Fahn, Patrick J.

From: Todd Kranda [kranda@kelschlaw.com]
Sent: Thursday, May 22, 2008 9:07 AM
To: Fahn, Patrick J.
Cc: Binek, William W.
Subject: Second Revised Tree and Shrub Sampling Plan
Attachments: ND Forested Area Sampling Plan - 2nd Revised May 2008.doc

Follow Up Flag: Follow up
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Pat and Bill –

Attached is the second revised Tree and Shrub Sampling Plan. The changes were made to show the rewording requested by the PSC yesterday for:

1. The requirement to "submit and approve" which was changed in the last sentence of the last paragraph at the bottom of the first section on inventory.
2. The change back of the word "would" to "will" where changed from the first draft and the change of the new use of "would" to "will" throughout the document. (I think I found each of these and changed them)

If you need anything else please advise.

Thanks

Todd

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KEYSTONE PIPELINE PROJECT

North Dakota

Tree and Shrub Sampling Methodology for Native Growth Areas

Revised May 2008

Tree/Shrub Inventory – Native Growth Areas

The Keystone Project will pass through approximately 214 miles of North Dakota. Evaluation of the route indicates that the project ROW will impact approximately 46 acres of trees (windbreak/shelterbelts, woodlots, riparian areas) spread out over about 180 different locations.

The North Dakota Public Service Commission's Order and Tree and Shrub Mitigation Specification directs the project to inventory all trees and shrubs located in windbreaks and shelterbelts. In compliance with this condition, Keystone will record the numbers and species of trees and shrubs in windbreaks and shelterbelts.

In addition, the Specification requires the project to either inventory native growth (forested) areas by direct count or to develop a sampling plan to determine the number of trees and shrubs that will be removed in native growth areas. The Project may elect to inventory the woodlots by direct counting. Alternatively, this Plan defines a sampling methodology to determine tree and shrub numbers in native growth areas. This Plan will be filed with the Commission and approved prior to the implementation of this sampling methodology.

Field Sampling Method

The inventory methodology will include a review of the aerial photographs along the project route to identify random plot sampling locations in native growth areas. Native growth (forested) areas occur in approximately 66 locations along the project route in North Dakota. In order to ensure that the sampling method properly represents the woody vegetation population, twenty of these locations (30 percent) will be selected for field sampling, based on the availability of landowner permission.

As part of this sampling methodology, the woodland sample sites will be stratified by county to ensure spatial variability is represented. In addition, Keystone will inspect each woodland site after the aerial photography review to classify the woodland communities by woodland type and by the dominance of vegetation in general height classifications (e.g., tall trees, tall shrubs, low shrubs, etc.). Following this classification, a stratified random sampling procedure will be used to ensure sample sites were proportional to the acreage of each woodland type.

For each field sampling location, Keystone civil survey teams will stake the edge of the project construction ROW. Biological survey teams will then establish two sample plots within the ROW limits (20 ft x 50 ft) and will clearly mark these plots with rope or flagging. The biological survey teams will record the approximate location of the sample plot, as well as the number and species of trees (>1" dbh), tall shrubs and short shrubs located within the plot boundaries. The tree and shrub count data from the sample plots will be provided to the project team to

determine the numbers of trees and shrubs the project will remove from all areas of the project.

Tree/Shrub Estimating Procedure

The project will determine the total area of anticipated construction clearing through forested areas by utilizing the project's high-resolution aerial photography overlain with the project workspace boundaries. The boundaries of the forested areas will be marked in the GIS system and a measurement of the area of disturbance through each native growth areas will be obtained. Data gathered on the ground from the tree/shrub plot samples will be extrapolated on an area-basis to establish the numbers of trees and shrubs cleared during construction of the project. For example, if 7 trees were counted in 1000 square foot sample area, the number of trees cleared on one acre of woodland would be projected to be 305 trees (43,560 square feet in an acre / 1000 square feet (sample area) = 43.56 x 7 (trees counted in 1000 sq ft sample area) = 304.92 estimated trees per acre).

Conducting transects or sample plots and extrapolating the data to determine vegetation estimates over much larger areas is a common estimating tool for forest inventory and vegetation analyses. The methodology described above is designed to provide an accurate determination of tree and shrub numbers in native growth areas that will be cleared by the Keystone Project in North Dakota. If the area of trees and shrubs actually cleared differs from the area originally calculated, an updated estimate of trees and shrubs will be determined at the end of the project. The numbers of trees and shrubs identified by this inventory method will be used to determine the species and quantity of trees and shrubs to be replaced.