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Safeguard Calculated Emissions Baseline - Basis of Preparation

Environment

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1 Overview

1.1 Roy Hill Project

Situated approximately 115 kilometres north of Newman, Roy Hill is a world-class, low phosphorus, Marra Mamba iron ore deposit located in the Pilbara – one of the world's premier iron ore provinces – and the only independent iron ore project with West Australian majority ownership.

With integrated mine, rail and port facilities (

Figure 1) which have the capacity to deliver 55 Million tonnes per annum (Mtpa) – Roy Hill is one of the world's major resource based projects, which will deliver enormous benefits to the broader community for years to come.

The Roy Hill Project consists of four facilities being:

- Mine
  - Conventional open pit, bulk mining operation from multiple production benches; and
  - 55Mtpa wet processing plant.
- Rail
  - 344 kilometre single line, heavy haul railway.
- Port
  - Purpose built, dedicated two berth iron ore port facility at Port Hedland, capable of receiving, stockpiling, screening and exporting 55Mtpa (wet) of direct shipped iron ore as lump and fines.
- Corporate offices
  - Perth Corporate Offices and Remote Operations Centre (ROC)

Roy Hill has a defined mineralisation of more than 2.3 billion tonnes of +50% Fe iron ore, of which 1.2 billion tonnes is +55% Fe iron ore. This is enough to sustain a mine life of more than 20 years.

Infrastructure that has been constructed to support the mine (Figure 2) includes:

- processing plant;
- tailings storage facility;
- surface water diversions;
- light and heavy vehicle access roads;
- bulk fuel facility;
- processing services area and mine services area inclusive of administration buildings, workshops and a warehouse;
- communications;
- water pipelines;
- accommodation village;

- airport;
- waste rock dumps;
- overland conveyors, and
- above ground power lines.

The delivery system between the mine and port has been carefully designed and modelled to deliver the required capacity and maintain product quality. This will ensure that Roy Hill is able to achieve its 55Mtpa capacity and deliver sustained, consistent high product quality with a high level of confidence.

Roy Hill loaded its first shipment of ore for export in late 2015.

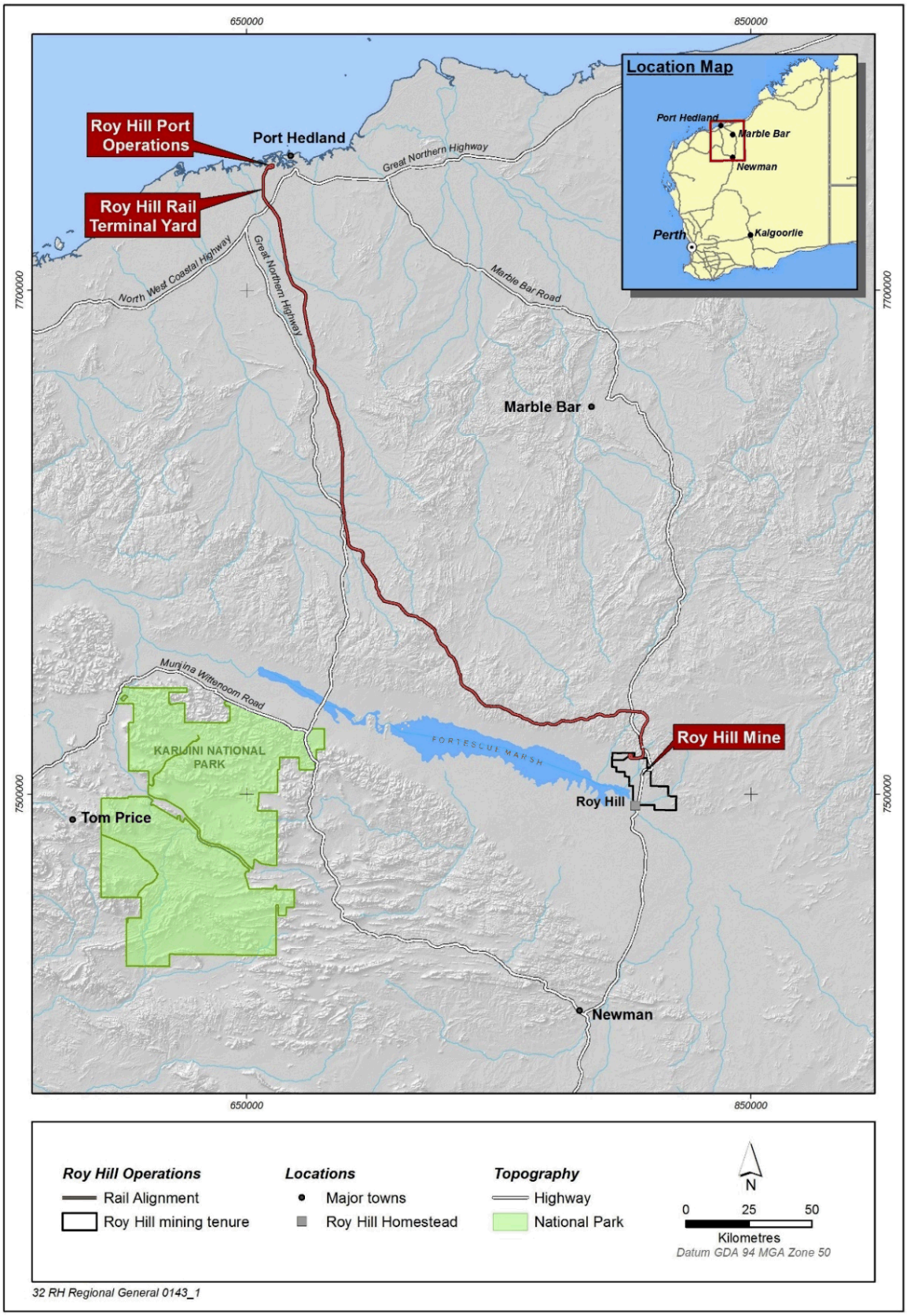

Figure 1: Roy Hill Site Location

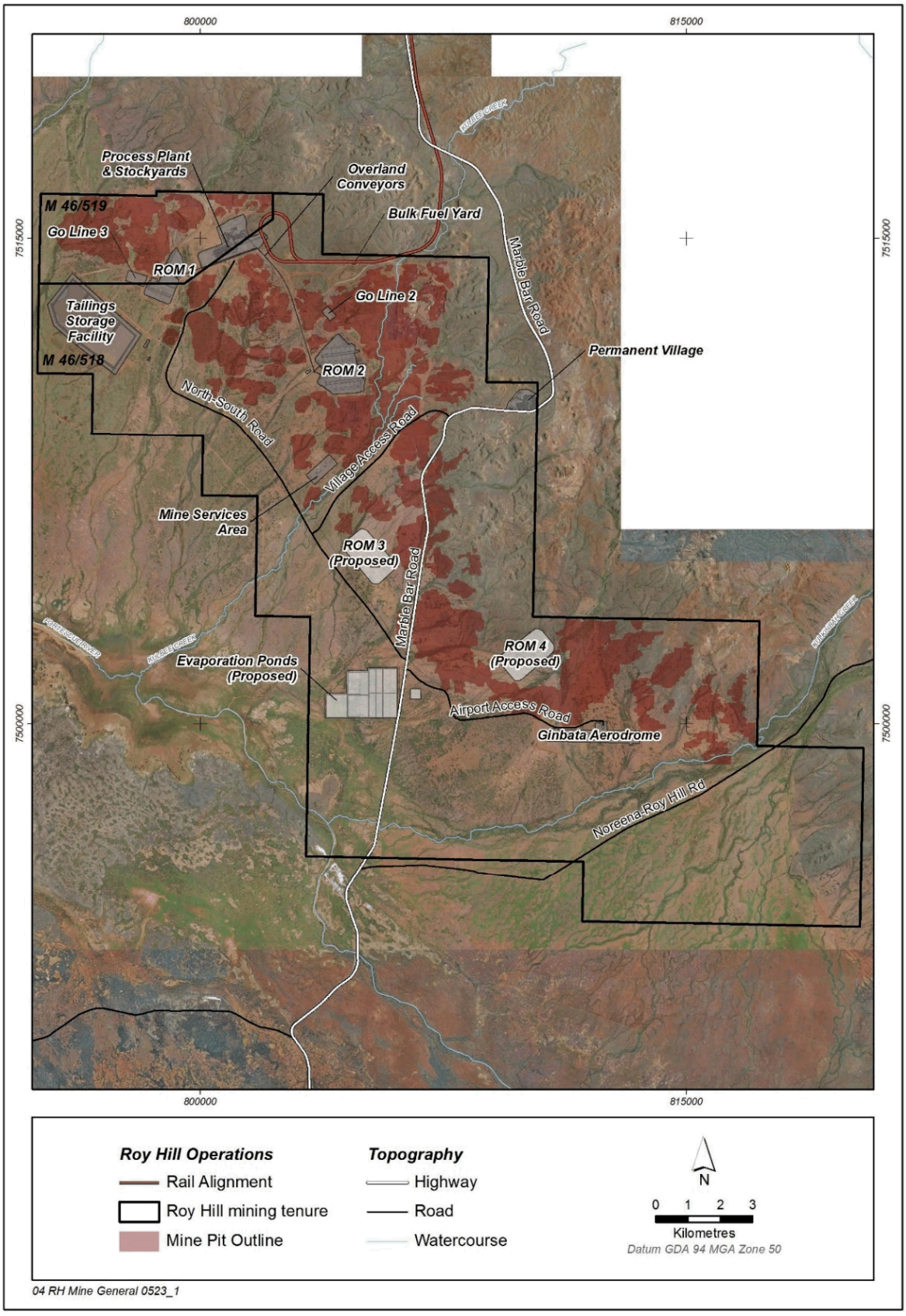

Figure 2: Mine Overview

1.2 Project Emissions

Roy Hill Holdings Pty Ltd (RHH) commenced reporting under Section 19 of the NGER Act in 2012-13. Being recently constructed, the Roy Hill facilities have not been provided with a 'Reported-emissions Baseline' by the Clean Energy Regulator (the Regulator) under the *National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015* (the Rules). As such the default baseline of 100,000 tonnes CO_2e applies unless an application for a calculated baseline is made.

Based on production and energy forecast data and emission estimates, the Roy Hill Corporate Offices, Rail and Port facilities are not expected to exceed the default emissions baseline.

Forecast data for the Mine has been reviewed for the period of FY2016-17 to FY2018-19, and indicates emissions will exceed the default baseline in FY2016-17, rising to 386,581 tonnes CO_2e in FY2018-19 (Figure 3). A breakdown of Roy Hill Mine facility covered emissions in FY2018-19 is shown in Table 1. The majority of emissions (99.4%) result from stationary and transport diesel combustion.

Table 1: Roy Hill Mine FY2018-19 covered emissions

Emission Source	FY2018-19 forecast covered emissions (T CO2-e)	Percentage of total emissions
Diesel (transport)	381,914	0.6%
Diesel (stationary)	2,246	98.8%
LPG (stationary)	0	0%
Other minor sources	2,421	0.6%
Total	386,581	100%

As the forecast emissions exceed 100,000 tonnes CO_2e for the mine facility an application for a calculated-emissions baseline is required. RHH is applying for a calculated baseline determination under section 23 of the Rules (New Facility Criteria) using forecast data for FY2018-19. It is however noted that the Roy Hill mine facility will still be in the ramp up phase following FY2018-19 and emissions beyond this timeframe are expected to continue to rise.

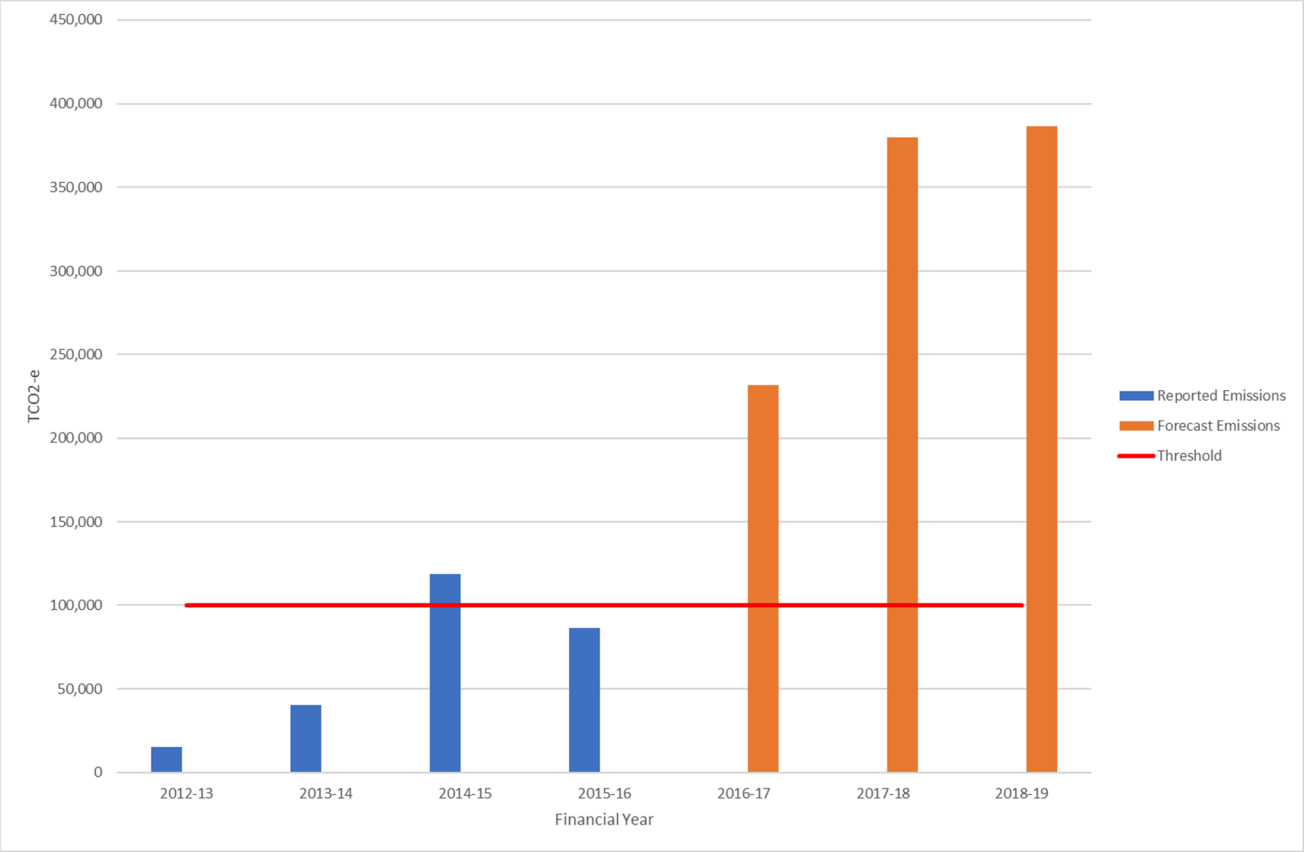

Figure 3: Roy Hill Mine Emissions

2 Purpose and Scope

This document describes how RHH have prepared the Roy Hill mine application for a calculated emissions baseline (CER- NGER-010) under section 22 of the Rules.

The intent of this document is to provide detail to support RHH's audit trail, to assist with knowledge management and to support the formal application.

This document outlines how RHHs:

Meets the New Facility criteria for a calculated emissions baseline for its Mine facility.

Identifies appropriate data sources and records through internal review processes and third party audits.

Collects and calculates applicable data for use in the application (CER-NGER-010).

3 Legislation

The Emissions Reduction Fund (ERF) is a component of the Australian Government's Climate change policy which contributes to the nation's target of reducing emissions to five percent below the year 2000 levels. The Emissions Reduction Fund is a voluntary scheme which provides incentives to businesses to reduce emissions through innovative practices and technologies. The scheme is enacted through the following;

- *Carbon Credits (Carbon Farming Initiative) Act 2011;*
- *Carbon Credits (Carbon Farming Initiative) Regulations 2011; and*
- *Carbon Credits (Carbon Farming Initiative) Rule 2015.*

The Emissions Reduction Fund includes a safeguard mechanism which promotes large businesses to keep their emissions within historical levels and ensure the reduced emissions are not displaced by a rise elsewhere.

The Safeguard Mechanism operates under the *National Greenhouse and Energy Reporting Act 2007* and came into effect on 1 July 2016. As a consequence, responsible emitters controlling facilities which emit 100,000 tonnes CO_2e or more of Scope 1 emissions are required to provide an annual report to the Regulator.

The National Greenhouse and Energy Reporting (NGER) Scheme was introduced in 2007 to provide data and accounting in relation to greenhouse gas emissions and energy consumption and production. The NGER Scheme requires the responsible emitter to report annual covered emissions annually, while the Safeguard Mechanism enables a comparison of reported emissions against a baseline.

Should the reported annual emissions be below the baseline, no further action is taken by the Regulator. If the emissions exceed the baseline, the responsible emitter is required to 'make good' the excess emissions by surrendering carbon credit units by 1 March the following year. Failing to surrender carbon units after that date incurs a penalty not exceeding $2.1 million.

4 Roy Hill NGER Reporting

Hancock Prospecting Pty Ltd (HPPL) has historically been responsible for reporting for the following facilities under section 19 of the NGER Act:

- Roy Hill Corporate facility (ROC);
- Roy Hill Mine facility;
- Roy Hill Port facility; and
- Roy Hill Rail facility (together the Facilities)

RHH is a subsidiary of HPPL and is the Responsible Emitter for the Facilities under section 22X(1)(a) of the NGER Act.

Under the terms of a letter agreement dated 17 May 2017, HPPL and RHH have agreed to transfer the NGER Act reporting obligations for the Facilities from HPPL to RHH, and have notified the CER in accordance with section 22X(1)(c) of the NGER Act.

5 Setting the Baseline

5.1 Safeguard Mechanism Rule

In accordance with the Rules, the Regulator has determined a 'Reported Baseline' for each designated large facility in Australia that has NGER emissions reported for the five years commencing FY2009-10 and ending FY2013-14. Section 14(1) of the Rules, requires the Regulator to select the highest annual covered emission number reported during the five year period from FY2009-10 to FY2013-14 provided that there has been no changes to activities conducted at the facilities. In the case where the reported baseline for a particular facility is inappropriate or for facilities that did not report during FY2009-10 to FY2013-14 there is an option to have an alternative determination made by the Regulator provided that certain criteria are met.

Applications for an alternative determination must be made to the Regulator. Applications must demonstrate that all applicable eligibility criteria have been met and be accompanied by an independent audit report providing assurances over certain information included in the application (such as emissions and production estimates).

To address circumstances where there is not sufficient historical emissions data for the Regulator to make a reported-emissions baseline determination, a facility can apply for a calculated-emissions baseline under section 22 of the Rules. An application for a calculated baseline under the new facility criteria can be submitted when covered emissions have exceeded, or are reasonably expected to exceed 100,000 tonnes CO_2e in the first year of the calculated baseline.

Section 27 of the Rules stipulates the information required to support calculated baseline applications. Based on the date of application, Section 27(c) states that for the period to be covered by the calculated baseline, the financial year with the highest expected production levels, in relation to the identified primary production variable, should be used as the basis for the application.

5.2 Calculation Methodology

Calculated-emissions baselines are set using an audited forecast of emissions over the period that the baseline is to apply. The baseline is calculated by multiplying the high point of estimated annual production over the period, depending on the application date, by the estimated emissions-intensity of that production (tonnes CO_2-e per unit of production).

Since the Roy Hill Mine facility has emitted more than 100,000 tonnes CO_2-e in FY2016-17, its New Facility calculated-emissions baseline will remain in place for the three-year period between FY2016-17and FY2018-19 after which it can be replaced by either a production adjusted baseline or a further calculated-emissions baseline.

5.3 Roy Hill Facility Circumstances

Roy Hill commenced reporting under Section 19 of the NGER Act in 2012-13 for the each of its facilities. During the period FY2009-10 to FY2013-14 none of the Facilities reported Scope 1 emissions in excess of 100,000 tonnes CO_2-e. As such the regulator did not make a reported emissions Baseline determination. During this time, Roy Hill Facilities were under construction.

As the Roy Hill Facilities have only recently been constructed, and were therefore not provided with a "Reported Emissions baseline" from the CER, Roy Hills Mine, Rail and Port facilities have been assessed against the criteria for a calculated emissions baseline determination. An assessment of forecast production and emissions levels has been conducted for the three year period between FY2016-17 to FY2018-19.

Forecast data for the Roy Hill mine shows that, within the timeframe permitted under the application (Table 3), emissions are expected to be at their highest in FY2018-19 at 386,581 tonnes CO_2-e. This also coincides with the highest production level that will occur within the application timeframe. It is expected that beyond this application timeframe, production and associated covered emissions will continue to increase, with full production not expected to be reached until FY2021-22.

It is also noted that the Roy Hill mine facility is not a grid connected electricity generator.

Forecast data for the Rail and Port facilities show a maximum emission level less than 100,000 tonnes CO_2-e.

5.4 Application Criteria

Roy Hill's mine facility meets the conditions set out in section 23 of the Rules (New Facility Criteria). Details on how Roy Hill meets the New Facility Criteria are provided in Table 2.

Table 2: New Facility Criteria

New Facility Criteria (as per s23 of the Rules)	Details of satisfaction of criteria
1) The new facility criteria are satisfied in relation to a facility if all the criteria in this section are met.	Roy Hill mine meets all new facility criteria.
2) The facility is not covered by the criteria for making a reported-emissions baseline determination in subsection 14(1) or (2).	The Roy Hill Mine Facility was not covered by criteria for making a reported-emissions baseline determination in subsection 14(1) or (2).
3) Scope 1 emissions of one or more greenhouse gases from the operation of the facility were not included in reports under the Act for all of the 5 financial years starting on 1 July 2009.	Scope 1 emissions of one or more greenhouse gases from the operation of the mine facility were included in only one of the Roy Hill reports under the Act for the five financial years starting on 1 July 2009 being FY2012-13.
4) The facility has emitted, or is reasonably expected to emit, more than 100,000 t CO_2-e of covered emissions in the first year of the proposed calculated-emissions baseline determination.	Roy Hill mine will emit more than 100,000 tonnes CO_2-e of covered emissions in the first year of the proposed calculated-emissions baseline determination.
5) The responsible emitter for the facility has not: a) Changed, or is not expected to change, the manner in which scope 1 emissions are reported or calculated under the Act; or b) caused, or is not expected to cause, scope 1 emissions of greenhouse gases; for the primary purpose of meeting the threshold in subsection (4).	There have been no changes made by Roy Hill for the mine facility with the purpose of meeting the threshold in subsection (4).
6) A calculated-emissions baseline determination has never been made in relation to the facility.	No calculated-emissions baseline determination has been made by Roy Hill for the mine facility.
7) The calculated-emissions baseline determination to which the application relates is to commence on 1 July 2016, 1 July 2017, 1 July 2018 or 1 July 2019.	Roy Hill's calculated-emissions baseline will commence 1 July 2016.

Methodologies used to collect the forecast data relied upon for the purposes of this application are detailed in Section 6.

5.5 Application Timelines

Applications for a calculated emissions baseline require forecasting of production volumes and associated greenhouse gas emissions. The period in which the application is being made determines which financial years are to be included in the scope of the audit. The Roy Hill Mine facility emissions exceeded 100,000 tonnes CO_2-e in FY2016-17. The relevant timings for application under the New Facility criteria are shown in Table 3. Roy Hill's mine facility application will be made by 31 October 2017, utilising forecast production and emissions data for FY2018-19.

Table 3: Application Timeframes

Application Timeframe	FY Forecast Period
30 July 2016	FY2016-17, FY2017-18 and FY2018-19
1 August 2016 - 30 July 2017	FY2017-18 and FY2018-19
31 October 2017	FY2018-19

Source: http://www.cleanenergyregulator.gov.au/NGER/The-safeguard-mechanism/Baselines/Calculated-baseline#deadlines

6 Data Forecasts

6.1 Forecast Processes and Material Assumptions

For the purpose of the Roy Hill mine facility application for a Calculated-emission Baseline, data covering the application period in its entirety has been audited. Data for the application has been sourced from the July 2017 Lenders' Life of Mine Plan (LOMP) completed by Mine Planning in July 2017. This LOMP provided physicals for input into the associated September 2017 Lenders' Budget, which was completed in September 2017 by both the Finance and the Mine planning team.

6.1.1 Life of Mine Plan

The Geological Modelling team publish a revised geological model every four months. This model incorporates the interpretation of the results of the Ore Definition drilling program, downhole probes, reverse circulation measure while drilling telemetry, and other data sources. The Mine Planning team use the revised geological model to update the pit designs and scheduling reserves, which are key inputs for the LOMP. Other inputs include equipment parameters, processing constraints and product targets which are subject to annual revision. This is based on customer requirements, market conditions, improved understanding of operational constraints and actual performance data.

The Mine Planning team use the updated inputs to run a revised LOMP annually. This is scheduled in months out to depletion of reserves. Key outputs of the LOMP are the:

- mining sequence,
- schedule physicals; and
- equipment hours.

The Mine Planning team look at various scenarios and combinations of inputs to determine the optimal solution to maximise project value. Figure 4 shows the mine planning process flow.

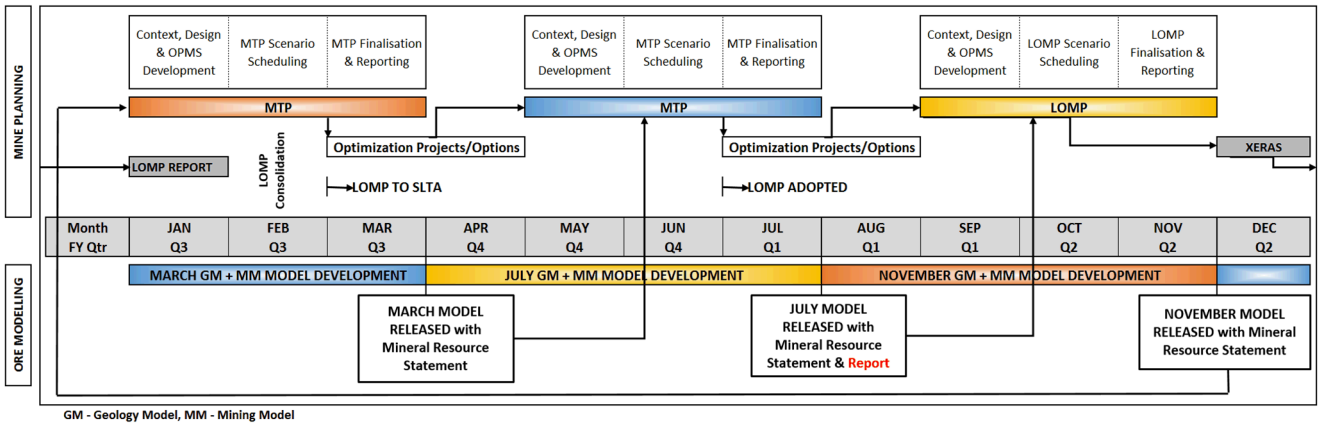

Figure 4: Mine Planning Process Flow

The use of industry standard Mine Planning Software, RPM's Open Pit Metal Solution (OPMS), enables the Mine Planning team to run multiple iterations of the mine plan for a large volume of data, using a combination of different inputs and schedule parameters. The impact of these different input parameters on the mine physicals and ultimately costs is then assessed using RPM's XERAS cost modelling software. As per the budgeting process, the total diesel requirement for mining equipment is calculated by applying an average fuel burn rate to the scheduled engine hours.

The fuel burn assumption for the haulage fleet is based on a combination of:

- OEM fuel burn guidelines,
- benchmark data from other large iron ore projects utilising the same trucks; and
- fuel usage estimates from haul cycle simulation software. As actual performance data becomes available, the fuel burn assumptions are compared and validated. If required, these assumptions are adjusted so that they better reflect operating conditions and expected future performance.

The haulage fleet (comprising largely of CAT 793 haul trucks) is the largest consumer of diesel and therefore is of key focus in forecasts. The 2017 data for CAT 793 fuel burn show averages of around 130L/hour. This is lower than the burn rate projected for FY 2019 due to:

- Current operating inefficiencies. Trucks are currently spending more time at idle than expected (low engine load factor) and therefore reducing the average fuel burn rates. Work is currently being undertaken to improve these inefficiencies and this is expected to be rectified by FY2019.
- In FY 2018-2019, RHH are also progressing into deeper parts of the deposit which in turn will increase the proportion of haulage up ramps loaded (high engine load factor).

The Caterpillar performance handbook states a burn rate of 145-192 L/hour for 30-40% engine load factor (medium operating conditions). Therefore, fuel burn assumptions show a step increase from current actual burn rate up to the 152-154 L/hour assumption used for FY2018-19 to take into account the above factors.

The haulage is modelled using RPM's HaulNet software, which is part of the OPMS suite. This uses manufacturer equipment specifications to determine travel times for every scheduled source and destination combination. This gives an indication of truck requirements for each schedule. The software also gives an

estimation of the diesel usage for the truck fleet, based on fuel burn curves which are input into the haulage model. The fuel requirements from HaulNet are used to verify the average rates used in the cost model.

All inputs and assumptions are verified through daily, weekly and monthly reconciliations and revised as required for each planning cycle.

6.1.2 Budget

The Mine Planning team under Technical Services is accountable for the delivery of physicals from the LOMP for input into the cost model. The Finance team is accountable for the preparation of the Budget, with support from individual business areas who provide operational budgets and supporting data.

In support of the budget development and on an ongoing basis, Roy Hill will use the forecast updates (forward looking) and production reconciliations (backward looking) to check that the short-term plan is aligned with the delivery of the LOMP.

A short-term plan is prepared for the one-year period beyond the current financial year in monthly increments. This is part of the annual life of mine budgeting process. All material assumptions affecting the budget are formally documented, including the financial impact over the life of mine period, and presented for review and approval by the Budget Review Committee (comprising the Chief Executive Officer, Chief Operating Officer and Chief Financial Officer).

The budget will be approved by the Budget Review Committee members once they are satisfied that the overall costs are reasonable and in line with the previous LOMP that was submitted and approved by the Senior Lender's Technical Agent (SLTA).

6.1.3 Assumptions

Key assumptions applied during the budget process relating to production and emissions data are as follows.

- For production budget purposes, Roy Hill is ultimately limited to the shipping capacity of 55 million tonnes per annum of iron ore. Operations budgets will be driven by the ramp-up activity to reach and maintain this capacity.
- The Budget Process Manual stipulates that "…[fuel] is budgeted by using fuel burn rates multiplied by equipment hours multiplied by the fuel price…" (page 17 of 98).
- Roy Hill has historically used fuel burn rates based on original equipment manufacturer (OEM) data. As activity levels have increased and more data on actual fuel burn rates has been collated, any deviation from the OEM data has been reflected in budgets.
- The equipment hours are derived by calculations detailing the mining activity to be undertaken, the total amount of material to be moved and the capacity of each relevant piece of equipment.
- Data for fuel burn rates and vehicle utilisation is collated on an ongoing basis and are formally reported monthly (by vehicle type). A review of the actual burn rates is compared to plan as well as analysis of diesel cost variances by price and quantity.

6.1.4 Review and Reconciliation

Daily, weekly and monthly production reconciliations are performed by operations to check assumptions and confirm ongoing compliance to the mine plan.

Monthly management reports are generated by Finance (from SAP) and any material variance against budget requires review and comment by the relevant budget holder. These comments, along with any relevant supporting analysis, are reported to the Leadership Team on a monthly basis.

6.2 Forecast Production and Emissions Intensity Variables

6.2.1 Production Variables

Roy Hill exports both a lump and fines iron ore product, however as the processing plant is grid connected, no additional emissions are created as a result of additional processing for either product. Therefore, both lump and fines are considered to constitute one production variable, being iron ore production, for the purpose of the application (CER-NGER-010). This production variable has been determined in accordance with the definitions listed in Part 1, section 4 of the Rules.

6.2.2 Forecast Emissions Calculation

Analysis of NGERs data for the mine facility to date suggest that 99.4% of Scope 1 emissions result from combustion of diesel for stationary and transport uses. As discussed in Section 6.1.1 modelling software is used as part of the budget process to forecast the amount of diesel required for operations at the mine. The equipment purpose has been identified as either for stationary or transport use in alignment with the *National Greenhouse and Energy Reporting (Measurement) Determination 2008* (Determination).

The number of tonnes of CO_2-e emitted per litre of diesel has been calculated for both stationary and transport combustion using the *National Greenhouse Accounts* methodology (Method 1) as published in the *National Inventory Report*. Emissions are estimated for individual fuel types by multiplying a (physical) quantity of fuel combusted by a fuel-specific energy content factor and a fuel-specific emission factor for each relevant greenhouse gas (in this case, carbon dioxide, methane and nitrous oxide). A factor of 99.4% is applied to the calculated total to ensure emissions from sources other than diesel combustion are considered.

The formula for calculation of emissions is as follows:

Formula

$$E_{ij} = \frac{Q_i \times EC_j \times EF_{ijoxec}}{1000}$$

Where;

Eij = Emissions of gas (tonnes CO_2-e)

Qi = Quantity of fuel (kL)

ECi = Energy content factor of fuel (GJ/kL)

EFijoxec = Emission factor for each gas (kg CO_2e/GJ)

For the purposes of this application, applying the formula above, the Roy Hill Mine Facility FY2018-19 forecast emissions are calculated as follows:

Roy Hill Mine Facility FY2018-19

Quantity of fuel – Stationary = 140,942 kL

Quantity of fuel – Transport =825 kL

Energy content factor of fuel (as per the Determination) = 38.6 GJ/kL

Emission Factor for each gas Stationary (as per the Determination) = CO_2 - 69.9, CH_4 - 0.1, N_2O - 0.2

Emission Factor for each gas Transport (as per the Determination) = CO_2 - 69.9, CH_4 - 0.1, N_2O - 0.5

Stationary Emission = (140,942 x 38.6 x (69.9+0.1+0.2)) / 1,000 =381,914 tonnes CO_2-e

Transport Emissions = (825 x 38.6 x (69.9+0.1+0.5)) / 1,000 = 2,246 tonnes CO_2-e

Total Emissions by diesel combustion = 384,160 tonnes CO_2-e

Diesel as Proportion of Total Emissions = 99.4%

Total forecast emissions = 384,160 / 99.4% = 386,581 tonnes CO_2-e

6.2.3 Emissions Intensity Calculation

The Emission intensity has been determined based on the quantity of diesel fuel (actual usage for previous years, or forecast usage for future years) for the production of iron ore.

The formula for calculation of emissions intensity is as follows:

Formula

Emissions intensity = A / B

Where;

A = Total direct emissions (tonnes CO_2-e)

B = Production of relevant product (t)

For the purposes of this application, applying the formula above, the Roy Hill Mine Facility FY2018-19 emissions intensity is calculated as follows:

Roy Hill Mine Facility

Forecast covered emissions FY2018-19 = 386,581 tonnes CO_2-e

Forecast Iron Ore Production FY2018-19 = 54,937,893 tonnes

Emissions Intensity = 386,581 / 54,937,893

Emissions Intensity = 0.00704 tonnes CO_2-e/tonne

Table 4 and Figure 5 shows historical and forecast emissions intensity variables for the Roy Hill mine facility. Data from FY2016-17 to FY2018-19 shows the emissions intensity increases relative to the ramp up of operations. The peak Emissions Intensity occurring in the financial year 2015-16 is attributed to a large diesel consumption for project earthworks and construction, with a comparatively low ore production as the processing plant was undergoing commissioning during this period.

Table 4: Emissions Intensity variables

FY Period	Production Variable	Production (t)	Emissions (tonnes CO_2-e)	Intensity (tonnes CO_2-e / t)
FY 2014 - 15	Iron Ore	No production - mine under construction	-	-
FY 2015 - 16	Iron Ore	10,228,366	85,742	0.00838
FY 2016 - 17	Iron Ore	33,456,712	191,029	0.00571
FY 2017 - 18	Iron Ore	54,859,672	379,965	0.00693
FY 2018 - 19	Iron Ore	54,937,893	386,581	0.00704

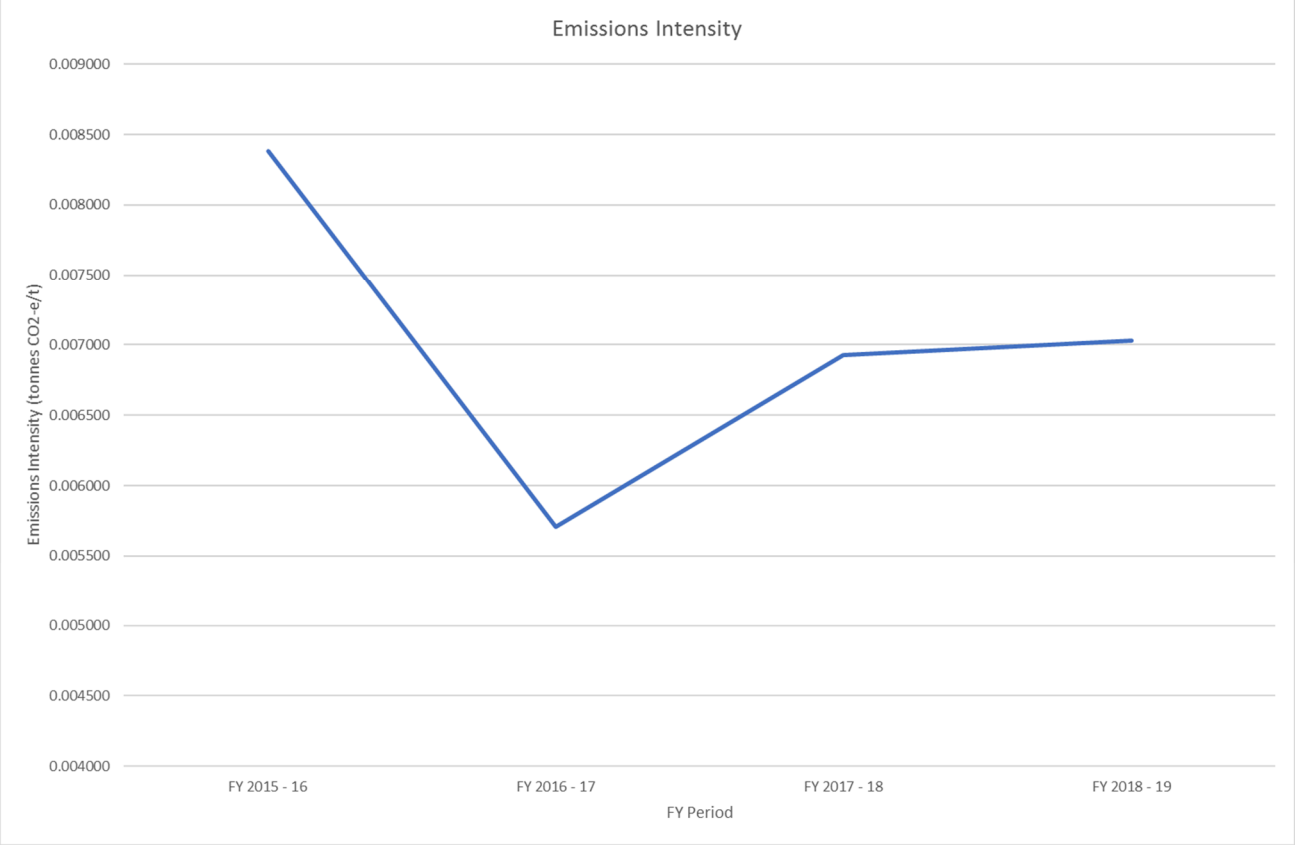

Figure 5: Emissions Intensity variables

It is not expected that the Roy Hill mine facility would exceed the threshold of 25,000MWH of electricity generated as defined in section 4 of the Rules.

The Emission intensity calculation has been derived as required under section 27 of the Rules. The criteria for developing this emissions intensity is outlined in Table 5.

Table 5: Emissions-intensity Calculation Criteria

Safeguard Mechanism Rule 2015	Requirement	Compliance
Section 6 (2)	Only covered emissions are included in the calculation.	Compliant
Section 6 (3)	If there is only one production variable—the emissions intensity of the production variable is calculated by dividing the total covered emissions of the facility by the production variable.	Emissions intensity calculation is covered below.
Section 6 (4)	If there are 2 or more production variables—the total covered emissions of the facility are apportioned between each production variable and then the emissions apportioned to each production variable are divided by that production variable.	There is only one production variable as lump and fines ore is grouped as one as outlined in Section 6.2.
Section 6 (5)	The emissions intensity is expressed in t CO_2-e per unit of the production variable.	The emissions intensity is expressed in tonnes CO_2-e per unit of the production variable. – see below.
Section 6 (6)	If a greenhouse gas other than carbon dioxide has contributed, or is reasonably likely to contribute, more than 1% of the expected covered emissions in the financial year being considered for the purpose of making of a calculated-emissions baseline determination—the emissions intensity of that gas in t CO_2-e per unit of each production variable must be separately identified	There is no other greenhouse gas likely to contribute more than 1%.
Section 6 (7)	The calculation must measure and apportion covered emissions in a manner that is consistent with the NGER (Measurement) Determination.	Calculations have been performed in accordance with the NGER (Measurement) Determination.
Section 6 (8)	The emissions intensity of each production variable must fairly represent the actual emissions attributable to the production variable.	Only one product variable is covered by this application.
Principles		
Section 6 (9)	If a covered emissions source overlaps 2 or more production variables—emissions from that source are apportioned between the variables so that the sum of the covered emissions apportioned to each variable in: (a) if production variables are being identified for a calculated-emissions baseline determination—each of the first 3 years of that baseline determination; and (b) if production variables are being identified for a variation of a baseline determination under subsection 51(2) and the facility is not a benchmark facility—both the financial year for which the baseline emissions number is to be varied and the most recent baseline intensity comparison year; should be no more than 5% greater than the total covered emissions, or expected covered emissions, from that source during each year.	N/A Roy hill has only one product variable.
Section 6 (10)	The method used to calculate the emissions intensity should be consistent with the method used in any previous successful application for a baseline determination or variation of a baseline determination relating to the same facility.	N/A No previous applications have been made.
Section 6 (11)	The apportionment of covered emissions to individual production variables should be free of bias that may lead to an overestimate of covered emissions in:	Only one product variable is covered in this application.

Safeguard Mechanism Rule 2015	Requirement	Compliance
	(a) if production variables are being identified for a calculated-emissions baseline determination— the period to be covered by the baseline determination; and (b) if production variables are being identified for a variation of a baseline determination under subsection 51(2) and the facility is not a benchmark facility—the most recent baseline intensity comparison year; due to changes in the relative mix of production variables.	

6.2.4 Emissions

Roy Hill Holdings Pty Ltd commenced reporting under Section 19 of the NGER Act in 2012-13. Table 6 shows the Scope 1 covered emissions for Roy Hill Holdings Pty Ltd Mine Facility as reported and adjusted for Global Warming Potentials.

Table 6: Historical scope 1 covered emissions

	Scope 1 (Tonnes CO_2-e) adjusted for GWP
	Roy Hill Mine
2012-13	15,181
2013-14	40,339
2014-15	118,741
2015-16	86,369

7 Relevant earlier estimates of production and/or GHG emissions

An estimate of GHG emissions relating to the mine facility was assessed as part of Roy Hills Stage 1 Public Environmental Review (PER) completed in June 2009.

Estimated annual scope 1 and scope 2 GHG emissions were calculated using Method 1 outlined by the *National Greenhouse and Energy Reporting (Measurement) Technique Guidelines* 2008 v1.0. Emission factors were based on the default values from the Department of Climate Change's National Greenhouse Accounts (NGA) Factors (January 2008).

The estimated average annual scope 1 emissions from the PER are detailed in Table 7. The financial year 2018-19 covered by this application is represented by Period 2. The 2009 report estimates an annual average of 243,527 tonnes CO_2-e on for scope 1 fuel consumption emissions for Period 2. This is significantly less than the current forecast emissions for the same period for the following reasons;

- Increased knowledge of the orebody;
- Increased knowledge of fuel burn / burn rates of machinery;
- A significant change to the ramp-up of ore production; and
- Limited information specific to Roy Hill annual average fuel consumption was available in 2009.

Table 7: Estimated average annual greenhouse gas emissions (2009)

Activity	Average annual scope 1 and 2 GHG emissions tonnes CO_2-e per year				
	Period 1 Years 1 to 3	Period 2 Years 4 to 8	Period 3 Years 9 to 14	Period 4 Years 15 to 17	Total
Scope 1 Emissions					
Mobile Equipment	164,778	235,089	323,475	311,641	267,386
Blasting	2,296	3,305	4,371	4,037	3,632
Waste and Waste Water	40	48	55	54	50
Vegetation Clearing	5,095	5,085	5,089	5,095	5,090
Total Scope 1	**172,209**	**243,527**	**332,990**	**320,827**	**276,158**

8 Greenhouse Gas Reduction

Roy Hill is undertaking the following initiatives to reduce greenhouse gas emissions:

- Where possible, Roy Hill has transferred power supply to infrastructure from diesel powered to gas powered;
- Mine plan developed to ensure short hauls are undertaken where possible to limit wear and tear on equipment and reduce diesel consumption; and
- Trial of a diesel fuel additive which may result in a number of efficiencies, including but not limited to, a potential reduction in fuel consumption.

9 Application Process

This document forms part of a calculated emission baseline application made for the Roy Hill Mine facility to meet the new facility criteria test.

This application includes the following:

- application form (CER-NGER-010);
- forecast production and diesel consumption data;
- information required under section 27 of the Rules; and
- independent audit report conducted by KPMG that complies with section 28 of the Rules providing assurance of the forecast production and emissions intensity and that the initial calculated baseline criteria have been met.

10 Roles and Responsibilities

Table 8 provides an overview of the roles and responsibilities relating to preparing the application (CER- NGER-010), including those roles responsible for provision of data relating to the application.

Table 8: Roles and Responsibilities relevant to Safeguard Calculated baseline application

Role	Responsibilities
Manager, Environment	Review of application form
Planner Demand Chain	Preparation and compilation of forecast production data
Specialist, Operational Reporting	Recording of production data
Superintendent Environmental Compliance	Completion of application for Calculated-emissions baseline
Superintendent Hydrocarbons	Recording of diesel usage data
Superintendent, Mine Planning	Preparation and compilation of forecast diesel usage data

11 Abbreviations

Abbreviation	Definition
CER	Clean Energy Regulator
EERS	Emissions and Energy Reporting Scheme
HPPL	Hancock Prospecting Pty Ltd
LOMP	Life of Mine Plan
Mtpa	Million tonnes per annum
NGER	National Greenhouse and Energy Reporting
OPMS	RPM's Open Pit Metal Solution
PER	Public Environmental Review
RHH	Roy Hill Holdings Pty Ltd
ROC	Remote Operations Centre
SLTA	Senior Lender's Technical Agent

12 Definitions

Term	Definition
CRU	The organisation that specialise in analysing and reporting on commodities.
Facilities	Roy Hill Mine, Rail, Port and ROC facilities
the Rules	National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015