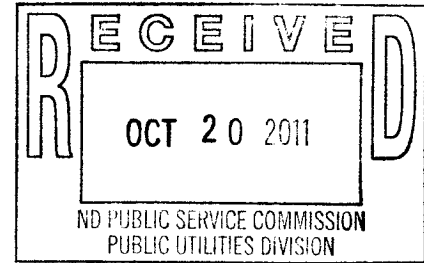


October 20, 2011

ND Public Service Commission
Attn: Patrick J. Fahn
State Capitol
600 East Boulevard – Dept. 408
Bismarck, ND 58505-0480



Re: **Case No. PU-10-554 Hiland Operating, LLC 6-inch Natural Gas Liquids Pipeline Tree Survey Sampling Method**

Mr. Fahn,

Hiland Operating, LLC, hereby files its Tree and Shrub Inventory Sampling Method for its 6-inch natural gas pipeline for your review and approval. Please note that this Method is the same that has been approved in previous tree inventories (i.e. Bridger Pipeline, LLC Four Bears Pipeline).

Sincerely,

Kathleen Spilman, PE
Managing Director

Enclosure: Tree and Shrub Sampling Method

Case Number PU-10-554 Hiland Operating, LLC

Tree and Shrub Sampling Method

Under limited circumstances, such as when trees are scattered in small areas—a complete or 100 percent tree enumeration may be feasible. However, the proper conduct of a timber inventory is a sampling process.

As outlined in the Public Service Commission Tree and Shrub Mitigation Specifications item 6, trees and shrubs may be inventoried by a sampling method that accurately represents the woody population. This sampling method, offered for review and approval, is to be used for tall and low shrubs and trees.

Sampling methods require a reliable determination of the forest area and measurement of all or an unbiased sample of trees within this area and are usually carried out using fixed-area random sample plots. The choice of a particular inventory system is governed by relative costs, size and density of timber, area to be covered, precision desired, number of people available for fieldwork, and length of time allowed for the estimate. Among the considerations involved in developing an efficient sampling scheme are sample size, plot size and shape, and the sampling design.^{1,2}

The data from the sample plots will be used to determine the species and quantity of trees and shrubs per unit area and will be used to be replaced from the total acreage of the wooded area to be cleared.

To assure that the information is representative, it is important to adequately size the sample plot to assure as much as possible of a population's variety within the sample. This goal can be achieved by subdividing and grouping sampling areas with populations as homogeneous as possible, by making sure that the sample units are well distributed over the whole population, by increasing the size of the sample or by adjusting size and shape of the sampling unit.

The sampling method that will be used is a random, rectangular, fixed-area plot. The size of the plot will depend on the size of the area that will be sampled and will be determined on an area by area basis. The sampling plots will range from a 25 square feet for smaller woody areas of Chokecherry and Juneberry, and 400 square feet for larger woody areas that include bigger trees, such as Green Ash and Bur Oak. The frequency of the plot will depend on the size of the area to be sampled. For areas greater than a quarter mile in length, three plots will be taken, one toward

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the beginning of the area, one in the middle and one plot toward the end. For areas between one-quarter and one-eighth mile long, two plots will be taken. However, areas less than one-eighth mile long, only one plot will be taken.

This method will be used for tree and shrub stands that are fairly uniform in density, size distribution and species composition to expedite the tree inventory process. These areas include; homogeneous wooded areas, the Yellowstone River area and heavily wooded draws and streams. Examples are shown below. The plot(s) will be taken where an accurate depiction of the woody vegetation would be represented. Windbreaks, shelterbelts and other planted areas will be individually counted. All trees and shrubs, including those considered invasive or noxious, one inch or greater in diameter at breast height, will be included in the sample plots. Each plot location, along with the individual tree count, will be recorded using Real-Time Global Positioning System (GPS) and all are linked using a Geographic Information System (GIS). The accuracy of the GIS system is less than 1 foot.

The information will then be transferred to a computer system and the number of trees will be calculated based on sample information developed for each. The trees inventoried will be plotted on maps of the pipeline construction corridor and reported to the North Dakota Public Service Commission.

Revised: August 1, 2011



Figure 1: Woody area on the Yellowstone River



Figure 2: Woody Draw where sampling method may be used

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