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Subject	Performance Report 2023
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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 for 2023 continues in the context of digital payments increasing in the UK and the decline in demand for new coins 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 continued low production tonnages of circulating coins during the year.

To manage the decline in production tonnages and also with the coming online of the Direct Brass Plating line, The Royal Mint during 2023 started the process of decommissioning four plating line operations. For 2023 the decommissioning process included isolation of services and removal of solutions. Plant equipment removal is expected to commence during 2024.

The Royal Mint during 2023 started locating and commissioning equipment associated with the project of recovery of gold from printed circuit board waste. The amount of energy and other resources used in the commissioning process was not significant during 2023. It is considered that during 2024 this will become a significant energy use.

3- Monitoring and Assessment

3.1 Emissions to Air

The introduction of The Royal Mint's permit variation EPR/KP3135KV/V005 on 19th January 2023, which was brought about by the introduction of a Direct Brass plating line, introduced a requirement to monitor stacks A9 for Hydrogen Cyanide emissions and A10 for Sulphur Dioxide emissions on a monthly basis.

The monitoring of the stacks commenced 26th January and has commenced monthly in line with the Environmental permit requirements.

The average result for the 12 rounds of Hydrogen Cyanide monitoring, during 2023, was less than 0.81 mg/m³, the limit set for Hydrogen Cyanide is 5 mg/m³. The highest recorded single reading occurred in June 2023 where the level reported was 4.7 mg/m³. An investigation into this recorded level identified that more frequent testing and changes of the scrubber liquor was required. The subsequent levels were reported less than 0.078 mg/m³.

The average result for the 12 rounds of Sulphur Dioxide monitoring, during 2023, was less than 0.07 mg/m³, the limit set for Sulphur Dioxide is 0.6 mg/m³. The highest recorded single reading occurred in August 2023 where the level reported was 0.27 mg/m³.

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.

There were no exceedances of the above limits during the period, this was despite incoming water, as tested by The Royal Mint's analytical team, on occasions having a higher chlorine levels than permitted discharge limit.

The range of measured parameters during the year were:

- Free Chlorine - 0.02 to 0.07 mg/l
- Suspended solids – 1.5 to 6.4 mg/l
- Temperature – 11.2 to 20.4 °C

The volume of one pass water, discharged to river during 2023 was broadly compatible with 2022 i.e., 89,582 m³ was discharged in 2022 and 89,300 m³ in 2023.

The Royal Mint continues to review annealing furnace usage, the main source of the W1 discharged water, and endeavours to use furnaces that use closed system cooling rather than one pass water, wherever possible.

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-Mychydd 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 2023.

Independent of the above monitoring The Royal Mint undertook, via a third party, monitoring on the Nant-Mychydd on the 15th of November 2023. The reported findings show a decreasing trend relating to total petroleum hydrocarbons.

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 or possibly off-site treatment.

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.

The range of measured parameters during the year were:

- Free Cyanide – > 0.05 to 0.08 mg/l
- Copper and its compounds – 0.0071 to 0.124 mg/l
- pH – 8.8 to 9.7

Discharges to sewer were similar to 2022 i.e., they were 45,431 m³ in 2022 and in 2023 they were 45,373 m³.

It is not considered at this time that changes in upstream production during 2023 will result in any future reductions in the volumes discharged. Although The Royal Mint continues to investigate process changes that may reduce volumes in the future.

During 2023 Dwr Cymru Welsh Water requested that the limits of certain determinants within The Royal Mint's trade effluent discharge consent be varied. Following discussions, the finalised limits were introduced 18th November 2023. The revised limits are not expected to impact on the volume of solution discharged to sewer.

3.4 Performance Parameters

3.4.1 Production Tonnage

As previously stated, there continues to be a decline in circulating coin production. Although in 2023 there was a slight increase on the previous year's Production tonnage. In 2023, the tonnage produced was 11,271 tonnes against 9,192 in 2022.

3.4.2 Mains Water Use

There was a slight reduction in the volume of mains water used on The Royal Mint site in 2023. Water usage was down from 153,107 m³ in 2022 to 121,014 m³ in 2023. The reduction occurred against an increased volume of finished circulatory coin produced, which resulted in the mains water use per tonne reducing from 16.66 to 10.74 m³ / tonne. The variation in mains water volume per tonne would indicate a more efficient use of mains water on site than the slight reduction in volume and in part this can be attributed to no significant mains water leaks occurring during the year.

3.4.3 Water Abstracted from River

The Royal Mint has in place an abstraction licence WA/057/0031/002/R001 which permits abstraction of up to 657,000 m³ per year from the river Ely. In 2023 The Royal Mint abstracted 320,620 m³ which was a significant increase on the previous year's 174,061 m³. This increase is part to the increased volume of circulatory coin production but the majority is due to a leak on site, the approximate location on which was not identified until the Christmas break 2023. The identification of the exact location and the civil works to undertake the identification and repair of the leak are in development at the time of complying this report.

3.4.4 Total Water Usage

The total water usage on site increased from 327,168 to 441,634 m³ the main reason for this increase was due to river water system leak. Leaks are a recurring problem 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 2023 was 21,840,382 kWh which is less than in 2022 which was 26,145,810 kWh. This reduction was brought about by the isolation of plant and equipment associated with the 4 planting lines scheduled for decommissioning.

3.4.6 Electrical Energy Sources

During 2023 The Royal Mint continued the work started during 2022, which was to change the sources of energy supplied to site. The energy mix now comes from a number of sources that are made up of:

- **Grid Supplied Electricity**
This is energy supplied via contractual agreements with EDF.
A total of 10,385,606 kWh of electricity was taken from the grid in 2023.
- **Wind Generated Electricity**
In addition to the existing wind turbine that has supplied electricity to The Royal Mint, and been operational for a number of years, during 2023 an additional wind turbine was constructed that also supplies electricity to The Royal Mint site. This wind turbine became operational during July 2023.
A total of 1,165,280 kWh of electricity was supplied to site by the wind turbines.
- **Solar Generated Electricity**
As reported at the end of 2022 the “offsite” solar farm came online between the 14th and 16th December 2022 and has operated during the entirety of 2023.
A total of 2,008,668 kWh of solar generated electricity was supplied to the site.
- **Combined Heat and Power (CHP) Generated Electricity**
At the start of 2023 a temporary CHP plant was operational on The Royal Mint site operating under an Environmental Permit for a Medium Combustion Plant issued to Infinite Renewables and as a directly associated activity to The Royal Mint's Environmental Permit.
In April 2023 the permanent CHP plant came online and the temporary unit was decommissioned.
A total of 8,280,826 kWh of electricity was supplied by the CHP plant.

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 15,488,014 kWh compared to 16,987,388 kWh in 2022. This reduction was in part due to the starting of plant decommissioning as gas heating was used to provide heating of the plating solutions in the zinc and cyanide plants.

3.4.8 **Total raw material used.**

Total raw material has not been compared with previous years' data. For this reporting period it has identified coil use, anode plating material and blanks brought / bought in for striking.

With the decline in production is expected that this reporting year will have been less than material used on site in previous years.

3.4.9 **CO₂ / Final Product Tonnage**

The Carbon Dioxide equivalent / tonne of circulatory coin reduced in 2023 to 560.52 Kg CO_{2e} / tonne from 1,074.19 Kg CO_{2e} / tonne in 2022.

The change in the source of energy supply contributed to this change, as during the year just over 30% of the electrical energy came from sustainable sources (wind and solar).

Also, the introduction of the permanent CHP introduced a plant that had a lower carbon footprint per kWh than grid supplied electricity.

3.4.10 **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.

During the year The Royal Mint saw a reduction in the amount of waste produced and disposed of, in 2022 it was 9032.8 tonnes against 7756.9 tonnes in 2023. With the increase in volume / tonnage of Circulatory Coin Produced the waste per tonne of circulatory coin reduced from 0.983 to 0.688 Tonne of waste / Tonne of circulatory coin.

Changes of note include in the volume of waste generated was:

- An approximate reduction of 16% in the waste metal removed from site. This waste metal is mostly produced from reject coinage and the webbing remaining metal when the blanks have been punched out of the incoming coil / strip.
- The decommissioning of four plating lines resulted in lower flows through The Royal Mint's Effluent Treatment Plant, which in turn resulted in a reduction in the amount of filtercake produced.
The volume produced reduced from 1736.34 to 986.88 tonnes, which is likely not to be repeated during 2024 as during the commissioning of the ozone cyanide treatment plant, cyanide solutions were removed off site for disposal.
- The amount of acid effluent removed by tanker for offsite disposal, this being an occasional option chosen to meet The Royal Mint's trade effluent discharge consent's condition on sulphate levels, was broadly comparable with 2023.
In 2024 597 tonnes of solution was removed against 609 tonnes in 2023. 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 change in upstream processes i.e., reduced volume and the flows to the effluent treatment plant resulted in occasional failures to discharge to sewer, which required removal of solution by tanker for offsite disposal. This has occurred in previous years but in 2023 the volume was larger than in the previous year (494 tonnes in 2023 against 168 tonnes in 2022).

- The mixed municipal waste generated by the site increased during the year. The waste removed increased from 336 tonnes to 432 tonnes. This in part is attributed to removal of materials associated with the decommissioning and items becoming obsolete. The Royal Mint is expecting this stream will change during 2024 following implementation of the separated waste collections legislation.
- The Royal Mint in 2024 produced a new segregated effluent waste stream for offsite disposal. This waste stream is created from separation of upstream detergent flows in order to improve the efficiency of the effluent treatment's plant operation and reduce the risk of failing discharges. The volume of waste generated by this waste stream was 272 tonnes.
- With the decrease in volume of coiled material received to be rolled and blanked for coinage the amount of soluble oil waste generated declines. In 2022, 172 tonnes of waste were produced and this reduced to 105 tonnes during 2023.

3.5

Reporting Forms

These will be supplied separately to this report.