

Report

Subject	Performance Report 2022
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Date	19 January 2023
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Version	1.0
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1- Background

This report has been produced by The Royal Mint in accordance with the Environmental Permit condition 4.4.2, which requires the following:

A report or reports on the performance of the activities over the previous year shall be submitted to Environment Agency (now Natural Resources Wales) by 31 January (or another date agreed in writing by the Environment Agency) each year. The report(s) shall include as a minimum:

- (a) a review of the results of the monitoring and assessment carried out in accordance with the permit including an interpretive review of that data.
- (b) the annual production/ treatment data set out in schedule 4 table S4.2: and
- (c) the performance parameters set out in schedule 4 table S4.3 using the forms specified in table S4.4 of that schedule.

2- Introduction

The Royal Mint's performance in 2022 continues in the context of digital payments increasing in the UK and the decline in demand for new coin in other countries. When people opt for different payment options, currency stays in circulation for longer, and reduces the need to mint new coins. In light of this, The Royal Mint has seen decline in production tonnages of circulating coins during the year.

This decline in circulating coins production tonnage has impacted on the operational efficiency of the plant / equipment which use significant amounts of energy and water in its process. In this context The Royal Mint, when and where it is possible, identifies options to reduce energy consumption by undertaking plant and equipment shutdowns.

Also, during the year, the commissioning of the Direct Brass Plating line started. The commissioning of this plant has resulted in the turning off of non-essential equipment associated with the operation which include two copper plating lines and a zinc plating line. Towards the end of 2022, the plating solution associated with the two copper plating lines and the zinc plating line was removed for disposal, which allowed further equipment isolation.

However, the plating lines' operation carry a significant electrical base loading:

- The Nickel-Plating lines accounted for approximately 37% of the energy consumed on site during 2022.
- The Copper Plating Lines accounted for approximately 7% of the energy consumed on site during 2022.
- The Zinc Plating line accounted for approximately 3% of the energy consumed on site during 2022.
- The installation and commissioning for the new Brass Plating line accounted for approximately 12% of the energy consumed on site during 2022.

Over 69% of the gas consumed on site is used in the annealing and plating operations.

3- Monitoring and Assessment

3.1 Emissions to Air

The Royal Mint's Environmental Permit against which this report has been produced requires that emissions to air at emission point A14 are monitored and reported on an annual basis.

In 2021 The Royal Mint decommissioned and removed the casting lines along with the stack associated with A14 through July and August 2021.

A variation to The Royal Mint's Environmental Permit, which has acknowledged the removal of emission point A14 has been produced by NRW and was issued to The Royal Mint on 19th January 2023.

3.2 Emissions to Water

3.2.1 W1 One Pass Cooling Water

The Royal Mint's Environmental Permit requires that emission of one pass cooling water, to the river Ely from the annealing furnaces and surface water is monitored by spot sample / 24-hour proportional sample monthly for the following parameters:

- Free Chlorine - limit 0.1 mg/l
- Suspended solids – limit 50 mg/l
- Temperature – limit 30 °C

The measurement of free chlorine and temperature are undertaken on site by The Royal Mint's analytical team.

The measurement of suspended solids is undertaken by an offsite UKAS and ISO 17025 accredited laboratory - Decus Research Limited based in Ammanford.

On the 19th of December The Royal Mint reported to NRW an exceedance of the free chlorine limit of 0.4 ppm at 09:00 and 0.8 ppm at 11:00. The flow was diverted away from river to sewer to prevent further exceedance and the process was investigated to identify the source of the contamination. No process issues were identified. However, the Royal Mint does undertake random sampling of the incoming river water and since the 31st of July 2022 there have been occurrences where the incoming level of chlorine has been greatly in excess of the 0.1 limit for discharge. Previously, this has not impacted on the discharge level but it is believed on this occasion this led to the exceedance.

As a control, the incoming river water chlorine levels were monitored during the 19th of December and at 09:00 on the 20th of December, when the incoming river water level for Chlorine was measured at 0.04 ppm, the discharge flow was reverted back to river.

The volume of one pass water, discharged to river, reduced from 93,738 m³ in 2021 to 89,582 m³ in 2022.

3.2.2 W2, W3, W5, W6, W7 Uncontaminated Surface Water from Roadways and Roofs

The Royal Mint's Environmental Permit requires that emissions of surface water from roadways and roofs to the Nant-Mychudd and river Ely are monitored by spot sample weekly for the presence of oil to confirm that none is present.

Drain checks are undertaken by The Royal Mint's security team weekly to identify if any oils are present. No oil was identified during the monitoring undertaken in 2022.

Independent of the above monitoring The Royal Mint undertook monitoring on the Nant-Myhydd on 22nd June and 16th November 2022. The reports on the monitoring previously supplied to NRW demonstrates metal concentration decreasing in over time; however occasional exceedances of the Environmental Quality Standard values for copper and zinc have been recorded over the whole monitoring period of 12 years.

3.3 Emissions to Sewer

The Royal Mint's Environmental Permit requires that emissions to sewer are monitored by spot sample / hourly average monthly / continuously for the following parameters:

- Free Cyanide – limit 0.2 mg/l
- Copper and its compounds – limit 1.0 mg/l
- pH – limits: minimum 6 - maximum 11

The effluent discharge occurs by a batch process, effluent discharge tanks are filled, sampled and tested by the effluent plant operators at various points during filling to ensure compliance with the discharge limits. The tank is also sampled prior to discharge by the effluent plant operators to ensure compliance with the discharge limits.

If the tank is found outside defined limits, at any point, it is transferred to a holding tank to rework.

During discharge, random samples are also taken by The Royal Mint's analytical team to ensure compliance.

The results that are reported quarterly to NRW are from samples that are analysed by Decus Research Limited.

An audit of Decus Research Limited by The Royal Mint was undertaken on 7th July 2022. This identified the following:

Decus Research Limited is a UKAS accredited testing laboratory, their registration number is 4303.

As Decus Research Limited do does not hold accreditation for cyanide, analysis this is undertaken by:

Eurofins Chemtest Ltd. UKAS Accreditation number for this laboratory group is 2183.

On 16th May, The Royal Mint reported an exceedance of the 0.2 mg/l limit for discharge of free Cyanide to sewer for a samples collected on 20th April at 01:00. The reported level was 0.21 mg/l although the total Cyanide for the same sample was reported as 1.9 mg/l.

Following investigation it was accepted that this exceedance was within the limits of the measurement of uncertainty.

Discharges to sewer were slightly reduced during 2022, in 2021 it was 67,182 m³ was discharged and in 2022 it was 45,431 m³.

3.4 Performanace Parameters

3.4.1 Production Tonnage

As previously stated, there continues to be a decline in circulating coin production. During 2022, the tonnage produced was 9,192 tonnes against 11,778 in 2021.

3.4.2 Mains Water Use

There was a significant increase in the volume of mains water to site during the year. Water usage was up from 84,666m³ in 2021 to 153,107m³ in 2022. There was a known increase in usage but this was significantly impacted by two occurrences during the year which were:

- There was a leak on site that took some time to identify and repair. This caused a larger volume of water (approximately 250% up on the comparable period in 2021) being recorded to site during the months of February to April
- A leak on the abstracted river water system (see below) required a topping up process using mains water, to maintain the required system volumes, this accounted for an increase in mains water usage of approximately 60% up on the comparable period of 2021.

3.4.3 Water Abstracted from River

The Royal Mint continues to look at opportunities to reduce the amount of water it abstracts from the river Ely for its current processes.

There was a reduction in the overall volume of water abstracted during 2022 174,061m³ down from 205,884m³ abstracted in 2021. It is highly likely that this reduction would have been greater and below the specific usage per tonne if it were not for a leak being identified at the end of October. The excavation and repair took a number of weeks to complete due to its location on site and the depth of pipework.

3.4.4 Total Water Usage

The reasons for increases in total water use are in part due to leaks that have occurred due to the aging infrastructure on site, both in the river and mains water systems. The Royal Mint endeavours to undertake rapid proactive and corrective measures to ensure losses from leaks are eliminated as soon as possible.

3.4.5 Electricity Use

The total energy use during 2022 (26,145,810 kWh) was greater than 2021 (24,306,500 kWh) this was in part due to installation and commissioning of aspects of the Direct Brass line as well as increased production within the commemorative coin business unit.

3.4.6 Energy Sources

During 2022 The Royal Mint changed the sources of electricity supply to the site. For a number of years, the mix of electrical energy was made up from grid supplied electricity and locally generated energy via an “offsite” wind turbine and small solar arrays on a few of The Royal Mint buildings.

In June 2022, there was a change in energy generation from the methods identified above to include a temporary combined heat and power (CHP) generator. The operation of the temporary plant followed the issue of an Environmental Permit to operate a Medium Combustion Plant by Infinite Renewables as a directly associated activity to The Royal Mint’s Environmental Permit .

Following issuing of the Infinite Environmental Permit and during 2022, construction of the long-term CHP took place which is expected to be operational at the end of the first quarter of 2023 when the temporary unit will be decommissioned.

Additionally, electricity from an “offsite” solar farm came online between the 14th and 16th December 2022.

3.4.7 Gas Use

The volume of natural gas used by the site (excluding that supplied to the Medium Combustion Plant) reduced during the year, it was 16,987,388 Kwh compared to 20,170,215 Kwh in 2021. This reduction was in part due to the lower volumes of material passing through the annealing furnaces. However, despite this reduction the specific usage in KWh/tonne was higher as the annealing furnaces cannot be turned off completely when not in use, as sudden changes in temperature can cause damage to the furnace and linings.

3.4.8 CO₂ / Final Product Tonnage

The Carbon Dioxide equivalent / tonne of circulatory coin increased in 2022 to 1,074.19 Kg CO_{2e} / tonne from 766.88 Kg CO_{2e} / tonne in 2021. Two factors contributed to this, one was the increased use of electricity on site and the other the use of CHP generated electricity, which is more carbon intensive than that of grid generated electricity.

3.4.9 Total Wastage / Final Product Tonnage

The Royal Mint continues to look at opportunities to improve right first-time production and reduce waste from the processes.

Although the waste produced per tonne of finished circulatory coin increased, there was an overall reduction in waste produced during 2022. The total waste produced during 2022 was 9032.8 tonnes against 9807.5 tonnes in 2021.

Changes of note include:

- An approximate reduction of 12.5% in the waste metal removed from site.
- Lower flows through The Royal Mint's Effluent Treatment Plant resulted in a reduction of approximately 18% in the filtercake waste produced by this plant.
- There was an increase in acid effluent removed for offsite disposal of approximately 16%, an increase of around 83 tonnes. This method of disposal has been chosen in order to meet The Royal Mint's trade effluent consent condition on sulphate levels.
- The Royal Mint's Mixed Municipal Waste stream including general and recycling waste (which is either recycled or goes to waste to energy) reduced by approximately 28% around 129 tonnes.
- There was a one-off disposal of redundant machine parts related to the former casting and rolling operation which accounted for an additional 211 tonnes of waste.
- The removal of plating solution from the cyanide and zinc plating processes accounted for 448 tonnes of material for disposal. In 2021 only 26 tonnes of a comparable material were disposed of.

The Royal Mint continues to pursue but has not been able to identify a recovery / recycle route for the effluent treatment plant filter cake waste stream. Since the closure of the previously used site in 2019, this waste stream has gone to landfill for disposal.

3.5 Reporting Forms

These will be supplied separately to this report.