
Greenhouse
Gas Emission
Reduction
Trading Pilot



**Saskatchewan Environment and Resource
Management (SERM) - Saskatchewan Power
Corporation (SaskPower)**

Forestry Sequestration Project

Trade-Matched Project

TECHNICAL COMMITTEE REVIEW REPORT

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TABLE OF CONTENTS

1. INTRODUCTION 4

2. PROJECT PROPONENTS 5

3. PROJECT DESCRIPTION..... 5

4. MANDATORY EVALUATION CRITERIA – NSR COMPONENT..... 6

4.1 Real Emission Reductions – NSR Component.....6

4.2 Measurable Emission Reductions – NSR Component.....9

 4.2.1 Carbon Stock Changes in Reference Case.....9

 4.2.2 Carbon Stock Changes in With-Project Case10

 4.2.3 Measurable Net Sequestration from the NSR Component.....10

4.3 Verifiable Emission Reductions – NSR Component12

4.4 Surplus Emission Reductions – NSR Component12

4.5 Summary of Conclusions – NSR Component..... 12

5. MANDATORY EVALUATION CRITERIA – FCR COMPONENT..... 14

5.1 Real Emission Reductions – FCR Component14

 5.1.1 Leakage.....14

 5.1.2 Permanence16

 5.1.3 Summary.....18

5.2 Measurable Emission Reductions – FCR Component18

 5.2.1 Carbon Stock Changes in Reference Case.....18

 5.2.2 Carbon Stock Changes in With-Project Case20

 5.2.3 Measurable Emission Reductions from the FCR Component20

5.3 Verifiable Emission Reductions – FCR Component21

5.4 Surplus Emission Reductions – FCR Component21

5.5 Summary of Conclusions – FCR Component 22

STEERING COMMITTEE DECISION 23

1. INTRODUCTION

This Technical Committee Review Report presents the GERT Technical Committee's views on whether this project meets the criteria set out in the GERT Rule. Where a project meets the GERT criteria, the Technical Committee will recommend to the GERT Steering Committee that it be registered (trade-matched projects only) or designated as GERT-reviewed (projects offered for sale and those not offered for sale). Each year, the annual emission reductions from GERT registered projects may be submitted for review and registration. In the GERT Memorandum of Understanding, signatory federal and provincial government agencies commit that they "will, to the extent possible, credit verifiable emission reductions from trades registered under the Pilot against any future emission obligations." Apart from this commitment, registration or designation of a project in the GERT pilot does not constitute any representation as to the acceptability of the project, or the monitoring or measurement methodology, by any government or regulatory body or under any legislation, or as to the ownership, use or value of the registered emission reductions.

The mandatory criteria evaluated in this report are real, measurable, verifiable and surplus. As one of the objectives of the GERT Pilot is to increase understanding of all issues related to the trading of greenhouse gases, GERT requests and reviews information on additionality relative to the project. An Additionality Report was not prepared for this project, as it was not a requirement at the time at which the project review commenced.

The project information contained in this report was provided by the Proponent and has not necessarily been checked by GERT to confirm its veracity. This project has evolved very considerably through the course of three Information Request Responses (IRRs). For that reason, the information contained in IRR3 is a better representation of the project than the discussion in the Project Document (PD). This report should be read in conjunction with the IRRs, and in particular IRR3. It is important to note that the quantification presented in these documents is based on estimates using various assumptions and methodologies. Emission reductions submitted for registration will be based on actual measurements for the with-Project Cases of the two components of this project, and actual measurements for the Reference Case of one of the components.

In this report the following terms are used.

Forest carbon pool

A component of the forest ecosystem in which carbon is retained in organic form, and into and out of which carbon moves as a result of natural and human-influenced processes. Pools include aboveground tree biomass, tree roots, other living vegetation biomass, and dead organic matter (litter, snags, coarse woody debris, and other detritus as well as decomposed organic matter in the soil). Harvested wood products may also be regarded as a forest carbon pool but the carbon in this pool is stored off-site and not in the forest ecosystem.

Carbon stock

The quantity of carbon contained in a carbon pool at a given point in time.

Carbon stock change

The change in a carbon stock over a given period of time. This can be measured as the carbon stock at the end of the period minus the carbon stock at the beginning of the period. It can also be measured as the net sum of all fluxes of carbon into and out of the particular pool over the period. A positive number means that carbon has been added to the stock in the period. A negative number means that carbon has been removed from the stock in the period.

Net sequestration

The carbon stock change in the with-Project Case minus the carbon stock change in the Reference Case.

2. PROJECT PROPONENTS

This project involves a 50-year trade-matched forest-based carbon offset agreement in which Saskatchewan Environment and Resource Management (SERM) has agreed to sell, and Saskatchewan Power Corporation (SaskPower) has agreed to buy, 'emission reductions' resulting from forest carbon management activities. SERM is a provincial government agency with the mandate to manage provincially owned land. Ownership of emission reductions is established in the formal agreement between SERM and SaskPower, which is attached to the Project Document. GERT makes no determination with respect to ownership.

3. PROJECT DESCRIPTION

For the purposes of GERT, emission reduction activity includes 'sequestration of GHGs that would otherwise have remained in or been released into the atmosphere' (GERT Pilot Rule, December 1999, Section 4.2), and the result of this activity is termed an 'emission reduction'. With respect to the Saskatchewan forest sequestration project reviewed in this report, the more appropriate term is net sequestration, as defined above. In this TCRR, the term emission reduction means net sequestration and the two terms are used interchangeably. Similarly, references to registered emissions reductions (RERs) mean registered net sequestration.

The project has two distinct components, which are addressed separately in this Review Report because of their very different features.

- (1) Direct carbon sequestration through the establishment of white spruce plantations in east central Saskatchewan on 3,300 ha that were harvested in the 1965-1990 and which are now designated Not Sufficiently Restocked (NSR). Planting will occur once the GERT review has

been completed. The net sequestration is the difference in the carbon stock changes on the land with, and without, the white spruce plantations.

- (2) Forest protection in the form of Forest Carbon Reserves (FCRs) established by the government of Saskatchewan, in which trees formerly available for harvest are now protected. The FCRs are areas that were set aside by the Saskatchewan government starting in 1997, as part of a system of protected areas called Representative Areas Network (RAN). The current area included in the FCRs is 206,000 ha in 12 separate areas, and the Proponents intend that additional FCRs will be added to the total as they are formally designated by the RAN program, and provided they fulfill the mandatory GERT requirements. The net sequestration, or emissions avoided, is the difference between the carbon stock change on the land with, and without, harvesting.

4. MANDATORY EVALUATION CRITERIA – NSR COMPONENT

4.1 Real Emission Reductions – NSR Component

“An emission reduction is real if it is a reduction in actual emissions, resulting from a specific and identifiable action, or undertaking, net of any Leakage of emissions, to a third party or jurisdiction.” (GERT Pilot Rule, December 1999)

Not Sufficiently Restocked (NSR) lands are lands that at one point were forested but which, after harvest or other disturbance, have failed to regenerate sufficiently. The planting of forest on such lands in this project is a specific and identifiable action. It will increase the amount of carbon stored in living trees, dead organic material and soil. The Technical Committee decided that leakage is not an issue with the plantations because the NSR lands have no competing uses that could be displaced¹, and decreased harvesting in the FCR component of the project will offset any marginal impact on the supply of timber².

The Committee concluded that the main issue with respect to the real criterion for the NSR component was the likelihood of future loss of carbon sequestered by the project, as a result of natural disturbances

¹ For example, if the NSR lands were being used for agricultural activity, which then moved elsewhere when the plantations were established, and caused net emissions, this would be leakage. However, the NSR lands are not being used so no activity is displaced by creation of the plantations.

² There is the potential for an impact on timber supply due to the “Allowable Cut Effect”. The current allowable harvest (“cut”) in the forest available for harvesting is determined based on various goals including ensuring a long-term supply of timber. Planting trees now leads to an increase in the area available for future harvest, which in turn means that the current allowable harvest on the remaining forest can be higher while still ensuring that the desired future harvest volume can be achieved. In the NSR case, the land involved is so small relative to the total forest land base available for harvesting that the Allowable Cut Effect is too small to calculate. However, if the plantation area were large enough to warrant calculating the effect it would be offset by decreased harvesting in the FCR component of the project, so long as it is accounted for in a transparent way.

or harvesting. This type of risk is of particular concern in biological sequestration projects and is referred to here as the permanence issue. The GERT Rule does not specifically include permanence of sequestration as a criterion. However, the Technical Committee decided to include this issue as part of its consideration of the real criterion.

With respect to natural disturbances such as fire and insects, the Proponents noted that climate change impacts on the plantations are difficult to predict, and that increased moisture stress, increases in insect pests, and higher fire frequency and intensity may accompany climate changes predicted for the Prairie region. The Proponents also noted that local factors and the resilience of established plantations could mitigate negative impacts and that the plantations are included in the areas given high priority in fire and insect suppression programs under government policy. The risk of loss of carbon is addressed by reducing the amount of net sequestration expected to be available for sale. In their analysis of the net sequestration associated with the NSR land the Proponents discount estimates by 7.5% to account for the risk of fire, and 0.2% for insects (spruce budworm). These discounts are half of those applied in the FCR component of the project. This reduction is based on the higher priority that will be assigned to protecting the plantations, and on the greater ease with which protection can occur as a result of the road network established in the course of developing the plantations.

The Technical Committee was satisfied that the measures taken by the Proponents to minimize risk are appropriate, but was uncertain whether the proposed discounts would be sufficient, especially given the possibility of losses due to changing climate. The Committee accepted the proposed approach for projecting sequestration estimation for the areas in question, in part because actual registered emission reductions (RERs) will be based on measured changes in sequestration.

Sequestration varies substantially over time as a result of planting. Initially, trees are quite small and sequester only small amounts of carbon each year. As the trees grow they begin to sequester larger and larger amounts of carbon each year but eventually sequestration slows down as the trees mature. Harvesting of the mature trees likely will occur in the future on the planted NSR lands, but well after the 50-year life of the project. In other words, at some point in the future there will be net carbon emissions as a result of harvesting, but this will be followed by re-planting, re-growth and sequestration, and so on. In IRR3, the Proponents advocated the use of long-term average annual net sequestration as the appropriate approach for addressing the variable temporal pattern of sequestration and emissions from the project. They estimated annual net sequestration over multiple harvest rotations (300 years in total) and determined the long-term average annual net sequestration on that basis (1,705 tC/yr, or 82,250 tC over 50 years).

The GERT Pilot Rule does not allow registration of emissions reductions (net sequestration) based on anything other than emissions reductions that actually have occurred in the period under consideration. The Technical Committee considered adjusting the rule to accommodate the proposal of the Proponents to use long-term averaging. The Committee decided that it could not make the change to accommodate long-term averaging at this point in time, but this was not meant to reflect upon the potential merits of this method of carbon accounting. Although the GERT rule is silent with regard to a proponent receiving

“debits” for net losses of carbon, the approach of issuing RERs for actual net sequestration that has occurred, relative to the Reference Case, is consistent with the “stock change” method of carbon accounting. Under that approach, proponents would receive debits or negative emission reductions (i.e. resulting from net emissions due to the project) for reductions in carbon stocks in the with-Project Case, relative to the Reference Case. Before or after the 50-year time frame of the project, emissions from the NSR lands that do not occur in the Reference Case could partially or fully negate the long-term atmospheric benefits of the NSR component. The Committee is of the view that any net emissions relative to the Reference Case should be treated as negative emission reductions.

One issue that emerged in the Proponent’s estimates is that the planting results in small net emissions when the plantations are initiated on the NSR land, as a result of clearing associated with the planting (see Table 1 below). The Technical Committee decided that these estimated emissions, based on the assumptions employed by the Proponents, do not represent a problem, as they are forecast to be quite small, and would be more than compensated by estimated sequestration from the FCR component in the same period. The Technical Committee emphasizes that Proponents of sequestration projects must quantify and include in their accounting any net emissions that occur during the life of the project.

The Technical Committee concludes that the NSR component results in a real emission reduction and that the build-up of carbon in the regenerated area will result in net sequestration of atmospheric CO₂ over the project life. However, the plantation raises a number of issues that the Technical Committee believes require a government policy decision. These include:

1. What is a reasonable minimum project lifetime for forest sequestration projects, during which project Proponents have responsibility for all emissions and removals on the project land?
2. Who will be, or should be, responsible for emissions that occur after the project has ended?
3. Is the stock change method the appropriate accounting approach for sequestration projects or are other methods such as a long-term averaging acceptable, keeping in mind relevant factors such as the Kyoto Protocol accounting rules³?

The Technical Committee notes that future policy decisions may require that emission reductions based on net sequestration must be accompanied by responsibility for any subsequent net emissions during or after the project life. For the purposes of learning, the Technical Committee accepted the 50-year life of the project, and decided not to address methods of accounting for net sequestration or emissions after the end of the project.

³ Carbon accounting rules for forestry activities in the Kyoto Protocol require calculation of carbon stock changes on land subject to the activities in the period 2008-12. See Decision 11/CP.7, pp. 54-63, UNFCCC/CP/2001/13/Add.1, Report of the Conference of the Parties on its Seventh Session, Marrakech, 29 October to 10 November 2001, Addendum, Part Two: Action Taken by the Conference of the Parties, Volume 1. See paragraph 17, page 61. <http://unfccc.int/resource/docs/cop7/13a01.pdf>

4.2 Measurable Emission Reductions – NSR Component

“An emission reduction is measurable if the actual level of GHG emissions with the project in place, and the level of GHG emissions in the Reference Case, can be quantified.” (GERT Pilot Rule, December 1999)

4.2.1 Carbon Stock Changes in Reference Case

The NSR Reference Case is the carbon sequestration that would occur on the land over the project lifetime in the absence of the project. Tree planting has not occurred on the land to date and would not occur without the project. Therefore, the key requirement for determining sequestration in the reference case is to account for natural successional changes following harvesting. The challenge in determining what these might be is that no data have been collected in Saskatchewan that reveals these patterns.

For both the Reference and with-Project Case estimates the Proponents use the CO2FIX carbon accounting model developed by the European Forestry Institute for analysis of plantations⁴. This model can account for all carbon pools and simulates carbon stock changes starting with various input data such as initial carbon levels and mean annual increment of the species used in the planting, as described in IRR1 and IRR2.

Based on expert judgement, and as described in IRR3, the Proponents assumed that the past harvesting that created the NSR areas was mostly in older-aged mixedwood stands and that the harvesting was largely focused on removal of large-diameter spruce (a harvesting process often known as “high-grading”). They also assumed that vegetation growth subsequent to harvesting has resulted in a low-density aspen stand. The carbon was then modeled using CO2FIX and a yield curve relevant to low-density aspen stands in Saskatchewan. Both aboveground and belowground biomass carbon were estimated. Soil carbon was not included based on an initial assessment by the Proponents that the project would have little effect on it. This represents the Reference Case for the purposes of projection of carbon stock changes.

For measurement of actual net carbon sequestration in the Reference Case the Proponents will establish control plots on NSR areas similar to those that will be planted in the with-Project Case. This will allow the current state and future natural successional processes to be monitored and measured, so that Reference Case carbon stock changes can be calculated. Vegetation abundance and biomass and carbon mass will be monitored and measured on all control plots, as will soil carbon. When the Proponents seek to register emission reductions from the NSR lands they will use this control plot data as the basis for Reference Case calculations, rather than the projections derived from the CO2FIX model.

The Technical Committee is satisfied that the Reference Case is appropriate and the sequestration in the

⁴ See <http://www.efi.fi/projects/casfor/CO2FIX/> for a description of the model.

Reference Case is measurable. The Committee also strongly supports the Proponents' plans to use control plot data as the basis for the Reference Case.

4.2.2 Carbon Stock Changes in With-Project Case

The with-Project Case is planting of white spruce, which is assumed to result in high-density spruce stands. Yield curves for high density white spruce stands in Saskatchewan were used in CO2FIX, and the relevant biomass and specific gravity values were input into the model to estimate the annual amount of carbon sequestered. The Proponents included only aboveground biomass and belowground biomass in the estimates. They did not include soil carbon, as they believe that the project may have no net impact on it.

The sites on which the planting will be carried out will be sampled for vegetation and soil carbon before planting commences. Both control and planted sites will be monitored after planting. This approach accounts for both "treatment" effects and changes in other variables over time, such as climate. Soils (both forest floor and mineral soils) will be sampled before planting and periodically after planting as part of the on-going monitoring program, to confirm assumptions that soil carbon does not vary significantly on these sites after planting. After planting, randomly selected trees on each plantation site will be sampled, dried and weighed to determine dry-weight biomass and carbon content. The Proponents plan to sample approximately 100 trees per year at years 1, 2, 3, 5, 10 and at 10-year intervals thereafter for the life of the plantation. In addition, regeneration surveys will be conducted at year five, and plantations will be surveyed at about year 10 to determine whether they have met the growth standards of SERM. When the Proponents seek to register emission reductions from the NSR lands they will use the sample plot data as the basis for with-Project Case estimates.

The Technical Committee is satisfied that the with-Project Case is measurable. The Committee strongly supports the Proponents' plans to use sample plot data as the basis for the with-Project Case, and believes the sample approach to be acceptable. The Technical Committee also requires that the with-Project Case calculations accurately reflect any impacts on carbon stocks due to road development for the project.

4.2.3 Measurable Net Sequestration from the NSR Component

The net sequestration over the project's life is calculated as the difference between the carbon stock change in the with-Project Case and carbon stock change in the Reference Case, and is shown in Table 1 below.

As noted above, the Technical Committee assumes that the estimated net emissions that occur when the plantation is established will be more than compensated for by net sequestration in the FCR component, and therefore are not of serious concern in the context of this project.

Overall, the Technical Committee concludes the NSR component of the project results in measurable net sequestration. The Proponents must provide summaries of the methods used, and detailed sampling

and control plot results, when it seeks to register emissions reductions. All carbon pools, including soil carbon, must be assessed. Carbon stock changes in each pool must be included in the emissions reductions submitted for registration, unless the Proponents can demonstrate that the carbon stock of a given pool is not declining.⁵

Table 1. Projected aboveground and belowground carbon stocks and carbon stock changes, Reference and with-Project Cases over 50 years, 3,300 ha NSR land, tonnes carbon.

Age of Project	Reference Case	With-Project Case	With-Project minus Reference
Carbon Stocks			
Before project	*	*	0
At initiation	9,744	9,338	-406
10	6,885	6,710	-174
20	7,058	18,532	11,474
30	14,793	41,470	26,677
40	30,487	69,366	38,879
50	46,828	98,962	52,135
Carbon Stock Changes			
At initiation	*	*	-406
Initiation to age 10	-2,859	-2,628	232
10 – 20	173	11,822	11,648
20 – 30	7,735	22,938	15,203
30 – 40	15,694	27,896	12,202
40 – 50	16,341	29,596	13,256
Total			52,135

* Cannot be estimated with the information provided. The Reference Case and with-Project Case area is the same, with the same carbon stock before the project is initiated. This fact, in combination with carbon stock projections for immediately after initiation of the project, means that net carbon stock changes resulting from initiation can be projected.

Under GERT rules, it is intended that registration of a project will be followed by annual submission of an emission reduction report within 90 days of the end of each calendar year, including the calendar year in which the project was registered. In the case of this project, the Committee accepts that the Proponents may not be able to seek registration of all emission reductions until after the proposed

⁵ It some cases it may be possible to demonstrate that a project will not result in a decline in the carbon stock of a pool relative to what would happen in the reference case. In other words, the carbon stock is stable or increasing relative to the reference case. In such cases, excluding the pool in the accounting will result in an underestimate of the net sequestration resulting from the project. Underestimates are acceptable while overestimates are not. Therefore, where a particular pool is difficult or expensive to measure it is acceptable to exclude the pool in the accounting provided Proponents can demonstrate that the project will not result in a decline in the carbon stock in the pool relative to the reference case. This would typically be demonstrated with reference to the scientific literature or recognized expert opinion. Such an approach is consistent with rules for forestry carbon accounting in the Kyoto Protocol. See Decision 11/CP.7, pp. 54-63, UNFCCC/CP/2001/13/Add.1, Report of the Conference of the Parties on its Seventh Session, Marrakech, 29 October to 10 November 2001, Addendum, Part Two: Action Taken by the Conference of the Parties, Volume 1. See paragraph 21, page 62. <http://unfccc.int/resource/docs/cop7/13a01.pdf>

monitoring and measurement systems have been installed. The Committee requires that the Proponents seek registration when they have real emission reductions to register backed by measurements and monitoring. The Committee recognizes that this means that registration of emission reductions may cover a period longer than a year.

4.3 Verifiable Emission Reductions – NSR Component

“An emission reduction is verifiable if the calculation methodology is acceptable, transparent and replicable and the raw data required to verify / audit the calculations is available”. (GERT Pilot Rule, December 1999)

To verify actual net sequestration from this component of the project, the Proponents need to show assumptions, methods of calculations and models in sufficient detail. The Technical Committee is satisfied that this had been done. Meeting the verifiable criterion also requires that the Proponents show that the raw data needed for verification / audit is available, and will be available in the future. SERM has indicated that it plans to house all collected data in the provincial Forest Management Effects Monitoring Program database management system. That data will be made available to the public.

The Technical Committee concludes that the NSR component emission reductions are verifiable.

4.4 Surplus Emission Reductions – NSR Component

“An emission reduction is surplus if it represents a reduction that is not otherwise required. If legal requirements affecting GHG emissions come into effect during the life of the project, then the Proponent must track and report an additional Reference Case which reflects the new requirements.” (GERT Pilot Rule, December 1999)

While the Saskatchewan *Forest Resources Management Act* currently requires forest management agreements to include licensee obligations to renew lands affected by harvest, this was not in place when the NSR component was initially harvested in the 1965 to 1990 period. The Forest Management License Agreement under which the area was initially logged did not require regeneration to a specified standard stocking level.

The Proponents take the position that, under the above circumstances, the NSR planting qualifies as surplus. This was described in IRR1. The Technical Committee agrees with this argument, and concludes that the NSR component is surplus.

4.5 Summary of Conclusions – NSR Component

Based on its review of the PD and the Proponent’s responses to three Information Requests, the Technical Committee concludes that the NSR component of the project satisfies the mandatory criteria defined by the GERT rule. The Technical Committee therefore concludes that the NSR component does result in emission reductions that are real, measurable, verifiable and surplus.

5. MANDATORY EVALUATION CRITERIA – FCR COMPONENT

5.1 Real Emission Reductions – FCR Component

“An emission reduction is real if it is a reduction in actual emissions, resulting from a specific and identifiable action, or undertaking, net of any Leakage of emissions, to a third party or jurisdiction.” (GERT Pilot Rule, December 1999)

This component of the project involves removal of land from tenure arrangements with forest companies, creating Forest Carbon Reserves (FCRs) on the land and withdrawing it from the area available for harvest. The basis for emission reductions is that the carbon stock changes on the land without harvesting are larger than with harvesting, over the project lifetime.

The Technical Committee focused on two main issues, the possibility of leakage associated with the FCRs, and the risk of loss of carbon sequestered by the project as a result of fire, insect infestations or disease - referred to here as the issue of permanence.

5.1.1 Leakage

In the GERT Pilot Rule, leakage is defined as occurring “when a project causes or results in an increase in GHGs elsewhere.” The most obvious example of leakage in a forest protection case is where the forest is protected in one location, causing harvesting to be diverted from that location to another that would not otherwise have been harvested. It is possible that the harvesting could be re-located to another jurisdiction or country.

The Technical Committee agreed that, for the purposes of this review, it would restrict itself to leakage within Saskatchewan. The leakage boundary for this project was set in light of three considerations. First, the seller (SERM) is responsible for managing all public forestland in Saskatchewan, which represents about 99% of all forest in the province. Second, the FCR lands are not of significant size relative to the larger regional harvesting landbase of Canada and the United States so that their withdrawal from harvesting will have little impact upon market prices. Three, detecting and quantifying leakage outside the province would be very difficult and impractical.

The Committee found assessing the possibility of leakage for the FCRs to be very complex. Factors that required consideration included past, current and future forest industry development plans and potential, government determination of the Allowable Annual Cut and changes in its determination methodologies, government forest management objectives and changes in the objectives, and tenure arrangements with companies and changes in those arrangements. Data indicators could be used to assess leakage. Examples include harvest volumes, timber prices, and wood product prices. The Committee concluded that these data would be inadequate indicators in this case because of the significant changes that have occurred in Saskatchewan forest management in the past decade.

Given the existence in Saskatchewan of forest not yet made available for harvesting, the Committee had

significant concerns that the creation of the FCRs could simply divert harvesting to other areas in the province, resulting in no reductions, or less-than-estimated reductions, in emissions from logging. This could occur through an increase in harvesting on forestland already in forest management agreements, or it could occur through an expansion of the areas subject to forest management agreements. The Committee agreed that, in the long run, the reduction of the total area that could be made available for harvesting in the province as a result of the creation of the FCRs would ultimately reduce emissions from logging. However, there still could be leakage in the short or medium term.

An example of how leakage could occur is as follows. The Proponents provide a strong argument that total provincial Allowable Annual Cut (AAC) will be an operative constraint on harvest levels in Saskatchewan in coming years. At the same time, the government's AAC calculation methodology applied to the FCRs shows that the AAC for these areas would be 292,649 m³ per year. The Proponents argue that according to standard management practice the actual harvest on the FCR areas would be determined by accessibility and forest age, not the nominal AAC of 292,649 m³ per year for those areas. As a result, the Proponents assume that the Reference Case harvest level in the FCR component would be much higher, at 1.7 million m³ per year in the first decade of the project, an assumption that the Committee accepts (see Section 5.2.1).

This means that, in the Reference Case, the harvest must be lower than the AAC in the non-FCR areas, in order to satisfy the condition that the total harvest on the FCR and non-FCR areas combined cannot be greater than the total provincial AAC. When the FCR areas are protected as a result of the project, the harvesting of 1.7 million m³ per year no longer occurs on the FCR areas so that harvesting could increase outside the FCR areas, while still respecting the overall AAC constraint. If this were to occur, then some portion of the emission reductions associated with the FCR lands would simply have been shifted to another area.

The Technical Committee felt that the narrative arguments made by the Proponents in IRR3 regarding leakage were in-depth and full. The arguments addressed forest management practices, tenure arrangements and timber supply and demand. The Committee concludes that leakage does not invalidate the FCR component but the Committee continues to have a concern that some of the net carbon sequestration estimated to result from the FCRs may be offset by leakage. To monitor this possibility, the Committee requires that the Proponents provide a report showing that leakage is not occurring, each time they seek to register emission reductions. This report must track actual AAC for Saskatchewan and actual harvest levels as possible indicators of leakage, as well as providing other relevant numerical indicators and narrative arguments.

The Technical Committee notes that concerns over leakage would be much less significant if the assumed harvest level in the FCR areas were equal to the calculated AAC for these areas (e.g. 292,649 m³ per year). It therefore recommends that the Proponents track an alternative reference case in which the annual harvest is equal to this AAC level or the level resulting from the use of the long-run sustainable yield approach described in IRR3. In the absence of persuasive documentation that harvests would have occurred at the projected level of 1.7 million m³ per year, and that no leakage has occurred, this alternative Reference Case would be used for the calculation of RERs (see the discussion in Section

5.2.1 under the measurable criterion).

5.1.2 Permanence

Enhancement of carbon stocks resulting from forest activities is potentially reversible through human activities, natural disturbances, or environmental change, including climate change. As discussed above with respect to the NSR component of the project, there are two substantive issues:

- a) Risk of loss of sequestered carbon during the project; and
- b) Risk of loss of sequestered carbon after the end of the project.

These losses may occur as a result of natural disturbance events like fire and insect/disease outbreaks, which are largely unpredictable and cannot be completely prevented. Losses can also occur because very old forests begin to “break-up” as trees die.

The GERT Rule does not specifically include permanence of sequestration as a criterion. However, the Technical Committee chose to address the issue under the mandatory ‘real’ criterion. The crux of the issue is the question of how long carbon must remain sequestered after the associated emission reduction (net sequestration) has been registered, how the risk of carbon loss is addressed in project design, and how it will be addressed in the longer term. The Technical Committee believes the issue of how long the carbon must remain sequestered is a broader policy question outside the scope of its review for this project. However, it is clear that the additional carbon should remain sequestered for the 50-year life of the project. Before or after the 50-year time frame emissions from the FCRs that do not occur in the Reference Case could partially or fully negate the long-term atmospheric benefits of the project.

With respect to risk mitigation, in IRR3 the Proponents provided a description and rationale of their approach to reduce risk. On the one hand, there is a potential for climate change to have significant effects on the occurrence of fire and insect outbreaks. On the other hand, the FCRs are part of the intensive protection zone wherein aggressive fire protection is the standard approach, so that the risk of fire will be reduced. The FCR areas will also be subject to standard insect protection programs. Risk will also be reduced by the fact that FCRs are scattered throughout the province so that any given fire or infestation event will only impact on a small part of the total FCR area.

Estimates of emission reductions submitted for registration will reflect discounts of the total estimated amount to account for the risk of future losses of forest during the project life, as a result of fire and insect outbreaks. The Proponents have estimated that appropriate discounts are 15% for risk of fire, and 0.5% for insect mortality in spruce and aspen-dominated stands. These discounts are based on historical data and the Technical Committee believes they are reasonable for the purposes of projecting RERs from this project over its lifetime (actual RERs will be based on measured stock changes).

In IRR3 the Proponent’s show estimated carbon stocks in Reference and with-Project cases at 10-year

intervals from 2010 to 2080. Calculation of the associated carbon stock changes (see Table 2 below) show that by the fourth decade (2030-40) estimated sequestration in the Reference Case exceeds that in the with-Project Case. This means that in the last two decades of the project, and subsequently, there are estimated net emissions relative to the Reference case, as a result of the project. This is of great concern to the Technical Committee.

The estimated net emissions in the later years of the project life reflect in part a lack of good data on what happens to forest ecosystem carbon in the FCR areas when the trees are over-mature and forest stands break-up. The Proponents have made conservative assumptions that likely overestimate the amounts of ecosystem carbon lost in the FCR areas due to stand break-up. When the Proponents seek to register emission reductions associated with the FCR areas they will need to provide improved information on the fate of carbon in the FCR areas. In particular they will need to develop and use better information on over-mature forests and stand break-up to provide better estimates of the net sequestration resulting from the project during its lifetime. As any registered emission reductions will be based on actual measurements and improved information for the with-Project case, the Proponents will have an opportunity to develop and use better estimates.

The Technical Committee recognizes that this component of the project provides a good learning opportunity, and that improved estimates can be provided as part of the Proponents monitoring plans (discussed below). Thus the Technical Committee accepts that the FCR component results in a real emission reduction through avoidance of emissions as a result of protecting areas from harvesting over the project life. However, it again emphasizes its concern that projected sequestration in the with-Project Case is less than in the Reference Case toward the end of the project. The Committee recommends that the Proponents seek to improve information on the carbon dynamics of mature stands and during stand break-up to provide a better picture of the net sequestration during the life-time of the project. If improved estimates still show that net emissions occur relative to the Reference case, toward the end of the project life, then this will limit the amount of emission reductions that can be registered.

Related to this, the FCR component of the project raises the same issues as the plantation component. These issues, which the Technical Committee believes require a policy decision, are:

1. What is a reasonable minimum lifetime for forest sequestration projects, during which project Proponents have responsibility for all emissions and removals on the project land?
2. Who will be, or should be, responsible for emissions that occur after the project has ended?
3. What is the appropriate accounting methodology for sequestration projects?

As already noted with respect to the NSR component, it is possible that future policy decisions may mean that any registered emission reductions based on measured net sequestration might be accompanied by responsibility for subsequent debits if carbon sequestration decreases relative to the

Reference Case in the future.

The Technical Committee concludes that the risk of loss of carbon during the project life due to fire and insects has been addressed satisfactorily. The Committee recommends that the Proponents report on the discounts used and their rationale, reflecting any new information, each time they seek to register emissions reductions.

5.1.3 Summary

The Technical Committee concludes that the FCR component of the project does result in real emission reductions. As noted above, the Committee makes a number of recommendations regarding information to be provided for review when the Proponents seek to register emission reductions for a given past period:

1. A report documenting whether or not leakage has occurred. If leakage has occurred then it must be quantified and the quantity of emission reductions adjusted. The report should also assess the possibility of leakage during the remaining life of the project;
2. A report on any fire and insect damage that has occurred, and the amounts by which the estimated emission reductions are discounted to address the risk of future losses from fire and insects. Both the actual emission reductions and the discounted emissions reductions should be provided. The Proponents have already given, and the Technical Committee has accepted, proposed discount rates. At the time of registration the Proponents are asked to confirm that these rates have been used or explain any new rates that are being used.
3. A report showing estimated Reference and with-Project Case carbon stock changes, by carbon pool, taking into account the best available assumptions and with-Project Case measurements. In particular, this report should show estimates for future net sequestration during the life of the project and beyond in order to provide information on the extent to which net emissions may occur in the future.

5.2 Measurable Emission Reductions – FCR Component

“An emission reduction is measurable if the actual level of GHG emissions with the project in place, and the level of GHG emissions in the Reference Case, can be quantified.” (GERT Pilot Rule, December 1999)

5.2.1 Carbon Stock Changes in Reference Case

The Reference Case is the emissions and removals that would occur on the FCR areas if they were harvested. The future harvesting profile is key to determining these emissions and removals. The Proponents based their assumed harvest schedule on the age profile of the FCR areas as derived from 1990 forest inventory data, which shows age classes in 10-year increments. They assume that all stands

that are already mature or over-mature (90 years or older), or would become mature by 2010, will be harvested by 2010. This amounts to harvesting 74% of the merchantable timber volume on the FCR land between 2000 and 2010. They assume the remaining 26% would be harvested over the subsequent decades to 2080, though the project ends after 50 years. This means that most of the net sequestration estimated to result from the FCR creation is estimated to occur by 2010.

The Proponents state, in IRR3, that the Annual Allowable Cut (AAC) for the FCRs would be 292,649 m³ per year if the government's AAC calculation methodology were applied to the FCRs alone. However they argue that the actual Annual Allowable Cut would have been calculated for a larger forest management agreement area, and the harvest would have been more rapid in the FCR areas due to the age of the forest. The Reference Case assumes a harvest rate of 1.7 million m³ per year during the first 10 years of the project (2000-2010). The Technical Committee accepts the Proponent's arguments that, due to its age, accessibility and merchantability, most of the timber would be harvested within the first 10 years.

The Technical Committee notes that the Reference Case estimates are dependent on this assumption but that it is difficult to validate. The Committee requires that further supporting evidence be presented to justify this assumption when emissions reductions are to be registered. If the assumption cannot be strongly defended by the Proponents at the time of registration then, emission reductions will have to be based on a Reference Case that does not depend on this assumption. In the eventuality that the assumption cannot be strongly defended, the Committee recommends that the Proponents develop and track an alternative Reference Case. This could be based either on what the AAC would have been for the FCRs alone or on projections derived from use of the long-run sustainable yield approach described in IRR3.

In estimating the carbon stocks at decade-long intervals in the Reference Case, the Proponents examined the effects of the harvesting, regeneration of forest after harvesting, the storage of timber in forest products, and growth of non-mature stands up to the point at which they are harvested. All carbon pools are considered including trees, understory, detritus, soil and forest products. To account for harvesting and forest products, in IRR3 the Proponents assume that all carbon is emitted unless it is stored in long-lived products (lumber and Oriented Strand Board (OSB)). The Technical Committee accepts this approach but notes that other approaches are possible for accounting for harvested wood products. In particular, the Committee notes that the current accounting rules (IPCC Guidelines) for the first commitment period of the Kyoto Protocol make the assumption that harvesting results in complete emissions of the harvested material. The approach taken by the Proponents is not consistent with this assumption, though it is a more realistic approach for their situation. The fact that the Proponent's approach reduces the emissions associated with harvesting in the Reference Case means that it is also a more conservative approach, for the purposes of estimating net sequestration, than the default method in the IPCC guidelines, which assumes 100% emissions at the time of harvest. A government policy decision on the appropriate approach in forest carbon sequestration projects may be necessary.

The Technical Committee is satisfied that the Reference Case is measurable. The Committee does not reject the use of the proposed approach described above for treatment of carbon in harvested wood

products. For learning purposes, the Technical Committee recommends that, when they seek to register emission reductions, the Proponents could also provide an alternative Reference Case in which all harvested material is assumed to be completely emitted rather than some portion of it being stored in long-lived wood products.

5.2.2 Carbon Stock Changes in With-Project Case

As described in detail in IRR3 the Proponents plan to carry out a monitoring program on the FCR lands to document changes in carbon stocks over time. This program will be based on a number of permanent data collection initiatives currently being implemented in Saskatchewan for all of its managed forest.

Protocols for permanent sample plot measurements of forest floor soils, vegetation and woody debris have been established, and will include information relevant to assessing carbon. Protocols used by the Saskatchewan government (SERM – Saskatchewan Environment and Resource Management) for forest inventory and permanent sample plot measurements are based on standard methodologies. The FCRs will include some of the permanent sample plots, and remote sampling will also be used to annually inspect for large-scale fire and insect disturbances. Follow-up ground based sampling will be used to determine the carbon impacts of any such disturbances. Mineral soils will not be included in the sampling given that experts do not believe they will be significantly affected by the project.

The Technical Committee believes the Proponent's approach is complete and consistent with existing practice for assessing forest resources and carbon. As noted above, the Technical Committee recommends that one area for research and measurement is the carbon dynamics of over-mature stands and stand break-up in the FCR areas. The Committee is satisfied that the with-Project Case is measurable.

5.2.3 Measurable Emission Reductions from the FCR Component

For the FCR component, the projected emission reductions over the lifetime of the project are calculated as the difference between the carbon stock changes in the with-Project and Reference Cases, i.e., emissions avoided. This is shown in Table 2 below.

The Technical Committee concludes that the FCR component results in measurable emission reductions during the project life. It requires that the Proponents provide summaries of the methods used, and detailed measurement results, when it seeks to register emissions reductions. All carbon pools, including those in soils and non-decomposed dead organic matter, must be assessed. Carbon stock changes in each pool must be included in the emissions reductions submitted for registration, unless the Proponents can demonstrate that the carbon stock of a given pool is not declining.

As with the NSR component, the Committee accepts that the Proponents may not be able to seek registration of all emission reductions until after the proposed monitoring and measurement systems have been installed. The Committee requires that the Proponents seek registration when they have real emission reductions to register backed by monitoring and measurement. The Committee recognizes that

this means that registration of emission reductions may cover a period longer than a year.

Table 2: Projected ecosystem carbon stocks and carbon stock changes, Reference and with-Project Cases over 50 years, 206,000 ha FCR land, tonnes carbon

Year of Project	Reference Case	With-Project Case	With-Project minus Reference
Carbon Stocks			
2000	*	*	0
2010	8,651,050	10,927,315	2,276,265
2020	9,058,727	11,708,011	2,649,284
2030	9,248,815	12,023,112	2,774,297
2040	9,748,596	12,166,225	2,417,629
2050	10,731,522	12,272,795	1,541,273
Carbon Stock Changes			
2000-10	*	*	2,276,265
2010-20	407,677	780,696	373,019
2020-30	190,088	315,101	125,013
2030-40	499,781	143,113	-356,668
2040-50	982,926	106,570	-876,356
Total			1,541,273

* Cannot be estimated with the information provided. In 2000, the Reference Case and with-Project Case carbon stocks are assumed to be identical. This assumption, combined with carbon stock projections for 2010, means that net carbon stock changes in 2000-10 can be projected.

5.3 Verifiable Emission Reductions – FCR Component

“An emission reduction is verifiable if the calculation methodology is acceptable, transparent and replicable and the raw data required to verify / audit the calculations is available”. (GERT Pilot Rule, December 1999)

The Technical Committee is satisfied that the Proponents have shown assumptions and methods of calculations in sufficient detail. The Committee also believes that the various measurement initiatives noted above, which will be housed in the publicly accessible provincial Forest Management Effects Monitoring Program database management system, will provide much of the data for verification and audit.

The Technical Committee therefore concludes that the FCR component emission reductions are verifiable.

5.4 Surplus Emission Reductions – FCR Component

“An emission reduction is surplus if it represents a reduction that is not otherwise required. If legal requirements affecting GHG emissions come into effect during the life of the project, then the Proponent must track and report an additional Reference Case which reflects the new

requirements.” (GERT Pilot Rule, December 1999)

The Technical Committee interprets the GERT Rule to mean that a project is surplus if it results in emission reductions or net sequestration that is not otherwise legally required. The FCR areas are protected under the provincial Representative Areas Network (RAN) program but it is the Committee’s understanding that there is no legal requirement for the province to set-aside or protect the areas. The removal of land from the harvesting land base involved a voluntary agreement with forest company licensees to remove the areas from their tenures on provincially owned land.

The Technical Committee is satisfied that the emission reductions from the FCR component are surplus.

5.5 Summary of Conclusions – FCR Component

Based on its review of the PD and the Proponent's responses to three Information Requests, the Technical Committee concludes that the FCR component of the project satisfies the mandatory criteria defined by the GERT rule. The Technical Committee therefore concludes that the FCR component does result in emission reductions that are real, measurable, verifiable and surplus.

GERT TECHNICAL COMMITTEE RECOMMENDATIONS

- *Based on its review the Technical Committee recommends the Steering Committee designate this trade-matched project as GERT-registered.*

STEERING COMMITTEE DECISION

The GERT Technical Committee and the GERT Steering Committee approve the assessment and recommendations contained in this Technical Committee Review Report.

APPENDIX A - PROJECT REVIEW PROCESS

Project Review Team - Membership

The review of this project was a long process, reflecting the complexity of the issues involved and the evolution and changes in the project over the course of the review. Below is a list of the Technical Committee members, and external advisors, who formed the Project Review Team. Not all members and advisors served on the Review Team for the whole review.

- Mike Apps (external advisor, Federal Government)
- Deborah Bisson (GERT Coordinator)
- Bryan Bogdanski (external advisor, Federal Government)
- Warren Bell (GERT)
- Judith Hull (Federal Government Representative)
- Tony Lempriere (external advisor, Federal Government)
- Stan Liu (Federal Government Representative)
- Peter Musso (Industry Representative)
- Ray Norgren (Industry Representative)
- Chris Rolfe (Environmental NGO Representative)
- Ken Plourde (Industry Representative)
- Liz Siarkowski (Industry Representative)
- Katherine Wreford (Industry Representative)
- Ross Young (Industry Representative)

The review also benefited from the advice of Dr. Sandra Brown, an internationally known expert in forest sequestration projects and a Lead Author of the chapter on project-based activities in IPCC (2001) *Special Report on Land Use, Land-Use Change and Forestry*, Intergovernmental Panel on Climate Change. Dr. Brown was contracted by GERT on the recommendation of the Review Team, to provide advice on a set of specific questions prior to the preparation of IR3.

History of the Review Process

The Project Review Team has conducted a thorough review of the PD in consultation with the Project Proponents. The recommendations from that process have also been thoroughly reviewed by the Technical Committee, and are endorsed in this document. The specific milestones of the review process are noted below:

August 1999	Project document submitted
April 2000	IR1 submitted to Proponents
August 2000	IRR1 received by Review Team
October 2000	IR2 submitted to Proponents

Saskatchewan Forest Sequestration Project

January 2001	IRR2 received by Review Team
April 2001	Review Team prepares Summary of Issues document to guide development of IR3
May 2001	Consultant contracted to review documents to date and the Summary of Issues document, and to advise the Review Team on a number of outstanding issues
June 2001	Consultant's report on outstanding issues received by Review Team
July 2001	IR3 submitted to Proponents
October 2002	Draft IRR3 received by Review Team
January 2002	Final IRR3 received by Review Team
February 2002	Review Team accepts IRR3 as final documentation required
March 2002	Draft TCRR prepared by Review Team Draft TCRR supplied to Proponents for review
April 2002	Draft TCRR submitted to TC for review
May 2002	TC accepted Review Report.

Note: The Information Requests and Information Request Responses are not attached to this TCRR as they are too long. They are instead posted with the TCRR at the GERT website, www.gert.org.