PLANNING FOR SOIL CONSERVATION BY THE OIL AND GAS INDUSTRY

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ABSTRACT

An approximation of the area of agricultural land disturbed by the oil and gas industry is followed by a review of the limited planning for soil conservation done by the industry. A new way of planning for soil conservation for pipelines is proposed.

LAND DISTURBANCE

The oil and gas industry and the agricultural industry have long been recognized as the two leading contributors to Alberta's prosperity. However the relationship between these two industries has not always been harmonious. One reason for past conflict was the amount of agricultural land disturbed by the oil and gas industry and the resultant disruption to farming.

The two types of industry disturbances that have effected most of the agricultural land are the construction of wellsites and the roads to these wellsites and the construction of pipelines.

There are 140,000 well sites in Alberta and I estimate they have disturbed roughly ((3X140,000/640)X.6) 400 square miles, or sections of agricultural land. The roads to these wellsites have disturbed an additional 100 sections of agricultural land.

There are 110,000 miles of pipeline in the province which have disturbed roughly (110,000 X 30/5280 X.6) 500 sections of land.
Which gives a total area of roughly 1000 sections or 30 townships of agricultural land.

To put it in perspective, this would be a strip of land 6 miles wide from Calgary to Edmonton.

You can see that in total the oil and gas industry have disturbed a lot of agricultural land and it is not surprising that this has upset some sectors of the agricultural community.

However, within the last 10 years, relationships between the oil and gas industry and the agricultural community have improved. One reason has been a greater awareness by the oil and gas industry of the impacts of its activities on farming. Along with this awareness, the industry has developed a variety of procedures for conserving and reclaiming agricultural lands.

INDUSTRY PLANNING

The oil and gas industry does not do much planning for soil conservation.

I grant you that so far as drilling is concerned there are some oilsand drill sites in the Cold Lake area for which site specific soil planning is done. But for the rest of the wellsites in the province the best that is available are standard company procedures for salvage of soil materials and construction of the drill sites. There is no attempt made to determine the types of soils that exist at the site or how best to handle them.

There is more planning for soil conservation for pipelines but it is only required on lines that are longer than 10 miles and greater than 6 inches in diameter and these represent about 1% of the 2000 lines that are built in the province each year. Fortunately there are some enlightened companies that do the same level of planning for all their pipelines as is required for the larger regulated lines.

In support of my contention that the industry does little planning for soil conservation I estimate that only 50 of the 1000 sections that the industry has disturbed have had any measure of soil conservation planning done for them.

In order to do site specific planning you need soil information on the area you are going to disturb and you need to take into account the properties of the soils when making the plan.

To apply a standard procedure which is supposed to conserve soil capability, to apply one, or two, procedures for the whole province is not, by my definition, planning.

I would say that using one or two procedures for conserving soil on industrial sites for the whole province is as ludicrous as picking one set of land management practices, or farming practices for all the farms in Alberta. It simply doesn't take into account the regional, local and site specific variations in soil parameters and weather conditions.

A NEW APPROACH

Some years ago we in the Land Reclamation Division of Alberta Environment recognized the need to show the relationship between soil properties and pipeline construction.

There was a problem; the soils experts had trouble relating their expertise to the pipeliners, and the pipeline planners had difficulty understanding the effect that their projects would have on the soils.

So we got a soils expert and an environmental pipeline consultant together and asked them to produce a manual on the relationships between pipelining and soil properties. The manual, after numerous rewrites is still in draft form although some of the drawings and terminology in it are now commonly used by pipeline planners.

The procedures advocated in the draft manual are:

1) Trench width, topsoil stripping
2) Blade width topsoil stripping
3) Trench and spoilpile topsoil stripping
4) Trench and spoil and work area topsoil stripping (Full right of way stripping).

However, there are a number of problems with the procedures outlined in the draft manual and with how the pipeline industry is utilizing them. There is a tendancy to pick one of the four procedures based on land use and time of year rather than on the soil qualities.

Another problem with the procedures as outlined in the manual is that they all refer to the width of stripping as if that was the only important aspect of stripping. That is not what the manual says but it seems to be the way that it is interpreted.

I would like to propose a new approach to planning to conserve soil on pipelines. The new approach requires only that you answer two questions. Which are:

1. How wide do you strip? and
2. How deep do you strip?

The idea originally came from Richard Johnson of the Alberta Environmental Centre in Vegreville. We borrowed his idea to see if it couldn't be used to simplify the planning of soil handling procedures for pipelines.

Lets look at the first question. How wide do you strip?

Well, what do you need to know to decide how wide to strip? My list, which I don't claim to be complete, contains five items; these are:

1. The width of the trencher.
   - the stripping width should be a minimum of 1 to 2 feet wider than the trencher bucket because topsoil is lost for 6" to a foot on each side of the trench from topsoil falling into the trench.

2. The size of the machinery.
   - this refers to the inside and outside measurements of the trenchers tracks since the stripping width should be inside both tracks or outside both tracks.

3. The quality of the field surface.
   - if the area under the spoilpile is not going to be stripped of topsoil then the topsoil surface upon which the spoil will be placed should be closely examined.

4. The potential for slumping.
   - if the subsoil is sandy and particularly if the water table is high there is a high potential for slumping of the trench sides, in this case the topsoil stripping width should be wider to prevent loss of topsoil into the trench.

5. The size of the subsoil roach.
   - again with only trench width topsoil stripping if the subsoil roach is large it will cover some of the in-place topsoil and there will be insufficient topsoil to cover the roach.

The second question: What is the depth of stripping?

To answer this question you need to know at least four pieces of information and they are:

1. The depth of topsoil
   We need to know this since in most cases this is the minimum depth of stripping.

2. The quality of the B horizon
   - if the topsoil is thin and the B material is good then you may want to include some B material into the topsoil to ensure sufficient depth for rooting.

3. The depth of the B horizon
   - if you are stripping into the B then you want to know how deep it is so you don't strip through it and into the C horizon.

4. The quality of the C horizon
   - if the C horizon is very sodic or saline then you may be prepared to include more lower quality B horizon material with the topsoil to provide an adequate buffer between the plants and the toxic C material.

The correct width and depth of stripping is the first step in ensuring that the reclaimed landscape will be as productive as it was before disturbance.

One thing I must say now is that better planning and full use of soils information will achieve absolutely nothing if the plans are not clearly communicated to the contractor and if there is not inspections to ensure that the plans are followed.

I don't want to leave you with the impression that there have not been great strides made in the quality of the land reclaimed over the past 10 years; because there have been great strides made but there are still problems that need to be solved. When pipelining on good agricultural land you have to try hard to screw up the reclamation especially if the land has two feet of Chernozemic topsoil. But as the land becomes poorer the problems become greater. Plans for pipelining on native range in southern Alberta need a lot of work, as do the procedures for winter construction.

I end with a challenge to the pipeline planners and to the pedologists who conduct the soil surveys; a challenge to use a little lateral thinking to expand on the approach that I have just outlined, or to propose realistic alternatives.

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