BOX 128
ROODHOUSE IL 62082
US

Bus Ph: (217)473-6975
Mob Ph: (217)473-6975 Prv Ph:

ROBERT HART
RT 1 BOX 128
ROODHOUSE IL 62082
US

Bus Ph: (217)473-6975
Mob Ph: (217)473-6975 Prv Ph:

Invoice No: 2564714
Date: 11/6/21 13:44
Page: 1 of 1
Payment Type: Finance

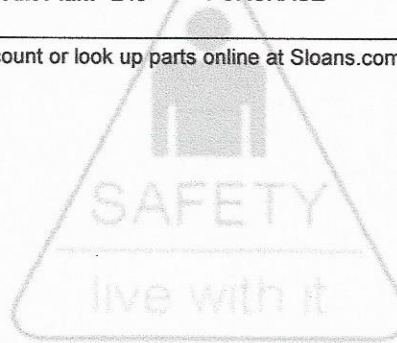
Supplied Quantity	Back Order Quantity	Part Number	Part Description	Bin Loc	List Price	Net Price	Extended Price	Tax Ind
7.00	0.00	AH213873	BRACKET	E-019	13.06	11.51	\$80.57	N
4.00	0.00	AH213874	BRACKET	E-030	13.06	11.51	\$46.04	N

INVOICE CONTAINS \$17.05 DISCOUNT

Customer Information			Finance Information		Parts Summary	
Customer PO No:			Type: Multi-use Acct US	Auth. No: 560211	Parts:	\$126.61
Tax Exempt No:	ON FILE		Merchant No: 34000532		Misc:	\$0.00
Salesperson:	JACOB DAWDY		Card No: xxxxxxxxxxxx1671		Sales Tax:	\$0.00
			Bill Code: 120 - PARTS		Deposit:	\$0.00
			Credit Plan: 249 - PURCHASE		Total:	\$126.61

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**TERMS AND CONDITIONS**

Repayment Terms:

This purchase(s) is subject to the terms of the Multi-Use Account, a service of John Deere Financial, f.s.b. I grant the issuer a purchase money security interest, except as limited in that agreement, in the goods described.

Received by: Date:

PO #: BOB HART 930F DAMAGE

Date: Jul 08 2022

Account #:

Dealer Information	Customer Information
Name: SLOAN IMPLEMENT COMPANY	Name:
Address: 425 SOUTH MAIN WHITE HALL, IL 62092 United States	Address:
Phone: 2173742138	Phone:
Fax: 2173746329	Email:
Contact:	Contact:

Part No.	Description	PIN	Comment 1	Comment 2	Qty	Unit Price	Price
AH214217	Plate		Agriculture	630F - COMBINE, PLATFORM (CUTTING)	1	445.99	445.99
AH214216	Plate		Agriculture	630F - COMBINE, PLATFORM (CUTTING)	1	349.36	349.36
AH214214	Plate		Agriculture	630F - COMBINE, PLATFORM (CUTTING)	1	336.16	336.16
H212374	Screw		Agriculture	630F - COMBINE, PLATFORM (CUTTING)	10	1.48	14.80
AH213874	Bracket		Agriculture	630F - COMBINE, PLATFORM (CUTTING)	4	13.06	52.24
AH213873	Bracket		Agriculture	630F - COMBINE, PLATFORM (CUTTING)	7	13.06	91.42

Currency:

Subtotal: 1289.97

Labor Hours: 20

Labor Rate: 119

Labor: 2380.00

Shipping Method:

Shipping:

Tax:

Total: 3669.97

+ 2 DAYS LOST WORK \$3000.

Dealer Message:

ESTIMATE FOR 930F DAMAGE.

LABOR RATE
\$118/HOUR

Exhibit F

IEPA's Report findings and IEPA's Violation Notices

**ILLINOIS ENVIRONMENTAL PROTECTION AGENCY**

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 • (217) 782-3397

JB PRITZKER, GOVERNOR

JOHN J. KIM, DIRECTOR

IEPA-DIVISION OF RECORDS MANAGEMENT
RELEASABLE

JUN 20 2019

MEMORANDUM

REVIEWER: SAB

DATE: June 18, 2019**TO:** Roger Callaway, DWPC/CAS**FROM:** Paul Kennedy, DWPC/FOS – Springfield Region**SUBJECT:** Spire STL Pipeline Stormwater
(Greene/Scott Counties) Construction Site InspectionIEPA
DIVISION OF RECORDS MANAGEMENT
EXEMPT IN PART

JUN 20 2019

REVIEWER: SAB

On April 4, 2019, a complaint was filed with the USEPA concerning silt-laden water being discharged from a construction site and into surface waters. This complaint was forwarded to Illinois EPA and Paul Kennedy on April 11, 2019. This complaint was filed under complaint number AC2187 in the Agency's complaint database. I (Paul Kennedy – author) sent an email to the complainant asking for more details soon after and received a response on April 16, 2019. After seeing some photos and learning more details on the issues at-hand, I decided that a site visit would be necessary to further investigate the complaint. A review of Agency files before the site visit yielded no information about the construction project.

Site Visit One

On Tuesday, April 23, 2019 at 9:00AM, I met with Matt Bertram, Project Manager for Central Land Consulting, at the Conoco Gas Station in White Hall, Illinois. His company provides legal services to landowners who have been impacted by the construction of pipelines in the oil and gas industry across various states.

The complaint was concerning a gas pipeline being put in near White Hall. Spire Energy is constructing a pipeline about 65 miles long with the purpose of bringing a new energy source to the St. Louis area. The project is called the Spire STL Pipeline. The properties that the pipeline was to be installed on were privately owned, mostly crop ground owned by farmers. Matt also informed me that Michels Corporation was the construction company contracted to install the pipeline. The complaint involves 3 properties in Greene County and 2 properties in Scott County, focusing on sites that have experienced runoff issues from the pipeline's easement onto the landowners' private land and into surface waters.

The first property we visited was owned by [REDACTED] located in Scott County. The specific section of the pipeline we visited was located to the Southwest of the intersection of Gourley Road and IL Route 106 in Roodhouse. The particular section of the pipeline we were inspecting went down a valley and crossed over a creek. A large section of the forested valley leading down to the creek needed to be cut down for the pipeline project.

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The soil inside the construction easement areas was a lighter color than the soil outside the area, it was a much lighter brown compared to black. The first 10 photographs in Attachment 1 were taken at the [REDACTED] property, each showing a potential water quality issue caused by stormwater runoff from the construction site. While the photos show that there were attempts made at controlling stormwater runoff, they also show areas that the silt fences have failed, and that silt-contaminated water has runoff from the site at some point before the site visit. The previous few days before the site visit had been dry, according to wunderground.com, White Hall hadn't received a significant rainfall since April 18, 2019. There was no active stormwater flowing throughout the day, however the flow paths where storm water did drain from the construction areas were still present, as evident by the silt and sediment left behind in the flow paths.

The next property, owned by [REDACTED] was also located in Scott County. This field was located to the Northwest of the intersection of Manchester Alsey Road and Jefferson Road in Alsey Township, IL. Matt informed me that this was the Northern-most property related to the complaint, and it was the 3rd property South of the Northern-most part of the pipeline. This section of the pipeline ran through a field of crop ground with a private pond located a few hundred yards to the East. Photographs 11 through 15 in Attachment 1 were taken at the [REDACTED] property. These show a subsoil-colored flow path leading from the construction zone, over black-colored topsoil crop grounds, towards a pond owned by the [REDACTED]. I estimated the path to be about 200 yards long at the time of the inspection. Upon my review of the pond, it appeared to me that there were some unnatural deposits that looked a bit clay-like, similar to what the subsoil in the construction area looked like. These deposits were only present in a small part of the pond near the side where storm water had previously flowed from the field. This stretch of pipeline construction had no silt fences or stormwater runoff prevention devices deployed. It appeared that the only runoff controls being used were the topsoil and subsoil piled to the side of the construction zone and the flat crop ground.

The next property related to the complaint was in Greene County, and owned by [REDACTED]. This property was located on 2700 North in Roodhouse, IL. The area of concern at this property was a private pond located about 100 feet from the construction area and a second pond located about twice as far. [REDACTED] wasn't available during this inspection, but I learned on my return trip the next week that the upper pond (closer to pipeline) drains into the lower pond. It was pointed out to me that a tile riser was located in the middle of the pipeline construction area, which drained directly into the upper pond. The tile riser was surrounded by 4 hay bales on all sides and was sitting next to a puddle of storm water. I didn't notice any water draining into the pond at the time. I noted that the upper pond appeared to be moderately to highly turbid with a brown tint, as shown in photograph 17 of Attachment 1. There appeared to be some clay-like bottom deposits, brown in color, scattered through parts of the pond. These same bottom deposits were more prevalent in the shallow flow path that led towards the lower pond, shown in photograph 18 of Attachment 1. I noted the water in the lower pond looked to be much more clear, low turbidity, dark blue-green in color, and relatively clear. Photograph 19 of Attachment 1 shows the lower pond and the clear water, allowing us to see the leaves resting on the bottom. I took this photograph to compare the healthy and unimpacted pond to the surface waters impacted by the contaminated runoff pollution, as well as using it as a baseline to compare any future contamination impacting the lower pond.

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The next property was owned by [REDACTED] were available, so they met us at the property and walked with us while I investigated the problem areas. Photographs 20 through 47 of Attachment 1 were all taken on properties owned by the [REDACTED] 3 in total, each separated by a short drive. Photographs 20 through 29 of Attachment 1 were taken at a field of crop ground adjacent to a wetland area, located to the West of US Route 67. Photographs 30 through 45 of Attachment 1 were taken near [REDACTED] cattle pasture and along a road adjacent to more crop ground, located South of 500 North Road in Carrolton, IL. Photographs 46 and 47 of Attachment 1 were taken on a road adjacent to the [REDACTED] property at another crop field. At this location the pipeline runs North/South across 500 North Road and it was just a few hundred feet North of the site where photographs 30 through 45 of Attachment 1 were taken.

The first location adjacent to the wetland showed multiple apparent breaches of the existing silt fence. We walked along the West side of the pipeline, starting from the North. The path we walked was directly between the construction area and the designated wetland area. There were wetland signs posted along our path. Unlike most of the other properties we viewed throughout the day, this site did have a silt fence along the West side of the construction area. However, I observed several spots in the fence where there appeared to have been a discharge with the flow path still being visible, the most significant area being at the North-most section of the construction zone. Photograph 20 of Attachment 1 shows the Northern edge of the construction zone. During our inspection, the area was dry, but according to [REDACTED] and Matt, a large section of the wetland leading up to the creek is often completely flooded. Photograph 20 of Attachment 1 shows a previous flow path from the construction area, along the crop ground adjacent to a ditch and the wetland boundary, and into the grassed wetland area to the North (in Photograph 21). The photographs show that hay bales were placed apparently to help filter out sediment that would discharge from the construction site, but the brown and clay-like material in the flow path shows that subsoil-contaminated water did leave the site and the hay bales did little to nothing to filter out the sediment. I observed locations where sediment filter bags looked to have blown out and failed during the dewatering process. Each of the filter bags I saw at the site were placed right next to the silt fence, and there was usually evidence of contaminated water flowing under the silt fence with some subsoil-colored contaminants.

After we left the first [REDACTED] Property site, we went to another property owned by the [REDACTED] where photographs 30 through 45 of Attachment 1 were taken. At this site, the pipeline passes through a cattle pasture owned by the [REDACTED] and runs North/South along a road and the edge of a crop field owned by the [REDACTED]. The complainants' concern at this site was related to a pond, located across the road from the pipeline, about 100 yards away. There was a tile riser located between the pipeline and the road that drained directly into the private pond. Photographs 30 and 31 of Attachment 1 show the tile riser's location relative to the construction area and the path the tile takes towards the pond. Along most of the construction area at this site, the excavated soil was piled on the edge of the construction area and seemed to be used as a stormwater control, with no silt fence. At the construction point closest to the tile riser, the excavated soil was not piled to the side, and instead a silt fence was located in the empty spot to control runoff. This is shown in photograph 31 of Attachment 1. There was an obvious flow path under the silt fence, which was covered in the subsoil colored silt and sediment indicating that contaminated water was

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running off the site at some point in the recent past. This sediment path extended to the tile riser, which empties out in the private pond.

We then walked back down the road to the gate to view the pond. Photograph 35 of Attachment 1 shows the outlet point from the tile drain. I noted the clay-like sediment located in the bottom of the pond and took a few photographs. Photograph 38 of Attachment 1 was taken at the opposite end of the pond from the outlet, and it appears that there is much less clay-like sediment resting at the bottom of the pond. The water had moderate turbidity, had a slight brown tint to it, and there was a layer of the subsoil-colored bottom deposits.

We then walked back up the road to the South, past where the pond's tile riser was located. Along the construction site, there were more tile risers located at regular intervals. Each location with a tile riser looked to be designed in the same way. There was a small break in the piled-up soil on the edge of the construction zone, and there was a silt fence of about 10-15 yards in its place. The construction site appeared to be designed to use the tile system as the means for dewatering the construction site. The other tile risers would drain into ditches located to the West across the road at the tree line and not directly into surface water, and we did not follow the eventual flow path to look at the surface water source. Eventually the ditches would empty out into Coates Creek, about 1 mile to the West.

After leaving the property with the cattle pasture, we proceeded to one last site on the [REDACTED] property that was having runoff issues. This site featured the pipeline construction area running North/South along 500 North Road. This site was located only about ¼ mile to the North of the private pond inspected at the previous site. The runoff appeared to flow from the construction area to the West, into a short tile line that emptied out just a few yards away into a culvert under the road. From there, the water would travel over land to the West, as shown in photograph 47, towards another tile riser, about ¼ mile downgradient.

The fifth site related to the complaint was owned by [REDACTED]. The property was located to the South of 1000 North Road in Carrolton, IL, in Greene County. This site featured the pipeline construction area running North/South through a large crop field owned by [REDACTED] which would eventually cross over an unnamed tributary to Macoupin Creek. This construction area was designed a lot like the [REDACTED] property, meaning the West side of the construction site had the piled-up soil being used as a runoff control and the other had a silt fence. The silt fence covered more of the construction zone at this site, but there was no silt fence at the points where water would flow downgradient into the construction site from the field. Photographs 48 through 59 of Attachment 1 show various points of apparent contaminated water flow either under the silt fence or through a failed silt fence. A lot of these flow paths ended up at a tile riser, which all drained a few hundred yards Southeast into a ditch at the tree line that would drain into the unnamed tributary to Macoupin creek. Matt and I walked along the construction site until we got to the creek crossing, which was shown in photographs 58 and 59 of Attachment 1. This creek crossing appeared to be much more controlled than at the [REDACTED] property. There didn't appear to be any breaches in the reinforced silt fence and no silt-laden flow paths, but the geography of the site made me think that a big rain event could easily lead to a discharge of silt-laden water directly into the creek below the construction site.

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The final property related to the complaint was owned by [REDACTED]. This property is located in Greene County, to the West of US Route 67 and Southeast of Macoupin Creek. Photograph 60 of Attachment 1 shows that the construction site runs through a completely flooded area. Matt informed me that the area does not have a permanent surface water body, and that all the standing water was just yearly flooding that will last until about June or July, depending on the rainfall in the Spring. This site is also located adjacent to Macoupin Creek, less than ¼ mile away. Matt informed me that the landowner was concerned about the potential washing away of a pile of topsoil piled on the side of the construction site.

Site Visit Two

About a week after my first visit of the Spire STL Pipeline, I received a phone call from Nate Laps with Central Land Consulting. He claimed that, with the recent rain, conditions at the subject properties had worsened and asked if I would be available to make another visit. I spoke with Matt Bertram and arranged to meet him and Alex Cannady, also with Central Land Consulting, at 9:00 AM on May 2, 2019 to make additional observations of the subject properties. There was a light rain falling throughout the day, and it had rained 4.83 inches since my first visit, according to wunderground.com. Attachment 3 shows a breakdown of the precipitation totals in the days leading up to May 2, 2019, with the information being pulled from wunderground.com.

The first site we visited was owned by [REDACTED] located in Scott County. [REDACTED] was present at the site during our visit, along with a handful of construction workers. [REDACTED] was able to answer a few questions for me, along with a neighbor of his. One of which was the name and flow path of the creek. [REDACTED] told me the creek is an unnamed tributary to Little Sandy Creek, which is a tributary to Illinois River. We walked down the hill from the North on the East side of the pipeline to where the pipeline crosses the creek. Photographs 1 through 4 of Attachment 2 were taken by the creek. Walking just outside of the silt fence on the North side of the creek, I identified a spot where contaminated water was leaking out from under the fence and draining directly into the creek, which was much higher than my last visit, flowing very fast, and dark brown in color. I took sample P1 from the point where water was flowing from the construction site and discharging into the creek, catching the water as it fell from the bank and down the slope to the creek. I also noted that the flooding outside of the construction area to the East extended about 50 feet from the silt fence shown in Photograph 1. We were unable to cross the creek to check conditions on the South side and were unable to cross the construction area to see conditions to the West of the pipeline.

After leaving the [REDACTED] property, we made our way to the property owned by [REDACTED] in Greene County. We greeted [REDACTED] who wasn't available at my previous visit, and walked around the back of the house to look at his ponds. The first thing I noticed and photographed was the brown color of the lower pond. A week before there was no brown coloring, but now there were highly turbid and light brown sections of the pond. This was most prevalent in the area where the upper pond drains into the lower and where the upper pond had at some point overtopped and drained into the lower pond over the grassed slope. This was where I took photograph 5 and 7 of Attachment 2. Photograph 6 of attachment 2 was of a dead tadpole, which was the only sign of distressed or deceased aquatic life at the site. Photographs 8 and 9 of Attachment 2 show the section of the lower pond where the upper pond drains

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into. The area closer to the outlet point shows the water is extremely turbid and a very bold brown color. Photograph 10 of Attachment 2 shows that the upper pond is in the same condition throughout. Looking up at the construction site, it appeared that there had been a large volume of water flowing from the silt fence to the pond as evident by the folded over grass on the slope. I noticed that the tile riser inside the construction area was surrounded by stormwater. There was a square of hay bales placed around it as well as a small wrapping of silt fence around the riser, as shown in photograph 13 of Attachment 2. The water was audibly draining through the tile riser at a fast rate, and I decided to take Sample P2 inside the hay-bale square. I wanted to get my next sample, Sample P3, as close to the tile outlet in the pond as possible, which was located about 15 yards from the edge of the water on the Southeast side of the upper pond. This sample was much less turbid than the sample from inside the construction zone next to the tile riser, but it still had a moderate to high turbidity and a distinct brown color. Before we left the Jones property, I took my last photograph, number 17 of Attachment 2, of the far edge of the upper pond. This photograph showed a contrast between the turbid and brown color of the pond and the clear rainwater that was draining over the grassed slope on the side opposite of the construction site.

After leaving the [REDACTED] property, we made our way back to the [REDACTED] property. We first stopped by the site running through the crop field between the road and the wetland area, to the West of US Route 67. We were unable to walk through the path we took a week prior due to flooding, so we had to go around to the other side of the construction area and walk down from the south. [REDACTED] met us as we parked and walked along the construction site with us. At this property, the construction site featured piled-up soil along with a silt fence on the West side adjacent to the wetland, where we walked. I observed multiple spots along the silt fence where contaminated water was leaking out and flowing into the ditch that runs parallel to the construction zone, roughly 10 to 15 yards away. At the time of the inspection, the ditch was flowing with up to a foot of water in some places, and the water was brown in color with moderate turbidity. Photographs 18 and 19 of Attachment 2 show an example of the water running off from the site and the path along the construction area. Photograph 20 of Attachment 2 shows the far North end of the active construction site at the time. The direction of the photo is where the pipeline will eventually be put in. The photograph shows that the silt fence and hay bales have not prevented stormwater from washing away into the wetland area and the flooded field outside of the construction zone. I walked around to the constructed drive path to take two more samples. I took Sample P4 on the side of the path where the water level had overtopped the silt fence because I wanted to see what kind of TSS levels were leaving the construction site and being deposited into the wetland area. I took Sample P5 on the other side of the drive path where there was no silt fence or runoff control of any kind.

After taking these two samples, we went to the cattle site owned by [REDACTED], which was South of 500 North Road, Carrolton, IL. We first stopped by the same pond we looked at the week before. [REDACTED] informed me on this trip that the pond was used for drinking water by his cattle. The pond had high turbidity and a very bold brown color. The conditions in the pond were much different from my last site visit, which resulted from the tile drainage system dumping contaminated stormwater into the pond. This was the only source of water entering the pond other than rain. I collected Sample P6 as close to the outlet point of the drainage system as I could. Again, the sample had a moderate to high amount of turbidity and was brown in color. We walked out of the pasture and up the road to the construction site where the tile riser to the pond was located. Like my last visit, there was a visible flow path leading from the short silt

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fence to the riser, except today I could see water flowing over the ground. The riser was flooded, shown in photograph 28, and was audibly draining water at a high rate. I confirmed, again, with [REDACTED] that this tile riser is connected to only one line that empties out directly into the pond. There are no other lines connected to the riser and there are no other lines connected to the outlet point at the pond. I took sample P7 directly outside of the silt fence and photographed the flowing water heading from my sample point to the tile riser. This water had the same visual qualities as the water that was draining into the pond, high turbidity and a bold brown color. After taking Sample P7, we then walked South along the unnamed road and construction site. I found the same situation at each drain tile along the pipeline construction area. The design of the site hadn't changed, piled-up soil being used on the edge of the construction site as a stormwater control, and near each tile riser there is a break in the soil piles and 20 yards of silt fence is used instead. Just like last week, the flow path from under the silt fences towards the tile risers was present, except this time they were actively discharging water from the construction site. Photograph 31 of Attachment 2 shows clear rainwater on top of the cropland adjacent to the contaminated water nearby. I wanted to provide a comparison of what the clear stormwater looks like at the site versus the contaminated runoff from the construction area. Photographs 32 through 37 of Attachment 2 show additional issues with tile risers and silt fences along the same pipeline site. The other risers all drain into ditches that would eventually end up draining into Coates Creek. Each riser features the same kind of construction design as the first along with the same runoff issues as the first. Some of the sites also had filter bags just inside the silt fence that appeared to have been used to dewater the construction site within the past week. Photograph 38 of Attachment 2 shows the construction site crosses over a low point in the middle of [REDACTED] cattle pasture. He informed me that the standing water is not a pond or any kind of body of water but instead a result of stormwater flooding. He also mentioned that most days the area will hold a small amount of water, even though it all drains underneath the road to another pasture, and eventually ending up in a ditch. I took photograph 38 of Attachment 2 to show the geography of the construction site and the potential for stormwater to runoff from the site.

After leaving the [REDACTED] property, we proceeded to a property owned by Bernard H Meyer Trust and Mary Lois Meyer Trust. When we arrived at the site, we were greeted by [REDACTED] who provided an update of the most recent activity at the site. There were a handful of construction workers present on site, and they had apparently been discharging water through a filter bag from the construction site via a pump. There was no active pumping occurring at that time, so I was unable to collect a sample. Photograph 39 of attachment 2 was taken from the road, and the dewatering activity was taking place across the road, behind where I was standing. [REDACTED] pointed out the green flags to me as marking where his field tile lines were located. He expressed concern over the potential of them being crushed and ruined by the construction. He informed me that the large crop field in which the pipeline construction was running through, was covered with a large grid of field tile. All the tiles drained into one outfall point, which emptied into a ditch that would eventually drain into Coates Creek. I chose not to collect a sample at this site, because it wouldn't give a good representation of water quality issues stemming directly from the construction project.

After leaving the [REDACTED] property, we went to the site owned by [REDACTED]. We crossed his alfalfa field and met [REDACTED] near the active construction area. We walked through a wooded area along the pipeline and arrived at the location where Photograph 40 in Attachment 2 was taken. Inside the

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construction area there was a pump being used for dewatering the trench where the pipeline was to be laid. Along the West side of the construction area, the side we were on, there had been a ditch cut inside the construction area to drain the dewatered stormwater from the site. This was shown in Photograph 42 in Attachment 2. Sample P8 was collected at the point where flow underneath the silt fence was heaviest, this was the most contaminated sample collected during the complaint investigation, having the highest level of turbidity, darkest brown color, and eventually the highest TSS count as measured by the lab.

In terms of geography, this section of the pipeline construction area was the high point, with a slight slope leading down to the West through a wooded area, eventually sloping down to a pond owned by [REDACTED] neighbor. Through the roughly 30-yard long (North-South) and 15-yard wide (East-West) stretch of alfalfa (partially shown in photograph 41 of Attachment 2) was a flow of contaminated stormwater leading from the construction site, under the silt fence, and down the wooded slope. Behind the edge of the tree line to the West, the wide channel of water came together to run down a flow path cut out from storm water. The volume of water flowing through the wooded area was so high that I mistook it for a natural creek. I asked [REDACTED] if it was a perennial stream, and he informed me that the flow was all caused by the runoff from the dewatering process. I was unable to photograph the flow through the wooded area due to a temporary problem with the camera. By the time we made it to the pond owned by [REDACTED] neighbor ([REDACTED]), the camera was working again. Sample P9 was collected from the point where the ditch filled with stormwater runoff from the construction site entered the pond owned by [REDACTED], [REDACTED] neighbor. [REDACTED] informed me that the pond was located about ¼ mile away from the pipeline at the point where sample P8 was collected. The pond had an overall brown tint to it with high turbidity, particularly closer to the point where the stormwater was running into it. [REDACTED] mentioned that the pond was in a much better condition, in terms of color and clarity, before the stormwater from the construction site began running off into the pond.

After leaving the pond owned by [REDACTED] we went to another section of the pipeline where the complainants claimed that runoff was an issue. We walked through open fields and along an unnamed tributary to Macoupin Creek a bit less than ½ mile in distance before we made it back to the pipeline. The water in the creek showed the same characteristics of the construction site runoff we had seen throughout the day. I took a picture of a small section of the creek, which can be seen in photograph 48 of Attachment 2. When we made it back to the pipeline, there was a separate construction crew actively excavating soil and dewatering the trench. This was farther enough down the pipeline to the South that the original site on the [REDACTED] property was out of view. I watched the construction workers for a few minutes but didn't observe them actively pumping water from the construction site. One worker attempted to operate the pump to no avail, and an excavator was actively moving soil. I took photographs 49-52 of Attachment 2 at this final site, all on the West side of the pipeline. These show trails of sediment left behind by a stormwater release underneath the silt fence at the top of a steep slope. The flow path ran down the hill and emptied into a ditch, which would empty into the unnamed tributary to Macoupin Creek shown in photograph 48 of Attachment 2. I collected sample P10 from the slow drip into the ditch, shown in photograph 51 of Attachment 2. Afterwards, we walked further south along the pipeline to observe the design of the construction area relative to the geography and water features of the area. I told [REDACTED] that I would like to see where the unnamed tributary empties into Macoupin Creek, but he informed me that the flooding was too severe to reach that location. We did walk to a point where I was able to see the

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Creek off in the distance and verified that the flooding was too extensive to attempt photographing or collecting a sample.

We then walked to the North through a field, and then along a road back to where our vehicles were. Matt and Alex left, and I stayed a few minutes more talking with [REDACTED]. He took me to see one more site that crossed directly over the unnamed tributary. [REDACTED] pointed out an area of trees that were cut down for the construction project and another construction area. I did not see any evidence of active discharges at the time and took no photographs or samples. After returning to my vehicle, I had a short concluding discussion with [REDACTED] and left the site to return to the Springfield Office.

Conclusion

Laboratory results for the 10 samples collected on May 2, 2019 are shown in attachment 4. Upon review of Illinois Environmental Protection Agency files after the two inspection dates, it was confirmed that there was no General Stormwater Permit for Construction Activities applied for or obtained for the Spire STL Pipeline Project. During Site Visit One, which occurred during dry weather, multiple locations along the pipeline project were identified as water quality hazards and were suspected of previously discharging contaminated water to Waters of the State, along with inadequate or absent stormwater controls at the various construction site locations. During Site Visit Two, which occurred during wet weather, active discharges from multiple locations along the pipeline project were observed and samples were collected. The laboratory results from the samples confirmed that the water running off from the construction sites and into Waters of the State were contaminated with high levels of Total Suspended Solids.

N:\REG\Springfield\SPF_BOW\SPF_BOW_SHARE\DWPC\Kennedy\Stormwater Complaints\Spire Pipeline Company\Report\AC2187.docx

Attachments (4)

cc: DWPC/FOS/Records Unit
DWPC/FOS – Springfield Region



Illinois Environmental Protection Agency
Division of Water Pollution Control
Field Operations Section

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Digital Photographs



File Name: P4230001.JPG

Date: 04/23/2019
Time: 9:34 AM
Direction: SE
Photo By: Paul Kennedy
Exposure Number: 01
County: Scott
Owner: [REDACTED]
Latitude: 39 32'05" N
Longitude: 90 25'59" W
Description: View from the East side of the pipeline looking downhill to the stream crossing. The area was previously forested and used for hunting, the path was cut to install the pipeline. The bridge can be seen at the bottom of the valley where the construction area crosses over the creek, an unnamed tributary to Little Sandy Creek, which is tributary to the Illinois River.



File Name: P4230002.JPG

Date: 04/23/2019
Time: 9:37 AM
Direction: SE
Photo By: Paul Kennedy
Exposure Number: 02
County: Scott
Owner: [REDACTED]
Latitude: 39 32'03" N
Longitude: 90 25'58" W
Description: East side of the pipeline construction area showing light brown colored subsoil spilling out underneath the silt fence. Note the color difference between the washed-out subsoil and the darker topsoil outside of the construction area. There were multiple instances of this same scenario along the construction area at this site.



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File Name: P4230003.JPG

Date: 04/23/2019
Time: 9:39 AM
Direction: SE
Photo By: Paul Kennedy
Exposure Number: 03
County: Scott
Owner: [REDACTED]
Latitude: 39 32'00" N
Longitude: 90 25'27" W
Description: East side of the pipeline at the bottom of the hill where the ground flattens out above the creek level. Showing where silt-laden water had washed away under the silt fence and flooded the area in the recent past. The subsoil color is present both inside and outside of the silt fence. This expanded for an area about 15 yards outside of the silt fence.



File Name: P4230004.JPG

Date: 04/23/2019
Time: 9:42 AM
Direction: NW
Photo By: Paul Kennedy
Exposure Number: 04
County: Scott
Owner: [REDACTED]
Latitude: 39 32'00" N
Longitude: 90 25'58" W
Description: East side of the pipeline, across the creek from previous photographs at its South bank. A clear flow path of soil/contaminants extending from under the silt fence directly into the creek in the recent past.



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Date: 04/23/2019
Time: 9:42 AM
Direction: SW
Photo By: Paul Kennedy
Exposure Number: 05
County: Scott
Owner: [REDACTED]
Latitude: 39 31'59" N
Longitude: 90 25'56" W
Description: South side of the creek looking up the hill above the creek to the South. This shows the controls put in place and the geography of the construction site directly above the creek. I was particularly concerned about the potential runoff and soil washing away during a heavy rain event.

File Name: P4230005.JPG



Date: 04/23/2019
Time: 9:44 AM
Direction: SW
Photo By: Paul Kennedy
Exposure Number: 06
County: Scott
Owner: [REDACTED]
Latitude: 39 31'58" N
Longitude: 90 25'54" W
Description: Photograph taken from the bank of the creek, farther South along the pipeline on the East side, to the South of where the creek bends from North/South to East/West and goes through the pipeline. This shows multiple piles of washed away subsoil on the slope down to the creek, along with the path the runoff took in the recent past.

File Name: P4230006.JPG



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Date: 04/23/2019
Time: 9:45 AM
Direction: SW
Photo By: Paul Kennedy
Exposure Number: 07
County: Scott
Owner: [REDACTED]
Latitude: 39 31'57" N
Longitude: 90 25'54" W
Description: Another example of a flow path stormwater runoff has taken from the construction area towards the creek. This is the same situations as photograph 06, just farther down the pipeline. This photo was taken from between the creek and the pipeline.

File Name: P4230007.JPG



Date: 04/23/2019
Time: 9:48 AM
Direction: SW
Photo By: Paul Kennedy
Exposure Number: 08
County: Scott
Owner: [REDACTED]
Latitude: 39 31'56" N
Longitude: 90 25'54" W
Description: Another example of runoff stemming from the construction site spilling down a steep embankment into the creek below. This photo was taken from the opposite side of the creek.

File Name: P4230008.JPG



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Date: 04/23/2019
Time: 9:56 AM
Direction: NE
Photo By: Paul Kennedy
Exposure Number: 09
County: Scott
Owner: [REDACTED]
Latitude: 39 32'00" N
Longitude: 90 25'59" W
Description: Photo taken on the West side of the pipeline, to the North of the creek. This shows an area of flooding outside of the construction area that extends about 50 yards out, that had flooded with "chocolate milk" colored contaminated storm water.

File Name: P4230009.JPG



Date: 04/23/2019
Time: 9:57 AM
Direction: E
Photo By: Paul Kennedy
Exposure Number: 10
County: Scott
Owner: [REDACTED]
Latitude: 39 32'01" N
Longitude: 90 25'59" W
Description: Another example of contaminated storm water running off from the construction site. This section had leaked through/under the silt fence and hay bales and left behind this small dried up section of the clay-like subsoil. This particular section was not directly leading into the creek.

File Name: P4230010.JPG



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Date: 04/23/2019
Time: 10:18 AM
Direction: NW
Photo By: Paul Kennedy
Exposure Number: 11
County: Scott
Owner: [REDACTED]
Latitude: 39 33'35" N
Longitude: 90 24'56" W
Description: Clearly shows the different colored soil that washed away from the construction site onto the darker colored topsoil of the row-crop field. The photo shows no runoff controls in place around the construction site.

File Name: P4230011.JPG



Date: 04/23/2019
Time: 10:18 AM
Direction: NE
Photo By: Paul Kennedy
Exposure Number: 12
County: Scott
Owner: [REDACTED]
Latitude: 39 33'35" N
Longitude: 90 24'56" W
Description: This photo was taken from the same spot as photograph 11, just turned around to show the sediment flow path leading from the construction site to a private pond, which is adjacent to the small strip of green grass in the photo.

File Name: P4230012.JPG



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Date: 04/23/2019
Time: 10:21 AM
Direction: N
Photo By: Paul Kennedy
Exposure Number: 13
County: Scott
Owner: [REDACTED]
Latitude: 39 33'37" N
Longitude: 90 24'51" W
Description: This photo shows the tail end of the flow path from the construction site to the private pond, which is located in the middle of the grass, out of view from this photograph.

File Name: P4230013.JPG



Date: 04/23/2019
Time: 10:24 AM
Direction: NW
Photo By: Paul Kennedy
Exposure Number: 14
County: Scott
Owner: [REDACTED]
Latitude: 39 33'40" N
Longitude: 90 24'49" W
Description: Light brown, subsoil colored, clay-like bottom deposits were noted to be on the bottom of the pond around the area where the flow path drained into the pond. In this photo it can be seen that the bottom deposits look to be the same color as the sediment left behind in the flow path from the construction site. This is the Southeast side of the pond.

File Name: P4230014.JPG



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Date: 04/23/2019
Time: 10:24 AM
Direction: NW
Photo By: Paul Kennedy
Exposure Number: 15
County: Scott
Owner: [REDACTED]
Latitude: 39 33'40" N
Longitude: 90 24'49" W
Description: This was another example of the bottom deposits visible near the bank of the pond, a few yards to the North from where photograph 14 was taken.

File Name: P4230015.JPG



Date: 04/23/2019
Time: 10:43 AM
Direction: E
Photo By: Paul Kennedy
Exposure Number: 16
County: Greene
Owner: [REDACTED]
Latitude: 39 30'25" N
Longitude: 90 25'50" W
Description: Photo was taken from the Southeast corner of the upper pond, showing the tile riser that drains into the upper pond inside the construction area to be surrounded by standing water and inside a square of hay bales. Here the pipeline runs North/South just to the East of the upper pond.

File Name: P4230016.JPG



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File Name: P4230017.JPG

Date: 04/23/2019
Time: 10:45 AM
Direction: W
Photo By: Paul Kennedy
Exposure Number: 17
County: Greene
Owner: [REDACTED]
Latitude: 39 30'26" N
Longitude: 90 25'50" W
Description: Photo from the East side of the upper pond. The water here is moderate to highly turbid, some slight brown coloration can be seen near the shore. This was near the tile outlet, which was about 15 feet towards the center of the pond.



File Name: P4230018.JPG

Date: 04/23/2019
Time: 10:46 AM
Direction: W
Photo By: Paul Kennedy
Exposure Number: 18
County: Greene
Owner: [REDACTED]
Latitude: 39 30'27" N
Longitude: 90 25'51" W
Description: This was the ditch that allowed water to flow from the upper pond to the lower pond. This ditch runs from the upper pond to the north, and then drains into the lower pond at its Northeast corner. On the bottom of the ditch there were brown mud deposits that appeared to be a different color from the mud along the banks. There was no evidence of any discoloration or unnatural turbidity in the lower pond.



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Date: 04/23/2019
Time: 10:47 AM
Direction: W
Photo By: Paul Kennedy
Exposure Number: 19
County: Greene
Owner: [REDACTED]
Latitude: 39 30'28" N
Longitude: 90 25'52" W
Description: This is a photo of the lower pond from its East side, between it and the ditch from the upper pond. This photo shows no discoloration or unnatural deposits or turbidity. This photograph was taken to use as a future comparison to any contamination that stems from runoff from the construction site.

File Name: P4230019.JPG



Date: 04/23/2019
Time: 11:26 AM
Direction: S
Photo By: Paul Kennedy
Exposure Number: 20
County: Greene
Owner: [REDACTED]
Latitude: 39 22'11" N
Longitude: 90 24'48" W
Description: This was taken to the North of the pipeline construction area. At this property the ground farther North had not been broken yet. This shows a channel in the crop ground that was cut via a dewatering discharge through the silt fence and hay bales. The light brown sediment from the excavated subsoil in the construction area can be seen in and around the channel cut by the runoff flow.

File Name: P4230020.JPG



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Date: 04/23/2019
Time: 11:26 AM
Direction: N
Photo By: Paul Kennedy
Exposure Number: 21
County: Greene
Owner: [REDACTED]
Latitude: 39 22'11" N
Longitude: 90 24'48" W
Description: This photo shows the continued path from the channel beginning in photograph 20. At the very top of the photo Apple Creek runs along the tree line. The landowner informed me that the entire area covered in the green grass will often be flooded at various times throughout the Spring season.

File Name: P4230021.JPG



Date: 04/23/2019
Time: 11:29 AM
Direction: E
Photo By: Paul Kennedy
Exposure Number: 22
County: Greene
Owner: [REDACTED]
Latitude: 39 22'11" N
Longitude: 90 24'48 W
Description: This photo was taken just to the West of the edge of the construction area shown in photograph 20. This gives a closer look at the washed away sediment that originated inside the construction area. The flow path leading towards the camera here emptied into a ditch that would eventually let out into Apple Creek in shown photograph 20.

File Name: P4230022.JPG



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Date: 04/23/2019
Time: 11:31AM
Direction: W
Photo By: Paul Kennedy
Exposure Number: 23
County: Greene
Owner: [REDACTED]
Latitude: 39 22'11" N
Longitude: 90 24'48" W
Description: This was an example of some washed away subsoil originating from the construction area. This spot was located inside the wetland area, which was marked by signs.

File Name: P4230023.JPG



Date: 04/23/2019
Time: 11:36 AM
Direction: NE
Photo By: Paul Kennedy
Exposure Number: 24
County: Greene
Owner: [REDACTED]
Latitude: 39 22'08" N
Longitude: 90 24'48" W
Description: This is a dewatering filter bag, which is used to dewater the construction area while capturing any silt or sediment in the water before discharging it from the construction site. They seemed to be either ineffective or would burst during use, because each spot along the pipeline where a filter bag could be observed also had a dried flow path left behind by silt contaminated water running off from the site.

File Name: P4230024.JPG



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Date: 04/23/2019
Time: 11:38 AM
Direction: N
Photo By: Paul Kennedy
Exposure Number: 25
County: Greene
Owner: [REDACTED]
Latitude: 39 22' 05" N
Longitude: 90 24' 48" W
Description: Another example of the light brown, clay-like subsoil having previously washed away from the construction site through/under the silt fence and emptying into the ditch to the West of the pipeline.

File Name: P4230025.JPG



Date: 04/23/2019
Time: 11:39 AM
Direction: S
Photo By: Paul Kennedy
Exposure Number: 26
County: Greene
Owner: [REDACTED]
Latitude: 39 22' 06" N
Longitude: 90 24' 48" W
Description: An example of the different colored soil running off from the construction site and being deposited into the ditch to the West. It can be seen that this dried flow path is right next to a filter bag in the construction area where dewatering most likely occurred.

File Name: P4230026.JPG



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Date: 04/23/2019
Time: 11:41 AM
Direction: S
Photo By: Paul Kennedy
Exposure Number: 27
County: Greene
Owner: [REDACTED]
Latitude: 39 22'06" N
Longitude: 90 24'48" W
Description: A trail of water can be seen running from a weak point in the silt fence to the crop ground between the pipeline and the ditch inside the wetland.

File Name: P4230027.JPG



Date: 04/23/2019
Time: 11:51 AM
Direction: W
Photo By: Paul Kennedy
Exposure Number: 28
County: Greene
Owner: [REDACTED]
Latitude: 39 22'11" N
Longitude: 90 24'48" W
Description: This was one of many signs posted just outside of the construction area to the West and North at this site. These were posted along the grass line surrounding the pipeline.

File Name: P4230028.JPG



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Date: 04/23/2019
Time: 12:09 PM
Direction: NE
Photo By: Paul Kennedy
Exposure Number: 29
County: Greene
Owner: [REDACTED]
Latitude: 39 19'56" N
Longitude: 90 25'20" W
Description: Recently used filter bag.
The soil just outside the silt fence
appears to be the same subsoil that
was excavated inside the
construction area.

File Name: P4230029.JPG



Date: 04/23/2019
Time: 12:09 PM
Direction: NW
Photo By: Paul Kennedy
Exposure Number: 30
County: Greene
Owner: [REDACTED]
Latitude: 39 19'56" N
Longitude: 90 25'20" W
Description: This photo was taken on
the West side of the pipeline. A
channel leading from the
construction area to a tile riser can be
seen. This tile riser drains directly
into the property owner's pond,
located to the Northwest.

File Name: P4230030.JPG



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Date: 04/23/2019
Time: 12:11 PM
Direction: SE
Photo By: Paul Kennedy
Exposure Number: 31
County: Greene
Owner: [REDACTED]
Latitude: 39 19'48" N
Longitude: 90 25'21" W
Description: This is the same tile riser from photograph 30 but from a different angle. The channel of flow can clearly be seen running from under the silt fence to the riser. This photo also shows the inadequate stormwater controls implemented at this particular site.

File Name: P4230031.JPG



Date: 04/23/2019
Time: 12:11 PM
Direction: W
Photo By: Paul Kennedy
Exposure Number: 32
County: Greene
Owner: [REDACTED]
Latitude: 39 19'48" N
Longitude: 90 25'21" W
Description: Photograph of the road from between it and the pipeline. The road showed some signs of water flowing through and washing part of it away. It appeared that stormwater originating from the construction site might have been the cause, but there was little in terms of silt or sediment left behind that could be attributed to runoff being the cause.

File Name: P4230032.JPG



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Date: 04/23/2019
Time: 12:15 PM
Direction: S
Photo By: Paul Kennedy
Exposure Number: 33
County: Greene
Owner: [REDACTED]
Latitude: 39 20'00" N
Longitude: 90 25'21" W
Description: North of the tile riser in the photograph 30 along the same road as photograph 32. A channel was cut on the left side of this road by stormwater resulting from dewatering pumping from the construction site in the recent past.

File Name: P4230033.JPG



Date: 04/23/2019
Time: 12:17 PM
Direction: W
Photo By: Paul Kennedy
Exposure Number: 34
County: Greene
Owner: [REDACTED]
Latitude: 39 19'48" N
Longitude: 90 25'21" W
Description: This pasture was to the West of the road, and North of the pond experiencing pollution. This is the path storm water would take to pass through the field before emptying into the ditch down in the tree line.

File Name: P4230034.JPG



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File Name: P4230035.JPG

Date: 04/23/2019
Time: 12:19 PM
Direction: W
Photo By: Paul Kennedy
Exposure Number: 35
County: Greene
Owner: [REDACTED]
Latitude: 39 19'58" N
Longitude: 90 25'22" W
Description: The point where the tile riser from photograph 30 will outlet into the pond to the West of the pipeline. The pond water has a moderate turbidity and light brown tint here. There are some clay-like, brown bottom deposits here, which look very similar to the same deposits seen at other sites and similar to the soil seen inside the construction zone and in the flow paths outside the construction zone.



File Name: P4230036.JPG

Date: 04/23/2019
Time: 12:19 PM
Direction: W
Photo By: Paul Kennedy
Exposure Number: 36
County: Greene
Owner: [REDACTED]
Latitude: 39 19'58" N
Longitude: 90 25'22" W
Description: Photo from where the small pool containing the tile outlet opens to the rest of the pond. Light brown, clay-like bottom deposits can be seen, the water had a moderate turbidity and a slight brown tint.



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File Name: P4230037.JPG

Date: 04/23/2019
Time: 12:21 PM
Direction: SW
Photo By: Paul Kennedy
Exposure Number: 37
County: Greene
Owner: [REDACTED]
Latitude: 39 19'58" N
Longitude: 90 25'22" W
Description: Photo from the bank of the pond, about in the middle of the East side. A comparison can be seen with normal leaves on the bottom of the pond near the bank, and leaves that are covered with the clay-like brown subsoil closer to the middle of the pond.



File Name: P4230038.JPG

Date: 04/23/2019
Time: 12:22 PM
Direction: S
Photo By: Paul Kennedy
Exposure Number: 38
County: Greene
Owner: [REDACTED]
Latitude: 39 19'59" N
Longitude: 90 25'23" W
Description: Photo from the North bank of the pond, the point farthest from the tile drain outlet point. The bottom of the pond shows some light brown deposits, but it is not as severe as it is closer to the outlet. The water was less turbid here and had a more natural tint as opposed to the brown tint on the other side.



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Date: 04/23/2019
Time: 12:32 PM
Direction: W
Photo By: Paul Kennedy
Exposure Number: 39
County: Greene
Owner: [REDACTED]
Latitude: 39 19'48" N
Longitude: 90 25'20" W
Description: Farther to the South from photograph 30, this photo was taken across the road at another tile riser outside of the construction zone. This shows the flow path of stormwater heading from the road down towards a ditch. The low point at the tree line is where the tile riser in photograph 40 lets out.

File Name: P4230039.JPG



Date: 04/23/2019
Time: 12:33 PM
Direction: E
Photo By: Paul Kennedy
Exposure Number: 40
County: Greene
Owner: [REDACTED]
Latitude: 39 19'48" N
Longitude: 90 25'20" W
Description: Photo taken from the same spot as photograph 39. The angle and slope make the road, between the riser and photographer, difficult to see. A flow path of contaminated stormwater can be seen leading from the silt fence to the tile riser. The lighter colored soil around the riser is the dried-up silt and sediment originating from the excavated subsoil in the construction area.

File Name: P4230040.JPG



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File Name: P4230041.JPG

Date: 04/23/2019
Time: 12:34 PM
Direction: E
Photo By: Paul Kennedy
Exposure Number: 41
County: Greene
Owner: [REDACTED]
Latitude: 39 19'44" N
Longitude: 90 25'20" W
Description: Photo was taken farther South along the pipeline from photograph 40. This was the same situation as the previous tile risers adjacent to the pipeline. Contaminated stormwater had drained through the silt fence and into the riser. At this site the flow path was still quite wet. Stepping into the mud was much different from stepping on the wet topsoil, it was much heavier and stickier, like the clay subsoil in the construction area.



File Name: P4230042.JPG

Date: 04/23/2019
Time: 12:36 PM
Direction: S
Photo By: Paul Kennedy
Exposure Number: 42
County: Greene
Owner: [REDACTED]
Latitude: 39 19'44" N
Longitude: 90 25'20" W
Description: This is the silt fence shown in photograph 41. This clearly shows how the filter bags were used to dewater the construction site and discharge contaminated water through/under the silt fence.



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Date: 04/23/2019
Time: 12:37 PM
Direction: W
Photo By: Paul Kennedy
Exposure Number: 43
County: Greene
Owner: [REDACTED]
Latitude: 39 19'44" N
Longitude: 90 25'20" W
Description: The channel cut by the dewatering flow leading from the silt fence towards the tile riser in photograph 41. Note the soil color difference between the dried silt around the channels and the normal crop field topsoil at the very top of the photo.

File Name: P4230043.JPG



Date: 04/23/2019
Time: 12:39 PM
Direction: W
Photo By: Paul Kennedy
Exposure Number: 44
County: Greene
Owner: [REDACTED]
Latitude: 39 19'43" N
Longitude: 90 25'22" W
Description: The outlet point from the tile drainage system connected to the tile riser in photograph 41.

File Name: P4230044.JPG



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Date: 04/23/2019
Time: 12:40 PM
Direction: E
Photo By: Paul Kennedy
Exposure Number: 45
County: Greene
Owner: [REDACTED]
Latitude: 39 19'44" N
Longitude: 90 25'21" W
Description: Photo taken at the same point as photograph 44. This shows the slope up towards the road and the stormwater drainage paths leading from it.

File Name: P4230045.JPG



Date: 04/23/2019
Time: 12:47 PM
Direction: E
Photo By: Paul Kennedy
Exposure Number: 46
County: Greene
Owner: [REDACTED]
Latitude: 39 20'12" N
Longitude: 90 25'20" W
Description: This site was about ¼ mile to the North of the pond in photograph 38. This was the site of another dewatering spot. The photograph was taken from the road, right on top of where the tile riser drained into a culvert that ran under the road and emptied into the field in photograph 47.

File Name: P4230046.JPG



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Date: 04/23/2019
Time: 12:47 PM
Direction: W
Photo By: Paul Kennedy
Exposure Number: 47
County: Greene
Owner: [REDACTED]
Latitude: 39 20'12" N
Longitude: 90 25'20" W
Description: The direction that stormwater would drain after coming out of the culvert under the road. From that point, water would travel over the ground for about ¼ mile before entering another tile riser, which would eventually let out into a ditch near the far tree line, which would eventually drain into Coates Creek.

File Name: P4230047.JPG



Date: 04/23/2019
Time: 1:51 PM
Direction: SW
Photo By: Paul Kennedy
Exposure Number: 48
County: Greene
Owner: [REDACTED]
Latitude: 39 15'33" N
Longitude: 90 24'46" W
Description: A failed section of the silt fence on the East side of the pipeline. The darker colored soil shows where the stormwater has spilled out of the construction area, including draining into the tile riser. This soil was a darker color because it was still damp. The standing water inside the construction area is all rain water.

File Name: P4230048.JPG



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Date: 04/23/2019
Time: 1:52 PM
Direction: SE
Photo By: Paul Kennedy
Exposure Number: 49
County: Greene
Owner: [REDACTED]
Latitude: 39 15'33" N
Longitude: 90 24'46" W
Description: This photo shows the path of the drain tile system leading to the outlet point in a ditch at the tree line. The near tile riser is the same in photograph 48.

File Name: P4230049.JPG



Date: 04/23/2019
Time: 1:55 PM
Direction: W
Photo By: Paul Kennedy
Exposure Number: 50
County: Greene
Owner: [REDACTED]
Latitude: 39 15'29" N
Longitude: 90 24'46" W
Description: Farther South from the silt fence failure in photograph 48. The dried silt/sediment from the contaminated stormwater running off under the silt fence was left behind in the flow path that runs towards another tile riser.

File Name: P4230050.JPG



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Date: 04/23/2019
Time: 1:55 PM
Direction: SE
Photo By: Paul Kennedy
Exposure Number: 51
County: Greene
Owner: [REDACTED]
Latitude: 39 15'29" N
Longitude: 90 24'46" W
Description: Same location as photograph 50, but a different angle. The dried path of subsoil silt and sediment can be seen heading towards the tile riser, which drains into a ditch at the tree line.

File Name: P4230051.JPG



Date: 04/23/2019
Time: 1:56 PM
Direction: W
Photo By: Paul Kennedy
Exposure Number: 52
County: Greene
Owner: [REDACTED]
Latitude: 39 15'29" N
Longitude: 90 24'46" W
Description: A closer view of the flow path extending underneath the silt fence from photograph 50. Here the same color soil can be seen in the top right of the photo, inside the construction zone, and outside of the silt fence, showing the contaminants that had runoff from the site before the inspection.

File Name: P4230052.JPG



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Date: 04/23/2019
Time: 1:58 PM
Direction: SW
Photo By: Paul Kennedy
Exposure Number: 53
County: Greene
Owner: [REDACTED]
Latitude: 39 15'22" N
Longitude: 90 24'46" W
Description: Another example of contaminated water bringing silt and sediment under the silt fence and later drying up, leaving behind an obvious flow path leading from the construction site. This photograph was taken farther along the pipeline to the South from the previous photographs.

File Name: P4230053.JPG



Date: 04/23/2019
Time: 1:58 PM
Direction: SE
Photo By: Paul Kennedy
Exposure Number: 54
County: Greene
Owner: [REDACTED]
Latitude: 39 15'22" N
Longitude: 90 24'46" W
Description: Taken from the same location as photograph 53, just looking a different direction. This shows the flow path the contaminated water took after leaving the construction site, draining into the tile riser shown.

File Name: P4230054.JPG



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Date: 04/23/2019
Time: 2:01 PM
Direction: W
Photo By: Paul Kennedy
Exposure Number: 55
County: Greene
Owner: [REDACTED]
Latitude: 39 15'15" N
Longitude: 90 24'47" W
Description: Another example of contaminated stormwater having run off from the site underneath the silt fence.

File Name: P4230055.JPG



Date: 04/23/2019
Time: 2:01 PM
Direction: SE
Photo By: Paul Kennedy
Exposure Number: 56
County: Greene
Owner: [REDACTED]
Latitude: 39 15'15" N
Longitude: 90 24'47" W
Description: Taken from the same spot as photograph 55 but looking a different angle. The flow path here leads from the construction site to the tree line, where there is a ditch that will eventually empty out into the unnamed tributary to Macoupin Creek.

File Name: P4230056.JPG



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Date: 04/23/2019
Time: 2:09 PM
Direction: N/A
Photo By: Paul Kennedy
Exposure Number: 57
County: Greene
Owner: [REDACTED]
Latitude: N/A
Longitude: N/A
Description: This was a throwaway picture that was accidentally taken.

File Name: P4230057.JPG



Date: 04/23/2019
Time: 2:09 PM
Direction: N
Photo By: Paul Kennedy
Exposure Number: 58
County: Greene
Owner: [REDACTED]
Latitude: 39 15'11" N
Longitude: 90 24'47" W
Description: This was taken from the bank of the creek, at the point where the pipeline crosses it. There was no evidence of contaminated stormwater having run off from the site at this location, the photograph was taken to show the geography of the site and it's potential to deposit contaminated water directly into the creek.

File Name: P4230058.JPG



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File Name: P4230059.JPG

Date: 04/23/2019
Time: 2:09 PM
Direction: S
Photo By: Paul Kennedy
Exposure Number: 59
County: Greene
Owner: [REDACTED]
Latitude: 39 15'09" N
Longitude: 90 24'47" W
Description: This is the same site as photograph 59 but taken facing the opposite direction. Again, this shows the potential for runoff to enter the creek due to the slope and geography of the site, although no evidence of previous discharges to the creek were present.



File Name: P4230060.JPG

Date: 04/23/2019
Time: 2:49 PM
Direction: NW
Photo By: Paul Kennedy
Exposure Number: 60
County: Greene
Owner: [REDACTED]
Latitude: 39 13'40" N
Longitude: 90 24'12" W
Description: This area shown was flooded, it is not a permanent surface water resource. According to the property owner, it is flooded until June or July most years. The pipeline construction area can be seen via the outline of the topsoil piles on the left and the mostly submerged soil piles on the right. The property owner was particularly concerned about the topsoil being washed away and the drain tile system being crushed by the construction.



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Digital Photographs



Date: 05/02/2019
Time: 9:43 AM
Direction: SW
Photo By: Paul Kennedy
Exposure Number: 01
County: Scott
Owner: [REDACTED]
Latitude: 39 32'01" N
Longitude: 90 25'57" W
Description: Silt fence has failed, and contaminated stormwater has spilled outside of the construction area. The flooded area extended about 50 feet outside of the silt fence and was not directly running off into the creek located near the top of the photo. The red sandbag at the top is located on the bridge crossing the creek inside the construction area.

File Name: P5020001.JPG



Date: 05/02/2019
Time: 9:48 AM
Direction: SW
Photo By: Paul Kennedy
Exposure Number: 02
County: Scott
Owner: [REDACTED]
Latitude: 39 32'01" N
Longitude: 90 25'57" W
Description: Taken outside of the construction area, on the North bank of the creek. Contaminated stormwater is running off from the construction area (shown in photograph 03) and draining directly into the creek.

File Name: P5020002.JPG



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Date: 05/02/2019
Time: 9:48 AM
Direction: NW
Photo By: Paul Kennedy
Exposure Number: 03
County: Scott
Owner: [REDACTED]
Latitude: 39 32'00" N
Longitude: 90 25'57" W
Description: Taken from the same location as photograph 02, just facing a different direction. Silt and sediment contaminated stormwater can be seen leaking out of the construction area under the silt fence. This was less than 10 yards from the bank of the creek.

File Name: P5020003.JPG



Date: 05/02/2019
Time: 9:52 AM
Direction: SE
Photo By: Paul Kennedy
Exposure Number: 04
County: Scott
Owner: [REDACTED]
Latitude: 39 32'00" N
Longitude: 90 25'57" W
Description: Sample P1 was collected from the flow path of stormwater running from under the silt fence directly into the creek. The water was captured as it fell from the bank and just before it would have landed in the flowing creek.

File Name: P5020004.JPG



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File Name: P5020005.JPG

Date: 05/02/2019
Time: 10:18 AM
Direction: NW
Photo By: Paul Kennedy
Exposure Number: 05
County: Greene
Owner: [REDACTED]
Latitude: 39 30'28" N
Longitude: 90 25'52" W
Description: View of the lower pond from its Southeast edge, directly between both ponds. An unnatural brown color can be seen in the areas away from the bank. Overall, the sections of the lower pond close to where water had previously and was currently draining from the upper pond were highly turbid with the same light brown color as the contaminated water located inside the construction areas.



File Name: P5020006.JPG

Date: 05/02/2019
Time: 10:19 AM
Direction: SE
Photo By: Paul Kennedy
Exposure Number: 06
County: Greene
Owner: [REDACTED]
Latitude: 39 30'27" N
Longitude: 90 25'51" W
Description: A dead tadpole located in the upper pond. This was the only sign of deceased or stressed aquatic life at the site. The high turbidity and brown color of the water here is a strong contrast to the conditions near the bank of the upper pond noted during the previous, dry weather visit.



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Date: 05/02/2019
Time: 10:21 AM
Direction: SE
Photo By: Paul Kennedy
Exposure Number: 07
County: Greene
Owner: [REDACTED]
Latitude: 39 30'27" N
Longitude: 90 25'52" W
Description: Taken from the same spot as photograph 05, facing away from the lower pond and towards the upper pond. The upper pond had overtopped the berm to the Northwest of it and emptied into the lower pond via the grass hill shown. This took place prior to the day's inspection and during the heavier rain events earlier in the week.

File Name: P5020007.JPG



Date: 05/02/2019
Time: 10:23 AM
Direction: NW
Photo By: Paul Kennedy
Exposure Number: 08
County: Greene
Owner: [REDACTED]
Latitude: 39 30'28" N
Longitude: 90 25'52" W
Description: View of the Northeast corner of the lower pond where the designed flow path from the upper pond outlets. This photo shows the high turbidity and brown color of the water near the outlet to the right, and the fading of the color farther out into the pond.

File Name: P5020008.JPG



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File Name: P5020009.JPG

Date: 05/02/2019
Time: 10:24 AM
Direction: W
Photo By: Paul Kennedy
Exposure Number: 09
County: Greene
Owner: [REDACTED]
Latitude: 39 30'28" N
Longitude: 90 25'52" W
Description: A different view of the outlet point from the upper pond into the lower pond. The actual outlet is somewhere in the vegetation shown. The visible water along the edge shows the same "chocolate milk" type water that has run off from the construction site to pollute the two ponds.



File Name: P5020010.JPG

Date: 05/02/2019
Time: 10:27 AM
Direction: W
Photo By: Paul Kennedy
Exposure Number: 10
County: Greene
Owner: [REDACTED]
Latitude: 39 30'26" N
Longitude: 90 25'50"
Description: View from the Southeast corner of the upper pond. The outlet point from the tile riser inside the construction area can be seen about 15 yards from the Northeast bank. The high turbidity and "chocolate milk" color is a sharp contrast to the conditions seen in the pond the previous week.



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Date: 05/02/2019
Time: 10:28 AM
Direction: SE
Photo By: Paul Kennedy
Exposure Number: 11
County: Greene
Owner: [REDACTED]
Latitude: 39 30'26" N
Longitude: 90 25'50" W
Description: Shows the laid-down grass between the construction area and the upper pond where stormwater had flowed over the grass from under the silt fence before the inspection.

File Name: P5020011.JPG



Date: 05/02/2019
Time: 10:29 AM
Direction: NW
Photo By: Paul Kennedy
Exposure Number: 12
County: Greene
Owner: [REDACTED]
Latitude: 39 30'26" N
Longitude: 90 25'50" W
Description: The same spot as photograph 11 but facing a different direction. This shows the continued flow path from under the silt fence, over the laid-down grass, and directly into the upper pond.

File Name: P5020012.JPG



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Date: 05/02/2019
Time: 10:30 AM
Direction: E
Photo By: Paul Kennedy
Exposure Number: 13
County: Greene
Owner: [REDACTED]
Latitude: 39 30'25" N
Longitude: 90 25'49" W
Description: Inside the construction area, this is the only tile riser that drains directly and only into the upper pond. At the time the photo was taken, there was an audible heavy flow rushing into the riser through the hay bales and the small silt fence shown.

File Name: P5020013.JPG



Date: 05/02/2019
Time: 10:31 AM
Direction: E
Photo By: Paul Kennedy
Exposure Number: 14
County: Greene
Owner: [REDACTED]
Latitude: 39 30'25" N
Longitude: 90 25'49" W
Description: Sample P2 was collected right up against the silt fence, inside the hay bales. The "chocolate milk" color and turbidity was the same as the contamination present in both ponds at this site.

File Name: P5020014.JPG



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File Name: P5020015.JPG

Date: 05/02/2019
Time: 10:34 AM
Direction: NW
Photo By: Paul Kennedy
Exposure Number: 15
County: Greene
Owner: [REDACTED]
Latitude: 39 30'26" N
Longitude: 90 25'51" W
Description: Sample P3 was taken a few feet out from the Southeast bank of the upper pond in an effort to get a sample as close to the outlet point in the middle of the pond as possible.



File Name: P5020016.JPG

Date: 05/02/2019
Time: 10:35 AM
Direction: N
Photo By: Paul Kennedy
Exposure Number: 16
County: Greene
Owner: [REDACTED]
Latitude: 39 30'26" N
Longitude: 90 25'51" W
Description: In the center of the photo, the bubbling caused by the tile line out-letting into the pond can faintly be seen. The top left of this photo also shows the flow path the upper pond naturally takes to drain via a separate short tile line down to the lower pond, located out of view on the other side of the grassed slope.



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File Name: P5020017.JPG

Date: 05/02/2019
Time: 10:37 AM
Direction: N
Photo By: Paul Kennedy
Exposure Number: 17
County: Greene
Owner: [REDACTED]
Latitude: 39 30'26" N
Longitude: 90 25'51" W
Description: This photo was taken on the West bank of the upper pond, at the point farthest from the tile outlet point. This shows the point where clear rainwater drains into the pond over grass from the side opposite the pipeline and mixes with the "chocolate milk" type water contaminating the pond.



File Name: P5020018.JPG

Date: 05/02/2019
Time: 11:16 AM
Direction: N
Photo By: Paul Kennedy
Exposure Number: 18
County: Greene
Owner: [REDACTED]
Latitude: 39 21' 56" N
Longitude: 90 24' 48" W
Description: Photo taken on the West side of the pipeline, between it and the ditch roughly 10 yards West that marks the edge of the labelled wetland area. Contaminated "chocolate milk" water can be seen leaking from the construction area under the silt fence.



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Date: 05/02/2019
Time: 11:16 AM
Direction: N
Photo By: Paul Kennedy
Exposure Number: 19
County: Greene
Owner: [REDACTED]
Latitude: 39 22'02" N
Longitude: 90 24'48" W
Description: Taken from the same spot as photograph 18 but facing a different angle. The contaminated stormwater was running off from under the silt fence, through the grass shown, and into the ditch on the edge of the wetland area. The ditch was flowing North towards the flooded field at the top of the photo.

File Name: P5020019.JPG



Date: 05/02/2019
Time: 11:23 AM
Direction: N
Photo By: Paul Kennedy
Exposure Number: 20
County: Greene
Owner: [REDACTED]
Latitude: 39 22'13" N
Longitude: 90 24'49" W
Description: The North edge of the construction area, taken from the West side of the pipeline. Construction had not been done farther North, but the pipeline will run straight North towards the tree line. This photo shows inadequate and failing stormwater controls around the site and the flooding that commonly occurs in the field to the North.

File Name: P5020020.JPG



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File Name: P5020021.JPG

Date: 05/02/2019
Time: 11:29 AM
Direction: W
Photo By: Paul Kennedy
Exposure Number: 21
County: Greene
Owner: [REDACTED]
Latitude: 39 22'13" N
Longitude: 90 24'48" W
Description: Sample P4 was collected at the point where the silt fence disappeared under the flood waters, along the West side of the construction site. Here it is sitting on the access road put in by the pipeline contractors. This sample contained the "chocolate milk" type characteristics similar to other sites, with a bit less turbidity due to the larger volume of stormwater around the site.



File Name: P5020022.JPG

Date: 05/02/2019
Time: 11:29 AM
Direction: SW
Photo By: Paul Kennedy
Exposure Number: 22
County: Greene
Owner: [REDACTED]
Latitude: 39 22'13" N
Longitude: 90 24'48" W
Description: This is another angle of sample P4, showing where exactly it was collected relative to the edge of the construction area and wetland to the West.



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File Name: P5020023.JPG

Date: 05/02/2019
Time: 11:31 AM
Direction: W
Photo By: Paul Kennedy
Exposure Number: 23
County: Greene
Owner: [REDACTED]
Latitude: 39 22'13" N
Longitude: 90 24'48" W
Description: Sample P5 was collected across the access road from where P4 was collected. The East side of the road had no controls in place to prevent stormwater from running off from the construction site directly North. The conditions of the sampled water were the same as sample P4.



File Name: P5020024.JPG

Date: 05/02/2019
Time: 11:31 AM
Direction: W
Photo By: Paul Kennedy
Exposure Number: 24
County: Greene
Owner: [REDACTED]
Latitude: 39 22'13" N
Longitude: 90 24'48" W
Description: This is another angle taken of sample P5 to better show where it was collected relative to the construction site.



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Date: 05/02/2019
Time: 12:00 PM
Direction: W
Photo By: Paul Kennedy
Exposure Number: 25
County: Greene
Owner: [REDACTED]
Latitude: 39 19'58" N
Longitude: 90 25'22" W
Description: View from the Southeast edge of the pond. The "chocolate milk" color and high turbidity is a sharp contrast to the conditions of the pond on the previous visit. At the time the photo was taking, water was flowing from the drain tile at a high rate, adding even more silt-contaminated water to the pond.

File Name: P5020025.JPG



Date: 05/02/2019
Time: 12:02 PM
Direction: W
Photo By: Paul Kennedy
Exposure Number: 26
County: Greene
Owner: [REDACTED]
Latitude: 39 19'58" N
Longitude: 90 25'22" W
Description: Sample P6 was collected at the point where the small pool surrounding the tile outlet connects to the larger open part of the pond. The narrow channel in the center of photograph 25 is where the sample was collected.

File Name: P5020026.JPG



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Date: 05/02/2019
Time: 12:02 PM
Direction: SW
Photo By: Paul Kennedy
Exposure Number: 27
County: Greene
Owner: [REDACTED]
Latitude: 39 19'58" N
Longitude: 90 25'22" W
Description: A different angle showing where sample P6 was taken relative to the outlet point of the tile drain.

File Name: P5020027.JPG



Date: 05/02/2019
Time: 12:08 PM
Direction: SE
Photo By: Paul Kennedy
Exposure Number: 28
County: Greene
Owner: [REDACTED]
Latitude: 39 19'56 N
Longitude: 90 25'20" W
Description: The tile riser shown is the only riser connected to the outlet point shown in photograph 27. Here a flow path can be seen leading from the construction area to the riser. At the time, there was an audible heavy flow running into the tile riser. The water surrounding the riser was the same "chocolate milk" color and turbidity consistent with the subsoil contaminated water running off from the construction area.

File Name: P5020028.JPG



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File Name: P5020029.JPG

Date: 05/02/2019
Time: 12:12 PM
Direction: E
Photo By: Paul Kennedy
Exposure Number: 29
County: Greene
Owner: [REDACTED]
Latitude: 39 16'56" N
Longitude: 90 25'20" W
Description: Sample P7 was collected from the water running off from the construction site underneath the silt fence. This water was flowing into the large puddle surrounding the tile riser and would eventually drain into the pond. The high turbidity and "chocolate milk" color is consistent with other sites where subsoil contaminated stormwater was running off from the construction area.



File Name: P5020030.JPG

Date: 05/02/2019
Time: 12:12 PM
Direction: NW
Photo By: Paul Kennedy
Exposure Number: 30
County: Greene
Owner: [REDACTED]
Latitude: 39 19'56" N
Longitude: 90 25'20" W
Description: This photo shows another angle of where sample P7 was taken. The flow path from the sample point to the tile riser is clear. The clay-like subsoil mud being deposited by the water running off was a very noticeable contrast to the natural topsoil of the crop field.



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File Name: P5020031.JPG

Date: 05/02/2019
Time: 12:16 PM
Direction: SE
Photo By: Paul Kennedy
Exposure Number: 31
County: Greene
Owner: [REDACTED]
Latitude: 39 19'55" N
Longitude: 90 25'20 W
Description: This is an example of non-contaminated stormwater located outside of the construction area. The lack of a color and little to no turbidity is a sharp contrast to the stormwater seen inside and running off from the construction areas along the pipeline project.



File Name: P5020032.JPG

Date: 05/02/2019
Time: 12:16 PM
Direction: NW
Photo By: Paul Kennedy
Exposure Number: 32
County: Greene
Owner: [REDACTED]
Latitude: 39 19'55" N
Longitude: 90 25'20 W
Description: This tile riser was located farther South along the West side of the pipeline. The same situation as shown in photograph 28 was present here: contaminated stormwater was running off from the construction area underneath the silt fence, draining into the tile riser. This riser let out a few hundred feet to the West, across the road, into a ditch at the tree line.



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Date: 05/02/2019
Time: 12:17 PM
Direction: NE
Photo By: Paul Kennedy
Exposure Number: 33
County: Greene
Owner: [REDACTED]
Latitude: 39 19'48" N
Longitude: 90 25'22" W
Description: This was the silt fence and the channel cut by the contaminated stormwater running off from the site that led to the tile riser shown in photograph 32.

File Name: P5020033.JPG



Date: 05/02/2019
Time: 12:17 PM
Direction: NW
Photo By: Paul Kennedy
Exposure Number: 34
County: Greene
Owner: [REDACTED]
Latitude: 39 19'48" N
Longitude: 90 25'20" W
Description: This photo was taken from the same spot as photograph 33 but facing a different direction. The flow path leading from under the silt fence to the tile riser is clear. The silt-contaminated "chocolate milk" runoff stormwater left behind a much stickier clay-like mud than the non-contaminated topsoil of the crop field on the unaffected parts of the ground.

File Name: P5020034.JPG



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Date: 05/02/2019
Time: 12:24 PM
Direction: SE
Photo By: Paul Kennedy
Exposure Number: 35
County: Greene
Owner: [REDACTED]
Latitude: 39 19'44" N
Longitude: 90 25'20" W
Description: Farther South along the West side of the pipeline, this was another instance where a silt fence was put up between the piled-up soil on the edge of the construction area. Again, this location was experiencing contaminated runoff water leaving the site underneath the silt fence and draining into a tile riser.

File Name: P5020035.JPG



Date: 05/02/2019
Time: 12:24 PM
Direction: SW
Photo By: Paul Kennedy
Exposure Number: 36
County: Greene
Owner: [REDACTED]
Latitude: 39 19'44" N
Longitude: 90 25'20" W
Description: This photo was taken from the same spot as photograph 35 but facing a different direction. This shows the flow path leading from the silt fence to the tile riser, which drains a few hundred feet to the West, under the road, into a ditch at the tree line.

File Name: P5020036.JPG



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Date: 05/02/2019
Time: 12:26 PM
Direction: W
Photo By: Paul Kennedy
Exposure Number: 37
County: Greene
Owner: [REDACTED]
Latitude: 39 19'43" N
Longitude: 90 25'22" W
Description: This was the outlet point connected to the tile shown in photograph 36. This tile connection is a single line with no other lines connected to it. The discharge from the tile drainage shown here is a good representative of all outlets seen on the day's inspection, in terms of water quality and rate of flow.

File Name: P5020037.JPG



Date: 05/02/2019
Time: 12:36 PM
Direction: SE
Photo By: Paul Kennedy
Exposure Number: 38
County: Greene
Owner: [REDACTED]
Latitude: 39 20'03" N
Longitude: 90 25'20" W
Description: This shows where the pipeline crosses a cattle pasture area. There were no noted points of runoff here, the photo was taken to reference the potential for erosion and runoff from the construction site. Note: The standing water here isn't a pond. According to the landowner there will be some flooding in the low point in the pasture, where the current flooding, is for most of the Spring. That water slowly drains to another field to the west of the road (where photo was taken from) and eventually a ditch.

File Name: P5020038.JPG



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Date: 05/02/2019

Time: 12:53 PM

Direction: N

Photo By: Paul Kennedy

Exposure Number: 39

County: Greene

Owner: [REDACTED]

Latitude: 39 19'13" N

Longitude: 90 25'28" W

Description: This photo shows the area inside the construction zone. The green flags mark the landowner's underground tile drainage system. The tile system was installed throughout the large crop field, all with one discharge point.

File Name: P5020039.JPG



Date: 05/02/2019

Time: 2:02 PM

Direction: S

Photo By: Paul Kennedy

Exposure Number: 40

County: Greene

Owner: [REDACTED]

Latitude: 39 14'38" N

Longitude: 90 24'43" W

Description: Contaminated stormwater was being pumped from the construction site and discharging under the silt fence a few dozen feet to the East. The "chocolate milk" contaminated water flowed through the landowner's alfalfa field, down through a wooded area, and into a private pond about ¼ mile away.

File Name: P5020040.JPG



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File Name: P5020041.JPG

Date: 05/02/2019
Time: 2:02 PM
Direction: E
Photo By: Paul Kennedy
Exposure Number: 41
County: Greene
Owner: [REDACTED]
Latitude: 39 14'38" N
Longitude: 90 24'43" W
Description: Photo taken from the same spot as photograph 40 but facing a different direction. This shows the distance to the construction site and the pump being used to dewater the hole where the pipeline will be placed. This pumped water was running down a channel in the construction area and flowing West under the silt fence shown, actively flowing over the ground where the photographer was standing.



File Name: P5020042.JPG

Date: 05/02/2019
Time: 2:03 PM
Direction: S
Photo By: Paul Kennedy
Exposure Number: 42
County: Greene
Owner: [REDACTED]
Latitude: 39 14'38" N
Longitude: 90 24'43" W
Description: This shows the channel that was cut inside the construction area to allow the runoff resulting from the dewatering pumping to flow away from the excavated hole for the pipeline. This water was draining under the silt fence to the North of the photograph and eventually draining into a private pond.



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Date: 05/02/2019
Time: 2:04 PM
Direction: NW
Photo By: Paul Kennedy
Exposure Number: 43
County: Greene
Owner: [REDACTED]
Latitude: 39 14'39" N
Longitude: 90 24'43" W
Description: This was the point of heaviest flow stemming from the dewatering pumping. This point was a few feet off camera to the left of photograph 41. This is a good representative of the consistent failures of the silt fence all along the stretch of construction where dewatering pumping was taking place.

File Name: P5020043.JPG



Date: 05/02/2019
Time: 2:11 PM
Direction: NE
Photo By: Paul Kennedy
Exposure Number: 44
County: Greene
Owner: [REDACTED]
Latitude: 39 14'39" N
Longitude: 90 24'43" W
Description: Sample P8 was collected just outside of the silt fence. This is the same location as shown in photograph 43 and was the most extreme example of silt and sediment contaminated stormwater observed during the inspection.

File Name: P5020044.JPG



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Date: 05/02/2019
Time: 2:22 PM
Direction: N
Photo By: Paul Kennedy
Exposure Number: 45
County: Greene
Owner: [REDACTED]
Latitude: 39 14'35" N
Longitude: 90 24'51" W
Description: After following the flow path leading from the pipeline construction area in photograph 44, sample P9 was collected where that runoff emptied out into a private pond. The water shown was a not part of the pond or a creek, it was simply the high volume of runoff that flowed over land.

File Name: P5020045.JPG



Date: 05/02/2019
Time: 2:23 PM
Direction: SW
Photo By: Paul Kennedy
Exposure Number: 46
County: Greene
Owner: [REDACTED]
Latitude: 39 14'35" N
Longitude: 90 24'51" W
Description: This photo was taken from the same spot as photograph 45 but facing a different direction. This shows the brown color and high turbidity of the pond, which resulted from the contaminated runoff.

File Name: P5020046.JPG



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Date: 05/02/2019
Time: 2:23 PM
Direction: E
Photo By: Paul Kennedy
Exposure Number: 47
County: Greene
Owner: [REDACTED]
Latitude: 39 14'35" N
Longitude: 90 24'51" W
Description: This photo was taken from the same spot as photograph 46 but facing a different direction. This shows the flow path of contaminated runoff before it empties into the pond. The channel is cut by stormwater, not a creek. This water originated at the construction site about ¼ mile away.

File Name: P5020047.JPG



Date: 05/02/2019
Time: 2:29 PM
Direction: W
Photo By: Paul Kennedy
Exposure Number: 48
County: Greene
Owner: [REDACTED]
Latitude: 39 14'34" N
Longitude: 90 24'49" W
Description: This unnamed creek is tributary to and emptied into Macoupin Creek about 1 mile downstream from where the photograph was taken. This creek received runoff discharges stemming from the construction area at multiple points along the landowner's property.

File Name: P5020048.JPG



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Date: 05/02/2019
Time: 2:37 PM
Direction: N
Photo By: Paul Kennedy
Exposure Number: 49
County: Greene
Owner: [REDACTED]
Latitude: 39 14'19" N
Longitude: 90 24'42" W
Description: A location where contaminated stormwater has run off from the site from under the silt fence. The flow path from this site drained downhill to a ditch that emptied into the creek tributary to Macoupin Creek.

File Name: P5020049.JPG



Date: 05/02/2019
Time: 2:37 PM
Direction: W
Photo By: Paul Kennedy
Exposure Number: 50
County: Greene
Owner: [REDACTED]
Latitude: 39 14'19" N
Longitude: 90 24'42" W
Description: This photo was taken from the same spot as photograph 49 but facing a different direction. The flow path and sediment left behind are clearly seen.

File Name: P5020050.JPG



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Date: 05/02/2019
Time: 2:55 PM
Direction: SW
Photo By: Paul Kennedy
Exposure Number: 51
County: Greene
Owner: [REDACTED]
Latitude: 39 14'19" N
Longitude: 90 24'43" W
Description: Sample P10 was collected at the bottom of the hill shown in photograph 50. The runoff stormwater was collected as it fell from the bank before landing in the ditch, which would drain into the tributary creek to Macoupin Creek.

File Name: P5020051.JPG



Date: 05/02/2019
Time: 2:55 PM
Direction: E
Photo By: Paul Kennedy
Exposure Number: 52
County: Greene
Owner: [REDACTED]
Latitude: 34 14'19" N
Longitude: 90 24'43" W
Description: This photo was taken from the spot where sample P10 was collected. This gives another view of the flow path the runoff water took from under the silt fence towards the creek.

File Name: P5020052.JPG



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White Hall, IL (Greene County)
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White Hall historical weather data from wunderground.com

Date	Precipitation Amount	Unit
5/2/2019	1.32	Inches
5/1/2019	0.25	Inches
4/30/2019	2.36	Inches
4/29/2019	0.03	Inches
4/28/2019	0	Inches
4/27/2019	0.09	Inches
4/26/2019	0	Inches
4/25/2019	0.14	Inches
4/24/2019	0.63	Inches
4/23/2019	0.01	Inches
Total	4.83	Inches



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Analysis: Total Suspended Solids (TSS) Batch# S19E032

Data Review Report

<u>Sample</u>	<u>Analyte</u>	<u>Initial Result</u>	<u>Qualifier</u>	<u>Final Result</u>	<u>Spike Level</u>	<u>Recovery</u>	<u>RPD</u>
19E0093-01	Total Suspended Solids	1,990.0000		1990 mg/L			
19E0093-02	Total Suspended Solids	526.6667		527 mg/L			
19E0093-03	Total Suspended Solids	160.5000		160 mg/L			
19E0093-04	Total Suspended Solids	215.5556		216 mg/L			
19E0093-05	Total Suspended Solids	526.6667		527 mg/L			
19E0093-06	Total Suspended Solids	191.0000		191 mg/L			
19E0093-07	Total Suspended Solids	352.0000		352 mg/L			
19E0093-08	Total Suspended Solids	7,890.0000		7890 mg/L			
19E0093-09	Total Suspended Solids	172.6667		173 mg/L			
19E0093-10	Total Suspended Solids	635.7143		636 mg/L			
S19E032-BLK1	Total Suspended Solids	0.0000		0.00 mg/L			
S19E032-DUP1	Total Suspended Solids	1,860.0000		1860 mg/L			6.75



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PREPARATION BENCH SHEET

S19E032

IEPA Laboratory

Printed: 5/6/2019 10:24:48AM

Matrix: Water

Prepared using: Extractions - TSS

Lab Number	Analysis	Prepared	Initial (ml)	Final (ml)	Source ID	Filter Weight (g)	Filter + Residue Wt. (g)	Funding Code	Extraction Comments
19E0093-01	Total Suspended Solids (TSS)	05/03/19 11:02	30	30		0.1163	0.1760	WPZ6	
19E0093-02	Total Suspended Solids (TSS)	05/03/19 11:02	30	30		0.1162	0.1320	WPZ6	
19E0093-03	Total Suspended Solids (TSS)	05/03/19 11:02	200	200		0.1177	0.1498	WPZ6	
19E0093-04	Total Suspended Solids (TSS)	05/03/19 11:02	90	90		0.1162	0.1356	WPZ6	
19E0093-05	Total Suspended Solids (TSS)	05/03/19 11:02	60	60		0.1193	0.1509	WPZ6	
19E0093-06	Total Suspended Solids (TSS)	05/03/19 11:02	100	100		0.1229	0.1420	WPZ6	
19E0093-07	Total Suspended Solids (TSS)	05/03/19 11:02	100	100		0.1232	0.1584	WPZ6	
19E0093-08	Total Suspended Solids (TSS)	05/03/19 11:02	20	20		0.1185	0.2763	WPZ6	
19E0093-09	Total Suspended Solids (TSS)	05/03/19 11:02	150	150		0.1217	0.1476	WPZ6	
19E0093-10	Total Suspended Solids (TSS)	05/03/19 11:02	70	70		0.1164	0.1609	WPZ6	
S19E032-BLK1	QC	05/03/19 11:02	1000	1000		0.1160	0.1160		
S19E032-DUP1	QC	05/03/19 11:02	30	30	19E0093-01	0.1157	0.1715		

Reagent/Solvent ID: Multi Analyte Solids Standard Lot# 041918

05/03/19, RM



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IEPA DOL
Issued: 3/12/2019
Date: 5-3-19
Box ID: 202ITX

Standard Method 2540D - 22nd Edition/Standard Method 2540E - 22nd Edition
TSS/VSS
Matrix: Water
Analyst: RM

LOG-TSS/VSS-R1
SOP: BEN018-00-0319
Batch: S19ED32

Filter Lot # 20218-8276-
Drying Oven ID A15907 (7C-42)
Muffle Oven ID A09635 (7C-12)
Balance ID B23

Sample number	Fraction	Filter ID	Filter Wt. (g)	Sample volume (mL)	TSS Weight Date: 5-6-19 Balance Checked: TSS <input checked="" type="checkbox"/> VSS <input type="checkbox"/> 1st weigh	Weight of filter + dried residue (g) 5-6-19 TSS <input checked="" type="checkbox"/> VSS <input type="checkbox"/> 2nd weigh	TSS <input type="checkbox"/> VSS <input type="checkbox"/> 3rd weigh	TSS <input type="checkbox"/> VSS <input type="checkbox"/> 4th weigh
BLK	TSS	HAYK8	0.1160	1000	0.1160	0.1160		
19EDD93-01	VSS	HAYK8	0.1157	30	0.1760	0.1714		
19EDD93-02	TSS	HAYK9	0.1163	30	0.1760	0.1758		
19EDD93-03	VSS	HAYK9	0.1162	30	0.1320	0.1319		
19EDD93-04	TSS	HAYK7	0.1177	200	0.1498	0.1495		
19EDD93-05	VSS	HAYK6	0.1162	90	0.1356	0.1354		
19EDD93-06	TSS	HAYK5	0.1193	60	0.1509	0.1508		
19EDD93-07	VSS	HAYK4	0.1229	100	0.1420	0.1419		
19EDD93-08	TSS	HAYK3	0.1232	100	0.1584	0.1582		
19EDD93-09	VSS	HAYK2	0.1185	20	0.2763	0.2761		
19EDD93-10	TSS	HAYK1	0.1217	150	0.1476	0.1475		
19EDD93-11	VSS	HAYK0	0.1164	70	0.1609	0.1609		

1st cook	TSS	VSS	2nd cook	TSS	VSS	3rd cook	TSS	VSS	4th cook	TSS	VSS
Date	5-3-19		Date	5-6-19		Date			Date		
Time in	12:45		Time in	11:20		Time in			Time in		
Oven temp	104.2°		Oven temp	104.2°		Oven temp			Oven temp		
Time out	13:45		Time out	8:20		Time out			Time out		
Oven temp	104.2°		Oven temp	104.2°		Oven temp			Oven temp		



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Illinois Environmental Protection Agency Laboratory

825 N. Rutledge Springfield, Illinois 62702 217.782.9780

LABORATORY RESULTS

Name:	PIPELINE COMPLAINT	Date Received :	05/02/19
Project/Facility Number:	[none]	Visit Number:	
Funding Code:	WPZ6	Temperature C:	3.00
Trip ID:		Lab Sample ID:	19E0093-01
Client Sample ID:	P1	Date/Time Collected:	05/02/19 9:50
Matrix:	Water	Collected By:	PJK
Sample Type:	Grab	Field pH:	

Total Suspended Solids by Standard Method 2540D

Method:	SM 2540D	Prepared:	05/03/19 11:02
Units:	mg/L	Analyzed:	05/03/19 11:02

<u>Analyte</u>	<u>Result</u>	<u>Qualifier</u>	<u>Reporting Limit</u>	<u>Regulatory Level</u>
Total Suspended Solids	1990		4	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety. Test results meet all requirements of NELAP (accredited by Florida DOH #E37645). If you have any questions about this report, please contact Tom Weiss, Laboratory Manager, at 217.782.9780.

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LABORATORY RESULTS

Name:	PIPELINE COMPLAINT		
Project/Facility Number:	[none]	Date Received :	05/02/19
Funding Code:	WPZ6	Visit Number:	
Trip ID:		Temperature C:	3.00
Client Sample ID:	P2	Lab Sample ID:	19E0093-02
Matrix:	Water	Date/Time Collected:	05/02/19 10:29
Sample Type:	Grab	Field pH:	
		Collected By:	PJK

Total Suspended Solids by Standard Method 2540D

Method:	SM 2540D	Prepared:	05/03/19 11:02
Units:	mg/L	Analyzed:	05/03/19 11:02

<u>Analyte</u>	<u>Result</u>	<u>Qualifier</u>	<u>Reporting Limit</u>	<u>Regulatory Level</u>
Total Suspended Solids	527		4	

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LABORATORY RESULTS

Name:	PIPELINE COMPLAINT	Date Received :	05/02/19
Project/Facility Number:	[none]	Visit Number:	
Funding Code:	WPZ6	Temperature C:	3.06
Trip ID:		Lab Sample ID:	19E0093-03
Client Sample ID:	P3	Date/Time Collected:	05/02/19 10:33
Matrix:	Water	Collected By:	PJK
Sample Type:	Grab	Field pH:	

Total Suspended Solids by Standard Method 2540D

Method:	SM 2540D	Prepared:	05/03/19 11:02
Units:	mg/L	Analyzed:	05/03/19 11:02

<u>Analyte</u>	<u>Result</u>	<u>Qualifier</u>	<u>Reporting Limit</u>	<u>Regulatory Level</u>
Total Suspended Solids	160		4	

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825 N. Rutledge Springfield, Illinois 62702 217.782.9780

LABORATORY RESULTS

Name:	PIPELINE COMPLAINT	Date Received :	05/02/19
Project/Facility Number:	[none]	Visit Number:	
Funding Code:	WPZ6	Temperature C:	3.00
Trip ID:		Lab Sample ID:	19E0093-04
Client Sample ID:	P4	Date/Time Collected:	05/02/19 11:27
Matrix:	Water	Collected By:	PJK
Sample Type:	Grab	Field pH:	

Total Suspended Solids by Standard Method 2540D

Method:	SM 2540D	Prepared:	05/03/19 11:02
Units:	mg/L	Analyzed:	05/03/19 11:02

<u>Analyte</u>	<u>Result</u>	<u>Qualifier</u>	<u>Reporting Limit</u>	<u>Regulatory Level</u>
Total Suspended Solids	216		4	

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LABORATORY RESULTS

Name:	PIPELINE COMPLAINT	Date Received :	05/02/19
Project/Facility Number:	[none]	Visit Number:	
Funding Code:	WPZ6	Temperature C:	3.00
Trip ID:		Lab Sample ID:	19E0093-05
Client Sample ID:	P5	Date/Time Collected:	05/02/19 11:30
Matrix:	Water	Collected By:	PJK
Sample Type:	Grab	Field pH:	

Total Suspended Solids by Standard Method 2540D

Method:	SM 2540D	Prepared:	05/03/19 11:02	
Units:	mg/L	Analyzed:	05/03/19 11:02	
<u>Analyte</u>	<u>Result</u>	<u>Qualifier</u>	<u>Reporting Limit</u>	<u>Regulatory Level</u>
Total Suspended Solids	527		4	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety. Test results meet all requirements of NELAP (accredited by Florida DOH #E37645). If you have any questions about this report, please contact Tom Weiss, Laboratory Manager, at 217.782.9780.

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LABORATORY RESULTS

Name:	PIPELINE COMPLAINT		
Project/Facility Number:	[none]	Date Received :	05/02/19
Funding Code:	WPZ6	Visit Number:	
Trip ID:		Temperature C:	3.00
Client Sample ID:	P6	Lab Sample ID:	19E0093-06
Matrix:	Water	Date/Time Collected:	05/02/19 12:01
Sample Type:	Grab	Field pH:	
		Collected By:	PJK

Total Suspended Solids by Standard Method 2540D

Method:	SM 2540D	Prepared:	05/03/19 11:02
Units:	mg/L	Analyzed:	05/03/19 11:02

<u>Analyte</u>	<u>Result</u>	<u>Qualifier</u>	<u>Reporting Limit</u>	<u>Regulatory Level</u>
Total Suspended Solids	191		4	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety. Test results meet all requirements of NELAP (accredited by Florida DOH #E37645). If you have any questions about this report, please contact Tom Weiss, Laboratory Manager, at 217.782.9780.

Reported:
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Illinois Environmental Protection Agency
Division of Water Pollution Control
Field Operations Section

Sample Lab Results
Spire STL Pipeline Complaint / AC2187
Attachment 4



Illinois Environmental Protection Agency Laboratory

825 N. Rutledge Springfield, Illinois 62702 217.782.9780

LABORATORY RESULTS

Name:	PIPELINE COMPLAINT	Date Received :	05/02/19
Project/Facility Number:	[none]	Visit Number:	
Funding Code:	WPZ6	Temperature C:	3.00
Trip ID:		Lab Sample ID:	19E0093-07
Client Sample ID:	P7	Date/Time Collected:	05/02/19 12:11
Matrix:	Water	Collected By:	PJK
Sample Type:	Grab	Field pH:	

Total Suspended Solids by Standard Method 2540D

Method:	SM 2540D	Prepared:	05/03/19 11:02
Units:	mg/L	Analyzed:	05/03/19 11:02

<u>Analyte</u>	<u>Result</u>	<u>Qualifier</u>	<u>Reporting Limit</u>	<u>Regulatory Level</u>
Total Suspended Solids	352		4	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety. Test results meet all requirements of NELAP (accredited by Florida DOH #E37645). If you have any questions about this report, please contact Tom Weiss, Laboratory Manager, at 217.782.9780.

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Illinois Environmental Protection Agency
Division of Water Pollution Control
Field Operations Section

Sample Lab Results
Spire STL Pipeline Complaint / AC2187
Attachment 4



Illinois Environmental Protection Agency Laboratory

825 N. Rutledge Springfield, Illinois 62702 217.782.9780

LABORATORY RESULTS

Name:	PIPELINE COMPLAINT	Date Received :	05/02/19
Project/Facility Number:	[none]	Visit Number:	
Funding Code:	WPZ6	Temperature C:	3.06
Trip ID:		Lab Sample ID:	19E0093-08
Client Sample ID:	P8	Date/Time Collected:	05/02/19 14:10
Matrix:	Water	Collected By:	PJK
Sample Type:	Grab	Field pH:	

Total Suspended Solids by Standard Method 2540D

Method:	SM 2540D	Prepared:	05/03/19 11:02
Units:	mg/L	Analyzed:	05/03/19 11:02

<u>Analyte</u>	<u>Result</u>	<u>Qualifier</u>	<u>Reporting Limit</u>	<u>Regulatory Level</u>
Total Suspended Solids	7890		4	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety. Test results meet all requirements of NELAP (accredited by Florida DCM #E37645). If you have any questions about this report, please contact Tom Weiss, Laboratory Manager, at 217.782.9780.

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Illinois Environmental Protection Agency
Division of Water Pollution Control
Field Operations Section

Sample Lab Results
Spire STL Pipeline Complaint / AC2187
Attachment 4



Illinois Environmental Protection Agency Laboratory

825 N. Rutledge Springfield, Illinois 62702 217.782.9780

LABORATORY RESULTS

Name:	PIPELINE COMPLAINT	Date Received :	05/02/19
Project/Facility Number:	{none}	Visit Number:	
Funding Code:	WPZ6	Temperature C:	3.06
Trip ID:		Lab Sample ID:	19E0093-09
Client Sample ID:	P9	Date/Time Collected:	05/02/19 14:21
Matrix:	Water	Collected By:	PIK
Sample Type:	Grab	Field pH:	

Total Suspended Solids by Standard Method 2540D

Method:	SM 2540D	Prepared:	05/03/19 11:02	
Units:	mg/L	Analyzed:	05/03/19 11:02	
<u>Analyte</u>	<u>Result</u>	<u>Qualifier</u>	<u>Reporting Limit</u>	<u>Regulatory Level</u>
Total Suspended Solids	173		4	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety. Test results meet all requirements of NELAP (accredited by Florida DOH #E37645). If you have any questions about this report, please contact Tom Weiss, Laboratory Manager, at 217.782.9780.

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Illinois Environmental Protection Agency
Division of Water Pollution Control
Field Operations Section

Sample Lab Results
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Attachment 4



Illinois Environmental Protection Agency Laboratory

825 N. Rutledge Springfield, Illinois 62702 217.782.9780

LABORATORY RESULTS

Name:	PIPELINE COMPLAINT	Date Received :	05/02/19
Project/Facility Number:	[none]	Visit Number:	
Funding Code:	WPZ6	Temperature C:	3.00
Trip ID:		Lab Sample ID:	19E0093-10
Client Sample ID:	P10	Date/Time Collected:	05/02/19 14:54
Matrix:	Water	Collected By:	PJK
Sample Type:	Grab	Field pH:	

Total Suspended Solids by Standard Method 2540D

Method:	SM 2540D	Prepared:	05/03/19 11:02	
Units:	mg/L	Analyzed:	05/03/19 11:02	
<u>Analyte</u>	<u>Result</u>	<u>Qualifier</u>	<u>Reporting Limit</u>	<u>Regulatory Level</u>
Total Suspended Solids	636		4	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety. Test results meet all requirements of NELAP (accredited by Florida DOH #E37643). If you have any questions about this report, please contact Tom Weiss, Laboratory Manager, at 217.782.9780.

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Illinois Environmental Protection Agency
Division of Water Pollution Control
Field Operations Section

Sample Lab Results
Spire STL Pipeline Complaint / AC2187
Attachment 4



Illinois Environmental Protection Agency Laboratory

825 N. Rutledge Springfield, Illinois 62702 217.782.9780

LABORATORY RESULTS

Name: PIPELINE COMPLAINT

Project/Facility Number: [none]

Funding Code: WPZ6

Trip ID:

Date Received : 05/02/19

Visit Number:

Temperature C: 3.00

Notes and Definitions

ND Analyte NOT DETECTED at or above the reporting limit

* Non-NELAP accredited

Report Authorized by:

Tom Weiss
Laboratory Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety. Test results meet all requirements of NELAP (accredited by Florida DOH #E37643). If you have any questions about this report, please contact Tom Weiss, Laboratory Manager, at 217.782.9780.

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**ILLINOIS ENVIRONMENTAL PROTECTION AGENCY**

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 • (217) 782-3397

JB PRITZKER, GOVERNOR

JOHN J. KIM, ACTING DIRECTOR

217/782-9861

May 31, 2019

CERTIFIED MAIL # 7015 0640 0002 6956 7950

RETURN RECEIPT REQUESTED

Spire STL Pipeline Company, LLC
Attn: Russell English
700 Market Street
St. Louis, MO 63101

Re: Violation Notice: Spire STL Pipeline Company, LLC
Violation Notice No.: W-2019-50038

Dear Mr. English:

This constitutes a Violation Notice pursuant to Section 31(a)(1) of the Illinois Environmental Protection Act ("Act"), 415 ILCS 5/31(a)(1), and is based upon a review of available information and an investigation by representatives of the Illinois Environmental Protection Agency ("Illinois EPA").

The Illinois EPA hereby provides notice of alleged violations of environmental laws, regulations, or permits as set forth in Attachment A to this notice. Attachment A includes an explanation of the activities that the Illinois EPA believes may resolve the specified alleged violations, including an estimate of a reasonable time period to complete the necessary activities. Due to the nature and seriousness of the alleged violations, please be advised that resolution of the violations may also require the involvement of a prosecutorial authority for purposes that may include, among others, the imposition of statutory penalties.

A written response, which may include a request for a meeting with representatives of the Illinois EPA, must be submitted via certified mail to the Illinois EPA within 45 days of receipt of this letter. If a meeting is requested, it shall be held within 60 days of receipt of this notice. The response must include information in rebuttal, explanation, or justification of each alleged violation and a statement indicating whether or not the facility wishes to enter into a Compliance Commitment Agreement ("CCA") pursuant to Section 31(a) of the Act. If the facility wishes to enter into a CCA, the written response must also include proposed terms for the CCA that includes dates for achieving each commitment and may include a statement that compliance has been achieved for some or all of the alleged violations. The proposed terms of the CCA should contain sufficient detail and must include steps to be taken to achieve compliance and the necessary dates by which compliance will be achieved.

Page 2 of 2

Spire STL Pipeline Company, LLC
VN W-2019-50038

The Illinois EPA will review the proposed terms for a CCA provided by the facility and, within 30 days of receipt, will respond with either a proposed CCA or a notice that no CCA will be issued by the Illinois EPA. If the Illinois EPA sends a proposed CCA, the facility must respond in writing by, either agreeing to and signing the proposed CCA, or by notifying the Illinois EPA that the facility rejects the terms of the proposed CCA. When compliance is achieved, the owner of the facility must submit a completed statement of compliance form certifying that all Compliance Commitment Agreement measures/events have been successfully completed.

If a timely written response to this Violation Notice is not provided, it shall be considered a waiver of the opportunity to respond and meet, and the Illinois EPA may proceed with referral to a prosecutorial authority.

Written communications should be directed to:

Illinois EPA – Division of Water Pollution Control
Attn: Caleb Ruyle/ CAS#19
P.O.BOX 19276
Springfield, IL 62794-9276

All communications must include reference to this Violation Notice number, **W-2019-50038**.

Questions regarding this Violation Notice should be directed to Caleb Ruyle at 217/782-9861.

Sincerely,



Roger Callaway
Compliance Assurance Section
Division of Water Pollution Control
Bureau of Water

Attachments

ATTACHMENT A**Spire STL Pipeline Company, LLC****VIOLATION NOTICE NO. W-2019-50038**

Questions regarding the violations identified in this attachment should be referred to Caleb Ruyle at (217) 782-9861.

On April 22, 2019 and May 2, 2019, a representative of the Illinois EPA investigated Spire STL pipeline construction sites located in Scott and Greene Counties in Illinois. During the investigations, it was determined that the pipeline failed to obtain a General NPDES Storm Water Permit for Construction Site Activities. There were also deficiencies in the erosion control and stormwater management best management practices at the sites which caused offensive conditions in waters of the State of Illinois. During the May 2 inspection, the facility was observed actively pumping sediment-laden water offsite which also caused offensive conditions in waters of the State of Illinois. Based on these findings, the project is in apparent violation of the Illinois Environmental Protection Act.

A review of information available to the Illinois EPA indicates the following violations of statutes, regulations, or permits. Included with each type of violation is an explanation of the activities that the Illinois EPA believes may resolve the violation including an estimated time period for resolution.

Failure to Obtain a General NPDES Storm Water Permit for Construction Activities

It has been determined that this project requires a General Storm Water Permit for Construction Activities (ILR10). Establish and implement procedures to assure that all required permits are acquired prior to the start of construction activity. Compliance is expected immediately.

<u>Violation Date</u>	<u>Violation Description</u>
04/22/2019	Failure to Obtain Coverage Under the General Storm Water Permit for Construction Site Activities
05/02/2019	
Rule/Reg.:	Section 12(a) and (f) of the Act, 415 ILCS 5/12(a) and (f) (2016); 35 Ill. Adm. Code 309.102 (a); NPDES ILR10 permit

Discharge of Contaminants

Cease and desist from discharging contaminants that cause or threaten to cause water pollution. Review operational and maintenance procedures and correct the deficiencies which caused the violation. Compliance is expected to be pursued immediately.

<u>Violation Date</u>	<u>Violation Description</u>
04/22/2019	No person shall cause, threaten or allow the discharge of any contaminants into the environment in any State so as to cause or tend to cause water pollution in Illinois, either alone or in combination with matter from other sources, or so as to violate regulations or standards adopted by the Pollution Control Board under
05/02/2019	

Rule/Reg.: this Act.
Section 12(a) of the Act, 415 ILCS 5/12(a) (2016)

Offensive Conditions

Review and evaluate your operational procedures in order to correct the deficiencies which caused the violations. Discharges must not cause a violation of water quality standards. Compliance is expected to be achieved immediately.

<u>Violation Date</u>	<u>Violation Description</u>
05/02/2019	Waters of the State shall be free from sludge or bottom deposits, floating debris, visible oil, odor, plant, oil, odor, plant or algal growth, color or turbidity of other than natural origin.

Rule/Reg.: Section 12(a) of the Act, 415 ILCS 5/12(a) (2016),
35 Ill. Adm. Code 302.203

Offensive Discharge

Review and evaluate the operational procedures in order to correct the deficiencies which caused the violations. Discharges must not cause a violation of water quality standards. Compliance is expected immediately.

<u>Violation Date</u>	<u>Violation Description</u>
05/02/2019	No effluent shall contain settleable solids, floating debris, visible oil, grease, scum or sludge solids. Color, odor and turbidity must be reduced to below obvious levels.

Rule/Reg.: Section 12(a) of the Act, 415 ILCS 5/12(a) (2016),
35 Ill. Adm. Code 304.106

Water Quality Violations

Review and evaluate the operational procedures in order to correct the deficiencies which caused the violations. Discharges must not cause a violation of water quality standards. Compliance is expected immediately.

<u>Violation Date</u>	<u>Violation Description</u>
05/02/2019	Discharge of contaminants caused a violation of water quality standards.

Rule/Reg.: Section 12(a) of the Act, 415 ILCS 5/12(a) (2016),
35 Ill. Adm. Code 304.105, 302.203

Effluent Violations

Review and evaluate your operational procedures in order to correct the deficiencies which caused the violations. Discharges must not cause a violation of State effluent discharge standards. Compliance is expected to be achieved immediately.

<u>Violation Date</u>	<u>Violation Description</u>
05/02/2019	Effluent – Solids, total suspended, Effluent Limit
Rule/Reg.:	Section 12(a) of the Act, 415 ILCS 5/12(a) (2016), 35 Ill. Adm. Code 304.124(a)

**ILLINOIS ENVIRONMENTAL PROTECTION AGENCY**

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 • (217) 782-3397

JB PRITZKER, GOVERNOR

JOHN J. KIM, ACTING DIRECTOR

217/782-9861

May 31, 2019

CERTIFIED MAIL # 7015 0640 0002 6956 7606
RETURN RECEIPT REQUESTEDMichels
Attn: David Stegeman
817 Main Street
Brownsville, WI 53006-0128**Re: Violation Notice: Michels**
Violation Notice No.: W-2019-50039

Dear Mr. Stegeman:

This constitutes a Violation Notice pursuant to Section 31(a)(1) of the Illinois Environmental Protection Act ("Act"), 415 ILCS 5/31(a)(1), and is based upon a review of available information and an investigation by representatives of the Illinois Environmental Protection Agency ("Illinois EPA").

The Illinois EPA hereby provides notice of alleged violations of environmental laws, regulations, or permits as set forth in Attachment A to this notice. Attachment A includes an explanation of the activities that the Illinois EPA believes may resolve the specified alleged violations, including an estimate of a reasonable time period to complete the necessary activities. Due to the nature and seriousness of the alleged violations, please be advised that resolution of the violations may also require the involvement of a prosecutorial authority for purposes that may include, among others, the imposition of statutory penalties.

A written response, which may include a request for a meeting with representatives of the Illinois EPA, must be submitted via certified mail to the Illinois EPA within 45 days of receipt of this letter. If a meeting is requested, it shall be held within 60 days of receipt of this notice. The response must include information in rebuttal, explanation, or justification of each alleged violation and a statement indicating whether or not the facility wishes to enter into a Compliance Commitment Agreement ("CCA") pursuant to Section 31(a) of the Act. If the facility wishes to enter into a CCA, the written response must also include proposed terms for the CCA that includes dates for achieving each commitment and may include a statement that compliance has been achieved for some or all of the alleged violations. The proposed terms of the CCA should contain sufficient detail and must include steps to be taken to achieve compliance and the necessary dates by which compliance will be achieved.

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Michels

VN W-2019-50039

The Illinois EPA will review the proposed terms for a CCA provided by the facility and, within 30 days of receipt, will respond with either a proposed CCA or a notice that no CCA will be issued by the Illinois EPA. If the Illinois EPA sends a proposed CCA, the facility must respond in writing by, either agreeing to and signing the proposed CCA, or by notifying the Illinois EPA that the facility rejects the terms of the proposed CCA. When compliance is achieved, the owner of the facility must submit a completed statement of compliance form certifying that all Compliance Commitment Agreement measures/events have been successfully completed.

If a timely written response to this Violation Notice is not provided, it shall be considered a waiver of the opportunity to respond and meet, and the Illinois EPA may proceed with referral to a prosecutorial authority.

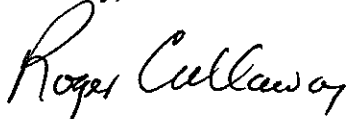
Written communications should be directed to:

Illinois EPA – Division of Water Pollution Control
Attn: Caleb Ruyle/ CAS#19
P.O.BOX 19276
Springfield, IL 62794-9276

All communications must include reference to this Violation Notice number, **W-2019-50039**.

Questions regarding this Violation Notice should be directed to Caleb Ruyle at 217/782-9861.

Sincerely,



Roger Callaway
Compliance Assurance Section
Division of Water Pollution Control
Bureau of Water

Attachments

ATTACHMENT A**Michels****VIOLATION NOTICE NO. W-2019-50039**

Questions regarding the violations identified in this attachment should be referred to Caleb Ruyle at (217) 782-9861.

On April 22, 2019 and May 2, 2019, a representative of the Illinois EPA investigated Spire STL pipeline construction sites located in Scott and Greene Counties in Illinois. During the investigations, it was determined that the pipeline failed to obtain a General NPDES Storm Water Permit for Construction Site Activities. There were also deficiencies in the erosion control and stormwater management best management practices at the sites which caused offensive conditions in waters of the State of Illinois. During the May 2 inspection, the facility was observed actively pumping sediment-laden water offsite which also caused offensive conditions in waters of the State of Illinois. Based on these findings, the project is in apparent violation of the Illinois Environmental Protection Act.

A review of information available to the Illinois EPA indicates the following violations of statutes, regulations, or permits. Included with each type of violation is an explanation of the activities that the Illinois EPA believes may resolve the violation including an estimated time period for resolution.

Discharge of Contaminants

Cease and desist from discharging contaminants that cause or threaten to cause water pollution. Review operational and maintenance procedures and correct the deficiencies which caused the violation. Compliance is expected to be pursued immediately.

<u>Violation Date</u>	<u>Violation Description</u>
05/02/2019	No person shall cause, threaten or allow the discharge of any contaminants into the environment in any State so as to cause or tend to cause water pollution in Illinois, either alone or in combination with matter from other sources, or so as to violate regulations or standards adopted by the Pollution Control Board under this Act.
Rule/Reg.:	Section 12(a) of the Act, 415 ILCS 5/12(a) (2016)

Offensive Conditions

Review and evaluate your operational procedures in order to correct the deficiencies which caused the violations. Discharges must not cause a violation of water quality standards. Compliance is expected to be achieved immediately.

<u>Violation Date</u>	<u>Violation Description</u>
----------------------------------	---

05/02/2019 Waters of the State shall be free from sludge or bottom deposits, floating debris, visible oil, odor, plant, oil, odor, plant or algal growth, color or turbidity of other than natural origin.

Rule/Reg.: Section 12(a) of the Act, 415 ILCS 5/12(a) (2016),
35 Ill. Adm. Code 302.203

Offensive Discharge

Review and evaluate the operational procedures in order to correct the deficiencies which caused the violations. Discharges must not cause a violation of water quality standards. Compliance is expected immediately.

<u>Violation Date</u>	<u>Violation Description</u>
05/02/2019	No effluent shall contain settleable solids, floating debris, visible oil, grease, scum or sludge solids. Color, odor and turbidity must be reduced to below obvious levels.
Rule/Reg.:	Section 12(a) of the Act, 415 ILCS 5/12(a) (2016), 35 Ill. Adm. Code 304.106

Water Quality Violations

Review and evaluate the operational procedures in order to correct the deficiencies which caused the violations. Discharges must not cause a violation of water quality standards. Compliance is expected immediately.

<u>Violation Date</u>	<u>Violation Description</u>
05/02/2019	Discharge of contaminants caused a violation of water quality standards.
Rule/Reg.:	Section 12(a) of the Act, 415 ILCS 5/12(a) (2016), 35 Ill. Adm. Code 304.105, 302.203

Effluent Violations

Review and evaluate your operational procedures in order to correct the deficiencies which caused the violations. Discharges must not cause a violation of State effluent discharge standards. Compliance is expected to be achieved immediately.

<u>Violation Date</u>	<u>Violation Description</u>
05/02/2019	Effluent – Solids, total suspended, Effluent Limit
Rule/Reg.:	Section 12(a) of the Act, 415 ILCS 5/12(a) (2016), 35 Ill. Adm. Code 304.124(a)

Exhibit G

Kenny Davis' Declaration of Spire Violating AIMA Timber Requirements

DECLARATION OF KENNETH DAVIS

I, Kenneth Davis, declare as follows:

1. My name is Kenneth Davis. I am over the age of 18 and competent to give this declaration. The following information is based on my experience and personal knowledge.

2. I am a member of Environmental Defense Fund. I have been a member since before the commencement of this lawsuit.

3. I reside in Scott County, Illinois.

4. My wife Kelly and I own a 40-acre property in Scott County, Illinois that I, along with family and friends, use for hunting and other outdoor recreation. I live just up the road, about six miles away, so I frequently visit the property. We purchased this tract of land 14 years ago because I wanted to be able to have my own land for hunting, and because Kelly and I planned to eventually build a home here in a more secluded area.

5. The Spire STL Pipeline crosses our property for a distance of approximately 1,500 feet, and the pipeline route runs through the middle of the property. I am opposed to the pipeline crossing my land. The presence of the Spire STL pipeline affects my use and enjoyment of the land because the construction process altered my hunting grounds and damaged the soil, and my wife and I have abandoned our plans to build a home on this land due to the presence of the

pipeline. I don't feel comfortable going back to the land the way I used to before the pipeline was installed and went into operation, and I would prefer that the pipeline be removed and my land restored.

History and Use of the Property

6. I am an outdoorsman who loves to be in the timber or out on the water. I love deer hunting, turkey hunting, and bass fishing. When I first started hunting, I could go anywhere in Scott County, but over the years access to property has become more restricted as more people lease out land specifically for hunting. I decided that it would be best to be able to enjoy my own land, so I bought the 40-acre property. It is primarily wooded, which is ideal for hunting, and there are some open fields that I essentially use as food plots for the deer. I typically invite a friend to mow the fields for hay three times per year, because mowing exposes the clover and chicory underneath, which are rich in nutrients and attract deer.

7. I use the property for bow hunting and shotgun hunting for deer during October through January. I usually take two or three does each year for meat, though my main passion is buck hunting. In the spring I go turkey hunting on the property. In the summer I like to hike around on the land, especially with my grandchildren.

8. My family also uses and enjoys the land. My uncle and cousins go foraging for mushrooms, and my two young grandsons have also come mushroom

hunting. I taught my 16-year-old and 8-year-old granddaughters to hunt on this property, and they come with me occasionally. I try to introduce my grandchildren to nature, and we walk around and find snakes and turtles. They like to walk through the creek that runs through the property and collect rocks to bring home. I am also teaching them to recognize itchweed and poison ivy. I derive great enjoyment from spending time outdoors on the land with my family.

Effect of the Spire STL Pipeline

9. I was first approached by a land agent on behalf of Spire STL in 2016, and was subsequently approached by other representatives of the company. The land agent and representatives offered to buy an easement on the section of my land where Spire STL planned to build the pipeline. I did not accept any offer because I did not want a pipeline constructed on my land. Representatives of Spire STL began accessing my land to conduct surveys in 2017, before Spire STL had received approval from FERC to construct the pipeline. They arrived to conduct the surveys without advance notice during deer season. I informed the crews that I did not want them on the property during hunting season, because I was frequently using the land at that time and their presence was both disruptive and unsafe.

10. I am aware that the Federal Energy Regulatory Commission approved Spire STL's application to build the pipeline in August 2018. I am aware that later that month, Spire STL filed a condemnation action in the U.S. District Court for

the Central District of Illinois, seeking possession of my land and the land of others in the area who did not want to accept the developer's buyout offer. Through the condemnation action, Spire STL seeks to take title to approximately 3.6 acres of land on my property.

11. I am aware that on December 14, 2018, the court issued an order granting Spire STL's request for a preliminary injunction, allowing the developer to take immediate possession of parcels of land. As a result of that order, Spire STL was allowed to take possession of a 1,500-foot-long strip of land across my property ranging from 90 to 140 feet wide. This includes a 50-foot permanent easement and a temporary easement ranging from 40 feet to 90 feet in width for use during construction.

12. Spire STL began construction of the pipeline on my property in January 2019, and the work was ongoing until June 2019. Spire STL construction crews have continued to access my land occasionally after construction appeared to be done. The construction process has caused long-term damage to the land. I feel less safe visiting my land when I know that the pipeline is present and operating.

13. My use and enjoyment of the land for its recreational and aesthetic value is diminished by the Spire STL pipeline. I love this land, but it does not feel the same to spend time here now that the pipeline is present. The construction of the pipeline resulted in significant deforestation, soil compaction, and

destabilization of land formations on my property. For example, there is a ridge on the property that was perfect for buck hunting. Deer have an excellent sense of smell, so it is important to be able to position yourself where they won't smell you while you are hunting. On the ridge, I had a good spot to watch an acorn patch where the bucks like to gather but they were unlikely to catch my scent. In that spot, I used to be able to see up to 20 bucks in one day. Now, as a result of the construction process and the presence of the pipeline, my hunting grounds are diminished because many of the trees in that area were removed and there is a big open strip of land through the middle of the woods. The exposed open air makes it easier for the bucks to catch my scent. The pipeline route goes along the acorn patch, so the wooded area where I would stake out and watch for bucks is exposed as a result of the deforestation.

14. The quality of my hunting experience has diminished since the Spire STL pipeline was built. When I am on the land, I prefer to stay away from the pipeline route because I find it sad and upsetting to look at, so now I try to hunt on other sections of the property. During the 2019-2020 hunting season, I never got close to a big buck. One day earlier this year, for example, I went buck hunting and only saw three bucks. I was watching a doe when a Spire STL helicopter flew low overhead—I am aware that they do flyovers sometimes to monitor the pipeline—and scared off the doe. I didn't see another deer for hours.

15. The construction of the pipeline was highly damaging to my land and soil. I tried to convince Spire STL to at least choose a different route across my property that would be less damaging to my hunting grounds and the trees, but they declined to do so; and Spire STL did not provide the 45-day notice that I understand they were required to provide before cutting down trees on the property. I believe that at least 90 large trees were removed from my property, in addition to some small trees.

16. The photo below, taken in January 2020, shows the open land where the pipeline runs through my property. The area that is now open, empty ground used to be forested.



17. The Spire STL construction crews also failed to preserve the topsoil on my land during the construction process, so the topsoil was mixed in with the

subsoil, which makes it harder for new plants to grow and hold the soil in place.

Additionally, the Spire STL crews used a bulldozer to flatten the soil after the pipeline was covered up, resulting in severe soil compaction. Because the soil is so compacted, there is often standing water in the fields along the route of the pipeline that is unable to drain for days at a time. Another result of the compacted soil is that all of the standing water creates deep voids in the ground, because the water has to flow somewhere and forms channels and ditches that continue to deepen over time. When I was turkey hunting this spring, I fell into one of the ditches. I am concerned about the worsening condition of the ground, which could continue to destabilize over time.

Exhibit H

Landowner Complaints to U.S. Senator Tammy Duckworth Regarding FERC Staff's Lack of Oversight



Other Assistance

8 South Old State Capitol Plaza
Springfield, IL 62701
Fax: 217-528-7043

Your Information

Name: Mr. Kenny Davis
Address: 421 North Main St. Winchester, IL 62694
Email: daviskenney112@gmail.com
Phone Number: (217) 370-3490

Have you contacted another Congressional office regarding this matter?
No

Would you like to designate another person with whom we may discuss the details of your case?
Yes

Designated Person Information

Name: Mr. NATE LAPS
Address: P.O. BOX 36134 CANTON OH, 44735
Email: nlaps@centrallandconsulting.com
Phone: 3303121060

What Can I Assist You With?

Other

Case Information

Name of Agency: Federal Energy Regulatory Commission
Reference Number: Docket # CP17-40

Description Of Request:

I am a landowner impacted by the Spire pipeline project and could really use my Senators assistance with FERC. I am very passionate about my land which was a hunting property as well as agriculture. I have filed several complaints to FERC throughout construction, but FERC didn't bother looking into Spire's project. I truly believe that my property is devastated and ruined because FERC did not do their job. In fact, one of the FERC managers, Rich McGuire, agreed with me and said FERC could make improvements. Regardless, my property is destroyed and FERC continues to just outright ignore our issues. We believe FERC is doing this because FERC anticipated for us landowners to take the abuse and not stand up for our pristine land. My main request to Senator Tammy Duckworth is to please submit my concerns to FERC and please look into this abuse. Kenny Davis

I am aware that provisions of the Privacy Act of 1974 (Public Law 93-579) may prohibit the release of information in covered agency files without my consent. I hereby give my consent for any applicable federal agency(ies) to release such information to the Office of United States Senator Tammy Duckworth and/or members of her staff in connection with my case or claim.

Signature: *Kenny Davis*

Date: 08 / 01 / 2022

My office must receive a signed copy of this form before we can assist you.

Once you have printed and signed the PDF, please submit the Privacy Act Release Form and any additional documents relevant to your case via the below email address, fax number or mailing address. Thank you and I look forward to assisting you.

Please submit your signed Privacy Act Release Form and documents via your preferred method:

Via E-mail:

SpringfieldCasework@duckworth.senate.gov

Via Mail:

8 South Old State Capitol Plaza
Springfield, IL 62701
Phone: (217) 528-6124

Via Fax:

(217) 528-7043



Other Assistance

8 South Old State Capitol Plaza
Springfield, IL 62701
Fax: 217-528-7043

Your Information

Name: Mr. Marc Steckel
Address: 36 SW 450th Street Carrollton, IL 62016
Email: mscrete11@irtc.net
Phone Number: (618) 535-5835

Have you contacted another Congressional office regarding this matter?
No

Would you like to designate another person with whom we may discuss the details of your case?
No

What Can I Assist You With?

Other

Case Information

Name of Agency: Federal Energy Regulatory Commission
Reference Number: Docket # CP17-40

Description Of Request:

Since the Spire pipeline project crossed my land in the beginning of 2019, I have been facing hard-ache and issues with FERC neglecting to address my concerns or regulate Spire's destructive construction and restoration practices. In fact, FERC never inspected the project or visited the properties in 2019 during construction and the whole year in 2020. FERC has recently visited my land twice and has witnessed the restoration issues, but has not taken any action or enforced Spire to resolve the issues. I am currently facing impacts to my livestock, farming equipment, and agricultural lands. I have exhausted all resources and remedies and I am requesting Senator Tammy Duckworth to submit my concerns to FERC so that hopefully FERC will start taking their obligations and restoration requirements seriously. Thank you, Marc Steckel

I am aware that provisions of the Privacy Act of 1974 (Public Law 93-579) may prohibit the release of information in covered agency files without my consent. I hereby give my consent for any applicable federal agency(ies) to release such information to the Office of United States Senator Tammy Duckworth and/or members of her staff in connection with my case or claim.

Signature: Marc Steckel

Date: 08 / 01 / 2022

My office must receive a signed copy of this form before we can assist you.

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and I look forward to assisting you.

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SpringfieldCasework@duckworth.senate.gov

Via Mail:

8 South Old State Capitol Plaza

Springfield, IL 62701

Phone: (217) 528-6124

Via Fax:

(217) 528-7043



Other Assistance

8 South Old State Capitol Plaza
Springfield, IL 62701
Fax: 217-528-7043

Your Information

Name: Mr. Matt Clayton
Address: 1833 Lynnville-Woodson Rd Winchester, IL 62694
Email: matt@e-co-op.com
Phone Number: (217) 320-5800

Have you contacted another Congressional office regarding this matter?
No

Would you like to designate another person with whom we may discuss the details of your case?
No

What Can I Assist You With?

Other

Case Information

Name of Agency: Federal Energy Regulatory Commission
Reference Number: Docket # CP17-40-000

Description Of Request:

I am a landowner that owns property in Scott County, IL. I have a portion of my property enrolled in the CRP through the US Department of Agriculture. The Spire pipeline project constructed their pipeline through my valuable hunting land and my CRP portion. Currently, I am in violation of my CRP program and I have been told I may have to pay back all income since the beginning of my enrollment, this is due to Spire polluting my land and FERC not regulating Spire. There are also environmental impacts too. My biggest issue is that I have communicated to FERC my concerns and risk of losing my CRP contract, but FERC is intentionally ignoring me and has interest in complying with their own regulations. I need Senator Tammy Duckworth's assistance in communicating to FERC how harmful their actions are to me and my neighbors. Thank you, Matt Clayton

I am aware that provisions of the Privacy Act of 1974 (Public Law 93-579) may prohibit the release of information in covered agency files without my consent. I hereby give my consent for any applicable federal agency(ies) to release such information to the Office of United States Senator Tammy Duckworth and/or members of her staff in connection with my case or claim.

Signature: Matt Clayton

Date: 08 / 02 / 2022

My office must receive a signed copy of this form before we can assist you.

Once you have printed and signed the PDF, please submit the Privacy Act Release Form and any additional

documents relevant to your case via the below email address, fax number or mailing address. Thank you and I look forward to assisting you.

Please submit your signed Privacy Act Release Form and documents via your preferred method:

Via E-mail:

SpringfieldCasework@duckworth.senate.gov

Via Mail:

8 South Old State Capitol Plaza

Springfield, IL 62701

Phone: (217) 528-6124

Via Fax:

(217) 528-7043



Other Assistance

23 Public Square, Suite 460
Belleville, IL 62220
Fax: 618-235-4011

Your Information

Name: Mr. Pat Parker
Address: 15493 Salem Road Dow, IL 62022
Email: Robparker9469@gmail.com
Phone Number: (618) 535-6929

Have you contacted another Congressional office regarding this matter?
No

Would you like to designate another person with whom we may discuss the details of your case?
No

What Can I Assist You With?

Other

Case Information

Name of Agency: FERC
Reference Number: Docket # CP17-40

Description Of Request:

I am requesting assistance with FERC regarding the Spire pipeline project. My consultants and I have communicated to FERC and have filed numerous reports to the FERC docket of the destruction Spire pipeline has caused to my Prime Farmland, such as construction debris, wood, and unsafe objects damaging my farm equipment, erosion, loss of topsoil, compaction, and many other issues. We have provided all the evidence to FERC, but FERC continues to ignore the severe restoration issues. I was told it might be possible for Senator Tammy Duckworth to submit a letter on my behalf to FERC to address my concerns. I would greatly appreciate any further assistance regarding this matter. Thank you, Pat Parker, Farmer Jersey County, IL

I am aware that provisions of the Privacy Act of 1974 (Public Law 93-579) may prohibit the release of information in covered agency files without my consent. I hereby give my consent for any applicable federal agency(ies) to release such information to the Office of United States Senator Tammy Duckworth and/or members of her staff in connection with my case or claim.

Signature: Pat Parker, 4850 Longhorn, LLC

Date: 08 / 01 / 2022

My office must receive a signed copy of this form before we can assist you.

Once you have printed and signed the PDF, please submit the Privacy Act Release Form and any additional documents relevant to your case via the below email address, fax number or mailing address. Thank you

and I look forward to assisting you.

Please submit your signed Privacy Act Release Form and documents via your preferred method:

Via E-mail:

BellevilleCasework@duckworth.senate.gov

Via Mail:

23 Public Square, Suite 460

Belleville, IL 62220

Phone: (618) 722-7070

Via Fax:

(618) 235-4011



23 Public Square, Suite 460
Belleville, IL 62220
Fax: 618-235-4011

Other Assistance

Your Information

Name: Ray Sinclair
Address: 20306 Otterville Road Jerseyville, IL 62052
Email: rsinclair62052@gmail.com
Phone Number: (618) 781-6383

Have you contacted another Congressional office regarding this matter?
No

Would you like to designate another person with whom we may discuss the details of your case?
Yes

Designated Person Information

Name: Mr. Nate Laps
Address: PO Box 36134 Canton OH, 44735
Email: nlaps@centrallandconsulting.com
Phone: 3303121060

What Can I Assist You With?

Other

Case Information

Name of Agency: FERC
Reference Number: Docket # CP17-40

Description Of Request:

I would like to communicate my hard-ache and concerns with FERC regarding the Spire Pipeline project. My farm has been impacted by Spire and is completely destroyed after 3 years of Spire constructing the pipeline. I have filed, communicated and constantly notified FERC to inspect and address my destroyed farmland, but have not had any such luck. I am requesting Senator Tammy Duckworth to submit a Congressional Inquiry regarding my concerns and significant impacts that have been ignored by FERC. Thank you and I look forward to Senators response. Ray Sinclair, Illinois Landowner

I am aware that provisions of the Privacy Act of 1974 (Public Law 93-579) may prohibit the release of information in covered agency files without my consent. I hereby give my consent for any applicable federal agency(ies) to release such information to the Office of United States Senator Tammy Duckworth and/or members of her staff in connection with my case or claim.

Signature: Ray Sinclair

Date: 08 / 01 / 2022

My office must receive a signed copy of this form before we can assist you.

Once you have printed and signed the PDF, please submit the Privacy Act Release Form and any additional documents relevant to your case via the below email address, fax number or mailing address. Thank you and I look forward to assisting you.

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BellevilleCasework@duckworth.senate.gov

Via Mail:

23 Public Square, Suite 460
Belleville, IL 62220
Phone: (618) 722-7070

Via Fax:

(618) 235-4011



Other Assistance

23 Public Square, Suite 460
Belleville, IL 62220
Fax: 618-235-4011

Your Information

Name: Mr. Greg Stout
Address: 13323 Elsay Road Dow , IL 62022
Email: Greg.stout@yahoo.com
Phone Number: (618) 374-1426

Have you contacted another Congressional office regarding this matter?
No

Would you like to designate another person with whom we may discuss the details of your case?
No

What Can I Assist You With?

Other

Case Information

Name of Agency: FERC
Reference Number: Docket # CP17-40

Description Of Request:

I am requesting Senator Tammy Duckworth's assistance regarding my concerns with FERC and their lack of overseeing the Spire pipeline project. My property is enrolled in the CP42 Pollinator Habitat Conservation Reserve Program through the US Department of Agriculture. Currently, I am in violation of my CP42 program and could face civil penalties due to Spire pipeline destruction. I have filed several extensive reports to FERC and asked FERC to inspect my land and address these issues, but FERC continues to ignore these serious issues and their own regulatory requirements. There still remains construction debris, missing topsoil and several other damages that FERC has will not address. I am requesting that Senator Tammy Duckworth submit my concerns to FERC so that hopefully FERC will take this seriously. Thanks Gregory Stout

I am aware that provisions of the Privacy Act of 1974 (Public Law 93-579) may prohibit the release of information in covered agency files without my consent. I hereby give my consent for any applicable federal agency(ies) to release such information to the Office of United States Senator Tammy Duckworth and/or members of her staff in connection with my case or claim.

Signature: Greg Stout

Date: 08 / 01 / 2022

My office must receive a signed copy of this form before we can assist you.

Once you have printed and signed the PDF, please submit the Privacy Act Release Form and any additional

documents relevant to your case via the below email address, fax number or mailing address. Thank you and I look forward to assisting you.

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Via Mail:

23 Public Square, Suite 460

Belleville, IL 62220

Phone: (618) 722-7070

Via Fax:

(618) 235-4011

Exhibit I

March 18, 2021 Compliance Order

174 FERC ¶ 61,219
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Richard Glick, Chairman;
Neil Chatterjee, James P. Danly,
Allison Clements, and Mark C. Christie.

Spire STL Pipeline LLC

Docket Nos. CP17-40-000
CP17-40-001

ORDER ON ENVIRONMENTAL COMPLIANCE

(Issued March 18, 2021)

1. On August 14, 2020, the Illinois Department of Agriculture (Department) filed with the Commission a report detailing the findings of site inspections conducted on seven privately-owned agricultural properties impacted by the construction of the Spire STL Pipeline Project (Spire Project).¹ With respect to these properties, the Department asserts that Spire STL Pipeline LLC (Spire) has failed to comply with certain agricultural mitigation measures required by the Agricultural Impact Mitigation Agreement (AIMA), which it executed with Spire on March 15, 2017. The Commission's August 3, 2018 order issuing a certificate of public convenience and necessity for the Spire Project incorporated the AIMA measures as conditions of the certificate.²

2. The Commission has sole authority to ensure compliance with its certificate orders. As we explained in *Mountain Valley Pipeline, LLC*³ and *Midship Pipeline Company, LLC*,⁴ the Commission's practice is to refer pipeline construction and

¹ Illinois Department of Agriculture's August 14, 2020 Letter (IL Dep't of Agriculture Letter) (submitting appended AIMA Report). The AIMA Report details the Department's findings and recommendations at six locations. However, because the right-of-way on tract no. IL-GC-029.000 (referred to in the report as "Forrest Neal Jones/Kenneth & Gayle Willis Property") occupies the boundary line between two properties, we will refer to seven properties, rather than six, when referencing the total number of properties the Department inspected.

² See *infra* P 5.

³ 172 FERC ¶ 61,193, at PP 10-13 (2020) (*Mountain Valley*).

⁴ 173 FERC ¶ 61,075, at PP 12-14 (2020) (*Midship*).

restoration compliance allegations to its staff in the Office of Energy Project's Division of Gas—Environment and Engineering as they are able to address compliance issues in an efficient and timely manner. Commission staff can quickly respond to compliance allegations because they oversee project construction and restoration,⁵ and thus, have specialized knowledge of certificate requirements, project route and facilities, existing environmental resources and land uses along the project route, and landowner concerns. Although Commission staff worked closely with the Department on environmental compliance issues, given the unique circumstances with the AIMA, the Commission has elected to take up the Department's compliance allegations in the first instance here.⁶

3. As discussed below, we have determined that the Department's report raises certain issues that warrant further remedial action by Spire.⁷

I. Background

4. On August 3, 2018, the Commission issued Spire a certificate of public convenience and necessity under section 7(c) of the Natural Gas Act (NGA)⁸ and

⁵ Restoration refers to the completion of the final grade, return of contours to pre-existing conditions (or otherwise approved), replacement of previously segregated topsoil, and the application of seed and mulch, if necessary, to the right-of-way workspaces.

⁶ The Commission will continue to refer pending and future compliance allegations to Commission staff as they can address these important issues in an efficient and timely manner. Allegations of non-compliance handled first by Commission staff receive no less consideration than those that we take up ourselves, and in all instances the initial decision, whether by staff or by the Commission, is subject to rehearing by the Commission. *Mountain Valley*, 172 FERC ¶ 61,193 at P 14; *Midship*, 173 FERC ¶ 61,075 at P 21.

⁷ We recognize that the Department has executed the AIMA with Spire and that the Commission is not a party to that agreement. However, because the Commission has sole authority to ensure a pipeline complies with its certificate, and the AIMA is a condition of that certificate, the Commission has authority to determine whether Spire has complied with the AIMA in this proceeding. Our determination here in no way inhibits the Department from enforcing its agreement with Spire in the appropriate state court. *But see Dominion Transmission, Inc. v. Summers*, 723 F.3d 238, 245 (D.C. Cir. 2013) (noting that state and local regulation is preempted by the NGA to the extent it conflicts with federal regulation, or would delay the construction and operation of facilities approved by the Commission).

⁸ 15 U.S.C. § 717f(c).

Part 157 of the Commission's regulations⁹ to construct and operate the Spire Project, a 65-mile-long greenfield pipeline extending from an interconnection with Rockies Express Pipeline LLC in Scott County, Illinois, to interconnections with both Spire Missouri, Inc. and Enable Mississippi River Transmission, LLC, in St. Louis County, Missouri.¹⁰ In the Certificate Order, the Commission agreed with the conclusions presented in the Environmental Assessment (EA) prepared by Commission staff and adopted the EA's environmental conditions as modified in the order.¹¹ The Certificate Order determined that the Spire Project, if constructed and operated as described in the EA, would not significantly affect the environment and is required by the public convenience and necessity.¹²

5. The EA included as Appendix D the AIMA that the Department and Spire had previously executed on March 15, 2017.¹³ The AIMA outlined mitigation measures that Spire would implement during the construction of the Spire Project on agricultural land in Scott, Greene, and Jersey Counties, Illinois. These mitigation measures were intended to "minimize the negative impacts that may occur due to pipeline construction" and to apply to "construction activities occurring partially or wholly on privately owned agricultural land."¹⁴ The Certificate Order required Spire to follow the construction procedures and mitigation measures described in its application and supplemental filings, and as identified in the EA, including the measures outlined in the AIMA.¹⁵

6. Spire accepted its certificate on August 8, 2018, and commenced construction in November 2018. Commission staff, itself or through a third-party compliance monitor, conducted monthly inspections of the construction right-of-way to ensure Spire's

⁹ 18 C.F.R. pt. 157 (2020).

¹⁰ *Spire STL Pipeline LLC*, 164 FERC ¶ 61,085 (2018) (Certificate Order), *order on reh'g*, 169 FERC ¶ 61,134 (2019) (Rehearing Order).

¹¹ Certificate Order, 164 FERC ¶ 61,085 at P 263 and app..

¹² *Id.* PP 123, 263.

¹³ Commission staff's September 29, 2017 EA at Appendix D (AIMA). The Department was a cooperating agency during the development of the EA.

¹⁴ AIMA at 1.

¹⁵ Certificate Order, 164 FERC ¶ 61,085 at app., Environmental Condition 1; *see also id.* P 241 (identifying the AIMA, as well as other construction, restoration, and mitigation plans, as being included as mandatory conditions of the order).

compliance with the environmental conditions of the Certificate Order.¹⁶ Commission staff and its contractor prepared reports summarizing their inspection findings, which are available in the Commission's public record. In addition, Spire filed weekly construction status reports with the Commission which are also available in the Commission's public record.

7. Commission staff and the Department jointly monitored and conducted inspections of Spire's construction activities to ensure compliance with the AIMA. The Department participated in three of Commission staff's construction inspections, on March 12,¹⁷ June 3,¹⁸ and August 28, 2019.¹⁹ On November 14, 2019, the Director of the Division of Gas – Environment and Engineering granted Spire's request to place the

¹⁶ See generally *Midship*, 173 FERC ¶ 61,075 at PP 11-21, for a more detailed description of the Commission's oversight of project construction and restoration.

¹⁷ Commission staff's March 11-12, 2019 Inspection Report (issued March 25, 2019). Noncompliance was noted on Marc Steckel's property for minor topsoil/subsoil mixing caused by working on unprepared surfaces and for mobilizing equipment through a saturated travel lane causing topsoil to dislodge from the adjacent topsoil pile into the travel lane. Spire documented resolution of the issue in its March 25, and April 1, 2019 construction status reports, stating that it had ceased use of the travel lane until grading crews reached the area and the remaining topsoil had been segregated.

¹⁸ Commission staff's June 3-4, 2019 Inspection Report (issued June 26, 2019). The Department participated in the overflight portion of the inspection but was inadvertently omitted in the report as an inspection participant. The Department did not communicate any concerns regarding compliance with the AIMA.

¹⁹ Commission staff's August 27-28, 2019 Inspection Report (issued September 19, 2019). No instances of non-compliance were observed. The Department communicated concerns with decompaction efforts on Philip and Zena Brown's property; however, after discussing allowable work during wet conditions according to the AIMA (Construction Standards and Policies, item 9), it was determined by all inspection participants, including the Department and Commission staff, that Spire's activities were consistent with the AIMA. Inspection participants, however, agreed that decompaction and ripping (i.e., use of deep tines to penetrate and break up compacted soil) should not occur until the Department and Spire's Agricultural Inspector collectively deemed soil conditions to be sufficiently dry. Once soil conditions were sufficiently dry, Spire notified the Department and resumed decompaction efforts on October 18, 2019.

majority of the project facilities into service,²⁰ including the section of pipeline crossing the seven properties at issue here. Before approving Spire's in-service request, Commission staff conducted field inspections which determined that Spire had adequately stabilized the construction workspaces and that restoration at that time was proceeding satisfactorily.²¹ Commission staff's oversight of the restoration process is still ongoing.²²

8. On August 14, 2020, the Department filed with the Commission a report detailing the findings of its June 19, 2020 site inspections of seven of the properties impacted by the construction of the Spire Project (AIMA Report). The AIMA Report focused on Spire's level of compliance with the AIMA's provisions related to topsoil loss, mixing, and compaction. For each of the seven inspected properties, the report summarized the Department's findings, provided photo documentation, and recommended actions to mitigate the identified soil issues. The report also referenced a pre-construction topsoil depth measurement for each property, which Spire had determined by measuring topsoil depths every 200 feet along the right-of-way as required by section 2.A of the AIMA.²³ In addition to the topsoil loss, soil mixing, and topsoil compaction issues identified in the AIMA Report, the Department also recommended additional corrective actions regarding soil sampling, rock removal, land leveling, and soil erosion.

9. On August 25, 2020, Commission staff sent letters to each of the landowners identified in the AIMA Report seeking their comments on the report's findings and the

²⁰ Division Director's November 14, 2019 Letter Authorizing Spire to Commence Service. On October 30, 2020, Commission staff granted Spire's request to place into service the remaining project facilities. Division Director's October 30, 2020 Letter Authorizing Spire to Commence Service (granting in-service request for Chain of Rocks interconnect in St. Louis County, Missouri).

²¹ Commission staff invited the Department to participate in the November 2019 inspection prior to the in-service approval and requested the Department's input on any outstanding concerns. The Department did not participate in the inspection, but did request that decompaction be performed on the Browns' property as discussed during the August 28, 2019 inspection. *See supra* note 19.

²² FERC Plan section VII.B.2 (post-construction reporting) requires project sponsors to file with the Commission quarterly reports documenting the results of follow up inspections, problem areas, including those identified by landowners, and corrective actions taken for at least two years following construction.

²³ *See* AIMA Report at 1, 5, 10, 14, 18, 23, and 27-32 (reproducing Spire's February 22, 2019 topsoil depth maps).

Department's recommended corrective actions.²⁴ The landowners generally agree with the Department's findings. The landowners' comments urge the Commission to adopt the findings of the AIMA Report, to require Spire to take additional correction actions above and beyond those identified by the Department, and to impose civil penalties.²⁵

10. Commission staff also asked Spire to comment on the report's findings and recommended corrective actions, and to identify any actions it proposed to take in response to the report.²⁶ Spire filed a response on September 4, 2020, detailing its efforts to comply with the AIMA and expressing its willingness to coordinate with the Department and the landowners to ensure restoration and revegetation is complete and consistent with the provisions of the AIMA.²⁷

II. Discussion

11. Commission staff has reviewed the Department's AIMA Report, the landowners' and Spire's comments on the report, as well as Spire's status reports²⁸ and staff's

²⁴ See Commission Staff's August 25, 2020 Letters to Kenneth Davis (tract no. IL-SC-018.000) (Davis Property); Forrest Neal Jones (tract no. IL-GC-029.000) and Kenneth and Gayle Willis (tract no. IL-GC-030.000) (identified in the AIMA Report as adjacent property IL-GC-029.000 because the right-of-way occupies the boundary line of the Willis's and Forrest Neal Jones's properties) (jointly, Jones/Willis Properties); Philip and Zena Brown (tract nos. IL-GC-078.000/-080.100) (Brown Property); Bernard and Mary Lois Meyer (tract nos. IL-GC-093.000/-094.000) (Meyer Property); Marc Steckel (tract nos. IL-JC-110.000/-111.000) (Steckel Property); and Jacob, Mildred, and Jay Gettings (tract no. IL-JC-149.000) (Gettings Property).

²⁵ See Law Offices of Carolyn Elefant PLLC's September 14, 2020 Comments (on behalf of Bernard and Mary Lois Meyer; Jacob, Mildred, and Jay Gettings; Forrest Neal Jones; Kenneth and Gayle Willis; and Kenneth Davis) (Elefant Landowners Comments); The Unsell Law Firm, P.C.'s September 14, 2020 Comment (on behalf of Marc Steckel) (Steckel Comments); The Unsell Law Firm, P.C.'s September 14, 2020 Comment (on behalf of Philip and Zena Brown) (Brown Comments).

²⁶ *Spire STL Pipeline LLC*, Docket No. CP17-40-000, at 2 (Aug. 25, 2020) (delegated order).

²⁷ Spire's September 4, 2020 Response to IL Dep't of Agriculture Report at 4-6 (Spire Comments).

²⁸ Spire is required to file status reports for at least two years following construction. Spire currently files these reports on a monthly basis. Should Spire successfully address the right-of-way restoration issues that are documented in its

inspection reports relating to the seven properties in question. As detailed below, we agree with the Department that, under the provisions of the AIMA, Spire must conduct further restoration work to address concerns regarding topsoil compaction, soil composition, land leveling, and soil erosion on the properties identified in the Department's report. Specifically, we adopt four of the Department's six recommendations as described further below.

A. Adopted AIMA Report Recommendations

1. Topsoil Compaction

12. The AIMA requires soil decompaction when three conditions are met: the area has been trafficked or traversed by vehicles or construction equipment, the soil penetrometer readings are 300 pounds per square inch (psi) or greater, and the soil strength (psi) in the right-of-way area is greater than that of the non-trafficked area.²⁹ Section 7(A) of the AIMA requires decompaction to be conducted in accordance with certain guidelines, including requiring a ripper tool with a shank length of no less than 18 inches.³⁰

13. Citing the findings of its AIMA Report, the Department states that successful decompaction has not been completed on the impacted soil,³¹ and recommends, for each of the seven properties, that Spire mitigate compacted soil according to the guidelines provided in Appendices A and B of the AIMA and in coordination with the landowners.³² The landowners agree with the Department's findings.³³

monthly status reports, Spire would transition from filing monthly status reports to filing quarterly reports for the remainder of the two-year period following construction.

²⁹ AIMA, Appendix A at 1. Penetrometer testing measures the firmness or consistency of soil.

³⁰ *Id.* at 10; *see also id.* at Appendix A (Guidelines for Conducting Proper and Successful Decompaction) and Appendix B (Soil Plasticity Test Procedures).

³¹ IL Dep't of Agriculture Letter at 2.

³² AIMA Report at 4 (Davis Property); 9 (Jones/Willis Properties); 13 (Brown Property); 17 (Meyer Property); 22 (Steckel Property); and 26 (Gettings Property).

³³ *See e.g.*, Elephant Landowners Comments at 6; Steckel Comments at 1; and Brown Comments at 1.

14. Spire responds that its soil decompaction efforts were consistent with the Commission's *Upland Erosion Control, Revegetation, and Maintenance Plan* (FERC Plan) and the AIMA.³⁴ Specifically, Spire explains that it conducted decompaction using an agricultural ripper under conditions suitable to ensure effective decompaction and under the oversight of an Agricultural Inspector.³⁵ Further, Spire states that the soil decompaction recovery is hindered where the landowners abstain from farming within easements, contending that resumption of pre-construction practices is an important component to restoring soil structure and revegetation. Spire asserts that it is not possible for its decompaction measures alone, without the addition of rooting plants, to provide the sustained, long-term decompaction results necessary for healthy soil and consistent crop productivity and yields.³⁶ Spire states that it will continue to monitor the right-of-way and to coordinate with the Department and Commission staff.³⁷

15. During Commission staff's oversight of Spire's construction activities and prior to the issuance of in-service approval for the project, staff determined that Spire's soil decompaction efforts and its compaction testing methods were consistent with the FERC Plan and the AIMA.³⁸ But, as Spire points out, landowners' choice of practices for revegetating agricultural areas can affect the soil porosity following decompaction efforts.³⁹ Here, the efforts by landowners to reestablish plant growth in previously disturbed agricultural areas along the Spire Project right-of-way were not uniform.⁴⁰

³⁴ Spire Comments at 5.

³⁵ *Id.*

³⁶ *Id.*

³⁷ *Id.*

³⁸ Commission staff's August 27-28, October 23-24, and November 12-14, 2019 inspection reports documented communication between the Department, Commission staff, the landowners, and Spire regarding concerns with decompaction efforts on the Brown property.

³⁹ For example, the AIMA notes the importance of root penetration to maintain reduced compaction and to establish permanent stabilized channels to conduct air and water into the soil profile. AIMA, Appendix A at 2

⁴⁰ *See* Commission staff's October 23-24, 2019 Inspection Report at 4 (issued November 5, 2019) (landowner elected not to have cover crop planted on Meyer Property); Spire's June 9, 2020 Supplemental Information Filing at 20 (cover crop planted but farming not resumed on right-of-way across Steckel Property); Spire's August 6, 2020 Construction Status Report at 3, 7-8 (farming not resumed on right-of-

Delaying or refraining from replanting crops, while the landowners' prerogative, may have affected the porosity and degree of compaction of the soil within the impacted right-of-way. In any event, for all seven properties, the Department has presented evidence that the three conditions warranting decompaction under the terms of the AIMA have been met (i.e., the area has been trafficked or traversed by vehicles or construction equipment, penetrometer readings are above 300 psi, and the soil strength in psi is greater than the non-trafficked area). Therefore, under the AIMA, additional decompaction is required on all seven properties.

16. In ordering paragraph (A), we require Spire to perform soil decompaction on all seven properties identified in the Department's AIMA Report. In addition, Spire must remove all rock greater than 3 inches in any dimension exposed during the decompaction activities. Because we are directing Spire to undertake additional ground disturbing actions, the oversight of an agricultural inspector is required to ensure that Spire performs these activities in compliance with the conditions of the Certificate Order and the AIMA. Therefore, we direct Spire, in ordering paragraph (E), to employ an agricultural inspector and, in ordering paragraph (F), to file weekly reports documenting the status of the decompaction activities.

2. Soil Sampling

17. Section 7 of the AIMA addresses compaction, rutting, fertilization, and liming following replacement of topsoil along the right-of-way.⁴¹ The AIMA provides that the cost of applying soil additives (i.e., fertilizer, manure, or lime) will be included in damages paid to the landowner,⁴² and that Spire and the landowner must consider the appropriate County Soil and Water Conservation District's opinion if a dispute arises regarding the need for, or the rate of, lime and fertilizer application.⁴³

18. The Department's AIMA Report recommends that Spire, through a third-party contractor accredited with the Illinois Soil Testing Association, conduct soil sampling and testing throughout the right-of-way on each of the properties identified in the AIMA Report. The report directs that soil samples, pulled every 200 feet along the length of the right-of-way, be tested for organic matter, pH level, nitrogen, phosphorus, and potassium,

way across Brown Property), 8 (cover crop planted but farming not resumed on right-of-way across Meyer Property), and 9-10 (soybeans and alfalfa planted on the right-of-way across Steckel Property).

⁴¹ AIMA at 10.

⁴² *Id.* at 10 (section 7(E)) and 12 (section 13(C)).

⁴³ *Id.* at 10 (section 7(F)).

and that the testing results be made available to Spire, the Department, the landowner, and the Commission.

19. Spire asserts that because restoration and revegetation work activities are ongoing widespread soil sampling and testing to determine whether damages are appropriate is premature.⁴⁴ Spire also notes that it would be difficult to predict crop yield based on soil sampling alone.⁴⁵

20. As discussed further in section II.C, the Commission has no authority to direct Spire to compensate landowners for damages to private property.⁴⁶ So while the AIMA explicitly provides that the cost of applying soil additives (e.g., fertilizer, manure, or lime) must be included in the damages paid to landowners,⁴⁷ the Commission has no authority to enforce this requirement. However, the Commission can direct Spire to provide certain soil additives for the landowners to apply. The results of the soil sampling and testing, as recommended by the Department, would inform this determination. Therefore, in ordering paragraph (B), we require Spire to conduct soil sampling along the segments of the right-of-way that cross each of the properties identified in the Department's AIMA Report. Spire must conduct the soil sampling after decompaction activities are complete and in accordance with the Department's specified parameters,⁴⁸ which direct that:

- Sampling and testing be completed by a third party accredited with the Illinois Soil Testing Association;
- Sampling procedures follow Natural Resources Conservation Service (NRCS) guidelines;
- Soil samples be taken every 200 feet, at a depth of 8 inches using an approved NRCS method (randomly or grid pattern);

⁴⁴ Spire Comments at 6.

⁴⁵ *Id.*

⁴⁶ *See infra* P 40.

⁴⁷ *See* AIMA at 10 (section 7(E)).

⁴⁸ *See, e.g.,* AIMA Report at 4.

- Soil samples not be taken from farm lanes and field borders, fertilizer bands in crop rows, or any area that is different from the rest of the field (e.g., severely eroded areas, sandy spots, and wet areas); and
- Soil samples be tested for organic matter, pH level, nitrogen, phosphorus, and potassium.

21. Spire must file with the Commission the results of the soil sampling and confirm its plans to provide to the landowners any soil additives needed on these parcels. Spire shall also provide the soil testing results to the Department and the landowner of the property from which the samples was taken. Additionally, Spire's weekly reports, required by ordering paragraph (F), must document the status of soil sampling and testing.

3. Land Leveling

22. Section 8(A) of the AIMA addresses land leveling and requires Spire, following completion of pipeline construction, to "restore the right-of-way to its original pre-construction elevation and contour should uneven settling occur or surface drainage problems develop as a result of pipeline construction."⁴⁹

23. For the Davis, Steckel, and Gettings Properties, the AIMA Report recommends that the right-of-way be restored to its original pre-construction elevation and contour.⁵⁰ The FERC Plan requires Spire to restore pre-construction contours and to monitor and correct problems with drainage in agricultural areas.⁵¹ The AIMA sets forth the specific procedures that the landowner and Spire should follow for any additional land leveling work that is needed following initial restoration of the right-of-way. However, if the landowner and Spire disagree as to the need for additional land leveling beyond the work performed at the time of construction, section 8(D) of the AIMA states that it shall be Spire's responsibility to disprove the landowner's claim that additional land leveling is warranted.⁵² The AIMA is silent as to who would be the deciding party should there be a disagreement between the landowner and Spire on land leveling. Commission staff did

⁴⁹ AIMA at 10.

⁵⁰ AIMA Report at 4 (Davis Property); 22 (Steckel Property); and 26 (Gettings Property).

⁵¹ See FERC Plan sections V.A.5 and VII.A.3.

⁵² AIMA at 11.

not identify any contouring or land leveling concerns during its inspections.⁵³ However, we recognize that land leveling concerns (e.g., subsidence) may develop over time, especially due to settling. Further, Spire has provided little evidence in the record documenting its position that additional land leveling on these properties is not required in response to the Department's report.

24. Therefore, in ordering paragraph (C), we direct Spire to perform land leveling activities on the Davis, Steckel, and Gettings Properties to restore the right-of-way to preconstruction contours. The agricultural inspectors, required by ordering paragraph (E), must oversee this work, and Spire's weekly reports, required by ordering paragraph (F), must document the status of land leveling work.

4. Soil Erosion

25. To prevent soil erosion, section 11(A) of the AIMA states that:

Spire will work with Landowners to prevent excessive erosion on right-of-way that has been disturbed by construction. Reasonable methods will be implemented to control erosion. This is not a requirement, however, if the land across which the pipeline is constructed is bare cropland that the Landowner intends to leave bare until the next crop is planted.⁵⁴

Section 11(B) further provides that if Spire and the landowner cannot agree on a reasonable method to control erosion on the right-of-way, they must consider the recommendations of the appropriate County Soil and Water Conservation District.⁵⁵

26. For the Steckel Property, the AIMA Report recommends that Spire correct gully erosion observed in the right-of-way.⁵⁶ Gully erosion on the right-of-way is also a compliance issue that Spire must address in accordance with sections V.A.5 and VII.A.4 of the FERC Plan. However, erosion control efforts differ based on land use. To prevent erosion, the FERC Plan requires Spire to reestablish and maintain vegetation in non-

⁵³ As documented in Commission staff's November 12-14, 2019 Inspection Report, Commission staff observed that the entire right-of-way was restored to pre-construction contours and that restoration was progressing acceptably with revegetation starting to establish along the project route.

⁵⁴ AIMA at 12.

⁵⁵ *Id.*

⁵⁶ AIMA Report at 22 (Steckel Property).

agricultural areas; and in agricultural areas, gives appropriate deference to the landowners to implement their preferred farming practices in cultivated croplands. Prior to the Department's site inspection, Spire had recorded erosion on this property as a problem area,⁵⁷ and had indicated in a subsequent construction status report that it was working with the landowner to resolve the issue outside of the growing season.⁵⁸

27. In ordering paragraph (D), we require Spire to correct the erosion issue on the Steckel Property within 30 days, or as soon as conditions in the field are suitable, and to submit documentation of the resolution to the Commission. The agricultural inspectors, required by ordering paragraph (E), must oversee this work, and Spire's weekly reports, required by ordering paragraph (F), must document the status of the corrective action.

B. Other AIMA Report Recommendations

1. Topsoil Loss and Soil Mixing

28. The AIMA defines topsoil as "[t]he uppermost layer of the soil that has the darkest color or the highest content of organic matter."⁵⁹ During construction, section 2(B) of the AIMA requires that topsoil be stored in a windrow (i.e., a segregated pile) parallel to the pipeline trench "in such a manner that it will not become intermixed with subsoil materials."⁶⁰ Section 2(H) of the AIMA directs that "the topsoil must be replaced so that after settling occurs, the topsoil's original depth and contour (with an allowance for settling) will be restored."⁶¹

29. The Department states that "(d)uring the Department's site visit, the Department's soil expert conducted an analysis and penetrometer testing on nearby, non-impacted soils and observed significant differences between topsoil depths on impacted land and non-impacted land."⁶² The AIMA Report identifies shallower topsoil depths on impacted land compared to non-impacted land for all seven properties, shallower topsoil depths on

⁵⁷ See Spire's June 17, 2020 Construction Status Report at 4 (recorded as Problem Area Report (PAR) 64).

⁵⁸ See Spire's August 6, 2020 Construction Status Report at 3 (providing update on PAR 64).

⁵⁹ AIMA at 6.

⁶⁰ *Id.* at 7.

⁶¹ *Id.* at 8.

⁶² IL Dep't of Agriculture Letter at 1.

impacted land compared to Spire's pre-construction topsoil measurements for five properties (Davis, Jones, Willis, Brown, and Meyer), and consistent topsoil depth on impacted land compared to Spire's pre-construction topsoil measurements for two properties (Steckel and Gettings).⁶³ The Department concludes that topsoil has not been restored to its original depth and contour as required by the AIMA,⁶⁴ and recommends, for each of the seven properties, that Spire restore topsoil to pre-construction depth.⁶⁵ During its site inspections, the Department also observed the intermixing of topsoil and subsoil material on all seven properties.⁶⁶ The Department recommends that Spire import replacement topsoil of a similar texture and quality onto the impacted sites subject to approval by the landowners or an unbiased, third-party professional.⁶⁷ The landowners agree with the Department's findings.⁶⁸

30. In response, Spire states that, prior to commencing construction, it collected topsoil depths in accordance with the AIMA's requirements; during construction, it properly salvaged, stockpiled, and protected topsoil; and following construction, it redistributed topsoil across the right-of-way to match the approximate pre-construction grade.⁶⁹ In accordance with the AIMA's requirements, Spire's Agricultural Inspector, a Certified Professional Soil Scientist, oversaw and documented Spire's compliance with the AIMA topsoil protection measures throughout construction. Spire states that it is premature to measure topsoil depth before soil porosity is restored, and questions the

⁶³ AIMA Report at 1 (Davis Property); 5 (Jones/Willis Properties); 10-11 (Brown Property); 14 (Meyer Property); 18 (Steckel Property); and 23 (Gettings Property).

⁶⁴ IL Dep't of Agriculture Letter at 1.

⁶⁵ AIMA Report at 4 (Davis Property); 9 (Jones/Willis Properties); 13 (Brown Property); 17 (Meyer Property); 22 (Steckel Property); and 26 (Gettings Property). For each property, the AIMA Report referenced Spire's topsoil depth measurements taken on the right-of-way prior to construction.

⁶⁶ IL Dep't of Agriculture Letter at 2; *see also* AIMA Report at 1 (Davis Property); 5 (Jones/Willis Properties); 10 (Brown Property); 14 (Meyer Property); 18 (Steckel Property); and 23 (Gettings Property).

⁶⁷ IL Dep't of Agriculture Letter at 2.

⁶⁸ Elephant Landowners Comments at 6; Steckel Comments at 1; and Brown Comments at 1.

⁶⁹ Spire Comments at 4.

validity of the Department's reported measurements.⁷⁰ Spire also asserts that topsoil measurements taken within the first three years following project construction would be inconclusive due to the lack of soil structure and plant root development.⁷¹ Instead, Spire counters that topsoil depth should be measured after landowners harvest their crops from the 2020 growing season, till the soil, and plant cover crops.⁷²

31. As to soil mixing, Spire states that because the Department only evaluated one soil pit per property, there is currently no way to determine whether soil mixing is localized or widespread.⁷³ Spire suggests that before it can evaluate whether soil mixing is impacting crop productivity, further discussions with the Department and additional monitoring and investigation of potential topsoil and subsoil mixing are warranted.⁷⁴ If it is then confirmed that soil mixing is negatively impacting crop productivity, Spire commits to creating "a detailed [soil] sampling plan with multiple sampling points to determine the correct reclamation strategy to restore agricultural productivity and address any mixing of topsoil and subsoil (if applicable)."⁷⁵ Spire notes that it will develop and implement any additional reclamation measures, as appropriate, in coordination with the Department, Commission staff, and landowners.⁷⁶

32. Both the AIMA and the FERC Plan measure the success of Spire's topsoil compliance based on crop regrowth and vigor.⁷⁷ Where landowners have opted to not

⁷⁰ *Id.* at 5.

⁷¹ *Id.*

⁷² *Id.*

⁷³ *Id.*

⁷⁴ *Id.*

⁷⁵ *Id.*

⁷⁶ *Id.*

⁷⁷ AIMA at 12-13 (section 13C); FERC Plan section VII.A.2. Specifically, the FERC Plan explains that revegetation in agricultural areas will be considered successful "when upon visual survey, crop growth and vigor are similar to adjacent undisturbed portions of the same field, unless the easement agreement specifies otherwise." FERC Plan section VII.A.2. Where landowners opt not to replant crops or cover crops on exposed soil on agricultural land disturbed by project construction, both the restoration of soil's function and the ability to assess the success of restoration may be impeded. The inspection and construction status reports for the Spire Project indicate that certain

plant crops, the Commission can only judge compliance by Spire's implementation of agricultural land best management practices (e.g., topsoil handling, construction debris removal, decompaction, and correction of any drainage or irrigation system problems identified post-construction). Like provisions in the AIMA, the FERC Plan requires the implementation of best management practices to salvage, segregate, stabilize, and return topsoil to the right-of-way in croplands in a manner that prevents the mixing of topsoil and subsoil. However, there is no requirement in the AIMA or the FERC Plan that the topsoil profile, or the topsoil and subsoil interface, be uniform across the right-of-way immediately following construction given the practical challenges of topsoil stripping, backfill, decompaction, and grading operations. Rather, it is the combined effect of the required best management practices to preserve the topsoil resource and the return of the impacted land to agricultural land use practices that ultimately leads to successful restoration.

33. Throughout construction of the Spire Project, Commission staff monitored Spire's activities on agricultural properties to ensure that Spire was implementing best management practices to preserve the topsoil resource, and found Spire was in compliance with the relevant provisions of the AIMA and FERC Plan. Although Spire was found to be out of compliance with topsoil handling requirements on a few occasions, Spire reported these instances in its status reports and, in each case, Commission staff verified that Spire had corrected the issue in a timely manner.⁷⁸

landowners either elected to not have a cover crop planted, resumed normal agricultural practices in the field except for on the right-of-way, or resumed normal agricultural practices on the right-of-way later than the rest of the surrounding field.

⁷⁸ For example, in February 2019, Spire reported soil mixing on the Davis Property due to mobilizing equipment on unprepared surfaces (i.e., topsoil had not been removed). Spire's February 16, 2019 Construction Status Report at 18 (noncompliance on Davis Property reported as ML-029-Q2) (reporting that equipment tracked on unprepared topsoil left deep ruts and that mixing of subsoil and topsoil had been observed in minimal amounts). The following week, Spire reported that it had resolved the topsoil non-compliance issue by removing additional topsoil. Spire's February 23, 2019 Construction Status Report at 18. Commission staff's inspection verified the resolution and did not identify any further compliance concerns. Commission staff's February 21, 2019 Inspection Report. Likewise, in March 2019, Commission staff identified soil mixing on the Steckel Property due to unprepared surfaces and mobilizing equipment through a saturated travel lane, which caused topsoil to dislodge from an adjacent topsoil pile. Commission staff's March 11-12, 2019 Inspection Report. Spire documented resolution of the issue in its subsequent status reports, stating that it had ceased use of the travel lane until grading crews reached the area and the remaining topsoil had been

34. In general, Commission staff observed that Spire installed topsoil depth markers consistent with section 2.A. of the AIMA, segregated topsoil and subsoil piles that were windrowed in a manner to prevent mixing, stabilized topsoil piles with vegetation, and installed erosion control devices to minimize erosion and runoff.⁷⁹ Both the Commission staff and Spire's agricultural inspector documented Spire's compliance with the subsoil and the topsoil replacement requirements during right-of-way restoration. We also note that for certain properties, the AIMA Report's topsoil measurements were consistent with or close to off right-of-way or pre-construction measurements, corroborating our staff's documentation that Spire was properly implementing best management practices to preserve the topsoil.⁸⁰

35. For each property, the Department's recommendation for full topsoil replacement is based on a comparison of the soil profiles from a single test pit on the impacted right-of-way with a single test pit in an adjacent field. We find the limited data presented do not support the Department's recommendation that full replacement of topsoil with imported topsoil is required on all seven properties. Accordingly, we find that the Department's recommendation to import topsoil to restore pre-construction depth is not warranted. However, the Commission will continue to monitor and investigate areas where differences in crop growth or vigor are observed on the right-of-way and in the adjacent fields.⁸¹

segregated. Spire's March 25, 2019 Construction Status Report at 22 and April 1, 2019 Construction Status Report at 18, 21. In both instances, because the amount of soil mixing observed was relatively minor, Commission staff did not require Spire to replace the topsoil.

⁷⁹ Commission staff's May 6-7, 2020 Inspection Report.

⁸⁰ The Department's on- and off-right-of-way topsoil depth measurements were within 2-3 inches for four properties (Davis, Jones, Willis, Steckel). Compared to Spire's pre-construction topsoil depth measurements, the Department's on-right-of-way topsoil depth measurements were within 2 inches for two properties (Brown, Meyer) and were consistent with pre-construction measurements for two properties (Steckel, Gettings). Although the Department's on- and off-right-of-way topsoil depth measurements were not similar for two properties (Meyer, Gettings), the Department's right-of-way topsoil depth measurements for both properties were within 2 inches or less of Spire's pre-construction measurements.

⁸¹ Commission staff's review of Spire's recent construction status reports and photographic documentation demonstrates that crop growth and vigor generally appear similar to adjacent undisturbed portions of the same field for most agricultural fields along the Spire Project pipeline route where landowners resumed crop planting.

2. Rock Removal

36. Section 5 of the AIMA addresses rock removal during project construction and directs Spire to remove all rock greater than 3 inches from the surface of all exposed subsoil, from all subsoil replaced back in the trench, and from all topsoil replaced after backfilling in the trench.⁸² The FERC Plan requires removal of excess rock from the top 12 inches of soil in cropland as part of cleanup operations;⁸³ and the size, density, and distribution of rock on the construction work area shall be similar to adjacent areas not disturbed by construction.⁸⁴

37. For the Davis and Jones/Willis Properties, the Department's AIMA Report recommends rock removal from the uppermost 42 inches of soil.⁸⁵ In support of its recommendation, the Department provides only two photos showing the discovery of a single, palm-sized rock.⁸⁶

38. Requiring rock removal from soil to depths of 42 inches would result in new impacts and further disruption of the topsoil resource similar in nature to the original construction process. The Department has not presented substantial evidence, nor have Commission staff's inspections identified any unresolved rock removal compliance concerns that would justify the increased resource impacts from requiring Spire to implement the Department's recommended rock removal activities. The AIMA states that, to best promote revegetation and restore crop production, a total depth of 30 or more inches of soil (topsoil plus subsoil) is required.⁸⁷ Conditions of deeper substrate do affect drainage patterns; and the presence of excess rock could result in vertical rock migration in years to come. However, disturbing the entire right-of-way to a depth of 42 inches to remove rock (which may or may not be present) from non-productive subsoil creates a

⁸² AIMA at 9-10.

⁸³ Agricultural production is primarily related to the topsoil strata, which is generally 4-12 inches deep. Even in areas of deeper topsoil, crop root establishment is generally in the top 12 inches.

⁸⁴ FERC Plan section V.A.4. Prior to the Commission's in-service approval, Commission staff and its compliance monitor inspected the project right-of-way and confirmed Spire's compliance with final clean-up procedures of the FERC Plan, including the rock removal procedures on agricultural properties.

⁸⁵ AIMA Report at 4 (Davis Property) and 9 (Jones/Willis Properties).

⁸⁶ *See id.* at 7-8 (Jones/Willis Properties).

⁸⁷ AIMA, Appendix A, section 3. D.

considerable amount of impact that would not likely provide lasting benefit. Further, the required soil cover over the pipeline is 60 inches; given the depth at which this work would need to occur, safety concerns outweigh the benefits of conducting this work over an operational pipeline.

39. For these reasons, we decline to fully adopt the Department's recommendation that Spire undertake rock removal from soil to depths of 42 inches on the Davis and Jones/Willis Properties. However, as previously discussed, in ordering paragraph (A), we direct Spire to remove all rock greater than 3 inches in any dimension exposed during the decompaction activities that must be performed on all seven properties, including the Davis and Jones/Willis Properties.⁸⁸ Additionally, the agricultural inspectors, required by ordering paragraph (E), will monitor decompaction and rock removal, and Spire's weekly reports, required by ordering paragraph (F), must document the status of decompaction and rock removal.

C. Request for Monetary Damages and Enforcement Investigation

40. The landowners request that the Commission determine whether and how landowners should be compensated for construction-related property damage or crop loss. However, the Commission has no authority to impose monetary damages or to otherwise require pipeline developers to compensate landowners for property damage or crop loss.⁸⁹ The jurisdiction to determine whether monetary damages are warranted and, if so, to determine appropriate compensation, resides with the courts.

41. Finally, the landowners assert that Spire's violations of the AIMA warrant referral to enforcement staff and the imposition of civil penalties.⁹⁰ We decline to do so. The agricultural impact mitigation concerns raised in the Department's AIMA Report have

⁸⁸ See *supra* P 16.

⁸⁹ See *Californians for Renewable Energy, Inc. v. Williams Nw. Pipeline*, 133 FERC ¶ 61,194, at P 26 (2010) (citing *S.C. Pub. Serv. Comm'n v FERC*, 850 F.2d 788 (D.C. Cir. 1988) (Commission cannot award damages under analogous Federal Power Act)).

⁹⁰ Elephant Landowners Comments at 9; Steckel Comments at 1; and Brown Comments at 1. In the alternative, some landowners urge the Commission to direct Spire to work with each impacted landowner to develop within 10 days a plan that would require, based on the landowner's preference, Spire to perform the additional restoration work or to compensate the landowner for his or her own efforts to restore the property. Elephant Landowners Comments at 10. We note that the AIMA allows Spire to negotiate with landowners that wish to perform certain mitigative actions themselves. See AIMA at 3.

been investigated by staff and addressed in this order and do not warrant an enforcement referral or the imposition of civil penalties.⁹¹ However, the Commission takes landowner concerns seriously and expects Spire to continue to work directly with agencies, in this case the Department, and the landowners to address their concerns.

The Commission orders:

(A) Within 30 days of the issuance date of this order, or as soon as conditions in the field are suitable, Spire shall perform soil decompaction following the guidelines set forth in section 7(A) and Appendices A and B of the AIMA and in coordination with the landowners on the Davis, Jones/Willis, Brown, Meyer, Steckel, and Gettings Properties. Spire must collect and remove all stone and rock three or more inches in size which has been lifted to the surface during decompaction activities. Spire may complete the required work at an alternative timeframe only if the landowner so requests.

(B) Within 30 days of completing the decompaction required by Ordering Paragraph (A), Spire shall conduct soil sampling throughout the construction right-of-way on the Davis, Jones/Willis, Brown, Meyer, Steckel, and Gettings Properties. Spire shall conduct soil sampling as follows:

- a. Sampling and testing shall be completed by a third party that is accredited with the Illinois Soil Testing Association;
- b. Sampling procedures shall follow Natural Resources Conservation Service (NRCS) guidelines;
- c. Soil samples shall be taken every 200 feet, at a depth of 8 inches using an approved NRCS method (randomly or grid pattern);
- d. Samples shall not be taken from farm lanes and field borders, fertilizer bands in crop rows, or any area that is different from the rest of the field (severely eroded areas, sandy spots, wet areas, etc.); and
- e. Samples shall be tested for organic matter, pH level, nitrogen, phosphorus, and potassium.

Once soil sample testing is complete, Spire shall file the results with the Secretary and confirm its plans to provide to the landowner(s) any soil additives needed on these parcels. Spire shall also provide the soil testing results to the Illinois Department of Agriculture and the landowner of the property from which the sample was taken. Spire shall file documentation of its consultation with the landowner regarding the third party-

⁹¹ See *Midship*, 173 FERC ¶ 61,075 at P 26 (explaining that Commission's investigation authority is discretionary under section 14 of the NGA, 15 U.S.C. § 717m); see also *Enforcement of Statutes, Regulations and Orders*, 123 FERC ¶ 61,156, at P 23 (2008) (Revised Policy Statement on Enforcement).

recommended type and amount of soil additives per acre.

(C) Within 30 days of the issuance date of this order, or as soon as conditions in the field are suitable, Spire shall perform land leveling and recontouring on the Davis, Steckel, and Gettings Properties. Spire may complete the required work at an alternative timeframe only if the landowner so requests.

(D) Within 30 days of the issuance date of this order, or as soon as conditions in the field are suitable, Spire shall correct the erosion issue on the Steckel Property and file documentation of the resolution in its weekly status report. Spire may complete the required work at an alternative timeframe only if the landowner so requests.

(E) Spire shall employ at least one agricultural inspector to oversee the additional mitigation measures on the Davis, Jones/Willis, Brown, Meyer, Steckel, and Gettings Properties. The agricultural inspector(s) shall be:

- a. responsible for monitoring and ensuring compliance with all mitigation measures required by the order and other grants, permits, certificates, or other authorizing documents;
- b. responsible for evaluating the construction contractor's implementation of the environmental mitigation measures required in the contract and any other authorizing document;
- c. empowered to order correction of acts that violate the environmental conditions of the order, and any other authorizing document;
- d. responsible for documenting compliance with the environmental conditions of the order, as well as any environmental conditions/permit requirements imposed by other federal, state, or local agencies; and
- e. responsible for maintaining status reports.

The agricultural inspector(s) shall possess the qualifications set forth in the AIMA and shall be responsible for monitoring and ensuring compliance with all mitigation measures required by the AIMA.

(F) As of the issuance date of this order, Spire shall file updated status reports with the Secretary on a weekly basis until all activities are complete. Status reports shall include:

- a. the status of activities required by the order and work planned for the following reporting period;
- b. a listing of all problems encountered and each instance of noncompliance observed by the Agricultural Inspector during the reporting period (both for the conditions imposed by the Commission and any environmental

conditions/permit requirements imposed by other federal, state, or local agencies);

- c. a description of the corrective actions implemented in response to all instances of noncompliance;
- d. the effectiveness of all corrective actions implemented;
- e. a description of any landowner/resident complaints which may relate to compliance with the requirements of the Order, and the measures taken to satisfy their concerns; and
- f. copies of any correspondence received by Spire from other federal, state, or local permitting agencies concerning instances of noncompliance, and Spire's response.

By the Commission. Commissioner Danly is dissenting in part with a separate statement attached.

(S E A L)

Kimberly D. Bose,
Secretary.

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Spire STL Pipeline LLC

Docket Nos. CP17-40-000
CP17-40-001

(Issued March 18, 2021)

DANLY, Commissioner, *dissenting in part*:

1. I dissent in part from the Commission's order requiring Spire STL Pipeline LLC (Spire) to conduct additional mitigation to comply with its certificate. The order's requirement that Spire perform additional soil decompaction, despite Spire having completed decompaction in 2019, is legally infirm because it is unsupported by substantial evidence and reasoned decision making. The order therefore runs afoul of the Administrative Procedure Act (APA).¹

2. As an initial matter, it should be recognized that any obligation to mitigate the agricultural impacts of construction must flow from the terms of Spire's certificate.² The Commission cannot order Spire to take actions beyond the requirements established in the conditions attached to its certificate and any orders purporting to compel Spire to take particular action must be supported by substantial evidence and reasoned decision making. The requirement that Spire conduct decompaction on agricultural lands originates in the Agricultural Impact Mitigation Agreement (Agreement)—an agreement negotiated between Spire and the Illinois Department of Agriculture (Department) and

¹ See 5 U.S.C. § 706 ("The reviewing court shall . . . hold unlawful and set aside agency action, findings, and conclusions found to be—(A) arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law; . . . (E) unsupported by substantial evidence . . ."); *Motor Vehicle Mfrs. Ass'n of U.S., Inc. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983) ("Normally, an agency rule would be arbitrary and capricious if the agency has relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise."). See also 15 U.S.C. § 717r(b) ("The finding of the Commission as to the facts, if supported by substantial evidence, shall be conclusive.").

² See 15 U.S.C. § 717f(e) ("The Commission shall have the power to attach to the issuance of the certificate and to the exercise of the rights granted thereunder such reasonable terms and conditions . . .").

adopted by the certificate order.³ The Agreement provides that it is “the complete instrument governing the mitigation of agricultural impacts that may *result from the construction of the natural gas pipeline . . .*.”⁴ The Agreement requires that Spire rip all areas (when sufficiently dry) traversed by vehicles and construction equipment, the soil penetrometer readings are 300 psi or greater, and the soil strength in the right-of-way is greater than that of the non-trafficked area.⁵ Thus, in order to require decompaction under the certificate, the Commission must make two findings: first, that there is compaction requiring mitigation, and second, that the pipeline is liable under the terms of its certificate for that compaction.

3. The Commission must support each finding with substantial evidence in the record and through reasoned decision making by “examin[ing] the relevant data and articulat[ing] a satisfactory explanation for its action.”⁶ Substantial evidence means “more than a mere scintilla,” that is “such relevant evidence as a reasonable mind might accept as adequate to support a conclusion.”⁷

4. The Commission fails to support either finding necessary to require additional decompaction with substantial evidence. At most, the Commission marginally supports its finding that there is compaction requiring mitigation. The order requires Spire to

³ See *Spire STL Pipeline LLC*, 164 FERC ¶ 61,085, at P 241 (2018). The certificate also requires Spire to comply with the terms of the Commission’s *Upland Erosion Control, Revegetation, and Maintenance Plan (Plan)*. See *id.* The Commission’s *Plan* requires soil compaction mitigation, specifically testing topsoil and subsoil for compaction and plowing severely compacted agricultural areas. See *Upland Erosion Control, Revegetation, and Maintenance Plan*, FERC, 14-15 (2013), <https://www.ferc.gov/sites/default/files/2020-04/upland-erosion-control-revegetation-maintenance-plan.pdf>.

⁴ Agreement at 16.

⁵ *Id.* at 10 and Appendix A.

⁶ *State Farm*, 463 U.S. at 30. See also *Elec. Consumers Res. Council v. FERC*, 747 F.2d 1511, 1513-14 (D.C. Cir. 1984) (“We defer to the agency’s expertise . . . so long as its decision is supported by ‘substantial evidence’ in the record and reached by ‘reasoned decision-making,’ including an examination of the relevant data and a reasoned explanation supported by a stated connection between the facts found and the choice made.”) (citing *Burlington Truck Lines v. United States*, 371 U.S. 156, 168 (1962); *Memphis Light, Gas & Water Div. v. FPC*, 504 F.2d 225, 230 (D.C. Cir. 1974); 16 U.S.C. § 825l (1982)).

⁷ *Consol. Edison Co. of N.Y., Inc. v. NLRB*, 305 U.S. 197, 229 (1938).

conduct additional decompaction to comply with the Agreement based on a report filed on August 14, 2020, by the Department. The Department's report states that "proper and successful decompaction has not occurred on the impacted soil" for each property based on a comparison of *one* soil penetrometer reading on the right-of-way with *one* reading off the right-of-way.⁸ Read for all its worth, the Department's report leads to no more than the conclusion that soil at one specific location on the right-of-way is more compacted than one specific location off the right-of-way for each property.

5. Even assuming that this is a sufficiently rigorous method to convincingly assess the need for decompaction, the record contains no evidence, substantial or otherwise, as to who bears the liability for that compaction. In fact, the record shows, and the order concedes, that the difference in compaction between the soil on the right-of-way versus off the right-of-way may not be directly attributable to the construction of the natural gas pipeline.⁹ Spire performed decompaction in the fall of 2019 on all of the properties, except for certain properties at the landowner's request and after having determined that soil compaction readings did not require decompaction prior to seeding.¹⁰ Spire filed comments stating that an Agricultural Inspector monitored and documented decompaction efforts to ensure effective soil decompaction occurred to restore crop and soil productivity.¹¹ The order states that the Commission's Compliance Monitors conducted multiple field inspections, reviewed Spire's decompaction program,¹² and

⁸ Illinois Department of Agriculture August 14, 2020 Report at 2.

⁹ See *Spire STL Pipeline LLC*, 174 FERC ¶ 61,219, at P 15 (2021) ("But, as Spire points out, landowners' choice of practices for revegetating agricultural areas can affect the soil porosity following decompaction efforts. Here, the efforts by landowners to reestablish plant growth in previously disturbed agricultural areas along the Spire Project right-of-way were not uniform. Delaying or refraining from replanting crops, while the landowners' prerogative, *may have affected the porosity and degree of compaction* of the soil within the impacted right-of-way.") (emphasis added).

¹⁰ *Id.* P 15, n.38; Commission staff November 12-14, 2019 Field Inspection Report at 4 (eLibrary Accession No. 20191202-3012).

¹¹ Spire June 9, 2020 Filing at 17.

¹² See *Spire*, 174 FERC ¶ 61,219 at PP 7, 15, n.38; see also Commission staff August 27-28, 2019 Field Inspection Report (eLibrary Accession No. 20190919-3054) (reviewed decompaction efforts); Commission staff September 25-26, 2019 Field Inspection Report (eLibrary Accession No. 20191016-3013) (same); Commission staff October 23-24, 2019 Field Inspection Report (eLibrary Accession No. 20191105-3011) (same); Commission staff November 12-14, 2019 Field Inspection Report (eLibrary Accession No. 20191202-3012) (same).

found Spire to be in compliance.¹³ There is no evidence in the record—and certainly nothing cited by the Department or any party to the proceeding—that shows Spire later conducted activities that re-compacted the soil. In fact, the Agreement implicitly acknowledged the scenario that may well be before us, that the pipeline might discharge all of its obligations to perform decompaction, but that the soil, due to no fault of the pipeline, might become re-compacted: “[r]educed compaction created by the ripper pass will not remain over time without subsequent root penetration.”¹⁴ For this reason, it “recommend[ed] to landowners to plant a cover crop (cereal rye, clover, alfalfa, tillage radish, turnips, etc.) following decompaction.”¹⁵ As it turns out, some of the affected landowners elected to not to plant crops on the affected right-of-way.¹⁶

6. In addition to failing to support its decision with substantial evidence, the Commission’s order falls short of the requirement to engage in reasoned decision making rendering it arbitrary and capricious. The Commission “must *examine* the relevant data and articulate a satisfactory explanation . . . including a ‘rational connection between the facts found and the choice made.’”¹⁷ The phrase—“[i]n any event”—used by the order to dismiss the countervailing evidence that Spire is not liable for the compaction can hardly qualify as examining the relevant data.¹⁸ A bare recitation of the pleadings and facts is insufficient.¹⁹ The Commission cannot “offer[] an explanation for its decision that runs

¹³ Commission staff November 12-14, 2019 Inspection Report at 5 (“[N]o instances of noncompliance were identified. The entire ROW was restored to pre-construction contours, restoration was progressing acceptably with revegetation starting to establish along the Project route.”).

¹⁴ Agreement at Appendix A; *see also id.* at 10 (“ripping across any agricultural land should only take one pass” and that “[a]dditional passes should only be conducted if the previous pass did not sufficiently shatter the soil.”) (emphasis in original).

¹⁵ Agreement at Appendix A.

¹⁶ *See* Spire Landowners September 14, 2020 Comments at 11.

¹⁷ *State Farm*, 463 U.S. at 43 (citing *Burlington Truck Lines v. United States*, 371 U.S. 156, 168 (1962)) (emphasis added); *see also id.* at 56 (“failed to offer the rational connection between facts and judgment required to pass muster under the arbitrary and capricious standard”).

¹⁸ *Spire STL Pipeline LLC*, 174 FERC ¶ 61,219 at P 15.

¹⁹ *See Mo. Pub. Serv. Comm’n v. FERC*, 234 F.3d 36, 41 (D.C. Cir. 2000) (“passing reference . . . is not sufficient to satisfy the Commission’s obligation to carry out ‘reasoned’ and ‘principled’ decisionmaking”).

counter to the evidence before [it].”²⁰ This, the Commission has clearly failed to do. The order is infirm under the APA.

7. Acceptance of a certificate of public convenience and necessity is not an assumption of liability in perpetuity for the ills suffered by affected landowners after mitigation has been completed. In order to compel action on the part of Spire, the Commission must support its action with substantial evidence and grapple with all of the evidence in the record. This order falls short by ignoring record evidence showing that Spire may not be responsible for further decompaction. No matter how sympathetic, well-pleaded or convincing one side of an argument is, the Commission must support its decisions with substantial evidence and reasoned decision making that analyzes all evidence from both sides. For these reasons, I respectfully dissent in part.

James P. Danly
Commissioner

²⁰ *State Farm*, 463 U.S. at 43.

Exhibit J

Agricultural Impact Mitigation Agreement



Bruce Rauner, Governor
Raymond Poe, Director

Bureau of Land and Water Resources

State Fairgrounds • P.O. Box 19281 • Springfield, IL 62794-9281 • 217/782-6297 • TDD 866/287-2999 • Fax 217/557-0993

March 21, 2017

Dear Landowner:

As the owner of land across which Spire STL Pipeline (Spire) plans to construct ±59 miles of 24-inch natural gas pipeline, the Illinois Department of Agriculture would like to inform you of the following matter.

Effective March 15, 2017, Spire and the Illinois Department of Agriculture (IDOA) entered into the attached Agricultural Impact Mitigation Agreement (AIMA) establishing standards and policies that Spire will follow as it constructs the 24-inch natural gas pipeline across agricultural land. The AIMA will provide a high level of protection to such land, but it may not address specific concerns that you may have. Such concerns must be addressed individually in your own easement agreement to accomplish your specific goals. The enclosed handout contains examples of those possible concerns.

As you review the enclosed AIMA, you may find procedures that you would like to change. Your right to negotiate changes is preserved by Paragraph A on page 3 of the AIMA. It states, "All mitigative actions are subject to modification through negotiation by Landowners and a representative of Spire, provided such changes are negotiated in advance of any construction, maintenance or repairs." Certain policies require Spire to consult with the Landowner or Tenant of a property. Spire will engage in good faith efforts to secure the agreement of the Landowner in such cases. You can discuss the changes you desire with the right-of-way agent that is assigned to you. It may also be advisable to work with your own attorney to make sure your interests are protected.

As you consider your personal interests, you may want to include the owner indemnification clause in your individual easement agreement to protect yourself, your family and future heirs against future claims or expenses arising from the natural gas pipeline construction, repairs and maintenance. This item is covered in Section 23 of the AIMA. We feel it is best that such issues are left to landowners to address in their individual easement agreement if specific items are of concern.

Please note that although the IDOA has entered into the AIMA with Spire, it does not constitute our endorsement of the project. The AIMA's only purpose is to provide a high level of protection to agricultural land that will be impacted by the pipeline's construction, if the project is approved by the Federal Energy Regulatory Commission. Landowners have the discretion of negotiating more stringent standards in their individual easement agreement with Spire.

If you have any questions, feel free to contact Terry Savko of my staff at 217-785-4458, the address listed above or terry.savko@illinois.gov.

Sincerely,

A handwritten signature in cursive script that reads "Steven D. Chard".

Steven D. Chard, Acting Chief
Bureau of Land and Water Resources

Enclosure

cc: Raymond Poe, IDOA Director
Warren Goetsch, IDOA
Don Moffitt, IDOA
Craig Sondgeroth, IDOA

Rae Payne, IL Farm Bureau
Laura Harmon, IL Farm Bureau
Steve Stierwalt, AISWCD
Kelly Thompson, AISWCD

Farm Bureau Managers and
Soil and Water Conservation Districts
(SWCDs) for Scott, Greene and Jersey
Counties

Exhibit C

AGRICULTURAL IMPACT MITIGATION AGREEMENT
between
SPIRE STL PIPELINE LLC
and the
ILLINOIS DEPARTMENT OF AGRICULTURE
Pertaining to the Construction of the
SPIRE STL PIPELINE PROJECT
A NATURAL GAS PIPELINE AND RELATED APPURTENANCES
in
SCOTT, GREENE and JERSEY COUNTIES, ILLINOIS

The Illinois Department of Agriculture (IDOA) and Spire STL Pipeline LLC (Spire) agree to the following measures which Spire will implement as it constructs a natural gas pipeline under agricultural land in Scott, Greene, and Jersey Counties, Illinois, as described in Spire's application to the Federal Energy Regulatory Commission (FERC) under Section 7(c) of the Natural Gas Act for a Certificate of Public Convenience and Necessity (Certificate), FERC Docket No. PF16-9-000, CP17-40-000. The mitigative actions outlined in this Agricultural Impact Mitigation Agreement (AIMA) will serve to minimize the negative impacts that may occur due to pipeline construction. The natural gas pipeline system subject to this AIMA is described below.

Spire is proposing to build, operate, and maintain the Spire STL Pipeline Project (Project). The Project consists of approximately 59 miles of new 24-inch-diameter natural gas pipeline commencing in Scott County, Illinois at an interconnect with the existing Rockies Express Pipeline LLC (REX) and traversing south through Greene and Jersey Counties, Illinois and into St. Charles and St. Louis Counties, Missouri. The 24-inch-diameter pipeline will tie into an existing 20-inch diameter pipeline in St. Louis County, Missouri that is currently owned and operated by Laclede Gas Company (LGC). As part of the Project, Spire also intends on modifying portions of this approximate 7.0-mile existing 20-inch-diameter pipeline to make it interstate serviceable. The Project will also include the construction of four new metering and regulating (M&R) facilities (one M&R facility in Scott County, Illinois and three M&R facilities in St. Louis County, Missouri), access roads and other minor aboveground appurtenant facilities. Construction is anticipated to commence in the first quarter of 2018.

In non-agricultural areas, the Project will require 50 feet of permanent easement and 40 feet of temporary workspace (which will revert to the Landowner upon completion of construction activities), a total of 90 feet of construction right-of-way. In agricultural areas, Spire will require 50 feet of permanent easement, 40 feet of temporary workspace and 25 feet of additional temporary workspace; a total of 115 feet of construction right-of-way.

If construction does not commence within two years from the issuance of the FERC's Certificate of Public Convenience and Necessity, the AIMA will be revised, with Spire's input, to reflect the IDOA's most current Pipeline Construction Standards and Policies. This AIMA, and any updated AIMA, will be filed with the FERC by Spire.

The construction standards and policies described below apply to construction activities occurring partially or wholly on privately owned agricultural land. With the exception of Item No. 3, they are not intended to apply to construction activities occurring entirely on public right-of-way, railroad right-of-way, publicly owned land, or privately owned land that is not agricultural

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land. Spire will, however, adhere to the construction standards relating to the repair of drain tile when drain tiles are encountered on public highways right-of-way, railroad right-of-way and publicly or privately owned land.

Introduction

Spire will retain qualified professionals on each construction phase of the Project. The qualified professionals may be engineers, soil scientists, agronomists and/or construction and environmental inspectors as appropriate during each phase of the Project. This shall include initial AIMA development, construction, initial restoration, and post-construction monitoring and follow-up restoration. The qualified professionals shall act to ensure that the provisions set forth in this document or in any separate agreement, will be adhered to in good faith by the Spire and by the Project construction contractor(s), and that all agreements protect the resources of both the Landowner and Spire.

The qualified professionals shall assist with the collection and analyzing of site-specific agricultural information gathered for the AIMA development by Spire. This information will be obtained through field review as well as direct contact with affected Landowners and farm operators, local County Soil and Water Conservation Districts (SWCDs), Agricultural Extension Agents and others. Spire shall provide a courtesy copy of the site-specific information to the appropriate local County SWCD(s) any time an AIMA modification is submitted.

Spire shall also retain Agricultural Inspectors that will work with the appropriate onsite Spire Project Inspectors and Project Contractors throughout the construction phase and through other phases as needed. Prior to such selection, the IDOA and Spire shall agree on the bidding process (including compensation). The Agricultural Inspectors will also maintain contact with the affected Landowners and farm Tenants in conjunction with Spire rights-of-way agents, as well as local SWCD personnel concerning farm resources and management matters pertinent to the agricultural operations and the site-specific implementation of the Agreement.

Spire will pay for the cost of the work performed by the Agricultural Inspectors that are, at a minimum, thoroughly familiar with the following:

- This Agreement;
- FERC's Plan and Procedures;
- Pipeline Construction Sequences and Process;
- Aspects of production agriculture, Illinois soils, soil and water conservation, and Farm operations.

The Agricultural Inspector will possess:

- Good oral and written communication skills, and the ability to work closely with the Landowner, Tenants, Spire and Project contractor(s).

Spire agrees that a minimum of one Agricultural Inspector will be assigned per construction (installation) spread.

The Agricultural Inspector(s) shall train all pipeline contractors on the terms of this Agreement and provide a copy of the Agreement to them.

When permitted by law and contract, Spire shall encourage its pipeline contractor(s) to use, where and if available, local drain tile contractors to redesign, reconstruct, and/or repair any subsurface drain tile lines that are affected by the pipeline installation. Often, the local

contractors have installed the Landowner's drain tile system and can have valuable knowledge as to the location, depth of cover, appurtenances, and any other factors affecting the tile operation. The drain tile contractor(s) shall follow the attached construction specifications (Refer to 3.D.).

Unless the easement or other agreement between the Landowner and Spire provides to the contrary, the actions specified in the pipeline standards and construction specifications contained in this AIMA will be implemented in accordance with the conditions listed below.

Conditions of the AIMA

The mitigative actions specified in the construction standards and policies set forth in this document below will be implemented in accordance with the conditions listed below:

- A. All mitigative actions are subject to modification through negotiation by the Landowner and a representative of Spire, provided such changes are negotiated in advance of any construction, maintenance, or repairs.
- B. Spire may negotiate with the Landowner to carry out the mitigative actions that Landowners wish to perform themselves.
- C. All mitigative actions employed by Spire, unless otherwise specified in these construction standards and policies or in an easement negotiated with an individual Landowner, will be implemented within 45 days of completion of the pipeline facilities on any affected property, weather and Landowner permitting. Temporary repairs will be made by Spire during the construction process as needed to minimize the risk of additional property damage that may result from an extended construction time period. If weather delays the completion of any mitigative action beyond the 45 day period, Spire will provide the affected Landowner(s) with a written estimate of the time needed for completion of the mitigative action.
- D. All mitigative actions will extend to associated future construction, maintenance and repairs by Spire.
- E. Spire will provide the IDOA with one set of mailing labels of Landowners and known Tenants on agricultural land, on a county-by-county basis, who are crossed by the proposed pipeline. As the list of affected Landowners and Tenants is updated, Spire will notify the IDOA of any additions or deletions. All labels will be sent to the IDOA upon execution of this AIMA. The IDOA will use the labels for mailing this AIMA to each Landowner and Tenant. Spire shall provide postage reimbursement to the IDOA for mailing to all Landowners.

The IDOA will also provide this AIMA to the County Farm Bureau and SWCDs offices in the affected counties for the purpose of holding Landowner informational meetings.

- F. Every effort will be made by Spire to determine affected Landowners and Tenants along the route of the pipeline. Spire will endeavor to keep the Landowners and Tenants informed of the Project's status, meetings and other factors that may have an impact upon their farming operations.
- G. After construction, Spire will provide the IDOA with "as built" drawings (strip maps) showing the location of all tile lines by survey station encountered in the construction of the pipeline. The drawings and GPS tile line repair coordinates will be provided on a

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county-by-county basis for distribution by the IDOA to the respective County SWCDs for the purpose of assisting Landowners with future drainage needs.

- H. In addition, after all construction is complete, affected Landowners on agricultural land will receive a copy of the drainage tile repairs location map with GPS coordinates identified as the Project crosses their property.
- I. Prior to the construction of the pipeline, Spire shall provide each Landowner or Landowner's Designate and Tenant with a telephone number and address which can be used to contact Spire, both during and following the completion of construction, regarding the work that was performed on their property or any other construction-related matter. Spire shall respond promptly to Landowner or Landowner's Designate and/or Tenant's telephone calls and correspondence.
- J. Spire agrees to include this AIMA as part of its submissions to the FERC.
- K. Spire will request that FERC includes a statement affirming Spire's adherence to the construction standards and policies in any environmental assessment and/or environmental impact statement that may be prepared on the Project.
- L. Spire will implement all mitigative actions contained in this AIMA to the extent that they do not conflict with the requirements of applicable federal, state and local rules and regulations and other permits and approvals that are obtained by Spire for the Project.
- M. Each mitigative action contained in this AIMA will be implemented to the extent that such mitigative action is not determined to be unenforceable by reason of the mitigative actions approved by, or other requirements of, the FERC Certificate issued for the Project or other State/Federal agency with permitting authority over the Project.
- N. A forester with local expertise shall be hired by Spire to appraise the merchantable value of any timber to be cut for construction of the pipeline. The Landowner shall be compensated 100 percent of the value.
- O. Spire will use good faith efforts to consult with both Landowners and Tenants of a given property in accordance with the terms of this AIMA.
- P. Spire will incorporate by reference, the terms of this AIMA, in easement agreements executed with Landowners on Agricultural Land in Illinois. However, in the event of a conflict between this AIMA and an easement agreement, the easement agreement will control.

Definitions

Agricultural Impact Mitigation Agreement (AIMA)	The Agreement between Spire and the Illinois Department of Agriculture described herein.
Agricultural Land	Land used for cropland, hayland, pasture land, managed woodlands, truck gardens, farmsteads, commercial ag-related facilities, feedlots, livestock confinement systems, land on which farm buildings are located, and land in government set-aside programs.
Best Efforts	Diligent and commercially reasonable efforts to achieve a given objective or obligation.
Best Management Practices (BMPs)	Any structural, vegetative or managerial practice used to treat, prevent or reduce soil erosion. Such practices may include, but are not limited to, temporary seeding of exposed soils, construction of retention basins for storm water control and scheduling the implementation of all BMPs to maximize their effectiveness.
Cropland	Land used for growing row crops, small grains, or hay; includes land which was formerly used as cropland, but is currently in a government set-aside program and pastureland comprised of prime farmland.
Drainage Tile/Drain Tile	Artificial subsurface drainage system including, but not limited to, clay and concrete tile, vitrified sewer tile, corrugated plastic tubing, and stone drains.
U.S. Dept. of Energy, Federal Energy Regulatory Commission (FERC)	Federal agency that regulates the transmission and wholesale sale of electricity and natural gas in interstate commerce, and regulates the transportation of oil by pipeline in interstate commerce. FERC also reviews the siting of interstate natural gas pipelines, natural gas storage projects, and liquefied natural gas (LNG) terminals. FERC's scientific, legal, and economic experts evaluate the environmental, cultural, geological, land use, and socioeconomic aspects of the Project. As part of this review, FERC seeks written comments from the public and holds public scoping meetings (when required).
Landowner	Person(s) holding legal title to property on the pipeline route from whom Spire is seeking, or has obtained, a temporary or permanent easement, or any person(s) legally authorized by a Landowner to make decisions regarding the mitigation or restoration of agricultural impacts to such Landowner's property.

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Landowner's Designate	Any person(s) legally authorized by a Landowner to make decisions regarding the mitigation or restoration of agricultural impacts to such Landowner's property.
Non-agricultural Land	Any land that is not "Agricultural Land" as defined above.
Parent Material	The unconsolidated mineral or organic material from which the true soil develops. Parent material is located below the subsoil strata and is not a rooting or growing medium. It will be removed from the right-of-way.
Pipeline	The 24-inch diameter natural gas pipeline, related aboveground facilities and appurtenances located in Scott, Greene and Jersey Counties in Illinois, as described in Spire's application to FERC for a Certificate of Public Convenience and Necessity.
Prime Farmland	Agricultural land comprised of soils that are defined by the USDA Natural Resources Conservation Service as being "prime" soils (generally considered the most productive soils with the least input of nutrients and management).
Right-of-way	The permanent easement and temporary workspace Spire acquires and utilizes for the purpose of constructing and operating the pipeline.
Spire	Spire STL Pipeline LLC and any contractor or sub-contractor in the employ of Spire for the purpose of completing construction of the pipeline or any mitigative actions covered by this Agreement.
Spread	Each major segment of project right-of-way where pipeline construction will occur. Spread length for a particular project may vary from a few miles up to ±60 miles.
Surface Drains	Any surface drainage system such as shallow surface field drains, grassed waterways, open ditches, or any other conveyance of surface water.
Tenant	Any person lawfully residing on or leasing/renting of the land.
Topsoil	The uppermost layer of the soil that has the darkest color or the highest content of organic matter, more specifically defined as the "A" horizon. The surface layer of the soil has the darkest color or the highest content of organic matter (as defined in the USDA County Soil Survey and verified with samples as stipulated under 2.A below).

Construction Standards and Policies

1. Pipeline depth

- A. Except for aboveground piping facilities, such as mainline block valves, tap valves, meter stations, etc., the pipeline will be buried with:
 - 1. A minimum of 5 feet of top cover where it crosses cropland.
 - 2. A minimum of 5 feet of topcover where it crosses pasture land or other agricultural land comprised of soils that are classified by the USDA as being prime soils.
 - 3. A minimum of 3 feet of top cover where it crosses pasture land and other agricultural land not comprised of prime soils.
 - 4. A minimum of 3 feet of top cover where it crosses wooded/brushy land.
 - 5. Essentially the same topcover as an existing parallel pipeline, but not less than 5 feet, where the route parallels an existing pipeline within a 100 foot perpendicular offset.
- B. Notwithstanding the foregoing, in those areas where (i) rock in its natural formation and/or (ii) a continuous strata of gravel exceeding 200 feet in length are encountered, the minimum top cover will be 30 inches.
- C. When the pipeline requires weights to keep it from floating, the pipeline will be buried deep enough to maintain the depth of topcover above the weights as specified in 1.A. above.
- D. On agricultural land subject to erosion, Spire will patrol the pipeline right-of-way with reasonable frequency to detect areas of erosion of the top cover. In no instance will Spire knowingly allow the amount of top cover to be less than 36 inches as a result of natural erosion, except as stated in 1.B. above.

2. Topsoil Replacement

- A. The topsoil depth shall be determined by a properly qualified soil scientist or soil technician (or qualified Agricultural Inspector) who will set stakes or flags every 200 feet along the right-of-way identifying the depth of topsoil to be removed.
- B. The actual depth of the topsoil, not to exceed 36 inches, will first be stripped from the area to be excavated above the pipeline and from the adjacent subsoil storage area. The topsoil will be stored in a windrow parallel to the pipeline trench in such a manner that it will not become intermixed with subsoil materials.
- C. All subsoil material that is removed from the trench will be placed in a second windrow parallel to the pipeline trench that is separate from the topsoil windrow.
- D. Parent material is not rooting material and should never be spread over the right-of way. Any parent material encountered with excavation shall be separated and hauled off the right-of-way and disposed of as agreed by Spire and the Landowner.

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- E. In backfilling the trench, the stockpiled subsoil material will be placed back into the trench before replacing the topsoil.
- F. Refer to Items No. 5.A. through 5.D. for procedures pertaining to rock removal from the subsoil and topsoil.
- G. Refer to Items No. 7.A. through 7.F. for procedures pertaining to the alleviation of compaction of the topsoil.
- H. The topsoil must be replaced so that after settling occurs, the topsoil's original depth and contour (with an allowance for settling) will be restored. The same shall apply where excavations are made for road, stream, drainage ditch, or other crossings. In no instance will the topsoil materials be used for any other purpose.

3. Repair of Damaged Tile Lines

If underground drainage tile is damaged by the pipeline's construction, it will be repaired in a manner that assures the tile line's proper operation at the point of repair. The following standards and policies shall apply to the tile line repair:

- A. Spire will endeavor to locate all tile lines within the right-of-way prior to the pipeline's installation so repairs can be made if necessary. Spire will contact affected Landowners/ Tenants for their knowledge of tile line locations prior to the pipeline's installation. All identified tile lines will be staked or flagged prior to construction to alert construction crews to the possible need for tile line repairs. If previously unidentified, tile lines that are encountered and cut during grading or trenching activities will be flagged at that time.
- B. All tile lines that are damaged, cut, or removed shall be staked or flagged with the stakes or flags placed in such a manner they will remain visible until the permanent repairs are completed.
- C. If water is flowing through any damaged tile line, the tile line will be immediately and temporarily repaired until such time that permanent repairs can be made. If the tile lines are dry and water is not flowing, temporary repairs are not required if the permanent repairs can be made within 14 days of the time damage occurred; however, the exposed tile lines will be screened or otherwise protected to prevent the entry of foreign materials, small mammals, etc. into the tile lines.
- D. Where tile lines are severed by the pipeline trench, repairs shall be made using the IDOA Tile Line Repair Drawings, Temporary and Permanent, 2015 (see Figures 1 and 2) or the Tile Bridge Permanent Repair.
- E. There will be a minimum of one foot of separation (or a separation to be specified by Spire during the time of construction that may exceed, but will not be less than one foot, between the tile line and the pipeline whether the pipeline passes over or under the tile line.
- F. The original tile line alignment and gradient shall be maintained. A laser transit shall be used to ensure the proper gradient is maintained. A laser operated tiling machine shall be used to install or replace tiling segments of 100 linear feet or more.

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- G. Before completing permanent tile repairs, all tile lines will be probed or examined by other suitable means on both sides of the trench for their entire length within any work areas to check for tile that might have been damaged by vehicular traffic or construction equipment. If tile lines are found to be damaged, they must be repaired so they operate as well after construction as before the construction began.
- H. All permanent tile line repairs must be made within 14 days of the pipeline being laid in the trench on the Landowner's property, weather and soil conditions permitting.
- I. Following completion of the pipeline, Spire will be responsible for correcting all tile line repairs that fail due to pipeline construction, provided those repairs were made by Spire. Spire will not be responsible for tile line repairs that Spire pays the Landowner to perform.
- J. Spire will use good faith efforts to consult with both Landowners and Tenants of a given property as appropriate.

4. Installation of Additional Tile Lines

- A. Spire shall be responsible for installing such additional drainage tile and other drainage measures as are necessary to properly drain wet areas on the permanent and temporary easements caused by the construction and/or existence of the pipeline.
- B. Where the pipeline's route parallels an existing pipeline within a 200-foot perpendicular offset, Spire shall be responsible for installing tile and/or other drainage measures, as necessary, to properly drain the area between the two pipelines to the extent the wet areas between the pipelines are caused by the construction and/or existence of the pipeline.
- C. It is presumed that any wet areas located in permanent and temporary easements and/or between the two parallel pipelines are caused by the construction and/or existence of the new pipeline unless Spire can prove that the construction and/or existence of the new pipeline is not the cause of the wet areas.

5. Rock Removal

The following rock removal procedures only pertain to rocks found in the uppermost 42 inches of soil, the common freeze zone in Illinois.

- A. Before replacing any topsoil, all rocks greater than 3 inches in any dimension will be removed from the surface of all exposed subsoil and from all subsoil that is replaced back in the trench.
- B. As the topsoil is replaced, all rocks greater than 3 inches in any dimension will be removed from the topsoil.
- C. If trenching, blasting, or boring operations are required through rocky terrain, suitable precautions will be taken to minimize the potential for oversized rocks to become interspersed with adjacent soil material.
- D. Rocks and soil containing rocks removed from the subsoil areas, topsoil, or from any excavations, will be hauled off the Landowner's premises or disposed of on the

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Landowner's premises at a location that is mutually acceptable to the Landowner and Spire. Haul off and/or disposal locations cannot conflict with Spire's FERC Certificated workspace allowance.

6. Removal of Construction Debris

All construction-related debris and material that are not an integral part of the Project will be removed from the Landowner's property. Such material to be removed would include litter generated by the construction crews. Litter shall be removed daily.

7. Compaction, Rutting, Fertilization, Liming

- A. After the topsoil has been replaced, all areas that were traversed by vehicles and construction equipment will be ripped at least 18 inches deep and all pasture and woodland will be ripped at least 12 inches deep. The existence of tile lines or underground utilities may necessitate less depth. The entire right-of-way will then be disked. Decompaction shall be conducted according to the guideline provided in Appendices A and B.
- B. When done correctly with the proper equipment and soil conditions, ripping across any agricultural land should only take one pass. Additional passes should only be conducted if the previous pass did not sufficiently shatter the soil.
- C. All ripping and disking will be done at a time when the soil is dry enough for normal tillage operations to occur on undisturbed farmland adjacent to the areas to be ripped.
- D. Spire will restore all rutted land within the right-of-way to its original condition.
- E. The cost of applying fertilizer, manure, and/or lime will be included in the damages paid to the Landowner, thereby allowing the Landowner to apply the appropriate type and amounts of fertilizer, manure, and/or lime as needed depending on the crops contemplated and the construction schedule.
- F. If there is any dispute between the Landowner and Spire as to what areas need to be ripped, the depth at which compacted areas should be ripped, or the necessity or rates of lime and fertilizer application, the appropriate County SWCD's opinion shall be considered by Spire and the Landowner.

8. Land Leveling

- A. Following the completion of the pipeline, Spire will restore the right-of-way to its original pre-construction elevation and contour should uneven settling occur or surface drainage problems develop as a result of pipeline construction.
- B. Spire will provide the Landowners with a telephone number and address that may be used to alert Spire of the need to perform additional land leveling services.
- C. If, in the future, uneven settling occurs or surface drainage problems develop as a result of the pipeline construction, Spire will provide such land leveling services within 45 days of a Landowner's written notice, weather and soil conditions permitting or at a time agreed upon by the Landowner and Spire.

- D. If there is any dispute between the Landowner and Spire as to what areas need additional land leveling beyond that which is done at the time of construction, it shall be Spire's responsibility to disprove the Landowner's claim that additional land leveling is warranted.

9. Construction During Wet Weather

Except as provided below, construction activities are not allowed on farmland where normal farming operations, such as plowing, disking, planting or harvesting, cannot take place due to excessively wet soils. Wet weather conditions are to be determined on a field by field basis and not for the project as a whole.

- A. Construction activities on prepared surfaces, surfaces where topsoil and subsoil have been removed, heavily compacted in preparation, or otherwise stabilized (e.g. through cement mixing) may occur at the discretion of the Company in wet weather conditions.
- B. Construction activities on unprepared surfaces will be done only when work will not result in excessive rutting creating an excessive mixing of subsoil and topsoil. Determination as to the potential of subsoil and topsoil mixing will be in consultation with the underlying Landowner, or, if approved by the Landowner, his/her designated Tenant.

10. Backfill Profile and Trench Crowning

- A. In all agricultural land areas, trench crowning shall occur during the trench backfilling operation using subsoil materials over the trench to allow for trench settling, to be followed by topsoil replacement. Due to the increased elevation of the crown compared to the rest of the right-of-way, surface drainage across the trench may be hindered until the crown has settled completely.
- B. Surface drainage should not be permanently blocked or hindered in any way. If excess soil is encountered, it will be removed offsite to prevent ridging, unless the Landowner and Spire agree otherwise. Adding additional soil to the crown over the trench in excess of that required for settlement will not be permitted. In areas where minor trench settling occurs after topsoil spreading, land leveling or imported topsoil shall be used to fill each depression. In areas where major trench settling occurs after topsoil spreading, and land leveling cannot be utilized; imported topsoil shall be used to fill each depression of significant depth. Topsoil from the adjacent agricultural land outside of the construction footprint shall not be used to fill the depressions.
- C. In agricultural areas where the materials excavated during trenching are insufficient in quantity to meet backfill requirements, the soil from any agricultural land adjacent to the trench and construction zone shall not be used as either backfill or surface cover material.

Under no circumstances shall any topsoil materials be used for pipe padding material or trench backfill. In situations where imported soil materials are employed for backfill on agricultural lands, such material shall be of similar texture and quality to the existing soils on site. Imported soils should be free from noxious weeds and other pests to the extent possible.

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- D. Parent material consists of the C horizon and may or may not consist of materials similar to those from which the A and B horizons developed. It may be blue clay; it may include rocks or sand. It will not promote or support viable plant growth. Under no circumstances is this material to be placed in the trench above the pipe or spread across the easement as part of the leveling material unless agreed to by the Landowner. Parent material is to be stored separated away from the topsoil and subsoil piles. It will be removed from the right-of-way.

11. Prevention of Soil Erosion

- A. Spire will work with Landowners to prevent excessive erosion on right-of-way that has been disturbed by construction. Reasonable methods will be implemented to control erosion. This is not a requirement, however, if the land across which the pipeline is constructed is bare cropland that the Landowner intends to leave bare until the next crop is planted.
- B. If the Landowner and Spire cannot agree upon a reasonable method to control erosion on the right-of-way, the recommendations of the appropriate County SWCD shall be considered by Spire and the Landowner.

12. Repair of Damaged Soil Conservation Practices

All soil conservation practices (such as terraces, grassed waterways, etc.), which are damaged by the pipeline's construction, will be restored to reflect at least a substantially similar condition to its pre-construction condition in consultation with the local SWCD. And in accordance with USDA Natural Resources Conservation Service standards.

- A. Spire will repair or pay the Landowner to repair any soil conservation practices (such as terraces, grassed waterways, etc.), which are damaged by the pipeline's construction.
- B. If Spire is responsible for repairing any damaged soil conservation practices, the repairs will be made in accordance with the specifications of the local SWCD.
- C. The work set forth in this section will be done within 45 days, weather and Landowner permitting, after the pipeline has been constructed.

13. Damages to Private Property

- A. Spire will reasonably compensate Landowners for any construction-related damages caused by Spire that occur on or off of the established pipeline right-of-way.
- B. Compensation for damages to private property caused by Spire shall extend beyond the initial construction of the pipeline, to include those damages caused by Spire during future construction, operation, maintenance, and repairs relating to the pipeline.
- C. Spire will reimburse Landowner, on a timely basis, for all agricultural production inputs (fertilizers of all types and kinds) needed to restore crop productivity to the right-of-way, the temporary work space, or any other portion of Landowner's property where crop yields are diminished by reason of the construction, repair, maintenance and inspection activities of Spire. This shall be a continuing obligation of Spire until crop growth and vigor are similar to adjacent undisturbed portions of the same field, in accordance with Spire's crop loss payments as part of each Landowner easement

agreement. Also, Spire shall make available to Landowner the name and contact information of a person acting on behalf of Spire with whom the Landowner can communicate information with regard to diminished crop yields, and need for reimbursement of cost of agricultural inputs. That person will have a background related to soil productivity and crop production.

14. Clearing of Trees and Brush from the Easement

- A. If trees are to be removed from the right-of-way, Spire will consult with the Landowner to determine if there are trees of commercial or other value to the Landowner.
- B. If there are trees of commercial or other value to the Landowner, Spire will allow the Landowner the right to retain ownership of the trees with the disposition of the trees to be negotiated prior to the commencement of land clearing. Spire's ability to transport and/or stockpile trees will be restricted to the confines of the FERC Certificated workspace.
- C. Unless otherwise restricted by federal, state or local regulations, Spire will follow the Landowner's desires regarding the removal and disposal of trees, brush, and stumps of no value to the Landowner by burning, burial, etc., or complete removal from any affected property.

15. Interference with Irrigation Systems

- A. If the pipeline and/or temporary work areas intersect an operational (or soon to be operational) spray irrigation system, Spire will establish with the Landowner an acceptable amount of time the irrigation system may be out of service.
- B. If, as a result of pipeline construction activities, an irrigation system interruption results in crop damages, either on the pipeline right-of-way or off the right-of-way, the Landowner will be reasonably compensated for all such crop damages that are attributed to the system interruption.
- C. If it is feasible and mutually acceptable to Spire and the Landowner, temporary measures will be implemented to allow an irrigation system to continue to operate across land on which the pipeline is also being constructed.

16. Ingress and Egress Routes

Prior to the pipeline's installation, Spire and the Landowner will reach a mutually acceptable agreement on the route that will be utilized for entering and leaving the pipeline right-of-way should access to the right-of-way not be practical or feasible from adjacent segments of the pipeline right-of-way or from public highway or railroad right-of-way. Access routes on non-public travel ways will be restricted to the confines of the FERC Certificated workspace.

17. Temporary Roads

- A. The location of temporary roads to be used for construction purposes will be negotiated with the Landowner and would be restricted to the confines of the FERC Certificated workspace.

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- B. The temporary roads will be designed to not impede surface drainage and will be built to minimize soil erosion on or near the temporary roads.
- C. Upon abandonment, temporary roads may be left intact through mutual agreement of the Landowner and Spire unless otherwise restricted by federal, state, or local regulations.
- D. If the temporary roads are to be removed, the rights-of-way upon which the temporary roads are constructed will be returned to their previous use(s) and restored to equivalent condition(s) as existed prior to their construction. All temporary access roads that are removed shall be ripped to a depth of 18 inches. All ripping will be done consistent with Items 7.A. through 7.F.

18. Weed Control

- A. On any right-of-way over which Spire has jurisdiction as to its surface use, (i.e., valve sites, metering stations, etc.), Spire will provide for weed control in a manner that prevents the spread of weeds onto adjacent lands used for agricultural purposes. Spraying will be done by a pesticide applicator that is appropriately licensed for doing such work in the State of Illinois.
- B. Spire will be responsible for reimbursing all reasonable costs incurred by owners of land adjacent to surface facilities when the Landowners must control weeds on their land which can be determined to have spread from land accommodating pipeline surface facilities, should Spire fail to do so after being given written notice and a 45-day opportunity to respond.

19. Pumping of Water from Open Trenches

- A. In the event it becomes necessary to pump water from open trenches, Spire will pump the water in a manner that will avoid damaging adjacent agricultural land, crops, and/or pasture. Such damages include, but are not limited to, inundation of crops for more than 24 hours, deposition of sediment in ditches and other water courses, and the deposition of subsoil sediment and gravel in fields and pastures.
- B. If it is impossible to avoid water-related damages as described in Item 19.A. above, Spire will reasonably compensate the Landowners for the damages or will correct the damages so as to restore the land, crops, pasture, water courses, etc. to their pre-construction condition.
- C. All pumping of water shall comply with existing drainage laws, local ordinances relating to such activities, and provisions of the Clean Water Act.

20. Aboveground Facilities

Locations for aboveground facilities shall be selected in a manner so as to be as unobtrusive as reasonably possible to ongoing agricultural activities occurring on the land adjacent to the facilities. First priority shall be made to locating aboveground facilities on right-of-way that is not used as cropland. If this is not feasible, such facilities shall be located so as to incur the least hindrance to the adjacent cropping operations (i.e., located in field corners or areas where at least one side is not used for cropping purposes).

21. Advance Notice of Access to Private Property

- A. Spire will provide the Landowner or Tenant with a minimum of 24 hours prior notice before accessing his/her property for the purpose of constructing the pipeline.
- B. Prior notice shall first consist of a personal contact or a telephone contact, whereby the Landowner or Tenant is informed of Spire's intent to access the land. If the Landowner or Tenant cannot be reached in person or by telephone, Spire will mail or hand deliver to the Landowner or Tenant's home a dated, written notice of Spire's intent. The Landowner or Tenant need not acknowledge receipt of the written notice before Spire can enter the Landowner's property.

22. Reporting of Inferior Agricultural Impact Mitigation Work

No later than 45 days prior to the commencement of the pipeline construction across a Landowner's property, Spire will provide the Landowner with a toll-free number the Landowner can call to alert Spire should the Landowners observe inferior agricultural impact mitigation work which is being done or has been carried out on his/her property.

23. Indemnification

Spire will indemnify all owners and farm tenants of agricultural land upon which such pipeline is installed, their heirs, successors, legal representatives, assigns (collectively "Indemnitees"), from and against all claims by third parties losses incurred thereby, and reasonable expenses, resulting from or arising out of personal injury, death, injury to property, or other damages or liabilities of any sort related to the design, laying, maintenance, removal, repair, use or existence of such pipeline, whether heretofore or hereafter laid, including damages caused by such pipeline or any of its appurtenances and the leaking of its contents, except where claims, injuries, suits, damages, costs, losses, and expenses are caused by the negligence or intentional acts, or willful omissions of such Indemnitees and/or their invitees, including contractors, provided further that such Indemnitees shall tender any such claim as soon as possible upon receipt of notice thereof to Spire. For activities undertaken by the Indemnitees and/or invitees near the pipeline, failure by such Indemnitees and/or invitees to call the **Illinois 811, Call Before You Dig** line shall be deemed negligence if the pipeline is not clearly marked by signs.

24. General Monitoring and Remediation

This Plan establishes construction and restoration guidelines to limit adverse effects to agricultural resources and to return the affected lands to productive agricultural use with a level of production consistent with that of the lands immediately adjacent to the right-of-way. Post construction and restoration situations may occur as a result of the pipeline construction which requires further restoration or corrective activities. These areas potentially requiring further restoration or corrective activities will be brought to Spire's attention through Landowner or Tenant contacts with Spire right-of-way staff or as a result of Spire's monitoring of the pipeline right-of-way in accordance with the FERC Plan and Procedures.

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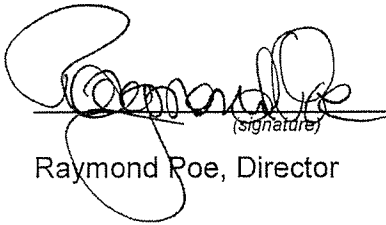
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Concurrence of the Parties to this AIMA

The Illinois Department of Agriculture and Spire STL Pipeline LLC concur that this AIMA is the complete instrument governing the mitigation of agricultural impacts that may result from the construction of the natural gas pipeline in Scott, Greene and Jersey Counties within the State of Illinois.

The effective date of this AIMA commences on the date of execution.

State of Illinois
DEPARTMENT OF AGRICULTURE


(signature)
Raymond Roe, Director

Illinois Department of Agriculture
63101 State Fairgrounds
P.O. Box 19281
Springfield, IL 62794-9281


(signature)

By Craig Sondgeroth, General Counsel

801 E. Sangamon Avenue
Springfield, IL 62702

March 15, 2017

SPIRE STL PIPELINE LLC
(signature)

Castor Armesto, General Counsel

700 Market Street
St. Louis, Missouri 63101

March 3, 2017

Appendix A.

Guidelines for Conducting Proper and Successful Decompaction

1. Decompaction is required when all three conditions apply.
 - A. the area has been trafficked or traversed by vehicles or construction equipment, and
 - B. the soil penetrometer readings are 300 psi or greater, and
 - C. The soil strength (psi) in the right-of-way area is greater than that of the non-trafficked area.
2. An Environmental and/or Agricultural Inspector (AI), with experience and training in the proper identification of compacted soil and operation methods of deep decompaction tools is required to observe the daily operation of the ripper/subsoiler to ensure the conditions are appropriate for decompaction efforts and that the proper equipment is utilized and that equipment is set-up and operated correctly.
3. To achieve the most effective shatter of the compacted soil the following guidelines have been established:
 - A. Conduct ripping when the soil is dry. Follow the "Soil Plasticity Test Procedures" detailed in Appendix B to determine if soil conditions are adequately dry to conduct decompaction efforts.
 - B. Deep ripping shall be conducted using a ripper or subsoiling tool with a shank length of no less than 18 inches and a shank spacing of approximately the same measurement as the shank length.
 - C. Use a ripper with a knife length of no less than 2 inches more than the desired depth of decompaction.
 - D. To best promote revegetation and restore crop production, a total depth of 30 or more inches of soil (topsoil plus subsoil) is required.
 - E. The minimum depths of decompaction stated above in 3.D. are required where possible. A safe distance from sub-surface structures (tile drains, pipelines, buried utilities, bedrock, etc.) must be maintained at all times. Where such structures exist, a lesser depth of decompaction will be required to prevent damage to equipment and the structures as well as to maintain a safe work environment. The allowable decompaction depth in these instances will be determined on a site by site basis.
 - F. When the knives are in the soil to the desired depth, the tongue of the ripper should be parallel to the surface of the ground.
 - G. Select a tractor that has enough horsepower to pull the ripper at a speed of 1.5 to 2 mph and whose footprint is of equal or lesser width than the ripper. Tracked equipment is preferred and typically required to achieve this criteria.
 - H. The ripper shanks should not create ruts, channels, or mixing of the sub-soil with topsoil. A speed of 1.5 to 2 mph is recommended to minimize the risk of rutting and soil mixing. The ideal operating speed can vary with soil characteristics, tractor and ripping tool used. An excessive travel speed will often increase mixing of soil horizons.
 - I. When the equipment is set up and operated correctly, the ripper should create a wave across the surface of the ground as it lifts and drops the soil.

- J. Make one ripping pass through the compacted area. Using a penetrometer, the AI will measure the PSI between the ripped knife tracks to determine if the single ripping pass was successful. Additional passes should only be used where needed as they may reduce the effectiveness of the ripping by recompacting the soil shattered in the previous pass.
- K. If the first pass does not successfully decompact the soil, additional passes will be needed. Should multiple passes of the ripper be needed to achieve decompaction between the knives tracks of the ripping tool, the subsequent passes should be positioned so the knife tracks from the previous pass are split by the second pass. If three or more passes have been made and sufficient decompaction has not yet been achieved the AI may choose to halt further decompaction efforts in that area until conditions improve or better methods are determined.
- L. Following ripping, all stone and rock three or more inches in size which has been lifted to the surface shall be collected and removed from agricultural areas.
- M. After ripping has been conducted, do not allow unnecessary traffic on the ripped area.
- N. In agricultural lands and croplands that will not be replanted to vegetation by the Company, recommend to landowners to plant a cover crop (cereal rye, clover, alfalfa, tillage radish, turnips, etc.) following decompaction. Reduced compaction created by the ripper pass will not remain over time without subsequent root penetration. Root penetration into the shattered soil is necessary to establish permanent stabilized channels to conduct air and water into the soil profile. Two good sources for landowner cover crop education are <http://www.mccc.msu.edu/CCinfo/cropbycrop.html> and <http://mcccdev.anr.msu.edu/>. For local expertise, consult with your county's Soil and Water Conservation District /USDA Natural Resource Conservation Service (NRCS) office for cover crop selection and compliance with NRCS planting deadlines.

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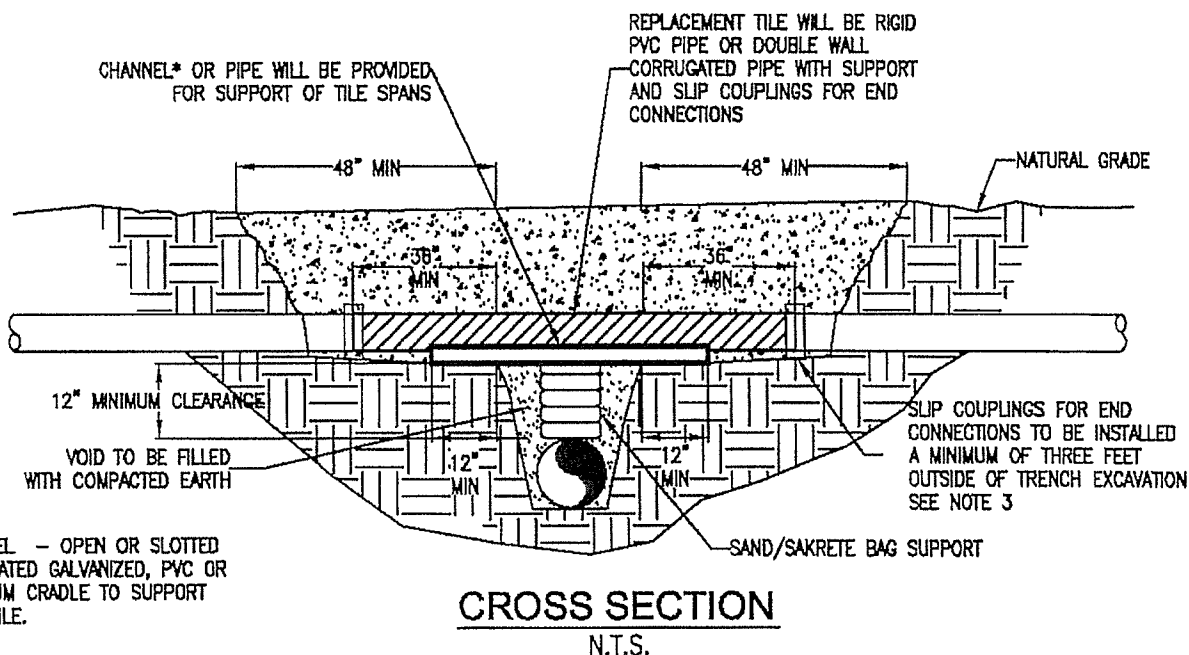
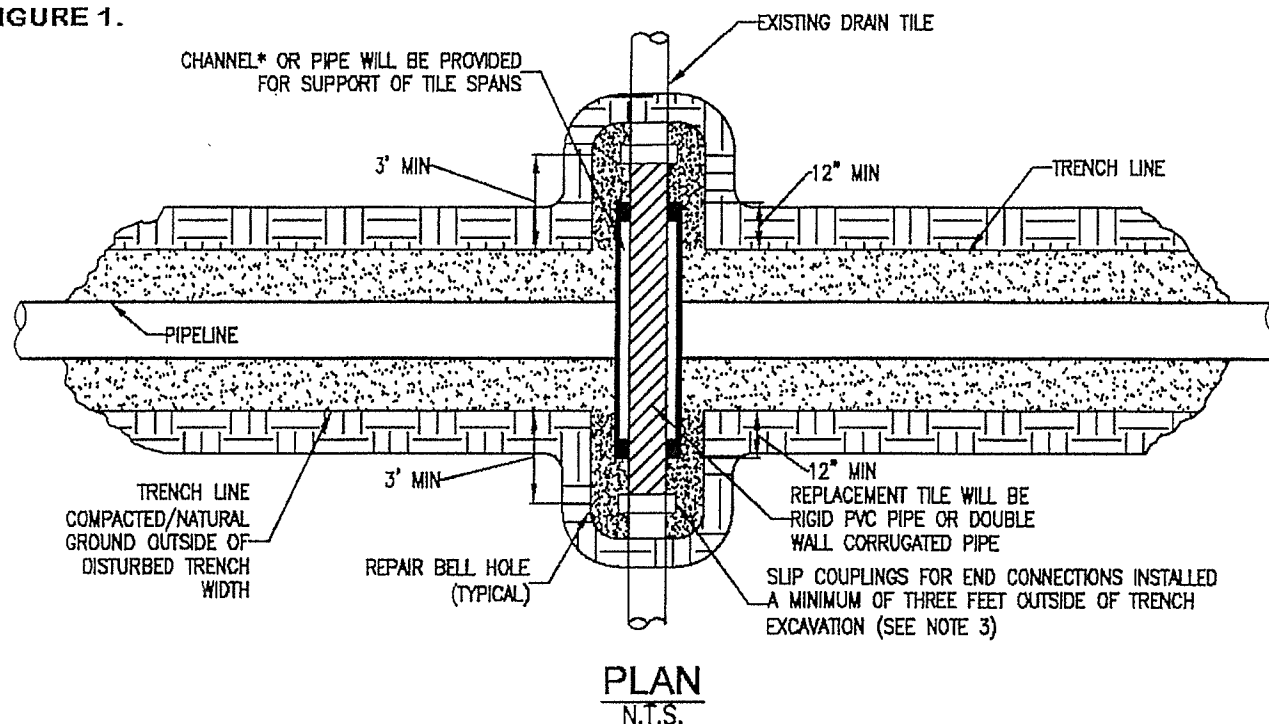
Appendix B.

Soil Plasticity Test Procedures

The Agricultural Inspector will test the consistency of the surface soil to a depth of approximately 4 to 8 inches using the Field Plasticity Test procedure developed from the *Annual Book of ASTM Standards, Plastic Limit of Soils* (ASTM D-4318).

1. Pull a soil plug from the area to be tilled, moved, or trafficked to a depth of 4-8 inches.
2. Roll a portion of the sample between the palms of the hands to form a wire with a diameter of one-eighth inch.
3. The soil consistency is:
 - A. Tillable (able to be worked) if the soil wire breaks into segments not exceeding 3/8 of an inch in length.
 - B. Plastic (not tillable) if the segments are longer than 3/8 of an inch before breaking.
4. This Procedure is to be used to aid in determining when soil conditions are dry enough for construction activities to proceed.
5. Once the soil consistency has been determined to be of adequate dryness, the plasticity test is not required again until the next precipitation event.

FIGURE 1.



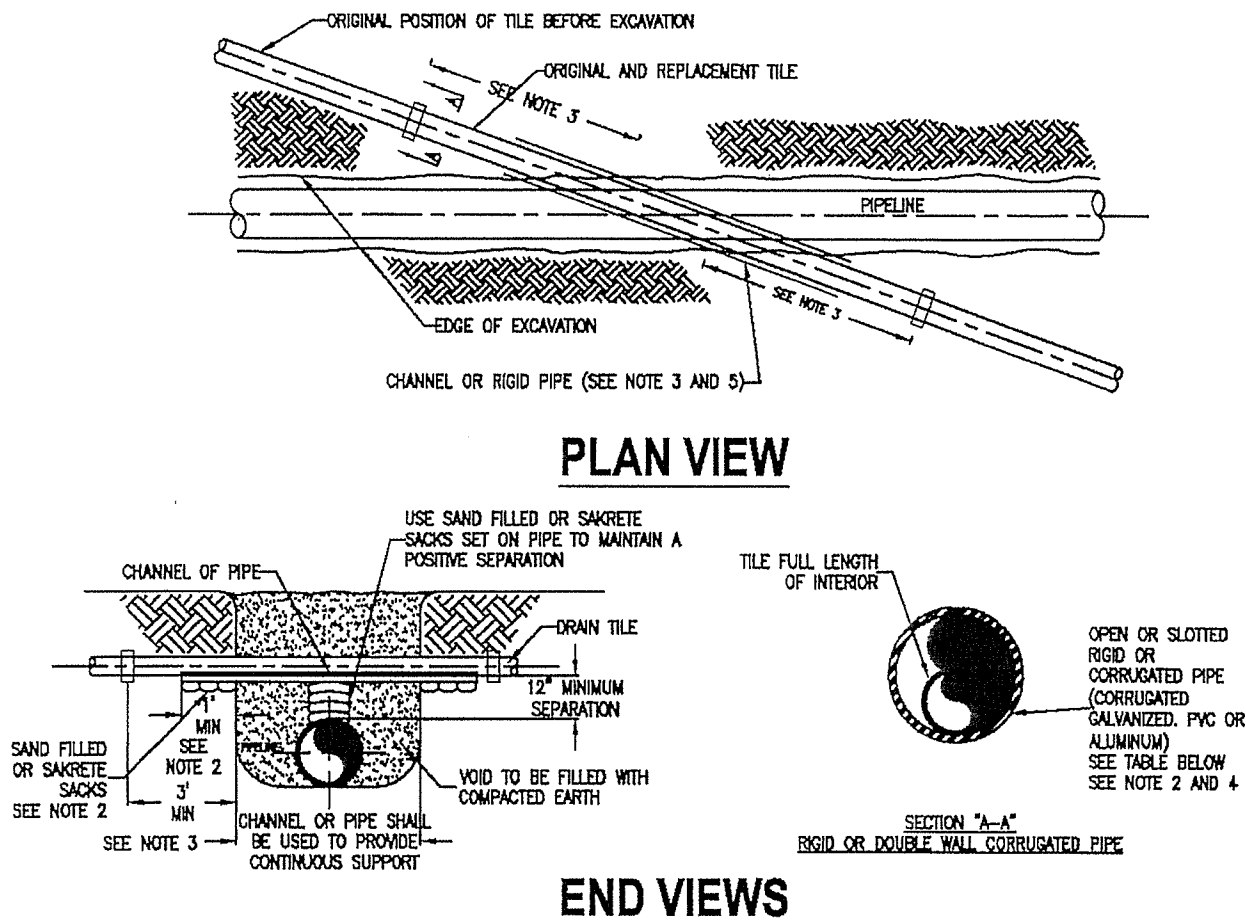
*CHANNEL - OPEN OR SLOTTED CORRUGATED GALVANIZED, PVC OR ALUMINUM CRADLE TO SUPPORT DRAIN TILE.

NOTE:

1. IMMEDIATELY REPAIR TILE IF WATER IS FLOWING THROUGH TILE AT TIME OF TRENCHING. IF NO WATER IS FLOWING AND TEMPORARY REPAIR IS DELAYED, OR NOT MADE BY THE END OF THE WORK DAY, A SCREEN OR APPROPRIATE 'NIGHT CAP' SHALL BE PLACED ON OPEN ENDS OF TILE TO PREVENT ENTRAPMENT OF ANIMALS ETC.
2. CHANNEL OR PIPE (OPEN OR SLOTTED) MADE OF CORRUGATED GALVANIZED PIPE, PVC OR ALUMINUM WILL BE USED FOR SUPPORT OF DRAIN TILE SPANS.
3. INDUSTRY STANDARDS SHALL BE FOLLOWED TO ENSURE PROPER SEAL OF REPAIRED DRAIN TILES.

TEMPORARY DRAIN TILE REPAIR

FIGURE 2.



MINIMUM SUPPORT TABLE			
TILE SIZE	CHANNEL SIZE	PIPE SIZE	
3"	4" @ 5.4 #11	4"	STD. WT.
4"-5"	5" @ 6.7 #11	6"	STD. WT.
8"-9"	7" @ 9.8 #11	9"-10"	STD. WT.
10"	10" @ 15.3 #11	12"	STD. WT.

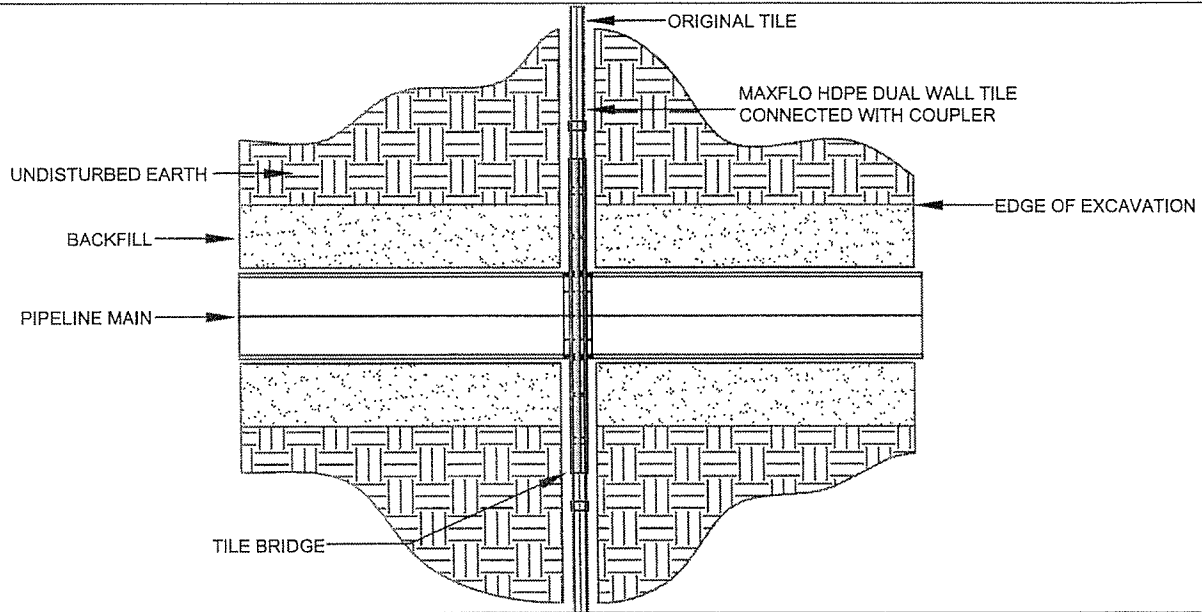
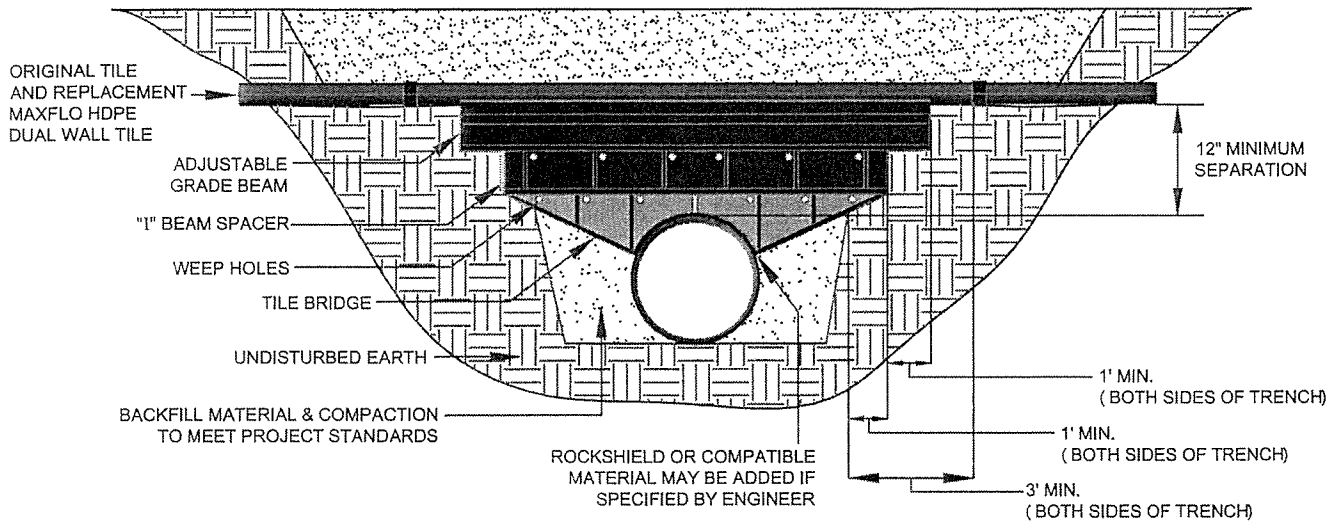
NOTE:

1. TILE REPAIR AND REPLACEMENT SHALL MAINTAIN ORIGINAL ALIGNMENT GRADIENT AND WATER FLOW TO THE GREATEST EXTENT POSSIBLE. IF THE TILE NEEDS TO BE RELOCATED, THE INSTALLATION ANGLE MAY VARY DUE TO SITE SPECIFIC CONDITIONS AND LANDOWNER RECOMMENDATIONS.
2. 1'-0" MINIMUM LENGTH OF CHANNEL OR RIGID PIPE (OPEN OR SLOTTED CORRUGATED GALVANIZED, PVC OR ALUMINUM CRADLE) SHALL BE SUPPORTED BY UNDISTURBED SOIL, OR IF CROSSING IS NOT AT RIGHT ANGLES TO PIPELINE, EQUIVALENT LENGTH PERPENDICULAR TO TRENCH. SHIM WITH SAKRETE, OR SAND BAGS TO UNDISTURBED SOIL FOR SUPPORT AND DRAINAGE GRADIENT MAINTENANCE (TYPICAL BOTH SIDES).
3. DRAIN TILES WILL BE PERMANENTLY CONNECTED TO EXISTING DRAIN TILES A MINIMUM OF THREE FEET OUTSIDE OF EXCAVATED TRENCH LINE USING INDUSTRY STANDARDS TO ENSURE PROPER SEAL OF REPAIRED DRAIN TILES INCLUDING SLIP COUPLINGS.
4. DIAMETER OF RIGID PIPE SHALL BE OF ADEQUATE SIZE TO ALLOW FOR THE INSTALLATION OF THE TILE FOR THE FULL LENGTH OF THE RIGID PIPE.
5. OTHER METHODS OF SUPPORTING DRAIN TILE MAY BE USED IF ALTERNATE PROPOSED IS EQUIVALENT IN STRENGTH TO THE CHANNEL/PIPE SECTIONS SHOWN AND IF APPROVED BY COMPANY REPRESENTATIVES AND LANDOWNER IN ADVANCE. SITE SPECIFIC ALTERNATE SUPPORT SYSTEM TO BE DEVELOPED BY COMPANY REPRESENTATIVES AND FURNISHED TO CONTRACTOR FOR SPANS IN EXCESS OF 20', TILE GREATER THEN 10" DIAMETER, AND FOR "HEADER" SYSTEMS.
6. ALL MATERIAL TO BE FURNISHED BY CONTRACTOR.
7. PRIOR TO REPAIRING TILE, CONTRACTOR SHALL PROBE Laterally INTO THE EXISTING TILE TO FULL WIDTH OF THE RIGHTS OF WAY TO DETERMINE IF ADDITIONAL DAMAGE HAS OCCURRED. ALL DAMAGED/DISTURBED TILE SHALL BE REPAIRED AS NEAR AS PRACTICABLE TO ITS ORIGINAL OR BETTER CONDITION.

PERMANENT DRAIN TILE REPAIR



TILE BRIDGE – PERMANENT TILE REPAIR



NOTES:

1. TILE REPAIR AND REPLACEMENT SHALL CROSS PERPENDICULAR TO THE PIPELINE WHILE MAINTAINING GRADIENT AND FLOW. WATER FLOW MUST BE EQUAL TO OR GREATER THAN ORIGINAL TILE CAPACITY. THE MINIMUM RECEIVING TILE SIZE REQUIRED FOR THE REPAIR SHALL BE 4" DUAL WALL WHEN CONNECTING TO 2", 3" OR 4" SINGLE WALL FIELD TILE AND 6" DUAL WALL WHEN CONNECTING TO 5" AND 6" SINGLE WALL FIELD TILE AND SO ON. ALL RECEIVING TILE SHALL BE DUAL WALL PERFORATED HDPE TUBING AND APPURTENANCES.
2. THE TILE BRIDGE SUPPORTING STRUCTURE SHALL PROVIDE A MINIMUM OF 1 LF SUPPORT INTO UNDISTURBED SOIL IN EACH TRENCH WALL. EACH ADDITIONAL SUPPORTING STRUCTURE SECTION SHALL ALSO PROVIDE A MINIMUM OF 1 LF SUPPORT INTO UNDISTURBED SOIL, INCLUDING ADJUSTABLE GRADE BEAM (WHICH INCLUDES "Y" SUPPORT STRUCTURE FOR PIPE) AND REPLACEMENT HDPE DUAL WALL. IN LOOSER, LESS STRUCTURED SOILS MORE PRONE TO SLOUGHING OFF, THESE SUPPORT DISTANCES MAY NEED TO BE INCREASED. REPLACEMENT HDPE DUAL WALL MAY BE ZIP TIED TO THE "Y" SECTION OF THE ADJUSTABLE GRADE BEAM. THE "Y" SECTION OF ADJUSTABLE GRADE BEAM SHALL SUPPORT HDPE DUAL WALL TO ASTM F449 STANDARDS. SPACER BEAMS MAY BE UTILIZED IF GREATER ELEVATION IS NEEDED BETWEEN THE TILE BRIDGE AND ADJUSTABLE GRADE BEAM TO MAINTAIN PROPER LINE AND GRADE. IF OVER DIGGING INTO THE UNDISTURBED SOIL INTENDED TO SUPPORT THE STRUCTURE OCCURS DURING INSTALLATION OF THE SUPPORTING STRUCTURE, THIS OVER DIG MAY BE FILLED WITH SAND FILLED OR SAKRETE BAGS PROVIDED THEY FIRMLY ABUT ADDITIONAL BAGS AND THE SIDEWALL OF THE TRENCH. IF THE TILE MUST BE RELOCATED, THE INSTALLATION ANGLE SHALL BE PERPENDICULAR TO THE PIPELINE DIRECTION.
3. THE DRAIN TILE REPAIR SECTION WILL BE PERMANENTLY CONNECTED TO THE EXISTING DRAIN TILE A MINIMUM OF 1 LF OUTSIDE OF THE UPPERMOST SUPPORTING STRUCTURE USING INDUSTRY STANDARDS TO ENSURE PROPER SEAL OF REPAIRED DRAIN TILES.
4. OTHER METHODS OF PERMANENT DRAIN TILE REPAIR SUPPORTS MAY BE USED IF THE PROPOSED METHOD IS OF EQUAL OR GREATER STRENGTH THAN DETAILED ABOVE. ANY ALTERNATE METHODS, INCLUDING "TIE IN" AREAS OR OTHER AREAS REQUIRING LONGER SPANS OF SUPPORT, SHALL CONTAIN ADEQUATE AND CONTINUOUS METHODS OF SUPPORT FROM UNDISTURBED TRENCH BOTTOM SOIL VERTICALLY TO THE SUPPORT STRUCTURE AND THROUGHOUT ITS LENGTH. ALTERNATE SUPPORTS SHALL BE APPROVED BY COMPANY REPRESENTATIVES AND LAND OWNERS IN ADVANCE.
5. ALL MATERIALS SHALL BE FURNISHED BY THE PROJECT OWNER AND OR CONTRACTOR.
6. PRIOR TO REPAIRING TILE, CONTRACTOR SHALL PROBE LATERALLY INTO THE EXISTING TILE THE FULL WIDTH OF THE RIGHT OF WAY TO DETERMINE IF ADDITIONAL DAMAGE HAS OCCURRED. USE OF ACCEPTED VIDEO CAMERA EQUIPMENT FOR INTERNAL INSPECTION MAY ALSO BE CONSIDERED. ALL DAMAGED/DISTURBED TILE SHALL BE REPAIRED AS NEAR AS PRACTICABLE TO ITS ORIGINAL OR BETTER CONDITION.

Exhibit K

FERC Plan



**Federal Energy
Regulatory
Commission**

**Office of
Energy Projects**

May 2013

UPLAND EROSION CONTROL, REVEGETATION, AND MAINTENANCE PLAN

Washington, DC 20426

MAY 2013 VERSION

UPLAND EROSION CONTROL, REVEGETATION, AND MAINTENANCE PLAN

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UPLAND EROSION CONTROL, REVEGETATION, AND MAINTENANCE PLAN (PLAN)

I. APPLICABILITY

- A. The intent of this Plan is to assist project sponsors by identifying baseline mitigation measures for minimizing erosion and enhancing revegetation. Project sponsors shall specify in their applications for a new FERC authorization and in prior notice and advance notice filings, any individual measures in this Plan they consider unnecessary, technically infeasible, or unsuitable due to local conditions and fully describe any alternative measures they would use. Project sponsors shall also explain how those alternative measures would achieve a comparable level of mitigation.

Once a project is authorized, project sponsors can request further changes as variances to the measures in this Plan (or the applicant's approved plan). The Director of the Office of Energy Projects (Director) will consider approval of variances upon the project sponsor's written request, if the Director agrees that a variance:

1. provides equal or better environmental protection;
2. is necessary because a portion of this Plan is infeasible or unworkable based on project-specific conditions; or
3. is specifically required in writing by another federal, state, or Native American land management agency for the portion of the project on its land or under its jurisdiction.

Sponsors of projects planned for construction under the automatic authorization provisions in the FERC's regulations must receive written approval for any variances in advance of construction.

Project-related impacts on wetland and waterbody systems are addressed in the staff's Wetland and Waterbody Construction and Mitigation Procedures (Procedures).

II. SUPERVISION AND INSPECTION

A. ENVIRONMENTAL INSPECTION

1. At least one Environmental Inspector is required for each construction spread during construction and restoration (as defined by section V). The number and experience of Environmental Inspectors assigned to each construction spread shall be appropriate for the length of the construction spread and the number/significance of resources affected.
2. Environmental Inspectors shall have peer status with all other activity inspectors.
3. Environmental Inspectors shall have the authority to stop activities that violate the environmental conditions of the FERC's Orders, stipulations of other environmental permits or approvals, or landowner easement agreements; and to order appropriate corrective action.

B. RESPONSIBILITIES OF ENVIRONMENTAL INSPECTORS

At a minimum, the Environmental Inspector(s) shall be responsible for:

1. Inspecting construction activities for compliance with the requirements of this Plan, the Procedures, the environmental conditions of the FERC's Orders, the mitigation measures proposed by the project sponsor (as approved and/or modified by the Order), other environmental permits and approvals, and environmental requirements in landowner easement agreements.
2. Identifying, documenting, and overseeing corrective actions, as necessary to bring an activity back into compliance;
3. Verifying that the limits of authorized construction work areas and locations of access roads are visibly marked before clearing, and maintained throughout construction;
4. Verifying the location of signs and highly visible flagging marking the boundaries of sensitive resource areas, waterbodies, wetlands, or areas with special requirements along the construction work area;
5. Identifying erosion/sediment control and soil stabilization needs in all areas;
6. Ensuring that the design of slope breakers will not cause erosion or direct water into sensitive environmental resource areas, including cultural resource sites, wetlands, waterbodies, and sensitive species habitats;

7. Verifying that dewatering activities are properly monitored and do not result in the deposition of sand, silt, and/or sediment into sensitive environmental resource areas, including wetlands, waterbodies, cultural resource sites, and sensitive species habitats; stopping dewatering activities if such deposition is occurring and ensuring the design of the discharge is changed to prevent reoccurrence; and verifying that dewatering structures are removed after completion of dewatering activities;
8. Ensuring that subsoil and topsoil are tested in agricultural and residential areas to measure compaction and determine the need for corrective action;
9. Advising the Chief Construction Inspector when environmental conditions (such as wet weather or frozen soils) make it advisable to restrict or delay construction activities to avoid topsoil mixing or excessive compaction;
10. Ensuring restoration of contours and topsoil;
11. Verifying that the soils imported for agricultural or residential use are certified as free of noxious weeds and soil pests, unless otherwise approved by the landowner;
12. Ensuring that erosion control devices are properly installed to prevent sediment flow into sensitive environmental resource areas (e.g., wetlands, waterbodies, cultural resource sites, and sensitive species habitats) and onto roads, and determining the need for additional erosion control devices;
13. Inspecting and ensuring the maintenance of temporary erosion control measures at least:
 - a. on a daily basis in areas of active construction or equipment operation;
 - b. on a weekly basis in areas with no construction or equipment operation; and
 - c. within 24 hours of each 0.5 inch of rainfall;
14. Ensuring the repair of all ineffective temporary erosion control measures within 24 hours of identification, or as soon as conditions allow if compliance with this time frame would result in greater environmental impacts;
15. Keeping records of compliance with the environmental conditions of the FERC's Orders, and the mitigation measures proposed by the project sponsor in the application submitted to the FERC, and other federal or state environmental permits during active construction and restoration;

16. Identifying areas that should be given special attention to ensure stabilization and restoration after the construction phase; and
17. Verifying that locations for any disposal of excess construction materials for beneficial reuse comply with section III.E.

III. PRECONSTRUCTION PLANNING

The project sponsor shall do the following before construction:

A. CONSTRUCTION WORK AREAS

1. Identify all construction work areas (e.g., construction right-of-way, extra work space areas, pipe storage and contractor yards, borrow and disposal areas, access roads) that would be needed for safe construction. The project sponsor must ensure that appropriate cultural resources and biological surveys are conducted, as determined necessary by the appropriate federal and state agencies.
2. Project sponsors are encouraged to consider expanding any required cultural resources and endangered species surveys in anticipation of the need for activities outside of authorized work areas.
3. Plan construction sequencing to limit the amount and duration of open trench sections, as necessary, to prevent excessive erosion or sediment flow into sensitive environmental resource areas.

B. DRAIN TILE AND IRRIGATION SYSTEMS

1. Attempt to locate existing drain tiles and irrigation systems.
2. Contact landowners and local soil conservation authorities to determine the locations of future drain tiles that are likely to be installed within 3 years of the authorized construction.
3. Develop procedures for constructing through drain-tiled areas, maintaining irrigation systems during construction, and repairing drain tiles and irrigation systems after construction.
4. Engage qualified drain tile specialists, as needed to conduct or monitor repairs to drain tile systems affected by construction. Use drain tile specialists from the project area, if available.

C. GRAZING DEFERMENT

Develop grazing deferment plans with willing landowners, grazing permittees, and land management agencies to minimize grazing disturbance of revegetation efforts.

D. ROAD CROSSINGS AND ACCESS POINTS

Plan for safe and accessible conditions at all roadway crossings and access points during construction and restoration.

E. DISPOSAL PLANNING

Determine methods and locations for the regular collection, containment, and disposal of excess construction materials and debris (e.g., timber, slash, mats, garbage, drill cuttings and fluids, excess rock) throughout the construction process. Disposal of materials for beneficial reuse must not result in adverse environmental impact and is subject to compliance with all applicable survey, landowner or land management agency approval, and permit requirements.

F. AGENCY COORDINATION

The project sponsor must coordinate with the appropriate local, state, and federal agencies as outlined in this Plan and/or required by the FERC's Orders.

1. Obtain written recommendations from the local soil conservation authorities or land management agencies regarding permanent erosion control and revegetation specifications.
2. Develop specific procedures in coordination with the appropriate agencies to prevent the introduction or spread of invasive species, noxious weeds, and soil pests resulting from construction and restoration activities.
3. Develop specific procedures in coordination with the appropriate agencies and landowners, as necessary, to allow for livestock and wildlife movement and protection during construction.
4. Develop specific blasting procedures in coordination with the appropriate agencies that address pre- and post-blast inspections; advanced public notification; and mitigation measures for building foundations, groundwater wells, and springs. Use appropriate methods (e.g., blasting mats) to prevent damage to nearby structures and to prevent debris from entering sensitive environmental resource areas.

G. SPILL PREVENTION AND RESPONSE PROCEDURES

The project sponsor shall develop project-specific Spill Prevention and Response Procedures, as specified in section IV of the staff's Procedures. A copy must be filed with the Secretary of the FERC (Secretary) prior to construction and made available in the field on each construction spread. The filing requirement does not apply to projects constructed under the automatic authorization provisions in the FERC's regulations.

H. RESIDENTIAL CONSTRUCTION

For all properties with residences located within 50 feet of construction work areas, project sponsors shall: avoid removal of mature trees and landscaping within the construction work area unless necessary for safe operation of construction equipment, or as specified in landowner agreements; fence the edge of the construction work area for a distance of 100 feet on either side of the residence; and restore all lawn areas and landscaping immediately following clean up operations, or as specified in landowner agreements. If seasonal or other weather conditions prevent compliance with these time frames, maintain and monitor temporary erosion controls (sediment barriers and mulch) until conditions allow completion of restoration.

I. WINTER CONSTRUCTION PLANS

If construction is planned to occur during winter weather conditions, project sponsors shall develop and file a project-specific winter construction plan with the FERC application. This filing requirement does not apply to projects constructed under the automatic authorization provisions of the FERC's regulations.

The plan shall address:

1. winter construction procedures (e.g., snow handling and removal, access road construction and maintenance, soil handling under saturated or frozen conditions, topsoil stripping);
2. stabilization and monitoring procedures if ground conditions will delay restoration until the following spring (e.g., mulching and erosion controls, inspection and reporting, stormwater control during spring thaw conditions); and
3. final restoration procedures (e.g., subsidence and compaction repair, topsoil replacement, seeding).

IV. INSTALLATION

A. APPROVED AREAS OF DISTURBANCE

1. Project-related ground disturbance shall be limited to the construction right-of-way, extra work space areas, pipe storage yards, borrow and disposal areas, access roads, and other areas approved in the FERC's Orders. Any project-related ground disturbing activities outside these areas will require prior Director approval. This requirement does not apply to activities needed to comply with the Plan and Procedures (i.e., slope breakers, energy-dissipating devices, dewatering structures, drain tile system repairs) or minor field realignments and workspace shifts per landowner needs and requirements that do not affect other landowners or sensitive environmental resource areas. All construction or restoration activities outside of authorized areas are subject to all applicable survey and permit requirements, and landowner easement agreements.
2. The construction right-of-way width for a project shall not exceed 75 feet or that described in the FERC application unless otherwise modified by a FERC Order. However, in limited, non-wetland areas, this construction right-of-way width may be expanded by up to 25 feet without Director approval to accommodate full construction right-of-way topsoil segregation and to ensure safe construction where topographic conditions (e.g., side-slopes) or soil limitations require it. Twenty-five feet of extra construction right-of-way width may also be used in limited, non-wetland or non-forested areas for truck turn-arounds where no reasonable alternative access exists.

Project use of these additional limited areas is subject to landowner or land management agency approval and compliance with all applicable survey and permit requirements. When additional areas are used, each one shall be identified and the need explained in the weekly or biweekly construction reports to the FERC, if required. The following material shall be included in the reports:

- a. the location of each additional area by station number and reference to previously filed alignment sheets, or updated alignment sheets showing the additional areas;
- b. identification of the filing at FERC containing evidence that the additional areas were previously surveyed; and

- c. a statement that landowner approval has been obtained and is available in project files.

Prior written approval of the Director is required when the authorized construction right-of-way width would be expanded by more than 25 feet.

B. TOPSOIL SEGREGATION

1. Unless the landowner or land management agency specifically approves otherwise, prevent the mixing of topsoil with subsoil by stripping topsoil from either the full work area or from the trench and subsoil storage area (ditch plus spoil side method) in:
 - a. cultivated or rotated croplands, and managed pastures;
 - b. residential areas;
 - c. hayfields; and
 - d. other areas at the landowner's or land managing agency's request.
2. In residential areas, importation of topsoil is an acceptable alternative to topsoil segregation.
3. Where topsoil segregation is required, the project sponsor must:
 - a. segregate at least 12 inches of topsoil in deep soils (more than 12 inches of topsoil); and
 - b. make every effort to segregate the entire topsoil layer in soils with less than 12 inches of topsoil.
4. Maintain separation of salvaged topsoil and subsoil throughout all construction activities.
5. Segregated topsoil may not be used for padding the pipe, constructing temporary slope breakers or trench plugs, improving or maintaining roads, or as a fill material.
6. Stabilize topsoil piles and minimize loss due to wind and water erosion with use of sediment barriers, mulch, temporary seeding, tackifiers, or functional equivalents, where necessary.

C. DRAIN TILES

1. Mark locations of drain tiles damaged during construction.
2. Probe all drainage tile systems within the area of disturbance to check for damage.
3. Repair damaged drain tiles to their original or better condition. Do not use filter-covered drain tiles unless the local soil conservation authorities and the landowner agree. Use qualified specialists for testing and repairs.
4. For new pipelines in areas where drain tiles exist or are planned, ensure that the depth of cover over the pipeline is sufficient to avoid interference with drain tile systems. For adjacent pipeline loops in agricultural areas, install the new pipeline with at least the same depth of cover as the existing pipeline(s).

D. IRRIGATION

Maintain water flow in crop irrigation systems, unless shutoff is coordinated with affected parties.

E. ROAD CROSSINGS AND ACCESS POINTS

1. Maintain safe and accessible conditions at all road crossings and access points during construction.
2. If crushed stone access pads are used in residential or agricultural areas, place the stone on synthetic fabric to facilitate removal.
3. Minimize the use of tracked equipment on public roadways. Remove any soil or gravel spilled or tracked onto roadways daily or more frequent as necessary to maintain safe road conditions. Repair any damages to roadway surfaces, shoulders, and bar ditches.

F. TEMPORARY EROSION CONTROL

Install temporary erosion controls immediately after initial disturbance of the soil. Temporary erosion controls must be properly maintained throughout construction (on a daily basis) and reinstalled as necessary (such as after backfilling of the trench) until replaced by permanent erosion controls or restoration is complete.

1. Temporary Slope Breakers
 - a. Temporary slope breakers are intended to reduce runoff velocity and divert water off the construction right-of-way. Temporary slope

breakers may be constructed of materials such as soil, silt fence, staked hay or straw bales, or sand bags.

- b. Install temporary slope breakers on all disturbed areas, as necessary to avoid excessive erosion. Temporary slope breakers must be installed on slopes greater than 5 percent where the base of the slope is less than 50 feet from waterbody, wetland, and road crossings at the following spacing (closer spacing shall be used if necessary):

<u>Slope (%)</u>	<u>Spacing (feet)</u>
5 - 15	300
>15 - 30	200
>30	100

- c. Direct the outfall of each temporary slope breaker to a stable, well vegetated area or construct an energy-dissipating device at the end of the slope breaker and off the construction right-of-way.
- d. Position the outfall of each temporary slope breaker to prevent sediment discharge into wetlands, waterbodies, or other sensitive environmental resource areas.

2. Temporary Trench Plugs

Temporary trench plugs are intended to segment a continuous open trench prior to backfill.

- a. Temporary trench plugs may consist of unexcavated portions of the trench, compacted subsoil, sandbags, or some functional equivalent.
- b. Position temporary trench plugs, as necessary, to reduce trenchline erosion and minimize the volume and velocity of trench water flow at the base of slopes.

3. Sediment Barriers

Sediment barriers are intended to stop the flow of sediments and to prevent the deposition of sediments beyond approved workspaces or into sensitive resources.

- a. Sediment barriers may be constructed of materials such as silt fence, staked hay or straw bales, compacted earth (e.g., driveable berms across travelways), sand bags, or other appropriate materials.

- b. At a minimum, install and maintain temporary sediment barriers across the entire construction right-of-way at the base of slopes greater than 5 percent where the base of the slope is less than 50 feet from a waterbody, wetland, or road crossing until revegetation is successful as defined in this Plan. Leave adequate room between the base of the slope and the sediment barrier to accommodate ponding of water and sediment deposition.
 - c. Where wetlands or waterbodies are adjacent to and downslope of construction work areas, install sediment barriers along the edge of these areas, as necessary to prevent sediment flow into the wetland or waterbody.
4. Mulch
- a. Apply mulch on all slopes (except in cultivated cropland) concurrent with or immediately after seeding, where necessary to stabilize the soil surface and to reduce wind and water erosion. Spread mulch uniformly over the area to cover at least 75 percent of the ground surface at a rate of 2 tons/acre of straw or its equivalent, unless the local soil conservation authority, landowner, or land managing agency approves otherwise in writing.
 - b. Mulch can consist of weed-free straw or hay, wood fiber hydromulch, erosion control fabric, or some functional equivalent.
 - c. Mulch all disturbed upland areas (except cultivated cropland) before seeding if:
 - (1) final grading and installation of permanent erosion control measures will not be completed in an area within 20 days after the trench in that area is backfilled (10 days in residential areas), as required in section V.A.1; or
 - (2) construction or restoration activity is interrupted for extended periods, such as when seeding cannot be completed due to seeding period restrictions.
 - d. If mulching before seeding, increase mulch application on all slopes within 100 feet of waterbodies and wetlands to a rate of 3 tons/acre of straw or equivalent.
 - e. If wood chips are used as mulch, do not use more than 1 ton/acre and add the equivalent of 11 lbs/acre available nitrogen (at least 50 percent of which is slow release).

- f. Ensure that mulch is adequately anchored to minimize loss due to wind and water.
- g. When anchoring with liquid mulch binders, use rates recommended by the manufacturer. Do not use liquid mulch binders within 100 feet of wetlands or waterbodies, except where the product is certified environmentally non-toxic by the appropriate state or federal agency or independent standards-setting organization.
- h. Do not use synthetic monofilament mesh/netted erosion control materials in areas designated as sensitive wildlife habitat, unless the product is specifically designed to minimize harm to wildlife. Anchor erosion control fabric with staples or other appropriate devices.

V. RESTORATION

A. CLEANUP

1. Commence cleanup operations immediately following backfill operations. Complete final grading, topsoil replacement, and installation of permanent erosion control structures within 20 days after backfilling the trench (10 days in residential areas). If seasonal or other weather conditions prevent compliance with these time frames, maintain temporary erosion controls (i.e., temporary slope breakers, sediment barriers, and mulch) until conditions allow completion of cleanup.

If construction or restoration unexpectedly continues into the winter season when conditions could delay successful decompaction, topsoil replacement, or seeding until the following spring, file with the Secretary for the review and written approval of the Director, a winter construction plan (as specified in section III.I). This filing requirement does not apply to projects constructed under the automatic authorization provisions of the FERC's regulations.

2. A travel lane may be left open temporarily to allow access by construction traffic if the temporary erosion control structures are installed as specified in section IV.F. and inspected and maintained as specified in sections II.B.12 through 14. When access is no longer required the travel lane must be removed and the right-of-way restored.
3. Rock excavated from the trench may be used to backfill the trench only to the top of the existing bedrock profile. Rock that is not returned to the trench shall be considered construction debris, unless approved for use as mulch or for some other use on the construction work areas by the landowner or land managing agency.

4. Remove excess rock from at least the top 12 inches of soil in all cultivated or rotated cropland, managed pastures, hayfields, and residential areas, as well as other areas at the landowner's request. The size, density, and distribution of rock on the construction work area shall be similar to adjacent areas not disturbed by construction. The landowner or land management agency may approve other provisions in writing.
5. Grade the construction right-of-way to restore pre-construction contours and leave the soil in the proper condition for planting.
6. Remove construction debris from all construction work areas unless the landowner or land managing agency approves leaving materials onsite for beneficial reuse, stabilization, or habitat restoration.
7. Remove temporary sediment barriers when replaced by permanent erosion control measures or when revegetation is successful.

B. PERMANENT EROSION CONTROL DEVICES

1. Trench Breakers
 - a. Trench breakers are intended to slow the flow of subsurface water along the trench. Trench breakers may be constructed of materials such as sand bags or polyurethane foam. Do not use topsoil in trench breakers.
 - b. An engineer or similarly qualified professional shall determine the need for and spacing of trench breakers. Otherwise, trench breakers shall be installed at the same spacing as and upslope of permanent slope breakers.
 - c. In agricultural fields and residential areas where slope breakers are not typically required, install trench breakers at the same spacing as if permanent slope breakers were required.
 - d. At a minimum, install a trench breaker at the base of slopes greater than 5 percent where the base of the slope is less than 50 feet from a waterbody or wetland and where needed to avoid draining a waterbody or wetland. Install trench breakers at wetland boundaries, as specified in the Procedures. Do not install trench breakers within a wetland.

2. Permanent Slope Breakers

- a. Permanent slope breakers are intended to reduce runoff velocity, divert water off the construction right-of-way, and prevent sediment deposition into sensitive resources. Permanent slope breakers may be constructed of materials such as soil, stone, or some functional equivalent.
- b. Construct and maintain permanent slope breakers in all areas, except cultivated areas and lawns, unless requested by the landowner, using spacing recommendations obtained from the local soil conservation authority or land managing agency.

In the absence of written recommendations, use the following spacing unless closer spacing is necessary to avoid excessive erosion on the construction right-of-way:

<u>Slope (%)</u>	<u>Spacing (feet)</u>
5 - 15	300
>15 - 30	200
>30	100

- c. Construct slope breakers to divert surface flow to a stable area without causing water to pool or erode behind the breaker. In the absence of a stable area, construct appropriate energy-dissipating devices at the end of the breaker.
- d. Slope breakers may extend slightly (about 4 feet) beyond the edge of the construction right-of-way to effectively drain water off the disturbed area. Where slope breakers extend beyond the edge of the construction right-of-way, they are subject to compliance with all applicable survey requirements.

C. SOIL COMPACTION MITIGATION

1. Test topsoil and subsoil for compaction at regular intervals in agricultural and residential areas disturbed by construction activities. Conduct tests on the same soil type under similar moisture conditions in undisturbed areas to approximate preconstruction conditions. Use penetrometers or other appropriate devices to conduct tests.
2. Plow severely compacted agricultural areas with a paraplow or other deep tillage implement. In areas where topsoil has been segregated, plow the subsoil before replacing the segregated topsoil.

If subsequent construction and cleanup activities result in further compaction, conduct additional tilling.

3. Perform appropriate soil compaction mitigation in severely compacted residential areas.

D. REVEGETATION

1. General

- a. The project sponsor is responsible for ensuring successful revegetation of soils disturbed by project-related activities, except as noted in section V.D.1.b.
- b. Restore all turf, ornamental shrubs, and specialized landscaping in accordance with the landowner's request, or compensate the landowner. Restoration work must be performed by personnel familiar with local horticultural and turf establishment practices.

2. Soil Additives

Fertilize and add soil pH modifiers in accordance with written recommendations obtained from the local soil conservation authority, land management agencies, or landowner. Incorporate recommended soil pH modifier and fertilizer into the top 2 inches of soil as soon as practicable after application.

3. Seeding Requirements

- a. Prepare a seedbed in disturbed areas to a depth of 3 to 4 inches using appropriate equipment to provide a firm seedbed. When hydroseeding, scarify the seedbed to facilitate lodging and germination of seed.
- b. Seed disturbed areas in accordance with written recommendations for seed mixes, rates, and dates obtained from the local soil conservation authority or the request of the landowner or land management agency. Seeding is not required in cultivated croplands unless requested by the landowner.
- c. Perform seeding of permanent vegetation within the recommended seeding dates. If seeding cannot be done within those dates, use appropriate temporary erosion control measures discussed in section IV.F and perform seeding of permanent vegetation at the beginning of the next recommended seeding season. Dormant seeding or temporary

seeding of annual species may also be used, if necessary, to establish cover, as approved by the Environmental Inspector. Lawns may be seeded on a schedule established with the landowner.

- d. In the absence of written recommendations from the local soil conservation authorities, seed all disturbed soils within 6 working days of final grading, weather and soil conditions permitting, subject to the specifications in section V.D.3.a through V.D.3.c.
- e. Base seeding rates on Pure Live Seed. Use seed within 12 months of seed testing.
- f. Treat legume seed with an inoculant specific to the species using the manufacturer's recommended rate of inoculant appropriate for the seeding method (broadcast, drill, or hydro).
- g. In the absence of written recommendations from the local soil conservation authorities, landowner, or land managing agency to the contrary, a seed drill equipped with a cultipacker is preferred for seed application.

Broadcast or hydroseeding can be used in lieu of drilling at double the recommended seeding rates. Where seed is broadcast, firm the seedbed with a cultipacker or roller after seeding. In rocky soils or where site conditions may limit the effectiveness of this equipment, other alternatives may be appropriate (e.g., use of a chain drag) to lightly cover seed after application, as approved by the Environmental Inspector.

VI. OFF-ROAD VEHICLE CONTROL

To each owner or manager of forested lands, offer to install and maintain measures to control unauthorized vehicle access to the right-of-way. These measures may include:

- A. signs;
- B. fences with locking gates;
- C. slash and timber barriers, pipe barriers, or a line of boulders across the right-of-way; and
- D. conifers or other appropriate trees or shrubs across the right-of-way.

VII. POST-CONSTRUCTION ACTIVITIES AND REPORTING

A. MONITORING AND MAINTENANCE

1. Conduct follow-up inspections of all disturbed areas, as necessary, to determine the success of revegetation and address landowner concerns. At a minimum, conduct inspections after the first and second growing seasons.
2. Revegetation in non-agricultural areas shall be considered successful if upon visual survey the density and cover of non-nuisance vegetation are similar in density and cover to adjacent undisturbed lands. In agricultural areas, revegetation shall be considered successful when upon visual survey, crop growth and vigor are similar to adjacent undisturbed portions of the same field, unless the easement agreement specifies otherwise.

Continue revegetation efforts until revegetation is successful.

3. Monitor and correct problems with drainage and irrigation systems resulting from pipeline construction in agricultural areas until restoration is successful.
4. Restoration shall be considered successful if the right-of-way surface condition is similar to adjacent undisturbed lands, construction debris is removed (unless otherwise approved by the landowner or land managing agency per section V.A.6), revegetation is successful, and proper drainage has been restored.
5. Routine vegetation mowing or clearing over the full width of the permanent right-of-way in uplands shall not be done more frequently than every 3 years. However, to facilitate periodic corrosion/leak surveys, a corridor not exceeding 10 feet in width centered on the pipeline may be cleared at a frequency necessary to maintain the 10-foot corridor in an herbaceous state. In no case shall routine vegetation mowing or clearing occur during the migratory bird nesting season between April 15 and August 1 of any year unless specifically approved in writing by the responsible land management agency or the U.S. Fish and Wildlife Service.
6. Efforts to control unauthorized off-road vehicle use, in cooperation with the landowner, shall continue throughout the life of the project. Maintain signs, gates, and permanent access roads as necessary.

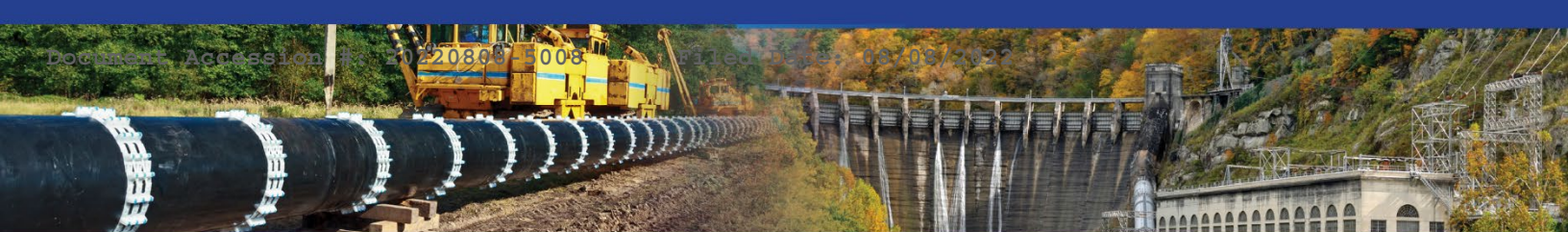
B. REPORTING

1. The project sponsor shall maintain records that identify by milepost:
 - a. method of application, application rate, and type of fertilizer, pH modifying agent, seed, and mulch used;
 - b. acreage treated;
 - c. dates of backfilling and seeding;
 - d. names of landowners requesting special seeding treatment and a description of the follow-up actions;
 - e. the location of any subsurface drainage repairs or improvements made during restoration; and
 - f. any problem areas and how they were addressed.
2. The project sponsor shall file with the Secretary quarterly activity reports documenting the results of follow-up inspections required by section VII.A.1; any problem areas, including those identified by the landowner; and corrective actions taken for at least 2 years following construction.

The requirement to file quarterly activity reports with the Secretary does not apply to projects constructed under the automatic authorization, prior notice, or advanced notice provisions in the FERC's regulations.

Exhibit L

FERC Strategic Plan Fiscal Years 2022 - 2026



Federal Energy Regulatory Commission

STRATEGIC PLAN

Fiscal Years 2022-2026

March 28, 2022
Chairman Richard Glick



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Message from the Chairman

America's energy landscape is undergoing profound change. The development of, and demand for, cleaner electricity is rapidly reshaping the resource mix. This requires us to consider how to ensure the reliable delivery of affordable electricity. This includes putting in place and enforcing market rules and regulations to ensure that competition works for the benefit of consumers everywhere. In addition, the increased attention paid to how we generate, transport, and consume energy provides an opportunity to ensure that the process by which we plan and permit necessary energy infrastructure is open, inclusive, and performed with an eye to the future.



At the same time, our energy infrastructure is facing unprecedented threats. Extreme weather caused by climate change—including more dangerous wildfires, hurricanes, droughts, as well as severe heat and cold—threatens our ability to reliably deliver energy, often when it is needed most. Similarly, the threat of cyberattacks on energy infrastructure is growing.

The Federal Energy Regulatory Commission has an important role to play in enabling the United States to benefit from the changes taking place while mitigating the threats. In this Strategic Plan, I outline the Commission's role and the priorities on which we must focus. I am privileged to work with the Commission's superb and diligent staff to pursue these priorities.

Richard Glick

Chairman

Federal Energy Regulatory Commission

Introduction

The Federal Energy Regulatory Commission (FERC, or the Commission) is an independent agency that regulates the transmission and wholesale sale of electricity and natural gas in interstate commerce, as well as the transportation of oil by pipelines in interstate commerce. FERC also reviews proposals to build interstate natural gas pipelines, natural gas storage projects, and liquefied natural gas (LNG) terminals. FERC licenses non-federal hydropower projects. Congress assigned these responsibilities to FERC in various laws, including the Federal Power Act, enacted 100 years ago, the Public Utility Regulatory Policies Act of 1978, the Natural Gas Act, the Natural Gas Policy Act of 1978, and the Interstate Commerce Act. More recently, as part of the Energy Policy Act of 2005, Congress gave FERC additional responsibilities: to protect the reliability and cybersecurity of the Bulk-Power System through the establishment and enforcement of mandatory reliability standards, as well as additional authority to enforce FERC regulatory requirements through the imposition of civil penalties and other means.

While the Commission has many statutory responsibilities, there are areas outside its responsibilities which fall to other federal agencies or state public utility commissions. Examples are outlined below.

WHAT FERC DOES	WHAT FERC DOES NOT DO
Regulates the transmission and wholesale sale of electricity in interstate commerce	Regulate retail electricity and natural gas sales to consumers
Reviews certain mergers and acquisitions and corporate transactions by electricity companies	Approve physical construction of electric generation facilities
Regulates the transmission and sale of natural gas for resale in interstate commerce	Regulate activities of the municipal power systems, federal power marketing agencies, and most rural electric cooperatives
Regulates the transportation of oil by pipelines in interstate commerce	Regulate nuclear power plants
Approves the siting and abandonment of interstate natural gas pipelines and storage facilities	Issue State Water Quality Certificates
Reviews the siting application for electric transmission projects under limited circumstances	Oversee the construction of oil pipelines
Assesses the safe operation and reliability of proposed and operating LNG terminals	Oversee abandonment of service as related to oil facilities
Licenses and inspects private, municipal, and state hydroelectric projects	Regulate mergers and acquisitions as related to natural gas and oil companies
Protects the reliability of the high voltage interstate transmission system through mandatory reliability standards	Exercise responsibility for pipeline transportation on or across the Outer Continental Shelf or for pipeline safety
Monitors and investigates energy markets	Regulate local distribution pipelines of natural gas
Enforces FERC regulatory requirements through imposition of civil penalties and other means	Oversee development and operation of natural gas vehicles
Oversees environmental matters related to natural gas and hydroelectricity projects and other matters	Address reliability problems related to failures of local distribution facilities
Administers accounting and financial reporting regulations and conduct of regulated companies	Regulate tree trimmings near local distribution power lines in residential neighborhoods

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Guiding Principles

Organizational Excellence: The Commission strives to use its resources efficiently and effectively to achieve its strategic priorities.

Due Process and Transparency: Paramount in all its proceedings is the Commission's determination to be open and fair to all participants.

Regulatory Certainty: In each of the thousands of orders, opinions, and reports issued by the Commission each year, the Commission strives to provide regulatory certainty through consistent approaches and actions.

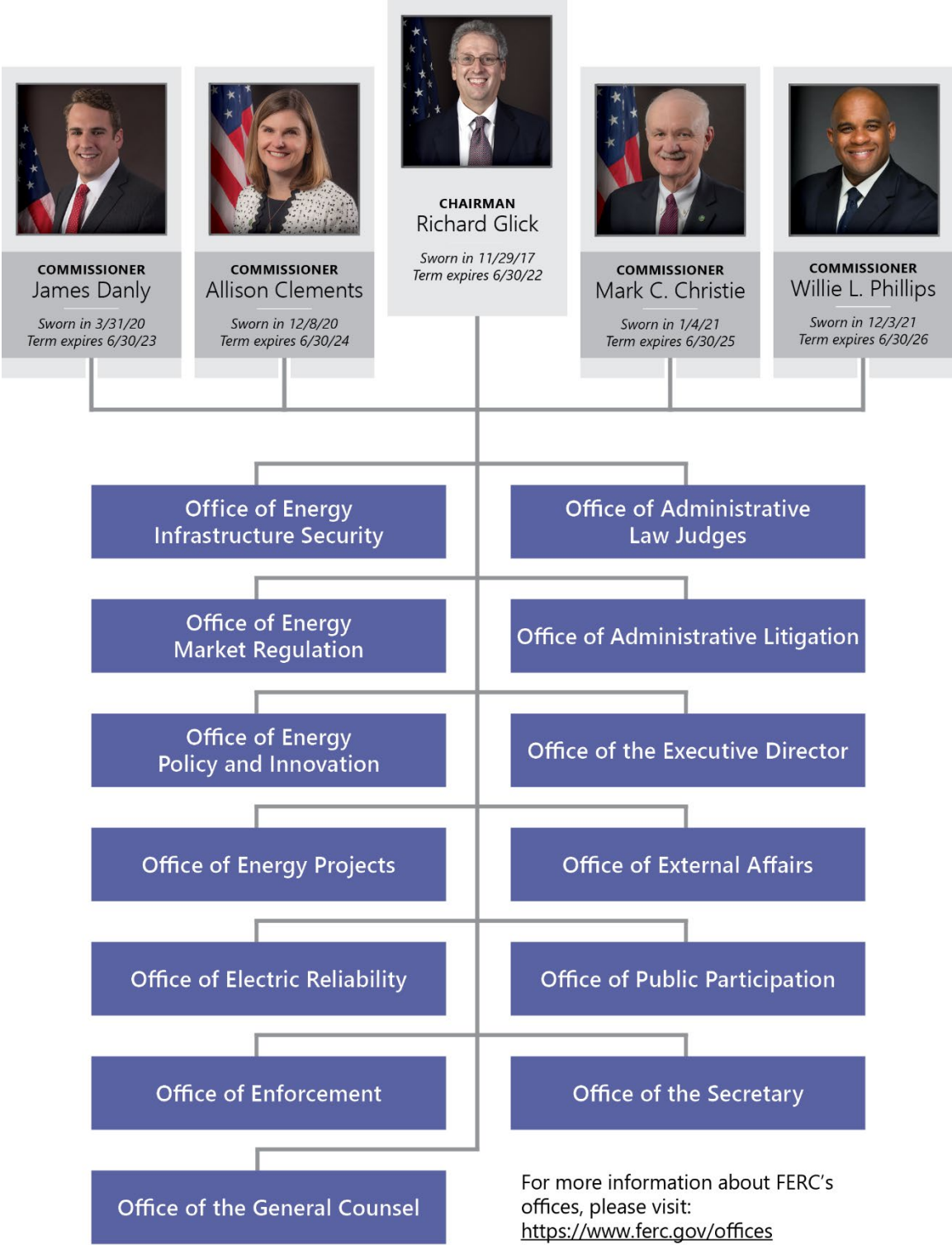
Stakeholder Involvement: The Commission conducts regular outreach to ensure that interested parties have an appropriate opportunity to contribute to the performance of the Commission's responsibilities.

Timeliness: The Commission's goal is to reach an appropriate resolution of each proceeding in an expeditious manner.

The Organization

FERC is composed of up to five commissioners who are appointed by the President of the United States with the advice and consent of the Senate. Commissioners serve staggered five-year terms and have an equal vote on the orders through which FERC acts. The President appoints one of the commissioners to be the chairman of FERC, the administrative head of the agency. FERC is a bipartisan body; no more than three commissioners may be of the same political party. To carry out its authorities, the Commission has approximately 1,500 staff members that are organized into 13 offices. Commission staff is located primarily in the Washington, D.C. region, with several field offices across the country.

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
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About This Document

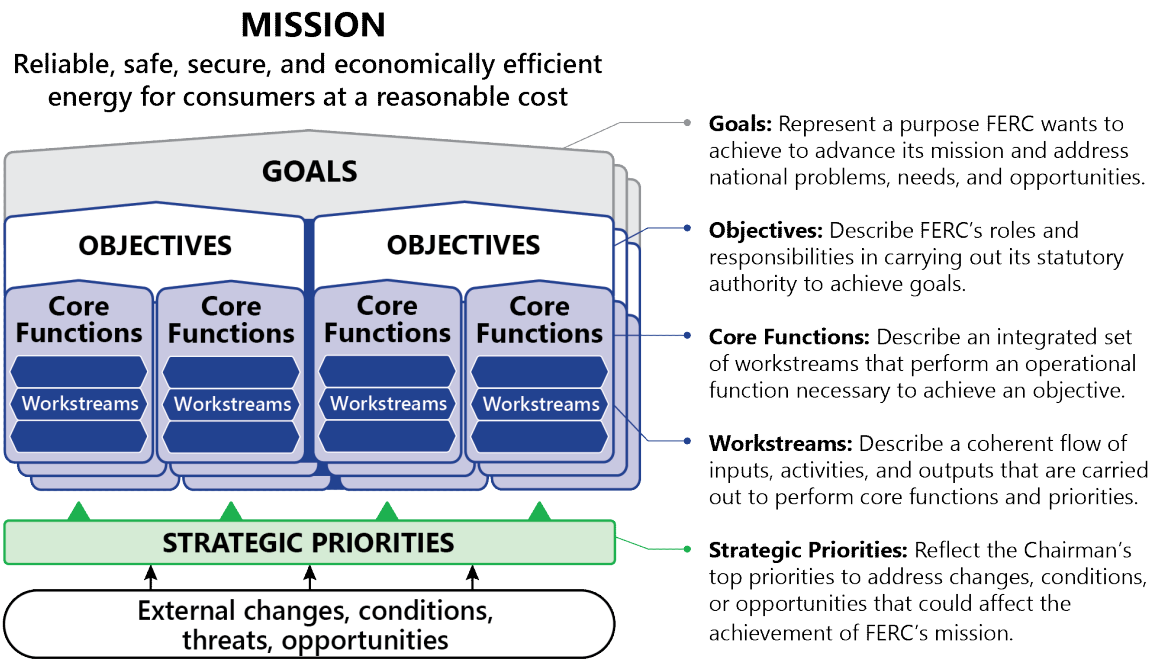
Document Purpose

The GPRA Modernization Act of 2010 requires every Federal agency to produce a new Strategic Plan at the beginning of each new term of an Administration. The Strategic Plan defines the agency mission, long-term goals, objectives to achieve those goals, strategies planned to address specific national problems, needs, challenges, and opportunities related to its mission.

The purpose of FERC’s Strategic Plan is to:

- Communicate to employees, Congress, and the public a direction for the future, addressing challenges affecting the mission.
- Provide a framework describing FERC’s mission and scope of responsibilities, including statutory authorities.
- Provide employees with alignment to the mission and support collaboration across organizational units toward common results.
- Inform decision-making about resource requests, the need for major new acquisitions, information technology, and strategic human capital planning.

As a regulatory agency, the foundation of FERC’s Strategic Plan is rooted in its federal mandates under various laws and statutes. The plan also demonstrates FERC’s responsiveness to external changes and conditions. The figure depicts how the elements of FERC’s strategic framework work together to achieve the mission.



How to Navigate this Document

This document first presents the Strategic Priorities, each of which is linked to a particular objective. It is then organized according to the strategic framework to allow the reader to understand how FERC accomplishes its work within each Goal. Use the navigation links at the bottom of each page and in headings throughout the document to jump between sections quickly and easily.

Strategic Framework

Mission

Reliable, Safe, Secure, and Economically Efficient Energy for Consumers at a Reasonable Cost

Assist consumers in obtaining reliable, safe, secure, and economically efficient energy services at a reasonable cost through appropriate regulatory and market means, and collaborative efforts.

Goal 1: Ensure Just and Reasonable Rates, Terms, and Conditions

OBJECTIVE 1.1: Establish and apply FERC rules and policies that will result in just, reasonable, and not unduly discriminatory or preferential rates, terms, and conditions of jurisdictional service.

● **STRATEGIC PRIORITY:** Modernizing Electric Market Design

● **STRATEGIC PRIORITY:** Facilitating the Development of the Electricity Infrastructure Needed for the Changing Resource Mix

CORE FUNCTION 1.1.1: Determine whether FERC rules and policies need to be added or changed.

Workstream: Evaluate Policies and Pursue Changes to Regulations Where Necessary

Workstream: Conduct Outreach and Information Sharing

CORE FUNCTION 1.1.2: Analyze and act on filings in a fair, clear, and timely manner.

Workstream: Analyze and Act on Filings

Workstream: Conduct Settlement Judge Procedures

Workstream: Conduct Hearing Procedures

OBJECTIVE 1.2: Promote compliance with FERC rules, including by detecting and deterring market manipulation.

● **STRATEGIC PRIORITY:** Promoting a Strong and Robust Enforcement Program

CORE FUNCTION 1.2.1: Assess compliance and financial filings of regulated entities.

Workstream: Conduct Compliance, Operational, Financial, and Other Audits

Workstream: Establish Accounting Policies and Analyze Financial Filings

Workstream: Assess, Analyze, and Administer Electric, Natural Gas, and Oil Forms

CORE FUNCTION 1.2.2: Monitor market activity and explore potential violations.

Workstream: Conduct Surveillance of Natural Gas and Electric Markets

Workstream: Conduct Investigations

Workstream: Conduct Enforcement Proceedings

Goal 2: Ensure Safe, Reliable, and Secure Infrastructure Consistent With the Public Interest

OBJECTIVE 2.1: Facilitate benefits to the nation through the review of energy infrastructure proposals, including natural gas and hydropower.

● **STRATEGIC PRIORITY:** Improving the Siting and Review Process for Interstate Gas Pipelines, LNG Facilities, and Hydroelectric Projects

CORE FUNCTION 2.1.1: Conduct thorough and timely technical review of applications to construct, operate, or modify natural gas and hydropower infrastructure.

Workstream: Review Applications for Interstate Natural Gas Pipeline, Storage, and LNG Projects

Workstream: Review Applications for Hydropower Projects

CORE FUNCTION 2.1.2: Assess compliance with environmental mitigation conditions in FERC orders during construction and operation of natural gas and hydropower infrastructure.

Workstream: Conduct Natural Gas Pipeline, Storage, and LNG Project Inspections/Reviews

Workstream: Conduct Hydropower Project Inspections/Reviews

OBJECTIVE 2.2: Minimize risks to the public associated with FERC-jurisdictional energy infrastructure.

● **STRATEGIC PRIORITY:** Safeguarding Electric Infrastructure from Emerging Threats to Reliability and Security

CORE FUNCTION 2.2.1: Conduct comprehensive and timely inspections of hydropower and LNG facilities to ensure compliance.

Workstream: Conduct LNG Facility Inspections

Workstream: Conduct Hydropower Facility Inspections

CORE FUNCTION 2.2.2: Protect and improve the reliable and secure operation of the Bulk-Power System through mandatory and enforceable reliability standards.

Workstream: Monitor Bulk-Power System Performance and Assess the Need for Modified/New Reliability Standards

Workstream: Review and Approve Proposed Reliability Standards

Workstream: Oversee the ERO and the Enforcement of Reliability Standards

CORE FUNCTION 2.2.3: Protect FERC-jurisdictional energy infrastructure through collaboration and sharing best practices.

Workstream: Collaborate With the Critical Infrastructure Community to Inform and Address Infrastructure Security

Workstream: Identify and Assess Threats and Vulnerabilities in Critical Energy Infrastructure

Goal 3: Provide Mission Support Through Organizational Excellence

OBJECTIVE 3.1: Manage resources effectively through an engaged workforce.

CORE FUNCTION 3.1.1: Maintain processes and provide compliant services that enable FERC offices to manage resources effectively and efficiently.

Workstream: Design and Implement Effective Internal Control and Accountability Systems

Workstream: Manage FERC's Finance, Accounting, and Acquisition Requirements

Workstream: Design and Implement Human Capital Strategies to Attract a Diverse and Effective Workforce

Workstream: Maintain a Secure and Reliable IT Infrastructure

Workstream: Maintain the Safety, Security, and Resilience of FERC Operations

CORE FUNCTION 3.1.2: Provide tools and services that enable employees to perform their jobs effectively and drive FERC's success.

Workstream: Protect Employees and Provide a Safe Workplace

Workstream: Provide Technical Support to Employees

Workstream: Develop and Engage Employees

OBJECTIVE 3.2: Facilitate trust and understanding of FERC activities by promoting transparency and equity, open communication, and a high standard of ethics.

● **STRATEGIC PRIORITY:** Improving Accessibility and Participation in Proceedings

CORE FUNCTION 3.2.1: Maintain legal and other processes in accordance with the principles of due process, fairness, and integrity.

Workstream: Provide Ethical and Legal Support and Analysis Regarding FERC's Operational Functions

Workstream: Provide Legal Guidance and Representation to FERC on Rehearing and Appeal of Commission Issuances

Workstream: Provide Guidance to the Commission on Matters Involving Environmental Justice and Equity

CORE FUNCTION 3.2.2: Promote understanding, participation, and engagement.

Workstream: Educate, Inform, and Engage

Workstream: Provide Outreach and Assistance on Individual Proceedings

Workstream: Maintain and Provide Public Information Systems and Services to Facilitate Public Engagement

Workstream: Coordinate Intervenor Funding

Strategic Priorities

The Commission has established the following six strategic priorities. The description that follows each strategic priority has four parts. The **Overview** identifies a significant external change, condition, or trend that FERC has assessed as an opportunity, threat, problem, or issue that is likely to affect the achievement of its mission and therefore must be addressed through the execution of its regulatory authority. The **Rationale for FERC's Involvement** describes why FERC can and should address the priority based on FERC's authority, capabilities, and/or core functions. **FERC's Activities and Their Expected Impact** describe the expected outcome (i.e., improvement/benefit achieved, or difficulty/disaster avoided) that FERC anticipates from addressing this priority. Finally, the **Link to Relevant Objective** indicates the objective to which the priority aligns and includes a link to that objective within the strategic plan. For each priority, the Commission has established a performance goal with a milestone-based performance indicator. Progress made on performance goals will be reported annually in the Congressional Justification.

- Modernizing Electricity Market Design
- Facilitating the Development of the Electricity Infrastructure Needed for the Changing Resource Mix
- Promoting a Strong and Robust Enforcement Program
- Improving the Siting and Review Process for Interstate Gas Pipelines, LNG Facilities, and Hydroelectric Projects
- Safeguarding Electric Infrastructure from Emerging Threats to Reliability and Security
- Improving Accessibility and Participation in Proceedings

● Priority: Modernizing Electricity Market Design

Overview

The organized wholesale electric markets (i.e., capacity, energy, and ancillary services markets) operated by Regional Transmission Organizations/Independent System Operators (RTOs/ISOs) need to be modernized to maintain their ability to serve wholesale electric customers efficiently and reliably in the future. The system resource mix is evolving to include more variable energy resources such as wind, solar, and battery storage. Customer demand or load is also expected to change due to increases in distributed energy resources, electrification, and other technology developments.

Together, the expected changes to the resource mix and load profiles will create new operational needs that markets are not currently designed to address. Increased operational flexibility will be

INTRO	PRIORITIES			GOAL 1			GOAL 2			GOAL 3			APPENDICES
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	Obj 1.2 >	CF 1.2.1	CF 1.2.2	Obj 2.2 >	CF 2.2.1	CF 2.2.2	CF 2.2.3	Obj 3.2 >	CF 3.2.1	CF 3.2.2			

necessary to help address these changing system needs. Given the time it takes to identify, refine, and implement market design reforms, it is imperative that the Commission proactively examine and identify necessary reforms to existing markets to ensure that the market operators (RTOs/ISOs) can procure new grid services, operate more flexibly, and send appropriate price signals to reflect the needs of the modern electric grid.

Rationale for FERC’s Involvement

A core component of the Commission’s mission is to ensure that the rates, terms, and conditions of jurisdictional service are just, reasonable, and not unduly discriminatory or preferential. Where appropriate, FERC leverages competitive market forces to promote efficiency for customers, including in organized wholesale electric markets. FERC has exclusive jurisdiction over wholesale electric market rules and the energy, ancillary services, and capacity prices determined in those markets. Therefore, the Commission oversees organized wholesale electric markets to ensure that they continue to provide efficient and reliable electric service to customers.

Changes to the modern electricity sector may necessitate that the Commission examine whether existing markets, as designed, enable market operators to procure new grid services needed to deliver electricity efficiently and reliably. Commission staff members have a comprehensive understanding of the complexities of wholesale electric market design, as well as the economic, engineering, policy, and legal expertise to evaluate reforms proposed by stakeholders, including market operators. In addition, this expertise equips the Commission to proactively engage in independent research, outreach, and analysis to propose reforms to existing markets to reflect the needs of the modern electric grid.

FERC’s Activities and Their Expected Impact

FERC intends to conduct an examination of the existing organized wholesale electric markets to determine whether reforms are necessary to meet the needs of the modern electric grid. The Commission will engage stakeholders, including market operators, resource owners, customer groups, governmental entities, industry experts, the Department of Energy National Labs, academia, and others to identify reforms that ensure existing markets provide appropriate incentives to resources for the operational capabilities that market operators need to serve customers efficiently and reliably. The Commission will also identify potential reforms to existing market rules that facilitate the integration of new and emerging technologies, such as battery storage, hybrid and co-located resources, and aggregated distributed energy resources, to allow these resources to offer their full capabilities and value to these markets. Based on an evaluation of filings submitted to the Commission under sections 205 or 206 of the Federal Power Act, or a targeted inquiry or generic rulemaking under section 206, the Commission will determine whether broader reforms are needed to modernize organized wholesale electric markets. The Commission expects that its efforts to address this priority will ensure that these markets continue to provide efficient and reliable service to customers amid the emerging transformation of the electricity sector.

Link to Relevant Objective

This Priority aligns to: Objective 1.1: Establish and apply FERC rules and policies that will result in just, reasonable, and not unduly discriminatory or preferential rates, terms, and conditions of jurisdictional service.

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
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● **Priority:** Facilitating the Development of the Electricity Infrastructure Needed for the Changing Resource Mix

Overview

The electricity sector is rapidly transforming. The energy resource mix increasingly includes new resources with characteristics that differ from the resources that have traditionally provided the majority of the nation's electricity supply. For example, the generation fleet is shifting from resources located close to population centers toward resources, such as wind and solar, that often produce electricity most efficiently in areas located far from where that electricity will be used. The rapid growth in demand for such resources also is creating delays and other challenges for new resources seeking to be interconnected to the electric grid. A large amount of additional electric transmission infrastructure is needed to address these issues and facilitate the participation of these new resources in wholesale electric markets efficiently, while maintaining the reliability of the electric grid. A more efficient, cost-effective, and reliable electric grid benefits all. Furthermore, the transforming electric grid can help to relieve communities that currently shoulder disparate energy burdens.

Rationale for FERC's Involvement

The Commission is responsible under the Federal Power Act for ensuring that rates, terms, and conditions of service for the transmission of electricity in interstate commerce are just, reasonable, and not unduly discriminatory or preferential. Fulfilling that responsibility involves careful attention to the processes by which utilities plan new electric transmission infrastructure and by which the costs of those facilities are allocated to transmission rates. Amid the rapid transformation of the electricity sector and the corresponding need for development of a large amount of additional electric transmission infrastructure, it is all the more important for the Commission to ensure that its rules and policies promote not only the continued reliability of the electric grid, but also planning that identifies more efficient and cost-effective new transmission infrastructure and allocates its costs roughly commensurate with its benefits. Additionally, while primary authority to approve and site electric transmission facilities continues to remain with the states, Congress recently expanded the Commission's authority to approve and site electric transmission facilities under certain circumstances. The Commission is responsible for implementing this new siting authority which will include consideration of stakeholder and community interests.

FERC's Activities and Their Expected Impact

The Commission expects to implement a series of reforms that will facilitate the development of new electric transmission infrastructure needed for a more reliable and resilient grid that can accommodate the rapidly changing resource mix. These expected reforms include changes to regional transmission planning and cost allocation and interregional coordination processes, as well as the interconnection queue process. Overall, the Commission expects that its reforms will accommodate the evolution of the electric grid more efficiently and cost effectively.

INTRO	PRIORITIES			GOAL 1			GOAL 2			GOAL 3			APPENDICES
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	Obj 1.2 >	CF 1.2.1	CF 1.2.2	Obj 2.2 >	CF 2.2.1	CF 2.2.2	CF 2.2.3	Obj 3.2 >	CF 3.2.1	CF 3.2.2			

Building upon the relationships that it has developed, the Commission will also engage with state partners as it considers potential reforms, helping it to identify and address potential barriers to transmission development. The Commission expects its reforms to facilitate the development of transmission infrastructure needed to meet the changing needs of the electricity system and to ensure that rates for Commission-jurisdictional services are just and reasonable.

Link to Relevant Objective

This Priority aligns to: Objective 1.1: Establish and apply FERC rules and policies that will result in just, reasonable, and not unduly discriminatory or preferential rates, terms, and conditions of jurisdictional service.

● **Priority: Promoting a Strong and Robust Enforcement Program**

Overview

Recently, energy markets have become increasingly complex due to, among other things, changes in the topography of energy resources and the emergence of new participants. These changes have led to new compliance challenges and reinforced the need for a rigorous and robust enforcement program. Vigilant monitoring and oversight, combined with timely actions against manipulative activity, including the imposition of civil penalties, are necessary to stay ahead of those changes and effectively detect and deter market manipulation and anticompetitive conduct that threatens the integrity of energy markets. Left unchecked, such behavior harms consumers and other stakeholders, results in inaccurate prices and unreliable price-setting mechanisms and interferes with market operations. It also causes entities participating in, benefiting from, or affected by energy markets to lose confidence that those markets are functioning fairly and producing results consistent with market rules and fundamentals.

Strong oversight and enforcement are also a priority for infrastructure projects and the Bulk-Power System. Commission-imposed requirements in pipeline certificates of public convenience and necessity and hydropower licenses must be met to ensure that infrastructure projects minimize adverse effects on the environment, landowners, and communities, including the most vulnerable communities, such as environmental justice communities, which tend to be minority and low-income populations that bear a disproportionate share of the adverse impacts of energy infrastructure project development. Similarly, failure to comply with the mandatory reliability standards for the Bulk-Power System approved by the Commission can jeopardize electric reliability and cause significant harm.

Rationale for FERC’s Involvement

The Federal Power Act and the Natural Gas Act, along with other statutory authorities, give FERC oversight and enforcement responsibilities that focus on increasing compliance of regulated entities and detecting and deterring market manipulation and other market violations. In

INTRO	PRIORITIES	GOAL 1			GOAL 2			GOAL 3			APPENDICES
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	Obj 1.2 >	CF 1.2.1	CF 1.2.2	Obj 2.2 >	CF 2.2.1	CF 2.2.2	CF 2.2.3	Obj 3.2 >	CF 3.2.1	CF 3.2.2	

particular, the Energy Policy Act of 2005 increased both the Commission’s responsibilities and its civil penalty authority. FERC collects and has access to high quality, relevant, and timely data, which it uses to conduct market surveillance to detect potential market violations and take proactive steps to reduce the probability that violations will occur. FERC also obtains information about potential violations through an Enforcement Hotline, referrals from ISOs/RTOs and their market monitoring units, referrals from other program offices within the Commission, self-reports, whistleblowers, and information gathered in other investigations. FERC analyzes this information to identify potential violations of applicable laws, the Commission’s regulations, or market rules, to conduct investigations, and, when appropriate, to exercise FERC’s civil penalty authority to discourage violations.

FERC’s authority, along with its surveillance, information gathering, and analytic capabilities, enable it to exercise vigilance and detect emerging compliance issues and make sure that its policies, procedures, and guidance are sufficient to inform industry action.

FERC’s Activities and Their Expected Impact

FERC expects to maintain an enforcement program that promotes compliance and deters market misconduct. Maintaining a strong and robust enforcement program will benefit energy markets by increasing the transparency of market information and enhancing market confidence. A robust enforcement program also ensures that infrastructure development is conducted in accordance with Commission regulations, rules, and orders, and that the electric grid is reliable and secure.

Link to Relevant Objective

This Priority aligns to: [Objective 1.2](#): *Promote compliance with FERC rules, including by detecting and deterring market manipulation.*

● **Priority:** Improving the Siting and Review Process for Interstate Gas Pipelines, LNG Facilities, and Hydroelectric Projects

Overview

Since the issuance of the Commission’s Certificate Policy Statement in 1999, the Commission has seen significant changes in the way the nation produces, transports, and uses natural gas. Those changes have contributed to an increase in proposals before the Commission for siting of natural gas infrastructure.

The same time period has also seen increasing threats to our nation’s energy infrastructure due to climate change as well as growing concerns of adverse impacts to environmental justice communities. Great strides have been made in understanding how the production, transportation, and consumption of natural gas, and the corresponding release of greenhouse gas emissions,

INTRO	PRIORITIES			GOAL 1			GOAL 2			GOAL 3			APPENDICES
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	Obj 1.2 >	CF 1.2.1	CF 1.2.2	Obj 2.2 >	CF 2.2.1	CF 2.2.2	CF 2.2.3	Obj 3.2 >	CF 3.2.1	CF 3.2.2			

contribute to the adverse effects caused by climate change. In addition, stakeholders in the Commission’s natural gas infrastructure certification proceedings increasingly have commented that energy and industrial infrastructure presents various health and safety risks that disproportionately burden environmental justice communities, which often already are affected by adverse health, economic conditions, and other factors. More recently, Executive Orders have conveyed a commitment to considering the greenhouse gas emission impacts of federal permitting decisions and to addressing equity and environmental justice implications of agency actions related to underserved communities.

Meanwhile, the Commission expects that between FYs 2021 and 2031, about 340 relicense applications will be filed, constituting one-third of all active Commission-issued licenses. The Commission will need to prepare for this volume of applications while maintaining its commitment to the timely review of hydroelectric license applications.

Rationale for FERC’s Involvement

Section 7 of the Natural Gas Act requires the Commission to issue certificates authorizing the construction and operation of facilities for the transportation and storage of natural gas in interstate commerce to the extent the Commission finds such construction and operation is, or will be, required by the present or future public convenience and necessity. Section 3 of the Natural Gas Act provides that the Commission shall approve applications for the siting, construction, expansion, and operation of LNG terminals unless it finds that such approval will not be consistent with the public interest. Under both sections 3 and 7 of the Natural Gas Act, Congress vested authority in the Commission to make a record-based determination and to decide the appropriate balance between the benefits and need for the project relative to the project’s adverse impacts, including environmental impacts (based on the Commission’s findings under the National Environmental Policy Act [NEPA]), impacts on landowners and communities, including environmental justice communities.

In recent years, federal appeals courts have found the Commission’s examination of greenhouse gas emissions and analyses of environmental justice impacts related to proposed natural gas infrastructure to be insufficient. Given these court decisions, the Commission must improve its consideration of these issues, consistent with its statutory authority and obligations.

Under the Federal Power Act, the Commission’s hydroelectric responsibilities include licensing, relicensing, and surrender and decommissioning. The Commission’s review under NEPA must ensure transparency for stakeholders regarding the potential environmental impacts and required mitigation measures for hydropower projects. In executing these responsibilities, the Commission plays an important coordination role with its federal agency partners to meet anticipated timelines for review and analysis. The Commission also maintains an enduring safety responsibility over all licensed hydroelectric facilities.

FERC’s Activities and Their Expected Impact

The Commission anticipates that a revised analytical framework will help ensure that its evaluation of potential impacts of proposed natural gas infrastructure will help protect the public from undue adverse impacts of such infrastructure. A revised analytical framework will help the Commission better ensure that the records compiled in its natural gas infrastructure proceedings are

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	Obj 1.2 > CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2		

sufficiently robust on all factors implicating the public interest. These include issues of need for a proposed project; potential environmental impacts, including climate change; and impacts on landowners and the public, including environmental justice communities, as well as mitigation of adverse impacts. A revised analytical framework also will support well-reasoned and more durable Commission decisions and promote regulatory certainty and reduced litigation.

In anticipation of the large number of relicense applications, the Commission will continue to coordinate with federal agency partners during the environmental review process to ensure timely processing. Additionally, in consultation with the hydroelectric industry and its stakeholders, the Commission will consider financial assurance requirements for licensees, which would be included in licensing, amendment, and transfer proceedings, as the Commission executes its dam safety responsibilities.

Link to Relevant Objective

This Priority aligns to: [Objective 2.1](#): *Facilitate benefits to the nation through the review of energy infrastructure proposals, including natural gas and hydropower.*

● **Priority:** Safeguarding Electric Infrastructure from Emerging Threats to Reliability and Security

Overview

Increasingly, extreme weather events and climate change pose a distinct and serious threat to the electric grid. In recent years, extreme weather events—such as prolonged record cold, heat waves, drought, and wildfires—have led to extended power outages affecting millions of Americans. The intensity, geographic extent, duration, and severity of these weather-induced events and impacts may increase over the next five years. These events and impacts cause severe economic impacts and can literally be a matter of life and death. Customers that are already vulnerable, such as low-income communities, communities of color, and Native communities, often suffer some of the worst effects.

In addition, the electric grid is increasingly facing advanced, persistent, and rapidly evolving cybersecurity threats. Cyberattacks have the potential to cause widespread disruption of electric service, which can threaten national security and endanger the health, safety, and economic well-being of millions of people. Cybersecurity threats originate from a variety of new and quickly emerging sources, including supply chain compromises, insider attacks, destructive malware, ransomware campaigns, and internet-of-things vulnerabilities.

Rationale for FERC’s Involvement

The Commission, in coordination with the North American Electric Reliability Corporation (NERC), plays an important role in ensuring the reliability of the electric grid. Under section 215 of the Federal Power Act, the Commission requires owners, operators, and users of the Bulk-Power

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	Obj 1.2 >	CF 1.2.1	CF 1.2.2	Obj 2.2 >	CF 2.2.1	CF 2.2.2	CF 2.2.3	Obj 3.2 >	CF 3.2.1	CF 3.2.2			

System to meet reliability standards. These standards include Operations and Planning reliability standards and Critical Infrastructure Protection reliability standards, among others. The Commission also fosters partnerships that allow it to work collaboratively with other federal agencies, states, and regulated entities to identify and promote best practices. This two-pronged approach of employing mandatory reliability standards, while also working collaboratively with stakeholders, enables the Commission to both establish foundational practices and alert industry to best practices in light of emerging threats.

FERC's Activities and Their Expected Impact

To address this priority and ensure the reliability of the electric grid, the Commission expects to evaluate and undertake measures to address the threats to grid reliability from both extreme weather and climate change, and from cyberattacks. For example, to address threats from extreme weather and climate change, the Commission is considering whether revisions to reliability standards to ensure the adoption of additional grid planning and operation practices to improve grid performance during extreme weather events are necessary. Commission efforts to address cybersecurity threats will be directed toward closing current security gaps, improving the probability of early attack detection, and helping to mitigate future threats. Overall, the Commission anticipates that its actions will serve to mitigate or avoid the adverse effects of widespread and extended power outages that may result from extreme weather, climate change, and cybersecurity threats. Such actions will help to protect all, including those communities which are most vulnerable.

Link to Relevant Objective

This Priority aligns to: Objective 2.2: *Minimize risks to the public associated with FERC-jurisdictional energy infrastructure.*

● Priority: Improving Accessibility and Participation in Proceedings

Overview

In recent years, FERC has seen increased interest in, and desire to, participate in Commission proceedings. Concurrently, there has been a growing need for assistance and support to ensure an opportunity and ability to access and participate in Commission proceedings. In FY 2021, the Commission took several steps in support of this priority.

First, the Commission established the Office of Public Participation (OPP). To develop OPP in a manner that would best serve the public, the Commission held numerous listening sessions, hosted a full-day workshop attended by the Commissioners, and reviewed written comments from affected members of the public and others interested in the Commission's decision-making processes. Commenters indicated that many members of the public lack the necessary resources to participate in Commission proceedings or do not understand how the Commission's actions may affect them until after intervention or comment deadlines have passed, diminishing their

INTRO	PRIORITIES			GOAL 1			GOAL 2			GOAL 3			APPENDICES
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	Obj 1.2 >	CF 1.2.1	CF 1.2.2	Obj 2.2 >	CF 2.2.1	CF 2.2.2	CF 2.2.3	Obj 3.2 >	CF 3.2.1	CF 3.2.2			

ability to meaningfully participate in those proceedings. Commenters also urged the Commission to make information about its actions and processes more accessible to the public through improved outreach, educational materials targeted at audiences that are less familiar with the Commission or have less technical knowledge, and communications in multiple languages.

Second, the Commission took steps, through its Office of External Affairs, to assess and improve Tribal government consultation and engagement practices. This effort recognizes the importance of feedback from Tribal Nations and a growing interest by Tribes to engage in Commission proceedings on a variety of matters.

Finally, as part of the Commission's initial steps in assessing how it can integrate environmental justice and equity considerations into Commission processes and decision-making, the Commission began bringing an equity lens to its work, to see how FERC can remove barriers to participation by members of the public who are underserved, such as environmental justice communities. It is essential to hear from communities who are unduly burdened and may be affected by Commission actions, to help meaningfully inform the Commission's way forward, consistent with environmental justice and equity.

Rationale for FERC's Involvement

Section 319 of the Federal Power Act directed the Commission to establish OPP to "coordinate assistance to the public with respect to authorities exercised by the Commission," including assistance to those intervening or seeking to intervene in Commission proceedings. Section 319 also allows the Commission, under rules it promulgates, to provide funding to compensate "any person whose intervention or participation substantially contributed to the approval, in whole or in part, of a position advocated by such person" (16 U.S.C. § 825q-1(b)(2)). OPP will focus on its statutory mission, including coordinating public assistance, outreach, and education, and any potential intervenor funding opportunities.

Several statutes, regulations, executive orders, and Presidential memoranda implicate the Commission's trust responsibility to Tribes, which the Commission implements through its Policy Statement on Consultation with Indian Tribes in Commission Proceedings. Executive Order 13175 of November 6, 2000 (Consultation and Coordination with Indian Tribal Governments) mandated the creation and submission of Tribal consultation policies at all executive departments and agencies—and encouraged the same at independent agencies such as FERC—requiring that "[e]ach agency shall have an accountable process to ensure meaningful and timely input by [T]ribal officials in the development of regulatory policies that have [T]ribal implications." The Council on Environmental Quality's regulations implementing NEPA require that agencies engage in early consultation with Tribal governments "when their involvement is reasonably foreseeable." Section 106 of the National Historic Preservation Act requires federal agencies to consider the impacts of any undertakings, prior to the issuance of any license or permit, on properties of religious and cultural significance to Indian Tribes, Alaska Natives and Native Hawaiians, and to consider inclusion of those properties in the National Register of Historic Places. The Federal Power Act, in several provisions, also requires the consideration of Tribes.

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	Obj 1.2 >	CF 1.2.1	CF 1.2.2	Obj 2.2 >	CF 2.2.1	CF 2.2.2	CF 2.2.3	Obj 3.2 >	CF 3.2.1	CF 3.2.2			

In carrying out its statutory responsibilities, and consistent with executive orders and federal guidance, the Commission must ensure that underserved communities, such as environmental justice communities, are able to participate meaningfully in proceedings that affect their interests. Directives, such as Executive Order 13985, provide that agencies identify and remove barriers to underserved communities and “increase coordination, communication, and engagement” with such communities.

FERC’s Activities and Their Expected Impact

The Commission anticipates that OPP will assist the public to participate meaningfully in Commission proceedings. In support of this goal, OPP also will engage with other Commission program offices working to improve outreach, technical assistance, and education to affected members of the public, including landowners and environmental justice communities. As a result of OPP’s work, the Commission anticipates that more members of the public who may be affected by the Commission’s actions may intervene or comment in proceedings, or initiate proceedings themselves. FERC also anticipates that enhanced public engagement will enable FERC to make more comprehensive and well-informed decisions.

The Commission expects that staff from across the agency will continue efforts to improve Tribal engagement and consultation procedures, with meaningful opportunities for input from Tribal leaders and government representatives. These improvements will enhance the Commission’s government-to-government engagement and Tribal consultation practices to ensure Tribal Nations are able to access and engage in the Commission’s decision-making processes more meaningfully and consistently.

The Commission also anticipates that its continued assessment of its work will produce ways to effectively integrate environmental justice and equity considerations into Commission processes and decision-making. Removing barriers to meaningful participation by members of the public who are underserved, such as environmental justice communities, supports well-informed Commission decision-making and durable decisions, and is consistent with Commission statutory obligations and environmental justice and equity.

Link to Relevant Objective

This Priority aligns to: [Objective 3.2](#): *Facilitate trust and understanding of FERC activities by promoting transparency and equity, open communication, and a high standard of ethics.*

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	Obj 1.2 >	CF 1.2.1	CF 1.2.2	Obj 2.2 >	CF 2.2.1	CF 2.2.2	CF 2.2.3	Obj 3.2 >	CF 3.2.1	CF 3.2.2			



GOAL 1

Ensure Just and Reasonable Rates, Terms, and Conditions

Ensure that rates, terms, and conditions of jurisdictional services are just, reasonable, and not unduly discriminatory or preferential.

The nation’s security and economic prosperity depend on maintaining reliable, safe, secure, and economically efficient energy services at a reasonable cost for consumers. FERC’s regulations ensure just and reasonable rates, terms, and conditions for jurisdictional services.

In carrying out its regulatory role, FERC uses a range of ratemaking activities as well as market oversight and enforcement. FERC’s jurisdiction includes the wholesale sale and transmission of electricity and natural gas in interstate commerce, the interconnection of new electric generation in interstate commerce, and the transportation of oil and other liquid fuels by pipeline in interstate commerce. FERC’s ratemaking activities leverage both regulatory and market means and involve the issuance of orders and the establishment of rules and policies. Its enforcement activities include both increasing compliance and detecting and deterring market manipulation.

Through these efforts, FERC ensures that consumers have access to the energy services they need, and that service providers are reasonably compensated.

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		Obj 1.2 > CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2	

GOAL 1 > OBJECTIVE 1.1

Establish and apply FERC rules and policies that will result in just, reasonable, and not unduly discriminatory or preferential rates, terms, and conditions of jurisdictional service.

Electricity, natural gas, and oil are vital resources that fuel economic activity and help to meet the nation’s energy needs. Through the Federal Power Act, Public Utility Regulatory Policies Act, Natural Gas Act, and Interstate Commerce Act, among other laws, Congress gave FERC authority to regulate the transmission and wholesale sale of electricity and natural gas in interstate commerce, and to regulate the transportation of oil by pipeline in interstate commerce. The Commission’s responsibility in the exercise of this authority is to ensure that rates, terms, and conditions for wholesale sales and transmission of electric energy and natural gas in interstate commerce, as well as for transportation of oil by pipeline in interstate commerce, are just and reasonable and not unduly discriminatory or preferential. When faced with the possibility of substantial investment in future infrastructure, including electric transmission facilities, the Commission must ensure that its rules and regulations result in jurisdictional entities addressing these challenges in an efficient and reliable manner.

FERC carries out this responsibility by issuing orders and establishing rules and policies that continually balance two important interests. First, protecting energy consumers against excessive rates, such as by promoting competition among traditional and emerging technologies in jurisdictional wholesale markets, and second, by providing an opportunity for regulated entities to recover their costs and earn a reasonable return on their investments. FERC’s orders, rules, and policies use both market and regulatory means to impact energy service provider practices. FERC leverages competitive market forces to promote efficiency for consumers where appropriate. When competitive market conditions do not exist, or competitive forces are inadequate to protect consumers, FERC relies on traditional rate-setting authority and tools such as cost-of-service ratemaking.

In exercising its authority, FERC ensures that interested stakeholders have the opportunity to provide their views, and that the Commission’s ultimate decisions are adequately supported by the public record. Stakeholder engagement and transparency help FERC establish rules and policy that result in just, reasonable, and not unduly discriminatory or preferential rates, terms, and conditions.

- The Strategic Priority of **Modernizing Electric Market Design** will provide a strategic focus for this objective’s activities, particularly the development of new, or the modification of existing, rules and policies to ensure markets continue to provide efficient and reliable service to customers.

- The Strategic Priority of **Facilitating the Development of the Electricity Infrastructure Needed for the Changing Resource Mix** will provide a strategic focus for this objective’s activities, particularly by focusing on reforms to facilitate the development of new electric transmission infrastructure needed to address the changing resource mix.

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		Obj 1.2 > CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2	

GOAL 1 > OBJECTIVE 1.1 > CORE FUNCTION 1.1.1

Determine whether FERC rules and policies need to be added or changed.

PURPOSE OF THE CORE FUNCTION

To adapt to emerging issues and changing circumstances.

Ensure that **consumers/stakeholders**:

- Have reasonable access to needed jurisdictional services.
- Have confidence that FERC takes accountability for, and is effective at, adjusting its rules and regulations and ensuring that they continue to serve the public interest.
- Have confidence in the quality and impartiality of the Commission’s analyses.
- Have the opportunity to comment and participate in Commission proceedings.

Ensure that **jurisdictional entities**:

- Are appropriately compensated for responding to system needs in a rapidly changing marketplace.
- Can be confident that the Commission is aware of changes impacting energy industry stakeholders and will respond to changing market conditions and trends.
- Have the opportunity to comment and participate in Commission proceedings.
- Understand how Commission rules and policies are established, why they were established, and the relevance they have to the entity’s business and operations.

To accomplish this core function, FERC draws on its staff’s understanding of both FERC policy and the complexities of energy markets, as well as expertise in qualitative and quantitative analyses, economics, engineering, rate design, policy, and law.

FERC carries out this core function through the workstreams described below.

Evaluate Policies and Pursue Changes to Regulations Where Necessary

To adapt to emerging issues and changing circumstances in the electric, natural gas, and oil industries, FERC evaluates existing rules and policies to assess whether they continue to ensure just, reasonable, and not unduly discriminatory or preferential rates, terms, and conditions of service. This evaluation allows FERC to develop new, or modify its existing, rules and policies to improve economic efficiency and operations in markets and FERC-jurisdictional infrastructure. The evaluation also enables FERC to ensure adequate compensation for resources responding to system needs, to remove barriers to ensure access to the market and grid for all resources, and to ensure that consumers have reasonable access to the jurisdictional services they need.

FERC accomplishes its ongoing review of existing rules and policies in a number of ways. Based on its knowledge and experience with the industries that it regulates, FERC may gather information through technical conferences or other means of outreach with stakeholders. The regulated community or other stakeholders may also petition the Commission for changes to its regulations. FERC also keeps informed of national and international events and trends and draws on its staff’s knowledge and experience with its jurisdictional industries to detect important recurring or

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		Obj 1.2 > CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2	

emerging issues. FERC gathers and uses data to perform economic, engineering, financial and technical analyses of the energy markets and infrastructure access and development issues to inform policy recommendations. For instance, FERC researches energy market design issues and evaluates the outcomes of recent policy changes on market participant behavior and market operations.

Where necessary, the Commission pursues changes to its regulations through rulemaking proceedings. The Commission follows the rulemaking process established for all federal agencies to ensure transparency, due process, stakeholder engagement, and public participation.

Workstream Impact

- Enable the Commission to better understand the potential impacts of changing external conditions.
- Develop responsive rules and policies that effectively balance the needs of jurisdictional entities and energy consumers.

Conduct Outreach and Information Sharing

The Commission and its staff undertake a variety of outreach and stakeholder engagement activities, including presentations and speeches, hosting technical conferences and workshops, and regularly meeting with stakeholders. This outreach and engagement allow the Commission to learn from stakeholders, share information, and educate different stakeholder groups on issues related to the function, evolution, and regulation of energy markets, as well as Commission policy and regulatory efforts. Staff also prepares recurring reports such as state of the market reports, annual assessments, and other Congressionally mandated reports. Commission staff also engages international stakeholders, and the Commission may establish memoranda of understanding with other countries.

Workstream Impact

- Allow the Commission to maintain a connection with stakeholders.
- Allow staff to learn from, educate, and exchange information with different groups regarding trends and recurring and emerging issues.

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		Obj 1.2 > CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2	

GOAL 1 > OBJECTIVE 1.1 > CORE FUNCTION 1.1.2

Analyze and act on filings in a fair, clear, and timely manner.

PURPOSE OF THE CORE FUNCTION

To take appropriate action on filings made to the Commission.

Ensure that **consumers/stakeholders**:

- Have access to energy and related jurisdictional services at a reasonable rate.
- Are able to voice their concerns and challenge filings.
- Receive due process.

Ensure that **jurisdictional entities**:

- Have an opportunity to recover their costs, earn a reasonable return on their investments, and react to changing market and industry conditions.
- Understand FERC’s decisions and the basis on which they were made.
- Implement FERC’s orders and regulations.
- Receive due process.

To accomplish this core function, FERC draws on a wide range of staff capabilities. The analysis of filings requires broad legal and technical expertise from attorneys, economists, accountants, engineers, and rate and policy analysts. The hearing and settlement procedures require negotiation, mediation, and litigation skills to facilitate settlement of complex cases, and assure the development of a complete and accurate record if the case goes to a hearing. These procedures also require expert legal and technical analysis to structure settlements or arrive at complex decisions that balance the needs of regulated entities and stakeholders, provide due process, reflect the facts, and uphold Commission policy.

FERC carries out this core function through the workstreams described below.

Analyze and Act on Filings

The Commission analyzes and acts on a wide range of filings from jurisdictional entities and other stakeholders. Jurisdictional entities have tariffs on file with the Commission that state what rates they can charge for jurisdictional services and establish the terms and conditions of service. Each year, the Commission receives thousands of rate filings regarding the rates, terms, and conditions of jurisdictional services. These filings, which come from public utilities, natural gas pipelines, and oil pipelines and hydroelectric projects request changes to their rates or tariff provisions or the establishment of new rates or services. The Commission establishes just, reasonable, and not unduly discriminatory or preferential rates, terms, and conditions of service by reviewing and acting on these filings from external entities. The Commission also receives a variety of other filings, including stakeholder complaints and requests for Commission action on issues related to mergers and acquisitions of jurisdictional facilities, qualifying facility status and related obligations, and authority to issue securities and incur debt. Commission staff uses qualitative and quantitative analysis, as appropriate, to inform decision making. FERC staff develops recommendations to the Commission regarding potential actions to enable the Commission to

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
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		Obj 1.2 > CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2	

issue a fair, clear, and timely order accepting, modifying, suspending, setting for hearing, or rejecting the rates, terms, and conditions of service. When rehearing is requested on an order, the Commission is committed to resolving that request in a timely manner.

Workstream Impact

- Allow the Commission to act in a timely, informed, and transparent manner on the filings it receives.

Conduct Settlement Judge Procedures

Although the Commission is able to analyze and resolve the merits of the majority of filings, there are cases where there are disputed issues of material fact that the Commission determines should be set for hearing. However, the Commission encourages settlements where possible, recognizing the value of resolving issues through consensual means. Settlements of disputes greatly reduce the time, expense, and resources the Commission and outside parties would otherwise devote to litigating these cases.

To facilitate settlement, the Commission often pauses hearing procedures for a short time and establishes a process to help parties negotiate a settlement. Commission staff, including administrative law judges (serving as settlement judges), trial staff, and dispute resolution staff, all play important roles in resolving matters and thus avoiding full litigation. Settlement negotiations often involve a balancing of the diverse interests of filing parties and representatives of a variety of stakeholders, including state commissions, residential energy consumers, local distribution companies, natural gas companies, public utilities, industrial and small commercial energy users, energy marketers, energy producers, and power generators.

After a settlement judge is appointed, trial staff and parties conduct informal information exchanges to secure the information needed to develop fact-based settlement positions. Trial staff also conducts a multidisciplinary analysis of the issues and develops an initial comprehensive settlement offer as the starting place for negotiations. The settlement judge acts as a mediator to help the parties reach a consensual resolution. The Commission's dispute resolution staff will also work with administrative law judges to broker settlements in certain cases. During the settlement judge proceedings, the judge reports to the Commission on the progress of the proceedings. If a settlement is reached, the judge certifies the settlement to the Commission. All settlements require Commission review and approval. If, when using the settlement judge procedures, the negotiations reach an impasse, settlement negotiations may continue with the trial staff. However, if the staff cannot bring the parties to a consensus, the Commission's chief administrative law judge will terminate settlement judge procedures and appoint a presiding administrative law judge to conduct a hearing, and issue an initial decision.

During settlement judge proceedings, FERC trial staff plays a vital role helping parties reach a consensual resolution, both during and outside of settlement conferences, or after settlement negotiations reach an impasse. In addition, trial staff utilizes its legal and technical expertise and negotiation skills to structure the resolution of the numerous issues that must be decided in order to secure a settlement that is both consistent with the public interest and acceptable to all parties.

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
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		Obj 1.2 > CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2	

Workstream Impact

- Limit the time, expense, and resources the Commission and outside parties devote to litigation.
- Reduce the likelihood of Commission decisions being appealed to the courts.
- Increase business certainty, which facilitates investment in needed energy infrastructure.
- Provide ratepayers with just and reasonable rates and terms and conditions of service in a timely manner.

Conduct Hearing Procedures

In instances where a settlement cannot be achieved, or when the Commission deems it necessary, a case may be set for hearing. The presiding judge convenes prehearing conferences, resolves discovery disputes, issues subpoenas, and orders. During the hearings, which can be lengthy, judges admit evidence, rule on motions and objections, and ensure the compilation of a record upon which judges can issue an initial decision. The judge ensures due process is afforded to all case participants and acts impartially and independently of the Commission in issuing a decision. The Commission’s trial staff helps develop the factual and legal record for administrative law judge action and Commission review. Trial staff conducts comprehensive discovery and file several rounds of expert testimony and exhibits addressing the issues presented in the case. Trial staff also introduces evidence, conducts direct and cross-examination of witnesses, and undertakes oral argument on issues that arise during the hearing. Following the hearing, trial staff files briefs addressing the factual, legal, and policy issues presented in the proceeding. Thereafter, the presiding judge issues an initial decision and certifies to the Commission a record that consists of all official exhibits, transcripts, evidence, and orders entered in the proceeding.

Following the issuance of the initial decision, the parties and trial staff may file further briefs with the Commission, after which the Commission issues its final decision in the case. The Commission can affirm (in part or in full), reject or remand for further consideration, any issue addressed in the initial decision.

Workstream Impact

- Provide parties with due process and fair representation.
- Ensure that Commission decisions are based on full, complete, and transparent information.
- Provide ratepayers with just and reasonable rates and terms and conditions of service in a timely manner.

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
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	<u>Obj 1.2 > CF 1.2.1</u>	<u>CF 1.2.2</u>	<u>CF 2.2.2</u>	<u>CF 2.2.3</u>	<u>CF 3.1.2</u>
					<u>Obj 3.2 > CF 3.2.1</u>
					<u>CF 3.2.2</u>

GOAL 1 > OBJECTIVE 1.2

Promote compliance with FERC rules, including by detecting and deterring market manipulation.

The Federal Power Act and the Natural Gas Act, along with other statutory authorities, give FERC oversight and enforcement responsibilities that focus on increasing compliance of regulated entities and detecting and deterring market manipulation. The Energy Policy Act of 2005, in particular, increased both the Commission’s responsibilities and its penalty authority.

Within the compliance focus of this objective, FERC gathers information about, and analyzes, market fundamentals, behavior, and trends in order to take proactive steps to reduce the probability of violations of applicable laws, the Commission’s regulations, or market rules. FERC also promotes internal compliance programs and employs a robust audit program to identify problems and provide recommendations to improve compliance. FERC also makes market and audit data transparent to the public and market participants so that market efficiency is promoted, and anomalies and areas of concern may be identified and reported.

Fraud and market manipulation pose a significant threat to the markets overseen by the Commission, and the financial harm imposed by such actions ultimately is borne by consumers. To detect and deter fraud and market manipulation, FERC uses market surveillance and other sources to identify indications of misbehavior. FERC then conducts investigations, and, when appropriate, may assess civil penalties to discourage violations.

Promoting compliance and inhibiting market misconduct strengthen markets, increase market confidence, and support the Commission’s goal of ensuring that rates, terms, and conditions of jurisdictional energy services are just, reasonable, and not unduly discriminatory or preferential.

- The Strategic Priority of **Promoting a Strong and Robust Enforcement Program** will provide a strategic focus for this objective’s activities, particularly through promoting compliance and deterring market misconduct.

INTRO	PRIORITIES	GOAL 1			GOAL 2			GOAL 3			APPENDICES
	Obj 1.1 >	CF 1.1.1	CF 1.1.2	Obj 2.1 >	CF 2.1.1	CF 2.1.2	Obj 3.1 >	CF 3.1.1	CF 3.1.2		
	Obj 1.2 >	CF 1.2.1	CF 1.2.2	Obj 2.2 >	CF 2.2.1	CF 2.2.2	CF 2.2.3	Obj 3.2 >	CF 3.2.1	CF 3.2.2	

GOAL 1 > OBJECTIVE 1.2 > CORE FUNCTION 1.2.1

Assess compliance and financial filings of regulated entities.

PURPOSE OF THE CORE FUNCTION

To maximize compliance of jurisdictional entities with FERC orders, policies, and regulations.

Ensure that **consumers/stakeholders** have increased confidence in:

- The market and the ability of FERC’s orders and policies to ensure just and reasonable rates, terms, and conditions.
- FERC’s ability to ensure compliance with its orders and policies.

Ensure that **jurisdictional entities**:

- Are aware of existing and emerging compliance issues/factors and understand how to achieve compliance.
- Are maintaining compliance and addressing compliance issues on an ongoing basis.
- Have increased confidence in the market and the ability of FERC’s orders and policies to ensure just and reasonable rates, terms, and conditions.

To accomplish this core function, FERC draws on its staff’s understanding of both FERC policy and the complexities of energy markets, as well as the expertise of different Commission offices with multidisciplinary skills in auditing, accounting, engineering, rate design, policy, and law.

FERC carries out this core function through the workstreams described below.

Conduct Compliance, Operational, Financial, and Other Audits

The Commission conducts audits of jurisdictional entities—including public utilities, natural gas pipelines, and oil pipelines—to assess compliance with the Commission’s authorizing statutes, orders, rules, and regulations. Each year, the Commission develops an audit plan that specifies the entities to be audited and particular areas of focus. The audit plan balances the Commission’s intention to comprehensively cover potential areas of noncompliance with a risk-based approach that prioritizes key areas of regulatory importance. In addition to assessing compliance, the audits help the Commission identify and analyze factors affecting noncompliance. To help regulated entities maintain compliance, FERC auditors provide informal feedback and recommendations during the audit engagements and issue a publicly available audit report that provides formal recommendations. The Commission also conducts outreach with jurisdictional entities, industry groups, and state commissions to encourage compliance with the Commission’s authorizing statutes, orders, rules, and regulations. The Commission encourages timely implementation of recommended corrective actions within six months of an audit’s completion.

Workstream Impact

- Increase compliance by informing regulated entities of areas of noncompliance and by providing encouragement, guidance, and specific recommendations for steps to take to move back into compliance.

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
		Obj 1.1 > CF 1.1.1 CF 1.1.2	Obj 2.1 > CF 2.1.1 CF 2.1.2	Obj 3.1 > CF 3.1.1 CF 3.1.2	
		Obj 1.2 > CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2	

Establish Accounting Policies and Analyze Financial Filings

The Commission's accounting program is instrumental in ensuring that rates established for jurisdictional companies are just and reasonable, and not unduly discriminatory or preferential. The accounting program establishes Commission accounting policies. In addition, the accounting program processes accounting filings and analyzes accounting matters in other filings submitted by regulated entities to ensure compliance with Commission accounting and related financial reporting regulations. Additionally, the program bolsters the accuracy, transparency, and usefulness of accounting information for the Commission, regulated entities, and interested parties in the development and oversight of rates. The accounting program also conducts outreach to discuss emerging accounting issues and potential Commission actions. This outreach helps to inform accounting policy.

Workstream Impact

- Inform market rule changes or other Commission actions.
- Ensure that market rules are effective and practicable for those who must follow them.

Assess, Analyze, and Administer Electric, Natural Gas, and Oil Forms

The Commission requires that entities participating in markets under its jurisdiction submit electric quarterly reports regarding jurisdictional sales and also requires other forms providing financial statements and operational data. Commission staff screens the forms to confirm that industry entities are complying with requirements. If an entity fails to file or submits a filing that is incomplete or has errors, Commission staff may issue a notice of failure to comply, and, if necessary, may refer the matter for investigation. For electric quarterly reports, Commission staff also conducts industry outreach via electric quarterly report user group meetings to answer questions and help entities comply with requirements. In addition, on an ongoing basis, Commission staff synthesizes and analyzes a large variety and quantity of data from these filings and other data sources to perform ex-post analysis of market-based rate authorizations. This analysis helps determine whether there are indications of an exercise of market power and ensure that jurisdictional rates remain just and reasonable and not unduly discriminatory or preferential. Finally, FERC continually seeks ways to improve data collected in all forms by conducting maintenance and improvement of internal systems and issuing notices of proposed rule changes.

Workstream Impact

- Ensure that jurisdictional entities comply with requirements to file electric quarterly reports and other forms by alerting companies of incomplete, erroneous, or absent filings, and by providing general guidance regarding filing requirements.
- Provide necessary information to the Commission to exercise its market oversight responsibilities.

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
		Obj 1.1 > CF 1.1.1 CF 1.1.2	Obj 2.1 > CF 2.1.1 CF 2.1.2	Obj 3.1 > CF 3.1.1 CF 3.1.2	
		Obj 1.2 > CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2	

GOAL 1 > OBJECTIVE 1.2 > CORE FUNCTION 1.2.2

Monitor market activity and explore potential violations.

PURPOSE OF THE CORE FUNCTION

To promote fair and competitive markets for energy market participants and consumers.

Ensure that **consumers/stakeholders**:

- Have increased confidence in the market and the ability of FERC’s orders and policies to ensure just and reasonable rates, terms, and conditions.
- Experience minimal financial burden due to fraud, market manipulation, and other anti-competitive conduct.

Ensure that **jurisdictional entities**:

- Are deterred from engaging in market manipulation or anti-competitive conduct.
- Are able to operate on a level playing field and experience fair competition.
- Have increased confidence in the market and the ability of FERC’s orders and policies to ensure just and reasonable rates, terms, and conditions.

To accomplish this core function, FERC draws on a wide range of staff expertise and capabilities, including staff’s development of automated tools to algorithmically screen data from the physical and financial energy markets; staff’s application of various discovery methods (investigative testimony, interrogatories, witness interviews, and site visits); and staff’s experience with investigation and enforcement, legal analysis, and case development, as well as brief writing and pleadings.

FERC carries out this core function through the workstreams described below.

Conduct Surveillance of Natural Gas and Electric Markets

FERC staff conducts comprehensive monitoring and analysis of wholesale natural gas and electric markets to identify potential market manipulation and other violations. FERC staff monitors energy markets on a daily basis using sophisticated surveillance screens and tools developed by staff that algorithmically screen data from the physical and financial energy markets. FERC’s surveillance screening methods use market data collected from a variety of public and non-public sources to identify indications of potential misbehavior. When a screen indicates a potential violation, FERC staff conducts an inquiry involving follow-up analyses to determine whether the matter should be the subject of an investigation. Occasionally, the follow-up analyses may indicate an inefficient market design issue, which may be addressed through Commission rulemaking or orders.

Workstream Impact

- Deter market manipulation across the FERC-jurisdictional energy markets.

Conduct Investigations

When potential violations are identified through surveillance activities, hotline tips, market monitor or Commission referrals, or other sources, Commission staff conducts comprehensive

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
		Obj 1.1 > CF 1.1.1 CF 1.1.2	Obj 2.1 > CF 2.1.1 CF 2.1.2	Obj 3.1 > CF 3.1.1 CF 3.1.2	
		Obj 1.2 > CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2	

investigations to determine whether a violation has occurred, and whether, based on the facts presented, it is appropriate for the Commission to exercise its civil penalty authority.

FERC staff conducts investigations using various fact-finding methods (including comprehensive data collection and investigative interviews) and data analyses to determine what happened and whether a violation has occurred. If no violation is identified, or if the violation is not deemed to be sufficiently serious to warrant further action, the investigation is terminated. In many instances, Commission staff may seek authorization from the Commission to attempt to resolve the investigation through settlement. If a settlement is not reached, Commission staff may recommend that the Commission pursue further enforcement proceedings at the Commission and, potentially, before an administrative law judge or federal district court. Investigations that reach this stage typically produce an administrative record that forms the basis for the investigative findings and legal conclusions. The Commission provides guidance to the regulated community where possible, including in the Annual Report on Enforcement, the publication of settlements and adjudicative orders, and through regular interactions with regulated entities.

Workstream Impact

- Produce a fair resolution of each investigation, including closure of that investigation, a settlement, or a move to an enforcement proceeding.

Conduct Enforcement Proceedings

If a settlement is not reached, FERC staff may recommend that the Commission issue an Order to Show Cause directing the subject to explain why it did not commit a violation and why penalties, disgorgement, or other proposed remedies are not warranted. After considering the factual record and legal arguments submitted during the Order to Show Cause process, if the Commission concludes that the subject committed a violation that warrants civil penalties and disgorgement, the Commission will issue either an Order Assessing Civil Penalties (in most matters arising under the Federal Power Act) or, if there are material issues of fact to resolve before the Commission issues a final order, the Commission will set the matter for hearing before an administrative law judge (in some matters arising under the Federal Power Act and matters arising under the Natural Gas Act). Upon a decision by an administrative law judge related to a matter arising under the Natural Gas Act, the Commission may issue an order assessing civil penalties. The entity that is subject to such penalties has the opportunity to seek rehearing of the Commission penalty decision and subsequent judicial review in a U.S. Court of Appeals.

If the Commission issues an Order Assessing Civil Penalties pursuant to the Federal Power Act, and the company or individual fails to pay the penalty in a timely fashion, the Commission seeks to enforce that assessment in federal court. Results of enforcement proceedings and settlements are publicly and transparently published to provide regulated communities and the public at large with knowledge of the Commission's actions.

Workstream Impact

- Ensure entities or individuals who violate rules are held accountable.
- Act as a deterrent to fraud, market manipulation, and other violations.

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
		Obj 1.1 > CF 1.1.1 CF 1.1.2	Obj 2.1 > CF 2.1.1 CF 2.1.2	Obj 3.1 > CF 3.1.1 CF 3.1.2	
		Obj 1.2 > CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2	



GOAL 2

Ensure Safe, Reliable, and Secure Infrastructure Consistent With the Public Interest

Promote infrastructure that is safe and reliable, both physically and cyber-secure, and consistent with the public interest.

Infrastructure for which FERC approval is required includes interstate natural gas pipelines and storage projects, LNG facilities, and non-federal hydropower that are found to be in the public interest. In addition, the Commission has authority to site electric transmission facilities in certain circumstances. Ensuring the development of safe, reliable, and secure infrastructure that provides energy for consumers at a reasonable cost is a significant, multifaceted challenge.

FERC’s role as an independent regulatory agency includes the review of infrastructure projects balancing the benefits of the proposed project against its adverse impacts, including environmental concerns, as well as impacts to landowners and communities. Additionally, FERC considers the minimization of risks to the public in the operation of the infrastructure. To promote safe, reliable, and secure infrastructure, FERC must ensure the sustainability and safety of non-federal hydropower projects and LNG facilities throughout their entire life cycle; oversee the development and review of, as well as compliance with, mandatory reliability and security standards for the Bulk-Power System; and help to secure the Bulk-Power System from cyber and physical attacks.

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
		Obj 1.1 > CF 1.1.1 CF 1.1.2	Obj 2.1 > CF 2.1.1 CF 2.1.2	Obj 3.1 > CF 3.1.1 CF 3.1.2	
		Obj 1.2 > CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2	

GOAL 2 > OBJECTIVE 2.1

Facilitate benefits to the nation through the review of energy infrastructure proposals, including natural gas and hydropower.

The Natural Gas Act and the Federal Power Act, among other statutory authorities, charge FERC with the responsibility to oversee the development of reliable and secure energy infrastructure that operates safely. Under these statutes, FERC must determine whether a project is in the public interest. FERC oversees the construction of interstate natural gas pipelines and storage projects, as well as restoration of land following such construction. FERC also oversees the construction and operation of LNG facilities and non-federal hydropower projects. FERC has authority to impose conditions on projects that it approves and to ensure compliance with those conditions.

FERC’s review of proposed projects must balance the benefits of a proposed project against its adverse impacts. In this balancing, FERC must consider competing interests, legal requirements, environmental concerns, and impacts to landowners, communities, and Tribes. FERC routinely coordinates with other agencies, as appropriate, to consider issues related to environmental statutes such as the Endangered Species Act, National Historic Preservation Act, Coastal Zone Management Act, and Clean Water Act. In exercising its authority, FERC must first find that projects are in the public interest and then, if certificated or licensed, must ensure the development of safe, reliable, and secure infrastructure.

- The Strategic Priority of **Improving the Siting and Review Process for Interstate Gas Pipelines, LNG Facilities, and Hydroelectric Projects** will provide a strategic focus for this objective’s activities, particularly: (1) the use of a revised analytic framework to ensure that the Commission’s evaluation of potential environmental impacts of proposed natural gas infrastructure will help protect the public from undue adverse impacts of such infrastructure; and (2) coordination with federal agency partners during environmental reviews to ensure timely processing of hydropower relicense applications.

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
	Obj 1.1 >	CF 1.1.1 CF 1.1.2	Obj 2.1 > CF 2.1.1 CF 2.1.2	Obj 3.1 > CF 3.1.1 CF 3.1.2	
	Obj 1.2 >	CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2	

GOAL 2 > OBJECTIVE 2.1 > CORE FUNCTION 2.1.1

Conduct thorough and timely technical review of applications to construct, operate, or modify natural gas and hydropower infrastructure.

PURPOSE OF THE CORE FUNCTION

To respond to energy infrastructure applications from private sector project sponsors with well-reasoned decisions, reached within a review period suitable to the complexity of the proposal.

Ensure that **stakeholders**:

- Are given a voice in the Commission’s infrastructure review process.
- Are aware of how to actively participate in the Commission’s review process.
- Understand FERC’s decisions and the basis on which they were reached.

Ensure that **applicants**:

- Recognize the environmental issues that may influence their project design and planning.
- Understand the types of studies and field surveys they will need to conduct as part of the FERC review process.
- Understand how to adhere to the compliance requirements contained in any Commission authorization for a project.

To accomplish this core function, FERC draws on a wide range of experts, including engineers, biologists, archaeologists, geologists, other environmental scientists, accountants, economists, and lawyers, who thoroughly review and analyze applications from environmental, engineering, economic, and legal perspectives.

FERC carries out this core function through the workstreams described below.

Review Applications for Interstate Natural Gas Pipeline, Storage, and LNG Projects

This workstream is broken down into three substreams: Pre-Filing Process, Application Review, and Outreach Efforts.

PRE-FILING PROCESS

The Commission established a pre-filing process that engages Commission staff and stakeholders prior to an applicant filing a formal application with the Commission. The goal of the pre-filing process is to identify and resolve issues early in the NEPA review process and reduce delays caused by incomplete filings. A six-month pre-filing period is mandatory for LNG projects; pre-filing is optional for gas pipeline and storage projects. During the pre-filing process, the Commission provides opportunities for applicants to engage staff and stakeholders to identify issues the applicant may want to address through changes to its proposal.

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
	Obj 1.1 >	CF 1.1.1	CF 1.1.2	Obj 3.1 >	CF 3.1.1
	Obj 1.2 >	CF 1.2.1	CF 1.2.2	CF 3.1.2	CF 3.2.2
			Obj 2.1 >	CF 2.1.1	CF 2.1.2
			Obj 2.2 >	CF 2.2.1	CF 2.2.2
				CF 2.2.3	
				Obj 3.2 >	CF 3.2.1

APPLICATION REVIEW

Once an application is filed, the Commission conducts an environmental review, consistent with NEPA. This review assesses and discloses potential environmental impacts and, in many cases, identifies mitigation measures to lessen these impacts. Concurrently, the Commission also conducts an engineering analysis of proposed pipeline, storage, and LNG facilities. Both of these reviews serve to assess whether the proponent has demonstrated that the project is in the public interest, under the Commission’s statutory obligations and as defined by the Commission’s regulations and policy, and to ensure that project’s proposed initial recourse rates, tariff, and accounting treatment are consistent with Commission regulations and policy. Together, these activities provide for an efficient, timely, and well-supported determination by the Commission. As a result of the application review, the Commission issues an order indicating the Commission’s decision to approve or deny the application for construction of natural gas infrastructure. Approval may be granted with or without modifications and conditions. As needed, the Commission can establish rules and set policy relative to applications for the siting, construction, expansion, and operation of pipeline, storage, and LNG projects.

OUTREACH EFFORTS

Commission staff conducts outreach meetings with natural gas companies, stakeholder groups, and other permitting agencies to provide guidance and insight on the Commission’s environmental review process and compliance-related matters. Commission staff also conducts natural gas environmental training seminars, which provide an opportunity for open dialogue between Commission staff and stakeholders. These seminars are typically attended by state, local, and federal agency officials, natural gas company representatives, construction contractors, and consulting firm staff. The seminars provide information on the filing requirements for environmental reports, reporting requirements for blanket certificate projects, updates on new regulations, an overview of the Commission’s baseline construction and mitigation measures, and more. These seminars are instrumental in improving understanding of how to adhere to the Commission-issued certificates and authorizations and to help applicants to prepare more robust applications that can be reviewed more expeditiously. Commission staff also extends its outreach efforts to Indian Tribes to enhance their participation in the Commission’s environmental review process for natural gas projects.

Workstream Impact

- Provide transparency for stakeholders regarding the potential environmental impacts and required mitigation measures for natural gas pipeline, storage, and LNG projects.
- Ensure that applicants and other stakeholders have up-to-date information regarding the Commission’s policies and regulations.
- Provide a clear understanding of the Commission’s environmental review process and compliance program for natural gas pipeline, storage, and LNG projects.

INTRO	PRIORITIES	GOAL 1	GOAL 2				GOAL 3	APPENDICES
		Obj 1.1 > CF 1.1.1 CF 1.1.2	Obj 2.1 > CF 2.1.1	CF 2.1.2			Obj 3.1 > CF 3.1.1 CF 3.1.2	
		Obj 1.2 > CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1	CF 2.2.2 CF 2.2.3			Obj 3.2 > CF 3.2.1 CF 3.2.2	

Review Applications for Hydropower Projects

This workstream is broken down into three substreams: Pre-Filing Process, Application Review, and Outreach Efforts.

PRE-FILING PROCESS

The pre-filing process typically begins three years before an applicant applies for a license or a small hydropower exemption. Under the Integrated Licensing Process (ILP), the Commission’s default process, Commission staff works with stakeholders throughout the pre-filing process to identify issues and study needs. Commission staff analyzes applicant study proposals and stakeholder study recommendations and issues study plan determinations. The study plan determination approves or modifies a proposed plan for conducting studies that will be used to prepare a license application.

A license applicant may request permission to use either the Traditional Licensing Process (TLP) or the Alternative Licensing Process (ALP) instead of the default ILP. Under both the TLP and ALP, the prospective license applicant leads the pre-filing process and works with stakeholders to identify issues and needs. Unlike the ILP, Commission staff is generally not involved in the TLP, and only minimally involved in the ALP, primarily during the first six months. Over the last five to ten years, about one third of pre-filing processes for license applications have used the ILP and two thirds have used the TLP. The ALP is rarely used. To prepare a small hydropower exemption application, the only pre-filing process available to the prospective applicant is the TLP, and the applicant is not required to file a notice of intent.

APPLICATION REVIEW

The Commission conducts a NEPA analysis on most hydropower project applications, with the exception of most conduit projects, which are located on a conduit used for agricultural, municipal, or industrial water consumption. The Commission is responsible for ensuring that the environmental document analyzes the project’s effects on potentially affected resources—including geology and soils, aquatic resources (including water quality), terrestrial resources, threatened and endangered species, recreation, land use and aesthetic resources, and cultural resources. Furthermore, the Commission examines alternatives and makes recommendations for protection, mitigation, and enhancement measures to be included in any license issued.

The Commission reviews and acts on plans and reports filed by licensees and exemptees pursuant to the license or exemption issued, as well as requests for additional time to make the required filings. The Commission also analyzes, and acts on, requests to amend conditions or provisions included in licenses and exemptions. As needed, the Commission can establish rules and set policy relative to the siting of hydropower projects.

Regulated entities may also file preliminary permit applications to secure priority for hydropower development while the permit holder studies the feasibility of a hydropower project, including studying potential impacts. Permits allow the holder to study a particular site for four years with the potential for an up-to-four-year extension, for a total of up to eight years. A permit guarantees the holder “first-to-file” status for a particular site in cases where multiple applications are received by the Commission for a hydropower license. The Commission reviews preliminary permit applications and monitors

INTRO	PRIORITIES	GOAL 1		GOAL 2			GOAL 3			APPENDICES
	Obj 1.1 >	CF 1.1.1	CF 1.1.2	Obj 2.1 >	CF 2.1.1	CF 2.1.2	Obj 3.1 >	CF 3.1.1	CF 3.1.2	
	Obj 1.2 >	CF 1.2.1	CF 1.2.2	Obj 2.2 >	CF 2.2.1	CF 2.2.2	CF 2.2.3	Obj 3.2 >	CF 3.2.1	CF 3.2.2

compliance with issued permits. A permit neither authorizes construction, nor requires the permit holder to apply for or to receive a license.

OUTREACH EFFORTS

Commission staff also conducts outreach efforts to educate and engage hydropower stakeholders. Staff actively participates in workshops to assist licensees with specific issues, as well as conduct hydropower licensing training sessions to provide guidance on how to obtain a license or exemption or how to effectively participate in the licensing and exemption processes. The sessions are typically attended by prospective and current licensees, federal and state natural resource agency personnel, Indian Tribes, and members of the public, and cover topics such as what licensing process to use, when to file comments and recommendations for license or exemption conditions, and how to officially intervene in a license or exemption proceeding.

Workstream Impact

- Provide transparency for stakeholders regarding the potential environmental impacts and required mitigation measures for hydropower projects.
- Ensure that applicants and other stakeholders have up-to-date information regarding the Commission’s policies and regulations.
- Inform stakeholders of licensing processes, Commission policy, and other issues regarding hydropower construction projects.

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
	Obj 1.1 >	CF 1.1.1	CF 1.1.2	Obj 3.1 >	CF 3.1.1
	Obj 1.2 >	CF 1.2.1	CF 1.2.2	Obj 3.2 >	CF 3.1.2
			Obj 2.1 >	CF 2.1.1	CF 2.1.2
			Obj 2.2 >	CF 2.2.1	CF 2.2.2
				CF 2.2.3	CF 2.2.3
				Obj 3.2 >	CF 3.2.1
					CF 3.2.2

GOAL 2 > OBJECTIVE 2.1 > CORE FUNCTION 2.1.2

Assess compliance with environmental mitigation conditions in FERC orders during construction and operation of natural gas and hydropower infrastructure.

PURPOSE OF THE CORE FUNCTION

To verify that project operators are meeting, as appropriate, the environmental protection obligations, engineering design requirements, and public use commitments contained in Commission authorizations.

Provide assurance to **stakeholders** that:

- Projects have oversight for meeting the responsibilities required under the Natural Gas Act and Federal Power Act.

Ensure that **applicants**:

- Understand the compliance requirements contained in any Commission authorization for a project.
- Take action to achieve and maintain compliance with the Commission’s requirements.

To accomplish this core function, FERC draws on its staff’s inspection experience and familiarity with environmental standards and requirements for energy infrastructure, including those related to facility design and construction, water and air quality, land use and recreation, erosion control, cultural resources, and wildlife and endangered species.

FERC carries out this core function through the workstreams described below.

Conduct Natural Gas Pipeline, Storage, and LNG Project Inspections/Reviews

The Commission’s on-site inspection program assesses implementation and compliance with the environmental protection and mitigation measures, as well as engineering design requirements, stated in its authorizations for natural gas facilities, throughout the construction and restoration phases. While major pipeline facilities are under construction, Commission staff conducts inspections at least once every 28 days to ensure adherence to the prescribed measures. Inspections are conducted throughout the construction and restoration phases, until project sites are deemed successfully restored. LNG projects are inspected at least once every 12 weeks during construction, and inspections continue through facility commissioning to ensure compliance with the Commission’s authorization.

Commission staff produces an inspection report that contains a summary of the inspection and compliance findings, including problem areas and areas of non-compliance. The report also includes corrective actions for deficiencies in compliance identified during construction and restoration inspections. Similarly, landowner concerns received directly by staff or via the Commission’s Landowner Helpline can be more efficiently and effectively resolved by on-site review during construction and restoration inspections. Annual reports are filed by regulated companies for any pipeline construction activities conducted during the prior year, under the blanket authorization provisions in the Commission’s regulations. FERC reviews the annual reports and assesses compliance with the Commission’s requirements, which in some cases require staff to conduct on-site inspections for larger projects. As needed, the Commission can issue orders and set policy relative to the construction and operation of pipeline, storage, and LNG projects.

INTRO	PRIORITIES	GOAL 1	GOAL 2				GOAL 3	APPENDICES		
	Obj 1.1 >	CF 1.1.1	CF 1.1.2	Obj 2.1 >	CF 2.1.1	CF 2.1.2	Obj 3.1 >	CF 3.1.1	CF 3.1.2	
	Obj 1.2 >	CF 1.2.1	CF 1.2.2	Obj 2.2 >	CF 2.2.1	CF 2.2.2	CF 2.2.3	Obj 3.2 >	CF 3.2.1	CF 3.2.2

Workstream Impact

- Ensure that natural gas pipeline, storage, and LNG facility operators understand and adhere to the engineering and environmental requirements of the Commission’s authorization.

Conduct Hydropower Project Inspections/Reviews

The Commission conducts environmental inspections of licensed and exempted projects to evaluate and assess compliance with environmental and public use conditions of licenses. Environmental and public use requirements typically result from terms and conditions specified by the state and federal resource agencies during the licensing and exemption processes, and from the amendment process. Environmental inspectors review the physical and operational features of a project’s facilities. During that effort, the inspector will look at all the required environmental protection and enhancement measures at a project and work with licensees and exemptees to identify common problem areas and assist licensees and exemptees with their responsibilities for maintaining compliance with license conditions.

The nature and frequency of environmental inspections at licensed or exempted projects depends on several factors and the type of environmental and public use impacts. With more than 1,200 projects under the Commission’s jurisdiction, the rate at which an environmental inspection occurs at any project over the course of a 40- to 50-year license term is limited. Generally, projects are prioritized based on factors such as whether the Commission has received complaints, the record of compliance, whether new license conditions or facilities have been recently added, and whether there are significant environmental or public use requirements—such as high recreational use areas, fish passage facilities, and wildlife mitigation areas.

Commission staff reviews licensees’ and exemptees’ compliance with requirements, terms, and conditions specified in license or exemption orders and approved plans. Typical examples of instances of non-compliance include minimum flow deviations, reservoir elevation deviations, water quality deviations, and deviations of required fish passage facility operations. During environmental inspections, the general findings are summarized with licensees and exemptees in the field. Subsequently, staff issues follow-up letters that provide regulated entities with a detailed description of the environmental inspection, including any areas of non-compliance or violations, and specify what corrective action must be taken by a certain date. Required follow-up actions are tracked until the licensee or exemptee completes the task. The environmental inspection program provides an opportunity for Commission staff to discuss the licensee’s compliance record with them one-on-one at the project, to confirm project compliance, and to provide specific guidance to ensure future compliance with license requirements. As needed, the Commission can establish rules and set policy relative to the construction and operation of hydropower projects.

Workstream Impact

- Ensure that hydropower facility owners/operators understand license/exemption requirements, are aware of any violations or areas of non-compliance, and understand the corrective actions that must be taken to achieve compliance with the Commission’s authorization.

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
		Obj 1.1 > CF 1.1.1 CF 1.1.2	Obj 2.1 > CF 2.1.1 CF 2.1.2	Obj 3.1 > CF 3.1.1 CF 3.1.2	
		Obj 1.2 > CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2	

GOAL 2 > OBJECTIVE 2.2

Minimize risks to the public associated with FERC-jurisdictional energy infrastructure.

The Natural Gas Act and the Federal Power Act, among other statutory authorities, charge FERC with ensuring that certain energy infrastructure, once authorized, continues to operate safely and reliably. Failure of LNG or hydropower infrastructure due to structural issues, unsafe operations, natural disasters, cyber and physical attacks, or other hazards can result in loss of life as well as environmental and economic consequences. In addition, the Energy Policy Act of 2005 amended the Federal Power Act to give FERC authority with respect to reliability standards for the Bulk-Power System and oversight of an Electric Reliability Organization (ERO). To fulfill these responsibilities, FERC must minimize risks to the public associated with FERC-jurisdictional energy infrastructure.

FERC achieves this objective through a range of activities. FERC conducts timely safety reviews and inspections with rigorous requirements, thereby advancing the safety of non-federal hydropower projects and LNG facilities throughout their entire life cycle. FERC also oversees the development and review of mandatory reliability and security standards for the Bulk-Power System, as well as compliance with these standards. In addition, FERC collaborates with regulated entities and other federal and state governmental agencies to identify solutions to cyber and physical threats to FERC-jurisdictional infrastructure, facilitating proactive efforts that prevent or mitigate loss or damage.

- The Strategic Priority of **Safeguarding Electric Infrastructure from Emerging Threats to Reliability and Security** will provide a strategic focus for this objective’s activities, particularly in terms of revising reliability standards and promoting best practices to address extreme weather and cybersecurity threats.

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
		Obj 1.1 > CF 1.1.1 CF 1.1.2	Obj 2.1 > CF 2.1.1 CF 2.1.2	Obj 3.1 > CF 3.1.1 CF 3.1.2	
		Obj 1.2 > CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2	

GOAL 2 > OBJECTIVE 2.2 > CORE FUNCTION 2.2.1

Conduct comprehensive and timely inspections of hydropower and LNG facilities to ensure compliance.

PURPOSE OF THE CORE FUNCTION

To verify that LNG and hydropower facilities meet the Commission’s criteria and confirm projects are maintained and operated safely.

Provide assurance to **stakeholders** that:

- Projects have oversight for meeting operational responsibilities required under the Natural Gas Act and Federal Power Act.

Ensure that **owners/operators**:

- Understand the operational compliance requirements contained in any Commission authorization for a project.
- Take action to achieve and maintain compliance with the Commission’s requirements.

To accomplish this core function, FERC draws on staff’s engineering expertise, inspection experience, and familiarity with safety standards, best practices, and Commission requirements.

FERC carries out this core function through the workstreams described below.

Conduct LNG Facility Inspections

To assess whether a facility may pose an undue risk to the public, Commission staff conducts a comprehensive environmental and engineering review process that includes working very closely with other federal agencies such as the U.S. Coast Guard and the Department of Transportation, which establish and enforce LNG safety and security standards. Once in operation, jurisdictional LNG peak-shaving plants are inspected once every other year, and LNG import or export terminals are inspected once each year. The Commission issues recommendation letters identifying actions that companies should take within a certain timeframe to address issues identified during the inspection. As needed, the Commission can issue orders and set policy relative to the construction and operation of LNG projects.

Workstream Impact

- Alert facility owners/operators to areas of non-compliance and identify corrective actions.
- Ensure the safety of the public, as well as the continued operation of natural gas infrastructure facilities that have been determined to be in the public interest.

Conduct Hydropower Facility Inspections

Highly trained Commission engineers work closely with local and other federal officials at all stages of hydropower project development and operation. Before projects are constructed, Commission engineers review designs, plans, and specifications of the proposed facility. Through regularly scheduled and comprehensive inspections during construction and operation, Commission engineers

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
		Obj 1.1 > CF 1.1.1 CF 1.1.2	Obj 2.1 > CF 2.1.1 CF 2.1.2	Obj 3.1 > CF 3.1.1 CF 3.1.2	
		Obj 1.2 > CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2	

verify that dams meet stipulated design criteria, identify necessary remedial modifications or required maintenance, and ensure compliance with requirements. The Commission issues hydropower inspection reports and follow-up letters documenting findings from these inspections. When issues are found, the Commission requires the licensee/exemptee to develop a plan and schedule for addressing the matter and conducting follow-up activities. The Commission is incorporating a risk-informed decision-making approach that provides the capability to assess non-traditional failure modes, provides leveled risk across different loading conditions, focuses inspections and surveillance on projects’ specific potential failure modes and monitoring programs, and guides remediation projects to provide an overall reduced level of risk to the public. As needed, the Commission can issue orders and set policy relative to the construction and operation of hydropower projects.

In support of the work conducting inspections, the Commission’s dam safety program includes additional activities described below to minimize risks to the public.

Review Independent Consultant Reports. The Commission requires comprehensive inspections and engineering evaluations of the high and significant hazard potential dams by independent consultants every five years. The Commission thoroughly reviews and evaluates all independent consultant inspection reports to determine whether additional studies are required or if remedial measures are necessary. Follow-up letters provide FERC’s review comments and input on the independent consultant’s proposed follow-up actions.

Develop Hydropower Guidelines. FERC publishes dam safety engineering guidelines to provide dam safety technical guidance to staff, the industry, consultants, and licensees/exemptees. The guidelines include the suggested procedures and criteria for the engineering evaluation and analysis of hydropower projects. The Commission’s surveillance and monitoring component provides methods to better identify and solve dam safety issues, and improves coordination, abilities, and trust among all stakeholders. FERC periodically updates existing engineering guidelines to reflect advancements in engineering standards and practices. In addition, FERC develops new guidelines to provide guidance on subject matter not currently covered by the existing guidelines.

Review Emergency Action Plans. All jurisdictional dams are required to develop and file emergency action plans (EAPs) with the Regional Engineer, unless exempted due to low hazard classification. EAPs provide for the development, maintenance, and periodic testing of project-specific plans for emergency response, including ensuring coordination and cooperation among the dam owners, state and local emergency management agencies, and the Commission. EAPs must be continually updated to reflect any changing internal and external conditions. Any changes made to an EAP must also be filed. FERC staff reviews EAPs and provide licensees with review letters that offer comments on the filing.

Workstream Impact

- Alert facility owners/operators to areas of non-compliance and identify corrective actions.
- Ensure the safety of the public, as well as the continued operation of hydropower infrastructure facilities that have been determined to be in the public interest.

INTRO	PRIORITIES	GOAL 1		GOAL 2				GOAL 3			APPENDICES
	Obj 1.1 >	CF 1.1.1	CF 1.1.2	Obj 2.1 >	CF 2.1.1	CF 2.1.2		Obj 3.1 >	CF 3.1.1	CF 3.1.2	
	Obj 1.2 >	CF 1.2.1	CF 1.2.2	Obj 2.2 >	CF 2.2.1	CF 2.2.2	CF 2.2.3	Obj 3.2 >	CF 3.2.1	CF 3.2.2	

GOAL 2 > OBJECTIVE 2.2 > CORE FUNCTION 2.2.2

Protect and improve the reliable and secure operation of the Bulk-Power System through mandatory and enforceable reliability standards.

PURPOSE OF THE CORE FUNCTION

To promote the reliability and security of the Bulk-Power System that delivers essential services to end users every moment of every day.

Provide assurance to **consumers/stakeholders** that:

- Blackouts and major Bulk-Power System disruptions are investigated, and results are used to prevent future blackouts and disruptions.
- Bulk-Power System planning and operation oversight leads to mandatory standards that evolve with the changing resource mix to continue to support reliable and safe operation.

Provide assurance to **users/owners/operators** that:

- Reliability and security standard development oversight leads to standards that efficiently and effectively support reliable and secure operation.
- ERO audits, investigations, and other compliance monitoring processes are fair and consistent and their outcomes, including penalties, are appropriate and reasonable.
- They have a voice and can provide input regarding trends affecting Bulk-Power System reliability and the range of possible actions to take to maintain and improve reliable and secure Bulk-Power System operations.

To accomplish this core function, FERC draws on its staff’s electrical engineering and cybersecurity expertise, including many years of experience in the utility industry.

FERC carries out this core function through the workstreams described below.

Monitor Bulk-Power System Performance and Assess the Need for Modified/New Reliability Standards

FERC actively monitors the performance of the Bulk-Power System. FERC maintains a monitoring system that provides up-to-the-minute data regarding the current performance of the grid. In preparation for, and during, events affecting Bulk-Power System performance, FERC staff actively engages with colleagues at the ERO to assess and report on current conditions and the status of restoration efforts. FERC augments its active Bulk-Power System monitoring with a wide range of data, including: ERO-collected data regarding generator and electric transmission system performance; ERO reports and studies; subscription data services; and direct engagement with Bulk-Power System users, owners, and operators. The Commission operates a 24/7 emergency message notification system to maintain Bulk-Power System situational awareness during active events such as storms and wildfires. To ensure that staff remains current regarding advancing power system technologies and cybersecurity, FERC actively engages with the U.S. Department of Energy, as well as with industry and professional organizations. In addition, FERC engages with

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
		Obj 1.1 > CF 1.1.1 CF 1.1.2	Obj 2.1 > CF 2.1.1 CF 2.1.2	Obj 3.1 > CF 3.1.1 CF 3.1.2	
		Obj 1.2 > CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2	

stakeholders and experts, sometimes by hosting technical conferences, to remain abreast of trends that may affect Bulk-Power System reliability.

FERC uses this information to assess potential risks to reliability and security and identify opportunities for improving reliability standards and oversight. FERC also conducts inquiries into major blackouts and other grid-related events. These inquiries, often conducted jointly with the ERO, identify the root causes of the events, verify best practices, publicize lessons learned, and determine whether improvements to the reliability standards would lower the risk of future events. Often, FERC staff works with the ERO and its Regional Entities to look closely at areas of concern, including: the impacts of California wildfires on electric transmission; the potential impact of climate change, extreme weather, and a changing resource mix on reliability; and evolving cybersecurity threats and possible mitigating technologies. These efforts determine whether changes to reliability standards may be needed, or what other activities would be warranted to maintain reliability given the dramatic changes currently underway.

Workstream Impact

- Ensure that FERC is up to date on the performance of the Bulk-Power System and the implications of any trends on continued reliability and security of the Bulk-Power System.
- Ensure that enforceable reliability standards are sufficient to maintain the reliability and security of the Bulk-Power System, given the changes facing the electric industry.
- Apply lessons from previous blackouts and other grid-related cybersecurity events to prevent the reoccurrence of similar disruptive events.

Review and Approve Proposed Reliability Standards

Under section 215 of the Federal Power Act, the ERO develops and proposes reliability standards, including cybersecurity standards, for review and approval by FERC. FERC may approve, reject, or direct changes to proposed reliability standards, and may not write reliability standards. FERC reviews each proposed reliability standard to determine whether it will maintain and improve the reliable and secure operation of the Bulk-Power System. For proposed reliability standards that have complex or controversial provisions, FERC will typically go through an in-depth notice and comment rulemaking process to build a complete record prior to issuing a final rule addressing the standard. For non-controversial proposed reliability standards, the Commission may approve the proposed reliability standard more expeditiously following abbreviated public notice and comment.

INTRO	PRIORITIES	GOAL 1		GOAL 2			GOAL 3		APPENDICES	
	Obj 1.1 >	CF 1.1.1	CF 1.1.2	Obj 2.1 >	CF 2.1.1	CF 2.1.2	Obj 3.1 >	CF 3.1.1	CF 3.1.2	
	Obj 1.2 >	CF 1.2.1	CF 1.2.2	Obj 2.2 >	CF 2.2.1	CF 2.2.2	CF 2.2.3	Obj 3.2 >	CF 3.2.1	CF 3.2.2

FERC monitors and participates in the reliability standards development process to help ensure that the developed standards adequately address threats to reliability and security prior to being filed with the Commission.

Workstream Impact

- Ensure that approved mandatory standards support reliable and secure grid planning and operations.
- Provide reasonable notice and opportunity for public comment prior to Commission action.

Oversee the ERO and the Enforcement of Reliability Standards

FERC oversees the ERO, reviewing and approving its budget and rules of procedure. The Commission also oversees the ERO’s enforcement activities, including audits, investigations, determinations of violations, proposed penalties, and remediation activities carried out by industry. The ERO submits proposed enforcement actions for the Commission’s review and approval before taking effect to help ensure that any penalty imposed bears a reasonable relation to the seriousness of the violation and that effective remediation timely occurs. If the Commission determines that further review is warranted, it may issue an order initiating review of a proposed penalty.

The Commission exercises independent enforcement authority for the reliability standards. For serious reliability and security events, such as blackouts, FERC may investigate to determine if reliability standards were violated. Additionally, FERC conducts non-public audits of the reliability standards, focusing primarily on cybersecurity. These audits evaluate compliance with the reliability standards and assess the overall security posture of the registered entities. These audits provide the Commission with firsthand insight into the strengths and weaknesses of the reliability standards, especially the cybersecurity standards, and into regulated utilities’ cybersecurity practices and procedures. To help improve the cybersecurity posture of industry generally, FERC staff issues an annual report on lessons learned from the cybersecurity audits, which assists industry in improving its cybersecurity posture and compliance with the cybersecurity standards. FERC uses its oversight of the ERO’s enforcement processes and actions, and its experience with audits, to determine if changes to the reliability standards are needed.

Workstream Impact

- Ensure the ERO’s enforcement efforts result in effective reliability and security practices.
- Improve entities’ compliance with reliability standards.
- Improve the overall security posture of industry.

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
		Obj 1.1 > CF 1.1.1 CF 1.1.2	Obj 2.1 > CF 2.1.1 CF 2.1.2	Obj 3.1 > CF 3.1.1 CF 3.1.2	
		Obj 1.2 > CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2	

GOAL 2 > OBJECTIVE 2.2 > CORE FUNCTION 2.2.3
Protect FERC-jurisdictional energy infrastructure through collaboration and sharing best practices.

PURPOSE OF THE CORE FUNCTION

To identify, communicate, assess, and address cyber and physical security threats on FERC-jurisdictional infrastructure through voluntary collaboration.

Provide assurance to **consumers/stakeholders** that:

- Operators of critical energy infrastructure facilities have access to the information and tools needed to secure their cyber and physical facilities.

Provide **energy facility owners/operators and stakeholders** with:

- Accurate and helpful alerts about the latest cyber and physical threats.
- Methods to address threats against their facilities.
- Access to classified information tailored to their needs.
- Clear best practices and tools for enhancing and maintaining cyber and physical security.
- Coordination with other sectors of critical infrastructure.

To accomplish this core function, FERC draws on its staff’s familiarity with FERC-jurisdictional infrastructure, extensive experience in grid operations, and cybersecurity expertise to enable FERC to coordinate with, and support, other government agencies and regulated entities in addressing security threats.

FERC carries out this core function through the workstreams described below.

Collaborate With the Critical Infrastructure Community to Inform and Address Infrastructure Security

FERC staff collaborates with the private sector as well as with federal partners on the latest threats to the security of energy infrastructure and countermeasures to those threats. FERC staff leverages these relationships to maintain awareness of new or existing threats, activities, and capabilities of adversaries that may initiate a cyber or physical attack on FERC-jurisdictional infrastructure. For example, FERC staff coordinates with its federal partners—including the Department of Energy, Department of Defense, Department of Homeland Security, the Office of the Director of National Intelligence, and the Transportation Security Administration—and energy industry entities to identify, analyze, and share information with energy industry entities about threats to jurisdictional energy infrastructure, as well as ways to mitigate and respond to these attacks. These collaborations often lead to the development and dissemination of tools, best practices, and threat mitigation measures and techniques among the critical infrastructure community.

Workstream Impact

- Ensure that other government agencies have information about the security posture of jurisdictional entities.
- Assist the critical infrastructure community to identify cyber and physical security priorities to inform best practices and mitigation strategies that protect against threats and vulnerabilities.

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
		Obj 1.1 > CF 1.1.1 CF 1.1.2	Obj 2.1 > CF 2.1.1 CF 2.1.2	Obj 3.1 > CF 3.1.1 CF 3.1.2	
		Obj 1.2 > CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2	

Identify and Assess Threats and Vulnerabilities in Critical Energy Infrastructure

FERC staff works with other federal agencies and regulated industries through architecture assessments, physical security reviews, exercises, reviews of cybersecurity programs, and other activities. Drawing on these experiences, staff uses their analysis and assessment capabilities to identify and characterize threats, vulnerabilities, responses, and countermeasures that are relevant to jurisdictional infrastructure.

FERC staff conducts assessments at individual electric, natural gas, and hydropower facilities, focusing on information technology (IT) and operational technology networks and the cyber and physical security of those networks. In these voluntary assessments, FERC staff examines an entity’s facilities to include a range of topics such as electromagnetic hardening, business environment, risk management, cybersecurity awareness and training, incident response and recovery, data security, protective technologies, network architecture, and supply chain security. Staff asks questions and makes observations, identifies options for improvement, and encourages facility operators to implement best practice mitigation strategies, countermeasures, and tools. FERC staff may review the entity’s audit plan for facilities that will be subject to a regulatory audit by NERC or the Commission to better guide the assessment schedule.

FERC staff also participates in large-scale security exercises, during which they deliver individualized feedback and guidance to the exercise participants. In addition, FERC staff supports infrastructure security research and development initiatives, when relevant to the security and resilience of critical energy infrastructure. Finally, FERC offers security information to state regulators and other organizations to help them better understand and improve their security efforts on critical energy infrastructure.

Workstream Impact

- Enable FERC to enhance and maintain cyber and physical security among critical infrastructure energy facilities.
- Allow FERC to analyze and understand broader infrastructure issues and provide a basis for identifying common vulnerabilities and developing best practices to mitigate them.
- Obtain feedback and insight about the efficacy of the advice, recommendations, and guidance it provides to owners of jurisdictional infrastructure.

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
	Obj 1.1 >	CF 1.1.1	CF 1.1.2	Obj 2.1 >	CF 2.1.1
	Obj 1.2 >	CF 1.2.1	CF 1.2.2	Obj 2.2 >	CF 2.2.1
				Obj 2.3 >	CF 2.3.1
				Obj 3.1 >	CF 3.1.1
				Obj 3.2 >	CF 3.2.1
					CF 3.2.2



GOAL 3

Provide Mission Support Through Organizational Excellence

Achieve organizational excellence by using resources effectively, adequately equipping FERC employees for success, and executing responsive and transparent processes, as well as proactive engagement and education, to strengthen public trust.

The public interest is best served when the Commission operates in an efficient, responsive, and transparent manner. The Commission pursues this goal by maintaining established processes and providing services in accordance with governing statutes, authoritative guidance, and prevailing best practices. The Commission’s staff, while serving in different program offices, must work collaboratively and execute processes that work in concert with each other to produce the high-quality results expected by the American people. In accomplishing this goal, the Commission will use its resources efficiently, empower its employees, and earn the public trust. These essential outcomes are indicative of a model regulatory agency.

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
		Obj 1.1 > CF 1.1.1 CF 1.1.2	Obj 2.1 > CF 2.1.1 CF 2.1.2	Obj 3.1 > CF 3.1.1 CF 3.1.2	
		Obj 1.2 > CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2	

GOAL 3 > OBJECTIVE 3.1

Manage resources effectively through an engaged workforce.

As the Commission faces new and increasing challenges, the demands on Commission offices and employees continue to grow. It is essential for the organization to provide support that addresses internal needs and enables organizational excellence.

FERC achieves this objective by providing processes and services that help office leadership prioritize resource allocations, make prudent investments that yield returns that directly benefit the agency’s mission, and use Commission resources in an efficient manner. These processes and services also help management meet federal statutes that require the Commission to recover its operating costs from the entities it regulates and do so in a manner that avoids unnecessarily increasing the cost of energy to consumers.

FERC also achieves this objective by providing services, tools, and resources that equip employees to drive success and accomplish the agency’s mission. On an annual basis, the Commission allocates over 60% of its budget to cover the compensation costs of its employees. Given this significant investment, the Commission places extremely high value on its employees, and is focused on ensuring that employees have a performance management system that clarifies expectations, removes barriers to performance and engagement, and provides useful feedback that supports employee effectiveness.

By providing processes and services that meet internal needs, FERC supports the effective use of resources, equips employees for success, and achieves organizational excellence.

INTRO	PRIORITIES	GOAL 1			GOAL 2			GOAL 3			APPENDICES
		Obj 1.1 >	CF 1.1.1	CF 1.1.2	Obj 2.1 >	CF 2.1.1	CF 2.1.2	Obj 3.1 >	CF 3.1.1	CF 3.1.2	
		Obj 1.2 >	CF 1.2.1	CF 1.2.2	Obj 2.2 >	CF 2.2.1	CF 2.2.2	CF 2.2.3	Obj 3.2 >	CF 3.2.1	CF 3.2.2

GOAL 3 > OBJECTIVE 3.1 > CORE FUNCTION 3.1.1

Maintain processes and provide compliant services that enable FERC offices to manage resources effectively and efficiently.

PURPOSE OF THE CORE FUNCTION

To enable leadership to prioritize resource allocations, make prudent investments that yield returns that directly benefit FERC’s mission while complying with federal requirements.

Provide assurance to **external stakeholders** that:

- FERC is a good steward of the financial and human resources entrusted to it.
- FERC maintains the assets, resources, and capabilities to carry out its legislative mandate and achieve its mission.
- FERC operates in full compliance with regulations and laws and is fully accountable to its varied stakeholders.

Ensure **FERC offices**:

- Have the resources they need to carry out operations.
- Are compliant with applicable laws and regulations.
- Have the support and guidance to achieve operational excellence and efficiency.

To accomplish this core function, FERC draws on its staff’s understanding of financial management, appropriations law, human capital, performance and risk management, information technology, and safety and security practices.

FERC carries out this core function through the workstreams described below.

Design and Implement Effective Internal Control and Accountability Systems

The Commission maintains a comprehensive framework that integrates the execution of Commission-wide strategic planning, program performance measurement, internal controls, and risk management. The framework also provides a foundation for ensuring that the Commission meets reporting and accountability requirements. In addition, the Commission provides systems, procedures, and guidance to assist office leaders in using the elements of this framework to inform their own planning and decision making; identify, prioritize, and mitigate key sources of risk; and ensure their operations are effective, efficient, and compliant with federal requirements.

Workstream Impact

- Ensure FERC’s operations are carried out according to deliberate and purposeful plans and that risks are effectively managed.
- Provide FERC the ability to assess and provide reasonable assurance of achieving effectiveness and efficiency of operations, compliance with requirements, and reliability of reporting.

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
		Obj 1.1 > CF 1.1.1 CF 1.1.2	Obj 2.1 > CF 2.1.1 CF 2.1.2	Obj 3.1 > CF 3.1.1 CF 3.1.2	
		Obj 1.2 > CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2	

Manage FERC’s Finance, Accounting, and Acquisition Requirements

In meeting its obligations to the public, the Commission must serve as a good financial steward. The Commission’s financial stewardship begins with establishing financial policies, procedures, and systems consistent with generally accepted accounting principles and guidance to ensure resources are used appropriately, and to minimize the risk of fraud, waste, and abuse. The Commission employs budgeting, acquisition, and related financial processes to ensure staff has the necessary resources to achieve its stated goals and objectives.

Further, the Commission recovers the full cost of its operations through annual charges and filing fees assessed on the industries it regulates under the Federal Power Act and the Omnibus Budget Reconciliation Act of 1986. It is critical that the Commission’s annual charges and financial reporting processes are accurate, appropriate, and transparent to earn the confidence of regulated industries and the American public. To this end, the Commission undergoes an annual, external financial statement audit to provide assurance that its financial statements are free from material misstatements.

Workstream Impact

- Ensure the effective, efficient, and transparent use of FERC’s financial resources.
- Document and demonstrate FERC’s financial stewardship, integrity, and accountability to external audiences.

Design and Implement Human Capital Strategies to Attract a Diverse and Effective Workforce

The Commission designs and implements human capital strategies to ensure that it has a diverse workforce with the skills and competencies needed to carry out its core functions effectively and meet current and future organizational needs. This begins with comprehensive workforce planning and competency modeling to both assess staffing needs and develop plans to meet those needs. The Commission identifies recruitment strategies to assist managers in acquiring highly skilled and qualified people to execute its authorities. The Commission’s human capital strategies reflect diversity and inclusion policies and strategies to strengthen the FERC community and support a diverse, healthy, and robust workforce culture. The Commission understands that diversity and inclusion are integral to maximizing operational effectiveness and retaining the required workforce. To further maintain and support a diverse and inclusive workforce, the Commission established its Diversity and Inclusion Strategic Plan which strives to remove barriers impeding equal opportunity for all employees.

Workstream Impact

- Ensure FERC can recruit the best candidates from across the country.
- Maintain a workforce with the right skills and competencies needed to achieve its mission.
- Ensure FERC supports and maintains a diverse, healthy, and robust workforce.

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
		Obj 1.1 > CF 1.1.1 CF 1.1.2	Obj 2.1 > CF 2.1.1 CF 2.1.2	Obj 3.1 > CF 3.1.1 CF 3.1.2	
		Obj 1.2 > CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2	

Maintain a Secure and Reliable IT Infrastructure

The Commission develops, coordinates, and maintains enterprise-wide IT systems that support the Commission’s critical operations and business needs. These systems include those used by external stakeholders to submit information to the Commission and to access public information. In addition, the Commission manages the hardware, software, and data needs of staff to ensure they have the tools and information needed to do their jobs. Critical to the IT program and agency operations, the Commission manages a robust cybersecurity program to ensure threats are effectively mitigated and information remains secure. In carrying out these responsibilities, the Commission develops necessary policies, procedures, and other documentation and ensures that all IT initiatives are compliant with applicable laws and regulations.

Workstream Impact

- Ensure that IT serves as a resource-multiplying asset to provide better quality information and faster service for FERC’s internal and external customers.

Maintain the Safety, Security, and Resilience of FERC Operations

Commission staff oversees the security and safety of Commission facilities and operations by conducting intelligence coordination and mission integrity activities. This includes managing and developing safety and physical security plans for facilities, continuity of operations plans, and Commission-wide oversight, guidance, coordination, and advocacy for national security information related activities. In addition, staff continuously evaluates and modifies Commission security, safety, and intelligence programs to ensure their effectiveness, compliance with government regulations, and coordination with local, state, federal, and private partners.

Workstream Impact

- Ensure the safety, security, and resilience of FERC operations and locations.
- Ensure that FERC has access to sensitive information and data from the intelligence community to monitor threats to energy infrastructure and to inform threat mitigation strategies.

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
		Obj 1.1 > CF 1.1.1 CF 1.1.2	Obj 2.1 > CF 2.1.1 CF 2.1.2	Obj 3.1 > CF 3.1.1 CF 3.1.2	
		Obj 1.2 > CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2	

GOAL 3 > OBJECTIVE 3.1 > CORE FUNCTION 3.1.2

Provide tools and services that enable employees to perform their jobs effectively and drive FERC’s success.

PURPOSE OF THE CORE FUNCTION

To ensure employees feel safe, equipped, and empowered for success.

Ensure that **employees**:

- Work in a safe and secure workplace.
- Have access to technical support so they can perform their jobs effectively.
- Work in an organization that supports their growth and development and values diversity and inclusion.
- Have clear expectations and useful feedback to perform effectively.
- Have recourse and assistance to address harassment and discrimination.

To accomplish this core function, FERC draws on its staff’s understanding of safety and security protocols, technical knowledge of Commission systems, and best practices related to training and developing an engaged workforce.

FERC carries out this core function through the workstreams described below.

Protect Employees and Provide a Safe Workplace

People are the Commission’s greatest asset, and the responsibility to protect staff is taken very seriously. The Commission continues to develop a mature and integrated protective operations program to ensure the security and safety of the Chairman, Commissioners, and Commission staff while they are conducting Commission activities throughout the United States. Additionally, the Commission has developed an Occupational Safety and Health Administration-Compliant Safety Program that identifies and addresses hazards facing FERC staff. The program also offers guidance to help employees ensure their own safety at work.

Workstream Impact

- Ensure that FERC employees are able to perform their jobs without any threat to their welfare or physical safety.

Provide Technical Support to Employees

The Commission provides a range of technical support services to employees. This includes IT support that covers IT problem solving, personal computers/laptops, applications, connectivity, telephony, and email. Commission support services also include the provision of office supplies and building related services such as furniture repairs, trash removal, and temperature regulation. Finally, the Commission

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
		Obj 1.1 > CF 1.1.1 CF 1.1.2	Obj 2.1 > CF 2.1.1 CF 2.1.2	Obj 3.1 > CF 3.1.1 CF 3.1.2	
		Obj 1.2 > CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2	

provides employees with travel support by answering travel-related questions, processing reservations and vouchers, administering the travel card program, and offering system support.

- Workstream Impact
- Ensure that FERC employees have the equipment, workspace, and tools they need to perform their jobs.

Develop and Engage Employees

The Commission strives to create an atmosphere and culture that values its diverse employees and empowers them to drive the Commission’s success. To that end, the Commission provides a range of services designed to develop and engage employees, support work/life balance, and help staff members maximize their contribution to FERC’s mission. The Commission provides employees various training and development opportunities based upon individual development plans and regular performance feedback between staff and supervisors. Diversity is highlighted and celebrated through monthly observances, guest speakers, and Employee Resource Groups, which are formed by employees across diverse demographics—race, national origin, gender, sexual orientation, military status—as well as shared interests. The Commission also ensures the work environment remains free from discrimination or harassment by providing various Equal Employment Opportunity (EEO) training and education, as well as maintaining an EEO issue and complaint resolution process in accordance with governing equal employment opportunity guidelines, laws, and regulations. The Commission routinely assesses and ensures that EEO principles are an integral part of its culture. EEO serves as an additional resource by providing direction, guidance, and monitoring of key activities to achieve a diverse workplace free of barriers to equal opportunity. The Commission’s EEO program helps support and ensure the workplace is free from discrimination in any of its management policies, practices, or procedures and supports the mission as reflected in its Diversity and Inclusion Strategic Plan.

- Workstream Impact
- Inform and focus employee effort, encourage engagement, and enable employees to drive success.
 - Ensure that employees have the opportunity to learn and grow.
 - Ensure EEO principles are an integral part of the FERC culture, the workplace is free from discrimination and harassment, and employees have support mechanisms to resolve issues and secure reasonable accommodations.

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
		Obj 1.1 > CF 1.1.1 CF 1.1.2	Obj 2.1 > CF 2.1.1 CF 2.1.2	Obj 3.1 > CF 3.1.1 CF 3.1.2	
		Obj 1.2 > CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2	

GOAL 3 > OBJECTIVE 3.2

Facilitate trust and understanding of FERC activities by promoting transparency and equity, open communication, and a high standard of ethics.

Facilitating understanding of how the Commission carries out its responsibilities and maintaining trust in the Commission are important components of the Commission’s commitment to organizational excellence. Trust and understanding increase acceptance of FERC decisions and reduce the potential for the public to dispute FERC rules and regulations. This enables the creation and enforcement of well-accepted policy.

The Commission achieves this objective by maintaining processes and public information services that promote transparency and open communication with respect to the conduct of the Commission’s business. FERC’s proactive communication, along with an online document repository and timely responses to inquiries, fosters awareness and understanding of the Commission’s activities. In particular, the Commission has a strong commitment to working with affected communities, including environmental justice communities and landowners who may be directly impacted by Commission infrastructure decisions.

In furtherance of this objective, the Commission has created the Office of Public Participation. This office will facilitate robust input from diverse perspectives, ensuring equity in FERC proceedings to provide more fulsome records that lead to stronger and fairer decision-making. The Commission is also renewing its commitment to Tribal governments by enhancing government-to-government consultation and engagement practices to ensure Tribal Nations are able to access and engage in the Commission’s decision-making processes more easily.

The Commission also furthers this objective by addressing in a timely manner arguments that the Commission made errors in its orders and other issuances. Timely consideration of such requests for rehearing allows parties aggrieved by Commission action to present their concerns to a U.S. Circuit Court of Appeals. Attorneys on Commission staff defend the Commission’s issuances in such court proceedings.

In addition, the Commission advances this objective by maintaining internal processes and services that ensure adherence to statutes, regulations, and self-imposed standards. FERC also provides training and guidance to promote an ethically informed workforce. These activities further encourage public confidence in the Commission’s activities and ability to fulfill its responsibilities.

- The Strategic Priority of **Improving Accessibility and Participation in Proceedings** will provide a strategic focus for this objective’s activities in three ways: (1) by focusing on improved outreach, technical assistance, and education to affected members of the public, including landowners and environmental justice communities to enhance public engagement; (2) by enhancing consultation and engagement practices with Tribal governments, and (3) by integrating environmental justice and equity considerations into Commission processes and decision-making. Together, these efforts enable FERC to make more comprehensive and well-informed decisions.

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
		Obj 1.1 > CF 1.1.1 CF 1.1.2	Obj 2.1 > CF 2.1.1 CF 2.1.2	Obj 3.1 > CF 3.1.1 CF 3.1.2	
		Obj 1.2 > CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2	

GOAL 3 > OBJECTIVE 3.2 > CORE FUNCTION 3.2.1

Maintain legal and other processes in accordance with the principles of due process, fairness, and integrity.

PURPOSE OF THE CORE FUNCTION

To demonstrate FERC’s commitment to integrity, fairness, and ethics as public servants and in the exercise of its regulatory authority.

Ensure that the **public, stakeholders, and jurisdictional entities:**

- Have a foundation for putting their trust into the Commission.
- Are given due process when challenging Commission orders and issuances.
- Understand how equity and environmental justice are considered within Commission processes.

To accomplish this core function, FERC draws on its staff’s legal expertise and experience regarding executive branch standards and requirements regarding ethics, transparency, and disclosure, as well as the arbitration and litigation of Freedom of Information Act (FOIA) requests, procurement, employment, and other administrative issues, where necessary.

FERC carries out this core function through the workstreams described below.

Provide Ethical and Legal Support and Analysis Regarding FERC’s Operational Functions

The Commission maintains staff that provides expert legal guidance, analysis, and support to the Commission’s operational functions as well as compliance with ethical standards and requirements. Commission legal staff ensures all Commission employees are aware of and adhere to the established ethical standards and related matters, such as standards of conduct and financial conflicts of interest. The Commission provides staff ethics training, answers staff questions, and provides guidance on matters such as recusals and post-employment requirements, and reviews certain employees’ financial disclosure reports.

The Commission’s internal legal support also provides guidance regarding administrative law, EEO, human resources, procurement laws, and the analysis of Executive Orders and Office of Management and Budget memos and how they impact the Commission. The Commission’s internal legal analysis also extends to determinations on FOIA and Critical Energy Infrastructure Information requests.

Finally, Commission counsel also represent the Commission in litigation and arbitration in the following areas: FOIA, procurement, employment, and other administrative issues.

Workstream Impact

- Demonstrate FERC’s high standards of ethics and commitment to integrity.
- Encourage a level of public trust and confidence.

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
		Obj 1.1 > CF 1.1.1 CF 1.1.2	Obj 2.1 > CF 2.1.1 CF 2.1.2	Obj 3.1 > CF 3.1.1 CF 3.1.2	
		Obj 1.2 > CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2	

Provide Legal Guidance and Representation to FERC on Rehearing and Appeal of Commission Issuances

Attorneys on Commission staff provide representation and guidance to the Commission when its orders or issuances are challenged through a request for rehearing or through a petition for review in a U.S. Court of Appeals. In accordance with the rehearing and judicial review frameworks under the Natural Gas Act, the Federal Power Act, and the Interstate Commerce Act, staff reviews and analyzes rehearing requests, and develops orders or notices to resolve them as appropriate.

Attorneys on Commission staff also represent the Commission when its issuances are challenged in a U.S. Court of Appeals. When a case involving a Commission issuance goes to the U.S. Supreme Court, attorneys on Commission staff support the Department of Justice in representing the Commission.

Workstream Impact

- Ensure that challenges to Commission issuances are handled in a manner that demonstrates integrity and fairness and assures due process for parties subject to Commission orders and issuances.

Provide Guidance to the Commission on Matters Involving Environmental Justice and Equity

Commission counsel provide guidance on measures to integrate environmental justice and equity considerations into Commission processes and decision-making, across all programs. Assessment of Commission policies and practices helps to inform staff’s development of an equity plan with actionable goals to guide the Commission’s work.

Workstream Impact

- Remove barriers that can block historically overburdened and underserved communities from benefitting from Commission policies and processes.
- Demonstrate Commission commitment to environmental justice and equity and facilitate public trust.

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
	Obj 1.1 >	CF 1.1.1	CF 1.1.2	Obj 3.1 >	CF 3.1.1
	Obj 1.2 >	CF 1.2.1	CF 1.2.2	Obj 3.2 >	CF 3.2.1
			CF 2.2.1	CF 2.2.2	CF 2.2.3
				Obj 3.2.1	CF 3.2.2

GOAL 3 > OBJECTIVE 3.2 > CORE FUNCTION 3.2.2
Promote understanding, participation, and engagement.

PURPOSE OF THE CORE FUNCTION

To promote transparency and understanding regarding FERC’s authority, activities, and proceedings, thereby enhancing participation and engagement in Commission activities.

Ensure that the **public, stakeholders, Tribes, and jurisdictional entities**:

- Understand how the Commission carries out its responsibilities.
- Have access to accurate and timely information about the Commission’s activities.
- Have the opportunity and support to participate in Commission proceedings, including through alternative dispute resolution, assistance with procedural or technical questions, and potentially an opportunity to seek intervenor funding.

To accomplish this core function, FERC draws on its staff’s expertise in public engagement and communication, an understanding of due process, Commission processes, procedures, and requirements, and in conflict resolution.

FERC carries out this core function through the workstreams described below.

Educate, Inform, and Engage

The Commission meaningfully engages with the public through outreach and education to facilitate greater understanding of Commission processes and solicit broader participation in matters before the Commission. This work includes educating the public, media, elected officials, and other stakeholders about FERC’s mission, role, direction, and policy, and ensuring that regulated entities and other interested stakeholders have access in a timely manner to accurate information about the Commission’s activities. Commission staff answers numerous questions from the public and stakeholders and leverage traditional and social media platforms (email, electronic public postings, podcasts, webinars, social media feeds, videos, presentations, press releases, reports, etc.) to share information from the Commission quickly with large and diverse audiences. Commission transparency is supported by timely responses to information requests as well as proactive communication and relationship building with stakeholders. Commission staff frequently addresses questions from Congress and other government agencies, state agencies and regulators, as well as from the media and the public at large.

Commission staff also serves as a liaison to Congress, other government agencies, Tribes, and foreign governments. In this liaison role, the Commission maintains relationships with members of Congress, coordinates the Commission’s participation in activities hosted by other agencies, facilitates consultation and engagement with Tribal governments on a variety of matters, and welcomes international visitors to the Commission.

Workstream Impact

- Facilitate understanding of how FERC carries out its responsibilities.
- Promote trust in and engagement with FERC.
- Demonstrate FERC’s commitment to transparency and open communication.

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
	Obj 1.1 >	CF 1.1.1 CF 1.1.2	Obj 2.1 > CF 2.1.1 CF 2.1.2	Obj 3.1 > CF 3.1.1 CF 3.1.2	
	Obj 1.2 >	CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2	

Provide Outreach and Assistance on Individual Proceedings

The Commission provides outreach and assistance on individual proceedings in a number of ways. Commission staff coordinates assistance to the public participating, or seeking to participate, in proceedings before the Commission through direct outreach, workshops, and with timely responses to inquiries received on its hotline. Commission staff manages a Landowner Helpline that assists landowners with issues relating to the construction or operation of FERC jurisdictional facilities. The Commission and its staff also act as a liaison to members of the public affected by Commission proceedings, including natural gas pipeline proceedings, by providing process information on individual proceedings, and coordinating requests for technical assistance. Staff ensures that the Commission is responsive to public input and that stakeholder interactions with the Commission are inclusive and fair.

The Commission also offers neutral and independent alternative dispute resolution services, assisting parties in the voluntary resolution of their energy and environmental disputes before, during, or after a complaint is filed with the Commission.

Workstream Impact

- Promote public participation and engagement with FERC.
- Ensure that individuals are treated in a manner that is inclusive and fair.
- Ensure that the concerns of Tribal members, environmental justice, energy justice, and other historically marginalized communities are fully and fairly considered in FERC proceedings.

Maintain and Provide Public Information Systems and Services to Facilitate Public Engagement

Commission staff maintains public information systems that allow for the submission by the public of comments, protests, and other correspondence about Commission proceedings. Commission information systems and services also allow the public to access submissions made to, and issuances posted by, the Commission. To facilitate public engagement, highly trained Commission staff prepares notices announcing incoming filings (shortly after filings are received by the Commission) or announcing proposed rules and establishing deadlines for interested stakeholders and/or the public to submit interventions, comments and/or protests to those filings or rules. To promote transparency, the evidentiary record that documents the basis for Commission decisions and rules is inputted and maintained in eLibrary (the Commission’s official document repository) and made available online for public view and examination. In addition, in advance of open public meetings where the Commission considers regulatory matters for final vote and processing, Commission staff issues public notices that list those matters to be discussed at the open public meeting. Finally, FERC issues a bi-weekly public notice to make the public aware of any off-the-

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
		Obj 1.1 > CF 1.1.1 CF 1.1.2	Obj 2.1 > CF 2.1.1 CF 2.1.2	Obj 3.1 > CF 3.1.1 CF 3.1.2	
		Obj 1.2 > CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2	

record communications to Commission staff that could influence the Commission’s decision-making process.

Workstream Impact

- Ensure that the public is kept up to date on Commission decisions and activities.
- Promote the efficient sharing of information between the agency, the public, and external stakeholders.
- Ensure that public and external stakeholders can comment on filings made with the Commission, rulemakings, and Commission issuances.

Coordinate Intervenor Funding

Section 319(b)(2) of the Federal Power Act authorizes the Commission to provide funding to compensate any person whose intervention or participation in a proceeding substantially contributed to the approval of a position advocated by that person. The Commission may compensate a person for reasonable attorney’s fees, expert witness fees, or other costs of intervening or participating in a significant proceeding before the Commission upon a showing of significant financial hardship. The Commission intends to establish a workstream by which staff provides advice and recommendations to the Commission with respect to potential intervenor funding. The Commission intends to conduct a rulemaking process to seek public comment on this topic.

Workstream Impact

- Ensure that any intervenor funding by FERC is appropriate and fair.
- Ensure that Intervenor funding decisions are transparent and understood.

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
		Obj 1.1 > CF 1.1.1 CF 1.1.2	Obj 2.1 > CF 2.1.1 CF 2.1.2	Obj 3.1 > CF 3.1.1 CF 3.1.2	
		Obj 1.2 > CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2	

Appendices

Appendix A: Regulatory Authority History and Overview

Overview

The Commission has an important role in the development of a reliable energy infrastructure and the protection of wholesale customers from unjust and unreasonable rates and undue discrimination and undue preference. The Commission draws its authority from various statutes and laws that are described below.

Hydropower

In 1920, Congress passed the Federal Water Power Act, which gave the Federal Power Commission, the Commission’s predecessor, its original authority to license and regulate non-federal hydropower projects. As Congress expanded the regulatory authority of the Federal Power Commission, the Federal Water Power Act ultimately became Part I of the Federal Power Act. Part I of the Federal Power Act has been amended by subsequent statutes including the Electric Consumers Protection Act of 1986, the Energy Policy Act of 1992, the Hydropower Regulatory Efficiency Act of 2013, and the America’s Water Infrastructure Act of 2018. The Commission relies on these authorities to carry out its hydropower responsibilities, including: the issuance of preliminary permits; determinations regarding qualifying conduit facilities; the issuance of licenses for the construction and operation of new projects; the issuance of relicenses for existing projects; the investigation and assessment of headwater benefits; and the oversight of all ongoing project operations, including dam safety and security inspections, public safety, and environmental monitoring. While the Commission’s responsibility under the Federal Power Act is to strike an appropriate balance among the many competing developmental and non-developmental (including environmental) interests, several other statutes affect hydropower regulation. These include, but are not limited to, NEPA, the Clean Water Act, the Coastal Zone Management Act, the Endangered Species Act, the Fish and Wildlife Coordination Act, and the National Historic Preservation Act.

Electric

Since 1935, the Commission has regulated certain electric industry activities under Part II of the Federal Power Act. Under the Federal Power Act sections 205 and 206, the Commission ensures that the rates, terms, and conditions of sales for resale of electric energy and transmission in interstate commerce by public utilities are just and reasonable and not unduly discriminatory or preferential. Under the Federal Power Act section 203, the Commission reviews mergers and acquisitions, and certain other corporate transactions involving public utilities and public utility holding companies. Under the Federal Power Act section 204, the Commission reviews the issuance of securities or assumptions of liabilities by certain public utilities subject to its jurisdiction. Section 215 of the Federal Power Act provides for the establishment of a federal regulatory system of mandatory and enforceable electric reliability standards for the Nation’s Bulk-Power System. The standards, developed by a Commission-certified ERO and approved by the Commission, apply to all users, owners, and operators of the Bulk-Power System. The ERO operates within the 48 contiguous states and is under the direct oversight of the

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
		Obj 1.1 > CF 1.1.1 CF 1.1.2	Obj 2.1 > CF 2.1.1 CF 2.1.2	Obj 3.1 > CF 3.1.1 CF 3.1.2	
		Obj 1.2 > CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2	

Commission. The Commission is ultimately responsible for the effective enforcement of the standards.

The Commission also has other electric regulatory responsibilities under portions of the Public Utility Regulatory Policies Act of 1978 and the Public Utility Holding Company Act of 2005 pertaining to qualifying facilities, exempt wholesale generators, and books and records access requirements. Under the Energy Independence and Security Act of 2007, the Commission, along with the Department of Energy and National Institute of Standards and Technology, has a role to play in ensuring awareness, coordination, and integration of the federal government’s diverse activities related to smart grid technologies and practices. The Commission’s regulations apply primarily to investor-owned utilities. In contrast, federal government-owned utilities (e.g., Tennessee Valley Authority, federal power marketing agencies), state and municipal utilities, and most cooperatively owned utilities, are not subject to Commission regulation (with certain limited exceptions). Regulation of retail sales and local distribution of electricity are matters left to the states. In addition, the Commission does not authorize the construction of new generation facilities (other than non-federal hydroelectric facilities). Such authorization is the responsibility of state and local governments.

Natural Gas and Liquefied Natural Gas

The Commission’s role in regulating the natural gas industry is largely defined by the Natural Gas Act. Under section 3 of the Natural Gas Act, the Commission reviews the siting, construction, and operation of facilities to import and export natural gas, including LNG terminals. As part of this responsibility, the Commission conducts cryogenic design and technical review of the proposed LNG facilities during the authorization process, and compliance inspections during construction. Once an LNG facility is constructed and operational, the Commission conducts safety, security, and environmental inspections for the life of the facility. Under section 7 of the Natural Gas Act, the Commission issues certificates of public convenience and necessity for the construction and operation of interstate natural gas pipelines and storage facilities. The Commission also conducts compliance inspections of natural gas pipelines and storage facilities during construction. Although the Commission does not have jurisdiction over the safety or security of natural gas pipelines or storage facilities once they are in service, it actively works with other agencies that do have these responsibilities, most notably the Pipeline and Hazardous Materials Safety Administration of the Department of Transportation. As required by NEPA, the Commission prepares environmental documents for proposed natural gas and LNG facilities and acts in conformance with other environmental statutes as appropriate, including the Endangered Species Act, National Historic Preservation Act, Clean Water Act, Clean Air Act, and Coastal Zone Management Act. Under sections 4 and 5 of the Natural Gas Act, the Commission oversees the rates, terms, and conditions of transportation and of certain sales for resale of natural gas in interstate commerce. The Commission is also responsible for determining fair and equitable rates for intrastate pipelines transporting or storing natural gas under section 311 of the Natural Gas Policy Act. The Commission’s jurisdiction over sales for resale of natural gas is limited by the Natural Gas Policy Act and the Natural Gas Wellhead Decontrol Act of 1989. Regulation of the production and gathering of natural gas, as well as retail sales and local distribution of natural gas, are matters left to the states.

INTRO	PRIORITIES	GOAL 1			GOAL 2			GOAL 3			APPENDICES
		Obj 1.1 >	CF 1.1.1	CF 1.1.2	Obj 2.1 >	CF 2.1.1	CF 2.1.2	Obj 3.1 >	CF 3.1.1	CF 3.1.2	
		Obj 1.2 >	CF 1.2.1	CF 1.2.2	Obj 2.2 >	CF 2.2.1	CF 2.2.2	CF 2.2.3	Obj 3.2 >	CF 3.2.1	CF 3.2.2

Oil

The Interstate Commerce Act gives the Commission jurisdiction over the rates, terms and conditions of transportation services provided by interstate oil pipelines. Oil pipelines transport crude oil, natural gas liquids (ethane, propane, and butane), refined petroleum products (gasoline, jet fuel and fuel oils), and liquefied petroleum gas. The Commission has no authority over the construction of new oil pipelines or over other aspects of the industry such as production, refining or wholesale or retail sales of oil. In addition to ensuring oil pipelines comply with the Commission's regulations governing oil pipelines' tariffs subject to section 6 of the Interstate Commerce Act, the Commission's responsibilities include the establishment of equal service conditions to provide shippers with equal access to pipeline capacity, and analyzing market-based, cost-of-service and anchor shipper contract rate applications to ensure just and reasonable rates for transporting petroleum and petroleum products by pipeline in interstate commerce.

Enforcement

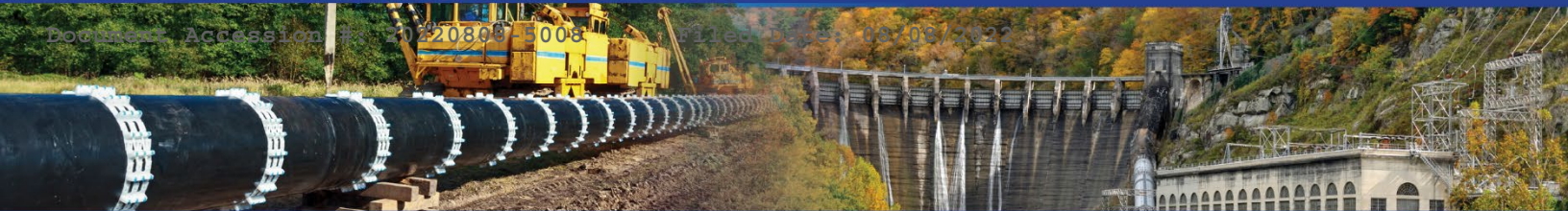
Through the Energy Policy Act of 2005, Congress gave the Commission broad authority to prohibit manipulation in wholesale energy transactions. Congress also enhanced civil penalties for violations of the Federal Power Act, the Natural Gas Act, and the Natural Gas Policy Act. The Energy Policy Act of 2005 made three major changes to the Commission's civil penalty authority. Congress expanded the Commission's Federal Power Act civil penalty authority to cover violations of any provision of Part II of the Federal Power Act, as well as of any rule or order issued thereunder. Congress extended the Commission's civil penalty authority to cover violations of the Natural Gas Act, or of any rule, regulation, restriction, condition, or order made or imposed by the Commission under the Natural Gas Act authority. Congress established the maximum civil penalty the Commission may assess under the Natural Gas Act, the Natural Gas Policy Act, or Part II of the Federal Power Act as \$1,000,000 per violation for each day that it continues. In addition, Congress expanded the scope of the criminal provisions of the Federal Power Act, the Natural Gas Act, and the Natural Gas Policy Act by increasing the maximum fines and increasing the maximum imprisonment time that apply when the Commission refers the case to the Department of Justice for criminal prosecution.

INTRO	PRIORITIES	GOAL 1	GOAL 2	GOAL 3	APPENDICES
		Obj 1.1 > CF 1.1.1 CF 1.1.2	Obj 2.1 > CF 2.1.1 CF 2.1.2	Obj 3.1 > CF 3.1.1 CF 3.1.2	
		Obj 1.2 > CF 1.2.1 CF 1.2.2	Obj 2.2 > CF 2.2.1 CF 2.2.2 CF 2.2.3	Obj 3.2 > CF 3.2.1 CF 3.2.2	

Appendix B: Acronyms

- ALP** Alternative Licensing Process
- EAP** Emergency Action Plan
- EEO** Equal Employment Opportunity
- ERO** Electric Reliability Organization
- FERC** Federal Energy Regulatory Commission
- FOIA** Freedom of Information Act
- FY** Fiscal Year
- GPRA** Government Performance Results Act of 1993
- ILP** Integrated Licensing Process
- ISO** Independent System Operator
- IT** Information Technology
- LNG** Liquefied Natural Gas
- NEPA** National Environmental Policy Act
- NERC** North American Electric Reliability Corporation
- OPP** Office of Public Participation
- RTO** Regional Transmission Organization
- TLP** Traditional Licensing Process
- U.S.C.** United States Code

INTRO	PRIORITIES	GOAL 1		GOAL 2			GOAL 3		APPENDICES	
	Obj 1.1 >	CF 1.1.1	CF 1.1.2	Obj 2.1 >	CF 2.1.1	CF 2.1.2	Obj 3.1 >	CF 3.1.1	CF 3.1.2	
	Obj 1.2 >	CF 1.2.1	CF 1.2.2	Obj 2.2 >	CF 2.2.1	CF 2.2.2	CF 2.2.3	Obj 3.2 >	CF 3.2.1	CF 3.2.2



FERC

STRATEGIC PLAN
Fiscal Years 2022-2026



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