Building 58, Castle Works, East Moors Road
CARDIFF CF24 5NN
Tel: 029 2035 1800
Fax: 029 2035 1801

31st January 2019

Dr Gareth Richards
Natural Resources Wales
Rivers House
St Mellons Business Park
St Mellons
CARDIFF
CF3 0EY

Our Ref: W:\Environmental\IPPC\Environment Agency Reporting\Permit Reporting\Rod & Bar Mill\EPRBV0759IC _Section 2 7_energy efficiency 2019.doc

Dear Dr Richards,

RE: Environmental Permitting Regulation (EPR) BV0759IC Rod & Bar Mill Permit Condition 2.7 – Energy Management

1.0 Introduction

CELSA Manufacturing UK Ltd is regulated under Environmental Permitting Regulations (EPR), formerly the Pollution Prevention and Control (England and Wales) Regulations 2000 to operate an installation which carries out activities as defined within schedule 1, part 2, chapter 2, section 2.1 A(1)(c). As such the company is permitted in accordance to the terms and conditions of EPR permit BV0759IC.

Section 2.7.2 of this permit states that:

'The Operator shall maintain and update annually an energy management system which shall include, in particular, the monitoring of energy flows and targeting of areas for improving energy efficiency.'

2.0 Current Energy Management System

CELSA's manage energy use through their ISO 14001 Environmental Management System and Greenhouse Gas Emissions Permit.

2.1 Energy Usage

Prime energy at the Rod & Bar Mill (RBM) is obtained from the following sources;

- Electricity; and
- Natural gas.

Electricity is supplied from the National Grid. Electricity usage is measured on a daily basis and any anomalies are investigated. The main uses of electricity at the RBM is the mill equipment, used for the main mill drives, water compressed air and hydraulic systems and ancillary mill operation such as fans, product transport and packaging.

The ancillary uses of energy in the RBM comprise of fans, pumps, compressors, lighting and recirculation pumps used to transfer cooling water around the water systems. Energy efficient motors are purchased as standard. Control of most motors is automatic. Most lighting is sodium.

The main use of natural gas is the re-heat furnace which has been operational at the site since 1976. The re-heat furnace has been considerably retrofitted to operate efficiently.

The RBM energy consumption is detailed in table 1 below.

Energy Source	Delivered (MWh)	Primary (MWh)	% of Total
Electricity	75,142	180,341	30
Gas (Natural)	249,221		70

Table 1: Energy Consumption 2018

Two notable changes have been made to the RBM installation since the original permit application, in late 2006 the spooler line was added to the RBM and in December 2008 the replacement Tempcore cooling process was added to the installation.

2.2 Energy Efficiency Plan

The RBM energy objective is to minimise the use of energy by using energy efficient products, reviewing energy usage regularly and identifying areas or practices that would result in energy efficiency. In addition, operating and maintenance procedures are designed to ensure efficient operation of motor, fans and heat exchangers. The following measures undertaken are representative of BAT requirements:

- Optimisation of warm-up procedures for the furnace (super-hot charging)
- Combustion air recuperation using the furnace off-gases, new recuperator was installed in the May 2018 shutdown;
- Delay strategy to optimise furnace loading;
- Maintenance of high temperatures in the re-heat furnace during short-term periods of no operation;
- On-line CO monitor to optimisation of furnace chemistry stoichiometry;
- Use of high efficiency motors;
- Hydraulic pumps have accumulator unloading in that the pumps are only loaded when flow is demanded;

- Water pumps are primarily under float control in that they only run to meet the demands of the process;
- Use of variable speed drives on water pumps;
- The RBM requirements for compressed air, consists of four rotary screw compressors (only 3 in operation at any one time) supplying the process demands through a ring main distribution system. Compressor usage is optimised to deliver on demand. The use of compressed air is monitored and any anomalies investigated. Optimal efficiency is achieved through contract maintenance;
- Use of energy efficient (LED) lighting where feasible;
- Lubrication of the rolling stands to minimise energy losses through friction; and maintenance of refractories to minimise insulation loss;
- In order to maximise efficiency it is necessary to manage the sequencing of the whole operation and this aspect is fundamental to the effective use of energy. Hourly, shift, daily and weekly use of process energy is monitored and any deviations from expectation are investigated a corrected. Operating techniques are continually under review in order to identify energy savings.
- The principle fans in use in the process are:
    - Furnace combustion fan;
    - Water cooling tower forced draft fans;
    - Mill motor cooling fans; and
    - 'Stelmor' process cooling fans.

  The furnace fans are optimised in use as they are fully regulating as part of the furnace operational requirement. The water cooling fans are optimised by closed loop feedback of water temperature so that it only runs when required to reduce the water temperature. The mill motor cooling fans only operate on demand to cool the motors. The 'Stelmor' fans are process route dependant and run on demand only.

3.0 Energy Management System Review

Environmental Management System Procedure ECP31 Management of Energy Use detail the data collection, collation and review activities required to manage CELSA's significant energy use. This enables CELSA Manufacturing (UK) Ltd to meet their Greenhouse Gas Emissions Trading Permit and ISO14001 system.

3.1 Energy Efficiency Objectives and Targets

Energy efficiency plans have been in place for a number of years, as part of the CELSA's main business strategy and current Environmental Management System (EMS) Objectives & Targets (O&T). These O&T's have associated action plans for energy reductions. These action plans are dynamic documents which are updated with new actions when areas for energy efficiency are identified.

To support energy O&T's, there is an extensive monitoring regime at the RBM for all energy sources with reporting on shift, day, week, month and annual basis. Daily, weekly and monthly meetings are held to discuss plant operation and performance, with energy usage part of the meeting agenda.

The following information summarises the energy specific EMS Objectives and Targets for 2019.

3.1.1 Consume no greater than 335 kWh/tonne of gas per month

A number of energy efficiency measures continued in 2018, such as hot charging of billets but unfortunately, the overall gas consumption totalled to 367 kWh/tonne.

A new gas consumption target of 335 kWh/tonne has been set for 2019.

3.1.2 Consume no greater than 100 kWh/tonne of electricity per month

The RBM consumed on average 133 kWh/tonne of electricity per month and therefore exceeded the target set. Electricity is tracked on a daily basis and optimising its use is a key KPI for all RBM employees.

A further electricity reduction target has been set for 2019.

3.2 Electricity & Gas Action Plan 2019

The electricity & gas reduction action plans to date for 2019 include the following:

- Optimise current use of hot charging. Improve RBM flexibility to change production plan to adapt it to the billets being delivered.
- Review improvement opportunities identified in Energy Saving Opportunities Scheme with a view to assessing feasibility of implementation;
- Improve sealing. Renew all the gas water sealing with stainless steel ones, refurbish scaling doors and carry out regular thermal images surveys to find insulation problems. Improve air ducts insulation.
- Regulation. Fit orifice plates in gas lines and balance all the burners in the furnace to get a perfect air-gas ratio. Measure the scale formation to reach an optimum air-gas ratio.
- Strategy. Continue reducing the set points in the preheating zones.
- Shutdowns: find ideal strategy scenario for furnace management during 24 hour shutdown, use heating ramps for standard lights-up.
- Billets cooling. Reduce the amount of water in contact with the billet in the roughing mill to reduce the furnace set point.

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- Compressed air. Reduce air leaks and isolate unused circuits depending of the mill rolling. Change pneumatic circuits for hydraulic circuits.
- Workshops. Find places with high consumption and put in place procedures to reduce these consumptions.
- Lighting: Set procedures to reduce lighting when not needed and investigate possibility of installing low energy LED lighting in warehouses.
- High emissivity coating of the refractory lining of the furnace reflects heat back into the furnace and thus reduces heat loss.

It must be noted that the action plans are subject to change if actions are deemed impractical to implement.

CELSA have reviewed the existing RBM Energy Management System as stated in Section 2.0 above and the current actions in section 3.0 reflect current energy management system. Two notable changes have been made to the RBM installation since the original permit application, in late 2006 the spooler line was added to the RBM and in December 2008 the replacement Tempcore cooling process was added to the installation. CELSA deem that this energy management system review is up to date with current procedures and practices at the Rod & Bar Mill.

Should you require any further information or should have any further questions arising from the above, please do not hesitate to contact me.

Yours sincerely

Gabriella Nizam
Environmental Advisor