

SCIENCE COORDINATION WORKSHOP  
Record of Discussion  
DEVELOPMENT OF A CATTLE RESIDUAL FEED INTAKE PROTOCOL  
MARCH 16, 2008  
9:00 – 4:30 PM

Objectives:

Focus on and achieve, either during the one-day workshop or through follow-up work, the desired workshop outcomes listed below. These will be used to support the developing GHG offset opportunities in the cattle sector:

- Acceptable GHG reductions that can be confidently advanced for genetic selection in the beef herd for residual feed intake (RFI), building upon established knowledge and science;
- Discussion on a preferred baseline approach;
- Identification of and priority for areas where additional work and tools that need to occur to support RFI project implementation.

General Process:

- Use a combination of a literature review in the form of a Science Discussion Document, sharing recent research results, researcher experience and group discussion of ideas and recommendations to achieve the workshop outcomes.
- The day will be spent on understanding the synthesis science and work towards consensus (defined by 80% agreement) on proposed options for quantification science and links to RFI practices.

**9:00 WELCOME AND INTRODUCTIONS – Review and Confirm Agenda**  
***Amanda Stuparyk, Climate Change Central***

**9:15 SETTING THE SCENE – Carbon Offsets Policy and Protocol Development in Alberta**  
***Amanda Stuparyk, Climate Change Central***

- Discussion of regulatory framework on GHG emissions in the Alberta content
- **See PowerPoint Presentation**

Q: If some of the protocols have overlap what happens?

A: Eg: Days on feed vs. reducing the beef lifecycle protocol usage

One can be part of the other, but pick the one which has the benefit on reducing GHGs.

Whichever protocol has the biggest benefit on a carbon credit point of view or alternatively you can use both protocols, ie. Edible oil and reduced days on feed.

Q: How many dollars have Large Final Emitters in Alberta used on buying credits?

A: There are a little over 100 regulated facilities in Alberta under the Specified Gas Emitter Regulation. For the first compliance cycle there were approximately 1.5 million offset credits were verified and serialized on the Alberta Registry – about 1 million offsets were used for compliance

Q: Do you think that that number will increase in the future?

A: LFEs need to meet compliance each year so there will continue to be a demand for compliance options

Q: Has enough business been done between LFEs and farmers to establish the supply and demand quota?

A: The LFEs needed options of how to reach compliance. In the future things will change because of supply and demand each year.

**10:10-10:35AM OVERVIEW OF GHG EMISSIONS QUANTIFICATION SCIENCE IN BEEF HERDS– Discussion of quantifying GHG emissions from Cattle - IPCC I/II methods and Beef Quantification Protocols – Dr. John Basarab, ARD**

- See PowerPoint presentation

**11:00-12:00PM WHAT IS RESIDUAL FEED INTAKE – How is it Measured, What are the Economics and What is the basis for the GHG and Genetic Relationships with RFI in Cattle – Dr. Paul Arthur, McArthur Institute, NSW, Australia**

- See PowerPoint presentation

Q: So RFI animals basically will eat less if you put a bail into the herd?

A: Yes, no matter what food is given, the low RFI animals eat less

Q: Do the animals get fuller faster?

A: It goes back to the genetics of the animals. Before RFI started, we knew from different experiments, that some animals needed less feed, so we found out that genetics were to attribute to the fact they did eat less. Therefore, we realized that breeding animals, which needed less food, would contribute to the fact that we could breed a certain low RFI animal, which would eat less food. Low RFI animals grew faster even with a lower quality feed and still could maintain growth in comparison to higher RFI animals. Many experiments are still being conducted on low RFI animals.

Q: What is the research on the differences between the low and high RFI animals concerning reproduction?

A: The result is coming very close but the age of puberty is slightly later in low RFI animals and so is calving, results from Lacombe Research station. The female side has been studied while the male is to be researched soon.

Q: Do you think through selection lines low RFI will continue through the future lines?

A: The research is ongoing – due to the longer generation times for cattle; research through mice indicates a continuance of low RFI for currently 23 generations and is ongoing. In cattle, there is data for 4-5 generations.

Q: What's the difference between feed conversion and feed intake?

A: At post, weaning time low RFI is more strongly related to feed intake than feed conversion, in finishing the relationship between feed conversion and intake becomes even *stronger*. Feed conversion is driven by gain rather than feed intake.

**1:00PM-1:30PM - RELATIONSHIPS BETWEEN RFI DIGESTIBILITY AND METHANE/MANURE PRODUCTION IN CATTLE - What do we know about impacts on digestibility of the diet in lower RFI cattle – Dr. Erasmus Okine, UofA**

**- See PowerPoint Presentation**

Q: Do you get the same result of methane consumption putting a cow in the chamber for a week than in the hood for 16 hours?

A: The variance doesn't change that much because 16 hours gives you an optimum production result.

**1:30-2:30PM - HOW MIGHT WE DEVELOP A PROTOCOL FOR RFI IN CATTLE – Application and adoption of RFI Technology in the Beef Industry, Considering Quantification and Verification Procedures - Dr. Paul Arthur, McArthur Institute**

Q: Does RFI depend on using a Grow Safe Systems specifically?

A: As long as you measure your feed accurately, it doesn't.

**Comment – Because of very extreme interest in the USA for RFI - GrowSafe has requested a North American standard for RFI feed intake and measurement and data collection (third party verified). We will have a standardized data base at GrowSafe.**

Comment – U of A – believes that standardized testing for EBVs in Alberta would be beneficial. Dr. Paul Arthur says that when you start off testing on low RFIs there's always going to be noise in the data but once it has been tested for a while the data becomes consistent. Set accuracy levels for EBVs initially was accepted at 40% accuracy, raised to 50% and now presently in AU the accuracy is now set at 60%.

Comment on the reluctance of adopting new technologies regarding low RFIs in Alberta.

A: the reason we're here is to develop a protocol and that this discussion has to do with developing protocol credits in Alberta and how to go ahead with the process, to try and minimize reluctance.

**3:00 – 4:15 PM - Discussion and Ratification of Options – Fiona Law, Computouch**  
**Key Considerations and Recommendations for Discussion at the Workshop**  
Science Discussion Workshop Polling and Discussion Questions

- 13 Workshop technical participants were provided with keypads to input a response to each question posed based on four categories:
  1. Hold for now
  2. Agree with more work
  3. Agree
  4. Strongly Agree

**Question 1. Is the scientific evidence strong enough for the reduction in GHG emissions (methane and manure) from selection for low RFI in beef cattle through the reduction in feed intake?**

**Polling Results: ACCEPTED (92% Agree)**

Strongly Agree - 77% (10)

Accept – 15% (2)

Accept more work – 8% (1)

Hold – 0

Discussion: What's the end test for RFI? The clearer statement is one which shows a constant level of production. Feed intake is lower for the lower RFI. For the full life of the low RFI animal has higher efficiency levels. When does the benefit end? For the full life of the animal. For example: Experiments show a higher RFI animal ate 1.5 kilograms of food more than the low RFI animals. There is proof no matter what type of diet the animals eat there will be a % reduction in the amount the animals eat.

**Question 2. Is the scientific evidence strong enough for the reduction in GHG emissions from selection for low RFI in beef cattle through improved digestibility and/or less methane being lost as a percentage of gross energy intake (e.g., 4% vs. 3% of GEI for a high grain diet)?**

**Polling Results: Require more work (61% Agree)**

Strongly Agree – 15% (2)

Accept - 46% (6)

Accept more work – 38% (5)

Hold - 0

Discussion: Not enough research / enough data to agree on this data. Uncertainty around IPCC quantification. There isn't enough research being conducted on this and with only two studies, one in AU and here in Alberta there is still uncertainty. The belief is here but the research funding hasn't allowed for more studies to occur. The data is here and believed but the methodology needs to be followed through. The protocol can move forward in a first generation protocol with modifications as further research and studies on methane reduction are conducted and become more certain.

**Question 3.1. An audit of this protocol would necessarily require registering (i.e. with a third party) RFID of bulls with certified RFI EBVs?**

**Polling Results: ACCEPTED (92% Agree)**

Strongly Agree – 69% (9)

Accept – 23% (3)

Accept more work – 8% (1)

Hold - 0

Discussion - What do you mean by registering with a third party? A: For example: In Australia before you trade any animal you must have an **NL Id #**. CCA could be a third party in Alberta. The third party in Alberta must come through before you can verify a protocol in Alberta. Does that registration need to occur? Does the EBV need to be pre-certified? We need a database which has a specific baseline so that cattle can be looked back on through the generations to see if the low RFI cattle are still improving. The third party might be more than one person to verify the animal, so we can't specify who the third party would or could be. It depends on the testing abilities and tracking systems.

A couple of challenges because low RFI must be tested for a long time. There is ongoing work and initiatives to provide auditing services and processes along the way. The USA has different auditing than Canada at present so a form of validation in certain areas and points are required. Genetic markers aren't far enough along to include in the process so they have been excluded in this first generation protocol. There are initiatives world wide working in the area of beef genetic markers forming collaborations to get data. They are going to use the marker information in getting the EBV data and then there isn't a question about collecting and the question should be how to process that info worldwide.

**Question 3.2. An audit of this protocol would necessarily require registering (i.e. with a third party) the RFID of progeny produced from certified RFI EBV bulls?**

**Polling Results: Require more work (61% Agree, 38% Hold, more work)**

Strongly Agree – 38% (5)

Accept 23% - (3)

Accept more work – 15% (2)

Hold – 23% (3)

Discussion - In the USA bulls will gain about \$25 more than a non low RFI bull. So the farmers now register and have to keep paperwork on the progeny and paperwork on that bull. In Australia you are not allowed to trade animals without tagging each animal and identifying them. Not sure carbon credits have enough value right now. An RFI database is needed to have this protocol to work properly.

This protocol is voluntary so if you have objections to third party auditing then you will not be eligible for carbon credit, unless you are willing to follow the protocol applicability.

If you're going to use progeny in the verifying system we need to address the way it needs to be verified.

**Question 4. What level of accuracy of RFI EBVs is acceptable? (General thought)**

**Majority: 50% Accuracy Level**

50% - 55% (6)

55% - 0

60% - 18% (2)

65% - 27% (3)

70% - 0

75% or higher - 0

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**Question 5. Carbon credits could be claimed for second generation progeny whose parents do not have certified EBVs for RFI?**

**Polling Results: Require more work (92% Hold, more work)**

Strongly Agree – 8% (1)

Accept - 0

Accept more work – 25% (3)

Hold – 67% (8)

**Question 7. Can carbon credits be claimed on overseas/out-of-country semen/bulls with certified RFI EBV?**

**Polling Results: Require more work (61% Agree, 38% Hold, more work)**

Strongly Agree – 15% (2)

Accept – 46% (6)

Accept more work – 23% (3)

Hold – 15% (2)

Discussion - We should accept with some form of certification. You can only humanly manage so many cattle so what we're trying to put together is one big herd so we own all the bulls.  
\*\*How will the Alberta Government deal with application of protocol through other provinces; keeping the cows in Manitoba? It is inevitable that these issues will arise further. This will be policy discussion and decision for future clarification and possible solutions.

Is there a possibility for a flexibility mechanism in the protocol regarding the various phases of the cattle and where they're coming from and where their end life is.

**4:15 – 4:30PM - Summary and Workshop Close**

*John Basarab and Amanda Stuparyk*

FINAL COMMENTS: Workshop information will be posted on Carbon Offset Solutions website. Work will continue on the design of a draft protocol for Residual Feed Intake in Cattle per recommendations from this consultation.

Meeting ADJOURN

