EXPLANATORY STATEMENT

Issued by the Authority of the Minister for the Environment

Carbon Credits (Carbon Farming Initiative) Act 2011

Carbon Credits (Carbon Farming Initiative) (Reducing Greenhouse Gas Emissions by Feeding Nitrates to Beef Cattle) Methodology Determination 2014

Contents

Background

The *Carbon Credits (Carbon Farming Initiative) Act 2011* (the Act) enables the crediting of greenhouse gas abatement in the land sector. Greenhouse gas abatement is achieved by either reducing or avoiding emissions or by removing carbon from the atmosphere and storing it in soil or trees.

Abatement activities are undertaken as offsets projects. The process involved in establishing an offsets project is set out in Part 3 of the Act. An offsets project must be covered by and undertaken in accordance with a methodology determination.

Subsection 106(1) of the Act empowers the Minister to make, by legislative instrument, a methodology determination. The purpose of a methodology determination is to establish procedures for estimating abatement (emissions reductions and sequestration) and project rules for monitoring, record-keeping and reporting on abatement.

A methodology determination must meet the offsets integrity standards set out in section 133 of the Act and the eligibility criteria set out in section 106 of the Act. The Minister cannot make a methodology determination unless the Domestic Offsets Integrity Committee (the DOIC) has endorsed the proposal to which the methodology determination gives effect under section 112 of the Act and advised the Minister of the endorsement under section 113 of the Act. The DOIC is an independent expert panel established to evaluate and endorse methodology proposals.

Application of the Determination

The *Carbon Credits (Carbon Farming Initiative) (Reducing Greenhouse Gas Emissions by Feeding Nitrates to Beef Cattle) Methodology Determination 2014* (the Determination) sets out the detailed rules for implementing and monitoring a project under the Carbon Farming Initiative (CFI) to reduce the methane generated by pasture-grazed beef cattle.

The abatement activity involves substituting nitrate lick blocks for urea as a dietary supplement for beef cattle, except in herds which are primarily fed via feedlotting.

Project proponents wanting to implement the Determination must make an application to the Clean Energy Regulator (the Regulator) and meet the eligibility requirements for an offsets project set out in subsection 27(4) of the Act. These requirements include compliance with the rules set out in the Determination.

Offsets projects that are undertaken in accordance with the Determination and approved by the Regulator can generate Australian carbon credit units (ACCUs) that can be sold to, for example, businesses wanting to offset their emissions.

Public Consultation

The methodology proposal *Reducing greenhouse gas emissions in pasture fed beef cattle by feeding nitrate supplements* (the proposal) was developed by RAMP Carbon, Meat and Livestock Australia and the Australian Agriculture Company Pty Ltd (the applicants).

The proposal was published on the Department's website for public consultation from 2 December 2013 to 11 January 2014. Two public submissions were received.

The DOIC considered the public submissions during its assessment of the methodology proposal in accordance with subsection 122(5) of the Act and endorsed the methodology proposal on 20 March 2014.

The Clean Energy Regulator and the applicants were consulted in the development of the Determination.

Determination Details

The Determination is a legislative instrument within the meaning of the *Legislative Instruments Act 200*3.

The Determination commences on the day after it is registered on the Federal Register of Legislative Instruments (FRLI).

The Determination expires when it is either revoked under section 123 of the Act, or on the day before it would otherwise be repealed under the *Legislative Instruments Act 2003*, whichever happens first. Under subsection 50(1) of that Act, a legislative instrument such as the Determination is repealed on the first 1 April or 1 October falling on or after the tenth anniversary of registration of the instrument on FRLI. For example, if the Determination is registered before 1 April 2015, it would expire on 31 March 2025 unless previously revoked.

Details of the Determination are at pages 5-20.

A Statement of Compatibility with Human Rights prepared in accordance with the *Human Rights (Parliamentary Scrutiny) Act 2011* is at page 21.

Documents incorporated by reference in the Determination

The Nitrates Calculator is a spreadsheet-based tool available on the Department's website (available at www.climatechange.gov.au/cfi). Based on data collected by projects and entered into the Nitrates Calculator, the Nitrates Calculator estimates the carbon dioxide equivalent net abatement amount (the net abatement amount) of the project for a single region, in a single feeding period.

Details of the Determination

Chapter 1
Eligibility

Outline of the Chapter

1.1 This chapter provides guidance on the eligibility criteria potential projects must meet in order to be declared an eligible offsets project (a project) under the Determination.

1.2 This chapter refers to provisions contained in Parts 1 and 2 of the Determination.

Kind of project to which the Determination applies

1.3 The effect of paragraph 106(1)(a) of the Act is that a methodology determination must specify the kind of offsets project to which it applies. The kinds of projects to which a methodology determination can apply are listed in the *Carbon Credits (Carbon Farming Initiative) Regulations 2011* (the Regulations) under Regulation 3.28 (the 'positive list'). The Determination specifies projects which reduce emissions by feeding nitrate supplements to livestock, which is listed in subparagraph 3.28(1)(i)(v)) of the Regulations [***section 1.4***].

Eligible herds

1.4 All sectors of the Australian beef industry are eligible under the determination, with the exception of farms primarily engaged in feedlotting beef cattle [***section 2.3***]. Records demonstrating the herd complies with section 2.3 must be kept [***paragraph 5.8(b)***] for 7 years in accordance with subregulation 17.1(1). A feedlot is a confined area with watering and feeding facilities where cattle are hand or mechanically fed for the purposes of production. The exclusion of feedlotted beef cattle herds is due to the impact manure management systems in feedlots have on nitrous oxide (a potent greenhouse gas) production in Australia. The dung and urine of feedlotted cattle produce significantly more nitrous oxide, and therefore carbon dioxide equivalent greenhouse gas, than the dung and urine of pasture-grazed cattle. It is therefore highly unlikely a net decrease in carbon dioxide equivalent greenhouse gas emissions could be achieved by undertaking a project under the Determination with feedlotted cattle.

Location

1.5 All CFI projects to which this Determination applies must be carried out in Australia (see paragraph 27(4)(a) of the Act) [***section 2.2***]. There are no restrictions on the location of these projects beyond this requirement. Records demonstrating the project was carried out in Australia must be kept [***paragraph 5.8(a)***] for 7 years in accordance with subregulation 17.1(1).

History of urea supplementation: the baseline area

1.6 To be declared an eligible offsets project, the land on which the project is to be carried out (the baseline area) must have a history of urea supplementation of beef cattle [***section 2.4***]. Records demonstrating the baseline area has a history of urea use must be kept [***paragraph 5.8(c)***] for 7 years in accordance with subregulation 17.1(1). This requirement is necessary for greenhouse gas accounting reasons; abatement is generated when nitrate is

substituted for urea as a dietary supplement. If this requirement was not met, for example, if nitrates were fed where no previous non-protein nitrogen (encompassing urea, nitrates and other, less commonly fed forms such as biuret) had previously been fed, the nitrous oxide emissions associated with the cattle's dung and urine would result in a net increase in greenhouse gas emissions. In this case, the project would not reduce methane emissions from beef cattle, and the project would not be eligible under the Determination.

1.7 It is noted that, from a greenhouse gas accounting perspective, the history of urea supplementation could have been demonstrated for the herd of cattle or the producer instead of for the land itself. This point was the subject of targeted industry consultation, with feedback from the beef industry advising that the nature of their industry would most easily lend itself to a land-based requirement. That is, the history of urea use is most easily demonstrated for a specified area of land (the baseline area). The intent of this requirement is to ensure that no additional nitrous oxides from dung and urine are being created by nitrate use compared to those already created by urea use on the same area of land.

1.8 The history of urea supplementation may not be uniform across all of the parcels of land (or 'baseline areas') comprising the project, therefore each baseline area participating in the project must demonstrate a history of urea use [***subsection 2.4(1)***]. For example, a single landholder may have purchased a neighbouring property and wish to undertake a project across both properties. In this case, the effect of subsection 2.4(1) would be that the landholder would be required to demonstrate a history of urea use on both the original and newly purchased property.

1.9 Another example of where subsection 2.4(1) would apply would be if several landholders have decided to undertake a project together (this arrangement is commonly known as an 'aggregation'). In this situation, a history of urea use would need to be demonstrated for each land parcel on which the project was being undertaken.

1.10 Subsection 2.4(1) also requires urea supplementation to have occurred at least once in the five years prior to the commencement of the first project year. This five year window reflects the semi-regular fluctuations in environmental conditions, particularly rainfall and therefore grass growth, which result in urea supplementation on beef cattle properties in Australia.

1.11 For each baseline area, the herd fed urea does not need to be the same herd used in the project [***subsection 2.4(2***)]. For example:

> Kate had a herd of Limousin cattle on her property until 2012, when she sold the Limousin herd and bought a herd of Droughtmasters. Kate used to feed her Limousin herd urea over the dry season, but has never fed her Droughtmaster herd urea. In 2014, Kate decided to undertake a project with the Droughtmaster cattle on her property (the same property on which she used to feed the Limousin cattle urea). Kate is eligible under the Determination because she has fed beef cattle urea on her property in the past five years, even though they are not the same cattle.

Anticipated impact of requirement to demonstrate historic urea use

1.12 The beef industry in Australia is generally divided into northern and southern production systems, both of which use urea supplementation when pasture protein content is insufficient to meet the cattle's needs. It is therefore anticipated that a large number of properties in the Australian beef industry will be eligible under the Determination.

1.13 The grazing environment in northern Australia is characterised by rapid maturing, low digestibility and low protein content C4 grasses. Similarly, pastures and crop residues in southern Australia are sometimes low in protein and digestible energy in autumn prior to opening rains or under drought conditions. Supplementation of either urea or nitrates in beef cattle subject to pasture protein constraints in such conditions allows cattle either to maintain their body weight or to provide low levels of live-weight gain (generally less than 0.2 kg per day) in periods where they would otherwise experience live-weight loss or even fatalities. The Determination is therefore expected to continue the productivity gains associated with urea supplementation while reducing greenhouse gas emissions from enteric methane production.

The project mechanism

1.14 The project mechanism is the activity for which ACCUs can be earned under this Determination [***section 2.5***]. The project mechanism is exclusive of all other activities, even if they are accounted for in the greenhouse gas assessment boundary. In the Determination, the effect of the project mechanism (in conjunction with the greenhouse gas assessment boundary [***section 4.5***]) is that projects cannot earn ACCUs for an activity other than reducing enteric methane emissions by substituting nitrate for urea (for example, by reducing their carbon dioxide emissions from fuel use when feeding nitrates when compared to urea).

1.15 Supplementing the diet of ruminant animals (such as cattle) with non-protein nitrogen (which includes urea and nitrates) increases the nitrogen available for conversion to microbial protein and increases the digestibility of the feed consumed. This effect on digestibility also increases rumen (the first part of cattle's stomach) turnover and thus intake, particularly of native pasture and straw.

1.16 Methane production in ruminants increases with intake, therefore supplementation with non-protein nitrogen will also increase a herd's methane production. However, methane production is lower when nitrates are used as the non-protein nitrogen source in comparison to urea. Therefore substituting nitrates for urea as a non-protein nitrogen supplement for ruminants results in abatement of enteric methane emissions.

Chapter 2
Operating a project

Outline of the Chapter

2.1 This chapter provides guidance on the requirements for operating a project to which the Determination applies [***section 3.1***].

2.2 The relevant provisions are contained in Part 3 of the Determination.

Feeding nitrates via lick blocks

2.3 Nitrates must be fed in the form of a lick block [***subsection 3.2(1)***]. This requirement recognizes that the majority of beef operations, particularly in northern Australia, have limited labour and equipment to manage daily supplementation. Lick blocks are a cost effective method of supplementation because of their low wastage, resistance to losses by rainfall and ease of deployment. These characteristics of lick blocks also mean that this method of supplementation is the most likely to ensure the nitrate supplements are in fact consumed by the herd at an even rate over the feeding period (an assumption of the Nitrates Calculator).

Lick block sulfur content

2.4 Cattle must receive a specified amount of sulfur during a nitrate supplementation period [***subsection 3.2(2)***]. It is important to note that the sulfur content relates to the rate the *nitrogen* (not nitrate) in the ration is fed to the herd. As all sources of non-protein nitrogen contain nitrogen, the amount of any urea or biuret (for example) fed during a nitrate supplementation period must be recorded in addition to the amount of nitrate fed via lick blocks [***paragraph 5.9(e)***]. All non-protein nitrogen fed to the herd during the reporting period must be entered into the Nitrates Calculator to verify that the sulfur feeding requirements of the Determination are met. The sulfur requirement [***subsection 3.2(2)***] and associated record-keeping provisions [***paragraphs 5.9(e)*** **and** ***(f)***] is the only restriction on feeding non-protein nitrogen that are not nitrate lick blocks to the herd under the Determination. Nonetheless, proponents are encouraged to undertake standard industry precautions for the safe feeding of all supplements.

Nitrate supplementation period

2.5 A nitrate supplementation period begins when one or more nitrate lick blocks are made available to the herd and ends when the nitrate lick blocks are no longer available to the herd [***subsection 3.2(3)***]. Nitrate lick blocks could no longer be available to the herd because either: the proponent collects the blocks, withdrawing them from the herd [***subparagraph 3.2(3)(b)(i)***]; or the cattle have completely consumed all the blocks and the landholder chooses not to replace them [***subparagraph 3.2(3)(b)(ii)***]. If the landholder chooses to replace nitrate lick blocks as the cattle consume them, the nitrate supplementation period continues until one the conditions set out in ***paragraph 3.2(3)(b)*** are met. There are no restrictions on the number or frequency of feeding periods that can occur in a year or in a reporting period.

Nitrate supplementation limit

2.6 The Determination has conservative nitrate supplementations limits [***subsection 3.3(3)***], as well as a mandatory nitrate adaptation period of two weeks for each new nitrate supplementation period [***subsections 3.3(1) and (2)***]. An exception to the mandatory nitrate adaptation period occurs if there has been less than 30 days between two consecutive nitrate supplementation periods [***Subsection 3.3(4)***]. In this case, nitrates can be fed up to a rate of 7 grams of nitrate per kilogram of dry matter intake (DMI) per day, or 50 grams of nitrate per adult animal equivalent per day (whichever occurs first), from the first day of the nitrate supplementation period [***subsection 3.3(4)***].

2.7 Both nitrates and urea are potentially toxic to livestock if fed at too high a concentration or if introduced to the diet too quickly. Overfeeding with these supplements can lead to toxicity and, in extreme cases, animal deaths. While clinical toxicity is unlikely to occur, nitrate feeding at or below the rates specified in the Determination [***Section 3.3***] can potentially cause sub-clinical toxicity. In cattle, sub-clinical nitrate toxicity is associated with reduced reproductive efficiency and lower weight gains unrelated to any change in feed intake that may occur. These potential side effects are related to the increased conversion of haemoglobin to methaemoglobin which restricts oxygen in the cattle's bloodstream.

2.8 However, when an adaptation period is undertaken [***Subsections 3.3(1) and (2)***], and then nitrate intake is limited to 7 grams of nitrate per kilogram of DMI (corresponding to 0.015 grams of nitrate per kilogram liveweight) for the rest of the nitrate supplementation period, the risk of sub-clinical toxicity is substantially reduced. Proponents are encouraged to undertake standard industry precautions for the safe feeding of all supplements.

Nitrate levels in natural feed intake

2.9 A safe level of nitrate feeding should consider the natural nitrate levels in the pasture in addition to any nitrate fed to the cattle via a lick block [***Section 3.3***].

2.10 Australian soils, particularly in Northern Australia, have low levels of total nitrogen. Leaching under high rainfall conditions in the wet season is one reason for this. Australian soils also have naturally low productivity, which results in low levels of organic matter being accumulated in the soil and therefore low levels of nitrogen storage. As a result, areas such as the Mitchell and Buffel grasslands and the lower rainfall areas of Central Australia have seasonally low levels of total nitrogen content and thus low pasture protein levels. Crude protein levels in native pastures commonly fall below 6-7% of the dry matter (DM) in the dry season (approximately 1.0% total nitrogen) and can be as low as 2%.

2.11 In the north, nitrate levels are low, even in the wet season when protein content of pasture increases during active plant growth. Nitrates usually comprise no more than 6% of the total nitrogen in DM (wet season) and 2-3% of total nitrogen in DM in other seasons.

Precautions for nitrate accumulating feeds, waters and plant species

2.12 The following feed types should be used with caution if feeding nitrates as a supplement:

- Hays made from cereal crops, especially hay grown under drought conditions and cut while 'sappy'. These can develop toxic nitrite levels if they heat up in storage. Oaten

hay is of particular concern and can become poisonous if previously dry hay becomes damp before feeding.

- Nitrate accumulating weeds of stubbles should be monitored. The following species are of particular concern and at times can contain high nitrate levels: Capeweed; Mintweed; Crown beard; Pigweed; Redroot; Caltrop (Catshead burr); Marshmallow; and Fat Hen. These species have the potential to comprise a significant proportion of dietary nitrate intake; where they are detected in quantities at which they could comprise a material proportion (that is, greater than 5%) of dietary intake, the nitrate supplementation rate should be reduced appropriately.

- Water can contain toxic levels of nitrates. Marginally toxic levels of nitrate in water, combined with marginally toxic levels of nitrate in feed, can lead to poisoning. High-risk sources include:
    - deep wells fed by soil water from highly fertile soils;
    - fluids draining from silos containing materials rich in nitrates; and
    - water contaminated by fertiliser, animal waste or decaying organic matter.

Adequate pasture availability for successful supplementation

2.13 Supplementation with non-protein nitrogen requires adequate pasture to be available for cattle to fill their rumen. Several industry organisations provide guidance on locally-appropriate methods for estimating pasture availability for cattle. For northern Australia, FutureBeef has developed a method, available on its website (www.futurebeef.com.au), to test if pasture availability is appropriate for stock numbers. For southern Australia, Meat and Livestock Australia (MLA) provides guidelines for estimation of pasture availability that project proponents may find helpful. Pasture mass can either be assessed by cutting, drying and weighing representative pasture samples or by the use of online tools. These resources are all available on the MLA website (www.mla.com.au).

Chapter 2 Summary: Recommended process for undertaking a feeding period

Step 1: Determine whether pasture availability will support nitrate supplementation (recommended).

Decide if supplementary feeding of nitrates, sulfur, and other factors such as water soluble sugars and any other limiting nutrients is feasible given available pasture mass. Note that supplementation is only a feasible option if sufficient pasture feed is available to supply metabolisable energy for maintenance.

Pasture mass should be at a level to provide the intake required to meet the assumed DMI for maintenance for each livestock class. Where the DMI is inadequate to meet the maintenance intake (for example in drought), the total intake of pasture plus any supplements (for example, crop residues or by-products but not feed blocks or non-protein nitrogen supplements) should be considered so as not to exceed a maximum intake rate of 7g/kg DMI or 50g per adult animal equivalent.

Step 2: Determine whether protein availability will support nitrate supplementation (recommended).

Decide if the Determination can be applied on the property given the animal class and protein concentration requirements in Table 1 (below) and the regional feed protein concentration values in the National Inventory Report of the relevant year. Implementing the Determination will provide emissions reduction and benefits to livestock survival when seasonal protein is below maintenance requirements for animal classes being supplemented. At pasture crude protein (CP) levels less than 6%, pasture cannot supply sufficient additional protein to meet minimum maintenance requirements for growing, non-pregnant cattle (see Table 1). Alternative management to nitrate feeding or provision of additional protein supplements with nitrates may be required. There will also be no benefit to animal maintenance from non-protein nitrogen supplementation where minimum protein requirements are already met from paddock feed. In this situation nitrous oxide evolution from additional soil emissions may negate abatement from methane reduction.

Table 1: Minimum protein requirements of various classes of cattle in Australia

Early weaned lighter calves		Heifers and Steers		Mature Dry Cows		Cows with suckling calf		Bulls	
Weight (kg)	Min. protein % DM	Weight (kg)	Min. protein % DM	Weight (kg)	Min. protein % DM	Weight (kg)	Min. protein % DM	Weight (kg)	Min. protein % DM
50	12	150	8	350	6	350	10		
100	10	200	8	400	6	400	10		
150	8	300	8	450	6	450	10		
200	8	400	8	500	6	500	10	600	10
		500	7	550	6	550	10	800	10

Source: Department of Primary Industries, Victoria 2007. Drought feeding of beef cattle - a guide for farmers and land managers, March 2007. ISBN 978-1-74199-055-3 (print) ISBN 978-1-74199-035-5 (online)

Step 3: Identify the amount of nitrate and urea needed to supplement the herd (recommended).

Nitrate supplements may be offered as an individual source of non-protein nitrogen, or in conjunction with urea, the traditional source in lick blocks. The total non-protein nitrogen (nitrate plus urea) should not exceed 30% of total CP intake. Using this approach, non-protein nitrogen supplementation with nitrates will meet the protein requirements of mature dry cows but other classes may require higher protein intake from paddock feed.

Step 4: Obtain a Commodity Vendor Declaration Form [*paragraph 5.9(f)*].

The Form must include the official method of analysis of the Association of Official Analytical Chemists. The analysis of the block must be undertaken in Australian Fodder Industry Association accredited laboratory. The information contained in the Form is necessary to calculate inputs into the Nitrates Calculator.

Step 5: Manage nitrate supplementation.

Step 5a: Ensure adequate sulfur is provided [***section 3.2***]

The total non-protein nitrogen ration, including the nitrate lick block and any urea, must contain sulfur to minimise nitrite accumulation and absorption to reduce the potential toxicity risk. The nitrogen to sulfur (N:S) ratios of the total ration must be between 10 and 20:1 to maintain the activity of sulfur-reducing bacteria.

Step 5b: Introduce nitrates at a reduced rate [***section 3.3***]

Proponents must introduce nitrates using a two-week adaptation period at a rate of 3.5g/kg DMI up to a maximum of 25g/day for an adult animal equivalent (450kg liveweight and 10kg DM/day intake), after estimating total herd requirement from the location, class, season and number of animals. After this minimum adaptation period with low nitrate level lick blocks the maximum concentration in feed can be increased to 7g/kg DMI up to a maximum of 50g/day for an adult animal equivalent. The adaptation period can be longer than two weeks at the discretion of the project proponent, but it must not be less than two weeks.

Step 5c: Ensure adequate pasture is available (recommended)

An adequate supply of pasture to supply fermentable energy to support rumen function should be available. If pasture supply or the supply of other supplements is restricted, or if lick blocks are provided during a drought, it is recommended that the lick blocks contain molasses or some other source of sugar to provide energy and as an attractant for cattle.

Step 5c: Consider choosing a sweet or salty nitrate lick block (recommended)

Water Soluble Sugar (WSS) supplementation (for example, molasses) through the lick block or through other feeds is not a requirement of the Determination. However, proponents may choose to include WSS supplements or salt (sodium chloride) as an attractant depending on the conditions of their property.

Step 6: Supply supplement blocks to the herd [*section 3.3*].

Step 7: Monitor the opening and closing stock of nitrates and urea [*section 5.5*].

In practice, a known weight of non-protein supplements will be offered to a set number of cattle (the herd) for a period of time (the nitrate supplementation period). If any residue of a nitrate lick block or urea supplement is left after the feeding period then the weight not consumed must be deducted from the weight of nitrate lick block offered.

Step 8: Monitor the composition of the herd in terms of numbers and livestock class [*section 5.3*].

Proponents should take this information into account when deciding on or adjusting the rate of nitrate supplementation. This information is also a required input into the Nitrates Calculator and is used to calculate the net abatement amount.

Step 9: Be guided by any state/territory regulations and/or guidelines for the use of urea (recommended).

State and territory governments provide guidelines on the rate of feeding for urea, based on local conditions. These guidelines have been designed to assist landholders avoid toxicity and wastage when feeding urea. It is recommended that proponents check with their local authorities if they are planning to use a combination of nitrate and urea feeding.

Step 10: Use best practice approaches to animal welfare when formulating the supplementation program (recommended).

It is recommended that proponents follow best practice approaches outlined in the *Model Code of Practice for the Welfare of Animals: Cattle* (Primary Industries Standing Committee 2004).

In particular, proponents should follow Section 2.2.5.2 and 2.2.5.4 of the Code insofar as: *'all rations formulated for use are to be nutritionally balanced and designed to provide sufficient nutrients and palatability for the production, maintenance and health of the cattle and to ensure that digestive upsets are minimised (S 2.2.5. 2)'* and *'the use of any ingredient must be limited to acknowledge nutritionally safe levels in the ration (S 2.2.5.4)'*.

Chapter 3
Calculating the net abatement amount

Outline of the Chapter

3.1 This chapter provides guidance on how the carbon dioxide net abatement amount is to be calculated.

3.2 The relevant provisions are contained in Part 4 of the Determination.

The net abatement amount

3.3 The net abatement amount for the project is the carbon dioxide equivalent of the amount of methane emissions avoided as a consequence of the project (that is, feeding nitrates in accordance with the Determination) [***section 4.1***]. This amount must be determined using the Nitrates Calculator [***subsection 4.1(2)***].

3.4 The Nitrates Calculator estimates the net abatement amount by determining the difference between methane emissions released by the cattle in the project under two scenarios; the baseline scenario [***section 4.5***] and the project scenario [***subsection 4.1(1)***]. The project scenario is the emissions that actually occurred during the nitrate supplementation period for which data is entered. The baseline scenario is the hypothetical emissions that would have occurred during the nitrate supplementation period if nitrates had not been fed (that is, the project mechanism had not been applied). The net abatement amount is the difference between the carbon dioxide equivalence of emissions under these two scenarios.

3.5 The Nitrates Calculator can be updated from time to time by the Department [***section 1.3***]. Minor updates are expected from time to time: to improve the usability of the Nitrates Calculator based on user feedback; to reflect new scientific research; or ensure continued alignment with the National Inventory Report. Any updates cannot change the basic inputs required by the Nitrates Calculator [***section 4.3***], nor can they otherwise contradict its functionality as described in the Determination.

3.6 The carbon dioxide equivalence of methane is determined by the Nitrates Calculator using the method and global warming potential (GWPs) set out in the *National Greenhouse and Energy Reporting (Measurement) Determination 2008* [***subsection 4.3(3)***].

Effect of exceeding the nitrate supplementation limit

3.7 If either of the nitrate supplementation limits [***subsections 3.3(2) and 3.3(3)***] are exceeded in a herd during a nitrate supplementation period, the rate at which nitrates are fed is taken to be 25 grams of nitrate per adult animal equivalent during the nitrate adaptation period, and 50 grams of nitrate per adult animal equivalent for the rest of the nitrate supplementation period [***section 4.2***]. In other words, ACCUs can only be earned for feeding nitrates up to the nitrate supplementation limit applicable to the relevant phase of the nitrate supplementation period (adaptation phase or non-adaptation phase). Exceeding these limits risks inducing nitrate toxicity in the herd and will result in the net abatement amount being calculated as if nitrates were fed at the nitrate supplementation limits. For example:

> Michael's project consists of two herds, one of which is located in Queensland, while the other is located in South Australia. If Michael fed the Queensland herd nitrates at a rate of 27 grams per adult animal equivalent during the nitrate adaptation period and 52 grams per adult animal

equivalent or the rest of the nitrate supplementation period, the net abatement amount for the Queensland herd in that project year would be calculated using a nitrate supplementation rate of 25 grams per adult animal equivalent during the nitrate adaptation period and 50 grams per adult animal equivalent for the rest of the nitrate supplementation period. In other words, Michael is not credited for the two grams per adult animal equivalent by which he exceeded the nitrate supplementation limit during the entire nitrate supplementation period.

3.8 The Nitrates Calculator estimates the grams of nitrate per adult animal equivalent per day for each nitrate supplementation period based on data entered by the user. If the nitrate supplementation limit has been exceeded, a warning will appear on the data entry and results pages of the Nitrates Calculator. This feature of the Nitrates Calculator can be used by project proponents before commencing a feeding period to plan how much nitrate to feed to their herds.

Using the Nitrates Calculator

Using National Inventory Report data

3.9 If using National Inventory Report data for the average liveweight inputs [***paragraph 5.4(2)(a)***], the appropriate data can be pre-filled into the Nitrates Calculator by selecting the 'Use National Inventory Report data' radio button located to the right of the 'Region' drop-box on the data entry page of the Nitrates Calculator. The Nitrates Calculator uses other inputs, such as region and year, to determine the appropriate National Inventory Report data for the remainder of the parameters used to calculate the net abatement amount. For ease of use, these parameters are not visible to a user of the Nitrates Calculator and are automatically determined upon data entry of required input fields.

Reporting periods containing multiple nitrate supplementation periods

3.10 If a reporting period contains multiple nitrate supplementation periods, the Nitrates Calculator must be used to determine the net abatement amount for each nitrate supplementation period in the reporting period [***section 4.3***]. These nitrate supplementation period net abatement amounts must all be reported separately [***paragraph 5.11(b)***] and summed to determine the net abatement amount for the reporting period [***paragraphs 4.1(2)(b) and 5.11(c)***].

Projects with multiple project areas (aggregated projects)

3.11 For projects with multiple project areas (for example, aggregated projects), in the interests of transparency it is recommended that a data entry and results sheet of the Nitrates Calculator is completed for each project area, for each nitrate supplementation period. As a minimum, a data entry and results sheet will need to be completed for each region in which there are project areas. This minimum requirement of the Nitrates Calculator ensures that different local conditions, such as pasture characteristics, are accurately reflected in the net abatement amount(s) calculated.

Chapter 4

Monitoring, measuring, record-keeping and reporting

Outline of the Chapter

4.1 This chapter provides guidance on the monitoring, measuring, record keeping and reporting requirements.

4.2 The relevant provisions are contained in Part 5 of the Determination.

Number of animals in each livestock class

4.3 In order to calculate the net abatement amount for a nitrate supplementation period, the Nitrates Calculator requires the number of animals in each livestock class in the herd during that nitrate supplementation period to be entered into the data entry page of the Nitrates Calculator. Proponents can either collect this information during the nitrate supplementation period, or during the 75 days immediately preceding the nitrate supplementation period, as outlined in Diagram 1[***subsection 5.3(2)***].

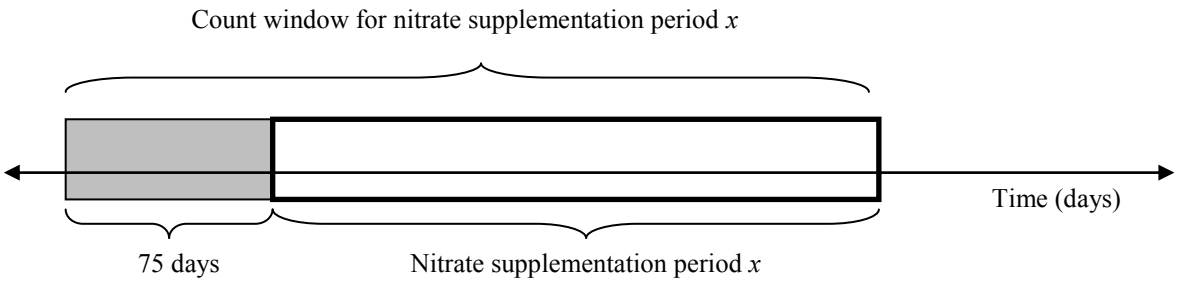

Diagram 1: Time during which the number of animals in each livestock class can be counted [***section 5.3***]

4.4 No specific method for undertaking the counts is required by the Determination. The endorsed methodology proposal, however, envisaged two likely methods for undertaking the counts: either via a muster; or via continuous sample monitoring (for example, National Livestock Identification Scheme data). In either case, the raw data used to determine the number of animals in each livestock class must be kept [***paragraph 5.9(g)***]. In cases where more than one count has been undertaken for a nitrate supplementation period, it is also recommended that proponents keep their working showing how they transformed the raw data collected into the Nitrates Calculator inputs (that is, the working behind the derivation of averages).

Average liveweight of animals in each livestock class

4.5 In order to calculate the net abatement amount, the Nitrates Calculator requires the average liveweight of animals in each livestock class at the beginning and end of each nitrate supplementation period to be entered into the data entry page. Proponents can either source this data from the National Inventory Report, or from on-farm records obtained by direct measurements of animals in the herd [***subsection 5.4(2)***].

Direct measurement approach

4.6 Project proponents choosing to determine the average liveweight of animals in each livestock class via direct measurements of animals in the herd [***paragraph 5.4(2)(b)***], must undertake data collection within the same window outlined in paragraph 4.3 and Diagram 1 (above) [***subsection 5.4(4)***].

4.7 While no method or equipment for undertaking the measurement is specified in the Determination, all measuring or monitoring instruments (for example, scales) must be inspected, maintained and calibrated in accordance with either the product literature that accompanies the instrument, or the applicable standard [***section 5.7***].

4.8 As all raw data used to determine average liveweight in each livestock class must be kept [***paragraph 5.9(g)***] the recorded weights of each individual animal in each livestock class must be kept. It is also recommended that proponents keep their working showing their transformation of this data into the Nitrates Calculator inputs to assist auditors. However, only the averages calculated from this raw data and inputted into the Nitrates Calculator are required to be submitted with the offsets report [***paragraph 5.11(1)(b)***].

Nitrate lick blocks and non-protein nitrogen supplements that are not nitrates (NPNNN)

4.9 The opening stock and closing stock of nitrate lick blocks and any NPNNN must be determined for each nitrate supplementation period [***sections 5.5; section 5.6***]. Opening stock means the weight, in kilograms, of either the nitrate lick blocks or NPNNN purchased before and during the nitrate supplementation period. Closing stock means the weight, in kilograms, of either the nitrate lick blocks or NPNNN purchased before or during a given nitrate supplementation period; and not consumed by the herd. The closing stock must therefore deduct the weight of any partially consumed nitrate lick blocks or NPNNN [***paragraphs 5.5(3)(b) and 5.6(3)(b)***]. Annual records must be kept of the opening and closing stock of: nitrate lick blocks; and any NPNNN [***paragraph 5.9(e)***].

4.10 While no method or equipment for weighing supplements is specified in the Determination, all measuring or monitoring instruments (for example, scales) must be inspected, maintained and calibrated in accordance with either the product literature that accompanies the instrument, or the applicable standard [***section 5.7***].

Reporting

The carbon dioxide equivalent net abatement amount for the reporting period

4.11 Where a reporting period applies to a single feeding period and the herd is in a single region, the carbon dioxide equivalent net abatement amount [***section 4.1***] will be an output of the Nitrates Calculator. However, where this is not the case the project proponent will need to report the sum of the net abatement amount outputs of the Nitrates Calculator as the carbon dioxide equivalent net abatement amount [***paragraph 5.11(1)(c); paragraph 4.1(2)(b)***]. This is because the Nitrates Calculator calculates the net abatement amount for a single nitrate supplementation period, for a single region.

Reporting inputs and outputs of the Nitrates Calculator

4.12 The inputs and outputs of the Nitrates Calculator can be provided as a printout or electronic copy of the completed Nitrates Calculator for each nitrate supplementation period and region in the reporting period [***subsection 5.11(2)***]. While these are a convenient way of providing the information, project proponents may provide it in other formats if they wish.

Determination details index

Determination Reference	*Explanatory Statement page/ paragraph reference*
Part 1: Preliminary	
Section 1.2	4 (Determination details)
Section 1.4	1.3
Part 2: Requirements for declaration as an eligible offsets project	Chapter 1: Eligibility
Section 2.1	1.1
Section 2.2	1.5
Section 2.3	1.4 1.14
Section 2.4	1.6 -1.13
Section 2.5	1.14
Part 3: Requirements for operation of eligible offsets projects	Chapter 2: Operating a project
Section 3.1	2.1
Subsection 3.2(1)	2.3
Subsection 3.2(2)	2.4
Subsection 3.2(3)	2.5
Section 3.3	2.6-2.13 3.7
Part 4: The carbon dioxide equivalent net abatement amount	Chapter 3: Calculating the net abatement amount
Section 4.1	3.1-3.5
Section 4.2	3.7 – 3.8 3.4
Section 4.3	3.3-3.6 3.9-3.11
Section 4.4	1.14-1.16
Section 4.5	3.4
Part 5: Monitoring, measuring, record-keeping and reporting requirements	Chapter 4: Monitoring, measuring, record-keeping and reporting
Sections 5.1 and 5.2	4.1-4.2

Section 5.3	4.3
Section 5.4	3.9 4.5-4.6
Sections 5.5 and 5.6	4.9
Section 5.7	4.7 4.10
Section 5.8	1.3-1.5
Paragraph 5.9	2.4 11 (Step 4) 4.4 4.8-4.9
Section 5.11	4.8 4.11-4.12

Statement of Compatibility with Human Rights

Prepared in accordance with Part 3 of the *Human Rights (Parliamentary Scrutiny) Act 2011*

Carbon Credits (Carbon Farming Initiative) (Reducing Greenhouse Gas Emissions by Feeding Nitrates to Beef Cattle) Methodology Determination 2014

This legislative instrument is compatible with the human rights and freedoms recognised or declared in the international instruments listed in section 3 of the *Human Rights (Parliamentary Scrutiny) Act 2011*.

Overview of the Legislative Instrument

The *Carbon Credits (Carbon Farming Initiative) (Reducing Greenhouse Gas Emissions by Feeding Nitrates to Beef Cattle) Methodology Determination 2014* (the Determination) sets out the detailed rules for implementing an agricultural emissions avoidance project under the *Carbon Credits (Carbon Farming Initiative) Act 2011*. Emissions are avoided by feeding nitrates, in the form of a lick block with a specified nitrate to sulfur ratio, to beef cattle.

The Determination requires project proponents to monitor the composition of their herd, that is, the number of animals in each livestock class and the weight of nitrogen-containing dietary supplements consumed by the herd. Project proponents must use the Nitrates Calculator to calculate the emissions avoided as a result of feeding the cattle the dietary supplements.

Project proponents wishing to implement an offsets project under the Determination must make an application to the Clean Energy Regulator (the Regulator) and meet the eligibility requirements set out under the *Carbon Credits (Carbon Farming Initiative) Act 2011*. Offsets projects approved by the Regulator can generate Australian carbon credit units that can be sold to businesses in Australia wanting to offset their carbon emissions.

Human rights implications

This legislative instrument does not engage any of the applicable rights or freedoms.

Conclusion

This legislative instrument is compatible with human rights as it does not raise any human rights issues.