

## **APPENDIX A**

# **POTENTIAL ENVIRONMENTAL IMPACTS AND PREVIOUSLY EMPLOYED MITIGATION OPTIONS FOR NATURAL GAS TRANSMISSION PIPELINES**

# Potential Environmental Impacts and Previously Employed Mitigation Options for Natural Gas Transmission Pipelines

## Introduction

The Federal Energy Regulatory Commission (FERC) has recently prepared numerous NEPA analyses for natural gas pipeline projects in the West, and has refined its analytical methods and mitigation requirements with each succeeding project. The following summary draws from this extensive body of information in attempting to characterize the general range of impacts associated with natural gas pipeline projects. The summary represents the types of impacts likely to receive more detailed attention in a subsequent NEPA analysis for the NRPF pipeline, and identifies a reasonable array of mitigation measures that have been employed on other projects, according to the specific nature and degree of impact. Note that the following summary does not imply that all of the impacts would be present or significant for the NRPF pipeline, nor that every mitigation measure listed will or should be employed for this project. More detailed descriptions of impacts and project-specific mitigation would be developed in a subsequent NEPA analysis.

## Geology

Impact: Active Fault Crossings.

Mitigation options: Geotechnical investigations, special design measures, such as extra-wide trench with granular backfill, increased pipe wall thickness, orienting angle of fault crossing to minimize potential stresses.

Impact: Slope instability.

Mitigation options: Avoidance, mechanical or vegetative stabilization, installation of line below landslide slop plane, monitoring (this may consist of visual inspection, land survey or instrumental monitoring).

## Paleontology

Impact: Direct or indirect damage or destruction of fossils.

Mitigation options: Avoidance, scientific excavation and curation, construction monitoring.

## Vegetation and Soils

Impact: Temporary and long-term alteration/loss of vegetative cover.

Mitigation options: Maximize use of existing corridors, clear only enough area to allow for safe construction/operation of line, scalp vegetation in areas where grading is not necessary, avoid removing mature trees where possible, restore/revegetate right-of-way, implementation of FERC's Erosion Control, Revegetation and Maintenance Plan (ECRM Plan).

Impact: Destruction of federal or state-listed sensitive plant species.

Mitigation options: Identify potential and actual occurrences of rare plants through agency consultation (i.e. with U.S. Fish and Wildlife Service and Washington Department of Wildlife), literature review and/or field surveys (note: Endangered Species Act requirements will be followed to address the project's potential to jeopardize any federally-listed plant species), avoid (through route realignment or exclusionary fencing) or restore identified rare plant populations.

Impact: Soil compaction.

Mitigation options: Compaction testing, maximization of dry season construction, halting of construction during extremely wet weather periods, ripping compacted soils during cleanup, implementation of FERC's ECRM Plan.

Impact: Soil horizon mixing.

Mitigation options: Topsoil separation/replacement; implementation of FERC's ECRM Plan.

Impact: Excess rock at or near surface.

Mitigation options: Topsoil separation/replacement, rock-picking, removal to designated disposal sites, implementation of FERC's ECRM Plan.

Impact: Soil erosion.

Mitigation options: Implementation of FERC's ECRM Plan, develop site-specific plans as necessary for particularly erosion-prone, sensitive, or difficult areas.

Impact: Crop losses.

Mitigation options: Compensate property owners, implementation of FERC's ECRM Plan to restore right-of-way and soil productivity.

- Impact: Disruption of irrigation or drainage systems.
- Mitigation options: Determine means to minimize impacts through direct discussions with property owners (e.g., timing constraints, special construction techniques, replacement/repair of structures), compensate property owners.
- Impact: Spread of noxious weeds.
- Mitigation options: Preconstruction weed inventories, consultation with local authorities, preconstruction weed treatment, equipment washdown, right-of-way revegetation, post-construction monitoring/remediation (see above for more detail)

## **Water Resources**

- Impact: Contamination of surfact/groundwater supplies by construction fluids (e.g., diesel, motor oil, hydraulic fluid).
- Mitigation options: Development and implementation of a Spill Prevention, Containment, and Control Plan (SPCC Plan).
- Impact: Damage to wells, springs, and seeps near the right-of-way from blasting or trenching.
- Mitigation options: Preconstruction documentation of private wells and springs, repair any damages, compensate property owners, develop and implement a groundwater monitoring and mitigation plan.
- Impact: Increased turbidity and/or sedimentation during stream crossing construction.
- Mitigation options: Implement FERC's Wetland and Waterbody Construction and Mitigation Procedures, comply with Washington Department of Fisheries and Wildlife and Department of Ecology permit conditions, cross intermittent or ephemeral streams during dry season to the extent feasible, develop site-specific crossing plans for major streams.
- Impact: Withdrawal/discharge of water for hydrostatic testing.
- Mitigation options: Implementation of FERC's Wetland and Waterbody Construction and Mitigation Procedures for hydrostatic testing, obtain necessary withdrawal and discharge permits/approvals, return water to source

where feasible, reuse water in adjacent test sections, regulate withdrawal and discharge rates, use energy dissipation devices and install sediment barriers as necessary to prevent erosion during discharge.

Impact: Disturbance to wetlands.

Mitigation options: Identification and delineation of all wetlands potentially affected, avoidance of wetlands where feasible, implementation of FERC's Wetland and Waterbody Construction Mitigation Procedures, implementation of Corps of Engineers and Department of Ecology permit conditions, development of site-specific construction and/or restoration plans where appropriate, minimization of construction area, used or specialized wetland construction techniques, restoration of wetland hydrology and vegetation, post-construction monitoring/remediation.

## **Fisheries and Wildlife**

Impact: Fishery resources impacts from turbidity/sedimentation, acoustic shock, destruction of stream cover, introduction of water pollutants, or entrainment of fish.

Mitigation options: Identify specific aquatic resources and concerns through agency consultation, including Washington Department of Wildlife, U.S. Fish and Wildlife Service, and National Marine Fisheries Service as appropriate; conduct literature review and/or field studies; implement FERC's Wetland and Waterbody Construction and Mitigation Procedures, SPCC Plan, and hydrostatic test water intake requirements, conduct in-stream construction within designated times of the year, develop site-specific mitigation as necessary for sensitive fish species, restore/revegetate stream banks.

Impact: Taking of federal threatened and endangered species.

Mitigation options: Comply with Endangered Species Act requirements to determine potential of project to jeopardize listed species, and design mitigation as necessary. Preliminary information indicates that a portion of Middle Route 1 traverses bald eagle habitat. On past pipeline projects, potential impacts to bald eagles have been avoided by prohibiting construction within specified distances of any active nest during wintering/nesting season and until any young have fledged.

Impact: Impacts on state sensitive species and game species.

Mitigation options: Consult with Washington Department of Wildlife and design appropriate avoidance/mitigation plans, some options of which are listed below.

Impact: Disturbance to nesting raptors.

Mitigation options: Conduct preconstruction surveys, restrict or avoid construction during nesting season within specified distances from active nests, monitor nests during construction.

Impact: Disturbance or destruction of ground-nesting or denning species.

Mitigation options: Conduct preconstruction surveys, restrict or avoid constructions during nesting/denning season, develop species-specific mitigation in consultation with Washington Department of Wildlife, restore right-of-way, follow FERC's ECRM Plan with respect to limiting vegetative maintenance on right-of-way.

Impact: Disturbance of fawning or migrating big game.

Mitigation options: Restrict or avoid construction during sensitive time periods, utilize trench plugs to allow passage, inspect trenches for trapped animals, monitor populations during construction.

## Land Use

Impact: Conflict with other development plans

Mitigation options: Work closely with affected property owners and local governments to identify and resolve potential conflicts, route pipeline parallel to existing linear facilities, route pipeline along property lines to the extent feasible.

Impact: Conflict with public use or recreation areas.

Mitigation options: Work closely with land manager or agency to identify and resolve any concerns, develop site-specific plans as necessary, schedule construction to minimize conflicts with high recreational use periods, explore multi-use corridor concepts.

Impact: Construction disturbance to residents.

Mitigation options: Minimize time trench is open, restrict construction time periods, restrict construction area width, employ special techniques such as

stovepipe or drag-section construction to expedite completion in residential areas, extensive use of fencing, avoidance of tree removal where possible, avoidance of special landscaping features, preparation of site-specific construction plans.

Impact: Disruption of grazing practices.

Mitigation options: Work with property owners to minimize or avoid disruptions, install temporary fencing, gates, cattleguards, etc..

Impact: Effect on sensitive visual resources.

Mitigation options: Maximize use of existing transportation corridors/rights-of-way, feather right-of-way edges in visually sensitive forested lands, retain screening vegetation or install visual screen plantings at visually sensitive road crossings or other view points, restore preconstruction land contours, revegetate right-of-way, design above-ground facilities, such as valve lots, to blend with natural surroundings, retain trees and rock outcroppings, where feasible, develop site-specific plans, as necessary.

Impact: Disruption to road and rail transportation during construction.

Mitigation options: Acquire road and rail crossing permits, bore most state and county roads and railroads, provide single-lane access or detours for open-cut roads.

## **Socioeconomics**

Impact: Long-term increase to local tax base, short-term increase in local payrolls and material purchases.

Mitigation options: Beneficial impacts; no mitigation.

Impact: Increased pressure on local support infrastructure caused by temporary influx of workers during construction (note: Impact is expected to be minimal for a project of this size).

Mitigation options: Work with local governments to identify and resolve any issues.

## **Cultural Resources**

Impact: Damage to cultural resources

Mitigation options: Comply with Section 106 of the National Historic Preservation Act, identify and evaluate historic properties that could be affected

(including sites of ethnographic significance), realign pipeline or install exclusionary fencing to avoid National Register-eligible sites, where feasible, develop and implement treatment plans in consultation with involved state and federal agencies, consult with Native American groups to identify and try to resolve concerns develop and implementation of a construction monitoring plan.

## Reliability and Safety

Impact: Public safety during construction.

Mitigation standards: Extensive signage, traffic control where necessary, preparation of blasting plans, implementation of speed limits for construction vehicles in congested areas, fencing of road bore pits or trench in residential areas, compliance with OSHA and other applicable safety regulations

Impact: Pipeline rupture or leakage.

Mitigation standards: Comply with Department of Transportation's Minimum Federal Safety Standards specified in 49 CFR Part 192, including inspection of materials and installation, visual and non-destructive testing of welds, and hydrostatic testing of the pipeline system prior to being put in service. Installation of cathodic protection system to prevent corrosion, regular communication with property owners to remind them to call company before excavating near pipeline, implementation of one-call system to locate and mark pipeline prior to third-party excavations in pipeline's vicinity, regular aerial and ground inspections of pipeline and right-of-way, maintenance of up-to-date emergency response procedures developed in cooperation with local public safety entities, implementation of regular safety training for pipeline personnel.

## Air and Noise

Impact: Fugitive dust during construction.

Mitigation options: Water exposed soil during periods of high traffic or wind.

Impact: Equipment exhaust during construction.

Mitigation options: Ensure equipment is well maintained.

Impact: Noise disturbance to residents during construction.

Mitigation options: Limit construction to daylight hours, notify residents of blasting plans.

### **Other Mitigation Measures Typically Employed**

- Site-specific route alignment changes to address landowner or land management agency concerns
- Environmental compliance inspection during construction, with weekly or monthly status reports to the FERC.
- Training of all project personnel in the specific environmental restrictions and requirements of the job.
- FERC approval of facility location changes and ancillary areas, including access roads, borrow and rock disposal sites, pipe storage yards, and staging areas.
- Acquisition and compliance with all other required agency permits and authorizations.
- Long-term maintenance and monitoring of pipeline system and right-of-way.