

KC HARVEY
ENVIRONMENTAL, LLC

April 3, 2013

State of North Dakota Public Service Commission
600 E. Boulevard, Dept. 408
Bismarck, ND 58505-0480



RE: PSC Case No.: PU-11-109- Vantage Pipeline Project Tree and Shrub Sampling Plan

Dear Mr. Kalk, Mr. Christmann, and Ms. Fedorchak,

Please review the attached Tree and Shrub Sampling Plan for the Vantage Pipeline Project. KC Harvey Environmental, LLC has prepared this Plan on behalf of Vantage Pipeline US, LP. This Plan was prepared in reference to the Tree and Shrub Mitigation Specifications in PSC Case No.: PU-11-109. The Project location is in Williams and Divide Counties, North Dakota. We would like to begin the tree and shrub survey in May or early June, prior to construction.

Please contact me at 406-585-7402, extension 19 or by email at lbarber@kcharvey.com with any related questions or requests for additional information.

Written responses can be sent to my attention at:

376 Gallatin Park Drive
Bozeman, MT 59715
lbarber@kcharvey.com

Sincerely,

KC HARVEY ENVIRONMENTAL, LLC

A handwritten signature in black ink, appearing to read "Loren M.B. Franklin".

Loren M.B. Franklin, M.S.
Reclamation Scientist

45 **PU-11-109** Filed: 5/6/2013 Pages: 14
Vantage Pipeline Project tree and shrub sampling plan

KC Harvey Environmental, LLC

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TREE AND SHRUB SAMPLING PLAN

Prepared for:

State of North Dakota Public Service Commission
Case No: PU-11-109

March 20, 2013

KC HARVEY
ENVIRONMENTAL, LLC



VANTAGE
PIPELINE US LP

Introduction

This document outlines the methodology Vantage Pipeline US LP will use to inventory the trees and shrubs within their pipeline corridor. The new pipeline will transport ethane from Tioga, North Dakota across the Canadian border to an existing pipeline system near Empress, Alberta. The portion of pipeline from Tioga, ND to the Canadian border is 79.8 miles with a construction right-of-way (ROW) of 70 feet. In addition to the ROW, there will be temporary work spaces (TWS) to allow storage of equipment and supplies along the ROW. The permanent ROW (PROW), approximately 30 feet of the ROW, will be maintained for the lifetime of the pipeline. Vantage Pipeline agrees to comply with all stipulations in the State of North Dakota Public Service Commission's (PSC) Tree and Shrub Mitigation Specifications (Appendix A), including the inventory stipulations, outlined in this document.

General Construction Tree and Shrub Plan

During the construction of the pipeline, trees and shrubs within the ROW will be avoided and undisturbed, when feasible. If trees or shrubs exist in the PROW, removal is necessary in order to maintain the integrity of the pipeline. The distribution of trees and shrubs within the ROW will be estimated using procedures outlined in this plan. The pre-construction inventory will note those likely to be removed during construction versus those which are expected to be avoided. During construction, the actual trees and shrubs removed will be documented. The sampling process is explained in more detail in the next section.

For shrubs within the ROW and outside of the PROW the above ground biomass will be cleared to allow for pipeline construction activities. The native soil will be undisturbed during construction, which will maintain the health of the shrub rootmass, and alternatively promote shrub re-generation. When the ROW crosses a windbreak or shelterbelt, the width of the ROW to be cleared will reduce to 50 feet per the PSC tree and shrub mitigation specifications.

Sampling Methodology

Pre-Inventory

Windrows, shelterbelts, and obvious groups of shrubs will be located along the ROW using 2012 aerial imagery and ArcGIS software. This step will be completed in advance of the field visit and locations will be entered into a GPS unit.

Field Inventory

Scientist knowledgeable in tree and shrub species identification will travel along the ROW and collect the inventory data. The field team will visit those areas defined in the pre-inventory as well as any other woody vegetation areas observed along the ROW during the field visit. All data will be collected using a GPS unit and a Tree and Shrub Inventory Form (Appendix B). Data collected during the inventory will include:

- GPS location
- Location on the ROW (*e.g.*, PROW, ROW, pipeline station #)
- Whether the trees or shrubs are native growth, part of a windrow or shelterbelt, or planted
- Land-cover in the area
- Designation to remove or avoid

- Number of trees or shrubs at that location (by species)
- Species and size class
- Whether the species is native or invasive
- Any known landowner specifications for tree or shrub replacement

Baseline surveys conducted for the pipeline did not document any wooded or forested areas along the pipeline route. Most trees occur as part of shelterbelts and the number of trees that would be removed will easily be documented by locating the centerline of the pipeline in the crossing location. Each tree within the stripping area would be inventoried in these locations. Patches of native shrubs are dispersed along the pipeline within the native grasslands. The sampling methods described below will focus on these locations.

Sampling will be completed in areas where the high density of shrubs prohibits an easy visual count. The method is presented in Appendix C for counting shrubs. A sample plot will be used to represent the overall area of the right of way where stripping would remove shrubs. Data collected from the sample plot will be extrapolated to the total surface area of the entire area of trees or shrubs. The number of shrubs to be removed within this area will be calculated using this method by multiplying the shrub density times the stripping area. When minimal stripping is used the area would be reduced to reflect the area where the shrub root biomass is removed.

For Shrubs, the sampling method will use a linear sample plot with a width of 2 feet. All trees will be inventoried in a windrow or shelterbelt. In windrows or other locations where trees are encountered, trees with a diameter of greater than or equal to 1" at chest height will be inventoried. The stems within the sample plot will be tallied and recording on a Tree and Shrub Inventory – Sample Plot Form (Appendix C).

Inventory During Construction

The total number of trees or shrubs removed may vary depending on decision-making during construction. During construction, the actual number of trees or shrubs removed in a specific location will be recorded using the Tree and Shrub Removal Record (Appendix C). For example, field scientists originally labeled a group of trees for removal in the initial inventory; however, the clear and grub crew deemed it feasible to avoid the group of trees by necking down the construction ROW at that specific location, changing the removal inventory. There is also the potential for the opposite situation: for example, a patch of shrubs located on a bend in the pipeline, where more work space is needed for construction.

Appendix A
State of North Dakota Public Service Commission
Tree and Shrub Mitigation Specifications

**STATE OF NORTH DAKOTA
PUBLIC SERVICE COMMISSION**

**Vantage Pipeline US, LP
Natural Gas Liquids Pipeline – Williams and
Divide Counties
Siting Application**

Case No. PU-11-109

Tree and Shrub Mitigation Specifications

Inventory

1. Trees and shrubs anticipated to be cleared, including those that are considered invasive species or noxious weeds (e.g., *Caragana arborescens*, *Elaeagnus angustifolia*, *Rhamnus cathartica*, *Tamarix chinensis*, *T. parviflora*, *T. ramosissima*, *Ulmus pumila*), must be inventoried before cutting. The inventory must record the location, number, and species of trees and shrubs.
2. In windbreaks, shelterbelts and other planted areas, trees or shrubs anticipated to be cleared, regardless of size, must be inventoried for replacement.
3. In native growth areas, trees anticipated to be cleared that are 1 inch diameter at breast height (dbh) or greater must be inventoried for replacement.
4. In native growth areas, shrubs anticipated to be cleared in the permanent right-of-way must be inventoried for replacement.
5. In native growth areas outside the permanent right-of-way, shrubs must be cut flush with the surface of the ground, taking care to leave the naturally occurring seed bank and root stock intact. If soil disturbance is necessary, the native topsoil must be preserved and replaced after construction. Shrubs must be allowed to regenerate naturally where native topsoil is preserved and replaced. Where native topsoil is not preserved and replaced, shrubs anticipated to be cleared must be inventoried for replacement.

6. In native growth areas, trees and shrubs may be inventoried by actual count or by a sampling method that will properly represent the woody vegetation population. A sampling plan developed by the company, filed with the North Dakota Public Service Commission (Commission) and approved prior to the start of construction must define the sampling method to be used for trees, for tall shrubs and for low shrubs. The data from the sample plots must be extrapolated to the total acreage of the wooded area to be cleared to determine the species and quantity of trees and shrubs to be replaced.

Clearing for Construction

7. Trees and shrubs must be selectively cleared, leaving mature trees and shrubs intact where practical.
8. The maximum width of clear cuts through windbreaks, shelterbelts and all other wooded areas is 50 feet, unless otherwise approved by the Commission.
9. If the area of trees or shrubs actually cleared differs from the area inventoried, the difference in number of trees and shrubs to be replaced must be noted on the inventory.

Replacement

10. Prior to tree and shrub replacement, documentation identifying the number and variety of trees and shrubs removed, as well as the mitigation plan for the proposed number, variety, type, location and date of replacement plantings, must be filed with the Commission for approval.
11. Two 2-year-old saplings must be planted for every one tree removed. Two shrubs (stem cuttings) must be planted for every one shrub removed.
12. Except in the case of invasive or noxious species, trees and shrubs must be replaced by the same species or similar species, suitable for North Dakota growing conditions as recommended by the North Dakota Forest Service.

Invasive or noxious species must be replaced by similar non-invasive or non-noxious species suitable for North Dakota growing conditions as recommended by the North Dakota Forest Service.

13. Tree and shrub replacement must not be conducted within a 20 to 30 foot wide path over the pipeline to facilitate visual inspections of the right-of-way in accordance with U.S. Department of Transportation safety regulations.
14. Landowners must be given the option of having replacement trees and shrubs planted on the landowner's property, either on or off the right-of-way. The landowner must also be given the opportunity to waive those options in writing in order to have replacement trees and shrubs planted off the landowner's property.
15. At the conclusion of the project, documentation identifying the actual number, variety, type, location and date of the replacement plantings must be filed with the Commission.
16. Tree and shrub replacements must be inspected annually, in September, for three years. The first annual inspection must be at least one year from the anniversary date of the original plantings. A report of each annual inspection must be submitted to the Commission by October 1 of each year, documenting the condition of plantings and any woodlands work completed as of September of each year. If after the third annual report the survival rate is less than 75%, the Commission may order additional planting(s).

Appendix B

Vantage Pipeline Tree and Shrub Inventory Form

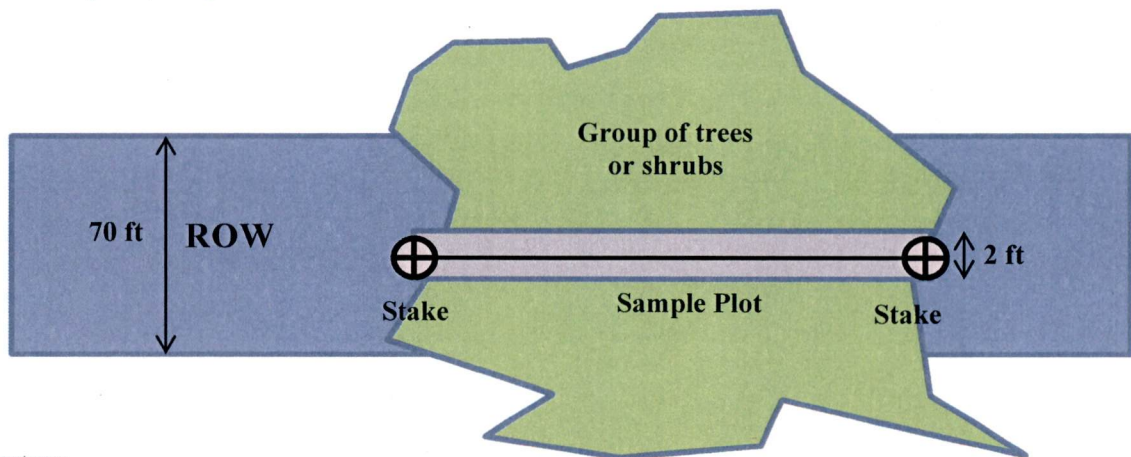
Appendix C

Sampling Method

General Note: Use this method in areas where the density of shrubs is too great that visual count is not a feasible method. Use this method in conjunction with the Tree and Shrub Inventory – Sample Plot Form in Appendix C and a GPS unit.

In the field:

1. Creating the Sample Plot.
 - a. The sample plot is a rectangle with a width of 2 feet and will extend the length of the group of trees or shrubs along the pipeline ROW. Tie a thick string or thin rope to a stake. Pound the stake in at one end of the area of trees or shrubs. Pound the other stake in at the opposite end of the area of trees or shrubs. Extend the string or rope the full length of the area of trees or shrubs that crosses the pipeline ROW and tie it to the stake at the end of the sample plot. Measure the length of the sample plot and collect a GPS point at each end.
2. Counting Method.
 - a. Walk along each side of the string and count the number of trees or shrubs (by species) within 1 foot of the string. Use the Tree and Shrub Inventory- Sample Plot Form to record the species, count, and other data associated to the sample plot. The trees and shrubs within the plot can be recorded on the same form but separate by species.
3. Map the perimeter of the woody area within the construction ROW by collecting a polygon feature (woody area shapefile) using the GPS unit.



Post inventory:

1. Download all the GPS shapefiles collected in the field.
2. In GIS, determine the surface areas where trees or shrubs would need to be removed (*e.g.*, PROW) within the woody area polygon features collected in the field (use square feet as the units).
3. Calculate the stem counts using the sample plot data collected at the specific location of interest. Divide the number of stems per species by the area of the sample plot (2 feet by the length measured in the field). Extrapolate to the entire area where trees or shrubs will need to be removed (*e.g.*, the PROW) by multiplying the number of stems per square feet (by species) by the removal area overlapping the woody area polygon (See Step #2). In areas where minimal stripping is planned the ROW width will be reduced to reflect the area to be stripped.

